10-1-2008

MaineDOT Microstation & InRoads Procedures

Maine Department of Transportation

MaineDOT MicroStation & InRoads Procedures

TABLE OF CONTENTS

Chapter 1 General Procedures

This chapter offers an introduction to the MicroStation working environment you'll find at the Maine Department of Transportation. If you are new to MicroStation, you'll find some helpful references about tool locations and document management. If you have previously used MicroStation, you'll also find some helpful hints, since we have customized our user interface to increase productivity.

This manual is to be used in conjunction with the Bridge Plan Development Guide and the Highway Design Guide. Please refer to these other documents for standard plan package requirements.

HOW TO USE THE MANUAL

KEEPING YOUR MANUAL UP TO DATE

Users Responsibility

It is the MicroStation/InRoads user's responsibility to keep their manuals up-to-date. When an area of the manual has been modified, we will recommend replacing the whole chapter affected by the change. This may require replacing the Table of Contents also. The MaineDOT internet website will contain individual chapters available for downloading. We will be adjusting the dates of the chapters as they are revised and add a note as to what specifically was changed within the chapter(s).

We will be sending the users a pop-up message, via the "Message of the Day", indicating which chapter(s) has been modified.

Message of the Day

The "Message of the Day" is a Visual Basic program that we use to send important messages to MicroStation/InRoads users. If a message was sent to you, read it to see if it affects you. Please do the recommended action if any is required. Clicking *OK* will remove the message and will not display it again. If you do not have time to read the message, hit *Cancel* and the message will appear again when you enter MicroStation/InRoads. A typical message might ask you to run your Update Utility, let you know if a plotter is working or tell you that the Manual has been updated. Try to treat these messages as high importance as we wouldn't be sending them otherwise.

Website Location

The updated MicroStation/InRoads Manual and our configuration files for MicroStation and InRoads are available on the internet for both in-house employees and the consultant community. The address to the individual chapters of the manual is as follows: http://www.maine.gov/mdot/cadd-support/InRoads/InRoadstableofcontents.php . Check the date of your hard copy with the chapters on the internet. This is another way to find out if you need to update a chapter. Keeping your manual up-to-date will ensure that a reference to another portion of the manual is accurate.

Sending Requests via E-mail

A user can print out the new chapter(s) to a local printer or photocopier, however if you want it to have 3 hole reinforced paper, you will have to print it by other means. The MaineDOT reproduction room is also going to take requests from individual users or bulk request from Programs or Regions. We are providing a link to their general email account so you can tell them the chapter(s) that you wish to have printed, the type of stock to print it on (reinforced - three hole punch) and a distribution request. Email requests to Repro.Mdot@maine.gov .

USING THE TABLE OF CONTENTS AS A QUICK PUNCH LIST

We have had requests to make quick To-Do list for some of the Chapters. We have added a few here and there, but not throughout the entire manual. This doesn’t mean that you shouldn’t read and follow all directions. Once you get familiar with a process, we suggest that you use the Table of Contents as a quick punch list for any given chapter. In most cases, the important steps are outlined in the table. If a step is unclear, open to the page and read more thoroughly.

USING THE ON-LINE MANUAL

Overview
We have created a PDF document of the entire MicroStation/InRoads manual and have made it available for in-house and consultant use. Many people prefer hard copies of the manual, however the PDF document provides more functionality.

Opening from within MicroStation
The online manual can be activated from within MicroStation by clicking on the icon that looks like a book with a magnifying glass on it (Figure 1-1).

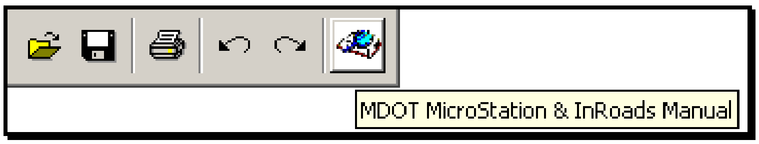


Figure 1-1: MicroStation/InRoads On-Line Manual Icon

This will kick off your PDF reader and open the manual. If you can foresee needing the manual for offline work, consider doing a “Save As…” and create a local copy on your PC/laptop.

Searching the On-line Manual
Like with most software, type **Ctrl+F,** click the binoculars or select **Edit>Find (on This Page)** and it will bring up the *Find* tool. Enter the topic you are searching for and Adobe will show you every occurrence of the word you are searching for, starting with the Table of Contents. Select the one that best fits your needs.

Following Cross References
In many places in the manual, we refer you to another topic for more information. With a hard copy, you have to browse to the chapter and page number. When using the on-line manual, you simply click the link to go to the page.

INTERNAL HELP PROGRAMS

Internal Help for MicroStation

Overview

As with most programs, MicroStation has an internal help program that is very useful and detailed. There are many options in using help. Selecting **Help** from the *main menu* bar with expose these options.

Contents

Help>Contents is similar to many Microsoft html Help products. It has a Contents, Index, Search and Favorites tabs.

Tool Index

This option opens a tool specific dialog and allows a user to search based on a tool selection. It still ultimately opens the larger help document but helps narrow the search.

Tool Tips

With this option checked on, hovering the pointer over a tool icon displays a tool tip, which is a yellow rectangle with text that provides the name of the tool.

Tracking

Turning on **Help>Tracking** will display help for whatever tool or view control you pick. This is a good option for new users because it will display all possible options for using the specific tool.

Internal Help for InRoads

Dialog Help

Most dialogs within InRoads have a **Help** button that provides help directly related to that specific dialog.

Contents

Help>Contents is similar to many Microsoft html Help products. It has a Contents, Index, Search and Favorites tabs.

Search for Help on

Allows a user to search the Help for key words.

Technical Support

This is available, but you must know the Select ID number, available through CADD Support. This is a last resort. Please contact CADD Support first to try and solve the issue.

Video Help

Many of the Help topics come with a video clip of the instructions that can be handy.

CADD Support Personnel

Phone

Please feel free to call your support personnel at any time when help is needed. We may refer you to a portion of this manual for detailed instructions or guide you through the task at hand by using the phone and Microsoft's Remote Assistance software. We can view the problem, take over your mouse and provide help.

Remote Assistance

Remote assistance can be kicked off through an email to us or we can *Offer Remote Assistance* to you.

Send Us an Email

Go to **Start>Programs>Remote Assistance** or **Start>Help and Support** and select **Invite Someone To Help You**. Pick Microsoft Outlook as the way you'd like to contact us and type in our email address or use the Address Book to select the name from the list. Follow the rest of the prompts, and include a password. Place a call in to the person you sent the email to and tell them the password.

Call and we'll Offer Assistance

We can *Offer Remote Assistance* in the event you need a hand. Give us a call and we'll do the rest.

INTERFACE OVERVIEW

GUI: THE GRAPHICAL USER INTERFACE

There are a couple of places that MicroStation will offer instructions, read out data, and generally try to be helpful. These are the **Tool Settings Window, Status Bar and Message Center**. Make sure you know where these things are and check back with them often.

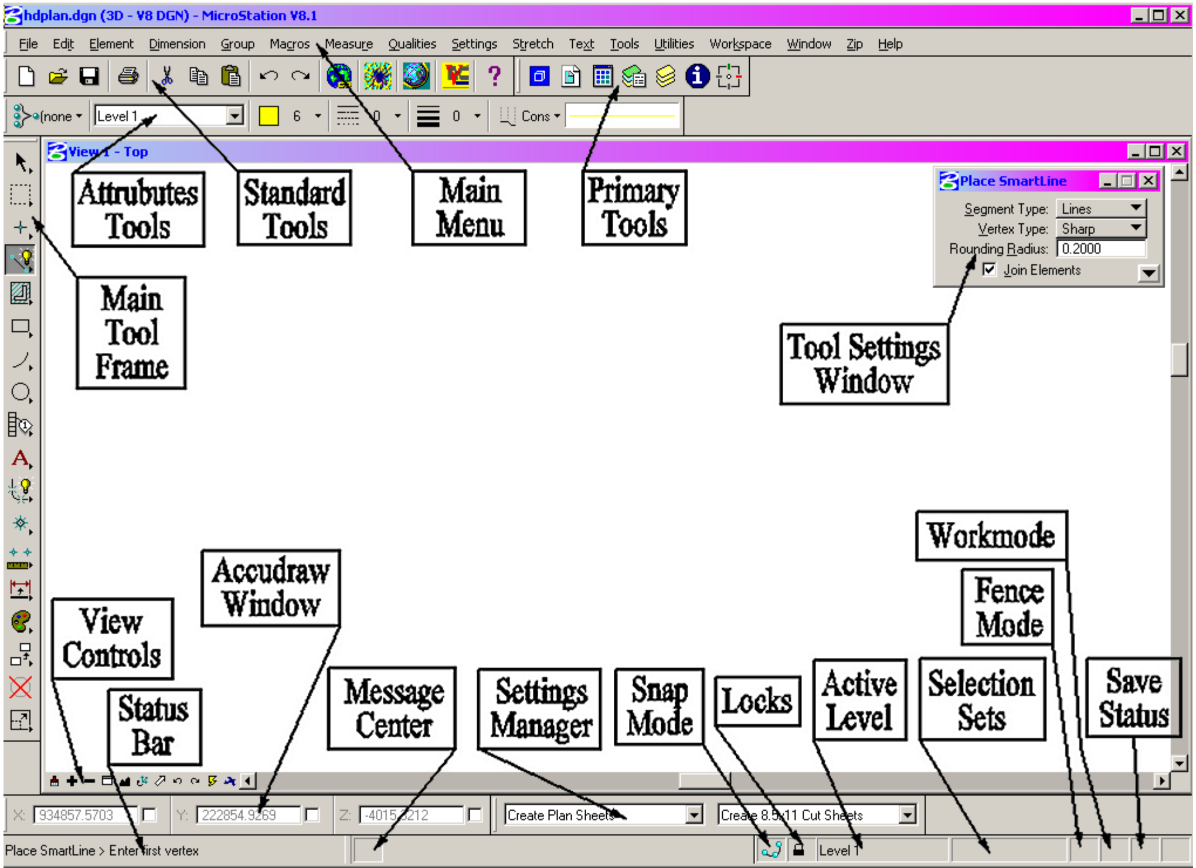


Figure 1-2: Interface Components

How do I get back Tool Bars that are missing?

If any aspect of the GUI has been closed, you're probably going to need to get it back. Every item outlined above can be closed except for the **Menus** and the **Status Bar**.

The **Attributes Tools** can be opened from the **Menus** by choosing **Tools>Attributes**.

The **Primary Tools** can be opened from the **Menus** by choosing **Tools > Primary**.

The **Standard Tools** can be opened from the **Menus** by choosing **Tools > Standard**.

The **Main Tool Frame** can be opened from the **Menus** by choosing **Tools > Main > Main**.

The **Tool Settings Window** can be opened by simply activating any command from a toolbox or menu.

The **Window Open/Close** button bar is used to open and close MicroStation Views. (The words “View” and “Window” are used interchangeably in MicroStation.) This button bar can be activated from the **Menus** by choosing **Window > Views > Dialog**.

The *Settings Manager* can be opened from the Menus by selecting **Settings > Manage**. Task-specific *Settings Managers* can be opened from **Settings > DOT SetMgrs**.

With our in-house customization we have specific settings managers auto loading based on file naming convention.

AccuDraw can be opened by pressing the **Toggle AccuDraw** button on the **Primary Tools** bar (Figure 1-3).

Figure 1-3: AccuDraw Button

How do I retrieve missing tools on a Tool Bar?

I have my tool bar up but it is not showing all the tools. Well in MicroStation V8 they have made the GUI more windows oriented. You can now right click on any tool bar and remove from display any of the dockable tools.

MOUSEING

Standard Buttons

Remember that the three buttons of the mouse are called **Data**, **Tentative**, and **Reset**. Here is a brief table of mouse button functions:

Left Button	Middle Button	Right Button
Data	Tentative	Reset
Accept	Snap	Reject
Yes	Maybe	No

Troubleshoot the Middle Button

It is possible that your Middle Button may not be snapping. From your main menu, select **Workspace > Button Assignments**. This will open the **Button Assignments** dialog (Figure 1-4).

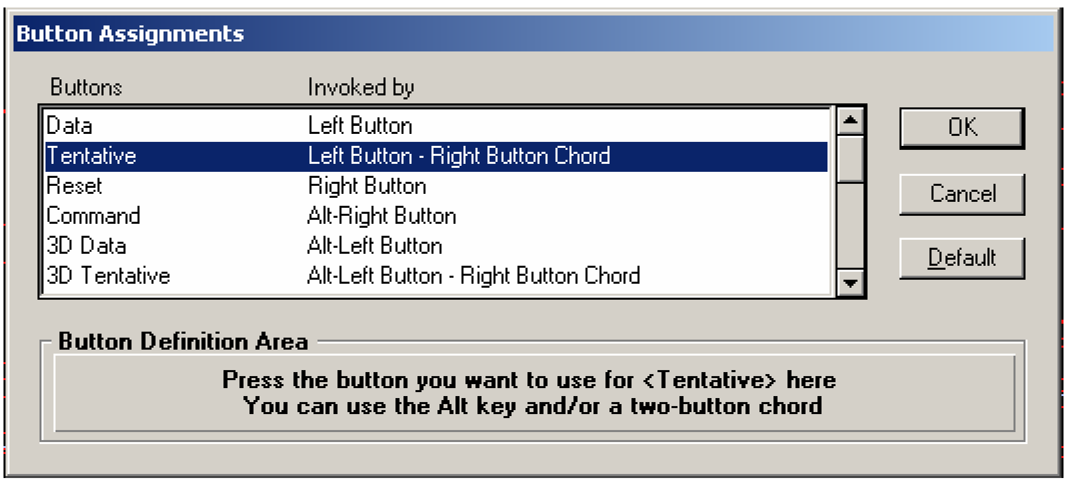


Figure 1-4: No Middle Button Assigned

Highlight the **Tentative** row. Notice the **Invoked by** column is not set to **Middle Button**.

Put your cursor in the **Button Definition Area** and hit your middle button. You should see the **Invoked by** column change to **Middle Button** (Figure 1-5)

♫ If you are using a 2 button mouse you can setup the tentative by following this same procedure and either holding the **Alt** button when hitting your **Left** mouse button or hitting your **Left** and **Right** mouse buttons simultaneously in the **Button Definition Area**.

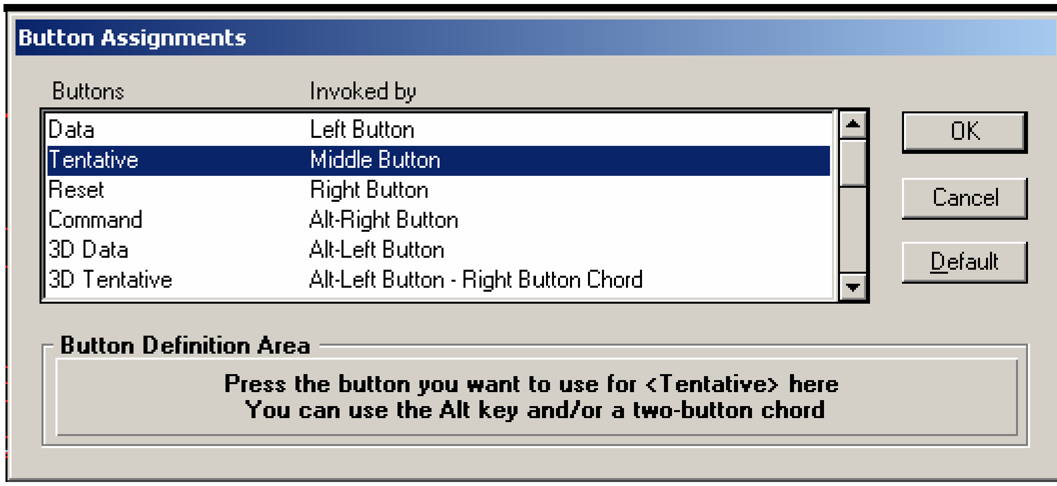


Figure 1-5: Middle Button Correctly Assigned

Press the **OK** button to preserve the assignment.

Using a Wheel Mouse

If you are using a wheel mouse you need to establish the wheel as a **Middle Button** in your mouse properties of your **Operating System (Start>Settings>Control Panel>Mouse)**.

There are some settings that you can set in your preferences for controlling the zoom and panning of your wheel mouse. You can find these setting by going to **Workspace>Preferences…** in the main menu. Select **Mouse** on the left side of your **Preferences** under your **Category** options. Check the different options out to the right and see what best fits your needs. (Figure 1-6)

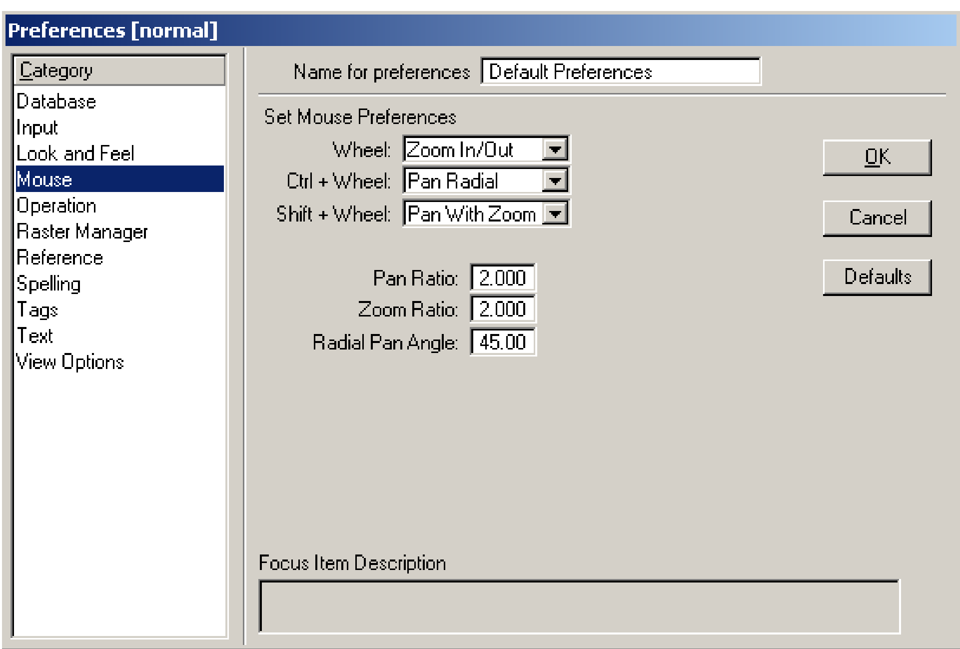


Figure 1-6: User Preferences

MENU OVERVIEW

Introduction

Our menu structure lets you run MicroStation from the keyboard. To let you keep one hand on the mouse, we've tried to maximize the keystrokes accessible with your left hand only.

The Principal

Menu items can be chosen with your mouse or from your keyboard. Notice the underlined letters in the menu (File, Element, etc.) Open any menu by typing the **Alt** key, then typing that underlined letter. Then type the underlined letter of a command in the menu.

Organization: The Top Level

Commands have been grouped together to make them quick to run and easy to find. Let's look at the menu structure, including important modifications we've made to existing menus as well as menus we've added:

The **File** menu has been modified to allow access to custom sheet-creation routines. The Reference (DOT) option has also been enhanced to give quick access to common Reference commands.

The **Edit** and **Element** menus have only minor changes.

The **Dimension** menu has been added to give quick access to some common Dimension settings.

The **Group** menu helps place and manipulate groups of objects. Using this menu, you can control fences and *graphic groups* and access tools for element selection sets as well.

The **Macro** menu is used to launch custom applications and enhancements.

Use the **Measure** menu measures distances, angles, areas and volumes.

The **Qualities** menu matches and changes color linestyle and other attributes.

The **Settings** menu has been modified to give you access to a wide range of MaineDOT *Settings Managers*, organized by task.

The **Stretch** helps you modify, extend, clip and trim elements.

The **Text** menu places and modifies text.

The **Tools**, **Utilities**, **Window**, and **Workspace** menus have only minor changes.

The **Zip** menu helps you place lines, shapes and cells. It also lets you move, copy, and modify, as well as hatch and delete.

Organization: The Next Level

To keep things simple we've tried to keep the menus similar. The **Group** and **Zip** menus have some items in common: **Copy**, **Move**, **Delete**, and **Scale** are in both menus. They also have similar entries for **Mirror** and **Rotate**.

For commands that are unique, we've tried to balance logic with convenience. On the convenience side, you can run the "place line" from **Zip** > **Zipline**. "**Zipline**" isn't a familiar word, but it's convenient to "place line" with the keystroke **Alt+Z, Z**. On the logical side, there's the "Measure Length" command. **Alt+R, L**. The **Alt+R** opens the **Measure** menu, and the **L** chooses "Length" as an option.

Organization: Submenus

Some commands have a lot of options you might want. With "Rotate", you might want to rotate by a specific angle. Then again, you might want to eyeball it. The **Rotate** item under both the **Group** and **Zip** menus has both of these options. You can "**Rotate by Angle**" or "**Rotate by 3 Points**".

Conclusion: The Pros and Cons

With this system, you can execute virtually every MicroStation command with a two or three letter shortcut that can be typed with one hand. If you forget the shortcut, you can remind yourself just by browsing through your menus.

FILE MANAGEMENT

NETWORK OVERVIEW

MicroStation Customization files and Drawing Files:

The master MicroStation customization files are on the network in a blind share. This means that they are in a secure location that isn't normally seen when mapping a drive letter. All users have a local copy of the customization on their C: or D: drive. Updates to the configuration are handled with an Update Utility. This utility does a date check of your local customization and updates files if changes were made to the master copy. Users also have a folder on their hard drive called **!msproj.** This **!msproj** folder contains project specific information that are used as variables. These variables store information such as town name, federal project number, street or route number and user names of those who have worked on the project. A copy of this folder is on your C: or D: drive for offline work. As new PIN's are created, you may need to update this folder for offline work so your project shows up in the list.

The master copies of all drawing files are located on the network on **\\dot0dta1fscadd1\pcpin1\.** This folder has been "mapped" to your machine as your **Y:** drive. This folder contains all of your design/detailing (project) information in the form of MicroStation files (.dgn).

Regional Office users create sync copies of their project drawing files to their local hard drive because the network speed is diminished due to the geographical location and in some cases offline work. In this case, the files are setup in a briefcase "PIN" folder at the root of their C: or D: drive.

OPENING FILES

To work only in MicroStation on an InRoads project, you should always launch **MicroStation for new InRoads Config** from your desktop icon.

♬ If you intend on using the InRoads tools, launch InRoads from the **InRoads Suite** icon on your desktop.

✓ ***Please refer to page 12-1 for more information on launching InRoads.***

The first dialog to open is the **MicroStation Manager**. At the bottom of this dialog you will notice the **Workspace** area. **User** should be set to **InRoads Network**. If working on your project locally, this can be switched to **InRoads Local. Interface** should be set to **mdot**.

Project should vary depending on what project you are working on. When you click on the **Project** picker, you should see a list of all active PINs. Pick your PIN from this list and MicroStation will take you directly to the design file directory for your Project. This is important because MicroStation will work smoother if it knows what project directory it should look to by default. If this is not working, please contact your CADD Support section.

Select a file to open from the left side of the **MicroStation Manager** and press **OK**.

ⓘ ***You can open multiple MicroStation sessions while working on a single project (i.e. Plan view and Cross Section), however if you open a file having the same name (i.e. two highway.dgn's) in two different project PINs, you may lose some work. You should always close all sessions of MicroStation prior to switching between projects.***

MAKING NEW FILES

Setup

This macro is used to make new design files that meet MaineDOT standards. It will create them only in the same folder as the MicroStation design file that is open when the macro is run. To create new files for a specific project, launch the project and open an existing file in the project's folder.

Launch the Makesheetz macro

Launch the **makesheetz** macro from your main menu by selecting **File** > **Makesheetz**. This will open the **File Prefix Dialog** (Figure 1-7).

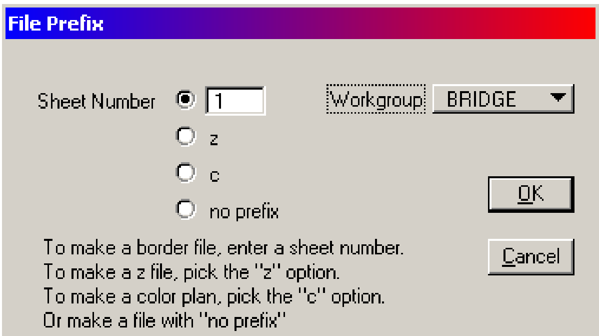


Figure 1-7: File Prefix

Choose Preliminary Information

In the **File Prefix Dialog**, you can choose to make a **numbered** sheet, a **z**-file, a **c**-file or a file with **no prefix**.

- Numbered Sheets contain borders. These are the drawings that comprise the plan set for delivery to Contracts. They are the sheets that get plotted. Choose a **Sheet Number**.
- Z-Files are the files where detailing work gets done. They typically get referenced into Numbered Sheets for plotting.
- C-Files are the files where coloring is done for visualization purposes.
- If you do not want a number, a "c" or a "z", you can also choose "no prefix."

  Notice you can choose a different **Workgroup** here. This option starts with your default workgroup. You can change this to create a file that would normally be made by another Workgroup.

When you have set your options, press **OK**.

Choose a File Type

This will bring up the **Create File of Type…** dialog (Figure 1-8).

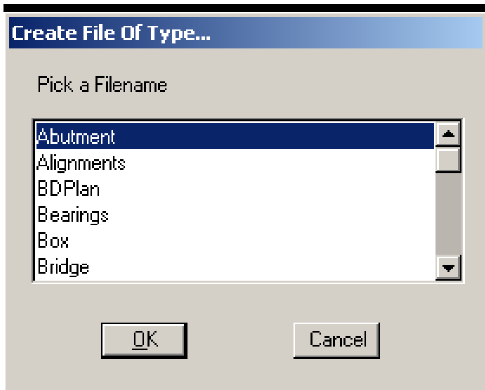


Figure 1-8: Create File of Type

Scroll down the list to find the file type that you want to create. Select it and press **OK**

Final Filename Editing

This will bring up the **Make File** dialog (Figure 1-9).

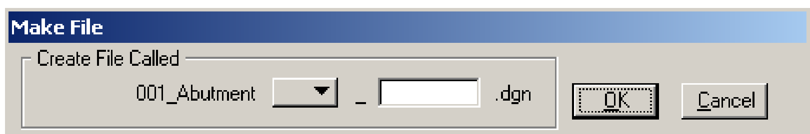


Figure 1-9: Make File

You can edit the entry in the **Create file called** box.

Choose a number from the pull down for multiple drawings of the same type: (Figure 1-10) or type a suffix into the text entry box (Figure 1-11).

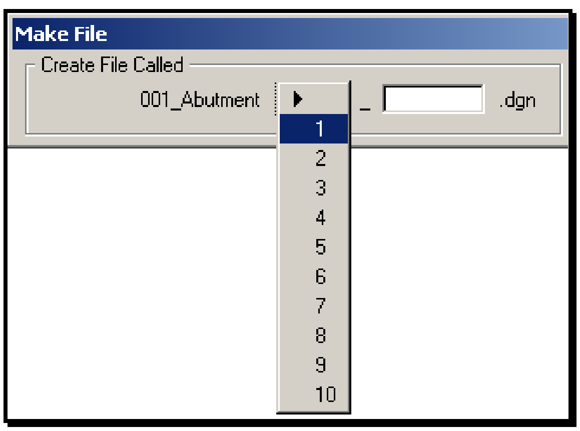


Figure 1-10: Index Picker

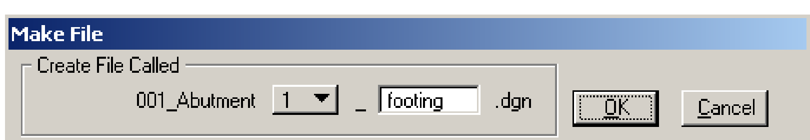


Figure 1-11: Suffix

Press **OK** when you have finished editing your filename.

♬ The macro will automatically enter the underscore character before your suffix. If you do not type a suffix in, it will not insert an underscore.

End Game

This will create the new file based on appropriate seed files and place the correct border cell, where needed. It will then opens up the **File Prefix** dialog again and prompt you to create another file (Figure 1-12)

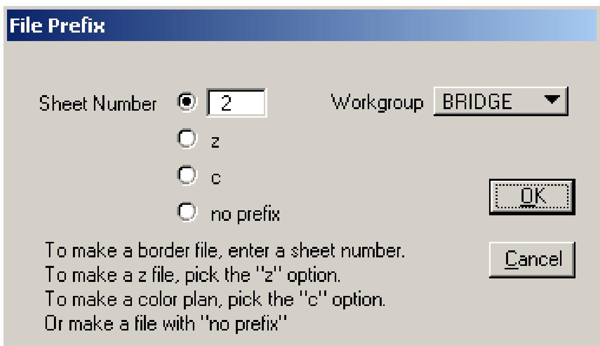


Figure 1-12: File Prefix Again

Press **Cancel** if you are done making files, or repeat these steps to make another file.

Safety Features

This macro will not automatically overwrite existing files, if you happen to tell it to create a file that already exists. It will first prompt you (Figure 1-13).

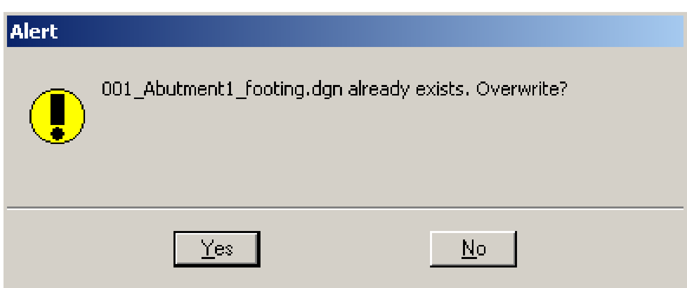


Figure 1-13: File Overwrite Alert

If you press **No**, the macro will bounce you right back to the **File Prefix Dialog** to let you pick a new sheet number.

FILE NAMES

The file names are important because the automatic sheet numbering capability of MicroStation relies on the first three digits of the file name. We all have had plots that came out with "XSE" in the "sheet number" box on your cross section plot. This is because the filename of your cross section you plotted was something like XSECTMC10_002.dgn. File names are also important because MicroStation automatically loads the Settings Manager that should be used based on the drawing type.

ⓘ ***Do not manually edit the sheet numbers on any of your drawings. Allow the automated procedure to handle this.***

Consider using the default number that displays, based on your workgroup, when cutting plan sheets. This will leave room for sheets that will go before the plans and numbered in the beginning of the project, for example:

001_title.dgn

002_typical_01.dgn

003_typical_02.dgn

004_estimate.dgn

005_drainage.dgn

006_notes_general.dgn

007_notes_construction.dgn

008_??.dgn

009_???.dgn

010_????.dgn

011_HDPlan1.dgn

The renumbering utility can be used again and again if necessary. Don't worry if they aren't in the correct order until final print.

ⓘ ***Avoid having sheets with the same prefix and suffix in their filename. Add a suffix to sheets to differentiate the like drawings (i.e. Typical_01.dgn, Typical_02.dgn). The sheet renumbering utility doesn't like having two drawings with the same prefix or root filename and suffix. You can use Windows Explorer to rename any identical root filenames to add a suffix or you can let the renumbering utility give you the warning and start rebuilding the list to the right.***

SHEET RENUMBERING UTILITY

Introduction

This utility was developed to quickly rename/renumber your plot drawing files in the event that a sheet is added or deleted from a plan set. It allows you to prioritize the plan set based on the order of files in the list.

Operating the Utility

To use this utility click on the icon on your desktop (Figure 1-14) or by selecting **Start>Programs>MDOT Utilities>MDOT MicroStation Sheet Numbering Utility.**

Figure 1-14: The Tao of Renumbering

Next you will need to click your way to the **PIN** directory that you are interested in by changing the drive letter in the lower left corner, above the **Renumber Plot Files** button, to **y:\\dot0dta1fscadd1\Pcpin1.** Double click on the **pin** folder and select the desired **project identification number (pin).** You should keep double clicking on the sub folders to get yourself to your workgroups MSTA folder as shown in Figure 1-15.

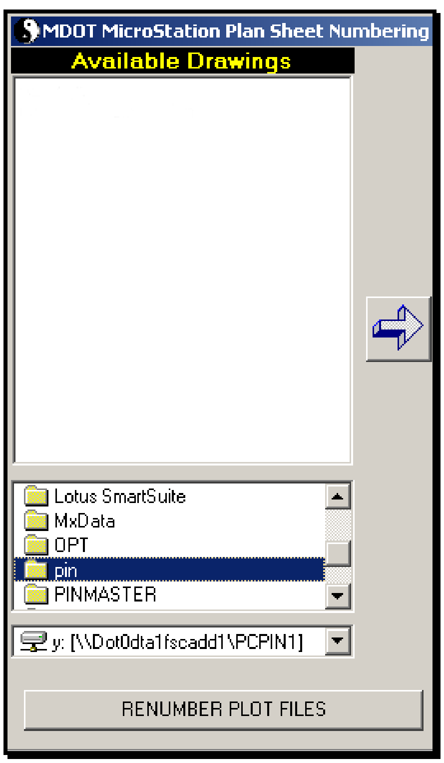


Figure 1-15: Browsing for Files.

Once there, you will see the list of drawings under the heading **Available Drawings** to the left and the utility automatically creates a list of all your numerical prefix drawings to the right under the **Listing of Sheets** category (Figure 1-16).

♬ If you have drawings with the same prefix numbers the utility will not populate the file names under the **Listing Of Sheets** beyond the duplication. You can either use *Windows Explorer* to rename individual prefixes or just populate the **Listing Of Sheets** beyond that point.

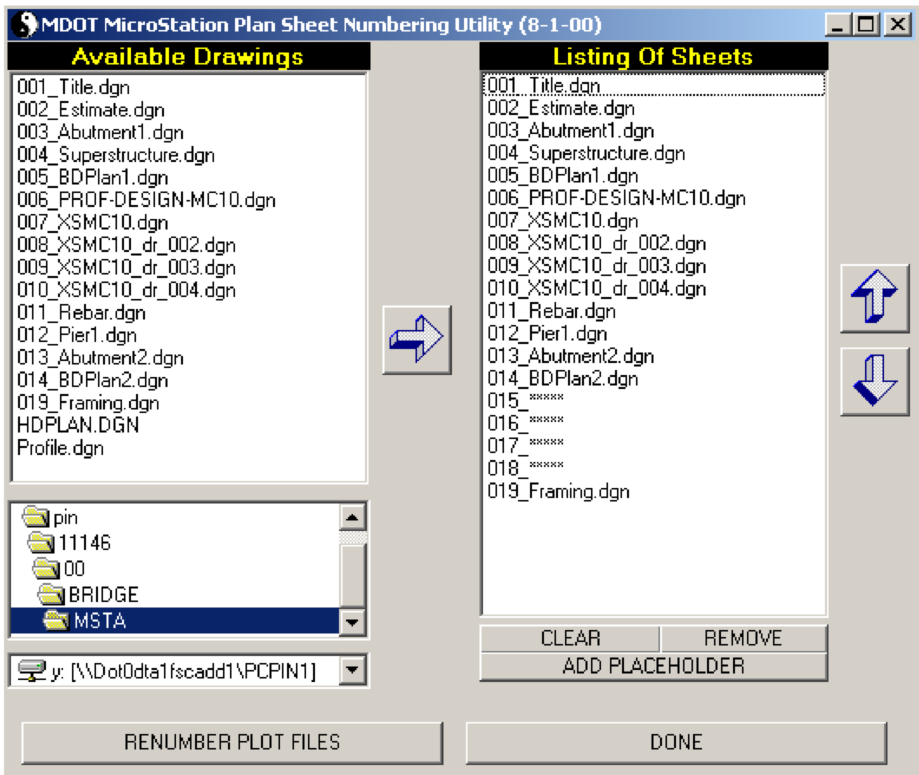


Figure 1-16: Renumbering Interface

Prioritizing Plan Set

Now we are ready to prioritize the drawing list to create the correct numbering of sheets for the final plan set. You may have noticed that the list to the right side of the utility shows place holders between the original numbered drawings you had created, that's O.K. just simply highlight each place holder *(015_xxxx)* that you don't want and hit the Remove button or hit the Clear button and remove all files so that you can rebuild you list of files by highlighting and using the arrow in the middle to push the file back to the right.

ⓘ ***The CLEAR button doesn't give you a warning! If you hit clear, this will remove all of the numbered prefixes from your drawings! You will need to locate and rebuild them.***

You have the ability to add placeholders between drawings to create a gap in your sheet numbers in case there are sheets being inserted from other workgroups. You can move a selection of files up and down with the arrows to the right of the utility to prioritize your plan set.

Once you have done this, go ahead and hit the **Renumber Plot Files** button and you should see your file names renumbered and the list to the left renamed as shown in Figure 1-17.

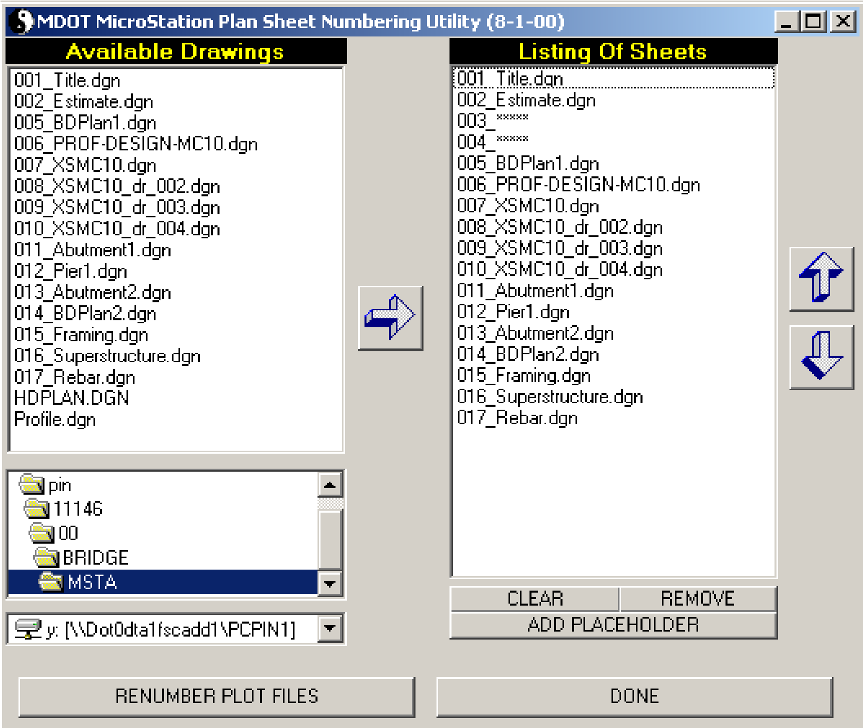


Figure 1-17: Renumbered Files

Press **Done** when you are finished.

Precautions

This utility is set up to look for files within your folder. It is necessary that all file names are unique not only in their root filename and suffix, but in their prefix as well. If this requirement isn't met then you will experience problems activating this utility and/or renumbering when in the utility.

The utility reverses the order of files when they are the first files pushed into the "Listing of Sheets". Add a couple of place holders and click on the last place holder prior to pushing a large grouping of sequential files into this area.

ⓘ ***If you get an error when first opening the utility, it may be because a PIN number that was previously renumbered no longer exist. To fix this problem, browse to your C:\windows directory and open the control.ini file. Delete the InitDirectory line in this file and the path to the PIN that it refers to. Reopen the Sheet Renumber Utility: (Figure 1-18)***

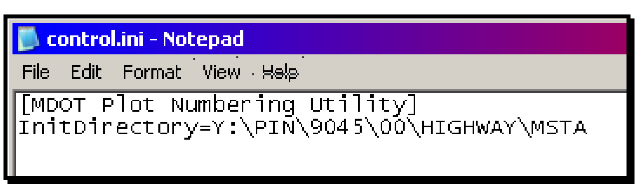


Figure 1-18: Control file

PCF EDITING

Discussion

PCF Files - “Project Configuration files” are files that contain project specific information that will be used by MicroStation and databases that can extract project information from lines of text in the file.

Open one of your prefix numbered drawings.

Edit PCF File

Go to **Workspace > Edit Project Data (PCF)** to revise or add information about this project. A list of variables will appear in a dialog.

ⓘ ***If you get the warning that says “Close MicroStation and choose a project that is consistent with your file location”, there are two thing it could be.***(***Figure 1-19***)

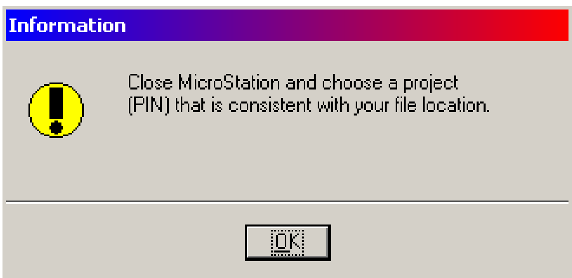


Figure 1-19: Information Dialog

1. You may have entered MicroStation improperly. You must open MicroStation by clicking on the **MicroStation** icon on your desktop and selecting your **PIN** number in the project pull down (this is in the lower portion of your *MicroStation Manager* window. This selects the PCF file that is associated with your PIN number) If you have the wrong project specifics on your plot, this is a BIG clue that you selected the wrong PCF in the project pull down or that your PCF has bogus information in it.
2. If the line in your PCF file says “PCF_PINNUMBER = _______”, and does not have a value, you will still get this warning. Simply correct this by adding your PIN number (i.e. 1234.00), saving the PCF file and restarting MicroStation.

ⓘ ***Do not enter the word “PIN” in the PCF_PINNUMBER field.***

Verify that the fields crucial to your drawing are filled in. Edit a field by clicking on the field and hit **OK**.

Another dialog will prompt you for input. Add the information and click **OK** (Figure 1-20).

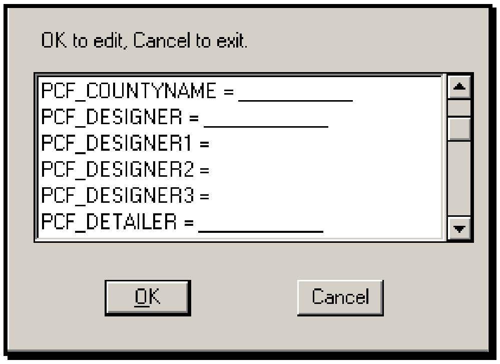


Figure 1-20: PCF Selections

When done, hit **Cancel to Exit.** Click **Yes** to save the changes.

- ♬ In the caption above, you will notice some similar selections. Due to the fact that some border drawings may contain different variables, you should enter the primary designer in both the PCF_DESIGNER and the PCF_DESIGNER1 fields. The same goes for PCF_DETAILER. Additional designer and detailer fields are there for a future border that will have the additional fields.
- ♬ If no changes were made and you attempt to save the file anyway, you will get an error. Click **OK** to bypass the error.

The macro will ask you if you would like to edit the border information. Say **Yes** to process all of the numbered drawings now or **No** to process them later using **Macros > Border Information** from the *Main Menu.* Figure 1-21

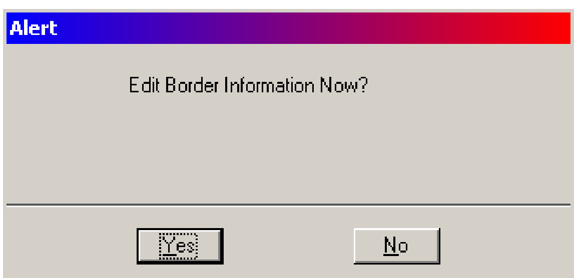


Figure 1-21: PCF Edit Alert

✓ ***Refer to the Border Information Macro on page 1-27.***

BORDER INFORMATION MACRO

Discussion

The standard border cells contain variables for sheet number, total number of sheets, street name, etc. These variables begin and end with a "$" or "@".

We have a macro that will substitute your active project information into those variables.

It will also look for the first three digits of your file name and use those as your current sheet number.

This is called the **Borderinfo** macro, and you run it from your main menu by selecting **Macros > Border Information**.

The macro is capable of processing a whole folder-full of files at once.

✓ ***Refer to page 1-30 for information on disabling edited items.***

Sheet Numbering

Before you run the macro, make sure your file fits naming conventions, i.e., begins with a 3-digit number and an underline.

✓ ***Check page 1-22 for instructions on using the Sheet Renumbering Utility.***

Process Options

If you are running the macro from an appropriate file and project setup, you will get the **Border Info** dialog box (Figure 1-22) that offers you two options.

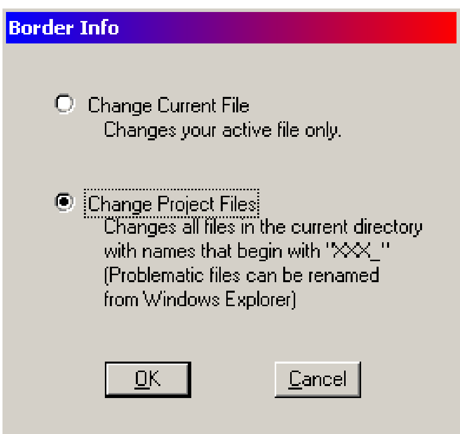


Figure 1-22: Border Info

Current File

Process your active file by picking **Change Current File**.

Project Files

Process a whole directory full of files by selecting the **Change Project Files** option. This will select all eligible files in your current directory for processing.

You will get a dialog that lists all the files that will be processed. You can browse through this list to confirm that only the files you want to process are listed (Figure 1-23).

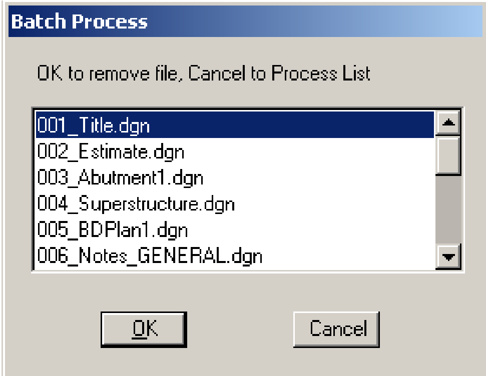


Figure 1-23: Batch Process

If you don’t wish to process a certain file in the list, highlight it and press **OK**. Otherwise, press **Cancel** and MicroStation will open and process each file on the list.

Remember that only files in your active directory that begin with a 3-digit number (followed by the underscore "_" character) will be processed.

Error Messages

When running this macro, you may get one of two error messages.

1. If you didn't pick your current project before opening the file, you'll get a prompt to "Close MicroStation and choose a project (PIN) that is consistent with your file location." This will protect you from substituting incorrect information onto a border.
2. If you are working in a file that is not properly named, you will get a prompt that explains the file naming criteria. You will get this message if you try to run the macro from a file that is not a border file or it has not been run through the Sheet Renumbering Routine.

Side Effects

The most important side effect of this macro to be aware of is that it will drop all border cells in every file processed.

The macro may not substitute information if you don’t have a standard border cell. In that case, drop the cell manually from **Qualities** > **Drop** > **Complex**.

Changing Data After the Fact

If you go back and need to change your project data, select **Workspace>Edit Project Data (PCF)**.

✓ ***Refer to page 1-25 for the specific details of editing PCF files.***

Troubleshooting

If it seems like the macro is not finishing, it may be because of one of the following reasons.

1. Someone may have changed or hard coded a variable on the border.

2. You cannot use a backslash between the month and year in your PCF file.
3. Your file may be corrupt. (See your CAD administrator)
4. If there is any multiline text in the border cell the macro can get hung up.

DISABLING THE BORDERINFO SUBSTITUTION

Overview of Droplink.bas

The downside of using the **Borderinfo** macro to substitute project information onto the border sheets (**Macro > Border Information)** is that you are limited in your ability to alter the results of the substitutions.

Once the macro has run, you can edit the text as normal. However, every time the **Borderinfo** macro runs, it will re-substitute its text: potentially overwriting your custom text entry.

The **DropLink** macro has been written to allow you to “hide” your altered text, preventing the **Borderinfo** macro from changing it when it is run.

A possible good use of this is if you want to maintain a certain designer/technician name of a plan sheet then you would droplink these names so that the border information would not change them.

Setup

There are two ways the **Droplink** macro can process elements.

You can place a fence or select a bunch of elements using PowerSelector and then run the macro. The macro will process all the indicated elements.

Or, you can run the macro with no *Fence* or *Selection Set*, and the macro will allow you to pick elements one at a time to drop.

Run the DropLink Macro

From the main menu, select **Macro** > **Droplink**.

If you have a *Selection Set* or *Fence*, *Datapoint* to *Accept*.

Otherwise, select each element you’d like to drop the linkage from.

What Does it Do?

The **DropLink** macro removes an invisible tag from the elements you indicate. This tag is the only way the **Borderinfo** macro can find these elements to change them. Without the tag, the **Borderinfo** macro will not further alter the elements.

ⓘ ***This process is only reversible by using Edit > Undo.***

Quitting

To exit out of the macro, simply choose another command.

PLOTTING OVERVIEW

MAINEDOT PLOT DRIVERS – REGION 0

Overview

The plot driver below are located in the !msInRoadsconf/standards/plotdrv folder.

Plots can be sent to any plotter, regardless of its location. Due to network speed, it may be more feasible to have someone at the location send the plots.

The OCETDS600-rm312 has two paper outputs trays available. A “table” which may result with plots in reverse order (i.e. MicroStation plots – single or *Batch Prints*) or an Ascending order integrated tray on the top of the machine for plots to be sorted in Ascending order (i.e. Print Exec Workgroup or other). We have added the type of output on the plotters described below.

- ♬ The recommended printing solution is *Batch Printing* or plotting with a *Fence* for single copies of a set of drawings. For more than one copy and for better management of the order in which they are printed, it is recommended that users *Batch Print* to create a multi-page PDF and print from Adobe directly to a plotter.

✓ ***Refer to page 28-15 for instructions on plotting a PDF from Adobe software directly to one of the plotter listed below.***

ⓘ ***When plotting a PDF, consider sending it directly from the Adobe PDF viewer software to a plotter that is mapped to your computer. You can reverse the order (depending on the plotter it goes to) and ask for additional copies. For your convenience, we have provided instructions on mapping the various plotters below each description.***

US_ OCETDS860-full-rm126 – Final Full Size Plotting

This option sends a full size plan sheet, which is 36” wide, to the plotter located in the reproduction room at MaineDOT – Augusta.

This plotter produces excellent plots and is capable of handling large batch jobs.

The exit tray is the table that will stack plans based on the order they were printed resulting in reverse order. The user is required to adjust the order. When *Batch Plotting,* click on the *Name* column to sort in descending order.

- ♬ If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click this link \\Dot0dta1psprint and then double click the OceTDS800-Rm126 plotter in the list.

US_ OCETDS860-half-rm126 – Final Half Size Plotting

This option sends a half size plan sheet, which is 18” wide, to the plotter located in the reproduction room at MaineDOT – Augusta.

The plotter has an 18” roll; therefore, no trimming is required.

The exit tray is the table that will stack plans based on the order they were printed resulting in reverse order. The user is required to adjust the order. When *Batch Plotting,* click on the *Name* column to sort in descending order.

US_ OCETDS860-long-rm126 – Long Plots (5' – 20')

This option sends plots longer than our normal plan sheet is tall (24"+/-). Currently, we have 4 different lengths available: 5ft, 10ft, 15ft, and 20ft. We use this in conjunction with clip boundaries of the same size to achieve a plot that is to a desired scale.

US_PLOT2FILE

This option is for creating plot files (.plt or .000). This is used in conjunction with the *Print Exec Workgroup*. The *Print Exec Workgroup* can use the plot files to create full or half size plots. Depending on where you send you plots, you may be required to print the job in reverse order.

✓ ***For more information on the Print Exec Workgroup, refer to page 1-67 .***

US_ OCETDS600-full-rm312 - Full Size Check Plots

This option sends a full size plan sheet, which is 36" wide, to the plotter located in Room 312 on the 3rd level of MaineDOT in Augusta.

This plotter is for quick working plots and is not intended to be used for final plots or large batch jobs. Please send only 50 plots at a time to this plotter.

The plots exit on the tray table that will stack plans based on the order they were printed resulting in reverse order. When *Batch Plotting,* click on the *Name* column to sort in descending order.

♬ If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click this link \\Dot0dta1psprint and then double click the OceTDS600_Rm312 plotter in the list.

US_ OCETDS600-half-rm312 – Half Size Check Plots

This option sends a half size plan sheet, which is 18" wide, to the plotter.

It is not intended for large half size batch jobs. Please send only 50 plots at a time to this plotter.

The plots exit on the tray table that will stack plans based on the order they were printed resulting in reverse order. When *Batch Plotting,* click on the *Name* column to sort in descending order.

US_ OCETDS600-long-rm312 – Long Plots (5' – 20')

This option sends plots longer than our normal plan sheet is tall (24"+/-). Currently, we have 4 different lengths available: 5ft, 10ft, 15ft, and 20ft. We use this in conjunction with clip boundaries of the same size to achieve a plot that is to a desired scale.

US_OCETCS500-full-rm126 – Full Size Color Plotter

This option is for sending Full Size color plan sheets to the OCETCS500 Plotter in Room

126 (reproduction room) at MaineDOT – Augusta. This is a high quality and fastest wide format color plotter in the building.

- If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click this link \\Dot0dta1psprint and then double click the OceTCS500-Rm126 plotter in the list.

US_OCETCS500-half-rm126 – Half Size Color Plotter

This option is for sending Half Size color plan sheets to the OCETCS500 Plotter in Room 126 (reproduction room) at MaineDOT – Augusta. This is a high quality and fastest wide format color plotter in the building.

US_OCETCS500-long-rm126 – Half Size Color Plotter

This option sends color plots longer than our normal plan sheet is tall (24”+/-) to the OCETCS500 Plotter in Room 126 (reproduction room) at MaineDOT – Augusta. Currently, we have 4 different lengths available: 5ft, 10ft, 15ft, and 20ft. We use this in conjunction with clip boundaries of the same size to achieve a plot that is to a desired scale. This is a high quality and fastest wide format color plotter in the building.

US_HPCOLOR4

This option is for sending color plots to the HP1055CM Plotter in Room 303 on the 3rd level of MaineDOT in Augusta. This plot driver points to the plotter through the same print server as all the printers and photocopiers in the building.

- If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click this link \\dot0dta1psprint and then double click the PLOTCHP4 plotter in the list.

US_HPCOLORRoom303

This option is for sending Full Size plan sheets to scale or larger color plots to the HP1055CM Plotter in Room 303 on the 3rd level of MaineDOT in Augusta. This plotter uses a different print server than the US_HPCOLOR4. It should be used when sending for large color plots.

- If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click this link \\Dot0dta1psprint and then double click the HPCOLORPLOTRM303-HPGL plotter in the list.

US_HPCOLORRoom303Half

This option is for sending Half Size plan sheets to scale or other color plots to the HP1055CM Plotter in Room 303 on the 3rd level of MaineDOT in Augusta. This plotter uses a different print server than the US_HPCOLOR4. It should be used when sending for large color plots.

US_HPCOLORRoom321

This option is for sending Full Size plan sheets to scale or larger color plots to the HP1055CM Plotter in Room 321 on the 3rd level of MaineDOT in Augusta. This plotter was intended to be used to share the load of the HPCOLORRoom303. It should be used when sending for large color plots.

- If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click this link \\dot0dta1psprint and then double click the PLOTCHP2 plotter in the list.

US_HPCOLORRoom321Half

This option is for sending Half Size plan sheets to scale or other color plots to the HP1055CM Plotter in Room 321 on the 3rd level of MaineDOT in Augusta. This plotter was intended to be used to share the load of the HPCOLORRoom303. It should be used when sending for large color plots.

US_ pdf-8x11

This driver will create a black and white 8 1/2 x 11 pdf document provided you are running MicroStation version 8.05 or higher.

US_ pdf-8x11color

This driver will create a color 8 1/2 x 11 pdf document provided you are running MicroStation version 8.05 or higher.

US_pdf-color-fullsize

This driver will create a color, full size pdf document provided you are running MicroStation version 8.05 or higher.

US_ pdf-color-halfsize

This driver will create a color, half size pdf document provided you are running MicroStation version 8.05 or higher.

US_ pdf-fullsize

This driver will create a full size black and white pdf document provided you are running MicroStation version 8.05 or higher.

US_ pdf-halfsize

This driver will create a half size black and white pdf document provided you are running MicroStation version 8.05 or higher.

PRINTER_BW

Drivers with PRINTER in the name sends the plots to your default 8.5” x 11” printer that you have mapped to your computer. If you are sending prints to a color printer, this option will print Black and White. If you are using this option and sending to a Black and White Printer, all lines (even if you are displaying color) will print black.

PRINTER_COLOR

Drivers with PRINTER in the name sends the plots to your default 8.5” x 11” printer that you have mapped to your computer. If you are displaying color in your drawing, this option will print color. If you are using this option and sending prints to a Black and White Printer, lines other than black will be a gray tone.

PRINTER_STANDARD_DETAIL

Drivers with PRINTER in the name sends the plots to your default 8.5” x 11” printer that you have mapped to your computer. This option is intended but not limited to Standard Detail printing and will print Black and White. This option produces thicker weights than the PRINTER_BW. Compare the results of the two drivers and choose the one that suits your needs.

Hearing_PRINTER

Drivers with PRINTER in the name sends the plots to your default 8.5” x 11” printer that you have mapped to your computer. This driver is used by the Public Hearing Section, however can be used by anyone. Test and compare the results of this driver with other printer drivers and choose the one that suits your needs.

REGIONAL OFFICE PLOTTERS (HP750C AND OCE PLOTTER)

Overview
All of the Regional offices are equipped with an HP750C color plotter and an OCE Plotter in addition to any Laser Jet printers. These plot drivers are located in the !msInRoadsconf/standards/plotdrv/divisions/RegionName folder.

Use the printer and PDF drivers in the *plotdrv* folder for printing to a Laser Jet (8.5 x 11) printer or to PDF. Use the drivers in your specific “divisions” folder for all plots going to your HP750C or OCE plotter.

US_FULL750C_???_GR
Default full-size black and white plot driver. Sends plots to the HP750C plotter.

♬ If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click one of the links below depending on the Region.

Region 1 click here→ \\Dot1dts1fsscr01 then double click the scr750c plotter in the list.

Region 2 click here→ \\Dot2dteaqpr001 then double click the HP750C plotter in the list.

Region 3 click here→ \\Dot3dtd4fsdix01 then double click the HP750C plotter in the list.

Region 4 click here→ \\Dot4dtb7fsbgr01 then double click the HP750C plotter in the list.

Region 5 click here→ \\Dot5dtp1fspqi01 then double click the HP750C plotter in the list.

US_HALF750C_???_GR
Default half-size black and white plot driver. Sends plots to the HP750C plotter.

US_Long_750C_???_GR
This option sends black and white plots longer than our normal plan sheet is tall (24”+/-). Currently, we have 4 different lengths available: 5ft, 10ft, 15ft, and 20ft. We use this in conjunction with clip boundaries of the same size to achieve a plot that is to a desired scale.

US_PLOTCHP_???
This option is for sending color plots to the HP750C plotter.

♬ There may be other drivers in your “divisions” folder that have been created by users. Some may work and others may not. If you need assistance with drivers contact CADD Support.

US_OCE9400FULL
This is a high speed, full size, black and white plotter that sends plots to the OCE plotter (if available) in your Regional Office.

The plots exit on the tray table that will stack plans based on the order they were printed resulting in reverse order. When *Batch Plotting,* click on the *Name* column to sort in descending order.

- ♬ If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click here→ \\Dot2dteaqpr001 then double click the Region 2 – Oce 9400 plotter in the list.

US_OCE9400HALF

This is a high speed, half size, black and white plotter that sends plots to the OCE plotter (if available) in your Regional Office.

The plots exit on the tray table that will stack plans based on the order they were printed resulting in reverse order. When *Batch Plotting,* click on the *Name* column to sort in descending order.

US_OCE9400LONG

This option sends black and white plots longer than our normal plan sheet is tall (24"+/-) to the OCE plotter (if available) in your Regional Office. Currently, we have 4 different lengths available: 5ft, 10ft, 15ft, and 20ft. We use this in conjunction with clip boundaries of the same size to achieve a plot that is to a desired scale.

US_OCETDS400FULL

This is a high speed, full size, black and white plotter that sends plots to the OCE plotter (if available) in your Regional Office.

- ♬ If you need to map this printer as a Windows Printer for submitting from software other than MicroStation (i.e. Adobe, Excel, ESERI, Paint, E-Plans), click one of the links below depending on the Region.

Region 1 click here→ \\Dot1dts1fsscr01 then double click the SCR OCE PLOTTER in the list.

Region 3 click here→ \\Dot3dtd4fsdix01 then double click the OceTDS450 plotter in the list.

Region 4 click here→ \\Dot4dtb7fsbgr01 then double click the OceTDS450 plotter in the list.

Region 5 click here→ \\Dot5dtp1fspqi01 then double click the PQI OCE Plotter in the list.

US_OCETDS400HALF

This is a high speed, half size, black and white plotter that sends plots to the OCE plotter (if available) in your Regional Office.

US_OCETDS400LONG

This option sends black and white plots longer than our normal plan sheet is tall (24"+/-) to the OCE plotter (if available) in your Regional Office. Currently, we have 4 different lengths available: 5ft, 10ft, 15ft, and 20ft. We use this in conjunction with clip boundaries of the same size to achieve a plot that is to a desired scale.

PEN TABLES

Overview

Pen tables are used in combination with certain Plot Drivers, to accomplish a desired output to a printer or plotter. Each pen table does something different to your drawing at plot time. Some will require testing with your type of drawing, others have been established for specific types of drawings.

!pentable.tbl

This is the default pen table for plan production. This is used for all plans being submitted to Contracts with the exception for Title sheets for Highway users.

We have combined four old pen tables into this default pen table. It substitutes certain text items (username, division, date, file name, etc.) into standard MaineDOT borders.

This pen table lets you print out survey elements in a gray tone. Elements are changed to gray if they are in a reference file that has one of the following logical names:

Topo, Text, Points, Contours, Topoadd1, Topoadd2, and Topoadd3.

Gray elements, like Cross Section and Profile grids, are prioritized to plot underneath all black elements. Elements in these files that are weight 0 are changed to weight 1.

As-Built.tbl

This pentable will be used when sending electronic As-Built drawings to the one of the color plotters. All existing elements will be grayed, proposed will be black and As-Built elements will be red.

BORINGLOG.tbl

This is used by Geotech to produce desired plots of their Boring Log sheets.

ENV_PRINTER_COLOR

This is used by Environment to produce the desired plots for 8 1/2” x 11” color Wetland Mitigation plans.

Graysurvey_wetlands.tbl

This is used by Environment to produce plans of Wetland delineation. This makes the Wetland **bold** so that they stand out on the plots.

Heavytopo.tbl

This plots out the existing survey in black as opposed to graying it out as does the !pentable.

MHPC.tbl

This is used by Environment to produce a color plan set for plans to be submitted to MHPC. Use this pentable when sending for plots that utilize Level Symbology Overrides.

MHPCplan-No Symbology

This is used by Environment to produce a color plan set for plans to be submitted to MHPC. This pentable doesn't use Level Symbology Overrides.

Prelim_plan_color.tbl

This is used by the Bridge Program to produce a colored preliminary plan.

Title.tbl

This is used by the Highway Program when printing a Title Sheets that has a Plan Layout. This adjusts dashed lines in the topo drawings so that they can still be displayed at the smaller scale.

Hearing_Thicker.tbl

These were set up for our Hearing Section in order to increase the weights of lines, by one stroke, at plot time.

Hearing_Thinner.tbl

These were set up for our Hearing Section in order to decrease the weights of lines, by one stroke, at plot time.

PublicHearing.tbl

These were set up for our Public Hearing Section to speed up the coloring process of metric projects.

usPublicHearing.tbl

These were set up for our Public Hearing Section to speed up the coloring process of U. S. Customary projects.

Laserjetblack.tbl

This option will force every color in your drawing to black. This was intended to be used with a Laser printer.

Rowblack.tbl

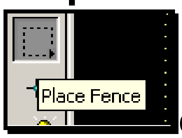
This option adjusts the processing order and forces all color to black except for color 46.

SINGLE SHEET PLOTTING (FENCE PLOTTING)

Overview

This procedure is for sending a single Plan Sheet to a plotter or printer at a desired scale using a fence. It requires that you are using a standard border drawing that has a predefined boundary shape. All border designed for (8.5 x 11) use a similar boundary string.

Step One: Place a fence



Click on the Place Fence icon and set the *Fence Type* to **Element** and the *Fence Mode* to **Inside** (Figure 1-24).

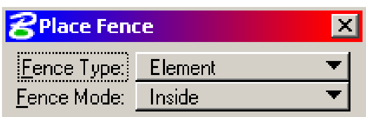


Figure 1-24: Place Fence Options

Click on the boundary shape

Step Two: Select Print/Plot

From the main menu select **File > Print** option.

On the **Print** dialog, press the **Magnifying Glass** button or go to the menu and select **File>Bentley Driver…** (Figure 1-25**)**.

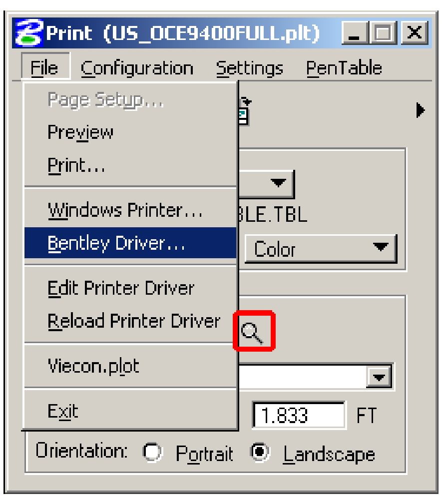


Figure 1-25: Plotter Driver on the Print Dialog

You should see a list of plot driver files pop up for you to select from. If you do not see the standard plot drivers, please browse to **C:\!msInRoadsconf\standards\plotdrv.** Select the plot driver that you want to plot to.

✓ ***For a complete list of drivers, refer to page1-32.***

Step Three: Select Pentable (If Necessary)

Select the pen table if necessary. The default table (!pentable) should be loaded, however if you want a different one, select **Pentable>Attach** from the menu and select the desired pen table. If you do not see the standard pen tables, please browse to **C:\ !msInRoadsconf\standards\tables\pen**.

✓ ***Refer to page 1-40 for a complete list of Pen Tables.***

Step Four: Modify Attributes (Optional)

You now have the ability to modify attributes through the **Print Dialog**. In the past you would have to select **Settings>View Attributes** from MicroStation to turn off Construction Elements on single sheet printing. Now you can select **Settings>Print Attributes…** from the **Print Dialog** menu and toggle things on and off without effecting the display in your main view.

Step Five: Preview Print (Optional)

From your **Print Dialog**, you can preview your plot by either selecting from the menu **File>Preview,** clicking on the **Preview** icon (Figure 1-26) next to the **Print** icon, or you can simply expand the dialog by clicking the **Show Preview** to the right top of the dialog (Figure 1-26).

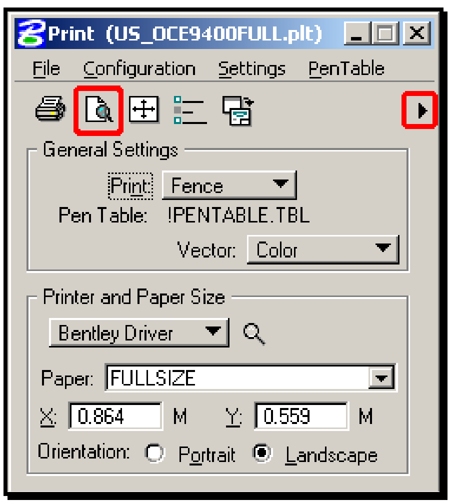


Figure 1-26: Preview Icon

Step Six: Show More Details

You can also get more information by selecting the **Show Details** expansion button in the lower right hand corner of the **Print Dialog** (Figure 1-27).

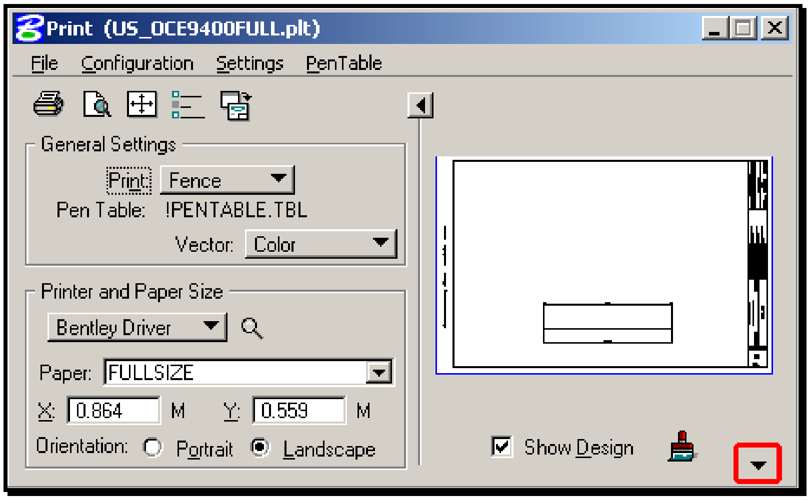


Figure 1-27: Show Details

Step Seven: Check Scale

When you expand the dialog you will see information about your **Print Size/Scale** and **Print Position** (Figure 1-28). You may notice that the **Scale:** shown in this image (3.2808' to 1 M) looks incorrect. It really isn't, this is the conversion factor of U.S. Customary to Metric. If you would like to see the correct scale you can change the settings to read feet to feet. This is done by selecting **Settings>Units>FT** from the **Print Dialog** menu. Now the scale should make more sense (Figure 1-29).

ⓘ ***If the scale seems to be out of whack when switching the units then you may need to reopen the file or close out of MicroStation and come back in to see the correct factor.***

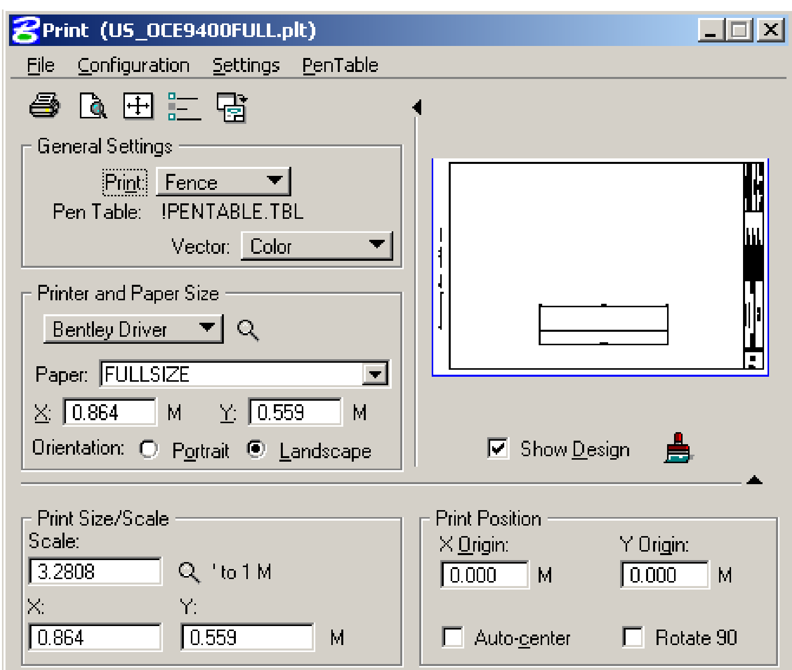


Figure 1-28: Print Size/Scale & Print Position

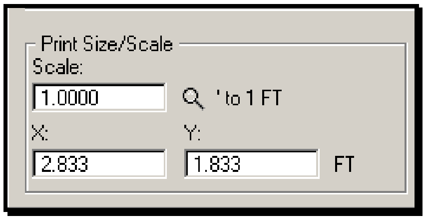


Figure 1-29: Print Size/Scale

The **Print Position** settings displayed in the prior caption are fine as displayed.

- ♬ When doing a fence plot and picking your plot driver you should not have to worry too much about the settings for **Print Size/Scale** or **Print Position**.

Step Eight: Print

If everything looks fine then hit your **Print** icon or **File > Print…** and send your print.

PLOTTING SHEET FILES (BATCH PRINTING)

Overview

This procedural manual will lead you through some routines involved in plotting sheet files (files named in the form of "001_HDPlan1.dgn" that contain standard borders.)

Step One: Making a Batch Print Job

The *Batch Print* utility **(File** > **Batch Print/Plot(DOT))** is MicroStation's "one-stop shopping" for plotting. It's going to make sure our plots are made to the right scale, to the right plotter, and with the right elements showing or not showing. It will also allow us to plot out files one by one, in specific groups, or all at once. Naturally, this takes a little bit of setup...

First, select **File > Batch Print/Plot (DOT)**. This brings up the *Batch Print* dialog (Figure 1-30).

- Selecting the DOT option will open a dialog to your PIN directory, giving you the option to select a previously saved *.job* file. Hit *Cancel* if you would like to setup your own at this time.

- The caption below (Figure 1-30) is for U.S. Customary units, based off the working units of your project MicroStation will launch a different *Batch Print* dialog with changes to the **Specifications Controlling Printing** area.

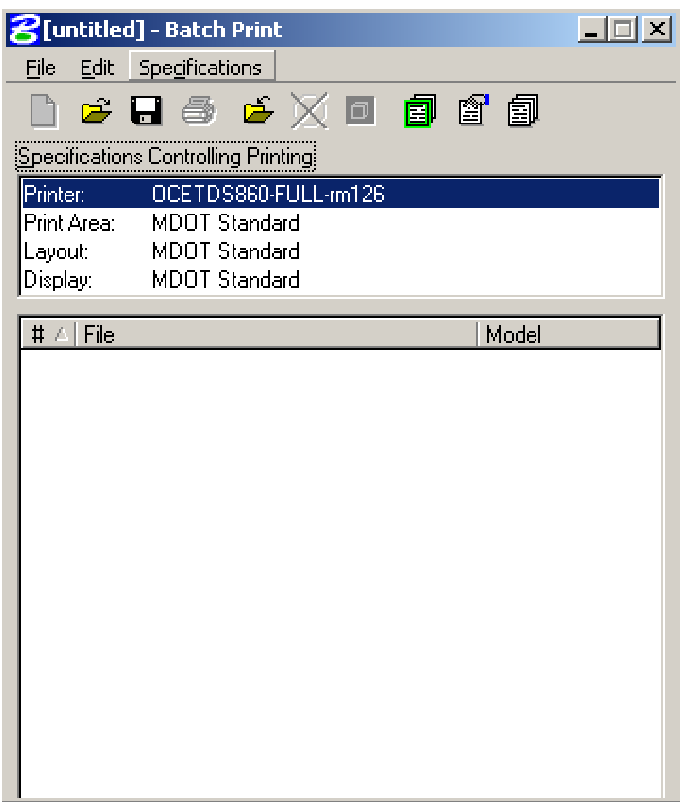


Figure 1-30: Batch Print dialog

This dialog allows you to create a *Batch Print* "Job." A Job has two parts: a list of files and a list of specifications. The files are simply the .dgn files that *Batch Print* is going to plot for you, and they'll be listed at the bottom of the dialog under the *Design Files to Print* area.

The Specifications control *how* these files are going to be plotted, the extents to be plotted, which printer they'll be sent to, which elements will be dithered, etc. There are four specific specifications: Printer, Print Area, Layout, and Display.

Step Two: Add Design Files

Next, select the files you want to include in your *Batchplot*. Click the **Add Design Files** button (Figure 1-31) on the *Batchplot* dialog.

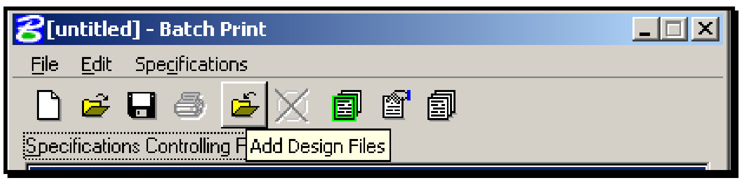


Figure 1-31: Add Design Files

This brings up the **Select Design Files to Add** dialog (Figure 1-32).

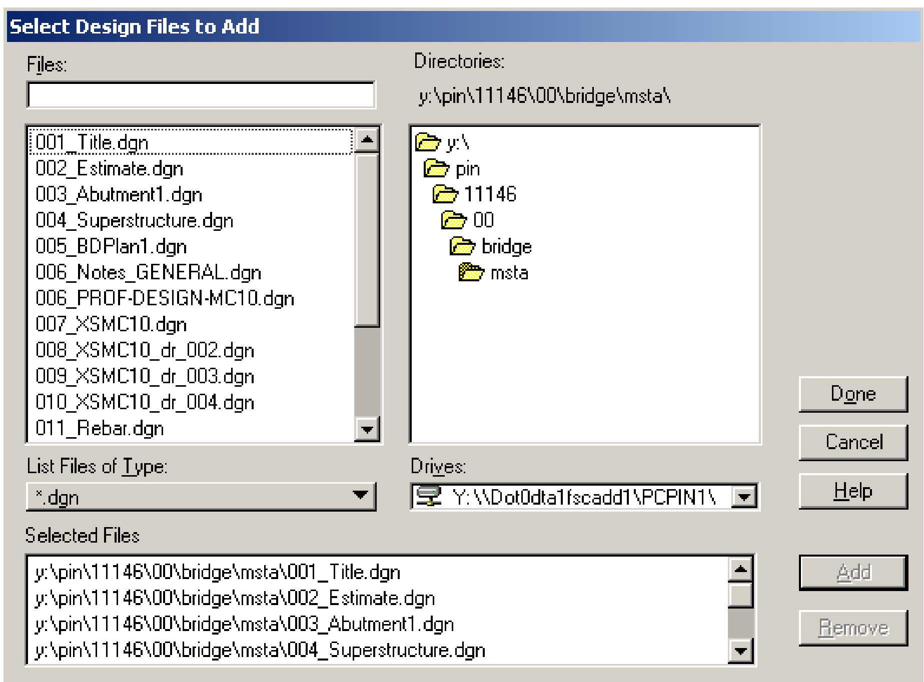


Figure 1-32: Select Design Files to Add

Select all of your sheet files from the file list at the left. When they are highlighted, press the **Add** button at the bottom of the dialog. Don't just select the files that you want to print right now. Pick all the sheet files in the job. *Batch Print* will allow you to print them out one at a time if you want. Notice the file names are now displayed in the **Selected Files** list. When you have added all the files, push "**Done**".

♬ MicroStation V8.5 and higher allows the user to sort their files in ascending or descending order based on their file name. Click the *Name* column (acts like a toggle) to sort in either direction. Depending on the plotter you are sending it to will determine how you want to sort them.

Step Three: Set Specifications

Part One: Set Printer

From the **Specifications Controlling Plotting** area, select the **Printer** line. The Printer specification chooses a plot output location and a sheet size. Push the **Select Specification** button to see the options (Figure 1-33).

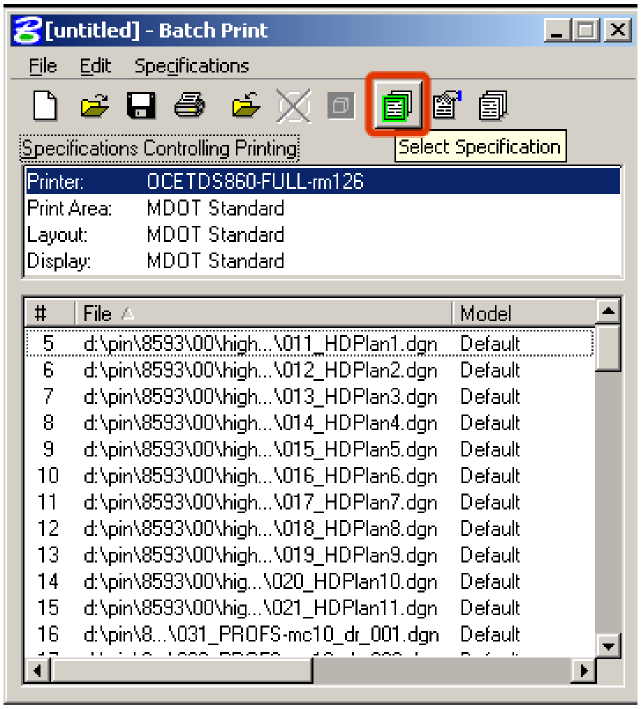


Figure 1-33: Batch Print Dialog

Notice that there are many selections here (Figure 1-34). The caption only shows seven, however, there are many to choose from as outlined previously. Select the plotter you wish to plot to.

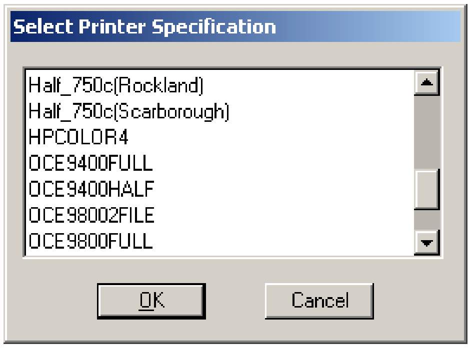


Figure 1-34: Select Printer Specification

Depending on the printer and sheet size you want, select the printer (i.e. OCETDS860-full-rm126) from the **Select Printer Specification** dialog and click **OK**.

Part Two: Set Print Area

The **Print Area** options determine what element you are looking for in a design file to print to. When plotting to a printer (81/2 x 11) select *printer, printer_color or Standard Details.* All other plan sheets should be plotted to the *MDOT Standard* option.

Part Three: Set Layout (not necessary)

The **Layout** specification does not need to be touched.

Part Four: Set Display

The **Display** specification controls which elements are plotted (for example, it can be used to turn off the display of all construction elements prior to plotting.) It is also responsible for attaching *Pen Tables* to the plot. We are using *Pen Tables* for a couple of purposes, including automatic sheet numbering and dithering survey information.

Select the **Display** selection in the *Specifications Controlling Printing* dialog and push the **Select Specifications** button (Figure 1-33).

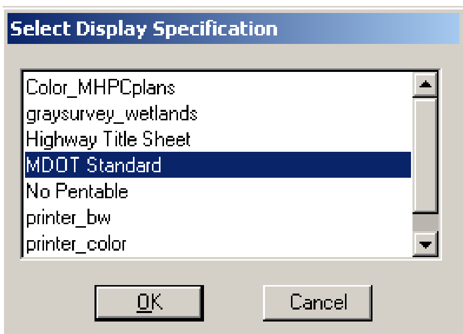


Figure 1-35: Select Display Specification

The default option is “oce” for Metric projects and “MDOT Standard” for U.S. Customary projects (Figure 1-35). This utilizes the *!pentable* and will make sure that sheet numbering happens correctly, survey files dither in our plot, and that grid lines are plotted underneath the proposed design. For explanation of additional pen tables, refer to their breakdown previously outlined in this Chapter.

Part Five: Save Job File

Now that we have our file list and specifications set, it’s time to save this *Batch Print Job*. On the **Batch Print** dialog, select **File > Save**. This brings up the **Save Job Set File** dialog (Figure 1-36).

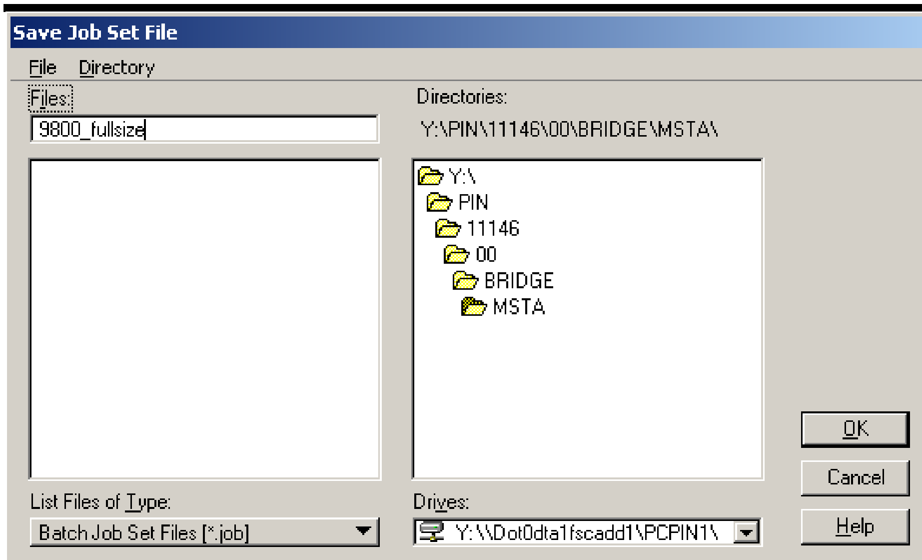


Figure 1-36: Save Job Set File Dialog

To make it easier to use this .job for the duration of the project type in a name that reflects both the sheet size and the plot location. For convenience, keep the .job file in your workgroups **\msta** directory of your project folder (this should be the default option.) When you've named the .job file, press **OK**. You have now successfully created a *Batch Print Job*.

Step Four: Printing with Batch Print

♬ MicroStation V8.5 and higher allows the user to sort their files in ascending or descending order based on their file name. Click the *Name* column (acts like a toggle) to sort in either direction. Depending on the plotter you are sending it to will determine how you want to sort them.

✓ ***Refer to the plotter listing on page 1-32 to determine whether or not the plots will come out in ascending or descending order.***

Now you can select one or more sheets to be plotted (using Ctrl key to pick and choose or Shift key to select a range). If you want to print all files, push print without selecting any files.

Click the *Print* icon or select **File>Print…**

The *Print Batch* dialog will open (Figure 1-37). If you made a selection, you will be prompted as such or if you did nothing, the all button will be defaulted. If you meant to select all, you can pick it now. After you make a selection, press **OK**.

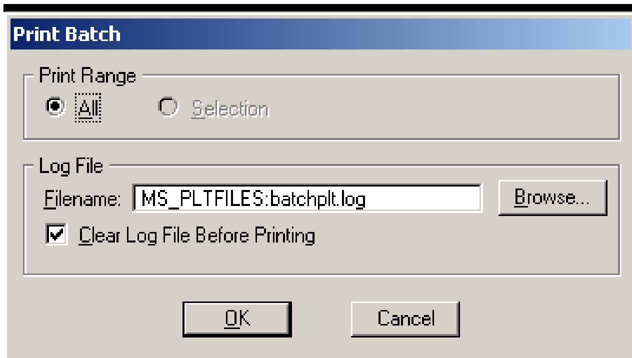


Figure 1-37: Print Batch Dialog

As the plots are being sent to the plotter, the progress will be displayed in another dialog. Wait until this is complete before trying to do anything else in your drawing.

Batch Print Troubleshooting

Batch Print also generates a **Log File** for troubleshooting purposes called *batchplt.log*. This file gets written to the same directory you are plotting from. Open Windows Explorer and browse to this location (i.e. Y:\pin\11146\00\Bridge\MSTA\). Open this file and look for an error statement or for the last file that was actually plotted.

Some common problems are, the file does not contain the *clip boundaries* necessary to define the plot area, or a small filled shape exists on one of your drawings. An example of a small filled shape could be a radius of a side road that is shaded on a Title Sheet. In this case, select the whole drawing and scale it up 100 times. Now the shape should be able to be plotted. If this doesn't work, consider hatching this area with close line spacing.

PRINTING FROM AN EXISTING BATCH PRINT JOB

Once a *Batch Print Job* has been created for a project, printing is much more streamlined.

To print a file (or a group of files) that is part of a *Batch Print Job*, first open the **Batch Print** dialog from **File > Batch Print/Plot (DOT)**. This option will also automatically browse to your active PIN folder.

Choose the existing .job file (Figure 1-38) you want to print from and press **OK**.

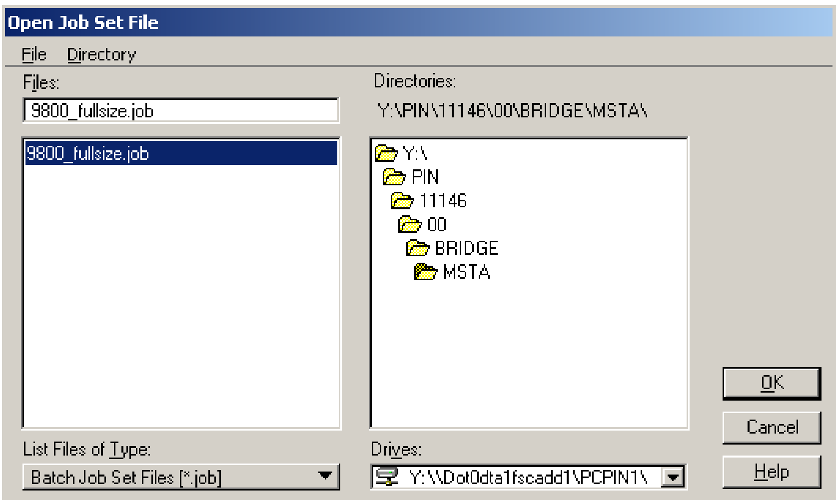


Figure 1-38: Open Job Set Dialog

On the **Batch Print** dialog, select the file or files you want to plot (Figure 1-39).

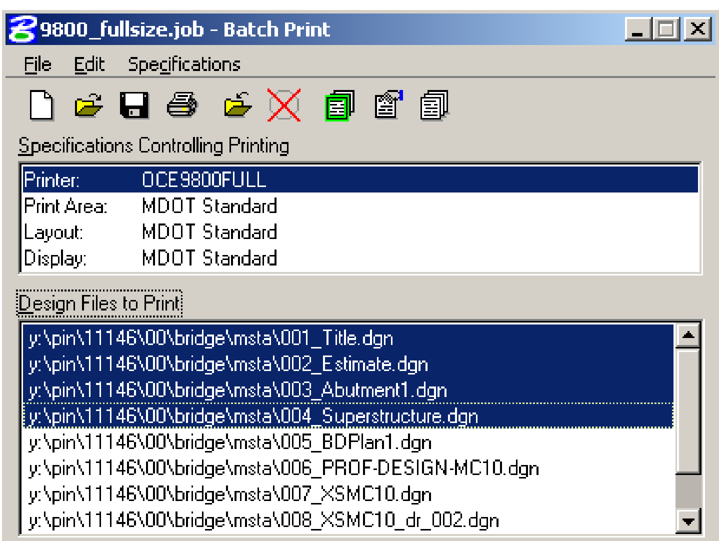


Figure 1-39: Pick Files to Batchplot

If you want to print all files, push print without selecting any files.

From the **Print** dialog, you have the option of printing **All** files, or just the **Selection** of files you made in the previous step (Figure 1-40).

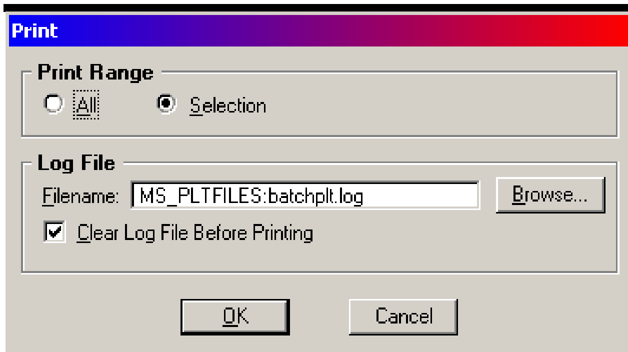


Figure 1-40: Batchplot Selection

Once you make a selection, push the **OK** button. As the plots are being sent to the plotter, the progress will be displayed in another dialog. Wait until this is complete before trying to do anything else in your drawing.

CREATING LONG PLOTS

Step One

Make sure you have the **Plan** *Settings Manager* by choosing **Settings > DOTSetMgrs > Plan Sheet Settings**. This should be autoloaded for you.

Right Click anywhere on the *Settings Manager* and choose **Category > Scale** and pick the scale you want to plot to (i.e. 1 in.=25 ft. or 1 in.=50 ft.). From the **USPlan** *Settings Manager* choose **Long Plots > [5 foot/ 10 foot/ 15 foot/ 20 foot/Plan Sheet HP Plotter/Plan Sheet OCE Plotter]**

ⓘ ***It is important that you remember which border size you used in order to set your paper size when you print.***

Step Two: Placing the Cell

You should see the plot boundary on your cursor. You will place it with two clicks. The first places the origin of the cell. The second allows you to spin the cell around the origin point (Figure 1-41).

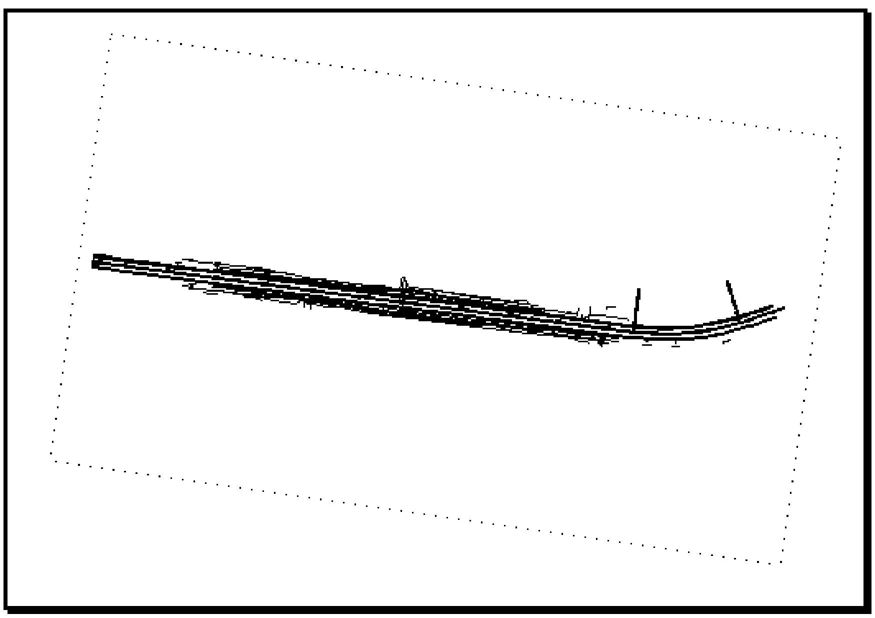


Figure 1-41: Long Plot Boundary

Step Three: Rotate View

Before we can print, we have to rotate our view. Select the **Rotate View** button in the lower left hand corner of window 1 (Figure 1-42).

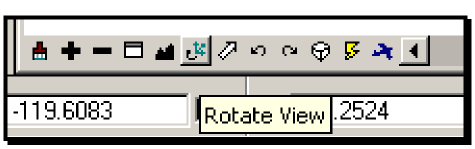


Figure 1-42: Rotate View Button

Select the **3 Points** method from the *Tool Settings Window* (Figure 1-43).

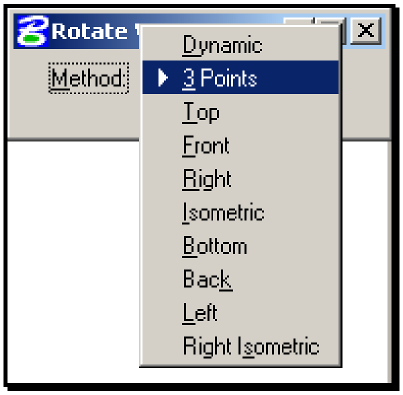


Figure 1-43: 3 Points Method

The “three points” specify the x origin, positive x direction and positive y direction of your view. Choose your first two points by snapping to the two corners of the boundary.

♫ Always define the two points in a left to right motion.

Your third point defines the positive y direction. Snap to an area of the screen that would be above the left to right selection of the two previous points.

ⓘ ***Picking these points in the wrong order can result in flipping your design upside down. Correct this by Rotating the view again, setting your Method to Top* (Figure 1-41).**

It is recommended to rotate your view horizontally as shown in (Figure 1-44).

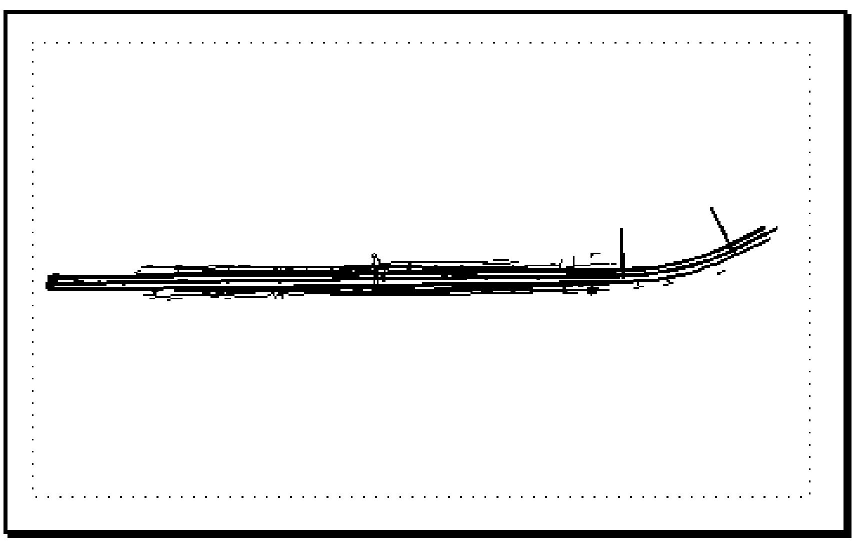


Figure 1-44: Vertical Long Plot View

Step Four: Printing

Place a fence on the boundary you just rotated.

From the main menu select the **File** > **Print** option.

In the **Print** dialog select **File> Bentley Driver…** or the **Magnifying** button (Figure 1-45).

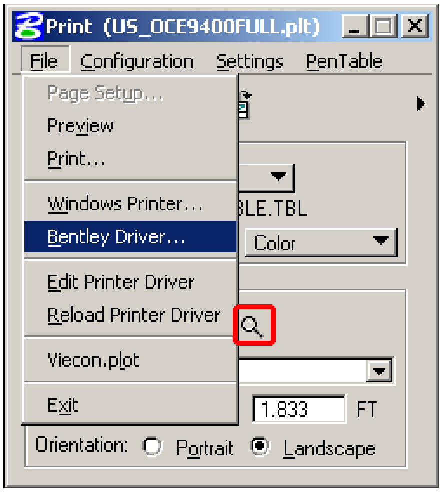


Figure 1-45: Plot Driver on the Print Dialog

You should see a list of plot driver's display for you. Select a driver that matches the type of plot you are sending. Use a driver with "**LONG**" in the name for **5, 10, 15** or **20** foot long plots, or use a driver with "**FULL or HALF**" in the name for "Plan Sheet" size clips.

The possible plot boundary shapes allow for a maximum plot size of 20 feet. There is no reason to change your **Paper:** size in the **Printer and Paper Size** area of the dialog (Figure 1-46). Leave it set to the defaulted **20FTPLOT** for any size.

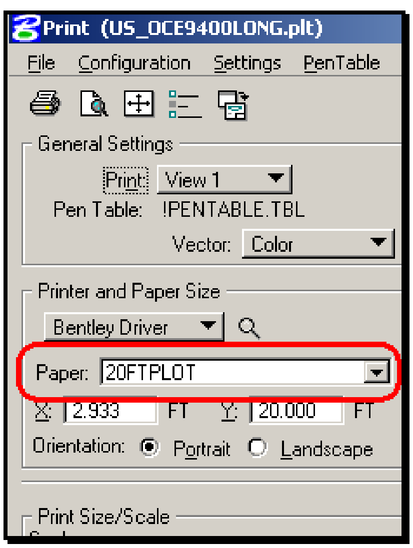


Figure 1-46: Page Setup on the Plot Dialog

♬ Based on the rotation you used in your view, it may be necessary to toggle the **Rotate 90** on or off to plot correctly (Figure 1-47).

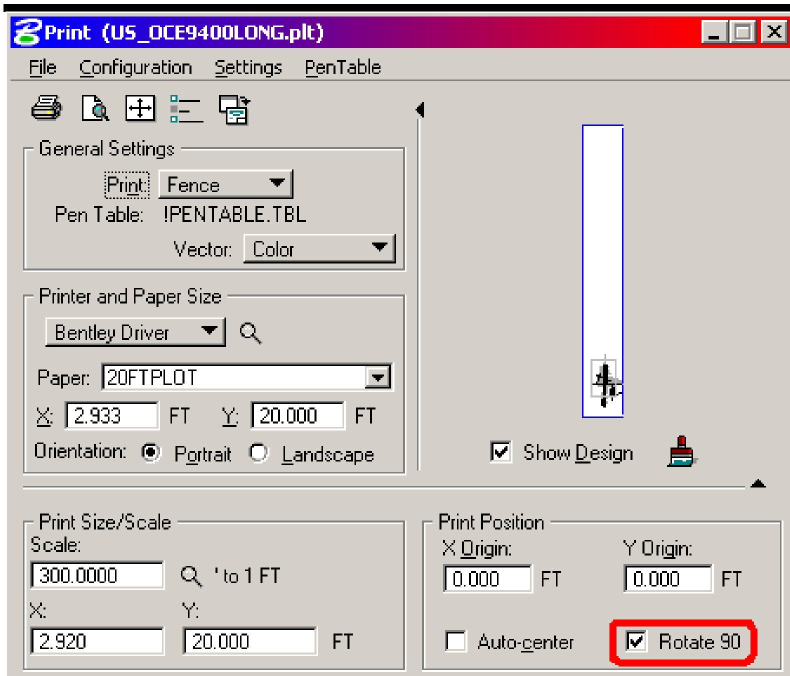


Figure 1-47: Print Rotate 90

ⓘ ***The processing time for long plots will be a little longer than a normal plot but we still need to be prompt in retrieving our plots so that they don't jam the plotter and also doesn't end up all over the floor.***

FENCE PLOTTING TO SCALE

It is easy to create a scaled print by placing a fence in the area you want. In the following example we are going to print an area to 1 in. = 25 ft.

Step One: Place Fence

Place a fence around the area you would like to print (Figure 1-48).

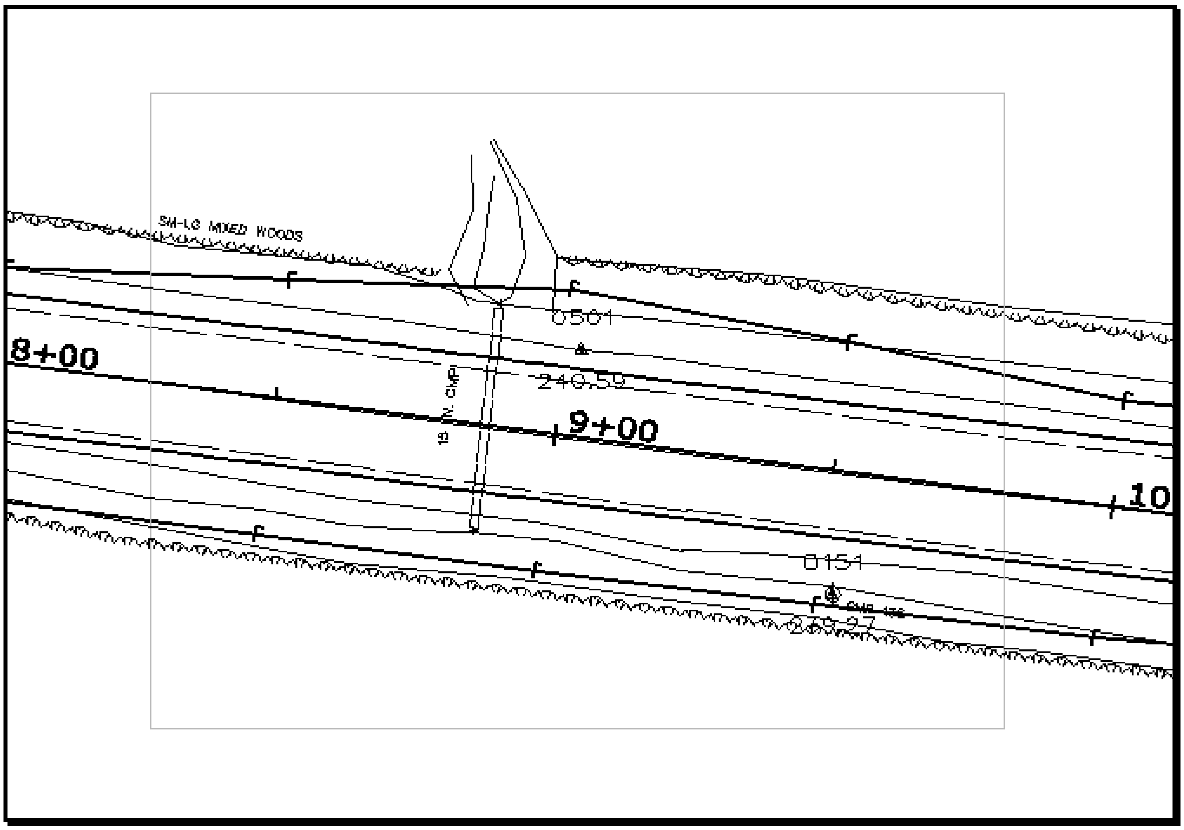


Figure 1-48: Place Fence

Step Two: Setting Scale

Select **File>Print** from the *Main Menu*. Expand the **Print** dialog so you can see the **Print Size/Scale** area, in the lower left hand corner of the dialog. In (Figure 1-49) we have our **Scale:** options set to "**':" to 1 FT**", this means we need to apply an absolute scale of "**300" (12 in. x 25 = 300)** to get a 25 scale plot (Figure 1-50). You could change this option to "**':" to 1 IN.**" by selecting **Settings>Units>IN** from the **Print** menu. This would allow you to set the **Scale:** to "**25**" (Figure 1-51).

♫ You are only allowed to change the scale option to a larger number than what is displayed when opening the *Print Dialog.* If you can not get the desired scaled print you want then consider either making the fence smaller or changing paper size.

If you have set your desired scale then select either the **Print** icon or **File>Print…** from the menu.

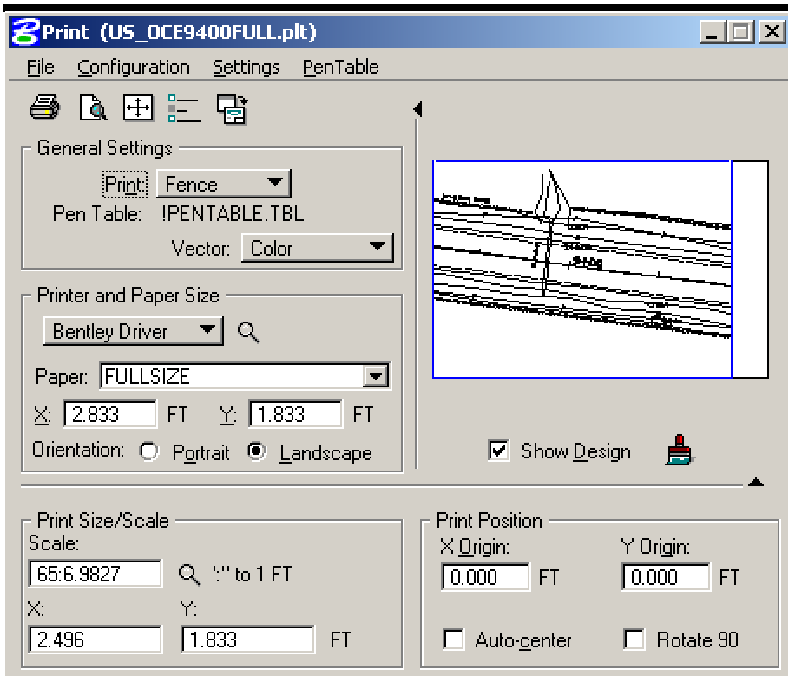


Figure 1-49: Scaled Printing by Fence

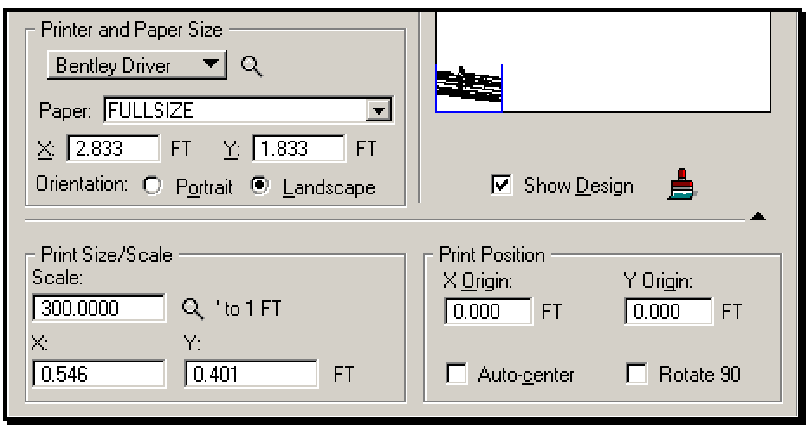


Figure 1-50: Scale Change Master Units

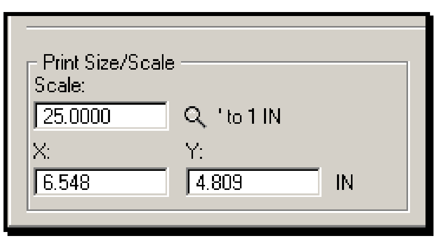


Figure 1-51: Scale Change Sub Units

COLOR PLOTTING

Using a combination of file referencing techniques it's possible to make plans that will print out in full color. It requires that you put all of your color-filled areas in a single file, then reference that file to your border along with your line drawings. Use a color plotter (i.e. **US_HPCOLORRoom303.plt**) plot driver to make your final printout.

File Setup

Start by making a new file to put your coloring in. It's probably quickest to start by opening the file you want to color, then from the menu, select **File > Save As** or by selecting **File>Make Sheetz**. Name your file beginning with a "c_" prefix to point out that the file is color.

Plotting to PDF

Create MicroStation PDFs

♫ A .pdf file is only a "snapshot" of the file at its present state. Any changes made to the MicroStation file will not be represented in the .pdf without recreating it. Without the PDF writer software, you can't add and remove .pdf sheets as they change, you would have to re-create the whole multi-page .pdf or send them as single sheets.

Option One: Creating a single PDF

Creating a .pdf is as easy as printing to a plotter. A single file can be created as a .pdf by placing a fence around the drawings plot boundary and picking the plot driver **pdf-fullsize** (select the US version for US Customary project) from the plotdrv folder. The file will be created in your active MSTA directory. *Print Exec Workgroup* can use the .pdf to print full size or scale the .pdf to halfsize if that's your desired hardcopy size. It is recommended that a user create a separate folder for the single .pdf and replace older ones as changes to the drawings are made.

Option Two: Batch Printing to a Multi-page PDF

When Batch Printing, select the **pdf-fullsize** printer from available printers. Add the files you want to print, select **pdf_bw-Fullsize** from the available printers and select print. When the *Print Batch* dialog opens (Figure 1-52), add a **file name** and **.pdf** extension (i.e. FinalPlans.pdf) in the *filename* portion of the dialog. Do not remove the MS_DEF: variable.

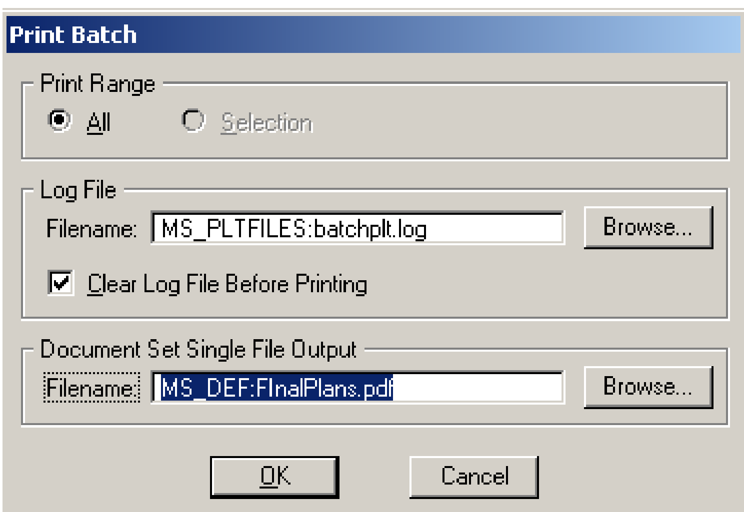


Figure 1-52 Print Batch dialog. Add the filename with the .pdf extension.

The file will be created in your active MSTA folder. *Print Exec Workgroup* can use the .pdf to print full size or scale the .plt to halfsize if that's your desired hardcopy size.

Printing PDF

A user can print a PDF document as Full Size or Half Size, in reverse order and request multiple copies. When there are vertical sheet internally to the PDF, these sheets will need to be rotated 180 degrees in the hard copy plan set. To bypass this issue, the sheets can be rotated electronically to appear as landscape sheets along with the rest of the internal pages. This can only be done by someone with PDF Writer software. Either the Reproduction staff or someone with this Adobe Professional software can finalize the PDF for printing or simply rotate the stack of sections manually.

Rotate Vertical Pages with Adobe Professional (Optional)

Vertical Cross Section pages need to be rotated 90 degrees counter-clockwise so that they are printed correctly with the binding edges matching all the other pages in the plan set.

Select the *Pages* tab and locate the vertical pages (if any exist). Select the first sheet that requires rotating. While holding the *Shift* key, scroll to the last vertical page. Release the *Shift* key. Right-click on the selected pages and select **Rotate Pages…** (Figure 28-10).

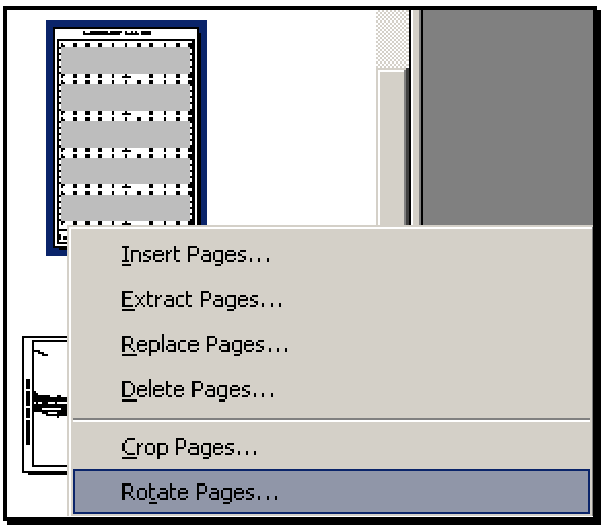


Figure 1-53: Right-click and select Rotate Pages

In the *Rotate Pages* dialog (Figure 28-11), adjust the *Direction* to **Counterclockwise 90 degrees.** Verify that the *Page Range* is set to **Selection.** Click **OK.**

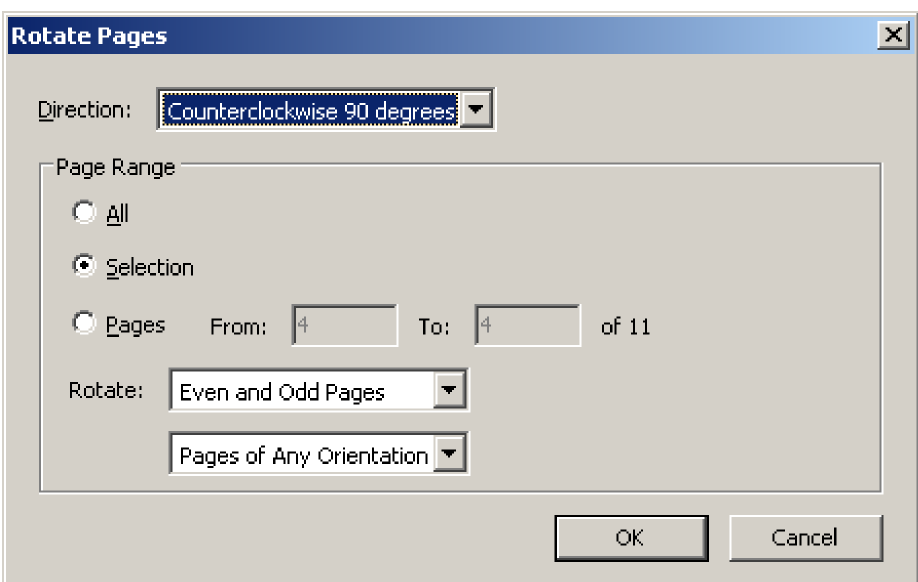


Figure 1-54: Rotate Pages dialog

Save the PDF Document

Select **File>Save** from the main menu.

Print to OCETDS600 or OCETDS800

Adding a Printer

Printing the PDF will require that the OCETDS600 or OCETDS800 has been added as one of your available printers. If it isn't, open *Windows Explorer* and browse to the \\Dot0dta1psprint\ folder (or click the underlined link in the electronic document). Double click the **OceTDS600-Rm312** or **OceTDS800-Rm126** printer in the list (Figure 28-12).

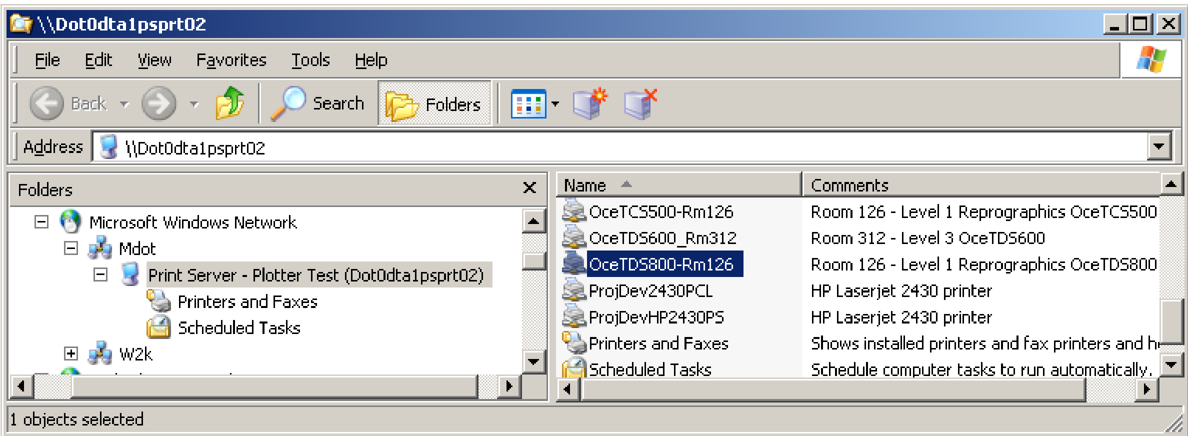


Figure 1-55: Double click the OceTDS800-Rm126 to add the printer

Printing the PDF Document

Open the PDF document. Select **File>Print.** Select the printer from the *Printer Name* pull down. Set the *Print Range* to **All.** Place a check mark in the **Reverse pages** box. In the *Page Handling* portion of the dialog, set the number of copies desired (if more than one, place a check mark in the collate box), set the *Page Scaling* to **None**, place a check mark in the *Auto-Rotate and Center* box and place a check mark in the *Choose Paper Source by PDF page size* box (Figure 28-13).

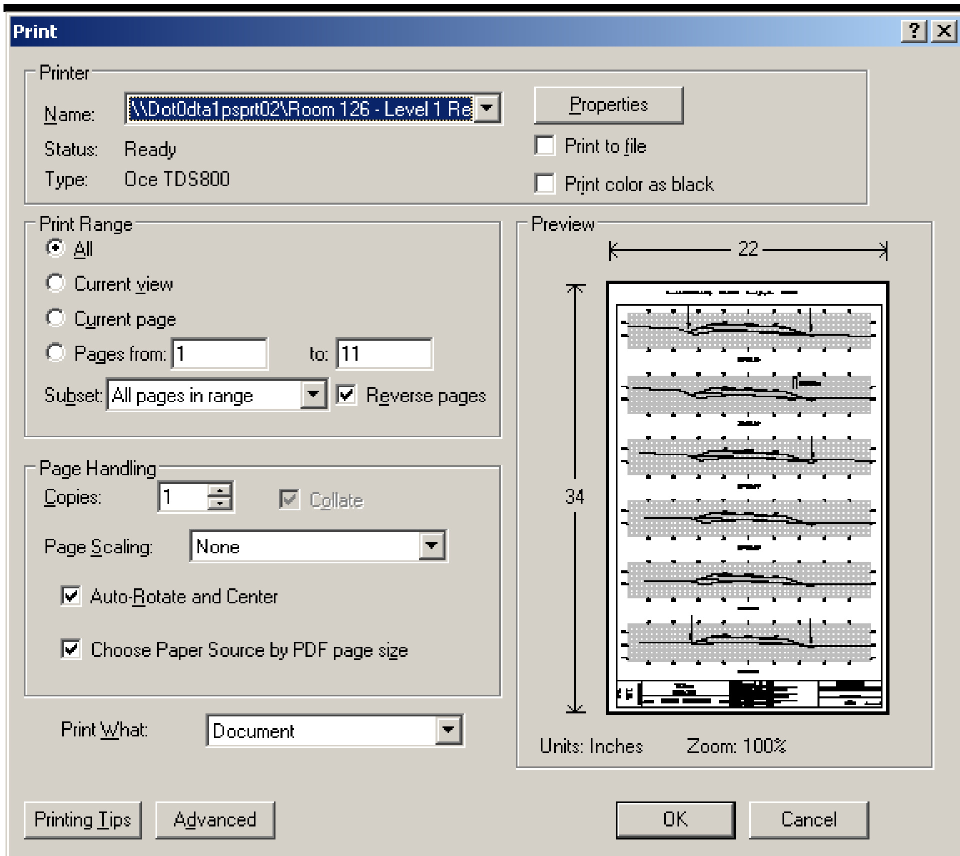


Figure 1-56: Print dialog with adjustment made for a Full Size US Customary project

Select *Properties.* Depending on whether you want a Full Size or Half size plot or whether it's a metric or U.S. Customary project, will depend on the settings you choose. Select the **Refresh** button on the *Basic* tab to refresh the list of page sizes available and make the adjustments necessary.

- **Full Size U.S. Customary Project –** Set the page size to **Oce D 22x34 in.**
- **Full Size Metric Project –** Set the page size to **Oce D+ 24x36 in.**
- **Half Size U.S. Customary Project –** Set the page size to **Oce B 11x17 in.**
- **Half Size Metric Project -** Set the page size to **Oce B+ 12x18 in.**

In addition to these setting, the OCETDS600 (only) will need one more adjustment for half size plots. Select the *Layout* tab (Figure 28-14). In the *Custom Scale* portion of the dialog, place a check mark in the *Keep Aspect Ratio* box. Adjust the *Custom Scale* to **50%.** Click **OK.**

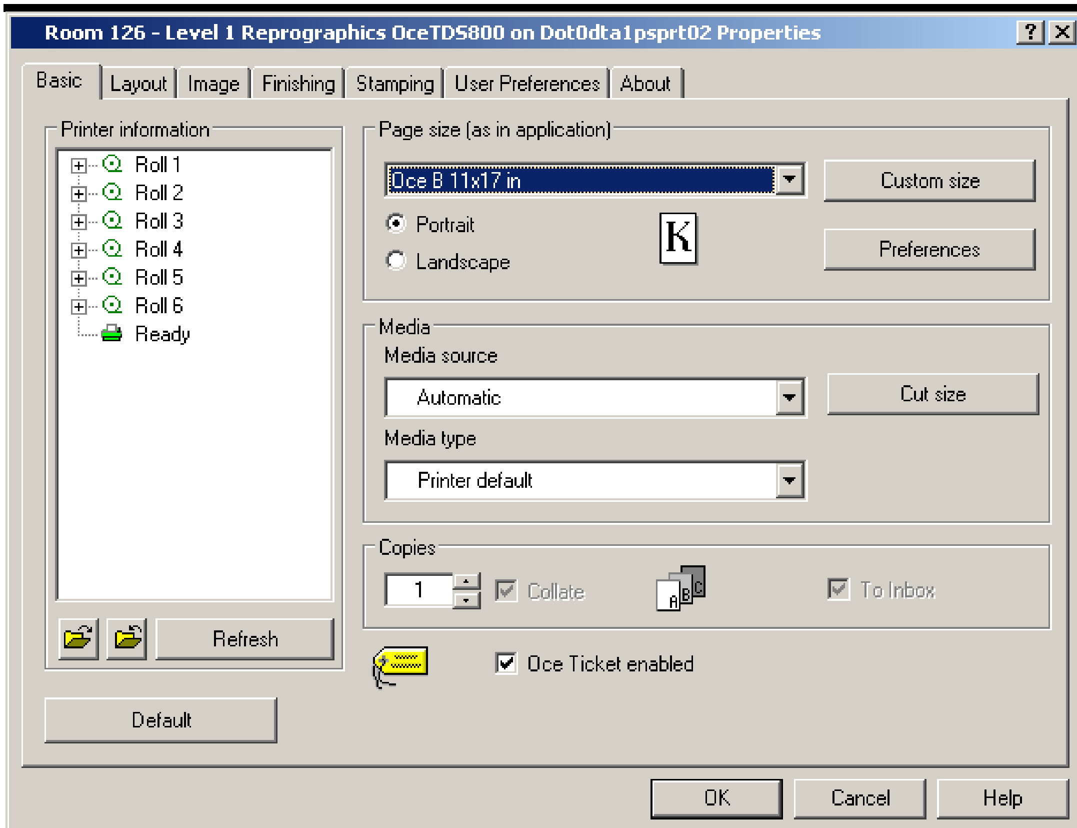


Figure 1-57: Adjusting the Custom Scale for Half size plots

♫ The *Preview* portion of the *Print* dialog will not display the correct dimensions for a half size plot, however, the 50% scale will happen when it reaches the plotter.

Select **OK** to start printing the PDF. A progress bar will appear displaying the printing progress.

PLOTTING TO PLT

Create MicroStation PLTs

- A plot file is only a “snapshot” of the file at its present state. Any changes made to the MicroStation file will not be represented in the plot file without recreating it. It is recommended that a user create a separate folder for the plot files and replace older ones as changes to the drawings are made.

Option One: Single Sheet Printing to .plt

Creating a plot file is as easy as printing to a plotter. A single file can be created as a plot file by placing a fence around the drawings plot boundary and picking the plot driver **PLOT2FILE** (select the US version for US Customary project) from the plotdrv folder. The file will be created in your active MSTA folder. This is a full size plot .plt (.000), however the *Print Exec Workgroup* can scale the image to halfsize if that’s your desired hardcopy size.

Option Two: Batch Printing to .plt

When Batch Printing, select the **PLOT2FILE** printer from available printers. The files will be created in your active MSTA folder. *Print Exec Workgroup* can use the .plt to print full size or scale the .plt to halfsize if that’s your desired hardcopy size.

USING PRINT EXEC WORKGROUP

Overview

This program is used to submit up to 100 files (per job) at once to the black and white OCETDS860 (Reproduction Room 126) & OCETDS600 plotter (RM312) at MaineDOT in Augusta. You can create multiple jobs when a project is over 100 sheets or create a multi-page .pdf. The user can save and retrieve jobs when additional prints are necessary. The Print Exec Workgroup application is a replacement for the Oce Job Director that some people may have used in the past to send CADD plot files (.plt) or .tif images from a CD archive. It will not handle .dgn files directly. You must create one or the other to take advantage of the job capability in Print Exec Workgroup.

Help

This document is not intended to cover all options within Print Exec Workgroup. A PDF help document provided by OCE on their product fully describes everything you need to know about Print Exec Workgroup and more. A HELP menu is also available internal to the application. To review the PDF document, click this link → OCEPrintExecWorkgroup or browse to \\dot0dta1fscadd1\pcpin1\msworksp\documentation\mdot\OCEPrintExecWorkgroup.pdf .

Plotters Available

OCETDS860-rm126

This plotter only has a table output delivery system which will print your jobs in reverse order unless you place a check make in the *Reverse Order* box.

If sending a multi-page PDF, *Batch Print* in reverse order and do not place a check mark in the *Reverse Order* box.

OCETDS600-rm 312

The OCETDS600-rm312 has two paper outputs trays available. The “table” option where plots exit in reverse order or an “Ascending order” option using the integrated tray on the top of the machine for plots to be sorted in Ascending order.

If sending a multi-page PDF, select the *Ascending Order* option as the preset configuration.

Step One: Adding Files to Print Exec Workgroup

Part One: Open Print Exec Workgroup

Click here →http://10.10.18.101 (OCETDS860-rm126) http://10.10.18.235 (OCETDS600-rm 312) or open a webpage and type the IP in the address bar, or pick it from your favorites menu. Click on the page to activate the controls. The opening page displays the plotter information. Click the **Submission** tab (Figure 1-58).

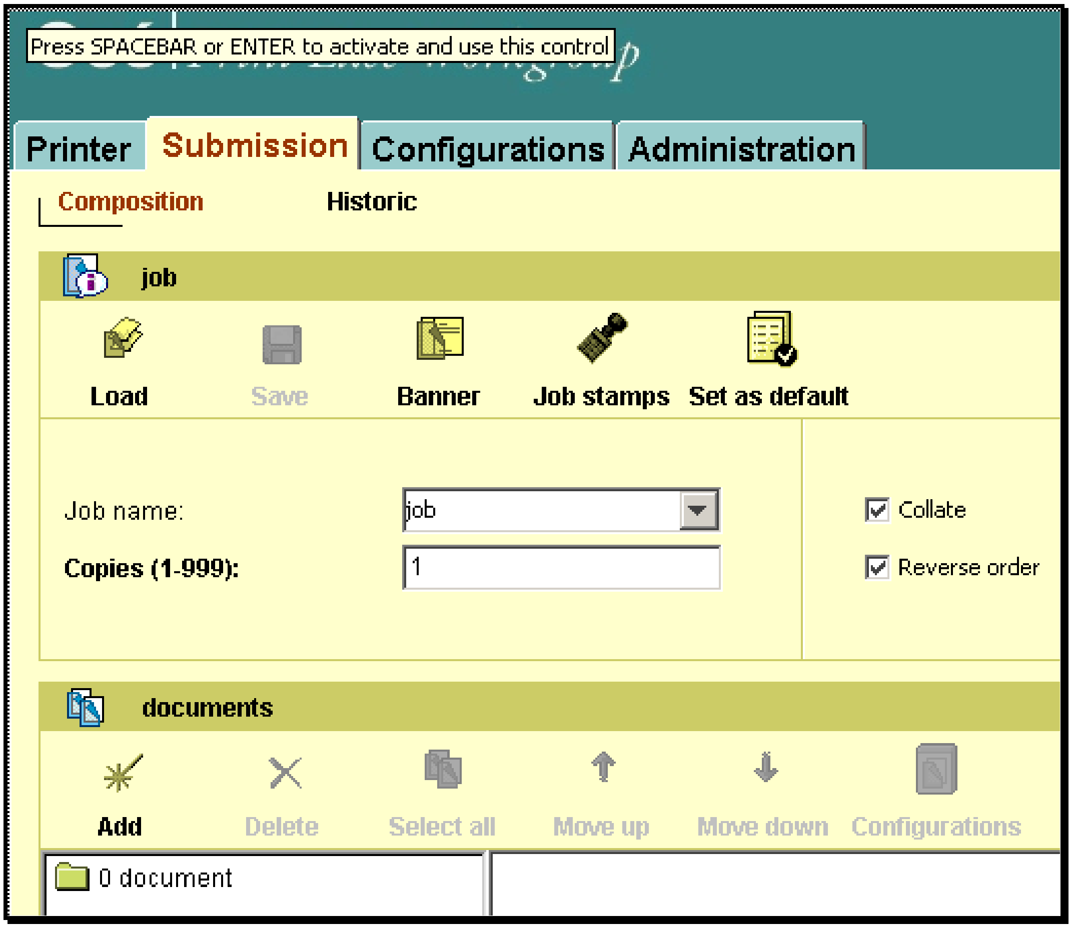


Figure 1-58 Print Exec Workgroup Dialog

Part Two: Select Add

In the *Documents* portion of the dialog, click the **Add** button (Figure 1-58). Click cancel to any warnings pop up saying that a link can't be found.

Part Three: Browse to File Location

Browse to your file location. Select them and click *OK* when finished adding files or *Add to Job* if you need to pick and choose files and/or browse elsewhere (Figure 1-59).

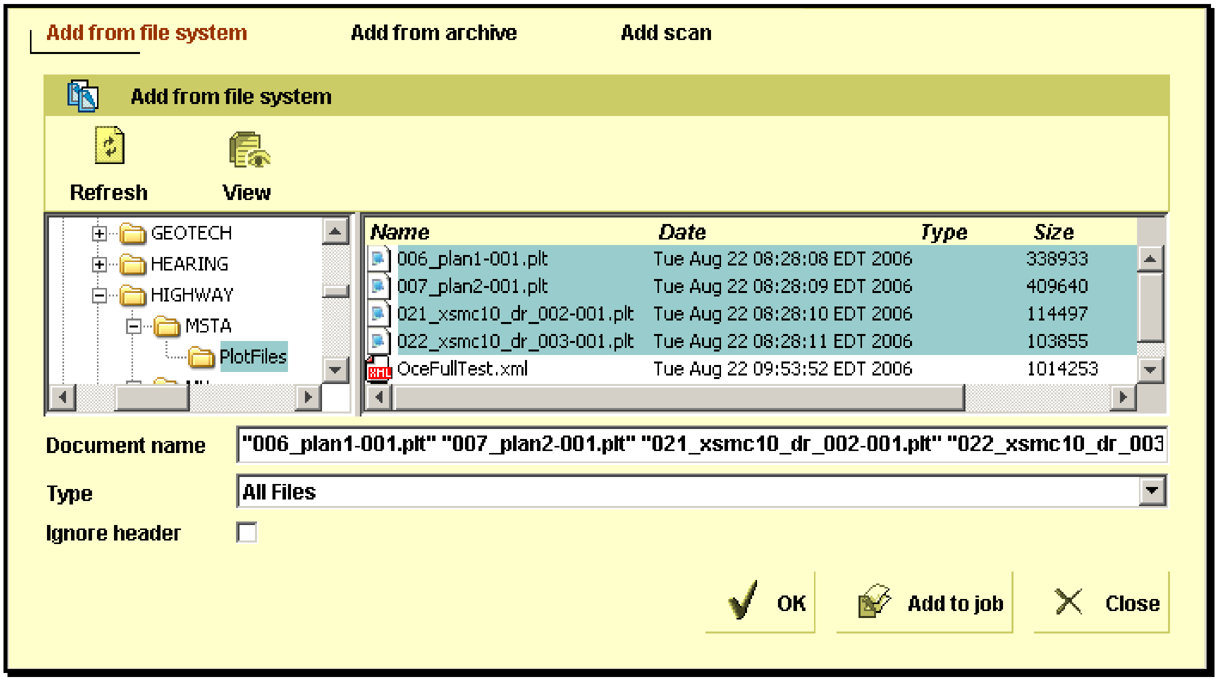


Figure 1-59 Add files dialog

Part Four: Check "Reverse Order/Collate"

Place a check in the **Reverse Order** button (Figure 1-58) so that the plots come out of the plotter with the last sheet first placing the first sheet on top (OCETDS860 or *Table* option on the OCETDS600). The OceTDS600 has a second paper handler for printing to *Ascending Order* that doesn't require *Reverse Order* sorting. Make a selection based on this information.

Place a check in **Collate** (Figure 1-58) if printing multiple copies.

Part Five: Select the number of Copies

Change the number of copies if more that one is required (Figure 1-58).

Part Six: Select Preset Plot Configuration

Highlight your files or click the folder above them to select them all. Click the **Configurations** button (Figure 1-58). Change the radio button to *All* (Figure 1-60). For full size plots, select **MicroStation_Fullsize**. For half size plots, select **MicroStation_Halfsize**. Click *Apply*. Click OK.

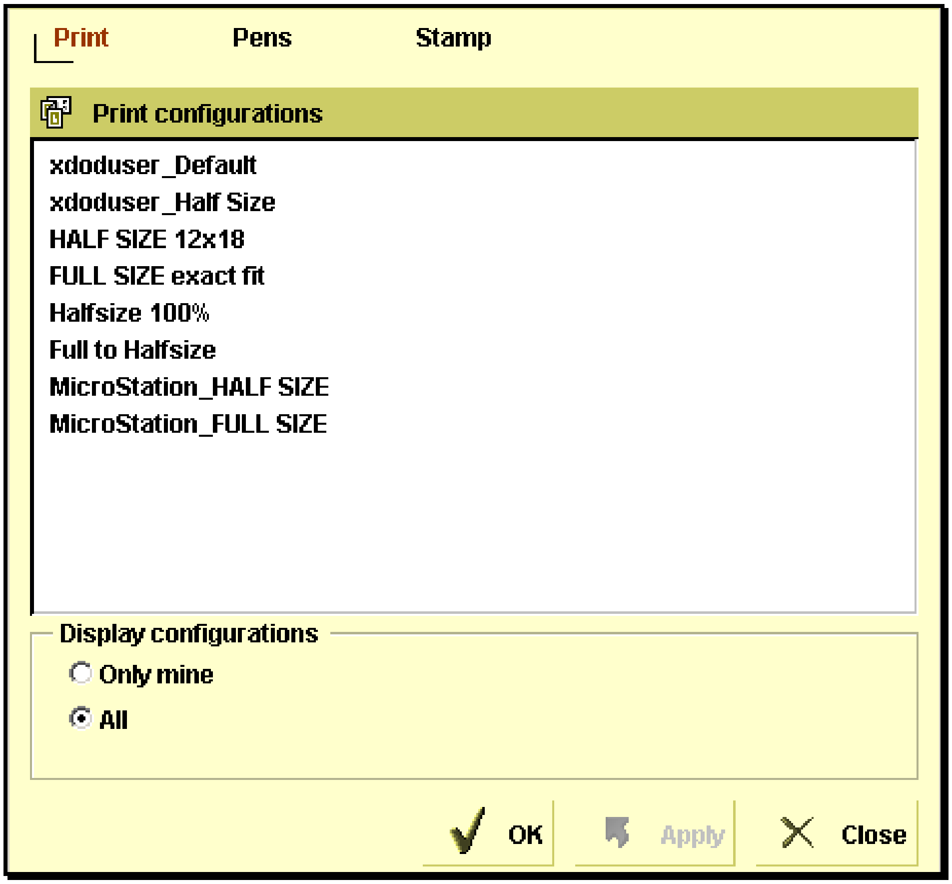


Figure 1-60 Select the appropriate MicroStation size.

Part Seven: Save Job with Documents (Optional)

Supply a name to your "job" file if you will need to recall it in the future. Saving the job with documents makes the job very portable and the job file larger (Figure 1-61). Using this option isn't necessary in most situations.

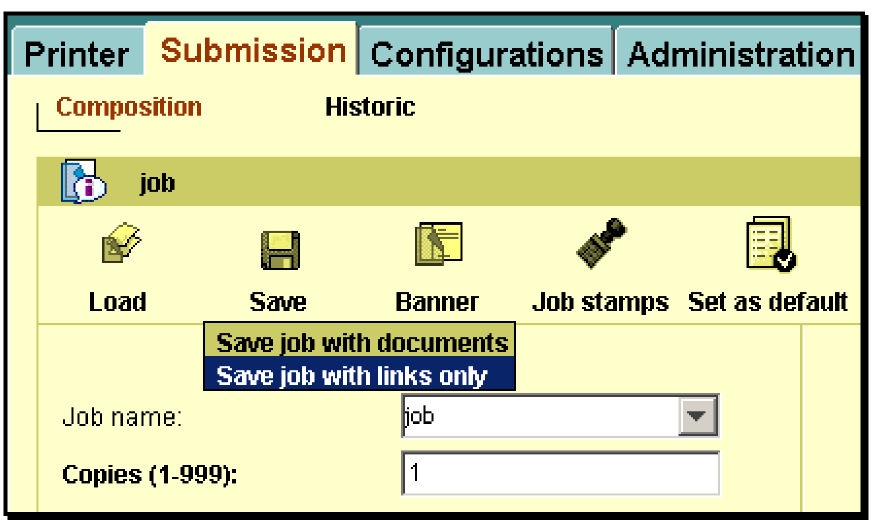


Figure 1-61 Save Job Options

Part Eight: Save Job with Links Only (Preferred Method)

Supply a name to your “job” file if you will need to recall it in the future. “Saving the job with links only” (Figure 1-61) makes the job file smaller and requires that your files (.pdf or .plt) are on the network. Make multiple job files for project with more than 100 pages in your plan set.

Part Nine: Print

Select the **Print** button.

Recalling a Previous Job

Click the **Load** button. Browse to your project location.

- ✓ ***For more information on Print Exec Workgroup, please refer to the internal help file or click this link → OCEPrintExecWorkgroup to open OCE’s user manual.***

Chapter 2 General Tools

FUNDAMENTALS

ELEMENT ATTRIBUTES

Setting Attributes

Every element placed in your MicroStation design file is placed with *Attributes*, including color, level, style, and weight. These are reflected in your **Attributes Tools Box** (Figure 2-1).

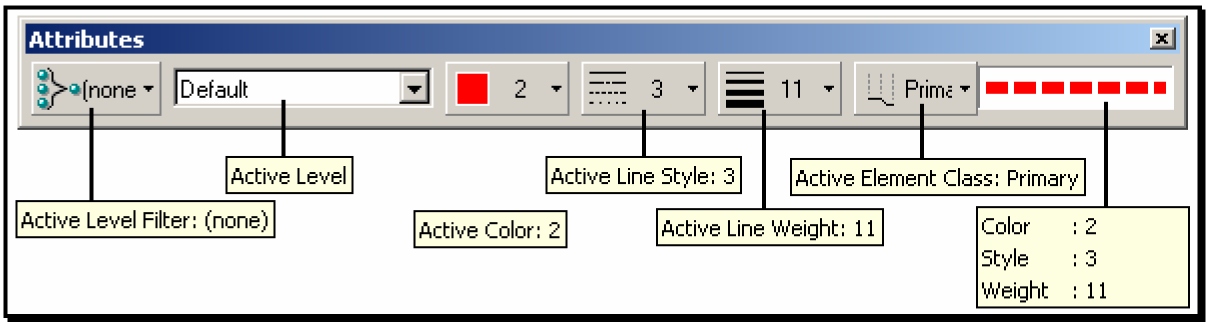


Figure 2-1: Attributes Tool Box

When you go to change an Element's Attributes, you can see these *Active Attributes*, along with another setting for your *Active Class* (Figure 2-2).

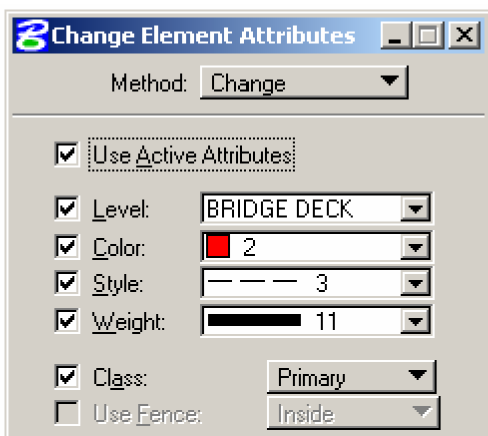


Figure 2-2: Change Element Attributes Setting

♬ Element Attributes can be matched by changing the *Method* to *Match/Change.* Making elements *Class-Construction* is a way of marking "junk" lines in MicroStation as. This makes it easy to avoid plotting them. You can turn off the display of *Construction* elements from the **View Attributes** dialog (**Settings > View Attributes**).

Settings Manager

You can let the *Settings Manager* take care of all these *Element Attributes* for you.

For example, choose **Exist. Roadway Lines > Sidewalks** from the **plan.stg** *Settings Manager* (Figure 2-3).

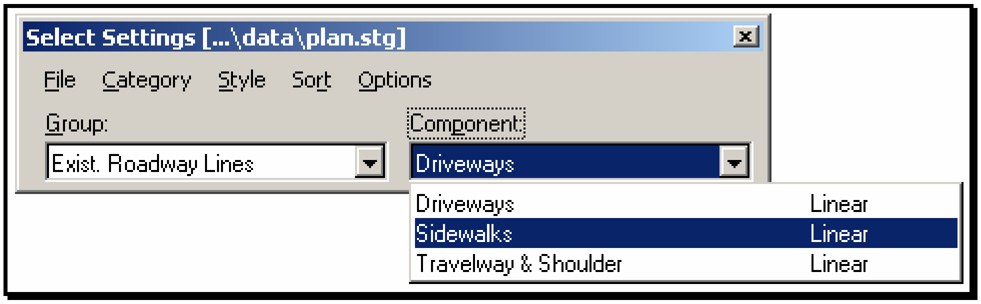


Figure 2-3: Pick a Component

This not only launches the *Smartline* command, it also sets your active color, style, weight and level for proper placement of existing sidewalk lines (Figure 2-4).

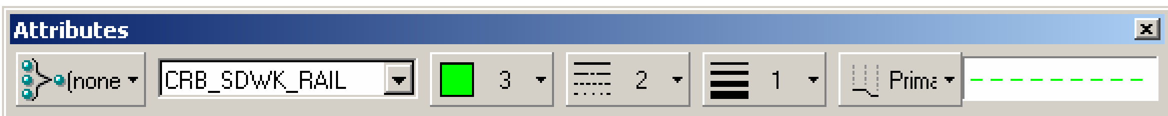


Figure 2-4: Sidewalk Setting

Level Display

The *Level Display* (Figure 2-5) can be launched from the main menu by selecting **Settings > Level > Display, Ctrl+E** or click the **Level Display** on the *Primary Tools* tool box.

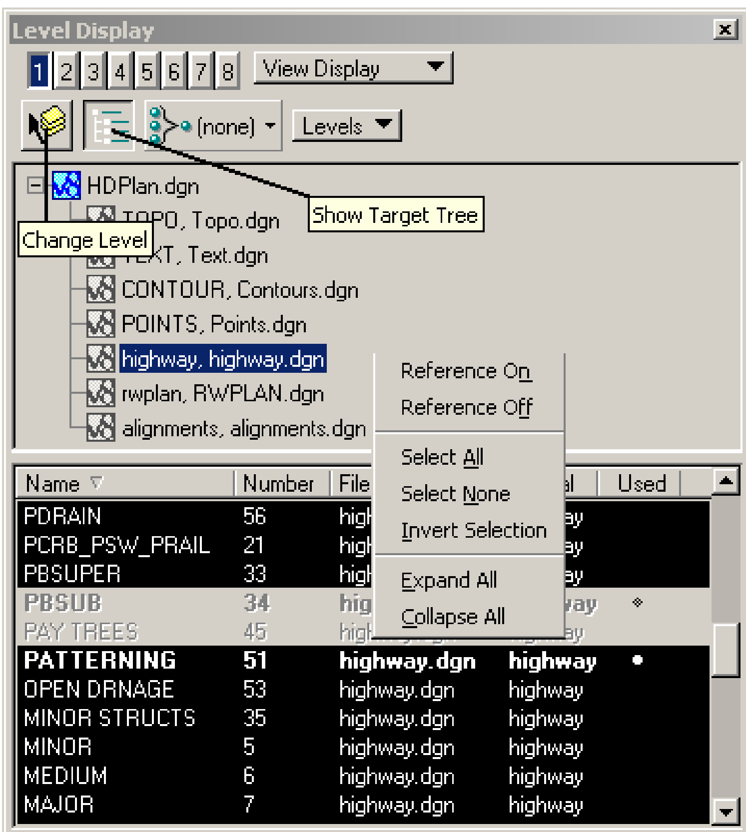


Figure 2-5: Level Display Dialog

This is a simple overview of some of the management options using the **Level Display.**

If the *Reference Files* or the active file is not displayed, **Click** on the **+** before the file, the **Show Target Tree** icon or **Right Click** and select **Expand All** from the menu to expand the file tree.

To toggle the display of levels in a file, **Click** a level if being used (white on black with a dot in the *Used* column) it will turn the level off and changes the white to black. If the level is off when clicked the change will be from black to white and turned on. All levels can be toggled by **Right Clicking** on a level and selecting **All On** or **All Off** from the menu. To turn off levels graphically, select the *Change Level* tool (Figure 2-5), in the *Level Display* dialog box, select the *Change Level* icon, choose **Level: Display Off** from the *Change Level Dialog* (Figure 2-6) and Data Hit the Element on the screen.

Figure 2-6: Change Level Dialog

The whole *Reference File* can be toggled by **Right Clicking** on the file and selecting **Reference On** or **Reference Off** from the menu.

Level Manager

The *Level Symbology* is now manipulated with the **Level Manager** (Figure 2-7). The *Level Manager* shown below does not display all of the columns available. By **Right Clicking** on the **Used** column header a menu appears showing other unchecked columns available. The *Level Manager* is displayed by clicking on the *Active Level* on the **Status Bar, Ctrl+L** or the *Level Manager* icon on the *Primary Tool Box.*

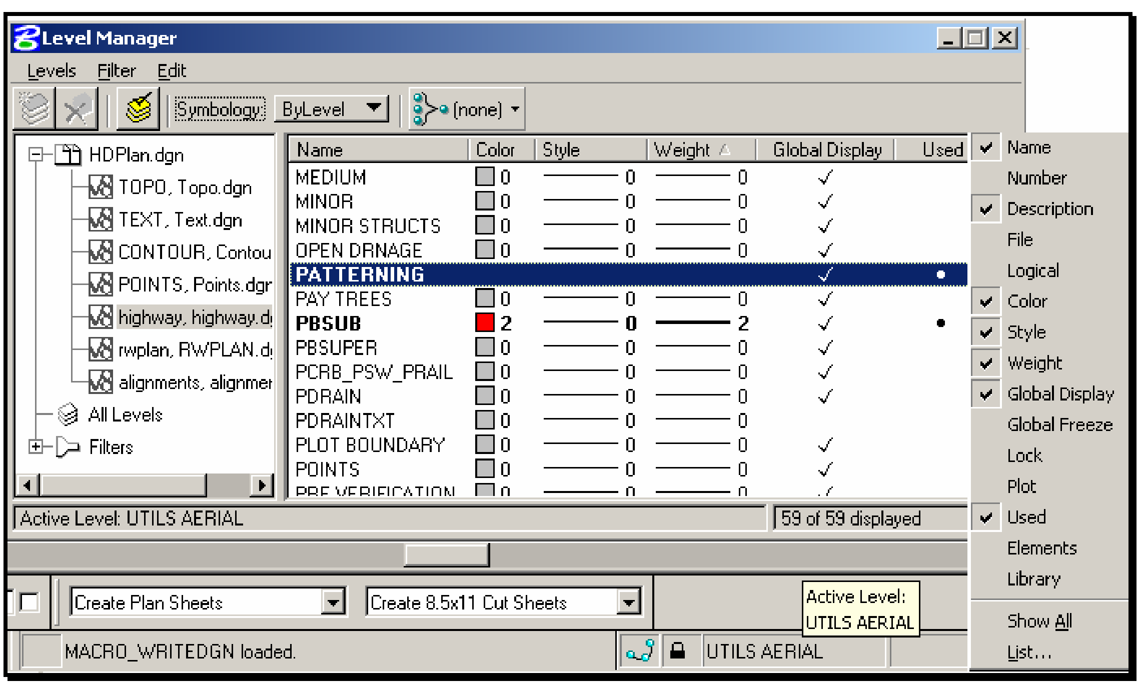


Figure 2-7: Level Manager Dialog

Most of our element symbology is set using the *Settings Manager* dialog. On occasion for viewing or plotting color, weight, or style needs to be manipulated without making actual changes to the element symbology. If necessary the *File Tree* can be expanded by clicking on the + beside the *Active File* in the *Level Manager Dialog.* Elements Symbology on every levels of each file can be changed by selecting the file on the left and the level from the right of the *Display Manager*. By clicking the checkmark in the Global Display column the graphic display of that level will be toggled on or off.

To use symbology by level switch the **Symbology** option to **ByLevel.** Click the desired Level Name, change the Color, Style and/or Weight and click **OK** to accept the change.

To override the symbology of a level switch the **Symbology** options to **Override**. **Right Click** on a level will bring up a menu with other options.

To view the symbology changes **Check** on **Level Symbology** and **Apply** in the *View Attributes* dialog (**Settings>View Attributes** or **Ctrl+B**). When the *Level Symbology* is uncheck the element attributes will return to normal.

SNAPS

Most of the elements placed are connected to previously placed elements. Snaps are use to accurately place points on a drawing. To tentative hit on an element **Snap Lock** has to be toggle on. To view the *Locks* (Figure 2-8) from the main menu **Settings>Locks>Full** or click the **Lock** on the *Status Bar* and select **Full**.

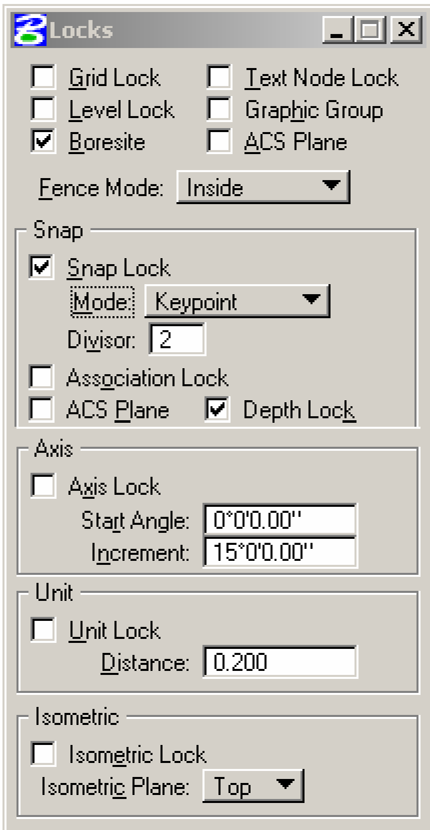


Figure 2-8: Locks Dialog

A *Snap Mode* can be locked by changing the **Mode:** in the Snap field of the *Locks Dialog* or by holding down the **Shift** key and selecting the *Snap Mode* from the *Status Bar*. To use the snaps for one snap, use *AccuDraw* shortcuts for some or select the snap from the *Status Bar*. For a complete list of *AccuDraw* shortcuts, click in the *AccuDraw* and type **"?" (Shift+?).** To view all the available *Snap Modes:* **Settings>Snaps>Button Bar** or click the Snap Mode on the *Status Bar* and select **Button Bar**. Right Click on one of the icons on the *Snap Mode Dialog* (Figure 2-9) and a menu of all the snap mode which can be toggled will appear.

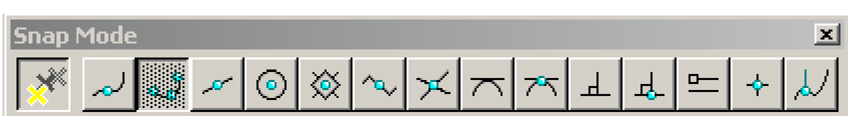


Figure 2-9: Snap Mode Dialog

Below is view and brief description of the available snap modes.

Toggles AccuSnap: Turns AccuSnap on and off

Nearest: A Point on the element nearest to the curser .

Keypoint: Locates an element keypoint: end, middle, center, etc. The snap most commonly used.

Midpoint: Midpoint of an element

Center: Center of circles, arcs, text, shapes, etc.

Origin: Origin of a cell, text justification, similar to the *Center Snap*

Bisector: Midpoint of an entire line string, multi-line, or complex chain, rather than to the midpoint of the closest segment.

Intersection: Intersection of two elements.

Tangent: Constrained to be tangent to an existing element.

Tangent From: Tangent from the existing element at the tentative point.

Perpendicular: Tangent to the existing element at the tentative point.

Perpendicular From: Perpendicular from an existing element

Parallel: A point parallel to an existing element

Through Point: A point through which the line you are placing will pass through

Point on Snap: A point along or extension of a element

AccuSnap

By hovering near a *Keypoint* of an element with the curser **AccuSnap** will display that point, the element, the type, level name and allow a *Data Point* to be placed at that point without a *Tentative Snap* (Figure 2-10).

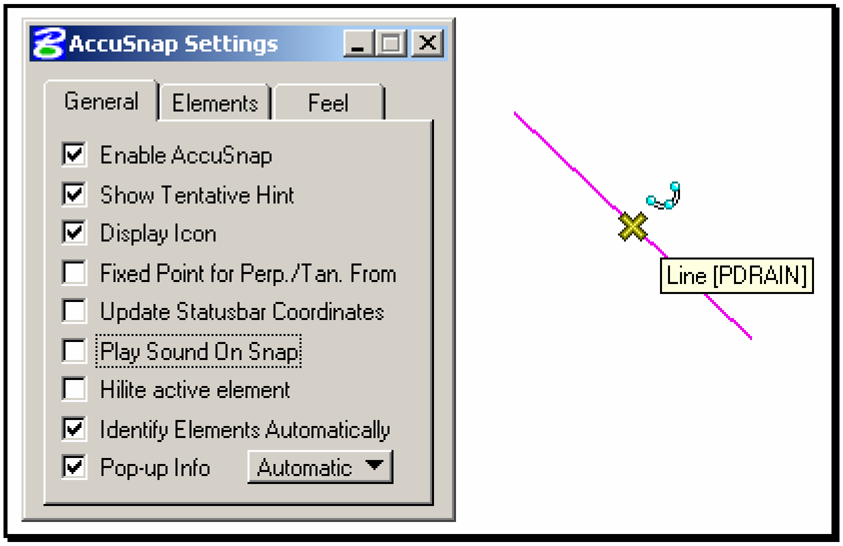


Figure 2-10: AccuSnap

AccuSnap can be toggled from the *Snap Mode Dialog* or the *AccuSnap Setting Dialog*. More settings are available with the *AccuSnap Setting Dialog* **Element** and **Feel** tabs.

Keypoint

Keypoint is used to snap to point on arcs or lines. The number of Keypoint on an element is set in the **Keypoint Snap Divisor Dialog** (Figure 2-11). The dialog can be open by typing **K** in your *AccuDraw* Window. The division can also be set from the main menu **Settings > Design File>Snaps**.

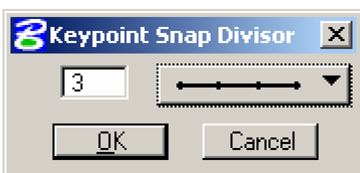


Figure 2-11: Keypoint Snap Divisor 3

Intersection

The *Intersection Snap* is used to locate the intersection of two elements. Locate one of the elements with a tentative snap which will highlight the element and just hover over the intersecting element with the curser and accept with a data snap when the *AccuSnap* appears on the screen. If *AccuSnap* is toggled off two tentative snaps, one on each element and a data snap to accept the point will be needed. You can continue snapping until the desired intersection is found; the last two tentative snaps define where the intersection point lies.

If the two elements do not actually intersect a point will be a projection where one or both elements would intersect.

Center

The center snap can be used to snap to the center of a line, shape, circle, cell, etc. It requires one tentative. The tentative has to be placed on the *outside* of the shape – *do not* try to eyeball it and snap near the middle. (Eyeballing actually will work with circles, but not with other shapes.) If *AccuSnap* is on, hover near the element and data hit when the *AccuSnap* appears.

Nearest

The nearest snap is used when you absolutely, positively have to get a point on an element, but you don't care (or don't know) exactly which point.

VIEW CONTROL

Overview

There are a number of view controls that you will use on a daily basis. You might want to edit your Function Keys to give you quick access to them. They include Zooming, Fit View, View Previous and View Next.

More Advanced view controls deserve another look.

Rotate View

Choosing the **Rotate View** (Figure 2-12) command gives you a number of choices.

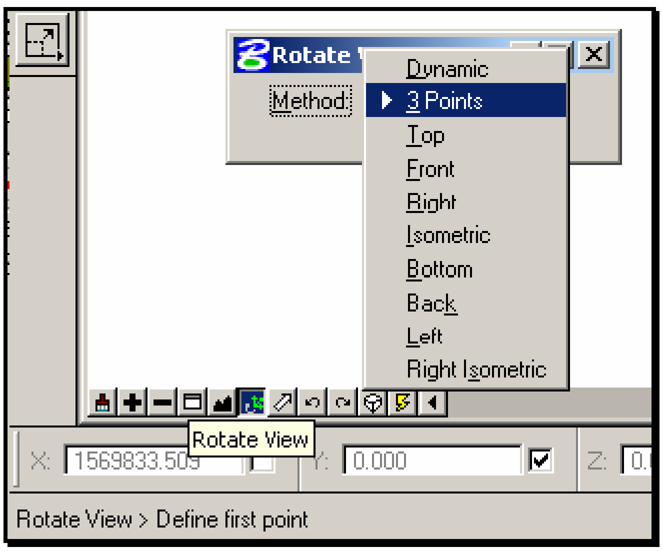


Figure 2-12: View Rotation Methods

The majority of these **Methods** relate to 3D view control. Remember that **Top** view is the default and always a safe starting point.

3 Points is the method of choice for rotating a view to something other than the default. The 3 points that you enter correspond to a xy axis. The first point is xy of zero (the coordinate origin). The second point defines the direction of the positive x-axis. The final point defines the direction of the positive y-axis.

♬ It is beneficial to have depth lock turned on for this operation.

3D Troubleshooting

Sometimes you will get unexpected results when you are working with 3D files. There are a couple of tricks that you can try out.

Flattening is always a good start.

Also make sure to rotate your view to “top.”

COMPLEX CHAINS AND SHAPES

Overview

Adjacent lines and arcs can be grouped together into *Complex Chains* and *Shapes*.

Creating Complex Chains

Use the **Create Complex Chain** tool to combine adjacent lines and/or arcs into a linear (non-closed) element.

♬ This allows you to measure length and construct distances along the combined element. It also speeds up modification and manipulation.

Activate the **Create Complex Chain** tool either from your **Main Tool Frame** (Figure 2-13) or from your main menu by selecting **Group > Groupings > Create Chain**.

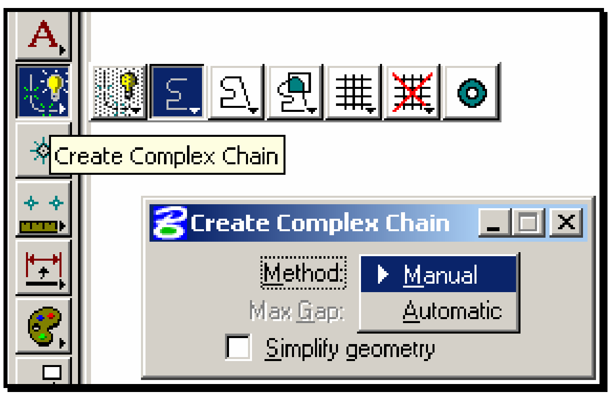


Figure 2-13: Create Chain

Using the **Manual** option, MicroStation prompts you to "Create Complex Chain > Identify Element." Pick each element you'd like to add to the chain, in order, until you have selected the entire chain.

ⓘ ***Make sure to* Accept *the final element in the chain.***

Reset to complete the chain.

Using the Automatic option, MicroStation will prompt you to "Automatic Create Complex Chain > Identify Element." Once you have picked that element, just *Data Point* to *Accept* it and MicroStation will automatically highlight the next element in the chain.

♬ MicroStation will jump gaps to complete these chains. Set the **Max Gap** value to tell it how far to look.

Keep *Accepting* until MicroStation completes the *Chain*.

If there is a fork in the path, MicroStation will highlight one possible path and prompt you with the statement "FORK – Accept or reset to See Alternative." Send a *Reset* if you don't like the path MicroStation has chosen.

Creating Complex Shapes

Use **Create Complex Shape** to combine adjacent lines and/or arcs into a closed (non-linear) shape.

♫ This allows you to measure length and area and construct distances along the element. You can also fill, pattern, or hatch the resultant area. It also speeds up manipulation and modification of the element.

Choose **Create Complex Shape** from the **Main Tool Frame** (Figure 2-14) or choose **Group > Groupings > Create Shape** from your main menu.

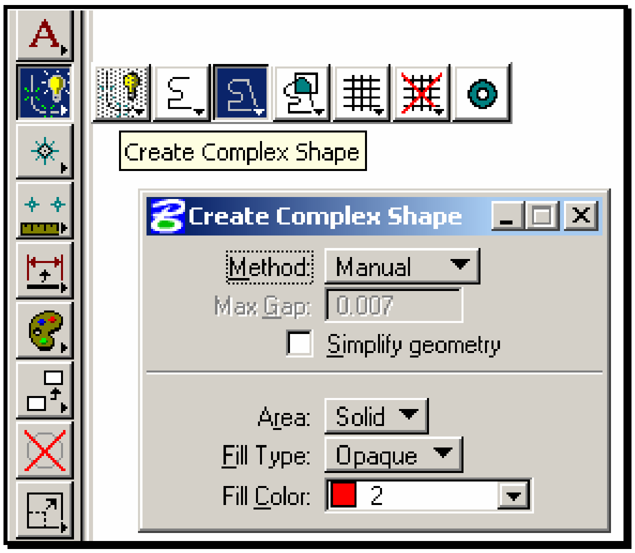


Figure 2-14: Create Complex Shape

Note that you have some of the same options here that you had in the **Create Complex Chain Tool Settings Window**.

Manual and **Automatic** creation procedures are much the same for **Shapes** as they are for **Chains**.

One notable difference is the fact that **Shapes** are only complete when they are closed. As soon as a **Shape** is closed by **Manual** or **Automatic** creation, the creation is immediately completed.

♫ If the end of the final segment does not correspond to the beginning of the first segment, MicroStation will draw a line that makes that connection.

Area

There are two choices for **Area** when you are creating a **Complex Shape**. They are **Solid** and **Hole**.

♫ This property is *only* relevant to *Hatching*. **Hole** elements cannot contain *Hatching* or *Patterning* elements.

It is strongly recommended that you do not ever place **Hole** elements in your drawing. It only leads to unnecessary confusion.

Fill Type

If you would like your resultant **Shape** to be either **Outlined** or **Opaque** you can make that selection here before you create the **Shape**.

Troubleshooting

Creating *Complex Chains* and *Shapes* is a fussy business: sometimes just a slight error can lead to unexpected results.

Extra Elements

Probably the most common mistake in creating *Complex* elements happens when the user *Resets* before the element is entirely finished. They realize they haven't created the entire *Chain*, and they go back to the beginning and re-create it.

The problem with this is that even though the first chain wasn't complete, it is still a legitimate element and MicroStation doesn't know that the user doesn't want it.

This ends up leaving all kinds of partial chains kicking around in your file.

♬ As a rule of thumb, don't forget to **Undo** your aborted efforts at creating *Chains* and *Shapes* before you go back and do it again.

COMPLEX REGIONS

Overview

While *Complex Chains* and *Shapes* are created by combining single, entire, simple elements, *Complex Regions* are *Closed* elements created through a more complicated interaction of multiple and potentially complex elements.

Launching the Tool

Choose **Create Complex Region** from you **Main Tool Frame** (Figure 2-15) or from your menu by choosing **Group** > **Groupings** > **Create Region**.

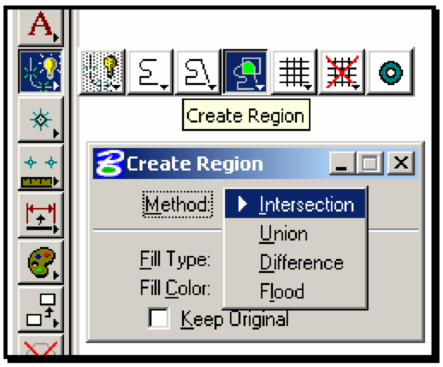


Figure 2-15: Create Complex Region

Complex Region Methods

In your **Tool Settings Window** you have four **Methods** to choose from. Starting from the circles and line in Figure 2-16, these four methods have the following effect:

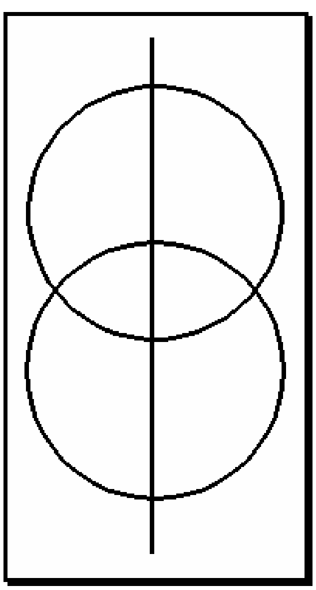


Figure 2-16: Starting Point

Intersection

Intersection creates a *Complex Region* out of the area where the two shapes overlap.

Choosing the two circles, the **Intersection** looks like Figure 2-17.

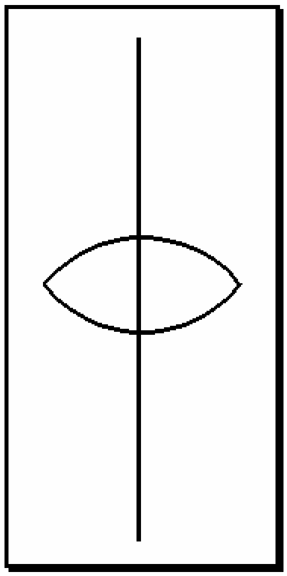


Figure 2-17: Intersection

Union

Union creates a *Complex Region* out of the outermost boundary of the shapes chosen.

Choosing the two circles, the **Union** looks like Figure 2-18.

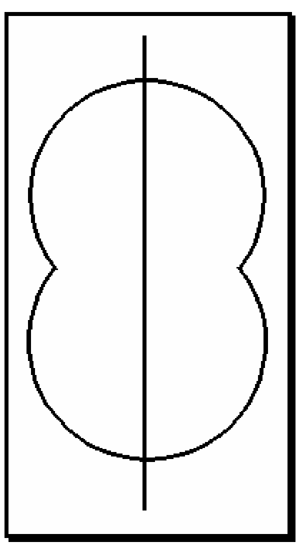


Figure 2-18: Union

Difference

Difference creates a *Region* that is the outside of the first chosen element, minus the outline of the subsequently chosen shapes.

Choosing first the top circle, then the bottom, the **Difference** looks like Figure 2-19.

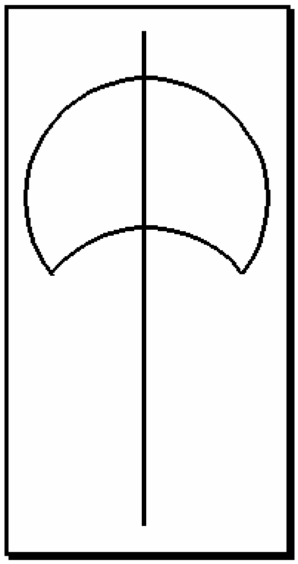


Figure 2-19: Difference

Flood

Flood defines an area by searching for enclosing elements around a *Data Point* sent by the user.

Sending a *Data Point* into the right side of the area where the two circles overlap looks like Figure 2-20.

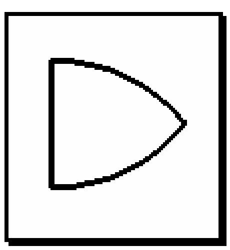


Figure 2-20: Flood

Fill

Note you have the same **Fill** options with *Create Complex Region* that you had with *Create Complex Shape*.

Keep Original

The examples above show the behavior of **Create Complex Region** with **Keep Original** disabled. Every element that contributes a piece to the resultant *Region* is deleted.

If you do not want these elements deleted, enable **Keep Original** from the **Tool Settings Window** (Figure 2-21).

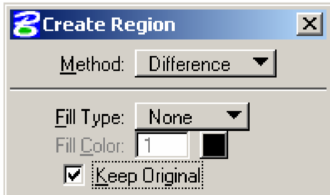


Figure 2-21: Keep Original

Tips and Tricks for Flood

In congested areas on the drawing, it is sometimes difficult to use the **Flood Method**. Often, MicroStation will not find the correct *Enclosing Region*.

PowerSelector

To simplify matters, start by using the *PowerSelector* to pick only the elements that make up the outline you want to create a region from. Now use *Flood* and data point somewhere in this area. *Flood* will look only for highlighted elements when it looks for an enclosing *region*.

Adjust Max Gap

If MicroStation can't find an enclosing *region*, you may have some slight gaps between elements. Try changing your **Max Gap** value to a higher number (Figure 2-22). If you have to set it higher than .1, you may need to make sure that your file is flat and that you have selected all of the elements that make up your boundary.

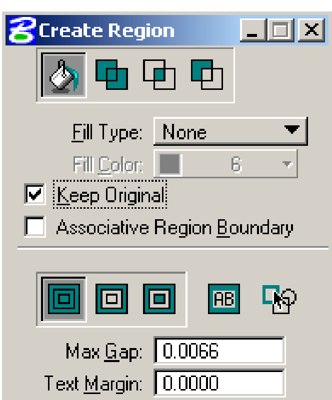


Figure 2-22: Create Region dialog – Max Gap

✓ ***Check Flattening your Active File on page 2-87.***

Set/Lock Z to Zero

Another macro that will help make sure that you are measuring on the same plane and get the correct area measurement is called ZLOCKANY. This macro is kicked off by selecting *Macros>Set/Lock Z* from the *Main Menu* and setting the active depth to "0" in the 3D file.

INTRODUCTION TO THE SETTINGS MANAGER

The *Settings Manager* is our one-stop-shopping for establishing standard MicroStation procedures and properties. We are going to use it to develop everything from standardizing text height to launching macros.

STRUCTURE OF THE SETTINGS MANAGER

The *Settings Manager* works kind of like a menu structure: it has *Groups* and *Components*. Groups are like menus and Components are like the items on the menus. Picking a *Group* without picking a *Component* is kind of like opening up a menu without selecting an item: nothing happens. Think of the *Components* as buttons that need to be pushed to make something happen. When you haven't picked a *Component*, you haven't really *done* anything. *Settings Managers* are used to place elements on the proper level with correct weight, style and scale.

The Many Faces of the Settings Manager

One of the most confusing aspects of the *Settings Manager* is that it can take on a couple of very distinct appearances. Figure 2-23 shows what the *Settings Manager* looks like as a **Large Dialog**.

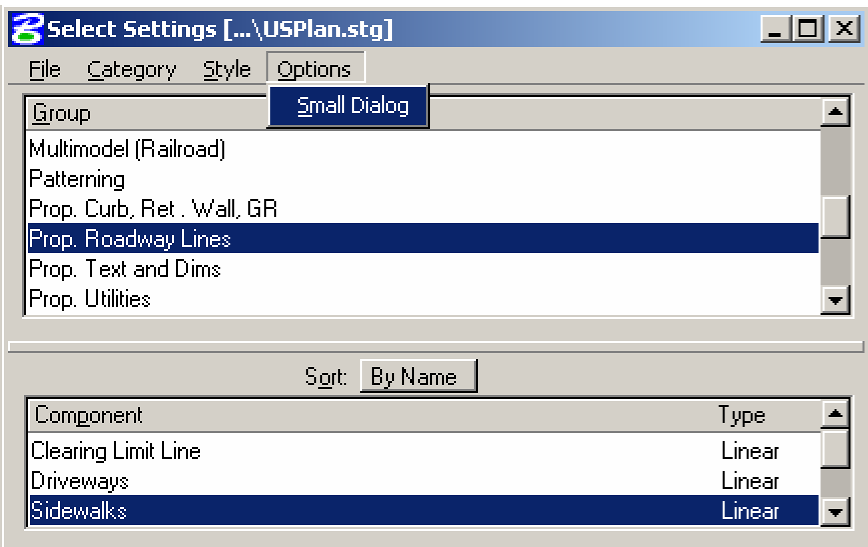


Figure 2-23: Settings Manager *Options*

This **Large Dialog** can be resized into the **Small Dialog** by choosing **Options > Small Dialog** from the Select Settings dialog. This will transform the **Settings Manager** to look like Figure 2-24.

Figure 2-24: Small Settings Manager *Dialog*

From here, we can choose **Options > Large Dialog** to return to the large dialog, or we can pick **Options > Hide Menu Bar** to make the dialog even smaller (Figure 2-25).

Figure 2-25: Even Smaller Settings Manager *Dialog*

When the menu bars have been hidden, the only way to used item on the menu is by right clicking on the **Settings Manager**. This gives you the same options that were previously available from the **Select Settings** dialog's menu (Figure 2-26).

Figure 2-26: Right-click for Menus

The *Settings Manager* can be docked when in *Small Dialog* mode (Figure 2-27). The usual location for the *Settings Manager* is at the bottom. It is a user preference and is reloaded to the same location as when *MicroStation* is closed.

Figure 2-27: Docked Settings Manager

Opening the Settings Manager

The *Settings Manager* is autoloaded depending on the work group and the working units of the file, if the file is opened using the *MicroStation Manager* and a *PIN* is selected. Task-specific *Settings Managers* can be launched from your main menu by selecting **Settings > DOTSetMgrs > [Task]** or **File>Open** from the *Settings Manager Dialog* and selecting the **.stg** from *Open Existing Settings File Dialog.*

SETTINGS MANAGER SCALE

One of the primary functions of the *Settings Manager* is to help us standardize text and dimension size. It can also help us make sure that our symbols and cells all come into our drawings at the right size. This is accomplished through careful manipulation of the **Settings Manager Scale**.

Real World Size Vs. Paper Size

There is some confusion over the concept of drawing *"One to one"* or *"Full Size"* and how that impacts the *scale* of the drawing. If you're drawing *one to one*, how could you possibly have a *scale* applied? Isn't everything *full size?*

The answer is "yes -- but there is more than one kind of *full size*."

How is that possible?

The AutoCAD terminology for this calls the two sizes "Paper Space" and "Model Space."

When you're detailing up an abutment, you want to make sure that a 6 meter wing measures 6 meters on the drawing -- that's "Model Space" -- your "Model" of the abutment measures the same size in your file that it will measure out in the field.

But what about when you want to annotate the abutment? You know that when you get your finished plot back from the printer you want your annotation text to be 3 millimeters high. But what does that 3 millimeters mean to your 6-meter wing? Nothing -- because those 3 millimeters are in "Paper Space" instead of "Model Space."

So how do you reconcile the two? That's where the **Setting Manager Scale** comes in.

Selecting a Scale

Right-click on your **Settings Manager** to open your options menu and select **Category > Scale** (Figure 2-28).

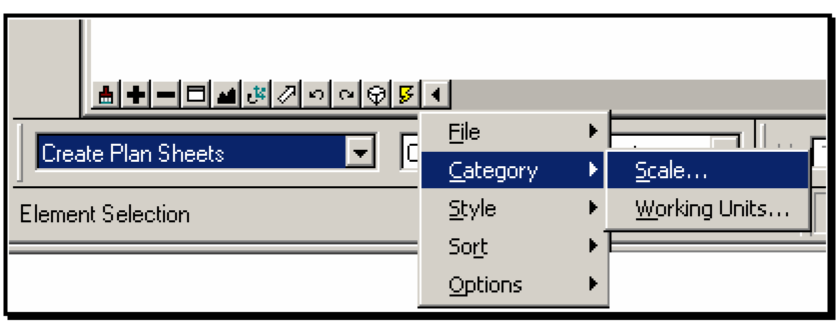


Figure 2-28: Right-click on the Settings Manager

This opens up the **Select Scale Dialog** (Figure 2-29).

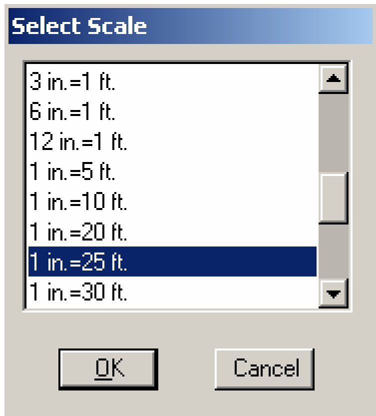


Figure 2-29: Select Scale Dialog

Let's say we select 1in. = 25 ft. (1:300) as our scale.

What does this change?

What does this do for us? All this does is alert the *Settings Manager* to our intended plot scale. From here on out, anything that we launch from the *Settings Manager* is going to know that it needs to be at the selected scale. We'll see the impact of this when we use the *Settings Manager* to place text and dimensions, as well as certain cells, linestyles and borders. It does this by changing the text height or by setting the **Active Scale**. It does not change the size of elements in your drawing.

♬ Note again that this has no impact on items already placed in the drawing.

This is not at all like changing our *Working Units*. *Settings Manager* uses its internal scale settings only to help you place new text and cells at the right size. Once your text has been placed, you can do whatever you want to your *Settings Manager* scale and it will not impact the text on your drawing (however, as soon as you place more text by selecting **Text > Text Note** from the *Settings Manager*, it will set your text size to reflect your current *Settings Manager* Scale.)

FENCES & GROUPS

SELECTION SETS

Select All

From your main menu, choose **Edit > Select All**. MicroStation will pick every element in your file.

ⓘ ***Even elements that are not currently displayed will be selected. This includes construction elements and elements on levels that have been turned off.***

Select None

To clear a *Selection Set*, you can always choose **Edit > Select None** from your main menu.

Element Selection

The Element Selection tool (Figure 2-30) can be used to pick single or multiple elements for processing.

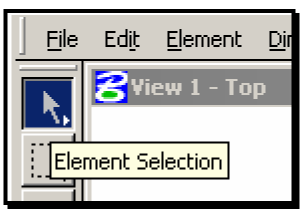


Figure 2-30: Element Selection

♬ Use of Element Selection changes the order in which you pick commands. Generally you pick your command first, then the element you want to affect. Using any element selection tool, you pick your elements first, then the command to alter them.

To select more than one element, hold down the **Ctrl** key when you click on new elements. If you select the wrong element, hold down the **Ctrl** key and click on it again to remove it from the *Selection Set*.

♬ Notice that when you add elements to a *Selection Set*, MicroStation displays the number of elements you have selected. This number is displayed in the right corner of your *Status Bar* as shown in Figure 2-31.

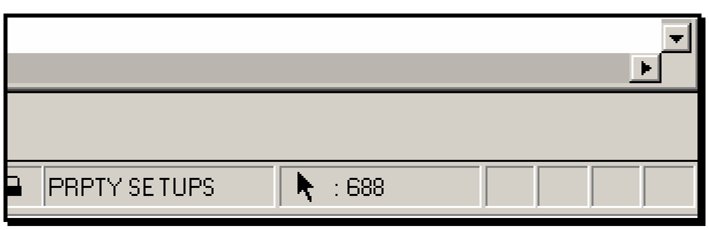


Figure 2-31: Count of Elements

To select elements over a wide area, click in empty space and drag. This will create a box. Elements entirely inside this box will be added to the *Selection Set*.

If you hold down **Ctrl + Shift** and drag the same box, it will add all elements overlapping the box to the *Selection Set*.

PowerSelector

The PowerSelector (Figure 2-32) is a more powerful way of quickly assembling *Selection Sets*.

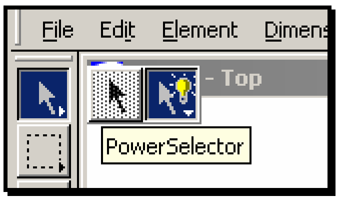


Figure 2-32: PowerSelector

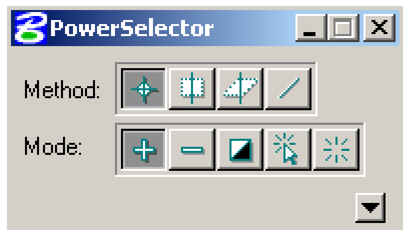


Figure 2-33: PowerSelector Tool Settings Window

The PowerSelector has a number of **Methods** and **Modes** of operation (Figure 2-33).

By changing **Methods** and **Modes**, elements can be added, subtracted, or inverted to a *Selection Set*.

Methods

By changing your **Method,** you can identify items singly, by block, shape or line.

Individual: selects graphically one element at a time

Block Inside: elements inside the block are selected

Block Overlap: overlapping elements plus those inside the block are selected

Shape Inside: elements inside a shape are selected

Shape Overlap: overlapping elements plus those inside a shape are selected

Line: selects elements that intersect a line

Modes

Add: adds elements to a selection set

Subtract: subtracts elements from a selection set

Invert: toggles the selection status of an element

New: clears the current selection set and starts a new set.

Clear/Select All: deselects all selected elements, or selects all elements if no elements are currently selected.

♬ Block and Shape **Methods** can be switched from **Overlap** to **Inside** just by clicking again on the respective icon in the **Tool Settings Window**.

“Permanent” Grouping

Once you have elements gathered together into a *Selection Set*, you might want to “cement” them together.

With the elements selected, pick **Edit > Group**.

Notice that once you have grouped elements together, the number of elements in your *Selection Set* drops to “1”.

These elements have been joined together the same way elements of a cell are joined together. The only difference is that these “cells” don’t have cell names. MicroStation refers to them as *Orphan Cells*. They can be modified and manipulated exactly the same way cells are. To drop these *Orphan Cells* back to their original independent state, use the *Drop Complex* tool.

ADVANCED POWERSELECTOR

Setup

There is a little arrow in the lower right-hand corner of the *PowerSelector Dialog* (Figure 2-34).

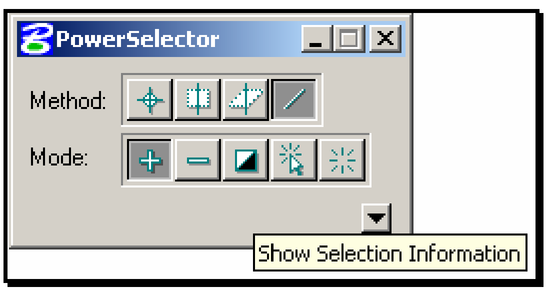


Figure 2-34: Show Selection Information

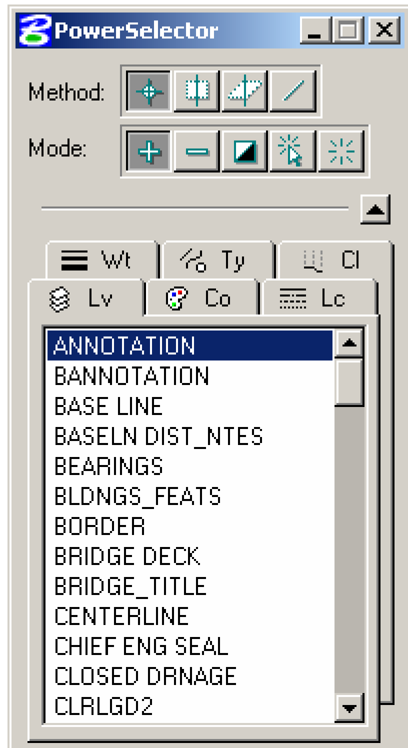


Figure 2-35: Expanded PowerSelector

To expand the *PowerSelector* click on the **Show Selection Information** arrow to reveal the Attribute tabs (Figure 2-35).

Tabs

Lv (Level): select levels from a list

Co (Color): select the required colors from a list (plus By Level).

Lc (Style): select the required line styles from a list (0–7 plus custom line styles present)

Wt (Weight): select the required line weights from a list (0–31 plus By Level).

Ty (Type): select the required element types from a list.

Cl (Class): select the required element classes from a list.

Adding Elements

Say you want to add all elements in a level to your *Selection Set*.

Start by choosing **Lv** tab from your **Tool Settings Window**.

Now **Click** the *Level Name* from the list of level names. Notice that the elements are highlighted and the level name moves to the top of the *Lv* list (Figure 2-36).

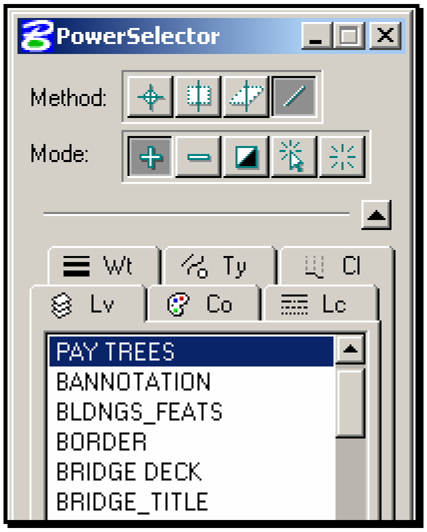


Figure 2-36: PowerSelector Lv Dialog

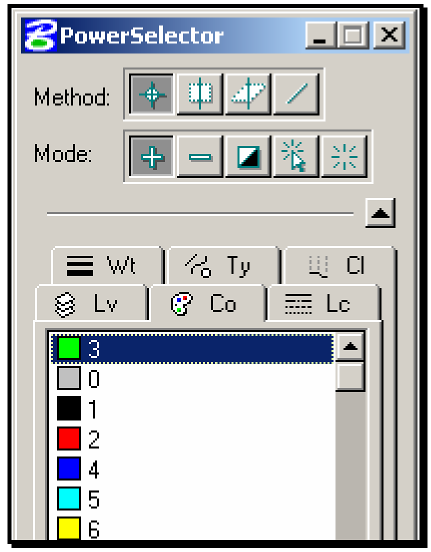


Figure 2-37: PowerSelector Co Dialog

All elements on **PAY TREES** level have been added to your *Selection Set*.

Now add all elements of color 2 to the set by choosing **Co tab** from the *PowerSelector*. Notice that *Color 3* is at the top of the list (Figure 2-37).

The *Color 3* is the color of elements already selected (elements on the PAY TREES level that was selected above from the *Lv* tab). To add color 2 to this list, **Click** the cursor in the "color **2**". Notice in (Figure 2-38) number *2* moved to the top with *3*. All the elements with the color *2* have been added to the *Selection Set.*

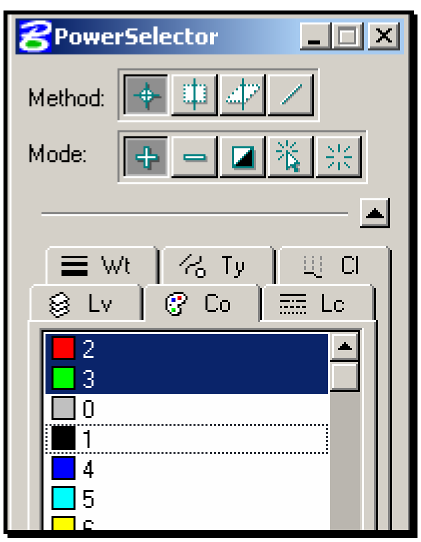


Figure 2-38: PowerSelector Co 2,3

ⓘ ***This does not mean that all elements of color 2 and 3 are selected: it only means that there are elements of these colors in this Selection Set.***

Subtracting Elements

You can also use this feature to remove specific colors, levels, styles and weights from your selection set. Start by selecting all *Levels* that have elements, either by choosing **Edit > Select All or** by **Clicking** on the first level that is not high lighted and dragging to display all of the levels and release. Now check out the **Lv** tab, all the levels that are present in the *Selection Set* (Figure 2-39) have elements.

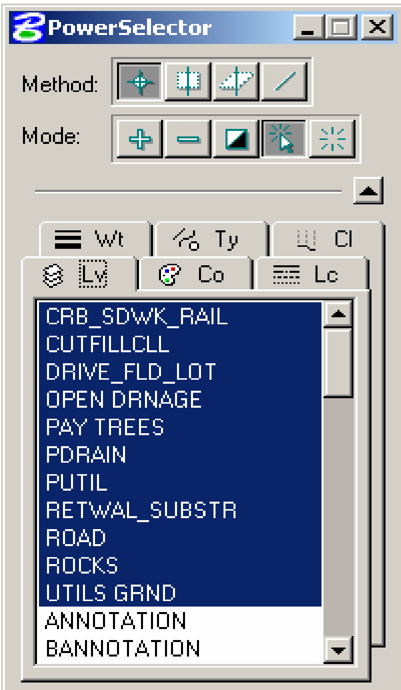


Figure 2-39: All Levels Picked

Clicking on the level name will remove all the elements on that level from the *Selection Set*.

Color, Style, Weight, Type and Class

By **Clicking** on the list from Color, Style, Weight, Type and Class tabs the elements can be manipulated the same way as the *Levels*.

SELECT BY ATTRIBUTES

Overview

Select By Attributes is an extremely useful tool for making focused alterations to a design file. You could use it to help accomplish any of the following:

- Move all text to MINOR.
- Delete all lines that are **Color 5** and **Weight 4**.
- Change all elements on PBSUPER to be Construction elements.

The *Select By Attributes* tool allows you to specify certain *Element Criteria*. It then searches through the file and selects elements that match those search criteria.

The **Select By Attributes Dialog** (Figure 2-40) can be opened from the main menu by selecting **Edit > Select By Attributes.**

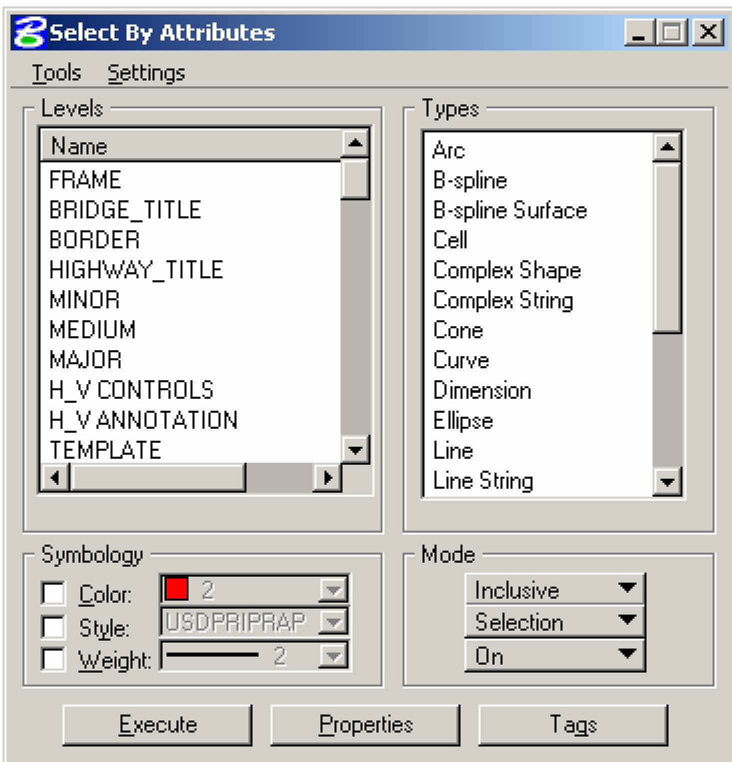


Figure 2-40: Select By Attributes

Standard Methods

The simplest application of the *Select By Attributes* tool uses the default settings.

In the **Levels**, **Symbology** and **Types** areas of the **Select By Attributes** dialog pick your search criteria. The example in (Figure 2-41) shows what the dialog would look like if you wanted to pick all text in levels **PRPTY ENVRN** and **RIGHT OF WAY** that is also of color **5**.

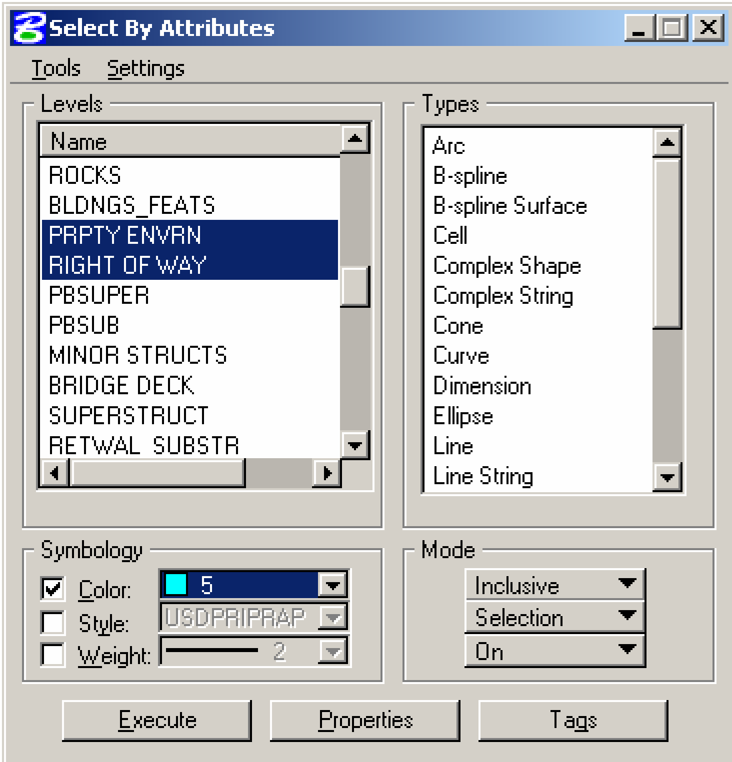


Figure 2-41: Select By Attributes Dialog

♫ Note that since **Style** and **Weight** are not selected, this process will identify elements of any style or weight.

Push the **Execute** button and MicroStation will add all elements that match these criteria to a *Selection Set*.

Element Type Hints

- The **Types** are of the **Select By Attributes Dialog** is not always straight forward. Here are a few hints that should make it easier to select the elements you want.
- Multi-line text is **Text Node** type. Single-line text is the **Text** type. Typically, if you want one, you want both of them.
- For circles, the **Type** you want to choose is **Ellipse**.
- To pick Smartlines with arcs in them, choose the **Complex String** type.
- Similarly, any closed area with arcs would be the **Compels Shape** type.
- Smartlines without arcs are **Line Strings**.
- All closed polygons (squares, triangles, rectangles, etc.) are **Shapes**.
- Leaders placed by the *Place Multi-Line Note* tool are **Dimension** types.
- **Right Clicking** in the Levels and Types fields Select By Attributes Dialog gives the option to *Select All, Select None or Invert Selection.*

- Elements grouped together by selecting **Edit > Group** are **Cells**.

ADVANCED SELECT BY ATTRIBUTES

Overview

Up until now, we have only used the default **Mode** settings of the **Select by Attributes** tool. These are good enough to get you where you need to go 90% of the time. But there are a few things you might want to do that you'll need some extra help with. For example, you might want to:

- Pick all elements except text.
- Delete all color 5 lines from one part of your drawing.
- Move all filled elements to level CENTERLINE.
- Delete all text of font 24.

Modes

The first thing to look at is the **Modes** section of the **Select By Dialog**. There are two areas we'll focus on. The first allows you to select either **Inclusive** or **Exclusive** modes (Figure 2-42).

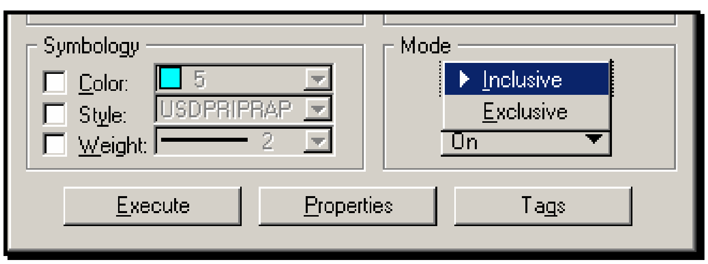


Figure 2-42: Inclusive/Exclusive

Inclusive, the default setting, means that all elements that match your criteria will be affected.

Exclusive means that all elements *except those* that mach your element criteria will be selected.

♬ Therefore, to pick all elements except text, set your **Type** field to **Text** and **Text Node**, set your **Mode** to **Exclusive** and push **Execute**.

The other parts of the **Mode** allow you to choose how you want to act on the elements you have selected (Figure 2-43).

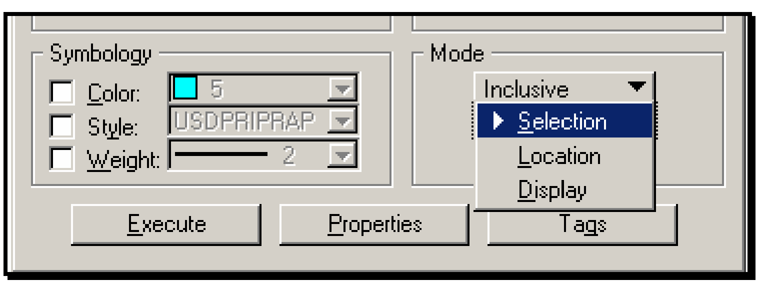


Figure 2-43: Selection/Location/Display

Selection, the default settings, adds the identified elements to a *Selection Set*.

Location allows you to “lock down” elements other than your identified elements. Only elements that match your criteria will be accessible to MicroStation commands. This will prevent you from copying, matching, or deleting any but your identified elements.

Display makes all other elements invisible. Only elements that match your criteria will show up on your window.

ⓘ ***Using the Display mode will have minor adverse effects on “dynamic” displays. This means fences, selection sets and other “rubber-banding” affects may not display as you’d expect. All the tools still work as normal, though.***

Properties

At the bottom of the **Select By Attributes Dialog** you will find the **Properties** button (Figure 2-44).

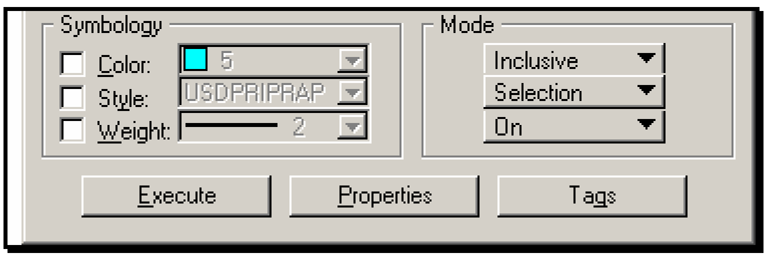


Figure 2-44: Properties

Pushing this button gives you access to more element selection criteria via the **Select By Properties Dialog** (Figure 2-45).

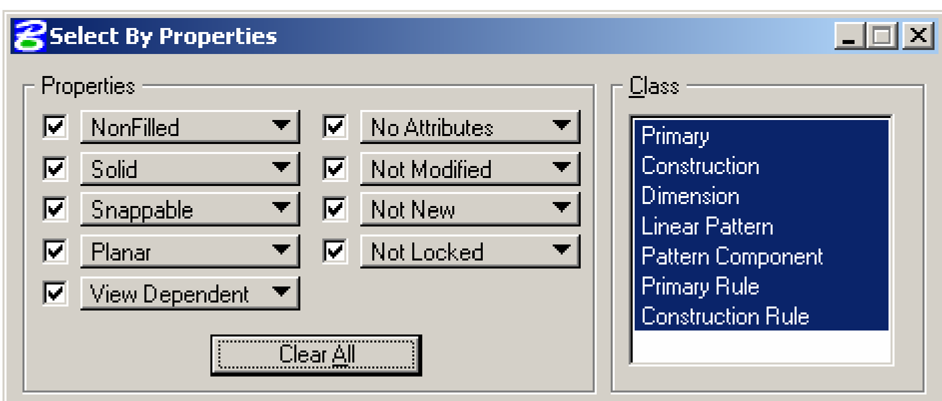


Figure 2-45: Select by Properties Dialog

Two parts of this dialog are likely to be useful to you.

From the **Properties** portion, you can place a **Check** next to the **Non-Filled** option and choose to select by whether or not an element is **Filled**.

From the **Class** area, you can select whether you want to pick **Construction** or **Dimension** elements.

♬ Even after you drop *Dimensions* into their component elements, those elements are still in the **Dimension Class** and can be selected together by the **Class** portion of the **Select By Properties Dialog**.

More Properties

From the **Select By Attributes Dialog**, you can open up four more dialogs that control settings for specific kinds of elements under the **Settings Menu** (Figure 2-46).

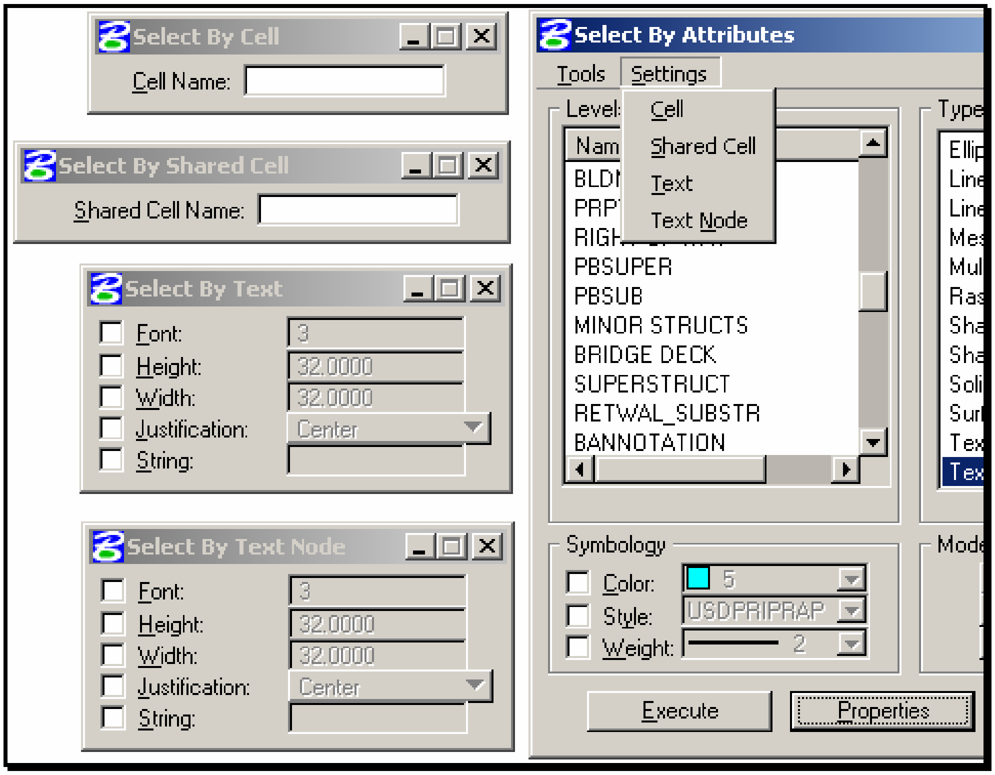


Figure 2-46: Settings Menu Properties

These options allow you to select cells and text by very specific element attributes.

Set Select By From Element

If you don't know exactly what attributes you want to select by, but you know of an element on your drawing that is an example of those criteria, you can choose **Tools > Set Select By From Element** from the **Select By Attributes Dialog Main Menu**.

This brings up the **Set Select By Dialog** (Figure 2-47).

Figure 2-47: Set Select By

Toggle on or off each item on the dialog depending on whether you want to select based on that criteria, then identify the element in your file to match.

FENCES

Discussion

With all the capability of the Element Selection tools, you could ask if there is really any need for another way of grouping elements.

Fences are more of an old-fashioned way of working in MicroStation, and they are not as necessary for day-to-day drawing as they used to be.

There are, however, some important reasons to keep fences in your arsenal.

One is processing time. If you have to move a lot of elements, it is usually quicker to fence them than to select them. This is because the selection tools require more redrawing of the elements to the views.

Another reason to use fences is to clip elements by setting your *Fence Mode* to either *Clip* or *Void-Clip*.

A less common application would be to use the *Void* mode to process all elements outside the fence boundary.

Fence Types

When you choose the **Place Fence** tool (Figure 2-48) you have a number of options of what kind of *Fence* you would like to place (Figure 2-49).

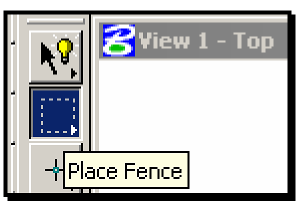


Figure 2-48: Place Fence

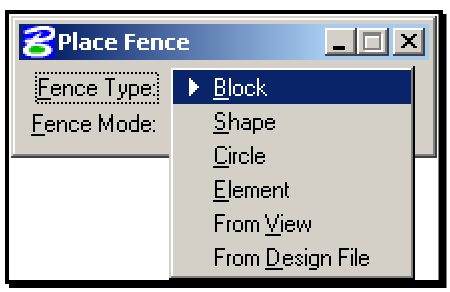


Figure 2-49: Fence Types

- **Block** allows you to define two corner of a rectangle.
- **Shape** allows you to define up to 101 vertices of a polygon.
- **Circle** allows you to define a center and radius for a multi-vertex polygonal approximation of a circle.

ⓘ ***This is not really a circle, but it's pretty close. Use it accordingly.***

- **Element** allows you to pick an element. MicroStation will approximately overlap the Element's outline with a fence.
- **From View** will place a fence that matches the view outline.
- **From Design File** will pick all elements in the design file.

Fence Modes

Once you have placed a fence, you can change your **Fence Mode** to affect elements that are either **Inside** or outside your fence, **Overlapping** it or not, or even **Clipping** elements at the point that the fence crosses them (Figure 2-50).

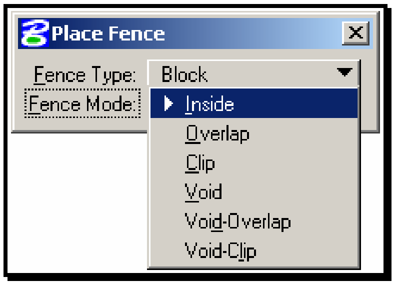


Figure 2-50: Fence Modes

- **Inside** affects only elements entirely inside the fence.
- **Overlap** affects elements with any part in the fence.
- **Clip** affects all elements inside the fence, cutting elements where they cross the fence boundary.
- **Void** affects all elements entirely outside the fence.
- **Void-Overlap** affects all elements with any part outside the fence.
- **Void-Clip** affects of all elements outside the fence, cutting elements where they cross the fence boundary.

Area of Influence

Selection Sets specifically identify particular elements. No matter how you process them, you never will process elements other than the ones you initially selected. This is *not* the way *Fences* work.

Fences always affect the elements that lie within their selection area (bearing in mind your active *Fence Mode*.) Every time you move or copy a fence from one location to another, you are defining a new area of influence, and can potentially be picking up new elements to process.

3D Windowing

Fences in 3D files are view-specific.

ⓘ ***Fences must be in your view at all times or they will be deactivated and you will need to place them again. Be careful when you zoom and pan.***

Deactivating Fences

The way to deactivate a fence is to choose the **Place Fence** tool. This immediately clears your active fence.

GRAPHIC GROUPS

Overview

ⓘ ***Graphic Groups are common even if you don't create them yourself: they are often the by-product of translations or custom applications. Be aware of their functionality.***

Graphic Groups are yet another way to bunch elements together for quick processing. They are more like *Selection Sets* than fences, since they single out specific elements rather than affecting all elements in a specific are the way fences do.

Graphic Groups have one special capability: elements in *Graphic Groups* can be moved independently or simultaneously depending on the current status of your *Graphic Group Lock*.

Graphic Group Lock

Graphic Groups rely on the *Graphic Group Lock*. This can be toggled on and off from the **Locks** portion of your **Status Bar** (Figure 2-51).

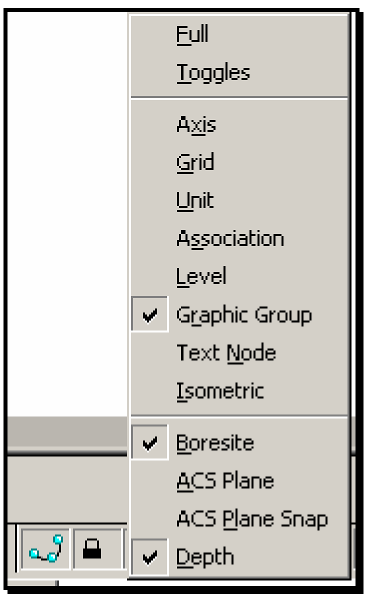


Figure 2-51: Locks in the Status Bar

When the *Graphic Group Lock* is turned on, all elements in the same *Graphic Group* are grouped together much like a single cell or *Selection Set*: they can be copied, rotated, moved or deleted as one.

However, when the *Graphic Group* lock is turned off, the elements are all affected completely independently of each other.

Adding Elements to a Graphic Group

Elements can be added to a graphic group either singly or by *Selection Set*.

To add elements one at a time, choose **Group > Groupings > Add to Graphic Group** from your main menu, or pick the **Add to Graphic Group** tool from your **Main Tool Frame** (Figure 2-52).

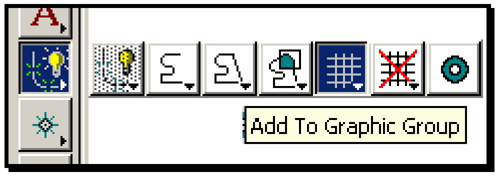


Figure 2-52: Add to Graphic Group

Once the tool is activated, pick all the elements you'd like to add to the group.

To add a bunch of elements to a *Graphic Group*, add them to a *Selection Set* (by *PowerSelector*, for instance). Then choose the **Add to Graphic Group** command and *Data Point* to *Accept* the action.

Removing Elements from a Graphic Group

Graphic Groups can be dropped either singly or all at once. To drop elements from a *Graphic Group* one-at-a-time, make sure your *Graphic Group Lock* is turned off. Pick the **Drop from Graphic Group** command from your **Main Tool Frame** (Figure 2-53) or select **Group > Groupings > Drop from Graphic Group** from your menu.

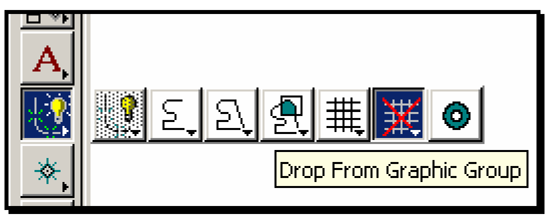


Figure 2-53: Drop from Graphic Group

Once you have chosen the tool, pick the elements you'd like to remove from the *Graphic Group*.

To drop an entire *Graphic Group*, follow the same routine as above, making sure that *Graphic Group Lock* is turned *on* instead of *off*.

Adding Elements to an Existing Graphic Group

You may want to add a couple of elements to an existing *Graphic Group*.

Choose the **Add to Graphic Group** tool. When it prompts you to "Add to Graphic Group > Identify Element" start by picking an element that is already in the *Graphic Group* you want to add to. Then go on to select the elements you would like to add to the *Graphic Group*.

AccuDraw

FUNDAMENTALS OF ACCUDRAW

✓ ***See page 2-50 for a detailed example of using AccuDraw.***

Introduction

Launch **AccuDraw** from the **Primary Tools** toolbox by pressing the **Start AccuDraw Button** (Figure 2-54).

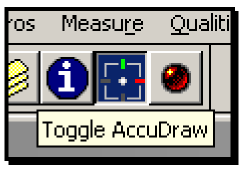


Figure 2-54: AccuDraw Start

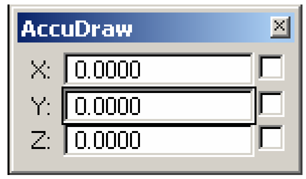


Figure 2-55: Rectangular AccuDraw Window

Somewhere on your screen you'll see the AccuDraw window (Figure 2-55).

The window may be in its *Distance/Angle* format as well (Figure 2-56).

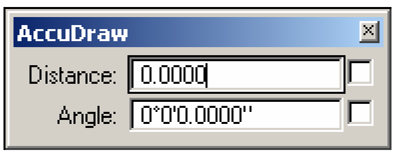


Figure 2-56: Polar AccuDraw Window

It's also possible that the AccuDraw window will be docked (Figure 2-57).

Figure 2-57: Docked AccuDraw Window

When you place a data point in the drawing, it will bring up the *AccuDraw Compass*. In Figure 2-58, you can see *AccuDraw* in *Rectangular* mode.

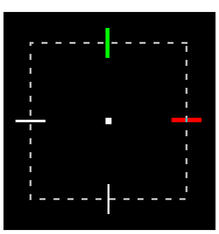


Figure 2-58: Accudraw's Rectangular Compass

♬ Use the *Rectangular* mode to draw xyz distances as well as slopes expressed as xy.

In Figure 2-59 you can see *AccuDraw* in its *Polar* mode.

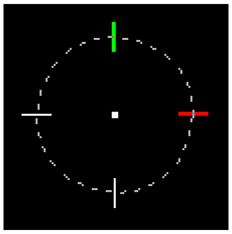


Figure 2-59: Accudraw's Polar Compass

♬ Use *Polar* mode to draw lines at a fixed angle or bearing.

Press your **[Spacebar]** key to toggle back and forth between distance and angle mode.

Shortcut Keys for Construction

O allows you to place the *AccuDraw Compass* at a specific point without placing a *Datapoint*.

RQ allows you to spin the *AccuDraw Compass*.

V rotates the *AccuDraw Compass* to be aligned with the view.

A locks the angle in

X, Y and **Z** lock the corresponding *AccuDraw Axis*.

[Enter] locks the *AccuDraw Axis* along whatever axis the user is gesturing.

ACCUDRAW SETTINGS

You can access *Accudraw's* settings by typing **GS** into your *AccuDraw Window* or from the *Main Menu* **Settings>AccuDraw**. This will bring up the **AccuDraw Settings Dialog** (Figure 2-60).

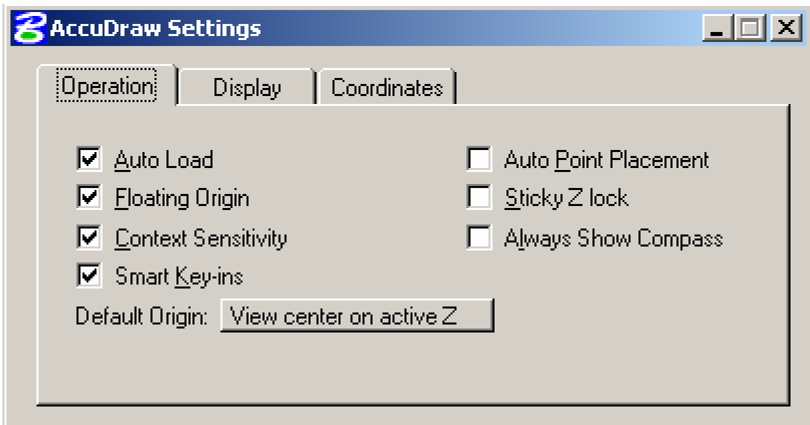


Figure 2-60: AccuDraw Settings Dialog

Operation Tab

Auto Load: If on (the default), when MicroStation is started loads AccuDraw automatically

Floating Origin: If on (the default), the origin moves to the last point placed

Context Sensitivity: If on (the default), enables tools to provide "hints" to AccuDraw to override its default behavior for smoother operation

♬ **Context Sensitivity** won't do anything without **Floating Origin** turned on.

Smart Key-ins: If on (the default), AccuDraw interprets a number as positive or negative, depending on the direction of the pointer from the compass. In rectangular mode only, causes AccuDraw to move the focus to either the x or the y field depending on pointer position.

Auto Point Placement: When on, places data points automatically when they have been fully constrained (default is off)

Sticky Z Lock: If on (default is off), when you lock the Z axis, for example, where you want to draw on the one plane (that is, you want to lock Z=0), while snapping to elements that are on another plane the Z value will remain locked until you turn it off.

Always Show Compass: If on (default is off), when is activate AccuDraw, the compass displays before placing a data point for the current operation.

Default Origin: Lets you choose the default origin. When a tool starts AccuDraw and there is no origin currently defined, then this setting specifies the default location of the AccuDraw drawing plane origin. Options are:

View Center on active Z: The AccuDraw's origin is centered in the view, at the Active Z depth

Global origin: The AccuDraw's origin at the Global Origin of the file

Global origin on active Z: The AccuDraw's origin at the Global Origin of the file and at the Active Z depth]

Display Tab

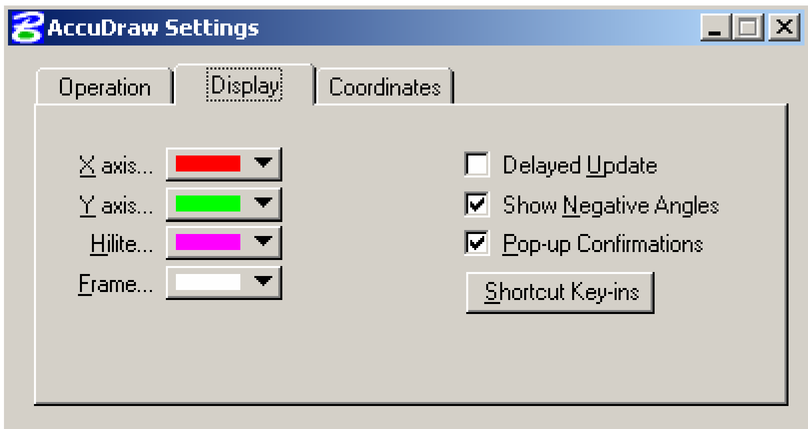


Figure 2-61: AccuDraw Settings Display Tab Dialog

X axis, Y axis, Hilite & Frame: The colors on the AccuDraw compass, via an option menu can be changes for the X axis, Y axis, negative X and Y axis and compass frame

Delayed Update: If on (default is off), the coordinates are updated in the AccuDraw window when pointer is at rest. If off the coordinates are continuously updated, as the pointer move.

Show Negative Angles: If on (default), AccuDraw displays negative angles (+/-180°)

Pop-up Confirmation: If on (default), AccuDraw displays shortcut popups.

Shortcut Key-ins: Opens dialog that lists AccuDraw shortcut keys.

Coordinates Tab

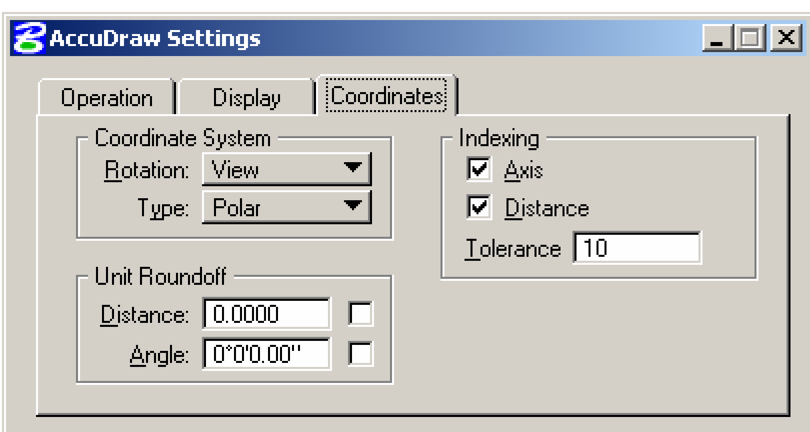


Figure 2-62: AccuDraw Settings Coordinates Dialog

Rotation: The AccuDraw compass can be rotated: Top, Front, Side, View, Auxiliary and Complex. Context lasts only for the current drawing tool

Type: Sets AccuDraw Compass to Rectangular or Polar

Unit Roundoff: This works like a grid, that helps place “freehand” drawings to a specific **Distance** and **Angle**.

Indexing: The **Distance** required to move the pointer from the indexed **Axis** is controlled by the **Tolerance** setting.

- Tolerance is measured in screen pixels, 1-99 allowed

ACCUDRAW SHORTCUT COMMANDS

AccuDraw shortcut commands are invoked by typing either the single letter or combination of two letters as outlined in the **AccuDraw Shortcuts** dialog (Figure 2-63).

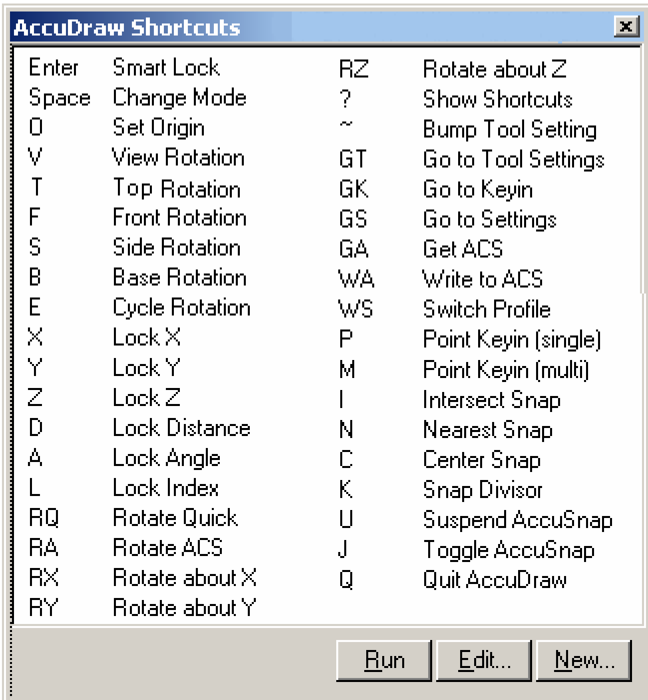


Figure 2-63: AccuDraw Shortcuts Dialog

♫ Note that these shortcuts will only run if *AccuDraw* has *focus.* For a complete list of shortcuts, type (Shift+?).

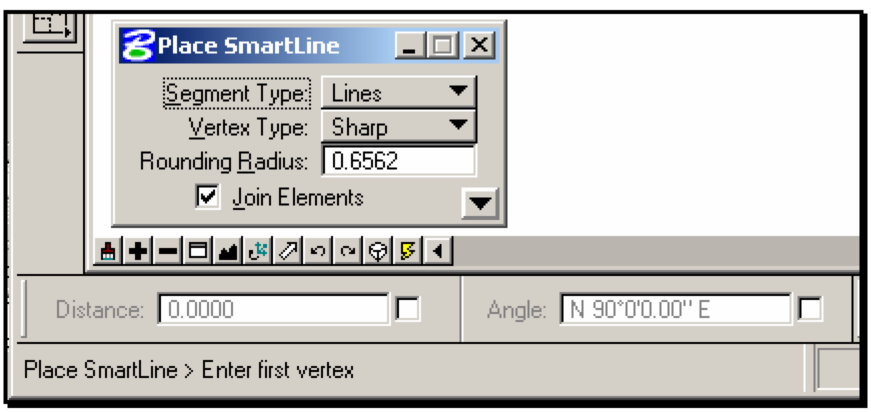


*Figure 2-64: AccudrawDocked - Focus **OFF***

Note also that the *Tool Settings Window* has *Focus* (like the **Place SmartLine** window in Figure 2-64) and *AccuDraw* is grayed. The **Esc** key toggles focus back and forth between *AccuDraw* and the *Tool Settings Window*. If I were to hit the **Esc** key (located in the upper left of my keyboard), the Focus will change to the AccuDraw (Figure 2-65) and the Place SmartLine window is grayed.

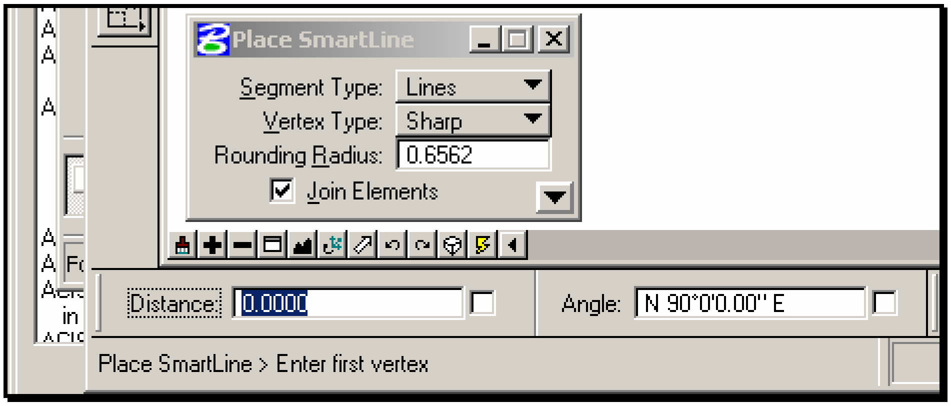


*Figure 2-65: AccuDraw Docked - Focus **ON***

Some Important Shortcut Keys

Try to get used to using the **K**, **N**, **C**, **O** and **I** shortcuts to activate your *Keypoint, Nearest, Center Origin* and *Intersection* snap modes.

ACCUDRAW EXAMPLE: ROADWAY TEMPLATES

Calculating Slope

AccuDraw can be used to calculate your cross slopes easily. The basic theory is to figure the "drop" for the distance and slope of your lane. Mathematically, to know how far a 3.3 m lane will "drop" at a -2% slope, you would multiply 3.3 * .02. This results in a .066 m drop. *AccuDraw* can do this for you in one easy step.

First select the **SmartLine** and place the first point.

Move your cursor in the X direction so that *AccuDraw* sets its *focus* in the X field. Input your lane width 3.3 meters as a horizontal distance (Figure 2-66).

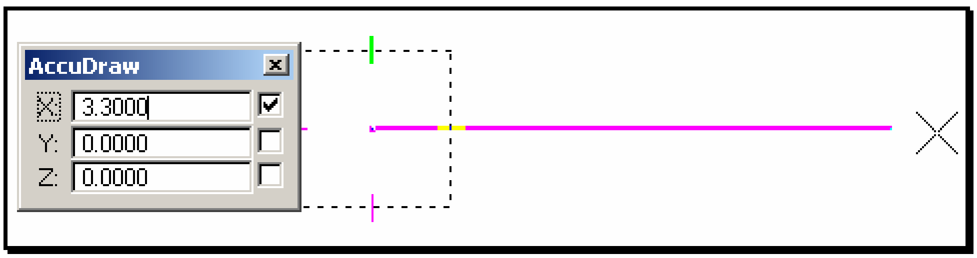


Figure 2-66: Enter Width in AccuDraw

Move the cursor in the Y direction, shifting the "focus" of the *AccuDraw* window accordingly. (For a negative slope move the cursor down or up for a positive slope.)

Enter the horizontal distance again, 3.3m. Then, using **[SHIFT 8**], evoke the multiplication function of *AccuDraw* and enter .02. By entering your slope in decimal form, you will be multiplying the lane width by the slope to calculating the drop (Figure 2-67).

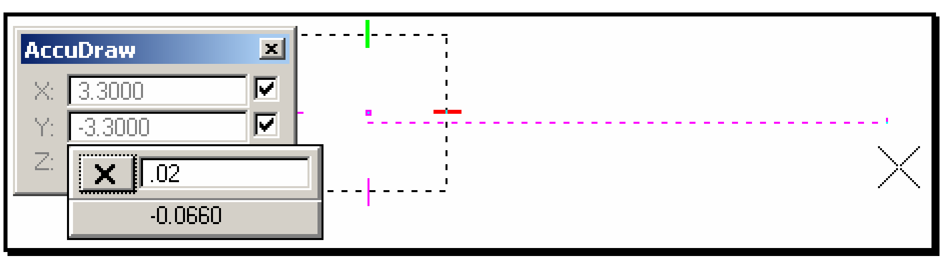


Figure 2-67: Calculate Vertical Drop Based on Slope

By accepting this position, you have just placed a line that extends the width of your lane and drops according to your decimal slope. If you then hit the "V" on your keyboard, the *AccuDraw* compass will rotate parallel to the view and you can continue placing a shoulder without quitting the SmartLine command.

Placing Accudraw's Origin

You can change the origin of your line and make it relative to a position on the screen. This comes in handy when drawing typicals from scratch. For instance, if you drew the finished grade using the distance/slope method described earlier, you could use the Origin function of *AccuDraw* to lay your pavement lines.

First, *snap* to the place that you want to move your origin from.

In this example, you would start with the smart line command and then snap on the centerline position of the finished grade (Figure 2-68).

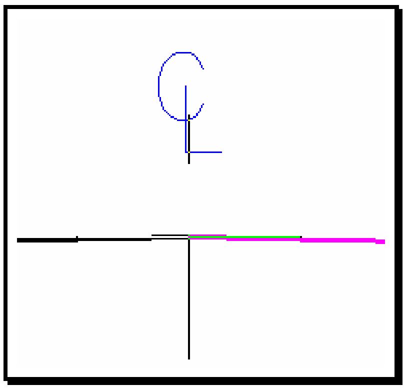


Figure 2-68: Tentative on the Centerline

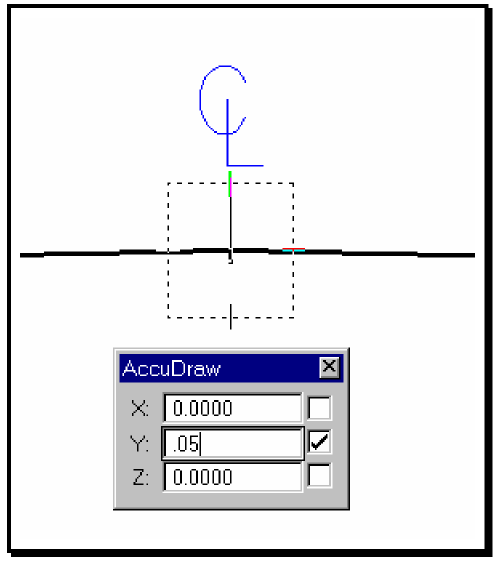


Figure 2-69: AccuDraw Origin

Without accepting that position, hit the “O” on your keyboard to invoke the **Set Origin** function of *AccuDraw* (Figure 2-69).

This will allow you to move your cursor without actually drawing a line. If you move your cursor in the Y direction, you can then input the exact distance you want to move away from your snap point and begin drawing. So if you wanted to move down 50 mm and start drawing again, you would move your cursor down and then type in .05. By accepting that position with a *data point* you can begin to draw again (Figure 2-70).

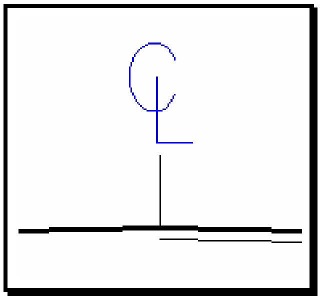


Figure 2-70: Free to Draw

Likewise, you can use multiple Origins to move first in one direction, and then another. With this functionality, you will hardly ever have to use construction lines. The *AccuDraw* Origin will allow you to move around and position your cursor almost anywhere in relation to other elements in your design file.

DRAWING IN SUB-UNITS

Sometimes, it is easier to draw in sub-units. With the introduction of the metric system, the conversion to master units is made quite easy.

1000 mm = 1m

500 mm = 0.5m

30 mm = 0.03m

…and so on and so on. But still, there will be times when you will want to draw in sub units, especially for U. S. Customary jobs.

This is done easily and simply with *AccuDraw*. All you need to do is choose your starting point for your line and then input the distances using a colon or semicolon (: or ;) before the numbers (Figure 2-71).

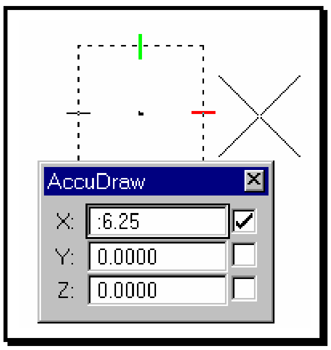


Figure 2-71: Subunits in AccuDraw

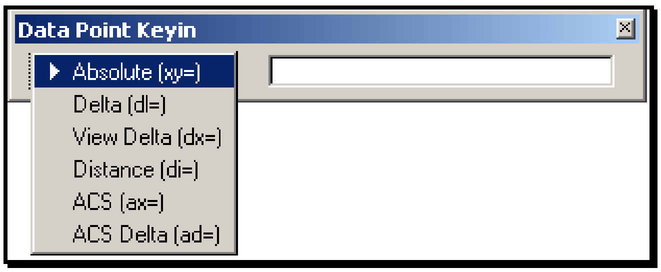
This tells *AccuDraw* that you will be using the sub-units. For instance, if you were working in an U. S. Custom job (ft, in) and wanted to draw a line that is 6.25 inches long; all you would have to do is input that distance in your *AccuDraw* window with **:6.25** (Using the proper X,Y, Z depending on what direction you want to move in).

Drawing by Coordinates

Using the Data Point Keyin

Sometime you may want to draw a line, place a cell or other type of element at certain coordinates in a drawing. Some files are at their intended State Plane Coordinate System (i.e. topo, contours, highway, bridge, alignment, etc.) and others are not dependent on the coordinate system (i.e. 3 digit prefix plan sheets and z files).

Start a command that will utilize a point placement method (i.e. *Place Line, Place Active Cell, etc)*. When ready to enter a coordinate position, verify that you have focus in *AccuDraw* and type **"P"** to activate the *Data Point Keyin* dialog.



Select *Absolute (xy=)* from the pull down. Enter the coordinate's points for the X, Y and Z values separating them by commas. If you need the dialog for multiple points, type **"MI"** for multiple keyin points.

✓ ***Please refer to MicroStation's HELP menu for more information about the different methods of the Data Point Keyin.***

Locking AccuDraws Compass at 0,0

By default, your AccuDraw compass is setup to reside at the last point that is selected in a file by clicking a data point. If a line is drawn, the *AccuDraw* compass is at the end of the line, rotated along the line so that a user can draw easily draw a perpendicular line from the last point or an arc that is tangent to the line just drawn.

At times you may want to set *AccuDraw* at 0,0 so that the lines, arcs, cells or text placement can be relative to 0,0 in your file. You can adjust your *AccuDraw* settings so that the compass is locked at 0, 0 and doesn't follow (Float) or move to the last data point or to the end of a line. To lock your *AccuDraw* compass at (0, 0) in your drawing, go to **Settings>AccuDraw** and while displaying the *Operation* tab, uncheck *Floating Origin.* Now go to **Utilities>Keyin** and type in **AccuDraw Setorigin 0, 0, 0.** This keyin can be added to a *Function Key* for quick activation. Sometimes you may want to temporarily move your origin to the end of a line so that you can draw lines based on an angle or bearing. You can still move this origin by using the *AccuDraw* shortcut key "o" (origin) and the "RQ" (rotate quick) functionality or "T" (top rotation) to rotate the compass to a top view (+Y = north). Reset your origin to 0, 0 in the file by typing the keyin again.

✓ ***Refer to previous pages in this chapter for more information about AccuDraws shortcut keys, setting its origin and floating origin.***

MEASURING

COORDINATE READOUT

Control the display of your working units from your main menu by selecting **Settings > Design File**>**Coordinate Readout** (Figure 2-72).

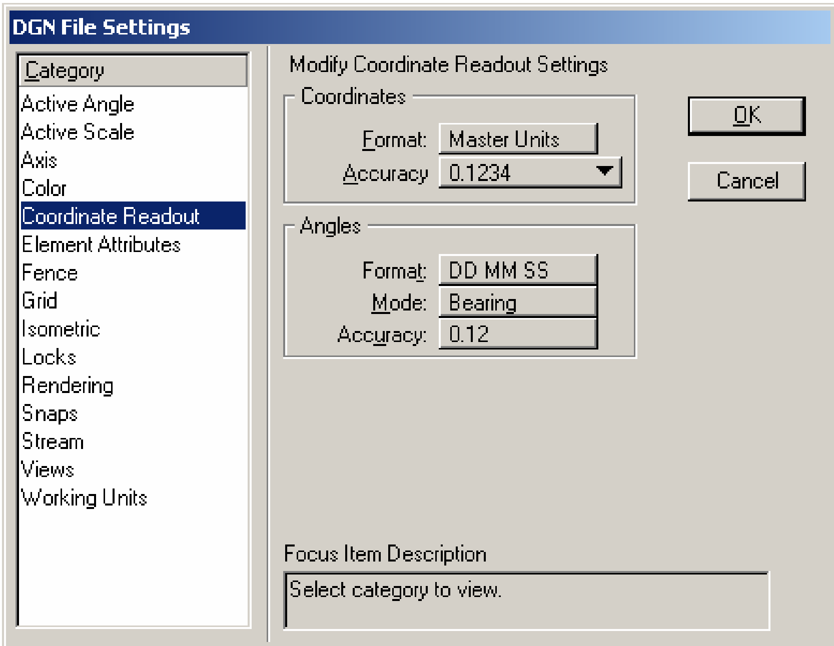


Figure 2-72: Design File Coordinate Readout

This area is going to control how MicroStation displays linear and angular measurements to you.

Linear Units, Accuracy

In the **Coordinates** area of this dialog, choose **Format** (Figure 2-73) and **Accuracy** (Figure 2-22).

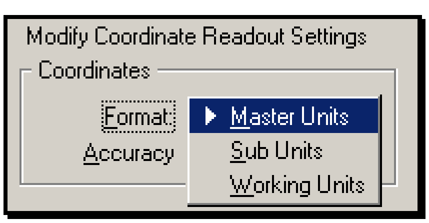


Figure 2-73: Coordinate Format

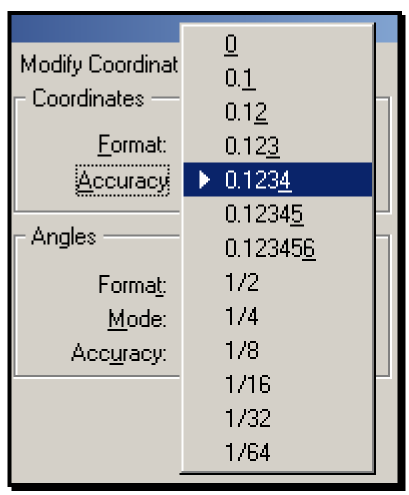


Figure 2-74: Coordinate Accuracy

The **Format** should be set to **Master Units** for working in metric drawings.

- The only time you would set **Format** to other than **Master Units** would be for U S Custom work. You might set it to **Sub Units** to display Imperial projects in feet and inches (whereas keeping it set to **Master Units** in Imperial will display data in decimal feet.)

Set your Accuracy to reflect how many decimal places you want your measurements displayed to.

Angle Accuracy and Mode

From the **Angles** portion of the **Design File Settings Dialog** you can control the **Format** (Figure 2-75), **Mode** (Figure 2-76), and **Accuracy** (Figure 2-77) of MicroStation's angular display.

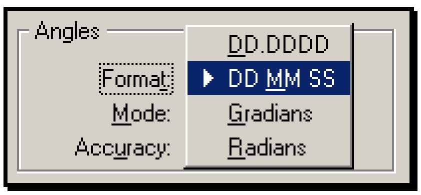


Figure 2-75: Angle Format

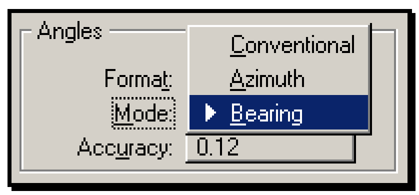


Figure 2-76: Angle Mode

Choose whether you want the **Format** of your angular display to be in decimal degrees or in degrees, minutes and seconds.

Choose whether you want your **Mode** to be **Conventional, Azimuth,** or **Bearing**. **Conventional** angles start with 0° at 3:00 (on a clock) and increasing counter-clockwise (90° would be 12:00). **Azimuth** angles start with 0° at 12:00, increasing clockwise (90° would be at 3:00). **Bearing** angles are expressed in terms of North/South X° East/West.

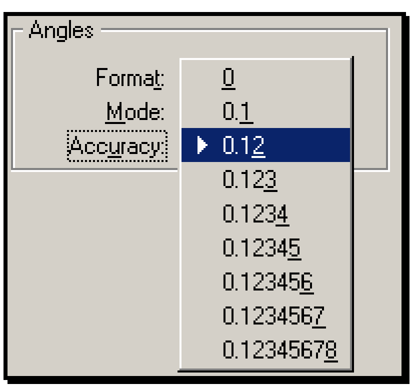


Figure 2-77: Angle Accuracy

Set your angular accuracy to as many decimal places as you want.

- Note that if your **Format** is **DD MM SS**, then your **Accuracy** is the number of decimal *Seconds* you want displayed.

MEASURING PART 1

You can access all measuring commands from your main menu by selecting **Measure** (Figure 2-78).

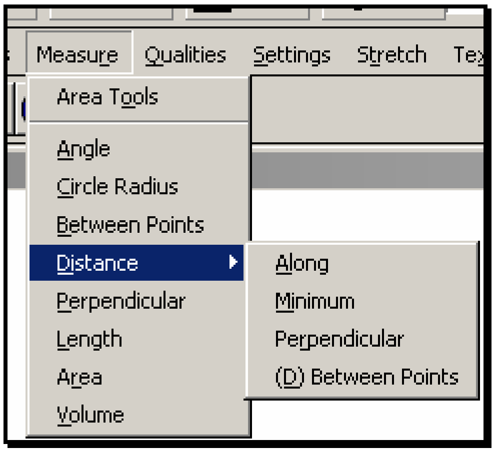


Figure 2-78: Measure Menu

Circle Radius, **Length**, **Area**, and **Volume** require that you simply identify one element.

♬ **Circle Radius** can be used to measure the radius of arcs and ellipses as well.

Angle and **Distance > Minimum** require that you identify two elements.

ⓘ ***Perpendicular measuring sometimes gives unexpected results in 3D files. If you encounter this, flatten your file and try again or try the Measure Distance Between Points command while using AccuDraw to get the Perpendicular distance.***

MEASURING PART 2

Measuring Areas

With a basic understanding of *Region Creation*, measuring areas becomes straightforward.

From your **Main Tool Frame**, select **Measure Area** (Figure 2-79) or choose **Measure > Area** from the main menu.

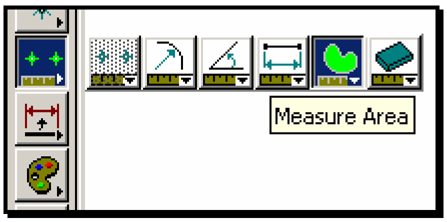


Figure 2-79: Measure Area

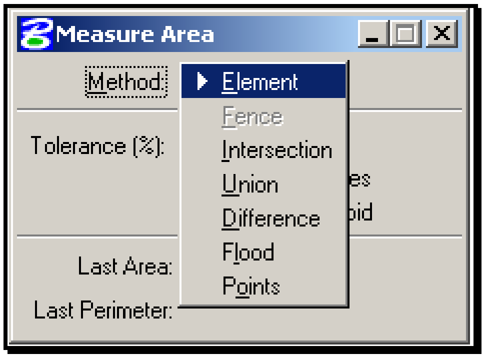


Figure 2-80: Measure Area Methods

A brief look in the **Tool Settings Window** should reveal some familiar **Methods** (Figure 2-80).

Element: measures the area of a single closed element

Fence: measures the area of a fenced area.

Intersection: measures the area where two or more closed elements overlap.

Union: measures the total area encompassed by two or more closed elements.

Difference: measures the area of a single closed element with "bites" taken out by other closed elements.

Flood: finds an enclosing region around a *data point*.

Points: measures the area of a polygon entered by the user.

Look at **Measure > Area Tools** for measuring and labeling areas in one fell swoop.

MEASURING AREAS AND PLACING TEXT

Step One: Lock "Z" to Zero

From the *Main Menu* select **Macros>Set/Lock Z** to force MicroStation to place all elements at "0.00" elevation in the file. Click **OK** for the defaulted "0".

- This will prevent MicroStation from jumping to elements at different depths in the file.

Step Two: Set the Category Scale

Right Click on your *Settings Manager* and select **Category>Scale.** From the list of available scales, select the scale that you intend on plotting your sheets.

- If you use the *Settings Manager* for almost any activity, it is required that you set the **Category Scale** first. This has to be set once in every file.

Step Three: Set the Text Attributes

Using the *Settings Manager*, select **Prop. Text and Dims>Text Note or Standard Text (Normal).** This will set your text to the correct height, width, color, level, style and weight.

Step Four: Open Measure Area Tools

Select **Measure>Area Tools** from the *Main Menu.* A new set of tools should open.

In the rightmost tool in the *Tool Box* (Figure 2-81), set some *Parameter Settings*.

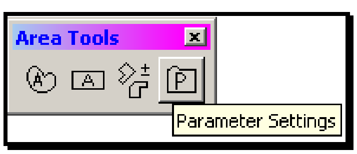


Figure 2-81: Area Parameter Settings

Part One: Set the Default Text Font

While in the **Text** tab, set the **Font** to **123 dotitalics** (Figure 2-82). This is the only setting necessary on the tab.

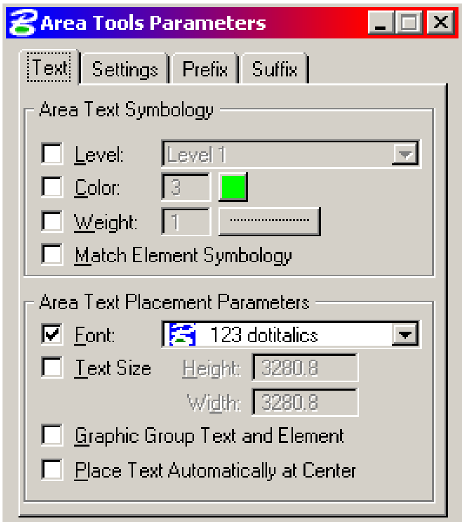


Figure 2-82: Adjust Text Font to 123 dotitalics

Part Two: Set the Default Prefix

Click on the *Prefix* tab (Figure 2-83). Add a prefix that you would like to use. (i.e. Wetlands =). You're limited to ten characters.

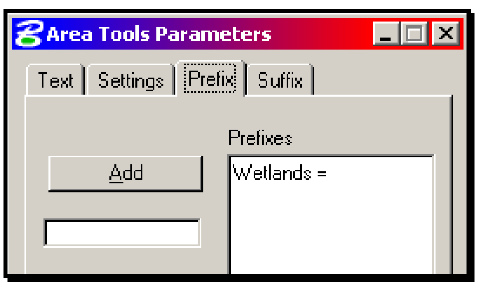


Figure 2-83: Add a prefix

Part Three: Set the Default Suffix

Click on the *Suffix* tab (Figure 2-84). Add a suffix that you would like to use. (i.e. s.f. or m\178 for metric). You're limited to ten characters.

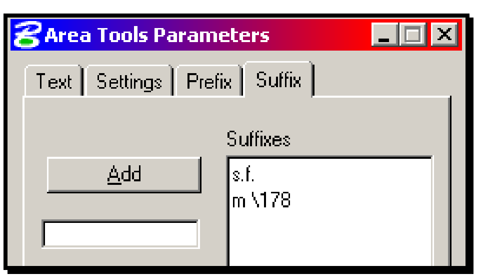


Figure 2-84: Add Suffixes

Step Five: Select Measure Area Tool

From the *Area Tools* toolbox (Figure 2-85), select *Measure Area.*

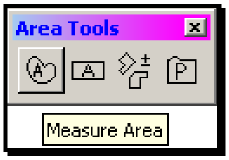


Figure 2-85: Measure Area Tool

Configure area tool for the method, prefix and suffix. Select one of the methods available. If using the *Flood* method, use the PowerSelector and select all bounding elements. If there is a gap in any of the connections, correct it or use the *Flood* method in the *Measure* Toolbox as it allows the jumping of gaps. Click inside the area or on the element (based on the method you picked).

This should label your area. The orientation of the text will be horizontal to your current view window which means you will have to rotate and possibly move text. Use the **Rotate Element** tool and set method to either **2 points** or **3 points.** Follow the prompts.

ⓘ ***If you cannot see the text for your areas, check that you have done all the steps in this section.***

Step Six: Select None

Select **Edit>Select None** to unselect any elements that may be currently selected.

<u>TIPS AND TRICKS</u>

We have a number of tools and tips to make the measurement of areas easier.

Measuring with Flood Method

PowerSelector

If you are working in a crowded area, you will have a hard time using the *Flood* method to pick exactly the area you want to measure. This is because *Flood* is confused by lots of crossing lines. To simplify matters, start by using the *PowerSelector* to pick only the elements that make up the outline you want to measure. Now use *Flood* and data point somewhere in this area. *Flood* will look only for highlighted elements when it looks for an enclosing *region*.

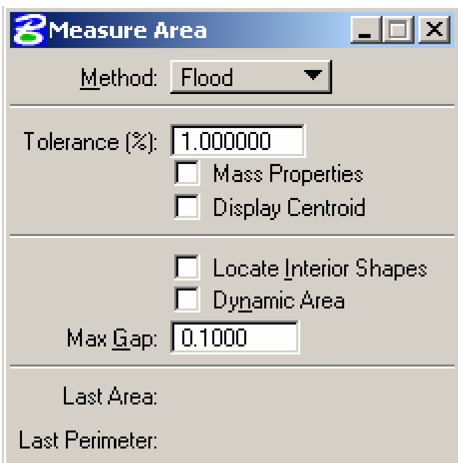


Figure 2-86: Measure Area by Flood Options

Adjust Max Gap

If MicroStation can't find an enclosing *region*, you may have some slight gaps between elements. Try changing your **Max Gap** value to a higher number (Figure 2-86). If you have to set it higher than .1, you may need to make sure that your file is flat and that you have selected all of the elements that make up your boundary.

✓ ***Check Flattening your Active File on page 2-87.***

Set/Lock Z to Zero

Another macro that will help make sure that you are measuring on the same plane and get the correct area measurement is called ZLOCKANY. This macro is kicked off by selecting *Macros>Set/Lock Z* from the *Main Menu* and setting the active depth to "0" in the 3D file.

Converting Metric Measurements to English

We have a macro that will convert your metric measurements directly into English units.

All you have to do is measure your area in Metric, then run the **acre.bas** macro. ROW users press **Alt+F2** or **Utilities>Macro>MicroStation BASIC>acre**. This will bring up the **Area** dialog (Figure 2-87).

Figure 2-87: Area Macro Options

Press the unit that you want to label and the macro will stick text right on your pointer. Make sure to have your text height and font (229 verdana) set up right beforehand.

♬ If you find, in the middle of the macro, that your text height is wrong, just **Reset** and pick the right text height. Then re-run the macro. You do not have to re-measure the area. MicroStation remembers the last area that you measured.

REFERENCE FILES

REFERENCES DIALOG

Select: **File > Reference (DOT)>Dialog**. This will open the **Reference Dialog** (Figure 2-88).

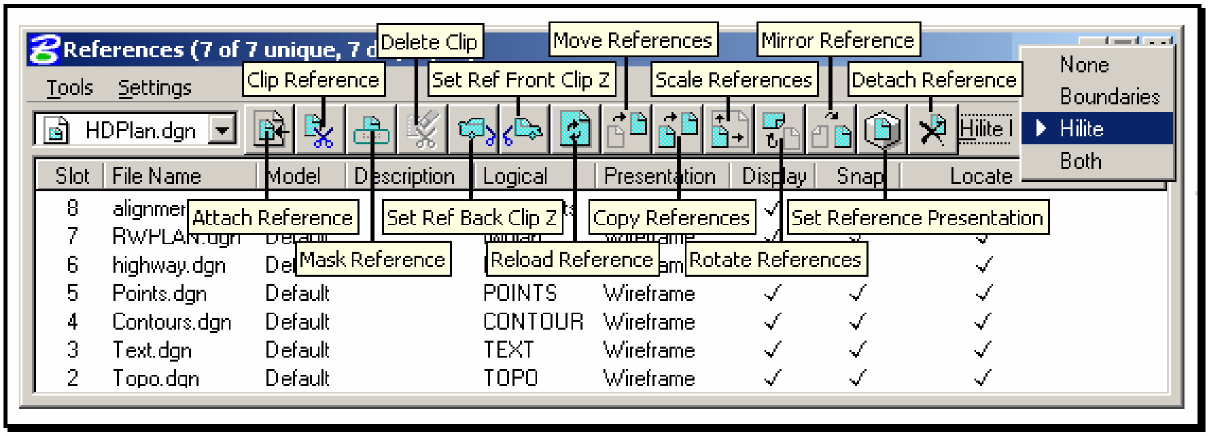


Figure 2-88: Reference Dialog

List box

Slot: The a number of a File referenced

File Name: The name of the DGN being attached

Model: The name of the Model that contains the elements displayed

Description: A description of the file reference

Logical: A name assign to the file being referenced

Presentation: The Display Mode of the graphics

Display: By clicking the checkmark turns the graphics in the file **On** or **Off**

Snap: When checked **On** snapping to an element is possible

Locate: When checked **On** allows elements to be copied into the *Active File*

You must first select a reference file in the *List Box* before you can change a setting or select a tool. However, you can change the Display, Snap, and Locate settings for DGN files simply by clicking in that column.

Icons

Attach Reference: Used to attach a reference to the active file

Clip Reference: Used to display only graphic inside a fence boundary

Delete Clip: Deletes the clip boundary of a reference

Set Ref Back Clip Z: Sets the back clipping plane for a 3D reference

Set Ref Front Clip Z: Sets the front clipping plane for a 3D reference

Reload Reference: Reloads all references, allowing you to see changes made since being loaded

Move Reference: Moves a reference

Copy Reference: Copies a reference

Scale Reference: Scales a reference

Rotate Reference: Rotates a reference

Mirror Reference: Mirrors a reference

Set Reference Presentation: Changes the display: Wireframe, wiremesh, etc.

Detaches Reference: Detaches a reference

Hilite Mode

Highlighted and/or surrounded a reference by a border when placed in the active file.

None: Does not place a dashed border or highlight the select reference.

Boundaries: Places a dashed border around the select reference.

Hilite: Highlights the selected reference.

Both: Places a dashed border and highlights the selected reference.

Main Menu (Tools)

Attach: Used to attach a reference to the active file

Attach URL: Opens the Select Remote Design File to Attach dialog box, which is used to attach a remote referenced model

Detach: Detaches a selected reference

Detach All: Detaches all references

Reload: Reloads a reference, allowing you to see changes made since being loaded

Reload All: Reloads all references

Ref Agent: Opens the Reference File Agent dialog box, which enables you to automatically maintain local copies of remote references

Exchange: Toggles from the master file to an attached reference

Move: Moves a reference

Copy: Copies a reference

Scale: Scales a reference

Rotate: Rotates a reference

Merge Into Master: Merges reference models to the active file.

Make Direct Attachment: Promotes the nested attachment to a direct attachment so it can be modified. The nested attachment becomes redundant with the newly created direct attachment. Quotation marks under Display, Snap, and Locate indicate a redundant attachment.

Mirror Horizontal: Mirrors a reference about the horizontal axis.

Mirror Vertical: Mirrors a reference about the vertical axis.

Clip Boundary: Used to display only graphic inside a fence boundary

Clip Mask: Masks a part of a reference that is inside a fence boundary

Delete Clip: Deletes the clip boundary of a reference

Clip Front: Sets the front clipping plane for a 3D reference

Clip Back: Sets the back clipping plane for a 3D reference

Main Menu (Settings)

Settings: Opens the an *Attachment Settings Dialog* that is used to set attachment information for references

Presentations: Opens the *Set Presentation Dialog* used to set presentation for references

Update Sequence: Opens the *Update Sequence Dialog* used to change the order of display for references

Adjust Colors: Opens the *Adjust Reference Color Dialog* used to modify or change colors of references

REFERENCES ATTACH

Most of the file will already be attached. From time to time files will need to be attached. To attach a reference from the same PIN without *Browsing*: **File>Reference (DOT)>Attach**. This will open up the **Attach Reference** dialog (Figure 2-89). This is an automated routine to look at where you entered MicroStation thru the projects list and place you into the proper directory tree.

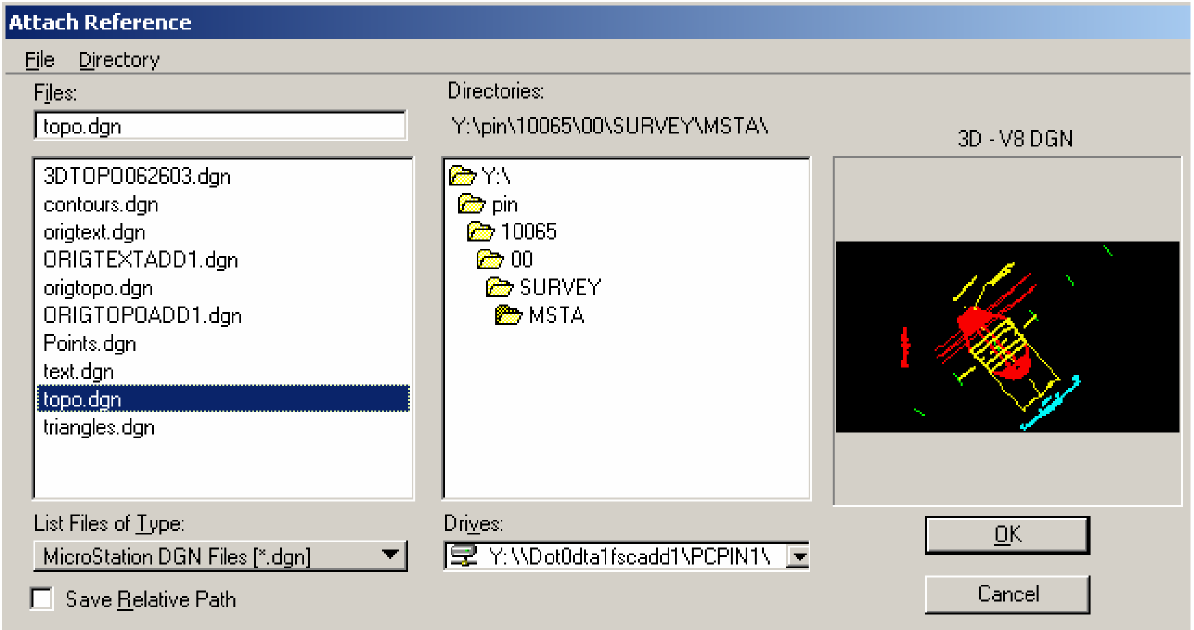


Figure 2-89: Attach Reference

Browse to the SURVEY\MSTA directory and select the file and **Click OK**. If *File>Reference (DOT)>Attach* is not used be sure that you are browsing in the proper directory because MicroStation remembers the last place you went to attach a reference file.

This brings up the **Attach Reference Settings** Dialog (Figure 2-90).

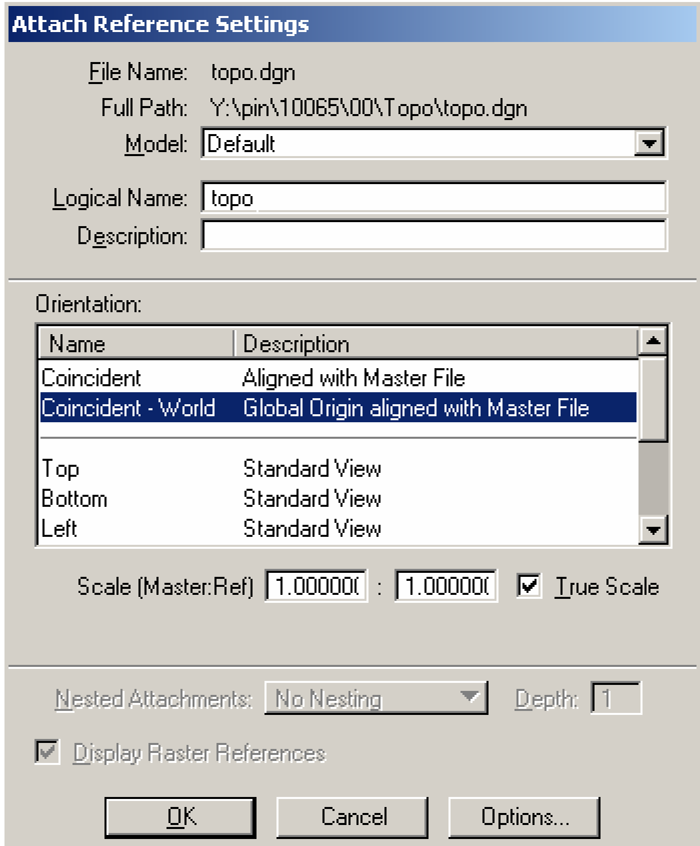


Figure 2-90: Attach Reference Settings Dialog

For now work is done in the **Default Model**. Type in a **Logical Name** (topo), select Orientation (Coincidental-World Global Origin align with Master File), **Scale (Master:Ref) 1:1** and **True Scale Checked**. Push the **OK** button. Push **Fit View** (on the lower left of the window border) to see all your reference files. **Nested Attachments** (Figure 2-91) will be grayed if no files are attached to the file being referenced.

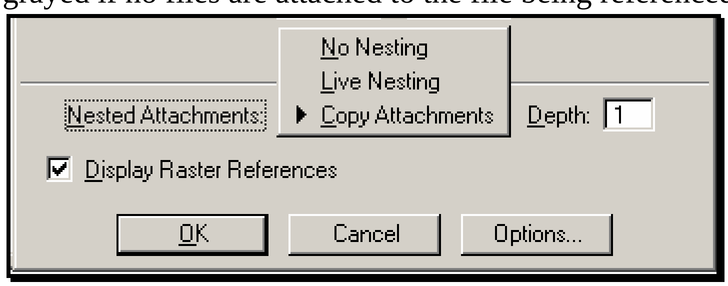


Figure 2-91: Nested Attachments

Nested Attachments

Nesting describes how nesting of references is handled.

No Nesting: References attached to the file being referenced will not be displayed

Live Nesting and **Copy Attachments**: References attached to the file being referenced will be displayed and appear in the list of reference

Depth

0: References only the file being attached

1: References the file and any files being reference to it

2: References the file, any files being reference to it and references any files attached to those and so on

For example, *Live Nesting*: File B is attached to file A. Further, file B also has file C attached. If you detach file C from B, file C will no longer appear as attached to file A.

Where *Copy Attachments*: File A has an attachment, file B which also has an attachment, file C, if file C is detached from B, file C will still appear as attached to A unless C has been explicitly removed.

Display Raster References

When a raster image is attached to a file a **Checkmark** can be placed in the box with a data click to display the image. If there is no image attached to the file the area on the Attach Reference Settings Dialog will be grayed.

REFERENCE FILE MOVING

Everyone likes to have some control on how the plan appearance looks. You have the ability to move your reference files around in your border.

Select: **File** > **Reference** to open the **References Dialog** box (Figure 2-92).

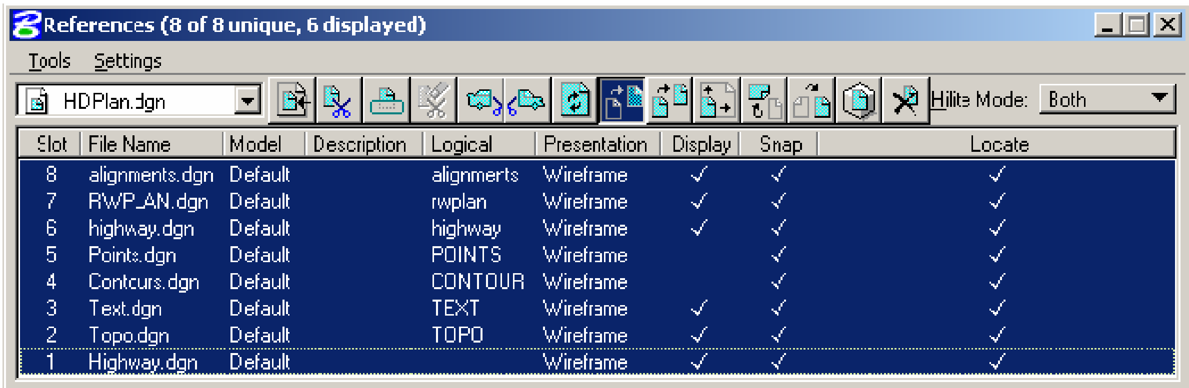


Figure 2-92: Reference Dialog

Highlight the reference file or files that you want to move. From the **Reference Dialog** box, select **Tools>Move**.

MicroStation will prompt you (in your **Status Bar**) to "Move Reference File > Enter Point to move from." Enter a data point. MicroStation will now prompt you to "Move Reference File > Enter point to move to." Enter another data point. MicroStation will move all the reference files you selected from the first point to the second point.

REFERENCE FILE ROTATION

MicroStation 3D files allow for reference file rotation in the **X, Y,** and **Z-axis**. When working in a plan view, reference file attachments will only need to be rotated around the **Z-axis**.

Select: **File > Reference**. This will open the **References Dialog** box (Figure 2-93).

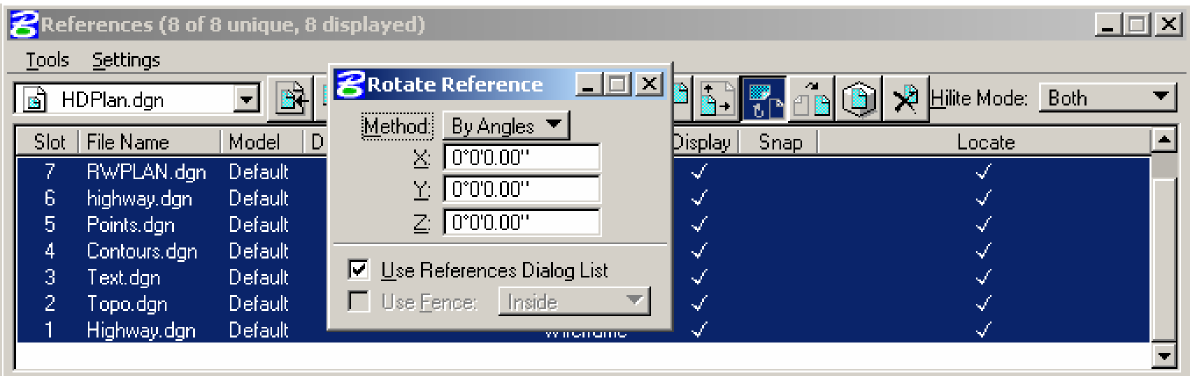


Figure 2-93: Reference Dialog

Let's begin by selecting the file or files you want to rotate. From the **Reference Files** dialog, select **Tools>Rotate**. This will open up the **Rotate Reference File Dialog**. Set the angle to rotate around the **Z-axis** and send a data point to your screen. After rotating you may want to move the reference files to a more precise location on your border.

✓ ***Refer to Reference File Moving, page 2-73.***

RASTER FILES

ATTACHING A RASTER IMAGE TO SCALE

Determine Image Size

Before the image is placed in MicroStation, create a rectangle the same dimensions as the 1:1 paper image multiplied by the original scale of the image. Doing this will insure that the Image will be to scale. To do this, open *Windows Explorer* and browse to the image. Next, **Rt+click** the image and select **Properties.** Select the *Summary* tab and click the *Advanced* button. You should see the width and height in pixels and the horiz. and vert. resolution (should be the same) (Figure 2-94).

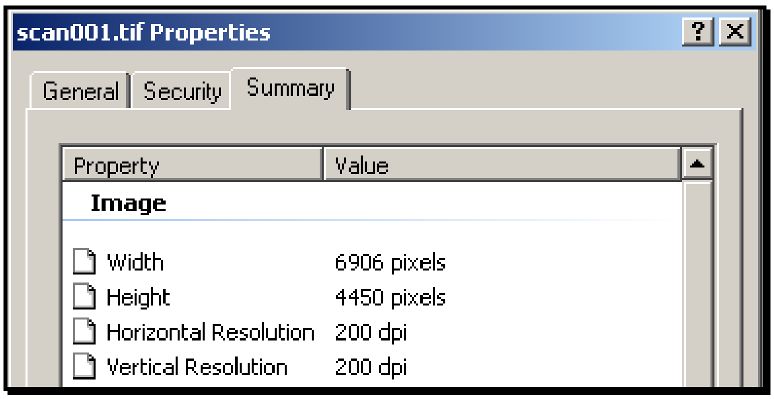


Figure 2-94: Windows Explorer

Divide the dimensions by the resolution to get the image size in inches. Using the numbers in the example above (Figure 2-94), divide 6906 by 200 & 4450 by 200 to get the width and height in inches (34.53 x 22.25). Now we have to multiply these dimensions by the original scale of the image. If the scale is 1"=25', the dimensions, both width and height, will need to be multiplied by the absolute scale which is 300 (12"x25'). You can calculate these dimensions now or use *AccuDraw's* built in calculator to calculate the dimensions on the fly. In this example, the rectangle will have to be 10,359' x 6,675' to be 1:1 (actual size) in MicroStation (i.e. 34.53 x 300 = <u>10,359'</u> & 22.25 x 300 = <u>6,675'</u>).

- If the image will open with *Paint*, check **Image>Attributes** for size in inches.
- The TDS860 is in the Reproduction Room which scans images at 300 dpi's (dots per inch).

Place Block

Start MicroStation, select the **Place Block** and place the first point. Move your cursor in the X direction so that *AccuDraw* sets its *focus* in the X field. Input colon **:34.53** (subunits) using **[SHIFT 8**], evoke the multiplication function and enter **300** for the horizontal distance. Move the cursor down in the Y direction, shifting the "focus" of the *AccuDraw* window accordingly. Enter the horizontal distance **:22.25 * 300** for the Vertical distance and enter a data point to finish the rectangle.

Attach Raster Image

To attach a *Raster Image*, select **File**>**Raster Manager**. This will open up the **Raster Manager Dialog** (Figure 2-95).

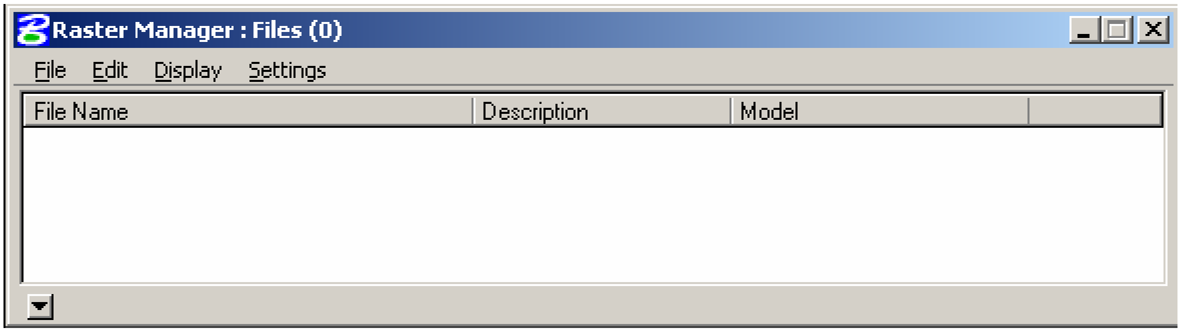


Figure 2-95: Raster Manager Dialog

From the main menu of the *Raster Manager Dialog* select **File>Attach**. When the **Attach Raster Reference Dialog** (Figure 2-94) opens browse to select the Image File and hit **OK**.

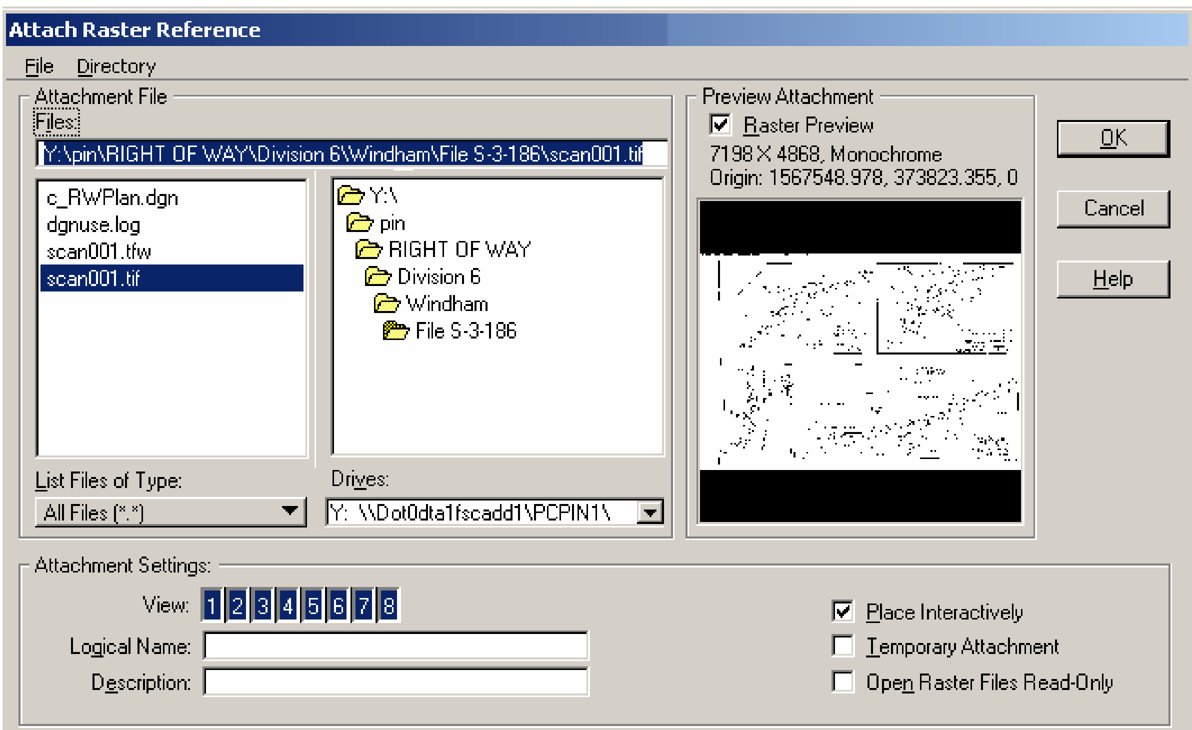


Figure 2-96: Attach Raster Reference

MicroStation will ask for **Enter Origin**, see *Status Bar*. Place a *Data Point* at the upper left corner of the rectangle previously created for the **Enter Origin** point. Next place a Data Point, in the lower right corner of the rectangle to enter the **Enter Corner** point. The scale of the image can be changed by **Scaling** the rectangle and detaching and reattaching the image: **File> Detach** and **File> Attach**.

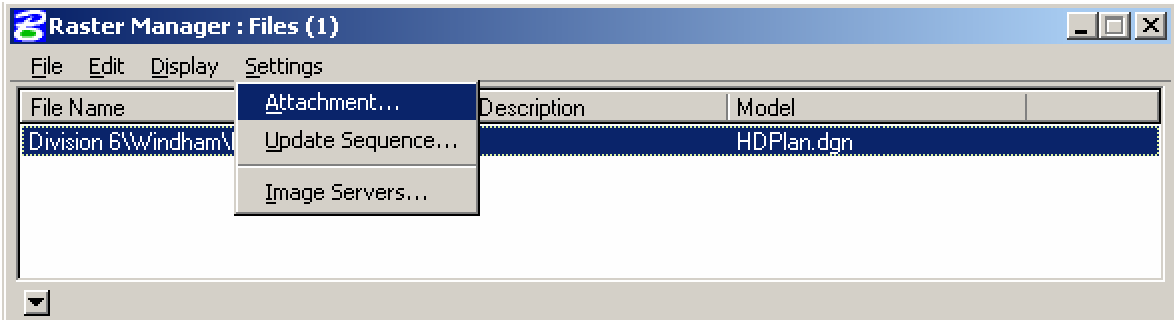


Figure 2-97: Raster Manager Attachment

In the *Raster Manager* (Figure 2-97) from the **Settings** submenu select **Attachment…**. To print the image white with black details the color may need to be changed. Open the **Color** tab (Figure 2-98) and check for a white **Foreground** and a black **Background**.

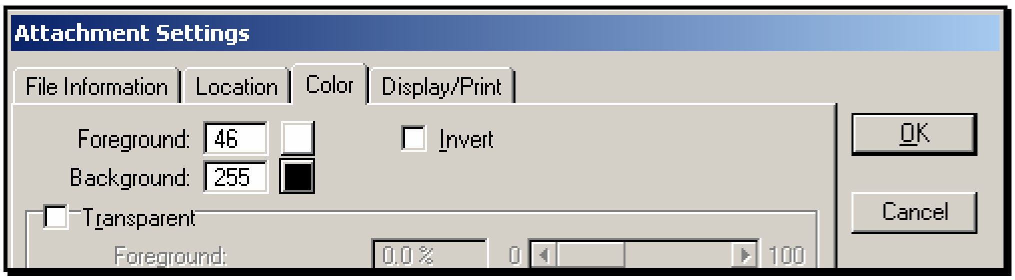


Figure 2-98: Attachment Settings

GEOREFERENCED IMAGES

Overview

MicroStation has the ability to attach Raster Images that have spatial extents. This means that the image has a "world" or a "sister" file that contains the X and Y coordinates of where the image should sit on the face of the earth. Because of many different potential coordinate systems, it is very important that you know what coordinate system your project is based on.

Browse to your projects directory on the Y: drive (\\dot0dta1fscadd1\pcpin1). Your project's Survey\MX folder contains a **Status.doc** or **Status.rpt** file. The **Status** file indicates what the units are for your project and the coordinate system used. Any images will have to be "projected" to this same coordinate system for the MicroStation graphic and the image to line up.

Preferences

Some of the "out of the box" preference will need to be adjusted also for the image to display properly and in the correct location. Go to **Workspace>Preferences…** and select *Raster Manager* from the *Category* list (Figure 2-99). Adjust your settings to look like the settings in the dialog box. This will allow images to be placed in your drawing based on its *World File* or *Sister File.* The units may have to be adjusted base on the image units.

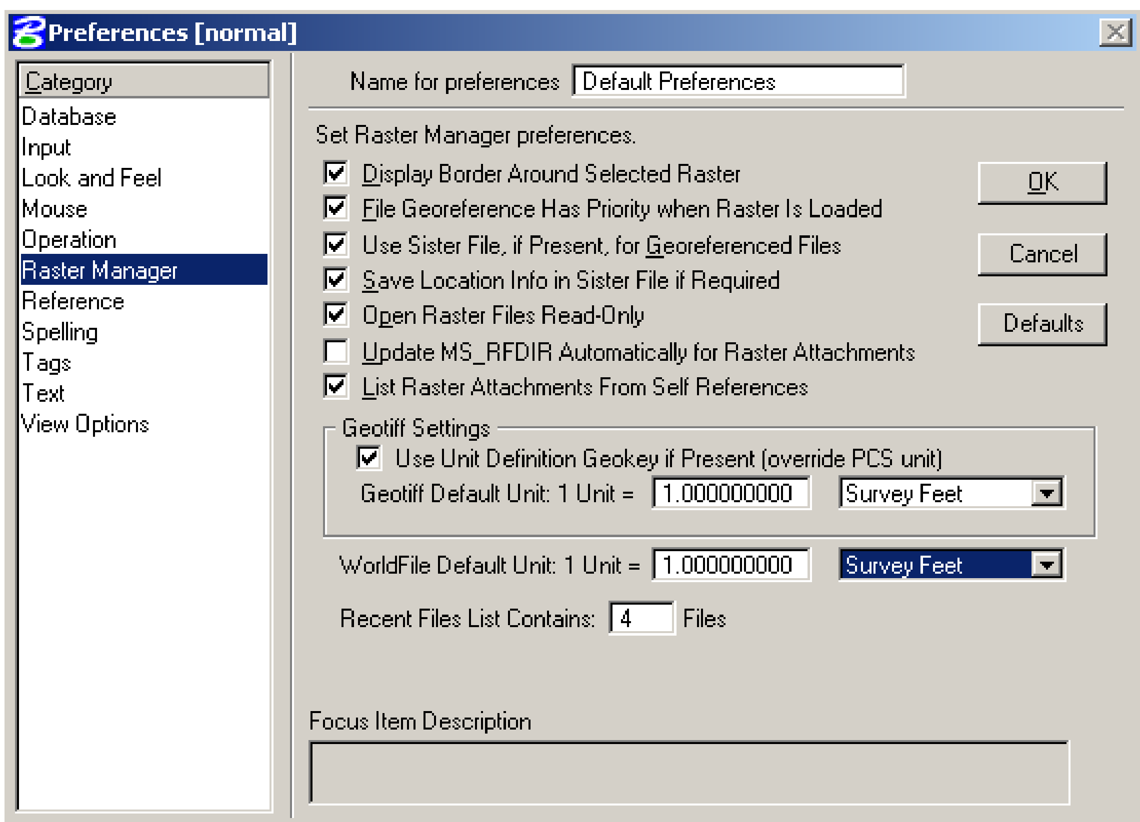


Figure 2-99 User Preference dialog – Raster Manager Preferences

MACROS

PLOTTING BY STATION AND OFFSET

Plotting elements along a centerline is fairly simple when you're on a straight portion of the alignment. *AccuDraw* performs this task very easily. Drawing a perpendicular line off a centerline on a radius is fairly easy, however plotting a point or placing a cell at a specific "odd" station along the curved alignment is a cumbersome task. We have created a macro that make this easy… once you get the hang of it. The *Pointalong* macro is going to make it possible for us to construct points at a specific distance along an existing alignment. From these points, we'll be able to draw a line perpendicular to the alignment at a specific distance.

Starting Point

Run the *Pointalong* macro by selecting **Graduate>Distance and Offset** from the most *Settings Managers* (ROW workgroup users have global *Function Key* menus in which by selecting the **F12** key will start the macro). You will be prompted to "Identify Point to Construct Distance From." (Figure 2-100)

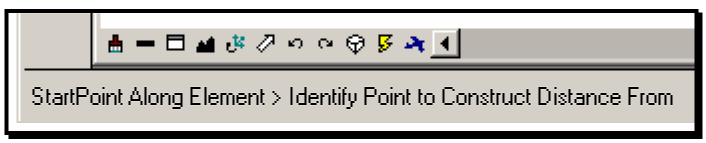


Figure 2-100: StartPoint Along Status Prompts

The Macro is expecting a data point on your "alignment." Using the *Keypoint* snap, *Intersection* snap or *AccuSnap,* snap to the middle of a station tick mark. Once this point is selected, either the tick mark or the centerline may be highlighted. You want the centerline highlighted. Right-click until it is highlighted and click your left mouse button to *Accept*.

Entering the Distance and Direction

Once you've entered a data point telling the macro the start point, it will prompt you to "Enter Distance Along Element." (Figure 2-101)

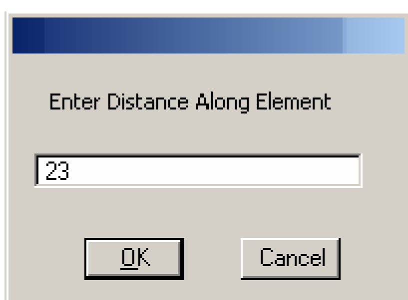


Figure 2-101: Input Distance

If you were trying to construct Station 1+35.240 from a tick mark at Station 1+20.000, the distance to construct would be 15.240. Enter in your desired value and press the **OK** button.

Choosing the Direction

This next step is very important. The macro isn't smart enough to know whether or not you want to construct a point to the left or to the right of the point that you just chose.

Look down in your *Status Bar* to see that the macro is now prompting you to “Identify Direction for Construction.” (Figure 2-102)

Figure 2-102: Status Bar Message

What it is asking for is a data point either to the left or to the right, or, in the case of a vertical line, above or below the first point you entered. Put your cursor on the baseline near the first point, but clearly to one side or the other (Figure 2-103) and enter in a data point (left button). There is no need to snap to enter this point.

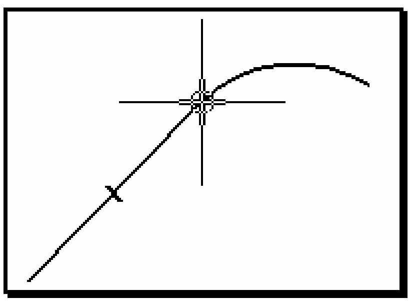


Figure 2-103: Identify Direction for Construction

When you enter a data point, MicroStation will start drawing a line at the specified offset and direction from the first point you entered (Figure 2-104).

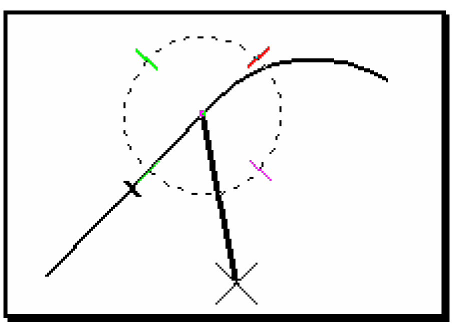


Figure 2-104: Point Constructed

It will also put the **AccuDraw** compass on the line, rotated to make it easy for you to construct a line perpendicular to your centerline.

Choosing the Offset Distance

Now that we are drawing a line, we can choose to go either to the right or to the left of the centerline. Just put your cursor graphically near where you want the line to go. Keep your cursor near the axes of **AccuDraw** and it will ensure that you are drawing perpendicular to the baseline.

Enter your Offset into the **Distance** field of your **AccuDraw** window (Figure 2-105).

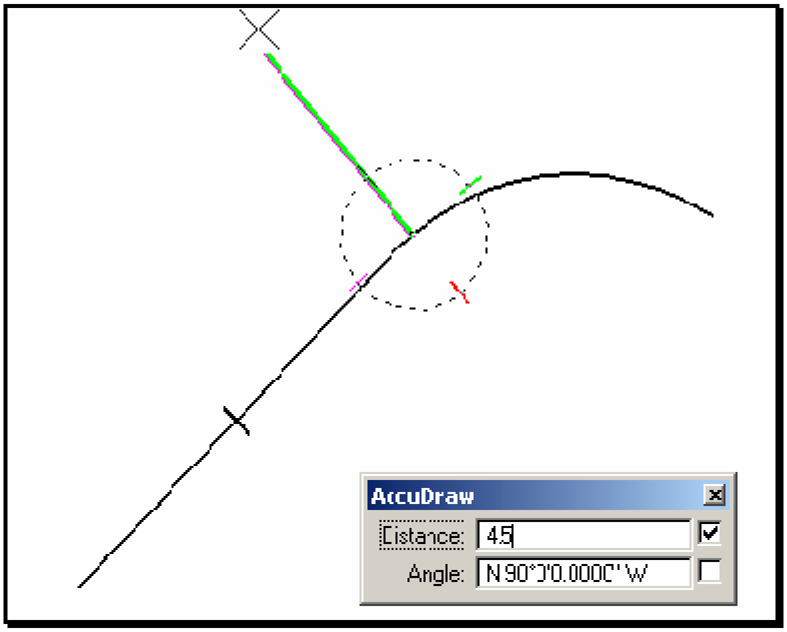


Figure 2-105: Constructing a Distance off the Baseline

Notice that the angle is 90°. Enter a *Data Point* to complete the command. *Reset* to stop drawing lines.

Troubleshooting

There is a **Warning Dialog** (Figure 2-106) that you will get from time to time when you construct distances using this macro.

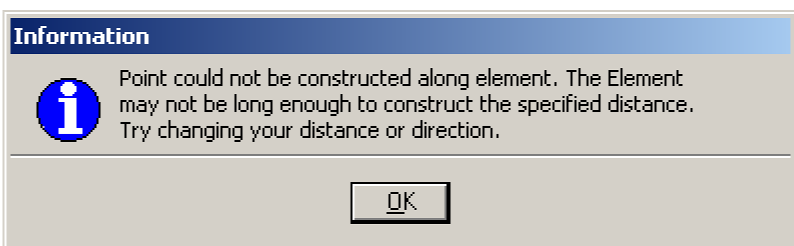


Figure 2-106: Pointalong Warning Dialog

It lets you know that the point you are trying to construct cannot be constructed because your Element is too short. This could happen for a couple of reasons.

1) You may have just chosen the wrong direction to construct from. Your baseline may run 16 kilometers to the right and only 16 centimeters to the left of your offset point. You can't construct a point 10 meters to the left of that first point.

2) You may have picked the wrong element to construct the distance along (i.e. tick mark). Choose the point again and make sure that you *Accept* only the element you want to construct along.

3) You may have used the *Drop Element* tool to drop *Complex Status* of the baseline. This would have broken up the lines and arcs that are joined together in a “complex chain” of a baseline, leaving only individual lines and arcs. The resulting elements are much shorter than a typical baseline.

You can put dropped baselines back together using the *Create Complex Chain* tool. Set your method in the *Tool Settings Window* to **Automatic.**

✓ ***Refer to 2-12 for using the Complex Chain Tool***

4) You may be confusing Metric and English units. Make sure you’re not trying to go 75 feet along a 40-meter line. MicroStation reads that “75” distance as 75 meters if you’re working in a metric drawing.

HOTSWAP

Overview
This macro helps you navigate to specific elements in reference files.

Launch the Macro
From the main menu, select **File > Reference (DOT) > HotSwap**.

Identify the Element
MicroStation will prompt "HotSwap > Identify Element." Chick on the element with a *Datapoint*.

MicroStation will not allow you to identify Dimensions to swap to the reference file. Pick a line, arc, circle, text, or some other basic element type.

MicroStation will also not allow you to identify elements in your active file.

Once you have picked an element, MicroStation will highlight the element and prompt you "HotSwap > Follow Element? (Accept/Reject)." *Datapoint* to *Accept* and MicroStation will open up the file of the indicated element.

Set Zoom Level
Once MicroStation has opened the target file, it will center your view window on the indicated element and open the **HotSwap Zoom Dialog** (Figure 2-107).

Figure 2-107: HotSwap Zoom Dialog

This dialog allows you to **Zoom In** or **Zoom Out** centered on the indicated element.

Press the **Done** button when you are finished zooming.

Tips
The easiest way to get back to your previous file is from your **File** menu.

At the bottom of the menu, right below **Protection** there should be a list of files. File number 1 is your active file. File number 2 is your previous file.

Open your previous file from the main menu by choosing **File > 2 [Filename…]** form the list of files.

LABEL SLOPE BY POINTS

Overview
This macro was created to make it easier to label roadway lines with the appropriate slope value.

Setup
Set your text up to the proper style and scale by using your *Settings Manager*.

✓ ***Refer to page 2-19 for more information on the Settings Manager.***

Run the Macro
From your Settings Manager, choose **Prop. Text and Dims > Slope %.** MicroStation will prompt you in the status bar "SlopeByPoints > Enter First Point." *Snap* and *Accept* to a point on the slope you wish to define.

MicroStation will prompt you in the status bar "SlopeByPoints > Enter Second Point." *Snap* and *Accept* to another point on the slope you wish to define.

You will get a positive slope if your first point is below your second point. You will get a negative slope if your first point is above your second point.

♬ For roadway slopes, snap to an inner point before an outer point.

Once you have defined your points, MicroStation will bring up the text dialog with your slope all typed in.

♬ You can edit the text at this point, if you desire. You could change the sign, degrees of accuracy, etc.

MicroStation will prompt you to "Place Text Above Element > Identify Element."

Datapoint on the line you want to label, near the point you would like the text to be. The text will appear, highlighted, above the element you selected. *Datapoint* to *Accept*, or *Reset* to choose another point for text placement.

FLATTENING YOUR ACTIVE FILE

Flatten.bas is a BASIC macro that was designed to help you squash a 3D file down to a single elevation. It's like pressing a leaf in a book: it takes all of the peaks and valleys and presses them down.

When to Flatten

Try to keep InRoads files 3D.

There are a couple of symptoms that may occur in your file to lead you to believe that you have a 3D problem. If you measure the distance between two points and find that it is much greater than you were expecting, perhaps those points are at different elevations. If you measure the length of a short line and find that it is hundreds of meters long, the line may be spanning two elevations.

How to Flatten

From the Main Menu, select **Macros > Flatten**. This will open the **Flatten File** dialog (Figure 2-108). Type in a target elevation for your elements and press **OK**.

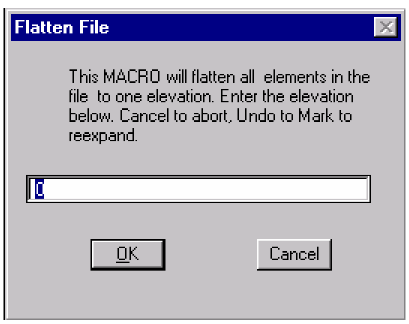


Figure 2-108: Flatten File Elevation

The Status Bar will prompt you to "Flatten Elements? (Accept in Plan View/Reject)". Enter a *Data Point* in your plan view.

How to Undo The Flatten

If you change your mind about flat elements, you are going to have to take a special course to undo what you have done: namely, go to the Main Menu and choose **Edit > Undo Other > To Mark**.

This is necessary because the Macro issues the scale command about ten times. If you were to undo singly, it would only undo one of those scales. The Macro sets a **Mark** in the file before it starts to scale though, so you can undo all of its impact in one fell swoop.

Other Options When Flattening

If you don't want to scale all the elements in your file, the Macro will allow you to scale only the contents of a Selection Set or a Fence. Pick a bunch of elements with the Element

Selection Tool or the *PowerSelector* or place a Fence before you run the Macro. The Macro will then only impact the elements you have selected.

Just What Exactly Does the Flatten Macro Do?

Flatten.bas starts by checking to see if you have an active Fence or Selection Set. If you don't, it executes the "Select All" command, picking all elements in the file. Then it prompts you to enter in an elevation for elements to be scaled to. Then it runs the "Scale" command, setting your active (xyz) scale to (1,1,0.00001). This scales in the xy direction by 1 (no change) and the z scale by 0 (flattening the elements.)

Next, the Macro turns off *AccuDraw* (because the scale command tries to read *Accudraw*'s orientation, which could really screw up the automation.) Now the Macro gets a *Data Point* and changes the z-value of that point to equal the z-value entered by the user. The Macro then briefly turns off the display of elements to the screen (this saves processing time.) Next, the Macro runs the scale command ten times (just once doesn't seem to do it.)

Finally, the Macro turns element display back on (you shouldn't even notice a difference) and activates *AccuDraw*. Even if you didn't have it on before, you'll have it on afterwards.

STEEL MACRO

Overview

The **Steel** macro draws standard steel shapes for the user. Selection is made in a graphic dialog box based on shape type. The user has the option of placing shapes by any of nine points of origin, i.e. top left, bottom right, etc.

Step Zero: Preparation for the Macro

This macro is not going to set any appropriate level, color, style or weight. Before you launch the macro, use your *Settings Manager* and pick the most appropriate setting (i.e. **Structural Detailing** > **Superstructure**.)

Step One: Launch the Macro

Launch the macro from the main menu by selecting **Macros** > **Steel**. This will bring up the **Steel Selector Dialog** (Figure 2-109).

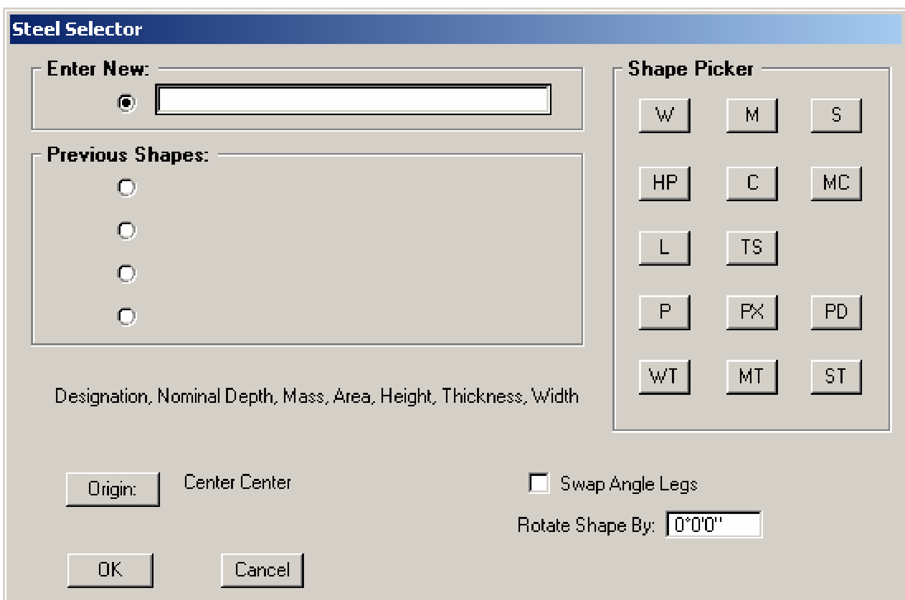


Figure 2-109: Steel Selector Dialog

Step Two: Pick Your Shape

On the right side of the **Steel Selector Dialog**, notice the section labeled **Shape Picker**. Each button in this area is labeled with a type of steel shape: **W, M, S,** etc. Find the steel type you want to place and click the button.

This will bring up the **Shape Picker Dialog** (Figure 2-110).

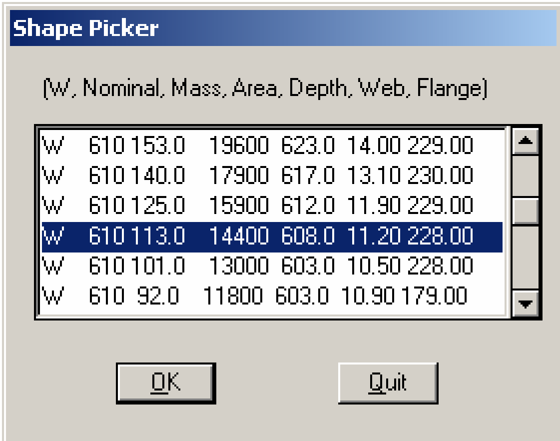


Figure 2-110: Shape Picker Dialog

This dialog is a scrolling list of all the available shapes of the type you selected. Scroll down the list until you find the shape you want to place, and then press **OK**.

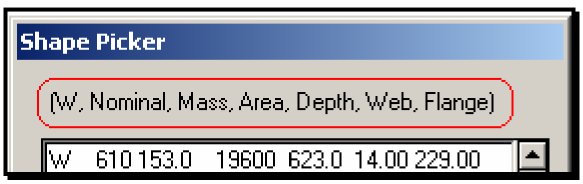


Figure 2-111: Steel Label

♬ If you have a hard time decoding the steel designations here, take a look at the text at the top of the dialog (Figure 2-111). These items correspond to the columns of text in the body of the **Shape Picker**, and should help you find the shape you're looking for.

Once you have picked your shape, the **Steel** macro will drop you back into the **Steel Selector Dialog** (Figure 2-112).

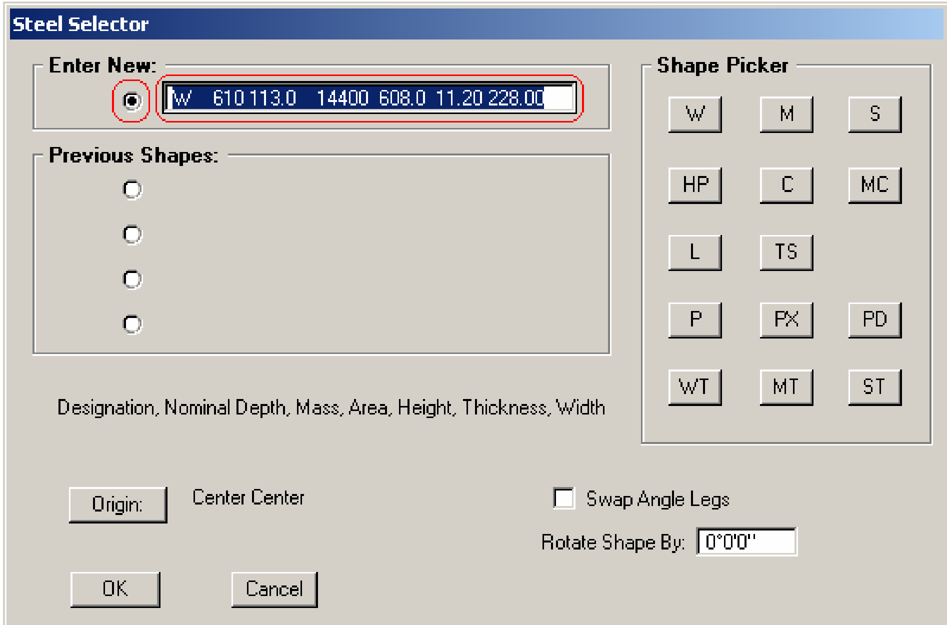


Figure 2-112: Steel Selector Take Two

♫ Notice that the shape you chose in the previous step is now highlighted in the **Enter New** box, and the **Selection Button** next to it is **Checked**.

Step Three: Choose an Origin

Now you need to make a decision about how you want to place this shape. On the **Steel Selector Dialog**, press the **Origin** button. This will bring up the **Placement Dialog** (Figure 2-113).

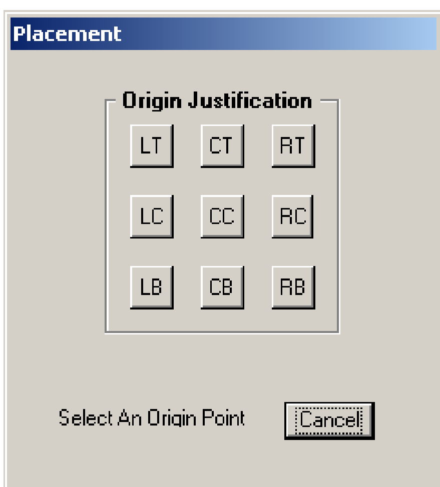


Figure 2-113: Placement Dialog

In the **Origin Justification** section of this dialog, there are nine buttons that you can press to set the justification. Your choice will depend on the detail you are working on. For this example, I'll choose **CT**, which is "Center Top." We'll see the impact of this when I place the shape.

Pressing any of those nine buttons will dismiss the dialog and bring up the **Steel Selector Dialog** again (Figure 2-114).

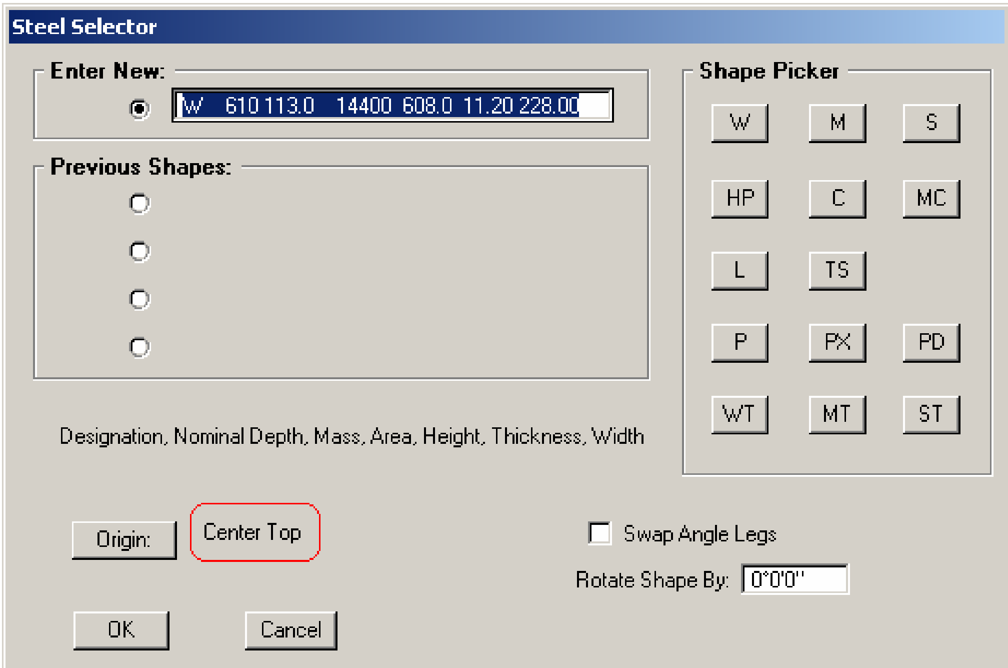


Figure 2-114: Steel Selector Take Three

Notice the **Origin** you selected in this step is displayed next to the **Origin** button. Press **OK** to place the steel shape.

Step Four: Place the Shape

Check your *Status Bar* for the prompt. It should say “Steel > Enter Origin of Shape (Reset to Exit.)” *Datapoint* to place your shape, *Reset* to abort. (You can also *Snap* to choose the origin point more specifically.)

The shape should appear where you *Datapoint* (Figure 2-115).

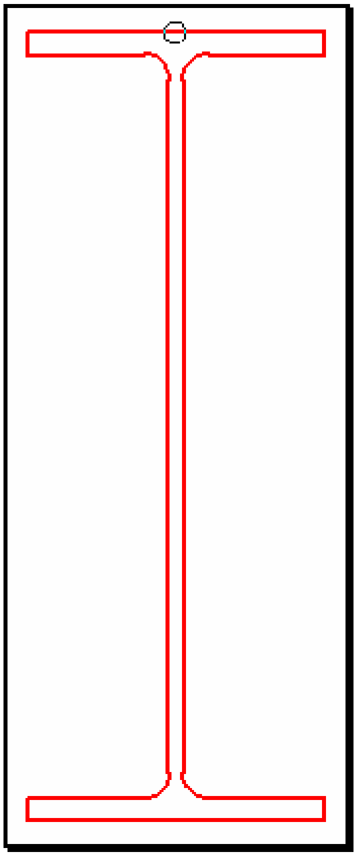


Figure 2-115: Placed Shape

♬ Notice the circle at the center of the top flange in Figure 2-115. This is the **Origin** point that I selected in **Step Three**.

Option One: More of the Same

If you want to keep placing more shapes like the one you just placed, just keep *Datapointing*. Until you *Reset*, MicroStation will continue to drop a shape wherever you *Datapoint*.

Option Two: Undo

If you have placed a shape in the wrong place, you can *Undo* the placement. From your main menu, select **Edit > Undo Other > To Mark**.

♬ This uses built-in MicroStation functionality related to setting *Marks* in your drawing – kind of like bookmarks – that allow you to *Undo* back to a specific point. You can set your own marks by choosing **Edit > Set Mark**.

Option Three: Using Previous Shapes

As you run the **Steel** macro a number of times to place different shapes, you should notice that it *remembers* shapes you've already placed. The most recent shape you've used is still in the **Enter New** box of the **Steel Selector Dialog**.

The four shapes you've used previously are stored in the **Previous Shapes** box in the **Steel Selector Dialog** (Figure 2-116).

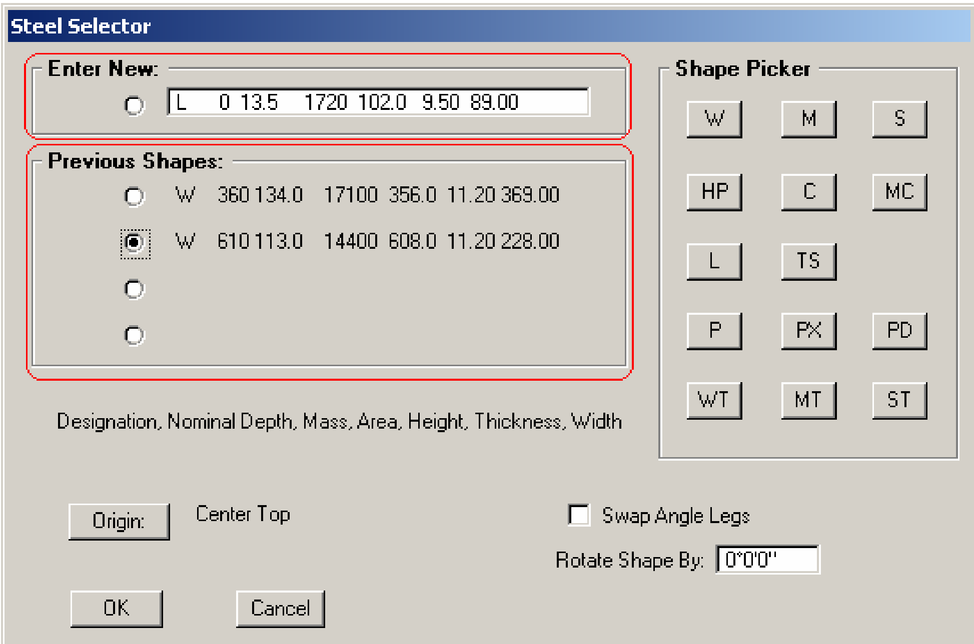


Figure 2-116: Steel Selector Previous Shapes

To place any one of these stores shapes, just **Check** the button next to the shape description, set your **Origin** and press **OK**.

Option Four: Angle Legs

L Shapes are drawn with **Leg 1** as vertical and **Leg 2** as horizontal. The resulting shape looks like an "L".

There are two ways to change the way **Ls** are placed by this macro.

1. Push the **Swap Angle Legs** button. This reverses the placement of **Leg 1** and **Leg 2**. This essentially mirrors the default **L** over a 45° mirror line.
2. Set the **Rotate Shape By** angle to a non-zero value. This spins the **L** counterclockwise by the angle specified.

WELD MACRO

Overview

The **Weld** macro was written to make it easier to place consistent weld symbols on structural details. It prompts you to enter two *Datapoints*: one for the location of the weld, the second for the location of the symbol. Then you fill out a dialog box full of options and the macro places the weld symbol for you!

Step One: Launch the Macro

Run the **Weld** macro from your main menu by choosing **Macros > Weld**.

Step Two: Enter Points

Look in your *Status Bar*. MicroStation should be prompting you to “Select Weld Location to Be Labeled (This is where the arrow points.)

Datapoint or *Snap* to the location of the weld.

Once you have *Accepted*, MicroStation will prompt you to “Select Location of Weld Symbol (This is the end of the arrow.)”

ⓘ ***If you snapped to the first point, you have to snap to define the second point as well. Place a tentative point (away from any element) in the approximate location you want the weld symbol to be drawn, and then Accept.***

Step Three: Fill out the Dialog

Now that you have *Accepted* the location for the weld and the symbol, the macro will open up the **Select Weld** dialog (Figure 2-117).

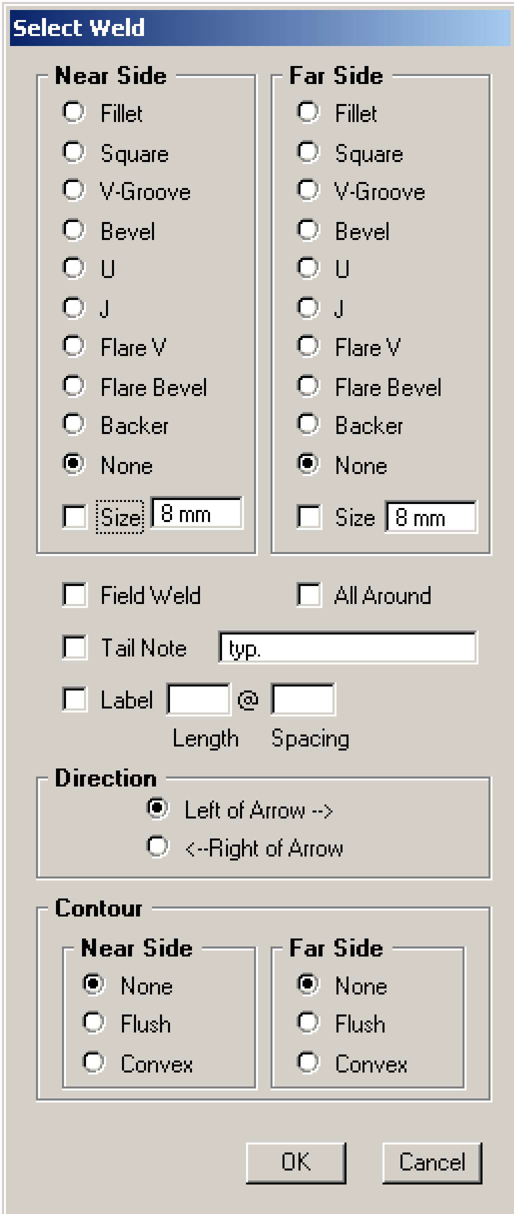


Figure 2-117: Select Weld

Weld Type

At the top of the dialog, you can select a **Near Side** and a **Far Side** weld. **Near Side** symbols will be placed under the line, **Far Side** symbols above the line. The various kinds of symbols are illustrated in Figure 2-118.

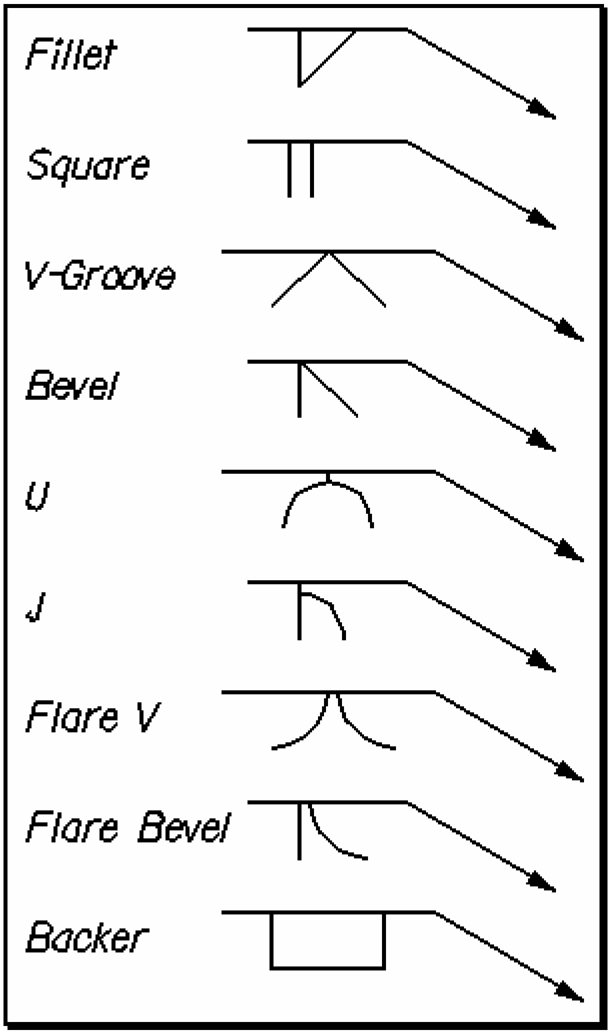


Figure 2-118: Weld Symbols

Choose whatever **Near Side** and **Far Side** welds you would like to show by **Toggling** the button next to the symbol type (Figure 2-119).

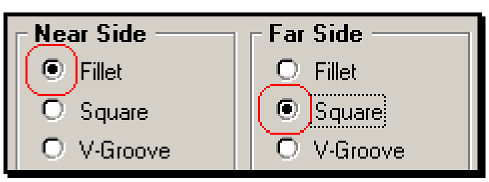


Figure 2-119: Pick Weld Type

♬ If you accidentally pick a weld type for the **Far Side** when you actually don't want to show a **Far Side** weld, pick **None** from bottom of the **Select Weld Dialog**.

Weld Size

Also in the **Near** and **Far Side** boxes you can make your **Size** selection (Figure 2-120).

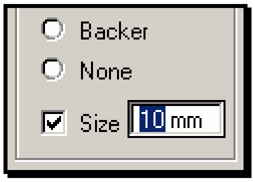


Figure 2-120: Weld Size

Place a **Check** in the box and type a size into the text field.

Field Weld, All Around, Notes, Labeling

Directly under the **Near Side** and **Far Side** boxes, you'll find more weld placement options (Figure 2-121).

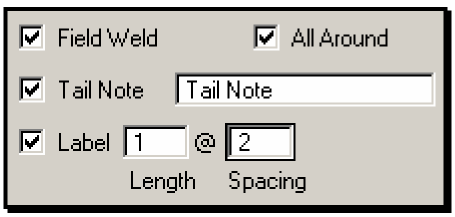


Figure 2-121: Weld Options

These options are illustrated by Figure 2-122.

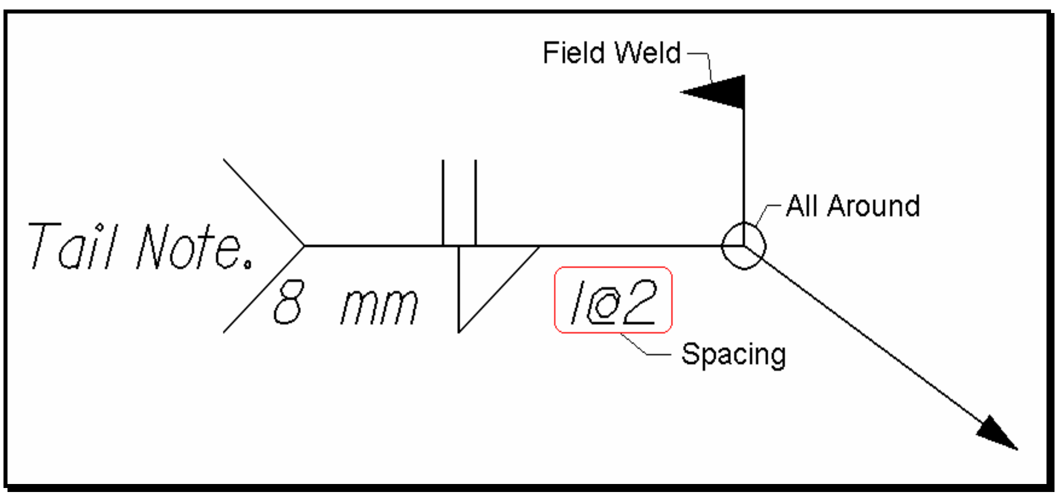


Figure 2-122: Weld Anatomy

Place **Checks** in the appropriate boxes to enable or disable these features and provide text in the text boxes.

Direction

The **Weld** macro is capable of automatically deciding whether the weld symbol should extend to the left or to the right of the arrow. If you want to override the default settings, select a **Direction** from the **Direction Box** (Figure 2-123).

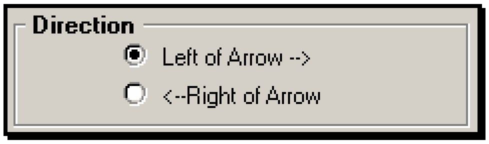


Figure 2-123: Weld Direction

Contour

Near the bottom of the **Select Weld Dialog** there is a **Contour Box** (Figure 2-124).

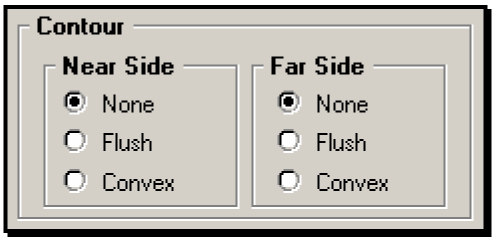


Figure 2-124: Weld Contour

The two options, **Flush** and **Convex** are illustrated in Figure 2-125 on a **Square** weld.

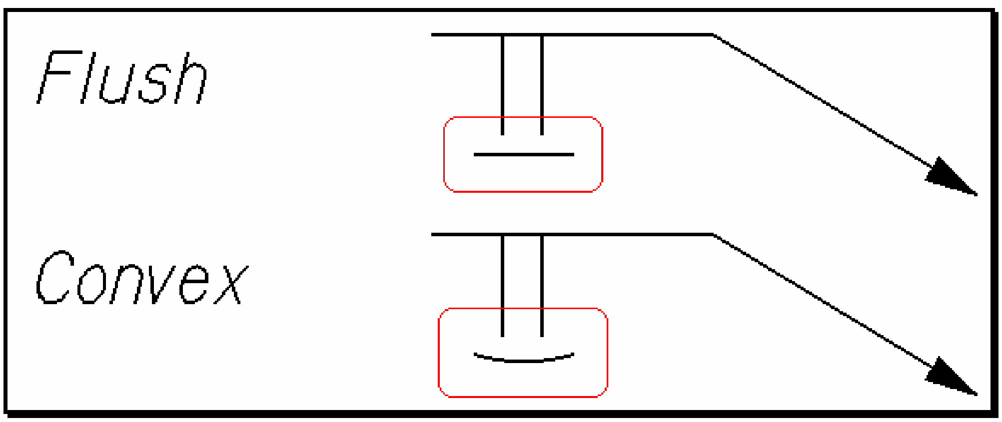


Figure 2-125: Weld Contour Appearance

Step Four: Apply Settings

Press the **OK** button to let the macro draw your weld. Or press **Cancel** to abort the symbol.

Undo It

Similar to the **Steel Macro**, the **Weld Macro** sets a *Mark* before it begins to draw. If you want to *Undo* the creation of a **Weld** symbol, simply choose **Edit > Undo Other > To Mark** from your main menu.

MOVE FILLED SHAPES BACK

Launch the Macro

From your menu, select **Macros** > **Send Fill Back**.

What Does it Do?

This Macro re-orders the display of elements. It selects all non-filled elements and uses a simple command to re-write them to the end of the design file. This makes them "newer" than the filled elements. New elements display on top of old elements. So by making all non-filled elements "new", we move the filled elements to the "back" of the picture.

Chapter 3 InRoads Configuration

MaineDOT InRoads Configuration

!MSINROADSCONF

Overview

The migration to InRoads design software was an opportunity to take advantage of some of the new capabilities of MicroStation. Up to now, projects were configured similarly to the first version of MicroStation used at MaineDOT. Many new enhancements have been added. In order to take advantage of the new enhancements and continue working with projects developed to date, users need to keep older project separate from new projects developed for use with InRoads.

Anatomy of a MicroStation/InRoads Design File

Level Structure

Originally MicroStation was limited to 63 levels for elements to be drawn on. MicroStation now provides an unlimited number of levels. This provides the opportunity to have a separate level for each group of elements or features. This separation of elements by level provides additional functionality within InRoads.

DGN Library Files

Management of the new level structure is accomplished using a .dgnlib file. This is an empty library file that contains the level structure consistent with MaineDOT standards. This is important for the management of the level structure. When a change to the level structure is necessary, the all new MicroStation files will automatically synchronize themselves to the library file.

Maximum Drawing Extents

Older files had a limitation to the maximum cube size. The extents of the cube were dependent on the accuracy of the file. To develop a cube big enough to encompass the state of Maine, MaineDOT had to compromise accuracy in the files. An inch in an old file was broken into127 parts. New V8 files do not have this limitation so we can increase the accuracy. Now an inch is broken up into 25,400 parts.

Survey Feet vs. International Feet

Prior versions of MicroStation used English units based on the International Foot. Survey data was, and still is processed based on the U.S. Survey Foot. The MX Change procedure projected the data to the correct coordinates within an International Foot file. Future work in InRoads and MicroStation will use the U.S. Survey unit of measurement for consistence.

- (1) International Foot = 0.3048 meters; (1) U.S. Survey Foot = 0.30480061 meters. This difference can amount to a 2-3 foot difference across the state of Maine.

Custom MicroStation Files and Drawings

The master MicroStation for InRoads customization files are on the network in a blind share. This means that they are in a secure location that isn't normally seen when mapping a drive letter. All users have a local copy of the customization on their C: or D: drive called **!msInRoadsconf**. Updates to the configuration are handled with an Update Utility. This utility does a date check of your local customization and updates files if changes were made to the master copy.

UPGRADING OLDER FILES TO NEW FORMAT

Overview

Occasionally it is decided that an older project will be re-designed in InRoads. In most cases, the alignment and the design will all be recreated through InRoads and result in the new InRoads file format (levels, units, precision, etc.).

At some point, CADD Support is informed and the existing directory that was setup for MX is renamed from the decimal extension to “XX”. The new directory structure is created with the new InRoads seed files.

Anyone that has work previously done for the project will be responsible for determining what files and/or folder should be migrated from the older directory (i.e. “XX”) to the new directory (i.e. “00”). Any MicroStation files that contain graphics to be used again in the InRoads directory will need to be Upgrade to the new file format. Files like RWPlan, EnvPlan, UTPlan, Geoplan, etc. will all need to be upgraded. In most cases, the plan sheets that were cut will not have to be upgraded as it would be better and easier to simply re-cut them (i.e. 001_RWPlan01).

Step One: Open Windows Explorer and Browse

Open *Windows Explorer* and browse to the XX directory of the PIN on the Y: drive (i.e. Y:\pin\12766\XX\ROW\MSTA) (Figure 3-1).

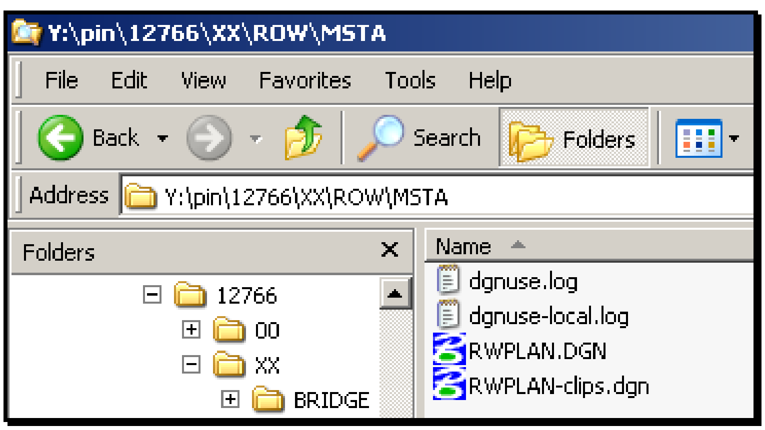


Figure 3-1: Browse to "XX" folder within Windows Explorer.

Step Three: Copy files to Clipboard

Select the files you wish to preserve and migrate to the new directory structure setup for InRoads. Select **Edit>Copy.**

♬ Please note, it is not necessary to copy empty files that do not contain graphics within the actual file. There is no need to migrate empty files, simply re-create them within the *MicroStation for new InRoads config* environment. If you feel the need to migrate the file, you must draw a line in the empty file for the program to work.

Step Four: Paste in new Directory

Browse to your *Workgroups* MSTA folder within the new decimal folder (i.e. “00”) and select **Edit>Paste.** At this point, you will most likely be asked to “overwrite” files. If you haven’t done anything to the new files within the InRoads folder structure, select **YES.**

Step Five: Open InRoads

Launch the *MicroStation new InRoads config* icon located on your desktop.

Step Six: Pick your Project

Click the *Project* drop down list in the *Workspace* area of the dialog and select your project from the list (Figure 3-2).

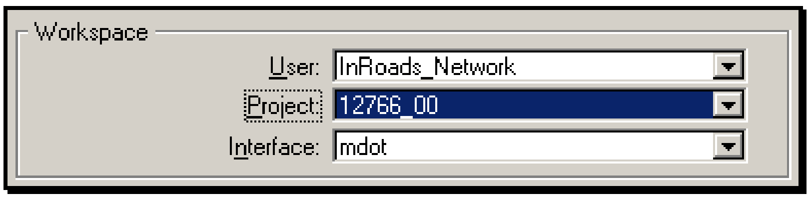


Figure 3-2: Select project from Project pull down.

- This will direct the *MicroStation Manager* dialog to the new InRoads project directory on the network (i.e. Y:\pin\12766\00\ROW\MSTA\) (Figure 3-3).

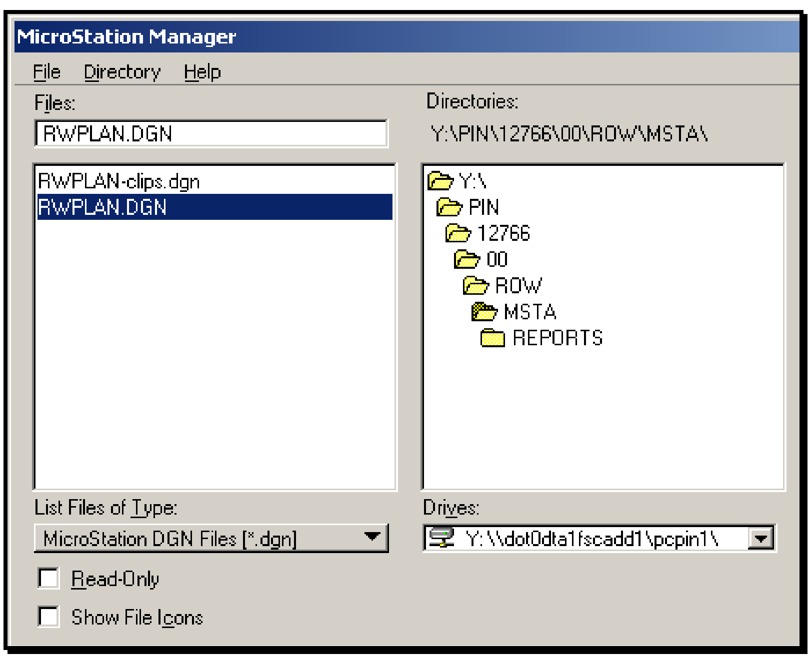


Figure 3-3: Project directory set by project pick.

Select one of the files you wish to upgrade (i.e. RWPLAN.dgn).

Step Seven: Warning Message

An Information panel will display (Figure 3-4) showing that the RWPLAN.dgn that was opened was created for the MX Platform. Here you will have the opportunity to correct the units of resolution for the InRoads platform. Click **OK.**

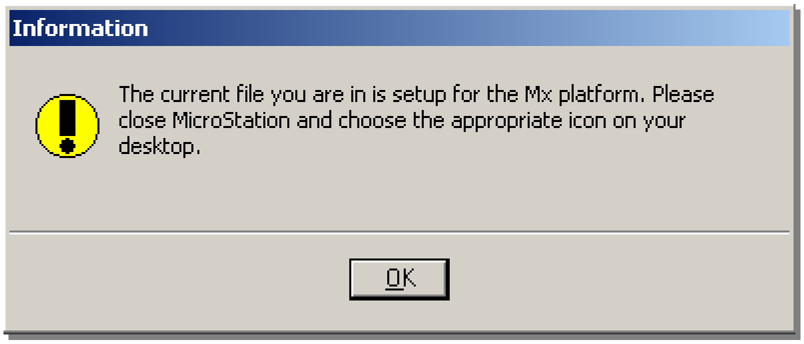


Figure 3-4: Warning message saying that file is setup for MX platform.

Step Eight: Run UOR Fix

Part One: Launch Program

Select **InRoads>Update UOR and units** from the MicroStation menu (Figure 3-5).

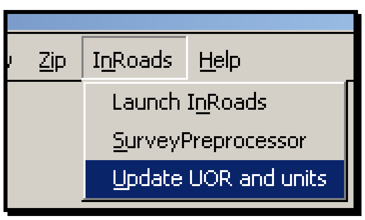


Figure 3-5: Launch UOR fix from MicroStation menu.

Part Two: Click Proceed

A warning dialog (Figure 3-6) will appear giving the user the opportunity to *Quit* or *Proceed* if the user is unsure of the need to convert. All MicroStation files created with the previous MicroStation configuration will need to be converted to the new InRoads units of resolution. Click **Proceed.**

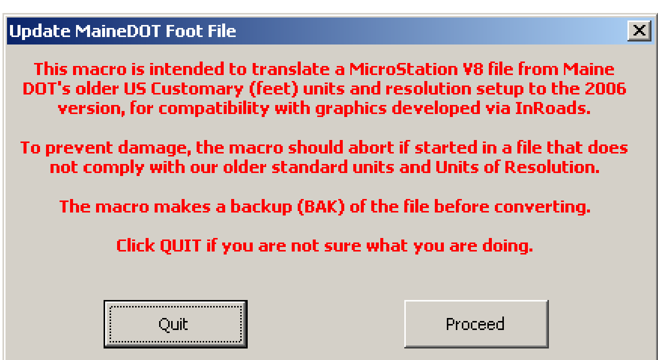


Figure 3-6: Warning message when updating UOR fix.

♬ The file may display some unusual graphics while it is being converted.

Once the program has run a *Successful Completion* message will appear (Figure 3-7). Click **OK.**

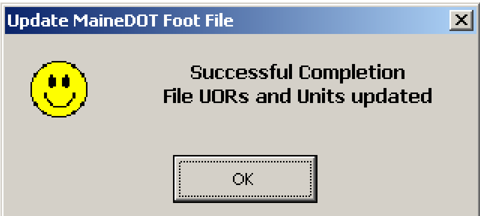


Figure 3-7: Update successful dialog.

♬ A back up file is automatically created of the original file prior to being converted. This file is located in the project folder and has the extension of .bak.

Part Three: Check Results

Check the Global Origin of the file. Select **Settings>Global Origin** from the MicroStation menu (Figure 3-8).

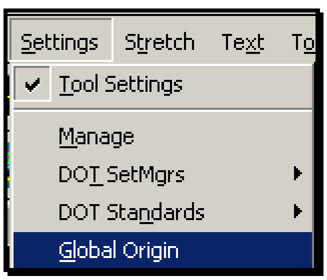


Figure 3-8: Check results of update UOR fix.

Verify that the Sub Per Master = 12.0000. Verify that the Uor Per Sub = 25400.05 (Figure 3-9).

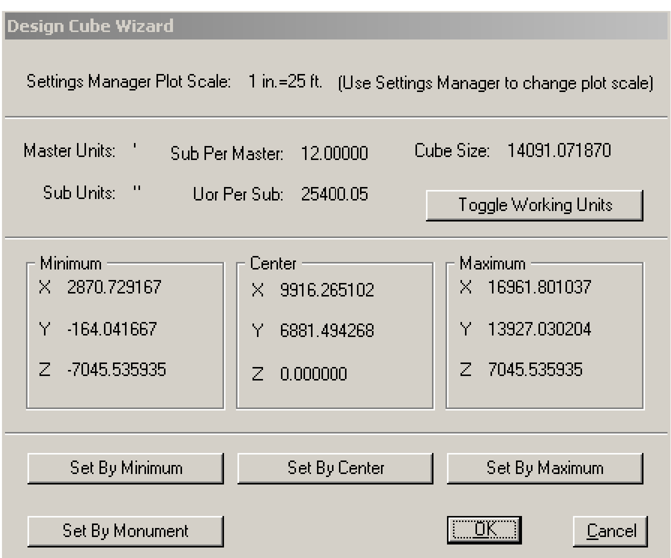


Figure 3-9: Design Cube Wizard dialog.

Click **OK** or **Cancel.**

Part Four: Fit View

Fit the view using the MicroStation view controls.

Troubleshooting

If you receive an error message, it could mean a couple of things. It could mean that there were no elements in the file or that the file is already the correct units. Checking the *Global Origin* in **Part Three** is the real test to see if the file was upgraded. Contact CADD Support for assistance if necessary.

DESKTOP ICONS

Overview

During the InRoads installation, a new MicroStation icon (*MicroStation new InRoads config*), an InRoads icon (*InRoads Suite*) and an Update Utility (*MDOT Update InRoads MicroStation*) will be copied to a user's *Desktop* to help keep the two configurations and projects separate.

♬ Survey data and files within the folder structure have to be processed on older projects if the intention is to use InRoads to design them.

MicroStation for New InRoads Projects

A new **MicroStation new InRoads config** icon will be copied to the users *Desktop* during the InRoads installation process. This icon is used to access MicroStation drawings developed specifically for an InRoads project. When MicroStation is launched from the new *Desktop* icon, the *User* will be defaulted to *InRoads_Network.* Another indication of the new configuration will be an *InRoads* menu item on the *main menu* of MicroStation. This menu item gives the user the ability to launch InRoads inside of MicroStation. Normally InRoads will be launch from the separate icon *InRoads Suite*.

InRoads Suite Icon

The *InRoads Suite* will be copied to the users *Desktop* during the InRoads installation process. This icon is used to access MicroStation for InRoads and the InRoads dialog. When InRoads is launched from the new *Desktop* icon, the *MicroStation Manager* screen will display the *User* as *InRoads_Network.* Once a file is entered, the InRoads splash screen will be displayed briefly before the InRoads menu dialog opens.

MicroStation/InRoads Update Utility

As with the previous configuration of MicroStation and MX, there will be a **MDOT Update InRoads MicroStation** icon used to update the new configuration for MicroStation/InRoads. This will update user's local copy of the configuration from the network.

ⓘ ***Your project directory contains some of the same files. This utility does not update files within your project***

✓ ***Refer to page 3-14 for detailed instructions on updating InRoads project files.***

There is a new look to the **MDOT Update InRoads MicroStation** utility (Figure 3-10). This now provides additional functionality in the event other aspects of InRoads are modified or a user needs to replace a file due to corruption locally.

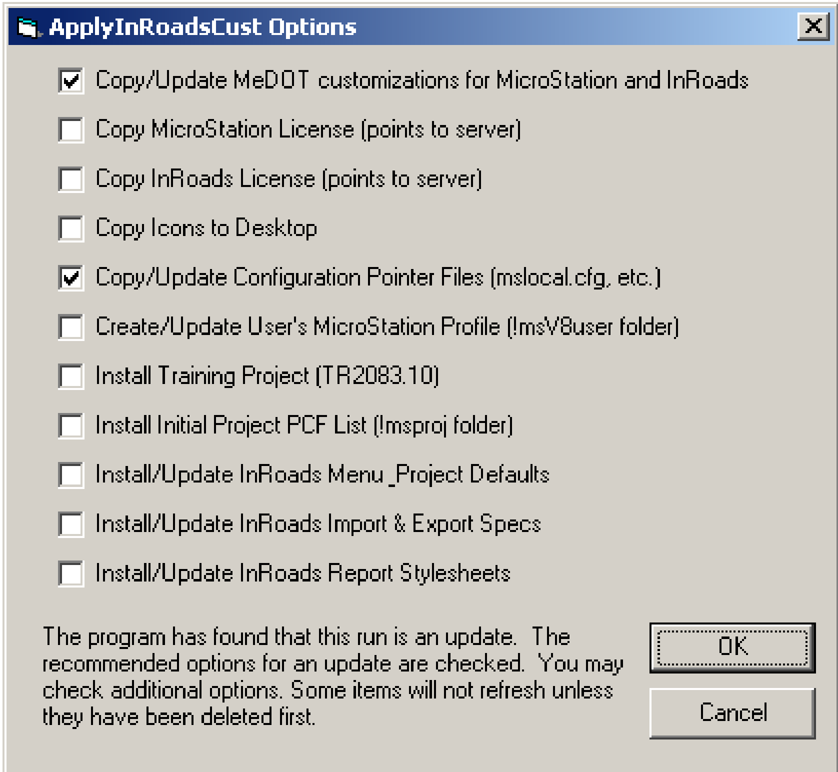


Figure 3-10: MDOT Update InRoads MicroStation utility

Option 1: The first option does exactly what the older utility does. It copies down changes to the MicroStation and InRoads configuration from a protected location on the server to your local hard drive.

Option 2: Copies a MicroStation license from the server to you local hard drive. This license points to the server so it isn't for use off line.

Option 3: Copies an InRoads license from the server to you local hard drive. This license points to the server so it isn't for use off line.

Option 4: Copies the default set of icons that were installed originally from the InRoads disk in the event they were deleted.

Option 5: Copies the mslocal files into the Bentley folder structure. This one file Tells MicroStation and InRoads to look to the !msInRoadsconf folder for all its customization.

Copies a MicroStation license from the server to you local hard drive. This license points to the server so it isn't for use off line.

Option 6: This allows a user to modify their User Configuration file for either additional names of others sharing your PC or if there is a change in your workgroup.

Option 7: Installs the training project and PCF file so a user can have keep up on their skills while waiting for an official InRoads project to work on.

Option 8: Creates a !msproj folder locally and copies down the initial list of PCF files.

Option 9: Installs/Updates the InRoads menu and Project Defaults if a change was required globally for all users. A message will be sent in the event a change is necessary.

Option 10: Installs/Updates any changes necessary to the import and export specifications necessary to process data. A message will be sent in the event a change is necessary.

Option 11: Installs/Updates InRoads Style Sheets used for reporting. As additional custom reports are created, users will be notified to run this option.

MicroStation for MX Projects

There will still be the need to work with older project developed prior to the implementation of InRoads. Users will still have an original MicroStation icon for this purpose. When the icon is launched, the *MicroStation Manager* screen will display the *User* as **Normal.** Another indication of the older configuration will be an **MXChange** menu present on MicroStation's main menu.

MicroStation V8 Update Utility

There will still be an Update Utility for the older configuration of MicroStation, while projects are completed in MX.

STANDARD INROADS PIN STRUCTURE

STANDARD INROADS FOLDER STRUCTURE

Overview

Project PIN creation should be requested through your CADD support staff. This will insure that every project is setup with the correct folder structure, permission groups, correct seed files and a *Project Configuration File (PCF).* Project team members can request the PIN at any time, however it's typically created after survey has the data ready to be placed on the network. If you don't see your PIN on the network, most likely survey has not been done yet.

Standard Folder Structure

When a PIN is created, a default folder structure is created on the network (i.e. y:\PIN\12345\00\) from a set of *master* project files. The structure contains workgroup folders and default files used by both MicroStation and InRoads (Figure 3-11).

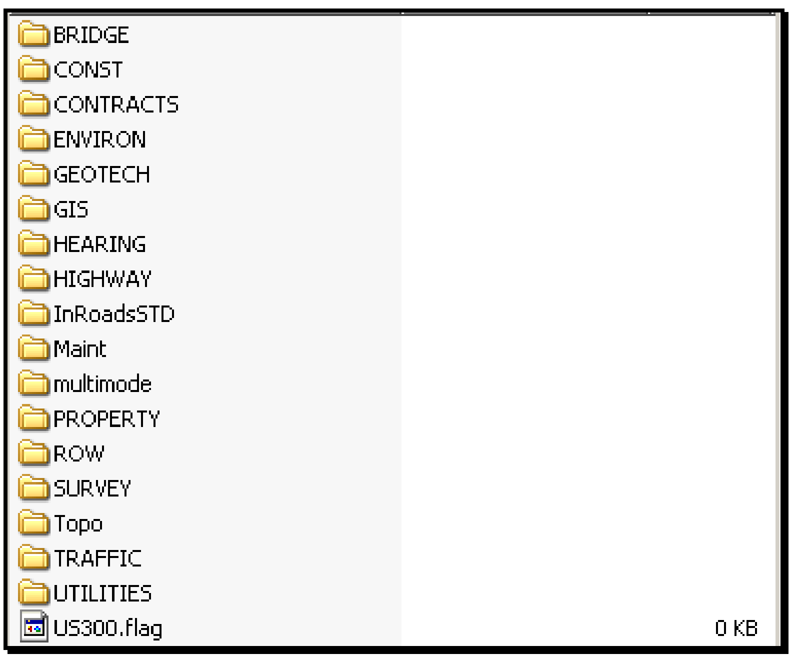


Figure 3-11: Default folder structure for MDOT standard projects.

Default InRoads Files

A set of default standard InRoads files are copied to the InRoadsSTD folder (Figure 3-12) for every newly created PIN on the Y: drive. These files have been modified for MaineDOT standards. As CADD Support develops additional functionality, some of these files may become "out-of-date". Two files specifically (template.itl and mdot_US.xin) will be in constant development for a while until we have fully completed and tested the customized files.

Figure 3-12: Default InRoads files in a newly created PIN directory.

A local copy of the InRoads standards files are copied to a folder (C:\!msInRoadsconf\standards\InRoadsSTD) on your hard drive that contains both the MicroStation and the InRoads configuration files. The user can manually refresh these files by running the *MDOT Update InRoads MicroStation* desktop icon. It is recommended that this update be run once a week. Notification via *The Message of the Day* will inform a user when it is absolutely necessary to run this update utility to get the latest standard configuration files to copy to your project's InRoadsSTD folder.

ⓘ ***Use caution when updating your project's Template Library (ITL) and Preference File (XIN). If you have developed templates that you want to preserve, rename your working template library before overwriting it. Also, as we start using the Quantity manager, you may add item numbers to the Styles within InRoads and do not want to loose work previously done.***

Permissions

When a PIN is created, CADD permissions groups are programmatically set for the project structure. This gives users read/write access only to the files in their workgroup and the *Topo* folder. This minimizes the possibility of files getting changed or overwritten when a user copies files locally for off-line work and later copies them back to the master copy on the network, overwriting the original files.

Project Configuration File

When a PIN is created, a *Project Configuration File (PCF)* is created on the network in the **y:\msworksp\!msproj** folder. The PCF file points to a project's standard folder structure on the network. A local copy of this folder can be found on the root of your C: drive (c:\!msproj). This is used when unplugged from the network to point to projects copied locally. During an InRoads installation, the local copy of the !msproj folder is wiped clean with the exception of a sample training project's PCF. This narrows down the local list of PCF files to just those you intend on working on. If you work on projects locally (unplugged from the network), you will need to manually copy the PCF for the project from the **y:\msworksp\!msproj** folder to your **c:\!msproj** folder.

The available PCF files are listed in the *Project* pull down which appears in the *Workspace* portion of the *MicroStation Manager* dialog (Figure 3-13).

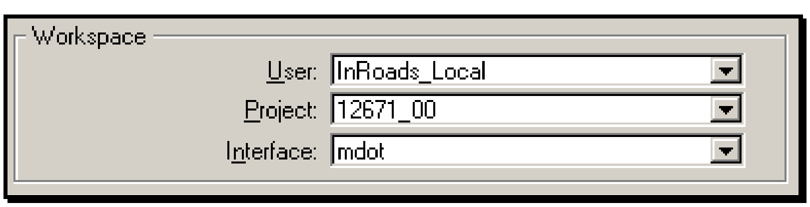


Figure 3-13: The Project pull down lists the available PCF files.

♬ The PCF file also contains project specific information that is used by MicroStation to automatically fill in title block information on drawings with a border.

USER CONFIGURATION FILES

ADJUSTING A USER'S WORKGROUP (IF NECESSARY)

Overview of UCF files

Each MicroStation/InRoads user has their own *User Configuration File (UCF)* which identifies the location where MicroStation will open a file whether on the network (y:\PIN) or a user's local hard drive (d:\PIN). MaineDOT has some Regional Offices with poor network connection speed and Surveyors that are working unplugged from the network. These users will need to work on a local copy of the network project. Additionally, they will need to work on files on the network. To streamline things, we are providing an easy way to switch between working on a project locally or on the network. Two UCF files are copied to the user's hard drive during the install, one *(InRoads_Network)* is for network projects and the other *(InRoads_Local)* for local projects.

The UCF also identifies which workgroup folder the user will be working in (i.e. Highway, Bridge, Survey, ROW, etc.). During the install of InRoads, the user has the opportunity to pick which workgroup they belong to from a pull down list. Should the user's workgroup discipline change or if the user works in more than one workgroup on a project, they can easily add additional UCF files or change the existing workgroup defined in the UCF file.

Step One: Editing ".UCF" Files

Using Windows Explorer, browse to the **c:\!msv8user\Your.Name\MSTAUSER\config\users** folder. Double click the *InRoads_Network.ucf* file to open it. If the ".ucf" file is not opened directly, Windows may not recognize this file extension (Figure 3-14). Pick **Select the program from a list** and click **OK.**

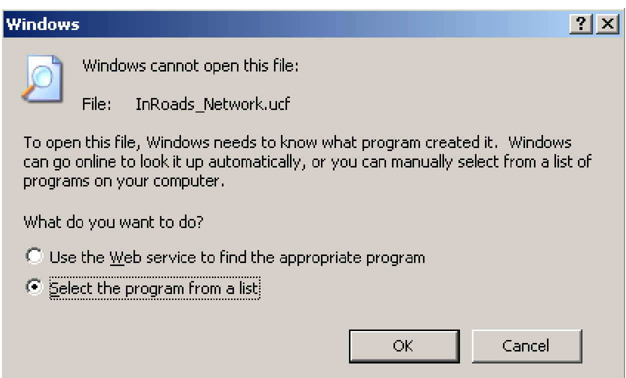


Figure 3-14 Associate the file type to open with Notepad

A new dialog will open (Figure 3-15) asking you to choose a program. Scroll down in the list and select **Notepad.** Place a checkmark in the box to **Always use the selected program to open this kind of file.** Click **OK.**

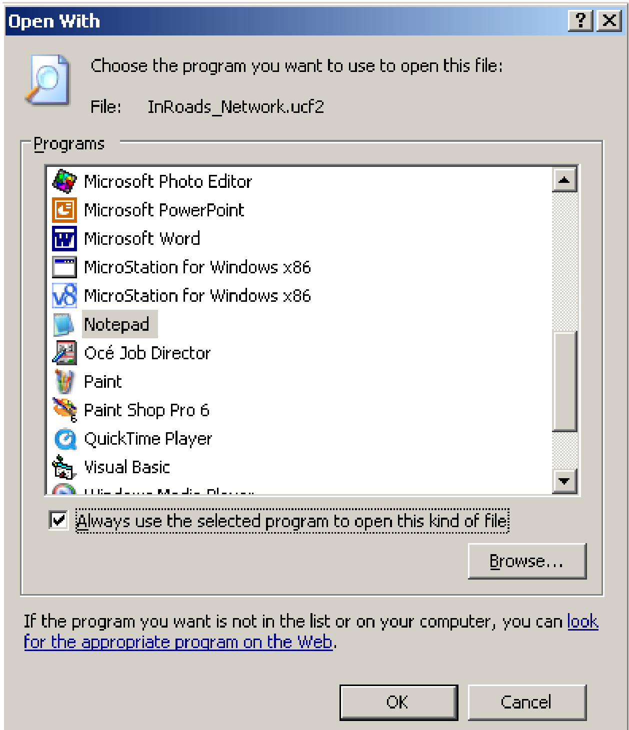


Figure 3-15 Select Notepad as the preferred program to open this file.

Step Two: Adjust the Workgroup (If necessary)

Locate the line in the files that says “WKGROUP =”. Copy and paste from the list of valid groups to overwrite the current workgroup (i.e. HIGHWAY).This must be all **CAPITOL** letters and have a space between the “=” and the value as in the examples provided in the file (Figure 3-16). This is the only change you should make in this file. Save this file and exit Notepad.

```
#----- Set up disk variables to match user's mapping -----#
PROJDISK1 = Y:

#-------------- Assign user's work group --------------------#
#-- Valid Groups are BRIDGE,BRMAINT,CONST,ENVIRON,GEOTECH, --#
#-- HEARING,HIGHWAY,ROW,SURVEY,TRAFFIC,UTILITIES ------------#
WKGROUP = HIGHWAY
```

Figure 3-16: User Configuration File

If you need to work locally in the new workgroup, then you should open the **InRoads_Local.ucf** and change that WKGROUP variable also.

ADDING ADDITIONAL UCF FILES

Overview

Occasionally a user may work in multiple workgroups on projects. A user's primary workgroup should be set in the *InRoads_Network.ucf* and *InRoads_local.ucf*. If necessary, you can add additional UCF files for secondary workgroups.

Step One: Copy an Existing UCF

Using Windows Explorer, browse to the **c:\!msv8user\Your.Name\MSTAUSER\config\users** folder. Select the two files *InRoads_Network.ucf* and *InRoads_local.ucf*. Select **Edit>Copy** from the Windows Explorer menu. Select **Edit>Paste.** This will place a "Copy of" the files in the same folder. Rename these files to something that makes sense in regards to your secondary workgroup and location of projects (i.e. *InRoads_ROWnet.ucf* and *InRoads_ROWlocal.ucf*.)

Step Two: Adjust Workgroup

Adjust the workgroup to provide quick access to that workgroup folder on the network or locally.

✓ ***Refer to page 3-18 for more information on Adjusting the Workgroup***

ⓘ ***This doesn't automatically give the user read/write access to the new workgroup folder. They would have to request new CADD permissions to the folder through their CADD support personnel.***

Chapter 4 Project Workflow (Survey)

WORKING LOCALLY

INROADS SURVEY PROJECT SETUP UTILITY

Overview

After the survey data has been collected in the field, it needs to be downloaded to a laptop or desktop computer (PC), checked for accuracy and processed through InRoads to create the Ground Surface. Since most Survey personnel perform this work in the field "unplugged" from the network, they will need to do the work locally. The **Survey Project Setup** is the recommended setup procedure for creating a PIN structure locally because it programmatically standardizes the creation the folder structure.

Step One: Run Survey Project Setup Program

Use **Survey Project Setup** program to create the folders and files needed to process the data on the local (D:\) drive. Double click the **InRoads Survey Project Setup** icon (Figure 4-1) on your desktop.

Figure 4-1: InRoads Survey Project Setup Icon on your Desktop

Step Two: Fill in Town, PIN and Path

In the setup panel, fill in the town name, pin number, and decimal extension of the pin number. Select the appropriate drive letter for the local PIN directory (i.e. D:\Pin\). Select the Units of Measure (Figure 4-2). Click **Create.**

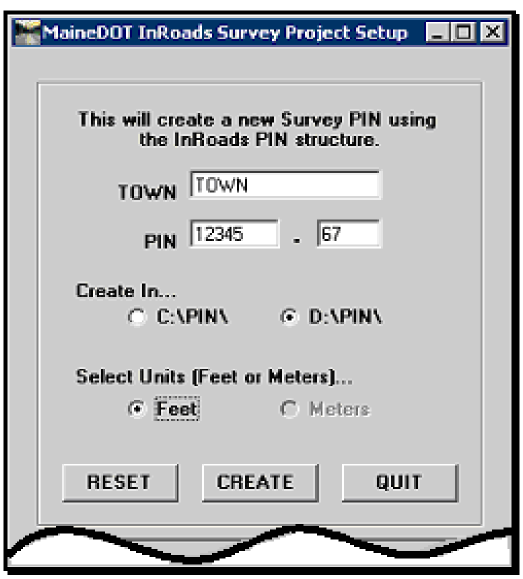


Figure 4-2: Survey Project Setup dialog.

♫ At this time there has not been any customization for the Metric platform. Therefore, the Meters option has been grayed out and cannot be selected.

The Output window at the bottom (Figure 4-3) will display the steps that were completed. When done, select **Quit.**

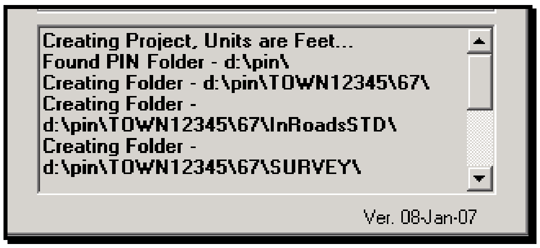


Figure 4-3: Survey Project Setup dialog's Output Window

The file structure created in the local project directory will appear as seen in Figure 4-4 (i.e. D:\Pin\Town12345\00\Survey\MSTA).

Figure 4-4: Folder Structure in Windows Explorer

The **InRoadsSTD** folder contains the *.xin file, that provides the customized MaineDOT standards and settings for each InRoads project.

The **SURVEY\MSTA** folder is the working location for InRoads. This is where copies of the “original” files from data collector will be processed and edited using Survey Fieldbook. A “blank” dgn file named **SURVEY.DGN** is used as the entry *.dgn for InRoads.

Step Three: Launch InRoads

Launch InRoads from the *InRoads Suite* icon. The *MicroStation Manager* dialog will open as seen in Figure 13-1. The default UCF file *(InRoads_Network.ucf)* will direct MicroStation/InRoads to the network location for projects.

Step Four: Change User

In the *Workspace* area of the dialog, select the pull down next to the *User* field and select **InRoads_Local.** This will direct MicroStation/InRoads to a local copy of the project directory (Figure 4-5).

✓ ***Refer to page 3-18 for more information on User Configuration files.***

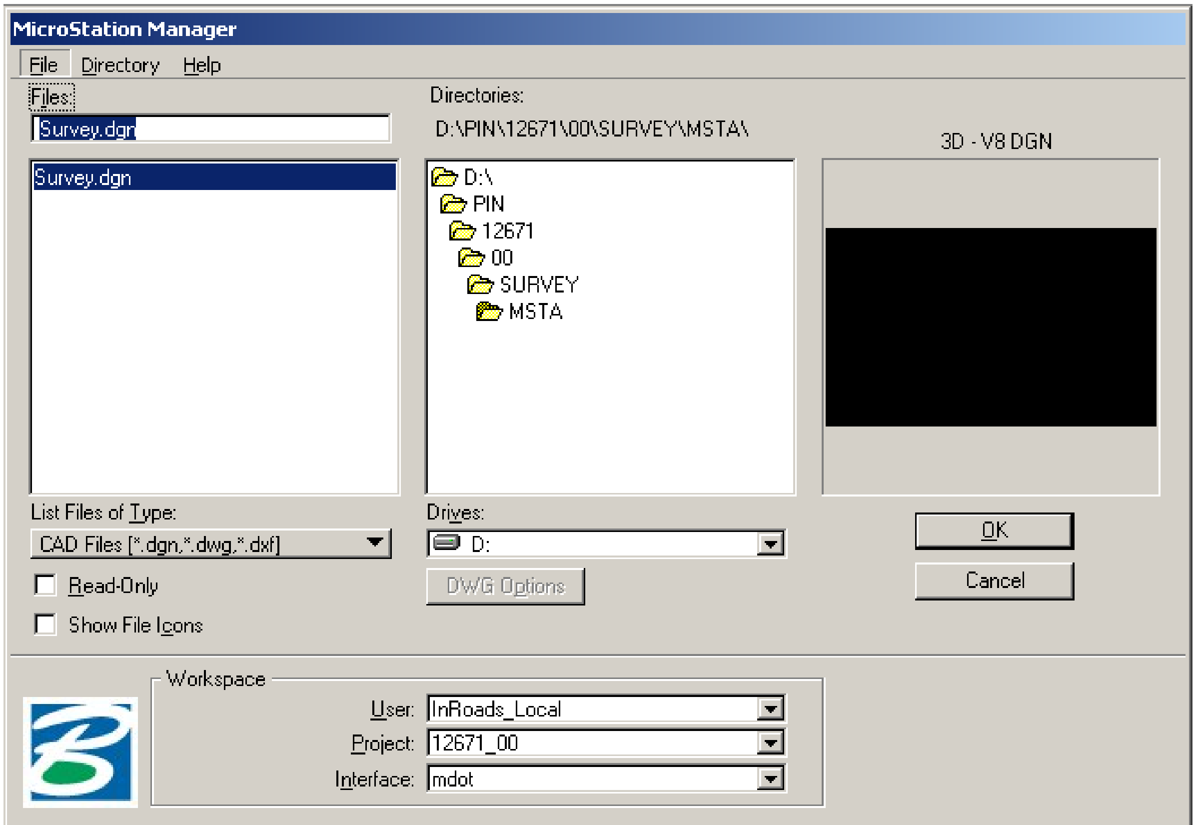


Figure 4-5 MicroStation Manager dialog when working locally.

Step Five: Select Your Project

Pick your project from the "Project" pull down. This will open that project's files on the d: drive in the user's MSTA directory based on their workgroup.

Step Six: Open a File

Select **Survey.dgn** from the directory. Click **OK.**

♫ At this point, the InRoads splash screen should open momentarily and then the InRoads menu dialog will open and wait for input.

✓ ***Consider creating an .RWK file to automatically attach the files you will be working with in the future. Refer to page 13-25 for instruction on Managing You RWK.***

WORKING ON THE NETWORK

OPTIONAL NETWORK USE

Overview

The default *User Configuration File (UCF)* file that InRoads uses when a user launches InRoads from the desktop icon is the *InRoads_Network.ucf*. This directs MicroStation/InRoads to the network location for project files. This is the recommended workflow for a few major reasons. All files on the network are backed up nightly and these files can be accessed by any of the project team members.

✓ ***Refer to page 3-18 for more information on User Configuration files.***

Step One: Launch InRoads

Launch InRoads from the *InRoads Suite* icon. The *MicroStation Manager* dialog will open (Figure 4-6). In the *Workspace* portion of the dialog, the *User* is defaulted to *InRoads_Network* and the directories will be pointing to the network (y: drive) for project PINs.

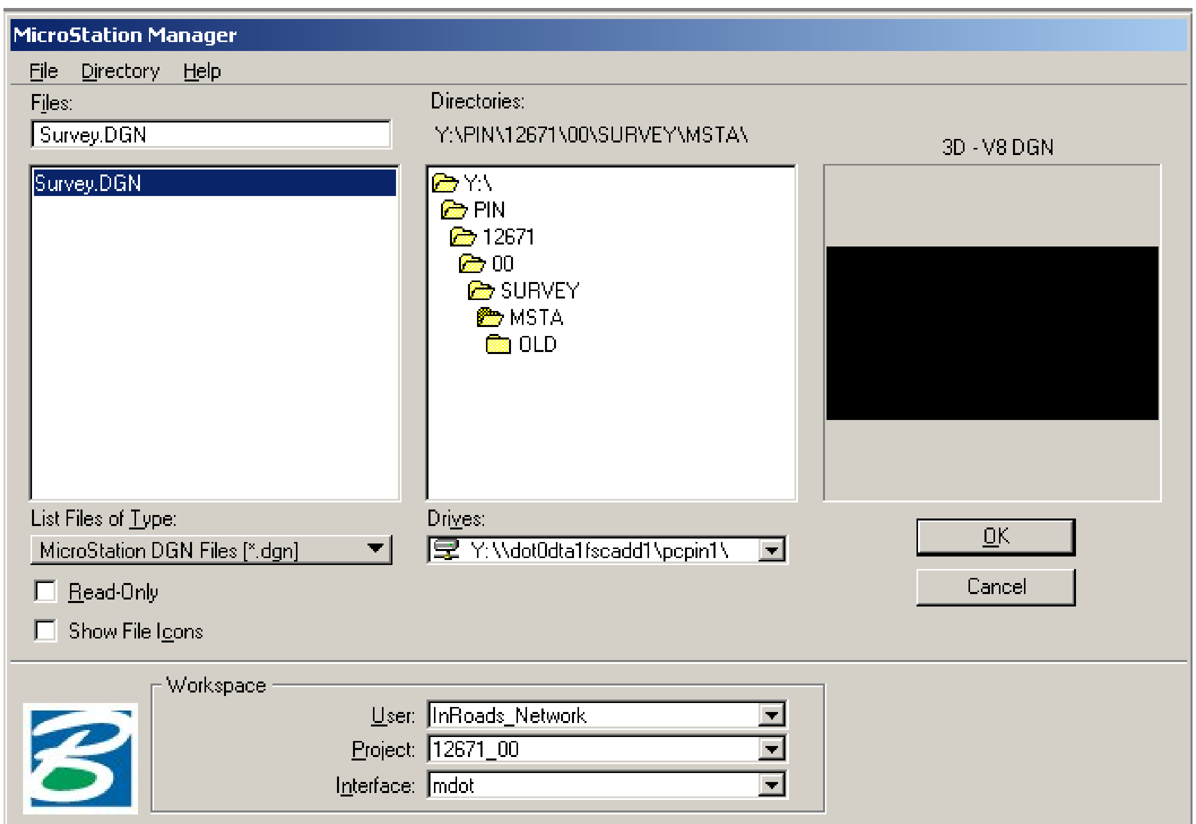


Figure 4-6 MicroStation Manager dialog when working on the network.

Step Two: Select Your Project

Pick your project from the "Project" pull down. This will open that project's files on the network (y: drive) in the user's MSTA directory based on their workgroup.

Step Three: Open a File

Select the **Survey.dgn** from the directory. Click **OK.**

♫ At this point, the InRoads splash screen should open momentarily and then the InRoads menu dialog will open and wait for input.

✓ ***Consider creating an .RWK file to automatically open the InRoads files you will be working with in the future. Refer to page 13-25 for instruction on Managing You RWK.***

Chapter 5 Survey Editing Procedures

CONVERT MX SURVEY TO INROADS SURFACE (OPTION 1)

OVERVIEW

Since MaineDOT is trying to rely less on MX and more on InRoads, we will be converting some older MX projects to InRoads. This option describes how to take an adjusted **Traverse.out** file and the SDMS files and process them to create an InRoads *Surface*. This process will require re-editing the survey data, analyzing Check Shots and adjusting some of the control codes to work within InRoads. Triangle cleanup on the InRoads platform will be necessary to finalize the Ground.dtm.

Traverse.out

This option requires that you have generated Traverse.out file of the adjusted traverse from MX.

Ground.prj

This option requires the SDMS **.prj** files.

Combined Factor

The Combined Factor must be known so it can be entered when importing the **.sdm** files.

DOWNLOAD FILES FROM THE DATA COLLECTOR

Step One: Copy Files to Y: drive

Download the “original” survey files from the data collector and place them in the OrigData folder located within the project’s SURVEY folder on the Y: drive (i.e. Y:\PIN\12345\67\Survey\Orig-data).

Step Two: Copy Files to D: drive

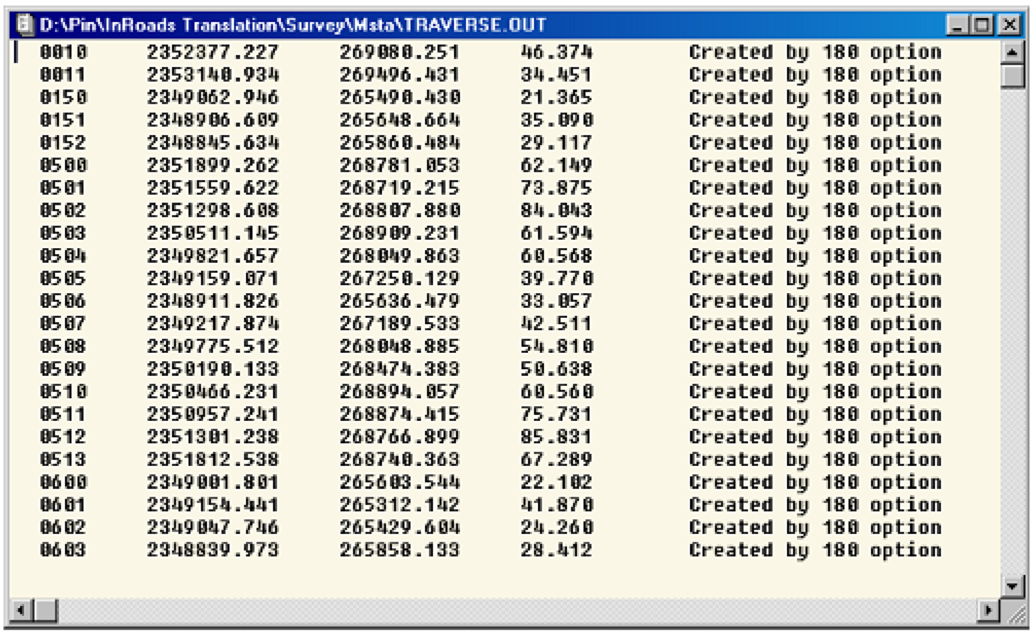
Place a copy of these files into the local MSTA folder on your D: drive (i.e. D:\PIN\12345\67\Survey\MSTA).

PROCESS TRAVERSE FILES

♬ TRAVERSE will soon be processed and adjusted using InRoads per instructions yet to be developed.

Overview
If the Traverse was previously located and adjusted using the current *Adjust* program, the data can be entered into MX to generate a TRAVERSE.OUT file. This file is manipulated to create a TRAVERSE.TXT file that can be entered into InRoads.

Step One: Edit the Traverse File
Open the **TRAVERSE.OUT** file with *Notepad* or *PFE Editor*. Remove all extra lines of information from the file so that the document looks like the figure below (Figure 5-1).


D:\Pin\InRoads Translation\Survey\Msta\TRAVERSE.OUT

0010	2352377.227	269080.251	46.374	Created by 180 option
0011	2353140.934	269496.431	34.451	Created by 180 option
0150	2349062.946	265490.430	21.365	Created by 180 option
0151	2348906.609	265648.664	35.090	Created by 180 option
0152	2348845.634	265860.484	29.117	Created by 180 option
0500	2351899.262	268781.053	62.149	Created by 180 option
0501	2351559.622	268719.215	73.875	Created by 180 option
0502	2351298.608	268807.880	84.043	Created by 180 option
0503	2350511.145	268909.231	61.594	Created by 180 option
0504	2349821.657	268049.863	60.568	Created by 180 option
0505	2349159.071	267250.129	39.770	Created by 180 option
0506	2348911.826	265636.479	33.057	Created by 180 option
0507	2349217.874	267189.533	42.511	Created by 180 option
0508	2349775.512	268048.885	54.810	Created by 180 option
0509	2350190.133	268474.383	50.638	Created by 180 option
0510	2350466.231	268894.057	60.560	Created by 180 option
0511	2350957.241	268874.415	75.731	Created by 180 option
0512	2351301.238	268766.899	85.831	Created by 180 option
0513	2351812.538	268740.363	67.289	Created by 180 option
0600	2349001.801	265603.544	22.102	Created by 180 option
0601	2349154.441	265312.142	41.870	Created by 180 option
0602	2349047.746	265429.604	24.260	Created by 180 option
0603	2348839.973	265858.133	28.412	Created by 180 option

Figure 5-1: Edited TRAVERSE.OUT file without extra lines.

Using the **REPLACE** command (CTRL+H) change all instances of “Created by 180 option” with PTRA.

Step Two: Save as Traverse.txt
Save the edited file as **Traverse.txt** to the local InRoads project location (i.e. D:\PIN\Town12345\67\Survey\MSTA).

PREPROCESS GROUND.PRJ FILES

Overview
MaineDOT current uses SDMS software for survey data collection. It produces radial topography files with a customized format. These files need to be processed into a compatible format for use with InRoads. A program called *Survey Preprocessor* (PSpreProcess) was developed to convert these files.

Step One: Launch Survey Preprocessor Program
Launch the *Survey Preprocessor* program by double clicking the desktop icon (Figure 5-2) or through the MicroStation menu structure by selecting **InRoads>SurveyPreprocessor**.

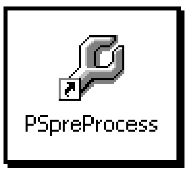


Figure 5-2: Survey PSpreProcess icon on the Desktop

This will open the MaineDOT SDMS to InRoads Preprocessor panel (Figure 5-3).

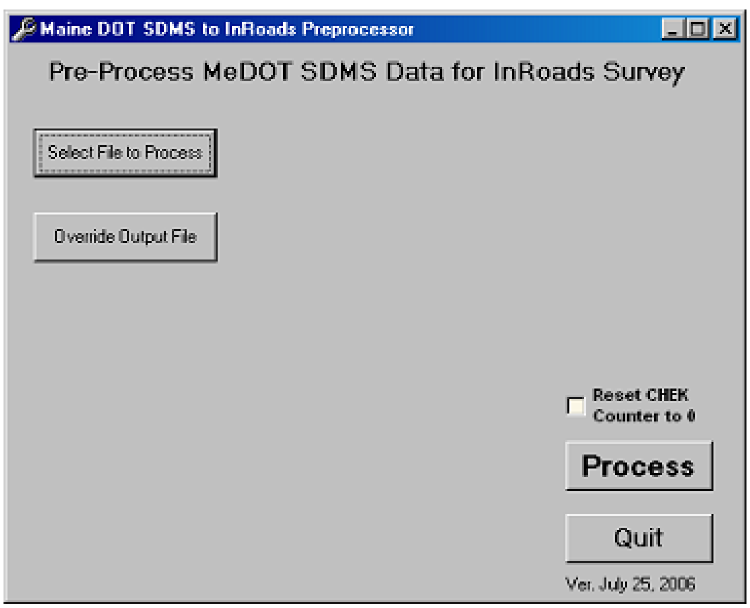


Figure 5-3: MaineDOT's SDMS Pre-Processor dialog.

Step Two: Select Files to Process
Click the *Select Files to Process* button. Browse to your project's MSTA folder you just created (i.e. D:\PIN\Town12345\67\Survey\MSTA). Select GROUND01.PRJ and click **Open** (Figure 5-4).

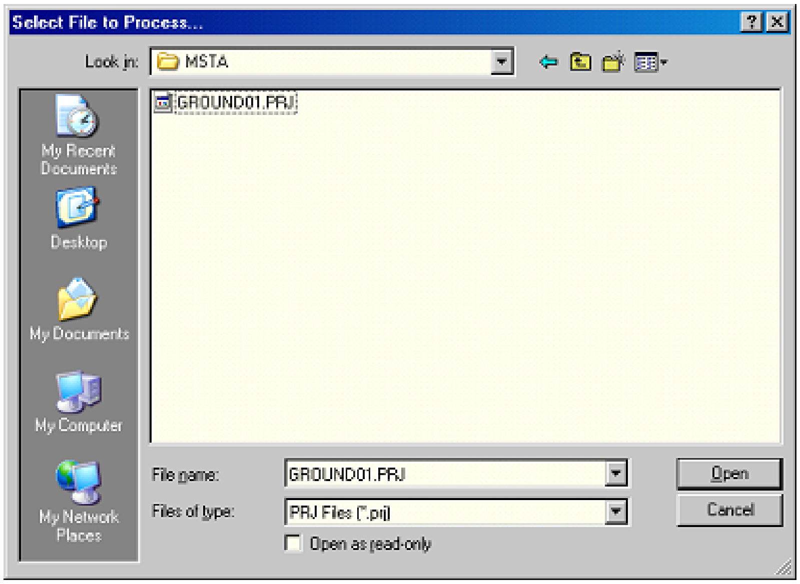


Figure 5-4: Browse and select the GROUND01.PRJ file.

♬ Only one file can be selected and processed at a time.

Step Three: Adjust Output Location (If necessary)

The preprocessor panel displays the path to the location where the *.sdm file is going to be created (Figure 5-5).

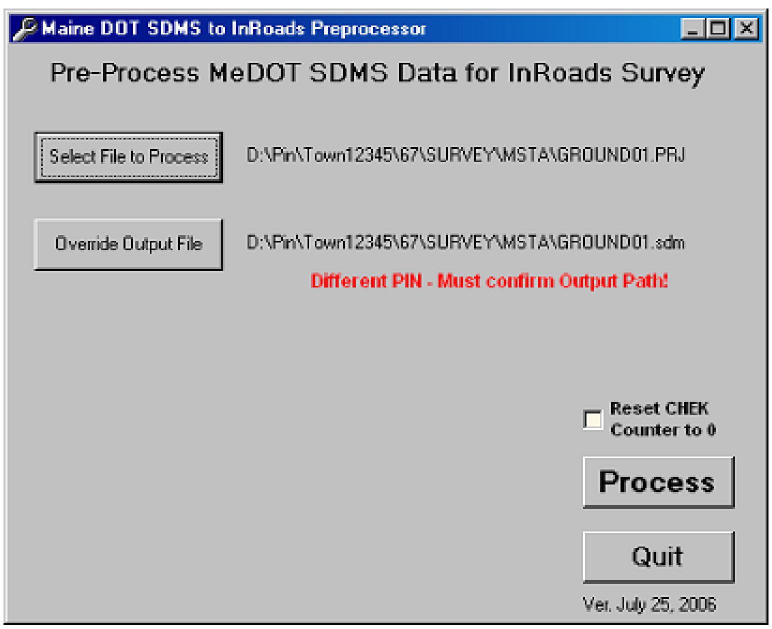


Figure 5-5: The Output location is displayed in the Preprocessor panel.

♬ The override button allows the user to specify a different location if needed.

Step Four: Process the File

Select the **Process** button. The files that have been processed will appear in the lower left portion of the dialog (Figure 5-6).

Repeat steps until all of the GROUND#.PRJ files are processed then select **Quit.**

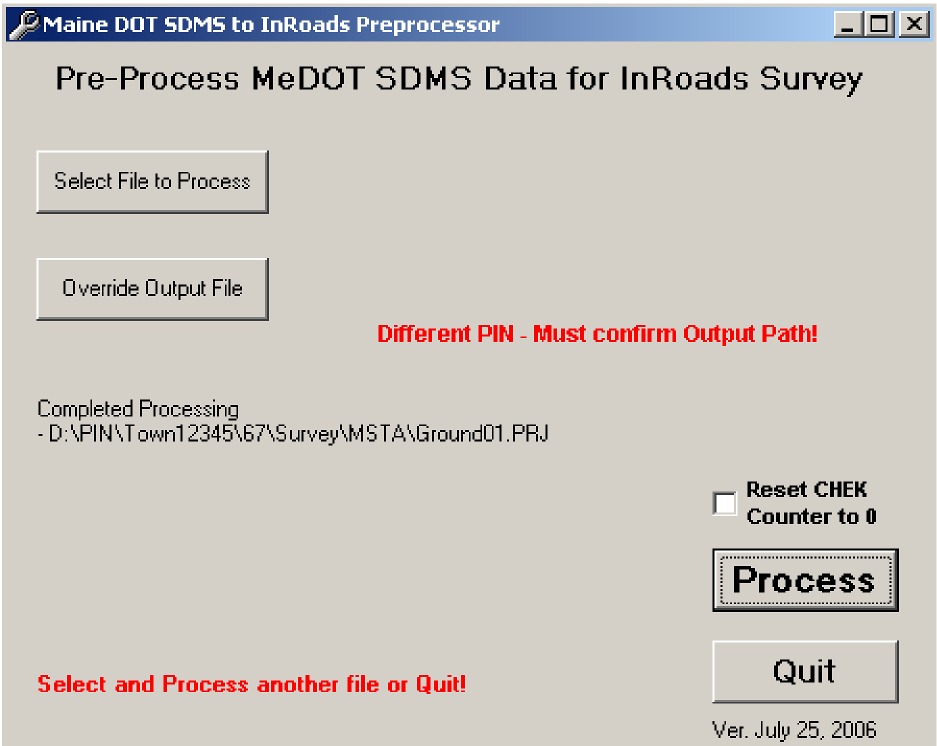


Figure 5-6: The Preprocessor dialog with the Completed files displayed.

Step Five: Reset CHEK Counter (If Necessary)

The *Reset CHEK Counter to 0* button is used only when files must be re-processed. InRoads requires that each shot number be unique. The processor appends each CHEK shot number with an incrementing extension. This information is stored in a project specific configuration file. When additional information comes in and a new ground.prj is processed, it will continue with the next increasing extension as the project dictates.

IMPORT SURVEY DATA

Step One: Launch InRoads

Launch InRoads by double clicking on InRoads Suite icon (Figure 5-7) located on your *Desktop.*

Figure 5-7: InRoads Suite Desktop icon.

Step Two: Adjust User and Project

At MicroStation Manager window, go to the Workspace area at bottom of the dialog. Select the pull down next to *User* and choose **InRoads_Local.** In the *Project* pull down, select your project from the list. This should set your directory to your project's Survey\MSTA directory (Figure 5-8).

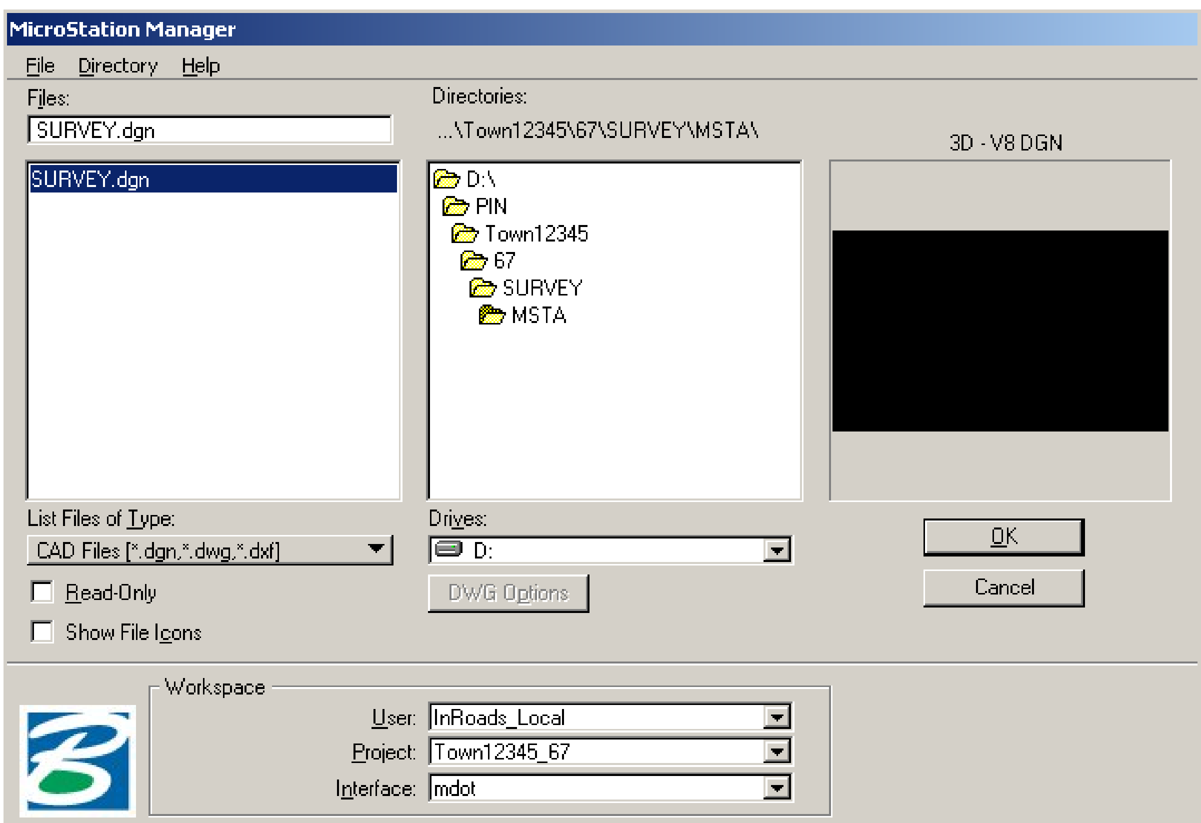


Figure 5-8: MicroStation Manager Dialog with User and Project set.

Step Three: Open the SURVEY.dgn

Select the **SURVEY.dgn** and click **OK** to open the file.

The SURVEY.DGN appears as an empty file with a black “background” screen. MicroStation is open with all of the familiar menus and tools. You will notice a smaller Bentley *InRoads Suite* window appear “inside” of the SURVEY.DGN. This dialog is the main controlling panel for InRoads. (Figure 5-9).

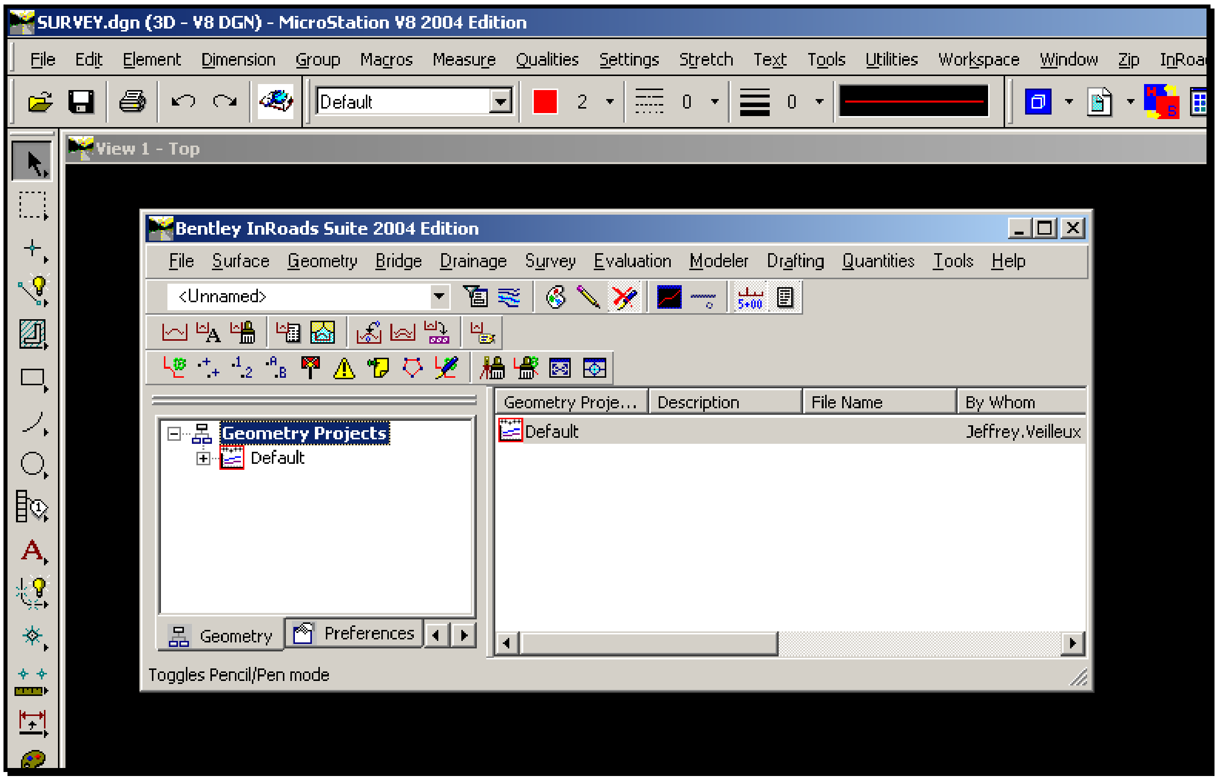


Figure 5-9: InRoads Suite running inside of MicroStation.

ADJUST TOOLBARS/ERROR CHECKING/PROJECT DEFAULTS

Adding Survey Toolbars

InRoads has a variety of toolbars customized for the different workflow processes. The toolbars are provided with each install but must be turned on by the user. This allows for personalization of the toolbars within the software.

Select **Tools>Customize** from InRoads main menu (Figure 5-10).

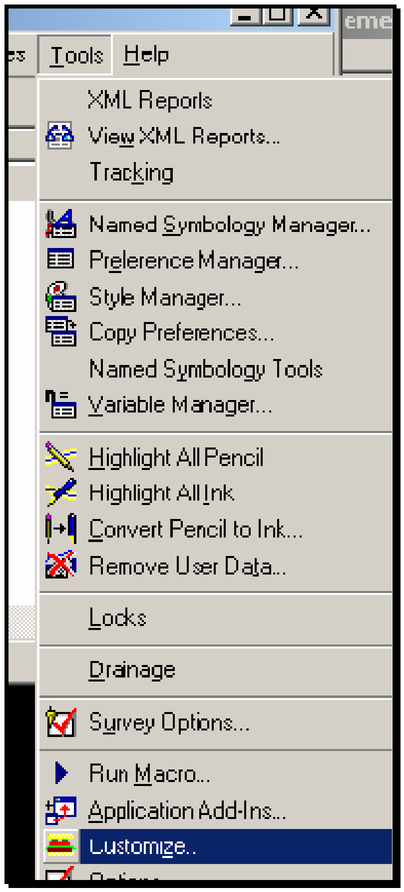


Figure 5-10: Customizing toolbars in InRoads

Place *check marks* in each of the boxes of **Survey, Survey Tools**, and **View Survey Data** (Figure 5-11). Then **Close**.

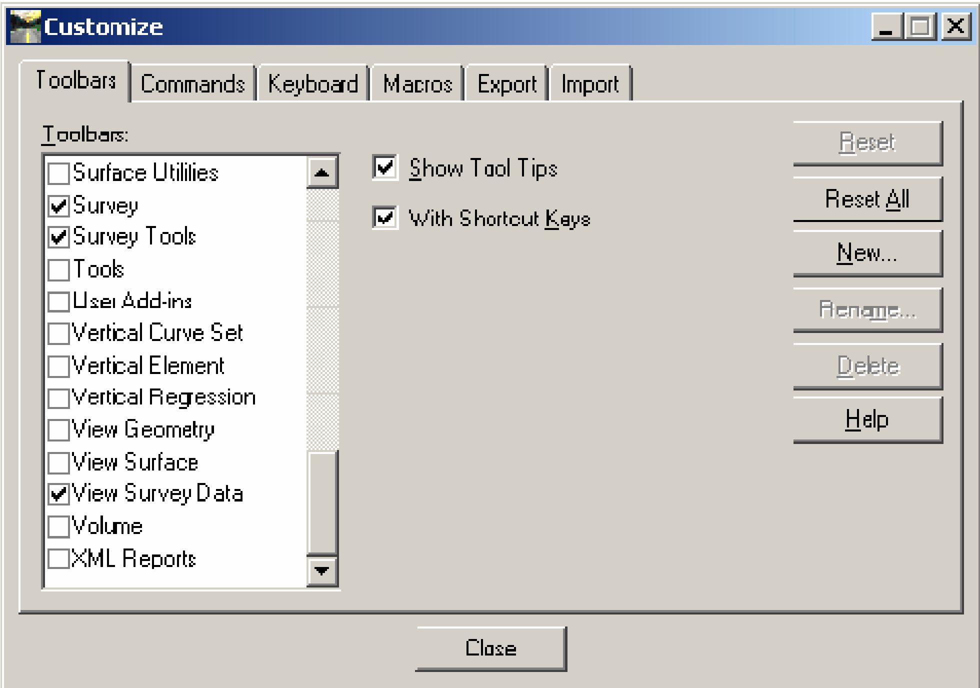


Figure 5-11: Adding toolbars to the InRoads main dialog

Adding Locks Toolbar

Select **Tools>Locks>Toolbar** from the InRoads main menu (Figure 5-12).

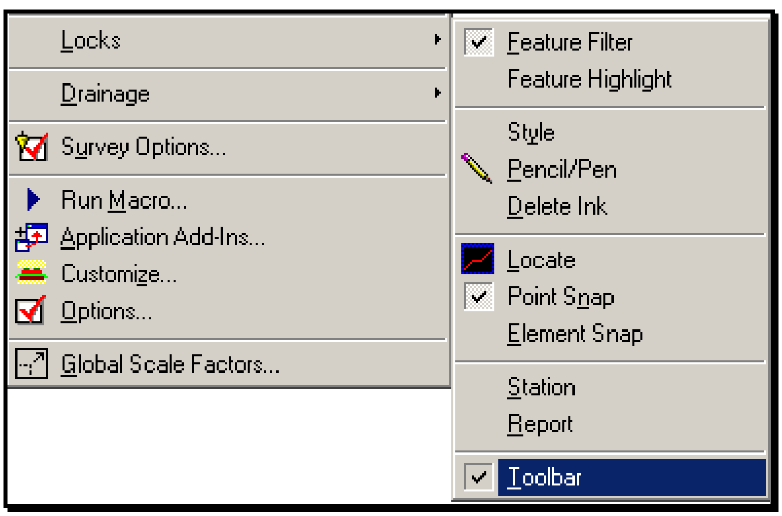
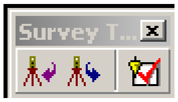


Figure 5-12: Adding the Locks toolbar to the InRoads dialog

Description of Toolbar Icons

The toolbar icons are described from left to right. Most commands can be found within InRoads, but once a user becomes familiar with the icons, they improve the workflow.

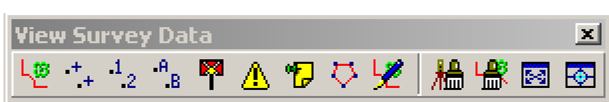


SURVEY TOOLS

- Import Survey Data
- Export Survey Data
- Survey Options

SURVEY

- Fieldbook Data
- Create Legend
- Control Codes
- Survey Style Filter
- Delete Survey Data
- Survey Data to Surface
- Survey Data to Geometry
- Survey Data to Drainage
- Inverse Survey Data
- Transform Survey Data
- Survey XML Report



VIEW SURVEY DATA

- View Planimetrics
- View Symbols
- View Names
- View Codes
- View Elevations
- View Errors
- View Notes

- View Networks
- Write Survey Data to Graphics
- Refresh View
- Regenerate Graphics
- Fit View
- Find Point in View

<u>LOCKS</u>

- Feature Filter List
- Feature Filter Lock (On/Off)
- Feature Highlight Lock (On/Off)
- Style Lock (On/Off)
- Pencil/Pen (Mode)
- Delete Ink Lock (On/Off)
- Locate Features/Locate Graphics (Mode)
- Point Snap Lock/No Snap/Element Snap Lock
- Station Lock (On/Off)
- Report Lock (On/Off)

✓ ***For more information on these tools and their functions, please refer to the InRoads internal Help (Help>Contents).***

Error Checking

InRoads offers several methods of viewing coding errors. InRoads creates a Fieldbook Audit Trail that will store the results for future reference.

Select **Tools**> **Survey Options** from the InRoads main menu. Click on the *General* tab (Figure 5-13).

In the *Fieldbook Audit Trail File Name* text box, use the browse button to navigate to the project folder and enter a name for the log file, then click **Save.**

In the *File Options* section enable the following:

- Resolve Code Errors
- Log Code Errors
- Add/Edit Audit Trail

Click **OK** to close the ***Survey Options*** panel.

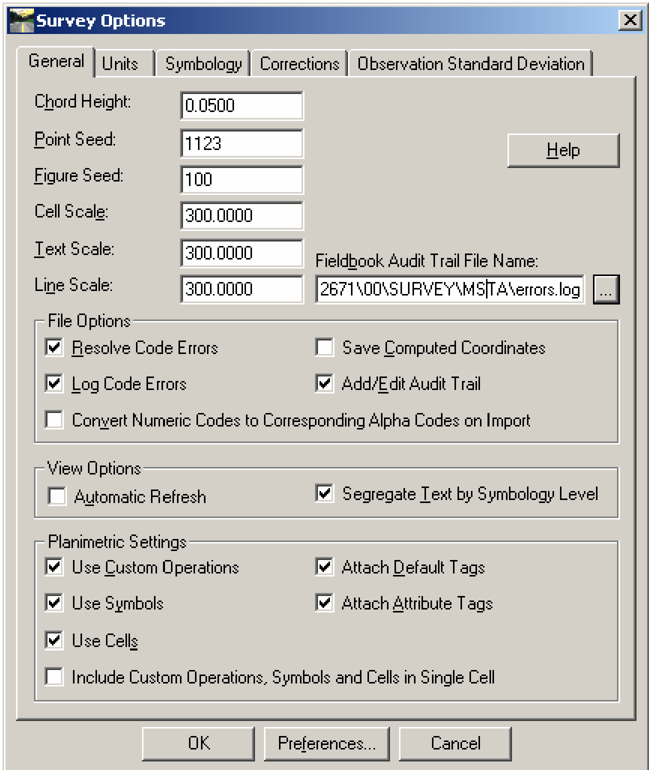


Figure 5-13: Adjust the Survey Options dialog

Verify Project Defaults

It is a good practice to verify the project defaults are set to the MaineDOT customization before continuing work on the project. This will ensure that the correct preferences are loaded.

From the InRoads menu select **File** > **Project Defaults**.

The *Configuration Name* text box (Figure 5-14) should reflect **MDOT**.

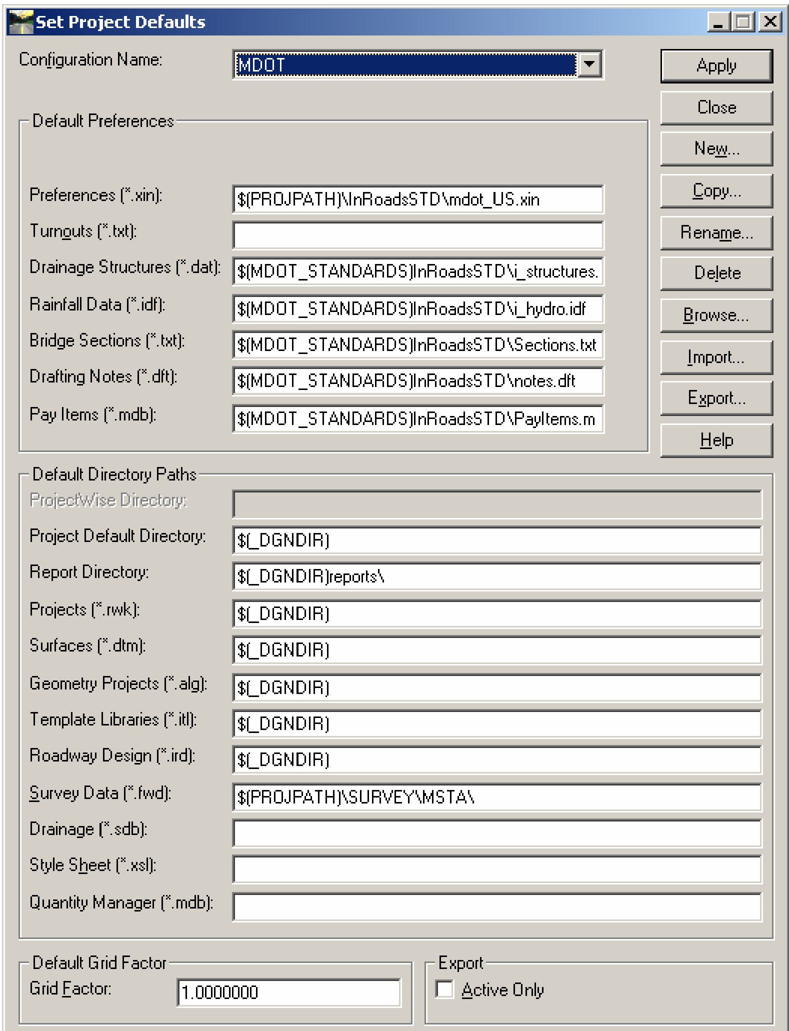


Figure 5-14: Set Project Defaults dialog set to MDOT

If it does not, the user will need to use the drop-down list to select the **MDOT** configuration name. Click **Apply** and then **Close**.

IMPORT TRAVERSE DATA

Step One: Change to the Survey Tab

Right click on a tab at the bottom left of the *InRoads* dialog and select **Survey** (Figure 5-15).

♬ You can also access the survey tab by using the arrow button until the Survey tab can be selected.

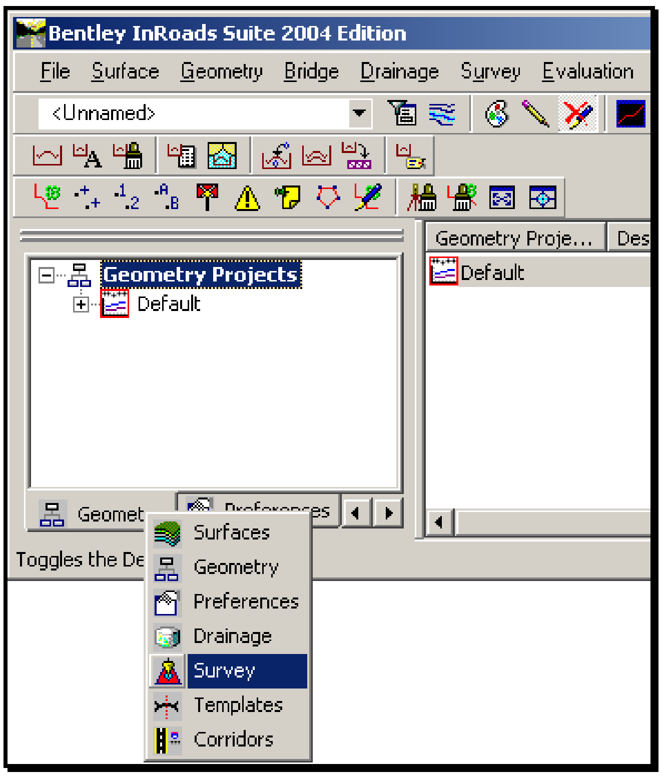


Figure 5-15: Selecting the Survey portion of InRoads Suite.

When the *Survey* tab is selected, you will notice the default *Book 1* (Figure 5-16).

ⓘ ***The InRoads survey data is stored in files called "field books". A default blank field book, Book 1, is provided initially. <u>WARNING: DO NOT DELETE BOOK 1. THIS IS ESSENTIAL TO INROADS FUNCTIONING.</u>***

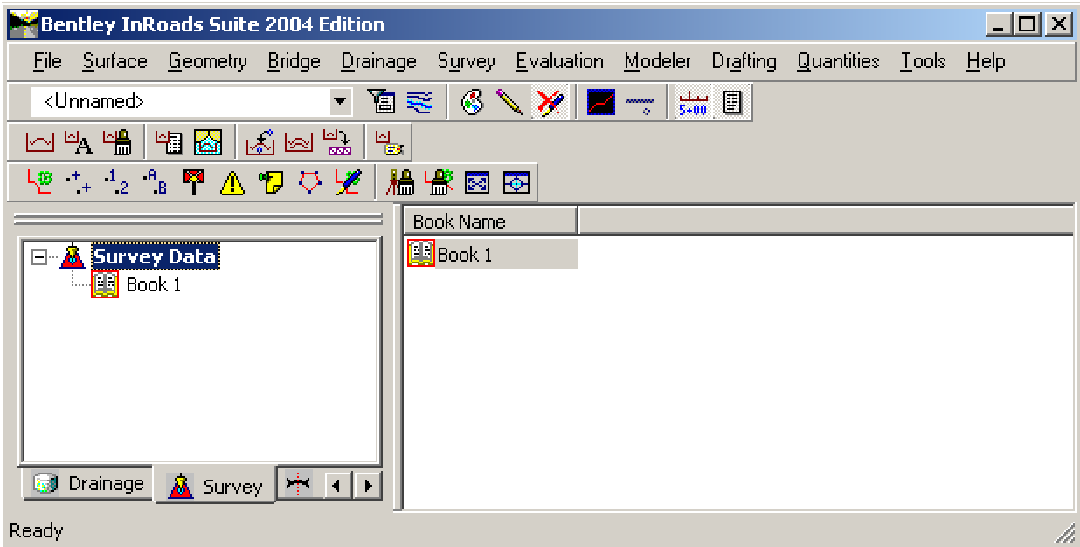


Figure 5-16: Survey tab displayed with the default Book 1.

Step Two: Create New Field Book for Traverse Data

Right click on *Survey Data* and select **New…** (Figure 5-17).

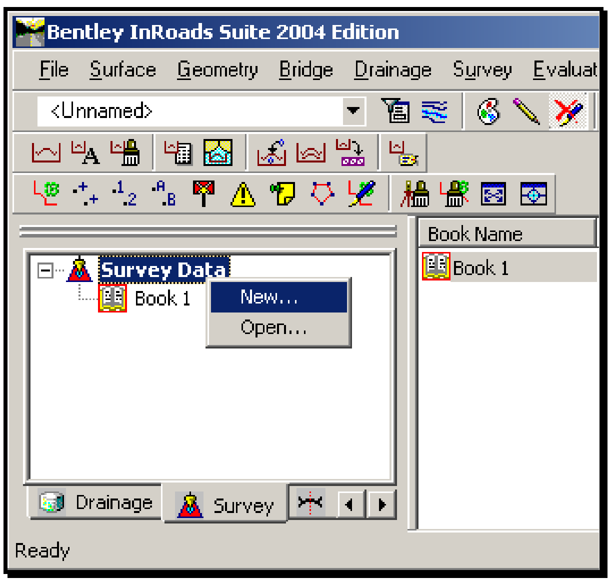


Figure 5-17: Right Click to create a new Book.

Enter **TRAVERSE ONLY** as the *Name* of the new book. Click **Apply** and **Close** (Figure 5-18).

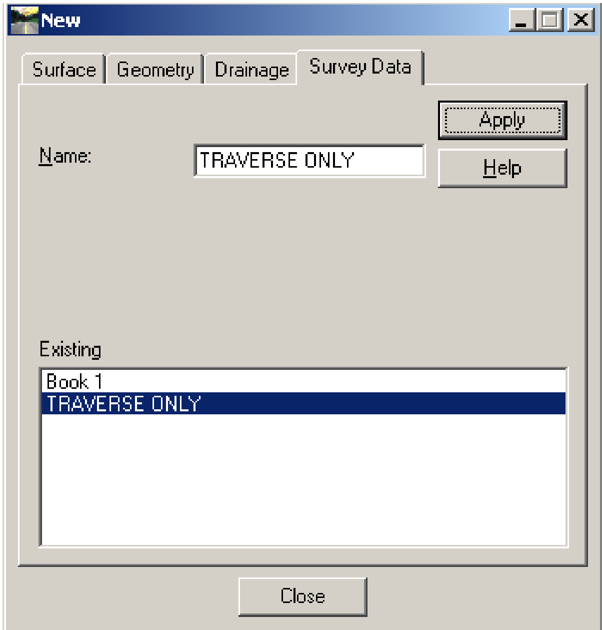


Figure 5-18: Add a new Book called TRAVERSE ONLY.

Step Three: Import Traverse Data to Book

Right Click on **TRAVERSE ONLY** and select **Save.** In the **Save As…** dialog, click **Save** and then **Cancel.** Right Click again and select **Import…** (Figure 5-19).

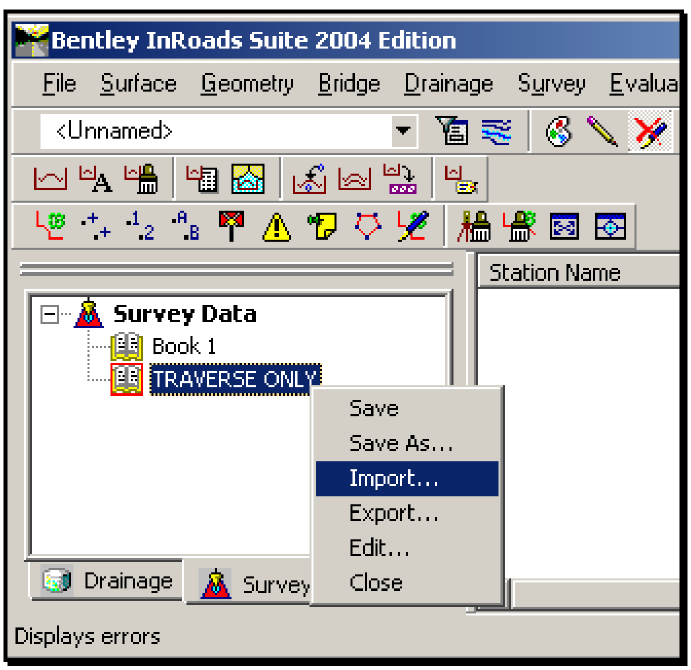


Figure 5-19: Import Traverse data into TRAVERSE ONLY Book.

Click the pull down next to *Files of Type* and select **Text File (*.*)** (Figure 5-20).

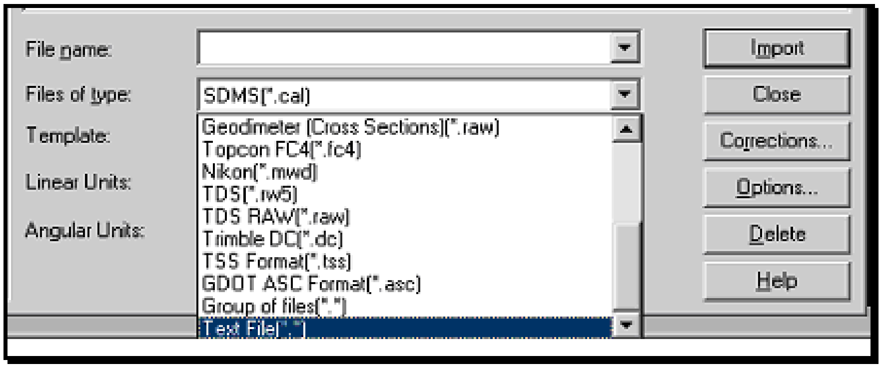


Figure 5-20: Set "Files of Type" to Text File [.*].*

Locate TRAVERSE.TXT and click **Import.**

ⓘ ***Do not add a Correction to the Traverse.out file generated by MX. This has had the correction already applied.***

Step Four: Adjustment Text Import Wizard

Part One: Set to Fixed Width

Select **Fixed Width – Fields are aligned in columns** (Figure 5-21) in the *Original Data Type* portion of the dialog and click **Next.**

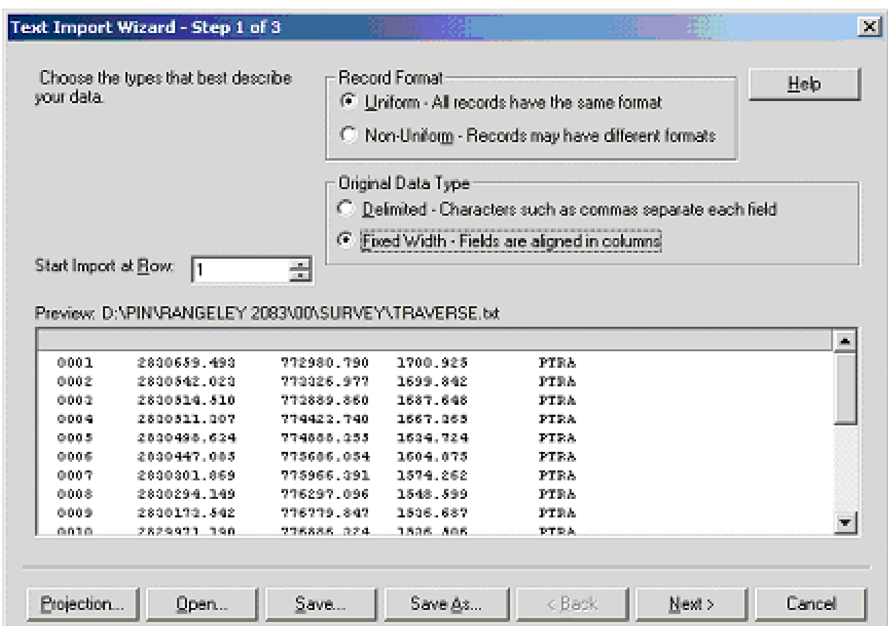


Figure 5-21: Set Original Data Type to Fixed Width.

Part Two: Add Column Breaks

Click in the “white space” between each column to make vertical lines separating the data (Figure 5-22). Click **Next.**

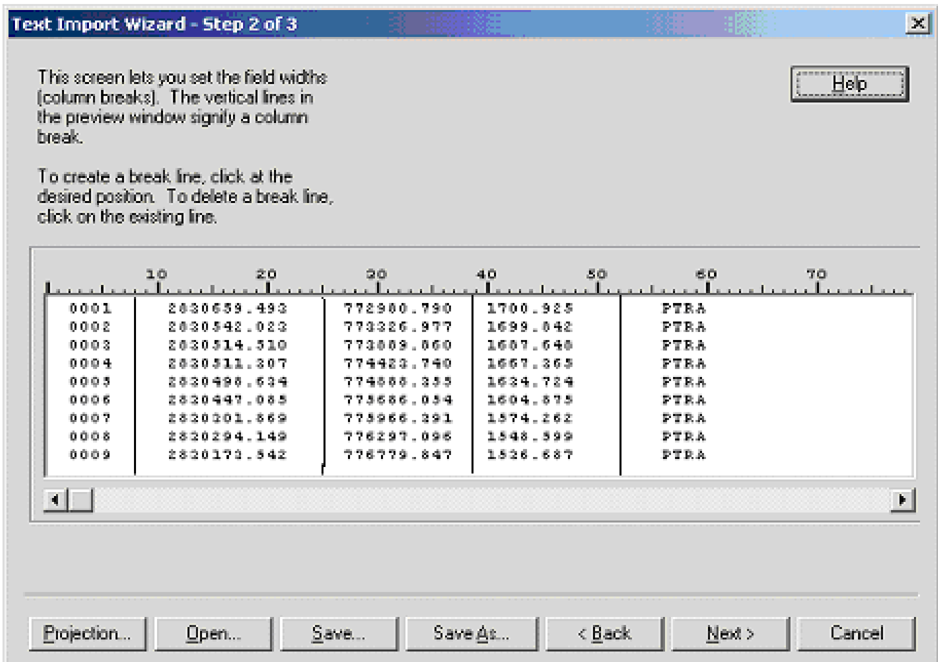


Figure 5-22: Place vertical lines to separate the data.

Part Three: Adjust Column Headings

Above the left-most column, Right Click on the heading *Skip* and select **Point Name.** Repeat for each column, choosing column names as shown in (Figure 5-23).

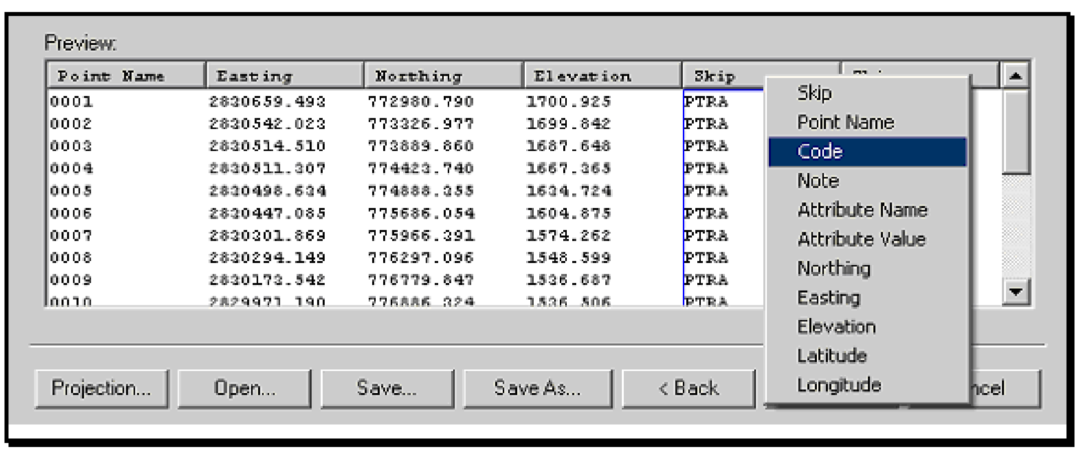


Figure 5-23: Editing Column Headings.

The rightmost column should be set to **Code.** When done, click **Finish** at bottom. Click **Close** at the *Import* dialog.

IMPORT RADIAL TOPOGRAPHY DATA

Overview

The field book that contains topographic data **MUST** also contain the TRAVERSE data. The method below allows the TRAVERSE data to be saved in a new fieldbook, called GROUND.fwd, while preserving only the TRAVERSE data in TRAVERSE ONLY.fwd.

Step One: Save TRAVERSE ONLY as GROUND Field Book

Right Click on TRAVERSE ONLY and choose **Save.** Right click on the TRAVERSE ONLY again and choose **Save As…** Supply **GROUND** as a *File Name.* Click **Save** (Figure 5-24). Select **Cancel** to close the dialog.

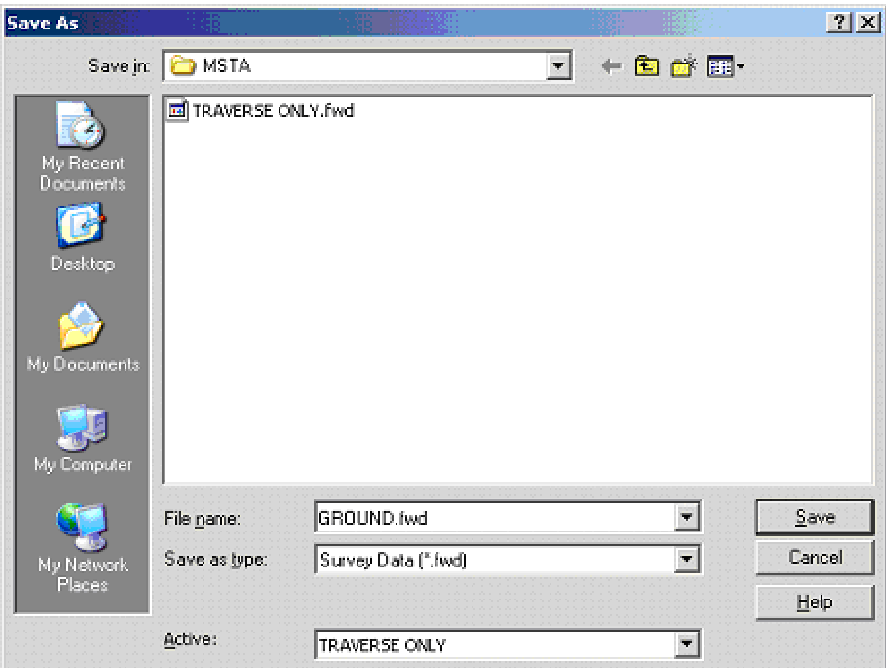


Figure 5-24: Save a copy of TRAVERSE ONLY as GROUND.

♫ The TRAVERSE ONLY fieldbook no longer appears in the InRoads window under Survey Data, but it is still in the D:\PIN\Town12345\67\SURVEY\MSTA folder for your project. The GROUND fieldbook now appears in the InRoads window, and currently contains only the TRAVERSE data.

Step Two: Import Radial Topo Data

Part One: Open Import dialog

Right Click on the ***GROUND*** field book and choose **Import…** (Figure 5-25).

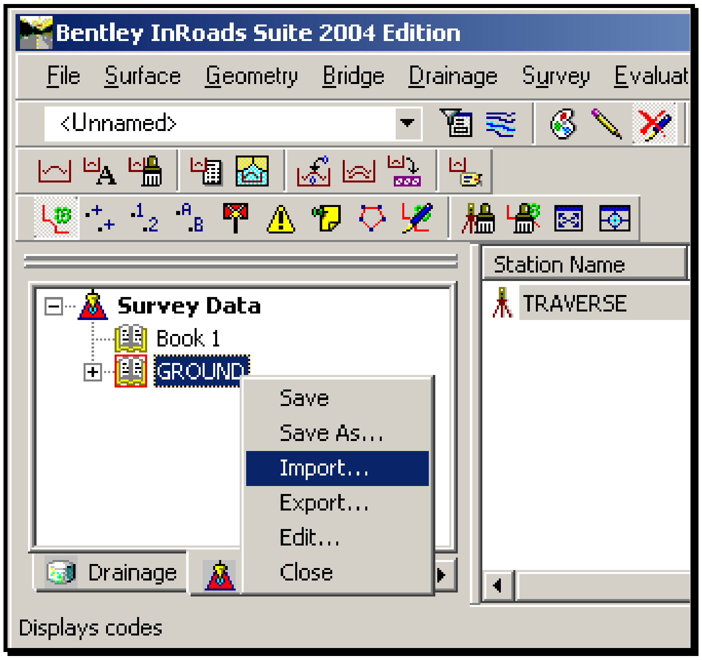


Figure 5-25: Import Radial Topo Data into GROUND fieldbook.

Click the pull down next to *Files of Type* and select **AASHTO SDMS (*.sdm)** (Figure 5-26) if not already set.

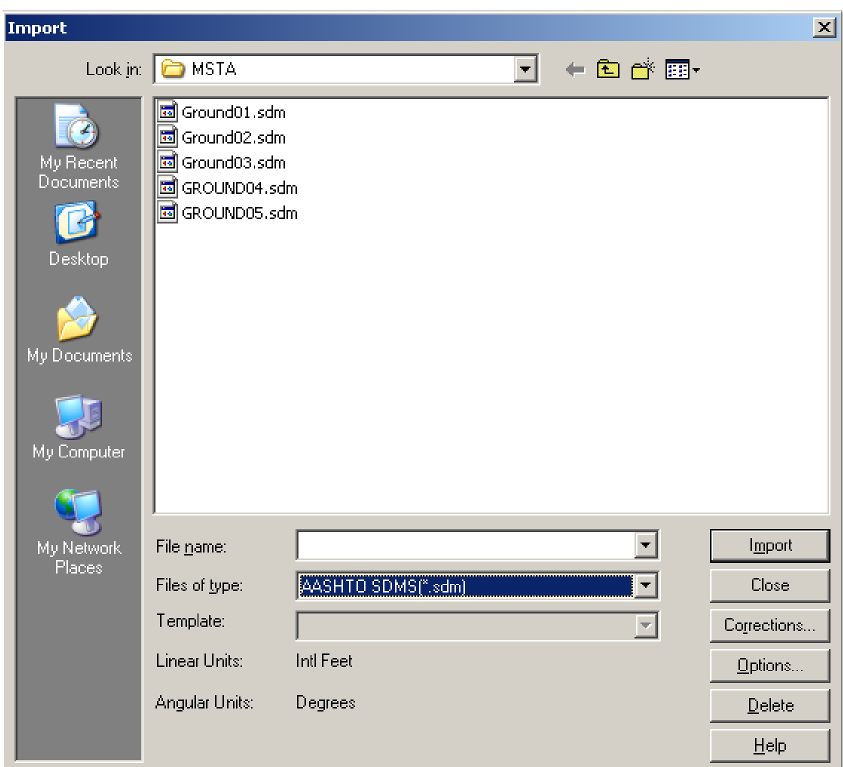
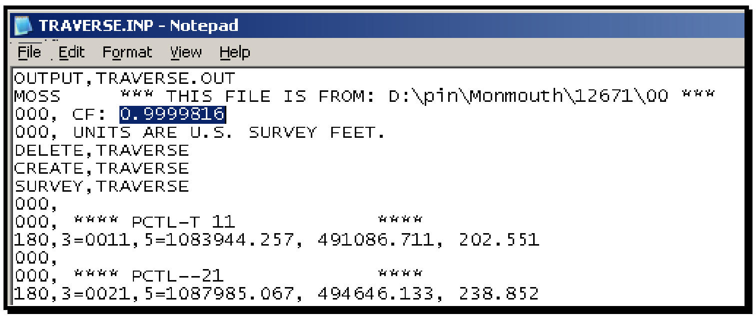


Figure 5-26: Select AASHTO SDMS (.sdm) in the Files of Type pull down.*

Part Two: Set the Correction Factor

ⓘ ***The Combined Factor must be added to the GROUND#.sdm files before they are imported into the GROUND field book.***

Browse Windows Explorer to the \SURVEY\Orig-data folder or the \SURVEY\MX\Orig-data folder. Open the **TRAVERSE.INP** file (Figure 5-27). The Combination Factor for the project is found on the *third line* of the report (i.e. 000, CF: 0.9999816). Copy this number by highlighting it and selecting **Edit>Copy** from the menu.


TRAVERSE.INP - Notepad
File Edit Format View Help

```
OUTPUT,TRAVERSE.OUT
MOSS      *** THIS FILE IS FROM: D:\pin\Monmouth\12671\00 ***
000, CF: 0.9999816
000, UNITS ARE U.S. SURVEY FEET.
DELETE,TRAVERSE
CREATE,TRAVERSE
SURVEY,TRAVERSE
000,
000, **** PCTL-T 11             ****
180,3=0011,5=1083944.257, 491086.711, 202.551
000,
000, **** PCTL--21              ****
180,3=0021,5=1087985.067, 494646.133, 238.852
```

Figure 5-27: Combined Factor from the Traverse.inp file

Return to the *Import* dialog box. Select the **Corrections…** button. Place a check beside *Curvature and Refraction*, then **Paste** (Ctrl+V) the **Combined Factor number** into the Slope Distance Scale Factor field (Figure 5-28). Click **OK.**

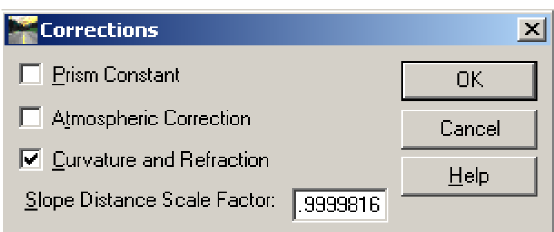


Figure 5-28: Corrections dialog with Combination Factor applied

Part Three: Import the SDM Files

Select the **Ground01.sdm** file. Click **Import…** Select the **Ground02.sdm** file. Click **Import…** Repeat this process for each remaining **GROUND#.sdm.** When all GROUND#.sdm files have been imported, select **Close.**

Part Four: Resolve Error Codes (if necessary)

If the *Resolve Error Code* dialog appears (Figure 5-29), click **Ignore All.**

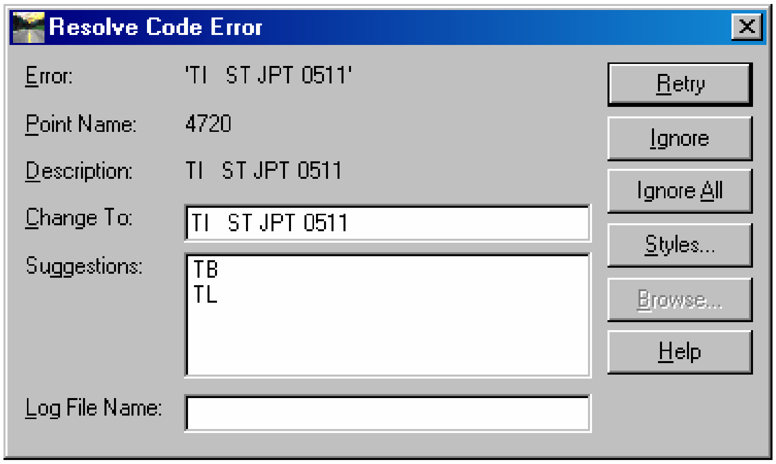


Figure 5-29: Resolve Error Code dialog

If an *Alert* dialog opens (Figure 5-30) stating that "One or more target heights missing from file", click **OK.**

Figure 5-30: Alert - Target heights missing dialog

The *Results* (Audit Trail) window appears (Figure 5-31). Click **Save As,** give it the file name **Edits.txt** and click **Save.** At the *Results* window, view the results to see what the error codes are and which shots have missing target heights. Click **Close.**

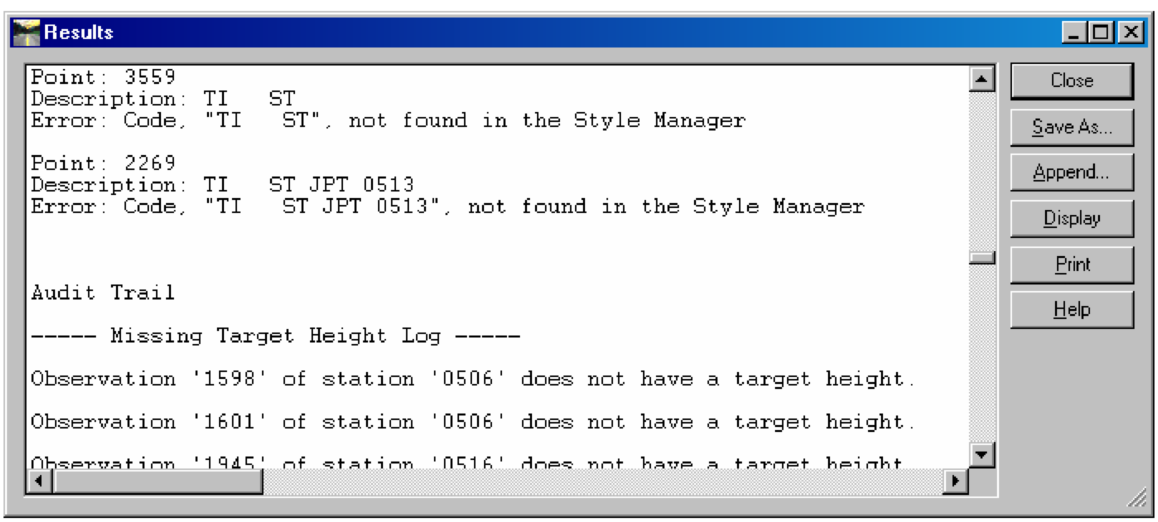


Figure 5-31: Results dialog displaying the Audit Trail

Part Five: View Results

In the *InRoads Explorer* window, the GROUND fieldbook shows the ***occupied stations*** of each set-up in the left half of window and the ***observation data*** coordinates in the right half of window (Figure 5-32).

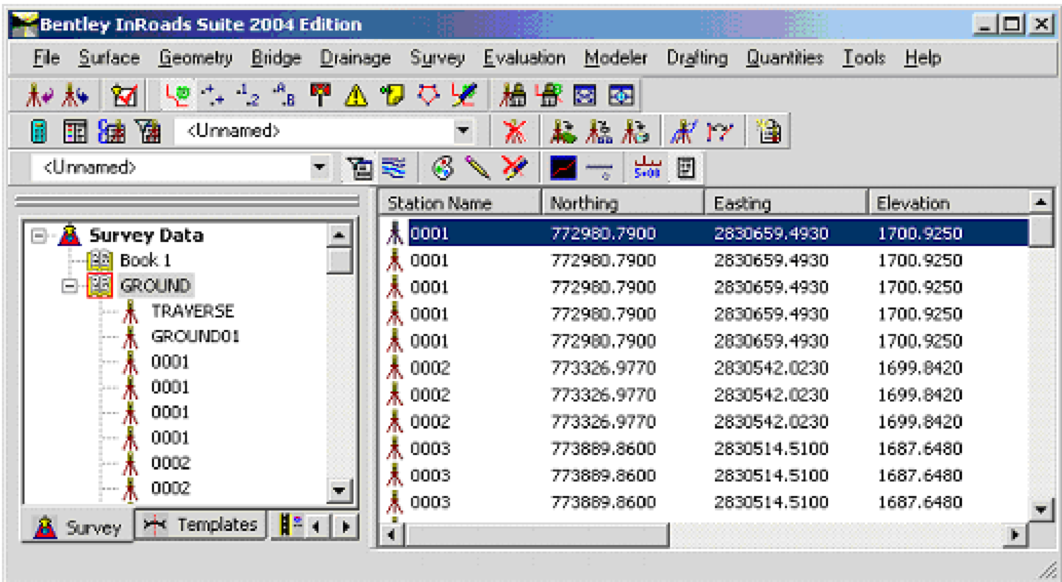


Figure 5-32: GROUND expanded showing occupied stations and observation data.

Part Six: Save Ground Field Book

Right click on the **Ground** *Field Book* and select **Save.**

VERIFY CHECK SHOTS

Overview

The CHEK shots for each set-up in the GROUND.FWD need to be verified. InRoads has a tool to create a report showing the X- and Y-Coordinates and Elevation of each observation in the GROUND.FWD fieldbook.

Step One: Turn on TraverseChecks Filter

Select the *Survey Filter* pull down (Figure 5-33) and pick the **TraverseChecks.**

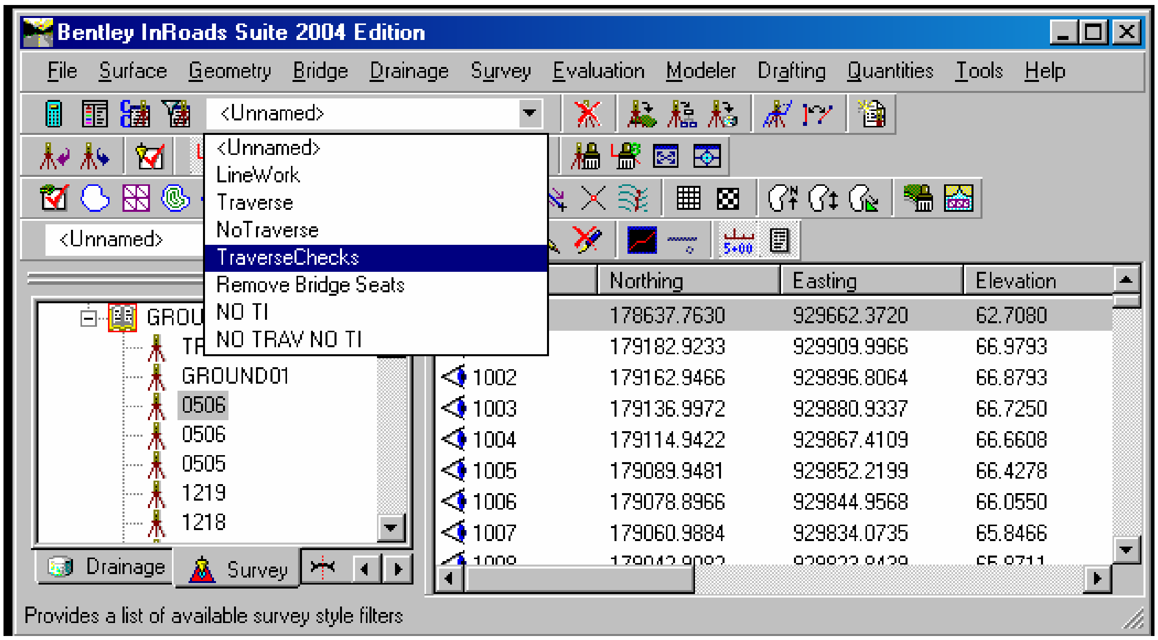


Figure 5-33: Select TraverseCheck from the Survey Filter pull down

Step Two: Select Survey>XML Report

From the InRoads main menu (Figure 5-34), select **Survey>XML Report…**

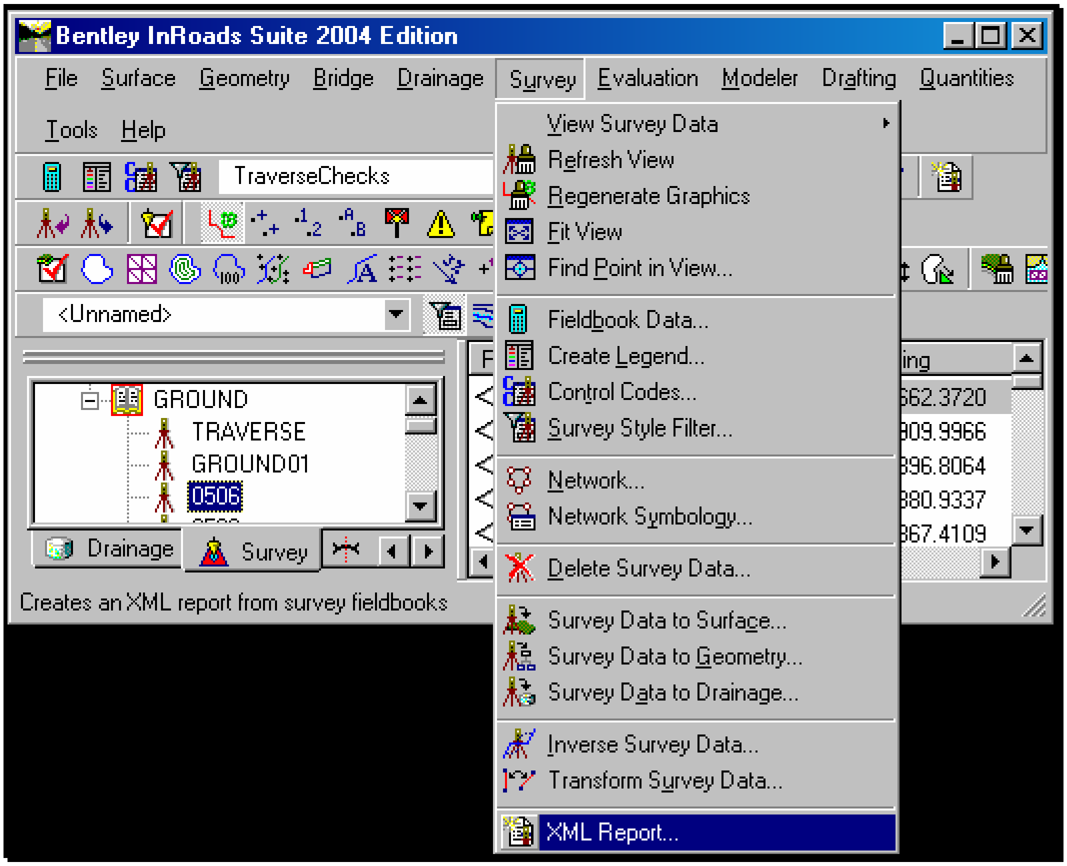


Figure 5-34: Selecting XML Reports from the Survey menu.

Step Three: Select Book to "Report" On

At the *Survey XML Report* window (Figure 5-35), click on **GROUND**. Select **Apply** and click **Close.** Wait for it to process.

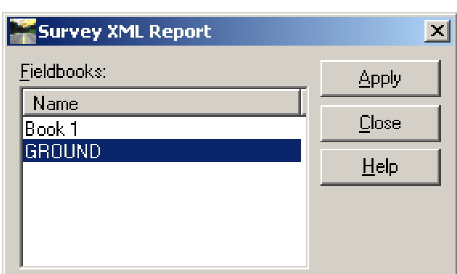


Figure 5-35: Create a XML Report of the GROUND fieldbook.

The *Bentley InRoads Report Browser* opens to the **Survey Check Shots.xml** report that you just created.

♫ The report may be using a style sheet other than the Survey Check Shot.xsl. Select the Survey Check Shot.xsl and right click it and select Set as Default Survey.

If the Report Doesn’t Open

If the InRoads Report Browser does not appear, select **Tools>View XML Reports…** Wait for processing.

When the *Bentley InRoads Report Browser* opens, click on the *Survey* folder and then on **SurveyCheckShots.xsl** (Figure 5-36).

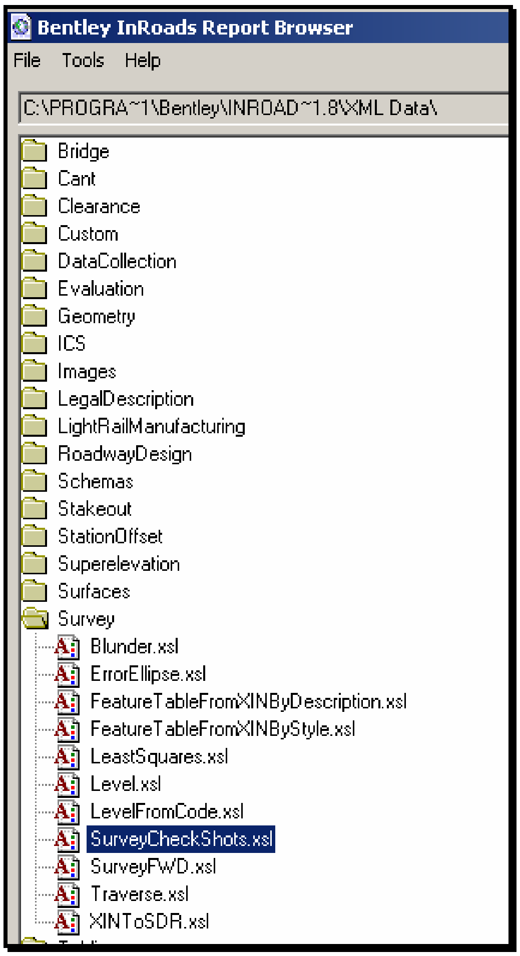


Figure 5-36: Select the Survey Check Shots.xsl report in the Survey folder.

REVIEW SURVEY CHECK SHOT .XML REPORT

Step One: Reading the Check Shots Report

The *Review Check Shots* window shows the TRAVERSE / FLY points for this project, listed by increasing numerical order**. The X-,Y-, Z-Coordinates to be "held" for each TRAVERSE / FLY point are listed in the top row, with Code PSSA**, **PTRA, PCTL, PGBM, PBMK or PFLY.**

The **yellow-shaded boxes** show the coordinates resulting when that point was used as a **CHEK shot** (Figure 5-37).

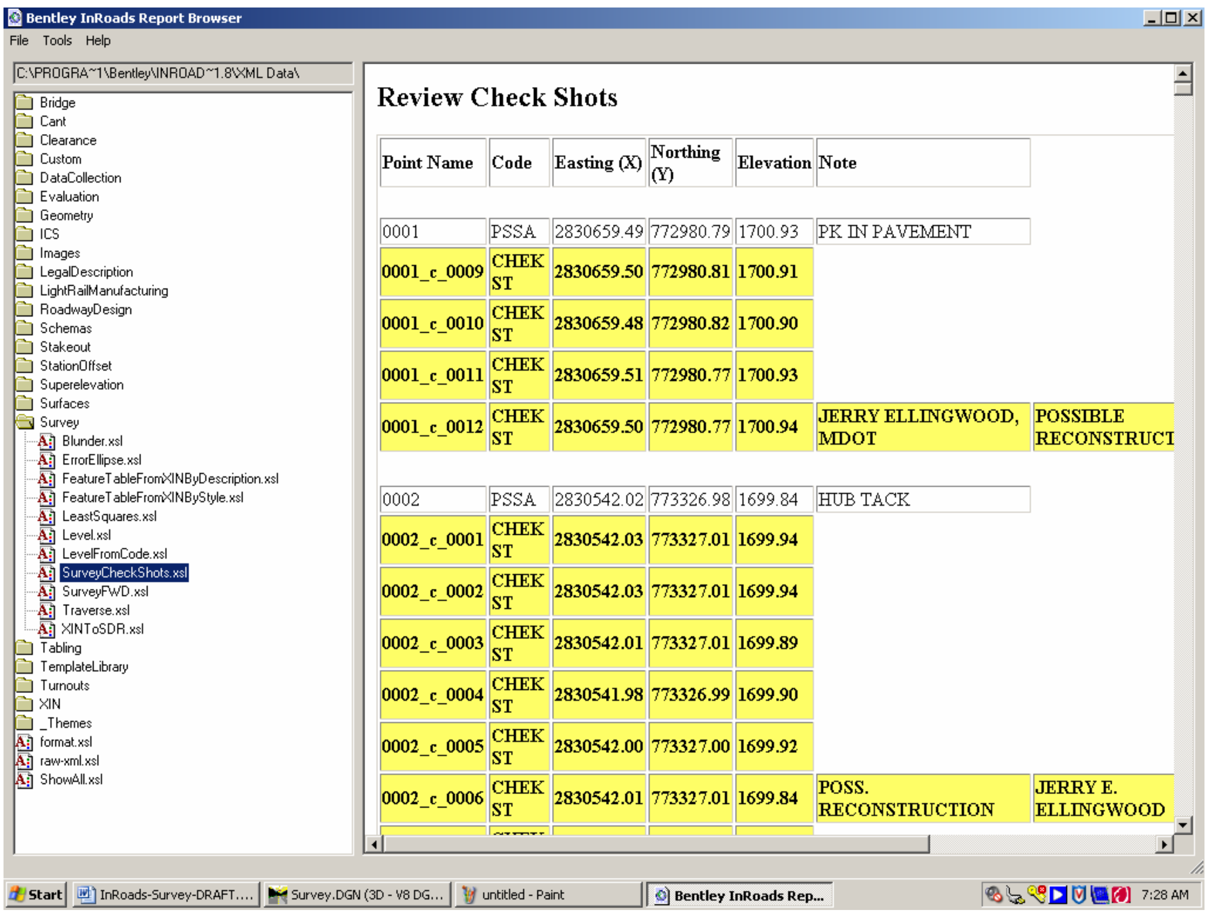


Figure 5-37: Color coded Survey Check Shots.

♬ InRoads demands a <u>unique number</u> for each point /shot in the fieldbook data. Since surveyors take several CHEK shots on TRAVERSE / FLY points, InRoads adds a unique, incrementing number for <u>each</u> CHEK shot.

For example, the CHEK shot numbered **0016_c_0096** is a code which means (see Figure 5-38):

- o $\boxed{0016}$ = This was taken on TRAVERSE / FLY point 0016.

- $\boxed{\_c\_}$ = Identifies this as a CHEK shot.
- $\boxed{0096}$ = There have been 95 previous CHEK shots taken in this GROUND.FWD fieldbook.

0016	PSSA	2829057.97	777922.08	1525.24	PK IN SIDEWALK	
0016_c_0096	**CHEK ST**	**2829057.91**	**777922.09**	**1525.25**		
0016_c_0098	**CHEK ST**	**2829057.91**	**777922.12**	**1525.26**	**POSS. RECONST.**	**JERRY E. ELLINGWOOD**
0016_c_0099	**CHEK ST**	**2829057.90**	**777922.11**	**1525.23**	**PK IN PAV. SIDEWALK**	**JERRY ELLINGWOOD (MDOT)**
0016_c_0100	**CHEK ST**	**2829057.93**	**777922.14**	**1525.23**	**PK IN SIDEWALK**	
0020	PTRA	2831281.29	770223.38	1585.01		
0021	PTRA	2830761.67	772228.09	1680.89		

Figure 5-38: Explanation of CHEK shot coding.

VERIFY ACCURACY OF CHECK SHOTS

Step One: Check Accuracy of X, Y and Z Coordinates

The X-Coordinate (EASTING), Y-Coordinate (NORTHING) and Z-Coordinate (ELEVATION) of each CHEK shot on a point need to be compared with the X-, Y- and Z-Coordinates which are being "held" for that point. For example, in the Figure below, CHEK shot number 0001_c_0009 has Easting (X) value only +0.01 ft. different from the "held" value of point 0001, a Northing (Y) value only +0.02 ft. different, and an Elevation (Z) value of only -0.02 ft. This CHEK shot is within the acceptable tolerances established for Maine DOT Survey Standards. (See Figure 5-39).

Review Check Shots

Point Name	Code	Easting (X)	Northing (Y)	Elevation	Note
0001	PSSA	2830659.49	772980.79	1700.93	PK IN PAVEMENT
0001_c_0009	**CHEK ST**	**2830659.50**	**772980.81**	**1700.91**	
0001_c_0010	**CHEK ST**	**2830659.48**	**772980.82**	**1700.90**	
0001_c_0011	**CHEK ST**	**2830659.51**	**772980.77**	**1700.93**	
0001_c_0012	**CHEK ST**	**2830659.50**	**772980.77**	**1700.94**	**JERRY ELLINGWOOD, MDOT**

Figure 5-39: Check accuracy of CHEK shots.

Step Two: Compare to Chart

Use this chart to determine if the CHECK shots are within MaineDOT Survey Standards (Figure 5-40).

Horizontal tolerances: **Vertical tolerances**:

* The first line of coordinates below represents the TRAVERSE Point's ***stored values***.

*	xxxxxxx.471	yyyyy.552	zzz.747
	xxxxxxx.486	yyyyy.500	zzz.772
	---	---	---
diff. =	-0.015 ft.	+0.052 ft.	-0.025 ft.

Max. allowed diff. in horiz.= 0.100 ft **Max. allowed diff. in vert.= 0.050 ft**

Metric (= 0.030 m) **Metric (= 0.015 m)**

****

NOTE: The Max. allowed diff. in horiz.= 0.100 ft. means the SUM of the difference between the x-coords squared and the y-coords squared and the Square Root of the results.

New example: Diff. in x-coord = 0.07 ft. squared = 0.0049 ft.
\+ Diff. in y-coord = 0.08 ft. squared = 0.0064 ft.
added together = 0.0113 ft.

Square Root of 0.0113 ft. = **0.106 ft.** (**slightly over Max. allowed diff. in horiz.**)

Figure 5-40: MaineDOT Survey tolerance chart.

If any CHEK shots are **BEYOND TOLERANCE**, review the set-up data**:**

- What factors may be causing the discrepancy?
- Can the discrepancy be justified?
- Will the data from this set-up need to be retaken?

Step Three: Save the Report

Select **File>Save As…** and name the report **CheckShotReport** (Figure 5-41). Select **Close.**

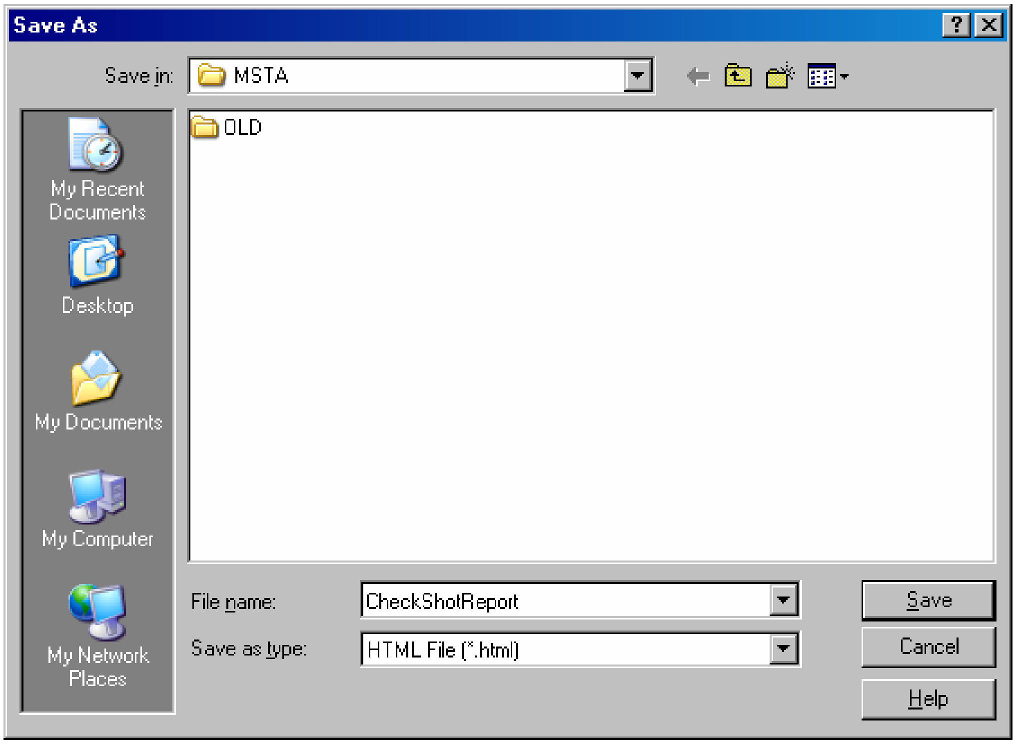


Figure 5-41: Save the Check Shot Report

Step Four: Adjust the Filter

At the *InRoads Explorer* dialog (Figure 5-42), change the *Survey Filter* pull down from *TraverseChecks* to **<Unnamed>.**

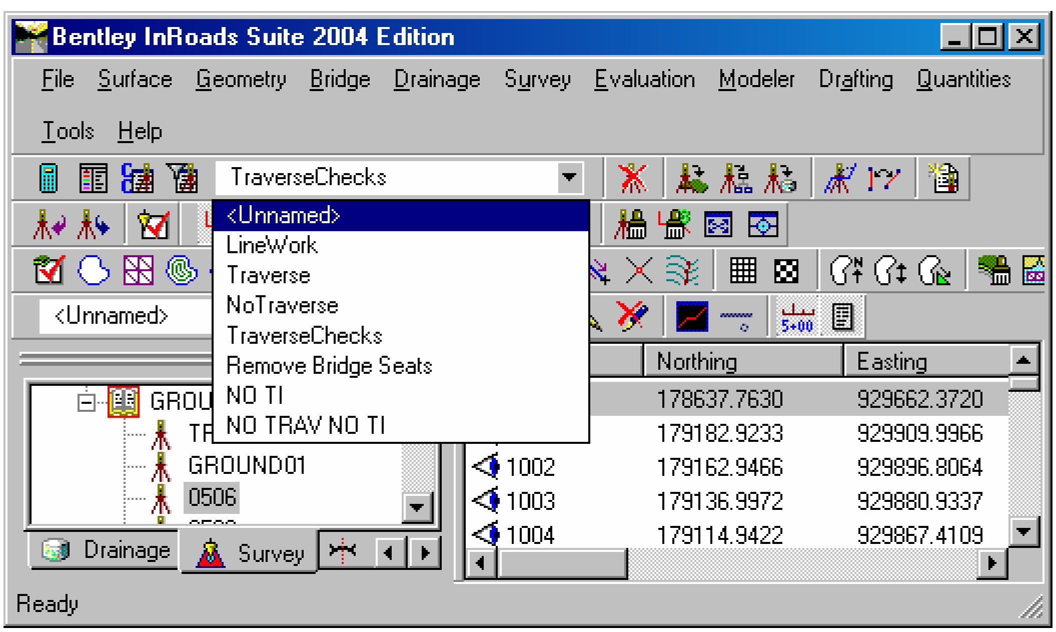


Figure 5-42: Adjust Filter to Unnamed

Step Five: Create Deliverables

✓ ***Refer to page 5-58 for detailed instructions on creating a Ground.dtm and MicroStation deliverables.***

CONVERT MX SURVEY TO INROADS SURFACE (OPTION 2)

OVERVIEW

Since MaineDOT is trying to rely less on MX and more on InRoads, we will be converting older MX projects to InRoads. The process outlined below describes how to import “survey edited” graphics from MX into a Surface within InRoads. This process will require a properly formatted ASCII text file to capture the annotation of the features. Triangle cleanup on the InRoads platform will be necessary to finalize the Ground.dtm.

MX Files

The original .dpw file is created within MX. This file is MX Changed to create a MicroStation .dgn with the proper MaineDOT standard level structure. This file is imported into a Surface from the graphics within the .dgn in order to provide a surface to design against.

MicroStation Files

The MicroStation file received from the Property Office for the topography will have the proper level structure internally once it has been MX Changed again. They will need to redo this in order to import the dgn file into a surface within InRoads.

ASCII Text File

The Text.rep file will be formatted (or pre-processed) correctly with Northing, Easting, and a combination of Alpha Code and Point Name, this way they will be able to use the InRoads Text Import Wizard to process the text information into the ground surface for use by their customers.

MX CHANGE FROM THE OLD PLATFORM

Step One: Open MicroStation

Open the MicroStation platform for MX and enter a .dgn file.

Step Two: Launch MX Change

Select **MXChange>Import MX Drawing…** from the MicroStation main menu (Figure 5-130).

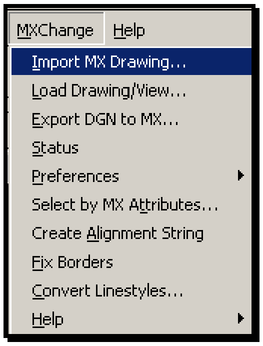


Figure 5-43: Import MX Drawing menu selection.

This activates a panel for the user to select the correct Units of measure, drawing scale and the software that is being used to design the project data.

Step Three: Adjust Units and Scale dialog

Select **New – Prep for InRoads** and the desired *Drawing Scale* (normally 25 ft per inch) Figure 5-131.

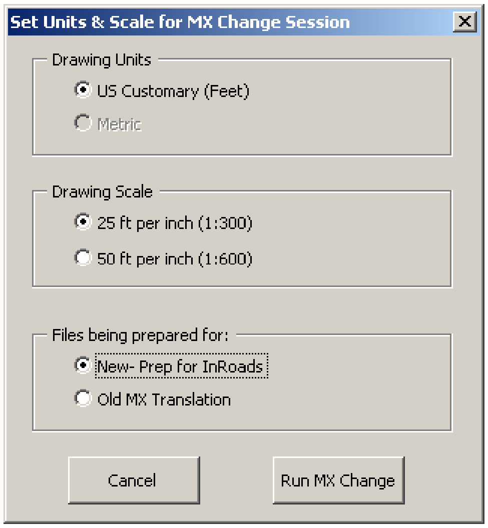


Figure 5-44: Units and Scale for MX Change Session.

Select **Run MX Change.**

♬ When selecting the bullet for New-Prep for InRoads, the metric option for the drawing units is grayed out because there is no customization developed for the metric platform.

Step Four: Import MX Drawing

Browse to the correct project folder using the **DPF…** button and select the **3DTOPOMMDDYY.dpw** (Figure 5-132).

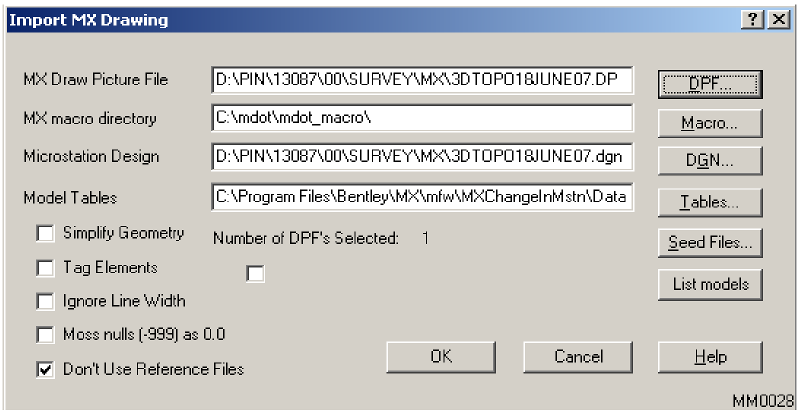


Figure 5-45: Import MX Drawing dialog.

Click **OK.**

Review the .dgn

Review the *.dgn file to verify that it is in the correct level structure for InRoads. A tentative snap on an element in the *.dgn will reflect the level name. Survey levels should start with a **S_** (i.e. S_Ground_Elevation).

Copy 3DTOPOMMDDYY to Survey/MSTA folder

Copy the **3DTOPOMMDDYY.dgn** from the MX folder to the Survey/MSTA folder.

UPDATE .DGN'S UNITS AND ACCURACY

Step One: Open InRoads

Launch InRoads from the desktop icon.

Step Two: Select InRoads Local

Click the *User* drop down list in the *Workspace* area of the dialog and select **InRoads_Local** (Figure 5-133).

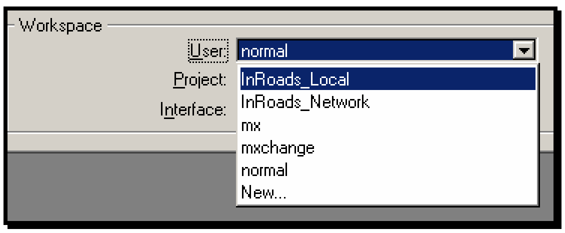


Figure 5-46: User selection set to InRoads_Local.

Step Three: Pick your Project

Click the *Project* drop down list in the *Workspace* area of the dialog and select your project from the list (Figure 5-134).

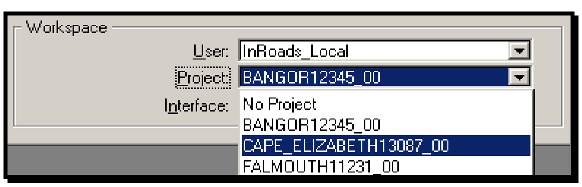


Figure 5-47: Select project from Project pull down.

♬ This will direct the *MicroStation Manager* dialog to look at the locally copied project and be pointing to the correct folder option (i.e. D:\pin\#####\##\Survey\MSTA\) (Figure 5-135).

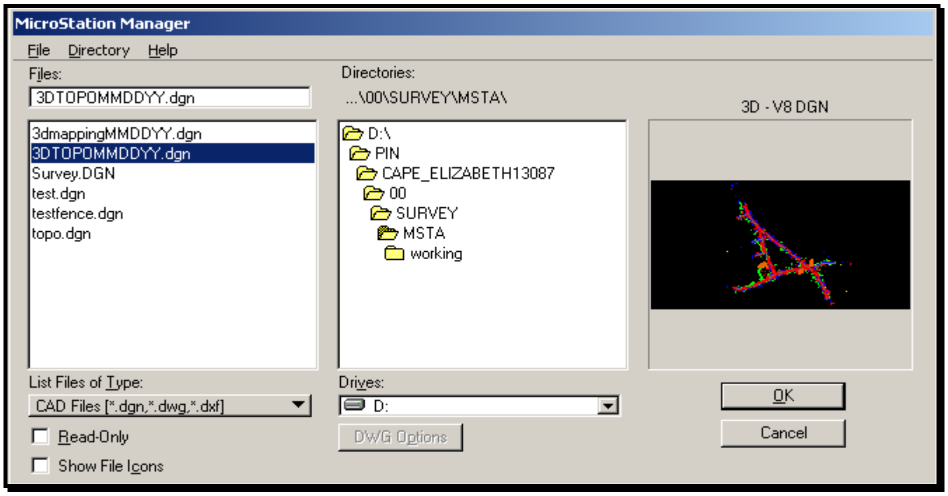


Figure 5-48: Current working directory set by project pick.

Select the **3DTOPOMMDDYY.dgn** file and click **OK**.

Step Four: Warning Message

An *Information* panel will display (Figure 5-136) showing that the 3dTOPOMMDDYY.dgn that was opened was created for the MX Platform. Here you will have the opportunity to correct the units of resolution for the InRoads platform. Click **OK.**

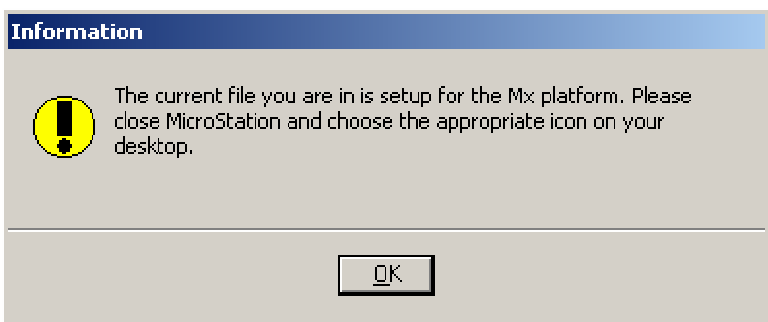


Figure 5-49: Warning message saying that file is setup for MX platform.

Step Five: Run UOR Fix

Part One: Launch Program

Select **InRoads>Update UOR and units** from the MicroStation menu (Figure 5-137).

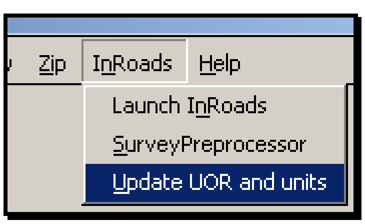


Figure 5-50: Launch UOR fix from MicroStation menu.

Part Two: Click Proceed

A warning dialog (Figure 5-138) will appear giving the user the opportunity to *Quit* or *Proceed* if the user is unsure of the need to convert. ALL Dgn's created with MXChange, will need to be converted to the new InRoads units of resolution. Click **Proceed.**

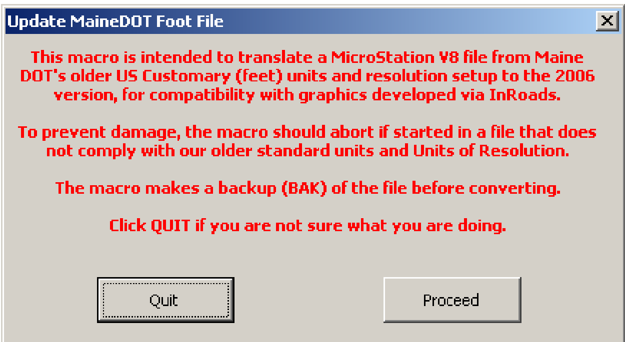


Figure 5-51: Warning message when updating UOR fix.

♬ The *.dgn may display some unusual graphics while the file is being converted.

Once the program has run a *Successful Completion* message will appear (Figure 5-139). Click **OK.**

Figure 5-52: Update successful dialog.

♬ A back up file is automatically created of the original *.dgn prior to being converted. This file is located in the project folder and has the extension of *.bak.

Part Three: Check Results

Check the Global Origin of the DGN. Select **Settings>Global Origin** from the MicroStation menu (Figure 5-140).

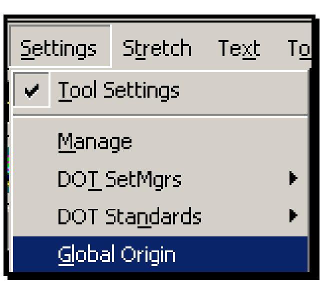


Figure 5-53: Check results of update UOR fix.

Verify that the *Sub Per Master* = **12.0000**. Verify that the *Uor Per Sub* = **25400.05** (Figure 5-141).

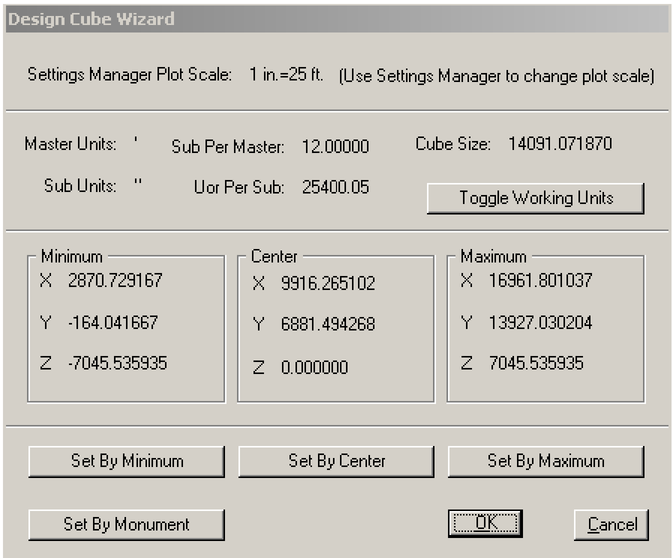


Figure 5-54: Design Cube Wizard dialog.

Click **OK** or **Cancel.**

Part Four: Fit View

Fit the view using the MicroStation view controls and select **File>Save Settings** to hold the graphics in the view.

IMPORT GRAPHICS INTO A SURFACE

Step One: Browse to Surface Tab

Open the **3dTOPOMMDDYY.dgn** for import to surface. Navigate to the *Surface* tab in the InRoads dialog by right-clicking on the tab panels at the bottom of the dialog and select *Surfaces* or use the arrows to select the *Surface* tab(Figure 5-142).

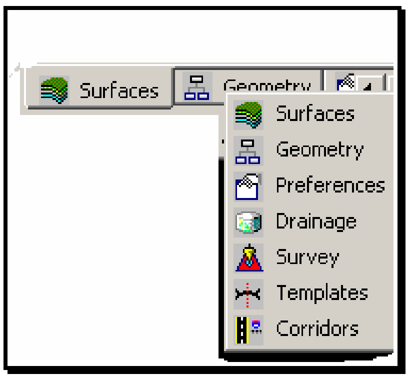


Figure 5-55: Browse to Surface tab.

Step Two: Import Surface Advanced

Select **File>Import Surface Advanced** from the InRoads menu (Figure 5-148).

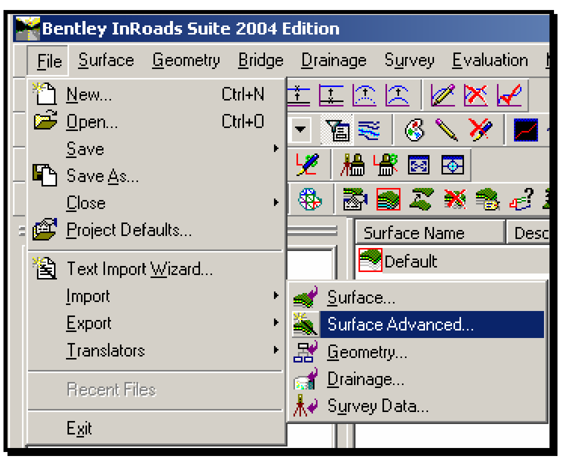


Figure 5-56: Import Surface menu selection.

Step Three: Supply a Name for the Surface

In the Surface text box, type **Ground.**

The *Load From* should be set to **All.**

The *Intercept Surface* should be set to **Default**.

Step Four: Select and Run Rule Set

In the *Rule Set* portion of the dialog box, use the pull down to adjust the *Rule* to **Me DOT Translation** (Figure 5-149).

Click **Apply.**

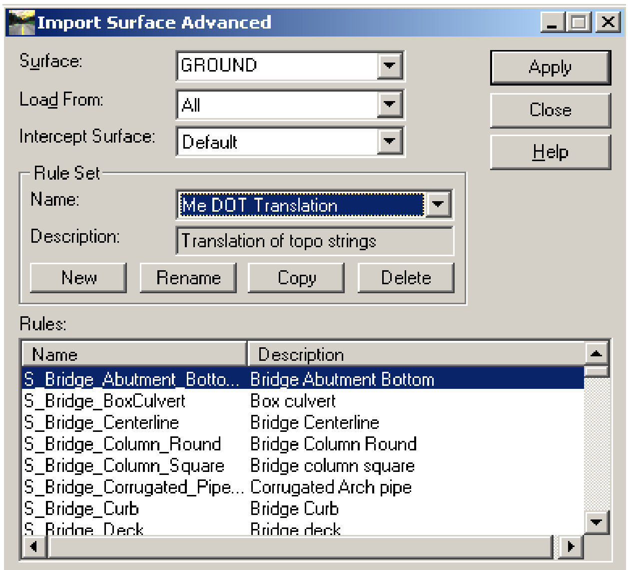


Figure 5-57: Import Surface Advanced dialog.

A message (Figure 5-150) will be displayed at the bottom of the MicroStation application when the process is complete.

Figure 5-58: Successful Completion message.

Click **Close** on the *Import Surface Advanced* dialog.

DEVELOP THE TEXT.REP FILE FOR IMPORT

Step One: Open an Excel Document

On your desktop right click and select **New>Microsoft Excel Worksheet** (Figure 5-59).

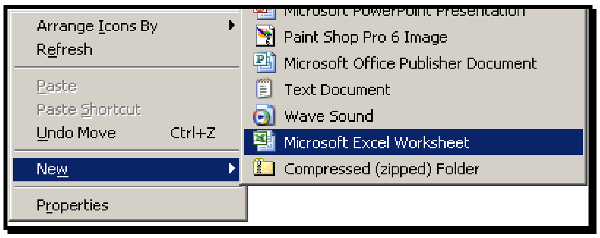


Figure 5-59: Creating a New Excel Worksheet

Open the new document that was placed on your desktop.

Step Two Import External Data

Select **Data>Import External Data>Import Data** from the Microsoft Excel main menu. Browse into the **MX** folder of your project, change the ***Files of Type:*** to **All Files (*.*)** and select the **Text.rep** file (Figure 5-60).

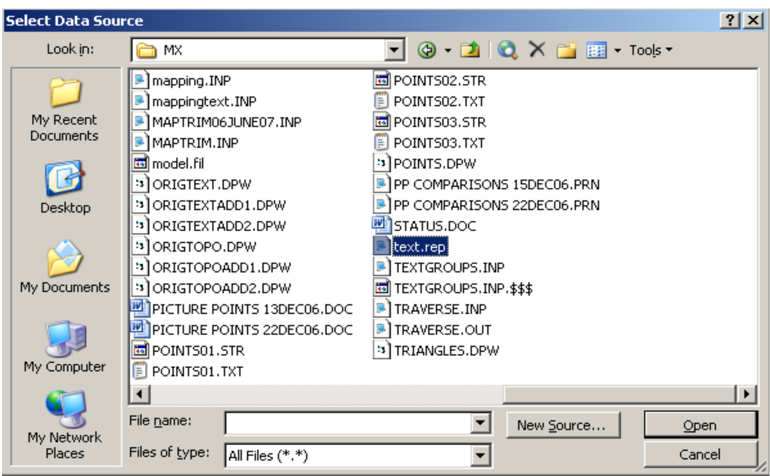


Figure 5-60: Select Data Source

Click **Open**.

Text Import Wizard – Step 1 of 3

Set the dialog box as shown below (Figure 5-61) and click **Next>**.

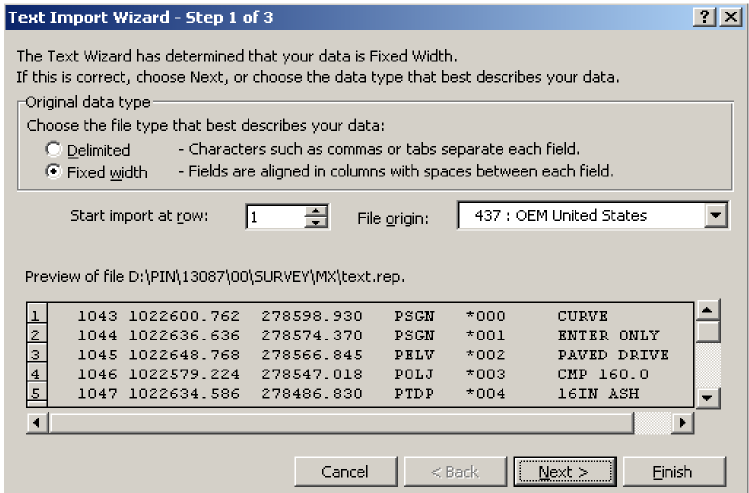


Figure 5-61: Text Import Wizard - Step 1 of 3

Text Import Wizard – Step 2 of 3

Verify that the last column contains all of the text within it. If a break line displays dividing the text, double click the break line to delete it.

Click **Next>** (Figure 5-62).

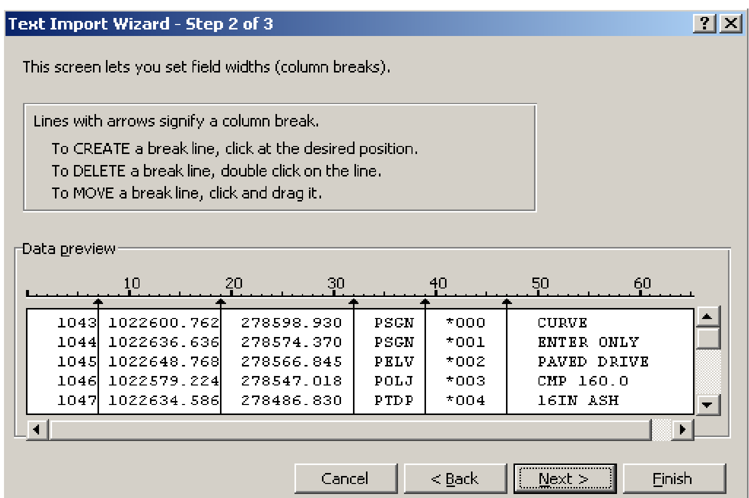


Figure 5-62: Text Import Wizard - Step 2 of 3

Text Import Wizard – Step 3 of 3

Holding your shift key highlight all of the columns and change the **Column data format** to **Text** and select **Finish** (Figure 5-63).

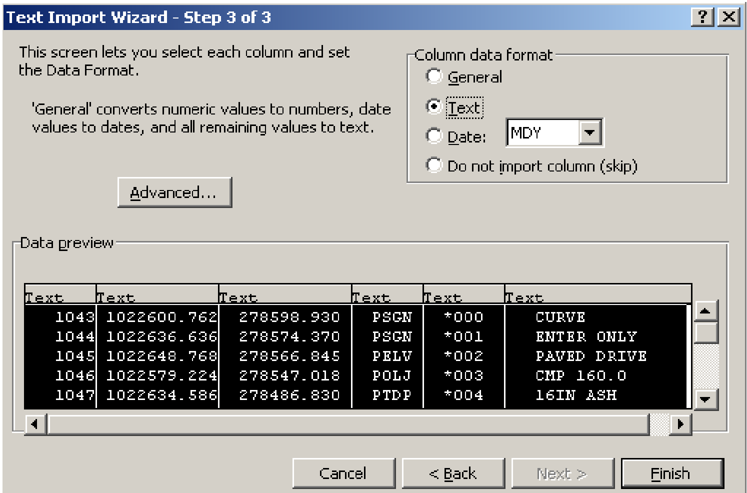


Figure 5-63: Text Import Wizard - Step 3 of 3

Select **OK** to the next dialog for the default location (Figure 5-64).

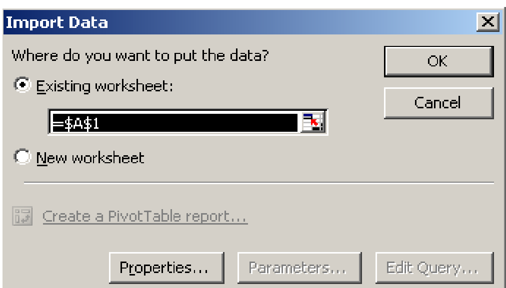


Figure 5-64: Import Data

Step Three: Concatenate Columns

Type the following formula in the **G1** cell: **=Concatenate(D1,A1)** and tab out of the cell. The cell should now represent the combination value of the two other cells (Figure 5-65).

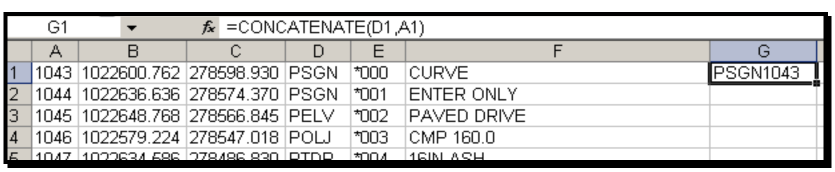


Figure 5-65: Concatenate Cells

With your mouse, left click and hold the bottom right edge of the **G1** cell and drag it to the last field of the file to populate the rest of the **G** column (Figure 5-66).

G1 =CONCATENATE(D1,A1)

	A	B	C	D	E	F	G
1	1043	1022600.762	278598.930	PSGN	*000	CURVE	PSGN1043
2	1044	1022636.636	278574.370	PSGN	*001	ENTER ONLY	PSGN1044
3	1045	1022648.768	278566.845	PELV	*002	PAVED DRIVE	PELV1045
4	1046	1022579.224	278547.018	POLJ	*003	CMP 160.0	POLJ1046
5	1047	1022634.586	278486.830	PTDP	*004	16IN ASH	PTDP1047
6	1050	1022703.932	278440.449	SND	*005	TOWN DIRECTORY	SND1050
7	1051	1022743.802	278404.530	POLJ	*006	160.02	POLJ1051
8	1053	1022780.483	278346.127	PELV	*007	PAVED DRIVE	PELV1053
9	1054	1022818.989	278342.279	PSGN	*008	NO PARKING / BIKE LANE	PSGN1054
10	1055	1022854.764	278309.793	PSGN	*009	RTE. 77	PSGN1055
11	1056	1022894.047	278343.291	PSGN	*00A	SPEED 35MPH	PSGN1056
12	1057	1022857.948	278409.633	PRWM	*00B	6IN X 6IN GRAN. H MON	PRWM1057
13	1058	1022927.276	278343.579	SND	*00C	MOBIL	SND1058
14	1060	1022973.383	278303.975	PELV	*00D	PAVED DRIVE	PELV1060
15	1061	1023000.738	278348.299	PSIL	*00E	1.5 STORY CONC. BLOCK: JONES	PSIL1061
16	1062	1022987.952	278324.752	PELV	*00F	UG TANK	PELV1062
17	1064	1022917.829	278231.144	PSGN	*00G	COMMERCIAL	PSGN1064
18	1065	1022926.024	278249.794	PSGN	*00H	NO PARK / BIKE LANE	PSGN1065
19	1066	1022874.690	278265.620	SND	*00I	CUMBERLAND FARMS	SND1066

Figure 5-66: Populating the rest of the Cells

Step Four: Save As Text.txt

Select **File>Save As** from the Microsoft Excel main menu. Browse to your project pin MSTA folder, change the *Save as type:* to **Text (tab delimited) (*.txt)** and give a *File name:* of **Text.txt**. Click **Save** (Figure 5-67).

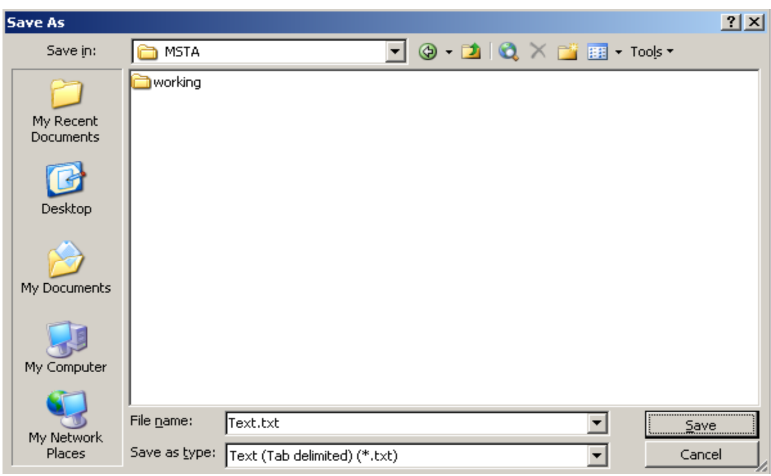


Figure 5-67: Microsoft Excel Save As

You will be prompted by a couple of dialogs after clicking Save. Click the **OK** and **Yes** and close the Excel document.

IMPORTING THE TEXT.TXT TO SURFACE

Step One: Text Import Wizard

Select **File>Text Import Wizard** from the InRoads main menu. Set the *Wizard Name* to **MX_Text** and the *Data Type:* to **Surface**. At the bottom of the dialog use the browser button (…) for *File Name:* to select the **Text.txt** file you created earlier (Figure 5-68).

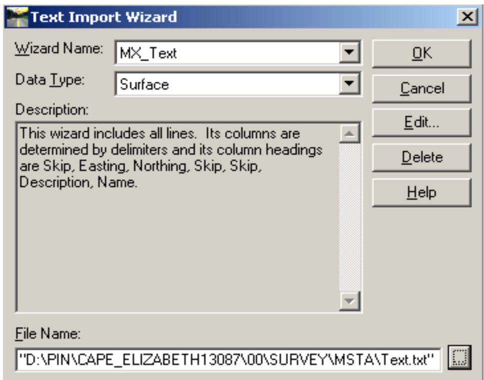


Figure 5-68: Text Import Wizard

Click **OK**.

Step Two: Surface Options

Within the *Surface Options* dialog, type the word **Text** for the *Surface:* name, in the *Features* area type the word **Text** in the *Seed Name:*, set the *Feature Style:* to **S_MX_Text**, set the *Point Type:* to **Random** and place a check mark in the *Exclude from Triangulation* check box (Figure 5-69).

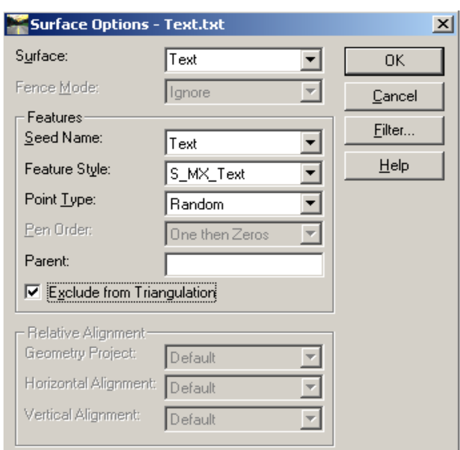


Figure 5-69: Surface Options

Click **OK**. This will generate a new surface named Text with all of the point descriptions of the features.

COMBINING GROUND AND TEXT SURFACES

Step One: Locate Features Lock

With the Ground and Text Surfaces loaded you will need to set the lock for **Locate Features** (Figure 5-70).

Figure 5-70: Locate Features Lock

Toggle the **Locate Graphics** lock to **Locate Features**.

Step Two: Drape Surface

Select **Surface>Design Surface>Drape Surface** from the InRoads main menu (Figure 5-71). Set the *Destination Surface:* to **Ground**, in the *Features* area of the dialog, set the *Surface:* to **Text** and right click in the list below and **Select All**. Place a check in the *Drape Vertices Only* check box.

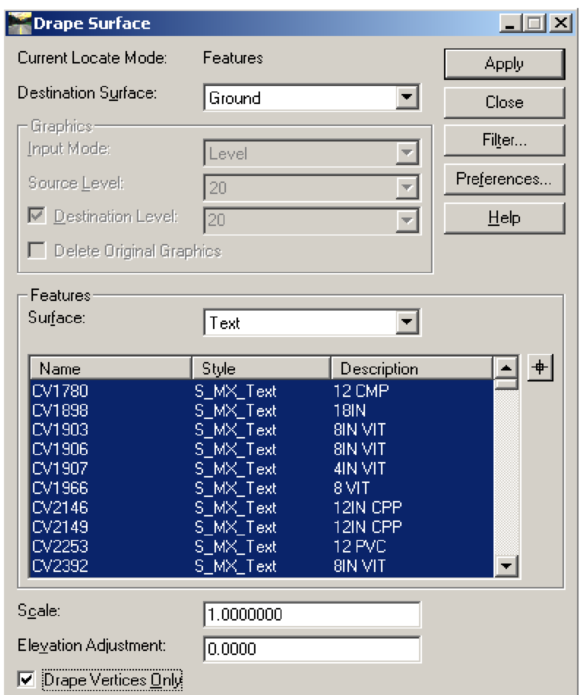


Figure 5-71: Drape Surface

Click **Apply** and wait for the process to end and **Close** the dialog.

Save the Ground.dtm file. You don't need to save the text surface because it is now part of the Ground.dtm with elevations.

- ✓ ***Refer to the Survey Editing Procedures starting on page 5-65 to finalize the Ground.dtm and Triangle cleanup procedure.***

SURVEY DATA FROM TRIMBLE DATA COLLECTORS

IMPORT TRIMBLE DC FILES

This portion of the manual will be written at a later date.

REMOVE FIELD DELETED POINTS FROM .FWD

Overview

Points that are deleted in the data collector in the field are recorded and tagged by Trimble. These points are tagged with a note of ***"Deleted – the time – and the date***." This note is carried through to InRoads, however InRoads still draws the point as if it were a valid point of topography. This issue will be resolved in a later release of the InRoads software. For now these points must be manually removed from the InRoads Survey Fieldbook.

Step One: Open Fieldbook

Open the survey Fieldbook in InRoads (Figure 5-72).

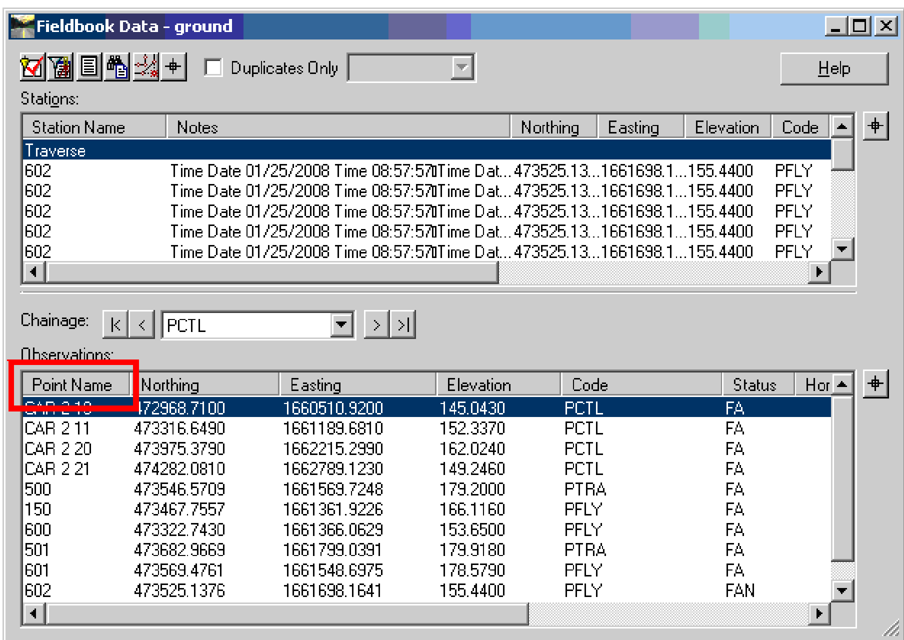


Figure 5-72: Fieldbook displaying the Point Name column.

Step Two: Add Column Heading

Right click on the *Point Name* column header in the lower portion of the Fieldbook (Figure 5-72).

This will bring up the *Fieldbook Custom View* dialog (Figure 5-73). Select **Notes** from the left-hand "*Available*" side and click **Add.**

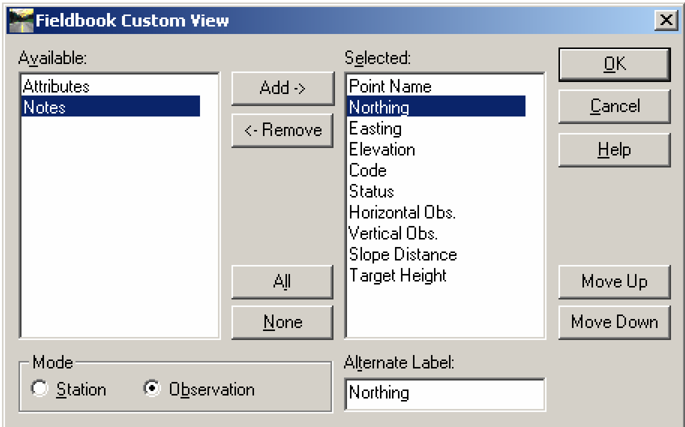


Figure 5-73: The Fieldbook Custom View dialog.

It will be added to the bottom of the list on the "*Selected*" side (Figure 5-74).

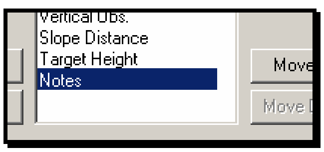


Figure 5-74: Notes field at the bottom of the Selected list of headings.

Use the **Move Up** button until **Notes** resides beneath **Point Name**.

♬ While the placement isn't critical to the function, it is convenient to have it's placement in the fieldbook in a location where the user will not have to use the horizontal scroll bar to read the Notes.

Click **OK.**

Delete Field Deleted Points

Manually scroll down through each set-up and remove any point marked as "Deleted" by the field crew (Figure 5-75). Right click the point and select **Delete.** Save the field book when done.

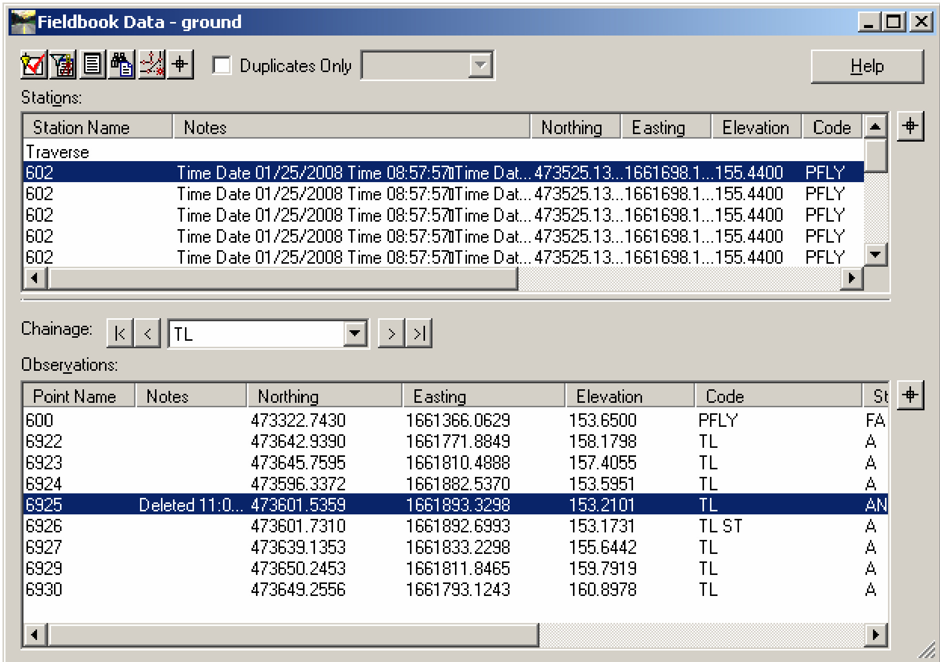


Figure 5-75: Locate and delete points marked as Deleted in the Notes column.

CREATE ORIGINAL GROUND SURVEY DELIVERABLES

OVERVIEW

Standard Naming

The department has a standard naming convention for all drawing files. The main reason for this is that many of our standard *plan view* type drawings for the department have the existing topography information referenced into them by default. This default reference only works when the files are named correctly and when they exist in the correct location.

Please follow procedures outlined below to adhere to these standards. Click this link for a complete list of MDOT Standard File Names or visit our website at www.maine.gov/mdot/cadd-support/microstation/std_filename.php.

Preserving Original Files

The Survey Folder is where the "Original" Survey files are stored. The folder is Read-Only to everyone except for the Survey Editors. MicroStation Survey clean up will be done in the **Topo** folder, unless network speed is an issue, and at which point, it can be copied locally.

✓ ***Refer to page 13-5 for documentation on working with files locally.***

Initial Topography Deliverables

InRoads Survey Editing

After an initial survey is completed, the Survey Editors will do the necessary InRoads editing. This editing will be similar to procedures done previously in MX.

Create MicroStation Deliverables

Create the following drawings and place them in the y:\pin\####\##\Survey\Msta folder.

Follow the InRoads procedures on writing the data into the standard MicroStation files.

ⓘ ***Please be positive that you have the latest MicroStation/InRoads configuration that utilizes the most up-to-date MicroStation seed files and InRoads preference file (.xin) by running the MDOT Update InRoads MicroStation utility from your desktop icon. Copy the .xin from the !InRoadsconf\standards\InRoadsSTD folder into your project's InRoadsSTD folder.***

✓ ***Refer to page 3-10 for more information on running the Update Utility for MicroStation and InRoads.***

3DtopoMMDDYY.dgn is the 3D topography file that has only been InRoads edited.

♫ Please use a 6-digit date without separators. (i.e. 3Dtopo092107.dgn)

3DmappingMMDDYY.dgn is the 3D Aerial Mapping file that has only been InRoads edited.

- Please use a 6-digit date without separators. (i.e. 3Dmapping092107.dgn)

Origtext.dgn is the raw text that describes the topographical features.

- The drawing now resides at the correct elevation and level of the feature the text is describing.

Points.dgn is all of the points for the topographical features.

- The drawing now resides at the correct elevation and level of the feature. It will be regenerated and overwritten with all additional surveys.

Contours.dgn is the 3D contour surface that includes both the ground survey and Aerial Mapping.

- It will be regenerated and overwritten with all additional surveys.

Triangles.dgn is the 3D triangles surface that includes both the ground survey and Aerial Mapping.

- It will be regenerated and overwritten with all additional surveys.

OrigWetlands.dgn is the 3D wetland drawing. It includes all wetland strings identified by a Biologist and flag text associated with them.

Ground.dtm - Create a surface from the Survey Features called **Ground.** This is should always be the latest and greatest surface that is used to design from.

- It will be a combination of all updates, whether mapping or additional ground survey.

Ground_only – Create this surface only if the project will include Aerial Mapping. This surface will be overwritten if and when additional topography is gathered. The surface will be the latest, most up to date surface of all ground survey collection data.

Mapping_only – Create this surface for all mapping projects. This surface will only contain the aerial mapping data. This surface will be overwritten only in the event additional aerial mapping is gathered.

Update Status Report

Add notes to the **Status.doc** file located in your PIN's Survey\MSTA folder.

Communication

At this point, send your correspondence to the proper contact in the desired MaineDOT Program division (i.e. Highway Program, Bridge Program, etc) to notify them that the survey files are available, however that they need to be cleaned-up in MicroStation.

Create Zip Files for A Design Consultant (If Necessary)

If this project is going to be done by a design consultant, create a zip file and place it in the Survey\Consultant folder. Use the PIN number and Town Name in the filename (i.e. 8467Topsham.zip).

Breakdown of files sent to a consultant

InRoads Files:

Ground.dtm – Complete ground surface with all updates.

Ground.fwd – Combined InRoads *Fieldbook* containing all original and updated data.

MicroStation files:

Topo.dgn is the features collected from Survey (cleaned-up). This file, if cleaned-up, is located in the **topo** folder of the PIN number.

Text.dgn is the text associated with Survey data (cleaned-up). This file, if cleaned-up, is located in the **topo** folder of the PIN number.

Points.dgn is the field Survey point numbers. This file resides in the Survey\MSTA folder.

Wetlands.dgn is the name of the cleaned up version of the wetlands drawing. It is located in the topo folder. If the file has not been cleaned up, the file will reside in the Survey/MSTA folder and is called **OrigWetlands.dgn.**

Contours.dgn is the 3D contours drawing. This would also include Aerial Mapping Contours. The file resides in the Survey\MSTA folder.

3DtopoMMDDYY.dgn is the 3D MicroStation design file (.dgn) of the Survey. This file resides in the Survey\MSTA folder. Select the file with the most recent date in the file name. It will include any additional topography if any was taken.

3DMappingMMDDYY.dgn is the 3D MicroStation design file of the Aerial Mapping (only on Photogrammetric Mapping projects). This file resides in the Survey\MSTA folder. Select the file with the most recent date in the file name. It will include any additional topography if any was taken.

Origtext.dgn is the 3D MicroStation design file of the text associated with ground survey data and Aerial Mapping. This file resides in the Survey\MSTA folder.

- If any additional topography was taken prior to distribution to a consultant, there may be **origtextadd#.dgn.** Include these files also.

Triangles.dgn is the 3D triangulation file for the project. This would also include Aerial Mapping Triangles. This file resides in the Survey\MSTA folder.

ⓘ ***When a design consultant requests survey information for a project, the 3DtopoMMDDYY and the 3DmappingMMDDYY files with the most recent dates are the files containing all the latest 3D topographical data. It will not be necessary to send any of the Origtopoadd#.dgn files.***

Communication

At this point, send your correspondence to the proper contact in the desired MAINEDOT Program division (i.e. Highway Program, Bridge Program, etc) to notify them that the zip file is available.

SCALE FACTOR FOR DELIVERABLES

Overview

The scale factor of deliverables is set to 300 by default which equals 25' scale. This is the absolute scale factor based on 25' to the inch. The factor of 300 is a result of 25 x 12 (12 inches per foot). If the desired scale for the deliverables is 50'/inch, the scale factor will need to be set to 600 absolute scale.

♬ This step is only necessary if the scale of deliverables were requested to be something other than 25 scale.

Adjust Scale Factor (if necessary)

Select **Tools>Survey Options** from the InRoads main menu (Figure 5-76).

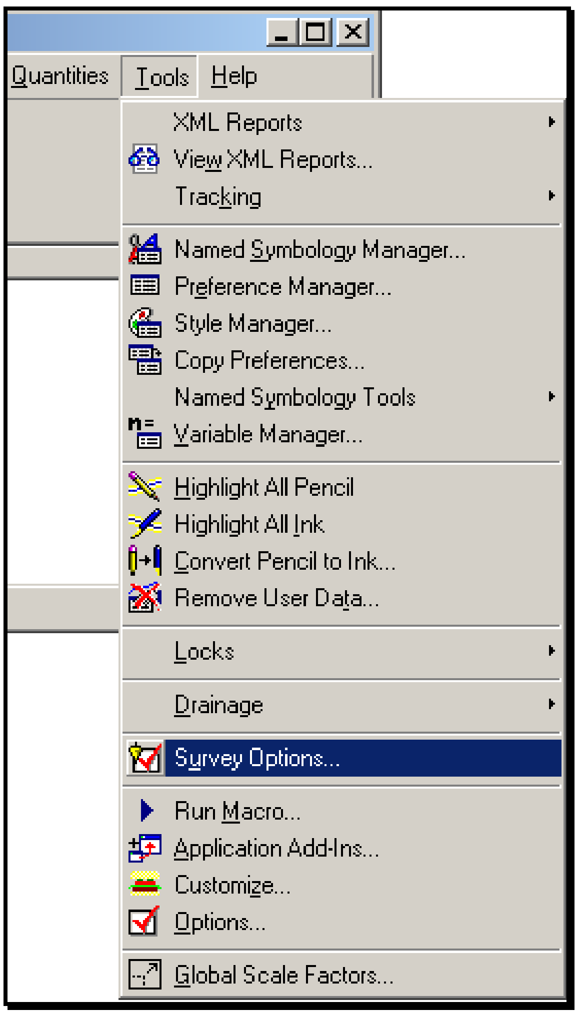


Figure 5-76: Select Tools>Survey Options to adjust scale of survey data

The *Survey Options* dialog's *General* tab is the location of the scale factor for survey data when it's written to graphics (Figure 5-77). If the desired scale is 1" = 50' or 600 absolute scale, adjust the *Cell Scale, Text Scale* and *Line Scale* to 600. Make the adjustments, only if this is going to be a 50 scale drawing and select **OK.**

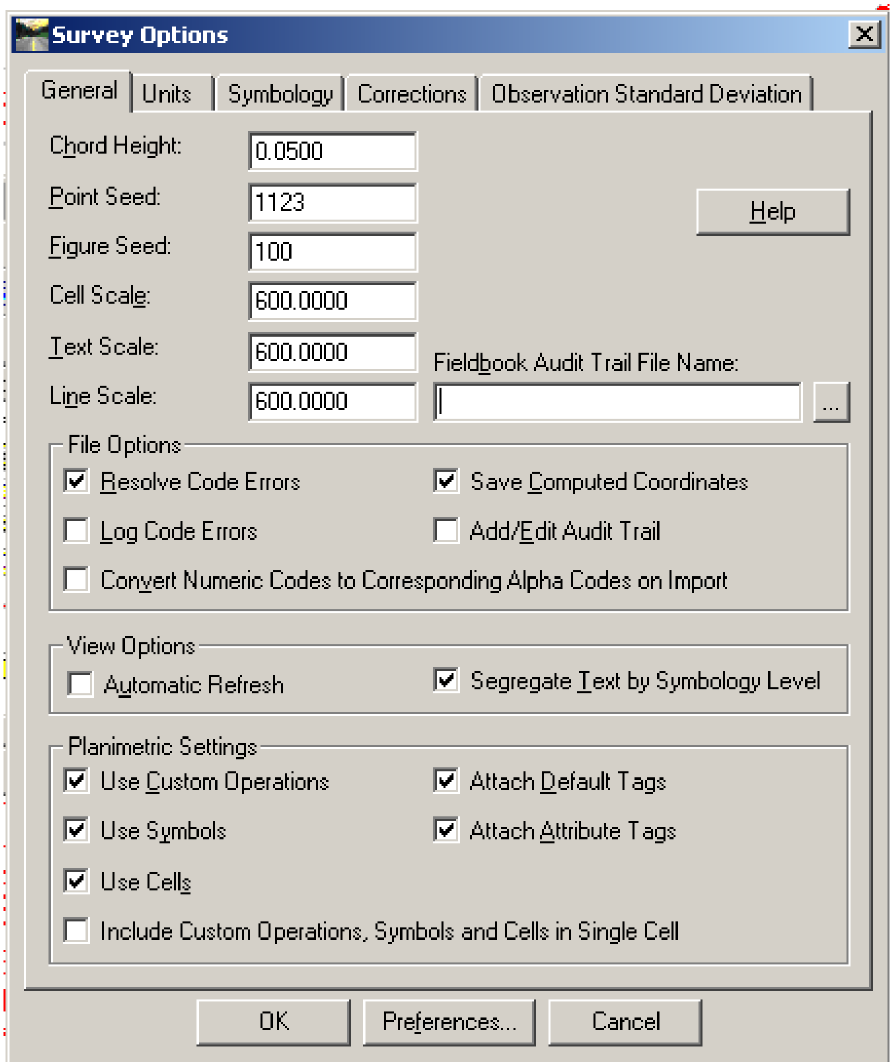


Figure 5-77: Survey Options dialog

CREATE THE GROUND.DTM SURFACE

ⓘ ***If this project is going to be combined with aerial mapping survey, users should use the following instructions to create a Ground_only.dtm surface. Supply Ground_only in the following dialogs. This is so that the perimeter of the Ground_only can be used to trim a hole in the mapping data. The Ground.dtm will be a combination of the merged surfaces.***

Overview

Create a *Surface* model called **Ground** based on the existing features. This surface will always be the most up to date surface containing the existing ground features. As *TopoAdds* are processed, the **Ground.dtm** will be re-created to display the latest topography. Designers will use this *Surface* to design from.

♫ It is required that the **Ground.fwd** *Fieldbook* is loaded in order to create the **Ground.dtm.**

Step One: Survey Data to Surface

Select **Survey>Survey Data to Surface** from the InRoads main menu (Figure 5-78).

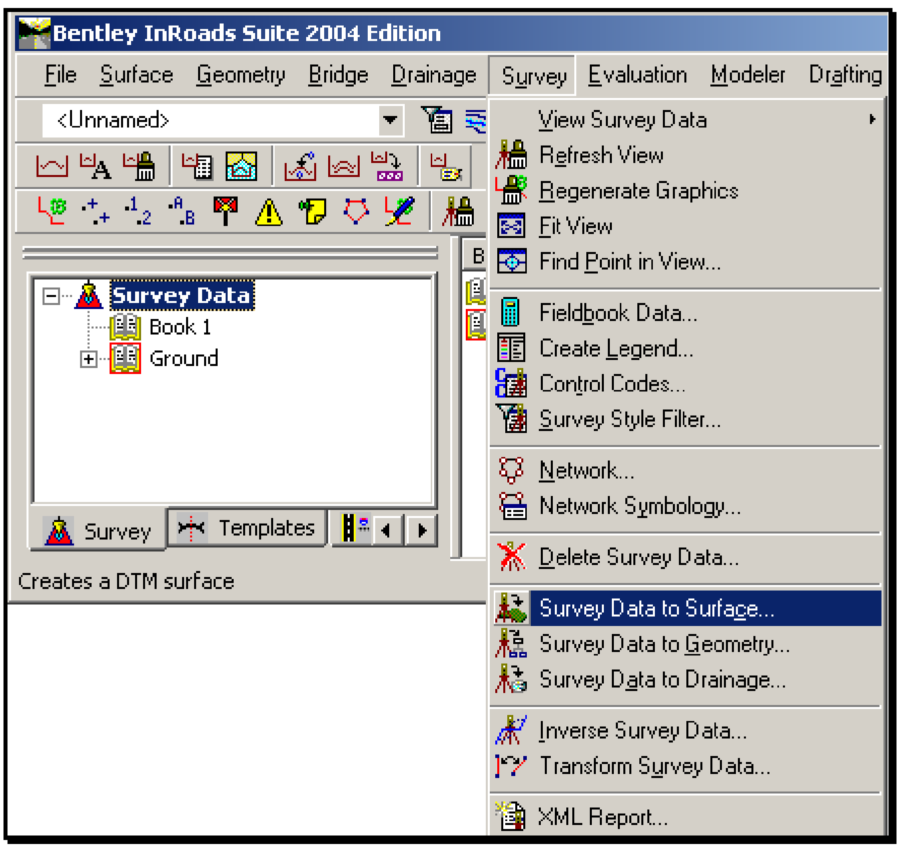


Figure 5-78: Survey Data to Surface

Step Two: Name the Surface Ground

Enter **Ground** in the *Surface Name* field of the *Survey Data to Surface* dialog (Figure 5-79). This is the standard naming convention for the surface. Change the *Description* to **Use Attributes.** All other settings in the dialog are correct by default. Click **OK.**

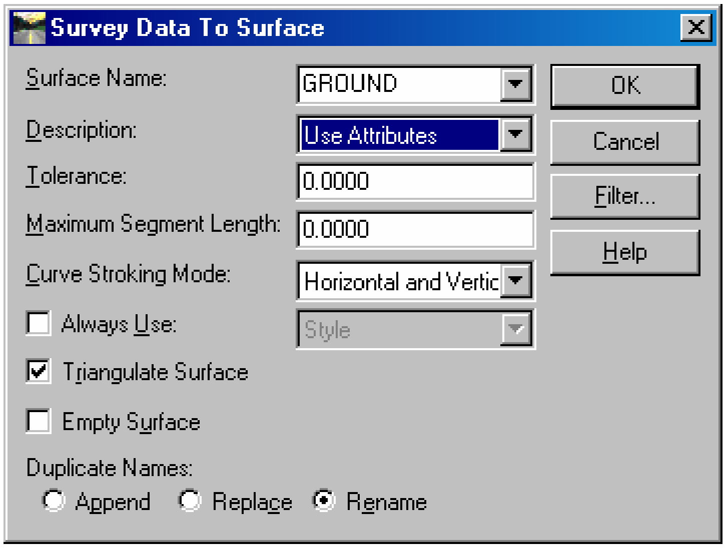


Figure 5-79: Enter GROUND as the Surface Name

Step Three: Triangulate Surface

When the *Triangulate Surface* dialog opens (Figure 5-80), verify that **Ground** is the surface selected. Add a *Maximum Length* of 100.00 to limit the length of a triangle leg. Click **Apply.** Select **Close** to dismiss the dialog.

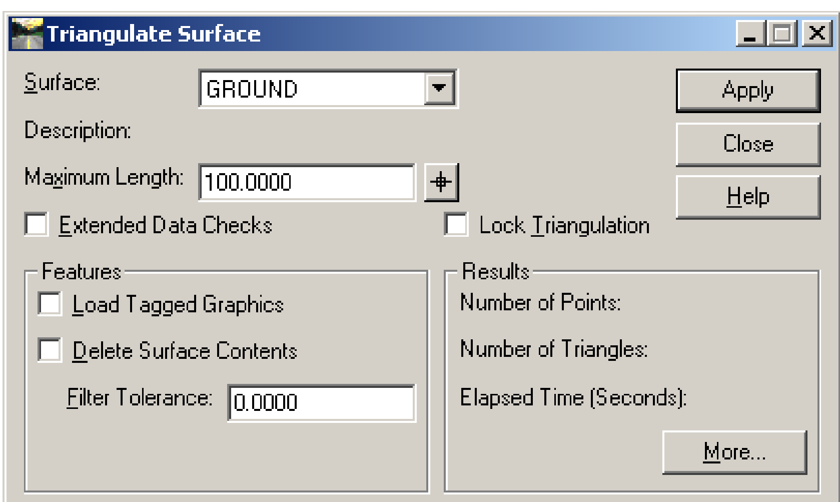


Figure 5-80: Click Apply to triangulate the Ground surface

Step Four: Add Style to Ground Surface

Navigate to the **Surface** tab in InRoads. Right click the **Ground** surface and select **Properties…** (Figure 5-81).

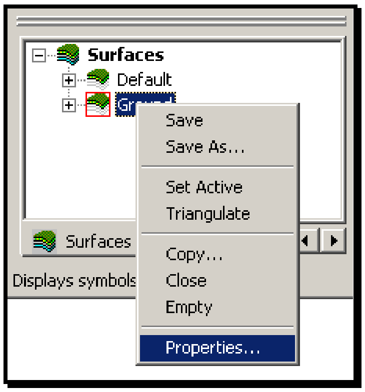


Figure 5-81: Edit the Properties of the Ground surface

Select the *Advanced* tab from the *Surface Properties* dialog (Figure 5-82). Set both the *Cross Sections Symbology* and the *Profiles Symbology* to **S_Roadway_Centerline.** Click **Apply** and then **Close.**

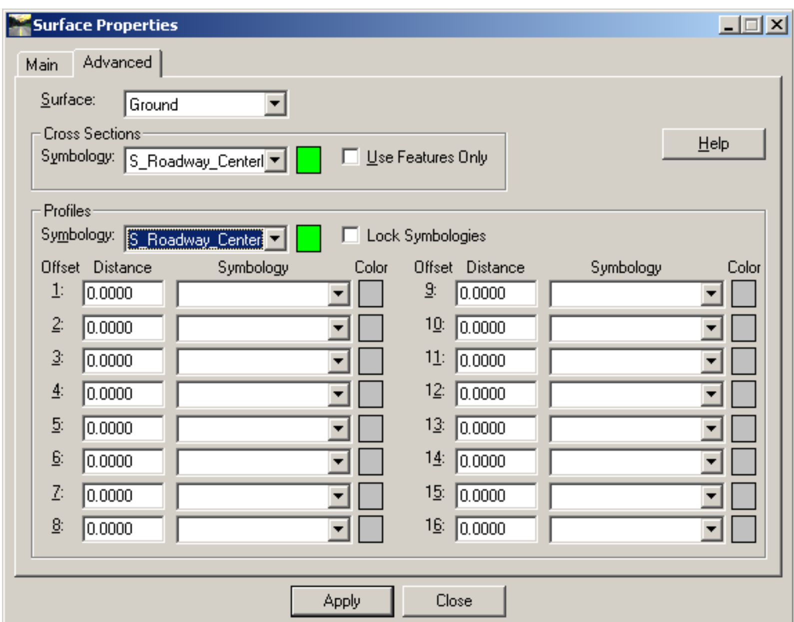


Figure 5-82: The advanced tab in the Surface Properties dialog

Step Five: Save the Surface

Select the **Surface** tab in InRoads. Right click the **Ground** surface and select **Save.** The **Save As** dialog opens and defaults to the user's SURVEY\MSTA directory. Select **Save** and then select **Cancel.**

CREATE THE TRIANGLES.DGN FILE

ⓘ ***If this project is going to be combined with aerial mapping survey, users will re-triangulate the combined surfaces, but at this time, triangulate the Ground_only survey surface and cleanup the triangles so that the perimeter of the ground can be used to trim a hole in the mapping data.***

Overview

Sometimes there may be an area in the ground survey inside of the *Perimeter* that doesn't completely connect such as a project with an intersection. In a case like this, the triangles that get connected may not represent the ground surface. If triangles are deleted in this area, an *Interior* must be created (similar to the perimeter or *Exterior)* to prevent triangles from regenerating in this area of the surface. On an Aerial Mapping project, the mapping data can be used to fill in these *Interior* gaps in ground survey.

Step One: Make a Triangles File

Select **File**>**Make Sheetz** from MicroStation's main menu. Select a **No Prefix** drawing (Figure 5-83). Select **OK.**

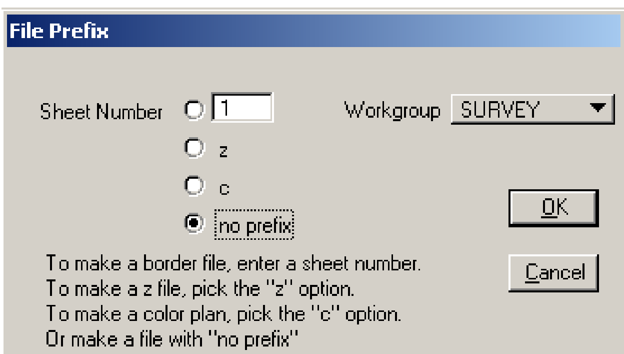


Figure 5-83: Make Sheetz dialog with No Prefix selected

- Users may have to move the InRoads dialog to display the *Make Sheetz* File Prefix dialog.
- The default *Workgroup* should be set to Survey for all Survey users. If not, contact CADD Support.

Step Two: Select Triangles

In the *Create File of Type…* dialog, select **Triangles** and click **OK** (Figure 5-84).

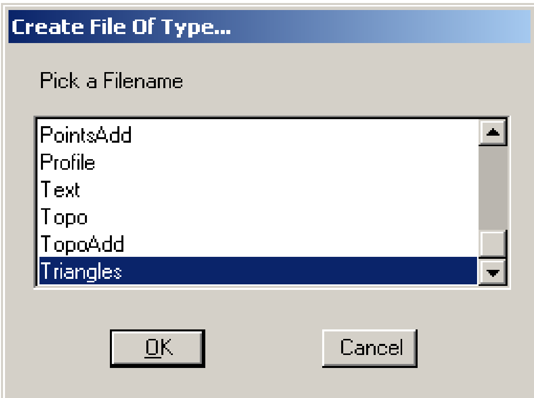


Figure 5-84: Create File of Type dialog with Triangles selected

In the *Make File* dialog (Figure 5-85), do not enter a date in this file name, simply click **OK.**

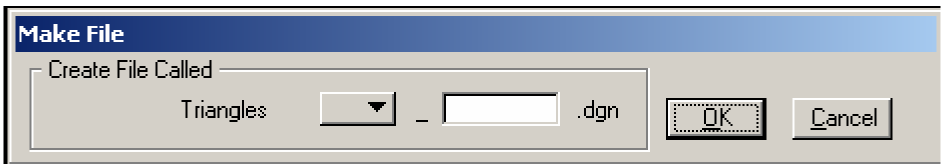


Figure 5-85: Make File dialog - Click OK

The user is brought back to the *File Prefix* dialog. Click **Cancel** to stop making sheets.

ⓘ ***This creates the new drawing using the correct seed file and opens the newly created file.***

Step Three: View Surface Triangles

Part One: View the Triangles

Select **Surface>View Surface>Triangles…** from the InRoads main menu (Figure 5-86).

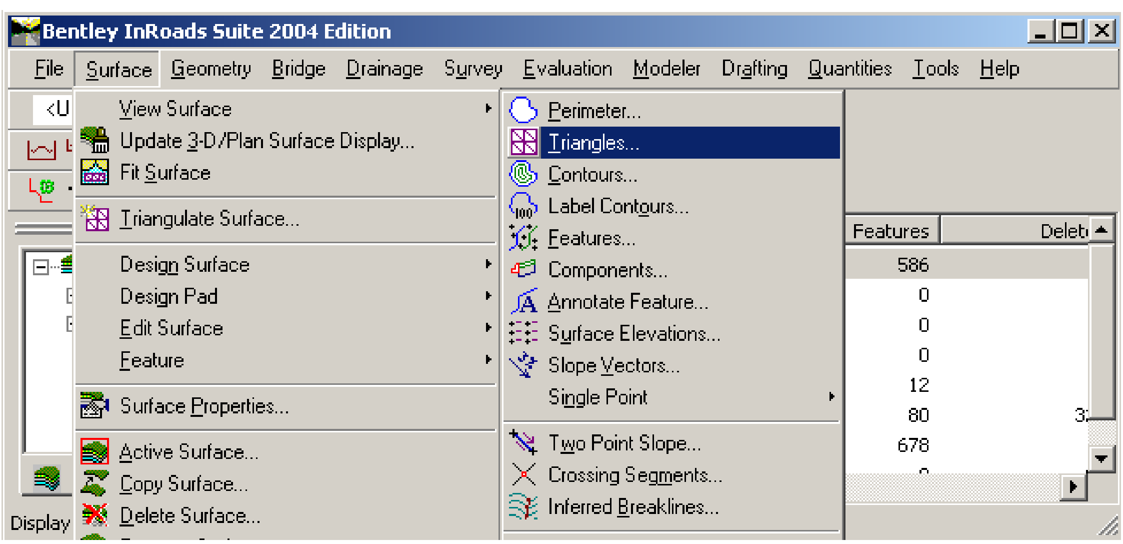


Figure 5-86: Select Surface>View Surface>Triangles from the InRoads main menu

Verify that the *Surface* **Ground** is selected. Click **Apply** and **Close** the *View Triangles* dialog (Figure 5-87).

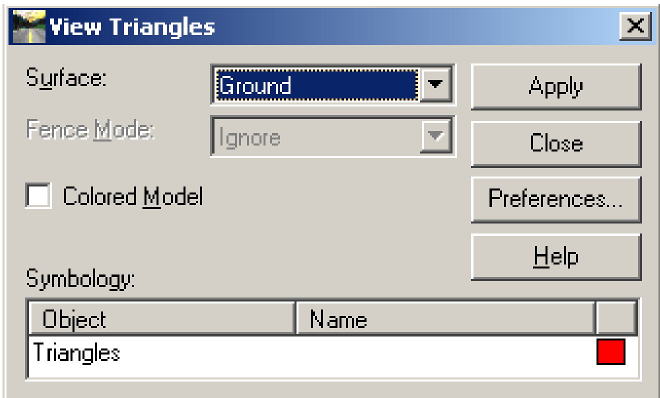


Figure 5-87: View Triangles of the Ground Surface

♬ If triangle cleanup is necessary, leave this box open to refresh the triangles occasionally. The triangles do not immediately display revisions.

Part Two: View Perimeter

Select **Surface>View Surface> Perimeter** from the InRoads menu. In the *View Perimeter* dialog box (Figure 5-88), verify that the *Surface* **Ground** is selected. Click **Apply.** Select **Close** to dismiss the dialog.

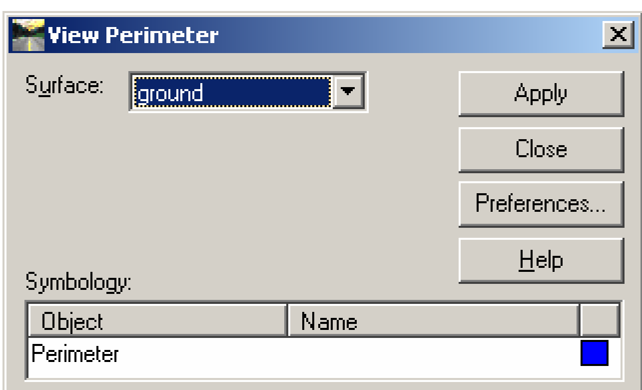


Figure 5-88: View Perimeter dialog with the Ground Surface selected

✓ ***Refer to page 5-176 for instructions on customizing a Perimeter if the project has two separate locations of topography separated by a large distance. It will be necessary to create to perimeters and connect them for triangulation.***

Step Four: Clean-up Exterior Triangles

Fit View to display the *Triangles.* The *Triangles* will need some clean-up. Select **Surface>Edit Surface>Delete Triangles** from the InRoads main menu (Figure 5-89).

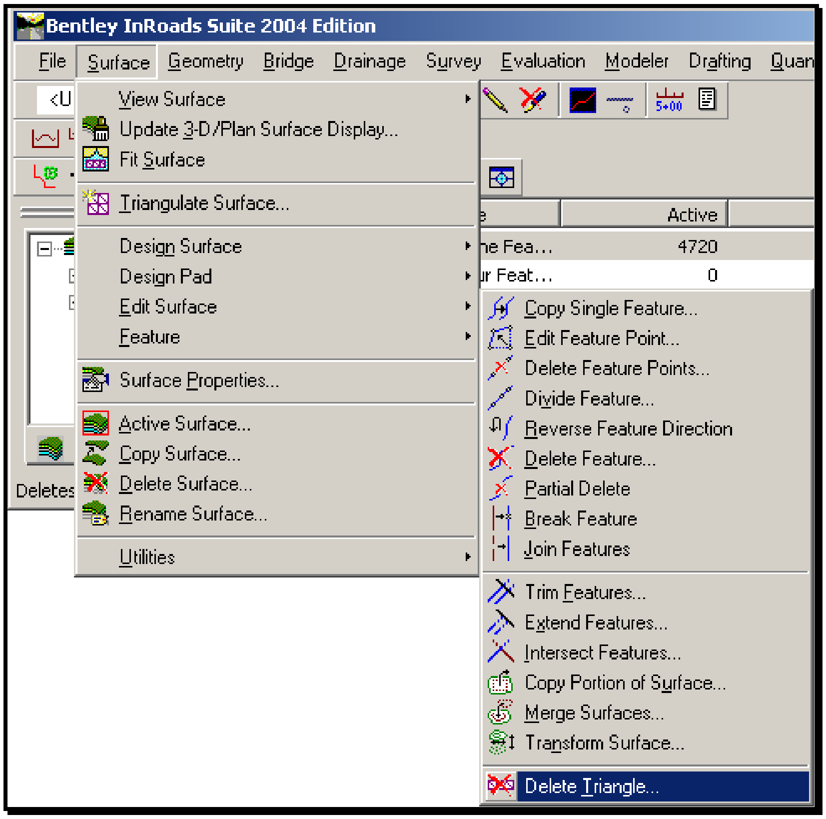


Figure 5-89: Select Surface>Edit Surface>Delete Triangles

In the *Delete Triangle* dialog, verify that the *Surface* **Ground** is *Active.* Click **Apply** and remove the extra triangles that aren't relevant by two *data* clicks (left mouse button) across triangles that need to be deleted. The tool is very similar to drawing a line across the triangles to be deleted. Following the prompts, click another left mouse button to *Apply*.

♫ The triangles do not disappear interactively.

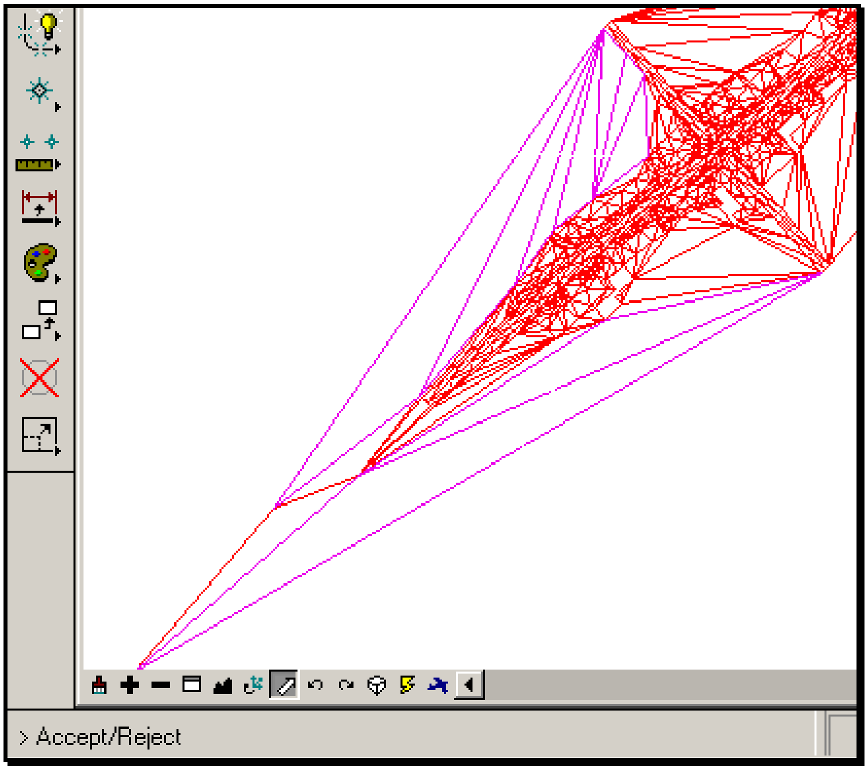


Figure 5-90: Triangles highlighted and prompts requesting action

To view your progress in deleting triangles, there are a couple of methods that can be used. The *View Triangles* dialog box, if left open, can be used to refresh the triangles by clicking **Apply** again (Figure 5-87). The recommended method is described below.

The user may also update the display by selecting **Surface>Update 3-D/Plan Surface Display…** from the InRoads main menu (Figure 5-91).

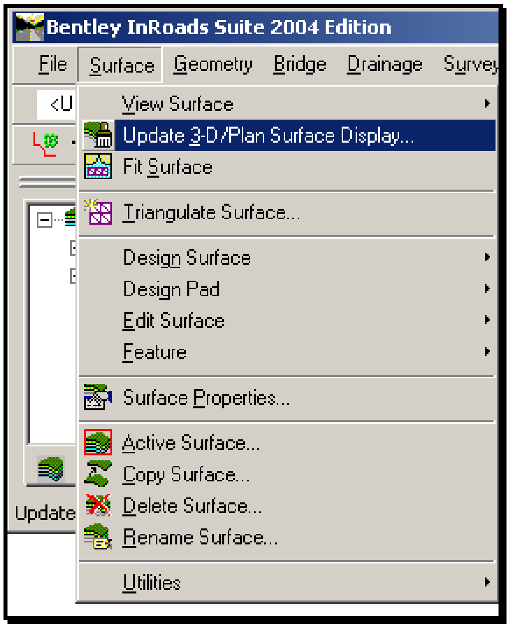


Figure 5-91: Update 3-D/Plan Surface Display in InRoads main menu

Select the **Ground** surface and place a check mark in the *Perimeter* and *Triangles* boxes (Figure 5-92). Click **Apply** and the current *Triangles* and the new *Perimeter* will be re-displayed in the view. Minimize the dialog and continue cleaning-up the triangles. Return to it when you want to refresh them again.

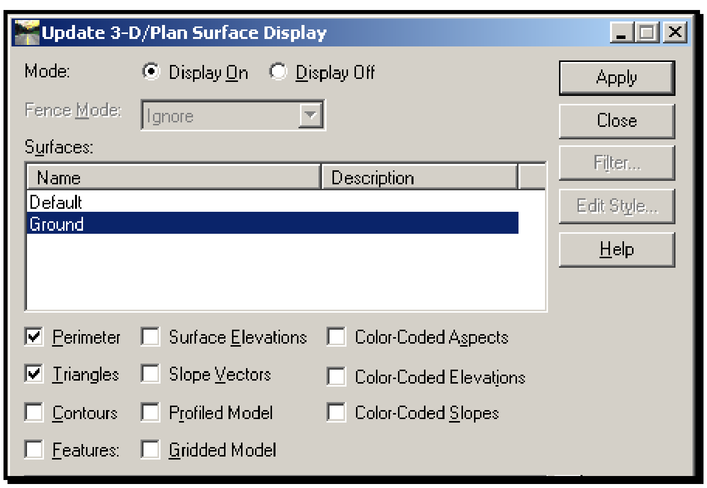


Figure 5-92: Update the plan display to view new triangles and perimeter

♬ If at any time you realize that you made an error deleting the triangles, you can right click the **Ground** surface and select **Triangulate. Warning:** Doing this will remove all the previous edits.

Step Five: Save the Ground

When the triangles have been edited to your satisfaction, right click on the **GROUND** surface in *InRoads Explorer* and select **Save.**

- If you made a mistake along the way, right click the **Ground** surface and select **Empty.** Re-create the surface by selecting **Survey>Survey Data to Surface…**

Step Six: Create an Exterior Boundary

Part One: View New Perimeter

Select **Surface>View Surface> Perimeter** from the InRoads menu. In the *View Perimeter* dialog box (Figure 5-88), verify that the *Surface* **Ground** is selected. Click **Apply.** Select **Close** to dismiss the dialog.

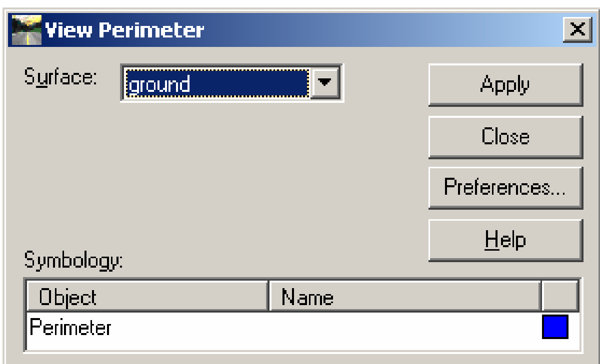


Figure 5-93: View Perimeter dialog with the Ground Surface selected

Part Two: Import Perimeter

To maintain the new perimeter, create an *Exterior Boundary* based on the *Perimeter.* Select **File>Import>Surface…** from the InRoads main menu (Figure 5-94).

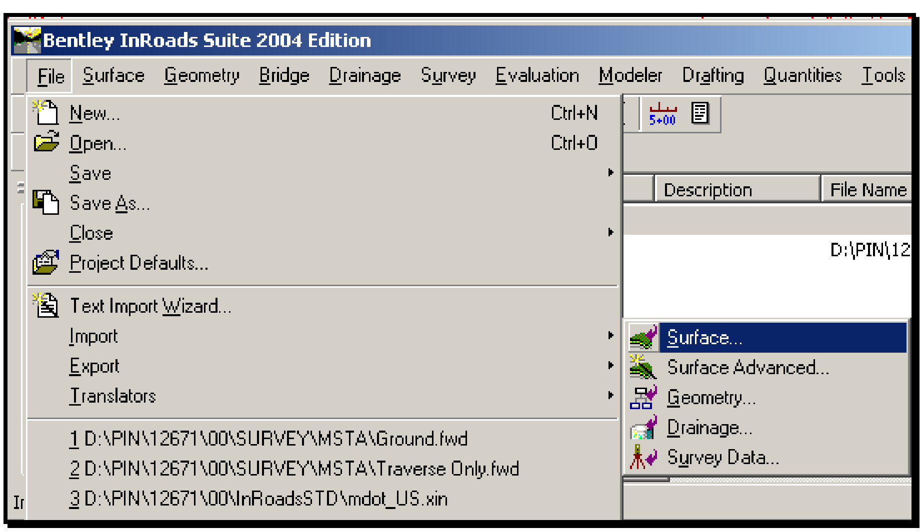


Figure 5-94: Select File>Import>Surface... from the InRoads menu

On the *From Graphics* tab, set the *Surface* to **Ground,** *Load From* to **Level,** *Level* to **Perimeter** and *Elevations* to **Use Element Elevations.** Type in **Exterior** as the *Seed Name* in the *Features* portion of the dialog. Use the pull down to set the *Feature Style* and *Point Type* to **Exterior** as seen in Figure 5-95**.** Click **Apply.** Wait for *Import Successful* message.

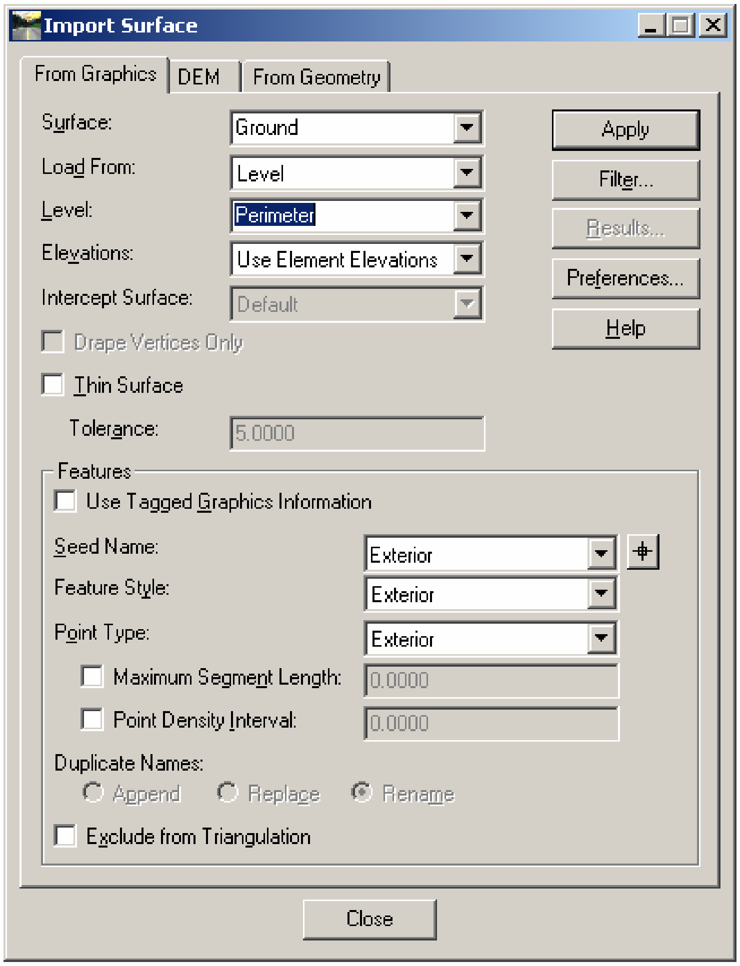


Figure 5-95: Import Surface dialog ready to import Exterior Boundary

This *Exterior Feature* is now in the **Ground** surface evident by the details in the InRoads Explorer dialog (Figure 5-96). This and will control the display of the *Triangles* and the *Contours* around the perimeter when they are displayed. Select **Close.**

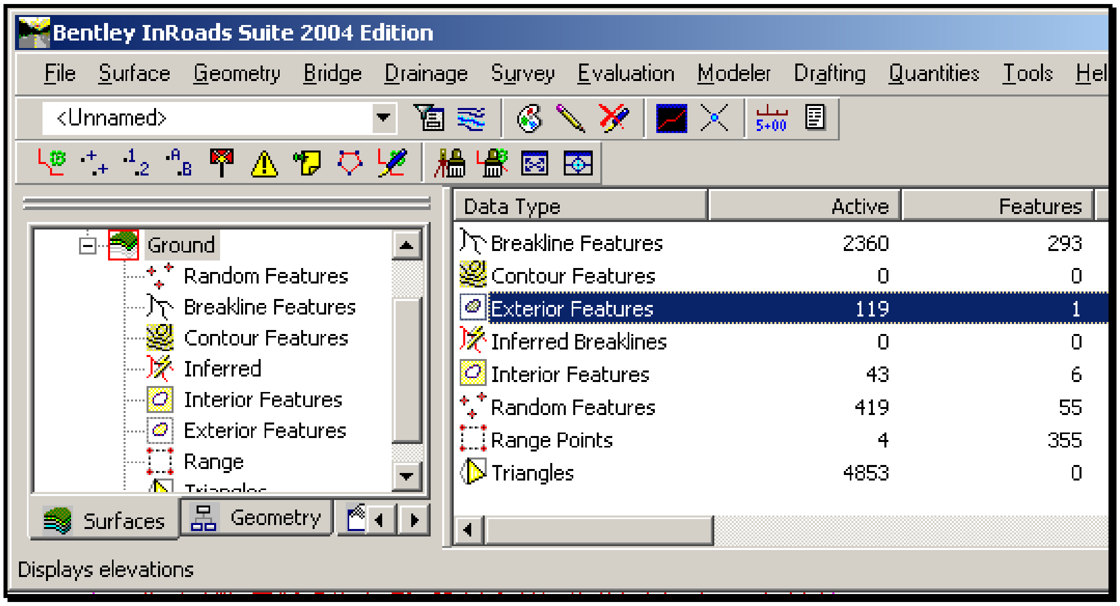


Figure 5-96: Ground Surface containing the Exterior Features

Part Three: View Results

View the results by clearing the display, selecting **Surface>View Surface>Features** and select only the **Exterior** (Figure 5-97).

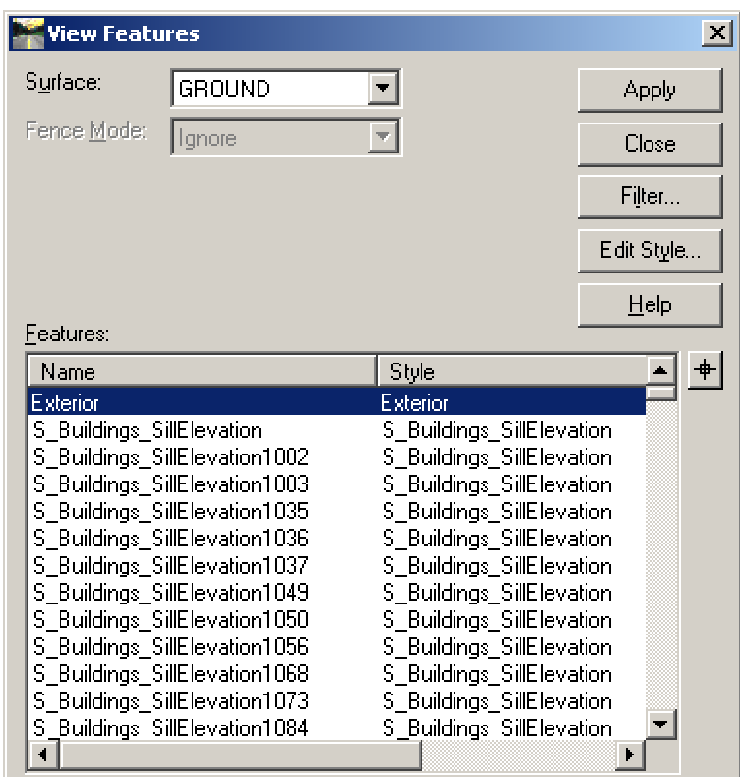


Figure 5-97: View only the Exterior feature of the Ground surface.

Click **Apply.** The shapes will be displayed in the view window (Figure 5-98).

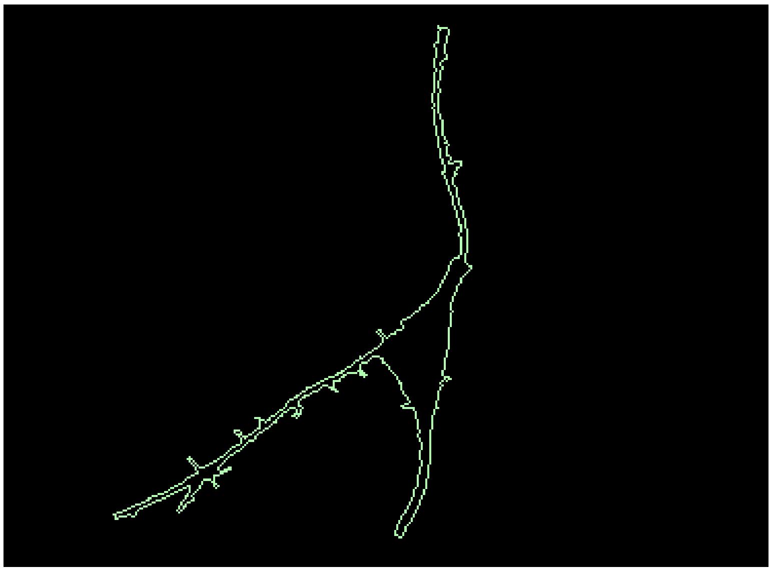


Figure 5-98: Exterior Feature displayed in the view window.

Part Four: Save the Ground Surface

Right click the **Ground** surface and select **Save.** If this project will also contain aerial mapping, type **Ground_only,** select **Save** and then select **Cancel.**

ⓘ ***If this project is going to be combined with aerial mapping survey, users should save this as Ground_only.dtm so that the perimeter of the ground can be used to trim a hole in the mapping data.***

Step Seven: Clean-up Interior Triangles (if necessary)

Using the same procedures for cleaning up the triangles around the *Perimeter*, clean-up the *Interior* triangles to better represent the ground surface.

♬ You can refresh the triangles by selecting **Surface>View Surface>Triangles.** Do not re-triangulate surface unless you want to discard the changes made.

Step Eight: Create Interior Shapes

Part One: Turn Off Graphic Groups

It is necessary to turn off the *Graphic Group Lock* that is often on in files. Select **Settings>Locks>Graphic Groups** from the MicroStation menu to uncheck the lock or click on the padlock at the bottom of the MicroStation dialog window and uncheck it there.

Part Two: Power Select Triangle Holes

Select the *Power Selector* tool in MicroStation. This is located within the *Element Selection* tool frame. Click the *Element Selection* tool, hold and drag to the right to access it (Figure 5-99).

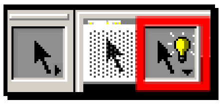


Figure 5-99: Accessing the Power Selector tool.

Adjust the *Tool Settings* dialog with the *Method* set to **Shape** and *Mode* set to **Add** (Figure 5-100). Click the *Shape* button twice to display a dotted line around the tool. This will select features by both crossing and encompassing them.

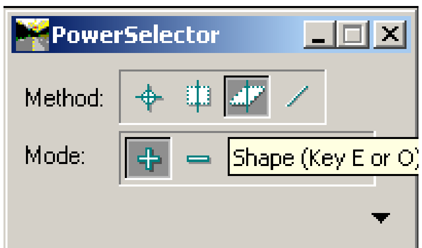


Figure 5-100: Tool Settings dialog set for shape and add.

Left click to draw a dashed line that forms a closed shape through the triangles that encompass the missing data in the ground surface (Figure 5-101). If there are multiple “holes” in the data, *Power Select* these areas as well.

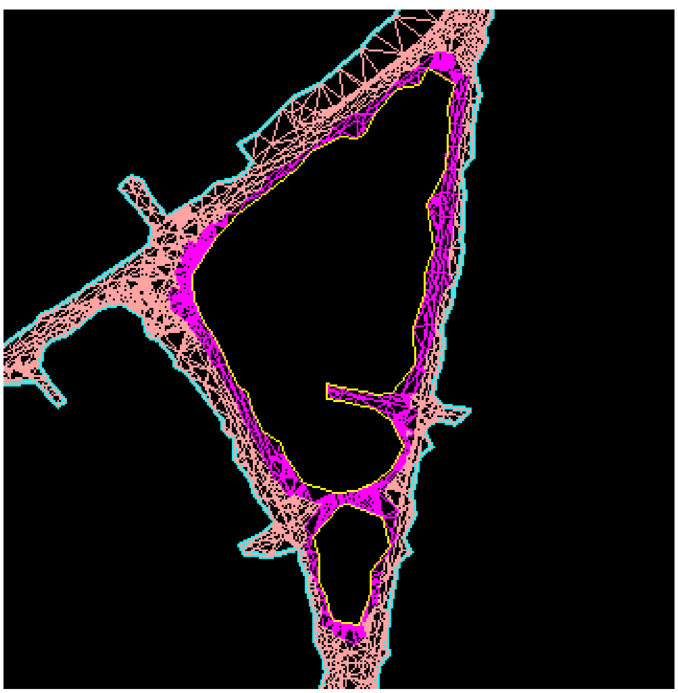


Figure 5-101: Triangles highlight when selected.

Part Three: Create a Region(s)

Using the *Level* pull down (Figure 5-102), set the *Level* to **Perimeter.**

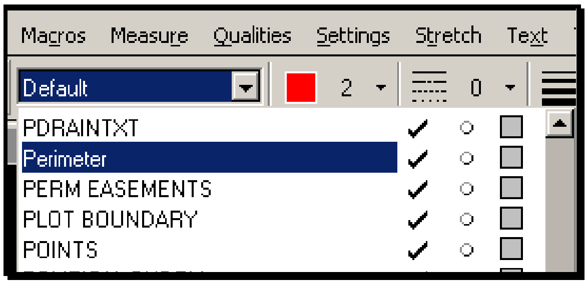


Figure 5-102: Set the Active Level to Perimeter.

Set the color (using the color pull down) to a color that you can easily see against the triangles.

Select the *Create Region* tool in MicroStation. Click the *Drop Element* tool, hold and drag to the right to access it (Figure 5-103).

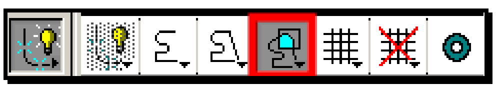


Figure 5-103: Select the Create Region tool.

Set the *Tool Settings* dialog to **Flood** *Method*, set the *Fill* to **None** and place a check mark in *Keep Original*. The remainder of the dialog (Figure 5-104) should be fine by default.

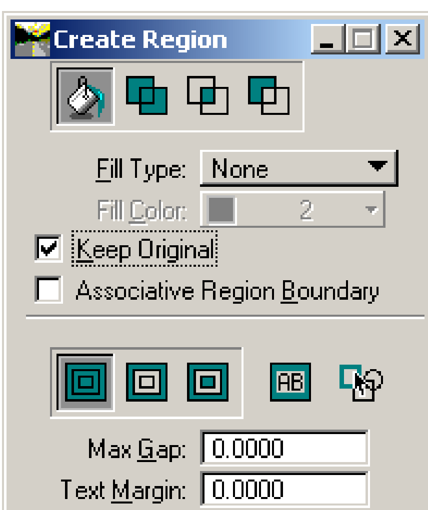


Figure 5-104: The Create Region's Tool Settings dialog.

Click inside of one of the areas that have been *Power Selected.* Left click again to *Accept* the command. Repeat as necessary. A shape will be created with the color you selected. Refresh the view if necessary.

Part Four: Select None

Select **Edit>Select None** from the MicroStation main menu.

Part Five: Import Interior Shapes

Select **File>Import>Surface** from the InRoads main menu. Set the *Surface* to **Ground.** Set *Load From* to **Level.** Set *Level* to **Perimeter.** Set *Elevation* to **Use Element Elevations.** Type **Interior** as a *Seed Name.* Set the *Feature Style* to **Interior.** Set *Point Type* to **Interior** (Figure 5-105). Click **Apply.** This will import all *Interior* perimeters at once. Select **Close.**

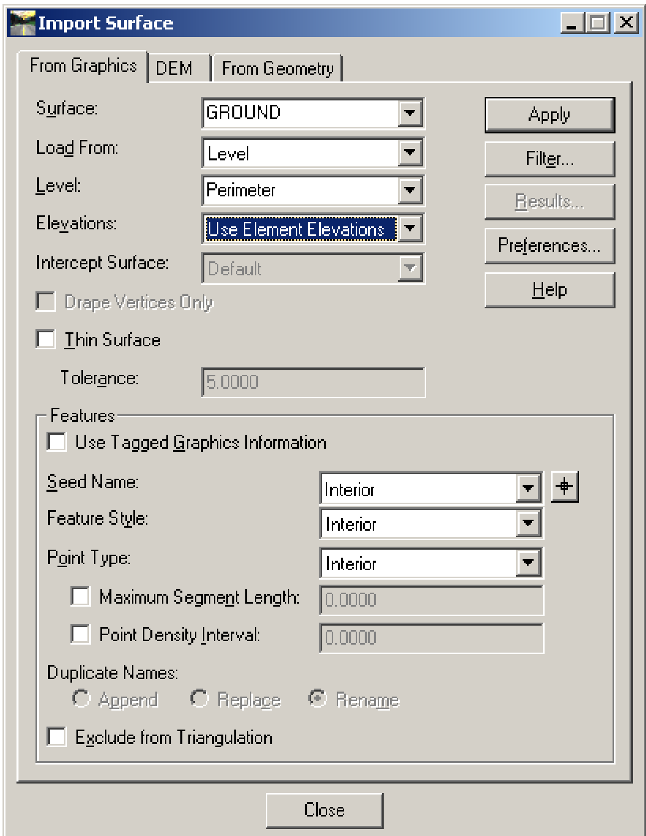
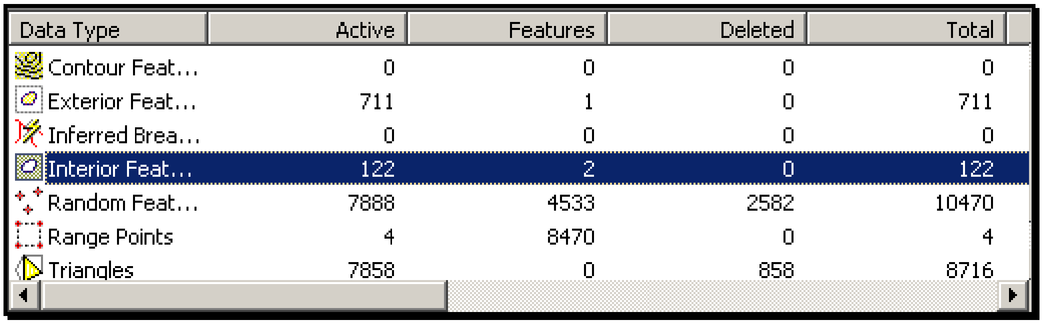


Figure 5-105: Import Surface dialog setup to import interior shapes

These *Interior Features* are now in the **Ground** surface evident by the details in the InRoads Explorer dialog (Figure 5-106). They will prevent the display of the *Triangles* and the *Contours* inside of the *Interior* shapes. Select **Close.**



Data Type	Active	Features	Deleted	Total
Contour Feat...	0	0	0	0
Exterior Feat...	711	1	0	711
Inferred Brea...	0	0	0	0
Interior Feat...	122	2	0	122
Random Feat...	7888	4533	2582	10470
Range Points	4	8470	0	4
Triangles	7858	0	858	8716

Figure 5-106: InRoads Explorer dialog confirming interiors exist in the surface.

Part Six: View Results

View the results by clearing the display, selecting **Surface>View Surface>Features** and select only the **Interiors** (i.e. Interior, Interior1, Interior2) (Figure 5-107).

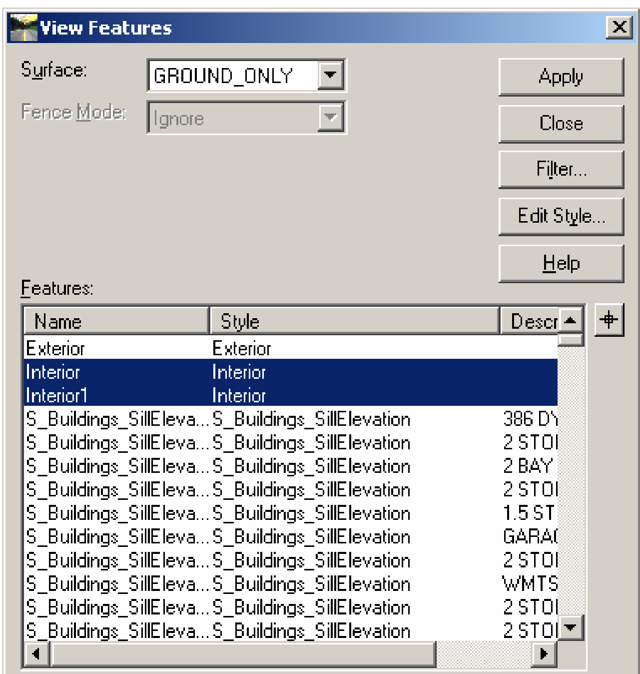


Figure 5-107: Select the Interiors only.

Click **Apply.** The shapes will be displayed in the view window (Figure 5-108).

Figure 5-108: Interiors displayed in the view window.

Step Nine: Save the Ground

When the triangles have been edited to your satisfaction, right click on the **GROUND** surface in *InRoads Explorer* and select **Save.**

Step Ten: Clear Display – View Triangles

Now that the *Interiors* and *Exterior* has been created, select **Edit>Select All** and click the **Delete Element** tool to clear the graphics.

Select **Surface>View Surface>Triangles.** Fit the view and select **File>Save Settings.**

CREATE THE CONTOURS.DGN FILE

ⓘ ***If this project is going to be combined with aerial mapping survey, users should wait to create the Contours.dgn until a complete Ground.dtm has been created from the merged Ground_only and Mapping_only surfaces.***

Step One: Make a Contours File

Select **File>Make Sheetz** from MicroStation's main menu. Select a **No Prefix** drawing (Figure 5-109). Select **OK.**

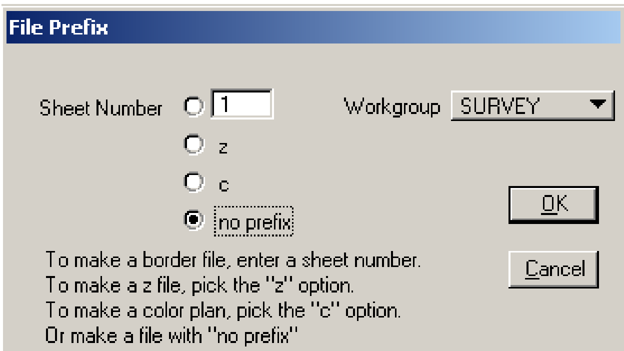


Figure 5-109: Make Sheetz dialog with No Prefix selected

- Users may have to move the InRoads dialog to display the *Make Sheetz* File Prefix dialog.
- The default *Workgroup* should be set to Survey for all Survey users. If not, contact CADD Support.

Step Two: Select Contours

In the *Create File of Type…* dialog, select **Contours** and click **OK** (Figure 5-110).

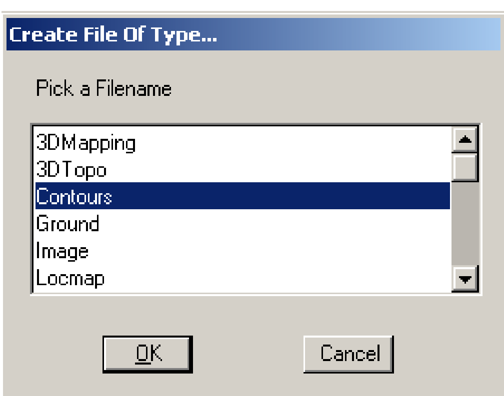


Figure 5-110: Create File of Type dialog with Contours selected

In the *Make File* dialog, click **OK.** Do not enter a date in this file name. Click **Cancel** to stop making sheets.

ⓘ ***This creates the new drawing using the correct seed file and opens the newly created file.***

Step Three: View the Contours

Select **Surface>View Surface>Contours** from InRoads main menu (Figure 5-111).

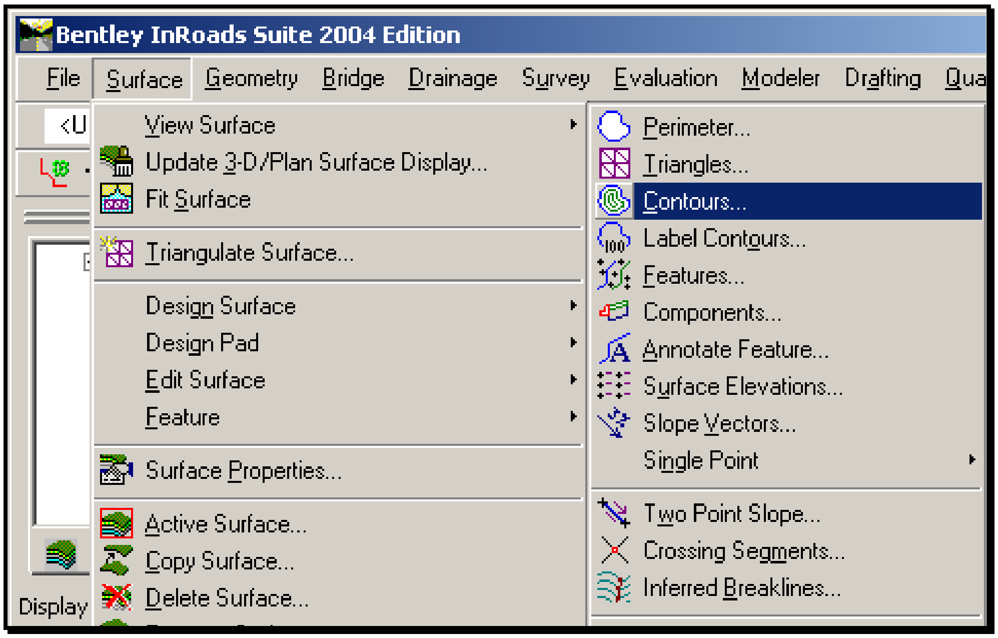


Figure 5-111: Surface>View Surface>Contours… from InRoads main menu

From the *View Contours* dialog (Figure 5-112), verify that **Ground** is the surface. Click **Apply** and **Close.**

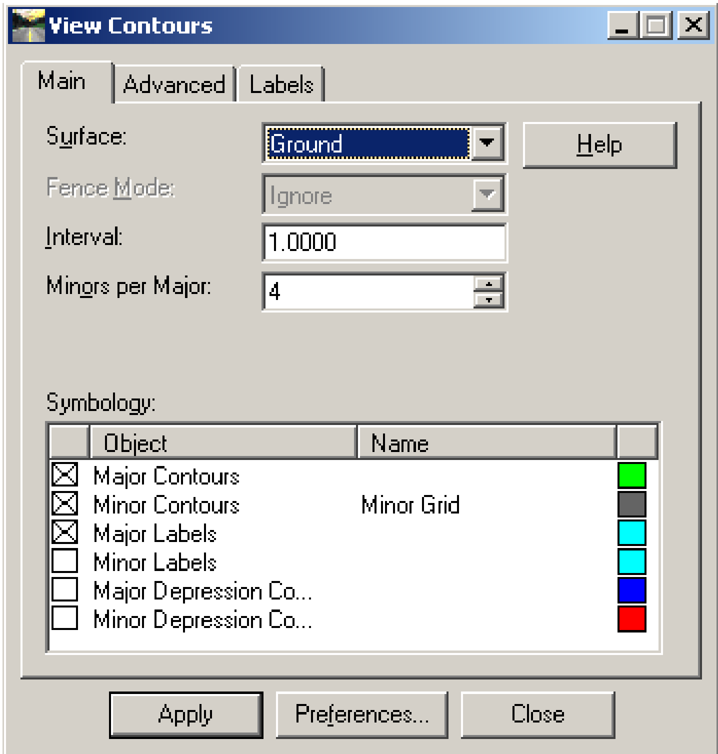


Figure 5-112: View Contours dialog

If you get a warning that your *Contours* are out of date, click **Yes** to update them prior to creating the contours (Figure 5-113). Select **Close** to dismiss the *View Contours* dialog. *Fit View* to view the contours.

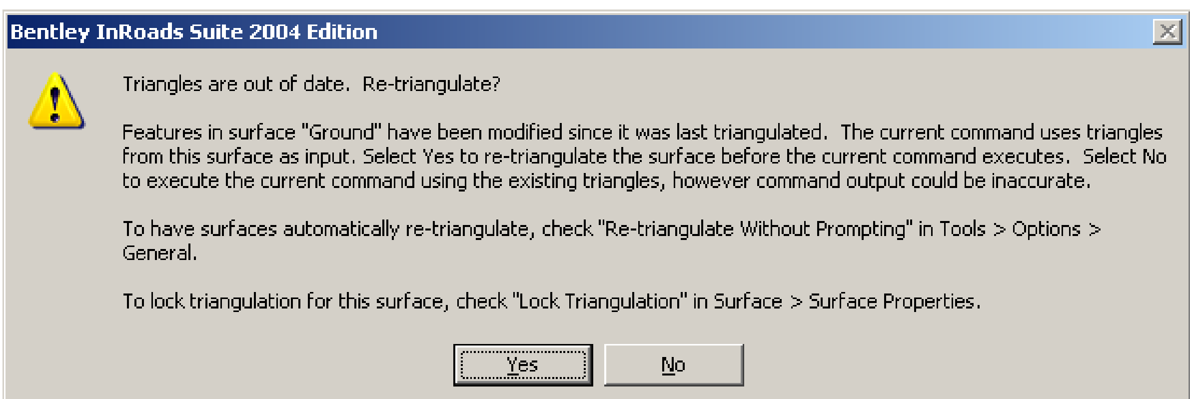


Figure 5-113: Warning stating that your triangles are out of date

Select **File>Save Settings** from the MicroStation main menu. This will save the view extents so that the next user that opens the Contours.dgn will see the contours fully displayed.

CREATE THE 3DTOPOMMDDYY.DGN FILE

Step One: Make a 3DTopoDate File

Select **File**>**Make Sheetz** from MicroStation's main menu. Select a **No Prefix** drawing (Figure 5-114). Select **OK.**

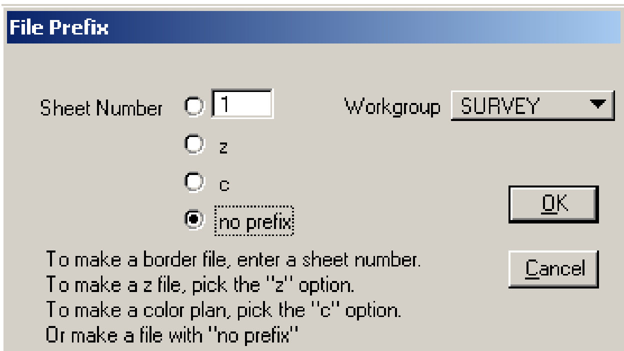


Figure 5-114: Make Sheetz dialog with No Prefix selected

- Users may have to move the InRoads dialog to display the *Make Sheetz* File Prefix dialog.
- The default *Workgroup* should be set to Survey for all Survey users. If not, contact CADD Support.

Step Two: Select 3DTopo

In the *Create File of Type…* dialog, select **3DTopo** and click **OK** (Figure 5-115).

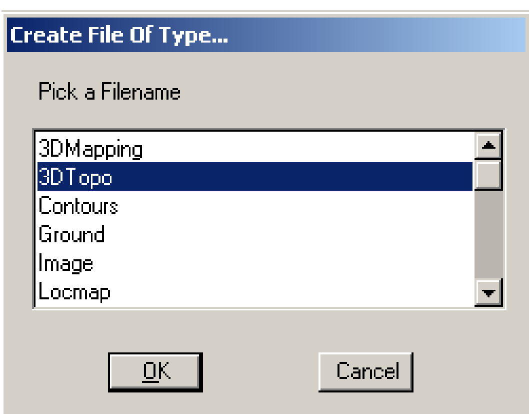


Figure 5-115: Create File of Type dialog with 3DTopo selected

Step Three: Add Date to File

In the *Make File* dialog, enter the date as MMDDYY (i.e. 092107) as seen in Figure 5-116. Click **OK.** Click **Cancel** to stop making sheets.

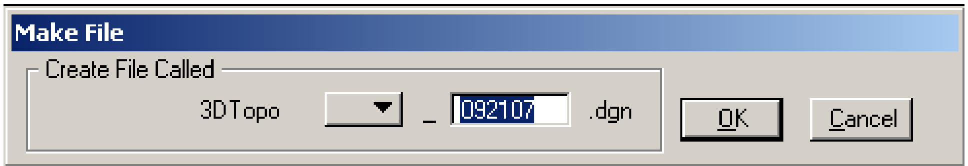


Figure 5-116: Enter date in the text field as MMDDYY

♫ The user can create all the new files needed at this point (i.e. OrigText.dgn and Points.dgn).

ⓘ ***This creates the new drawing using the correct seed file and opens the newly created file.***

Step Four: Write Survey Data to Graphics

Select **Survey>View Survey Data>Write Survey Data to Graphics…** from the InRoads main menu (Figure 5-117).

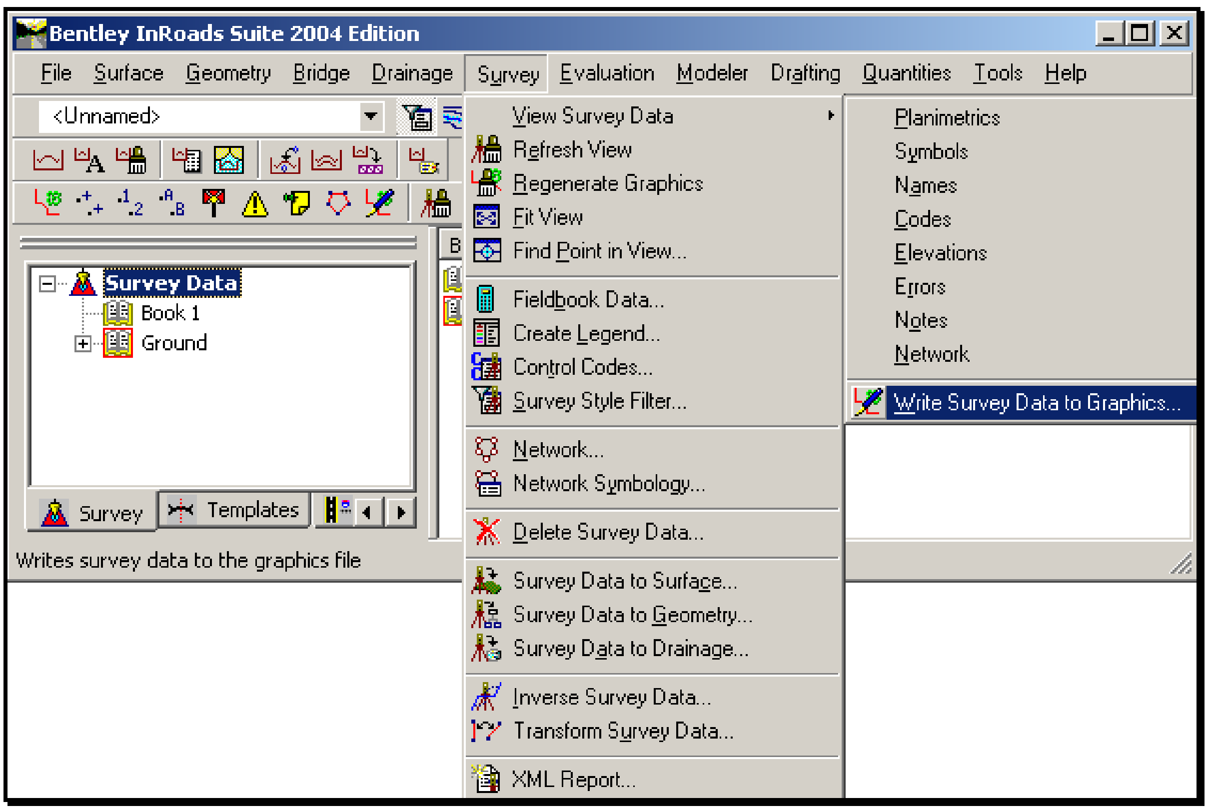


Figure 5-117: Write Survey Data to Graphic from InRoads main menu

Select **Planimetrics** from the *Include* portion of the *Write Survey Data to Graphics* dialog (Figure 5-118). Click **Apply** and then **Close.**

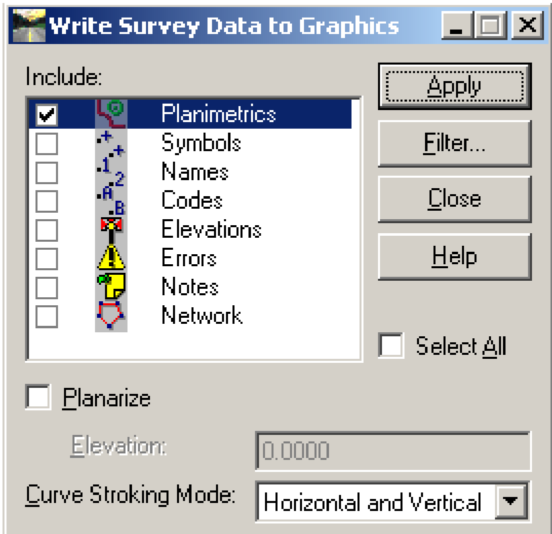


Figure 5-118: Select Planimetrics to write topography to the file

The InRoads dialog will display the progress on the lower left hand corner of the dialog (Figure 5-119).

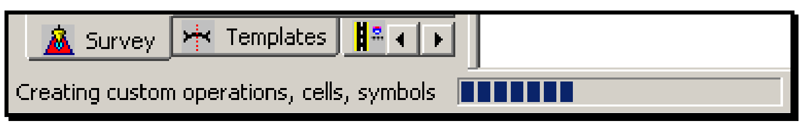


Figure 5-119: Progress bar as it processes the data

Fit View to view the data. Select **File>Save Settings** from the MicroStation menu.

CREATE THE ORIGTEXT.DGN FILE

Step One: Make a OrigText File

Select **File>Make Sheetz** from MicroStation's main menu. Select a **No Prefix** drawing (Figure 5-120). Select **OK.**

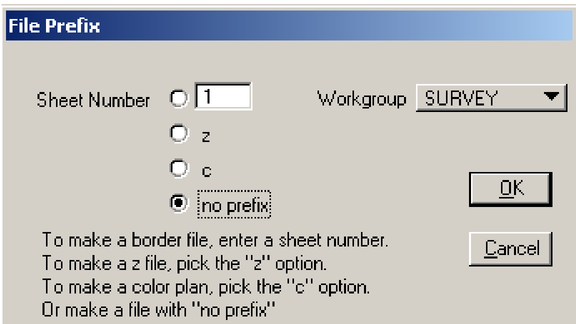


Figure 5-120: Make Sheetz dialog with No Prefix selected

- Users may have to move the InRoads dialog to display the *Make Sheetz* File Prefix dialog.
- The default *Workgroup* should be set to Survey for all Survey users. If not, contact CADD Support.

Step Two: Select OrigText

In the *Create File of Type…* dialog, select **OrigText** and click **OK** (Figure 5-121).

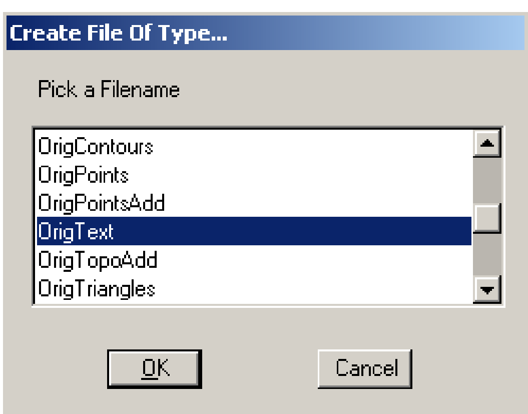


Figure 5-121: Create File of Type dialog with OrigText selected

In the *Make File* dialog, click **OK.** Do not enter a date in this file name. Click **Cancel** to stop making sheets.

ⓘ ***This creates the new drawing using the correct seed file and opens the newly created file.***

Step Three: Write Survey Data to Graphics

Select **Survey>View Survey Data>Write Survey Data to Graphics…** from the InRoads main menu (Figure 5-122).

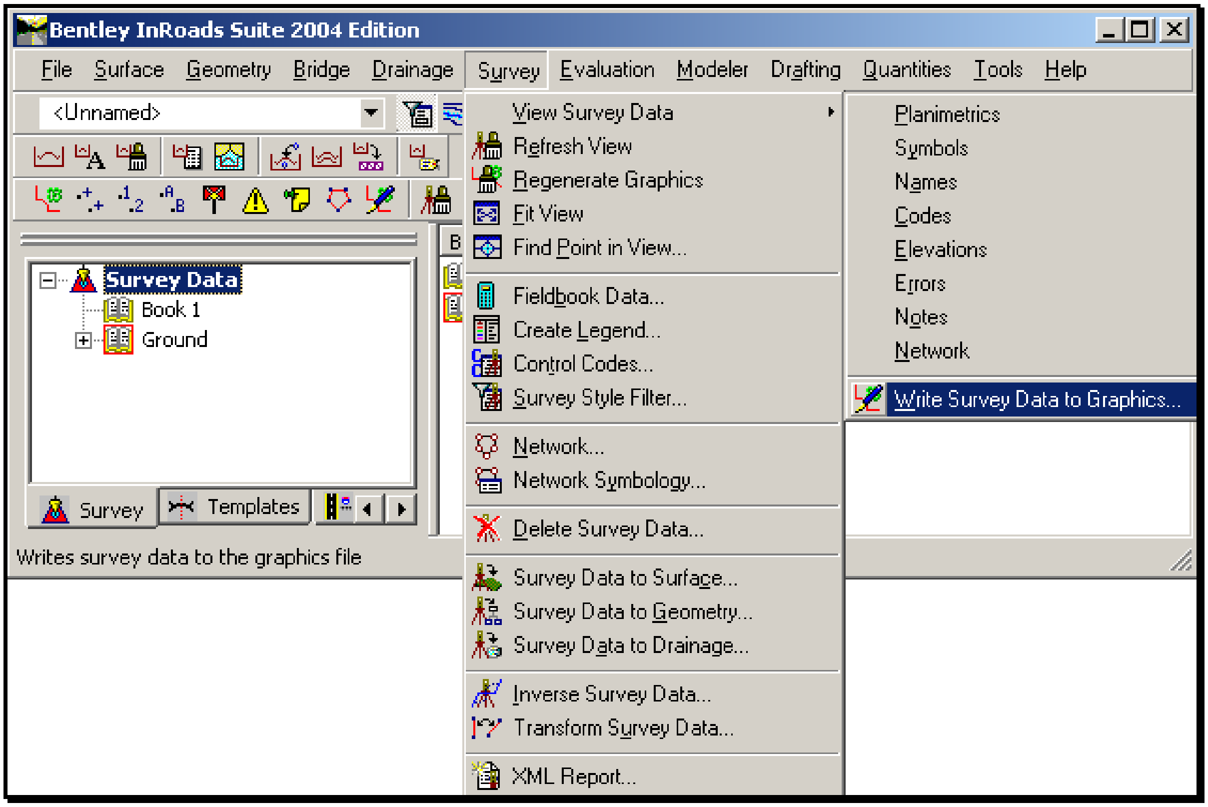


Figure 5-122: Write Survey Data to Graphic from InRoads main menu

Select **Notes** from the *Include* portion of the *Write Survey Data to Graphics* dialog (Figure 5-123). Click **Apply.**

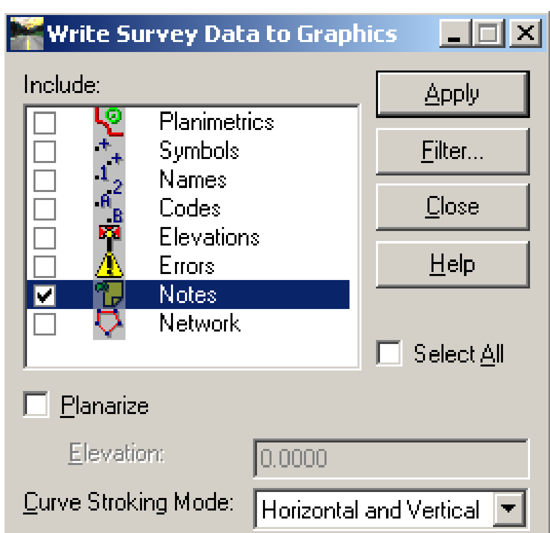


Figure 5-123: Select Notes to write Survey Text to the file

The InRoads dialog will display the progress on the lower left hand corner of the dialog (Figure 5-124).

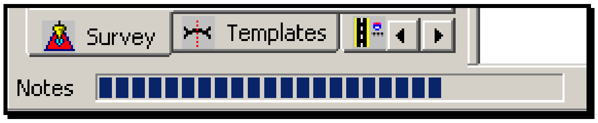


Figure 5-124: Progress bar as it processes the data

Close the *Write Survey Data to Graphics* dialog when the processing is complete. Fit the view to view the data. Select **File>Save Settings** to maintain the zoom extents.

CREATE THE POINTS.DGN FILE

Step One: Make a Points File

Select **File>Make Sheetz** from MicroStation's main menu. Select a **No Prefix** drawing (Figure 5-125). Select **OK.**

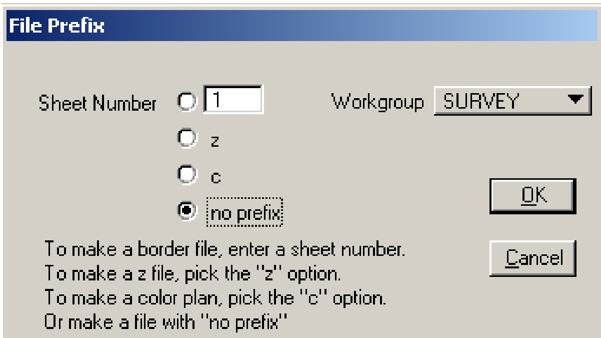


Figure 5-125: Make Sheetz dialog with No Prefix selected

- Users may have to move the InRoads dialog to display the *Make Sheetz* File Prefix dialog.
- The default *Workgroup* should be set to Survey for all Survey users. If not, contact CADD Support.

Step Two: Select Points

In the *Create File of Type…* dialog, select **Points** and click **OK** (Figure 5-126).

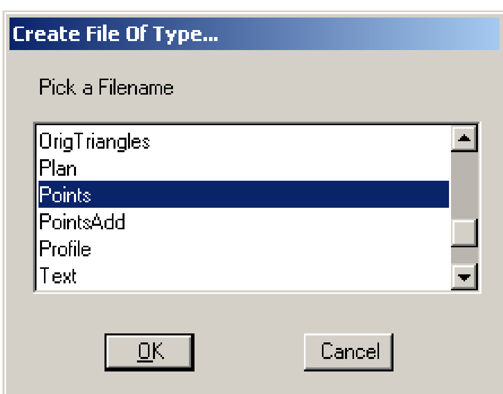


Figure 5-126: Create File of Type dialog with OrigText selected

In the *Make File* dialog, click **OK.** Do not enter a date in this file name. Click **Cancel** to stop making sheets.

ⓘ ***This creates the new drawing using the correct seed file and opens the newly created file.***

Step Three: Write Survey Data to Graphics

Select **Survey>View Survey Data>Write Survey Data to Graphics…** from the InRoads main menu (Figure 5-127).

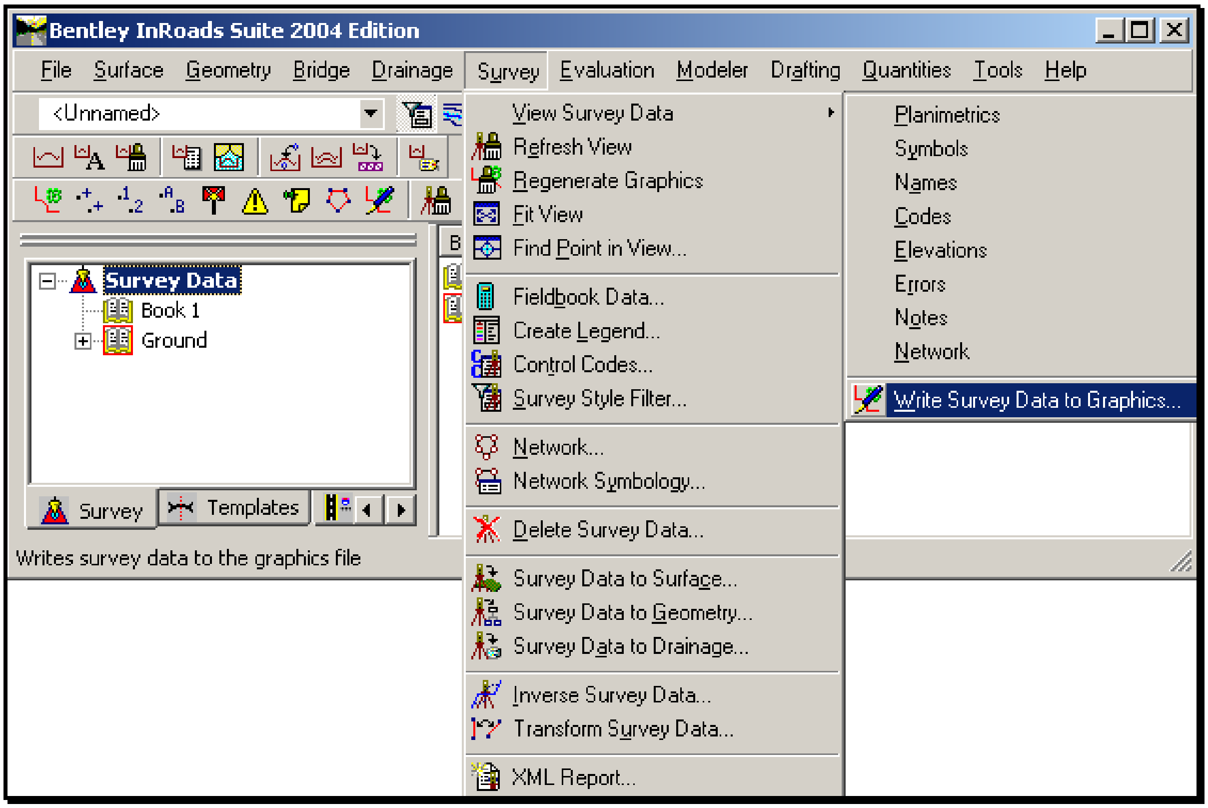


Figure 5-127: Write Survey Data to Graphic from InRoads main menu

Select **Symbols** and **Names** from the *Include* portion of the *Write Survey Data to Graphics* dialog (Figure 5-128). Click **Apply.**

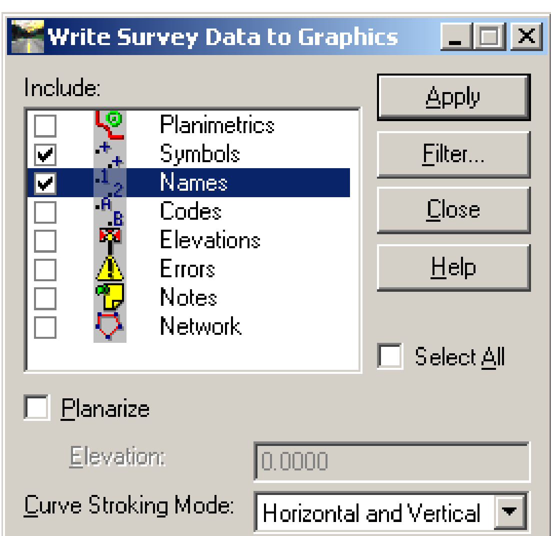


Figure 5-128: Select Notes to write Survey Text to the file

The InRoads dialog will display the progress on the lower left hand corner of the dialog (Figure 5-129).

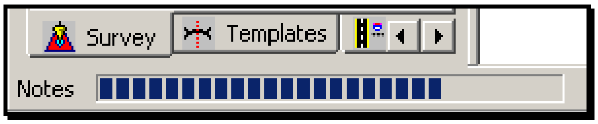


Figure 5-129: Progress bar as it processes the data

Close the *Write Survey Data to Graphics* dialog when the processing is complete. Fit the view to view the data. Select **File>Save Settings** to maintain the zoom extents.

CREATING A MAPPING SURFACE VIA MX

OVERVIEW

Receivables from Mapping Consultant

Receivables from Mapping Consultants may differ until a standard procedure has been defined. Normally we receive MicroStation .dgn files, and an MX input file (GENIO).

MX Files

The .inp or .txt file is imported into MX and a .dpw file is created. This file is MXChanged to create a MicroStation .dgn with the proper MaineDOT standard level structure. This file is imported into a Surface from the graphics within the .dgn in order to provide a surface to design against.

MicroStation Files

The MicroStation files received from a mapping consultant generally do not have the proper level structure internally to be directly imported into a surface. We will be communicating with these consultants to attempt to get a compatible file and bypass the MX procedures altogether.

ASCII Text File

If an ASCII .txt file is formatted (or pre-processed) correctly with Northing, Easting, Control Code and Alpha Code, it could be inputted into InRoads as an .fwd (Survey Field Book). There are thousands of points in mapping data, so the time to process and or edit the data may make it difficult to work with.

- ♬ Since MaineDOT is trying to rely less on MX, the process of importing a Surface from graphics or receiving a properly formatted ASCII text file will likely be the process used.

Step One: Open MicroStation

Open MicroStation and enter a .dgn file.

Step Two: Launch MXChange

Select **MXChange>Import MX Drawing…** from the MicroStation main menu (Figure 5-130).

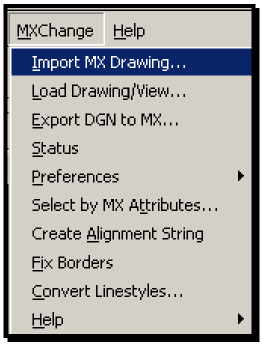


Figure 5-130: Import MX Drawing menu selection.

This activates a panel for the user to select the correct Units of measure, drawing scale and the software that is being used to design the project data.

Step Three: Adjust Units and Scale dialog

Select **New – Prep for InRoads** and the desired *Drawing Scale* (normally 25 ft per inch) Figure 5-131.

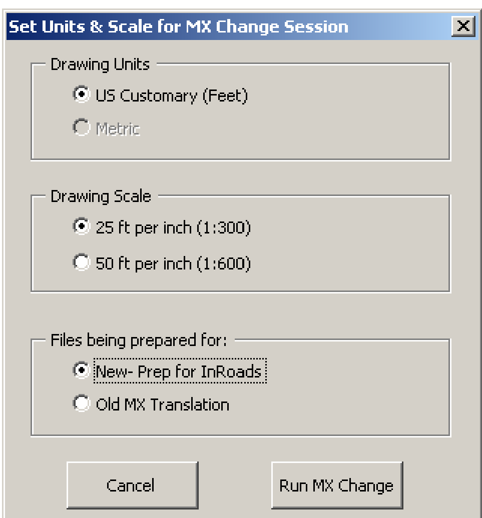


Figure 5-131: Units and Scale for MX Change Session.

Select **Run MX Change.**

♬ When selecting the bullet for New-Prep for InRoads, the metric option for the drawing units is grayed out because there is no customization developed for the metric platform.

Step Four: Import MX Drawing

Browse to the correct project folder using the DPF… button and select the 3DmappingMMDDYY.dpw (Figure 5-132).

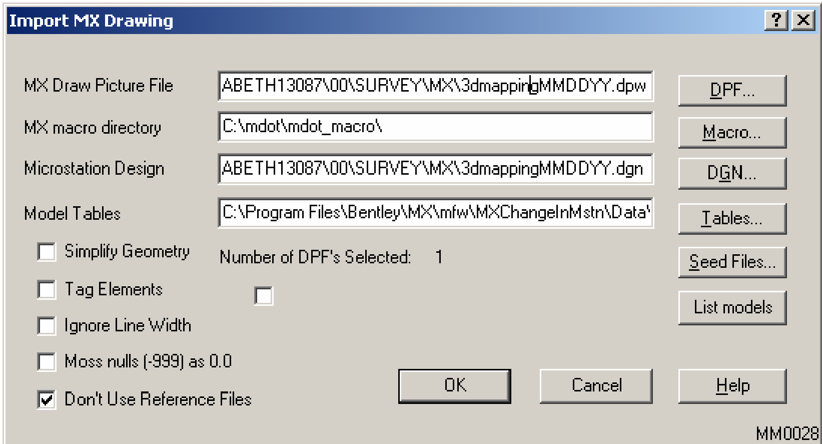


Figure 5-132: Import MX Drawing dialog.

Click **OK.**

Review the .dgn

Review the *.dgn file to verify that it is in the correct level structure for InRoads. A tentative snap on an element in the *.dgn will reflect the level name. Mapping levels should start with a **M_** (i.e. M_Ground_Elevation).

Copy 3DmappingMMDDYY to Survey/MSTA folder

Copy the 3DmappingMMDDYY.dgn from the MX folder to the Survey/MSTA folder.

UPDATE .DGN'S UNITS AND ACCURACY

Step One: Open InRoads

Launch InRoads from the desktop icon.

Step Two: Select InRoads Local

Click the *User* drop down list in the *Workspace* area of the dialog and select **InRoads_Local** (Figure 5-133).

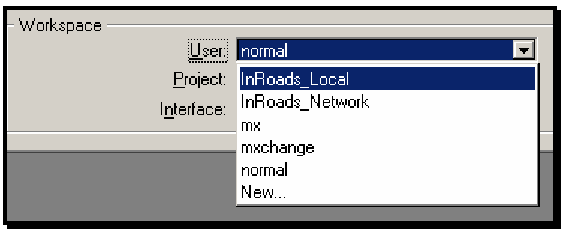


Figure 5-133: User selection set to InRoads_Local.

Step Three: Pick your Project

Click the *Project* drop down list in the *Workspace* area of the dialog and select your project from the list (Figure 5-134).

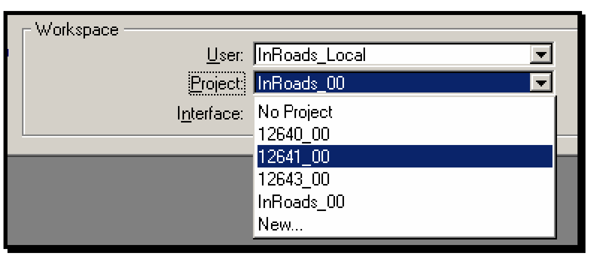


Figure 5-134: Select project from Project pull down.

- This will direct the *MicroStation Manager* dialog to look at the locally copied project and be pointing to the correct folder option (i.e. D:\pin\#####\##\Survey\MSTA\) (Figure 5-135).

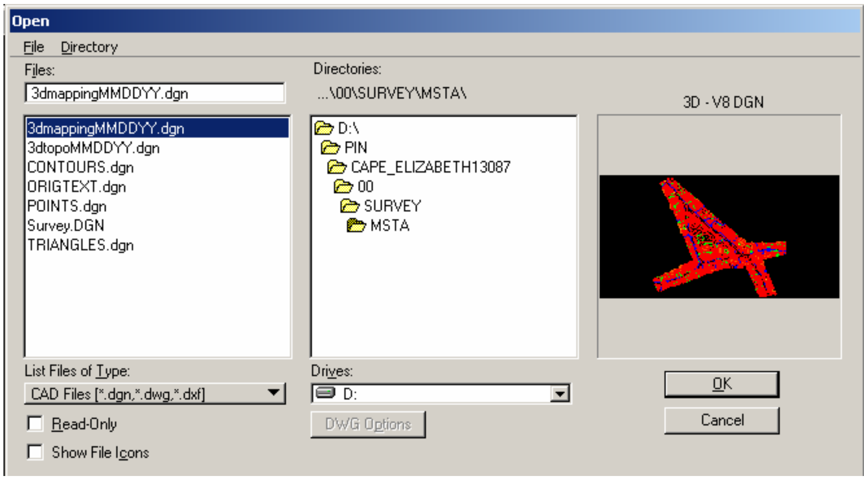


Figure 5-135: Current working directory set by project pick.

Select the 3DmappingMMDDYY.dgn from the list of available files.

Step Four: Warning Message

An Information panel will display (Figure 5-136) showing that the 3dmappingMMDDYY.dgn that was opened was created for the MX Platform. Here you will have the opportunity to correct the units of resolution for the InRoads platform. Click **OK.**

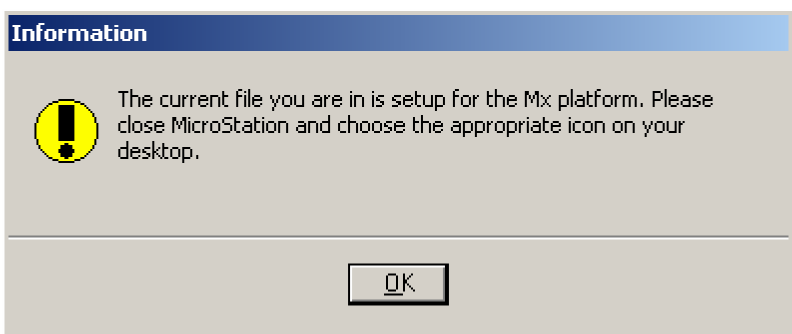


Figure 5-136: Warning message saying that file is setup for MX platform.

Step Five: Run UOR Fix

Part One: Launch Program

Select **InRoads>Update UOR and units** from the MicroStation menu (Figure 5-137).

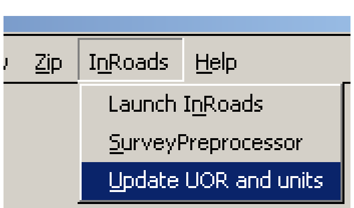


Figure 5-137: Launch UOR fix from MicroStation menu.

Part Two: Click Proceed

A warning dialog (Figure 5-138) will appear giving the user the opportunity to *Quit* or *Proceed* if the user is unsure of the need to convert. ALL Dgn's created with MXChange, will need to be converted to the new InRoads units of resolution. Click **Proceed.**

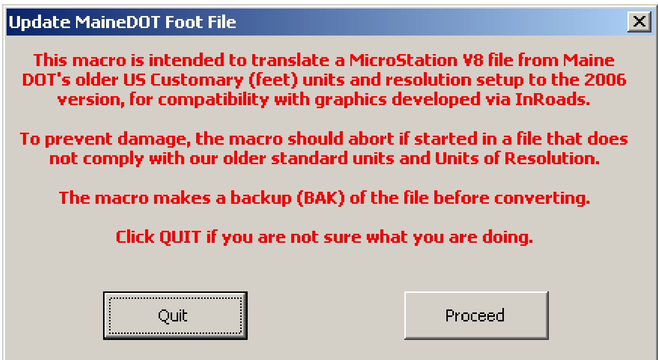


Figure 5-138: Warning message when updating UOR fix.

♬ The *.dgn may display some unusual graphics while the file is being converted.

Once the program has run a *Successful Completion* message will appear (Figure 5-139). Click **OK.**

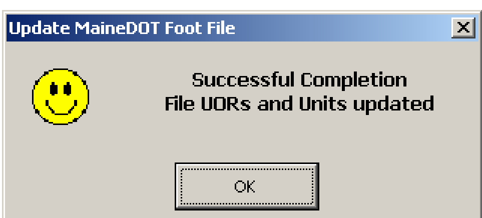


Figure 5-139: Update successful dialog.

♬ A back up file is automatically created of the original *.dgn prior to being converted. This file is located in the project folder and has the extension of *.bak.

Part Three: Check Results

Check the Global Origin of the DGN. Select **Settings>Global Origin** from the MicroStation menu (Figure 5-140).

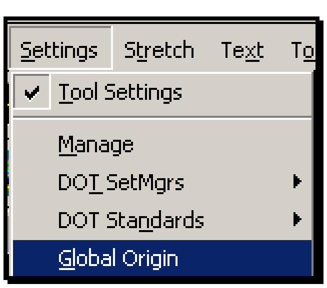


Figure 5-140: Check results of update UOR fix.

Verify that the Sub Per Master = 12.0000. Verify that the Uor Per Sub = 25400.05 (Figure 5-141).

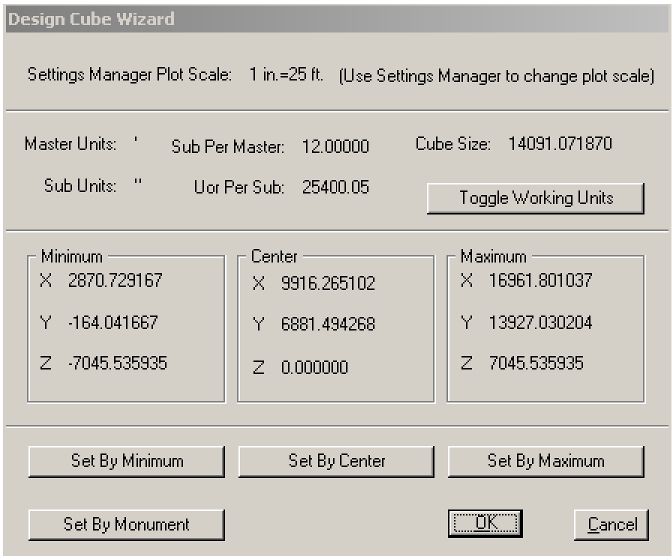


Figure 5-141: Design Cube Wizard dialog.

Click **OK** or **Cancel.**

Part Four: Fit View

Fit the view using the MicroStation view controls.

Import Graphics Into a Surface

Step One: Browse to Surface Tab

Navigate to the *Surface* tab in the InRoads dialog by right-clicking on the tab panels at the bottom of the dialog and select *Surfaces* or use the arrows to select the *Surface* tab(Figure 5-142).

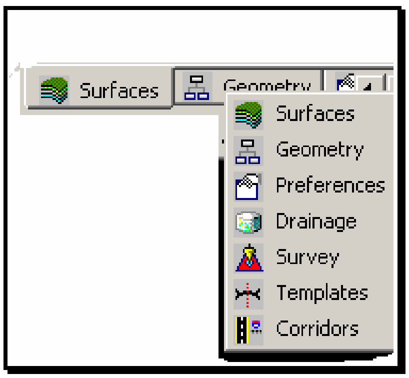


Figure 5-142: Browse to Surface tab.

Step Two: Open the Ground_only Surface

Right click on *Surface* and select **Open** (Figure 5-143).

Figure 5-143: Open menu selection.

While in the *Open* dialog, select the **Ground_only.dtm.** Select **Open.** Click **Cancel** to close the *Open* dialog.

♬ If there isn't a **Ground_only** surface, it may be because it was unknown that mapping data would be collected. Using *Windows Explorer*, browse to the Survey/MSTA and rename the Ground.dtm to Ground_only. Open this surface.

Step Three: Display the Exteriors and Interiors

Selecting **Surface>View Surface>Features** and select only the **Interiors** (i.e. Interior, Interior1, Interior2) (Figure 5-144).

♬ If your project required interior shapes to be created in the Ground_only surface, these features should appear in the list of features, otherwise ignore the process of viewing and importing.

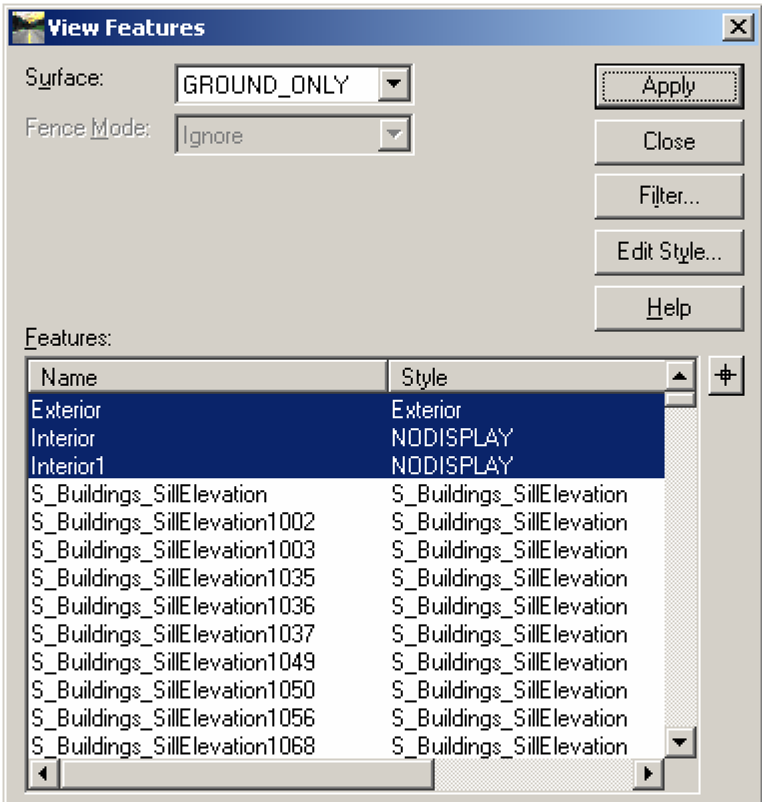


Figure 5-144: Select the Interiors only.

Click **Apply.** The shapes will be displayed in the view window.

Step Four: Place Fence on Exterior

Select the *Place Fence* tool from MicroStation (Figure 5-145).

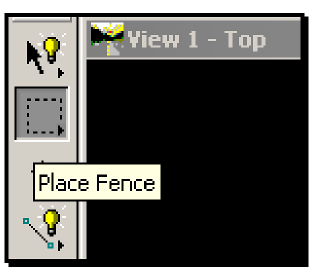


Figure 5-145: Place fence tool from MicroStation Main Tool frame.

Set the *Type* to **Element.** Set the *Fence Mode* to **Void-Clip** (Figure 5-146). Click on the *Exterior*.

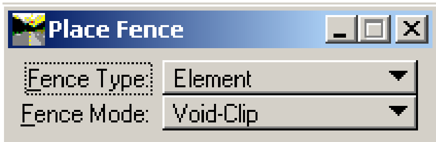


Figure 5-146: Place Fence dialog.

Verify fence by the icon at the bottom of MicroStation (**Error! Reference source not found.**).

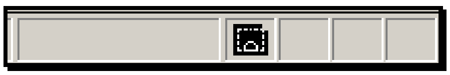


Figure 5-147: Fence set to Void-Clip - icon.

Step Two: Import Surface Advanced

Select **File>Import Surface Advanced** from the InRoads menu (Figure 5-148).

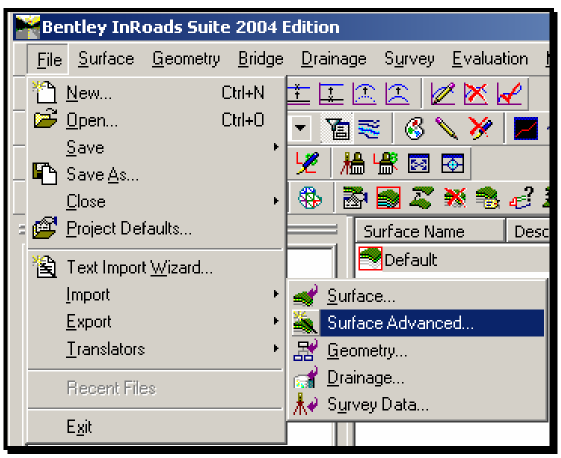


Figure 5-148: Import Surface menu selection.

Step Three: Supply a Name for the Surface

In the Surface text box, type **MAPPING_only.**

The *Load From* should be set to **Fence.**

The *Intercept Surface* should be set to either **Default** or **Mapping_only** if there is one available (i.e. when there is an *Interior* to be imported).

Step Four: Select and Run Rule Set

In the *Rule Set* portion of the dialog box, use the pull down to adjust the *Rule* to **Me DOT Translation Mapping** (Figure 5-149).

Click **Apply.**

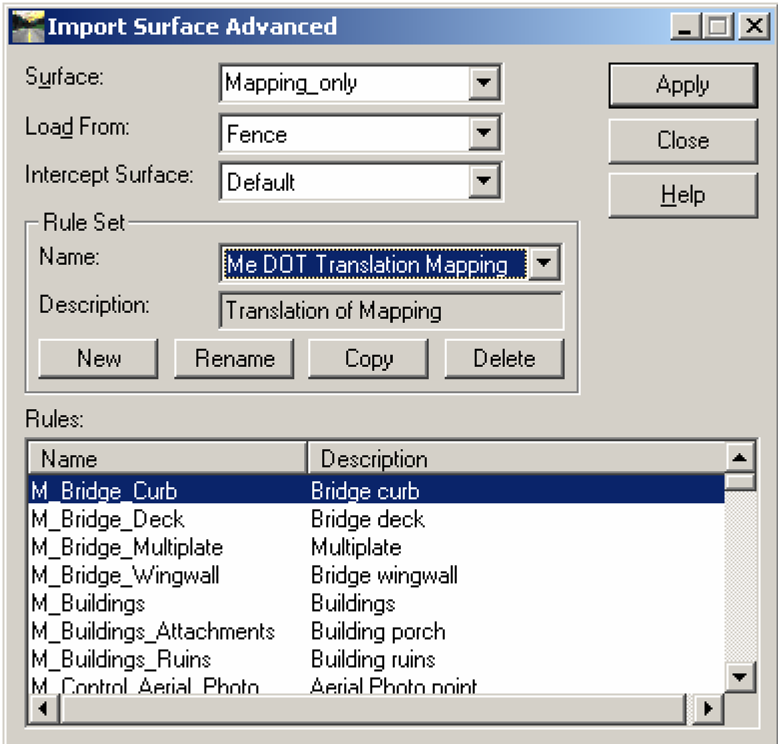


Figure 5-149: Import Surface Advanced dialog.

A message (Figure 5-150) will be displayed at the bottom of the MicroStation application when the process is complete.

Figure 5-150: Successful Completion message.

Click **Close** on the *Import Surface Advanced* dialog.

Step Five: Place Fence on Interior (if one exists)

Select the *Place Fence* tool from MicroStation (Figure 5-151).

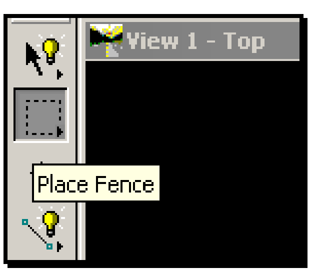


Figure 5-151: Place fence tool from MicroStation Main Tool frame.

Set the *Type* to **Element.** Set the *Fence Mode* to **Clip** (Figure 5-152). Click on the *Interior*.

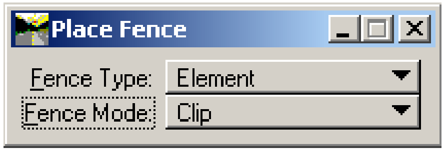


Figure 5-152: Place Fence Tool Settings dialog.

Verify fence by the icon at the bottom of MicroStation (Figure 5-153).

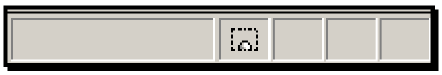


Figure 5-153: Fence set to Clip - icon.

Step Two: Import Surface Advanced

Select **File>Import Surface Advanced** from the InRoads menu (Figure 5-154).

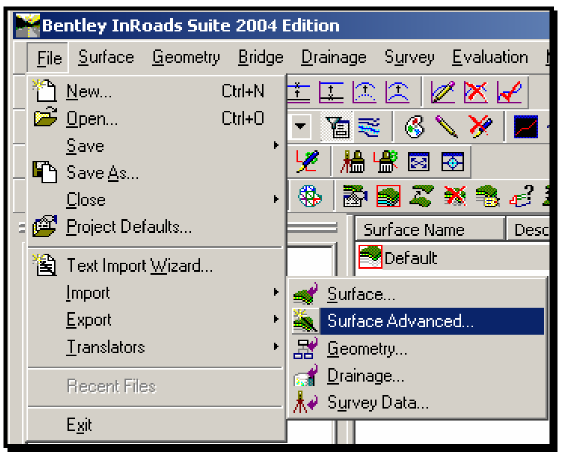


Figure 5-154: Import Surface menu selection.

Step Three: Supply a Name for the Surface

Select **Mapping_only** from the *Surface* pull down.

Set the *Load From* pull down to **Fence**.

The *Intercept Surface* should be set to either **Default** or **Mapping_only** if there is one available (i.e. when there is an *Interior* to be imported).

Step Four: Select and Run Rule Set

In the *Rule Set* portion of the dialog box, use the pull down to adjust the *Rule* to **Me DOT Translation Mapping** (Figure 5-155).

Click **Apply.**

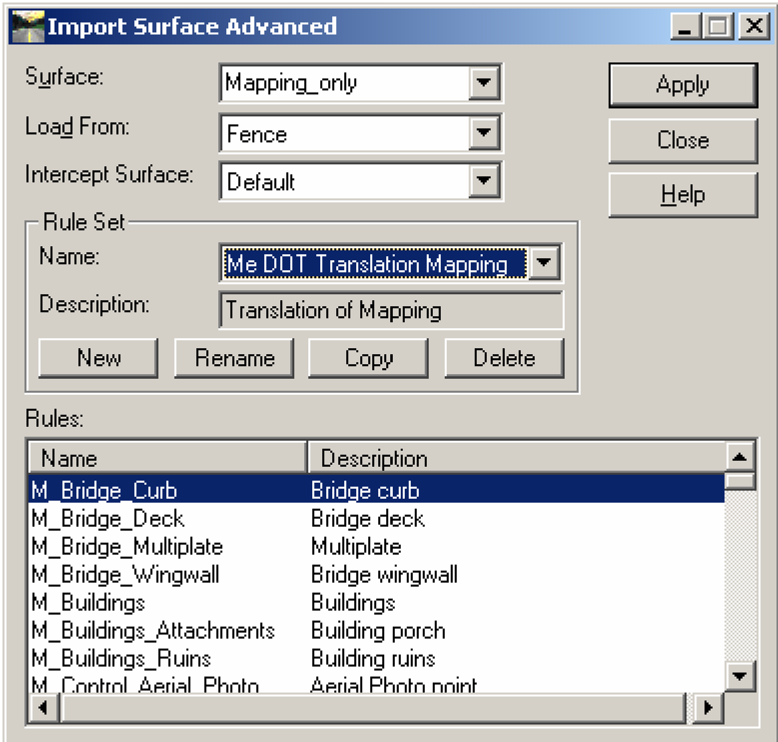


Figure 5-155: Import Surface Advanced dialog.

A message (Figure 5-156) will be displayed at the bottom of the MicroStation application when the process is complete.

Figure 5-156: Successful Completion message.

Click **Close** on the *Import Surface Advanced* dialog unless there is another *Interior.* Repeat the process for all *Interiors* displayed from the Ground Surface.

Display and Save the Mapping Surface

Step One: Open Survey.dgn

Select **File>Open** from the MicroStation main menu. Select the **Survey.dgn** and the click **OK.**

Step Two: View Mapping Surface Features

Select **Surface>View Surface>Features…** from the InRoads menu (Figure 5-157).

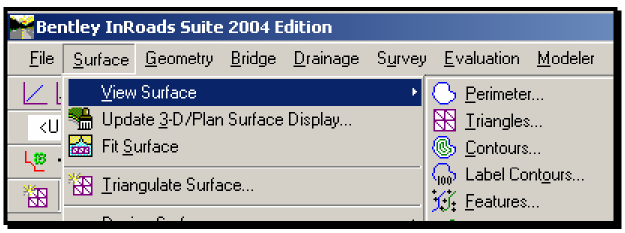


Figure 5-157: View Surface Features menu selection.

Select the **Mapping_only** surface from the *Surface* pull down if not already selected (Figure 5-158). Click **Apply** and then **Close** the dialog.

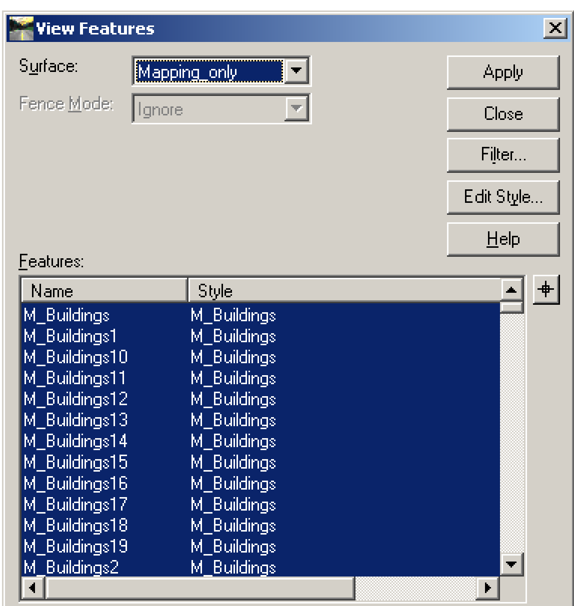


Figure 5-158: View Features from Mapping_only Surface.

Select the **Fit View** icon from MicroStation's view controls. The mapping surface features are now displayed in the view window.

Step Three: Adjust Mapping_only Symbology

While the focus is on the *Surface* tab, right click the **Mapping_only** surface and select

Properties… (Figure 5-159).

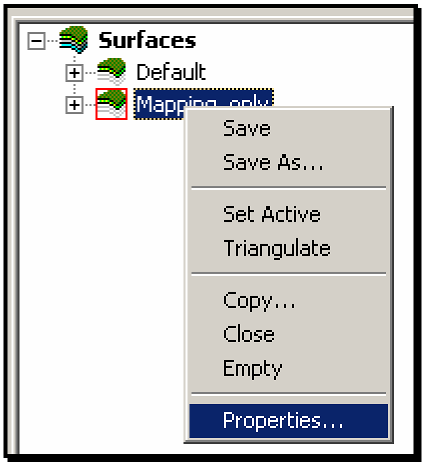


Figure 5-159: Surface Properties menu selection.

Switch to the *Advanced* tab (Figure 5-160) on the *Surface Properties* panel. Using the pull down list, set the Cross Sections Symbology to use **M_Roadway_Centerline**. Do the same for the Profile Symbology. Click **Apply** and then **Close.**

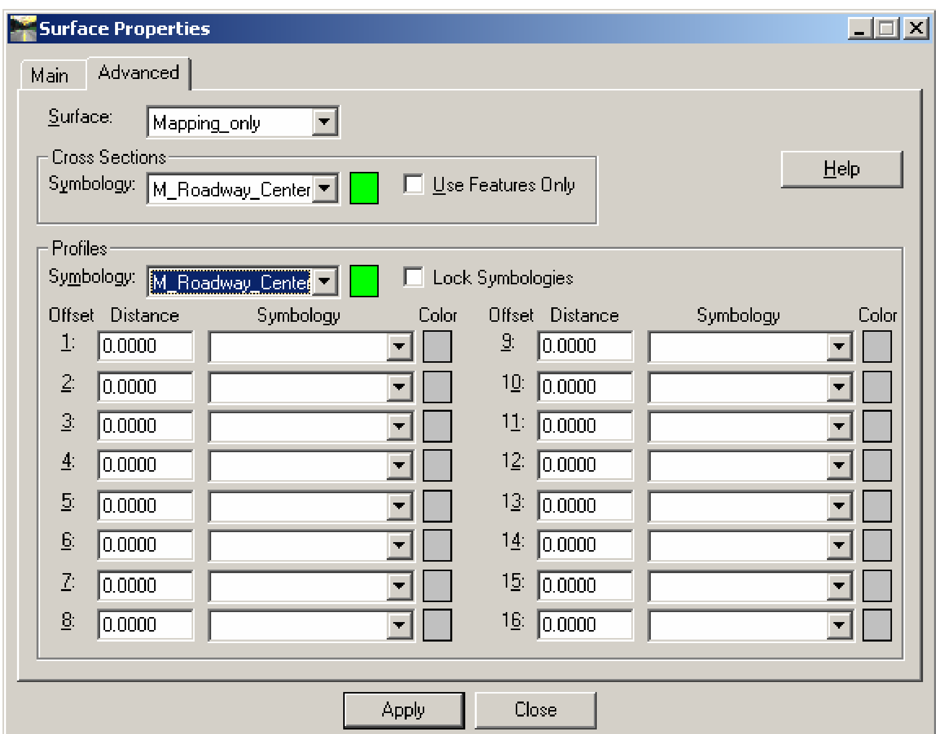


Figure 5-160: Advance tab on Surface Properties dialog.

Step Four: Save the Mapping_only Surface

From the InRoads menu, select **File>Save>Surface** (Figure 5-161).

Figure 5-161: Save Surface menu selection.

The *Save As* dialog (Figure 5-162) will allow you to specify the **Mapping_only.dtm.** It should automatically be pointing to the correct project location. Click **Save** and then **Cancel** to close the *Save As…* dialog.

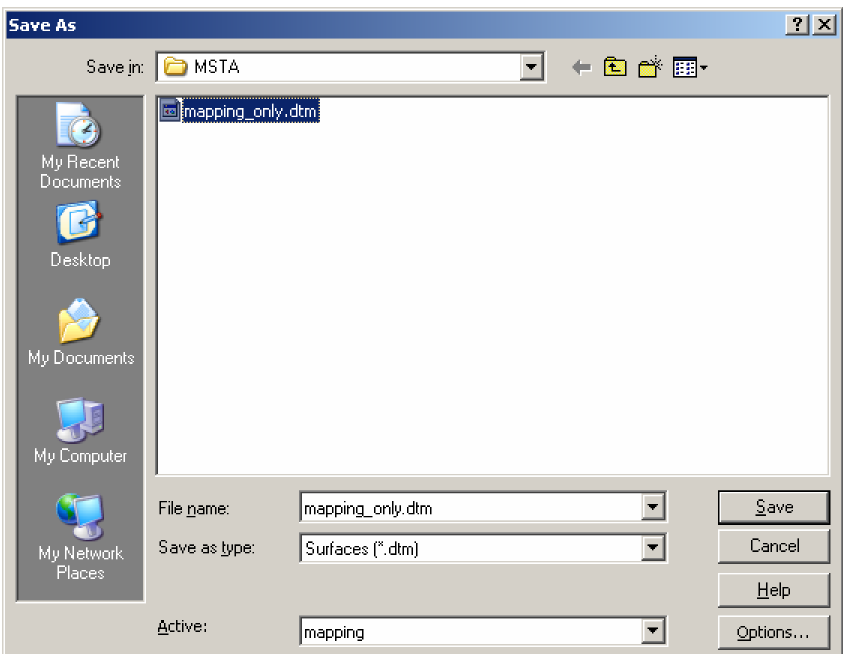


Figure 5-162: Save As dialog.

Step Five: Clear Display

Select **Edit>Select All** from the MicroStation main menu. Select **Delete** element tool from the MicroStation tool bar or the **Delete** key on your keyboard.

COMBINING MAPPING AND GROUND SURFACES

MERGE AND TRIANGULATE SURFACES

Step One: Load Surfaces

Part One: Browse to Surface Tab

Navigate to the *Surface* tab in the InRoads dialog by right-clicking on the tab panels at the bottom of the dialog and select *Surfaces* or use the arrows to select the *Surface* tab(Figure 5-163).

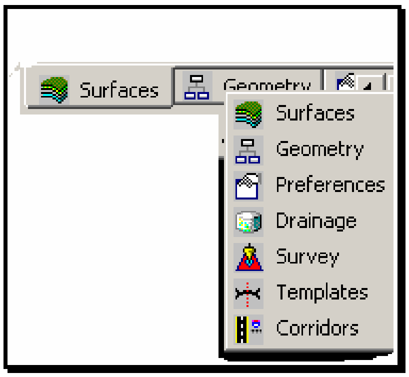


Figure 5-163: Browse to Surface tab.

Part Two: Open Mapping_only.dtm

Right click on *Surface* and select **Open** (Figure 5-164).

Figure 5-164: Open menu selection.

Select **Mapping_only.dtm** (Figure 5-165) and select **Open.**

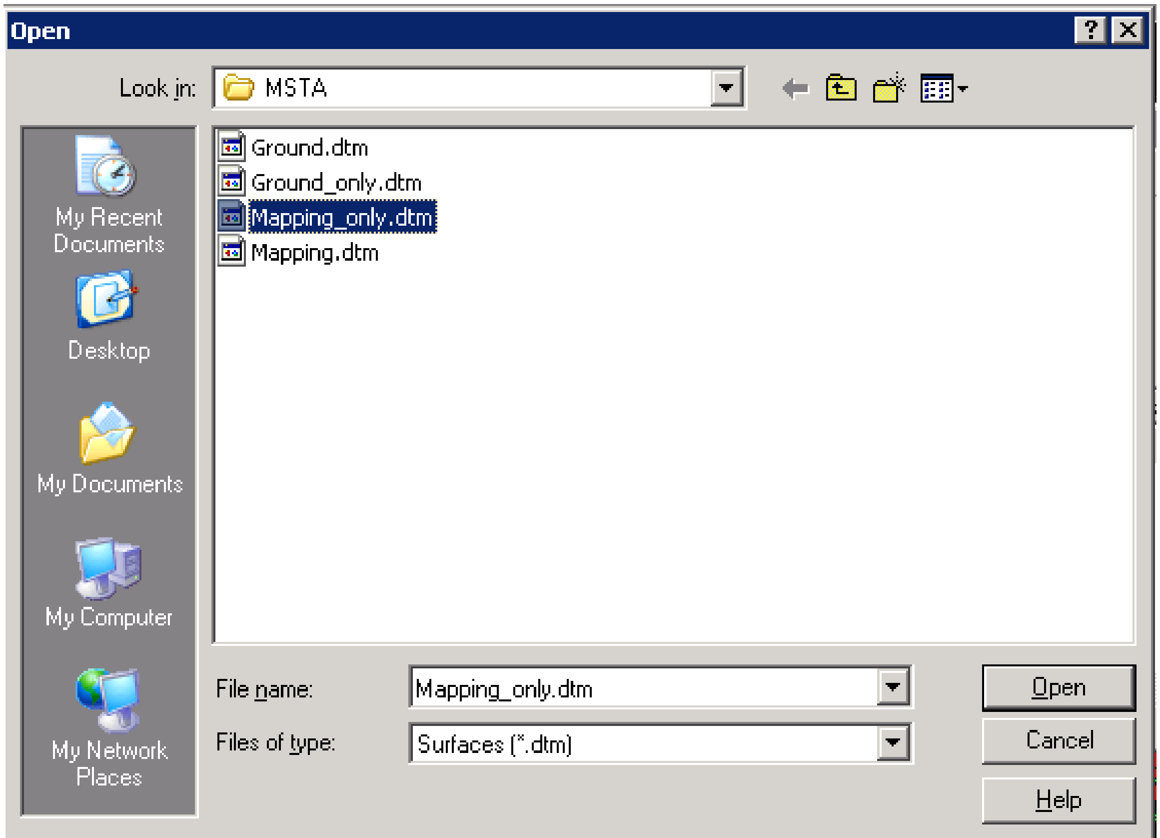


Figure 5-165: Open dialog, select Ground_only.dtm.

Part Three: Open Ground_only.dtm

While in the *Open* dialog, select the **Ground_only.dtm.** Select **Open.** Click **Cancel** to close the *Open* dialog.

♬ If there isn't a **Ground_only** surface, it may be because it was unknown that mapping data would be collected. Using *Windows Explorer*, browse to the Survey/MSTA and rename the Ground.dtm to Ground_only. Open this surface.

Step Two: Open Merge Surfaces dialog

Select **Surface>Edit Surface>Merge Surfaces** from the InRoads menu (Figure 5-166).

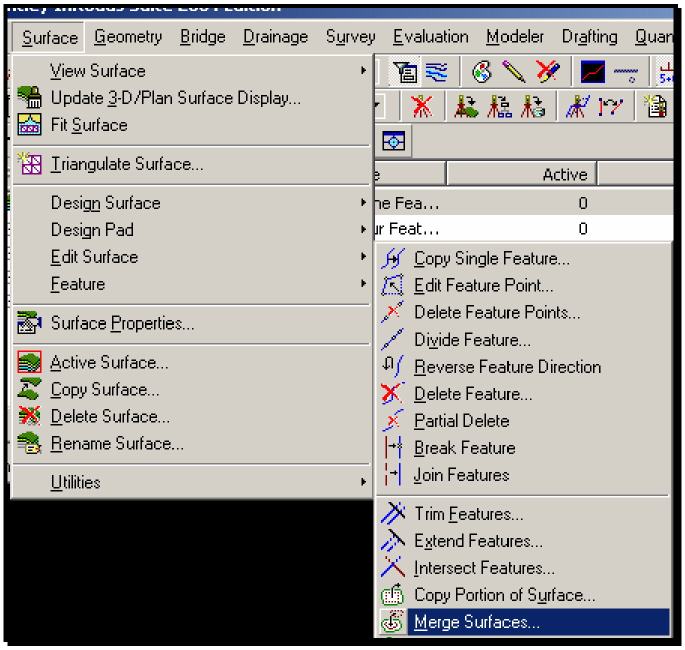


Figure 5-166: Open Merge Surface dialog from InRoads menu.

Step Three: Adjust Dialog and Click Apply

Set *Original* to **Ground-only**, set *Design* to **Mapping-only** and set the *Destination* to **Ground** (Figure 5-167).

Select the *Retain All Original Surface Points* and the *Retain Features Excluded from Triangulation* options. Un-check the *Add Design Surface Edge as Breakline.* Select **Rename** in the *Duplicate Names* option.

Click **Apply** and then close the dialog.

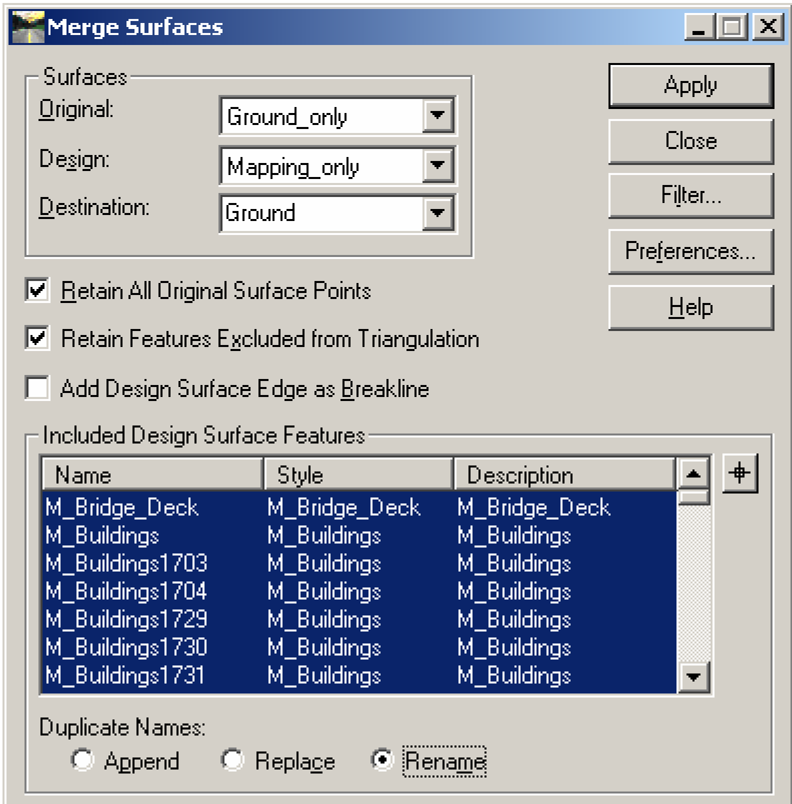


Figure 5-167: Merge Surface dialog with appropriate settings.

Step Four: Delete the Exterior and Interior Features

When the merging happened, the *Exterior* and *Interiors* from the *Ground_only* were added to the combined *Ground.dtm.* They will have to be deleted in order to triangulate the combined surface.

Part One: Select Delete Features

Select **Surface>Edit Surface>Delete Features** from the InRoads menu (Figure 5-168).

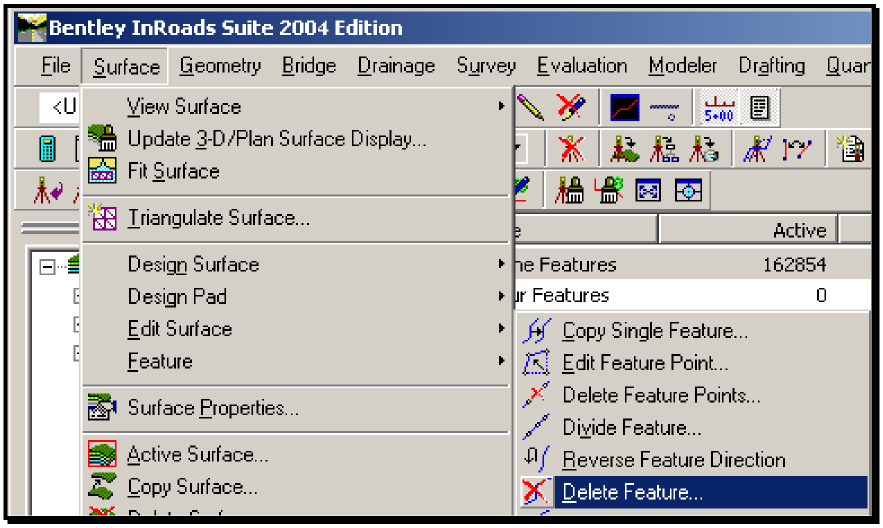


Figure 5-168: Select Delete Features from the InRoads menu.

Part Two: Set Surface to Ground

Set the *Surface* to **Ground.**

Part Three: Select Features

Select the *Exterior* and any *Interior* features from the **Ground** surface (Figure 5-169). Hold **Ctrl** key to select multiple files.

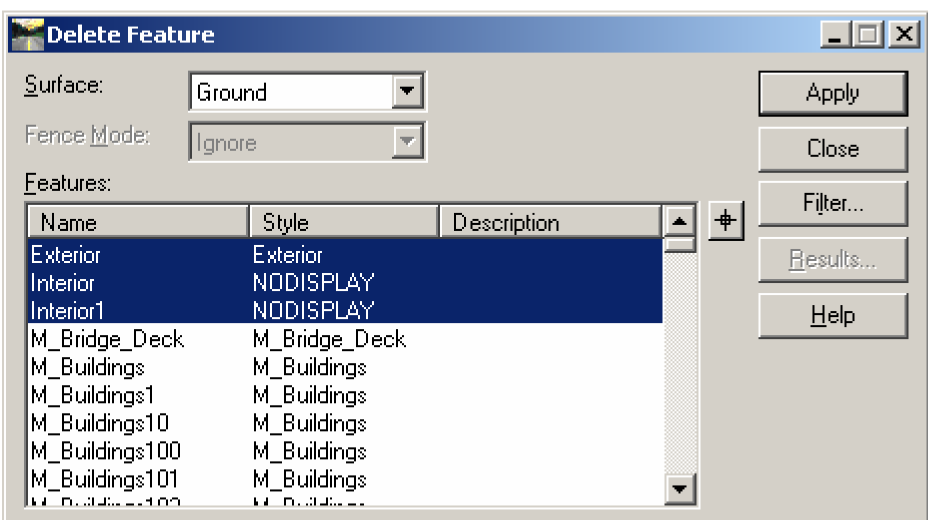


Figure 5-169: Delete Features dialog with correct settings.

Part Four: Click Apply

Click **Apply.** Click **OK** (Figure 5-170).

Figure 5-170: Delete Features OK or Cancel dialog.

Allow time to process. When processing is complete, the dialog will return.

Step Five: Open Triangulate Surface dialog

Select **Surface>Triangulate Surface** from the InRoads menu (Figure 5-171).

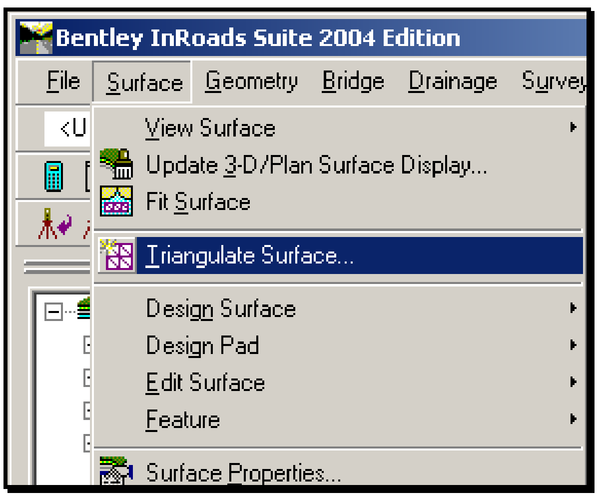


Figure 5-171: Open Triangulate Surface dialog from InRoads menu.

Step Six: Adjust Dialog and Click Apply

Set the *Surface* to **Ground** (Figure 5-172). Set the *Maximum Length* to 100. Click **Apply** and then **Close.**

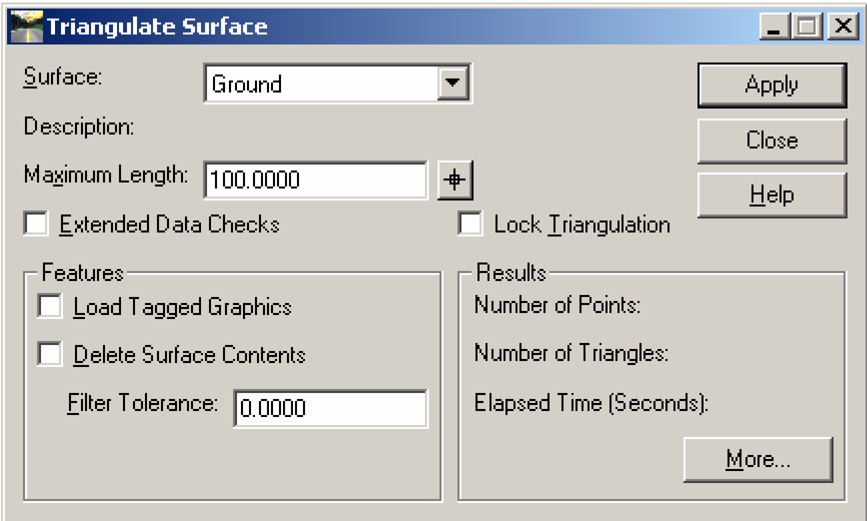


Figure 5-172: Triangulate Surface dialog.

Step Seven: Check Results

Part One: Clear Display

Select **Edit>Select All** from the MicroStation menu. Click the *Delete Element* tool or the *Delete* key on the keyboard.

Part Two: Display Triangles

Select **Surface>View Surface Triangles** from the InRoads menu (Figure 5-173).

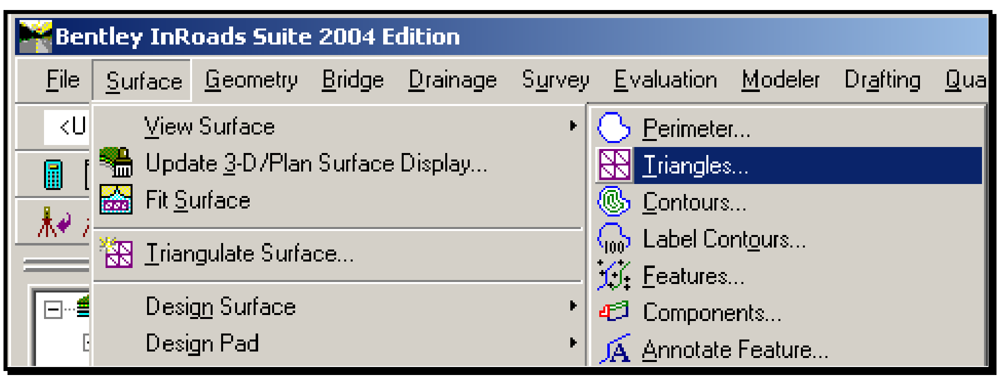


Figure 5-173: Open View Surface Triangles from InRoads menu.

Set the Surface to **Ground** and click **Apply** (Figure 5-174). Close the dialog.

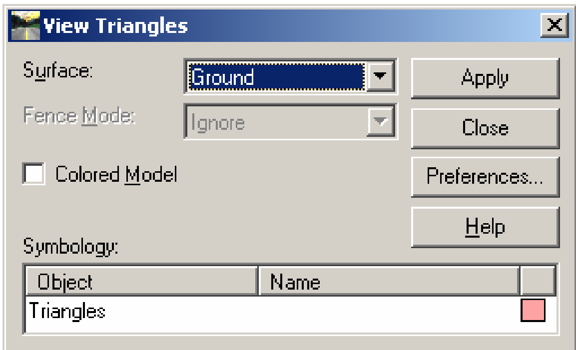


Figure 5-174: View Triangles of the Ground surface.

Part Three: Check common points along triangulation

Using your middle mouse button, snap to the corners of triangles near common points along triangulation. The status bar in MicroStation will display the X, Y, Z values (Figure 5-175). Notice the difference in elevation "Z". They should be close.

Figure 5-175: Status bar at bottom of MicroStation window.

Part Four: Render the model with Phong (Optional)

One of the view control icons is a yellow lightning bolt (Figure 5-176) "Change a view's display mode".

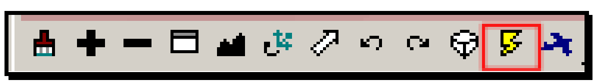


Figure 5-176: MicroStation View Controls.

Click the icon to open the *Set View Display Mode* dialog (Figure 5-177). Turn on *Graphics Acceleration.* Change the *Display Mode* to **Phong.**

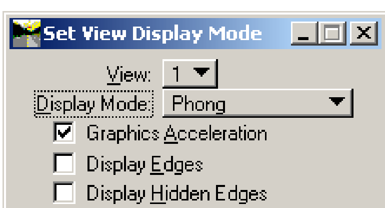


Figure 5-177: Set View Display Mode dialog.

Use the *Pan View* tool with *Dynamic Display* to pan around in the view (Figure 5-178).

Figure 5-178: Pan View Tool Settings dialog.

Use the *Rotate View* tool with the *Method* set to *Dynamic* and *Dynamic Display* as well to rotate the view (Figure 5-179).

Figure 5-179: Rotate View Tool Settings dialog.

If the lighting is too dark on the model, select **Settings>Rendering>Global Lighting** from the MicroStation menu. Place a check in the *Ambient* option and adjust the *Intensity* by either entering a value or using the slider bar (Figure 5-180).

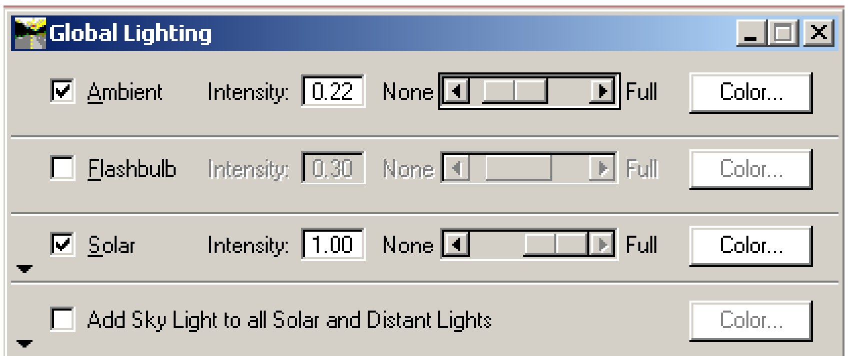


Figure 5-180: Global Lighting dialog.

To return to a top view, use the *Rotate View* tool and set the *Method* to **Top** (Figure 5-181).

Figure 5-181: Rotate View with method set to top.

Part Five: View Combined Surface (Optional)

Clear the display by selecting **Edit>Select All** from the MicroStation menu. Hit the **Delete** key on your keyboard.

Select **Surface>View Surface>Features** from the InRoads menu. Set **Ground** as the *Surface*. Click **Apply** then allow time to process. Select **Close.**

Step Eight: Save Ground.dtm

Browse to the **Surface** tab. Right click the **Ground** surface and select **Save.** If this is an update, you may be prompted to overwrite the *Ground* surface.

CREATE MAPPING PROJECT DELIVERABLES

CREATE COMBINED DELIVERABLES

Create Triangles.dgn

- ✓ ***Refer to page 5-67 for detailed instructions for creating a Triangles.dgn from the Ground.dtm which is the combined surface of Ground_only and Mapping_only.***

Create Contours.dgn

- ✓ ***Refer to page 5-82 for detailed instructions for creating a Contours.dgn from the Ground.dtm which is the combined surface of Ground_only and Mapping_only.***

CREATE THE 3DMAPPINGMMDDYY.DGN FILE

Step One: Make a 3DMappingDate File

Select **File>Make Sheetz** from MicroStation's main menu. Select a **No Prefix** drawing (Figure 5-182). Select **OK.**

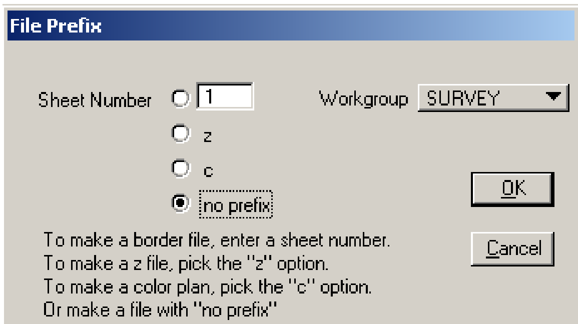


Figure 5-182: Make Sheetz dialog with No Prefix selected

- Users may need to move the InRoads dialog to display the *Make Sheetz* File Prefix dialog.
- The default *Workgroup* should be set to Survey for all Survey users. If not, contact CADD Support.

Step Two: Select 3DMapping

In the *Create File of Type…* dialog, select **3DMapping** and click **OK** (Figure 5-183).

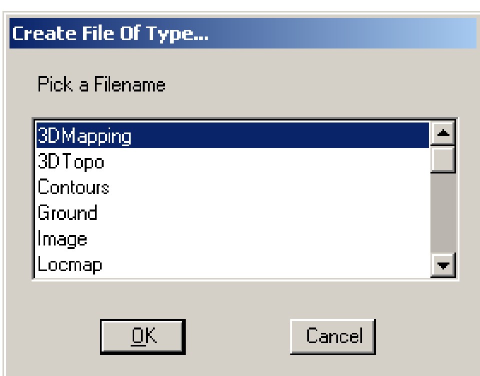


Figure 5-183: Create File of Type dialog with 3DMapping selected

Step Three: Add Date to File

In the *Make File* dialog, enter the date as MMDDYY (i.e. 091907) as seen in Figure 5-184. Click **OK.** Click **Cancel** to stop making sheets.

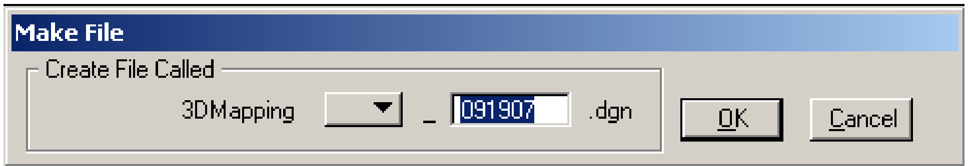


Figure 5-184: Enter date in the text field as MMDDYY

ⓘ ***This creates the new drawing using the correct seed file and opens the newly created file.***

Step Four: View Mapping Features

Part One: Open Mapping _only Surface

Open the **Mapping_only** surface if not already opened.

Part Two: View Surface Features

Select **Surface>View Surface>Features…** from the InRoads main menu (Figure 5-185).

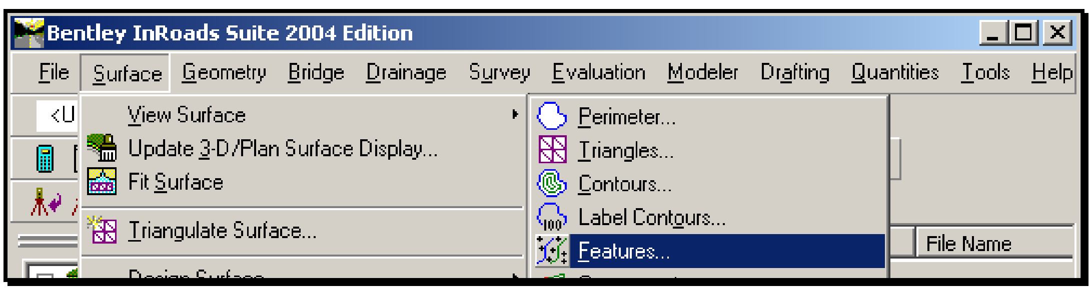


Figure 5-185: View Surface>Features from InRoads main menu.

Part Three: Click Apply

Set the *Surface* pull down to **Mapping_only.** Click **Apply** and then **Close** (Figure 5-186). Fit the view and select **File>Save Settings** from the MicroStation menu.

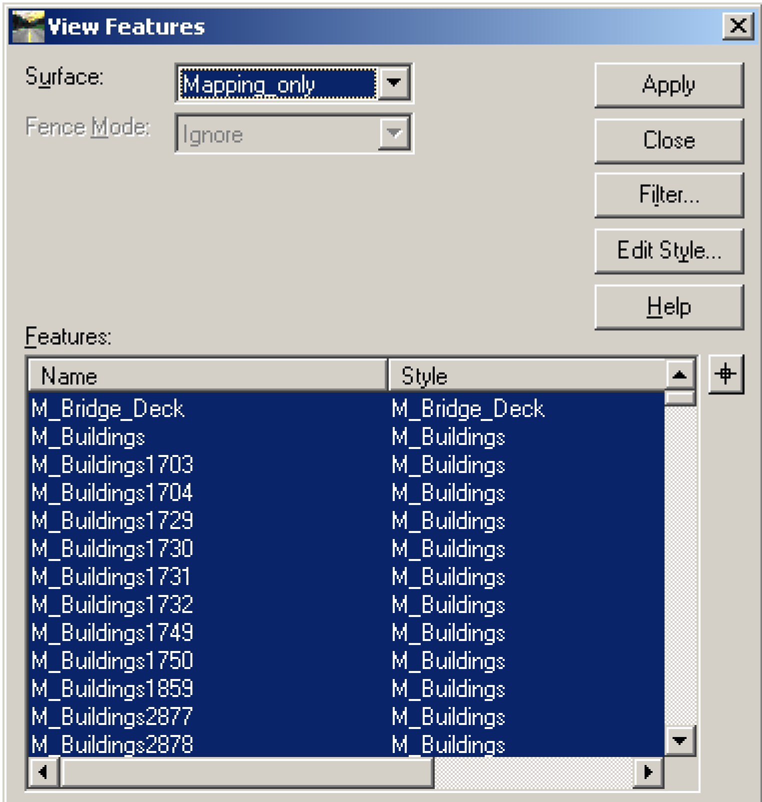


Figure 5-186: View the Features for the Mapping_only surface.

Step Five: Mapping Text?

In the majority of cases there is no mapping text. If one was supplied, most likely it was supplied as a .dgn file. Open the mapping text.dgn and display the perimeter from the **Ground_only.dtm** and use the shape to create a fence by element and delete inside the fence.

FIX BUILDINGS IN MAPPING DATA

FIX BUILDINGS THAT WERE LOCATED FROM MAPPING DATA

Overview

Buildings located during the mapping process are occasionally defined by the roof edges or as segmented lines and may have elevations defined as -999. If not corrected prior to triangulation of the final Ground surface, triangles are generated inside of the buildings thus impacting the cross sections.

♬ Not all mapping buildings are defined in such a way as to impact the Ground Surface triangles but if they do, the following steps should eliminate the interior triangles.

Step One: Delete M_Building Features

With InRoads running, display the Ground.dtm in the Survey.dgn. Select **Surface**>**Edit Surface>Delete Feature…** from the InRoads main menu (Figure 5-187).

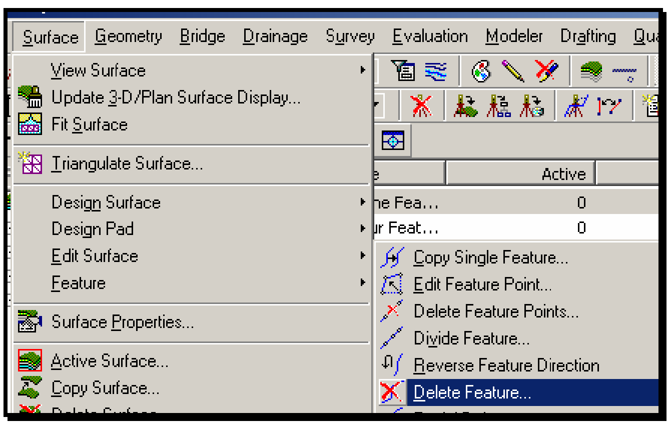


Figure 5-187: Select Surface>Edit Surface>Delete Feature… from the InRoads menu.

Set the *Surface* pull down to **GROUND.** In the *Features* portion of the dialog (Figure 5-188), select all of the **M_Buildings** only (using Ctrl. And/or Shift keys). Click **Apply.**

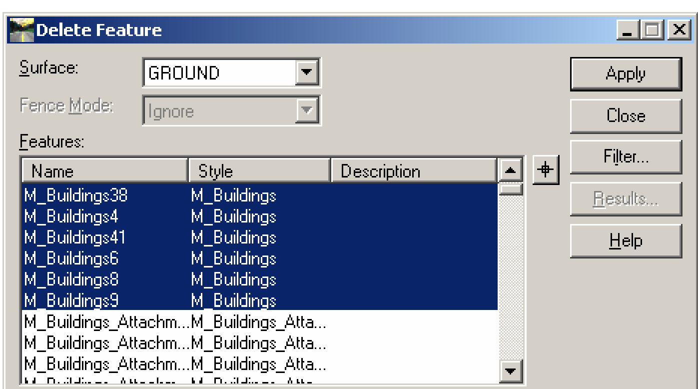


Figure 5-188: Select all M_Buildings features.

At the warning message (Figure 5-189), click **OK.**

Figure 5-189: Warning message asking if you're sure you want to delete features.

When brought back to the *Delete Feature* panel, click **Close.**

Step Two: Re-Triangulate Ground Surface

The Ground Surface will need to be re-triangulated so that the building features can be draped to the correct surface elevations when imported back into the Ground Surface.

Select **Surface>Triangulate Surface…** from the InRoads menu (Figure 5-190).

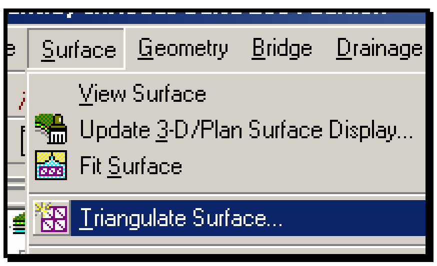


Figure 5-190: Select Surface>Triangulate Surface… from the InRoads menu.

Set the dialog to match the image in Figure 5-191.

Surface: **Ground**.

Maximum Length: **100**

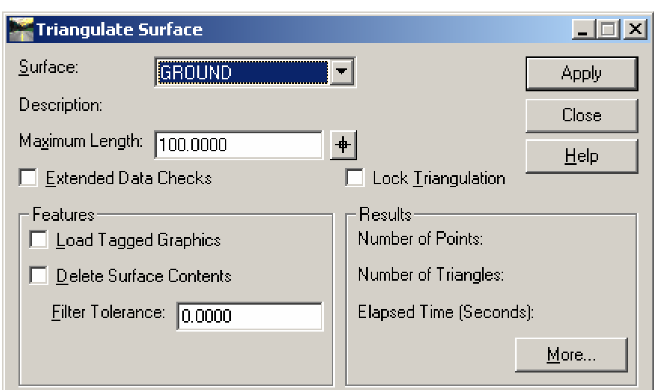


Figure 5-191: Triangulate Surface dialog.

Click **Apply** and then **Close.**

Step Three: Isolate M_Buildings in Mapping.dgn

Part One: Open 3DMapping.dgn

Open the original 3dmapping.dgn that was MxChanged for InRoads by selecting **File>Open** from the MicroStation menu (Figure 5-192).

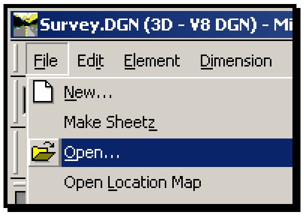


Figure 5-192: Select File>Open from the MicroStation menu.

Select the latest **3dmapping_Date.dgn** in the *Open* dialog box and click **OK** (Figure 5-193).

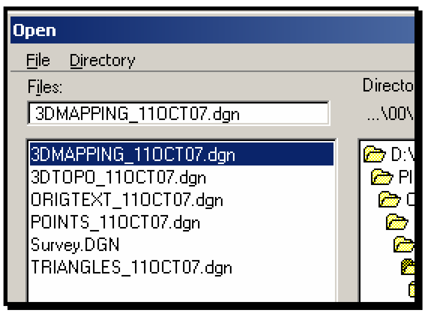


Figure 5-193: Select the 3dmapping.dgn in the Open dialog box.

Part Two: Isolate Building Level

Using the *Level Display* tool (Figure 5-194), set the active level to **M_Buildings** by double-clicking on that level name in the list of levels (Figure 5-195).

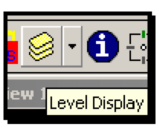


Figure 5-194: Level Display icon in the Primary tool box in MicroStation.

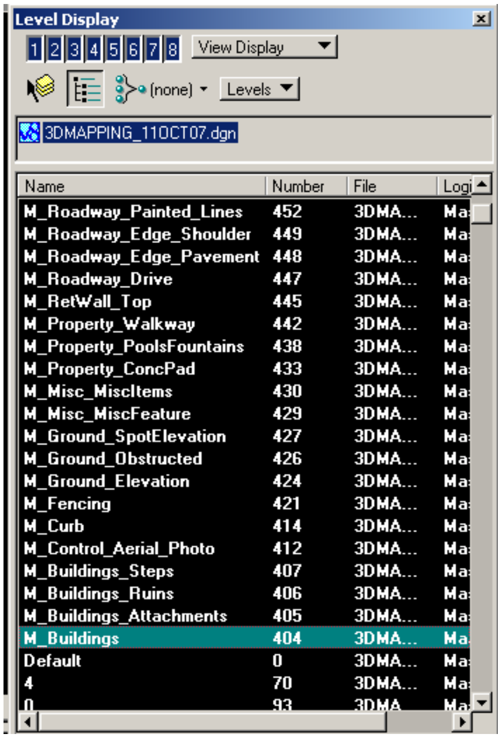


Figure 5-195: Double-click on the M_Buildings level.

♫ The active level in the list will be light blue or teal in color.

Right-click in the level names area in the *Level Display* panel and select **All Off** (Figure 5-196). This will leave only the buildings displayed. Close the *Level Display* dialog.

Figure 5-196: Right-click in the level names area in the Level Display panel and select All Off.

Step Four: Close Buildings (if necessary)

All buildings will need to closed (at least 4 sides) before importing them into InRoads. The following procedures are tips for those not familiar with the MicroStation tools.

Part One: Set Category Scale

Right-click in the Settings manager area and choose Category -> Scale… (Figure 5-197).

Figure 5-197: Setting the Category Scale.

Select the correct scale and click **OK** (Figure 5-198).

♫ For standard MaineDot work use 1in. = 25ft (1 in. = 50 ft. for 50 scale).

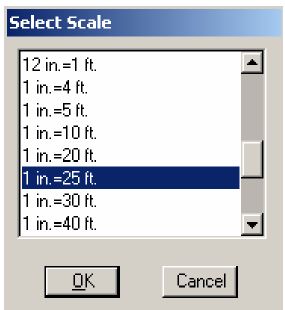


Figure 5-198: Select Scale dialog.

Part Two: Set Symbology

Click on the *Match Element Attributes* icon (Figure 5-199) and then click on a building on the screen to set the M_Buildings linestyle.

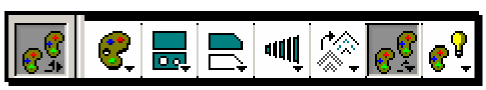


Figure 5-199: Match Element Attributes tool.

The Match Element Attributes dialog should look like the screen capture in ???.

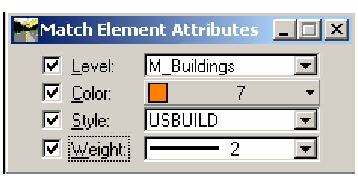


Figure 5-200: Match Element Attributes dialog.

Part Three: Close Buildings

Using the Place Smart line tool (Figure 5-201), connect the missing legs of the building using the follow method to keep the sides square.

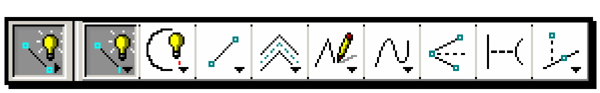


Figure 5-201: SmartLine tool.

Snap and Accept to the end of the building line (or left click if using AccuSnap) to set the first data point (Figure 5-202).

Figure 5-202: First point at the end of the building line.

Type **RQ** from the keyboard to adjust the rotation of the AccuDraw compass. Click back along the same line to define the rotation (Figure 5-203).

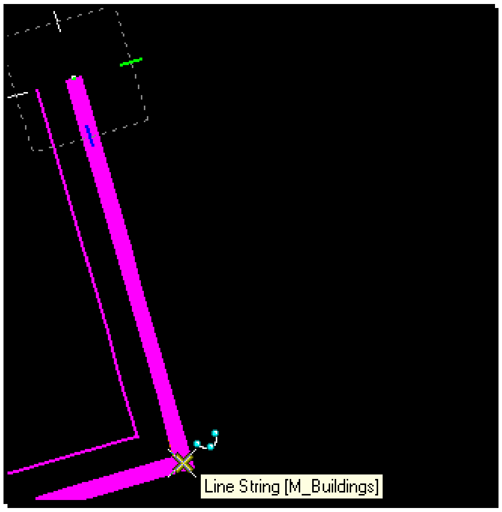


Figure 5-203: AccuDraw compass aligned with the side of the building.

Move the cursor in the direction required to draw the line. The line hi-lights as it follows along the 90 degree axis (Figure 5-204).

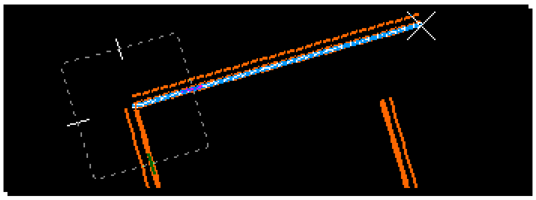


Figure 5-204: Line drawn perpendicular to the building edge.

Hit Enter on the keyboard to hold the correct direction and move the cursor down to the connecting point of the adjoining line (Figure 5-205).

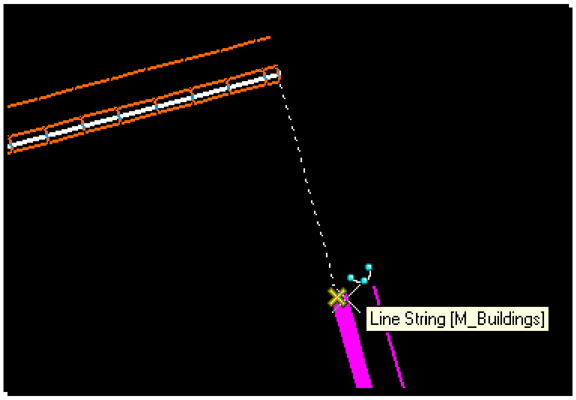


Figure 5-205: Line extended to the new building corner.

Left click once on the data point. This will define the length of the line drawn along the first leg of the building. A second left-click will draw the last leg of the building to the disconnected building edge (Figure 5-206). Right click (reset) to stop drawing this line.

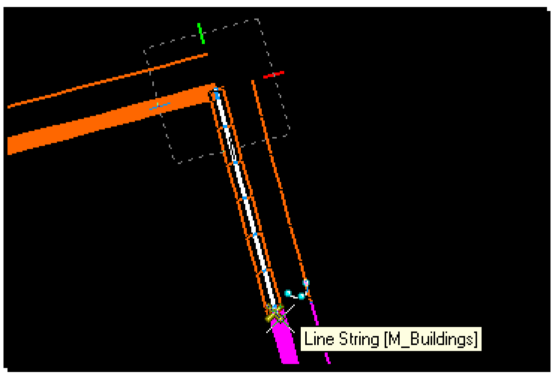


Figure 5-206: Connect to the existing building line.

Part Four: Create a Region (Closed Shape)

Use the Create Region tool (Figure 5-207) to make a closed shape of the modified building (Group>Groupings>Create Region from the MicroStation menu).

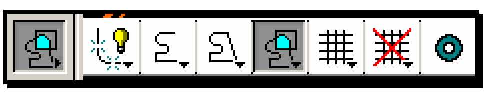


Figure 5-207: Create Region tool.

Select Flood on the Create Region panel (Figure 5-208).

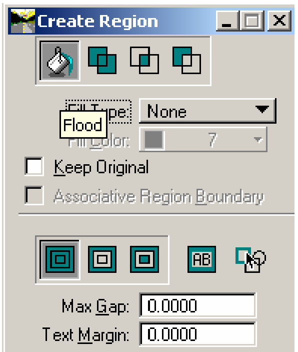


Figure 5-208: Flood method selected.

Follow the prompts at the bottom of the MicroStation panel (Figure 5-209) and left click inside the building. The area inside of the building should highlight (Figure 5-210).

Figure 5-209: Prompt from MicroStation to enter data point.

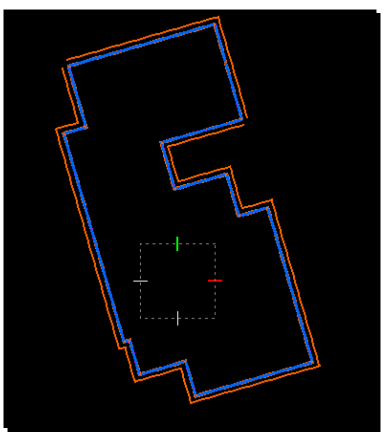


Figure 5-210: Verification that the command worked.

Left click again to Accept the Create Region command (Figure 5-211) as prompted.

Figure 5-211: Prompt from MicroStation to Accept the Create Region command.

Part Five: Adjust Building Linestyle

The scale of the line may be affected by the Flood tool. To change it back to the correct scale, select the *Change Element Attributes* tool (Figure 5-212) or select **Qualities>Change>All** from the MicroStation menu.

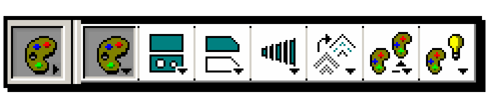


Figure 5-212: Change Element Attributes tool.

Follow the prompts at the bottom of the MicroStation panel (Figure 5-213) and left click to identify the element.

Figure 5-213: Prompt from MicroStation to Identify an Element.

Left click once more to Accept the change (Figure 5-214).

Figure 5-214: Prompt from MicroStation to Accept the Element.

Example before the change (Figure 5-215).

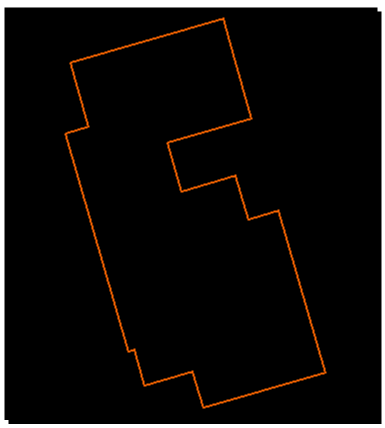


Figure 5-215: Improper linestyle before the change.

Example after change (Figure 5-216).

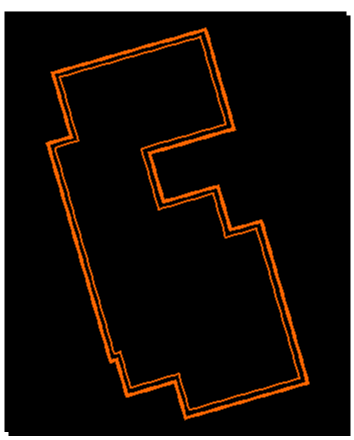


Figure 5-216: Proper linestyle after the change.

Part Six: Repeat

Repeat the steps for all buildings that are open.

CREATE A BUILDINGS SURFACE

Step One: Create Building Surface

In the *InRoads Explorer*, create a new surface called **Buildings** by right-clicking on the *Surfaces* name and select **New…** from the pop up menu (Figure 5-217).

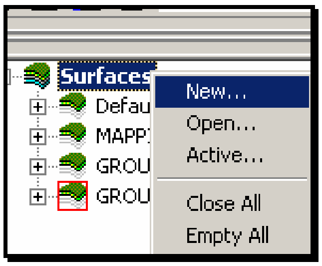


Figure 5-217: Right click on the word Surfaces and select New.

In the *New* dialog box enter **Buildings** in the *Name:* field text box (Figure 5-218). Click **Apply** and then **Close.**

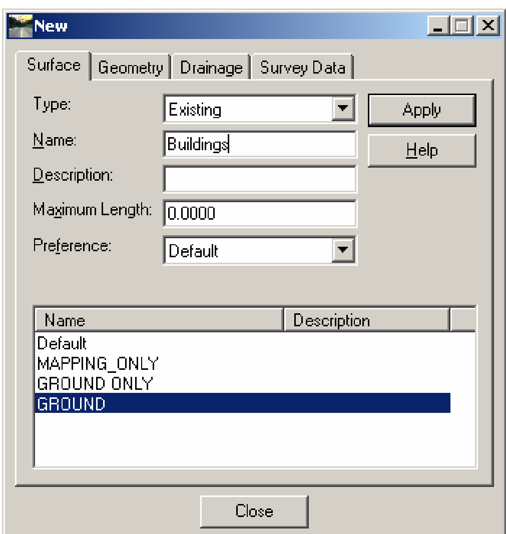


Figure 5-218: Enter Buildings in the Name field.

Step Two: Place a fence around buildings

Select the Place Fence tool (Figure 5-219) from the MicroStation toolbar. The *Method* should be set to **Block** and *Mode* to **Inside** (Figure 5-220). Fit the view and place a fence by two corners encompassing all of the buildings.

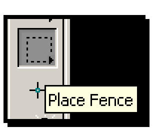


Figure 5-219: Place Fence icon.

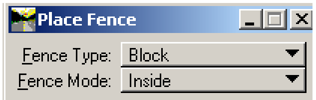


Figure 5-220: Fence Tool Settings dialog.

Step Three: Import into Surface

Select **File**>**Import**>**Surface Advanced…** from the InRoads menu (Figure 5-221).

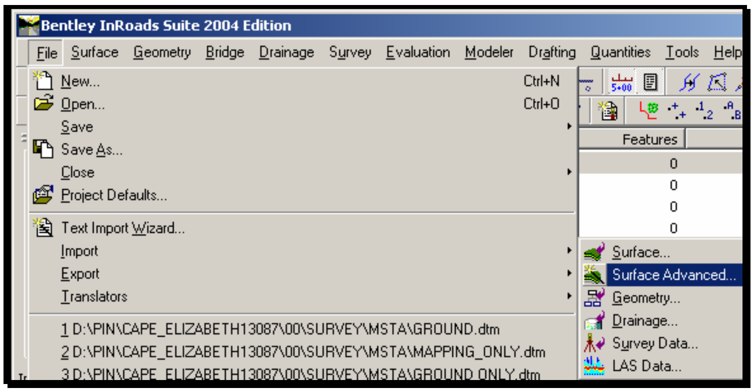


Figure 5-221: Select File>Import>Surface Advanced… from the InRoads menu.

Set the *Import Surface Advanced* panel to match the following criteria as seen in Figure 5-222.

Surface: **Buildings**

Load From: **Fence**

Intercept Surface: **Default**

Rule Set Name: **MeDOT Translation Mapping**

Click **Apply** and then **Close.**

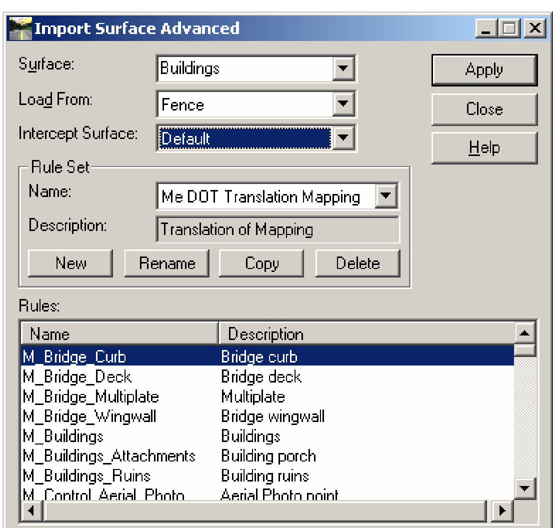


Figure 5-222: Import Surface Advanced dialog set to import mapping buildings.

Step Four: Adjust Level Display

Open *Level Display* (Figure 5-223).

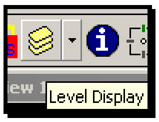


Figure 5-223: Level Display tool in the Primary Toolbar.

Right-click in the level names area in the *Level Display* panel (Figure 5-224) and select **All On**, then close the dialog panel.

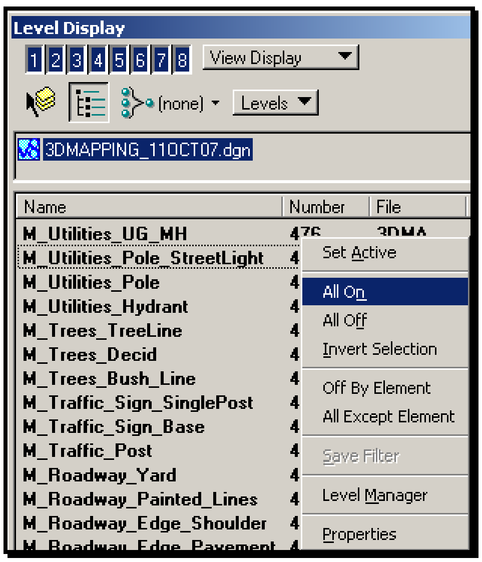


Figure 5-224: Right click and select All On.

VIEW BUILDING SURFACE FEATURES

Step One: Open Survey.dgn

Select **File>Open** from the MicroStation main menu (Figure 5-225).

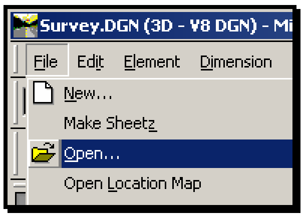


Figure 5-225: Select File>Open from the MicroStation menu.

Select the **Survey.dgn** in the *Open* dialog box (Figure 5-226) and click **OK.**

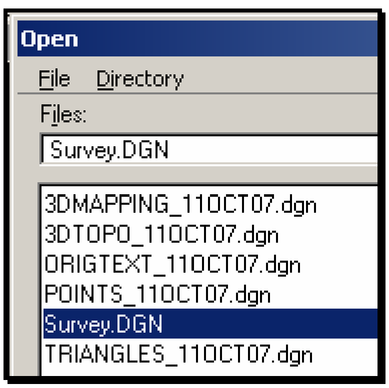


Figure 5-226: Select the Survey.dgn file and click OK.

Step Two: Clear Display (If Necessary)

Select **Edit>Select All** from the MicroStation main menu. Select the **Delete** key on the keyboard or select **Zip>Delete** from the MicroStation menu.

Step Three: View Building Features

Select **Surface>View Surface >Features** from the InRoads menu (Figure 5-227).

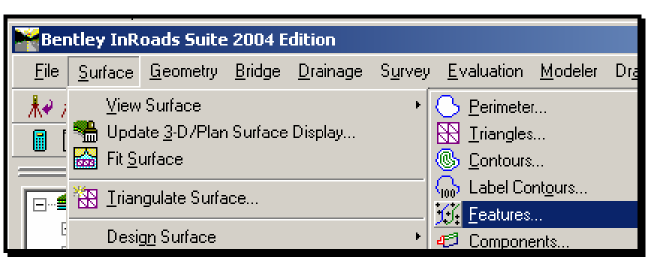


Figure 5-227: Select Surface>View Surface>Features from the InRoads menu.

On the *View Features* dialog (Figure 5-228), set the *Surface* to **Buildings** click **Apply** and then **Close.**

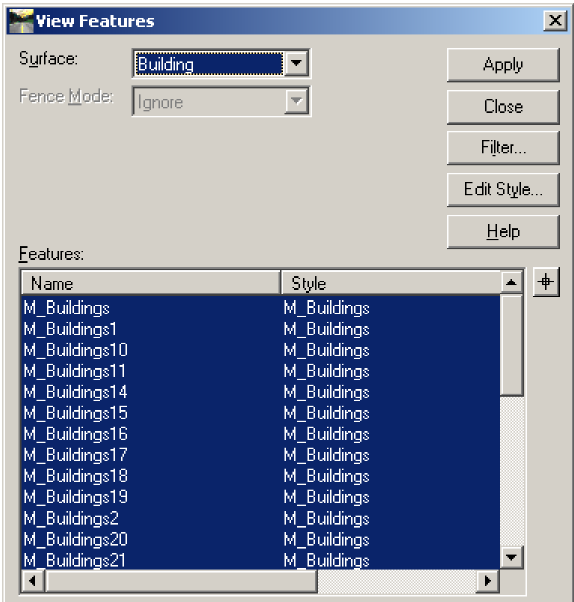


Figure 5-228: View Features dialog.

ADJUST GROUND SURFACE PERIMETER/EXTERIOR

Select **Surface>View Surface>Perimeter** from the InRoads menu (Figure 5-229).

Figure 5-229: Select Surface>View Surface>Perimeter from the InRoads menu.

Set the *Surface* name to **Ground** (Figure 5-230), click **Apply** and then **Close.**

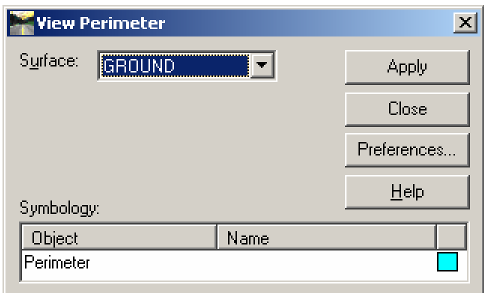


Figure 5-230: View Perimeter dialog.

Step One: Modify Perimeter (If Necessary)

Examine the *Perimeter* around the outside of the buildings. Modify the perimeter so that the buildings are not cut off by the perimeter/exterior line.

From the Modify Tool Bar, select the **Insert Vertex** icon (Figure 5-231).

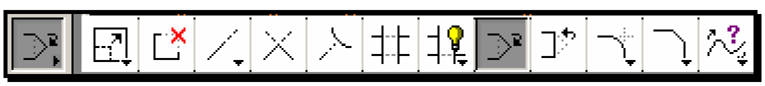


Figure 5-231: Insert Vertex icon from the Modify Tool Bar.

Following the prompts at the bottom of the MicroStation panel, select the Perimeter/Exterior from the screen. Click on the screen to place the new vertex (Figure 5-232).

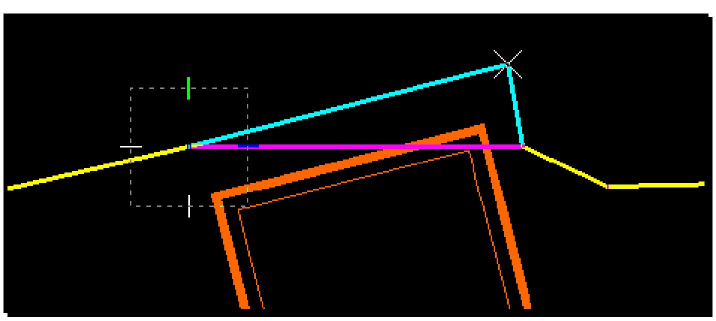


Figure 5-232: Adjusting the Perimeter around the buildings.

Utilizing the various tools, fix the remaining points on the Perimeter/Exterior

Step Two: Import the modified Perimeter/Exterior

Overview

If an adjustment to the *Perimeter* was required, the old *Perimeter* in the **Ground** surface will have to be deleted. The new modified *Perimeter* will need to be imported as the new *Exterior*. This *Exterior* will now control the *Triangulation* of the Ground surface.

Part One: Delete Old Exterior/Perimeter

Select **Surface>Edit Surface>Delete Feature** from the InRoads menu (Figure 5-233).

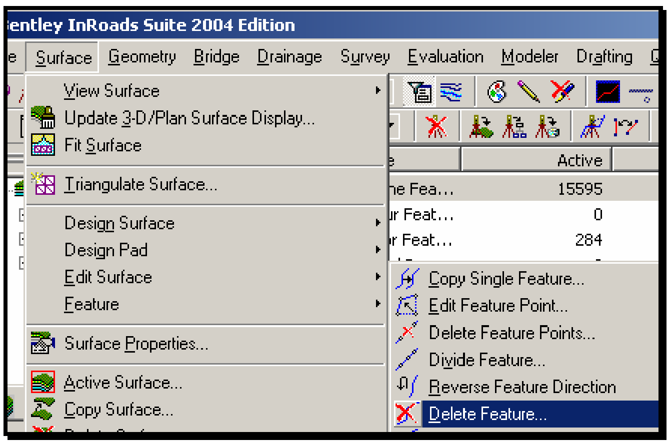


Figure 5-233: Surface>Edit Surface>Delete Feature from the InRoads menu.

Select the **Exterior** feature only in the *Features* portion of the *Delete* dialog (Figure 5-234). Click **Apply** and then **Close.**

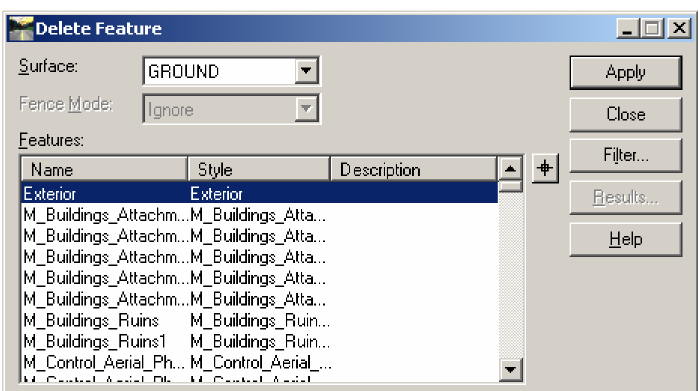


Figure 5-234: Exterior selected from the Delete Features dialog.

Part Two: Import Modified Perimeter

Select **File>Import>Import Surface…** from the InRoads menu (Figure 5-235).

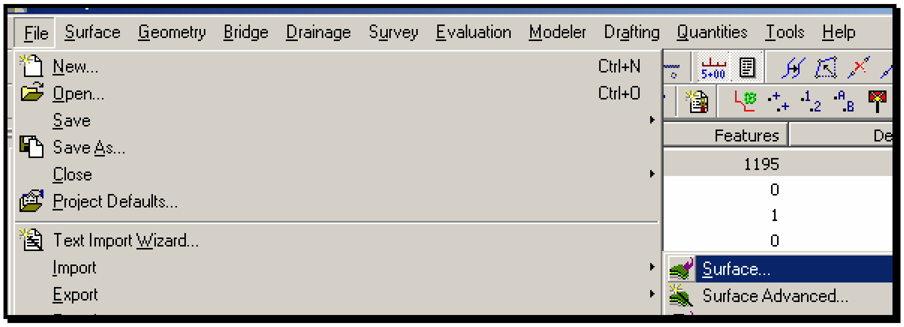


Figure 5-235: Select File>Import>Import Surface… from the InRoads menu.

On the *Import Surface* panel set the following selections as seen in Figure 5-236.

Surface: **Ground**

Load From: **Level**

Elevations: **Use Element Elevations**

Seed Name: **Exterior**

Feature Style: **Exterior**

Point Type: **Exterior**

Click **Apply** and then **Close.**

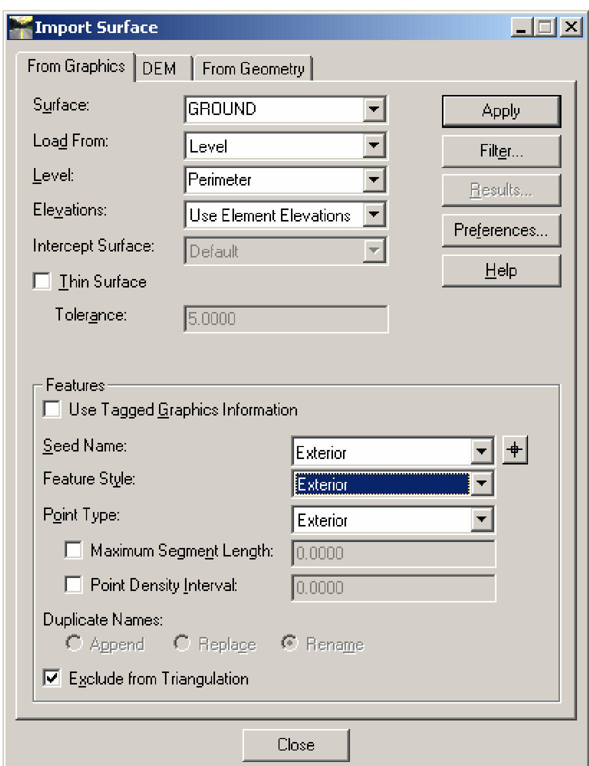


Figure 5-236: Import Surface dialog properly adjusted.

Step Three: Re-Triangulate Ground

Overview

The Triangles can be re-generated with the newly adjusted Perimeter/Exterior and the buildings can be *Draped* to the surface.

Part One: Re-triangulate Surface

Triangulate the **Ground** surface again, now that it will encompass the mapped buildings. Select **Surface>Triangulate Surface** from the InRoads menu (Figure 5-237).

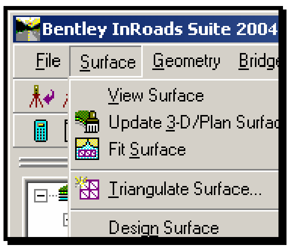


Figure 5-237: Select Surface>Triangulate Surface from the InRoads menu.

Select **Ground** as the *Surface* and set the *Maximum Length* to 100 (Figure 5-238). Click **Apply** and then **Close.**

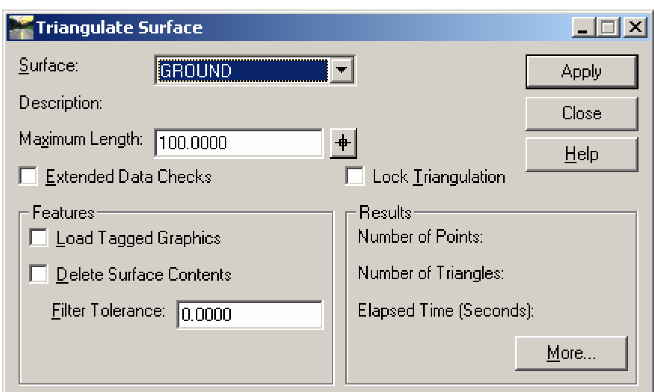


Figure 5-238: Ground Surface with Maximum Length of 100 feet.

Part Two: View the triangles

Select **Surface>View Surface>Triangles** from the InRoads menu (Figure 5-239).

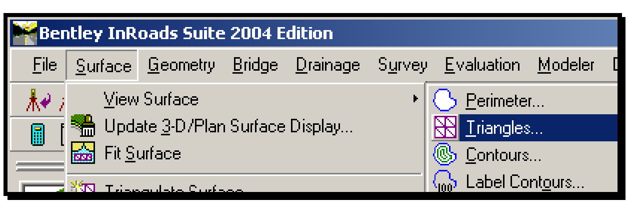


Figure 5-239: Select Surface>View Surface>Triangles from the InRoads menu.

Set the *Surface* to **Ground** (Figure 5-240). Click **Apply** and then **Close.**

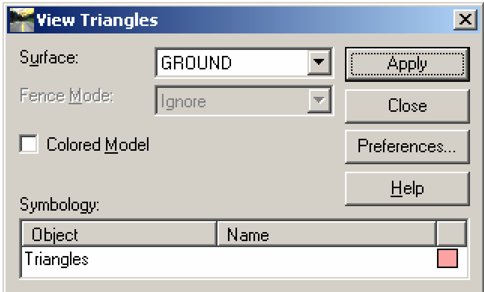


Figure 5-240: Set the Surface to Ground.

Verify visually that the generated Triangles are correct. Make changes if needed and repeat the above instructions. To complete, follow the standard procedures outlined in the instructions for processing Mapping data.

DRAPE BUILDINGS TO GROUND SURFACE

♬ The *Drape to Surface* command will copy the features **M_Buildings** from the Buildings.dtm to the Ground surface.

Step One: Drape Surface

Select **Surface>Design Surface**>**Drape Surface…** from the InRoads main menu (Figure 5-241).

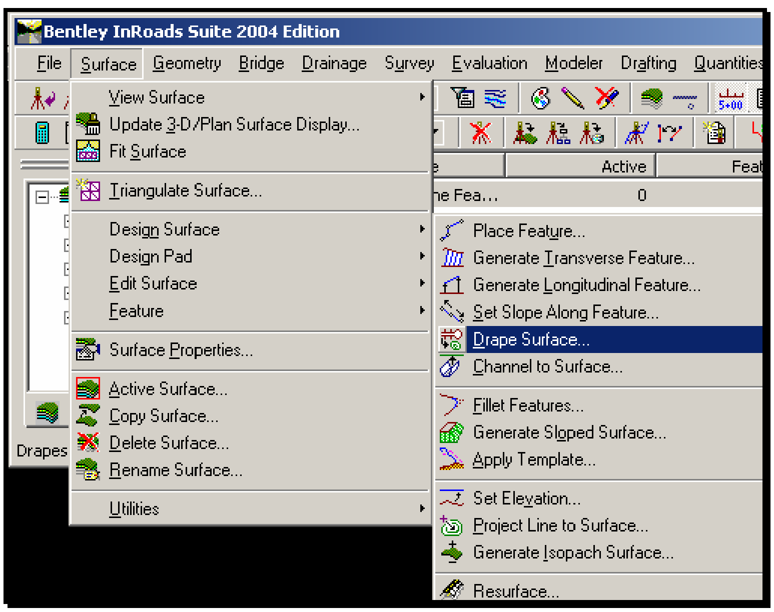


Figure 5-241: Select Drape Surface from the InRoads menu.

On the Drape Surface dialog, verify that **Features** is the method of location (Figure 5-242).

Figure 5-242: Current Locate Mode is set to Features.

If it is not, this can be changed by toggling to *Features from Graphics* by just clicking on the button located on the InRoads *Locks* toolbar (Figure 5-243). Locate Mode is set to *By Graphics* when the icon looks like the screen capture in Figure 5-244 and set to *By Features* as displayed in Figure 5-245.

Figure 5-243: Locks tool bar.

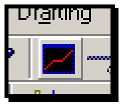


Figure 5-244: Set to Locate by Graphics.

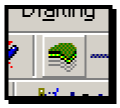


Figure 5-245: Set to Locate by Features.

Set the *Drape Surface* panel to match the dialog in Figure 5-246.

Destination Surface: **Ground**

Surface: **Buildings**

Right click and **Select All** the *Features* in the list. Click **Apply** and then **Close.**

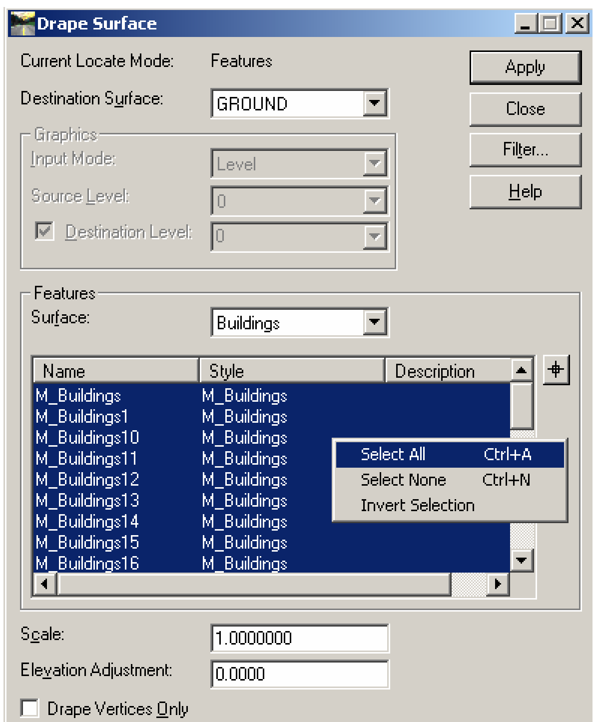


Figure 5-246: Drape Surface dialog set properly.

Step Two: Display Ground Features

Clear the display by selecting **Edit>Select All** and clicking the **Delete Element** tool or the delete key on your keyboard.

Set the *Ground* surface to be active by browsing to the Surface tab and right clicking the *Ground* surface and selecting **Set Active** (Figure 5-247).

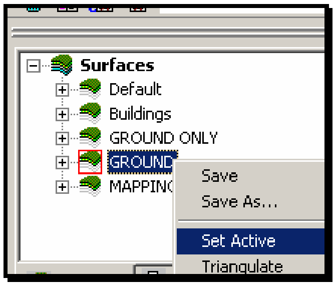


Figure 5-247: Set the Ground Surface Active.

Select **Surface>View Surface >Features** from the InRoads menu (Figure 5-248).

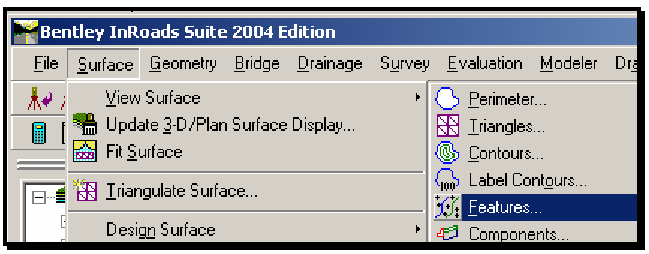


Figure 5-248: Select Surface>View Surface> Features.

Click **Apply** and then **Close** on the *View Features* dialog (Figure 5-249).

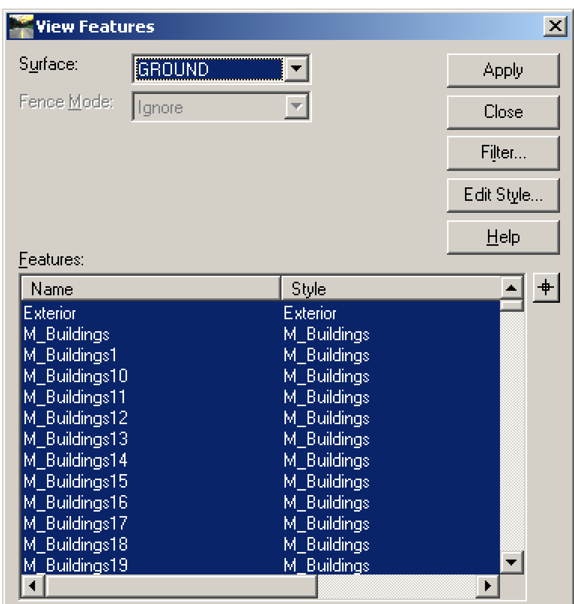


Figure 5-249: View Features dialog with Ground Surface selected.

Step Three: Re-Triangulate Ground

Overview

The Triangles can be re-generated with the buildings *Draped* to the surface. The buildings are *Interior* features and will not have triangles inside their enclosed shapes.

Part One: Re-triangulate Surface

Triangulate the **Ground** surface again, now that the mapped buildings are in the surface. Select **Surface>Triangulate Surface** from the InRoads menu (Figure 5-250).

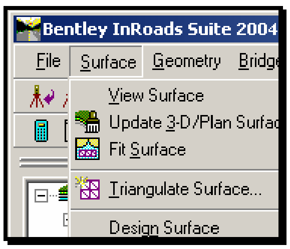


Figure 5-250: Select Surface>Triangulate Surface from the InRoads menu.

Select **Ground** as the *Surface* and set the *Maximum Length* to 100 (Figure 5-251). Click **Apply** and then **Close.**

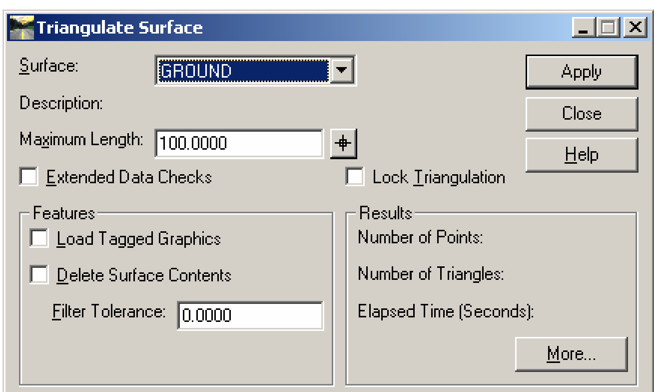


Figure 5-251: Ground Surface with Maximum Length of 100 feet.

Part Two: View the triangles

Select **Surface>View Surface>Triangles** from the InRoads menu (Figure 5-252).

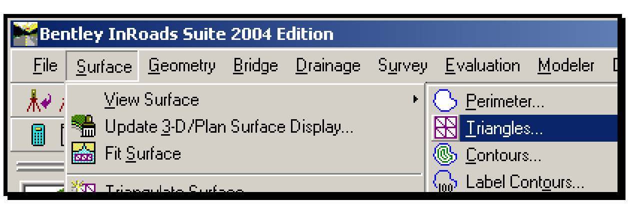


Figure 5-252: Select Surface>View Surface>Triangles from the InRoads menu.

Set the *Surface* to **Ground** (Figure 5-253). Click **Apply** and then **Close.**

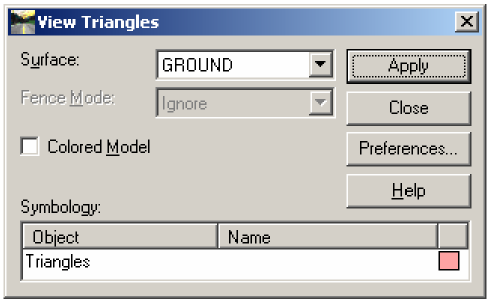


Figure 5-253: Set the Surface to Ground.

Verify visually that the generated Triangles are correct. Make changes if needed and repeat the above instructions. To complete, follow the standard procedures outlined in the instructions for processing Mapping data.

CREATE TOPO UPDATE DELIVERABLES (GROUND SURVEY)

OVERVIEW

Similar Procedures

There are many similar procedures when it comes to creating original deliverables and creating topoadd deliverables. To avoid duplication, we may reference previously documented steps that are identical to the steps required to process the additional deliverables.

Topography Update Deliverables

InRoads Survey Editing

After the additional survey is completed, the Survey Editors will do the necessary InRoads editing. This editing will be similar to procedures done previously in MX.

Recreate/Overwrite Surfaces

Save Exterior and Interior(s) – Create a surface called **Exterior** and copy previously saved **Exterior** and **Interior(s)** into the surface to control triangulation of new Ground surface. Can be written to displayed and combined to new area limiting the need to clean-up original triangles.

Ground.dtm - Recreate/overwrite the **Ground** surface**.** This is should always be the latest and greatest surface that is used to design from. It will be a combination of all updates, whether mapping or additional ground survey.

Ground_only.dtm – Aerial Mapping project will require that the user recreate/overwrite the Ground_only.dtm surface**.** This is should always be the latest and greatest surface that is a combination of all ground survey updates.

Mapping_only – Aerial Mapping project will require that the user overwrite the Mapping_only.dtm surface**.** This is should always be the latest and greatest mapping surface. Each ground survey update will create holes in the mapping data that will be filled in by the ground surface.

Create MicroStation Deliverables (Adds)

Create the following drawings and place them in the y:\pin\####\##\Survey\Msta folder.

Follow the InRoads procedures on writing the data into the standard MicroStation files.

ⓘ ***Please be positive that you have the latest MicroStation/InRoads configuration that utilizes the most up-to-date MicroStation seed files and InRoads preference file (.xin) by running the MDOT Update InRoads MicroStation utility from your desktop icon. Copy the .xin from the !InRoadsconf\standards\InRoadsSTD folder into your project's InRoadsSTD folder.***

✓ ***Refer to page 3-10 for more information on running the Update Utility for MicroStation and InRoads.***

Origtopoadd#.dgn will consist of the updated 3D topographical features.

Origtextadd#.dgn is the updated text that describes the updated topographical features.

Wetlandsadd#.dgn is the additional 3D wetland drawing. It includes all wetland strings identified by a Biologist and flag text associated with them.

Regenerate Points, Contours & Triangles

The following drawings require editing and regeneration in InRoads to update and display the latest information. This editing will consist of similar procedures done in MX prior to this document. All files will reside in the Survey\Msta folder.

Points.dgn will consist of all the original points and all additional points for all of the topographical features.

Contours.dgn is the 3D Contour surface. This will incorporate the original Contour surface with the new Contour surface (both ground survey and Aerial Mapping), providing one complete, seamless surface.

Triangles.dgn is the 3D Triangle surface. This will incorporate the original Triangle surface with the new Triangle surface (both ground survey and Aerial Mapping), providing one complete, seamless surface.

Create other MicroStation Deliverables

3DTopoMMDDYY.dgn - In InRoads, create a new file called **3DtopoMMDDYY.dgn** from the latest GROUND.fwd and place it in the Survey\Msta folder.

- ♬ This file contains the most complete ground topographical features as of the date in the filename.

ⓘ ***Use a 6-digit date without separators. (i.e. 3Dtopo021402.dgn)***

3DMappingMMDYY.dgn - If this is a mapping project, and additional ground survey was completed, remove the portion of the mapping model defined by the exterior boundary of the latest ground survey and create a new file called **3DmappingMMDDYY.dgn** (supplying current date in place of MMDDYY) and place it in the Survey\Msta folder. Leave the boundary in the file to help identify the area that has been updated.

ⓘ ***Use a 6-digit date without separators. (i.e. 3Dtopo091707.dgn)***

Update Status Report

Add notes to the **Status.doc** file located in your PIN’s Survey\MSTA folder.

Communication

At this point, send your correspondence to the proper contact in the desired MAINEDOT Program division (i.e. Urban Arterial Program, Bridge Program, etc) to notify them that the updated survey files are available, however that they still need to be cleaned-up in MicroStation.

ⓘ ***The end product, in the Survey\Msta folder, is to have all individual topographical files preserved as historical data, enabling someone to track what was done and when. This folder also contains a combined, topographical drawing called 3DtopoMMDDYY.dgn, which contains the complete ground topography (old and new) as of the date indicated in the filename. It also may contain the latest 3DmappingMMDDYY.dgn, which contains only the mapping data with a hole(s) indicating where ground survey was supplied.***

ADD NEW FIELD DATA TO GROUND.FWD

Step One: Open Ground.fwd

Browse to the Survey tab. Right click on *Survey Data* on the InRoads explorer window and select **Open…** (Figure 5-254). Select the **Ground.fwd** then click **Cancel.**

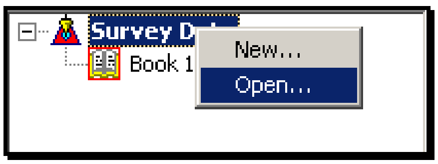


Figure 5-254: Open the Ground.fwd field book.

Step Two: Import Additional Radial Topo Data

Part One: Open Import dialog

Right Click on the ***GROUND*** field book and choose **Import…** (Figure 5-255).

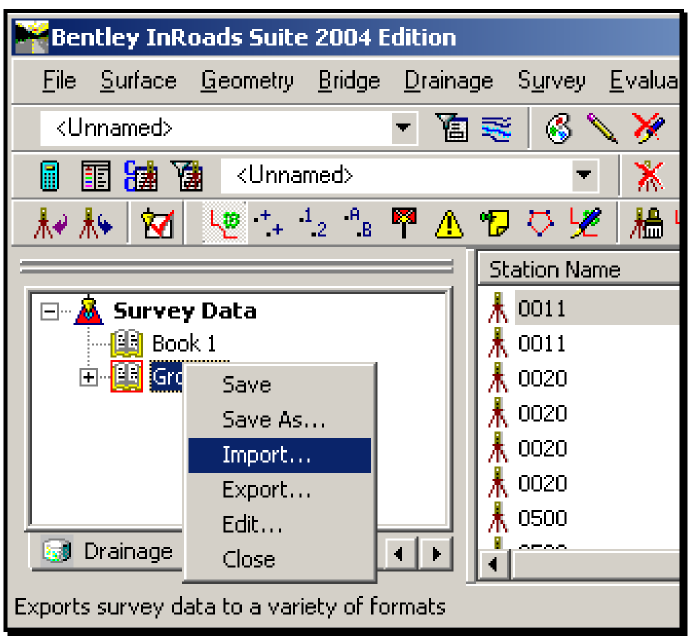


Figure 5-255: Import Radial Topo Data into GROUND fieldbook.

Part Two: Set the Correction Factor

ⓘ ***The Combined Factor must be added to the GROUND#.sdm files before they are imported into the GROUND field book.***

Browse Windows Explorer to the \SURVEY\Orig-data folder or the \SURVEY\MX\Orig-data folder. Open the **TRAVERSE.INP** file (Figure 5-256). The Combination Factor for the project is found on the *third line* of the report (i.e. 000, CF: 0.9999816). Copy this number by highlighting it and selecting **Edit>Copy** from the menu.

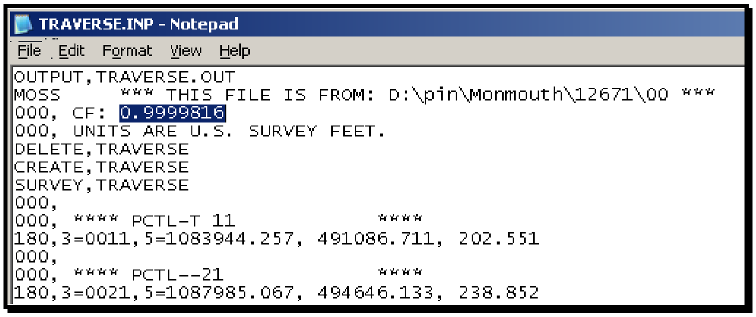


Figure 5-256: Combined Factor from the Traverse.inp file

Return to the *Import* dialog box. Select the **Corrections…** button. Place a check beside *Curvature and Refraction*, then **Paste** (Ctrl+V) the **Combined Factor number** into the Slope Distance Scale Factor field (Figure 5-257). Click **OK.**

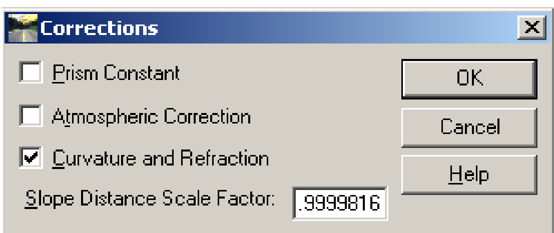


Figure 5-257: Corrections dialog with Combination Factor applied

Part Three: Import the SDM Files

Select the **Ground02.sdm** file. Click **Import…** then select **Close.**

Part Four: Resolve Error Codes (if necessary)

If the *Resolve Error Code* dialog appears (Figure 5-258), click **Ignore All.**

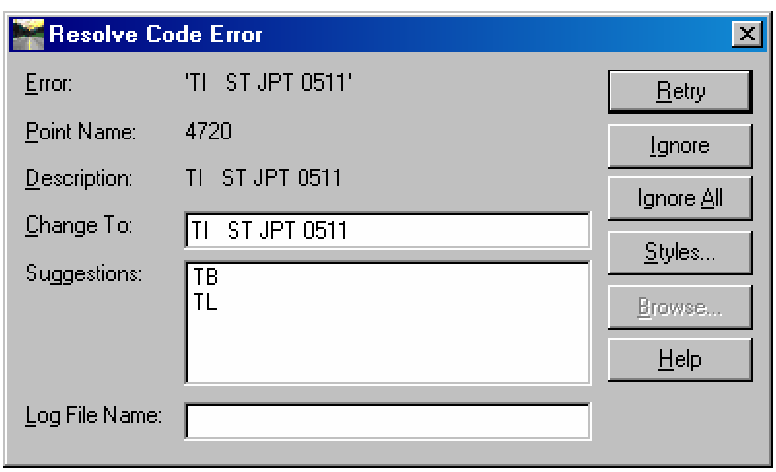


Figure 5-258: Resolve Error Code dialog

If an *Alert* dialog opens (Figure 5-259) stating that “One or more target heights missing from file”, click **OK.**

Figure 5-259: Alert - Target heights missing dialog

The *Results* (Audit Trail) window appears (Figure 5-260). Click **Save As,** give it the file name **Edits.txt** and click **Save.** At the *Results* window, view the results to see what the error codes are and which shots have missing target heights. Click **Close.**

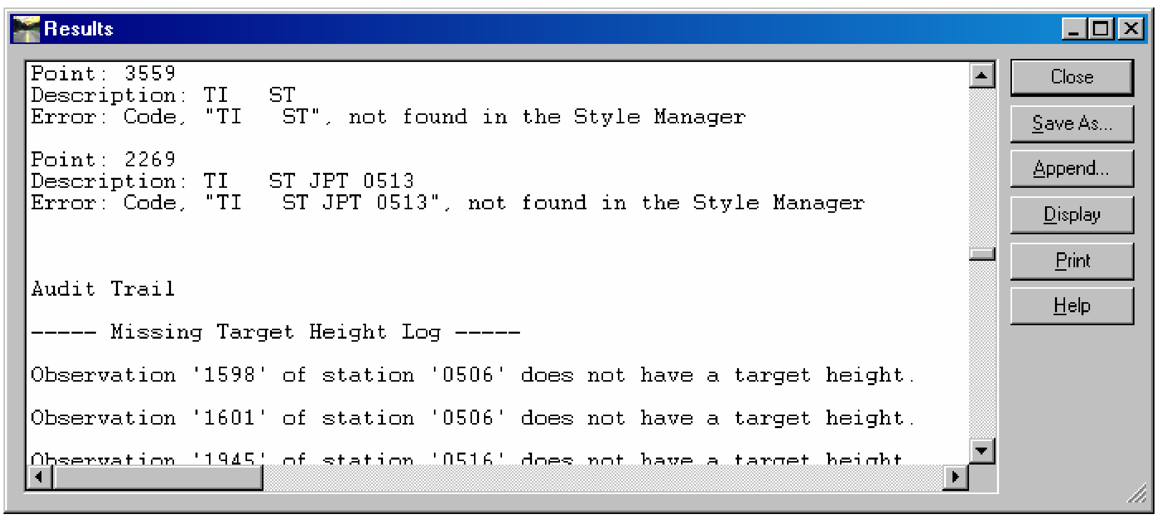


Figure 5-260: Results dialog displaying the Audit Trail

Part Five: View Results

In the *InRoads Explorer* window, the GROUND fieldbook shows the ***occupied stations*** of each set-up in the left half of window and the ***observation data*** coordinates in the right half of window (Figure 5-261).

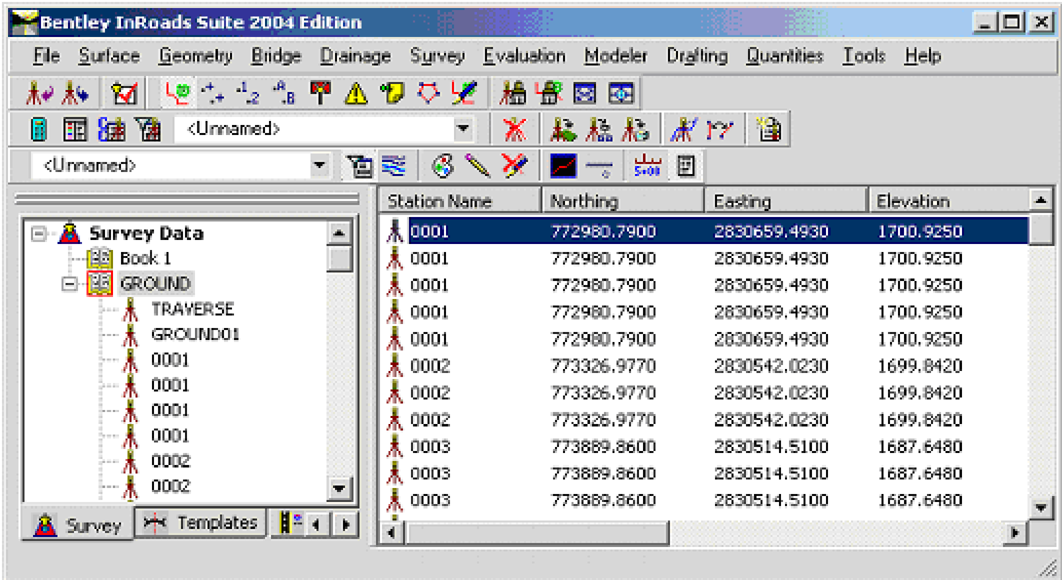


Figure 5-261: GROUND expanded showing occupied stations and observation data.

Part Six: Save Ground Field Book

Right click on the **Ground** *Field Book* and select **Save.**

Step Three: Verify Check Shots

✓ ***Refer to page 5-27 for detailed information on verifying the CHEK Shots. This process is identical to the verification of the original data.***

EDIT THE COMBINED SURVEY DATA

Step One: Survey Edits

Using similar processes of survey editing that was taught in the Survey training class (and some yet to be documented), edit the additional data (i.e. *Control Codes, Points, etc.)* so that it connects properly with the original survey data in the Ground.fwd.

✓ ***This routine will be documented further on page 5-36.***

Step Two: Save the Ground.fwd

After any editing has been done, right click the Ground.fwd and select **Save.**

CREATE COMBINED GROUND SURVEY DELIVERABLES

Overview

Most likely the original **Ground.dtm** surface has been edited, the triangles have been cleaned-up and an **Exterior** or multiple **Interior** features have been created. To prevent having to do the triangle clean-up on the original extents of the **Ground** again**,** we can preserve the Exterior and Interiors from being overwritten by the re-generation of the Ground.dtm.

Visual inspection of the added topography in relation to the original footprint will determine if full triangle clean-up will be necessary. Savvy CADD users could display both the Exterior from the original Ground and the GroundAdd# and combine the two using MicroStation tools and import the combined Exterior.

Step One: Create an Exterior Surface

Browse to the *Surface* tab and right-click on **Surface** and select **New…** (Figure 5-262).

Figure 5-262: Select New from the Surface tab in the Explorer view of InRoads.

Step Two: Setup New Surface Dialog

In the *New* dialog box (Figure 5-263) set the following choices…

Type: **Existing**

Name: **Exterior**

Click **Apply** and then **Close.**

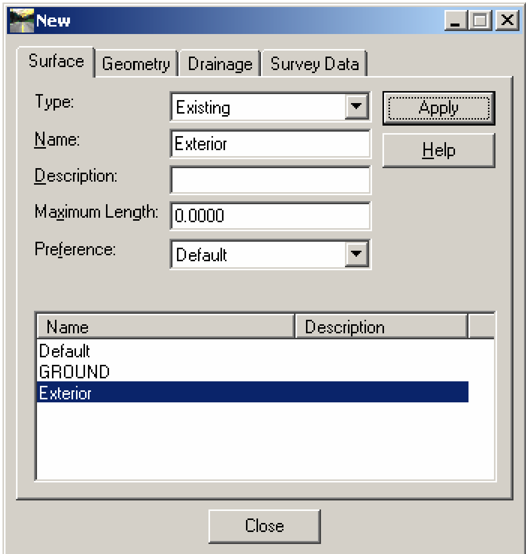


Figure 5-263: New Surface dialog box.

Step Three: Copy Exterior/Interior Features into Surface

Now that a surface has been created to hold the Exterior and Interior features, they must be copied to the new surface.

Select **Surface>Edit Surface>Copy Portion of Surface** from the InRoads *Surface* menu.

Set the *Source Surface* to **Ground.** Set the *Destination Surface* to **Exterior.** Select the **Exterior** and all the **Interiors** (if any exist) from the *Features* portion of the dialog (Figure 5-264). Click **Apply** and then **Close.**

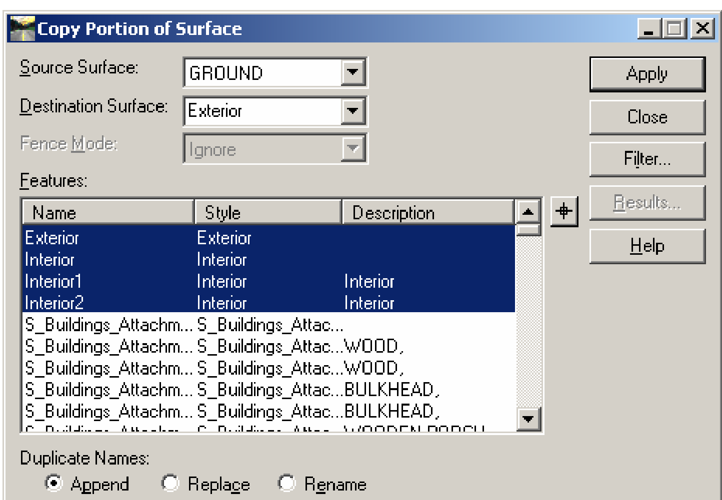


Figure 5-264: Select Feature in the Copy Portion of Surface dialog.

Step Four: Create Ground or Ground_only (.dtm)

Create a new surface from the **Ground.fwd** named **Ground.dtm** (for projects with "Ground Survey" only) or called **Ground_only.dtm** (for projects that will contain "Ground Survey" and "Aerial Mapping"). Overwrite the previously created "Ground" surface.

✓ ***Refer to page 5-64 for detailed instructions for creating a surface from the field book.***

Step Five: Copy Exterior/Interior Features Into New Ground Surface

Select **Surface>Edit Surface>Copy Portion of Surface** from the InRoads Surface menu (**Error! Reference source not found.**).

Set the *Source Surface* to **Exterior.** Set the *Destination Surface* to **Ground.** Select the **Exterior** and all the **Interiors** (if any exist) from the *Features* portion of the dialog (Figure 5-265). Click **Apply** and then **Close.**

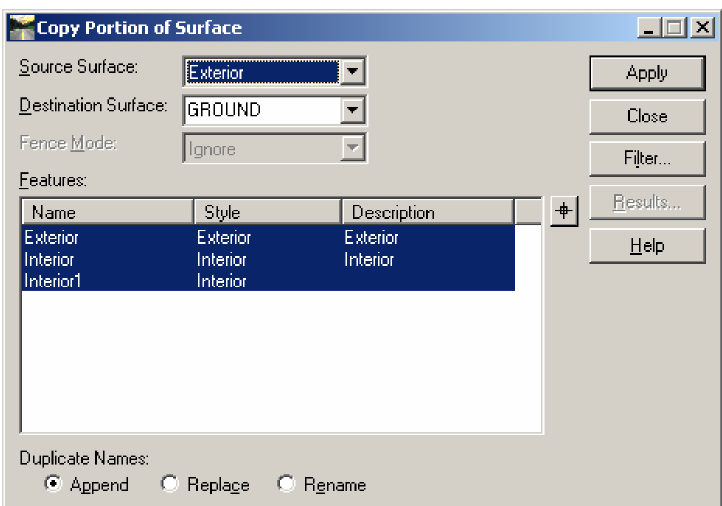


Figure 5-265: Copy Portion of Surface dialog.

Step Six: Create Triangles.dgn File

Create a new **Triangles.dgn** file using the *Makesheetz* program in MicroStation. Overwrite the previous **Triangles.dgn.**

✓ ***Refer to page 5-67 for detailed instructions for creating the Triangles.dgn and the Triangle cleanup.***

Step Seven: Create Contours.dgn File

Create the **Contours.dgn** file using the *Makesheetz* program in MicroStation. Overwrite the previous **Contours.dgn.**

If this is an aerial mapping project, wait until the new ground_only.dtm has been merged with the mapping_only.dtm into a surface called **Ground** and display the contours from that surface.

- ✓ ***Refer to page 5-82 for instructions for creating the Contours.dgn.***

Step Eight: Create 3DtopoMMDDYY.dgn File

Create a new **3DtopoMMDDYY.dgn** file using the *Makesheetz* program in MicroStation. This will serve as the latest ground information from the Ground.fwd.

- ✓ ***Refer to page 5-85 for instructions for writing the ground.fwd to graphics.***

Step Nine: Create Points.dgn File

Create a **Points.dgn** file using the *Makesheetz* program in MicroStation. Overwrite the previous **Points.dgn.**

- ✓ ***Refer to page 5-91 for detailed instructions for writing the Points and Symbols to graphics.***

CREATE GROUNDADD FIELDBOOK

Overview

Similar to the MX procedures, the survey editors are required to deliver MicroStation files of only the topo update information. This is to prevent any re-work in regards to MicroStation cleanup that may have been done for the project. Users can simply cleanup the topoadd# file and merge it with the previously cleaned up topo.

Step One: Save Ground.fwd As GroundAdd#.fwd

Open the **Ground.fwd** if not already open. Right click the Ground.fwd and select **Save As…** (Figure 5-266).

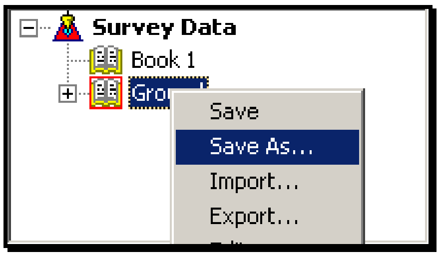


Figure 5-266: Right click ground and select Save As...

Supply **GroundAdd#** as the file name (i.e. GroundAdd1.fwd). Click **Save** then **Close** (Figure 5-267).

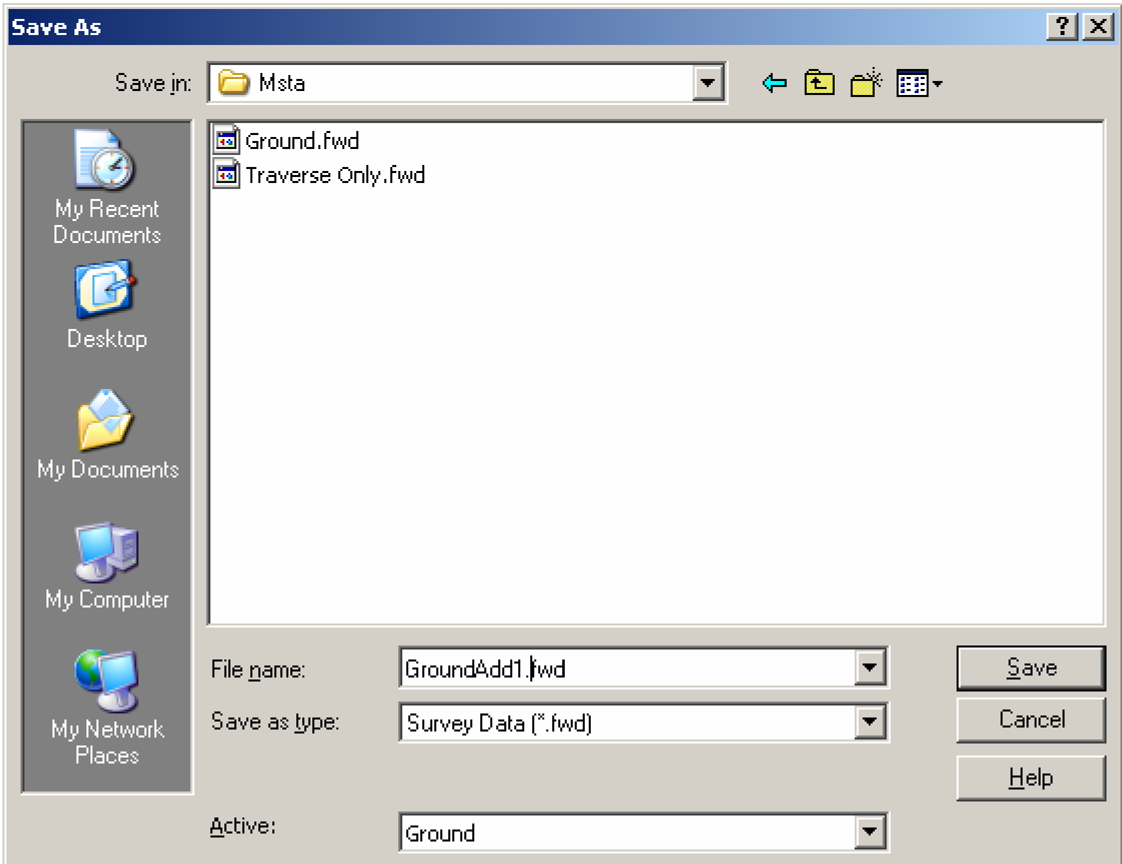


Figure 5-267: Supply the name GroundAdd# and click save.

Step Two: Delete Previous Stations

♬ At this point, the **GroundAdd#.fwd** has all of the data from the original ground survey and the additional ground data. We will need to remove the original ground data to isolate only the Traverse and the additional ground data.

Part One: Open Fieldbook

Open the *Fieldbook* by selecting **Survey>Fieldbook Data…**from the InRoads menu of by clicking on the *Fieldbook* icon located on the *Survey* toolbar (shown in Figure 5-268).

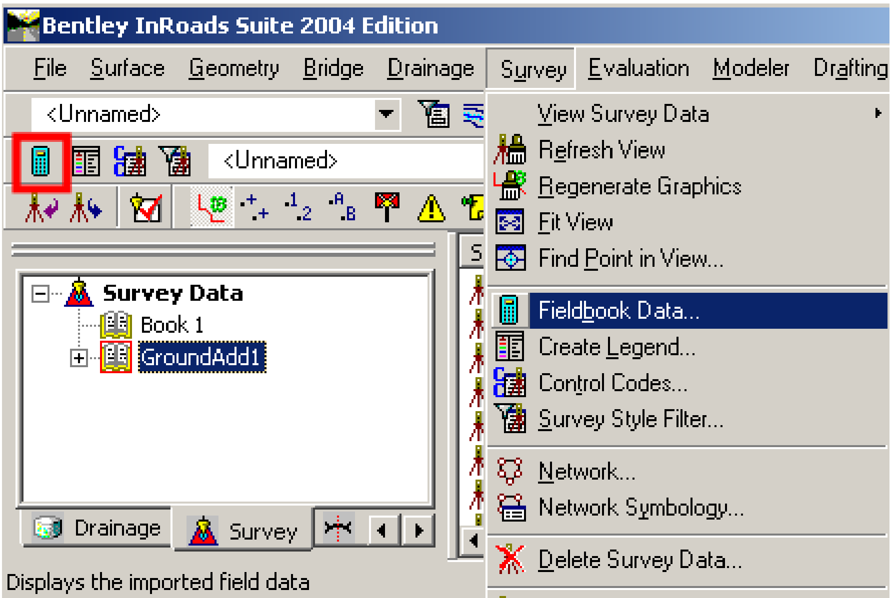


Figure 5-268: Open the Fieldbook to view GroundAdd# data.

Part Two: Select the Ground01 and Observations

In the *Stations* portion of the *Fieldbook*, left click on **Ground01.** Next, hold the *Shift* key on your keyboard and use the scroll bar to scroll down to the last *Station* under **Ground01.** Click that *Station*. All *Stations* should be highlighted (Figure 5-269).

♫ If this is the second or third topo add, select all Ground# except for the most recent.

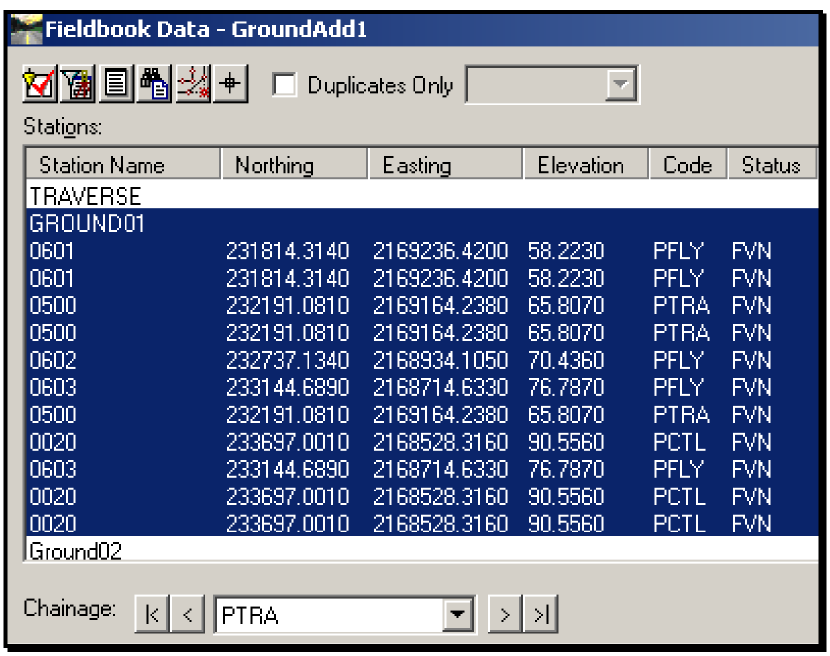


Figure 5-269: Select Ground01 and the stations under it.

Right click in the highlighted area and select **Delete** (Figure 5-270).

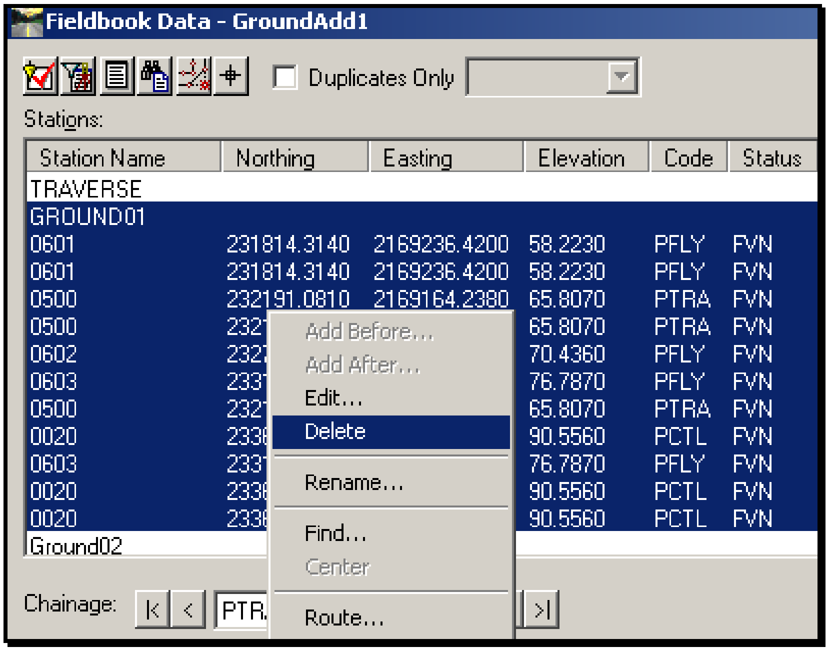


Figure 5-270: Right click in the highlighted area and select delete.

You will be asked if you are sure you want to delete the selected stations. Click **Yes** (Figure 5-271).

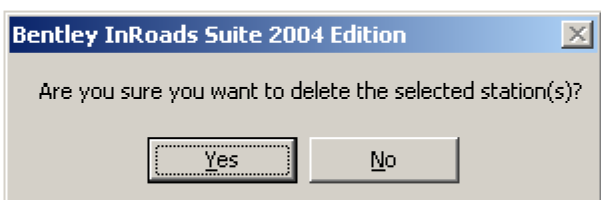


Figure 5-271: Confirmation message about deleting selected stations.

Next you will be warned that deleting the selected stations will possibly cause orphaning of data (Figure 5-272). Select **Yes** to continue.

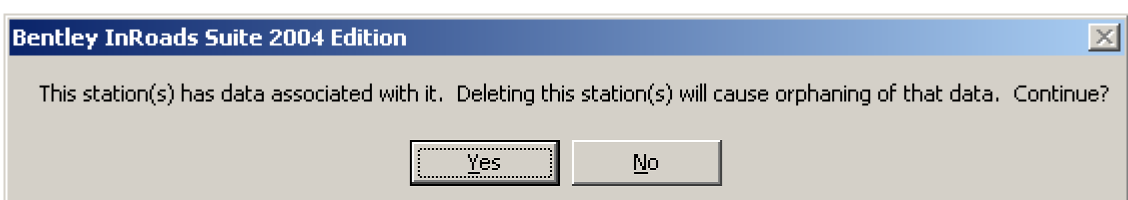


Figure 5-272: Warning stating that you may be orphaning data.

Close the *Fieldbook.*

Step Three: Save the GroundAdd#.fwd

Right click the **GroundAdd#** *Fieldbook* and select **Save.**

CREATE TOPO UPDATE DELIVERABLES

Step One: Make a OrigTopoAddDate File

Part One: Launch Make Sheetz Program

Select **File**>**Make Sheetz** from MicroStation's main menu. Select a **No Prefix** drawing (Figure 5-273). Select **OK.**

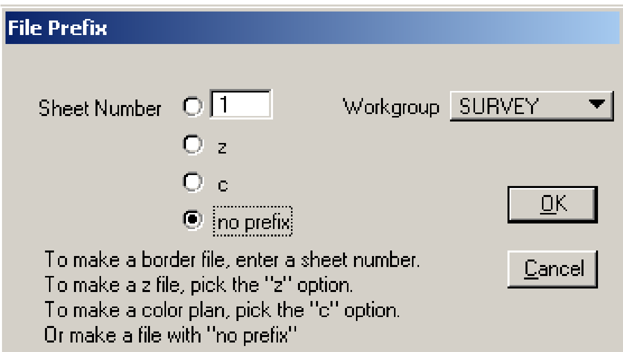


Figure 5-273: Make Sheetz dialog with No Prefix selected

- Users may have to move the InRoads dialog to display the *Make Sheetz* File Prefix dialog.
- The default *Workgroup* should be set to Survey for all Survey users. If not, contact CADD Support.

Part Two: Select OrigTopoAdd

In the *Create File of Type…* dialog, select **OrigTopoAdd** and click **OK** (Figure 5-274).

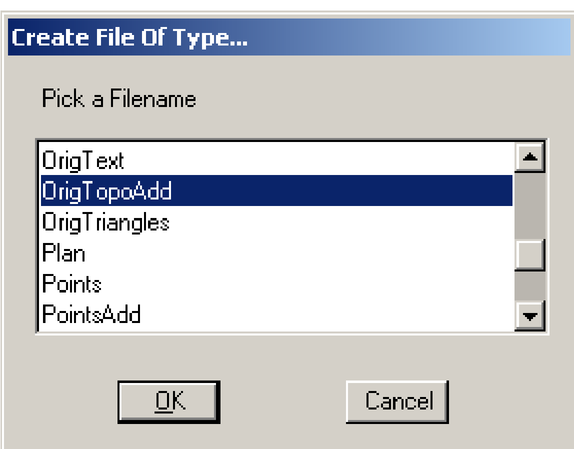


Figure 5-274: Create File of Type dialog with OrigTopoAdd selected

Part Three: Increment File Name

In the *Make File* dialog, adjust the pull down next to the file name (Figure 5-275) and increment the number based on which topoadd you are creating (i.e. OrigTopoAdd**1**). Click **OK.** Click **Cancel** to stop making sheets.

Figure 5-275: Increment the number of the OrigTopoAdd file.

ⓘ ***This creates the new drawing using the correct seed file and opens the newly created file.***

Step Two: Write Survey Data to Graphics

While the **GroundAdd1** *Fieldbook* is active, select **Survey>View Survey Data>Write Survey Data to Graphics…** from the InRoads main menu (Figure 5-276).

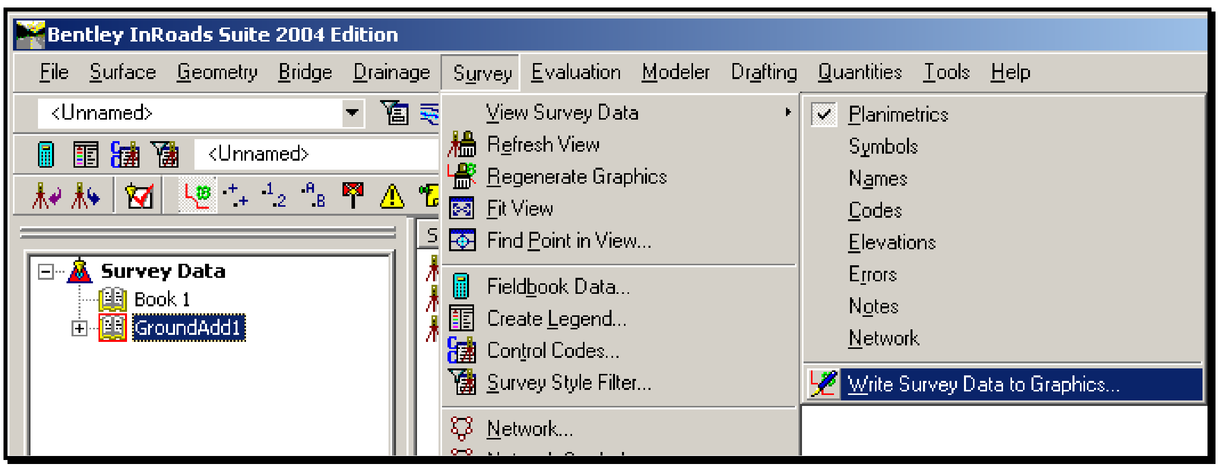


Figure 5-276: Write Survey Data to Graphic from InRoads main menu

Select **Planimetrics** from the *Include* portion of the *Write Survey Data to Graphics* dialog (Figure 5-277).

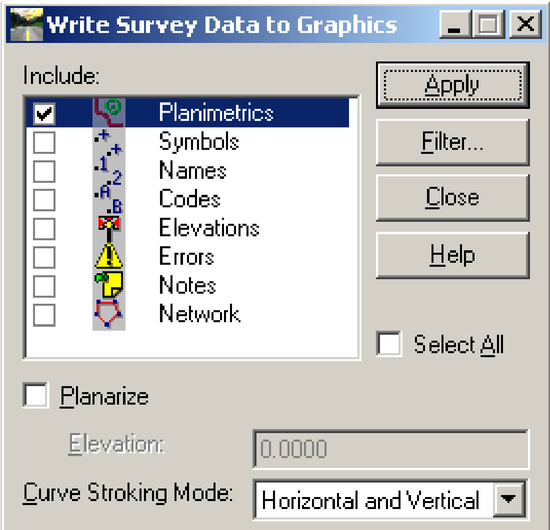


Figure 5-277: Select Planimetrics to write topography to the file

Click **Apply** in the *Write Survey Data to Graphics* dialog.

The InRoads dialog will display the progress on the lower left hand corner of the dialog (Figure 5-278).

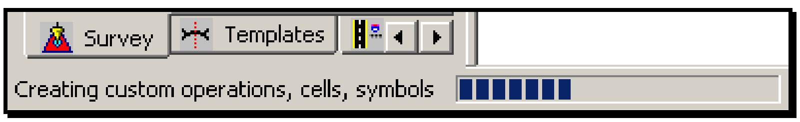


Figure 5-278: Progress bar as it processes the data

Close the *Write Survey Data to Graphics* dialog when the processing is complete. *Fit View* to view the data. Select **File>Save Settings** from the MicroStation menu.

Step Three: Make a OrigTextAdd File

Part One: Launch Make Sheetz Program

Select **File>Make Sheetz** from MicroStation's main menu. Select a **No Prefix** drawing (Figure 5-279). Select **OK.**

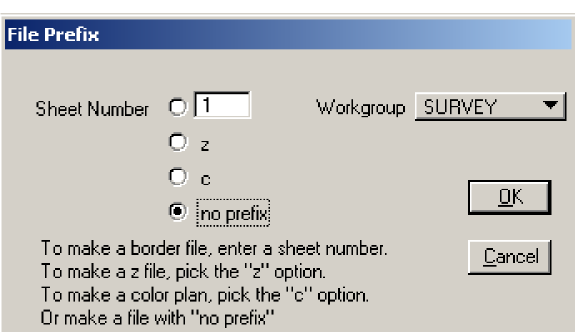


Figure 5-279: Make Sheetz dialog with No Prefix selected

- Users may have to move the InRoads dialog to display the *Make Sheetz* File Prefix dialog.
- The default *Workgroup* should be set to Survey for all Survey users. If not, contact CADD Support.

Part Two: Select OrigTextAdd

In the *Create File of Type…* dialog, select **OrigTextAdd** and click **OK** (Figure 5-280).

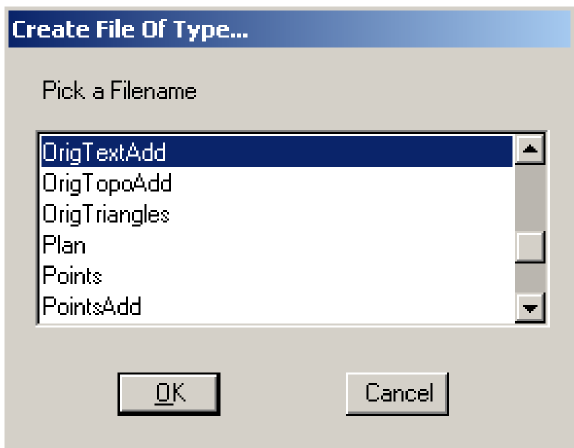


Figure 5-280: Create File of Type dialog with OrigTextAdd selected

Part Three: Increment File Name

In the *Make File* dialog, adjust the pull down next to the file name (Figure 5-281) and increment the number based on which textadd you are creating (i.e. OrigTextAdd**1**). Click **OK.** Click **Cancel** to stop making sheets.

Figure 5-281: Increment the number of the OrigTextAdd file.

ⓘ ***This creates the new drawing using the correct seed file and opens the newly created file.***

Step Four: Write Survey Data to Graphics

Select **Survey>View Survey Data>Write Survey Data to Graphics…** from the InRoads main menu (Figure 5-282).

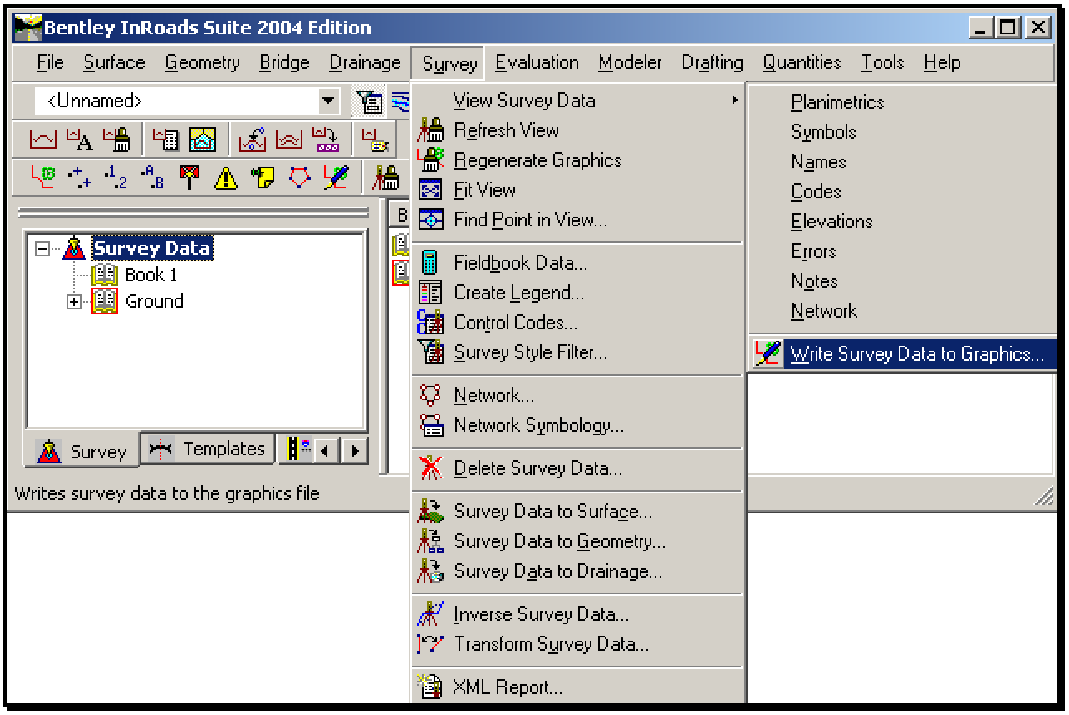


Figure 5-282: Write Survey Data to Graphic from InRoads main menu

Select **Notes** from the *Include* portion of the *Write Survey Data to Graphics* dialog (Figure 5-283). Click **Apply.**

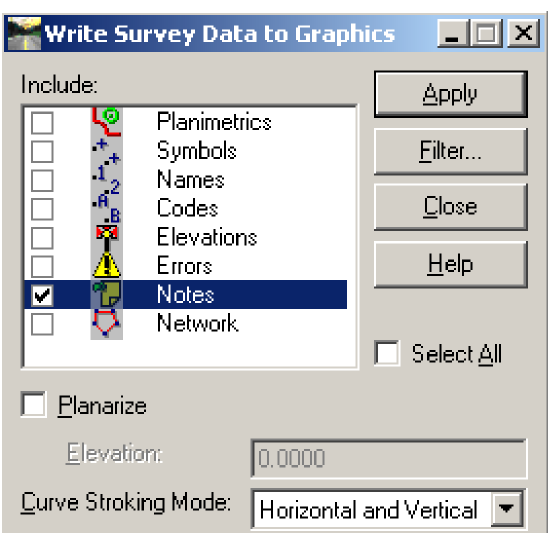


Figure 5-283: Select Notes to write Survey Text to the file

The InRoads dialog will display the progress on the lower left hand corner of the dialog (Figure 5-284).

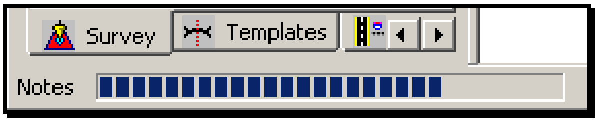


Figure 5-284: Progress bar as it processes the data

Close the *Write Survey Data to Graphics* dialog when the processing is complete. Fit the view to view the data. Select **File>Save Settings** to maintain the zoom extents.

MERGE TOPO UPDATES WITH MAPPING

COMBINING MAPPING AND GROUND SURFACES

If all procedures are followed properly, the original steps taken to combine the Ground_only and the Mapping_only surfaces are identical, however the **Exterior** (perimeter) of the updated Ground_only may be larger depending on the extents of the update.

- ✓ ***Refer to page 5-111 for the detailed instructions on Combining the Mapping and Ground Surfaces and creating the updated "combined" deliverables.***

CUSTOMIZE A PERIMETER

VIEW MULTIPLE TRIANGLES AND PERIMETERS

Overview

Occasionally there's a single project that has topography located in two separate locations with a significant space between the data. MaineDOT customization generates triangles with a maximum triangle side length of 100 ft. When there is such a gap in the data, the perimeter does not extend between both sets of topography. This documentation will assist the user in generating a perimeter that can be manually edited to contain both areas with minimal triangulation clean-up. It is the assumption that the Survey Data Fieldbook edits have been completed and the user is at the point in the editing process to edit the triangles.

Step One: Write Survey Data to Surface

Select **Survey**>**Survey Data to Surface** from the InRoads menu. Adjust the dialog (Figure 5-285) to match the following descriptions:

Surface Name: **GROUND**

Description: **Use Attributes**

Verify that *Triangulate Surface* is **checked**.

Click **OK.**

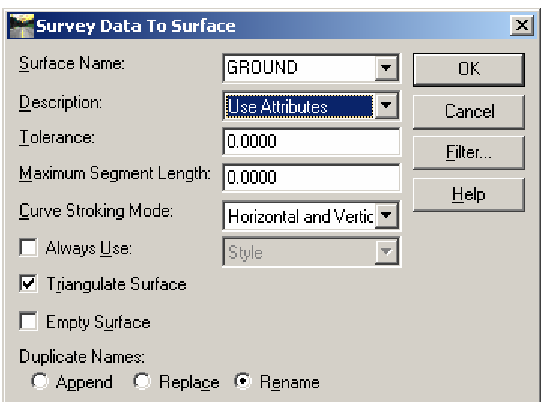


Figure 5-285: Survey Data To Surface dialog with proper settings.

Step Two: Triangulate Surface

Select **Survey**> **Triangulate Surface** from the InRoads menu. Set the dialog (Figure 5-286) to match the following descriptions:

Surface Name: **GROUND**

Maximum Segment Length: **100.000**

Click **Apply** and then **Close.**

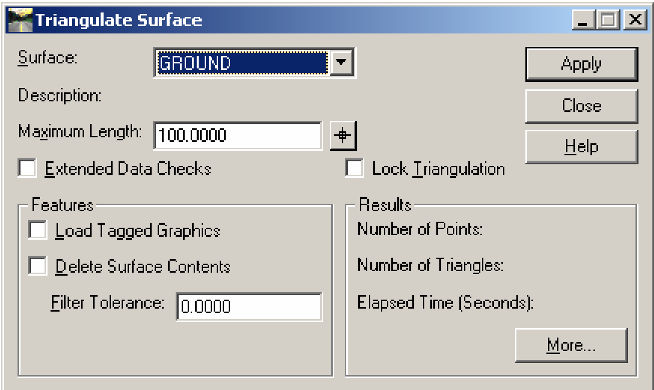


Figure 5-286: Triangulate Surface dialog with proper settings.

Step Three: View Perimeter for Ground Surface

Select **Surface**>**Update 3-D/Plan Display** from the InRoads menu. Set the dialog () to match the following descriptions:

Mode: **Display On**

Surfaces: Select **GROUND**

Place a check mark for **Perimeter**.

Click **Apply** then **Close.**

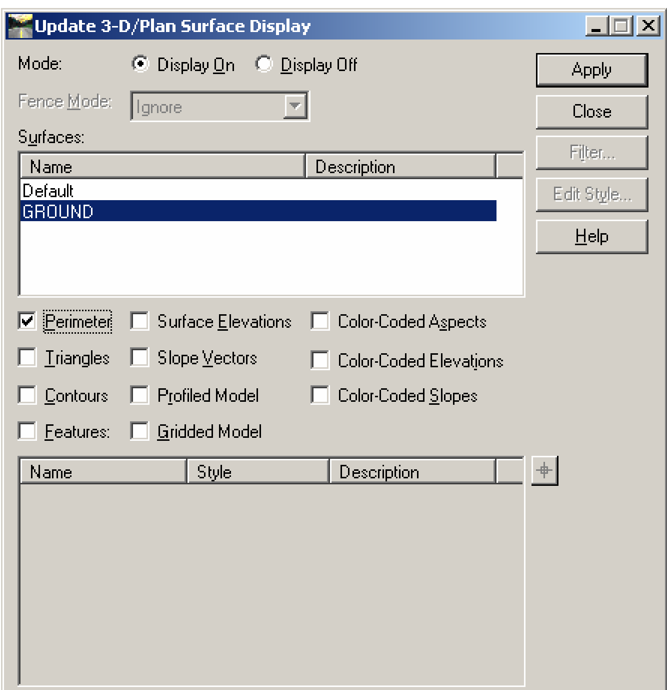


Figure 5-287: Update 3-D/Plan Surface Display dialog.

ⓘ ***Notice that the Perimeter does not encompass both of the project areas. The following steps will enable users to create the additional Perimeter and join the two areas for triangulation.***

Step Four: Create a Temporary Surface

Overview

The user will need to place a fence around the portion of the surface that does not have the perimeter. This partial surface will then be copied to another temporary surface called, Temp. The Temp surface will be triangulated separately using a maximum leg length of 100.000. The temporary perimeter generated around this surface will be manipulated and combined with the first one to create a full perimeter that will be copied to the Ground Surface as an exterior boundary line.

Part One: View Survey Data

Display the **topography** using the *View Survey Data* toolbar, by turning on *Planimetrics* (Figure 5-288) and selecting *Regenerate Graphics* (Figure 5-289).

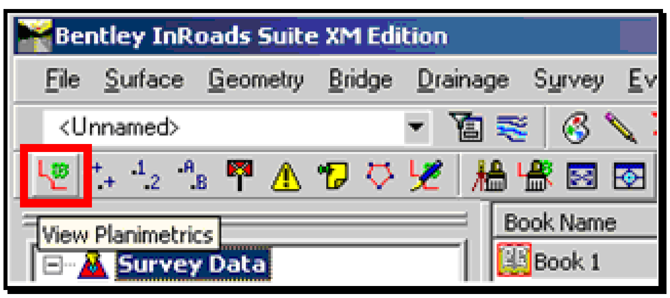


Figure 5-288: View Planimetrics icon.

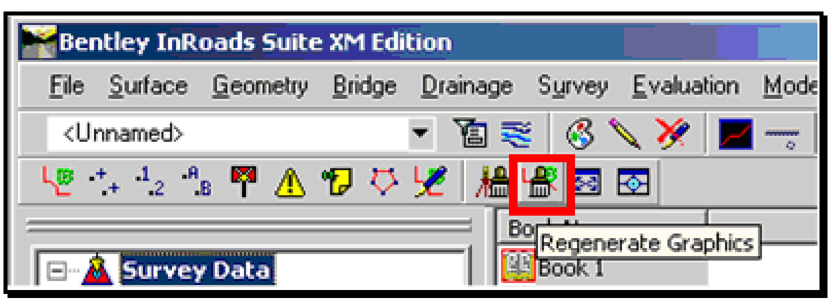


Figure 5-289: Regenerate Graphics icon.

✓ ***For more information on loading the View Survey data tool bar, refer to page 5-11.***

Part Two: Place Fence

Select the **Place Fence** icon from MicroStation's main tool bar (Figure 5-290). Set the *Fence Type* to **Block** and the *Fence Mode* to **Inside** (Figure 5-291).

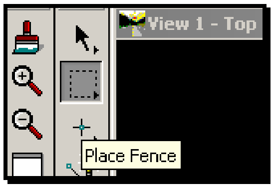


Figure 5-290: Place Fence tool in MicroStation main tool bar.

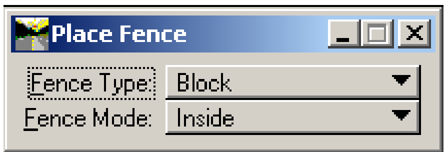


Figure 5-291: Fence Tool Settings dialog set to Block and Inside.

Place a fence around the surface area not contained in the perimeter.

Part Three: Copy Portion of the Surface

Select **Surface>Edit Surface**>**Copy Portion of Surface** from the InRoads menu.

Adjust the *Copy Portion of Surface* dialog (Figure 5-292) as follows:

Source Surface: **Ground.**

Type in **Temp** as the *Destination Surface.*

Fence Mode: **Inside.** Make sure all features are highlighted in the *Features* portion of the dialog box.

Click **Apply** and then **Close.**

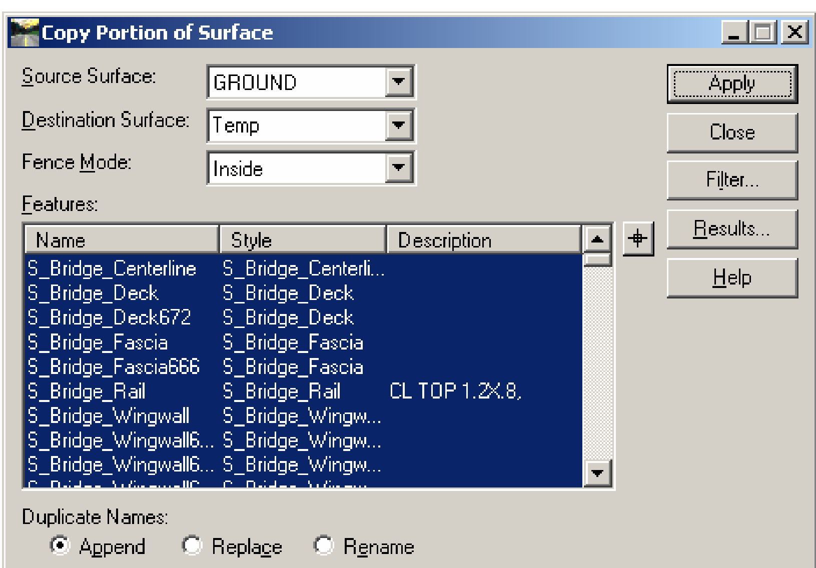


Figure 5-292: Copy Portion of Surface dialog.

Remove the fence from the selected area by clicking on the *Place Fence* tool again.

Step Five: Triangulate Temp Surface

Select **Surface**>**Triangulate Surface** from the InRoads menu.

Adjust the *Triangulate Surface* dialog (Figure 5-293) as follows:

Surface name: **TEMP**

Maximum Length: **100.000**

Click **Apply** and then **Close.**

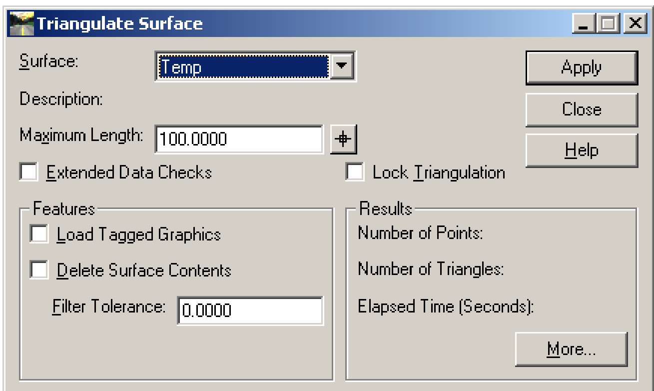


Figure 5-293: Triangulate the Temp surface.

Step Six: View the Perimeter and Triangles for the Temp Surface

Select **Surface>Update 3-D/Plan Display** from the InRoads menu. Adjust the *Update 3-D/Plan Display* dialog (Figure 5-294) as follows:

Mode: **Display On**

Surfaces: Select **Temp**

Fence Mode: **Ignore** (should be grayed out)

Place a check mark for **Perimeter** and **Triangles**

Click **Apply** then **Close.**

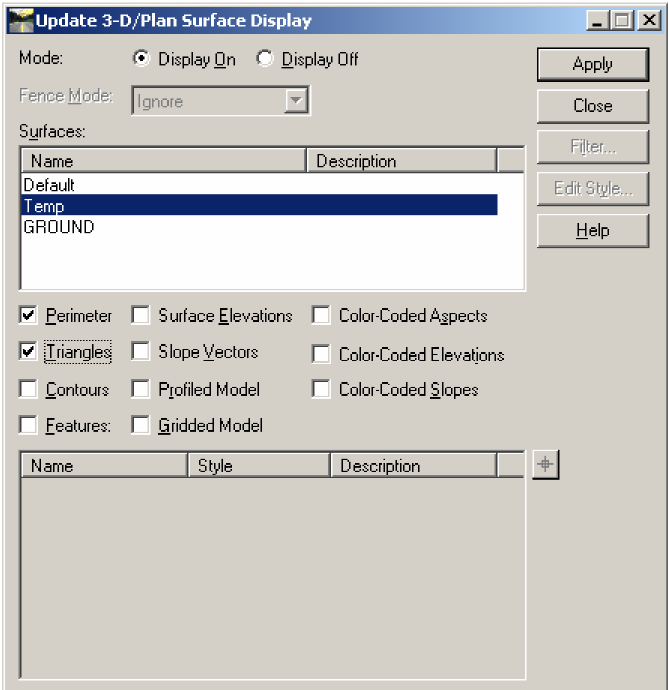


Figure 5-294: Update 3-D/Plan Display dialog.

Step Seven: Triangles Clean-up

- At this time with both perimeters displayed the user will need to clean-up the triangles in each area respectively. This is done now because once the perimeters have been joined and saved to the Ground Surface as an Exterior boundary, the deletion of triangles will not update the "perimeter vertexes".

Part One: Clean-up Temp Surface Triangles

Fit View to display the *Triangles.* The *Triangles* need some clean-up. Select **Surface>Edit Surface>Delete Triangles** from the InRoads main menu (Figure 5-89).

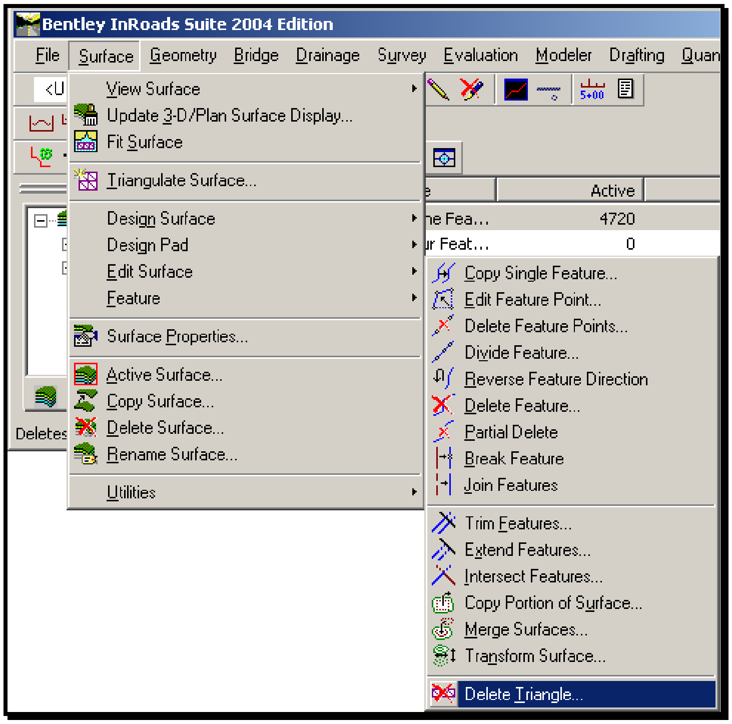


Figure 5-295: Select Surface>Edit Surface>Delete Triangles

In the *Delete Triangle* dialog, verify that the *Surface* **Temp** is *Active*. Click **Apply** and remove the extra triangles that aren't relevant by two *data* clicks (left mouse button) across triangles that need to be deleted. The tool is very similar to drawing a line across the triangles to be deleted. Following the prompts, click another left mouse button to *Apply (Accept)*.

♬ The triangles do not disappear interactively.

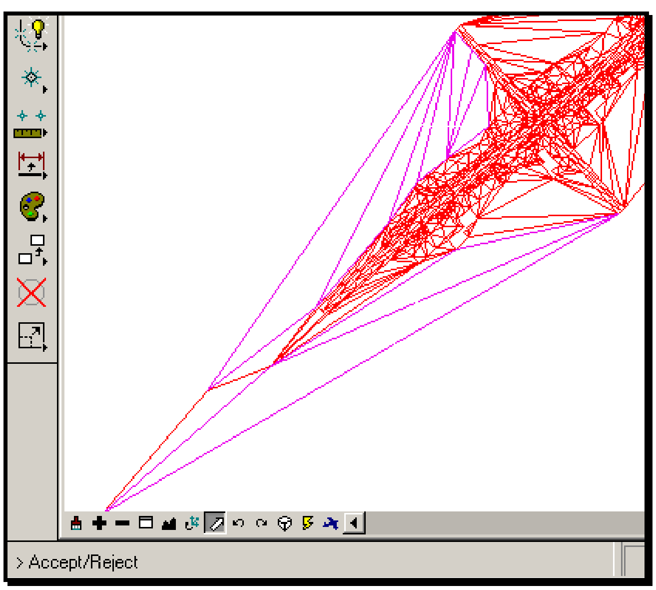


Figure 5-296: Triangles highlighted and prompts requesting action

To view your progress in deleting triangles, there are a couple of methods that can be used. The *View Triangles* dialog box, if left open, can be used to refresh the triangles by clicking **Apply** again (Figure 5-297). The recommended method is described below.

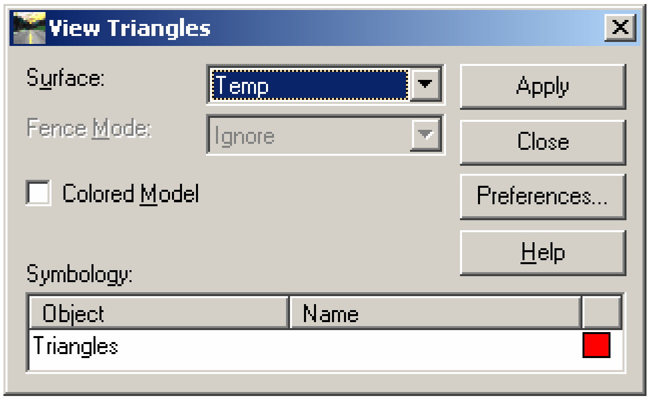


Figure 5-297: View Triangles dialog with Temp surface selected.

The user may also update the display by selecting **Surface>Update 3-D/Plan Surface Display…** from the InRoads main menu (Figure 5-91).

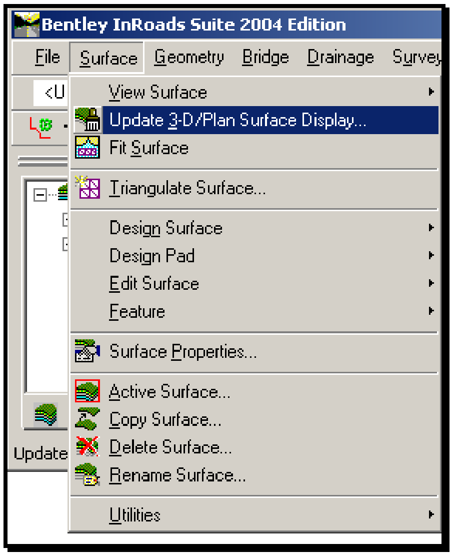


Figure 5-298: Update 3-D/Plan Surface Display in InRoads main menu

Select the **Temp** surface and place a check mark in the *Perimeter* and *Triangles* boxes (Figure 5-92). Click **Apply** and the current *Triangles* and the new *Perimeter* will be re-displayed in the view.

♫ If the user minimizes this dialog box, it can be maximized with one click and the user can then select Apply again to keep the display refreshed during the clean-up process.

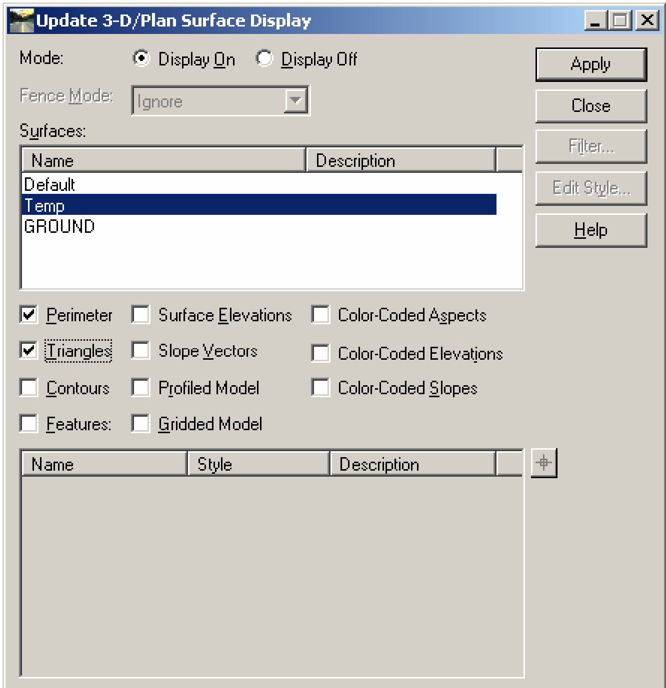


Figure 5-299: Update the plan display to view new triangles and perimeter

Part Two: Cleanup Ground Triangles

Repeat the process for the Ground Surface and Triangles in the area where the perimeter for Ground was defined.

JOINING THE PERIMETERS

Overview
With the triangles cleaned up in their respective areas, it is now feasible to join the two perimeters. This will create one closed shape that will be imported to the Ground surface as an exterior boundary. This exterior boundary will keep the triangles contained to the edited locations.

Step One: Shut off Planimetrics
Use the View Survey Data toolbar (Figure 5-300) to turn off the Planimetrics and refresh the drawing. The view window should show the two different perimeters only.

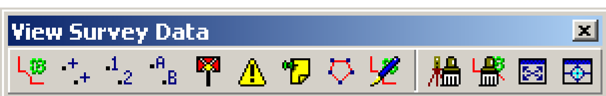


Figure 5-300: View Survey Data tool bar.

♫ The next group of commands will be using the MicroStation tools to manipulate and join the perimeters.

Step Two: Shut Off Graphic Group
Click the padlock at the bottom of MicroStation's main dialog (Figure 5-301).

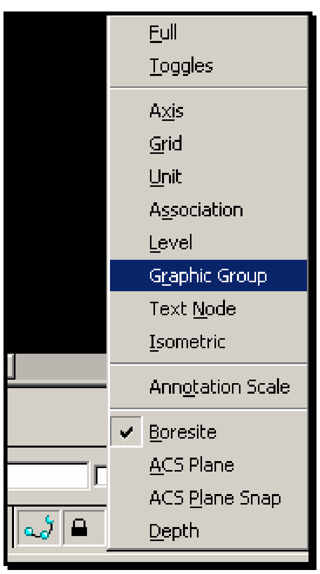
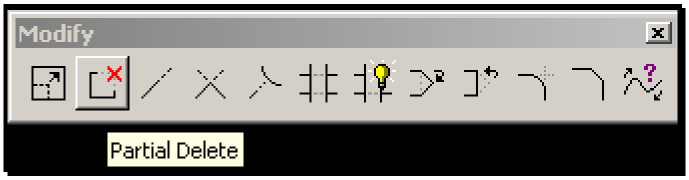


Figure 5-301: Padlock icon in the MicroStation dialog.

Remove the check for the graphic group lock.

Step Three: Delete Part of Perimeters

Part One: Delete part of Perimeter #1



Click and hold the *Modify* tool and pull to the right. Select the Delete Partial element icon (This can also be activated by selecting **Stretch>Delete Partial** from the MicroStation menu).

Zoom in on the near side of the perimeter for the Ground surface. (The near side is the one nearest to the perimeter for the Temp surface.) Locate a suitable, flat portion of the perimeter to delete part of (Figure 5-302).

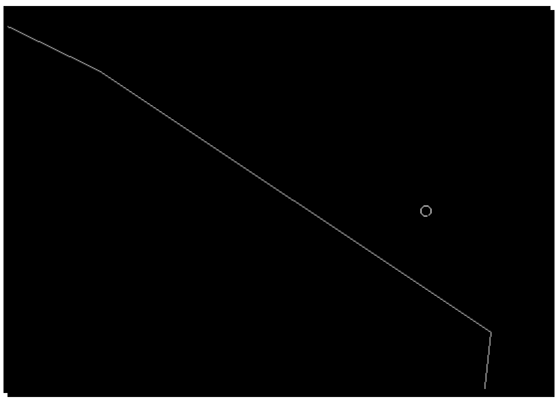


Figure 5-302: A flat portion of the perimeter suitable for partial delete.

ⓘ ***To delete part of the element, the user must select a flat section of the perimeter and not one of the vertexes. This will insure that the bearing of the side maintains its integrity.***

The first left click of the *Partial Delete* tool, will highlight the element and place a starting location for the gap. A second left click at the same location will allow the user to then move the cursor in the either direction to create the gap. A third left click will place the end point for the gap (Figure 5-303).

♫ Only a small gap is necessary for joining the perimeters.

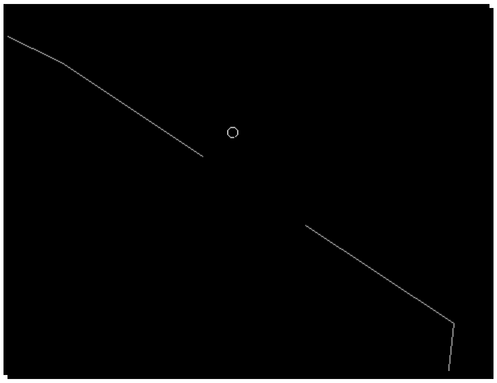


Figure 5-303: A portion of the perimeter with a small gap.

Part Two: Delete Part of Perimeter #2

Zoom in on the other perimeter nearest the first perimeter. Repeat the process on a suitable flat portion of the second perimeter.

Step Four: Connect With Lines

Overview

With both perimeters containing gaps, they must now be joined together. This will be done by using the *Place Smartline* tool to draw a line from one perimeter to the other.

Part One: SmartMatch the Perimeter

Now set the linestyle to be drawn to match the "perimeter" linestyle. Select the **SmartMatch** icon (Figure 5-304) from the *Change Attributes* tools (or select **Qualities>Match>All** from the menu) and click on one of the perimeter lines. This will adjust the *Level, Color, Style* and *Weight* of the element to be placed.

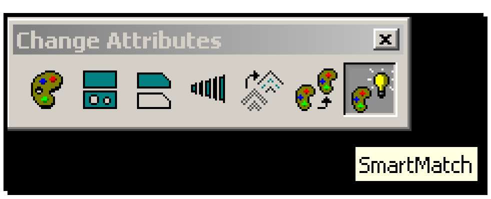


Figure 5-304: SmartMatch tool in the Change Attributes tool bar.

Part Two: Place SmartLine

Select **Place Smartline** icon (Figure 5-305) (or select **Zip>Lines>SmartLines** from the menu) and click on one side of the gap in a perimeter and then click on the corresponding side of the gap in the second perimeter.

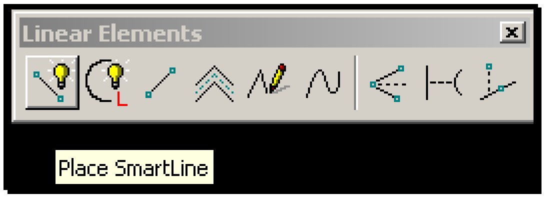


Figure 5-305: Place SmartLine tool in the Linear Element tool bar.

♬ When working with two different locations on the dgn, it is convenient to have two windows open, each one viewing the area to be edited. An example is shown in Figure 5-306. Do this by selecting Window>Views>5. Fit view and zoom to second gap area.

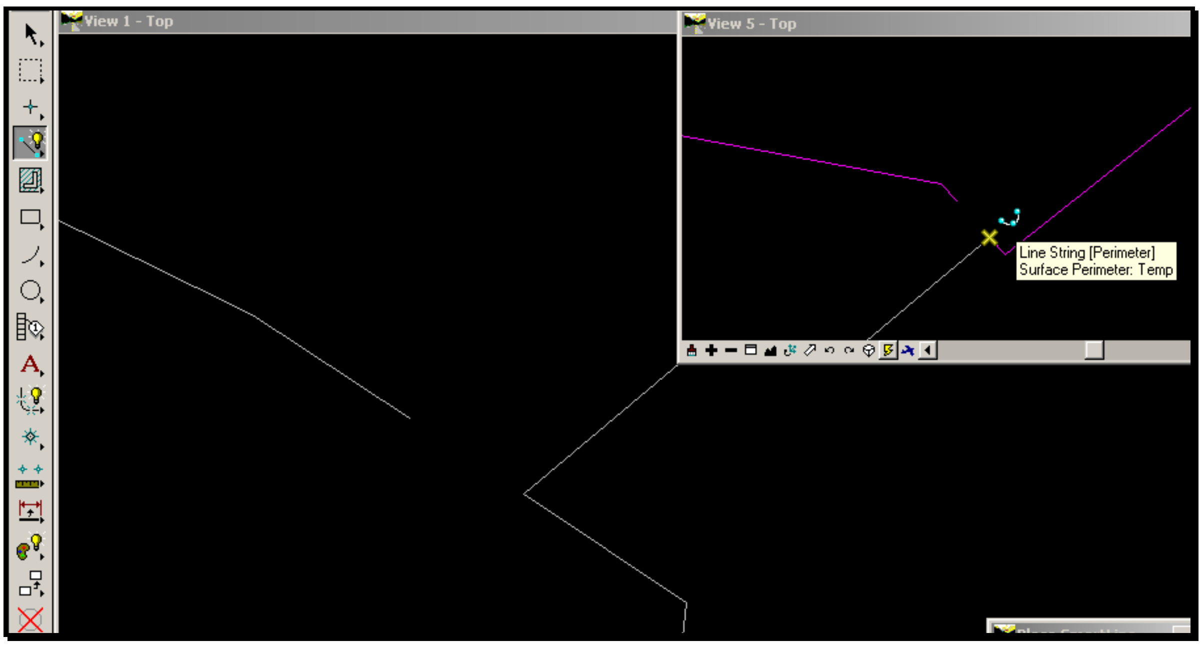


Figure 5-306: Multiple view windows open in MicroStation.

Part Three: Copy the Line Parallel

With one line placed connecting the perimeters, the user must then create a parallel line with an offset of 0.1 feet. InRoads will not allow an exterior line to be placed directly on top of another one. This narrow offset will satisfy that need.

Select the **Zip>Parallel>Copy Parallel** from the MicroStation menu (Figure 5-307).

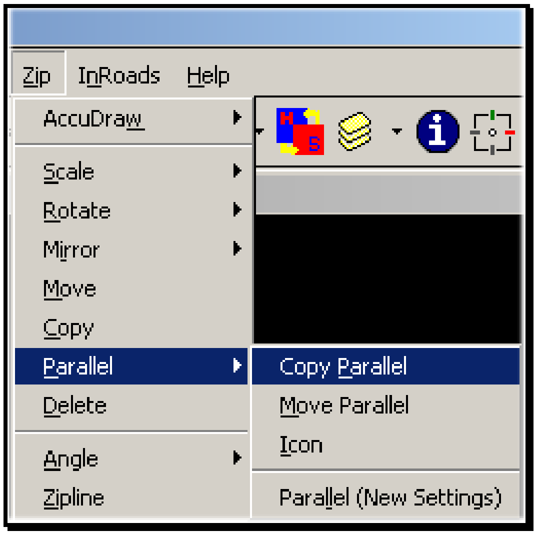


Figure 5-307: Select Copy Parallel from the MicroStation menu.

Enter **.1** as the distance to *Copy Parallel.*

Left click on the line just created and move the cursor in the direction toward the side of the gap still needing to be connected (Figure 5-308) and left click again. Now right click to end the command.

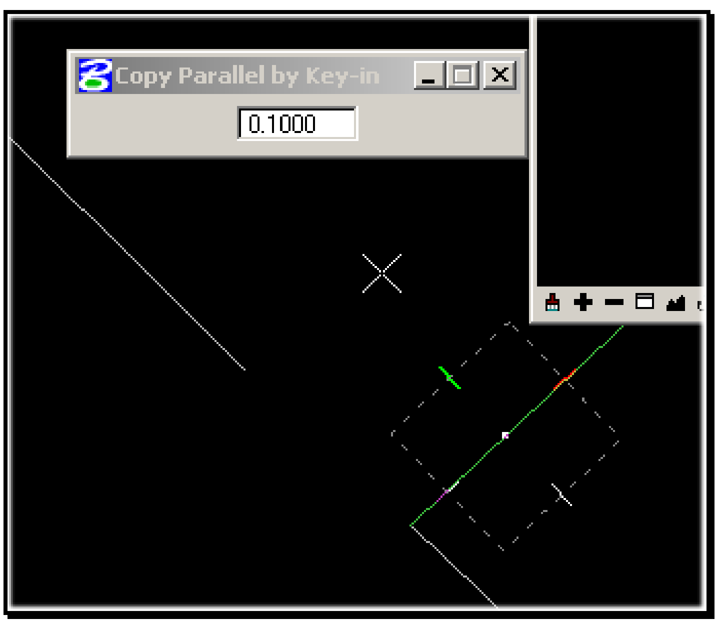


Figure 5-308: Copy the line parallel in the direction of the gap.

With such a small offset distance, the user may not see the second line created (Figure 5-309). Zoom in to verify that it was created.

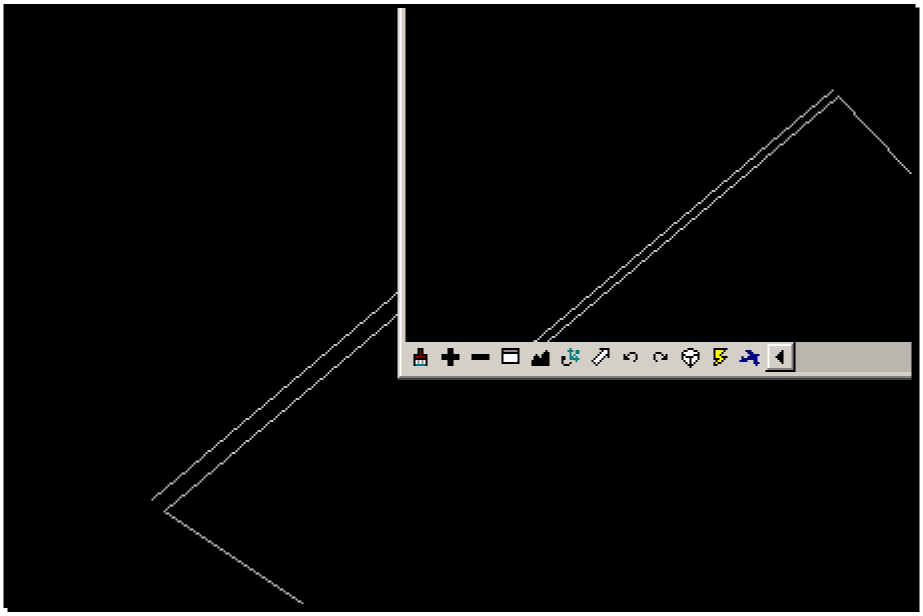


Figure 5-309: Zoom in to verify the line was copied.

Step Five: Connect Parallel Lines to Gap

Connect the parallel string just created with the other side of the gap using the *Modify* tools. To do this, select the **Extend Elements to Intersection** tool located in the *Modify* tool bar (Figure 5-310).

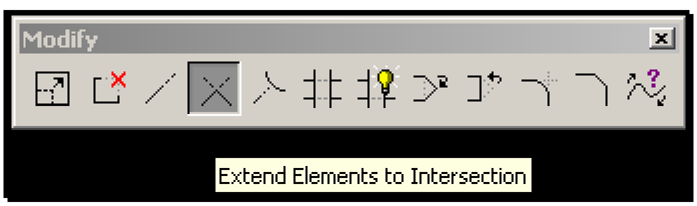


Figure 5-310: Extend Elements to Intersection tool.

Left click on the end of the parallel line and then left click on the edge of the gap that it is being connected to. The connection should appear as shown below (Figure 5-311).

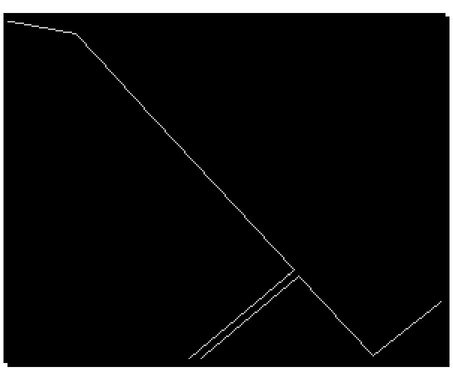


Figure 5-311: Connected parallel line to gap.

Repeat for the other end of the parallel line connecting it to and closing the other gap in the second perimeter.

Step Six: Create Complex Shape

Create a complex shape of the lines, joining them as one shape. Select the **Create Complex Shape** icon (Figure 5-312), located in the *Groups* tool.

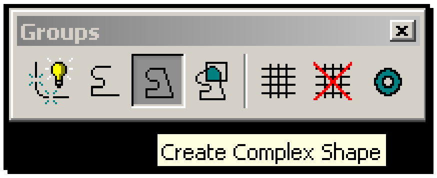


Figure 5-312: Create Complex Shape icon.

Make sure the *Method* is set to **Manual** on the *Create Complex Shape* dialog (Figure 5-313).

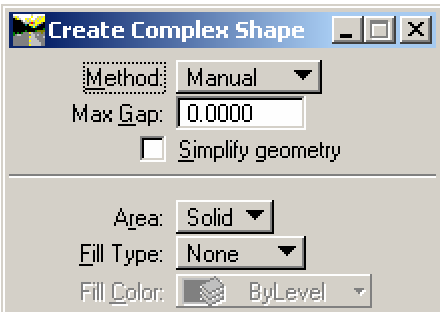


Figure 5-313: Create Complex Shape Tool Settings dialog.

Working in a clockwise direction with left-clicks (<u>*or which ever direction the user chooses as long as the elements are selected as if the image were being drawn with a pencil),*</u> select the first perimeter, the adjoining line that connects to the next perimeter, the second perimeter, then the returning line that connects back to the first perimeter, ending with a final click on the starting perimeter (Figure 5-315). Each line highlights when selected.

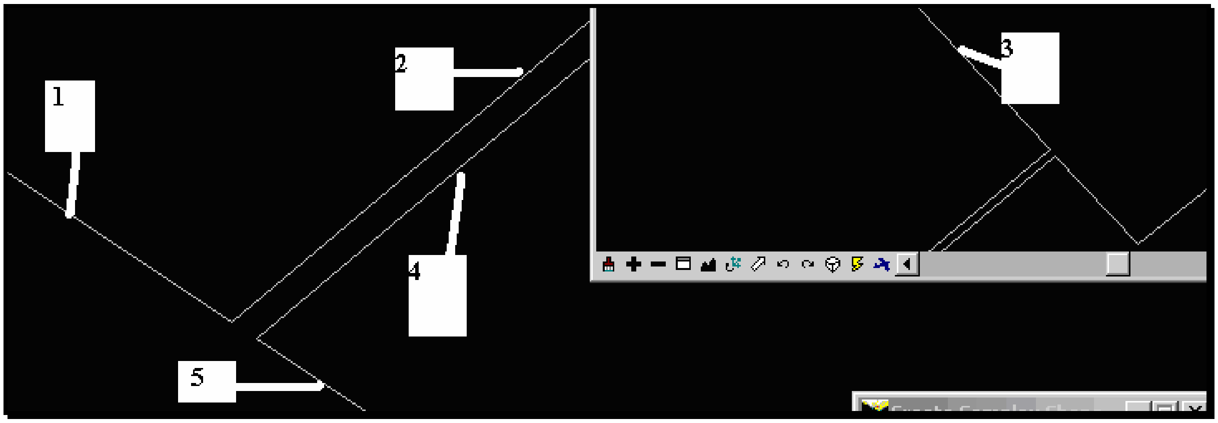


Figure 5-314: Connecting all the pieces of the new shape.

The user should see the message at the bottom of the MicroStation window indicating that the shape is closed (Figure 5-315).

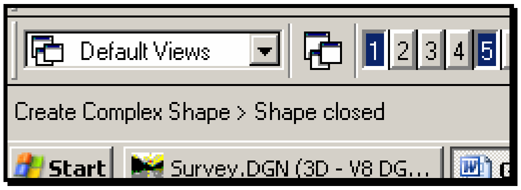


Figure 5-315: Status bar stating that the shape is closed.

Step Seven: Import Perimeter

With the complex shape created from the elements, it must now be added to the *Ground surface* as and **Exterior line**.

Verify that the *Ground Surface* is *Open* and set to *Active*.

Select **File**>**Import**>**Surface** from the InRoads menu (Figure 5-316).

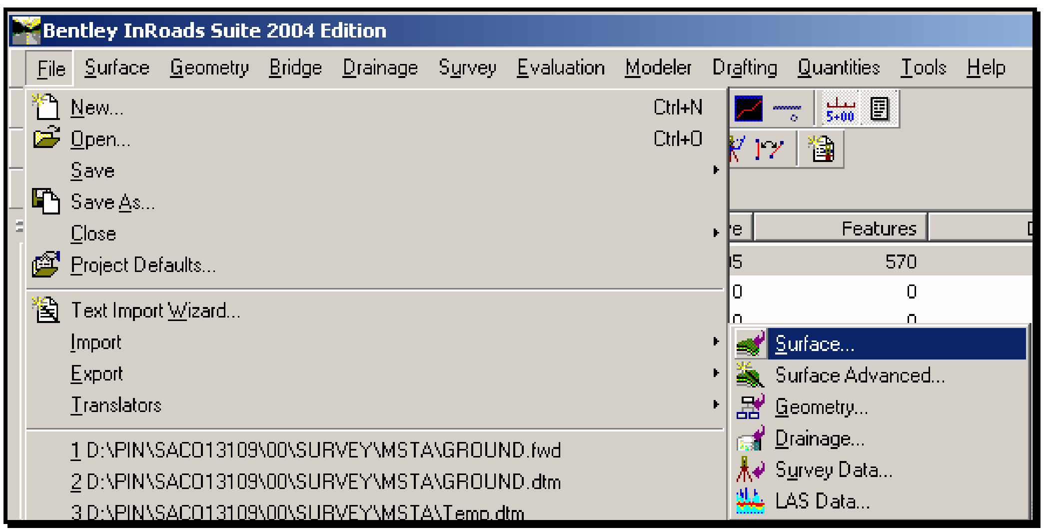


Figure 5-316: Select File>Import>Surface from the InRoads menu.

Adjust the *Import Surface* dialog (Figure 5-317) to reflect the following settings:

Surface: **GROUND**

Load From: **Level**

Level: **Perimeter**

Elevations: **Use Element Elevations**

Seed Name: **Exterior** (has to be typed in)

Feature Style: **Exterior**

Point Type: **Exterior**

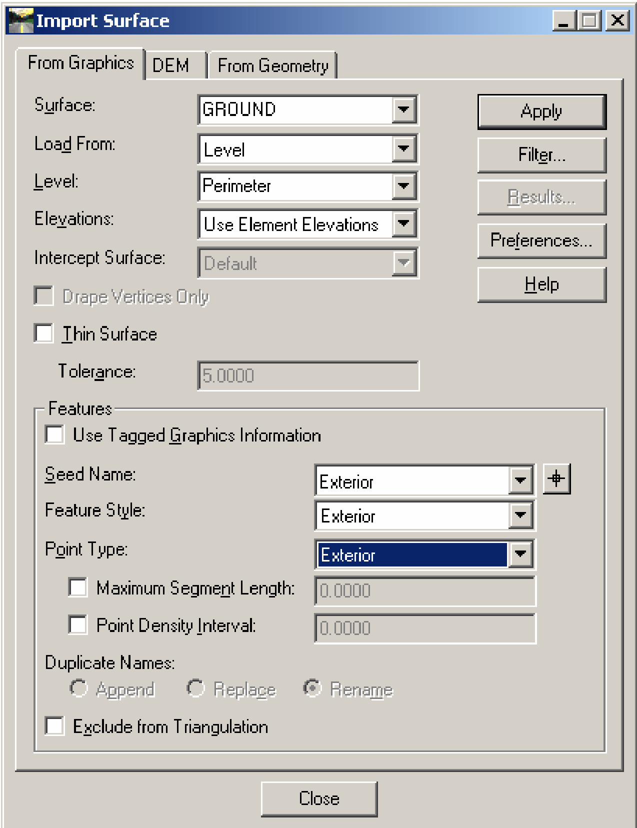


Figure 5-317: Import Surface dialog with proper settings.

Click **Apply.**

Click on the **Results** button to verify that there was only 1 line copied (Figure 5-318). **Close** the *Results* panel.

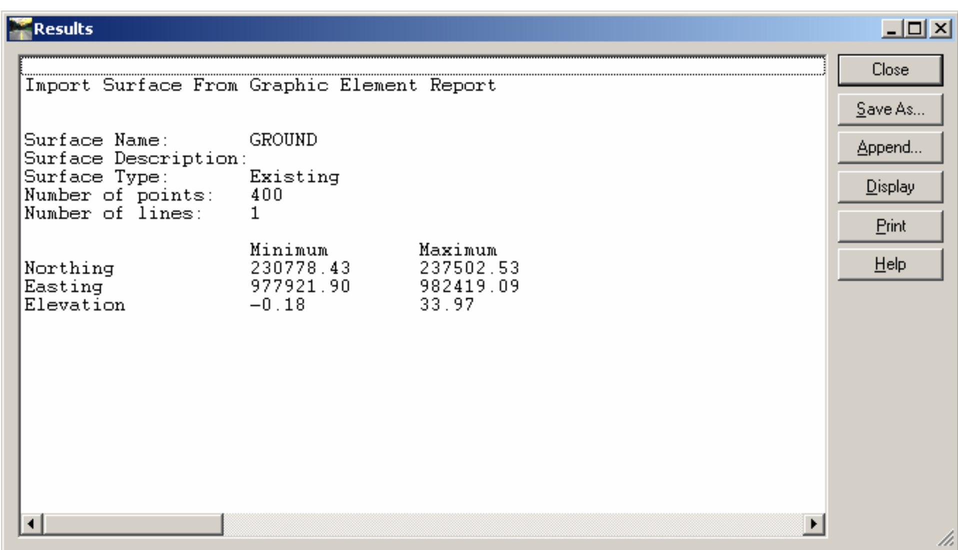


Figure 5-318: Results dialog after importing the exterior.

Close the *Import Surface* dialog box.

Step Eight: Triangulate Surface

Select **Surface>Triangulate Surface** from the InRoads menu (Figure 5-319).

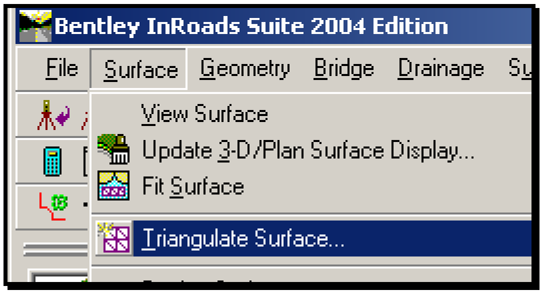


Figure 5-319: Selecting Triangulate surface from the InRoads menu.

In the *Triangulate Surface* dialog (Figure 5-320), set the *Surface* to **Ground** and the *Maximum Length* to 100. Click **Apply** and then **Close.**

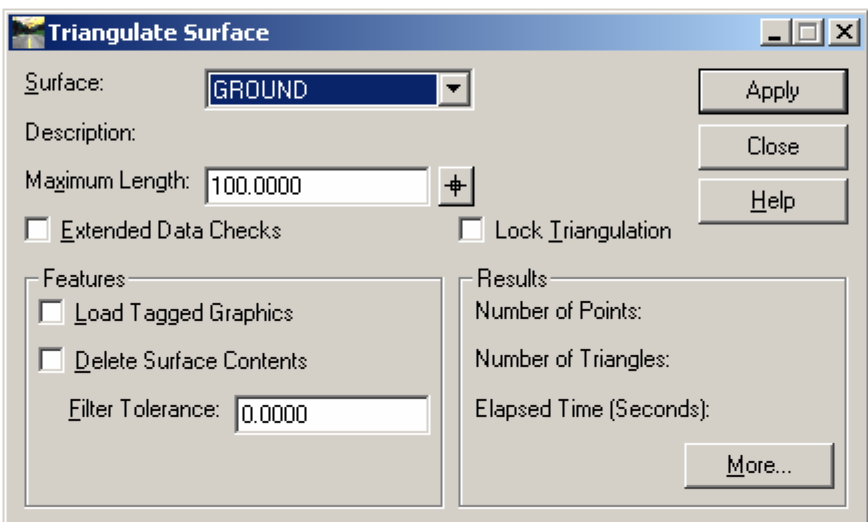


Figure 5-320: Triangulate Surface dialog.

Step Nine: Clear the Display

Select **Edit>Select All** from the *MicroStation* menu (Figure 5-321). Hit the **Delete** key on your keyboard. All the graphics should be removed from the active file.

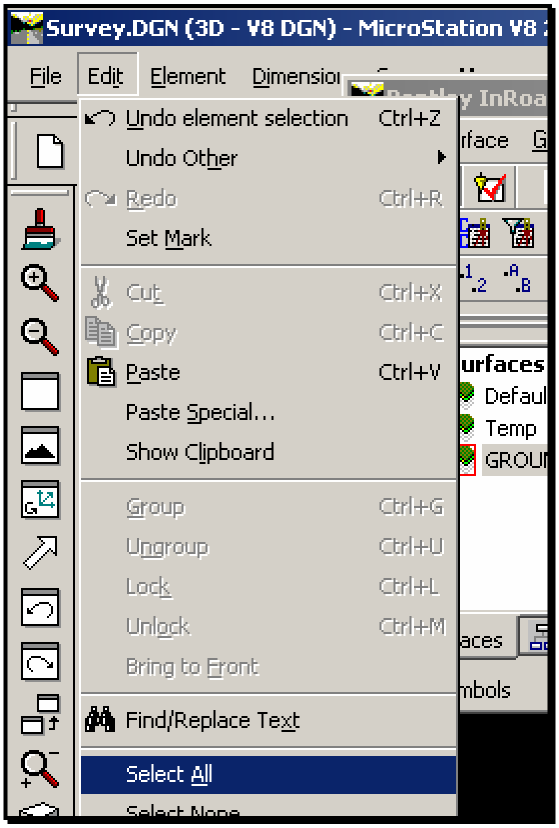


Figure 5-321: Selecting all the graphics in the view window.

Step Ten: View the Triangles and Perimeter.

Select **Surface>Update 3-D/Plan Surface Display** from the InRoads menu (Figure 5-322).

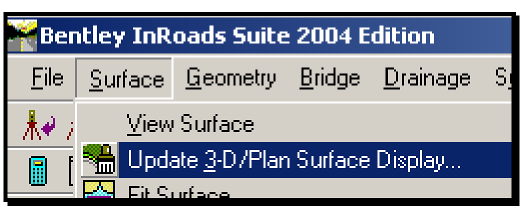


Figure 5-322: Update 3-D/Plan Surface Display...

Adjust the **Update 3-D/Plan Surface Display** dialog to match the following settings (Figure 5-323):

Mode: **Display On**

Surfaces: **Ground**

Place **check** marks for **Perimeter** and **Triangles.**

Click **Apply** and then **Close.**

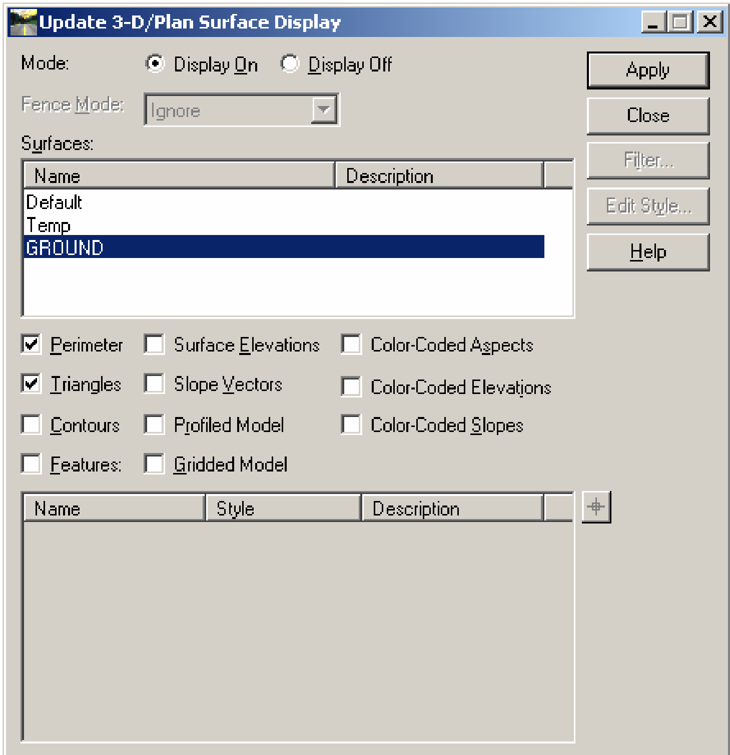


Figure 5-323: Update 3-D/Plan Surface Display dialog.

This is an example of a finished product (Figure 5-324).

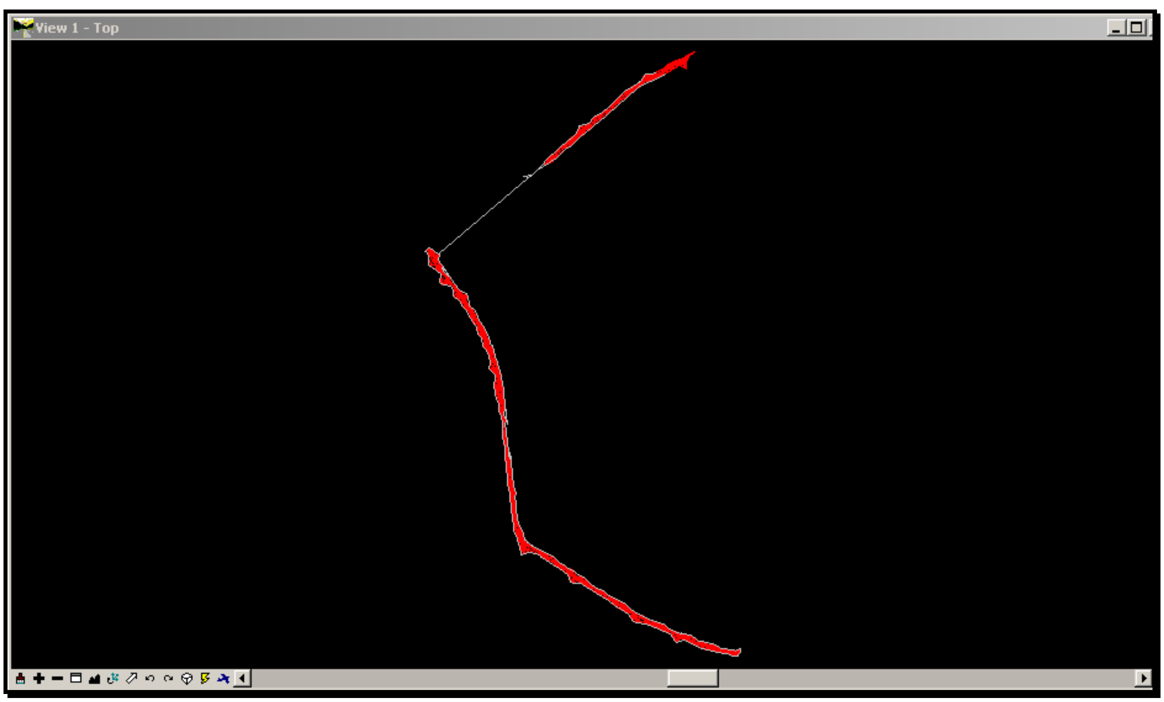


Figure 5-324: One perimeter around two areas of topo.

WETLANDS

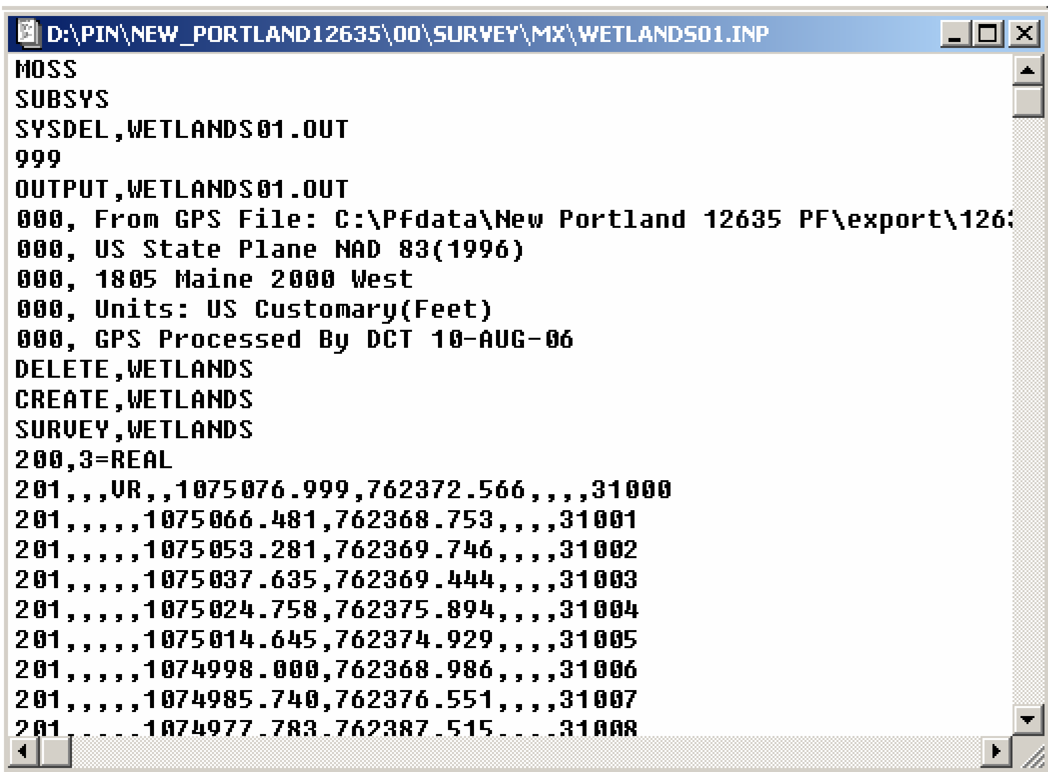
CONVERT TO MX COMPATIBLE FORMAT

Overview

Currently wetland information is processed externally from its GPS state and formed into a file format compatible with an Mx input file. This file will need to be re-formatted to make it compatible with the import to InRoads for processing. At this time, a processor has not been developed to take the wetlands information from the original GPS state to an InRoads file.

Step One: Edit and Save Wetlands Input File

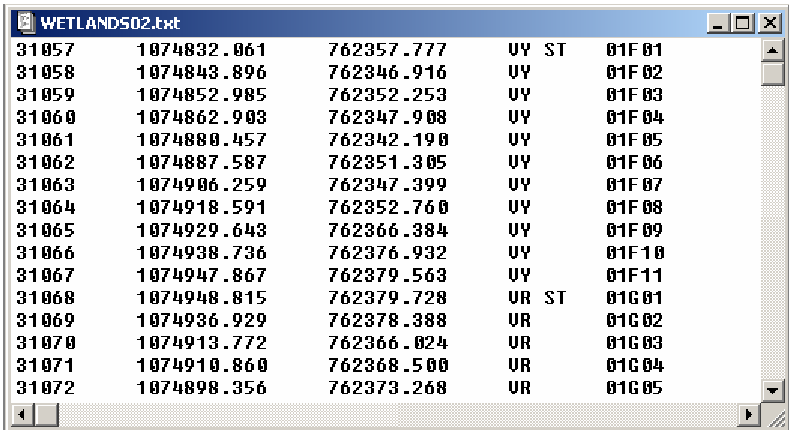
Edit the Wetlands0*.inp file with the PFE Editor. Remove all heading lines before the first instance of 201 by selecting the text and pushing the **Delete** button on your keyboard (Figure 5-325).


D:\PIN\NEW_PORTLAND12635\00\SURVEY\MX\WETLANDS01.INP

```
MOSS
SUBSYS
SYSDEL,WETLANDS01.OUT
999
OUTPUT,WETLANDS01.OUT
000, From GPS File: C:\Pfdata\New Portland 12635 PF\export\126:
000, US State Plane NAD 83(1996)
000, 1805 Maine 2000 West
000, Units: US Customary(Feet)
000, GPS Processed By DCT 10-AUG-06
DELETE,WETLANDS
CREATE,WETLANDS
SURVEY,WETLANDS
200,3=REAL
201,,,VR,,1075076.999,762372.566,,,,31000
201,,,,,1075066.481,762368.753,,,,31001
201,,,,,1075053.281,762369.746,,,,31002
201,,,,,1075037.635,762369.444,,,,31003
201,,,,,1075024.758,762375.894,,,,31004
201,,,,,1075014.645,762374.929,,,,31005
201,,,,,1074998.000,762368.986,,,,31006
201,,,,,1074985.740,762376.551,,,,31007
201,,,,,1074977.783,762387.515,,,,31008
```

Figure 5-325: Original input file before editing.

Using a file editor, organize/edit the file to match the following image (Figure 5-326). The point number (name) must come before the coordinates, the text can be copied from the **Wetlands0*.dat** and added so that it will be imported as one complete file. Remember to add **ST** to the start of each new feature string.


WETLANDS02.txt

31057	1074832.061	762357.777	VY ST	01F01
31058	1074843.896	762346.916	VY	01F02
31059	1074852.985	762352.253	VY	01F03
31060	1074862.903	762347.908	VY	01F04
31061	1074880.457	762342.190	VY	01F05
31062	1074887.587	762351.305	VY	01F06
31063	1074906.259	762347.399	VY	01F07
31064	1074918.591	762352.760	VY	01F08
31065	1074929.643	762366.384	VY	01F09
31066	1074938.736	762376.932	VY	01F10
31067	1074947.867	762379.563	VY	01F11
31068	1074948.815	762379.728	VR ST	01G01
31069	1074936.929	762378.388	VR	01G02
31070	1074913.772	762366.024	VR	01G03
31071	1074910.860	762368.500	VR	01G04
31072	1074898.356	762373.268	VR	01G05

Figure 5-326: Edited input file organized correctly.

Once completed **Save** the edited file as **WETLANDS0*.TXT**.

Step Two: Create New Survey Book

Browse to the *Survey* tab in the InRoads explorer dialog, right-click on **Survey Data** and select **New…** (Figure 5-327).

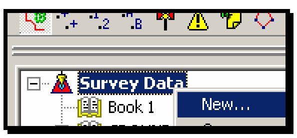


Figure 5-327: Right click on Survey Data and select new.

In the *New* dialog panel (Figure 5-328), enter the name **Wetlands**. Click **Apply** and then **Close** to exit the dialog. This will create a Wetlands.fwd.

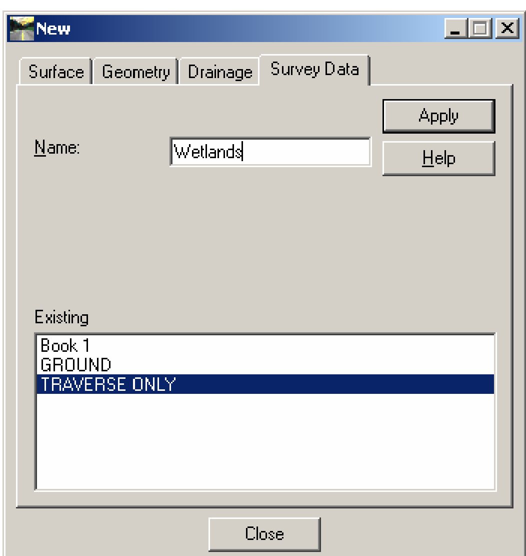


Figure 5-328: Enter Wetlands in the New dialog.

♬ The Wetlands information is already in a coordinate base and therefore does not require traverse data to be entered before the wetland features.

Step Three: Import Wetlands Text File

Right-click on the **Wetlands** fieldbook name and select **Import…** (Figure 5-329).

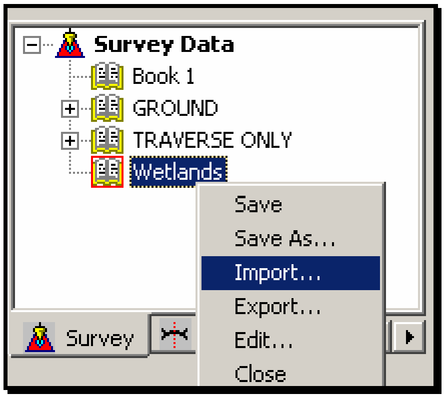


Figure 5-329: Right click field book and select import.

Browse to the location of the **WETLANDS0*.TXT** file. Use the drop-down list under *Files of type:* and select **Text file(*.*)** (Figure 5-330).

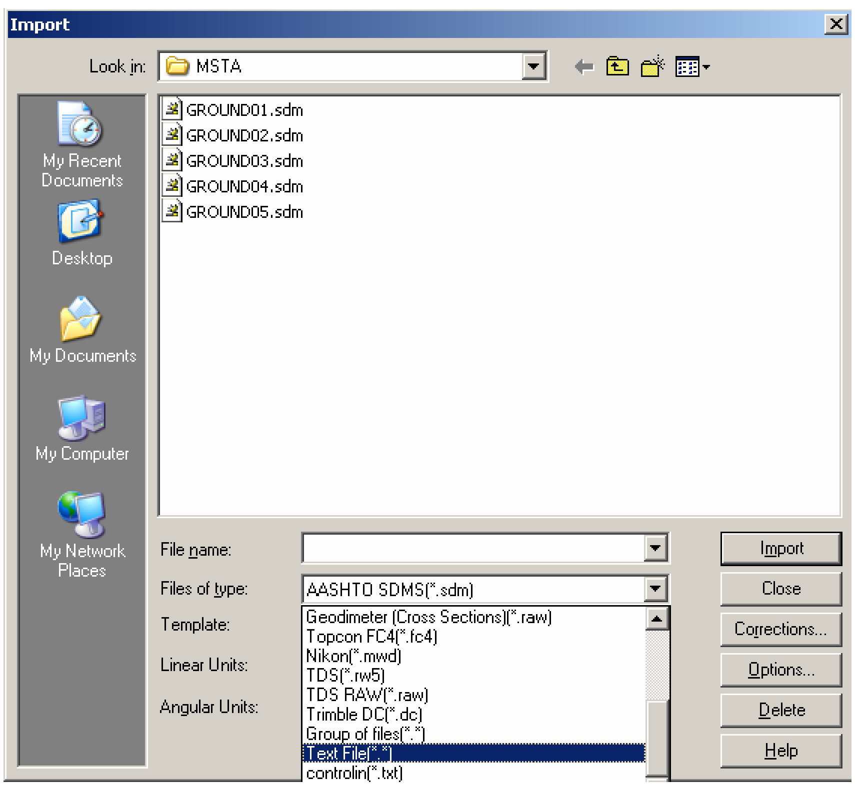


Figure 5-330: Change Files of Type to Text File.

Pick the **Wetlands0*.txt** file. Select **Import.**

Set the *Original Data Type* to **Fixed Width – Fields are aligned in columns** (Figure 5-331). Click **Next.**

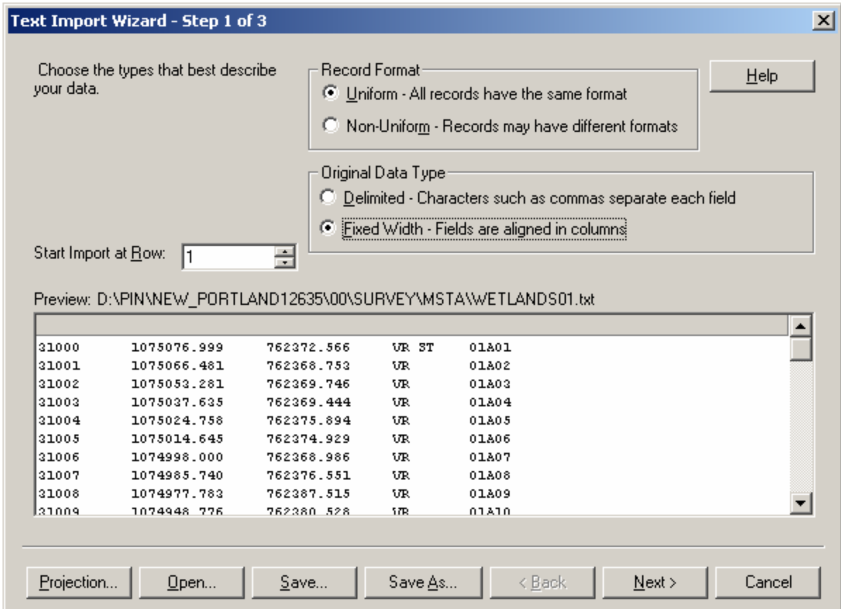


Figure 5-331: Text Import Wizard dialog.

Place the lines to separate the columns (Figure 5-332). Click **Next.**

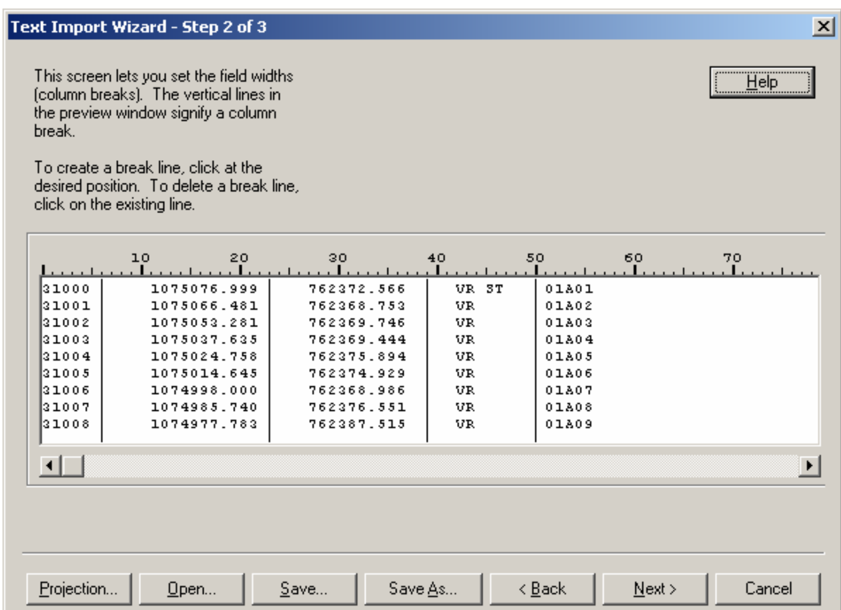


Figure 5-332: Data in columns.

Right-click on the **column header** and set to the **correct definition** for each column of information (Figure 5-333). Click **Finish** and then **Close** or import another wetlands file if necessary.

- This can be accomplished by using the drop-down list at the top of the dialog box as well.

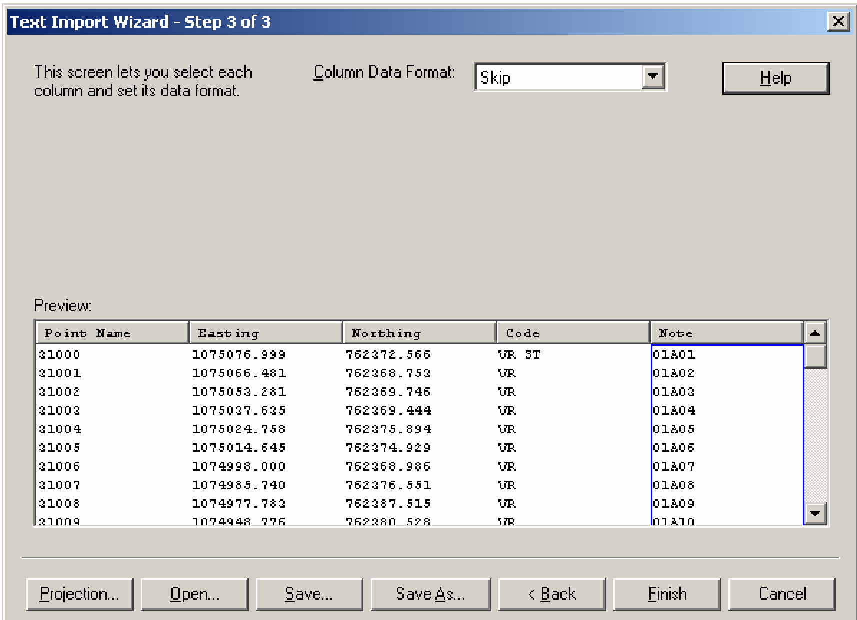


Figure 5-333: Set the header to the correct value.

- Wetland files have the combined factors already applied so this is not an issue when importing this type of data.

Step Four: View the Wetland Features

Verify the **Wetlands.fwd** is the active fieldbook. It will have a red box surrounding the fieldbook icon (Figure 5-334).

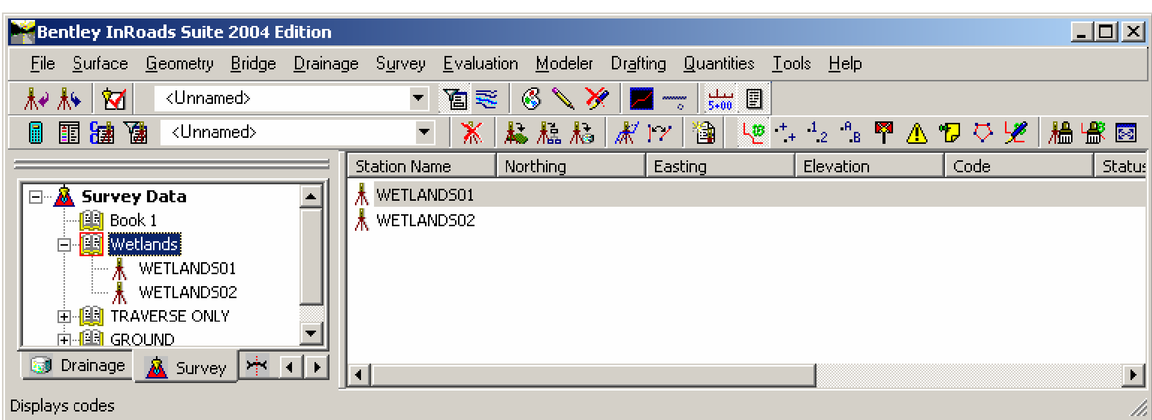


Figure 5-334: Wetlands field book set active.

Using the View Survey Data tool bar (Figure 5-335), select **View Planimetrics** (Figure 5-336) then click **Regenerate Graphics** (Figure 5-337)**.**

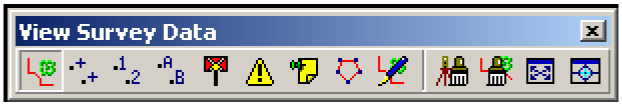


Figure 5-335: View Survey Data tool bar.

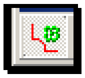


Figure 5-336: View Planimetrics tool.

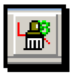


Figure 5-337: Regenerate Graphics tool.

✓ ***Refer to page 5-11 for instruction on loading this tool bar.***

Fit the view. The image displayed will contain only the wetland features (Figure 5-338).

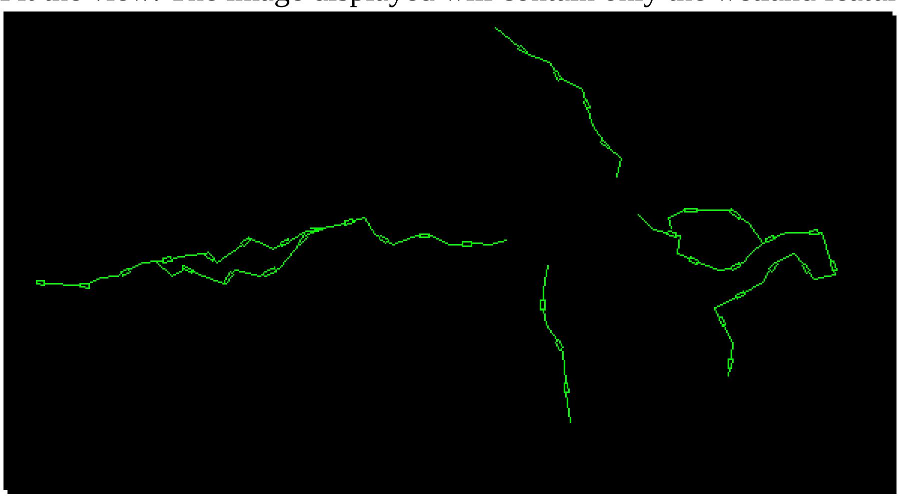


Figure 5-338: Wetland Features are displayed.

Step Five: Compare with Ground Surface

Switch to **Surface** by selecting it from the bottom left tab located on the InRoads panel (Figure 5-339). Open the **Ground.dtm** so the features can be viewed in Surface mode. This will allow the ground surface to be viewed as a back drop while the Wetlands.fwd is viewed in the Survey menu as a fieldbook.

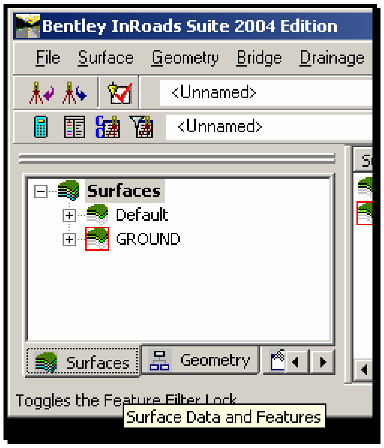


Figure 5-339: Browse to the Surface tab and open Ground.

Select **Surface**>**View Surface>Features** from the InRoads menu bar (Figure 5-340).

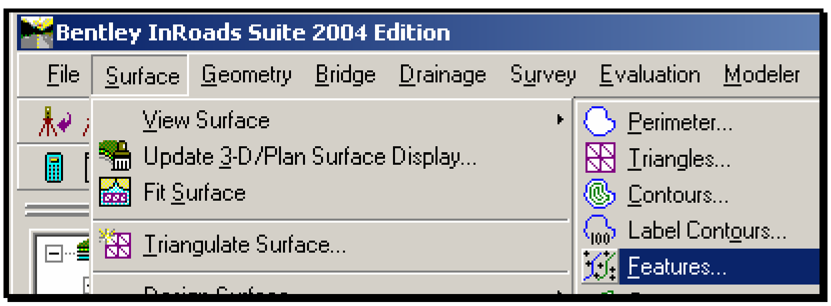


Figure 5-340: Select Surface>View Surface>Features.

Set Surface to **Ground**, click **Apply** and then **Close** (Figure 5-341).

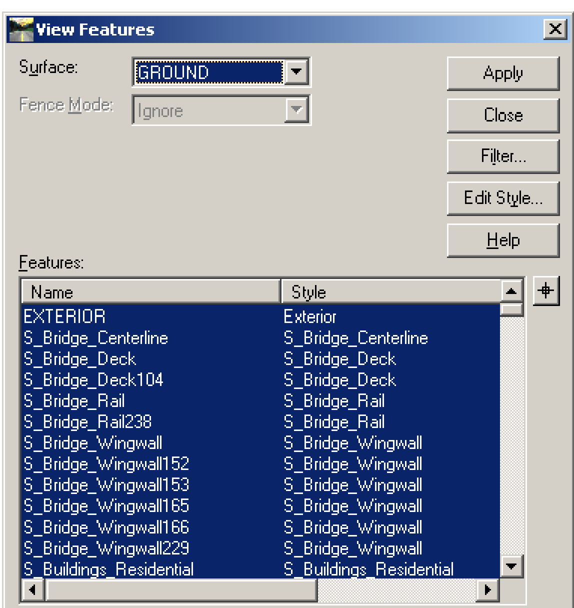


Figure 5-341: View the Ground surface features.

Switch back to **Survey,** using either the tabs or by *Right-clicking* in the tab area and selecting Survey from the drop-down list (Figure 5-342).

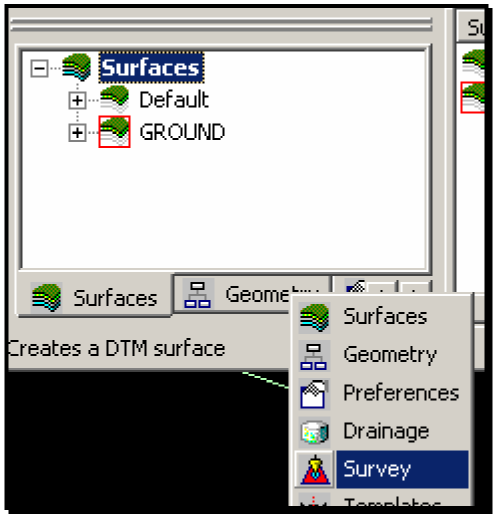


Figure 5-342: Browse to the Survey tab.

Review the Wetland data as compared to the Ground surface. Check point numbers and text associated with the features.

Step Six: Create the OrigWetland.dgn Deliverable

Select **File**>**Make Sheetz** from the MicroStation menu (Figure 5-343).

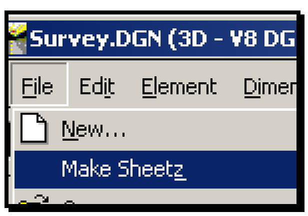


Figure 5-343: Select Make Sheets from the MicroStation file menu.

Select **No Prefix** (Figure 5-344), make sure the workgroup is set to **Survey** and then click **OK.**

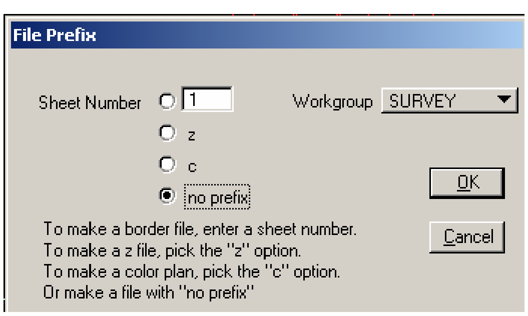


Figure 5-344: No prefix selected.

From the *Create File of Type…* panel use the scroll bar to locate and select **OrigWetlands** (Figure 5-345). Click **OK.**

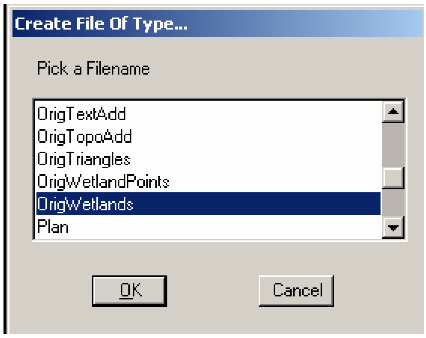


Figure 5-345: OrigWetlands selected.

Click **OK** at the *Make File* dialog (Figure 5-346).

Figure 5-346: Make File dialog.

When the *File Prefix* panel pops back up click **Cancel** to stop making sheets.

Step Seven: Display the Wetland Features

Select **Survey>View Survey Data>Write Survey Data to Graphics** from the InRoads menu (Figure 5-347).

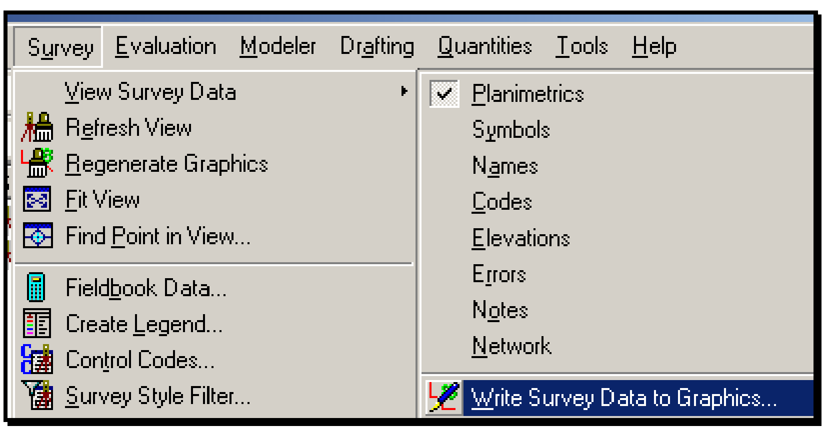


Figure 5-347: Write Survey Data to Graphics menu.

Place check marks in the **Planimetrics** and **Notes** boxes. Click **Apply** and then **Close** (Figure 5-348).

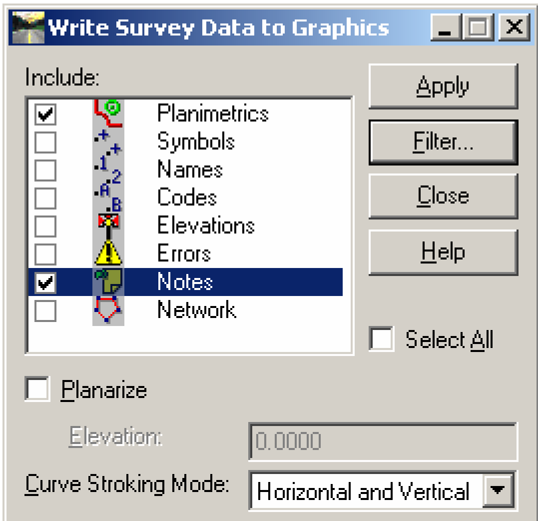


Figure 5-348: Select Planimetrics and Notes.

Select *Fit View* from the MicroStation view controls.

Select **File>Save Settings** from the MicroStation menu. This will ensure that the Origwetlands.dgn will display the strings when opened up by the next person to use it.

Step Eight: Create the OrigWetlandpoints.dgn Deliverable

Select **File>Make Sheetz** from the MicroStation main menu (Figure 5-349).

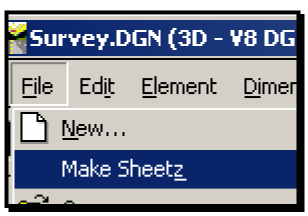


Figure 5-349: Select File>Make Sheetz from the MicroStation menu.

Select **No Prefix** (Figure 5-350), make sure the workgroup is set to **Survey** and then click **OK.**

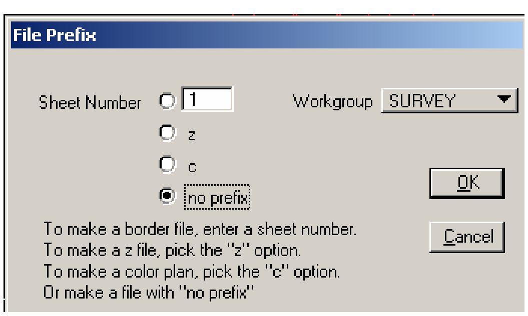


Figure 5-350: No prefix selected.

From the *Create File of Type…* dialog (Figure 5-351), use the scroll bar to locate and select

OrigWetlandPoints. Click **OK.**

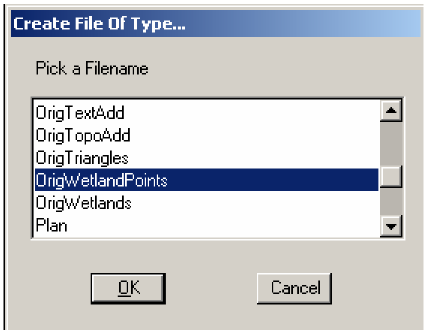


Figure 5-351: OrigWetlandPoints selected.

Click **OK** on the Make File panel (Figure 5-352).

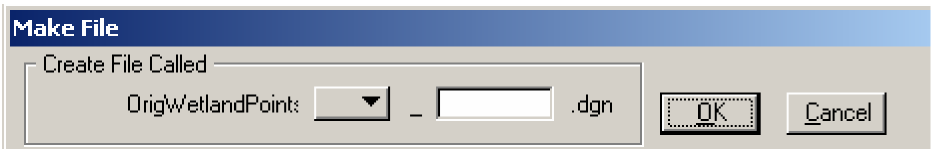


Figure 5-352: Make File dialog.

When the *File Prefix* panel pops back up click **Cancel** to stop making sheets.

Step Nine: Display the Wetland Points

Select **Survey>View Survey Data>Write Survey Data to Graphics** from the InRoads menu (Figure 5-353).

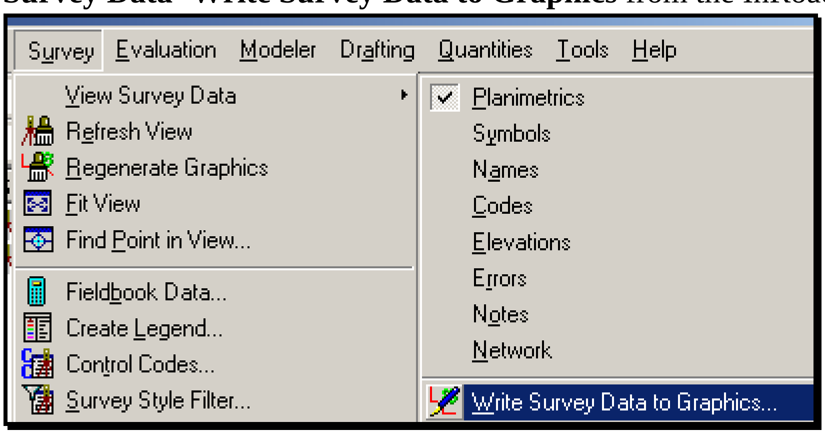


Figure 5-353: Select Survey>View Survey Data>Write Survey Data to Graphics from the InRoads menu.

Place check marks in the boxes for **Symbols** and **Names** only (Figure 5-354). Click **Apply** and then **Close.**

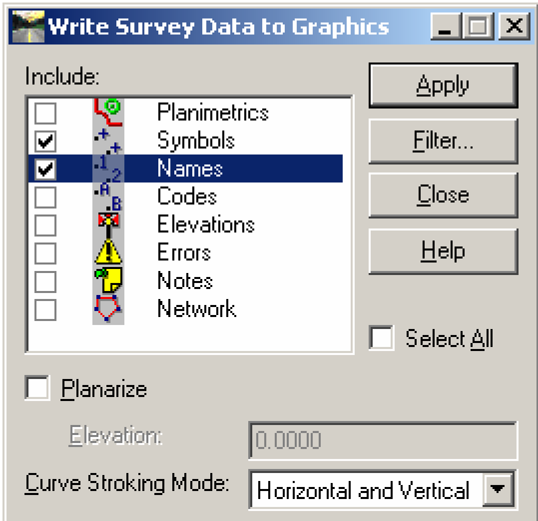


Figure 5-354: Select Symbols and Names.

Select *Fit View* from the MicroStation view controls.

Select **File>Save Settings** from the MicroStation menu. This will ensure that the OrigwetlandsPoints.dgn will display the strings when opened up by the next person to use it.

Step Ten: Save the Field Book

In the InRoads dialog, right click on the **Wetlands** field book on the *Survey* tab and select **Save** (Figure 5-355).

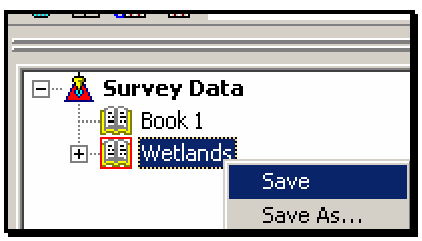


Figure 5-355: Save the Wetlands field book.

Step Eleven: Copy files to Network

Copy the necessary files to the Y:drive PCPIN location as is the standard procedures.

LAYOUT MX ALIGNMENT WITH TRIMBLE

GENERATE A DC FILE FOR TRIMBLE DATA COLLECTOR LAYOUT

Step One: Export Alignment from MX

Create an InRoads folder using the *InRoads Survey Project Setup* program (Figure 5-356). This will ensure that the proper folder structure and mdot_us.xin will be utilized with the InRoads software.

Figure 5-356: InRoads Survey Project Setup icon on the Desktop.

Start an MX session and open the project to be processed for alignment layout.

♬ This can be done on the network or locally. It is the user's preference.

ⓘ ***Caution, if working on the network, all changes made will affect the Network copy of the project. Verify that the Design model is the most current.***

Select **File**>**Export**>**LandXML** from the *MX Menu* (Figure 5-357)**.**

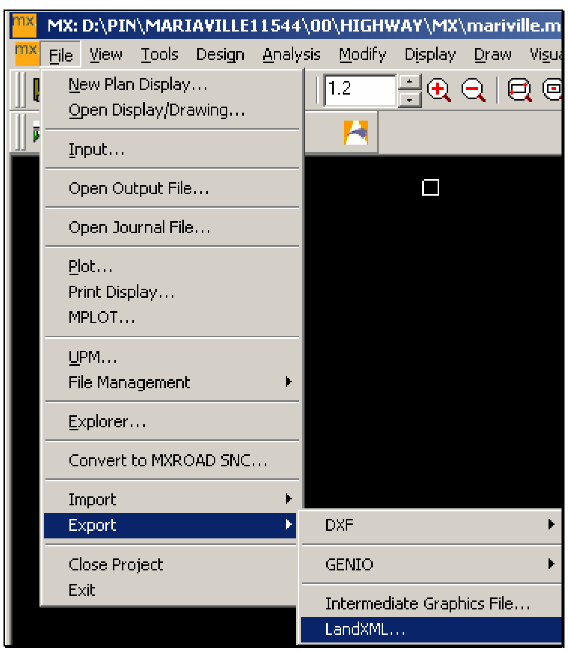


Figure 5-357: Open the LandXML translator from the MX menu.

On the left side of the *LandXML* panel (Figure 5-358), select the **Design** model (or the model name containing the construction alignment).

On the right side of the dialog use the drop down list and set the *XML State* to indicate **proposed**.

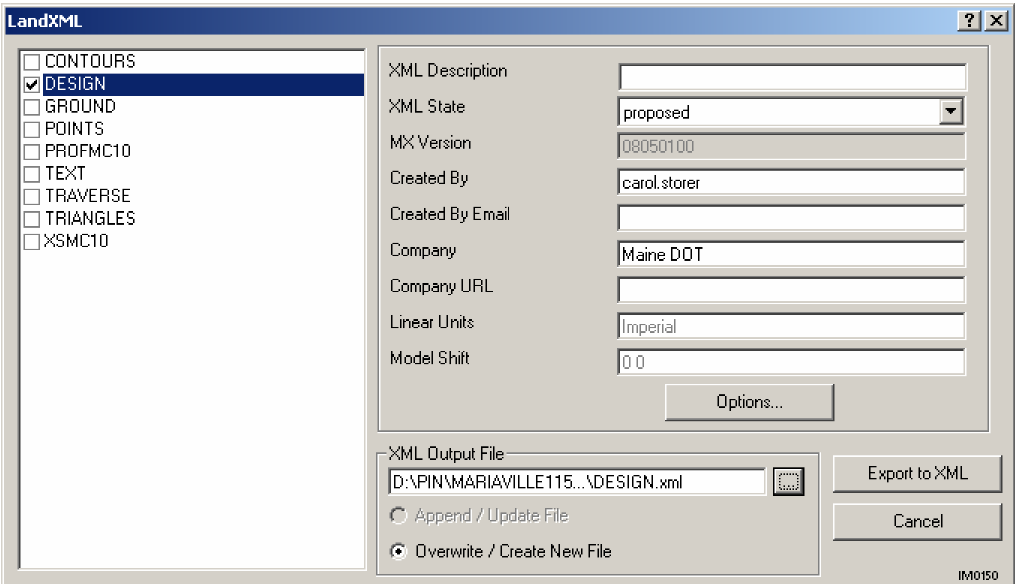


Figure 5-358: LandXML dialog with typical setup.

In the *XML Output File* name text box, select the browse button. Browse to the Survey\MSTA folder of the locally created project directory structure (Figure 5-359) and supply a name for the file (i.e. DESIGN.xml).

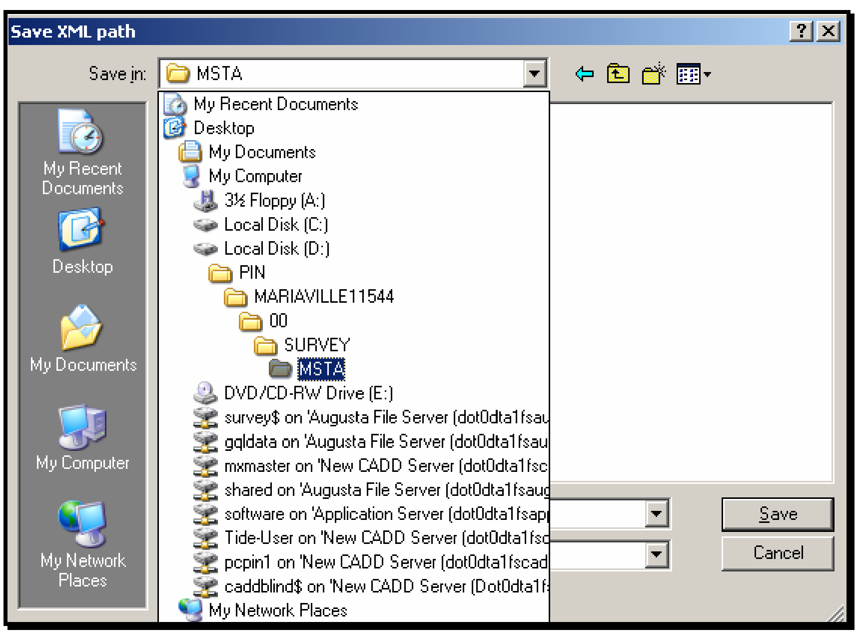


Figure 5-359: Save XML file path to locally created InRoads project folder structure.

♫ This file will be saved to the locally created InRoads project folder (i.e. D:\Pin\TOWN12345\00\SURVEY\MSTA).

Click **Export to XML** then click **OK** to close the *XML Export Summary* dialog (Figure 5-360).

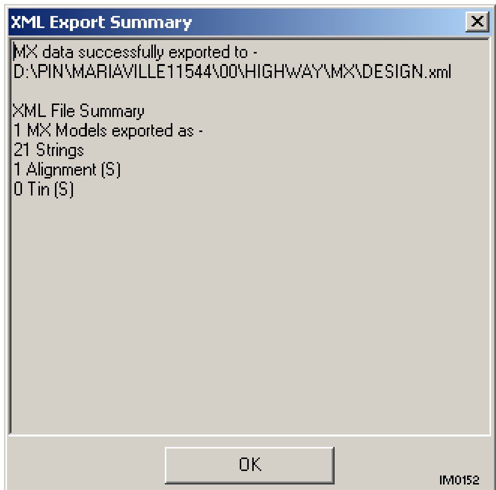


Figure 5-360: XML Export Summary dialog.

Step Two: Import LandXML file into InRoads

Launch InRoads from the Desktop icon (Figure 5-361). Change the *User* from InRoads_Network to **InRoads_Local.** Select your project from the *Project* pull down. Open the Survey.dgn.

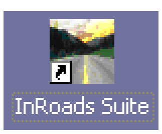


Figure 5-361: InRoads Suite icon located on the Desktop.

Switch to the *Geometry* tab. Right click on *Geometry Projects* and select **New…** (Figure 5-362).

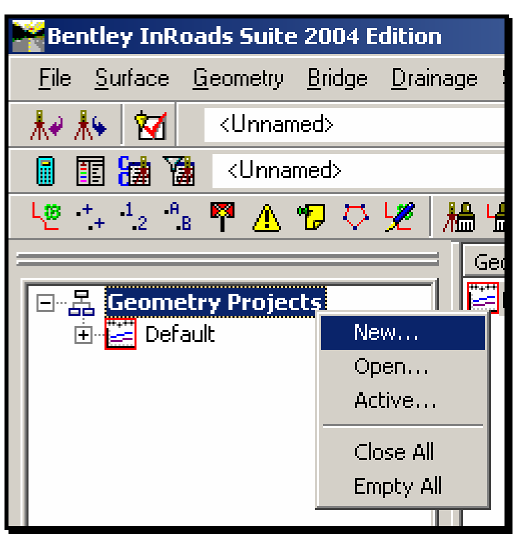


Figure 5-362: Create a new Geometry Project.

Adjust the **New** dialog (Figure 5-363) enter **DESIGN** as the *Name* of the new *Geometry Project*. Click **Apply** and then **Close.**

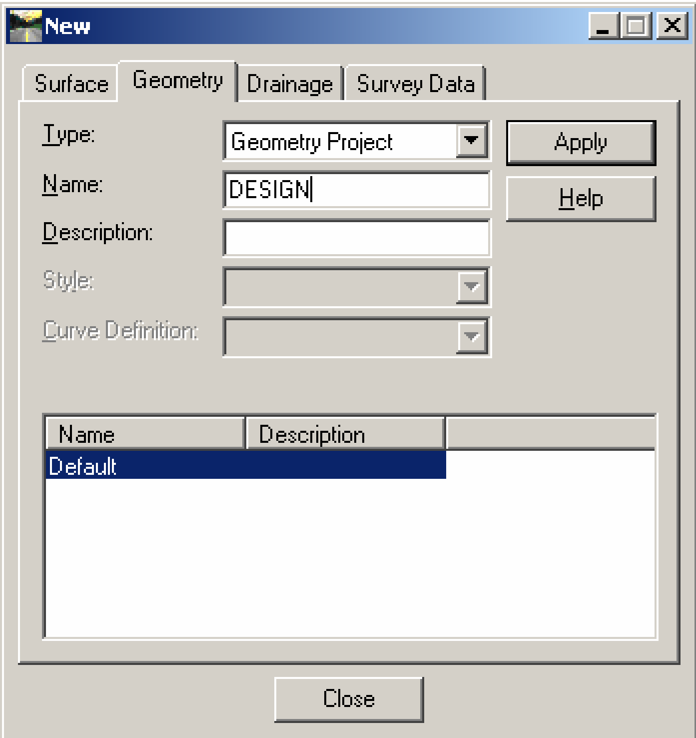


Figure 5-363: Create a new Geometry Project from the New dialog.

Select **File>Translators>LandXML Translator…** from the InRoads menu (Figure 5-364).

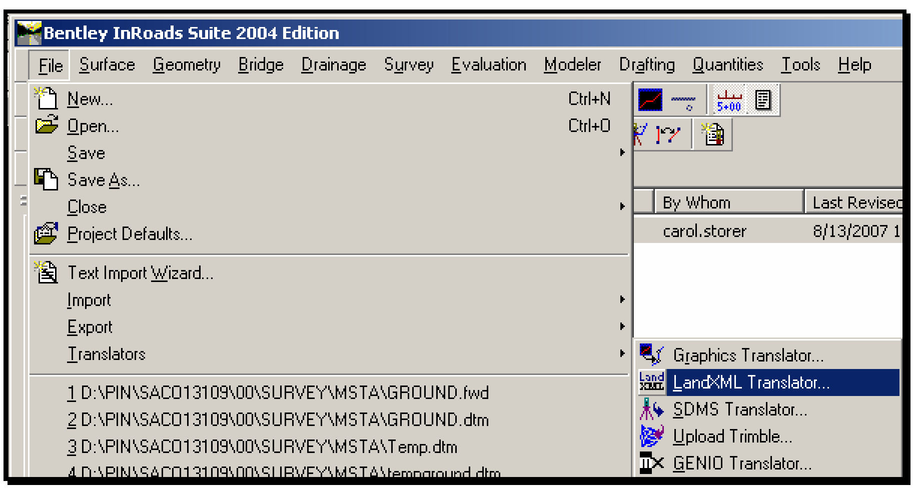


Figure 5-364: Launch the LandXML Translator from the InRoads menu.

Adjust the *LandXML* dialog (Figure 5-365) to the following settings:

In the *Surfaces* portion of the dialog, set the *Feature Seed Name* to **MC10** and the *Feature Style* to **D_Roadway_Centerline.**

In the *Geometry* portion of the dialog, set the *Default Style* to **D_Roadway_Centerline.**

Use the *Browse* button to locate the XML file created of the Design Model exported from MX.

Click **Apply** then **Close.**

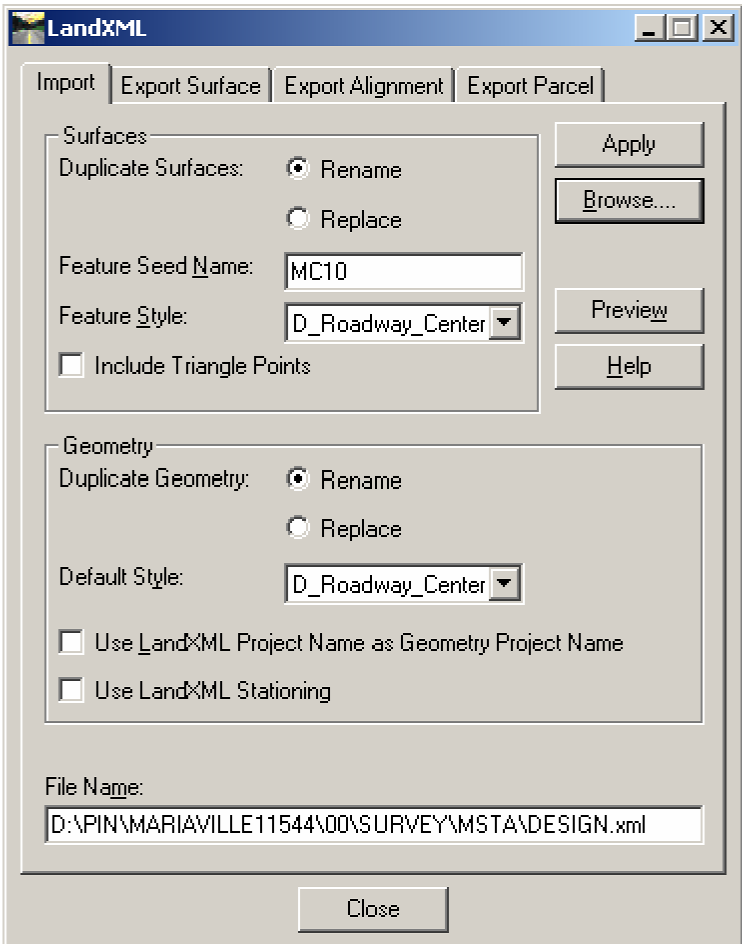


Figure 5-365: LandXML dialog with the correct settings from importing the .xml file.

This process created a *Horizontal* and *Vertical* alignment within the **DESIGN** *Geometry Project.* This can be verified by clicking the plus sign next to the DESIGN project to display its contents (Figure 5-366).

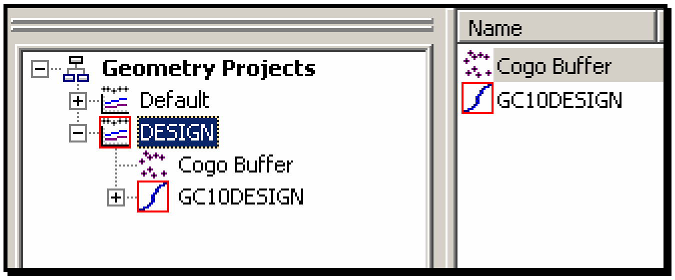


Figure 5-366: View the contents of the DESIGN Geometry Project.

Step Three: Switch to Metric Units (if necessary)

Select **Tools>Options** from the InRoads menu (Figure 5-367).

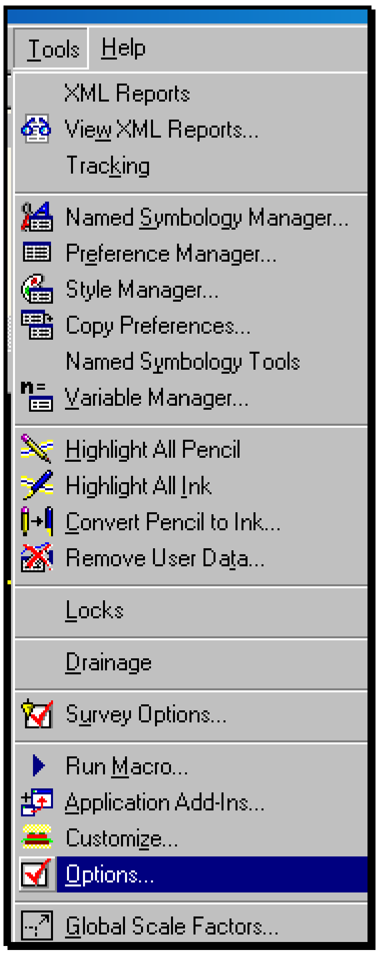


Figure 5-367: Select Tools>Options from the InRoads menu.

Select the *Units and Format* tab (Figure 5-368). In the *Units* area of the dialog, adjust the *Linear:* to **Metric** using the pull down.

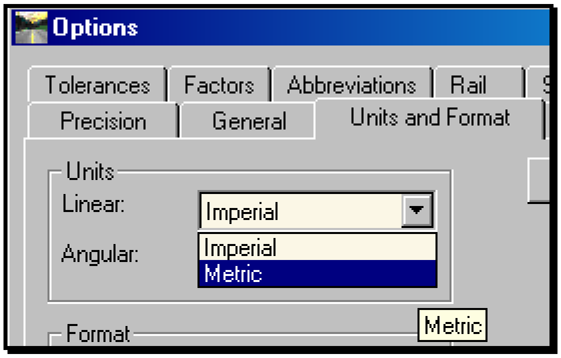


Figure 5-368: Adjust the Linear units to Metric.

In the *Format* section of the dialog (Figure 5-369), change *Station:* to **s+sss.sss** representing the metric stationing.

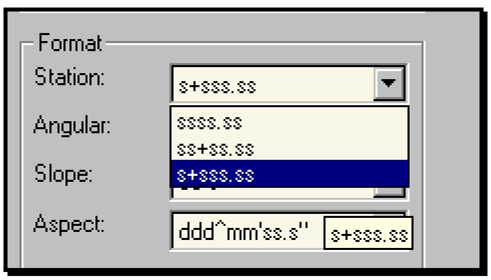


Figure 5-369: Adjust the stationing to the metric format.

Click **Apply** and then **Close.**

Step Four: Display the Alignment

Part One: Turn On Station Lock

Verify that the **Station Lock** located in the *Locks* toolbar is **ON** (Figure 5-370).

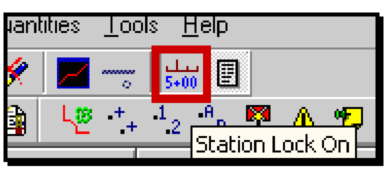


Figure 5-370: Station Lock should be On for next step.

Part Two: View the Alignment

Select **Geometry>View Geometry>Active Horizontal** from the InRoads menu.

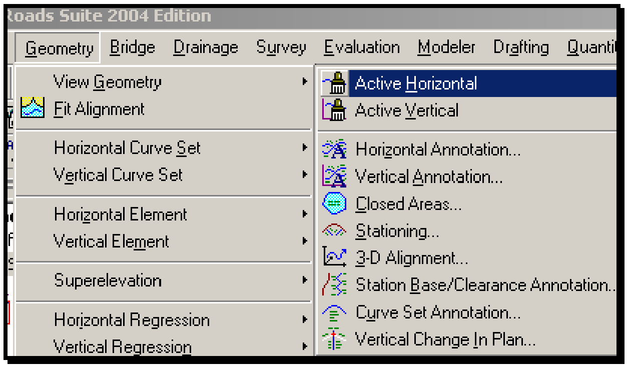


Figure 5-371: Select Geometry>View Geometry>Active Horizontal from the InRoads menu.

Part Three: View Stationing

Select **Geometry>View Geometry>Stationing** from the InRoads menu. Verify that the *Horizontal Alignment* selected reflects the **MX alignment name** in the *Main* tab of the *View Stationing* dialog (Figure 5-372).

In the *Limits* section of the dialog, verify that the correct alignment stationing is displayed (even though grayed out).

Part Four: Adjust for Metric Project (if necessary)

Click on the *Preferences* button. Select **Metric.** Click **Load,** and then **Close.**

Part Five: Click Apply

Click **Apply** and then **Close.**

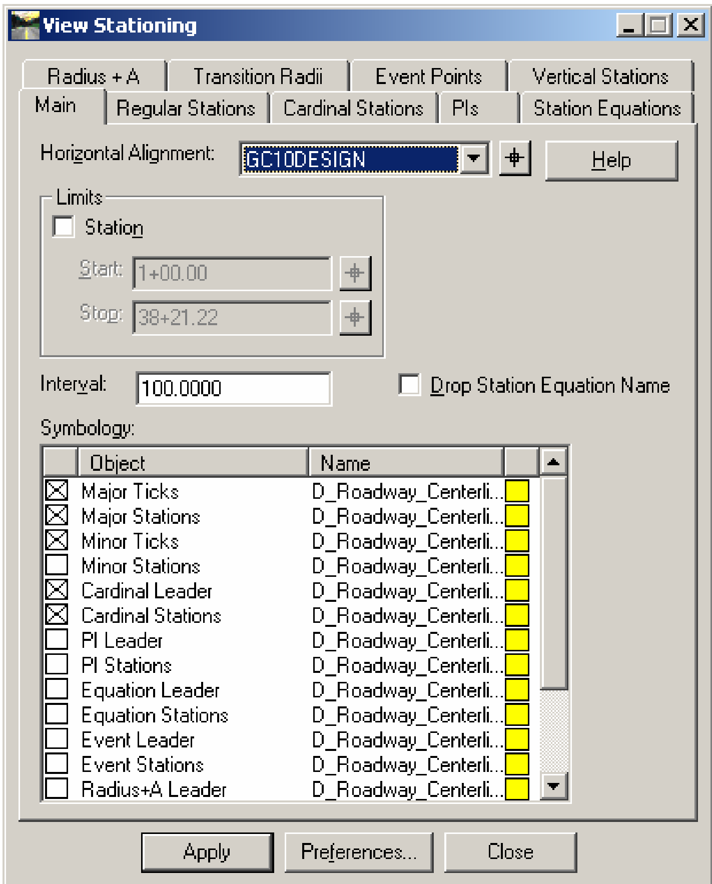


Figure 5-372: View Stationing dialog.

Select **Fit View** from MicroStation's view controls to refresh the drawing for a visual inspection.

Step Five: Correct Alignment stationing (if necessary)

♬ This process is only necessary if the alignment stationing is incorrect.

If you noticed that the stationing was incorrect in the *View Stationing* dialog (Figure 5-373) in the previous step, select **Close** to close the dialog.

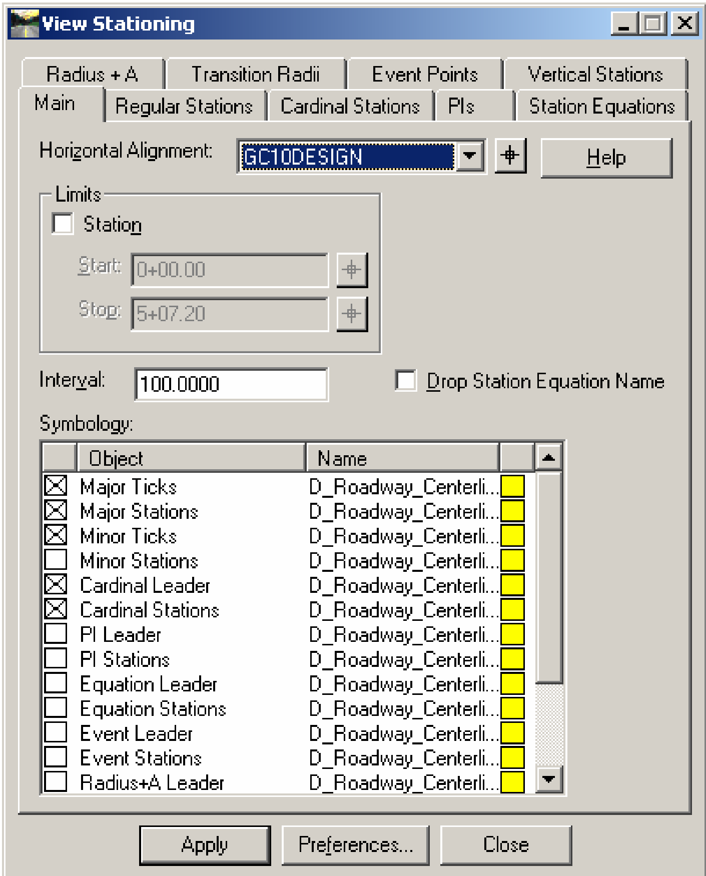


Figure 5-373: View Stationing dialog with incorrect stationing.

Select **Geometry>Horizontal Curve Set>Stationing…** from the InRoads menu (Figure 5-374).

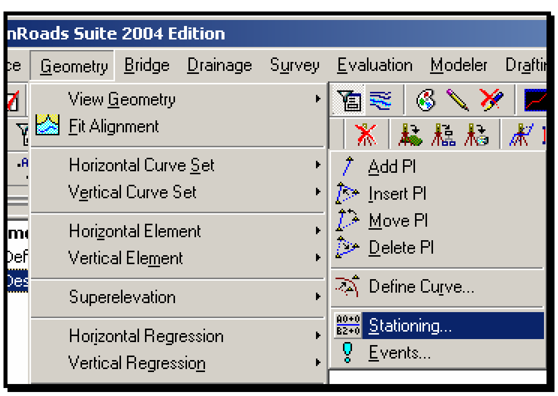


Figure 5-374: Opening the Stationing dialog from the InRoads menu.

Enter the correct start station in the *Starting Station* text box (Figure 5-375). Click **Apply** and then **Close.**

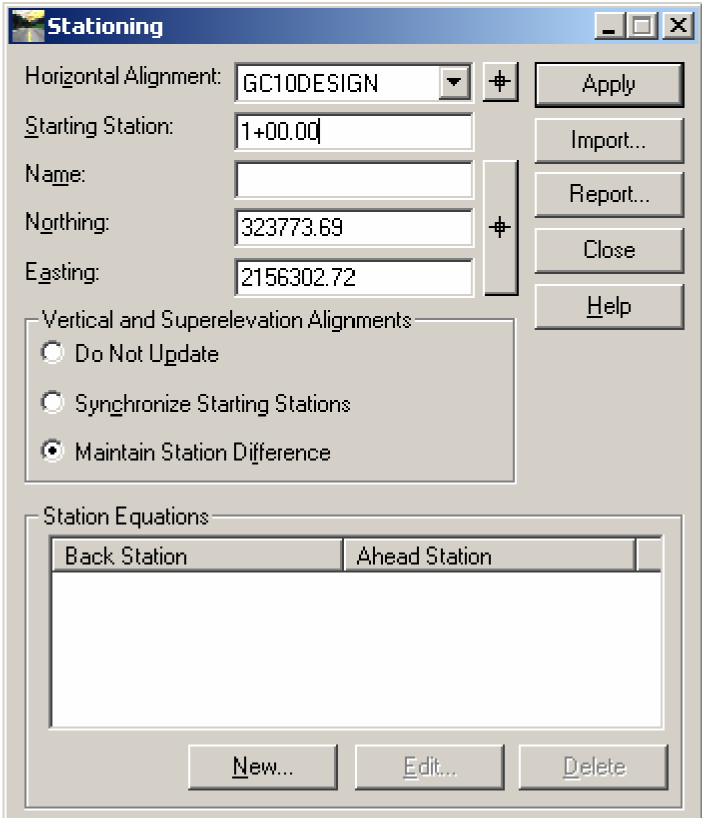


Figure 5-375: Adjusting stationing using the Stationing dialog.

Select **Geometry>View Geometry>Stationing** from the InRoads menu. Review the *Stationing* portion of the dialog. This should now show the correct stationing.

Click **Apply** and then **Close.**

Select **Fit View** from the MicroStation view controls to refresh the drawing for a visual inspection of the alignment.

Step Six: Generate the Trimble.dc file

Select **File>Translators>Upload Trimble** from the InRoads menu (Figure 5-376).

ⓘ ***If this menu item is not available, select Tools>Application Add-Ins and place a check in the Upload Trimble Add-In and click OK.***

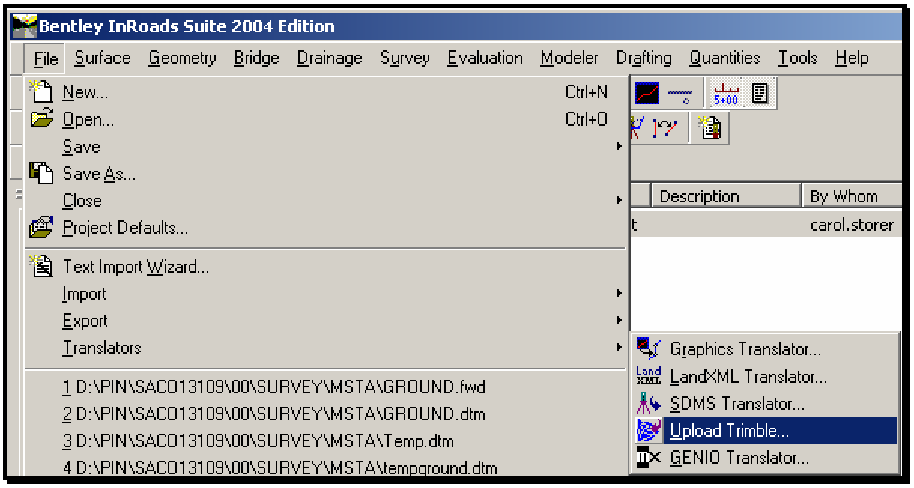


Figure 5-376: Select Upload Trimble from the InRoads menu.

Adjust the *Upload Trimble* dialog (Figure 5-377) to reflect the following settings:

Geometry Project: **Design** (the geometry project name the information was translated to)

Surface: **Design** (the surface must be open/active)

Linear Units: **US Feet** or **Metric** (if necessary)

Select the Horizontal Alignment in the *Horizontal Alignments* portion of the dialog (i.e. GC10Design).

Click **Apply.**

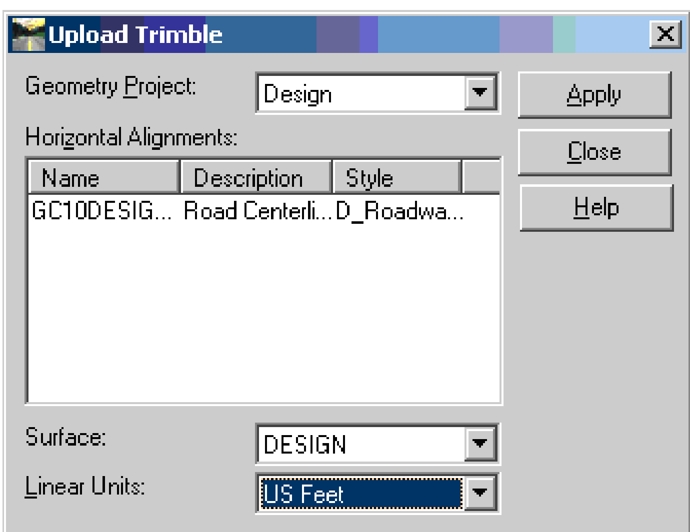


Figure 5-377: Upload Trimble dialog with the proper settings.

One Time Trimble Authorization (if necessary)

At the *Authorize Trimble Link* panel… (Figure 5-378).

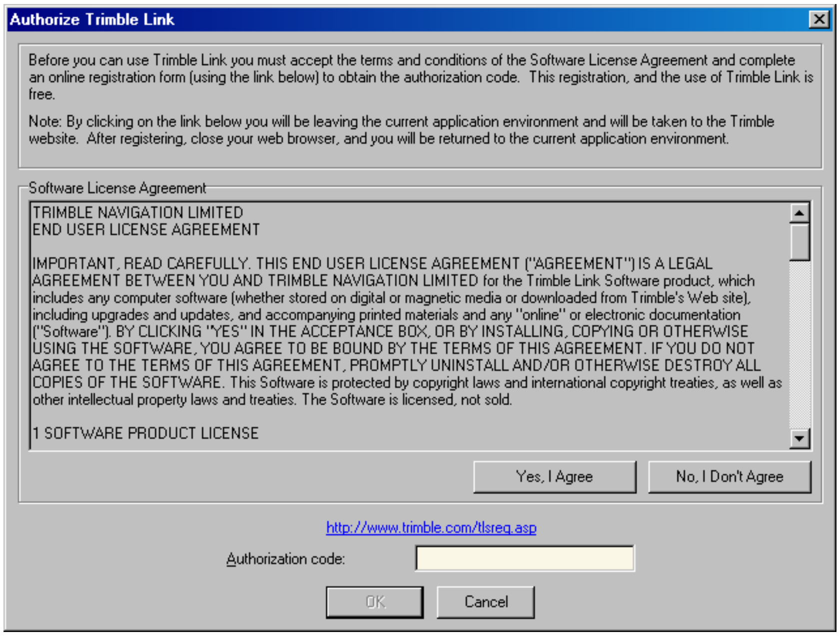


Figure 5-378: Authorize Trimble Link dialog.

Click on the internet link and fill in the user information to register for the authorization code (Figure 5-379). Click **Send Registration Now**.

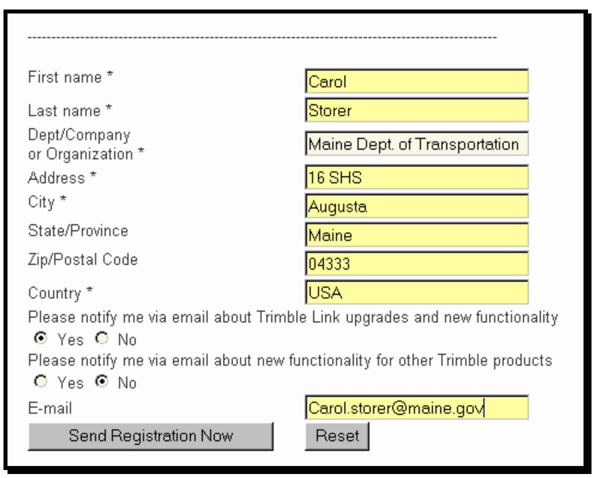


Figure 5-379: Trimble Link Registration dialog.

You will receive your Key Code immediately (Figure 5-380).

Figure 5-380: Key Code after registration is successful.

Enter the *Authorization Code* into the authorization panel (Figure 5-381) and click **Yes, I Agree** and then **OK.**

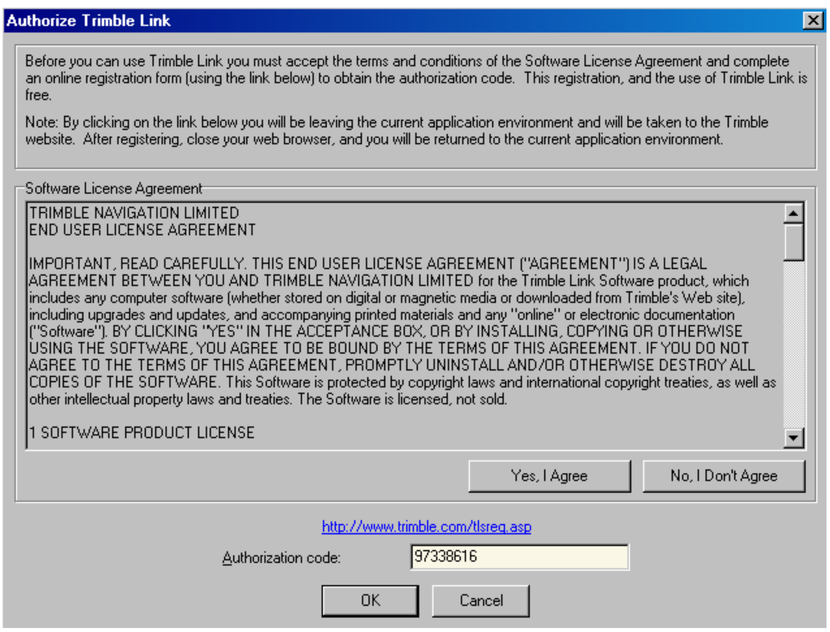


Figure 5-381: Key code in Authorize Trimble Link dialog.

Step Six: Continued

At the *Save As* dialog (Figure 5-382), provide a file name for the DC file. Click **Save.**

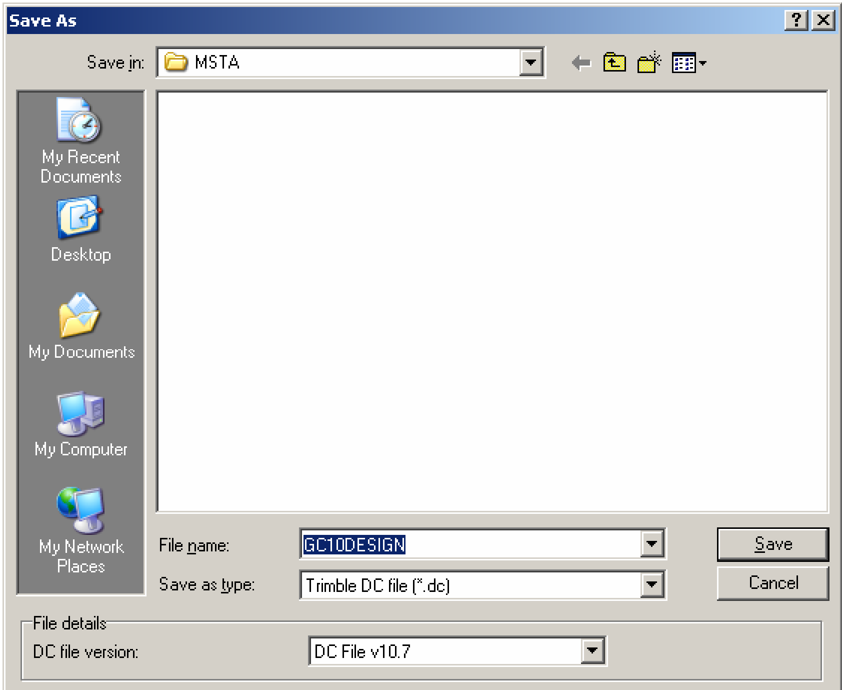


Figure 5-382: Save As dialog when saving the .dc file.

Click **Cancel** on the *Save As* dialog (Figure 5-383) for the *Trimble TIN model*.

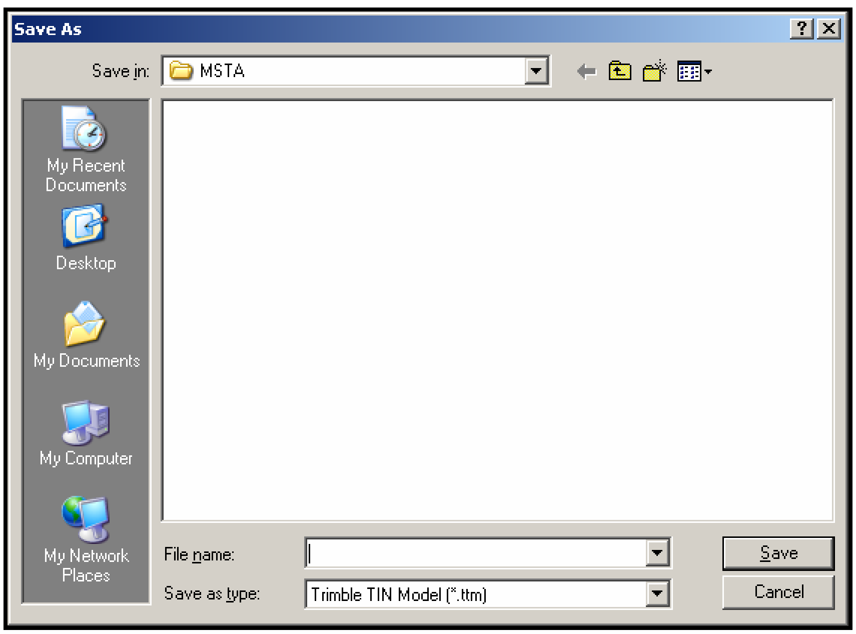


Figure 5-383: Cancel the Save As dialog for the Trimble Tin Model.

Select **Close** on the *Upload Trimble* dialog.

The *.dc file for layout is saved in the local project directory (Figure 5-384) and can be copied to the appropriate folder on the network.

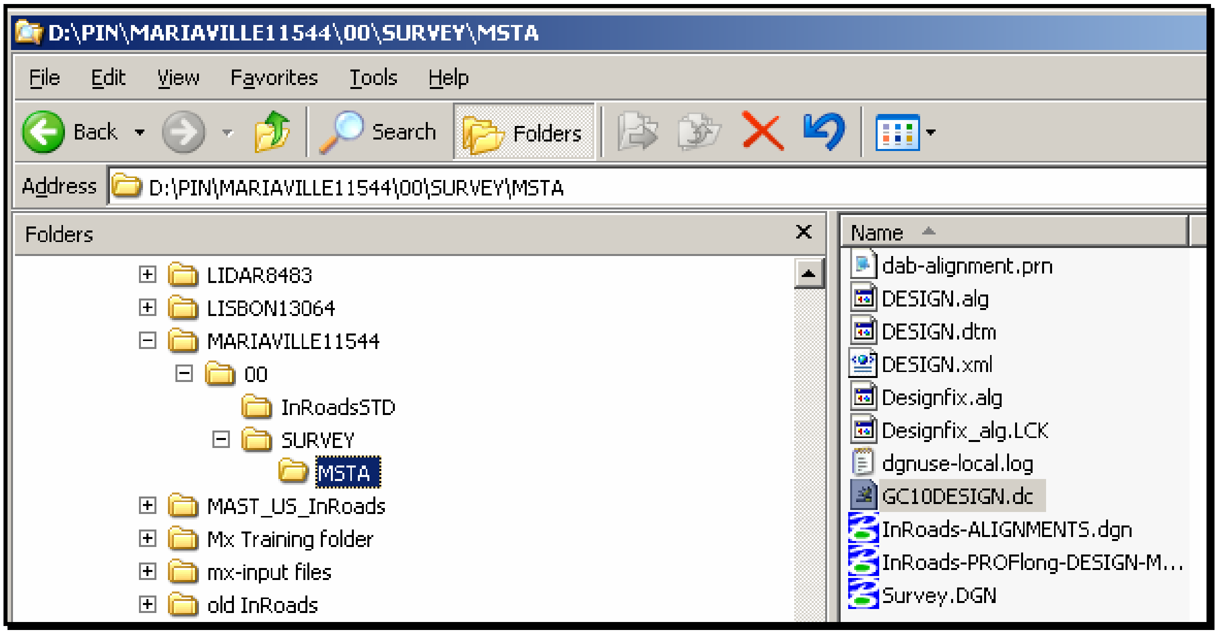


Figure 5-384: Default location of the saved .dc file.

Step Seven: Compare with DAB or Plans

Compare the Trimble.dc file to a dab-report or a set of construction plans.

DECIPHERING TRIMBLE .DC CODES

Trimble Codes

31 - ROAD: HORIZONTAL STRAIGHT

Position	Length	Data format	Description of field
1	2	Type code	Record type code = 31
3	2	Derivation	Derivation code
5	16	Azimuth	Azimuth (from 0 deg)
21	16	+Distance	Distance

32 - ROAD: HORIZONTAL ARC (Radius/Length)

Position	Length	Data format	Description of field
1	2	Type code	Record type code = 32
3	2	Derivation	Derivation code
5	16	+Distance	Arc length (along centerline)
21	16	Distance	Radius

34 - ROAD: VERTICAL ALIGN (Vertical Header)

Position	Length	Data format	Description of field
1	2	Type code	Record type code = 34
3	2	Derivation	Derivation code
5	16	Distance	Start station
21	16	Distance	Start elevation

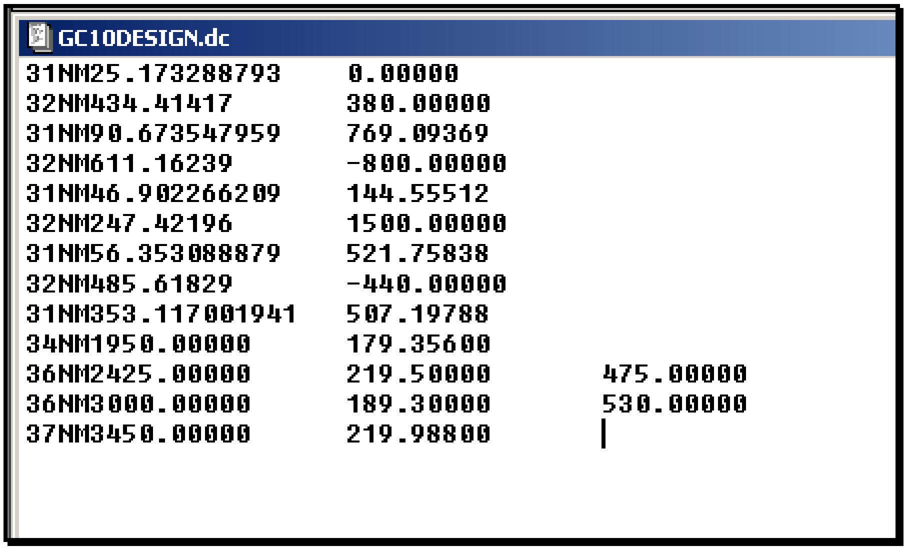
36 - ROAD: VERTICAL PARABOLIC

Position	Length	Data format	Description of field
1	2	Type code	Record type code = 36
3	2	Derivation	Derivation code
5	16	Distance	Station of intersection
21	16	Distance	Elevation of intersection
37	16	+Distance	Length

37 - ROAD: VERTICAL POINT

Position	Length	Data format	Description of field
1	2	Type code	Record type code = 37
3	2	Derivation	Derivation code
5	16	Distance	Station
21	16	Distance	Elevation

Breaking apart the Trimble.dc file …



```
GC10DESIGN.dc
31NM25.173288793    0.00000
32NM434.41417       380.00000
31NM90.673547959    769.09369
32NM611.16239       -800.00000
31NM46.902266209    144.55512
32NM247.42196       1500.00000
31NM56.353088879    521.75838
32NM485.61829       -440.00000
31NM353.117001941   507.19788
34NM1950.00000      179.35600
36NM2425.00000      219.50000      475.00000
36NM3000.00000      189.30000      530.00000
37NM3450.00000      219.98800
```

Type code = 31, Derivation =NM, Azimuth = 25.173288793, distance = 0.00000

Type code = 32, Derivation =NM, Arc length = 434.41417, Radius =380.00000

Type code = 31, Derivation =NM, Azimuth = 90.673547959, distance = 769.09369

Type code = 32, Derivation =NM, Arc length =611.16239, Radius = -800.00000

Type code = 31, Derivation =NM, Azimuth = 46.902266209, distance = 144.55512

Type code = 32, Derivation =NM, Arc length =247.42196, Radius =1500.00000

Type code = 31, Derivation =NM, Azimuth = 56.353088879, distance = 521.75838

Type code = 32, Derivation =NM, Arc length =485.61829, Radius = -440.00000

Type code = 31, Derivation =NM, Azimuth = 353.117001941, distance = 507.19788

Type code = 34, Derivation =NM, Start Station = 1950.00000, elevation=179.35600

Type code = 36, Derivation =NM, Station of PVI = 2425.00000, elevation = 219.50000, Length = 475.00000

Type code = 36, Derivation =NM, Station of PVI = 3000.00000, elevation =189.30000, Length = 530.00000

Type code = 37, Derivation =NM, End Station = 3450.00000, elevation = 219.98800

CREATE TRIMBLE.DC FILE FROM GRAPHICS (ALIGNMENTS.DGN)

GENERATE A DC FILE FOR TRIMBLE DATA COLLECTOR LAYOUT – METRIC PROJECTS

At this time the configuration to change the Units of Resolution does not work for Metric projects. The user will need to re-produce the alignment in the Mx software from the Dab-alignment report and then proceed to bring the information into InRoads as previously documented using a LandXML file.

GENERATE A DC FILE FOR TRIMBLE DATA COLLECTOR LAYOUT

Step One: Create InRoads Folder Structure

Create an InRoads folder using the *InRoads Survey Project Setup* program icon on your desktop (Figure 5-385). This will ensure that the proper folder structure and mdot_us.xin will be utilized with the InRoads software.

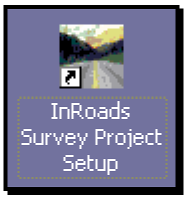


Figure 5-385: InRoads Survey Project Setup icon located on the users desktop.

Step Two: Copy Necessary Files

Using *Windows Explorer*, **Copy** the **Alignments.dgn** and **ProflongMC10.dgn** files from the Highway\MSTA or Bridge\MSTA folder, and paste into the newly created local project folder.

Copy the **Triangles.dgn** from the Survey/MSTA folder and paste into the newly created local project folder, as well.

Step Three: Launch InRoads

Launch InRoads from the desktop icon. Change the *User* to **InRoads_Local.** Select your project from the *Project* pull down. Select the **Alignments.dgn** file as the entry drawing.

The User will receive the warning message that the drawing was created for the MX platform (Figure 5-386). Click **OK.**

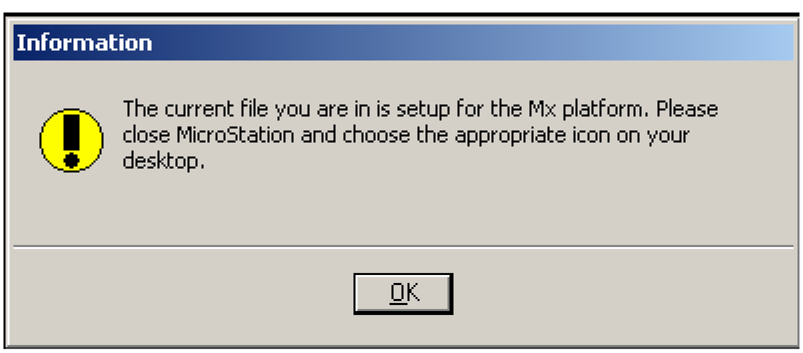


Figure 5-386: Warning stating that the file was intended for MX.

Step Four: Upgrade the Files

Select **InRoads>Update UOR and Units** from the MicroStation main menu (Figure 5-387).

Figure 5-387: Selecting Update UOR and units from the MicroStation menu.

Another warning message will open and give you an opportunity to quit the program (Figure 5-388). Select **Proceed.**

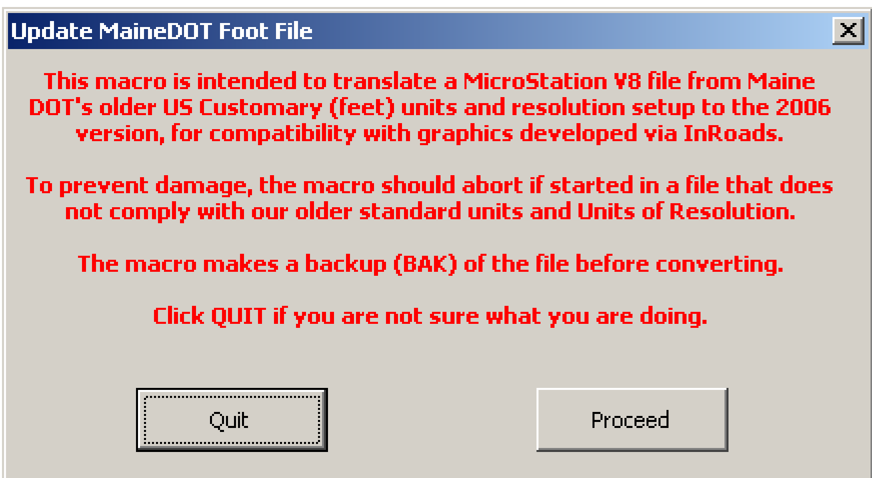


Figure 5-388: Update MaineDOT Foot File warning.

When the program is complete a *Successful Completion* dialog will open (Figure 5-389). Click **OK.**

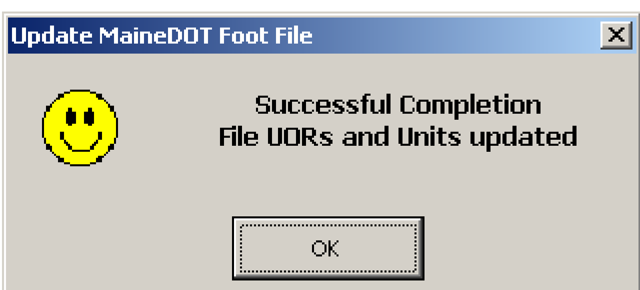


Figure 5-389: Successful Completion dialog.

<u>REPEAT</u> the upgrading process to the **ProflongMC10.dgn** and the **Triangles.dgn** as well.

Step Five: Create a New Geometry Project

Browse to the *Geometry* tab in InRoads. Right-click on the name **Geometry Projects** (Figure

5-390) and select **New…**

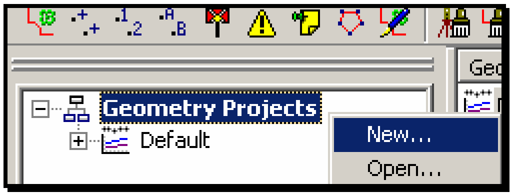


Figure 5-390: Create a new Geometry Project.

In the ***New*** dialog, select the *Geometry* tab (Figure 5-391) and adjust the dialog as follows:

Type: **Geometry Project**

Name: **Design**

Click **Apply** and the **Close.**

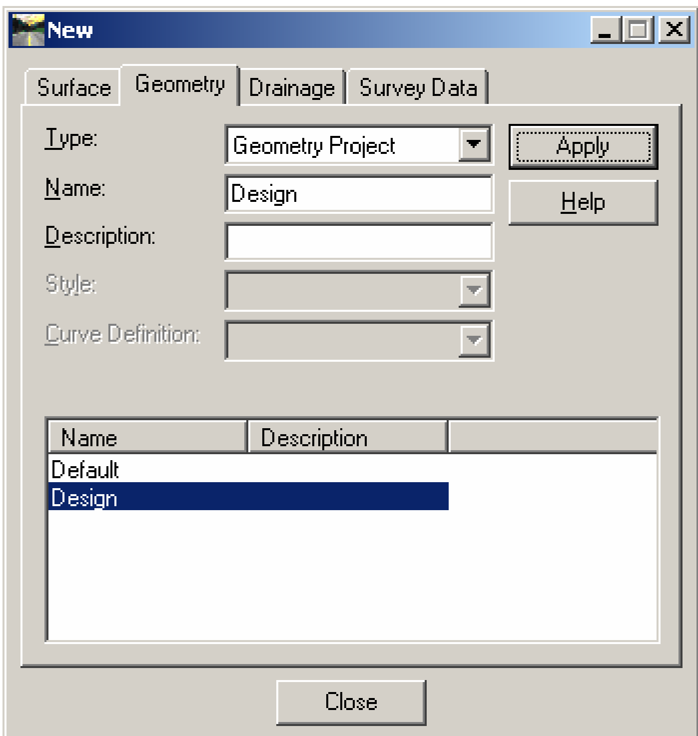


Figure 5-391: Create a new Geometry Project with these settings.

Step Six: Import Horizontal Alignment

Select **File>Import>Geometry…** from the InRoads menu (Figure 5-392).

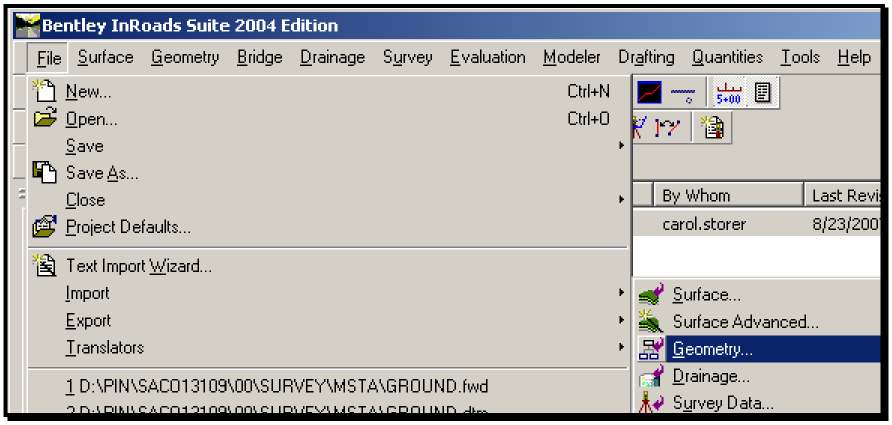


Figure 5-392: Select File>Import>Geometry from the InRoads menu.

In the *Import Geometry* dialog, select the *From Graphics* tab (Figure 5-393) and adjust the settings as follows:

Type: **Horizontal Alignment**

Name: **MC10** (or appropriate alignment name)

Style: **D_Roadway_Centerline**

Geometry Project: **Design**

Place a **check mark** for *All Selected Elements Added to Single Alignment*.

Using the MicroStation element selection tool, **select the alignment string** on the display.

Click **Apply** and then **Close.**

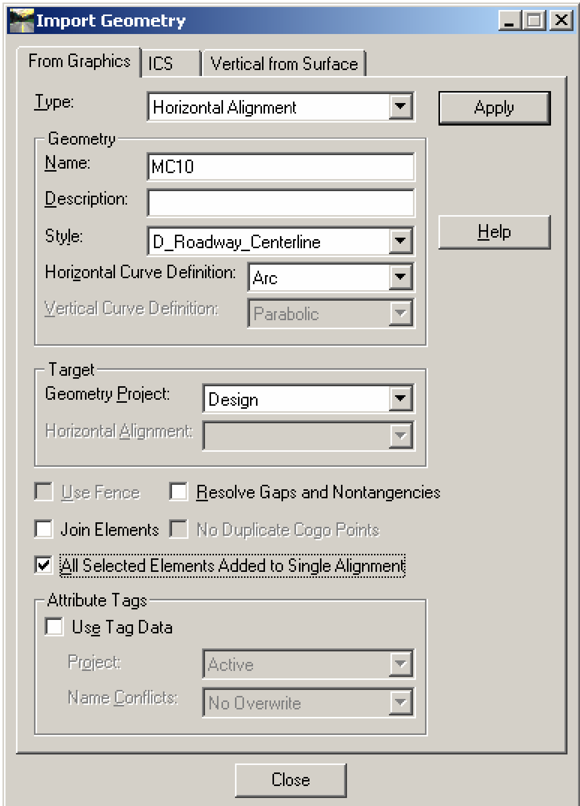


Figure 5-393: Import Geometry - From Graphics dialog with appropriate settings.

There should now be a geometry project named **Design** containing a horizontal alignment named **MC10**. This can be verified by browsing to the *Geometry* tab within the InRoads Explorer view (Figure 5-394).

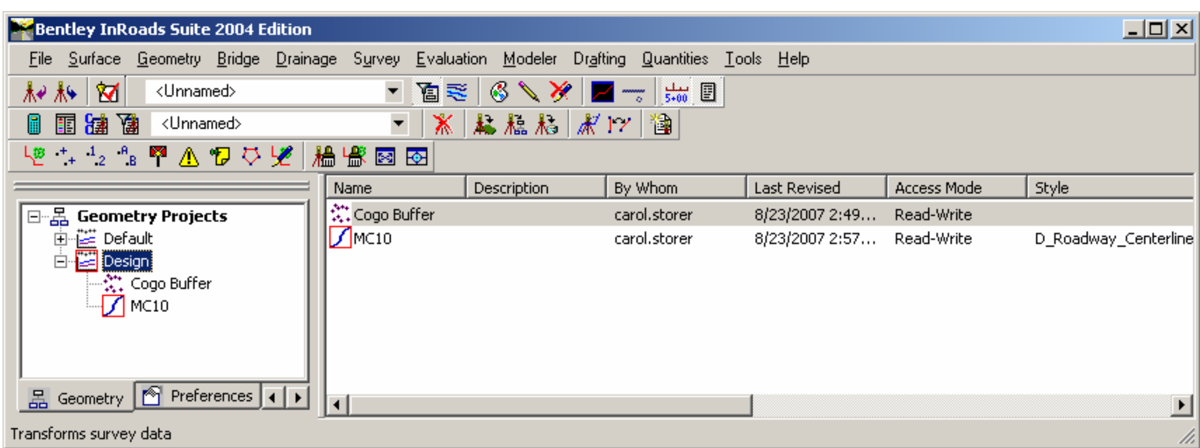


Figure 5-394: The Design Geometry Project should now contain a Horizontal Alignment called MC10.

Step Seven: Create a Surface from the Triangles.dgn

Open the **Triangles.dgn**.

♬ If the UORs and units have not been fixed on this DGN yet it must be done at this time.

Part One: Analyze Triangles

Select **Qualities>Analyze Element** from the MicroStation menu and click on a triangle. In the *Element Information* dialog (Figure 5-395) scroll to the top of the listing on the left. If it says *Cell Header*, the triangles are defined as a cell and must be dropped.

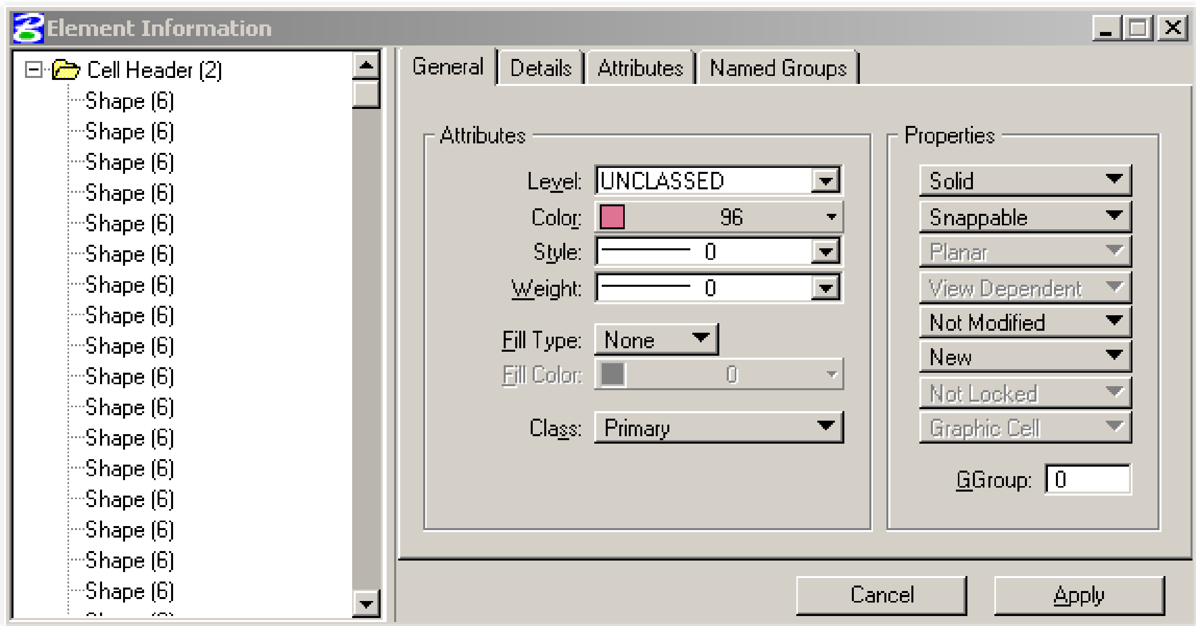


Figure 5-395: Element Information dialog displaying that the triangle is part of a cell.

If they are not part of a cell, skip *Part Two: Drop Cells (if necessary).*

Part Two: Drop Cells (if necessary)

Select **Qualities>Drop>Complex (Cell, Chain, etc.)** from the MicroStation menu (Figure 5-396).

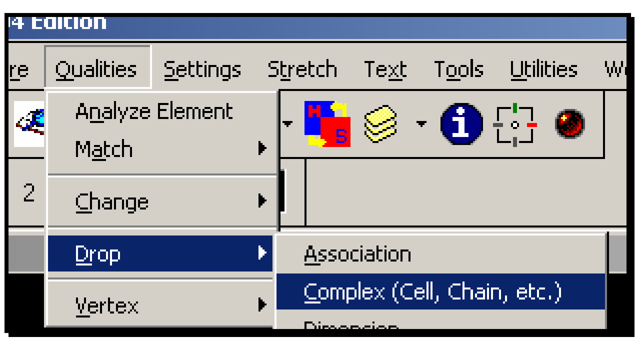


Figure 5-396: Select Qualities>Drop>Complex (Cell, Chain, etc.) from the MicroStation menu.

Following the prompts at the bottom of the MicroStation dialog, left click to select one of the Triangles. Left click to **Accept** the command. Right click to end the command which will not drop the triangle any further (line segments).

Part Three: Create New Surface

Switch to the *Surfaces* tab on the InRoads Explorer dialog. Right click on *Surfaces* and select **New…** (Figure 5-397).

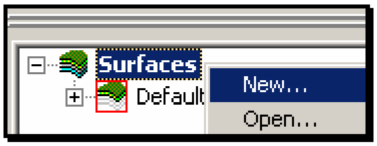


Figure 5-397: Right click and select New to create a new surface.

Create a new existing surface called Triangles by adjusting the **New** dialog (Figure 5-398) as follows:

Type: **Existing**

Name: **Triangles**

Click **Apply** and then **Close.**

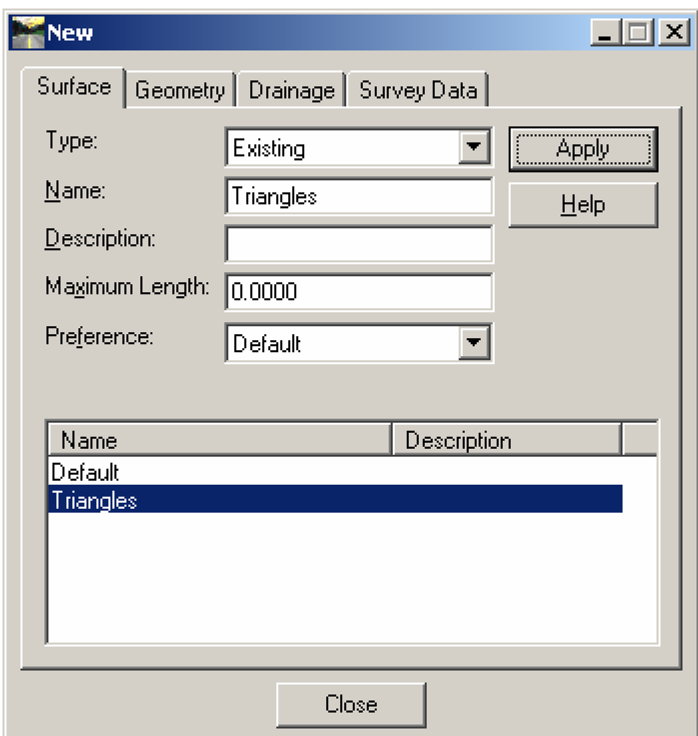


Figure 5-398: Create a new surface called Triangles.

Part Four: Import Graphics into Surface

Use the MicroStation's **Power Selector** tool (Figure 5-399) to place a box around the Triangles (Figure 5-400). This selects all elements within the box.

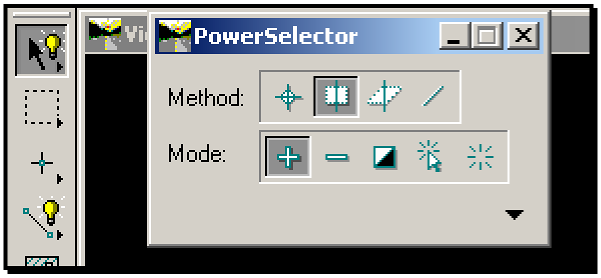


Figure 5-399: Power Selector tool with the Method set to Block and Mode to Add.

Figure 5-400: Triangles with Power Selector block around all elements.

Select **File>Import>Surface** from the InRoads menu (Figure 5-401).

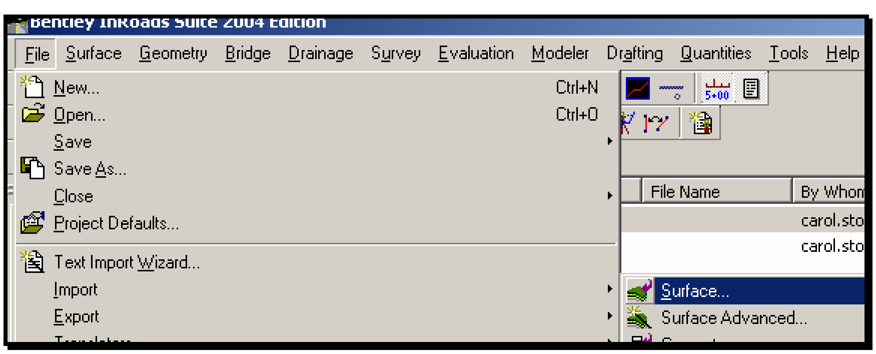


Figure 5-401: Select File>Import>Surface from the InRoads menu.

Adjust the *Import Surface* dialog (Figure 5-402) to match the following settings:

Surface: **Triangles**

Load From: **Single Element**

Elevations: **Use Element Elevations**

In the *Features* portion of the dialog, adjust these settings.

Seed Name: **Triangles** (enter using the keyboard)

Feature Style: **TRIA**

Point Type: **Breakline**

Click **Apply** and then **Close.**

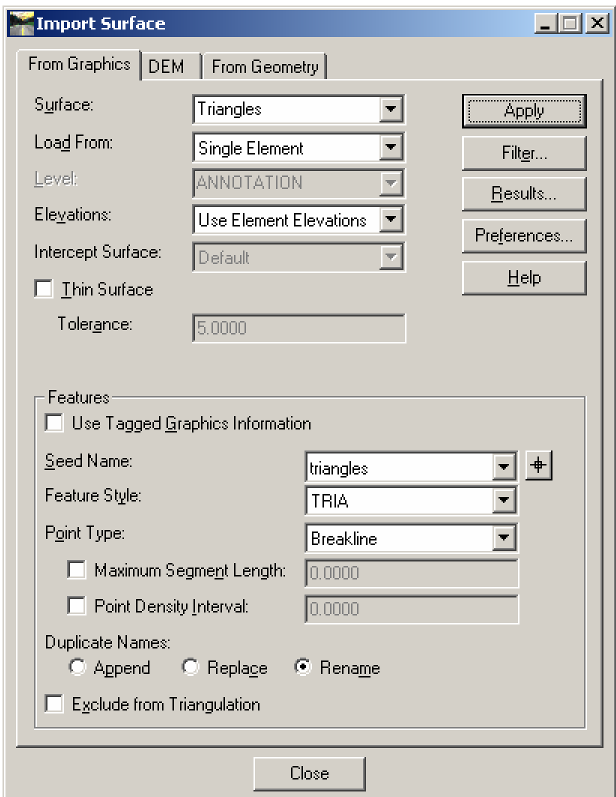


Figure 5-402: Import Surface dialog with appropriate settings for triangles.

Step Eight: Create Profile of Triangle Surface

Open the **Proflong-MC10.dgn**. Fit the view.

Part One: Create Profile

Select **Evaluation>Profile>Create Profile** from the InRoads menu (Figure 5-403).

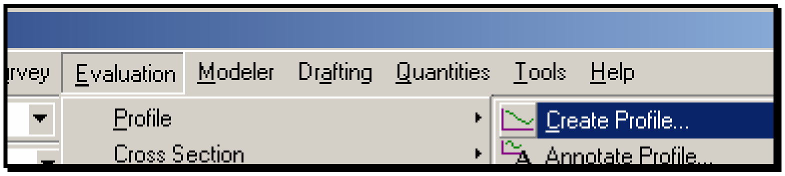


Figure 5-403: Select Evaluation>Profile>Create Profile from the InRoads menu.

Adjust the following settings on the *Create Profile* dialog (Figure 5-404).

On the *General* leaf, the *Set Name* should be **MC10.** Select **Triangles** in the *Surfaces* portion of the dialog. Click **Apply.**

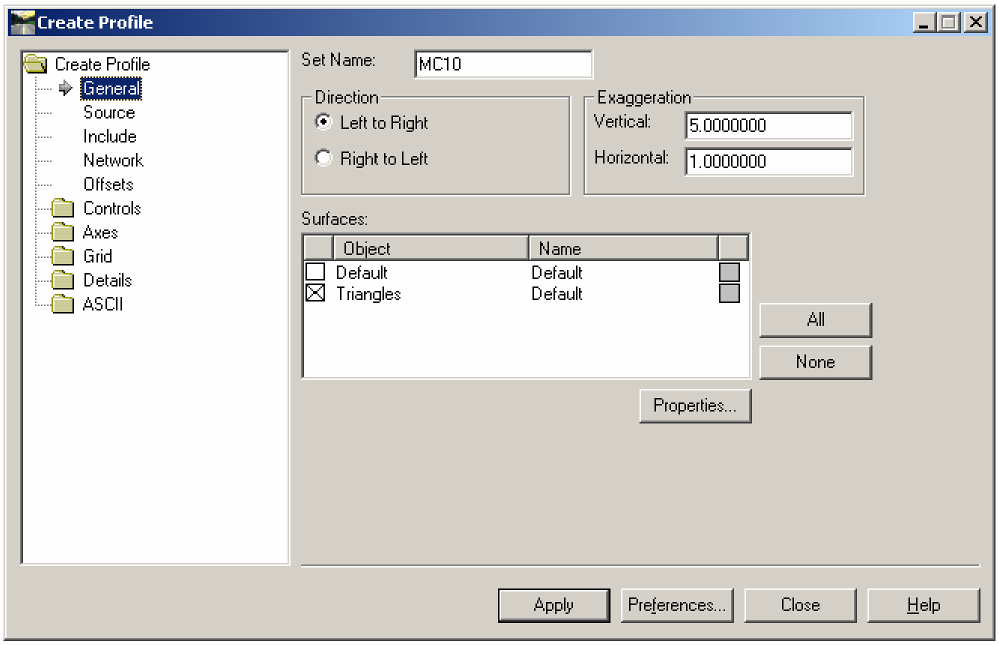


Figure 5-404: Create Profile dialog with appropriate settings.

Follow the prompts at the bottom of the MicroStation session and left click in the view window to place the profile that was just created. It's recommended to place it below the original long profile (Figure 5-405). Click **Close** on the *Create Profile* dialog.

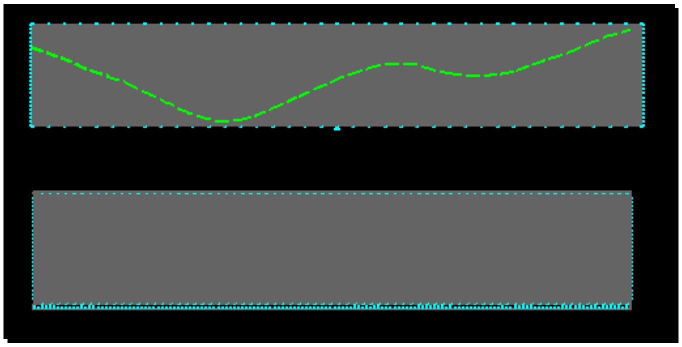


Figure 5-405: A new profile drawing placed in the long profile drawing.

Part Two: Load Default Preference (if necessary)

- If the newly created profile appears as a very small display when placed in the Proflong-MC10.dgn, return to the *Create Profile* dialog and select the **Preferences…** button located at the bottom of the dialog (Figure 5-406).

Figure 5-406: Select the Preferences button to reestablish the default settings.

Select **Default** in the list of available preferences (Figure 5-407) and click **Load.** Select **Close** to exit the *Preferences* dialog.

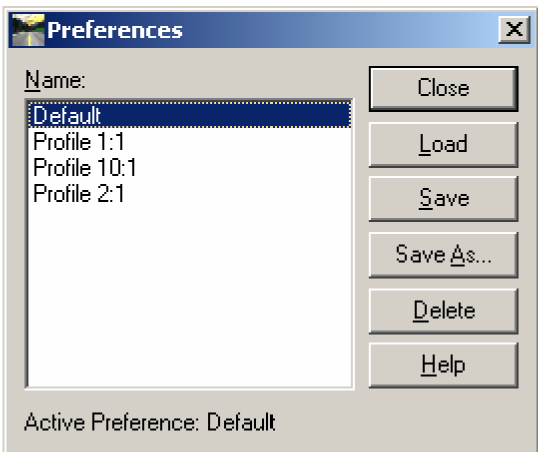


Figure 5-407: Select Default in the list of available preferences and click Load.

Click **Apply** and place in the drawing again.

Part Three: Copy Centerline from Long Profile

Zoom in on the start of the Profile drawing brought over from MX/MicroStation (not the profile just created through InRoads).

Using the *Copy Element* icon (Figure 5-408), select and copy the proposed alignment from the original profile using *AccuSnap* or a tentative (middle mouse click) to accurately pick the end of the proposed centerline and place it on the InRoads generated profile (Figure 5-409).

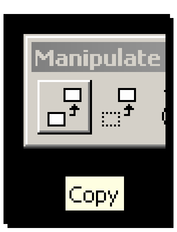


Figure 5-408: Copy Element tool within the Manipulate tool frame.

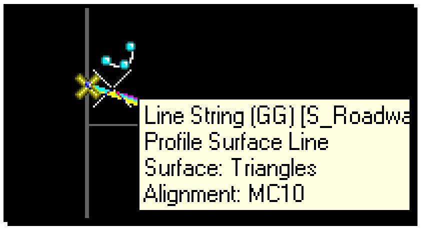


Figure 5-409: Place a copy of the Centerline in the InRoads Generated Profile.

This will relate the proposed alignment to the Triangles Surface in InRoads giving it valid elevations.

Step Nine: Import Vertical Alignment from Profile

Using the *Element Selection* tool, select the proposed alignment string that was copied into the InRoads generated profile drawing.

Select **File>Import>Geometry** from the InRoads menu (Figure 5-410).

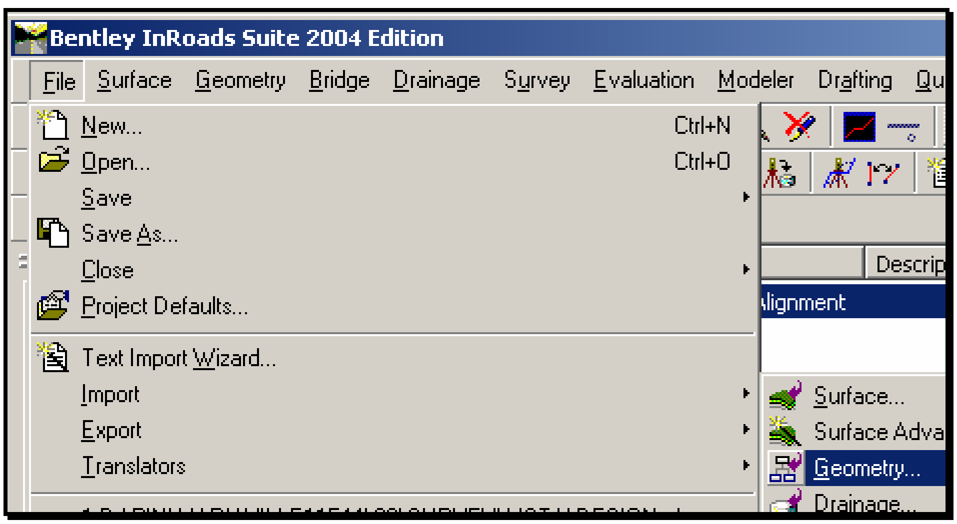


Figure 5-410: Select File>Import>Geometry from the InRoads menu.

Adjust the *Import Geometry* dialog to match the following settings as shown in Figure 5-411.

Type: **Vertical Alignment**

Name: **MC10**

Style: **D_Roadway_Centerline**

Click **Apply** and then **Close.**

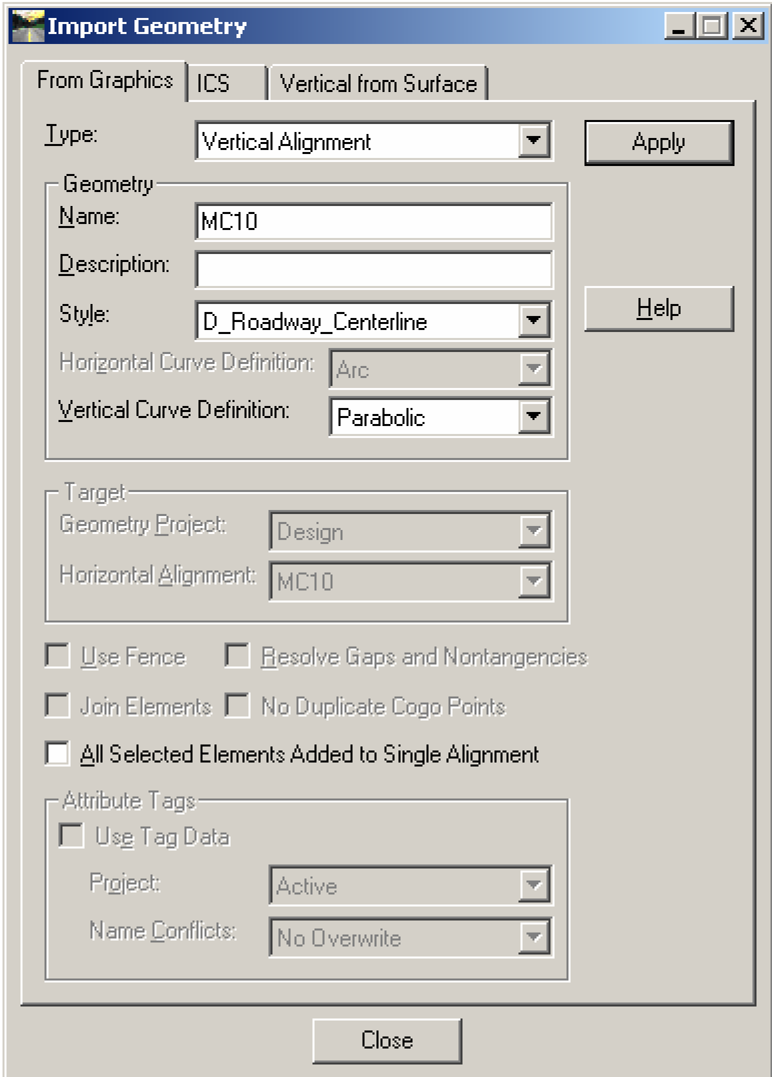


Figure 5-411: Import Geometry dialog adjusted to import Vertical alignments from graphics.

Step Ten: Create Trimble *.dc file

Now that the *Geometry Project* contains both a horizontal alignment and a vertical alignment, the user can create the Trimble.dc layout file.

Select **File>Translators>Upload Trimble…** from the InRoads menu (Figure 5-412).

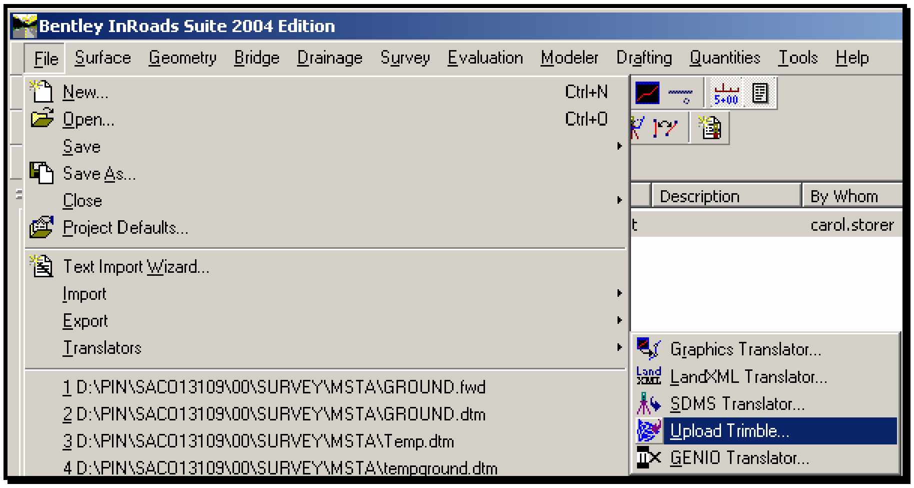


Figure 5-412: Select File>Translators>Upload Trimble... from the InRoads menu.

Adjust the *Upload Trimble* dialog to match the following settings as seen in Figure 5-413.

Geometry Project: **Design** (the *Geometry Project* name the information was translated to)

Surface: **Triangles** (the surface must be open/active)

Linear Units: **US Feet**

Select the name of the alignment in the *Horizontal Alignments* portion of the dialog (MC10).

Click **Apply.**

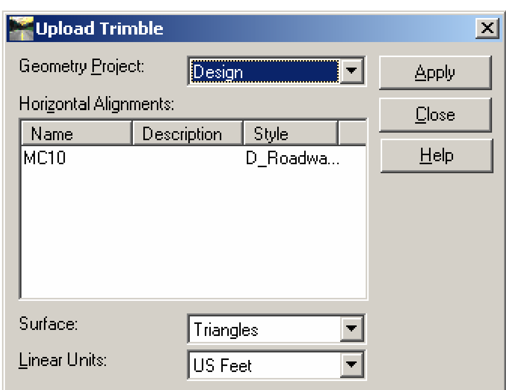


Figure 5-413: Upload Trimble dialog with appropriate settings.

In the *Save As* dialog (Figure 5-414), provide a file name for the DC file (i.e. GC10DESIGN). Click **Save.**

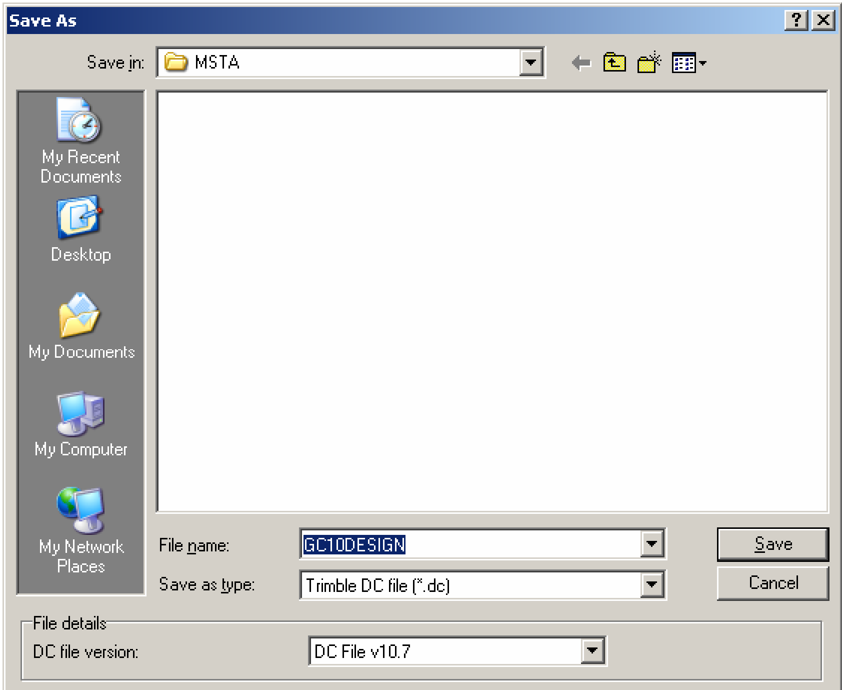


Figure 5-414: Save As dialog with settings for Trimble DC file generation.

Click **Cancel** on the *Save As* dialog (Figure 5-415) for the *Trimble TIN model* then click **Close** to close the *Upload Trimble* dialog.

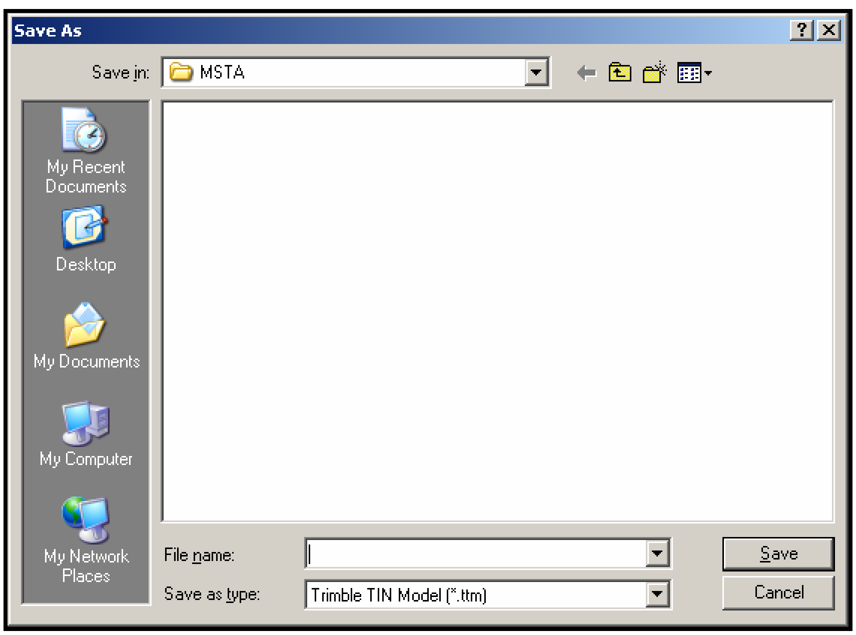


Figure 5-415: Select Cancel at the Trimble TIN Model Save As dialog.

The *.dc file for layout is saved in the local project directory (Figure 5-416) and can be copied to the appropriate folder on the network.

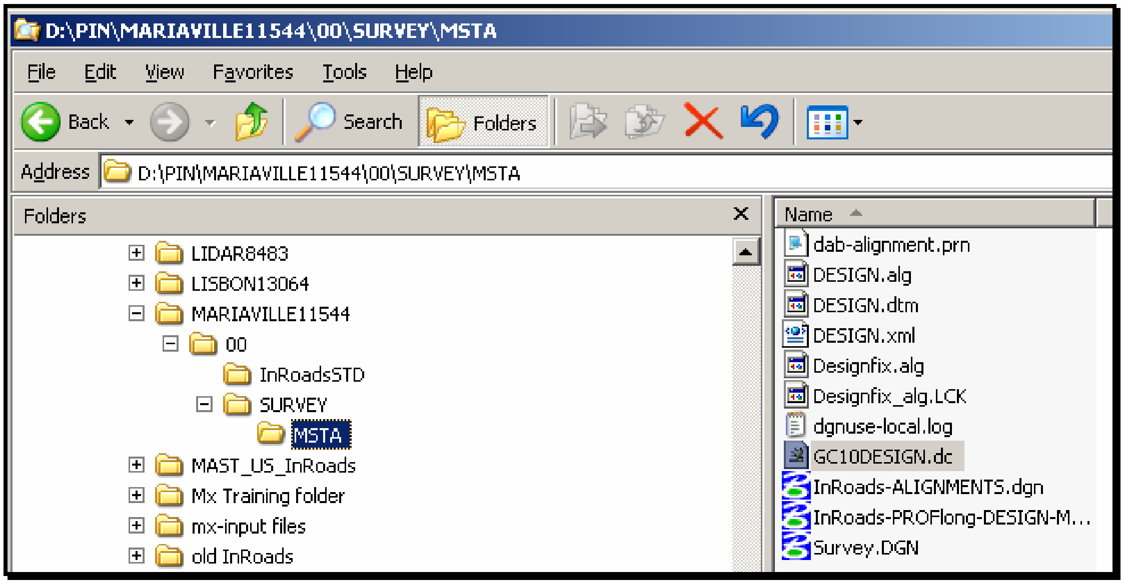


*Figure 5-416: Example of a local directory and Uploaded Trimble *.dc file.*

Chapter 6 MicroStation Survey Cleanup

MICROSTATION CLEANUP PROCEDURES

General Information

Standard Naming

The department has a standard naming convention for drawing files. The main reason for this is that many of our standard *plan view* type drawings for the department have the existing topography information referenced into them by default. This default reference only works when the files are named correctly and when they exist in the correct location.

Please follow procedures outlined below to adhere to these standards. The standard file names for existing Survey information residing in the **Topo** folder are Topo, Text, Contours, Points and Wetlands. These are the only five files that should permanently live in the **Topo** folder. Click this link for a complete list of MDOT Standard File Names or visit the website at www.maine.gov/mdot/cadd-support/microstation/std_filename.php.

Preserving Original Files

The Survey\Msta Folder is where the "Original" Survey files are stored. The folder will act as the topographical history for any given project. A user can open the folder and tell what was done for original survey, and all subsequent topoadds. The folder is Read-Only to everyone except for the Survey Editors, therefore, MicroStation Survey clean up will be done in the **Topo** folder. If network speed is an issue because of proximity to the server, then copy the necessary files locally.

✓ ***Refer to page 13-5 for documentation on working with files locally.***

The End Result

The end result is to make the Topo and Text drawings, which exist in the **Topo** folder, a combination of all Survey topography and text for the project (including Aerial Mapping data). This would leave no question as to which drawings need to be referenced to display all of the existing, cleaned up topography for the project.

INITIAL TOPOGRAPHY CLEANUP

Quick Punch List

- Copy files from Survey/MSTA to Topo folder
- Rename files
- Cleanup Files
- Add note to Cleanlog.txt file

♬ This punch list is to give an overview of what is to be done with original survey files. If the topography is needed prior to the cleanup, copy the files to the topo folder and rename them to Topo, Text, Contours and Points.

Determine Direction of Proposed Alignment

This step is very important. If you haven't already, take necessary steps to determine who the Project Manager is for the project. Ask which direction that they anticipate the alignment to be laid out. If this is unknown, **do not** cleanup this drawing until it's been established.

Step One: Open Windows Explorer

Open Windows Explorer **(Start>Programs>Accessories>Windows Explorer)** and browse to your project on the y: drive.

Regional Offices or users with a poor network connection should copy the project folder to your local D:\PIN folder and continue with the steps in this document, substituting your D: drive where the document says Y: drive. This process can done utilizing a Windows *Briefcase*.

✓ ***Refer to page 13-5 for information on creating a Windows Briefcase.***

♬ Survey Editors may already have the folder locally if they have run the *InRoads Survey Project Setup* utility.

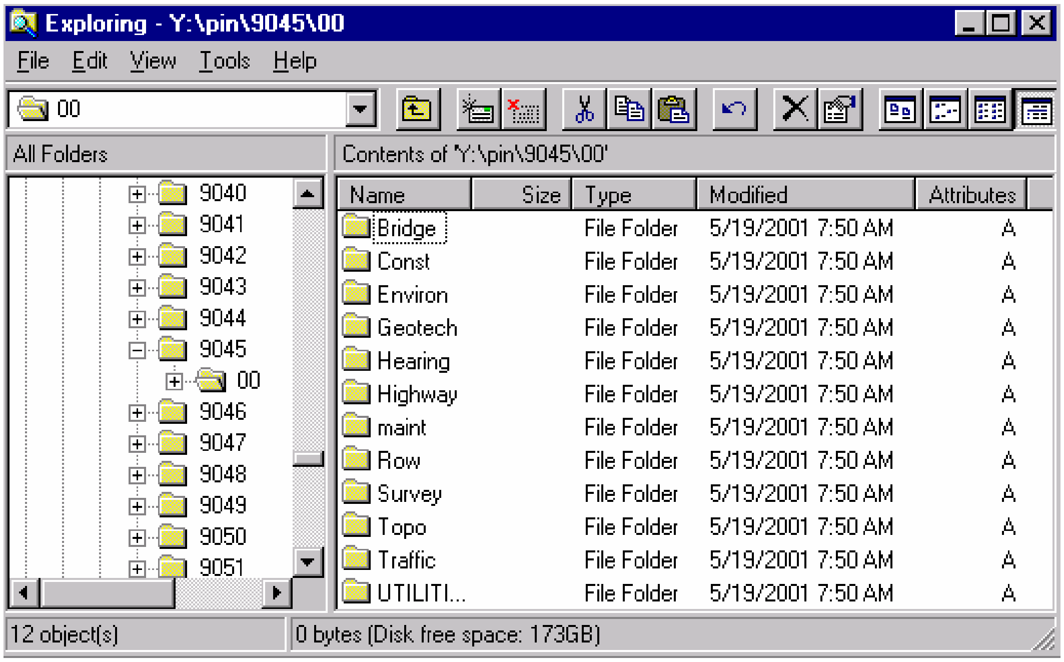


Figure 6-1: Browse with Windows Explorer

Step Two: Open the Topo Folder

In the example above (Figure 6-1), double click the Topo folder to display its contents. This folder should be empty. If it is, proceed to the next step.

ⓘ ***If this folder already contains files, someone may have started Survey cleanup on this project. Do not overwrite these files with the next step. Open the Cleanlog.txt file to see if there are any "cleanup" notes. Skip to Step Four: Open MicroStation.***

Step Three: Copy Files from Survey\Msta to Topo Folder

Part One: Browse to Survey\Msta

With Windows Explorer still open, browse to the **Survey\Msta** folder, displaying its contents in the rightmost window.

Part Two: Select Files

Select the following files (Hold **Ctrl** to select more than one at a time): **3DtopoMMDDYY.dgn, 3DmappingMMDDYY.dgn (if one exists), Origtext.dgn**, **Contours.dgn** and **Points.dgn**.

ⓘ ***If there are more than one 3DtopoMMDDYY.dgn files, this indicates that there has been topoadds done for this project. Select the most recent file based on its date. If no cleanup has been done, cleanup up the latest dated file and you will be taking care of every topoadd, including the original topo. All topography is displayed in the latest***

3DtopoMMDDYY.dgn file. Always check the Cleanlog.txt file to see what has been cleaned up.

✓ ***Refer to page 5-59 for a list of MicroStation and InRoads Deliverables from Survey.***

Part Three: Copy

From the Main Menu, select **Edit>Copy** (Figure 6-2)**.**

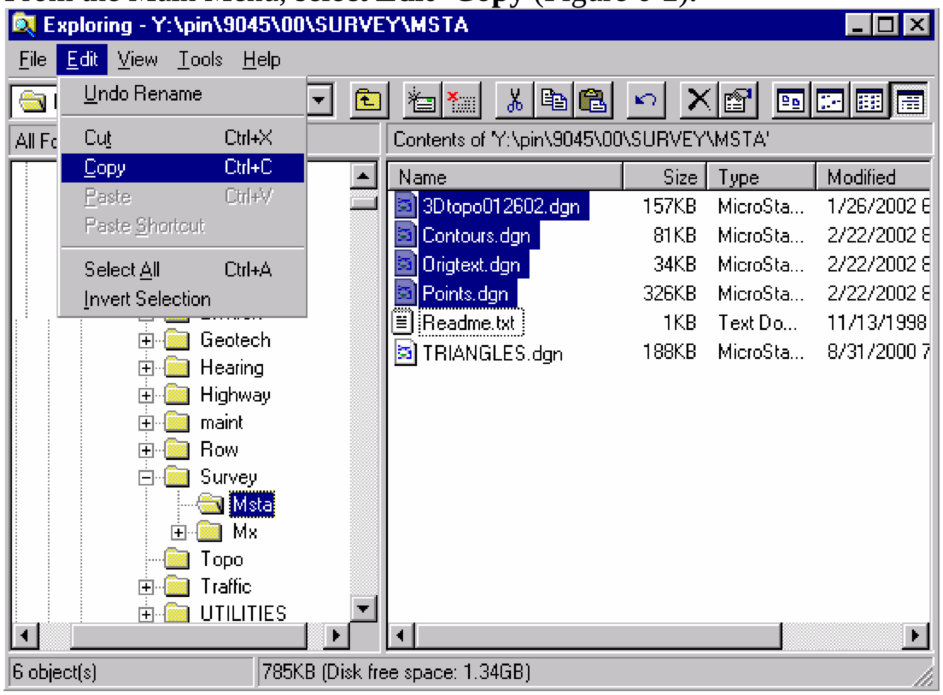


Figure 6-2: Select and Copy files from Survey\MSTA folder

Part Four: Paste

Click on the **Topo** folder. From the Main Menu select **Edit>Paste** (Figure 6-3)**.**

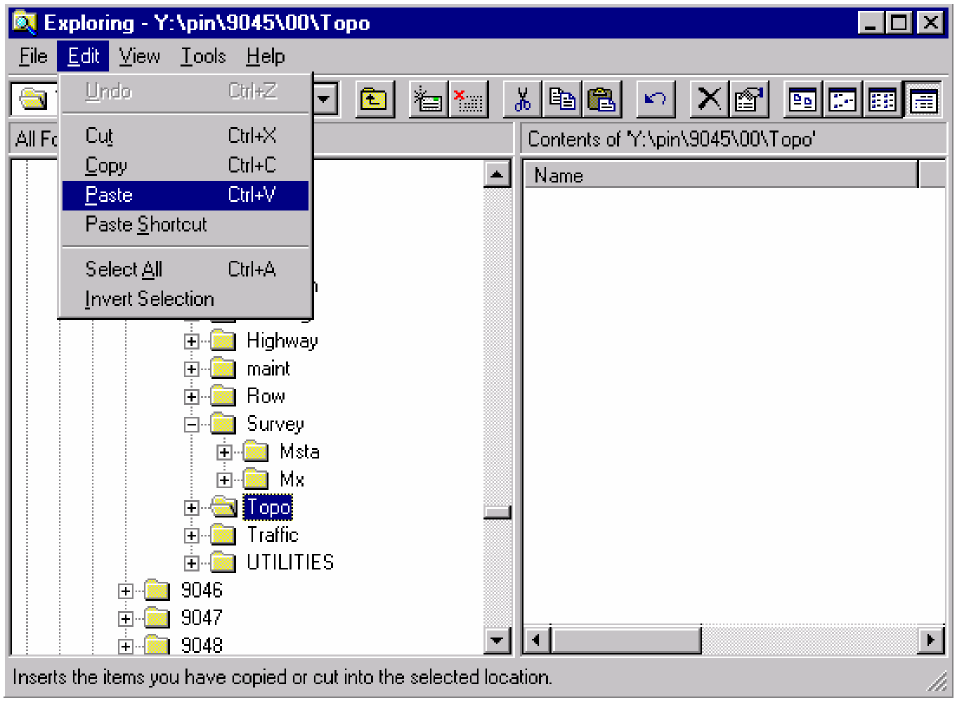


Figure 6-3: Paste files from Survey\MSTA folder to Topo folder

Part Five: Rename Topo, Text and Mapping

Select **3DtopoMMDDYY.dgn.** From the Main Manu, select **File>Rename.** Begin typing the new name, which is **Topo.dgn.** Hit Enter to accept this name.

Select **Origtext.dgn.** From the Main Menu select **Files>Rename.** Begin typing the new name, which is **Text.dgn.** Hit Enter to accept this name.

Select **3DmappingMMDDYY.dgn.** From the Main Menu select **Files>Rename.** Begin typing the new name, which is **Mapping.dgn.** Hit Enter to accept this name.

Part Six: Add Notes to Cleanlog.txt File!

As a courtesy to others, always add a note to the **Cleanlog.txt** file located in the **Topo** directory as progress is made during the cleanup process. Here are a few examples of informative cleanup notes.

03/04/02 John Doe - Started **Topo.dgn** cleanup.

03/04/02 John Doe - Started **Mapping.dgn** cleanup.

03/07/02 John Doe - Finished **Topo.dgn** cleanup.

03/07/02 John Doe - Started/Finished **Text.dgn** cleanup.

♫ Regional Office employees that copy the project locally should browse to the Y:drive PIN folder and make the edits to the network copy of the Cleanlog.txt file so that other employees can check the status of the project. If you make the comments to your local Cleanlog.txt file, no one else can see this but you.

Step Four: Open MicroStation

Open MicroStation by clicking the "MicroStation new InRoads config" icon on your desktop. When the *MicroStation Manager* window appears, pick your project from the *Project* pull down. Browse to the **Topo** directory by double clicking your project number's decimal folder (i.e. pin\12671\ **"00"** folder), then double clicking the "Topo" folder.

- If you are working locally (on your D: drive), select the *User* pull down and change to **InRoads Local.** Select your project from the *Project* pull down. If it isn't there, copy the .pcf file from the Y:\msworksp\!msproj folder to your c:\!msproj folder. Reopen MicroStation.

- If the project pull down does not take you to your project, contact your CADD Support personnel.

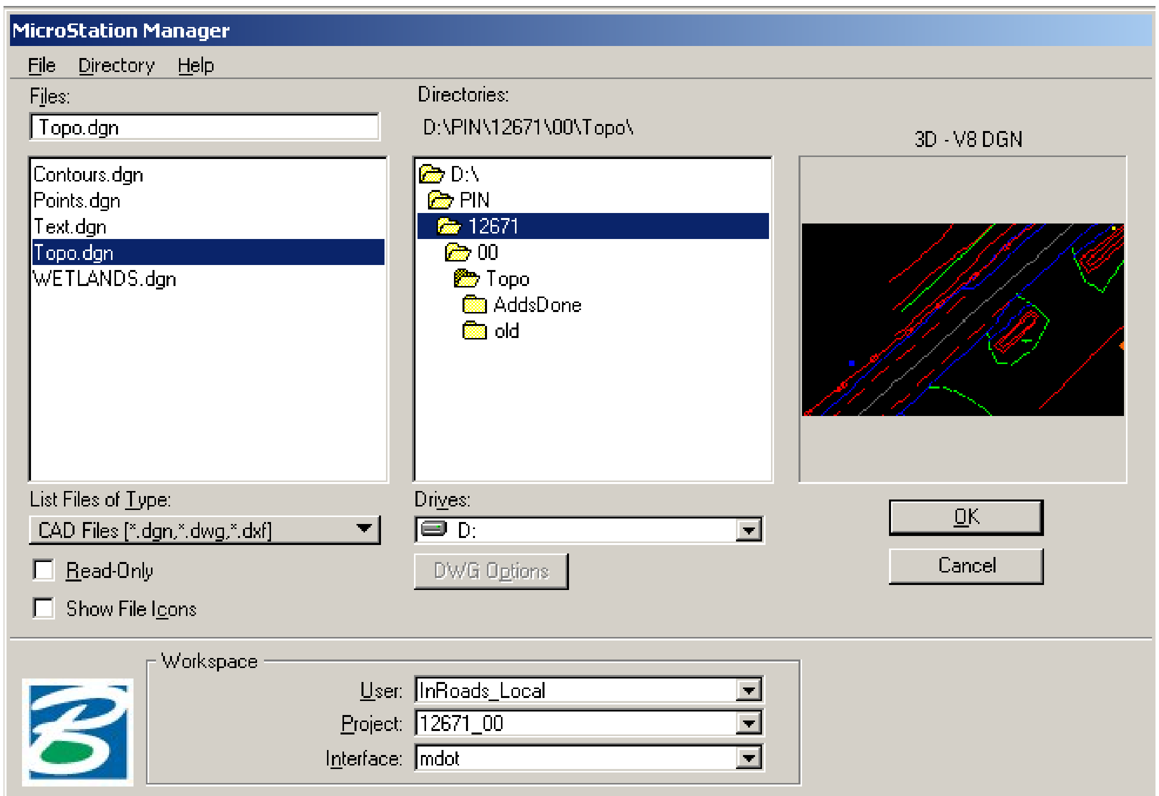


Figure 6-4: Select the topo.dgn and click OK

You should see four or five drawings on the left. Select **topo.dgn** (Figure 6-4) and click **OK.** Once the file is open, click *Fit View* from *Window 1's* view control toolbar. Close *Window 2, Window 3and Window 4* if necessary and maximize *Window 1.*

ⓘ ***If the Topo directory is empty, go back to Step Three and copy files.***

Step Five: Attach Reference Files

The **topo** and **text** drawings do not have any reference files attached by default. Even though you can only edit one file at a time, it is helpful to have both drawing displayed. Select **File>Reference(DOT)>Attach** from the Main Menu. Select the **Text.dgn,** browsing to the **Topo** folder if necessary. Click OK. It is not necessary to enter a *Logical or Description.* Attach by *Coincident World* method. Repeat this process for the **Points.dgn** and **Contours.dgn** drawings. To shut off the display of these two reference files, open the *Reference File* dialog (**File>Reference** from the Main Menu), click the "checkmark" in the *Display* column of the reference files you wish to shut off.

Step Six: Turn Off Line Weights (Optional)

Some users prefer to have line weights shut off. To do this, select **Settings>View Attributes** (Ctrl+B) from the Main Menu. Uncheck Line Weights. Hit **Apply.** Close View Attributes Window.

Step Seven: Adjust Level Display (Optional)

Adjusting levels may not be necessary if the Survey Editor used the correct filter that doesn't display the *Ground Elevations* or *Traverse Points.* Directions are here in the event it does not happen. You may want to shut off levels **S_Control_Traverse_Point** and **S_Ground_Elevation** in the **topo.dgn.** These are the Traverse Points and the Ground Elevation strings. No Cleanup is required on these elements, and shutting them off reduces the clutter on the drawings. This is done by selecting **Settings>Level>Display (Ctrl+E)** and deselecting the levels you don't want to be displayed.

Refresh the view if necessary. Close the dialog box.

♬ When the Survey Editors create the file, they should be using a *Filter* that wouldn't bring these elements into the topography file.

Step Eight: Load Clean-up Tools (Optional)

From the Main Menu, select **Tools>Tool Boxes…**

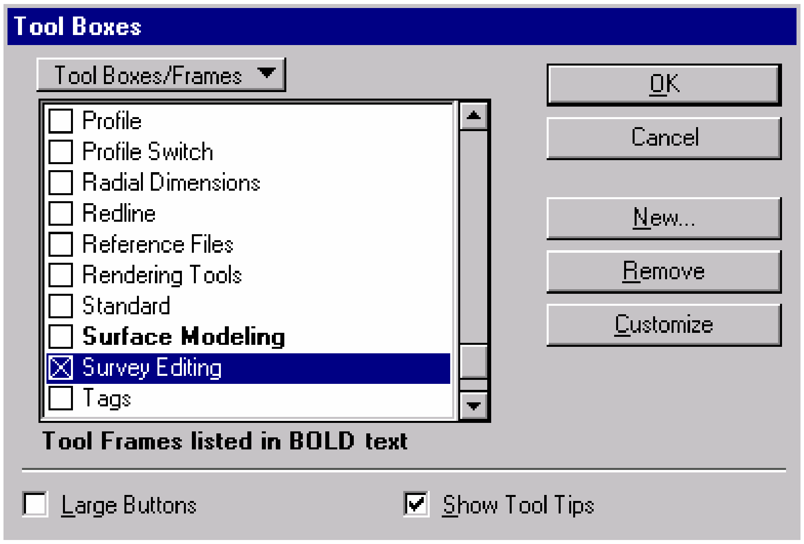


Figure 6-5: Tool Boxes dialog

Scroll down the list and click to place an “X” in the **Survey Editing** box (Figure 6-5). Click **OK**. A new set of tools should appear.

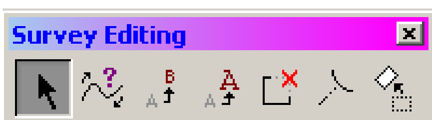
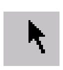


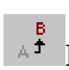
Figure 6-6: Survey Editing Tool Box

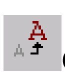
These *Survey Editing* tools (Figure 6-6) are dockable and will auto-load next time you enter MicroStation.

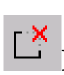
ⓘ ***If you do not have these tools as an option, contact your CADD Support.***

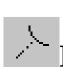
 **Element Selection Tool:** Can be used to select individual elements or multiple elements by holding the **Ctrl** key. (Also located in the *Main* Tool Box.)

**Change Element Direction Tool:** Use this to reverse a custom linestyle direction. (i.e. Trees and Bushes). (Also located in the *Modify* Tool Box.)

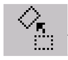
**Edit Text:** Says it all. (Also located in the *Text* tool box.)

**Change Text Attributes:** Used to change the text to the MAINEDOT standard height and width. (Also located in the *Text* tool box.)

**Partial Delete:** Used to delete part of an element. (Also located in the *Modify* Tool Box.)

**Extend Element to Intersection:** Used to extend an element. (Also located in the

Modify Tool Box.)

**Rotate:** Used to rotate individual elements (i. e. text and cells) around a user-defined point or origin point. (Also located in the *Manipulate* Tool box)

ⓘ ***For a detailed description of any tool, select Help>Contents and then Help>Tracking. Click on each tool, one at a time, and look to the Help window for a description.***

Step Nine: Adjust Ditch Arrows (May be Necessary)

General Information

Adjusting the direction of existing ditches will need to be done manually in InRoads until a solution has been worked out, whether it's the field crew picking up the points according to the direction of flow or it's done programmatically.

Part One: Adjust Display of Topo.dgn to Isolate Ditch and Culverts (Optional)

All ditch lines must be checked to see that the arrows point in the direction of the flow of water. To isolate the ditch lines, open the *Level Display* by selecting **Settings>Level>Display (Ctrl+E).** With topo levels displayed, ***Right Click*** anywhere in the Levels area and select **All Except Element** (Figure 6-7).

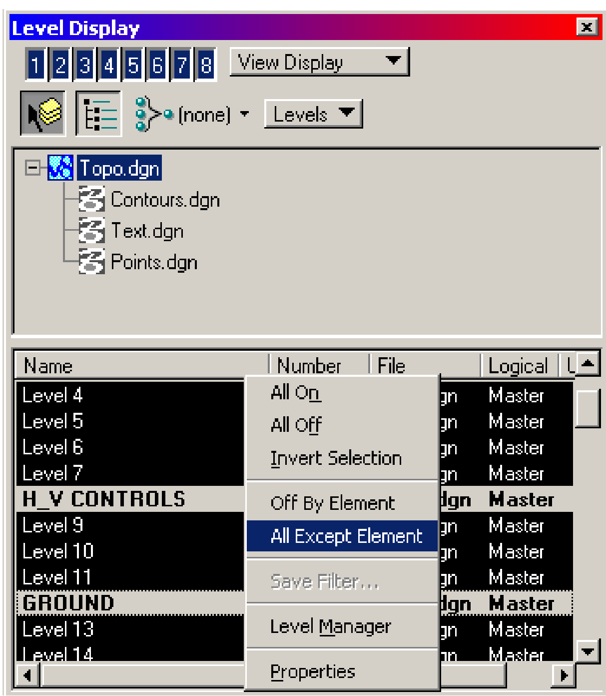


Figure 6-7: Right Click and Select All Except Element

Click on any ditch line or culvert pipe. Click to *select* the element, then, click to *accept it.* Only the "S_Drainage_Ditch_Line" items will be displayed. Close the dialog.

Part Two – Option A: Using Elevation to Determine Direction

An accurate way to determine flow direction is to check the elevation at both ends of the ditch line. All elements are 3 dimensional.

Shut off *Depth Lock* by selecting **Settings>Locks>Depth** from the Main Menu. Use a *Keypoint* snap (default snap) with your middle mouse button and click on one end of ditch line. Look to the Status bar located in MicroStation's status bar (Figure 6-8).

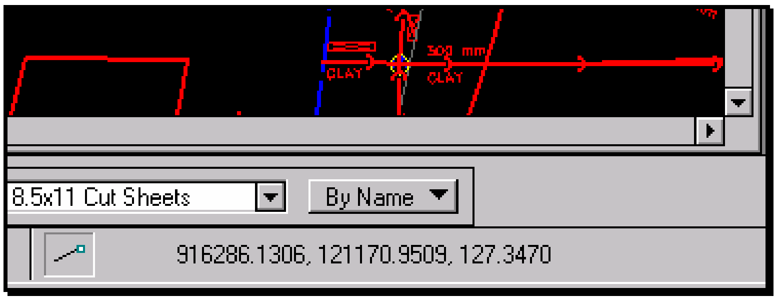


Figure 6-8: X, Y and Z coordinate displayed in MicroStation Status bar

The elevation (Z) is the rightmost set of numbers (or look in the Z field of *AccuDraw)*. Click on another vertices of the line to determine which direction the ditch is flowing. Use the **Reverse Directions** tool to change direction if necessary. An example of using the tool is in the next step.

Part Two – Option B: Using Contours to Determine Direction

Turn on the display of your **Contours.dgn (File>Reference** from the Main Menu**)** to quickly determine flow direction. Place a "check mark" in the display area for contours.

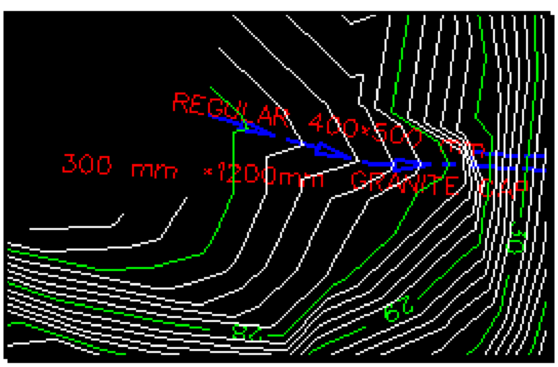
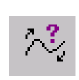


Figure 6-9: Example of ditch arrow in wrong direction

In the Example above (Figure 6-9), the ditch arrow is pointing from the 27.00 +/- to 29.00 +/-, which is uphill and therefore wrong.

Part Three: Click the Reverse Direction Tool 

Click the tool and follow the prompts in the bottom left status bar.

Part Four: Select the Ditch line

Click the ditch line with the left mouse button. An arrowhead will appear (Figure 6-10) displaying the current direction of the line.

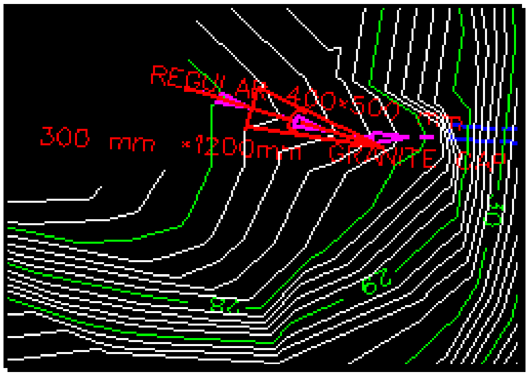


Figure 6-10: Reverse Direction tool in action

Part Five: Accept or Reject

Click anywhere in the view window with a left mouse button to *Accept* or a right mouse button to *Reject*. (Figure 6-11).

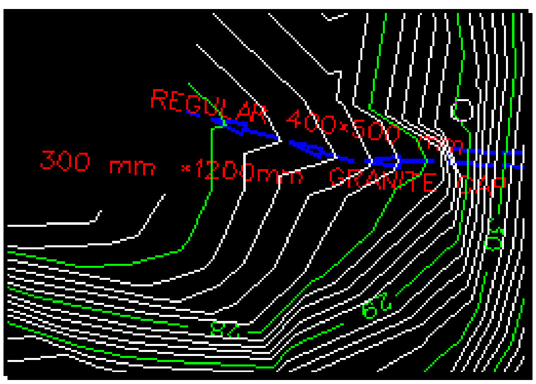


Figure 6-11: Reverse Direction results

Part Six: Adjust Level Display (If You Adjusted it to Isolate Ditches)

Turn on the levels that you shut off. From the Main Menu, select **Settings>Level>Display (Ctrl+E).** With the *topo* levels displayed, ***Right Click*** anywhere in the levels area and select **All On.** Select the **S_Control_Traverse_Point** and **S_Ground_Elevation** levels to shut off these two levels. Close Window.

Step Ten: Determine Direction of Proposed Alignment

This step is very important. Take necessary steps to determine who the Project Manager is for the project. Ask which direction that they anticipate the alignment to be laid out. If this is unknown, **do not** cleanup this drawing until it's been established.

Step Eleven: Adjust View and Save Settings (Optional)

Rotate the View Window

If your project is not running from left (West) to right (East), you may want to rotate your view window so that the majority of the project is horizontal across your screen. Select **Rotate View** from Window 1's *View Controls* (Figure 6-12).

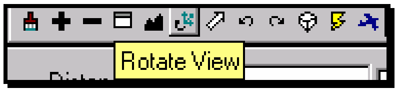


Figure 6-12: Rotate View Tool

♬ Rotate View as often as necessary to get the majority of elements horizontal in your view. It is best **not** to snap to elements in your file while performing this command, unless you lock your "Z" prior to doing so **(Macros>Set/Lock Z).** A slightly skewed view may result if the 3 elements snapped to are at different elevations.

When the *Rotate View* dialog appears, set method to 3 points. **First point (0/0),** click on screen where you want the lower left corner of the new window to be. **Second point (+X direction),** click where you'd like the bottom right corner of the view window to be. **Third point (+Y direction)**, click to define the top left corner of the view window (Figure 6-13).

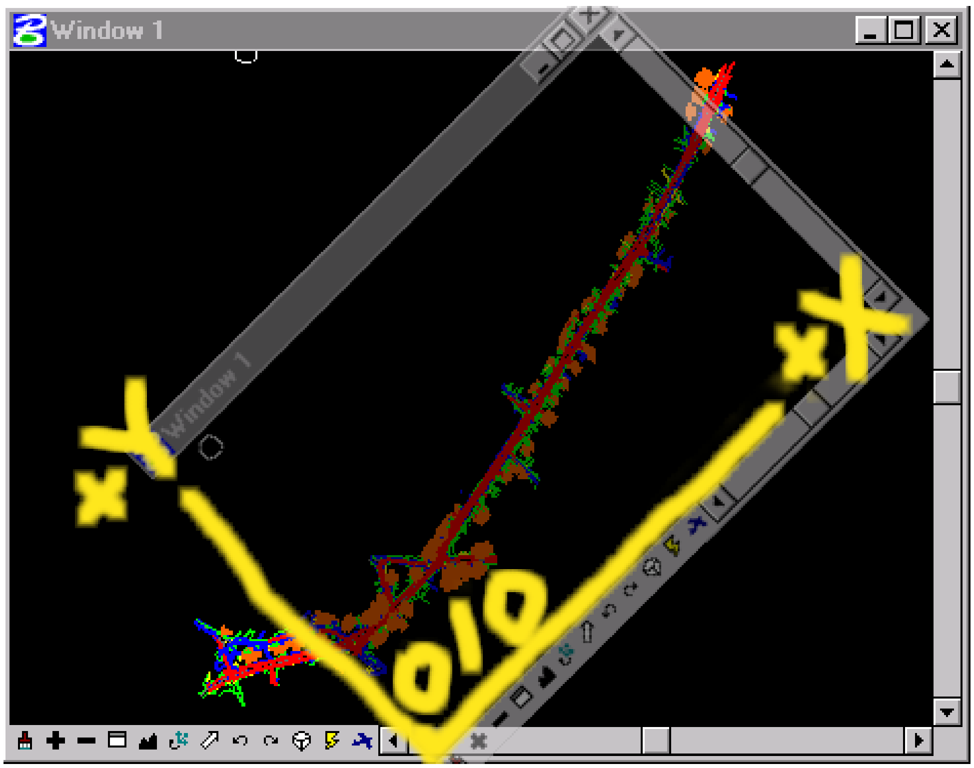


Figure 6-13: Rotating your View

Graphic Group Unlock

Disable Graphic Groups by selecting **Settings>Locks>Graphic Groups** from the Main Menu or click the padlock on the status bar and click Graphic Groups to remove the checkmark.

Save Settings

To save these settings as your default view for the file, select **File>Save Settings.**

- If *Save Settings* is grayed out, this means that your current preferences are to save settings on exit. It will accomplish what this step is intended to do.

Step Twelve: Reverse Element Direction

There are many other directional elements (like ditches) that may require reversing in the **Topo.dgn.** Use the **Reverse Directions Tool** to reverse tree lines, bush lines, house lines, curbing lines, guardrail strings, wetland lines, river and water lines and other underground utility lines, to correctly display each element.

Tree lines, Bush lines and Gardens should have the “rounded” side towards road. The rounded cell in the line is representing the canopy or outer edge of the wooded area.

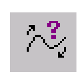
The heavier line of a **house and river** line style represents the outer edge of that object. House lines may have two or more segments to reverse.

Underground utility lines and wetland lines have text imbedded in them that may require reversing. Water lines, for example, may need to be reversed to show the ‘W’ symbol aligned correctly with the centerline or plan sheet.

Curbing lines may need to be reversed so that the symbol will fall closest to the edge of pavement or dashed edge of concrete, gravel or planting.

Guardrail lines may need to be reversed so that the posts are away from the roadway.

Click on Change Element Direction Tool and reverse the string(s) (may have more than one segment to reverse).

Part One: Click the Reverse Direction Tool 

Click the tool and follow the prompts in the bottom left status bar.

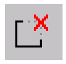
Part Two: Select the Line (Identify the Element)

Click on the line with a left mouse button. An arrowhead will appear displaying the current direction of the line.

Part Three: Accept or Reject

Click anywhere in the view window with a left mouse button to *Accept* or a right mouse button to *Reject.*

- You may have trouble reversing closed elements (shapes, blocks, etc.) and elements that go in both directions. Try deleting a small portion of the element using the

Delete Partial tool.  Click on the Partial Delete Tool. Click anywhere on the string, then without moving the cursor away from the center of AccuDraw's compass, click where you originally clicked forming a partial deletion of the line that is unnoticeable.

Step Thirteen: Rotating Topography Cells

General Information: What to Rotate

Iron Pins - Rotate so that the text in the cell runs parallel with the roadway. Iron pin rotation will vary from pin to pin, so it's better to rotate these individually.

Power, Telephone and light poles - Poles that have a line through them should be rotated so that the line is perpendicular to the centerline of the roadway. A light pole would have its mast over parking lots or the roadway.

ⓘ ***The point that a Pole is picked up in the field is its face closest to the centerline of the roadway. While cleaning up the poles, consider moving the pole so that the intersection of the line and circle is represented as the face of the pole closest the roadway. Make a note in the CleanLog.txt file.***

Single Post Street signs - The flat side of the sign should be facing the oncoming lane of traffic, unless it is a 'No Parking' sign or an entrance to a business. These will be facing the street (as seen in real life).

Double Post Signs - Double posted signs are created with a linestyle. This linestyle is directional and may need to be reversed to face traffic or the roadway.

Mailboxes - The short, flat side of mail box cell should be parallel to centerline, with the two pointed ends away from the road.

Catch basins & Drop Inlets - The "grate lines" should be perpendicular to curb / edge of pavement (so a bicycle wheel won't drop into them).

Hydrants - Rotate so that the spout is facing the roadway (as seen in real life).

Sill Elevations on buildings - The letters "Sill El" should generally be perpendicular to the building wall. If on the front face of building, rotate them so they are perpendicular and inside the building.

Global vs. Individual Rotation Introduction

Most cells will come in from the cell library at the same orientation (with the exception of Iron Pins and sill shots) and will need to be rotated around their individual origins to align with the centerline at that specific location on the project.

One pass **Globally,** using selection sets through the entire project will align the majority of cells correctly. The cells that it doesn't correct will most likely be an even 90-degree increment away from being correct.

ⓘ ***This method works best on the straight portions of your project. Areas on a curve can be dealt with by using smaller selection sets or simply by using individual rotation methods.***

Utilize the **Individual rotate** command for Iron Pins, signs and other item that need final tweaking. Intersections of Side Roads require a bit more attention in this respect.

Global Rotation: Select Multiple Cells to Rotate

Identify a portion of your project that is fairly straight. If your project is one big curve use small selection sets so that global rotation will be effective.

To set your editing filter to only cells in your file, go to **Edit>Select By Attributes.**

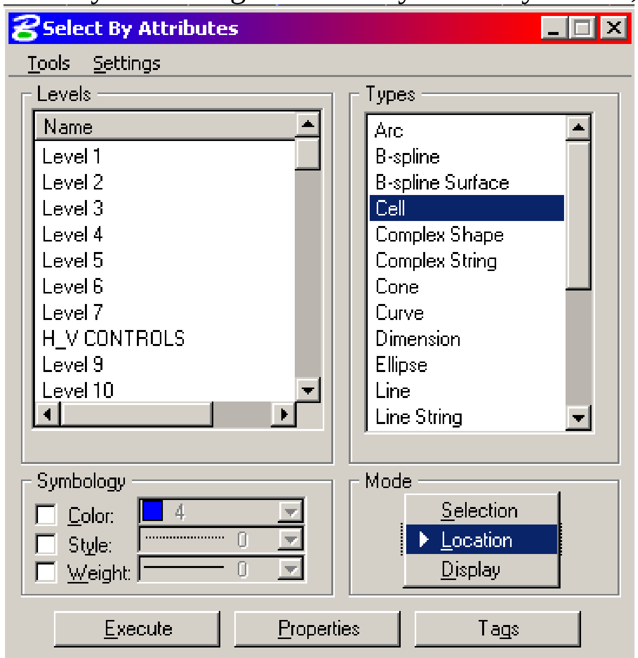


Figure 6-14: Select By Attributes set to locate cells only

In the *Types* portion of the dialog, select **Cell.** In the *Modes* section of the dialog, change *Selection* to ***Location*** (Figure 6-14**).** Hit *Execute.* Now you are <u>only</u> able to edit (rotate) cells in your file for the time being. If the dialog gets in the way, you can close it and click OK to keep the edit filtering "on" (Figure 6-15). When done editing cells, open **Select By Attributes** again and hit cancel to stop filtering.

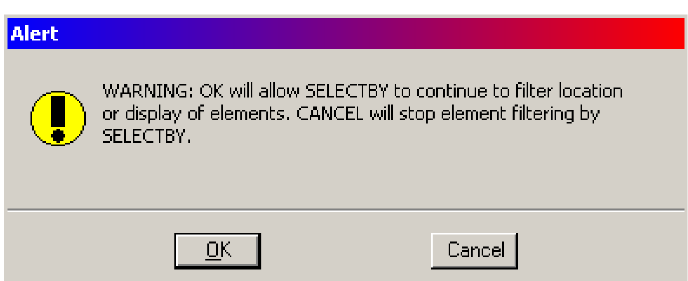


Figure 6-15: Select By Attributes Alert Message

Using the Power Selector - The power selector works well for selecting single or multiple cells because of the various selection methods. You can also add and subtract from your selection set easily. Choose *Shape* method and choose the "**+**" in the mode field (Figure 6-16).

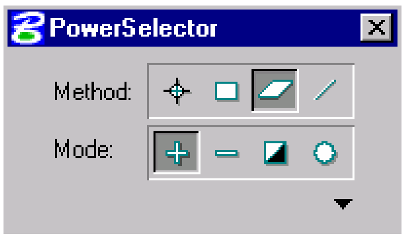


Figure 6-16: Power Selector set to shape

Left click to form a shape around the cells you want to rotate, returning back to the beginning point to close the shape. You should see them highlight.

♫ To create new selection sets, hit your "spacebar" to clear the current selection set (while focus is in *Power Selector* dialog) and place a shape around the new set of cells.

✓ ***Refer to page 2-26 for more information on the Power Selector tool.***

Click the **Rotate** tool from the Survey Editors tool box or the Main tool frame. In the Tools Setting box, click the down arrow (Figure 6-17) to *Show Extended Information.* Place a checkmark in the *About Element Center* box (Figure 6-18) of the dialog box.

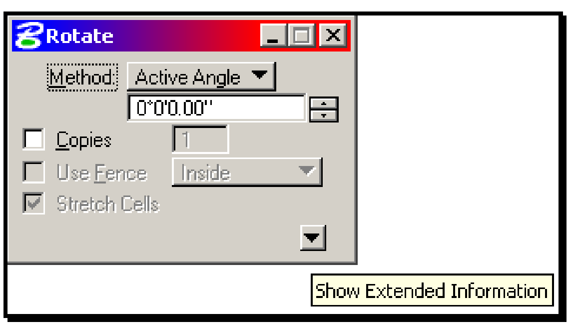


Figure 6-17: Rotate Element's Show Extended Information button

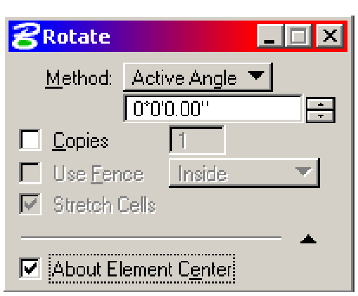


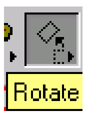
Figure 6-18: Rotate Element's About Element Center box

Active Angle method: Take a rough guess of what the angle would be between the cell and the roadway. In the **angle** field, type in the angle. If you don't have any idea what the angle might be, try using a 5-degree rotation and click multiple times on the screen to continue rotating this amount. (Type in a "-" for a clockwise rotation.)

2 Points method: Click on the screen and you are dynamically rotating the cells around their origins. Move your cursor around the *AccuDraw's* compass until the majority is rotated correctly. Click to *Accept* this rotation. Right Click to stop rotating.

Individual Rotation

To perform individual rotations, rotate the cells around the point established by the Survey Crew, which is also the center/origin point of most cells.



Click the **Rotate** tool from the Survey Editors tool box or Main tool box. In the Tools Setting box, click the down arrow to *Show Extended Information.* Place a checkmark in the *About Element Center* box of the dialog box. Click near the cell (the actual pivot is set to the cells origin based on the tool setting). The cell will rotate dynamically as you move the mouse around *AccuDraw's* compass. Left click again to define the amount of rotation. Right Click to stop rotating the cell.

Step Fourteen: Moving Vertices

You may need to connect any storm sewer pipes, sanitary pipes, water lines and other underground utilities. Do this <u>only</u> if absolutely certain that the like-sized pipes that point towards each other actually connect underground. A field inspection or correspondence with town or city utility companies by the Project Manager may be necessary in an urban situation.

Use the *Modify Element* tool to move one end of the line to the center of the desired utility manhole, catch basin or water gate.

Delete duplicate lines.

Step Fifteen: Adjust and Save Changes (Courtesy To Others)

Rotate Window 1 back to a top view. Click on *Rotate View* and set the *Method* to **Top**. Click in the view to accept the new rotation. Select **File>Save Settings.**

♫ If *Save Settings* is grayed out, this means that your current preferences are to save settings on exit. It will accomplish what this step is intended to do.

Step Sixteen: Add Note to <u>Cleanlog.txt</u> File!

Make a comment to the Cleanlog.txt to let people know that the topo has been cleaned up.

- Regional Office employees that copy the project locally should browse to the Y:drive PIN folder and make the edits to the network copy of the Cleanlog.txt so that other employees can check the status of the project. If you make the comments to your local Cleanlog.txt file, no one else can see this but you.

Step Seventeen: Repeat for Mapping.dgn (Projects that Utilizes Aerial Mapping)

Cleanup Mapping.dgn

If the Survey/MSTA folder has a **3DmappingMMDDYY.dgn,** you must clean up this file as well. Follow the same steps as outlined in the “Initial Topography Cleanup” section. Substitute **mapping.dgn** where it asks for the **topo.dgn.**

- Some older projects may have mapping in a separate folder. Files may not follow the naming described in this manual. Contact CADD Support for assistance.

Merge Mapping.dgn into Topo.dgn

Once the **Mapping.dgn** cleanup has been completed, open the **topo.dgn** file from the Topo folder. Select **File>Reference (DOT)>Attach** from the *Main Menu* and select the **Mapping.dgn**, browsing to the **Topo** folder if necessary. Click OK. It is not necessary to enter a *Logical or Description.* Attach by *Coincident World* method.

From the *Reference File* dialog, select the **Mapping.dgn** file. Then select **Tools>Merge Into Master.** Following the prompts, click in your view window. This dialog will come up (Figure 6-19) warning you that you are about to merge the Reference file into your current file.

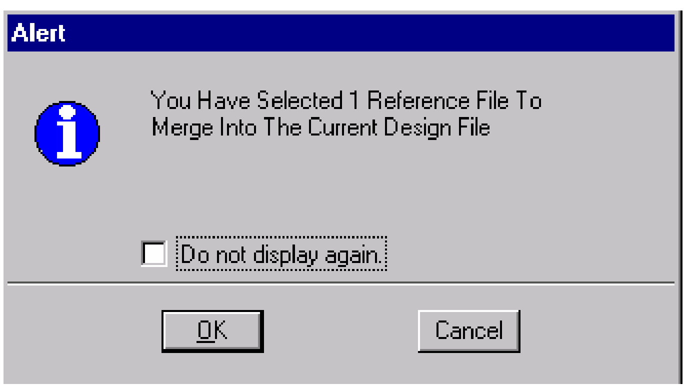


Figure 6-19: Merging Reference File Alert

If everything looks good, click OK to proceed.

Hit *Refresh.*

INITIAL TEXT CLEANUP

Determine Direction of Proposed Alignment

This step is very important. If you haven't already, take necessary steps to determine who the Project Manager is for the project. Ask which direction that they anticipate the alignment to be laid out. If this is unknown, **do not** cleanup this drawing until it's been established.

Step One: Open the Text.dgn (From the Topo Folder)

Open MicroStation by clicking the "MicroStation new InRoads config" icon on your desktop. When the *MicroStation Manager* window appears, pick your project from the *Project* pull down. Browse to the **Topo** directory by double clicking your project number's decimal folder (i.e. pin\9045\ **"00"** folder), then double clicking the "Topo" folder.

- If you are working locally (on your D: drive), select the *User* pull down and change to **InRoads Local.** Select your project from the *Project* pull down. If it isn't there, copy the .pcf file from the Y:\msworksp\!msproj folder to your c:\!msproj folder. Reopen MicroStation.

- If the project pull down does not take you to your project, contact your CADD Support personnel.

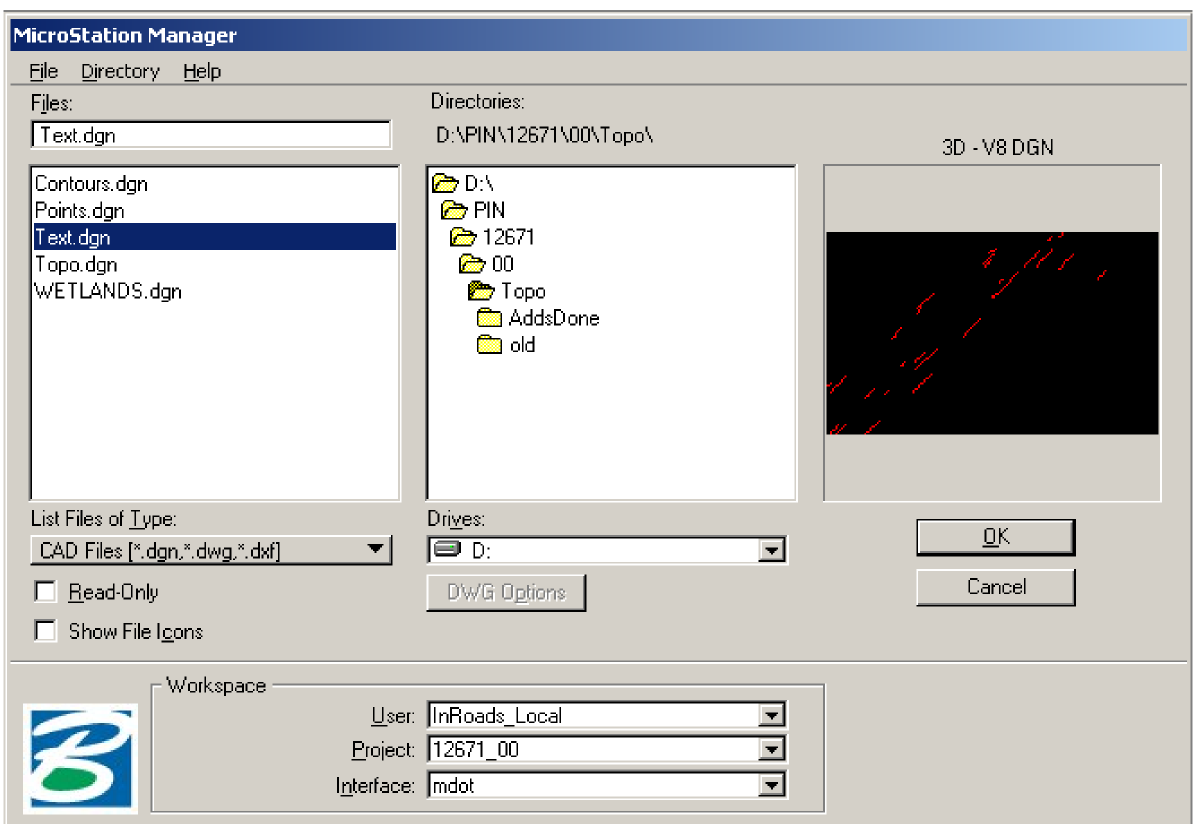


Figure 6-20: Select Text in the MicroStation Manager dialog

You should see four or five drawings on the left. Select **text.dgn** and click **OK** (Figure 6-20). Once the file is open, click *Fit View* from *Window1's* view control toolbar. Close *Window2, Window3and Window4* if necessary and maximize *Window1.*

Step Two: Reference Topo.dgn

Select **File > Reference(DOT)>Attach**. Browse to the **Topo** folder if necessary and select **topo.dgn.** It's not necessary to enter a *Logical* or *Description.* Attach by *Coincident World* method.

Step Three: Rotating Text

General Information

Most text should be rotated to read from west to east (parallel to centerline), and/or from south to north (perpendicular to centerline). In tight situations, a 45-degree rotation is acceptable.

All rotated text, if perpendicular to the centerline, should be legible from the right side of the plan sheet. This enables a person to read the text from a stapled set of plans with the most ease.

Text on buildings should be rotated either parallel or perpendicular with the building face.

Text for drives should run parallel to the drive unless it identifies a wide parking area/lot.

Global vs. Individual Rotation Introduction

All text in the text.dgn comes in at the same angle.

One pass **Globally,** using selection sets through the entire project will align the majority of text elements correctly. The text that it doesn't correct will most likely be an even 90-degree increment away from being correct.

This method works best on the straight portions of your project. Areas on a curve can be dealt with by using smaller selection sets or simply by using individual rotation methods.

Utilize the **Individual rotate** command for text blocks that need final tweaking. Intersections of Side Roads require a bit more attention in this respect.

Global Rotation: Select Text Blocks to Rotate

Identify a portion of your project that is fairly straight. If your project is one big curve use small selection sets so that global rotation will be effective.

Using the Power Selector - The power selector works well for selecting single or multiple text blocks because of the various selection methods. You can also add and subtract from your selection set easily. Choose *Shape* method and choose the “**+”** in the mode field (Figure 6-21).

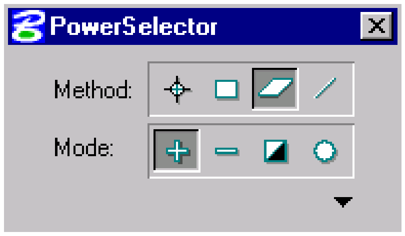


Figure 6-21: Power Selector set to shape

Left click to form a shape around the text blocks you want to rotate, returning back to the beginning point to close the shape. You should see them highlight.

Click the **Rotate** tool from the Survey Editors tool box or the Main tool frame. In the Tools Setting box, click the down arrow to *Show Extended Information (*Figure 6-22*).* Place a checkmark in the *About Element Center* box of the dialog box (Figure 6-23).

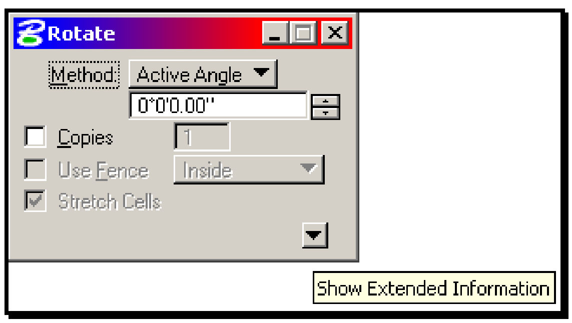


Figure 6-22: Rotate Element’s Show Extended Information button

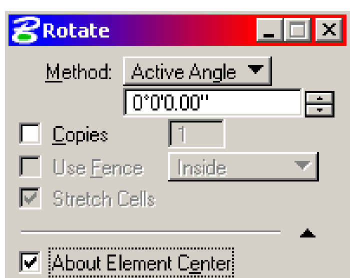


Figure 6-23: Rotate Element’s About Element Center box

Active Angle method: Take a rough guess of what the angle would be between the text block and the roadway. In the **angle** field, type in the angle. If you don’t have any idea what the angle might be, try using a 5-degree rotation and click multiple times on the screen to continue rotating this amount. (Type in a “-“ for a clockwise rotation.)

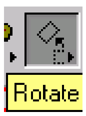
2 Points method: Click on the screen and you are dynamically rotating the text blocks around their origins. Move your cursor around the *AccuDraw’s* compass until the majority is rotated correctly. Click to *Accept* this rotation. Right Click to stop rotating.

- To create new selection sets, hit your “spacebar” to clear the current selection set (while focus is in *Power Selector* dialog) and place a shape around the new set of text blocks.

✓ ***Refer to page 2-26 for more information on the Power Selector tool.***

Individual Rotation

To perform individual rotations, rotate the text block around the point established by the Survey Crew, which is also the center/origin point of the cell it identifies.



Click the **Rotate** tool from the Survey Editors tool box or Main tool frame. In the Tools Setting dialog, click the down arrow to *Show Extended Information.* Place a checkmark in the *About Element Center* box of the dialog box. Click near the text block (the actual pivot is set to the text block’s origin based on the tool setting). The text block will rotate dynamically as you move the mouse around *AccuDraw’s* compass. Left click again to define the amount of rotation. Right Click to stop rotating the text block.

Step Four: Moving Text

After text is rotated, it may also require moving. Text should be kept out of and away from roadway as much as possible. Use common sense when moving items nearest the cell that they describe so the plan “looks good”. Use the *Move Element* tool to move single text blocks.

- *Snapping* to text (middle mouse) will show you what the text is describing. This works well in areas where text is on top of text making it difficult to distinguish. Identify what the text is describing and move it to a better location until all elements are clearly identified.

Step Five: Editing Text (Optional)

Text for similar elements should be consistent. Examples of inconsistent labels are GRAV.DR., GR.DRIVE, GRAVEL DR.. Adjust these to read GRAVEL DRIVE. (If in a tight area, abbreviations may be unavoidable.) Use the *Edit Text* tool to do this. Click the tool and then identify the text. Click once more to *Accept* and the text will appear in the **Text Editor** window. Make your changes and hit **Apply**. Right click to stop editing *that* text block.

Abbreviations or making the text appear on two lines may be necessary in order to squeeze long descriptions in highly congested areas. Like items close to each other, may be labeled once. To do this, edit the text using the *Edit Text* tool. Click on the text, once more to *Accept* and it should appear in the **Text Editor** window. Make your changes and hit **Apply** (i.e. 5 – 400 to 500 mm CEDAR SHRUBS).

Step Six: Labeling With Arrows (Optional)

It may be necessary to create an arrow line pointing to the cell it represents. Here are a few steps to accomplish this.

Part One: Select Arrow Line

Select **Text (Misc)>Arrow Lines** from the *Settings Manager*.

Part Two: Smart Match Text Block

Select **Qualities>Match>Level** from the MicroStation's main menu and click on the text block that the arrows belong to. Click again in the view window to *Accept* the selection.

Part Three: Make Lines

Click to the left of the text block with the left mouse button. Type RQ (Rotate Quick) and align your *AccuDraw* axis along the text block and click your left mouse button. Enter the distance that you want your line to be from the text, 3 feet (1.0 m) is usually good and click your left mouse button to *Accept*. Point to the cell that you are annotating (Figure 6-24). Do the same for the other side if necessary.

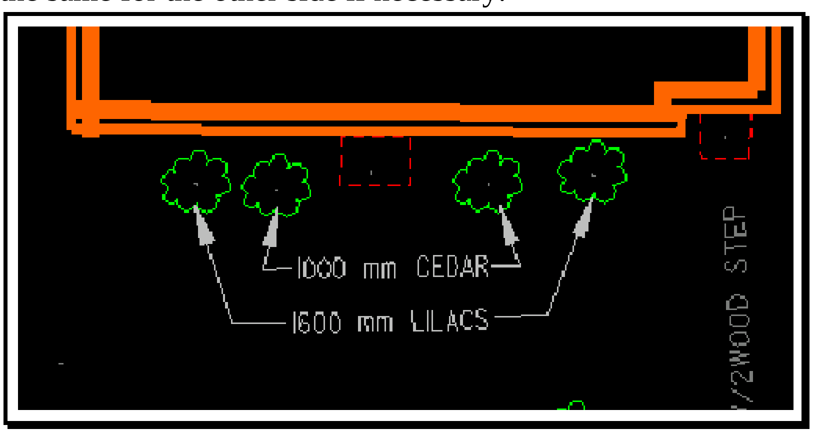


Figure 6-24: Example of annotating with arrows

Step Seven: Adjust and Save Changes (Courtesy To Others)

Rotate Window 1 back to a top view. Click on *Rotate View* and set the *Method* to **Top**. Click in the view to accept the new rotation. Select **File>Save Settings.**

♬ If *Save Settings* is grayed out, this means that your current preferences are to save settings on exit. It will accomplish what this step is intended to do.

Step Eight: Add Note to <u>Cleanlog.txt</u> File! (Courtesy To Others)

Make a comment to the Cleanlog.txt to let people know that the text has been cleaned up.

♬ Regional Office employees that copy the project locally should browse to the Y:drive PIN folder and make the edits to the network copy of the Cleanlog.txt so that other employees can check the status of the project. If you make the comments to your local Cleanlog.txt file, no one else can see this but you.

ADDITIONAL TOPOGRAPHY CLEANUP

Quick Punch List

- Copy topoadd# files from Survey/MSTA to Topo folder
- Rename files (remove the "Orig")
- Cleanup Files
- Blend the two Files
- Merge file into topo.dgn
- Add note to Cleanlog.txt file

♬ This punch list is to give an overview of what is to be done with additional topography files. If the topoadd are needed prior to the cleanup, copy the files to the topo folder temporarily.

♬ If there are more than one 3DtopoMMDDYY.dgn files, this indicates that there has been topoadds done for this project. If no cleanup has been done on the whole project, cleanup up the latest dated file and you will be taking care of every topoadd, including the original topo. All "ground survey" topography is displayed in the latest 3DtopoMMDDYY.dgn file. Always check the Cleanlog.txt file to see what has been cleaned up.

♬ Supply your topoadd number where you see a "#" sign.

Step One: Copy/Rename Origtopoadd#, Origtextadd#, Contours and Points

Copy Origtopoadd#, Origtextadd#, Contours and Points from the **Survey\Msta** folder into the **Topo** folder using Windows Explorer. You will be prompted to overwrite Contours and Points. Say **Yes.**

Select Origtextadd#.dgn. From the Explorers Menu, select **File>Rename.** Remove the Orig from the file name. Repeat for Origtopoadd#.dgn (i.e. **topoadd1.dgn** and **textadd1.dgn.)**

✓ ***Refer to page 6-4 in the Initial Topography Cleanup portion of this manual for more detailed instruction if necessary.***

♬ The original 3DmappingMMDDYY.dgn file contains all Aerial Mapping data. No additional Aerial mapping is ever done. If there is more than one 3DmappingMMDDYY.dgn, it means that additional ground survey has been taken in the form of an Origtopoadd#.dgn. Survey re-creates a 3DmappingMMDDYY.dgn to indicate where the ground survey fits in. This area(s) is encompassed by a boundary string.

Step Two: Add Note to Cleanlog.txt File!

As a courtesy to others, always add a note to the **Cleanlog.txt** file located in the **Topo** directory as progress is made during the cleanup process. Here are a few examples of informative cleanup notes.

03/04/02 John Doe - Started **Topoadd#.dgn** cleanup.

03/07/02 John Doe - Finished **Topoadd#.dgn** cleanup.

03/07/02 John Doe - Started/Finished **Textadd#.dgn** cleanup.

- Regional Office employees that copy the project locally should browse to the Y:drive PIN folder and make the edits to the network copy of the Cleanlog.txt so that other employees can check the status of the project. If you make the comments to your local Cleanlog.txt file, no one else can see this but you.

Step Three: Open Topoadd#

Click the MicroStation icon on your desktop and pick your *Project* from the pull down. Browse to the **Topo** folder. Select **Topoadd#.dgn** and click OK.

- If the project pull down does not take you to your project, contact your CADD Support personnel.

Step Four: Attach Reference Files

Select **File>Reference(DOT)>Attach** from the Main Menu. Select the **Textadd#.dgn,** browsing to the **Topo** folder if necessary. Click OK. It is <u>not</u> necessary to enter a *Logical* name or description for any attachments to this file. Attach by *Coincident World* method. Repeat this process for the **Topo.dgn** and **Text.dgn** drawings. Shut off the display of **Topo** and **Text** unless you need to see the “big” picture.

Step Five: Refer to Step 6 through Step 16 in the “Initial Topo Cleanup” portion of this manual

Follow the same steps that were followed when doing an Initial topo cleanup. Many steps may be skipped depending on the type of information in the Topoadd# file.

ADDITIONAL TEXT CLEANUP

Determine Direction of Proposed Alignment

It should be apparent which way alignment is going to be laid out from the current Topo and Text drawings. Rotate accordingly.

Step One: Open the Textadd#.dgn (From the Topo Folder)

Step Two: Reference Topoadd#.dgn

Select **File > Reference(DOT)>Attach**. Browse to the **Topo** folder if necessary and select **Topoadd#.dgn.** It's not necessary to enter a *Logical* or *Description.* Attach by *Coincident World* method. Repeat this process for the **Topo.dgn** and **Text.dgn** drawings. Shut off the display of **Topo** and **Text** unless you need to see the "big" picture.

Step Three: Refer to Step 3 through Step 8 in the "Initial Text Cleanup" portion of this manual

Follow the same steps that were followed when doing an Initial text cleanup.

BLENDING NEW TOPO AND TEXT WITH OLD

General Information – Blending Tips

Topoadd1 and Textadd1 features take precedence in the Topo file, therefore, most of the work will be done in the **topo.dgn** file. Edit topo.dgn and text.dgn to accommodate the new topography (topoadd1.dgn and textadd1.dgn) to be merged.

Use a combination of MicroStation's tools to accomplish the task of "blending" the updated Topography with the **Topo.dgn** and the **Text.dgn** file. The areas of additional survey should stand out from the previous surveys if you use *Level Symbology*.

Aerial Mapping Projects or Portions Modified

Part One: Open Topo.dgn – Attach Topoadd#

Open the **Topo.dgn.** Select **File>Reference (DOT)>Attach** from the *Main Menu.* Browse to the **Topo** folder if necessary and select **Topoadd#.dgn.** It's not necessary to enter a *Logical* or *Description.* Attach by *Coincident World* method. The **Topoadd#.dgn** takes precedence in the drawing. This will replace any Mapping Survey elements that exist in the topo.dgn. There should be a boundary element around the additional ground survey elements.

Part Two: Place Fence By Element

Select the *Place Fence* tool. Change *Fence Type* to **Element.** Set *Fence Mode* to **Clip.** Click on the boundary element. The element will highlight indicating the fence was placed.

Part Three: Delete fence Contents

Select the *Delete Fence Contents* tool. Set the *Fence Mode* to **Clip.** Click in your view to *Accept* the command. This should remove the old elements that were picked up through Aerial Mapping methods to make room for the newly surveyed information.

Adjust Colors for Easy Editing - Level Symbology (Optional)

Adjusting colors of the drawings will make it easier to distinguish the old Topography and the updated Topography. Adjust colors to your personal preference. You may want to follow the same steps outlined below for the topo.dgn, text.dgn, and the Topoadd#.dgn, so while in that drawing, your colors are the same throughout all of the files you need to edit. The example below is adjustments to make while in the topo.dgn.

Part One: Open Topo.dgn and Attach Topoadd#.dgn and Textadd#.dgn

Open **topo.dgn** from the \topo folder. Select **File > Reference(DOT)>Attach**. Browse to the **Topo** folder if necessary and select **Topoadd#.dgn.** It's not necessary to enter a *Logical* or

Description. Attach by *Coincident World* method. Repeat this process for the **Textadd#.dgn** drawing.

Part Two: Open Topo and Turn On Level Symbology

From the Main Menu, select **Settings>View Attributes (Ctrl + B).**

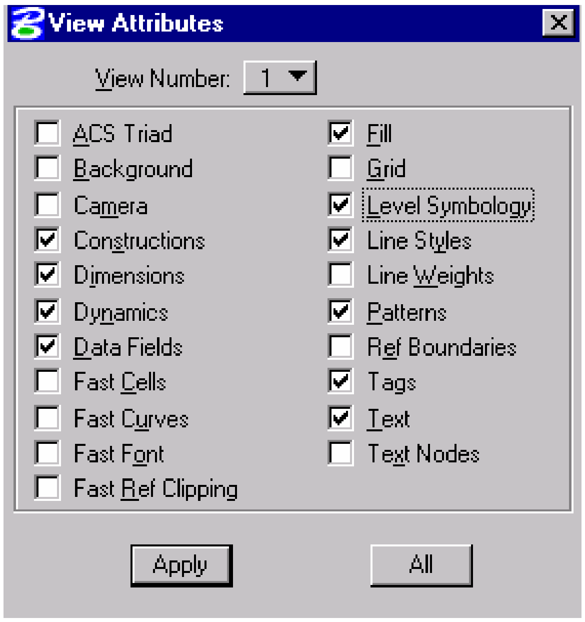


Figure 6-25: View Attributes using Level Symbology

Place a checkmark in the *Level Symbology* box (Figure 6-25). Hit **Apply.**

Part Three: Assign Colors to the Active Design File (i.e. Topo)

Open the **Settings>Level>Manager** dialog from the Main Menu.

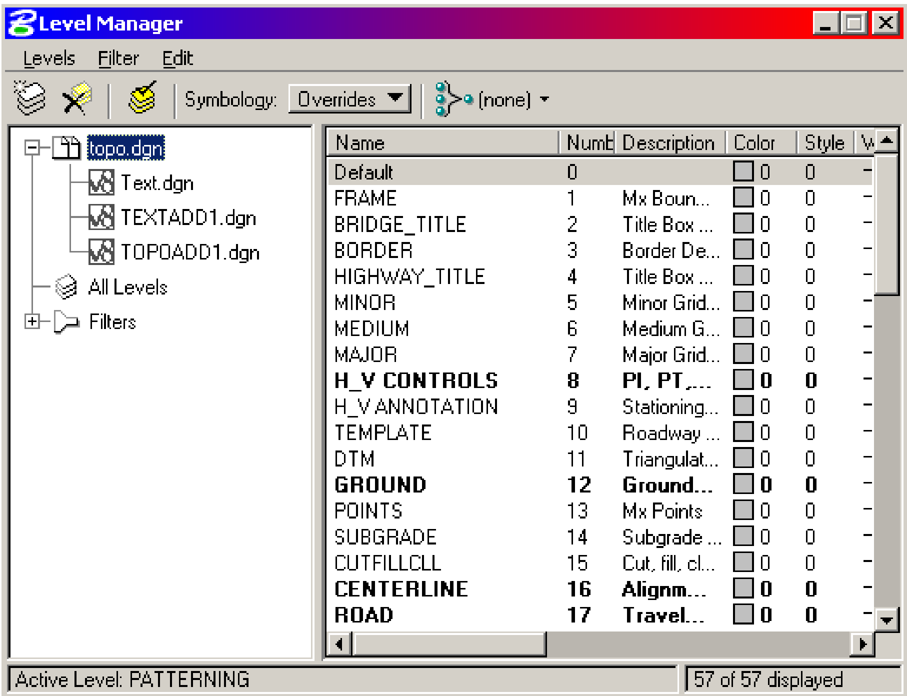


Figure 6-26: Level Manager dialog

In the leftmost window, click to highlight *Topo* (Figure 6-26) which is the active file you are in. *Right-Click* in the rightmost window and pick *Select All* (Figure 6-27). All *Levels* will highlight (Figure 6-28).

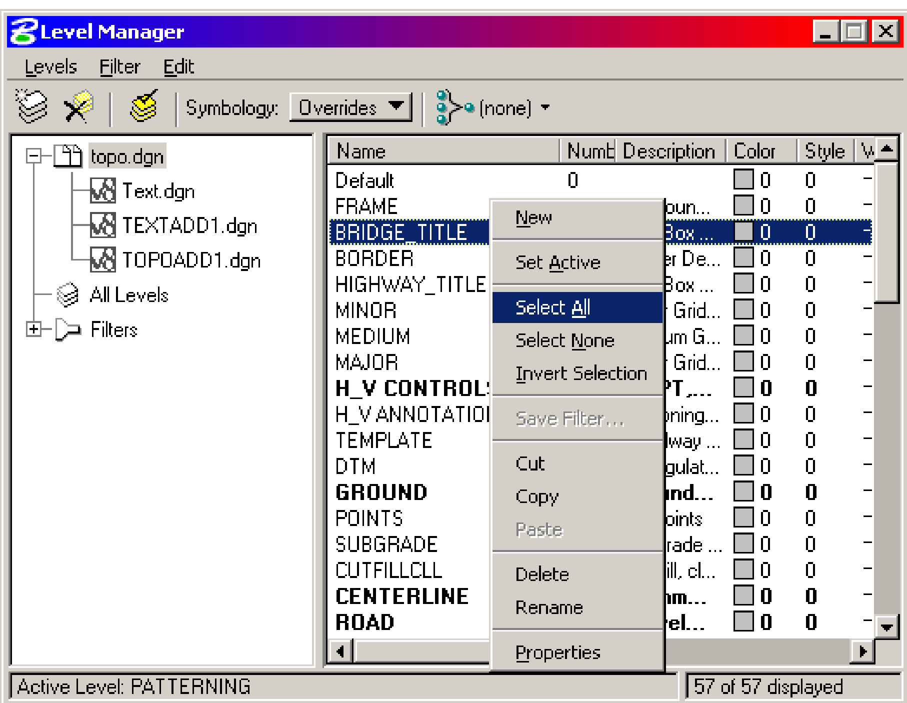


Figure 6-27: Right Click and select Select All

Right-Click again and select *Properties (*Figure 6-28*).*

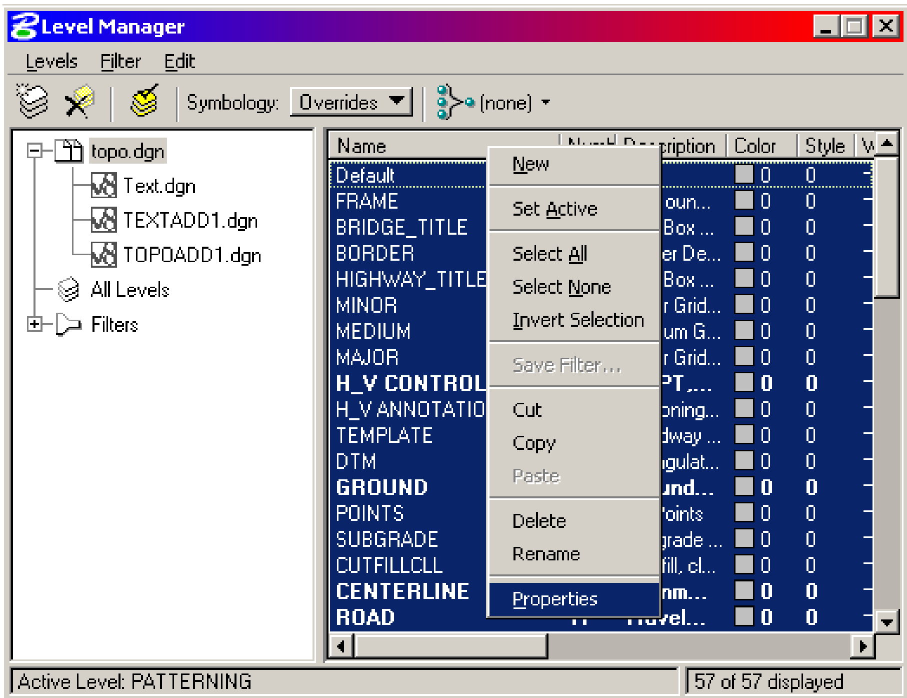


Figure 6-28: Right Click and select Properties

In the *Level Properties* dialog, adjust the *Symbology Overrides* to look like the dialog in Figure 6-29. (Ignore the *Symbology: By Level* area.) Hit *OK.*

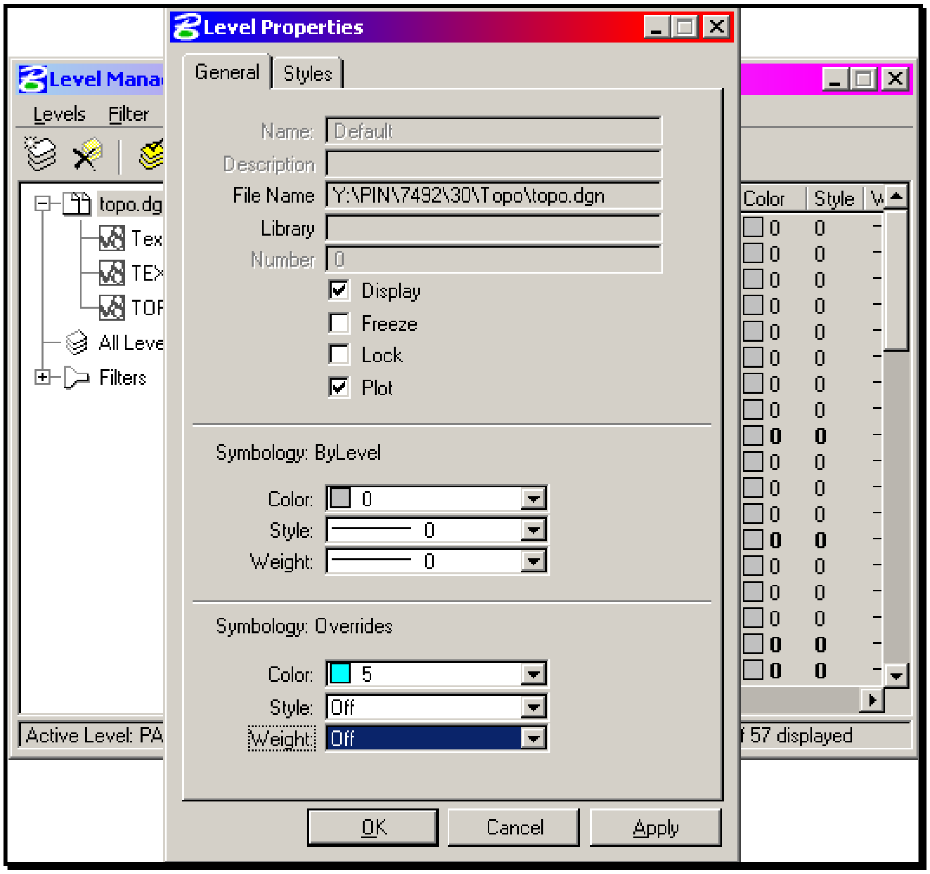


Figure 6-29: Symbology Overrides section of Level Properties

Part Four: Repeat for Text.dgn

Repeat the same process for the text.dgn. Be sure to select the **text.dgn** on the left side of the dialog to display its levels. If you don’t see the text drawing, expand the tree by clicking the “+” sign next to topo.dgn. Use the same color you used for topo.

Part Five: Assign Colors to the Topoadd#

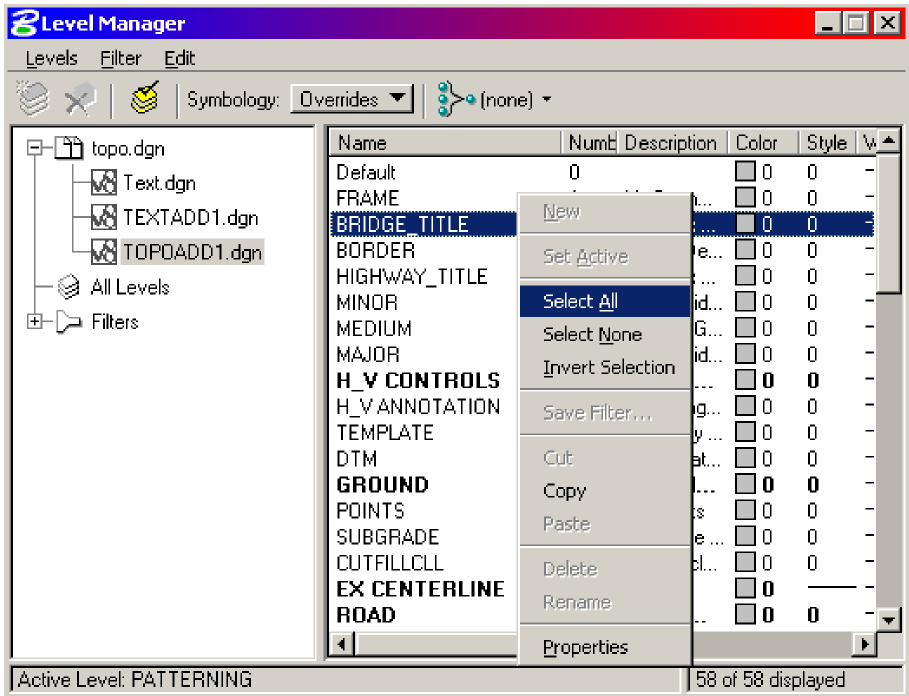


Figure 6-30: Right Click and pick Select All

In the leftmost window, click to highlight *Topoadd1.dgn. Right-Click* in the rightmost window and pick *select all* (Figure 6-30). All *Levels* will highlight.

Right-Click again and select *Properties.*

In the *Level Properties* dialog, adjust the *Symbology Overrides* to look like the dialog in Figure 6-31. (Ignore the *Symbology: By Level* area.) Hit *OK.*

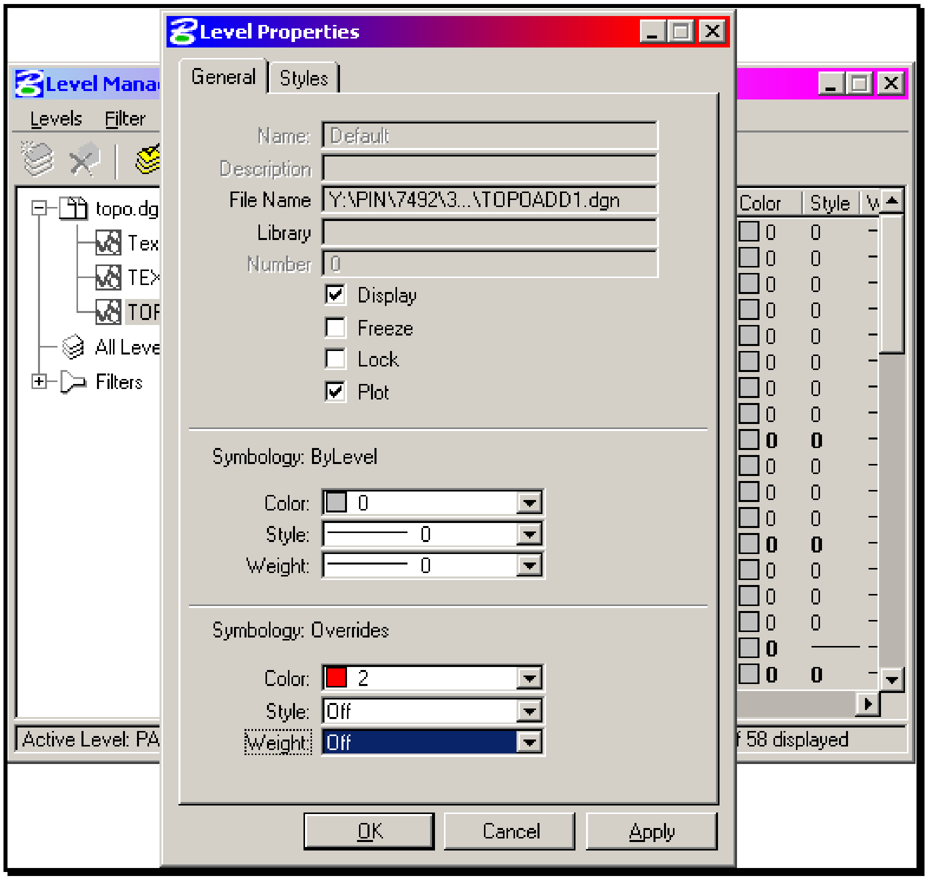


Figure 6-31: Symbology Overrides section of Level Properties

Part Six: Repeat for Textadd#.dgn

Part Seven: Refresh View

Click on the paintbrush in the *View Controls* tools to *Refresh* the view.

Part Eight: Save Settings

From the Main Menu, select **File>Save Settings.**

File Swapping (Handy Tip - Optional)

While editing the **Topo** file, you may need to swap back and forth between it and the **Text.dgn** and/or the **Topoadd1.dgn**. Try using **File>Reference(DOT)>HotSwap.** Follow prompts as the macro takes you to the element you select in any of the reference files you have attached. This gives you the capability to edit it. Also, use **File>2 (Alt+F+2)** to swap to the file you just came from.

Hilite Display of Reference Files (Optional)

In the *Reference File* dialog, set your *Hilite Mode* to **Hilite.** Select a reference file to highlight it.

Update the Reference File Sequence (Optional)

Some people may want to change which file is displayed on top of which file. In the *Reference File* dialog, select **Settings>Update Sequence.** This determines which file is displayed first.

MERGING NEW TOPO AND TEXT WITH OLD

Step One: Open Topo.dgn and Attach Topoadd#.dgn

Open **topo.dgn** from the \topo folder. Select **File** > **Reference(DOT)>Attach**. Browse to the **Topo** folder if necessary and select **Topoadd#.dgn.** It's not necessary to enter a *Logical* or *Description.* Attach by *Coincident World* method.

Step Two: Merging Topoadd# File

Part One: Select Reference File to Merge

Once the Topo file has been edited to allow for incorporation of the new topography, open the **File>Reference(DOT)>Dialog.**

From the *Reference File* dialog, select the **Topoadd#.dgn** file. Then select **Tools>Merge Into Master.** Following the prompts, click in your view window. This dialog will come up (Figure 6-32) warning you that you are about to merge the Reference file into your current file.

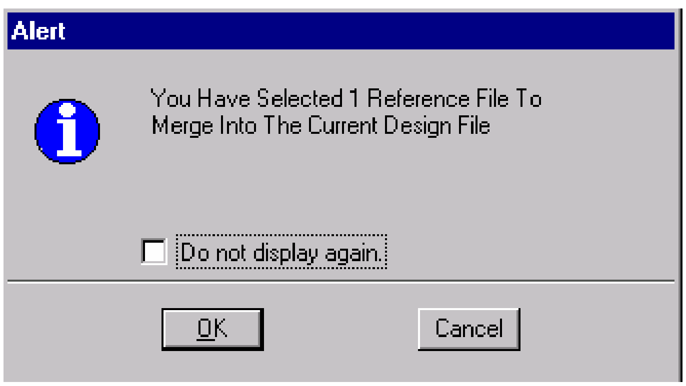


Figure 6-32: Merging Reference File Alert

If everything looks good, click **OK** to proceed.

Hit *Refresh.*

Part Two: Adjust and Save Changes (Courtesy to Others)

Rotate Window 1 back to a top view. Click on *Rotate View* and set the *Method* to **Top**. Click in the view to accept the new rotation.

If *Level Symbology* was used, select **Settings>View Attributes** and uncheck *Level Symbology*. Hit *Apply*. Close View Attributes Window.

Select **File>Save Settings**. Exit MicroStation.

Step Three: Open Text.dgn and Attach Textadd#.dgn

Open **text.dgn** from the topo folder. Select **File>Reference(DOT)>Attach**. Browse to the **Topo** folder if necessary and select **Textadd#.dgn.** It's not necessary to enter a *Logical* or *Description.* Attach by *Coincident World* method.

Step Four: Merging Textadd# Files

Part One: Select Reference File to Merge

Once the Text file has been edited to allow for incorporation of the new text, open the **File>Reference(DOT)>Dialog.**

From the *Reference File* dialog, select the **Textadd#.dgn** file. Then select **Tools>Merge Into Master.** Following the prompts, click in your view window. This dialog will come up (Figure 6-33) warning you that you are about to merge the Reference file into your current file.

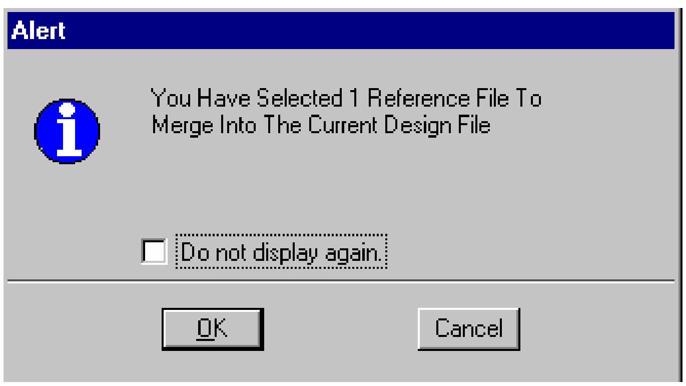


Figure 6-33: Merging Reference File Alert

If everything looks good, click **OK** to proceed.

Hit *Refresh.*

Part Two: Adjust and Save Changes

Rotate Window 1 back to a top view. Click on *Rotate View* and set the *Method* to **Top**. Click in the view to accept the new rotation.

If *Level Symbology* was used, select **Settings>View Attributes** and uncheck *Level Symbology*. Hit *Apply.* Close View Attributes Window.

Select **File>Save Settings**. Exit MicroStation.

Step Five: Moving Topoadd# and Textadd#

Using Windows Explorer, move the **Topoadd#.dgn** and the **Textadd#.dgn** files you just edited and merged from the **Topo** folder to the **ADDSDONE** folder located in your project's **Topo** folder.

- If Topoadd and Textadd drawings still exist in the **Topo** folder, this should tell a user that the clean up and merging is not yet complete.

Step Six: Add Note to Cleanlog.txt File!

Follow steps previously outlined in this document. Add a note saying that the two files have been merged.

- Regional employees make changes to this file on the Y: drive.

Step Seven: Copy Contents of Topo folder to Y:drive (Regional Employees)

If you are a Regional Employee or did the cleanup on your C: or D: drive, copy the contents of the Topo folder on your hard drive to the Y: drive Topo folder of your PIN number. As in similar procedures outlined in this manual, use the **Edit>Copy** and the **Edit>Paste** commands in Windows Explore.

If you used Window's *Briefcase,* synchronize the project to the y:\ drive.

✓ ***For more information on synchronizing your briefcase, refer to page 13-13.***

WETLAND SURVEY CLEANUP

GENERAL INFORMATION

Standard Naming

The department has a standard naming convention for drawing files. The main reason for this is that many of our standard *plan view* type drawings for the department have the existing topography information referenced into them by default. This default reference only works when the files are named correctly and when they exist in the correct location.

Please follow procedures outlined below to adhere to these standards. The standard file names for existing Survey information residing in the **Topo** folder are Topo, Text, Contours, Points and **Wetlands**. These are the only five files that should permanently live in the **Topo** folder. Click this link for a complete list of MDOT Standard File Names or visit the website at www.maine.gov/mdot/cadd-support/microstation/std_filename.php.

Preserving Original Files

The Survey\Msta Folder is where the "Original" Survey files are stored. The folder will act as the topographical history for any given project. A user can open the folder and tell what was done for original survey, and all subsequent "survey adds". The folder is Read-Only to everyone except for the Survey Editors, therefore, MicroStation Survey clean up will be done in the **Topo** folder. If network speed is an issue because of proximity to the server, then copy the necessary files locally.

- ✓ ***Regional Office users should refer to page 13-5 for documentation on working with files locally in a Windows Briefcase.***

The End Result

The end result is to make the **wetlands.dgn**, which exist in the **Topo** folder, a combination of all wetlands lines and text for the project. This would leave no question as to which drawing needs to be referenced to display all of the cleaned up wetlands for the project.

INITIAL WETLANDS CLEANUP

Quick Punch List

- Copy files from Survey/MSTA to Topo folder
- Rename files
- Cleanup Files
- Add note to Cleanlog.txt file

♬ This punch list is to give an overview of what is to be done with original wetlands file. If the wetlands are needed prior to the cleanup, copy the file to the **Topo** folder and rename it.

Step One: Open Windows Explorer

Open Windows Explorer **(Start>Programs>Accessories>Windows Explorer)** and browse to your project on the y: drive.

♬ **Regional Offices** or users with a poor network connection can copy the project folder to your local D:\PIN folder and continue with the steps in this document, substituting your D: drive where the document says Y: drive.

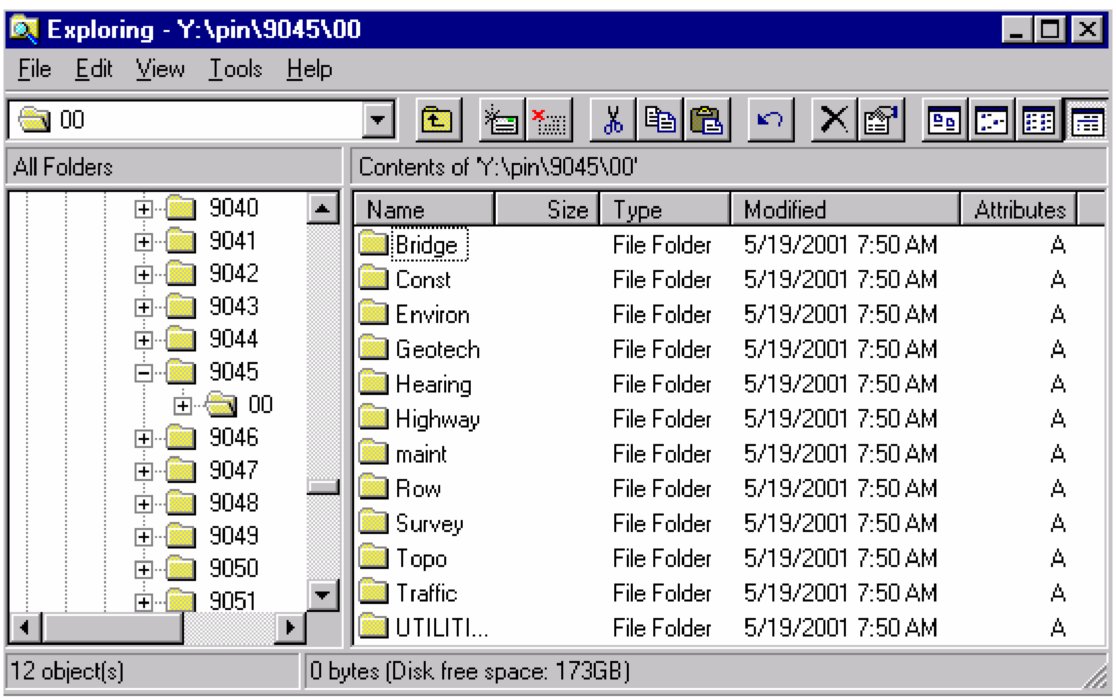


Figure 6-34: Browse to your PIN's topo folder

Step Two: Open the Topo Folder

In the example Figure 6-34, double click the Topo folder to display its contents. This folder should not have a **wetlands.dgn** file in it. If it does, skip the next step.

ⓘ ***If this folder already contains files, someone may have started Wetlands cleanup on this project. <u>Do not</u> overwrite this file with the next step. Open the Cleanlog.txt file to see if there are any "cleanup" notes. Skip to Step Four: Open MicroStation.***

Step Three: Open the Survey\MSTA Folder - Copy Files to Topo Folder

Part One: Browse to Survey\MSTA

With Windows Explorer still open, browse to the Survey\MSTA folder, displaying its contents in the rightmost window.

Part Two: Select Files

Select the **OrigWetlands.dgn.** If there have been additional wetland areas added to this project (i.e. wetlandsadd1.dgn) and no cleanup has been done on any of it, select these also.

Part Three: Copy

From the Main Menu, select **Edit>Copy** (Figure 6-35)**.**

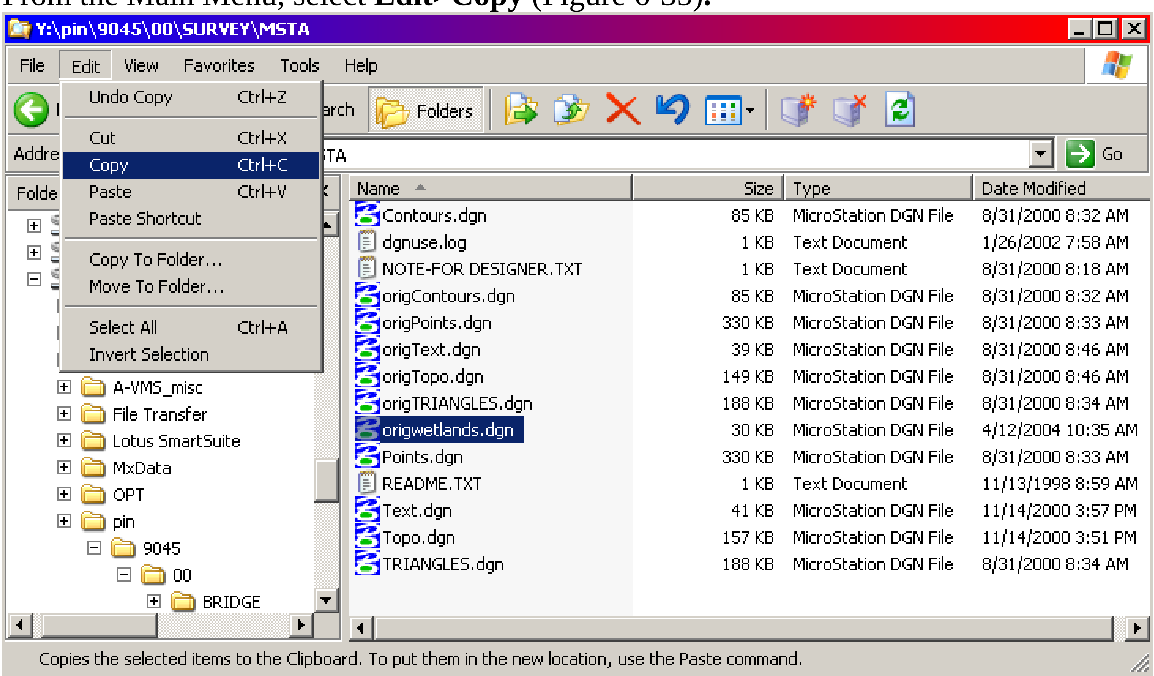


Figure 6-35: Copy OrigWetlands.dgn from the Survey\MSTA folder

Part Four: Paste

Click on the **Topo** folder. From the Main Menu select **Edit>Paste** (Figure 6-36)**.**

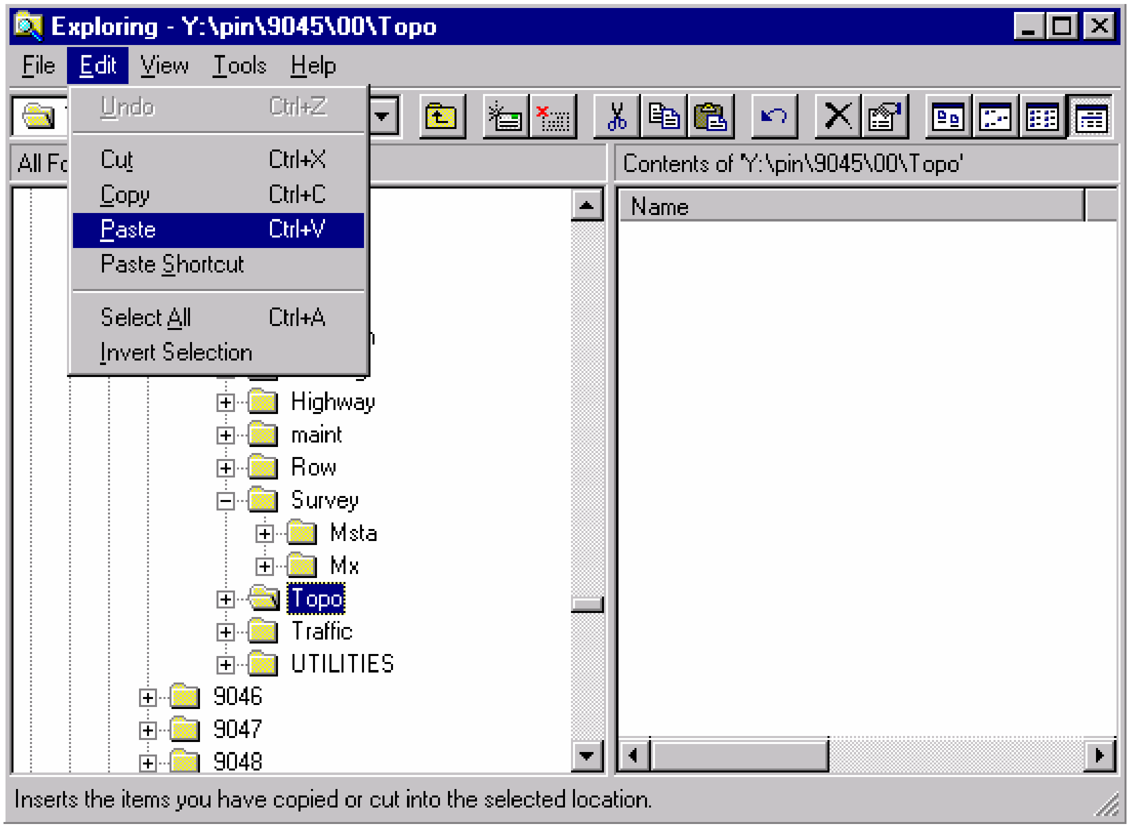


Figure 6-36: Paste OrigWetlands.dgn into the Topo folder

Part Five: Rename OrigWetlands.dgn

Select **OrigWetlands.dgn.** From the Main Manu, select **File>Rename.** Begin typing the new name, which is **wetlands.dgn.** Hit Enter to accept this name.

Part Six: Add Notes to Cleanlog.txt File!

As a courtesy to others, always add a note to the **Cleanlog.txt** file located in the **Topo** directory as progress is made during the cleanup process. Here are a few examples of informative cleanup notes.

03/04/02 John Doe - Started **wetlands.dgn** cleanup.

03/07/02 John Doe - Finished **wetlands.dgn** cleanup.

03/07/02 John Doe - Started/Finished **wetlands.dgn** cleanup.

♫ Regional Office employees that copy the project locally should browse to the Y:drive PIN folder and make the edits to the network copy of the Cleanlog.txt so that other employees can check the status of the project. If you make the comments to your local Cleanlog.txt file, no one else can see this but you unless you have your project Briefcased. In this case, be sure to synchronize this file also.

Step Four: Open MicroStation

Open MicroStation by clicking the “MicroStation new InRoads config” Icon on your desktop. When the *MicroStation Manager* window appears, pick your project from the *Project* pull down. Browse to the **Topo** directory by double clicking your project number’s decimal folder (i.e. pin\12671**”<u>00</u>”** folder), then double clicking the “Topo” folder.

- If you are working locally (on your D: drive), select the *User* pull down and change to **InRoads Local.** Select your project from the *Project* pull down. If it isn’t there, copy the .pcf file from the Y:\msworksp\!msproj folder to your c:\!msproj folder. Reopen MicroStation.
- If the project pull down does not take you to your project, contact your CADD Support personnel.

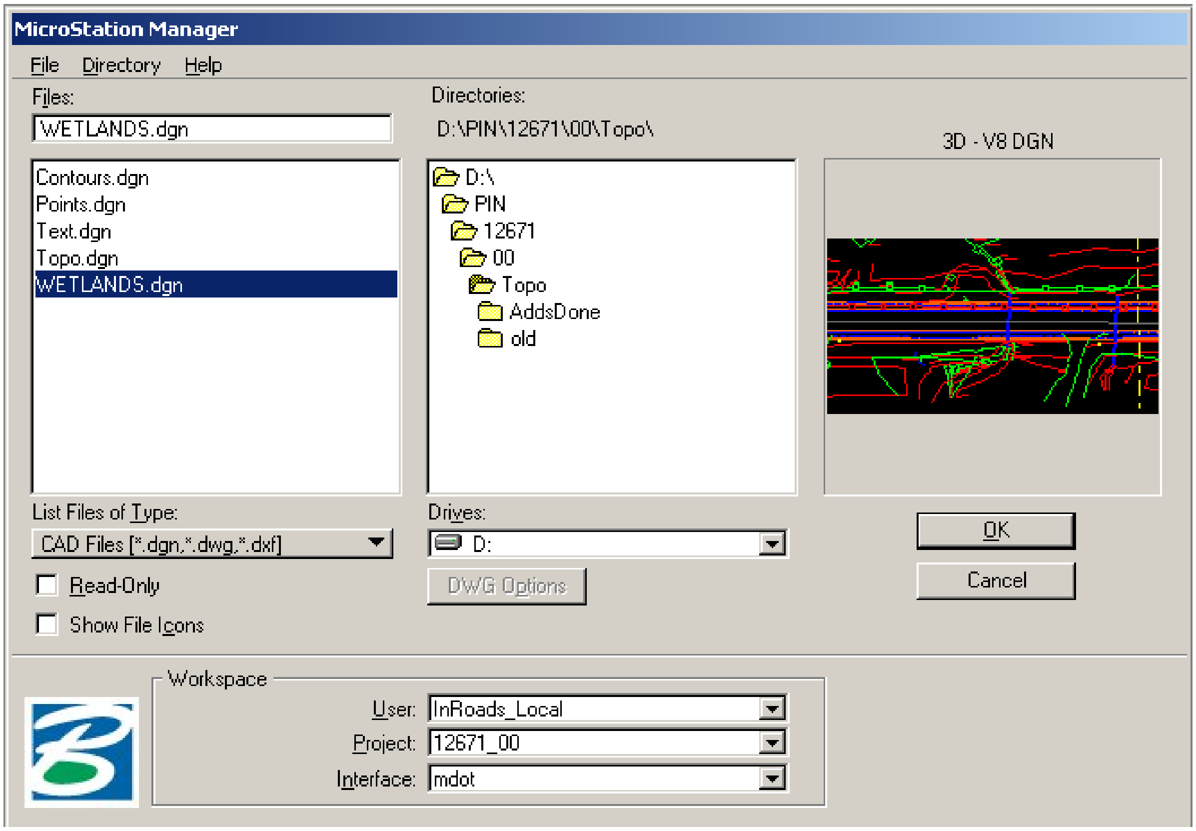


Figure 6-37: Select wetlands.dgn from your list of available files

You should see your drawing on the left. Select **wetlands.dgn** (Figure 6-37) and click **OK.** Once the file is open, click *Fit View* from *Window1’s* view control toolbar. Close *Window2, Window3and Window4* if necessary and maximize *Window1.*

ⓘ ***If the Topo directory is empty, go back to Step Three and copy the file(s).***

Step Five: Attach Reference Files

The wetlands drawing doesn't have any reference files attached by default. Even though you can only edit one file at a time, it is helpful to have other drawings displayed. Select **File>Reference(DOT)>Attach** from the Main Menu. Select the **alignments.dgn,** browsing to the **Highway** or **Bridge\MSTA** folder if necessary. Click OK. It is not necessary to enter a *Logical or Description.* Attach by *Coincident World* method.

ⓘ ***If an alignments.dgn file is not found, take necessary steps to determine who the Project Manager is for the project. Ask which direction that they anticipate the alignment to be laid out. If this is unknown, do not cleanup this drawing until it's been established. This will determine which direction you adjust the linestyles for readability.***

Step Six: Adjust View and Save Settings (Optional)

Rotate the View Window

If your project is not running from left (West) to right (East), you may want to rotate your view window so that the majority of the project is horizontal across your screen. Select **Rotate View** from Window 1's *View Controls* (Figure 6-38).

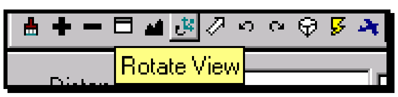


Figure 6-38: Rotate View tool

When the *Rotate View* dialog appears, set method to 3 points. **First point (0/0),** click on screen where you want the lower left corner of the new window to be. **Second point (+X direction),** click where you'd like the bottom right corner of the view window to be. **Third point (+Y direction)**, click to define the top left corner of the view window (Figure 6-39).

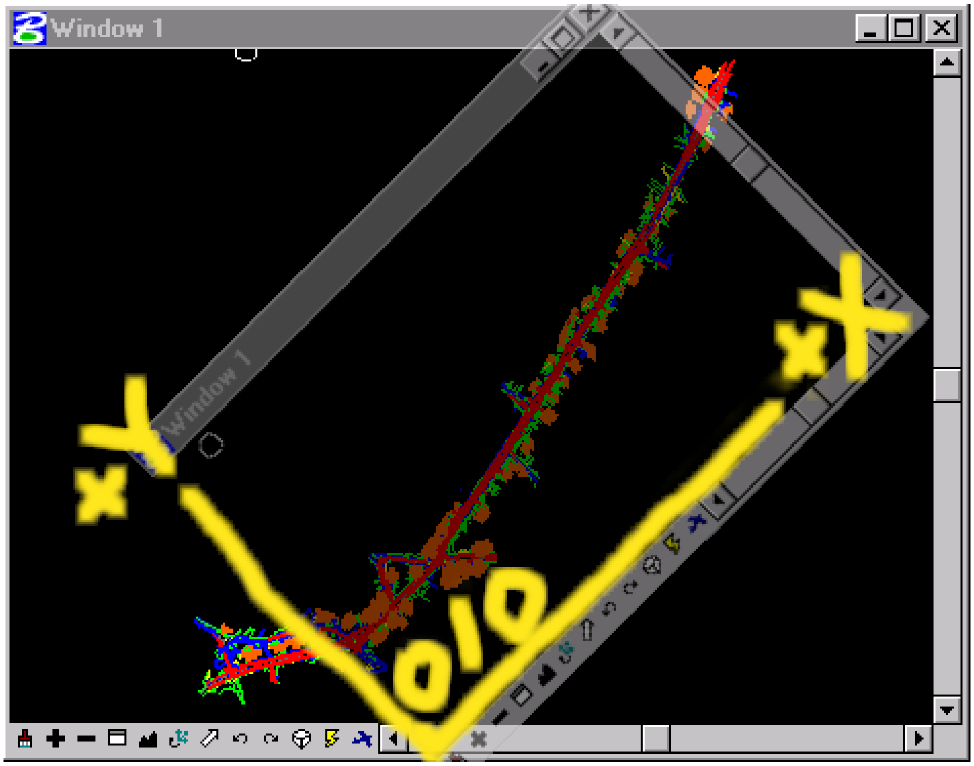


Figure 6-39: Rotating View with 3 point method

- Rotate View as often as necessary to get the majority of elements horizontal in your view. It is best **not** to snap to elements in your file while performing this command, unless you lock your "Z" prior to doing so **(Macros>Set/Lock Z).** A slightly skewed view may result if the 3 elements snapped to are at different elevations.

Graphic Group Unlock

Disable Graphic Groups by selecting **Settings>Locks>Graphic Groups** from the Main Menu or click the padlock on the status bar and click Graphic Groups to remove the checkmark.

Save Settings

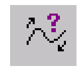
Select **File>Save Settings** to save these settings as your default view for the file.

- If *Save Settings* is grayed out, this means that your current preferences are to save settings on exit. It will accomplish what this step is intended to do.

Step Seven: Reverse Wetland Linestyle Direction

Objective

Wetland lines have text imbedded in the linestyle. Ultimately, we want the text to be legible when the plans are cut into sheets. The text should be readable from left to right in accordance to the direction of the alignment.

Part One: Click the Reverse Direction Tool 

The *Reverse Element Directions* tool is located in the *Modify* toolbox or from the *Main Menu* select **Qualities>Change>Directions**. Click the tool and follow the prompts in the bottom left status bar.

Part Two: Select the Line (Identify the Element)

Click on the line with a left mouse button. An arrowhead will appear displaying the current direction of the line.

Here is an example of a wetland line before clean up (Figure 6-40). Notice only part of the line reads correctly.

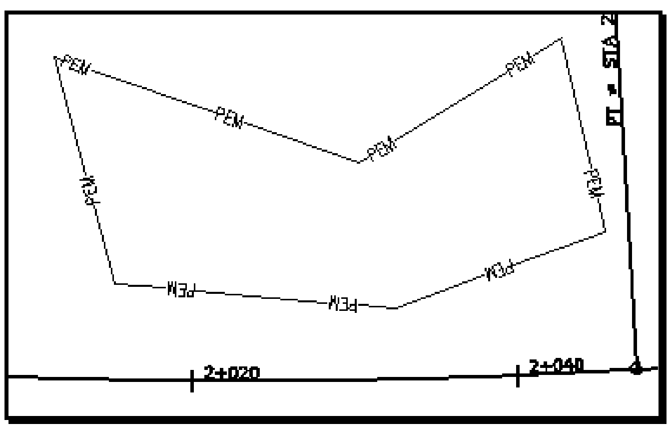


Figure 6-40: Example before reversing elements

Part Three: Accept or Reject

Click anywhere in the view window with a left mouse button to *Accept* or a right mouse button to *Reject*.

Here is an example of a wetland line after clean up (Figure 6-41). Notice that all portions of the line read correctly. A partial delete had to be done to get accomplish this.

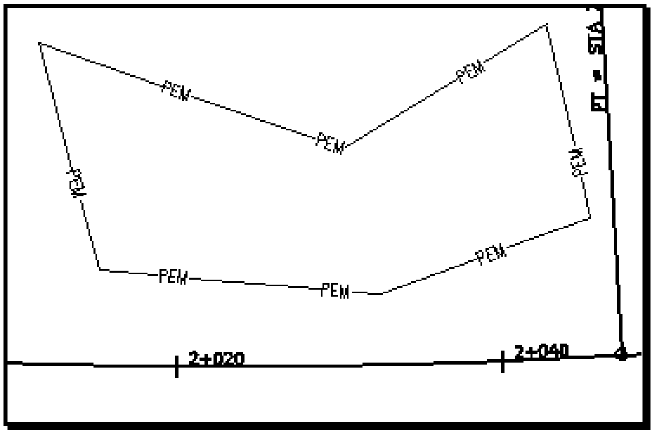
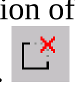


Figure 6-41: Example of a cleaned up wetland line

♫ You may have trouble reversing closed elements (shapes, blocks, etc.) and elements that go in both directions. Try deleting a small portion of the element using the *Delete Partial* tool which is located in the *Modify* toolbox.  Click on the Partial Delete Tool. Click on a vertex of the string, then without moving the cursor away from the center of AccuDraw's compass, click where you originally clicked forming a partial deletion of the line that is unnoticeable.

Step Eight: Moving Vertices

You may need to adjust wetland lines because the line may not have been drawn correctly. Use the *Modify Element* tool to move a vertex from one location to another.

Step Nine: Changing Linestyle (if necessary)

If the wetland *Linestyle* is incorrect, select the line and select **Wetland/Rare Vegetation>?New Type?** from the *Settings Manager*. Select **Quality>Change>Symbology** from the main menu and click in the view window.

Step Ten: Add Wetland Lines (if necessary)

Use the *Settings Manager* to place new wetland lines if necessary. Select **Wetland/Rare Vegetation>?Type?** from the *Settings Manager*. Draw the line using *AccuDraw's* abilities. If there are Station and offsets available, consider using the *Point Along* macro.

✓ ***Refer to page 2-81 for instructions for entering station and offset values for plotting wetland lines manually.***

Step Eleven: Rotating Text

General Information

It is up to the discretion of the individual or their unit as to rotate the wetland flags or not.

Since other units will most likely shut off the wetland “flag” text, it’s important to know that you are doing this for your biologist’s checking purposes only.

Most text should be rotated to read from west to east across your screen (parallel to centerline), and/or from south to north (perpendicular to centerline). In tight situations, a 45-degree rotation is acceptable.

All rotated text, if perpendicular to the centerline, should be legible from the right side of the plan sheet. This enables a person to read the text from a stapled set of plans with the most ease.

Global vs. Individual Rotation Introduction

All text in the wetlands.dgn comes in at the same angle.

One pass **Globally,** using selection sets through the entire project will align the majority of text elements correctly. The text that it doesn’t correct will most likely be an even 90-degree increment away from being correct.

ⓘ ***This method works best on the straight portions of your project. Areas on a curve can be dealt with by using smaller selection sets or simply by using individual rotation methods.***

Utilize the **Individual rotate** command for text blocks that need final tweaking. Intersections of Side Roads require a bit more attention in this respect.

Global Rotation: Select Text Blocks to Rotate

Identify a portion of your project that is fairly straight. If your project is one big curve use small selection sets so that global rotation will be effective.

Using the Power Selector - The *Power Selector* works well for selecting single or multiple text blocks because of the various selection methods. You can also add and subtract from your selection set easily. Choose *Shape* method and choose the “**+**” in the mode field (Figure 6-42).

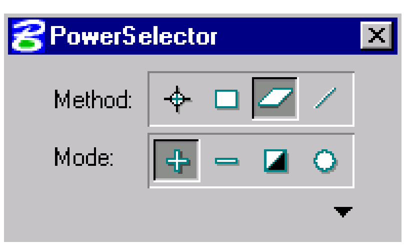


Figure 6-42: Power Selector set to shape

Left click to form a shape around the text blocks you want to rotate, returning back to the beginning point to close the shape. You should see them highlight.

Click the **Rotate** tool from *Main* tool frame. In the Tools Setting box, click the down arrow to *Show Extended Information (*Figure 6-43*)*. Place a checkmark in the *About Element Center* box of the dialog box (Figure 6-44).

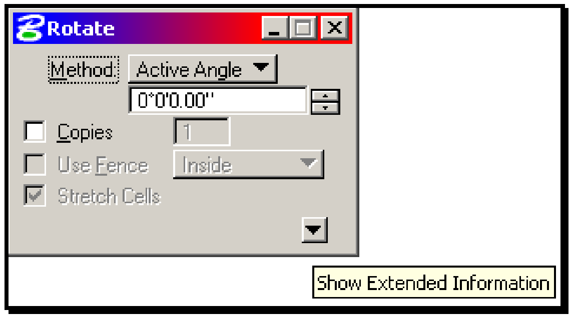


Figure 6-43: Rotate Element's Show Extended Information button

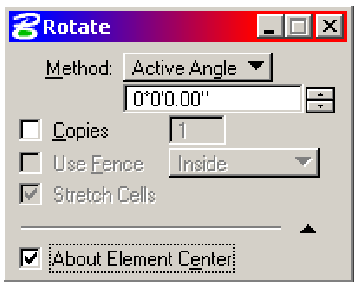


Figure 6-44: Rotate Element's About Element Center box

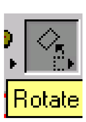
Set *Method* to **2 Points.** Click on the screen and you are dynamically rotating the text blocks around their origins. Move your cursor around the *AccuDraw's* compass until the majority is rotated correctly. Click to *Accept* this rotation. Right Click to stop rotating.

♬ To create new selection sets, hit your "spacebar" to clear the current selection set (while focus is in *Power Selector* dialog) and place a shape around the new set of text blocks.

✓ ***Refer page2-26 for more information on the Power Selector tool.***

Individual Rotation

To perform individual rotations, rotate the text block around the point established by the Survey Crew, which is also the center/origin point of the cell it identifies.



Click the **Rotate** tool from the *Main* tool frame. In the *Tools Setting* dialog, click the down arrow to *Show Extended Information.* Place a checkmark in the *About Element Center* box of the dialog box. Click near the text block (the actual pivot is set to the text block's origin based on the tool setting). The text block will rotate dynamically as you move the mouse around *AccuDraw's* compass. Left click again to define the amount of rotation. Right Click to stop rotating the text block.

Step Twelve: Moving Text

After text is rotated, it may also require moving. Use common sense when moving items nearest the vertex that they describe so the plan "looks good". Use the *Move Element* tool to move single text blocks.

- Snapping to text (middle mouse) will show you what the text is describing. This works well in areas where text is on top of text making it difficult to distinguish. Identify what the text is describing and move it to a better location until all elements are clearly identified.

Step Thirteen: Add Note to Cleanlog.txt File!

Make a comment to the Cleanlog.txt to let people know that the wetlands have been cleaned up.

- Regional Office employees that copy the project locally should browse to the Y:drive PIN folder and make the edits to the network copy of the Cleanlog.txt so that other employees can check the status of the project. If you make the comments to your local Cleanlog.txt file, no one else can see this but you.

ADDITIONAL WETLANDS CLEANUP

Quick Punch List

- Copy wetlandsadd# file(s) from Survey/MSTA to Topo folder
- Cleanup Files
- Blend the two Files
- Merge file into wetlands.dgn
- Add note to Cleanlog.txt file

♬ This punch list is to give an overview of what is to be done with additional wetland files. If the wetlandsadds are needed prior to the cleanup, copy the files to the topo folder temporarily.

♬ Supply your wetlandsadd number where you see a "#" sign.

Step One: Copy Wetlandsadd#

Copy wetlandsadd#.dgn from the **Survey\Msta** folder into the **Topo** folder using Windows Explorer.

✓ ***Refer to page 6-44 to see how it was done in the Initial Wetlands Cleanup portion of this manual.***

Step Two: Add Note to Cleanlog.txt File!

As a courtesy to others, always add a note to the **Cleanlog.txt** file located in the **Topo** directory as progress is made during the cleanup process. Here are a few examples of informative cleanup notes.

03/04/02 John Doe - Started **Wetlandsadd#.dgn** cleanup.

03/07/02 John Doe - Finished **Wetlandsadd#.dgn** cleanup.

03/07/02 John Doe - Started/Finished **Wetlandsadd#.dgn** cleanup.

♬ Regional Office employees that copy the project locally should browse to the Y:drive PIN folder and make the edits to the network copy of the Cleanlog.txt so that other employees can check the status of the project. If you make the comments to your local Cleanlog.txt file, no one else can see this but you.

Step Three: Open Wetlandsadd#

Click the "MicroStation new InRoads config" icon and pick your *Project* from the pull down. Browse to the **Topo** folder. Select **Wetlandsadd#.dgn** and click OK.

♬ If the project pull down does not take you to your project, contact your CADD Support personnel.

Step Four: Attach Reference Files

Select **File>Reference(DOT)>Attach** from the Main Menu. Select the **Wetlands.dgn,** browsing to the **Topo** folder if necessary. Click OK. It is <u>not</u> necessary to enter a *Logical* name or description for any attachments to this file. Attach by *Coincident World* method. Select the **alignments.dgn,** browsing to the **Highway** or **Bridge\MSTA** folder if necessary. Click OK. Attach by *Coincident World* method.

Step Five: Refer to Step 6 through Step 13 in the “Initial Wetlands Cleanup” portion of this manual

Follow the same steps that were followed when doing an Initial wetlands cleanup.

MERGING NEW WETLANDS WITH OLD

Step One: Open Wetlands.dgn and Attach Wetlandsadd#.dgn

Open **wetlands.dgn** from the \topo folder. Select **File > Reference(DOT)>Attach**. Browse to the **Topo** folder if necessary and select **Wetlandsadd#.dgn.** It's not necessary to enter a *Logical* or *Description.* Attach by *Coincident World* method.

Step Two: Merging Wetlandsadd# Files

Once the Wetlands file has been edited to allow for incorporation of the new wetlands, open the **File>Reference(DOT)>Dialog.**

From the *Reference File* dialog, select the **Wetlandsadd#.dgn** file. Then select **Tools>Merge Into Master.** Following the prompts, click in your view window. This dialog will come up (Figure 6-45) warning you that you are about to merge the Reference file into your current file.

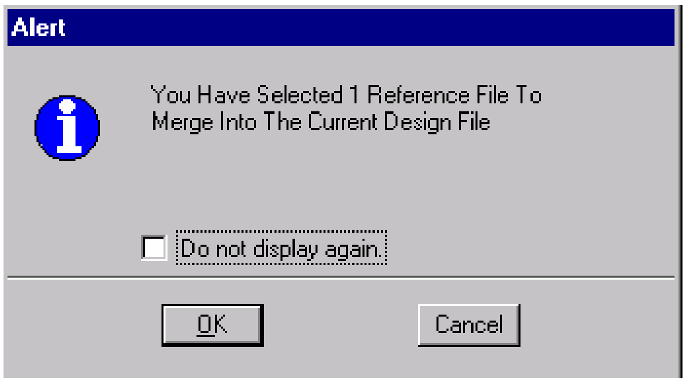


Figure 6-45: Merging Reference File Alert

If everything looks good, click OK to proceed.

Hit *Refresh.*

Step Three: Moving Wetlandsadd#

Using Windows Explorer, move the **Wetlandsadd#.dgn** file(s) you just edited and merged from the **Topo** folder to the **ADDSDONE** folder located in your project's **Topo** folder.

- If Wetlandsadd drawings still exist in the **Topo** folder, this should tell a user that the clean up and merging is not yet complete.

Step Four: Add Note to Cleanlog.txt File!

Follow steps previously outlined in this document. Add a note saying that the two files have been merged.

- Regional employees make changes to this file on the Y: drive.

Step Five: Copy Contents of Topo folder to Y:drive (Regional Employees)

If you are a Regional Employee or did the cleanup on your D: drive, synchronize your files in the briefcase (if one was used) or copy the contents of the Topo folder on your hard drive to the Y: drive Topo folder of your PIN number. As in similar procedures outlined in this manual, use the **Edit>Copy** and the **Edit>Paste** commands in Windows Explorer.

Chapter 7 Title Sheet Development

TITLE SHEET DEVELOPMENT

Quick Punch List

Create a Title Sheet Using Make Sheetz

Edit Headings Using Border Macro

Create a Location Map

Create a Layout Drawing (If Necessary)

Create a Title Sheet

Step One: Open MicroStation

To begin, double click on your “MicroStation new InRoads config” icon and select your project from the project pull down. Open any file.

Step Two: Create Title Sheet

Select **File>Make Sheetz** from the *Main Menu.*

Use a numbered prefix. The default is 001_ which makes this the first sheet in your final plan set.

♬ If for some reason you will need two title sheets for this project, add the suffix “1” to avoid having two files with the same root file name.

✓ ***Refer to page 1-18 for help making sheets.***

Step Three: Editing Text Headings

<u>Do not</u> manually edit the text in your title sheet. Use **Workspace>Edit Project Data (PCF)** to change all of the variables in your drawing. Variables are any text in your drawing that has a “$” or “@” symbol in it. The text that remains can be edited by using the *Edit Text* tool or by selecting **Text>Edit Text** from the *Main Menu.*

✓ ***To learn more about editing variables in your PCF file, refer to PCF Editing on page 1-25.***

CREATING LOCATION MAPS

Step One: Open Location Map

From the *Main Menu*, select **File > Open Location Map**. Select the file called “Statemap-local.dgn”. This should be pointing to your C: or D: drive if you have the Location Map files copied locally. You can open the files over the network, however they are large are will open very slowly. Contact CADD Support if you are pointing to the network for the Statemap#.dgn files.

Ignore Warning Message

Ignore the warning stating that you entered a design file that was setup for the MX platform (Figure 7-1).

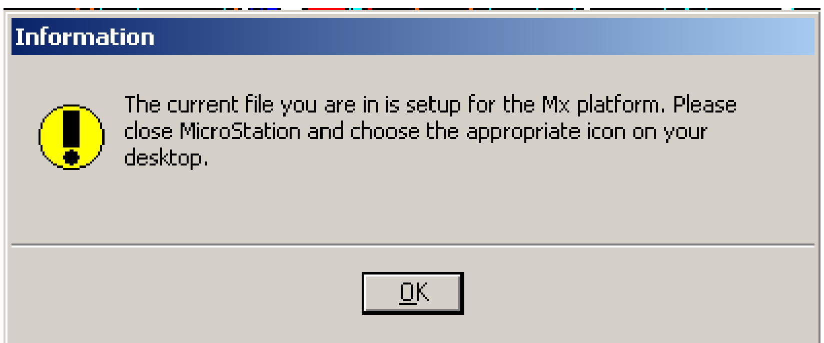


Figure 7-1: Warning message stating the file was setup for MX.

Step Two: Locate the Project Area

Find the area of the state that your project is located. Once you have located this area, run the location map macro from your *Main Menu* by selecting **Macro** > **Location Map**.

Step Three: Place the Square

Once the macro has been activated a square boundary element will appear on your cursor. (If it doesn’t, you may be zoomed in too close.) Place the square around the project area trying to encompass any text that you want to appear in your map.

♬ The size of the square can be modified to cover a larger area by adjusting the X, Y and scale (i.e. X=2, Y=2, Z=2 to double the area of the map) before placing it on the map. Contact CADD Support for assistance if necessary.

Step Four: Save the Locmap.dgn

A dialog will appear stating the directory path and a default file name of **Locmap.dgn.**

ⓘ ***If this is not the right directory, hit Cancel. You will need to start back at Step No. 1 of the “Create a Title Sheet”, selecting the correct PIN from the “Project Pull-down” in the MicroStation Manager dialog.***

If all looks good, Hit **OK** to let the macro create the file. It will then open the file it just created.

Ignore Warning Message

Ignore the warning stating that you entered a design file that was setup for the MX platform (Figure 7-2).

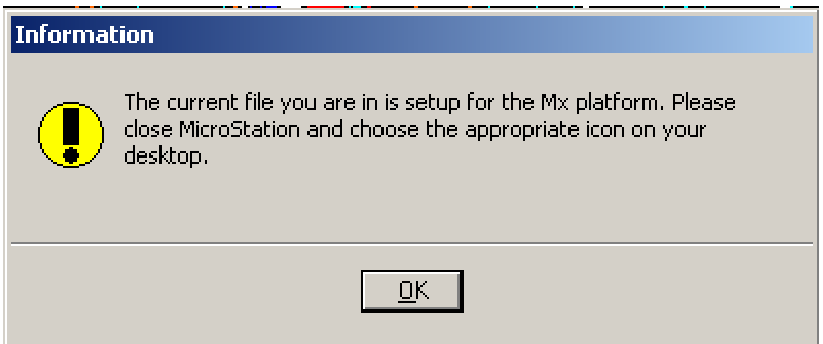


Figure 7-2: Warning message stating the file was setup for MX.

Step Five: Proceed with Update of MaineDOT Foot File

Next, another program will launch prompting you to *Update MaineDOT Foot File*. Click **Proceed** (Figure 7-3).

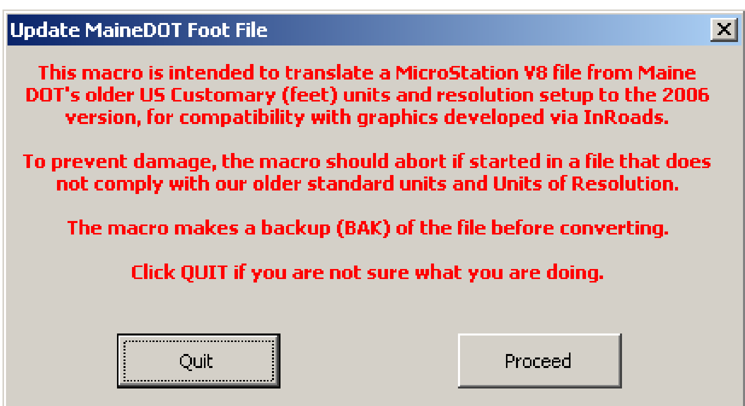


Figure 7-3: Update MaineDOT Foot File dialog.

Once the process is complete, you will receive another message (Figure 7-4). Click **OK.**

Figure 7-4: Successful Completion dialog.

Step Six: Copy Map to Clipboard

After the macro opens the file it just created, it will select all elements and copy them to the clipboard. It will show you the **Information** dialog (Figure 7-5).

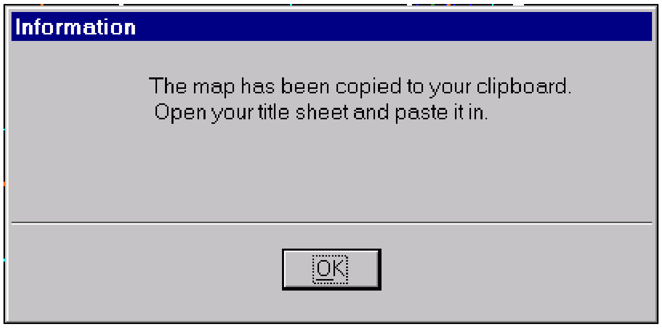


Figure 7-5: Map copied to clipboard

ⓘ ***This step doesn't always work. What the macro intends to automate is selecting all of the elements in the file, snapping (without accepting) to a corner of your box and activating the Edit>Copy command. Do this manually if the automation doesn't work.***

♫ If you aren't getting all of the lines in the map, you may have used the *Find and Replace* command. Re-open the map, *Fit the View* and locate the town or city manually.

Step Seven: Paste Map

Select **Edit>Paste** from the *Main Menu.*

Set the scale in the *Tool Settings* dialog. Here are some scales to use when pasting the location map into certain files:

- **1:1 border drawing**, (i.e. 001_Title.dgn) set the scale to .00000789 for U. S. Customary projects (.00001 for metric projects).
- **1:250 border drawings**, (i.e. 003_Plan1.dgn) set the scale to .0025. This is used for the Bridge Programs metric "Preliminary Plan" drawings.
- **1:300 (1" = 25') border drawings,** (i.e. 003_Plan1.dgn) set the scale to .00234. This is used for the Bridge Programs U.S. Customary "Preliminary Plan" drawings.

Snap to the corner of the location map box on your title sheet. Left Click to accept.

Once you have pasted the map into the title sheet you can clean it up as necessary.

♫ If you adjusted the size of your map to cover a larger area (i.e. 2 times larger) enter one of the scales above depending on the application. Use *AccuDraw's* calculating ability to divide ("/") the X, Y and Z by 2 to get the map to fit the standard map border. Adjust the scale as necessary.

CREATING A LAYOUT (HIGHWAY PROJECTS WITH A SURVEY & DESIGN)

Introduction

Once the proposed design file (i.e. highway.dgn) has been created, follow these steps to create a layout drawing to be placed on the title sheet.

Step One: Create a Layout Drawing

Open any drawing in your PIN directory if you're not already in one. From the *Main Menu*, select **File>Make Sheetz.** Create a drawing called **z_layout.dgn.**

✓ ***Check page 1-18 for more about creating drawings using the Makesheetz macro.***

Step Two: Place a North Arrow

Do a *Fit View*. The default *View* orientation should be *Top* which means North is up. Using the **Plan Sheet Settings Manager**, select **Symbols & Linestyles > North Arrow True.** In the *Tool Settings* dialog, enter 90 degrees in the *Active Angle* field, click on the padlock to lock the X, Y, and Z fields. (Figure 7-6)

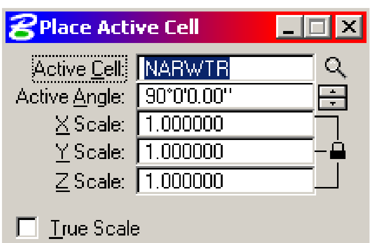


Figure 7-6: Adjust Active Angle, Padlock locked

Type **300** (250 metric) in the *X* field, followed by a (**Shift+8**), then, enter the total number of clip boundaries on the main line for your project (your referenced hdplan.dgn boundaries) in the layout drawing. This will size the cell appropriately for the title sheet. (Figure 7-7)

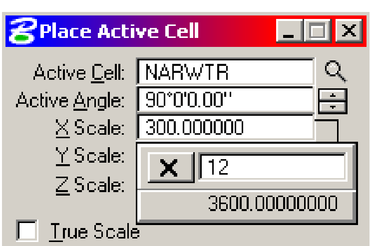


Figure 7-7: Using AccuDraw's Calculator

Set the cell down close to the boundaries in your layout drawing, with a *Datapoint.*

Step Three: Rotate Your View

Rotate your view using the **3 points** method until the graphics in your view are aligned the way you want to see them on your title sheet.

- To make clip boundary horizontal: snap and accept to the lower left and lower right corners of your boundary. These two points define the X-axis. Snap and accept to the upper left corner of the boundary to provide the final point (positive Y direction according to your first point).

Step Four: Create a Saved View

Using the **Plan sheet Settings Manager**, select **Create Plan Sheets > Create Saved View**. Now define the rectangle for your saved view. Be sure to encompass all clip boundaries and your north arrow. Read the dialog and follow the prompts.

A dialog will appear asking for a name of your saved view. Name it "**layout.**" A description is not necessary.

Leave the *Add Shape* box **unchecked.**

Click **Make. (**Figure 7-8**)**

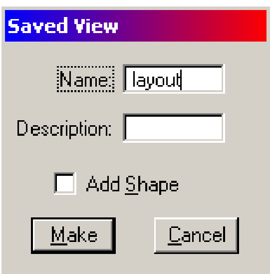


Figure 7-8: Saved View Dialog Settings

Step Five: Reference the view into the Title Sheet

Open the **title sheet** (i.e.001_title.dgn).

Go to **File > Reference (Dot)>Attach.**

Select **z_layout** and hit **OK**.

In the *Attach Reference Settings* dialog, select the named view called "**layout".**

Determine how many *clip boundaries* (plan sheets) on the main line for your project (your referenced hdplan.dgn boundaries) in the layout drawing. Multiply this number by the scale in which the sheets were cut (i.e. **300** (250 metric)). Enter this number in the right most field of the scale (Master:Ref) portion of this dialog to scale your layout file appropriately. (i.e. 12 sheets x 300 = 3600) See Figure 7-9.

- If after attaching you decide that you want to the area is too large to fit on the title sheet, you can adjust the attachment with a series of commands or simply detach and reattach adding a one to your number of sheets. (i.e. 1 + 12 sheets (13) x 300 = 3900)

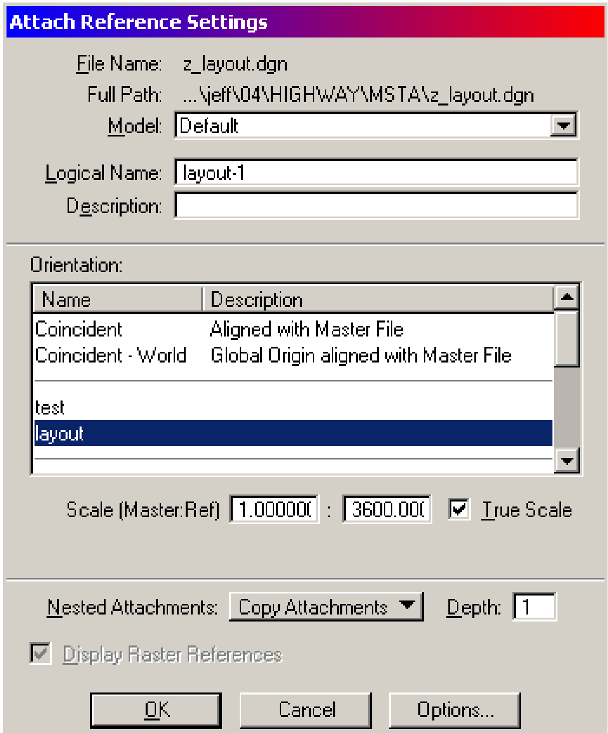


Figure 7-9: Sample Setting for Attaching Layout

Set the *Nested Attachments*: to **Copy Attachments** with a *Depth* set to “1”. This will attach the layout drawing and everything it has attached with it.

✓ ***Check page 2-71 for an explanation of Reference Nesting.***

Click OK and you should see a rectangle on your cursor. Left click to place it down on the title sheet. You can move it if necessary in the next step.

Fit View.

♬ If you aren’t seeing the same thing you saw in your *layout.dgn*, place a fence around the border and select **File>Reference (DOT)>Clip>Boundary>All.** Set the *Method* to **Fence,** place a *check* in the *Use References Dialog List* and click in the view window (Figure 7-10).

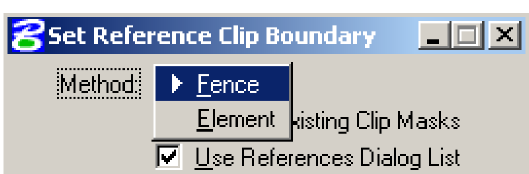


Figure 7-10: Set the Clip Boundary Tool Settings dialog

Step Six: Tweaking the Layout Placement

Once the layout is placed, you can still manipulate the reference files.

Go to **File** > **Reference (Dot)** > **Dialog**. Select all reference files in the dialog.

In the **Reference Dialog**, choose **Tools > Move** or **Tools > Scale** or **Tools > Rotate** if things need to be moved, rotated or scaled again. You can repeat this function as many times as you want, being sure that all reference files are selected before manipulating. You may need to move other things around in your Title sheet to make room for it (i.e. scales, location map box, etc).

ⓘ ***When rotating the referenced saved view, rotate it in the "Z" value only.***

Step Seven: Stationing the Layout

Introduction

The alignment drawing that is attached is most likely too small to read on your Title sheet. It is also centered in your roadway which is going to be filled in, identifying the new pavement area. The alignment is a temporary attachment to be used as a guide for the next step and can be shut off eventually.

Part One: Open z_layout.dgn

Open your **z_layout** drawing and turn off your graphic group lock (**Settings>Locks>Graphic Groups)**.

✓ ***Refer to page 2-40 for a description of working with graphic groups.***

Part Two: Copy Alignment String

Copy your alignment element into the **z_layout** file using the copy tool. It isn't necessary to copy in the station or tick marks.

Part Three: Graduate – Create New Tick Marks

Measure a rough distance from the centerline to a point just outside of the proposed pavement area to determine how long the tick mark will have to be to still be visible once the pavement is filled in.

Use the *Plan Sheet Settings Manager* to place station lines by selecting **Graduate** from the left side, and depending on the proposed pavement widths, select a tick mark that will be long enough to be visible outside of the shaded pavement area. Current options are 20', 25', 40' 50' and 60' for US Customary projects (5 m, 10 m and 15 m for metric projects).

A new toolbox should be on your screen. (Figure 7-11) Click on the **Place cell along** tool.

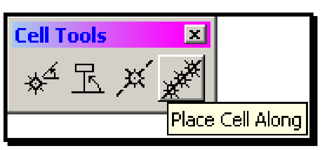


Figure 7-11: Pace Cell Along Tool

When the dialog opens, enter the desired spacing for the tick marks. Defaults are 100' or (10 meters). (Figure 7-12)

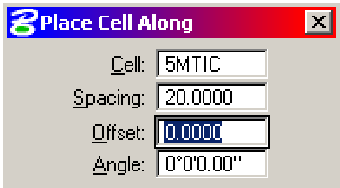


Figure 7-12: Place Cell Along Dialog

Snap to the beginning of your centerline to see how your ticks are going to be placed. Click to accept or reject the placement. If your alignment does not start at an even station, delete a portion of the "copied" center line to force it to start at an even station.

- The normal text for stationing is 100 feet (20 meters), but if you have a really long job, maybe you might want to space them at 1000 feet (100 meters) or another even increment. Be sure that the *Offset* and *Angle* are both set to "0". (Figure 7-12)

Part Four: Adding Text for Stations

Open your **001_title.dgn.** It's best to station the alignment in the Title Sheet to produce standard size text.

Right Click on the *Settings Manager.* Set the *Category Scale* to 12" = 1 ft. (1:1 metric) (Figure 7-13).

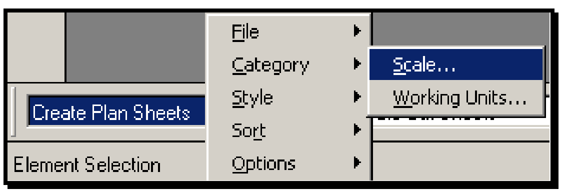


Figure 7-13: Right Click, Category Scale

Using your *Plan Sheet Settings Manager*, select **Proposed Text and Dims>Standard Text (Normal).** Start placing your station text. For long jobs, it may make sense to place your stations every 1000 feet (100 meters).

- Use AccuDraw's functionality of "o" (origin) and "rq" (rotate quick) to place the text at different angles along your project's centerline.

Step Eight: Shading the Layout Drawing

Introduction

This step will shade all proposed pavement areas. Due to certain limitations, you will have to do this in sections as opposed to one large filled shape. Shading should be done in the **z_layout** drawing. It is important that your proposed design **(Highway.dgn)** has been flattened to "0" along with the **z_layout** drawing.

- On large projects, shading may not be necessary because the layout is scaled down so small that when printed, the proposed pavement lines themselves are so close together that they appear to be one solid line. Print out a test plot of the Title Sheet to determine if shading is necessary.

Part One: Open z_layout

Part Two: Create Temporary Lines

Use the *Smartline* tool to create lines across (perpendicular) the roadway every 1000 to 2000 feet (100 to 200 meters) or so to break the shading into manageable areas. Straight portions of the alignment may allow you to shade larger sections at a time.

- The highway.dgn typically needs to have lines draw on it to signify the match points on the beginning and ending of the main line and the limit of work on the side roads. Do this work in the highway.dgn by *Smart Matching* the shoulder or travelway line then drawing a line connecting the opposite shoulders at the beginning and ending of the project.

Part Three: Flatten

Flatten the drawing by selecting **Macros>Flatten** from the *Main Menu.*

Part Four: Select Boundary Lines of Area to be Shaded

Using your *Power Selector* or similar means, select the lines that define the boundaries of area to be shaded (i.e. edge of pavements, and 2 junk lines you created earlier).

Part Five: Create Regions

Select **Group>Groupings>Create Regions** from the *Main Menu* or pick the **Create Regions** tool from the *Groups* tool box. Set the dialog to look like Figure 7-14.

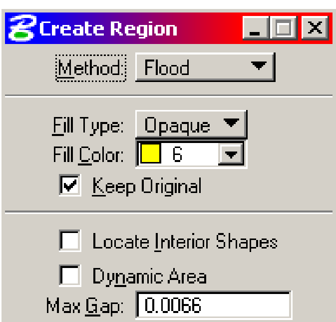


Figure 7-14: Create Region Settings

The color you select is optional. All colors, with the exceptions of 10-16, will print black. Colors 10-16 will print a shade of gray.

The *Level* that you place the shading is optional. It is a good idea to select a *Level* that is not being used.

Part Six: Flood Area

Click anywhere inside of the area you *Power Selected.* Click again to *Accept.* This should fill the area.

- If you get a warning that says “No Enclosing Region Found”, you can adjust the *Max*

Gap to a larger number so the tool will jump gaps in the lines.

♬ If you get a warning that says "Shapes are not coplanar", it could mean that the Highway.dgn or possibly the z_layout.dgn isn't flattened. Re-flatten both drawings and try again.

If all else fails, change your *Method* to *Points* and use data points to create the filled shape, however, this doesn't work so well around curves.

Contact your CADD Support for assistance.

Step Nine: Adjusting the Layout Scale

U.S. Customary Projects

To adjust the scale, you will need to take in account what scale you placed the Layout into your title sheet. In Step 5, we counted the number of clip boundaries (12) and multiplied that by 300 to get 3600. Divide this number by 12 to get the scale per inch of your Layout drawing. In this example your scale per inch would be 300.

You can also find out what scale factor you used by opening the **File>Reference** dialog and double clicking on one of the attachments and looking to the Scale (*Master:**Ref***) portion of the dialog. Divide the reference scale by 12.

Use **Text>Edit Text** from the *Main Menu* to edit the text in the bar scale Figure 7-15.

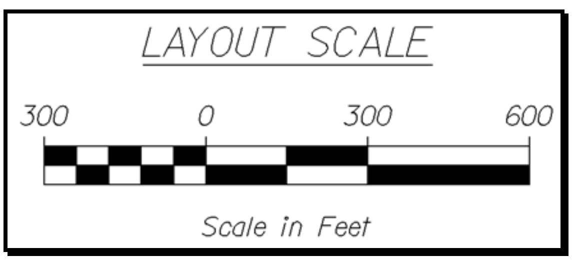


Figure 7-15: U.S. Customary Layout Scale Example

Metric Projects

To adjust the scale, you will need to take in account what scale you placed the Layout into your Title Sheet. In Step 5, we counted the number of clip boundaries (12) and multiplied that by 250 to get 3000. Multiply this number by .02 and the result is the scale used in the Layout bar scale (i.e.3000 X .02(constant) = 60 meters).

You can also find out what scale factor you used by opening the **File>Reference** dialog and double clicking on one of the attachments and looking to the Scale (*Master:**Ref***) portion of the dialog. Multiply the reference scale by .02.

Use **Text>Edit Text** from the *Main Menu* to edit the text in the bar scale Figure 7-16.

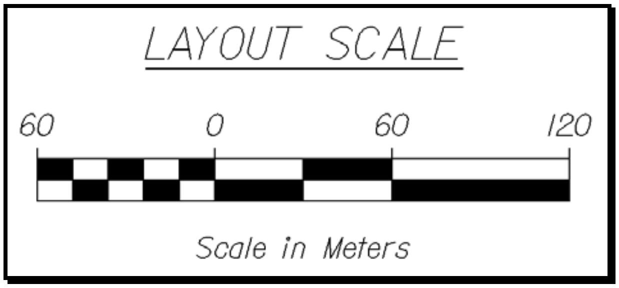


Figure 7-16: Metric Layout Scale Example

Step Ten: Place Text on the Title Sheet

Use the *Settings Manager* (**Prop. Text and Dims>Standard Text (Normal)** to enter text labels for Side Roads, Town Lines, Sheet Numbers, etc.

CREATING A LAYOUT (NO SURVEY)

Introduction

This section is intended for projects with no survey. We will use a portion of the Location Map to create a rough drawing as your layout.

Step One: Place Temporary North Arrow

Before you clip out an area from the Location Map for your layout, place a small vertical line near the project area. This will represent north. North is up in the map.

Step Two: Place a Fence

Use the *Place Fence* command and set the *Fence Type* to ***Shape*** and the *Fence Mode* to ***Clip*** (Figure 7-17) **(Group>Fence>Shape).**

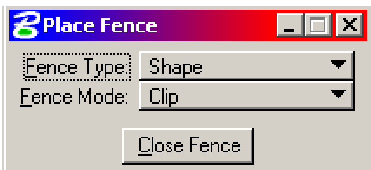


Figure 7-17: Place Fence – Clip Mode

Place your fence around the project area, as close to your project as possible, encompassing only the beginning of side roads and your temporary north arrow Figure 7-18.

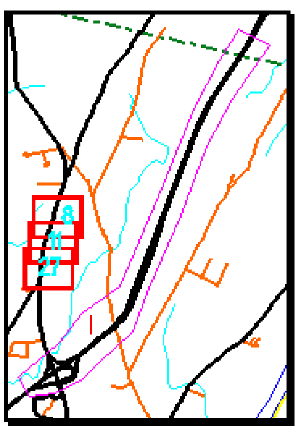


Figure 7-18: Fence Encompassing Project Area with Temporary North Arrow

Step Three: Copy Fence

From the *Main Menu*, select **Group>Copy Fence** or use the *Manipulate Fence Contents* tool**.** Verify that the *Fence Mode* is set to **Clip** (Figure 7-19)**.**

Figure 7-19: Manipulate Fence Contents Settings

Place a *datapoint* to define where you want to copy from and click another *datapoint* in the middle of your title sheet to place the contents of the fence.

Step Four: Scale and Rotate

Use *Power Selector* and select your new layout elements. Use a combination of *Scale Element* **(Zip>Scale)** and *Rotate Element* **(Zip>Rotate>Rotate By 3 Points)** to adjust the layout to fit within your Title Sheet.

Step Five: Adjust Scale

The scale of the layout drawing pulled from the location map will be somewhat rough. It may be a good idea to simply remove the scale for the layout and add a note stating it is "Not to Scale".

Step Six: Place North Arrow

Using the **Plan Sheet Settings Manager**, select **Symbols & Linestyles > North Arrow True.** In the *Tool Settings* dialog, set the active angle to "0" and set the X, Y, Z scales to 1. Snap to the middle of the line you placed in the location map to represent the temporary north arrow. Before *Accepting*, type "O" for origin, then follow it by "RQ" on your keyboard. Snap to the end of the line that should point to north, Accept the *AccuDraw* rotation. Now move the arrow to wherever it fits well on your title sheet. Use a *datapoint* to place the arrow. Delete the "temporary line representing your North Arrow.

Step Seven: Place Text on the Title Sheet

Use the *Settings Manager* (**Prop. Text and Dims>Standard Text (Normal)** to enter text labels for Side Roads, Town Lines, Sheet Numbers, etc.

Chapter 8 Typical Sections

TYPICAL SECTION SHEET DEVELOPMENT

OVERVIEW

Whether you use the typical section program to draw your lines or not, there is a certain strategy to keep in mind. First of all, you should draw all your lines first, as the program would have you do. Then you should trim up all the lines, adding cells if necessary. Then add the dimension, text, notes and cells for station to station range and quantities.

ⓘ ***Use the Cross-Sections* Setting Manager *to draw new lines.***

- ♬ Draw the typical completely before you move on to labeling and dimensions. This will help you keep the elements in the right levels without needing to *Match Element Attributes* all the time.

Freehand Template Techniques

✓ ***Refer to page 2-50 for an example of using AccuDraw to draw roadway sections.***

InRoads Template used as a Typical Section

InRoads can “Display” a template that is in the Template Library with dimension (not real dimension type elements) and text in a MicroStation drawing. InRoads does not add the end conditions that are applied, only the relative *Components* in the template.

CREATING A TYPICAL SECTION DRAWING FILE

Step One: Open MicroStation

To begin, double click on your “MicroStation new InRoads config” icon and select your project from the project pull down. Open any file.

Step Two: Create a New Drawing(s)

Select **File > Make Sheetz** to create a new numbered prefix file for every typical sheet you will need. If there will be more than one, be sure to add a suffix in the make sheets dialog (Figure 8-1).

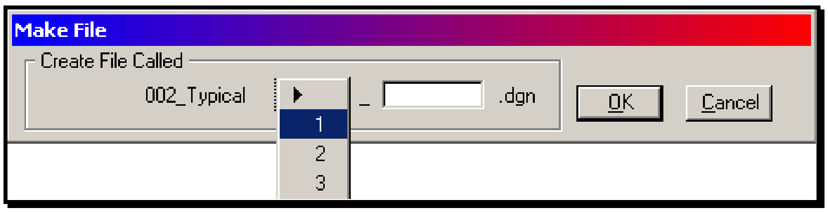


Figure 8-1: Selecting a Suffix for Multiple Drawings of the Same Type

✓ ***Refer to page 1-18 for help creating files.***

CREATING TYPICALS USING THE TEMPLATE MACRO (OPTION 1)

This macro was created for the Bridge Program to make drawing templates on Cross Sections easier. This can be used for Typical Sections as well. It allows you to place guardrail and curbing (based on the offset from centerline), and remembers your setting should you need to make more than one (Figure 8-2).

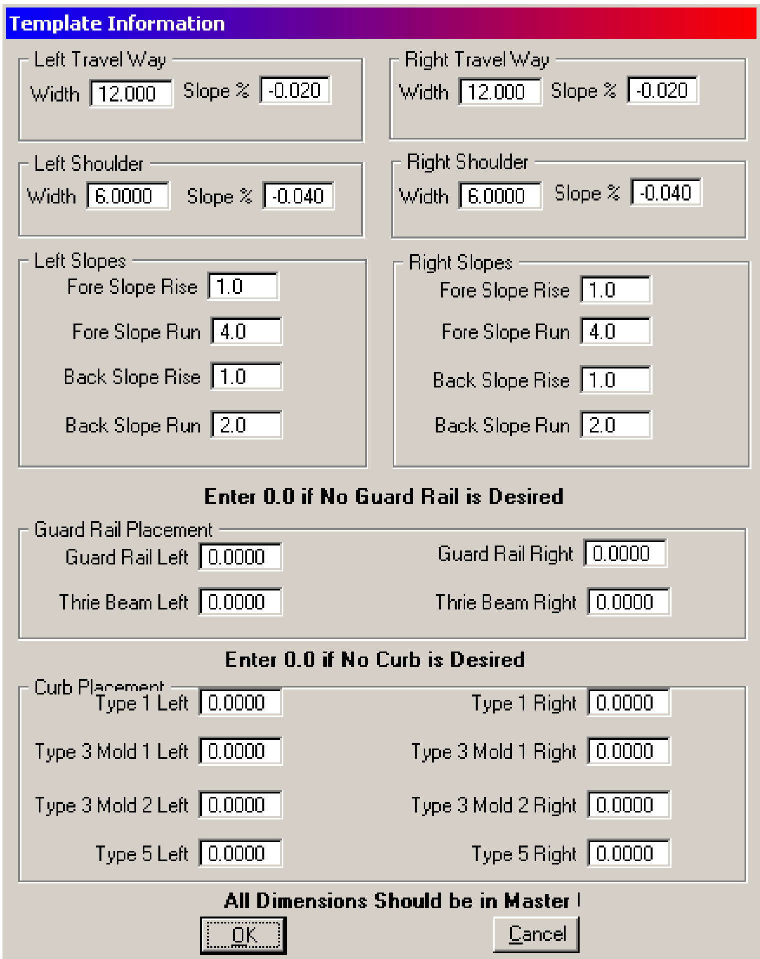


Figure 8-2: Typical U.S. Customary Template Information Dialog

The Guardrail and Curb placement requires that you give the offset from the centerline to the cell. Look to the Standard Details for the proper offsets or ask your designer.

CREATE TYPICALS FROM INROADS TEMPLATES (OPTION 2)

Overview

The saved “project specific” templates that are in your Template Library can be used to begin your Typical Sections for your project. End conditions are not components, so these do not get created through this process.

♬ You cannot use edited *Template Drops* from the *Roadway Designer*, only what is saved in the Template Library.

Step One: Open Template Library

Open your template library used for your project or your **.rwk** that loads your default template library. Select **Modeler>Create Template** from the InRoads main menu.

Step Two: Browse to Template Folder

Expand your project specific template folder (Figure 8-3).

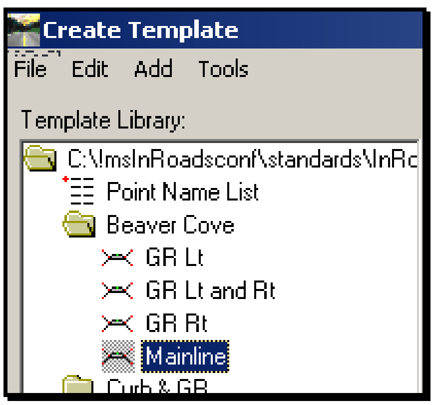


Figure 8-3: Expand folder that contains your project's templates.

Step Three: Right Click and Display

Right click on a specific template in the library and select **Display…** (Figure 8-4).

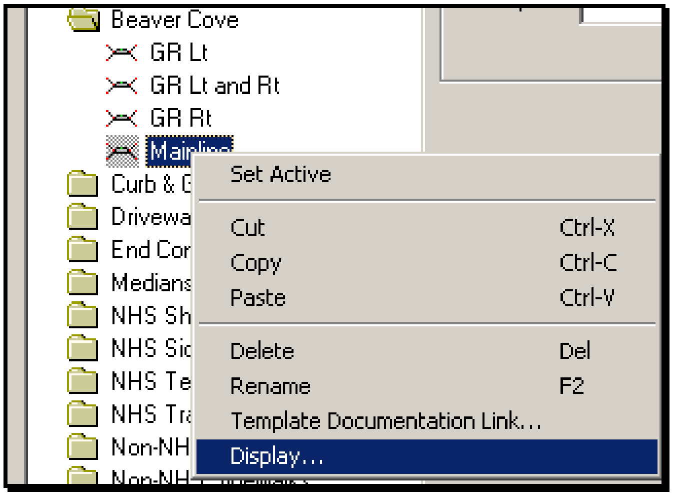


Figure 8-4: Right click the template and select display.

Step Four: Verify Global Scale Factor

Select **Tools>Global Scale Factors…** from the InRoads menu. Set the scale factors to 60, 1 and 60.

Step Five: Click Apply

The *Display Template* dialog opens with all the defaults preset (Figure 8-5). Click **Apply** and then place a data click within the typical section border.

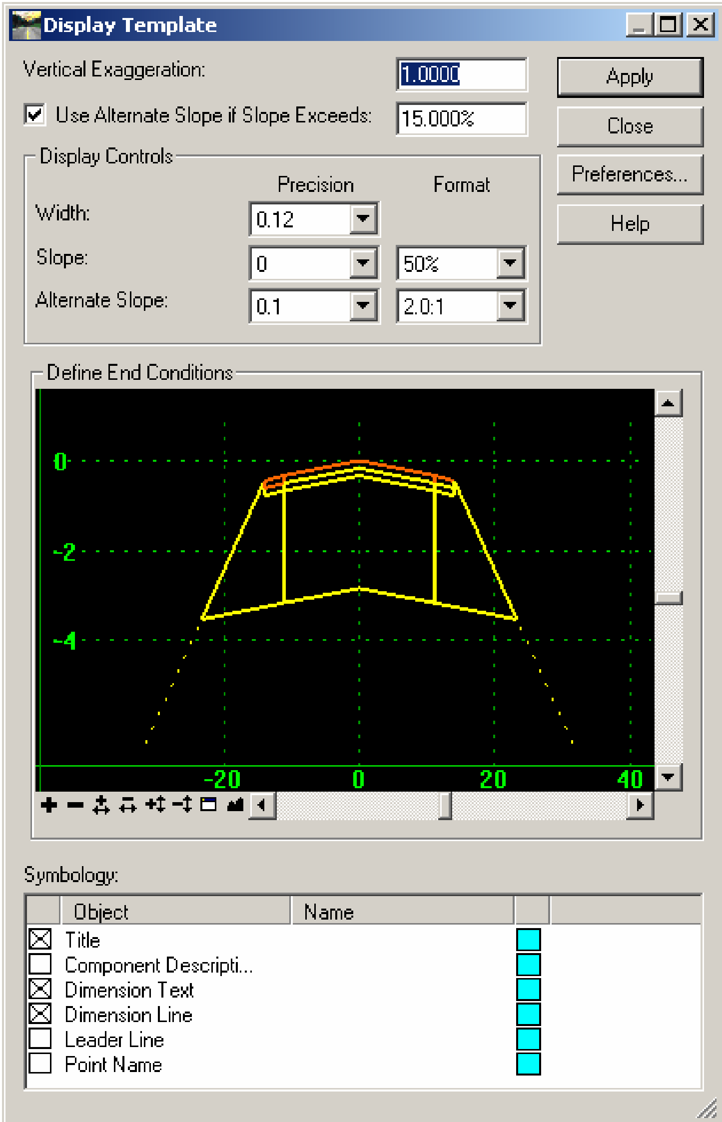


Figure 8-5: Display Template dialog with defaults preset.

Repeat for the other typicals for the project. The results are shown in Figure 8-6.

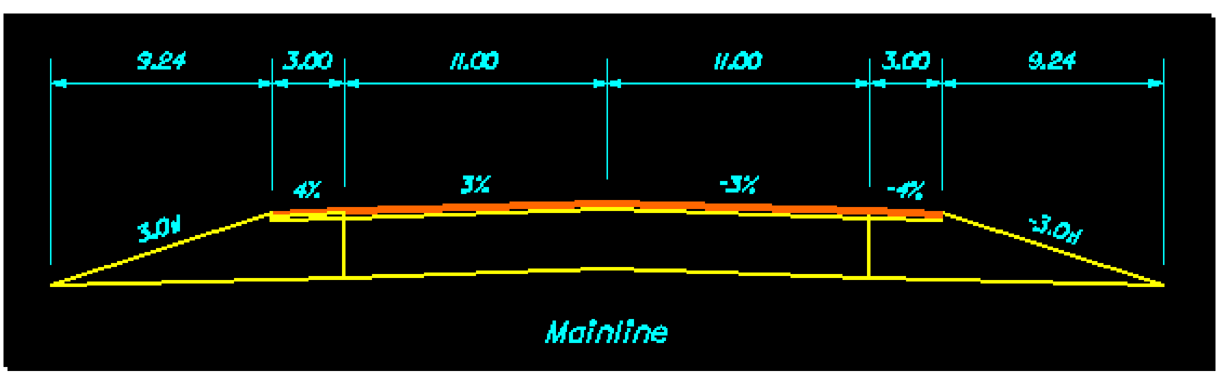


Figure 8-6: Example of a Template placed as a Typical Section.

♬ The dimensions are displayed in decimal feet instead of Feet and Inches. The dimension lines can be shut off prior to clicking **Apply** or deleted afterwards. The *End Conditions* are not displayed. It is recommended that the dimensions are placed through the settings manager.

DIMENSIONS, TEXT, NOTES AND CELLS

ⓘ ***Always use the Settings Manager when placing dimensions and text. This is especially helpful in keeping your elements on the correct levels.***

Step One: Set the Category Scale

Right click the *Settings Manager* and select the proposed scale of the drawing (i.e. 1 in = 4 ft.).

✓ ***Check page 2-19 for a complete introduction to the Settings Manager.***

Step Two: Place Text, Dimension and Tables

Select **Proposed Text and Dims** from the left side of the *Settings Manager* and pick the desired option from the right side.

Select **Tables** from the left of the *Settings Manager* and select the desired table type from the right. Place the cell (Figure 8-7).

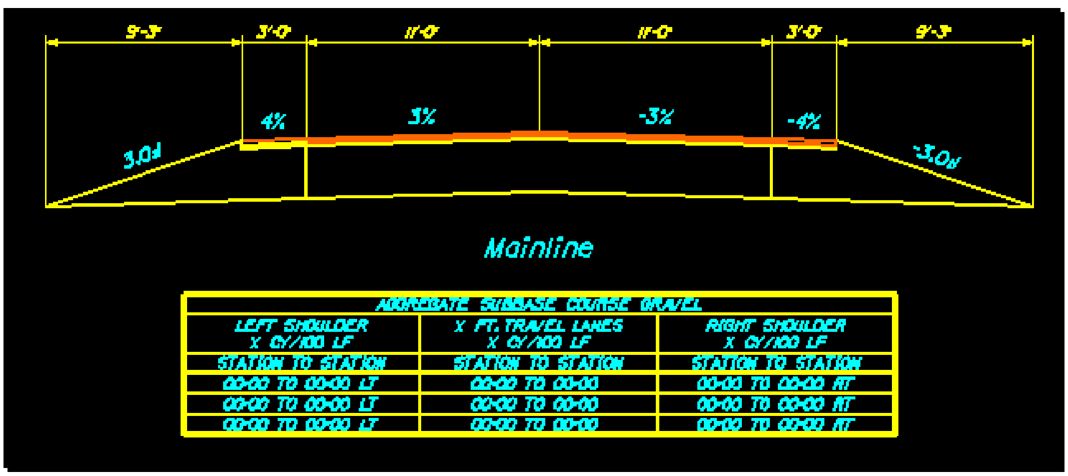


Figure 8-7: Cell placement for standard tables.

Chapter 9 Estimate Sheets

USING ESTIMATOR

USING ESTIMATOR

Introduction

This is a description of how to use the Estimator for producing a cost sheet for pricing a project.

Step One: Getting into Estimator

First you will need to double click on the icon on your desktop. Once in you will need to log in. For that you will need to know the user name and password. Those are ***Beta*** for the user name and ***User*** for the password (Figure 9-1).

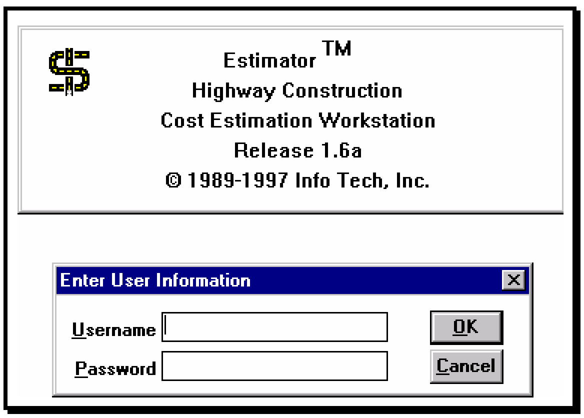


Figure 9-1: Log In to Estimator

Note: you must capitalize the first letter of each in order to get in.

ⓘ ***Contact CADD Support if you do not have an icon. Experienced users: Map any drive letter to \dot0dta1fsaug01\$Com-ProgMan\Highest\ folder. Create a shortcut on your desktop by right clicking the Highest.exe program and selecting Send To>Desktop (create shortcut).***

Step Two: Starting a new Estimator Project

Once in you will need to open a catalog of items. There are a couple of selections. Select the catalog based on the units in your project. To do so simply go to File > Open Catalog and select your catalog (Figure 9-2).

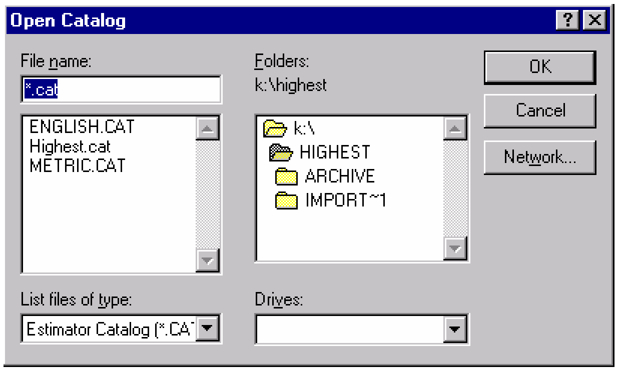


Figure 9-2: Select your Catalog

Next you will have to either select an existing file or you will have to create a new file. To open an existing file just simple choose **File** > **Open** and retrieve the file of interest. If it is a new file you will need to do **File** > **New** and an **Edit Project Header** box (Figure 9-3) will appear and you will need to supply some information about your project.

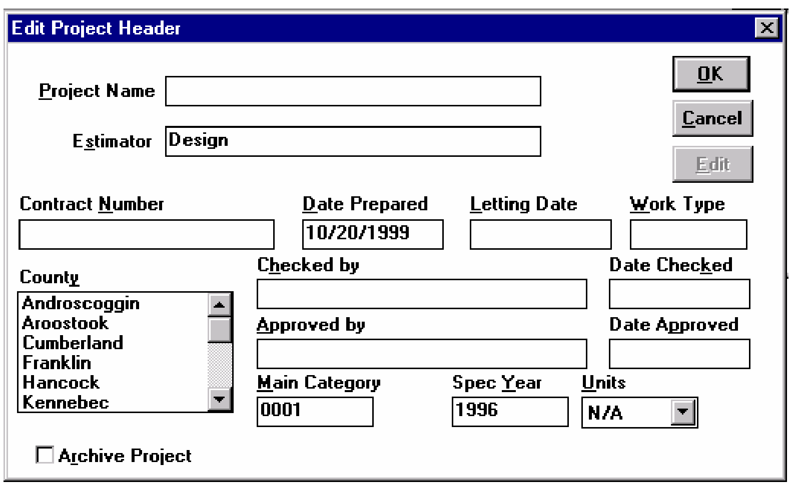


Figure 9-3: Edit Project Header

The type of information need is as follows:

Project Name (Town Name)

Contract Number (the Pin #)

Letting Date (Construction Begins)

Work Type (SB, LB, etc.)

Select County

Checked By (can be left blank)

Approved By (can be left blank)

Note: You will find a list of work types on the last page of this document.

Once you have provided the information, click O.K. and you will see the Project Header Box (Figure 9-4) pop up.

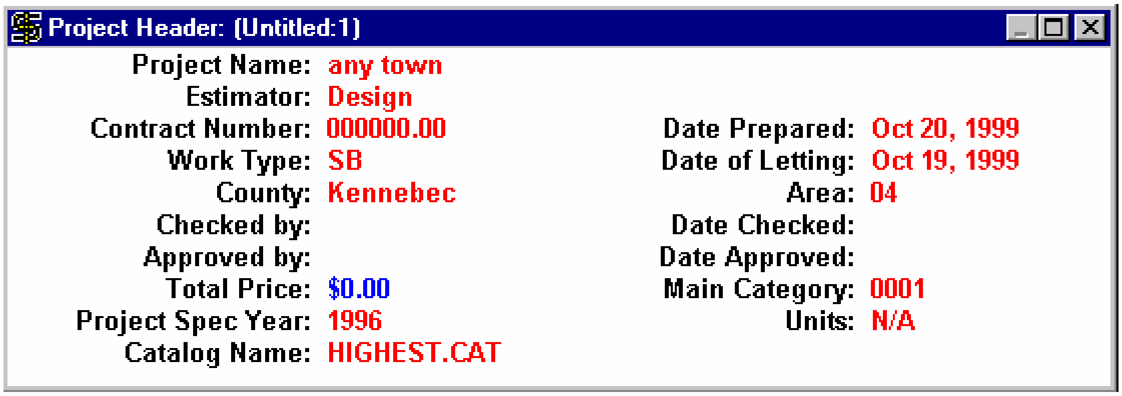


Figure 9-4: Project Header

Step Three: Adding items to the List

First you will need to double click on the **$0.00** and you will see another box pop up (Figure 9-5).

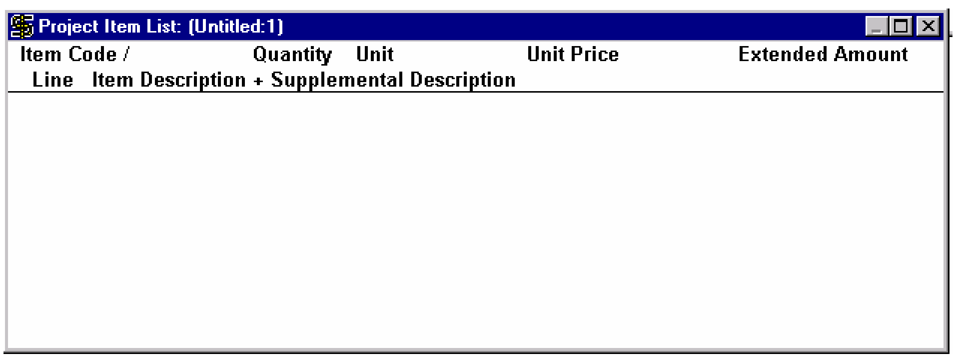


Figure 9-5: Empty Project Item List

Next you need to go to the menu at the top and select **Edit > Add** this will open up another box (Figure 9-6) which will allow you to start selecting the items pertaining to the project specified.

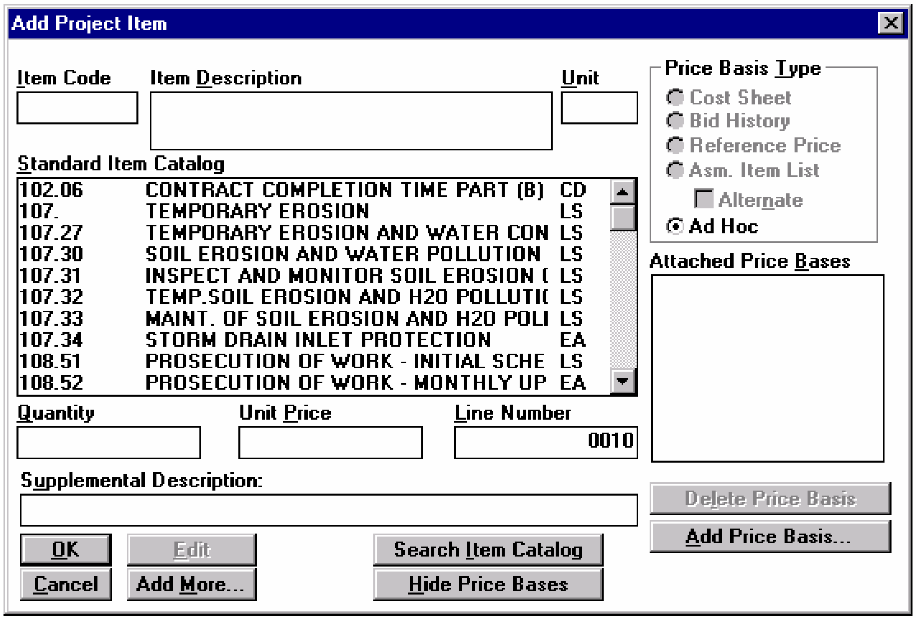


Figure 9-6: Add Project Item

Once you select an item you will then need to either hit in the Quantity field with your mouse or tab to it, in either case you will need to put a quantity there and then hit **Add More** to continue inputting item numbers and quantities.

When you are done completing your list just hit **O.K. and Cancel,** this should then bring you back to the list of items within the ***Project Item List*** as shown in Figure 9-7.

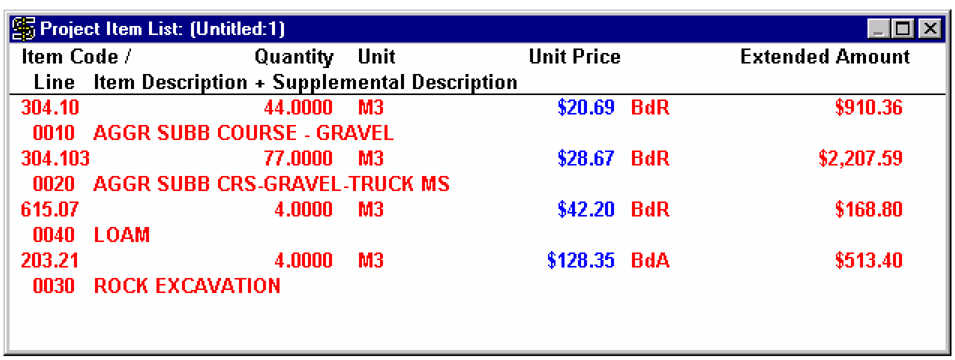


Figure 9-7: Project Item List

As you might have noticed that the list is not in numerical order. This is not a problem, you can easily fix this problem by simply going to the menu on top and selecting **Utilities > Sort** and this will bring up another dialog box that gives you numerous ways of sorting the item list. The most common selection would be sorting by *Item Code - Ascending Order* as shown in Figure 9-8.

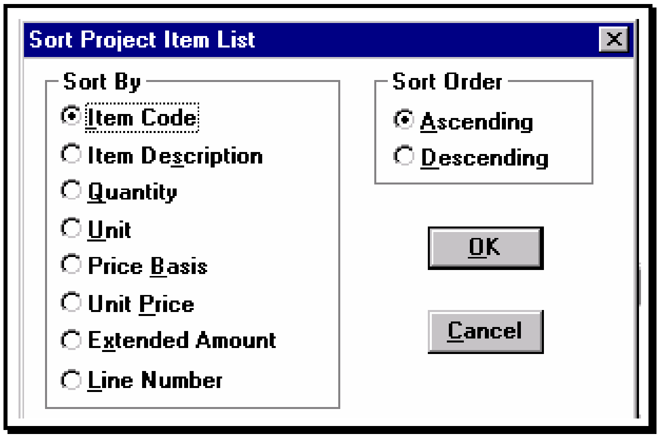


Figure 9-8: Sort Item List

Step Four: Editing Existing Data

It is fairly simple to edit existing *quantities* already in place and *Unit Prices (?)* that may not come out of the history of the item selected. To do this just click on the value you want to change and a box will appear to allow you to edit as shown in Figure 9-9 and Figure 9-10.

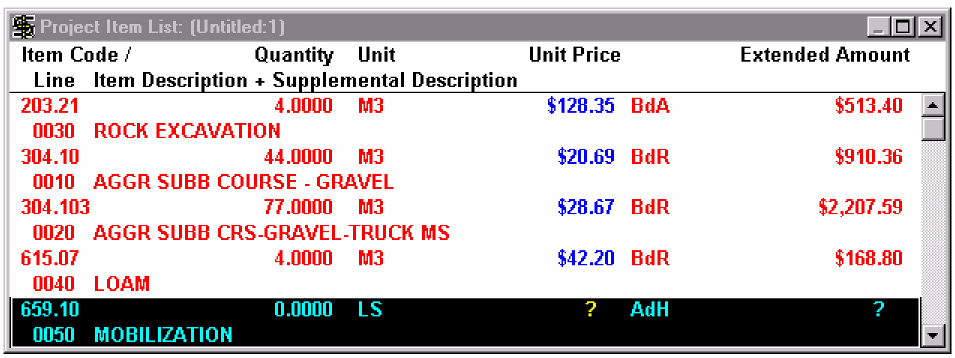


Figure 9-9: Project Item List

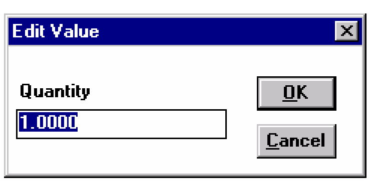


Figure 9-10: Edit Project Item Quantity

Step Five: Printing and Saving

To print go to the menu at the top and select **File** > **Print** and you should receive a display like Figure 9-11.

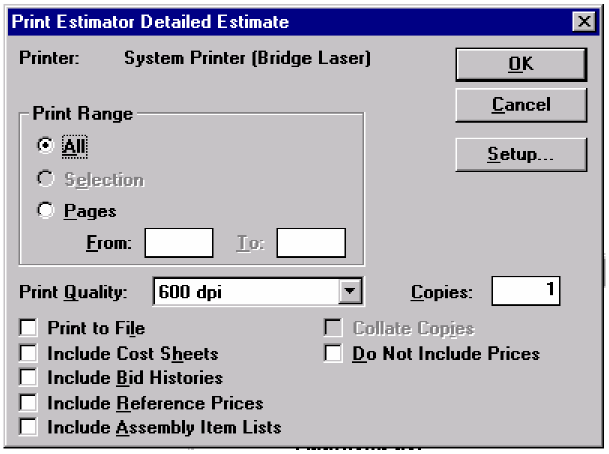


Figure 9-11: Print Estimator Detailed Estimate

You should verify your system printer is correct and you will notice that the default range is ***All***, hit **O.K.** and off to the printer it will go.

You also can use this item list for the front of your Estimate Book by checking off the selection for ***Do Not Include Prices*** and printing the document.

When complete always remember to save your document. The preferred naming convention is typical to our PIN structure. For example ***00567890.he.*** Also pay attention to the location that the file is being saved to. The process should point to the correct directory automatically, but on a rare occasion things do get messed up. The proper directory structure that the file should be in is ***:\Highest\00567890.he***

Project Work Type Codes

I = Interstate Highway Projects

R = Rural Highway Construction

U = Urban Highway Construction

HOV = Hot Bituminous Overlays

LOV = Light Bituminous Overlays

LB = Large Bridge Construction (15 m or over)

SB = Small Bridge Construction (Incl. Pipes)

BH = Bridge Rehabilitation

SIG = Traffic Signals

LIT = Lighting and Signing

L = Landscape

Additional Information

People should be aware that if the have an item that does not appear in the catalog selection set that they should notify ***Eric Erskine*** so that the item can be established into the program.

If you are having difficulty getting access to the program then you will need to speak to the appropriate support person to correct the problem.

ESTIMATE SHEET DEVELOPMENT

Quick Punch List

Add Items To Estimator (If Necessary)

Export Items from “Estimator”

Make Estimate Sheet Using Make Sheetz

Import Items from CSV file

Adjust Lump Sum Items (If Necessary)

EXPORTING QUANTITY ITEMS FROM THE ESTIMATOR

Introduction

This is a description of how to export a list of Quantities for the purpose of filling out the Estimated Quantities sheet. This assumes that all or most of the items have been previously entered into the Estimator program.

✓ ***For information on using the Estimator program, refer to page 9-2.***

Step One: Getting into Estimator

First you will need to double click on the icon on your desktop.

ⓘ ***Contact CADD Support if you do not have an icon. Experienced users: Map any drive letter to \\dot0dta1fsaug01\$Com-ProgMan\Highest\ folder. Right click the Highest.exe and select Send To>Desktop (create shortcut).***

Now log in (Figure 9-12)

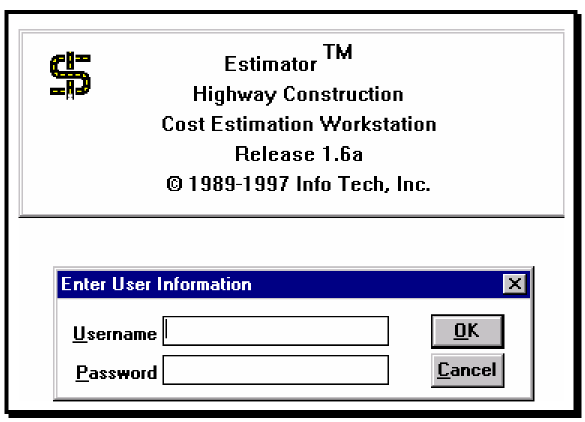


Figure 9-12: Log In to Estimator

"Beta" is the user name and "User" is the password.

♫ Usernames and passwords are case-sensitive: you must capitalize the first letter of each word.

Step Two: Exporting (*.he) File

Once you are in the Estimator program you must select the appropriate file that was created by either you or the Designer and open that file.

Now that you have selected the file, go to **File > Export.**

Here is the important part, you must select the **Export File Format:** and change this to**: Lotus (Category Items)** even though we do not use Lotus products (Figure 9-13).

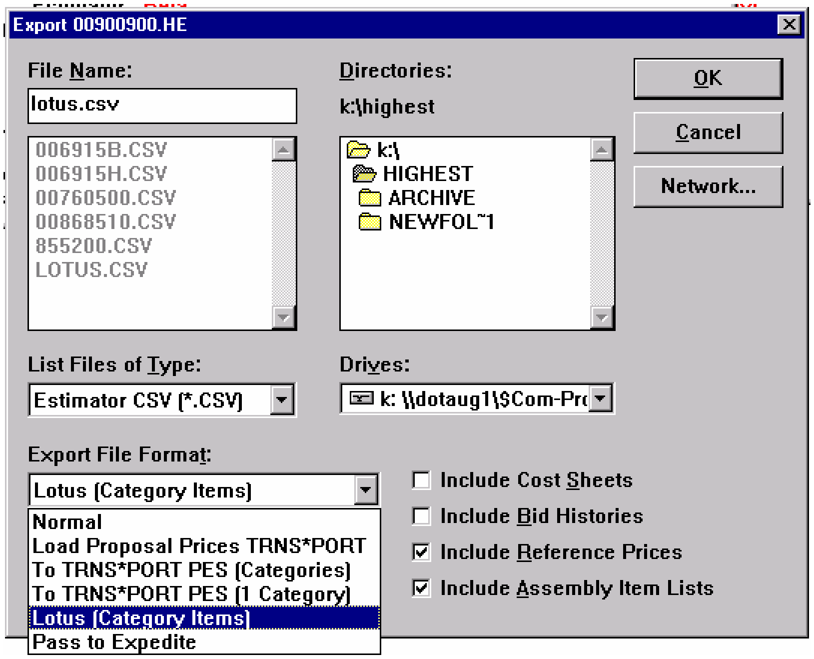


Figure 9-13: Export Dialog

Next you will need to change the directory to the appropriate PIN directory that you are working in. To do this you need to select the drive letter that the PIN is sitting in. In this case MAINEDOT standards is the **Y** drive**.**

Once there, double click on the Pin folder, your PIN number and to your workgroups \MSTA folder. This is where the macro looks for this file (i.e. **y:\pin\9009\00\highway\msta\).**

Now that everything is set, hit the **O.K.** button and the **Estimator** will go through its process of exporting the document into the **MSTA** folder in your pin directory.

IMPORTING LOTUS.CSV FILE INTO ESTIMATED QUANTITIES SHEET

Step One: Open MicroStation

To begin, double click on your "MicroStation new InRoads config" icon and select your project from the project pull down. Open any file.

Step Two: Make an Estimate Sheet

Select **File** > **Make Sheetz** and create a numbered drawing (i.e. 003_Estimate.dgn).

✓ ***Check out page 1-18 for more information about making sheets.***

Step Three: Run Estimate Macro

Once you are in the drawing, you need to activate the macro to begin importing your estimate items. To do this, go to **Macros** > **Estimate**. You will be prompted to "*snap* to the upper left corner of first table" (Figure 9-14). *Accept* with a left click.

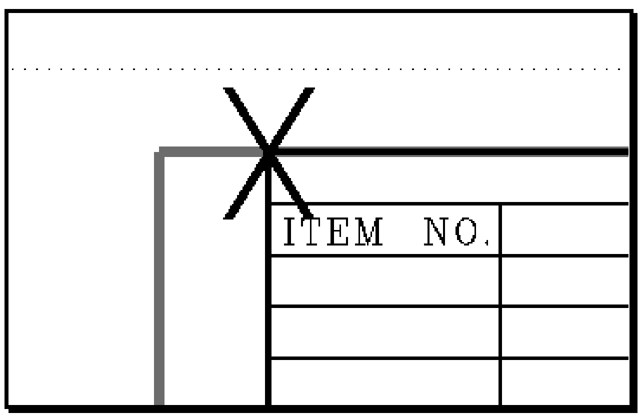


Figure 9-14: Example of Snap Point "Upper Left Corner of First Table"

Step Four: Adjust Quantities

This should have filled out your Estimated Quantity sheet. It will be necessary to edit text on a couple of the items that are supposed to be **L.S.**, but because the Estimator requires actual quantities for the item, it will require that you change the value to "1". Use the *Edit Text* tool.

The Contract Section would rather not see decimals in the quantities. Edit the text and round all decimal number up to the nearest whole number.

ⓘ ***If you would rather use a different justification on certain text, use Text>Rejustify (Macro) and select the text you want to change. When the dialog comes up, pick the new justification.***

♫ If there are changes to the Estimator (*.he) file, you will need to export another Lotus.csv file and overwrite the existing one. Then go into the file, delete the existing list, and re-run the macro.

Additional Sheet Needed?

Occasionally you may have more items than one Estimate Sheet will hold. In this case, the macro writes the additional information off to the right of the border. If your original border hasn't been dropped, copy it and place it with the additional items. (If it has been dropped, get a copy from the USBorder/Border cell library.)

Place a fence around the new border and select **Utilities>Development Tools>Fence File** from the *Main Menu.* When the new dialog appears, supply the name of an additional Estimate Sheet (i.e. 004_Estimate2.dgn) being sure to increment the prefix and suffix. Click OK. Click on the screen to *Accept* the command. Open the new sheet. If all looks good, delete the extra border and contents from the original file. Contact CADD Support for assistance.

Chapter 10 Drainage Sheets

DRAINAGE SHEET DEVELOPMENT

Quick Punch List

Copy Drainage Spreadsheet into PIN directory

Enter drainage data into **drainage.xls**.

Save **drainage.xls** as a *tab-delimited text file*.

Create a Drainage Sheet using Make Sheetz

Run the Drainage Macro

USING THE DRAINAGE SPREADSHEET

Introduction

This macro merges data from an excel spreadsheet into MicroStation. There are a couple of steps involved. Follow them exactly.

ⓘ ***Do not attempt to be creative in the naming of your file or create multiple files to somehow trick the program. It won’t work.***

Step One: Copy the Spreadsheet

The **drainage.xls** spreadsheet is a standard form. The **drainage.xls** template is located in the **Y:\msworksp\MDOT MicroStation Utilities\Spreadsheets & Notes** folder. Make a copy of this file and place it in your workgroup’s **MSTA** folder before entering your project data.

ⓘ ***Do not edit the spreadsheet on the Y: drive!***

Step Two: Enter Drainage Data

Enter your drainage data into the spreadsheet. Do not attempt to reformat the spreadsheet in any way. Add all the information to this one spreadsheet even if there isn’t any grid lines present in the rows or columns. Save your file.

♬ Make sure you save your changes by choosing **File** > **Save**.

Step Three: Save as TXT file

Our macro cannot access excel data when it is saved in workbook (xls) format. From **Excel**, choose **File** > **Save As…** This will open the **Save As** dialog (Figure 10-1).

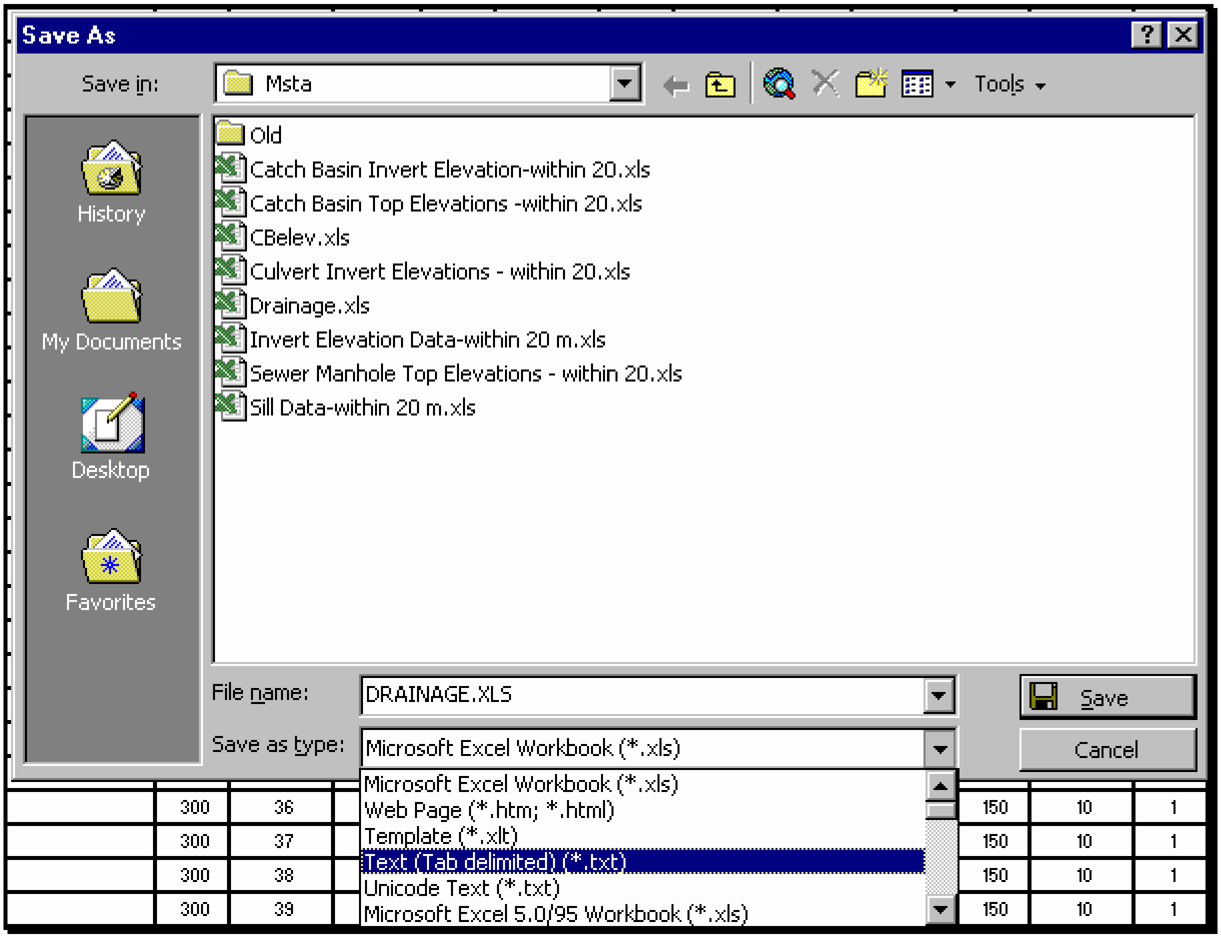


Figure 10-1: Save As Txt

From the bottom of this dialog, choose **Text (Tab delimited) (*.txt)** in the **Save as type** field.

Check that the file name is **DRAINAGE.TXT** and select **Save** button. This will bring up a **Microsoft Excel** dialog warning you about the limitations of tab delimited text (Figure 10-2).

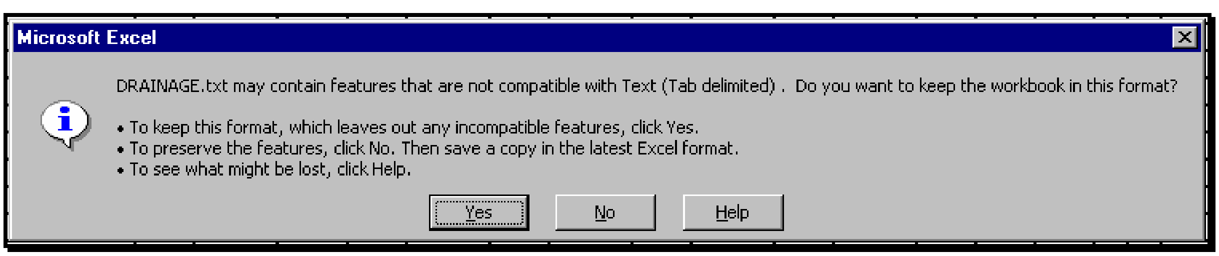


Figure 10-2: Save As Warning

Tab delimited text files aren't capable of handling all the formatting options of Microsoft Excel. This is not going to be a problem for us.

Dismiss this dialog by pushing the **Yes** button.

♬ Notice that you are now editing a file called “Drainage.txt”. This filename is a must for the macro to work (Figure 10-3).

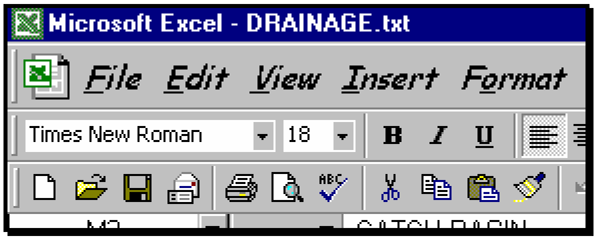


Figure 10-3: New File Name

You are now finished with **Excel**. Choose **File > Exit**. You will get a warning dialog like Figure 10-4.

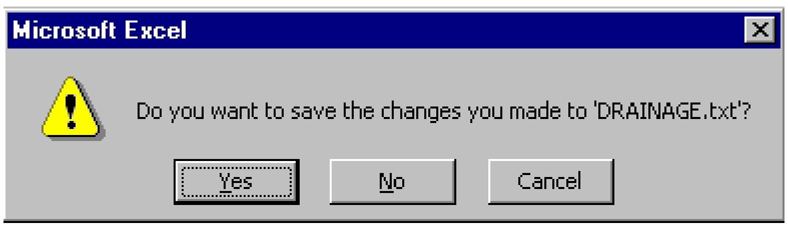


Figure 10-4: Save Changes?

You do **not** need to save this file again. Dismiss this dialog by pressing the **No** button.

IMPORTING DRAINAGE INFORMATION

Step One: Open MicroStation

To begin, double click on your "MicroStation new InRoads config" icon and select your project from the project pull down. Open any file.

Step Two: Make an Drainage Sheet

, go to **File > Make Sheetz** and create a *numbered* sheet with *Drainage* as the file type (i.e. 004_Drainage.dgn).

✓ ***Check out page 1-18 for more information about making sheets.***

Step Three: Run the Macro

From the *Main Menu* select **Macros>Drainage**.

MicroStation will prompt you "Drainage > Snap to upper left corner of first table" *Snap* to the point marked with an "X" in Figure 10-5, and *Accept*.

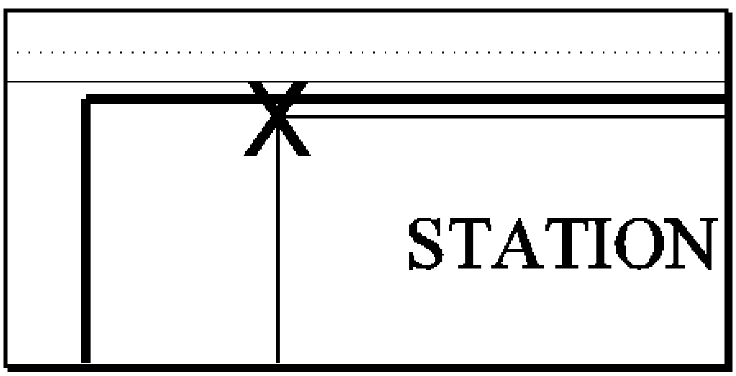


Figure 10-5: Upper Left Corner

MicroStation will place a column of text in every column of the table has information.

ⓘ ***If you would rather use a different justification on certain text, use Text>Rejustify (Macro) and select the text you want to change. When the dialog comes up, pick the new justification.***

Multiple Drainage Sheets

If you have more than 78 lines of drainage information, the macro will start placing another column of text to the right of the first table and place an additional border.

- Place a fence around the new border and select **Utilities>Development Tools>Fence File** from the *Main Menu.* When the new dialog appears, supply the name of an additional Drainage Sheet (i.e. 005_Drainage2.dgn) being sure to increment the prefix and suffix. Click OK. Click on the screen to *Accept* the command. Open the new sheet. If all looks good, delete the extra border and contents from the original file. Contact CADD Support for assistance.

Chapter 11 Note Sheets

NOTES SHEET DEVELOPMENT

Quick Punch List

Copy Template from Y: drive to your PIN on the Y: drive

Open and Edit the Template in Microsoft Office (i.e. Word or Excel)

Save as new Format (according to specific instructions)

Open new file, select range of text and Copy to Clipboard

Open MicroStation, Make Sheetz and set text Style

Paste (according to specific instructions)

Edit Sheet Type in title box

Run **Macros>Border Information**

LOCATION AND EXPLANATION OF TEMPLATE FILES

Introduction

We are using Microsoft Word for all text arranged in paragraph form, to be pasted into MicroStation. Text that is intended to be in columns should be produced in Microsoft Excel. We have placed template files in the following directory - **Y:\msworksp\MDOT MicroStation Utilities\Spreadsheets & Notes**. Please **copy** files from this location into your projects PIN directory under your workgroups MSTA folder. Do not edit the files in their original location.

General Notes

There are a few template files available to be used for generating your General Construction Notes. They require editing for every project and should be checked for accuracy.

Imperial General Notes.doc - This file has a listing of the most common General Notes used on U.S. Customary projects.

Metric General Notes.doc - This file has a listing of the most common General Notes used on metric projects.

Metric Expanded General Notes.doc - This file includes all of the General Notes in the *Metric General Notes.doc* file, plus, an additional 50+ notes that may pertain to more complex projects. Check both of these files and decide which one suits your projects needs.

Summary of Excavation and Borrow

The Summary of Excavation and Borrow is an Excel spreadsheet. It can be easily pasted into a MicroStation drawing for your final plans. The file is called **Summary-Excavation-Borrow.xls.** This form is sometimes confusing to do by hand on complicated projects. Just enter the figures and the formulas will take it from there. It also allows you to delete the lines (rows) that aren't needed. When doing this, the user must also delete out any lines with an **"ERR"** in them, starting from top of the sheet to the bottom.

Use the same instructions used when pasting Construction Notes into MicroStation.

Estimating US Customary Projects (Manually)

We have a spreadsheet to help do one of the most tedious tasks of Estimating which is calculating your **Cuts** and **Fills**. Once you supply the stations, without the (+) symbol, the sheet will automatically fill in the distances between stations. (Do not enter numbers in the shaded cells) After you enter areas or lengths, it will automatically average them and give you totals. Each sheet will give you totals that are summarized on the **Index** of the spreadsheet. Right now there are only five pages for the calculations and an index. If more pages are needed, ask your support staff to create them and revise the master. Here is a listing of files available for English projects.

ENGLISH-ESTIMATE-CUYDS.xls - This is for estimating items requiring a cubic yard measurement (i.e. Common Excavation, Gravel, etc.).

ENGLISH-ESTIMATE-SQYDS.xls - This is for estimating items requiring a square yard measurement (i.e. Loam, Sod, etc.).

ENGLISH-INDEX.xls - This is for indexing your estimate book that you turn in with your project. Many people are not including this with their comps, but if you are, this will make it easier. Also you can experiment with exporting a text file from Highest (Estimator) with out the prices.

♬ InRoads can easily produce End Area Volume reports for the project.

✓ ***Refer to page 20-31 for information on End Area Volume reports.***

Estimating Metric Projects (Manually)

We have a spreadsheet to help do one of the most tedious tasks of Estimating which is calculating your **Cuts** and **Fills**. Once you supply the stations, without the (+) symbol, the sheet will automatically fill in the distances between stations. (Do not enter numbers in the shaded cells) After you enter areas or lengths, it will automatically average them and give you totals. Each sheet will give you totals that are summarized on the **Index** of the spreadsheet. Right now there are only five pages for the calculations and an index. If more pages are needed, ask your support staff to create them and revise the master. Here is a listing of files available for Metric projects.

METRIC-ESTIMATE-CUMETERS.xls - This is for estimating items requiring a cubic meter measurement (Common Excavation, Gravel, etc.).

METRIC-ESTIMATE-SQMETERS.xls - This is for estimating items requiring a square meter measurement (Loam, Sod, etc.).

METRIC-INDEX.xls - This is for indexing your estimate book that you turn in with your project. Many people are not including this with their comps, but if you are, this will make it easier. Also you can experiment with exporting a text file from Highest (Estimator) with out the prices.

♬ InRoads can easily produce End Area Volume reports for the project. Documentation soon to follow will be described in the Cross Section portion of this manual.

GENERAL NOTES SHEETS

Step One: Copy the Template File

Using Windows Explorer, browse to the Y:\msworksp\MDOT MicroStation Utilities\Spreadsheets & Notes folder. Select the General Notes file that best pertains to your project. Copy the file from this location into your projects PIN directory, under your workgroups MSTA folder.

Step Two: Open and Edit Using WORD

Open and edit the Microsoft Word file, supplying your project specific information. Save the file in its native format (.doc).

Step Three: Save As .txt File

From the Main Menu, go to **File > Save As**., Select "**Plain Text (*.txt)**" in the *Save as Type* pull down (Figure 11-1). Verify that the path of the new file name is pointing to your PIN directory.

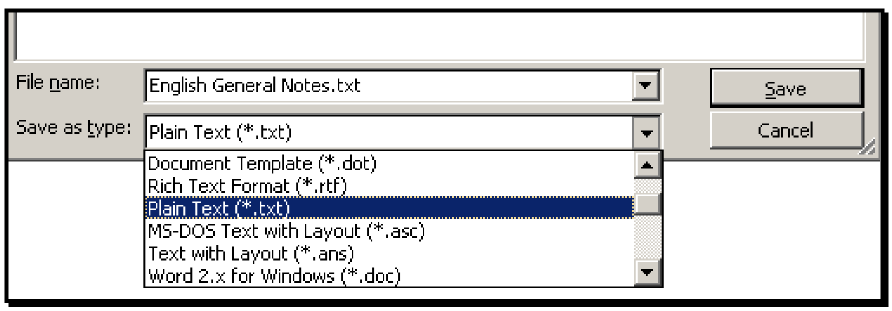


Figure 11-1: Save as type- Plain Text (.txt)*

A new dialog will open. Place a check mark in the "Insert Line Breaks" box (Figure 11-2) and leave the other defaults as is. Click OK.

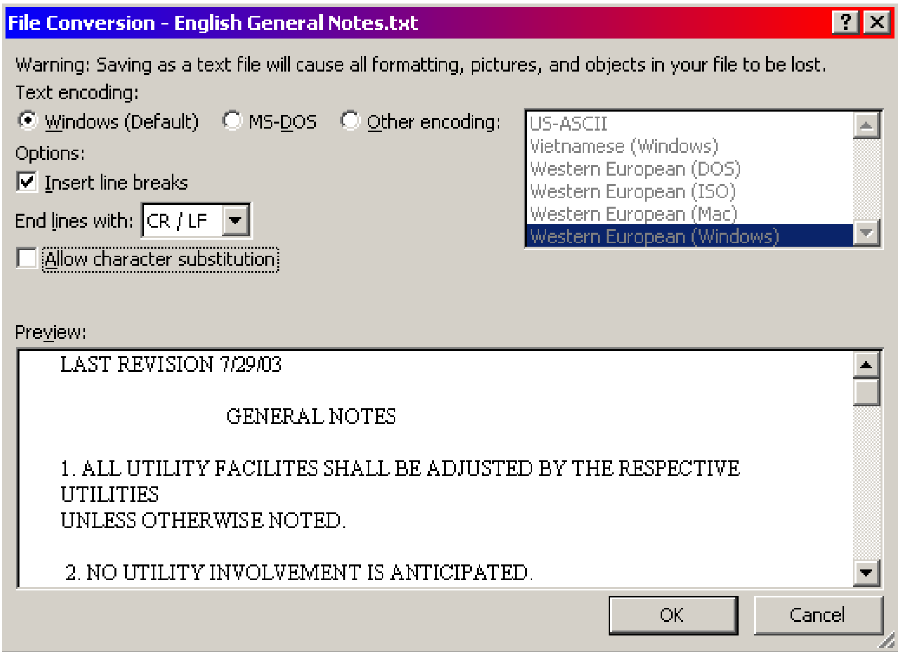


Figure 11-2: Select Insert Line Breaks

Close the Word document.

Step Four: Open and Copy the Text from the New File

Using Windows Explorer, browse to your projects PIN directory and open the file that you just saved with the **.txt** extension. Select the range of text you wish to paste into MicroStation. From the Main Menu, select **Edit>Copy.**

- ♬ You can select all of your text and manipulate it prior to placing it in the MicroStation *Text Editor* dialog. The *Text Editor* has the same capabilities as the Notepad text editor. You can Copy, Paste and Cut by either Right clicking in the dialog or using shortcut keys **Ctrl+C (Copy), Ctrl+V (Paste) or Ctrl+X (Cut).**

- ♬ If you are familiar with PFE Editor, Right Click the file and select “Open With…” then select “Choose Program” and select PFE Editor. You can select up to 100 lines of text and still fit it within your border. Notepad doesn’t give you this information.

Step Five: Open MicroStation

Open MicroStation by double clicking the “MicroStation new InRoads config” icon on your Desktop and pick your PIN number from the project pull down. Open the MicroStation file that you wish to place the General Notes in. If necessary, create a new file from the Main Menu using **File** > **Makesheetz.** Use a numbered drawing, selecting **Notes** from the drawing type dialog. Consider adding “General” in the suffix to better specify the sheet type (i.e. 006_Notes_general).

✓ ***See the Make Sheetz documentation on page 1-18.***

Step Six: Set Your Text Size and Font

Right click on the Settings Manager and select **Category** > **Scale.** Normally, General Notes are placed on a border that hasn't been scaled. Select 12in. = 1 ft. for U.S. Customary projects (1:1 for metric projects). From the Settings Manager, select **Proposed Text and Dims** > **Text Note.** This sets your text attributes.

Step Seven: Paste the Selected Text

While your **Text Editor** has focus (active), type **Ctrl+V** to paste the notes into the window or *Right Click* to bring up the "Right-Click Menu" and select **Paste** (Figure 11-3).

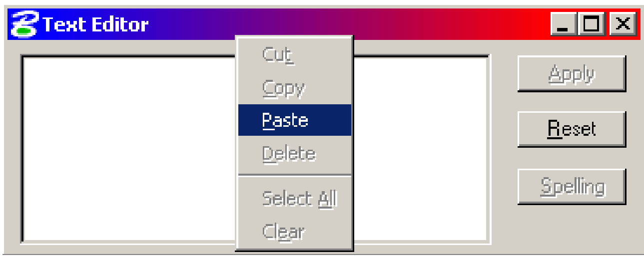


Figure 11-3: Right Click with mouse - Paste Option

Step Eight: Placing Text in the File

Place the text as you would any other text (*Datapoint)* utilizing *AccuDraw* and/or tentative snaps to place it accurately.

If the text you pasted will not fit inside of your border, use the *Edit Text* tool and click on the text. In the *Text Editor* dialog, select the extra text that isn't fitting within the border starting from the bottom up and type **Ctrl+X.** This will "cut" the extra text to the Clipboard. Click *Apply* to accept the changes. Click on the *Place Text* tool. With your cursor in the *Text Editor* dialog, type **Ctrl+V** to paste the remaining text. Place it down using *AccuDraw* to place it accurately. Continue until all of the text fits within the border. Create a second sheet if necessary.

ⓘ ***If you have over 200 lines of text, the text block may not display when you do a fit view. This is normal due to the limitations of multi-line text (text nodes). Zoom in to see the text.***

Step Nine: Editing Text

Edit text like you would any other text by selecting the **Edit Text** tool from the Main tool frame.

CONSTRUCTION NOTE SHEETS

Introduction

Depending on who generated the construction notes, you may be working with an Excel Spreadsheet, reports generated from InRoads software or hand written hard copies.

These instructions are not intended to explain how to use Excel, but instead, it explains how to take a construction note file and paste it in to MicroStation.

If you are using reports generated from InRoads, these are usually web type files that can be easily converted into Excel files.

Importing Reports into Excel (Informational/Optional)

If you are building the spreadsheet from **.prn** reports, select **Data>Import External Data>Import Data** from Excel's main menu. Browse to your workgroups MSTA folder and select the .prn file. Click OK. A text import dialog will open. Select **Delimited.** (Figure 11-4) Click Next.

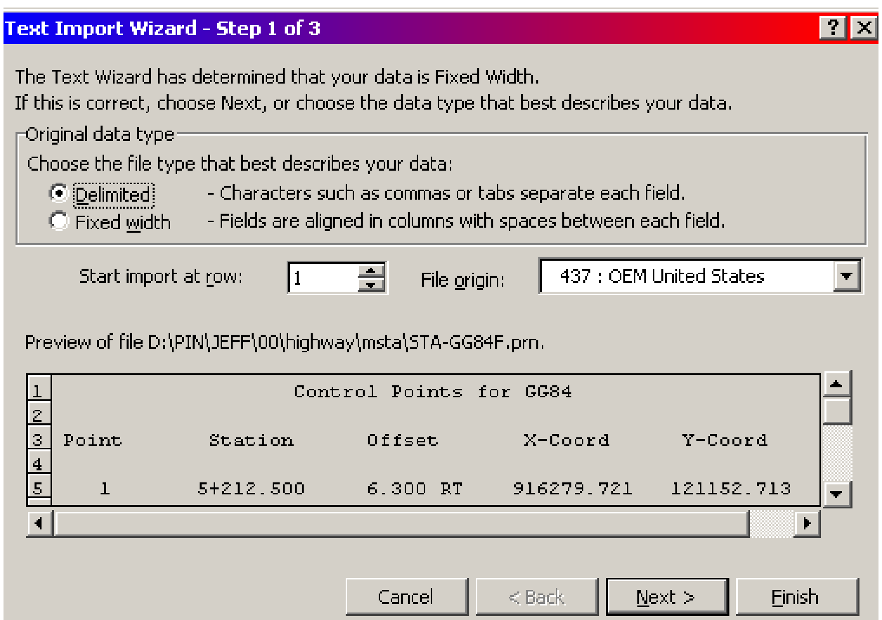


Figure 11-4: Text Import Wizard

In the next dialog, make an additional selection for "Space" as your delimiter (Figure 11-5). The other selections by default do not need changing. Click **Next.**

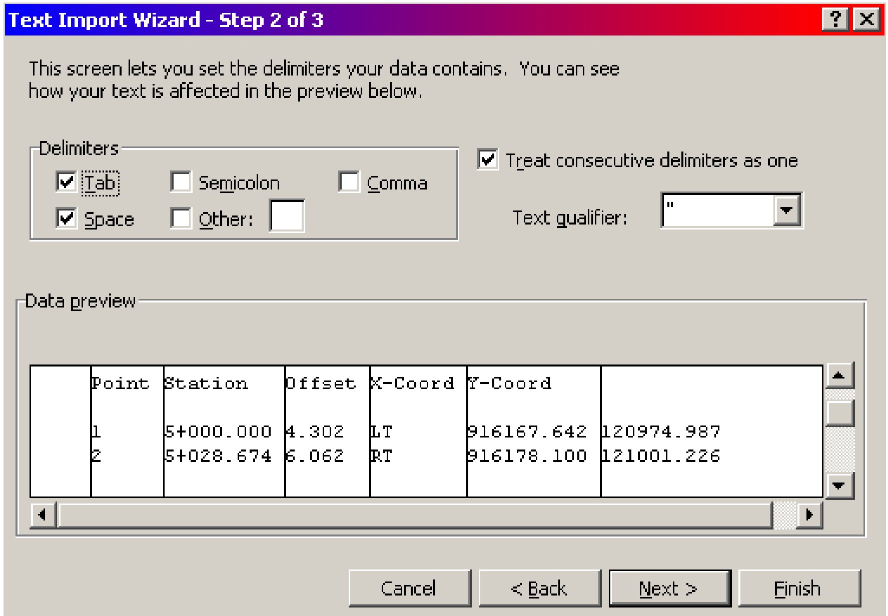


Figure 11-5: Select "space" as your delimiter

In the final dialog of importing text you have the opportunity to format cells in the spreadsheet. "General" is normally good for this setting. If you wish to omit a column, click on the column header and click on the "Do not import column (skip)" button. Click **Finish** (Figure 11-6)**.**

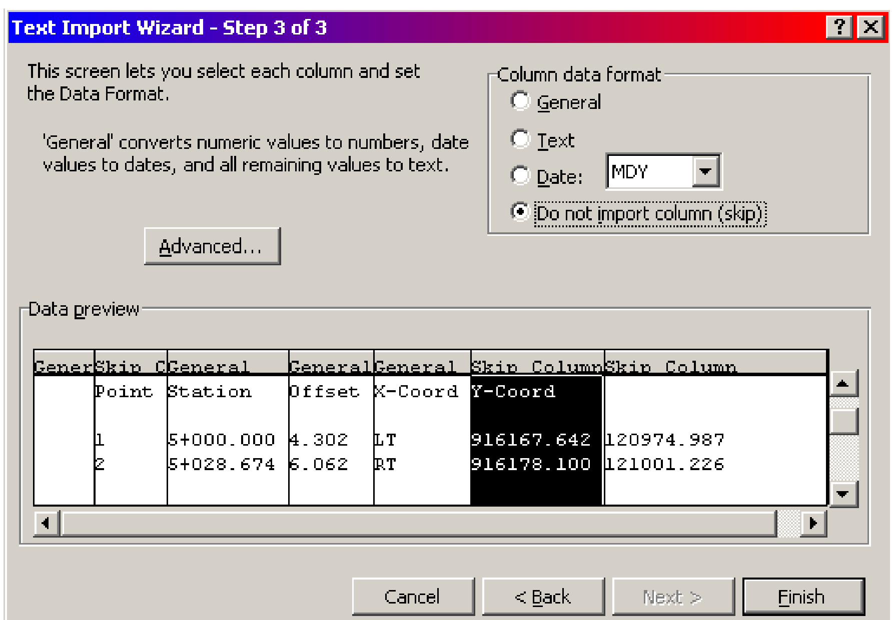


Figure 11-6: Import Wizard column formatting

Step One: Open Spreadsheet

Locate and open the spreadsheet (.xls file) in your PIN directory that has the Construction Notes in them.

- Right click in your MSTA folder and select **New>Microsoft Excel Worksheet** if you need to create one. Name it appropriately and add in your information.

Step Two: Save as Formatted Text (Space delimited)

If you have to make any changes to the spreadsheet, make the changes and save them.

Select **File>Save As…** from Excel's main menu. Change the *File As Type* pull down to **Formatted Text (Space delimited) (*.prn)** (Figure 11-7)**.** Notice that your file name now has a new extension. Click **Save.**

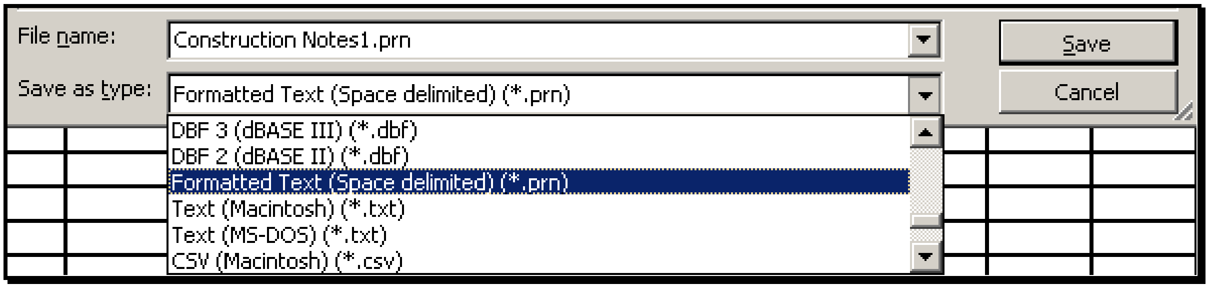


Figure 11-7: Save as Type Text (Tab delimited) (.txt)*

- If you have multiple sheets in one Excel Spreadsheet, you will need to go into each sheet and save them individually as a different file name (i.e. Construction-Note1.prn, Construction-Note2.prn). The .prn format cannot handle multiple pages all at once.
- The .prn extension will allow the user to adjust the widths of the columns in Excel and carry over the changes into the text document (.prn).

Step Three: Warnings

You will get a series of warnings. First one saying the format doesn't support multiple sheets. Click **OK.** (Figure 11-8)

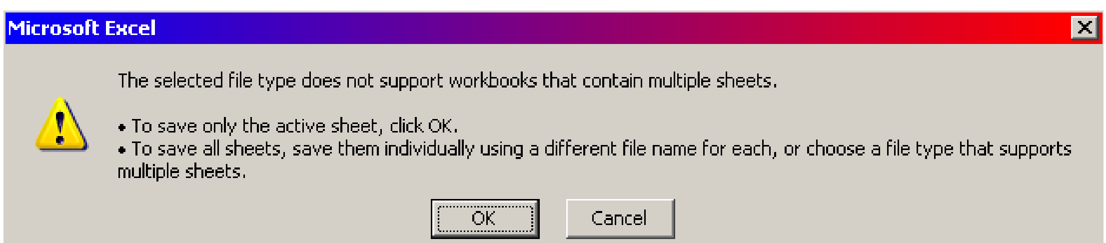


Figure 11-8: Warning One – Click OK

At the next warning click **Yes.** (Figure 11-9)

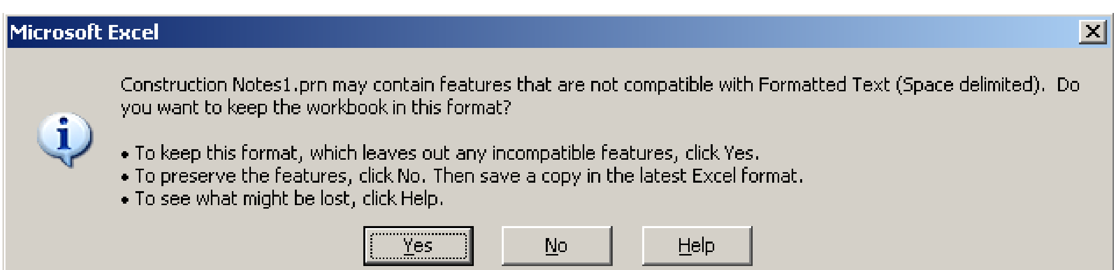


Figure 11-9: Warning Two – Click Yes

Close the Excel session. When asked to save the document, click **NO** (Figure 11-10)**.** You have already created the **.prn** documents as a separate file and do not need to save the changes in the Excel workbook.

ⓘ ***If you had made changes after saving it as a .prn file, do a Save As… and change the "Save as type" back to .xls***

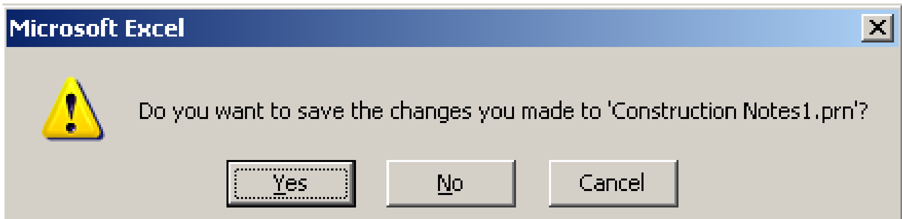


Figure 11-10: Warning when closing the file – Click NO!

Step Four: Open MicroStation

Open MicroStation by double clicking the "MicroStation new InRoads config" icon on your Desktop and pick your PIN number from the project pull down. Open the MicroStation file that you wish to place the Construction Notes in. If necessary, create a new file from the Main Menu using **File > Makesheetz.** Use a numbered drawing, selecting **Notes** from the drawing type dialog. Consider adding "Construction" in the suffix to better specify the sheet type (007_Notes_construction).

Step Five: Set Your Text Size and Font

Right click on the Settings Manager and select **Category** > **Scale.** Normally, Construction Notes are placed on a border that hasn't been scaled. Select 12in. = 1 ft. for U.S. Customary projects (1:1 for metric projects). From the Settings Manager, select **Proposed Text and Dims** > **Monospaced Text.** This sets your text attributes.

Step Six: File Import>Text

Go to **File>Import>Text** from the Main Menu. Select the file that you created with the .prn extension. Place the text with a data point, utilizing *AccuDraw* to place it accurately amongst other notes on your sheet.

Step Seven: Editing the Text

After placement, you will notice that there may be some adjustment necessary. Use the Edit Text tool in your *Main Tool Frame* or use the *Main Menu* and select **Text>Edit Text**. Click the text and adjust as necessary.

ⓘ ***The original .xls file is a handy document because it can be used to generate item lists in your Estimate Book that we turn in to Contracts. It's up to the team as to whether or not you keep the master .xls file up to date or edit the changes within MicroStation only.***

Chapter 12 MicroStation Plan Sheet Creation

CREATING CUT SHEETS IN MICROSTATION

CREATING PLAN SHEET DRAWINGS

Step One: Open your group's ??plan.dgn

Open MicroStation and choose your PIN.

✓ ***Refer to page 1-17 for more information on opening files.***

Locate the **??plan.dgn** that is in your groups MSTA directory (i.e. hdplan.dgn, bdplan, geoplan, envplan, etc).

Step Two: Reference in Survey Data

From the main menu, choose **File** > **Reference** to open the **Reference** dialog.

Check to see that the appropriate files are attached to this drawing (i.e. contours, topo, points, and text). Wetland data will eventually be in a file called **wetlands.dgn.** If it exists in the topo directory, attach it.

By default, all Survey files should be attached. If these files are <u>not</u> attached, you will have to attach them manually. To reference all files needed for you plan sheets into this file, select **File** > **Reference (DOT)** > **Attach**. Browse to the **Topo** directory of your current project (Figure 12-1).

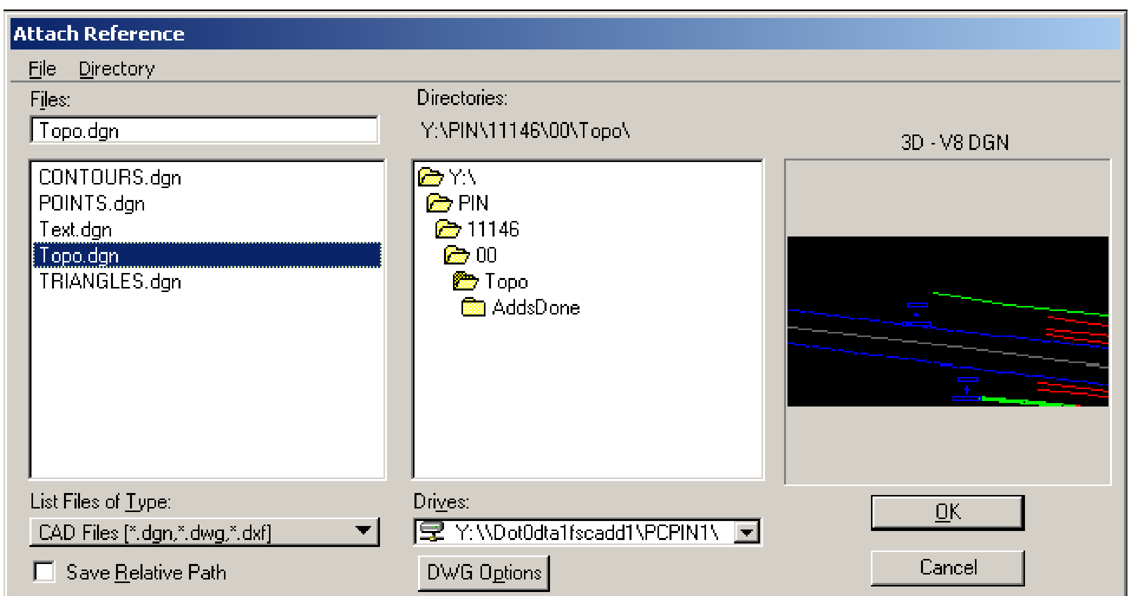


Figure 12-1: The Topo Directory

ⓘ ***It is important that you attach files from the topo directory and not the survey directory. The files in the survey directory are to be used as backups for the survey section only.***

Pick any one of these files from the **Topo** directory and push **OK**.

This brings up the **Attach Reference Settings** dialog. Below file name and path is the Model drawing that you will be attaching. Typically this will show the attachment of the **Default** model.

Next, type in a **Logical Name** (either “topo”, “contours”, “text”, “wetlands” or “points”) for the file.

Now pick **Coincident – World** as your Orientation. This will always line up your drawings based on the coordinates of those files.

Leave the **Scale (Master:Ref)** set to 1:1 and **True Scale** checked on.

If the **Nested Attachments** area grays out on you then that is a good indication that there is no files attached to the file you are currently attaching. If this portion does not gray out then you will need to set this to **No Nesting** or change the **Copy Attachment Depth** value to **0** (Figure 12-2).

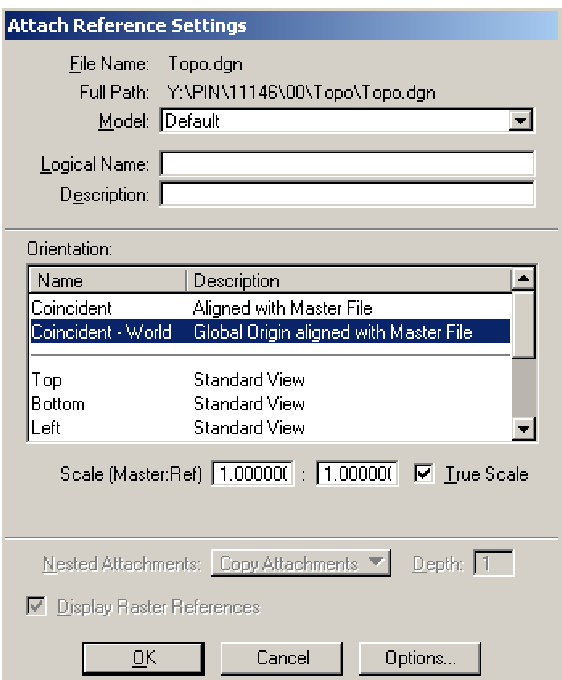


Figure 12-2: Reference Settings

✓ ***Check page 2-70 for an explanation of Reference File Attachment settings.***

Push the **OK** button.

Now repeat these steps until you have attached all the survey files you need to attach.

Step Three: Attach Proposed Design and Alignment

If the plans you are creating require the proposed design and alignment, attach them using the same method as above. Depending on type of project, bridge or highway, browse to the necessary workgroups \MSTA folder and attach the two files.

Push **Fit View** (Figure 12-3) to see all your reference files.

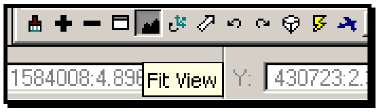


Figure 12-3: The Fit View Button

ⓘ ***If you fit view and the graphics zoom way out and does not maximize in your view window, there may be some problems with a file or files that you have attached. Attempt to correct this before you continue. One common problem is that maybe you attached the file base on Coincident instead of Coincident – World. Shut off the display of your reference files one at a time, fitting view after each one is shut off to try and isolate which file is causing the problem. Once you have isolated the file in question, detach and try reattaching based on the method described previously.***

Step Four: Place Clip Boundaries

At this stage we are going to be placing rectangles along the alignment that will correspond to our sheets. We will be using the *Plan Sheet Settings Manager* to accomplish this. If it isn't loaded already, go to **Setting > DOT SetMgrs > Plan Sheet Settings.**

✓ ***Check page2-19 for an introduction to the Settings Manager.***

Part One: Set the Category Scale

Right Click the **Settings Manager**, choose **Category > Scale** and set your scale (i.e. 1 in.=25 ft. or 1 in.=50 ft. for U.S. Customary projects or 1:250 or 1:500 for metric projects).

Part Two: Place the Cells

From the *Settings Manager,* select **Create Plan Sheets** > **Place Clip Boundary**.

This selects our sheet boundary cell and activates a cell placement command that will make it easy to place a bunch of these rectangles along the alignment.

Notice the box on the end of your cursor. When you send a *Datapoint* to MicroStation, the box will be placed at that location.

♫ It's best not to snap to elements in your file. If the two elements you snap to are at different elevations, you might end up with a slightly skewed view.

The box you just placed will immediately begin to rotate by the origin point (the point you just entered.) Move your mouse around and notice how it spins. When it is aligned with the roadway, enter another *datapoint* and it will immediately prompt you to place the next boundary.

♫ Don't worry if they're not in exactly the right place. You can go back and clean up any placement later by using the move and rotate tools.

ⓘ ***It is important that you place these boundaries in the order that you want your sheets***

to be numbered. We have a routine that automatically creates the plan files for us, and it will number them in the same order that you place these clip boundaries.

Step Five: Placing North Arrows

Start by rotating the view to "top" if not already in a top view.

✓ ***Refer to page 2-11 for help with view controls.***

From the *Settings Manager,* select **Symbols and Linestyles**> **North Arrow True.**

North is up in your view. It may be necessary to enter 90 degrees in the *Place Active Cell* dialog to orientate the North Arrow to a vertical position. Place the north arrows inside of your clip boundaries in a place that is out of the busy area of your plan (preferably the top center of each sheet).

Step Six: Create Cut Sheets

Now that you have placed all your sheet boundaries, we are going to run a macro that will create new plan files for us. From the *Settings Manager* select **Create Plan Sheets > Create Cut Sheets**. This macro is going to create saved views in ??plan.dgn that are aligned with the clip boundaries we just placed then create new drawings and attach the saved view from the ??plan.dgn.

The macro asks you what number you want to use for the starting number of the plan sheets (Figure 12-4).

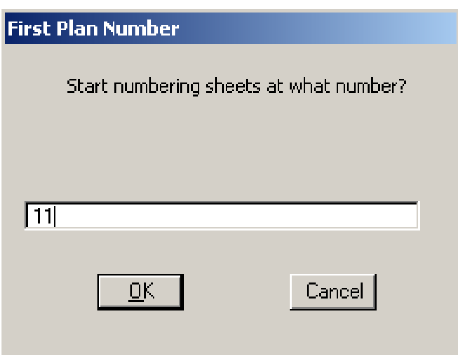


Figure 12-4: Start Numbering At?

♫ Depending on your workgroup, you may have a different starting numbers by default. The number you see is set based on the estimated number of plan sheets that will be placed before these sheets in your plan package. You do have the option to change this number at this point in the macro if you have a good feel for your plan package set. We will go back later and re-number all the sheets once the complete plan package is ready.

When the program is finished, it will drop you back into ??plan.dgn and fit the view in a top rotation. Open up the files you've just created and see how they look!

Live Nesting

What is Live Nesting? This is a new method in MicroStation V8 of attaching a file with references to another file like our border sheets. By using Live Nesting you no longer need to use the old methods of **Batch>Attach** and **Batch>Settings** to manipulate the way you want your cut sheets to appear for plotting purposes. Now if you want to turn off certain levels, adjust displays of reference files or attach/detach additional reference files, you can simply do this in your source drawing (i.e. HDPlan, BDPlan, etc.) and all of your border files will be displayed in the same manner.

Troubleshooting

If you open a plan sheet drawing and the graphics within the sheet are not correct, it could mean a couple of things.

It could mean that some of the drawings that are referenced in are not at the same Global Origin as the rest of your drawings. See your Support Staff for assistance if needed or read the documentation on Flattening drawings and shifting the global origins.

Or, it could mean that the clip boundary was placed incorrectly. You can fix this without rerunning the "Create Cut Sheets" part of the plan sheet process by following these steps.

1) Open the incorrect plan sheet. Go to **File > Reference** - to open reference dialog.

2) **Tools > Detach All** to detach the existing reference files.

3) Now **Tools > Attach** and be sure to browse to your PIN and select ??PLAN.

4) When the **Reference File Settings** dialog comes up, select the "Saved View" from the Orientation area you need (i.e. 011) and set Nested Attachments method to **Live Nesting**. Now the saved view will be on your cursor.

5) Set it down as close to being in the center of your border as possible.

♬ It is not necessary to give a description or logical name.

Adjusting Saved Views

You can adjust (re-define) the area of the reference files on your plan sheet by using the reference file dialog **Tools** in combination with the *Place Fence* command.

Place a fence around your sheet frame and highlight all of the reference files. Choose **Tools > Clip Boundary.** This will expand the area of your original saved view to the extents of your fence.

Also, use the **Tools > Clip Mask** to remove parts of a reference file or files.

Re-sheeting

It is possible to use the macro to recreate these sheeted drawings. The macro will prompt you to overwrite duplicate files.

However, it is not capable of only sheeting up one or two sheets—it's all or nothing. If you need to make a change to ??plan.dgn (move a clip boundary, add a clip boundary, etc.)

you’re going to have to go through the process of sheeting again.

Just a reminder, it can only sheet up files in the order that the clip boundaries were placed in the file. If you need to add sheets at the beginning of the project, it might be easier to delete all your clip boundary cells that you placed and start again from scratch (using *Settings Manager* **Create Plan Sheets > Place Clip Boundary**).

Chapter 13 Project Workflow (Design)

WORKING ON THE NETWORK

STARTING INROADS

Overview

The default *User Configuration File (UCF)* file that InRoads uses when a user launches InRoads from the desktop icon is the *InRoads_Network.ucf*. This directs MicroStation/InRoads to the network location for project files. This is the recommended workflow for a few major reasons. All files on the network are backed up nightly and these files can be accessed by any of the project team members. Managing files that are copied from the network to a user's computer will present the possibility of overwriting files that have had work done on them.

✓ ***Refer to page 3-18 for more information on User Configuration files.***

Step One: Launch InRoads

Launch InRoads from the *InRoads Suite* icon. The *MicroStation Manager* dialog will open (Figure 13-1). In the *Workspace* portion of the dialog, the *User* is defaulted to *InRoads_Network* and the directories will be pointing to the network (y: drive) for project PINs.

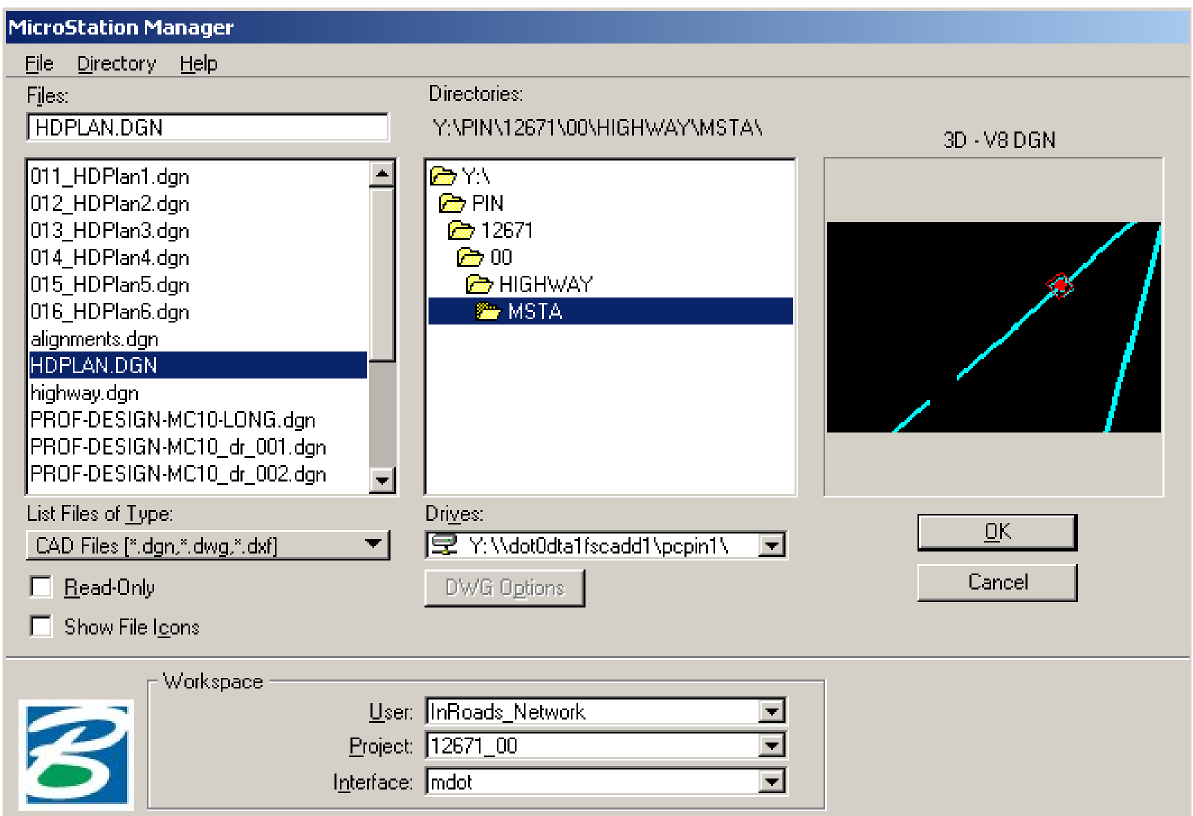


Figure 13-1: MicroStation Manager dialog when working on the network.

Step Two: Select Your Project

Pick your project from the "Project" pull down. This will open that project's files on the network (y: drive) in the user's MSTA directory based on their workgroup.

Step Three: Open a File

Select a .dgn from the list of files in the directory. Each workgroup has at least one file in their project directory for entry purposes (i.e. HDPlan.dgn, BDPlan.dgn RWPlan.dgn). Click **OK.**

♬ At this point, the InRoads splash screen should open momentarily and then the InRoads menu dialog will open and wait for input.

Step Four: Create a Working Drawing

Overview

It is recommended that users create a "working drawing" to develop the alignment, profile, proposed design and view preliminary cross sections. In this file users can test multiple horizontal and vertical alignment scenarios. It can also be used for writing "temporary" design features to graphics and viewing preliminary cross sections based on theoretical alignments. The idea is that if users work in the deliverable drawings (i.e. alignments, highway or bridge drawings) while in a testing phase, others automatically see this data if it exists on the network and may begin to do their work based on the preliminary work. Reserve creating the deliverable drawings until you are somewhat ready to post them to all (ROW, Environment, Public Hearing, etc.).

Part One: Create Working Drawing

Select **File>Make Sheetz** from the MicroStation main menu. Select a *No Prefix* drawing and select a file name such as bridge or highway and provide the suffix **working** to the file name (i.e. bridge_working or highway_working, multimode_working, etc.).

✓ ***Refer to page 1-18 for more detailed instructions on making new drawings.***

WORKING LOCALLY

CREATE A BRIEFCASE

Overview

MaineDOT has some Regional Offices with poor network connection speed and Surveyors that are working unplugged from the network. These users will need to work on a local copy of the network project.

The *Windows Briefcase* software provides a method of comparing project files on the network with project files copied locally. A briefcase is simply a folder with intelligence. In the event a file is modified, added to a project, or deleted from a project, it is possible to know when and possibly by whom.

♬ Sometimes *Windows* thinks that you have a file open if the *Explorer* window has a folder open in the *Briefcase*. To avoid this, simply close the *Explorer* window or click on another folder. Figure 13-2 is a typical message you will see if you are accessing the briefcase through *Windows Explorer*.

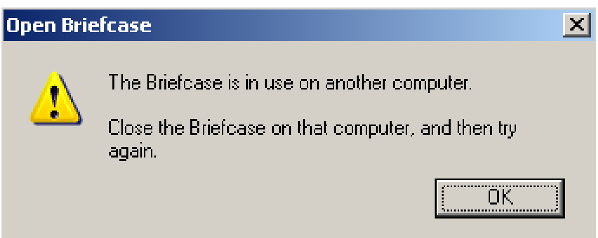


Figure 13-2: Open Briefcase

Step One: Create D:\PIN folder

Open *Windows Explorer* and browse to your D drive. Verify that you have a folder named PIN at the root of the D drive. If it does not exist, create one (Right click and select **New>Folder**).

Step Two: Create a Briefcase

Click on your D:\PIN folder on the left side of the *Explorer* window. **Right click** on the right side of Explorer (anywhere except on a file or folder) and select **New>Briefcase** (Figure 13-3).

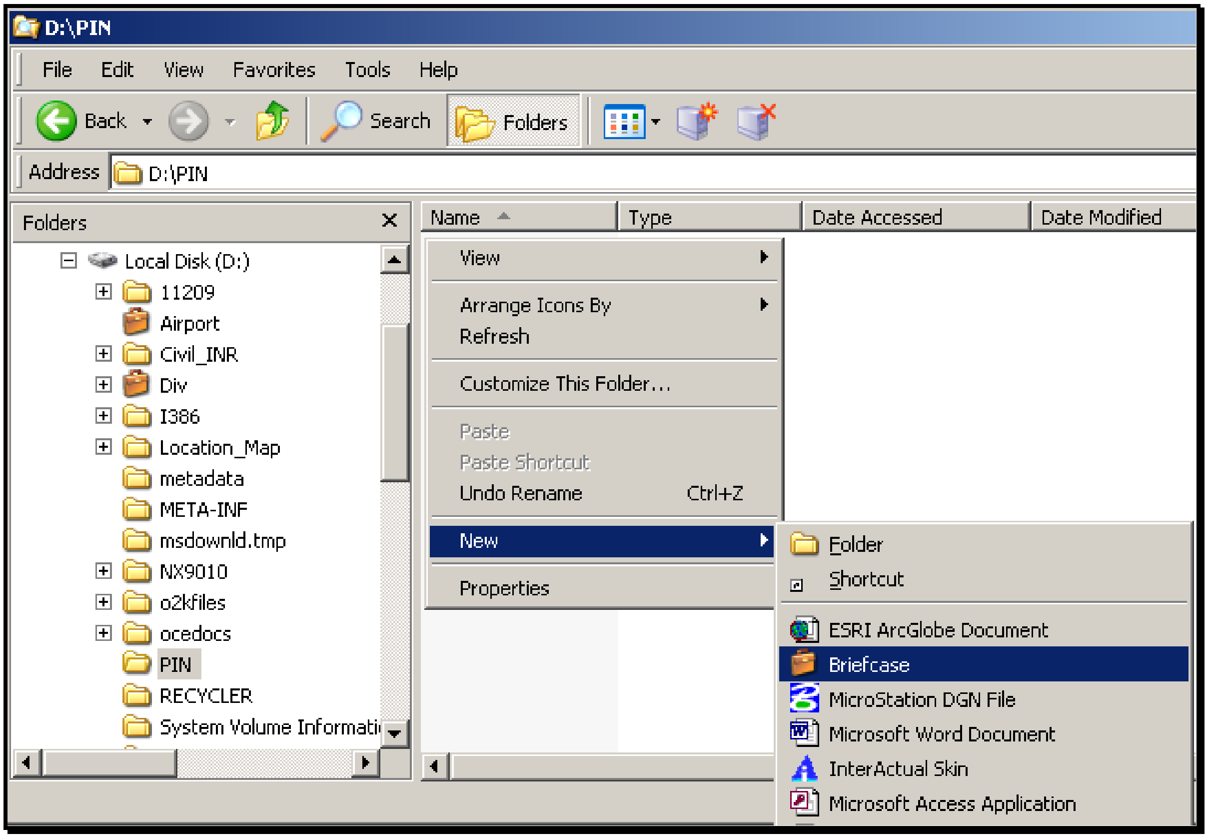


Figure 13-3: Creating New Briefcase

Step Three: Rename the Briefcase

Right click on the Briefcase and select **Rename**. Type the PIN number of the project you want to work on locally and hit enter (i.e.12745). It's crucial to stick with the same name as it appears on the y: drive.

Step Four: Open the Briefcase

Double click on the briefcase.

- The first time you open the briefcase, the Briefcase Wizard will open giving you brief instructions. Click Finish.

ADDING PROJECTS TO YOUR BRIEFCASE

Overview

One way to add files to your briefcase is to add all file types. This will make a full copy of all files in the project directory. This is the easiest way of creating a synchronized copy in your briefcase.

Step One: Adding Network Files To Your Briefcase

Browse *Windows Explorer* to the **Y:\PIN** directory and navigate to your PINs folder. Select your project's decimal folder. Select **Edit>Copy To Folder…** from the *Windows Explorer* menu (Figure 13-4).

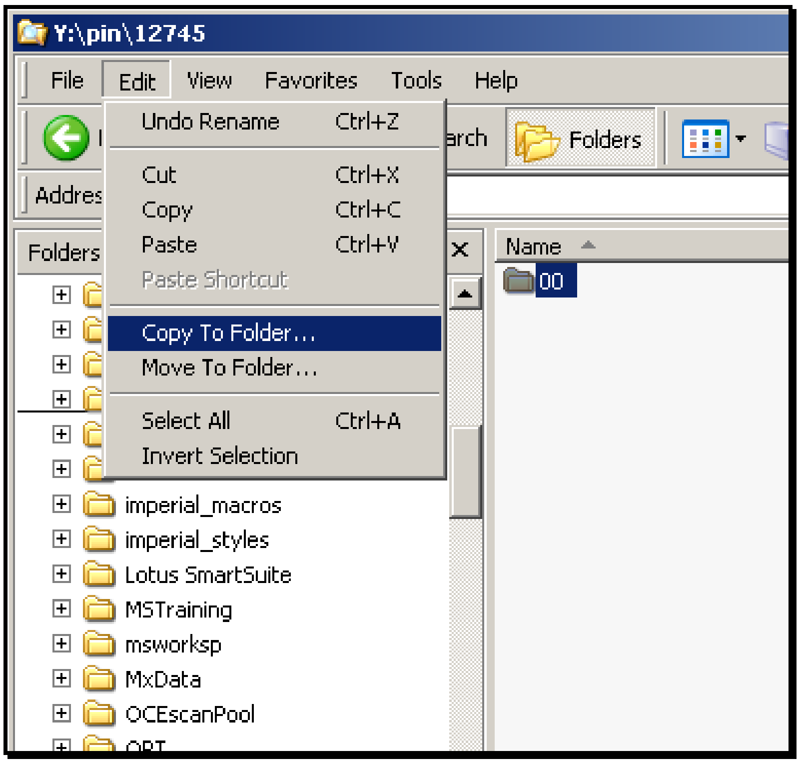


Figure 13-4: Select Copy To Folder…

In the *Copy Items* dialog, navigate to the briefcase you just created on your D: drive (i.e. D\PIN\12745) Figure 13-5. Select **Copy.**

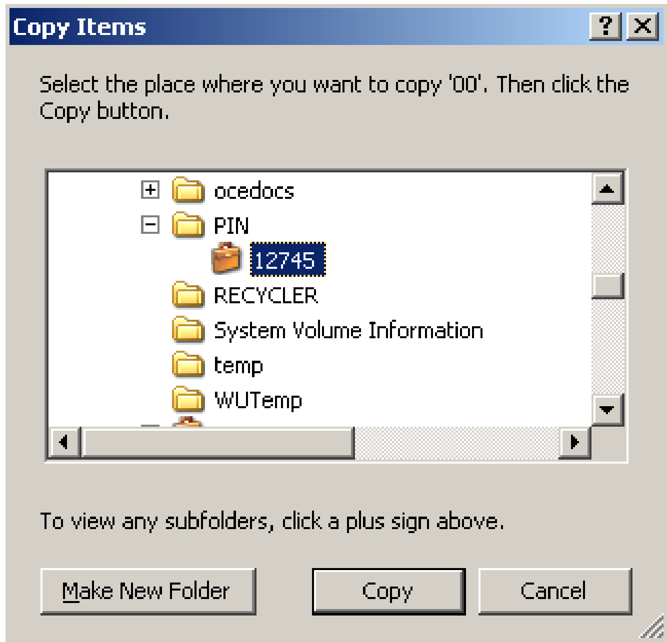


Figure 13-5: Navigate to your PINs briefcase on your D: drive.

You will begin *Updating Briefcase* evident by the dialog (Figure 13-6) and the progress bar. When the process is complete, the dialog will disappear.

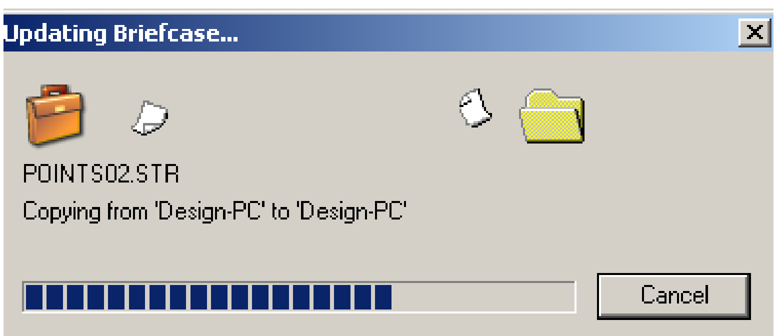


Figure 13-6: Updating Briefcase dialog while processing.

The time it takes to process depends on your network connection and the speed of your computer. The initial synchronization will take longer than updates that you will do in the future.

When there is a database (.mdb) on the network, you may get a few warnings along the way. The warnings are intended for reasons described below.

Step Two: Synchronizing Databases

Synchronize Your Databases (Read/Write Permissions)

If the briefcase encounters a database that you have permissions to edit, you will be prompted with a few warning dialogs.

First Warning: Creating a Replica

The briefcase will handle synchronizing a database and will create a copy locally (Figure 13-7). If you intend on working on this database offline, select **Yes.** If not, select *No* and refer to page 13-11 for instructions on manually updating the briefcase.

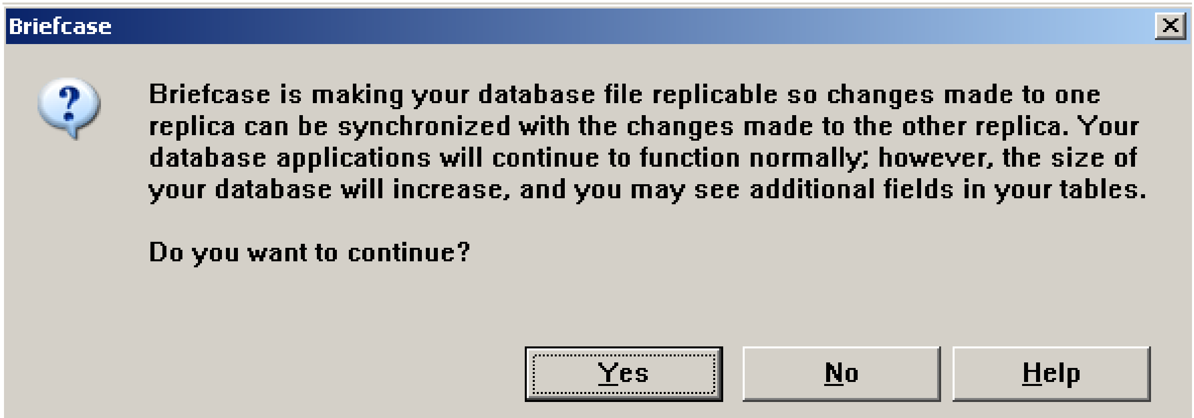


Figure 13-7: Creating a replica of the database locally.

Second Warning: Creating a Backup

The briefcase will now recommend creating a backup of the original database on the network as it prepares it to be the Design Master (Figure 13-8). Only one of the databases will be able to modify and save the design of the database (add additional fields, formatting, change Queries, etc.). This is referred to as a Design Master.

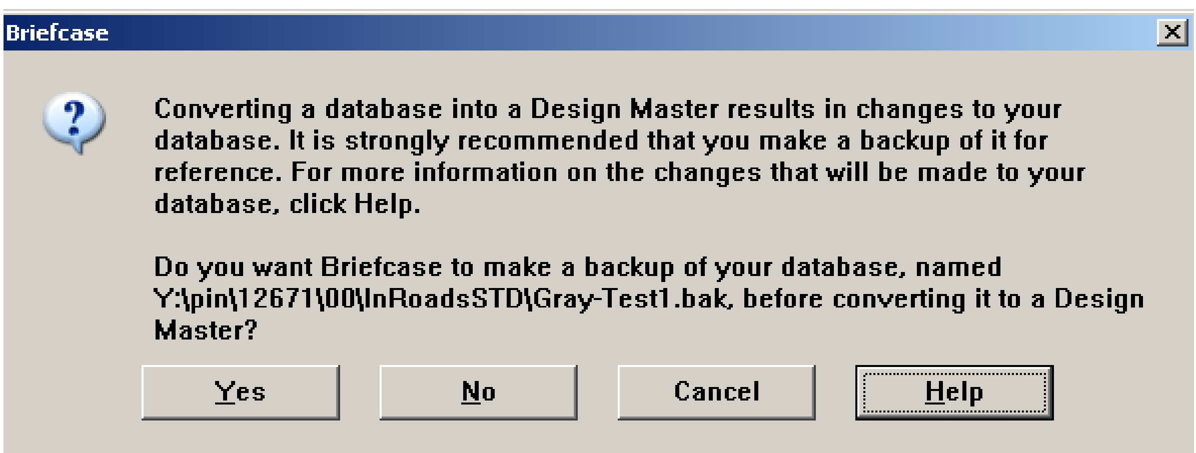


Figure 13-8: Creating a backup of the database.

Third Warning: Pick the Design Master

Select the copy of the database that you want to be the Design Master (Figure 13-9). If most of the changes to the design of the database are going to be done locally, select the *Briefcase Copy*. Otherwise, select the *Original Copy*.

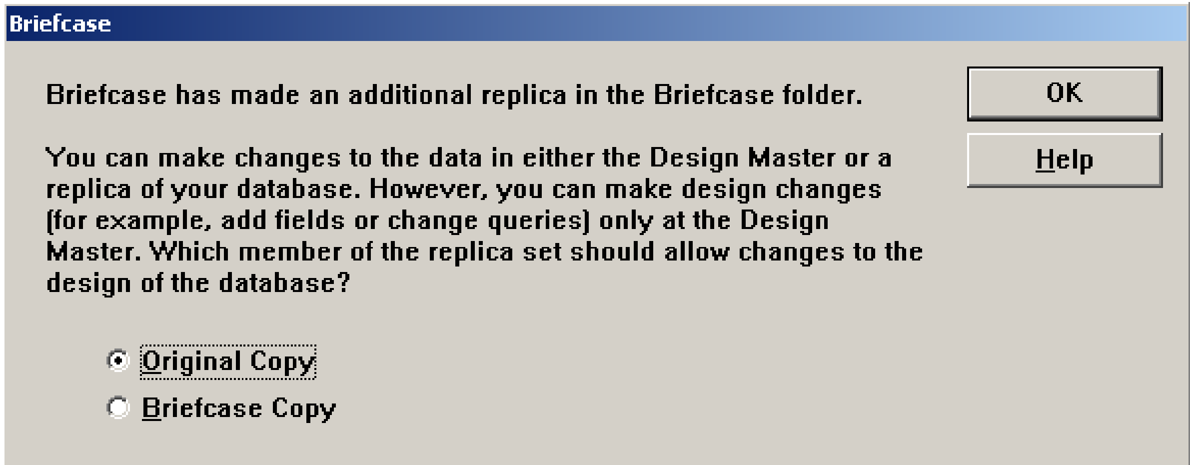


Figure 13-9: Select which database has the ability to make design changes.

Synchronizing Others Databases (No Permissions)

If the briefcase encounters a database that you do not have permissions to edit, a single dialog will open (Figure 13-10) stating that it may be already open by someone else or that you do not have permissions to edit it. In this case, the only option is to click **OK.** Refer to page 13-11 for instructions on manually updating the briefcase.

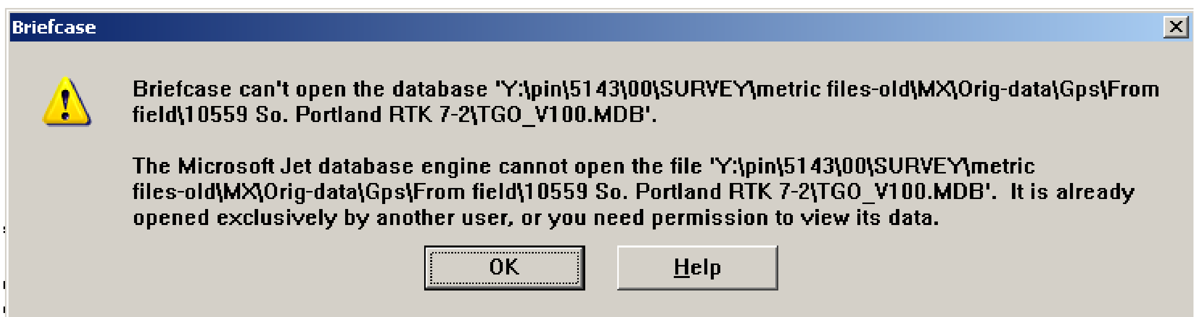


Figure 13-10: Briefcase can't open the database - No permissions.

Step Three: Remove Database(s) from Synchronize List

If you told the briefcase not to create a replica or permissions prevented you from having access to the database, you will have to finish the original synchronization manually. Now you will have the opportunity to skip those databases from being updated in your briefcase.

Manually Update the Decimal Folder

In *Windows Explorer* select your PINs decimal folder. Select **Briefcase>Update All** from the *Windows Explorer* menu. In the *Update* dialog (Figure 13-11), scroll and locate any databases (.mdb) that you do not want to synchronize. The left portion of the dialog is your briefcase location and the rightmost portion is the network file. **Right-click** near the arrow and “Create” text in the center of the dialog between the database and the network location. Select **Skip** from the list. Repeat as necessary. When finished, click **Update.**

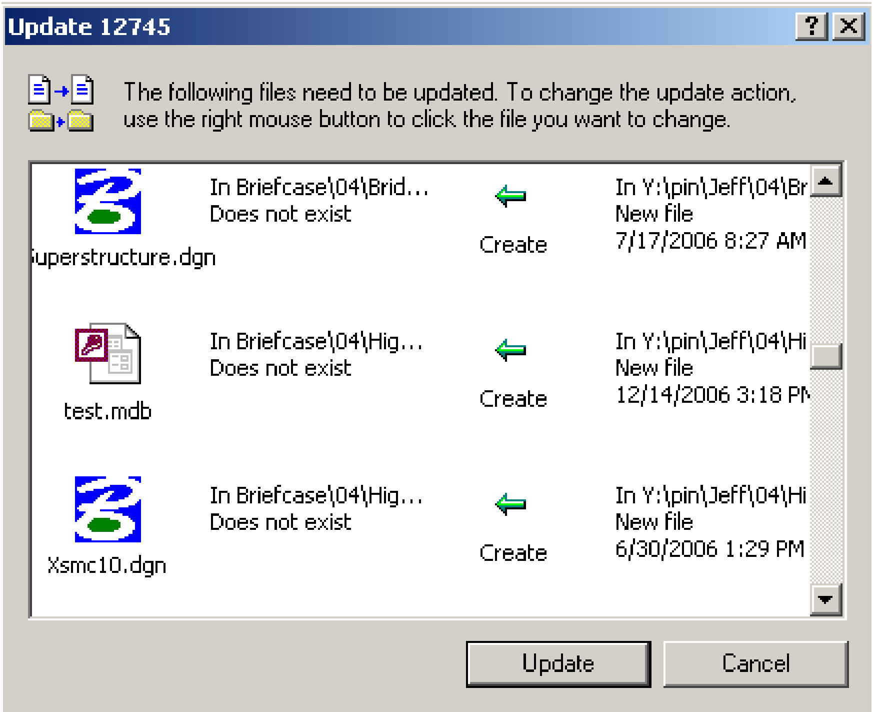


Figure 13-11: Update project dialog waiting for input.

SYNCHRONIZE YOUR BRIEFCASE

Update Briefcase and Network

Overview

As you work on your project on your local hard drive, any files that you make changes to will be tracked in your briefcase. Likewise, if files are changed on the network, your briefcase will identify them. Synchronizing the briefcase with the network will allow the user to select which files to update and perform the updating. Users should synchronize their briefcase with the network weekly. The network is backed up nightly and is meant to store the master copy of all project files.

Step One: Open Your Briefcase

Open *Windows Explorer*. Make sure that *Explorer* is displaying all details **(View>Details).** Click on your project's Briefcase on the left side of the *Explorer* window to display the contents on the right.

Step Two: Update All Files (Recommended)

From *Windows Explorer's* main menu, select **Briefcase>Update All.** The briefcase will compare the files in on your hard drive with the network copies and display the results (Figure 13-12).

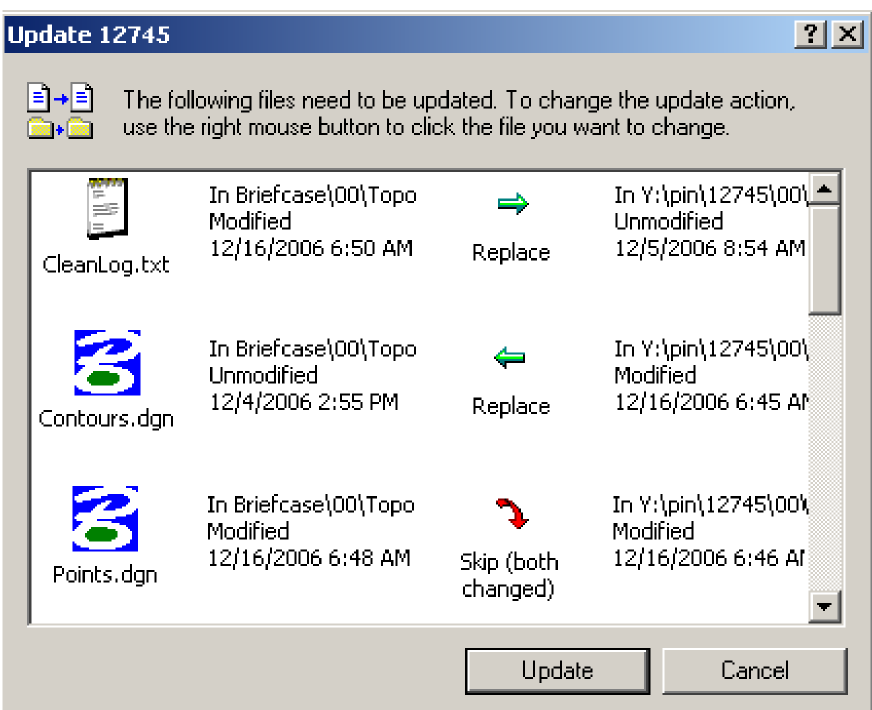


Figure 13-12: Update dialog with default action.

The left column displays the file name in question, the next column displays the briefcase files information, the next column displays the default action to take in order to update both locations and the right column displays its counterpart's information on the Y: drive.

The default action can be adjusted at any time by right clicking the file and selecting a new action to be preformed to the file. Below is a breakdown of the actions.

Replace Option

When a file has been modified in one or the other location, the briefcase prompts you to replace the unmodified file. This is most likely what you want to do.

However, there may be an instance when the file you were working on was corrupted or changes performed are unwanted, you could get a new copy by replacing the file in your briefcase. If you right click the file, you get these possible alternatives (Figure 13-13). Notice that you also have the option of skipping the update.

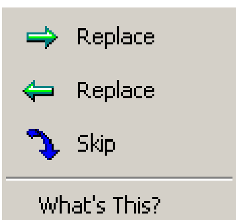


Figure 13-13: Update Options

Skip (both changed) Option

When the file in the briefcase and the file on the network have both been modified, the briefcase prompts you to "skip" updating the file. This is when **communication** will need to take place. Open *Windows Explorer* and browse to the Y: drive and locate your PIN. Open the folders to the location of the common file (i.e. Y:\pin\ 12745\00\Highway\MSTA). Open the **dgnuse.log** file. This file keeps a record of who has opened the files on the network and possibly made changes. Look for an entry in the log for the file in question. The log provides you with the time, date and name of the person who had opened the file (Figure 13-14).

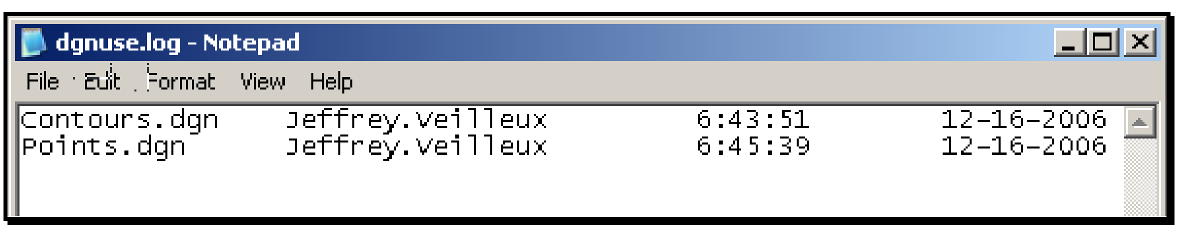


Figure 13-14: The dgnuse.log file provides valuable information.

Find out from this person if any work was done to the file. Once it is determined which file takes precedence, you can **Right Click** the file and change which direction that the file will be copied (Figure 13-15).

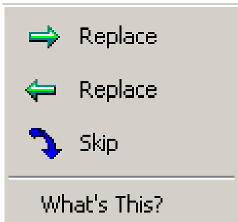


Figure 13-15: Options when both files have been modified.

If it is undetermined which file should be preserved, select **skip** until the files can be compared with one another.

The “dgnuse.log” can be misleading. The dgnuse.log on the network tells you who opened the file on the Y: drive only, it doesn’t tell you if this person has made changes to the file. If a person uses the preference “Immediately Save Design Changes” this will change the modified date regardless if changes are made. When a person synchronizes their briefcase, a dgnuse-local.log gets copied to the network, giving a record of who is adding files from a briefcase.

Delete Option (File Removed)

The **Delete** option lets you know when a file was deleted in either of the two locations. If a file is no longer needed and is deleted, the briefcase gives you the opportunity to make both locations identical (Figure 13-16).

Figure 13-16: Options when a file(s) has been deleted.

If you Right Click on the file, you get these possible alternative actions (Figure 13-16). The briefcase gives you the opportunity to delete the file, create (copy) the file again in the location it was deleted from or simply don’t delete the file. The dgnuse.log won’t help you to find out who deleted this file, however it may tell you who has been working on this project on the network, and that itself may open the lines of communication.

Create Option

If a new file was created in either location, the briefcase will give you the option to create the file in the other location (Figure 13-17).

Figure 13-17: Create options.

It is common that other users may be adding files on the network as well as in you in your briefcase. Survey, for example, may have additional topography that you need locally. The default action (create) is the normally the one you want. You can right click the file for alternative actions. The only other action for create is “skip”.

Renaming Files in Your Local Briefcase

It is recommended that all file renaming (i.e. Sheet Renumbering Utility) be done locally in your briefcase. The intelligence of your briefcase allows you to take the renamed files and create them on the network and at the same time it will also delete the files that were associated to these files from the network. This allows for no confusion or duplication of files on the network with different names.

REMOVING A PROJECT FROM THE BRIEFCASE

Once final plans have been delivered to the Contracts for printing, you can remove it from your briefcase. Prior to removing it, do one last synchronization on the PIN and manually copy any “orphan” files to the network. Orphan files are additional file types that reside only in your briefcase.

♬ If you added additional file types or created the briefcase with all file types, there may not be any orphan files.

Step One: Open Briefcase and browse to the MSTA folder

Open *Windows Explorer* and browse to your project’s MSTA folder on your local hard drive.

Step Two: Sort by File Status and copy to Clipboard

Click on the Status heading in Windows Explorer to group the like files together. Highlight the orphan files (Figure 13-18) and select **Edit>Copy.**

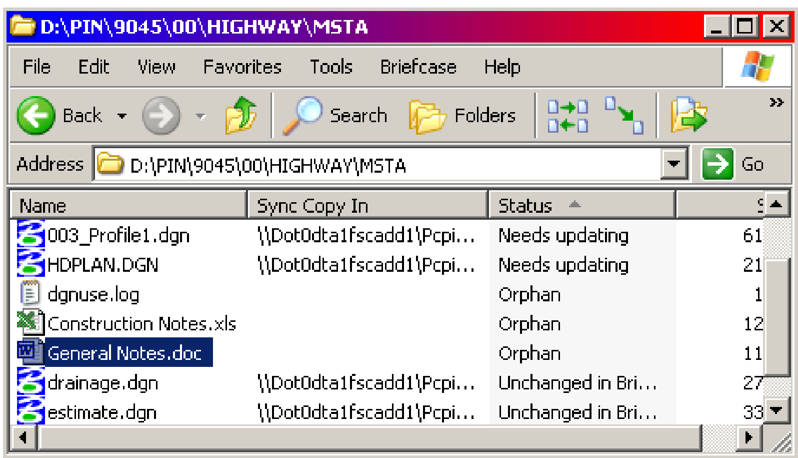


Figure 13-18: Adding Orphan Files

Step Three: Paste files into the appropriate folder on the Y: drive

Open your *Explorer* to the Y: drive and browse to the folder that contains the project files (i.e. Y:\PIN\9045\00\Highway\MSTA). Select **Edit>Paste** to copy them to this location.

Step Four: Delete the Project

After all project files have been synchronized and orphan files copied to the network, you can highlight your briefcase and select **File>Delete** to delete the PIN and free up space on your hard drive.

STARTING INROADS

Overview

Working locally requires that the user simulate the network directory by having a folder named **PIN** at the root of their D drive (i.e. D:\PIN). It also requires users to have a copy the project's PIN folder in their D:\PIN directory (i.e. D:\PIN\12671\00).

Managing files between the network and a user's computer can be present the possibility of overwriting a modified file unintentionally when posting the files back to the master copy on the network. To help manage files copied locally, we strongly recommend the use of *Windows Briefcase* which is described later in this document.

- ✓ ***Refer to page 13-5 for detailed instructions on setting up and using Windows Briefcase.***

Step One: Launch InRoads

Launch InRoads from the *InRoads Suite* icon. The *MicroStation Manager* dialog will open as seen in Figure 13-1. The default UCF file *(InRoads_Network.ucf)* will direct MicroStation/InRoads to the network location for projects.

Step Two: Change User

In the *Workspace* area of the dialog, select the pull down next to the *User* field and select **InRoads_Local.** This will direct MicroStation/InRoads to a local copy of the project directory (Figure 13-19).

- ✓ ***Refer to page 3-18 for more information on User Configuration files.***

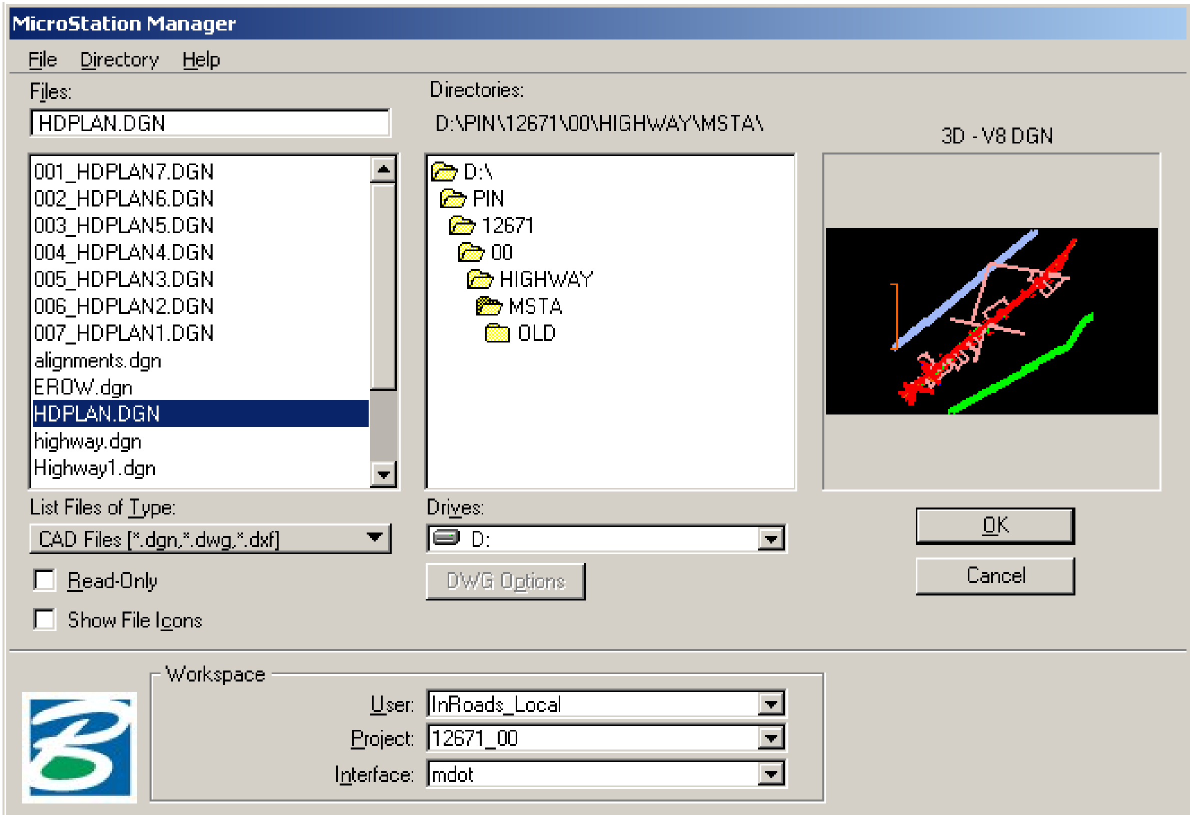


Figure 13-19 MicroStation Manager dialog when working locally.

Step Three: Select Your Project

Pick your project from the "Project" pull down. This will open that project's files on the d: drive in the user's MSTA directory based on their workgroup.

Step Three: Open a File

Select a file from the list of .dgns in your directory. Each workgroup has at least one file in their project directory for entry purposes (i.e. HDPlan.dgn, BDPlan.dgn RWPlan.dgn). Click **OK.**

♫ At this point, the InRoads splash screen should open momentarily and then the InRoads menu dialog will open and wait for input.

Step Four: Create a Working Drawing

Overview

It is recommended that users create a "working drawing" to develop the alignment, profile, proposed design and view preliminary cross sections. In this file users can test multiple horizontal and vertical alignment scenarios. It can also be used for writing "temporary" design features to graphics and viewing preliminary cross sections based on theoretical alignments. The idea is that if users work in the deliverable drawings (i.e. alignments, highway or bridge drawings) while in a testing phase, others automatically see this data if it exists on the network and may begin to do their work based on the preliminary work. Reserve creating the deliverable drawings until you are somewhat ready to post them to all (ROW, Environment, Public Hearing, etc.).

Part One: Create Working Drawing

Select **File>Make Sheetz** from the MicroStation main menu. Select a *No Prefix* drawing and select a file name such as bridge or highway and provide the suffix **working** to the file name (i.e. bridge_working or highway_working, multimode_working, etc.).

✓ ***Refer to page 1-18 for more detailed instructions on making new drawings.***

STARTING AN INROADS PROJECT

BRIEF OVERVIEW OF PROJECT WORKFLOW

Overview

This portion of the manual outlines the basic workflow of a common InRoads project. These topics a broken down in more detail in the Chapters to follow. These Chapters are referenced with page numbers.

Starting an InRoads Project

Launching InRoads

- ✓ ***Refer to page 12-1 for instructions on entering a project correctly.***

Make Working Drawing

- ✓ ***Refer to page 13-4 for instruction on creating a working drawing.***

Attaching the Ground Surface

- ✓ ***Refer to page 13-25 for instructions on opening a surface.***

Attaching Template Library

- ✓ ***Refer to page 15-5 for instruction on how to attach the standard MaineDOT template library.***

Creating a Geometry Project

Create a Geometry Project

- ✓ ***Refer to page 14-2 for instructions on creating a Geometry Project.***

Create a Horizontal Alignment

- ✓ ***Refer to page 14-5 for instructions on creating a Horizontal Alignment.***

Create a Vertical Alignment

- ✓ ***Refer to page 14-7 for instructions on creating a Vertical Alignment.***

Design Your Horizontal and Vertical Alignment

- ✓ ***Refer to page 14-6 for instructions on designing your horizontal and vertical alignments.***

Create Alignment Deliverables

- ✓ ***Refer to page 14-11 for instructions on creating the alignment drawing.***

Creating a Template

Attach MaineDOT's Standard Template Library

- ✓ ***Refer to page 15-5 for instructions on attaching MaineDOT's Standard Template Library.***

Create Project Specific Folder

- ✓ ***Refer to page 15-6 for instructions on creating a project specific folder.***

Create Project Specific Templates

- ✓ ***Refer to page 15-7 for instructions on creating a project specific template(s).***

Creating a Corridor within Roadway Designer

Create a Design Corridor

- ✓ ***Refer to page 16-4 for instructions on creating and Managing Corridors.***

Drop and Run a Template down the Corridor

- ✓ ***Refer to page 16-4 for instructions on applying a Template Drop(s) on a Corridor***

Adjust Transitions

- ✓ ***Refer to InRoads HELP or Bentley instructional manuals for this item until further documentation is accomplished.***

Design Superelevation

- ✓ ***Refer to page 16-14 and the InRoads HELP for instructions on adding and adjusting Superelevations.***

Design Drives and Side Roads

- ✓ ***Refer to page 17-1 for instructions on Designing driveways. This same approach can be used for simple side roads.***
- ✓ ***Refer to instruction manuals used by Bentley instructor for more information on complex side road design.***

Creating a Design Surface

Create the Deign Surface

- ✓ ***Refer to page 16-28 for instructions on creating a design surface.***

Editing the Design

Edit the design in the Roadway Designer to maintain the model (surface) integrity. Changes made in MicroStation will not appear in the design surface.

- ✓ ***Refer to InRoads HELP or Bentley instructional manuals for this item until further***

documentation is accomplished.

Create Highway or Bridge Design Deliverables

✓ ***Refer to page 16-29 for instructions on creating a design drawing.***

Drainage Development

This area still needs development. We will be taking advantage of InRoads Storm and Sanitary product, however, setup is not yet complete. Drainage will need to be developed using the resulting sections and design plan. Consider creating a separate file for drainage features and reference the design so that if the design needs to be re-written to graphics, the drainage won't be lost. When the design is set in stone, merge the drainage into the design file.

Geometric Curb Layout

This area still needs development. Each curb and/or gutter feature will need to be made into an alignment, reports derived and provided in table format. We will be developing custom reports, filters and sheet up routine in the near future.

MANAGING YOUR INROADS PROJECT (RWK)

Overview

An .RWK file is an easy way of automatically loading all the *Surfaces (.dtm), Alignments (Geometry Projects .alg),* the *Template Library (.itl), Roadway Designer* file (.ird), Survey *Field Book (.fwd)* and *Preference* file (.xin) for your project instead of having to load them individually. You can have multiple .RWK files based on the task at hand. You can set the .RWK file to automatically update these same files when you close InRoads. Anything newly created will need saved then can to be added to the .RWK in order to be opened automatically.

Creating and Saving an .RWK

Overview

The **Template.itl** and the **mdot_us.xin** should be in the project directory by default. The **mdot_us.xin** is automatically loaded when you enter InRoads correctly. The **Ground.dtm** is available when Survey has completed the Survey Editing and has created the deliverables. Below is an example of creating an .RWK with the basics, then later adding the other aspects as you create them.

Step One: Open InRoads

Open InRoads via the InRoads Suite icon on your desktop. Select your project from the *Project* pull down. Enter a file.

Step Two: Open the Ground.dtm

Select **File>Open** from the InRoads main menu. Change the *File Type* pull down to **Surfaces (*.dtm)** and browse to the *Survey\Msta* folder. Select the **Ground.dtm,** click **Open** and then **Cancel** to close the dialog.

Tip: You can also browse to the *Surface* tab (or other tabs for that matter), in InRoads Explorer. Right click on the word *Surface* and select **Open…** (Figure 13-20) Browse to the Survey\MSTA folder, and select **Ground.** Click **Open** and then **Cancel** to close the dialog.

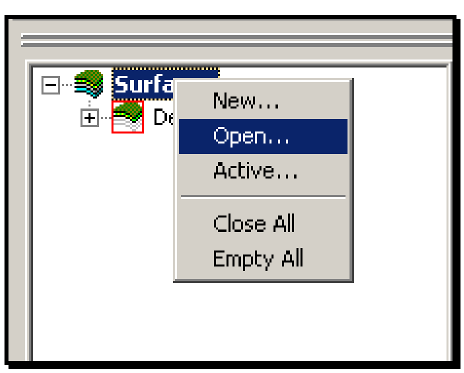


Figure 13-20: Sub menu for opening a surface.

Step Three: Open Template.itl

Select the *Template* tab, right click on the *Template Library* and select **Open.** If necessary, browse to the InRoadsSTD folder within your project.

Step Four: Save As… Design.rwk

Select **File>Save As…** from the InRoads main menu. If necessary, change the *File Type* pull down (Figure 13-21) to **Projects (*.rwk).** Supply a name for the .RWK (i.e. Design or Survey depending on the user).

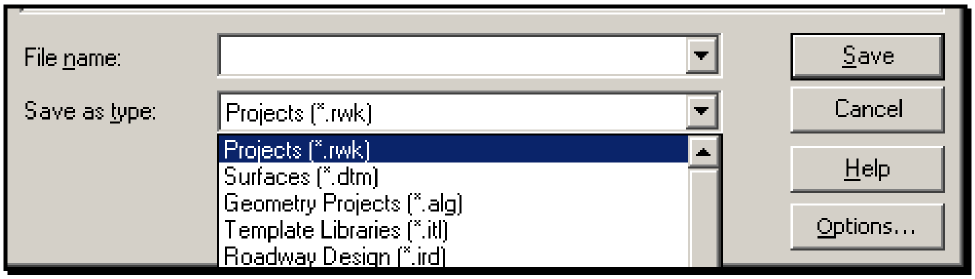


Figure 13-21: Adjust the Save as Type pull down to Projects (.rwk)*

Step Five: Select Options Button

Select the **Options** button (shown in Figure 13-21). Select the *Surfaces* tab. Place an “X” in the *Add* box (Figure 13-22).

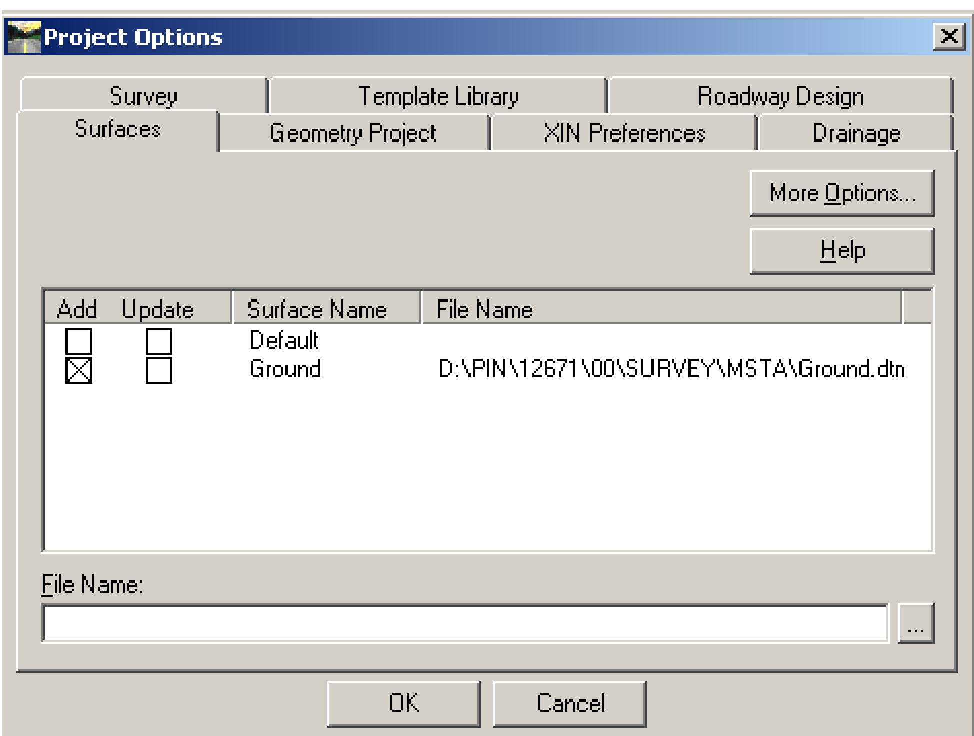


Figure 13-22: Project Options when saving an .RWK as Add only

♬ Depending on permissions, you may not be able to write to the Survey\MSTA folder.

Select the *Template* tab. Place an “X” in the *Update* box (Figure 13-23). This will automatically load (Add) and save (Update) the file as users enter and exit InRoads.

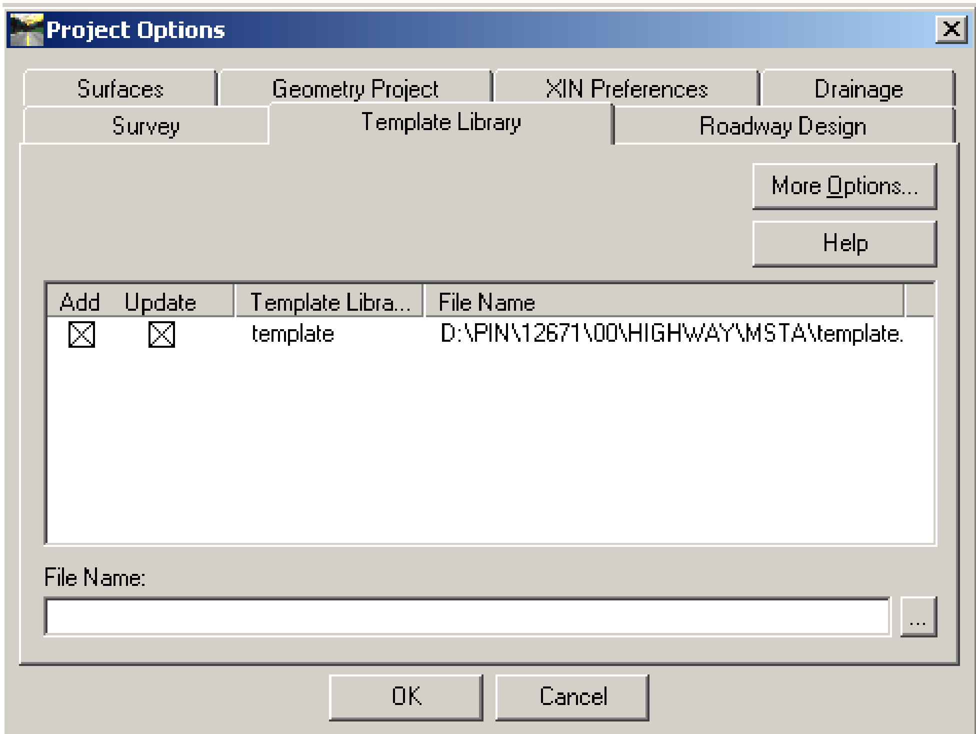


Figure 13-23: Project Options when saving an .RWK as Update and Add

Click **OK.** Select the **Save** button then select **Cancel** to close the *Save As* dialog.

Adding to a RWK

As a user creates each aspect of an InRoads project, they will need to add it to the .RWK. For example, when creating a *Geometry Project* (alignment container), first a user would have to save the .ALG by selecting **File>Save>Geometry Project.** Click **Save** and then **Cancel** to close the dialog.

Then, select **File>Save>Project…** and select the **Design.rwk** or **Survey.rwk** depending on your workflow. Click the *Options* button and select to the *Geometry Project* tab. Place an “X” in the *Update* box. This will also place an “X” in the *Add* box as well. Click **OK** to dismiss the *Project Options* dialog. Select **Save** to save the .RWK. You will be prompted to overwrite the original .RWK file. If this is your intention, click **Yes.**

Manually Editing a RWK

Overview

When you create an .RWK, it hard codes the path to the files. If you happened to be working on the D:\ drive when you saved your .RWK, it will remember the path to your project located on the D: drive. The .RWK wouldn’t work once the project is copied to the Y:

drive. Once an .RWK is established, it can be easily copied and edited to point to the project on the Y: drive or visa-versa.

Edit with Notepad

Using *Windows Explorer*, browse to your *Workgroup's* MSTA folder within your PIN. Locate the .RWK file. Highlight the file, select **Edit>Copy.** Select **Edit>Paste** to paste a copy within the same directory. Select **File>Rename** and enter a new name for the file (i.e. Design-network.rwk).

Double click it. Windows can't open the file but will give you an option to *Select the Program from a List.* Pick this option (Figure 13-24) and select *Notepad* to open this file type.

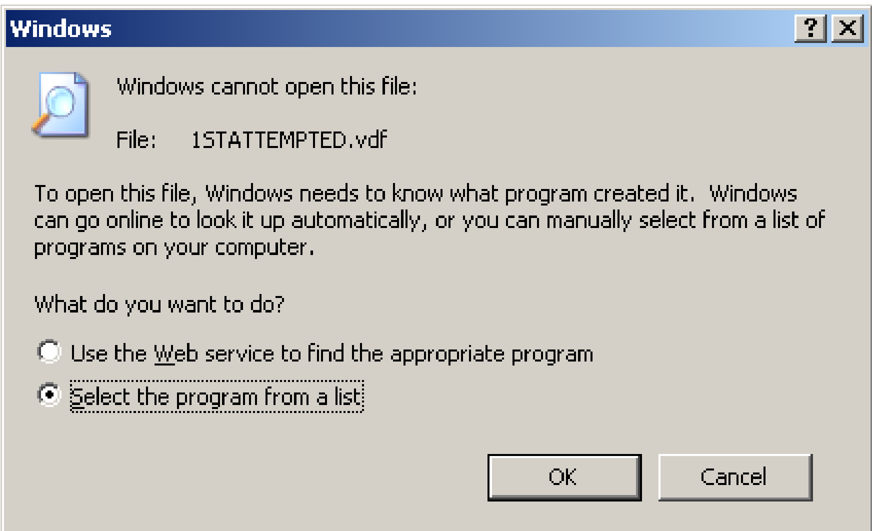


Figure 13-24: Select a program to open the .rwk extension (Notepad)

Once the file is open, you will notice that the paths are pointing to the D: drive (Figure 13-25).

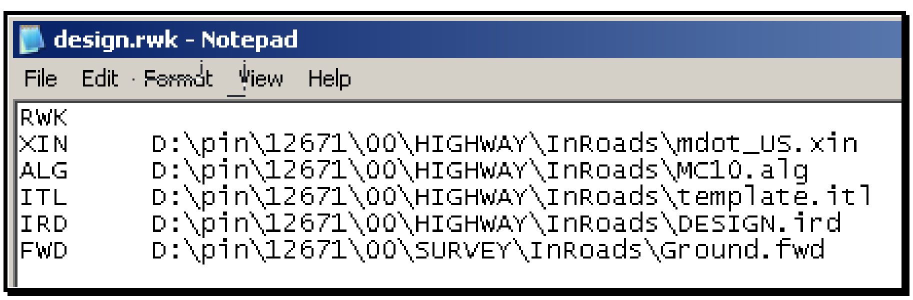
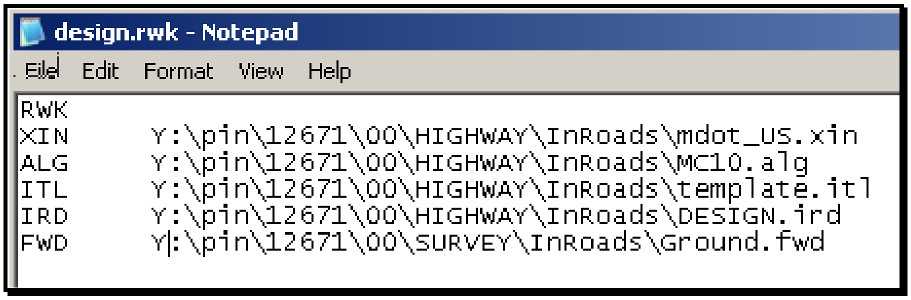


Figure 13-25: RWK file pointing files the D: drive

Replace the D: with a Y: so that the paths to the files are directed to the network (Figure 13-26). Save the file.




```
RWK
XIN     Y:\pin\12671\00\HIGHWAY\InRoads\mdot_US.xin
ALG     Y:\pin\12671\00\HIGHWAY\InRoads\MC10.alg
ITL     Y:\pin\12671\00\HIGHWAY\InRoads\template.itl
IRD     Y:\pin\12671\00\HIGHWAY\InRoads\DESIGN.ird
FWD     Y:\pin\12671\00\SURVEY\InRoads\Ground.fwd
```

Figure 13-26: RWK file adjusted so that it points for files on the Y: drive

Chapter 14 Alignment Design

CREATE AN ALIGNMENT

CREATE A GEOMETRY PROJECT

Overview

To create an alignment in InRoads, you first must create a *Geometry Project.* A *Geometry Project* is nothing more than a container for your horizontal and vertical alignment. InRoads store an alignment as an **.ALG** file. You can have multiple *Geometry Projects* open, but only one active.

Step One: Open InRoads

✓ ***Please refer to page 12-1 for more information on opening InRoads.***

Step Two: Create a Geometry Project

Using the “arrow” buttons on the *InRoads Explorer* dialog (highlighted in red in Figure 14-1), browse to the *Geometry* tab. Right click the words **Geometry Project** and select **New…** (or select **File>New…** from the InRoads main menu.)

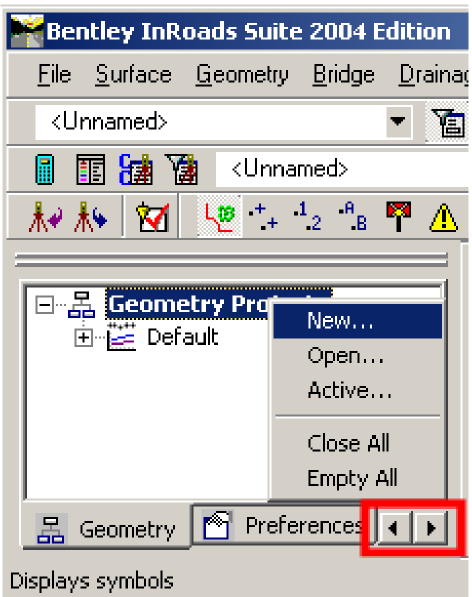


Figure 14-1: Create a new Geometry Project

Step Four: Name the Geometry Project

Supply a name for your *Geometry Project* (i.e. MC10 or MainLine) as seen in Figure 14-2. Add a description if you think it would be helpful, but it’s not necessary. Click **Apply.** Don’t close the dialog yet.

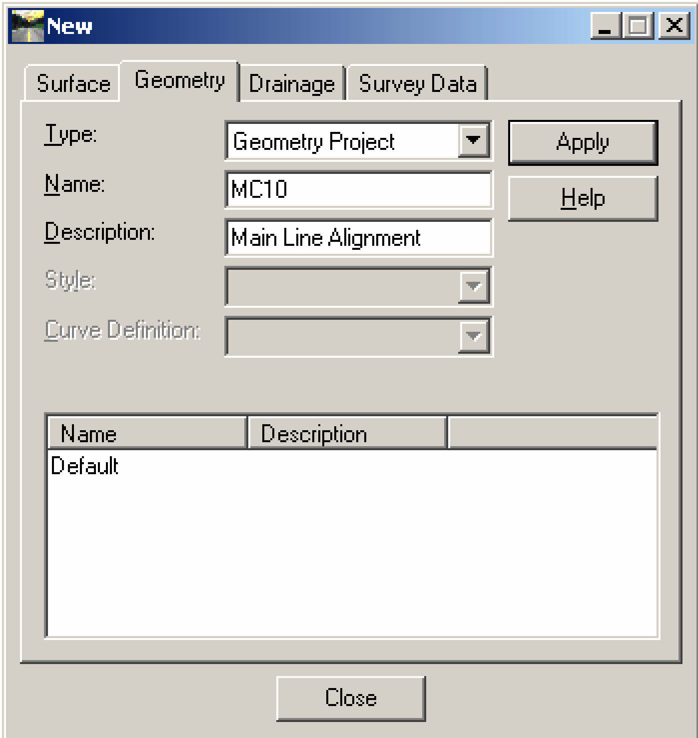


Figure 14-2: Name the Geometry Project

CREATE HORIZONTAL ALIGNMENT

Step One: Create a Horizontal Alignment

With the *New* dialog still open, change the pull down to *Horizontal Alignment* (Figure 14-3).

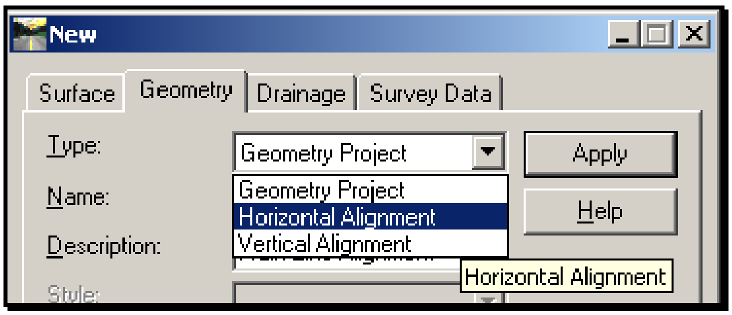


Figure 14-3: Create a new Horizontal Alignment

- ♫ If you've closed the dialog, right click the **Geometry Project** you just created and select **New…** or select **File>New…** from the InRoads main menu.

Step Two: Name the Horizontal Alignment

Supply a name for your *Horizontal Alignment* (i.e. MC10 or MainLine) as seen in Figure 14-4. You can use the same naming convention as the *Geometry Project*. Add a description if you think it would be helpful, but it's not necessary.

Change the *Style* to **D_Roadway_Centerline.** Click **Apply.** Don't close the dialog yet.

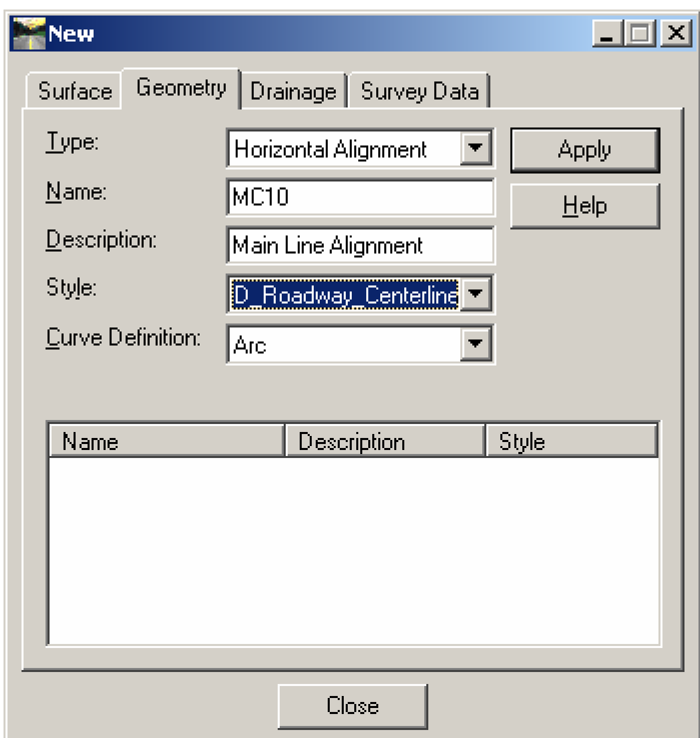


Figure 14-4: Name the Horizontal Alignment

Step Three: Design Horizontal Alignment

Please refer to InRoads HELP and/or the documentation delivered with training (Bentley courseware).

Step Four: Display and Annotate Horizontal Alignment

- ✓ ***Refer to page 14-11 for detailed instructions on displaying and annotating your horizontal alignment.***

CREATE VERTICAL ALIGNMENT

Step One: Create a Vertical Alignment

With the *New* dialog still open, change the pull down to *Vertical Alignment* (Figure 14-5).

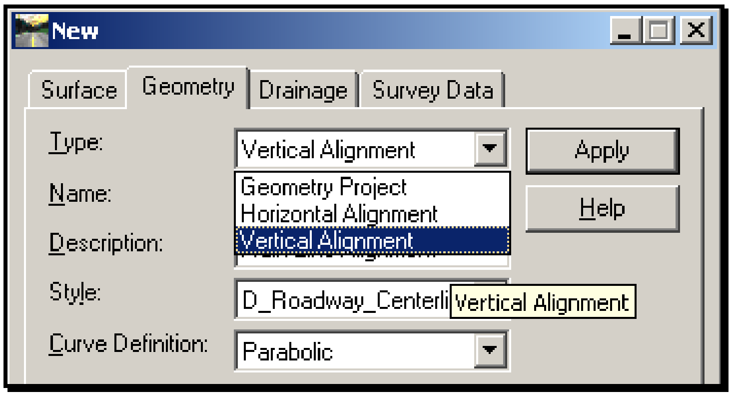


Figure 14-5: Create a new Vertical Alignment

♬ If you've closed the dialog, right click the **Horizontal Alignment** you just created and select **New…** or select **File>New…** from the InRoads main menu.

Step Two: Name Vertical Alignment

Supply a name for your *Vertical Alignment* (i.e. MC10 or MainLine) as seen in Figure 14-6. You can use the same naming convention as the *Geometry Project*. Add a description if you think it would be helpful, but it's not necessary.

Change the *Style* to **D_Roadway_Centerline.** Click **Close.**

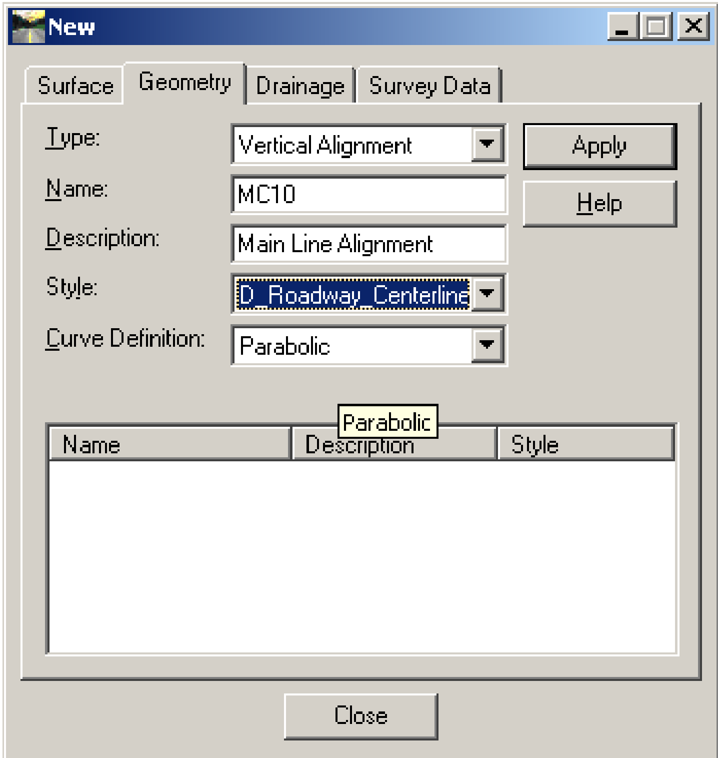


Figure 14-6: Name the Vertical Alignment

Step Three: Design Vertical Alignment

Please refer to InRoads HELP and/or the documentation delivered with training (Bentley courseware).

Step Four: Display and Annotate Vertical Alignment

✓ ***Refer to page 18-8 for detailed instructions on displaying and annotating the vertical alignment.***

SAVE GEOMETRY PROJECT

Saving the Project

There is more than one way to save the project. Right click on the *Geometry Project* and select **Save** (Figure 14-7). The directory should be defaulted to your *Workgroup's* MSTA folder. Select **Save** and click **Cancel** to close the dialog.

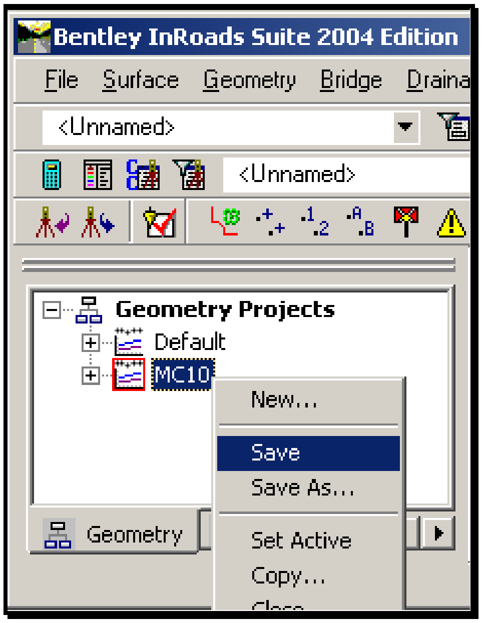


Figure 14-7: Save the Geometry Project at the InRoads Explorer dialog

Another method is to select **File>Save>Geometry Project** from the InRoads main menu (Figure 14-8). The directory should be defaulted to your *Workgroup's* MSTA folder. Select **Save** and click **Cancel** to close the dialog.

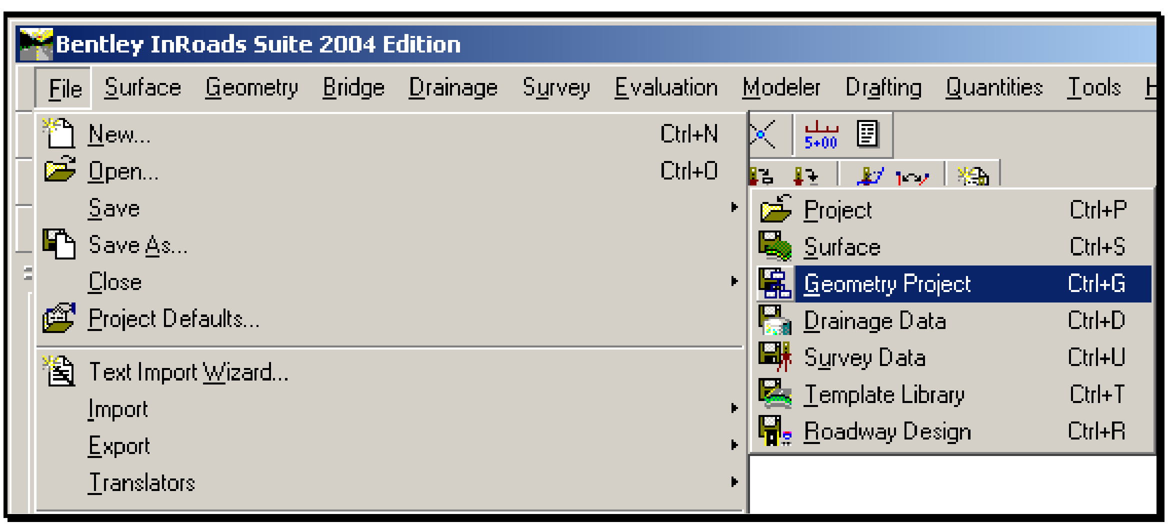


Figure 14-8: Saving the project via the main menu

Add to RWK

Now would be a good time to add the *Geometry Project* to your RWK. Select **File>Save As…** and adjust the *Save as Type* to **.rwk** and adjust the *Options* button to *Add* and *Update* the new *Geometry Project.*

✓ ***Refer to page 13-27 for more information on adding to an RWK.***

DISPLAY YOUR ALIGNMENT DRAWING

CREATE ALIGNMENT DRAWING

- After entering your project file you may want to verify your *Global Scale Factors* are set to the desired scale before displaying your Alignment drawing.
- If you started your alignment at a station other than an even 100' increment (i.e. 10+21.00, 2+20.00), verify your *Station Lock* is **on** before annotating your alignment.

Step One: Open InRoads Suite

To begin, double click your **InRoads Suite** icon. By default the user is set to **InRoads_Network**, if you are working in a local pin setup then you will want to change the user to **InRoads_Local**. Select your project from the project pull down and open your workgroups **??plan.dgn** (i.e. HDPlan.dgn or BDPlan.dgn.).

Step Two: Create Alignments drawing

Select **File>Makesheetz** from the *MicroStation Main Menu.* Select the **no prefix** option and press **OK,** select **Alignments** and press **OK**, press **OK** again in the next dialog and the program will create your **Alignments.dgn** file in the active directory and opens it for you. Click **Cancel** to exit the program.

✓ ***Refer to 1-18 for help making drawing files.***

Step Three: Displaying your Alignment

Verify that you're **Geometry Project** is open and active. This can be achieved by checking for a red outline around your **Geometry Project** (Figure 14-9). If you haven't loaded your project then right click on **Geometry Projects** and select **Open**.

- If you have multiple **Geometry Projects** you can activate your project by right clicking on it and select **Set Active**.

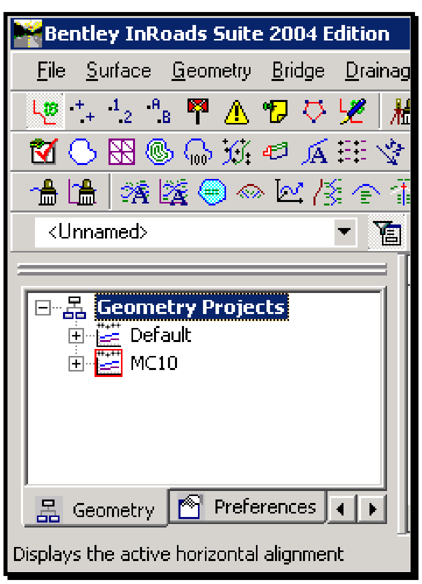


Figure 14-9: Active Geometry Project

Select from the *InRoads Main Menu* **Geometry>View Geometry>Active Horizontal** this will draw your centerline.

Step Four: Annotating your Alignment

Part One: Label Stationing

To Label the alignment stationing select from the *InRoads Main Menu* **Geometry>View Geometry>Stationing…** (Figure 14-10).

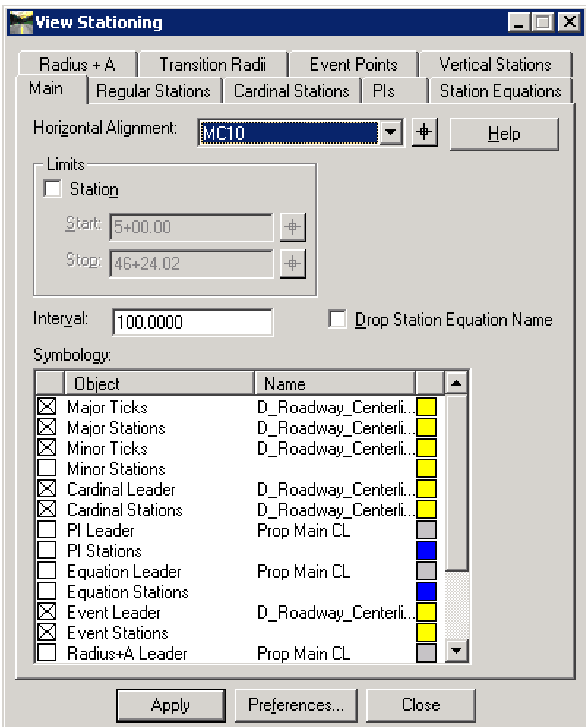


Figure 14-10: View Stationing

Settings have been predefined for MaineDOT standards, select **Apply** to see the stationing for your alignment.

Part Two: Label Bearings

To label the alignment bearings for your tangents along the alignment, select from the *InRoads Main Menu* **Geometry>View Geometry>Horizontal Annotation…** Figure 14-11).

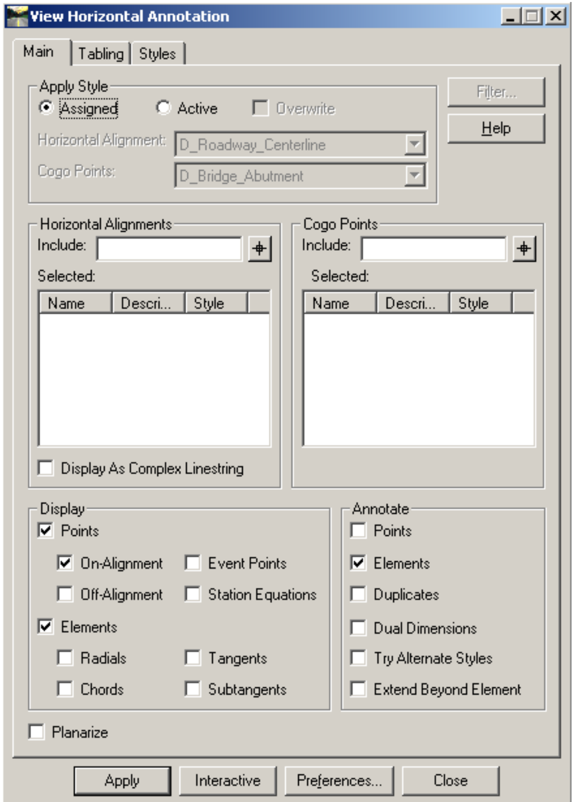


Figure 14-11: View Horizontal Annotation

From within the **View Horizontal Annotation** dialog you will need to select your alignment to be included for annotation. There are two ways to include your alignment. The first is to use the picker from the dialog located to the right of the **Include:** for **Horizontal Alignments** (Figure 14-12).

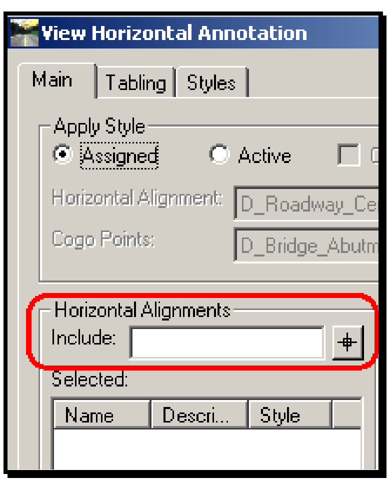


Figure 14-12: Horizontal Alignments to Include

Select your alignment from within the Alignments.dgn file with a left click to select it and another left click to accept the element. The **View Horizontal Annotation** dialog (Figure 14-13) will redisplay with your alignment **Selected:**.

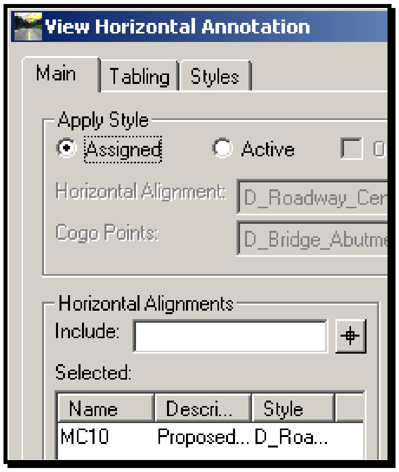


Figure 14-13: Horizontal Alignment Selected

The other option would be to put focus into the **Include:** area of the **Horizontal Alignments** portion of the dialog and select **Filter…** located to the upper right of the dialog. This will open the **Geometry Selection Filter** dialog (Figure 14-14) where you could pick one or more alignments to be added for annotation.

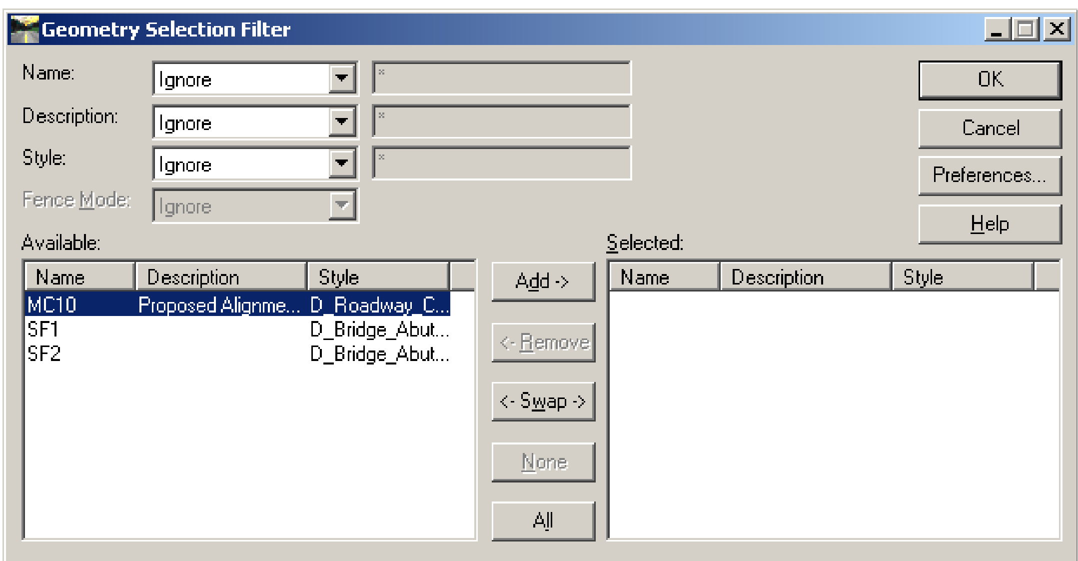


Figure 14-14: Geometry Selection Filter

Highlight your alignment and click the **Add ->** button and press **OK**. Click **Apply** in the **View Horizontal Annotation** dialog to finish annotating your bearings.

Part Three: Label Curve Annotation

To place curve data for the alignment select **Geometry>View Geometry>Curve Set Annotation…** (Figure 14-15).

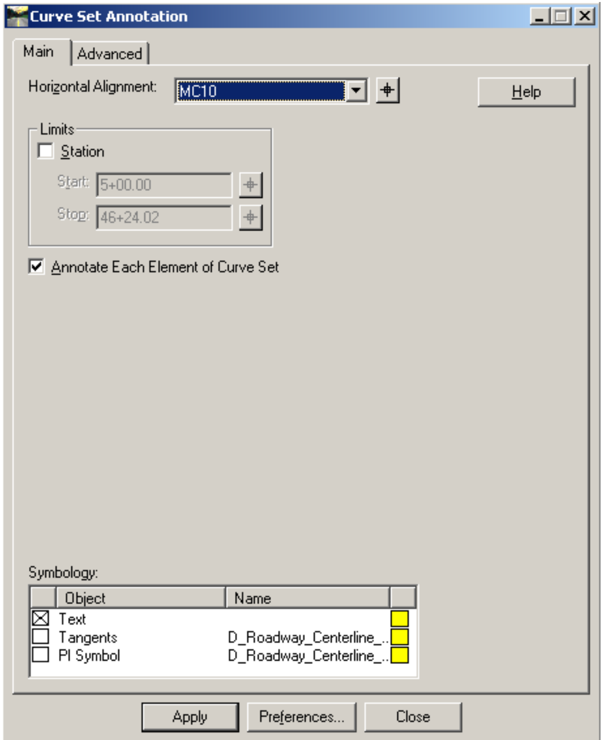


Figure 14-15: Curve Set Annotation

- Curve Data placed right of your alignment will require rotation of 180 degrees. Use your MicroStation tools to finalize your drawing.

Step Five: Flatten the Alignment

Select **Macros>Flatten** from the MicroStation menu. Click **OK** to flatten all elements in your **Alignments.dgn**.

- By default InRoads version XM should display the alignment at elevation zero unless you display a 3D alignment. InRoads will still maintain all information about the vertical alignment for reporting.

IMPORTING ALIGNMENT FROM GRAPHICS

This portion of the manual needs further development however is documented in the Bentley InRoads documentation.

Chapter 15 Templates

USING PREDEFINED SUB ASSEMBLIES

OVERVIEW

Sub Assemblies

Sub Assemblies are a grouping of minor components that form an intelligent portion of a template. Without them, some relationships (constraints) between pieces and parts would not work correctly when adjusting them in the *Roadway Designer* utility in InRoads. Until you become familiar with necessary constraints, symbology and surfaces, you should try and use the ones provided. You can modify them for your specific needs.

Importance of Feature Based Naming

Each vertex of a segment or closed shape within a template is relative to a longitudinal feature (called a string in MX) in proposed plan view (surface). In order to get the majority of string to automatically connect from typical to typical (template drop to template drop), these points have to be named the exactly same. For each shoulder to connect, the ES_L from one template needs to connect to an ES_L of the next template. Also, when you connect two *Sub Assemblies* together, the points need to match so that they combine correctly. You can connect points manually in the event this isn't possibly.

Affixes

All of the predefined shoulder *Sub Assemblies* were built for the left right in order to connect properly to the travelway *Sub Assemblies.* When using these *Sub Assemblies,* it is unnecessary to ever *Apply Affixes.* This will allow the component point labels to combine and join together correctly. Only *Apply Affixes* when constructing new templates or *Sub Assemblies* from raw components.

Reflecting and Mirroring

Reflecting or *Mirroring* should not be used when building templates from the predefined *Sub Assemblies* due to the fact that there have been Lt and Rt shoulders provided for each shoulder scenario. These options are used when constructing templates from raw components.

Alternate Surfaces

The predefined *Sub Assemblies* are designed so that there are multiple surfaces that can be generated on the fly. Not only can you create a surface of the Wearing Course, but you can easily generate a surface of the bottom of Wearing Course, bottom of Base Course of pavement, and bottom of subgrade. These surfaces can be reported on or displayed for various purposes. Some uses include field layout, volume calculations or visualization.

NHS and Non-NHS Templates

NHS Travelways are developed for 12' lane width, with two courses of pavement that are 3" thick. The shoulders are developed for an 8' shoulder with two courses of pavement that are 3" thick. The subgrade is designed at 18". Non-NHS template *Sub Assemblies* have been designed similarly with the exception of the width that are designed according to the current Highway Design Guide specifications based on the AADT.

The two top layers can be adjusted to what ever the pavement design requires. The first layer can be adjusted and considered 6” of total pavement. The second layer can be considered one of the many base course treatments (i.e. Foamed Asphalt, PMRAP, or other) and adjusted accordingly. Item numbers will be manually attached to the styles that are being used for the layers. The top layer can be reported as square yards and its multiple course depths calculated manually to estimate the separate tonnage.

Adjusting Widths, Slopes and Depths

Slopes, widths and depths of each component in a *Template Drop* can easily be manipulated in and out of transitions from station to station by adjusting the *Parametric Constraints.* Template points can also be manually edited for permanent change for a specific job.

✓ ***Refer to page 16-22 for more information on Parametric Constraints.***

Positive and Negative

A positive distance is one that moves from left to right anywhere on the template. Slopes are also signed from left to right where going up is positive and down is negative.

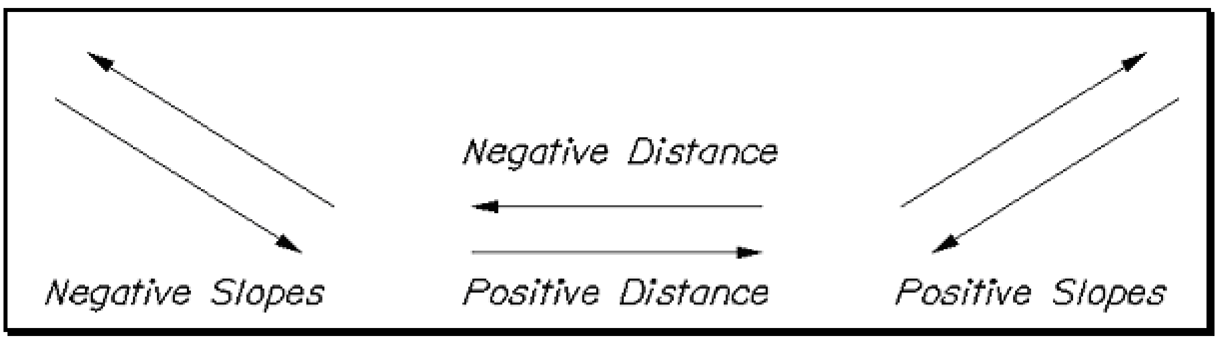


Figure 15-1 Positive and Negative slopes explained.

Wheel Mouse

A wheel mouse works well for viewing and manipulating templates. Besides zooming in and out, pressing the middle button (wheel) allows you to click and drag to move the template around. Using [Ctrl+wheel] will adjust the horizontal exaggeration and [Shift+wheel] will adjust the vertical exaggeration.

UPDATE AND ATTACH THE LATEST TEMPLATE LIBRARY

Updates to the Library

As we develop and modify the template library (**template.itl**), it will be necessary for users to refresh their copy in their project.

If you have been actively creating templates in the library within your project, use the *Template Library Organizer* to copy templates or folders from one library to another.

✓ ***Refer to page 15-18 for guidance on the Template Library Organizer.***

If you wish to overwrite your library within your project, run the Update Utility. Next, copy the library from your local copy in the C:\!msInRoadsconf\standards\InRoadsSTD folder to your PINs InRoadsSTD folder.

Attaching the Default Template Library

After launching InRoads, select **File>Open** from the InRoads main menu. Change the *File Types* pull down to ***.itl.** and browse to your projects InRoadsSTD folder.

BUILDING TEMPLATES FROM SUB ASSEMBLIES

Overview

NON-NHS Projects

These type projects have some pre-built templates already constructed based on the AADT. They contain two end conditions in one template. Turn on *Display All Components* in order to see both scenarios. These are intended for **evaluation purposes only** and will still need to be adjusted for pavement depths and maximum 3:1 slope offset from centerline. These templates will evaluate the possible needs for Guardrail on the project. Once this is determined, either delete the scenario not needed or build a template that will be used for the specific area. Expand the folder to see it these suit your needs or build them manually according to the following instructions.

"Typical" Strategies

It's a good idea to create the multiple templates (typical sections) that you foresee being used on your project. Maybe it's a sidewalk on the Left with curb type 1 in the urban section and curb type 3 in the rural section with daylight and possible guardrail on the right. Maybe there's need for a truck lane or an island in one portion of the project. *Template Drops* can be placed roughly where the area of need is and transitions or adjustments later.

Base Pavement Flexibility

There are certain cases where the base pavement continues from the Travelway and into the shoulder. Sometimes the base pavement is carried into the shoulder from 6", up to 24" or possibly full width of the shoulder. These points defining the width and slope of this base layer will need to be adjusted after connection to the Travelway. They are designed as 24" by default and 3" in depth. The width and depth can ultimately be adjusted with the *Parametric Constraints* or manually edited. The base pavement layer can be considered "Foamed Asphalt", "PM Rap" or a "Reclaimed" material in a grinding situation. Eventually the *Style* can be tied to any Item Number you desire for quantification.

Step One: Create Project Folder

Select **Modeler>Create Template…** from InRoads main menu. Right click on the top folder in the *Template Library* directory tree and select **New Folder** (Figure 15-2)**.** Enter your project's town name.

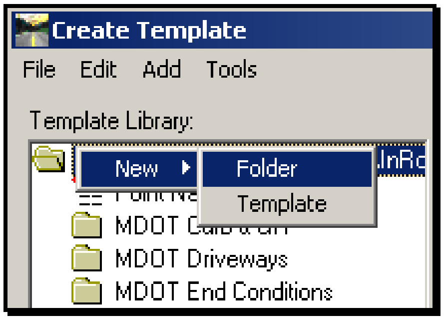


Figure 15-2 Creating a project folder

♬ This will make it easy in the future to copy templates from one project with a similar design to another or when provided back to CADD Support in order to update the master template library.

Step Two: Create a Template

Right click on the folder you created (town name) and select **New>Template** (Figure 15-3). Supply a name that describes the template (i.e. 4:1 Daylight LT SW RT).

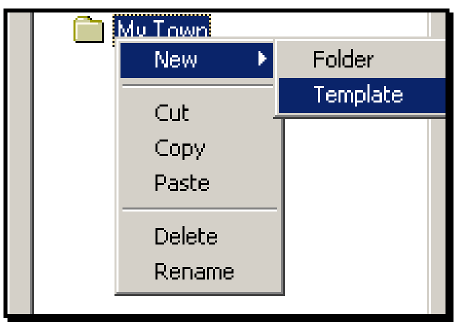


Figure 15-3 Create New Project Specific Template

Step Three: Add Travelway Sub Assembly

Part One: Turn On Dynamic Settings

Go to **Tool>Dynamic Settings.** This will open the *Dynamic Settings* dialog (Figure 15-4). Make sure that it is set to the X: Y: mode. Set the *Step* values to 0.1000. This precision allows you to place features to the nearest tenth of a foot.

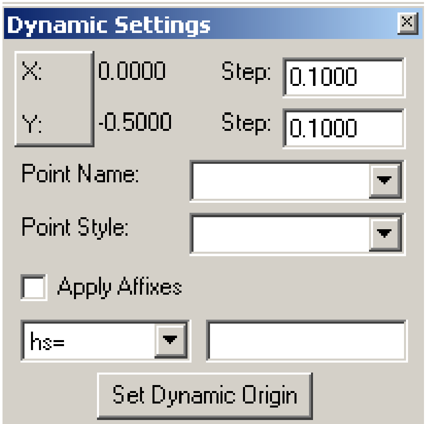


Figure 15-4 Dynamic Settings Dialog

Part Two: Uncheck Apply Affixes

All Travelway should be placed without affixes. The points have been assigned a _L or _R already.

Part Three: Expand Folder

Double click the **NHS (or Non-NHS) Travelway** folder to expand it.

Part Four: Drag and Drop Travelway

While hovering your mouse over the word **Travelway,** drag and hold the **Travelway** *Sub Assembly* into the "gridded" template window. While holding down your left mouse button, right click to get to the placement options menu. Verify that the *Sub Assembly* is not mirrored or reflected. Hit your ESC key to clear the menu. Release your left mouse when the *Sub Assembly* is near and "snapped" to the magenta colored box in the center of the screen (Figure 15-5).

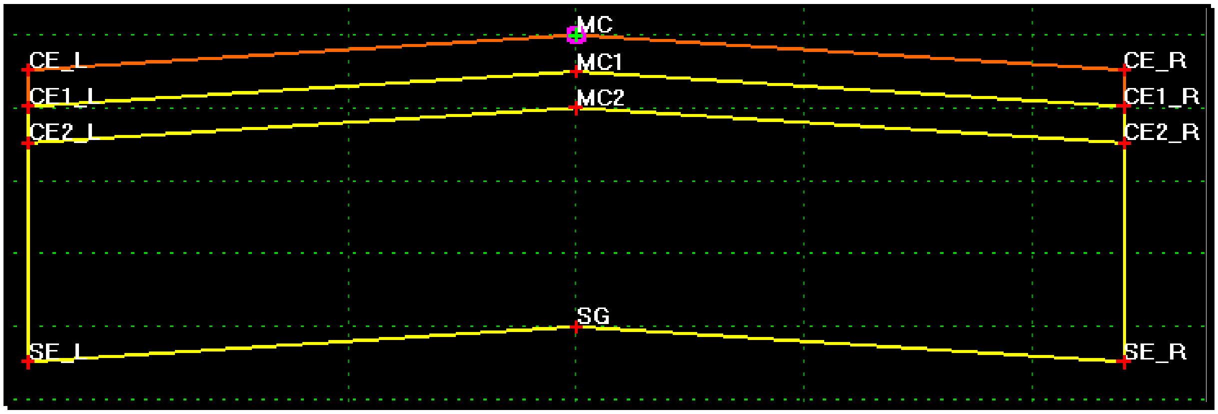


Figure 15-5 Travelway Sub Assembly placed at the Dynamic Origin

♬ The magenta colored square is the *Template Origin* or centerline point that the section is based on. You can set this origin in other locations when an offset centerline is desired.

Step Four: Add Shoulder Sub Assemblies

Overview

Similar to the pre-built Non-NHS templates, there are some shoulder *Sub Assemblies* that have been built for evaluation purposes only (Ditch/GR). They are used to determine areas that will require Guardrail and or ditching. They contain two end conditions in one template. Turn on *Display All Components* in order to see both scenarios. These are intended for evaluation purposes only and will still need to be adjusted for pavement depths and maximum 3:1 slope offset from centerline. These templates will evaluate the possible needs for Guardrail on the project. Once this is determined, either delete the scenario not needed or build a template that will be used for the specific area.

There are two points on every shoulder *Sub Assembly* that will require manual constraints once connected to the *Travelway*. These points can be identified by the Green points BD (or BD2) and points SS or (SS1). This will allow the shoulder to break correctly for Superelevation.

Part One: Turn Off Apply Affixes

From the *Create Template* menu, select **Tools**>**Options…**and remove the check mark in the *Apply Affixes* box (Figure 15-6). Click **OK.**

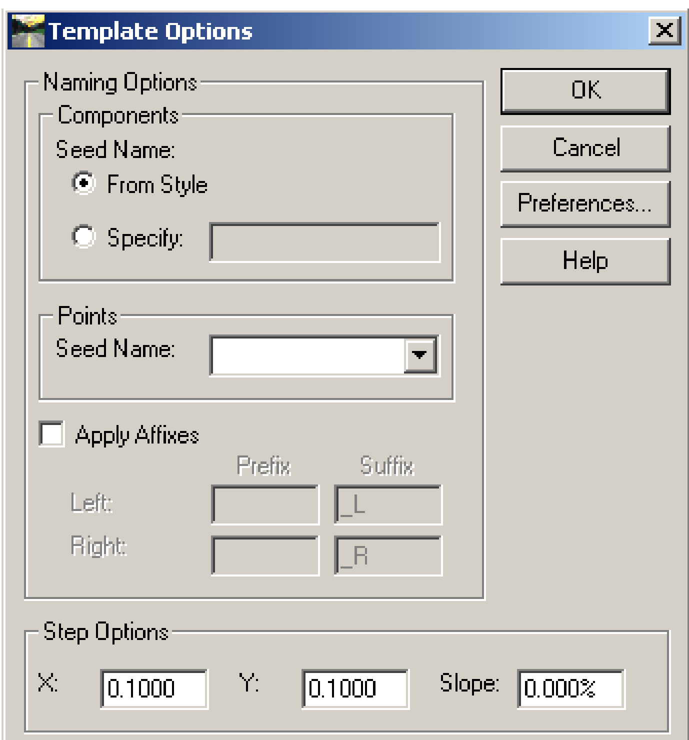


Figure 15-6 Template Options – Uncheck Apply Affixes

Part Two: Drag and Drop Shoulder

Double click to expand the **NHS (or Non-NHS) Shoulders** folder. Pick the shoulder *Sub Assembly* that you would like to use for the starting point of your alignment. While hovering your mouse over the shoulder (i.e. **4:1 Ditch Round BkSlope LT**) drag and hold the *Sub Assembly* into the "gridded" template window. While holding down your left mouse button, right click to get to the placement options menu. Verify *Reflect and Mirror* is **unchecked**. Hit *ESC* to close the sub menu. Release the *Sub Assembly* on CE point at the edge of Travelway. The point will turn white when exactly on top of the point. Repeat for the opposite shoulder picking the type of shoulder required.

Part Three: Adjust Shoulder Width or Depth (if necessary)

Double click the ES points to adjust the horizontal width of your shoulder. All points below this point will follow the new width. All NHS shoulders are defaulted to 8' in the templates. Adjust the ES1 and MC1 points to adjust the depth of the wearing course. Adjustments can be made manually or by using the *Parametric Constraints* utility inside of *Roadway Designer* as described later.

Part Four: Adjust Base Pavement Width or Depth

Double click base pavement point BD or BD2 (_L or _R). By default these points are extended 2' into the shoulder. Set a *Horizontal* constraint to the CE point and adjust the width if necessary. Now apply a *Vector-Offset* constraint to points CE1 and MC1 (Figure 15-7). This will set the slope of the base pavement layer to follow the slope of the Travelway. Click **Apply.** Repeat for the opposite shoulder.

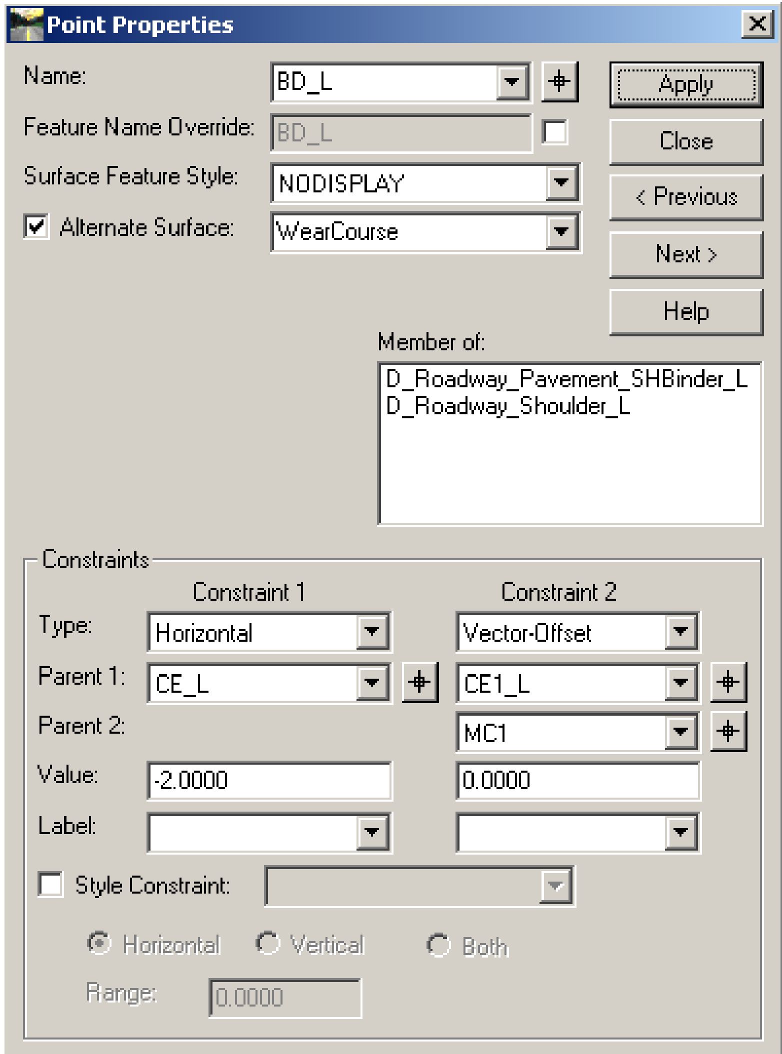


Figure 15-7 Constrain point BD with a Horizontal and Vector-Offset

If the base pavement layer will be the **full width of the shoulder,** right click the BD or BD2 points and select **Delete Constraints.** Right click the point again and select **Move.** Move the points to the ES1 point. Right click this point and select **Merge Points.** There will be up to three points in this location. Select the points BD and BD1 (one at a time) to merge the point. The result should be a single point labeled ES1 for connectivity between templates.

To adjust the base depth, double click base pavement point ES2 or ES3 (_L or _R). By default the base pavement depth is 3". Set the *Vertical* constraint to be the depth required. Adjust points CE2 and MC2 to the same depth as well.

Part Five: Adjust points SS

Double click subgrade point SS or SS1 (_L or _R). These points will require a second constraint that could not be added until connected to the travelway. These points need to follow the same slope as the subgrade in the travelway. Set the second constraint as a *Vector-Offset* to points SE and SG (Figure 15-8). This will set the slope of the subgrade in the shoulder to follow the slope of the Travelway. Click **Apply.** Repeat for the opposite shoulder.

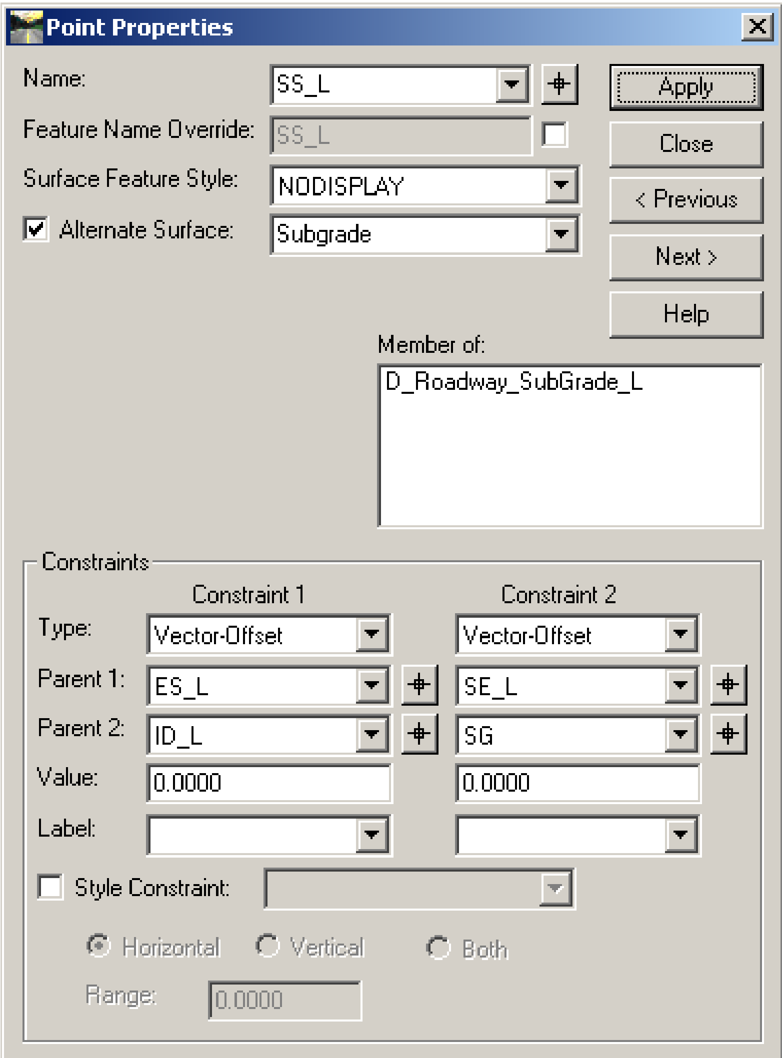


Figure 15-8 Constrain point SS with two Vector-Offsets for Daylight sections.

Other Adjustments (optional)

There are other points in a template that you may want to adjust. Certain shoulder *Sub Assemblies or Non-NHS templates* contain *Rules* based on certain criteria such as offset to the Toe of slope. To give the offset a tangible value, double click the points IC or IF and apply a horizontal value from the MC (centerline) point in your template. If the ROW line is parallel to the centerline at a 3 Rod (33') offset, adjust your maximum offset of the flatter slopes to 32' or so to keep the limits inside of the ROW line. Let the maximum slope allowed govern encroachment into the ROW.

You can make manual adjustments to the template you just created by double clicking on the points and adjusting their values, however they can be adjusted using the *Parametric Constraints* utility inside of *Roadway Designer* described later.

✓ ***Refer to 16-22 for more information of Parametric Constraints and the Roadway Designer.***

Step Five: Add Underdrain

Overview

The drainage features are available to add to your templates. The are based on standard depths which can be adjusted manually in a *Template Drop* based on the *Point* feature or a 3D line draped on the proposed plan surface. Eventually, we will be exploring the *Drainage and Sanitary* utility in InRoads.

Part One: Turn On Apply Affixes

From the *Create Template* menu, select **Tools>Options…**and place a check make in the *Apply Affixes box.* Also verify that the suffix _L and _R are going to be applied to the underdrain *Sub Assemblies*. Click **OK.**

Part Two: Drag and Drop Underdrain

Double click to expand the **Underdrain** folder. Pick the underdrain *Sub Assembly* that you would like to use for the starting point of your alignment. While hovering your mouse over the underdrain (i.e. **12" UD**) drag and hold the *Sub Assembly* into the "gridded" template window. While holding down your left mouse button, right click to get to the placement options menu. Select *Reflect* if you want to place the underdrain on the left. Deselect *Reflect* if you want to use it on the right. Release the *Sub Assembly* on point SS which is the edge of subgrade. Repeat for the opposite side if necessary.

BUILDING MEDIANS

Overview

Currently there is only one median type available called **Curb Type 5**. There are Travelway templates designed to connect to the median for the left and right lanes. The width of the median can be controlled by *Point Controls* defined by an element drawn in a plan view.

Step One: Place the Median

Create a new template in your *Town* folder. Double Click to expand the *Medians* folder. Select the median and place it without *Affixes* at the center point in the new template.

✓ ***Refer to 15-7 for more detailed instructions that are similar to placing a Median Sub Assembly.***

Step Two: Place Travelways

Place the *Travelway LT (Median)* as you would place a shoulder *Sub Assembly* (without *Affixes*) connecting it to the respective point. Repeat for the right Travelway.

✓ ***Refer to 15-7 for more detailed information that is similar to placing the Travelway Medians.***

Step Three: Add Shoulder Sub Assembly

Drag and drop shoulder *Sub Assembly* on the CE point of the *Travelway LT (Median)*.

✓ ***Refer to 15-9 for more detailed information on placing the shoulders for a median section.***

Step Four: Variable Width Medians

Part One: Draw Median in Plan View

Using MicroStation tools, draw the median in plan view. It is recommended that the median is split down the center and drawn in two sections. One represents the face of curb on the LT side of the median and one representing the face of curb on the RT.

Part Two: Select Lt Side(s) of Median(s)

Select all the LT portions of the medians (regardless if it crosses centerline).

Part Three: Import Geometry

Select **File>Import>Geometry** from the InRoads main menu. In the *From Graphics* tab (Figure 15-9), set the *Type* to **Horizontal Alignment.** Supply a name (i.e. MedianLT). Set the *Style* to **D_Curb_Type_5_Lt.** Click **Apply** and accept the selection set. Repeat for the RT side of the medians.

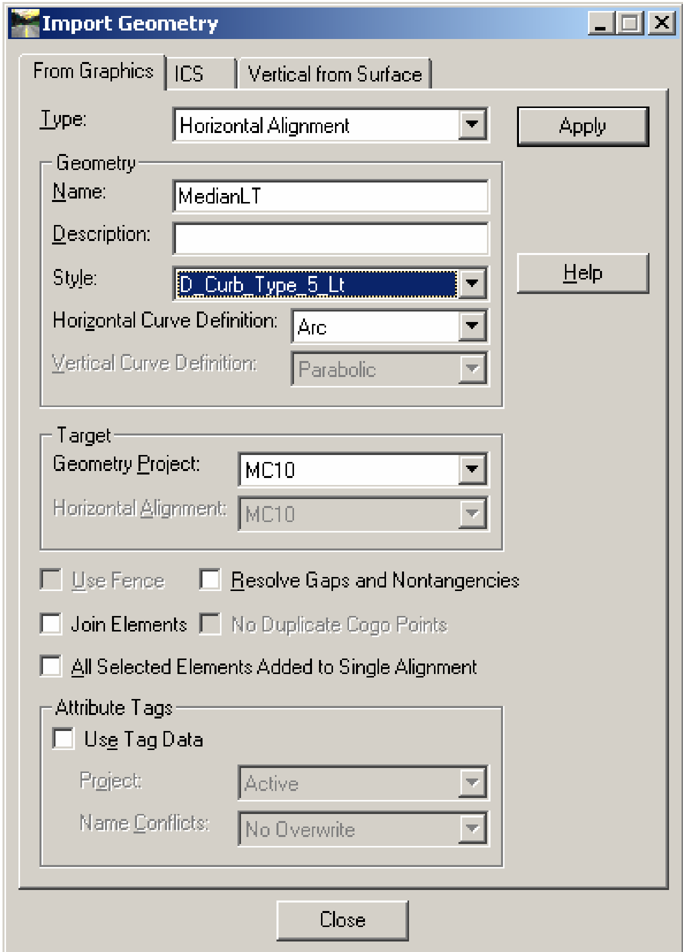


Figure 15-9: Import the LT and RT portions of the medians From Graphics.

The face of curb points in the median templates have a *Style Constraint* that will automatically follow the geometry (alignments) you just imported from graphics.

AUXILIARY LANES

Overview

It isn't necessary to use an auxiliary lane *Sub Assembly* unless the lane is intended to use a different cross slope than the normal Travelway lane. Instead, simply adjust the *Parametric Constraints* to adjust your right or left Travelway width (or both) from station to station and also to adjust your transition in and out of the lane.

Step One: Place Travelway

Create a new template in your *Town* folder. Place the Travelway without *Affixes* on the center point of the template.

✓ ***Refer to 15-7 for placing a Travelway Sub Assembly.***

Step Two: Place Auxiliary Lane

Place Auxiliary Lane as you would place a shoulder *Sub Assembly* connecting it to the respective point.

✓ ***Refer to 15-7 for more detailed information similar to placing the Auxiliary Lane.***

Step Three: Add Shoulder Sub Assembly

Part One: Turn off Apply Affixes

Uncheck the *Apply Affixes* box of the *Dynamic Settings* dialog.

Part Two: Place Shoulder Assembly

Drag and drop shoulder *Sub Assembly* on the outer portion of the Auxiliary Lane.

Part Three: Adjust Transitions

Adjust the transition in and out of the auxiliary lane using *Parametric Constraints*.

IMPORTING TEMPLATES FROM GRAPHICS

Overview

It is possible to import graphics from MicroStation into InRoads as a *Template.* All the curb types, underdrain and guardrail in the default template library were imported from existing MicroStation graphics. There are some steps that need to be done to make it possible.

Step One: Drop Cells, Complex Lines and Shapes

Cells and Complex Shapes must be dropped. Select **Qualities>Drop>Complex** and click on the cell or elements to be imported.

Step Two: Select the Components

Select the components by using the *Power Selector* or other selection method.

Step Three: Import the Template/End Condition

Select **File>Import Template** from the *Create Template* dialog in InRoads.

Step Four: Define the Template Origin

Define the origin with data click.

Step Five: Connect the Dots

The *Import Template* command will bring the elements into your *Template Library* as line segments. Create new components (connect the dots) using the InRoads template tools to make single components with the correct symbology.

TEMPLATE LIBRARY ORGANIZER

Copy Templates From One Library to Another

Step One: Open Destination Template Library

Select **File>Open** from the *Create Template* dialog menu. Browse to the library you want to copy other templates to. This is the destination library.

Step Two: Open Template Library Organizer

Select **Tools>Template Library Organizer (**Figure 15-10).

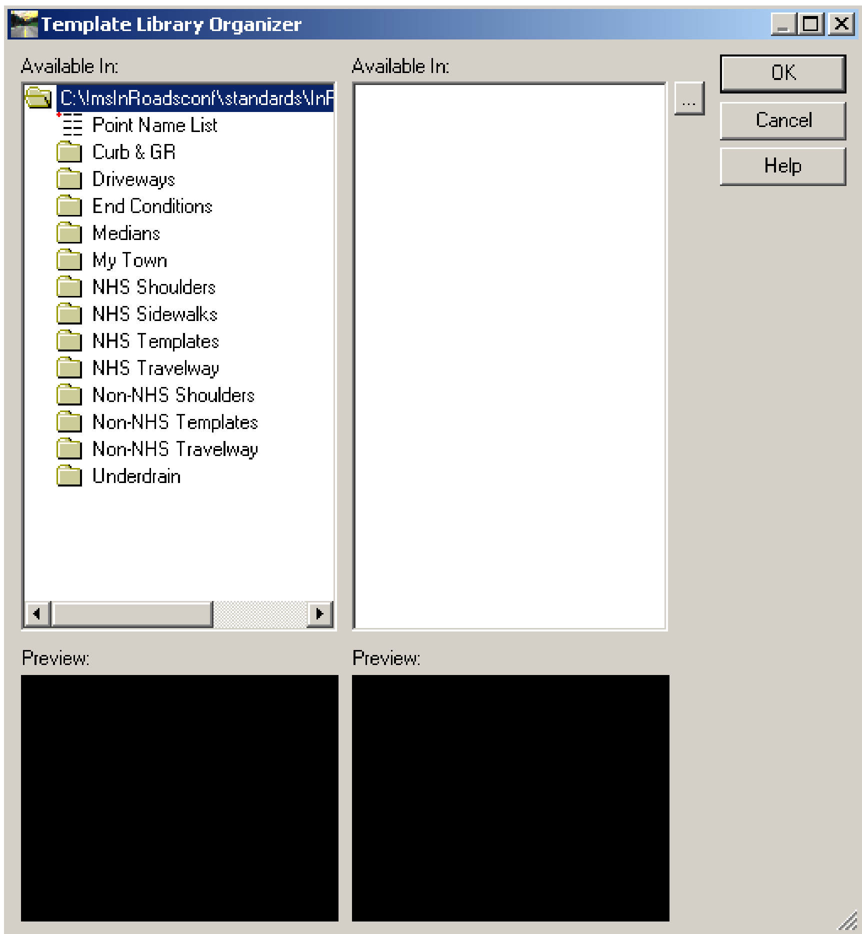


Figure 15-10 Template Library Organizer dialog

Step Three: Browse to Library Copying From

One the right side of the dialog, click the browse button (button with 3 dots) and browse to the source library you are copying from.

Step Four: Drag and Drop Templates or Folders

Drag and drop Templates or Folders from the Library on the right side of the dialog to the library on the left. When finished, you will be prompted to save changes to the library(s).

Chapter 16 Roadway Design Development

USING THE ROADWAY DESIGNER

PREREQUISITES

Geometry - Alignment (Horizontal and Vertical)

You must have a horizontal and vertical alignment to use the Modeler.

✓ ***Refer to InRoads Help menu for more information on creating an alignment.***

Ground Surface

As part of normal workflow, the Survey Group within the Property Office will be providing an existing ground surface as a standard deliverable. The existing surface is called **Ground.dtm** and is located in the Survey/MSTA folder in your project directory.

Template Library

It's a good idea to generate the templates or *Template Drops* (typical sections) that you foresee using on your project (i.e. Sidewalk RT, Daylight LT). You need at least one template to drop on your alignment in order to process against your existing ground surface.

✓ ***Refer to 15-7 for more information on creating a template.***

CORRIDORS AND TEMPLATE DROPS

Overview

The *Roadway Design* file (.ird) contains most of your custom design options for your project. It contains the corridor, arrangement of templates used, the custom end conditions, any editing done to a particular station, parametric constraints, super elevations, etc.

Step One: Start Roadway Designer

From the InRoads *main menu,* select **Modeler>Roadway Designer.**

Step Two: Creating a Corridor

Select **Corridor>Corridor Management…** from the InRoads menu (Figure 16-1). Supply a name for your corridor (i.e. MainLine or Design). If multiple corridors are necessary (i.e. on-ramps, exit ramp, slip lane, other merging alignments, etc.) for different sections of the alignment or feature, they can be added here. Normally a single corridor works for most projects. Set your horizontal and vertical alignments. Click **Add.** Close the dialog.

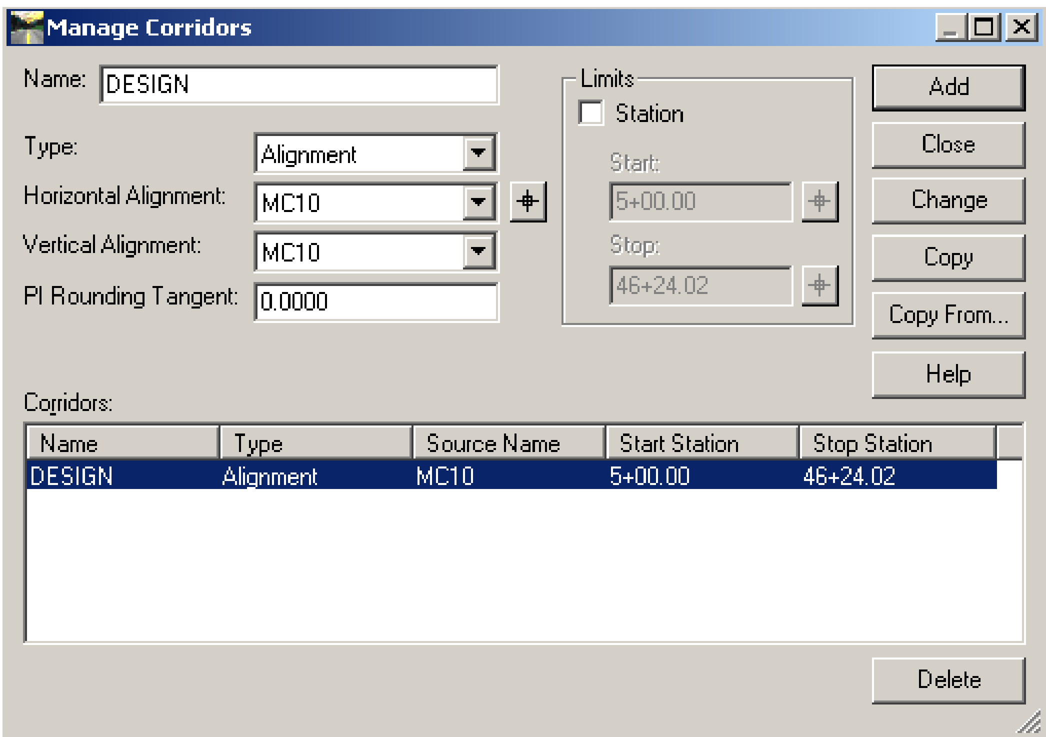


Figure 16-1 Manage Corridors dialog.

Step Three: Add Template Drops

Overview

Select **Corridor>Template Drops** from the InRoads menu. If you have an idea where the templates will apply, place the templates at these stations.

Transitions Between Templates

If a transition is required from one template to another (i.e. regular daylight section to a daylight section with an auxiliary lane or daylight to guardrail section), place the individual drops twice, once at the start of the area and once at the end (Figure 16-2). Leave a 50 foot transition (or what's required) between the two template drops for fine tuning. Only similar templates should be transitioned together. These are templates that have the same point naming throughout.

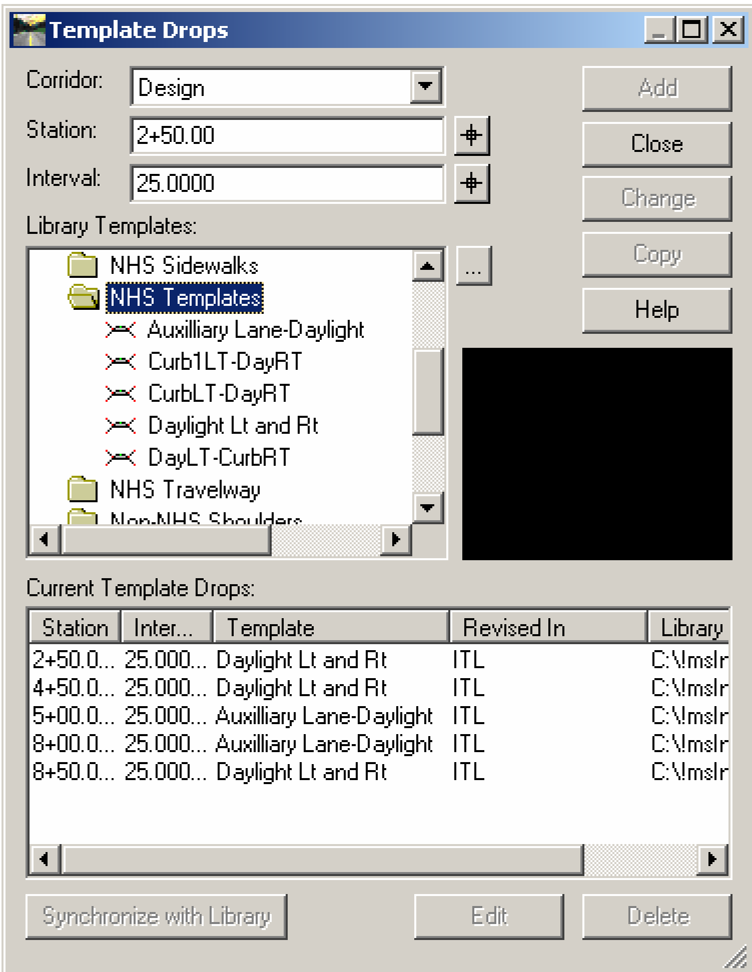


Figure 16-2 Template Drop dialog.

A yellow box will appear in the *Roadway Designer* indicating the transition area. Double click the yellow box and verify point connectivity. Refer to *Help* or training documents as to joining points.

Disabling Transitions

Never transition from a box section to a daylight section. A single instance of the drop is required at the station that the template changes. To disable the transition, right click the yellow box and uncheck *Enable Transition.* This will prevent the transition of the two templates.

ⓘ ***There is a known issue with the software when transitioning from a curb section to a daylight section. The curb feature may not extend all the way to the beginning of the next template drop. In this case it is necessary to add the same curb drop .01 feet prior to the daylight drop.***

Close Template Drop Dialog

When finished adding the *Template Drops,* hit **Close** to exit the dialog.

Step Four: Select an Active Surface

Set the *Active Surface* using the pull down (Figure 16-3). Select the "Ground" *Surface* that represent the existing ground for your project (i.e. Ground). By default it should be called *Ground.dtm* and will be located within the Survey/MSTA folder.

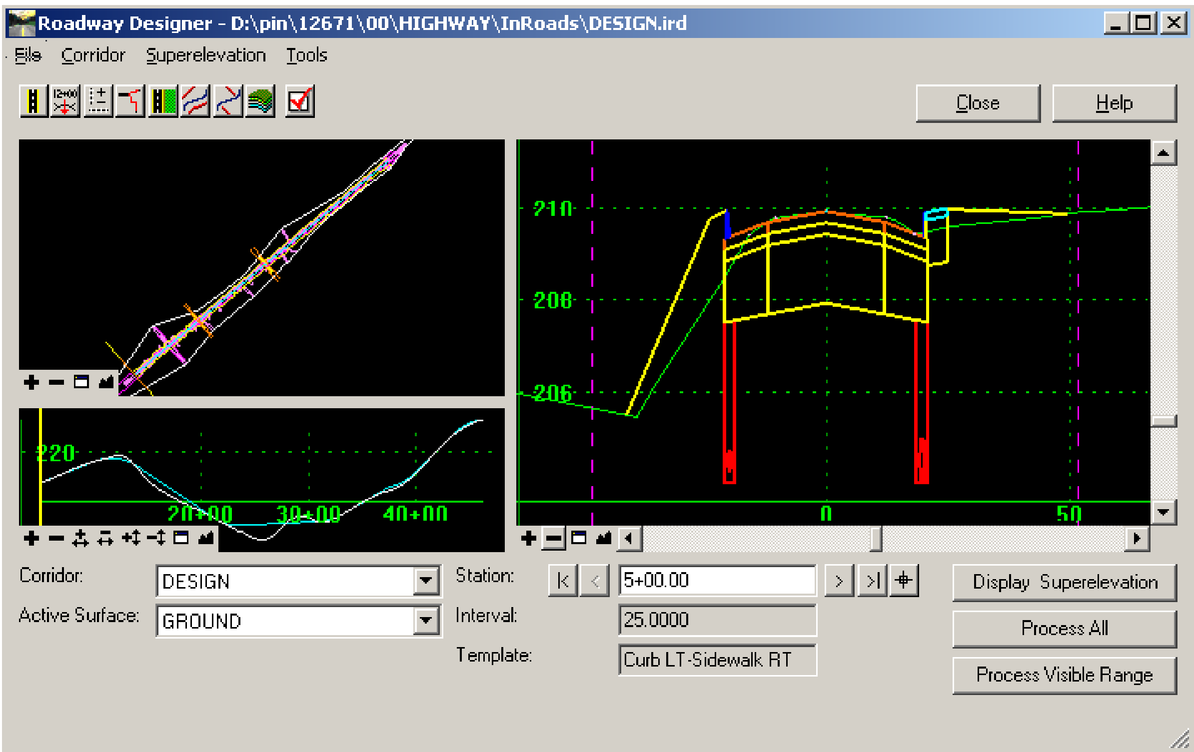


Figure 16-3 Roadway Designer dialog with Corridor and Active Surface selected.

Step Five: View the Sections

You can select *Process All* or simply use the arrow keys to move from beginning to end of your project. *Process All* displays the slope intercepts along the project and the possible end condition failures (highlighted in red blocks).You can also use the yellow line in plan or profile view to look at certain key areas along your project. The yellow block areas represent the transition areas between the *Template Drops.*

♬ If there are certain stations you wish to view within the *Roadway Designer*, add a *Key Station* by selecting **Corridor>Key Stations** from the *Roadway Designer* menu.

Step Six: Adjust Template Drops

If after looking through the sections within the *Roadway Designer*, you may want to adjust the station of a drop based on it's interaction with the existing ground. Select **Corridor>Template Drops** from the *Roadway Designer* menu. Highlight the drop in the *Current Template Drops* portion of the dialog (Figure 16-2) and adjust the station. Select the **Change** button to make the change. You may need to change an additional drop to accommodate this change.

DISPLAY REFERENCES FROM GROUND SURFACE (DRIVES AND ROADWAY EDGES)

Overview

It can be handy to display the existing edges of Travelway, shoulders and drives along the project while tweaking your design. Because the *Ground* surface contains all of the existing features, you can pick the features you want to include. This could be anything from wetlands, existing ditches, retaining walls, or other feature(s). This doesn't mean that these features are going to show up in Cross Sections. There's another procedure for displaying point and crossing features in sections. This is simply for the Modeler plan view window.

Step One: Display Drives and Road Edges

We have developed a standard filter called **Entrance Edges** to make it easy for the user to display these features in plan view of the *Roadway Designer*.

Select **Corridor>Display References** from the *Roadway Designer* menu (Figure 16-4).

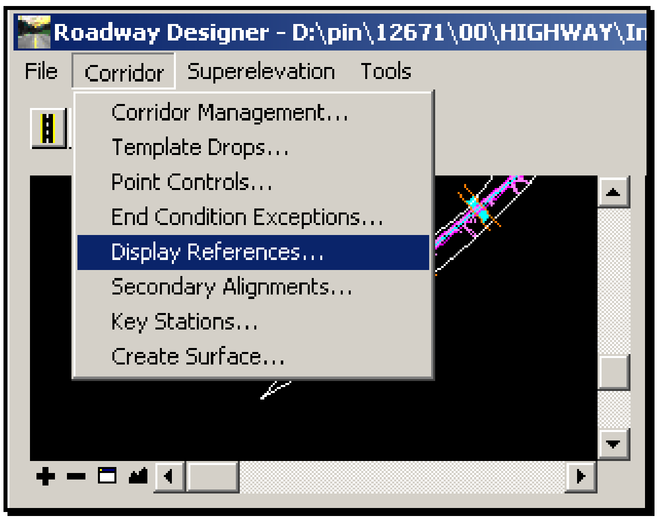


Figure 16-4 Roadway Designer Display References...

Step Two: Set Surface and Filter

Use the *Surface* pull down and select **GROUND** (Figure 16-5). Select the radio button in the *Filter* selector and use the pull down to select the filter called **ENTRANCE EDGES.** Click the **Add** button. If there are other features in the *Ground* surface you would like to add, you can select them individually by selecting the *Feature* radio button and using the *Feature* pull down to add the items.

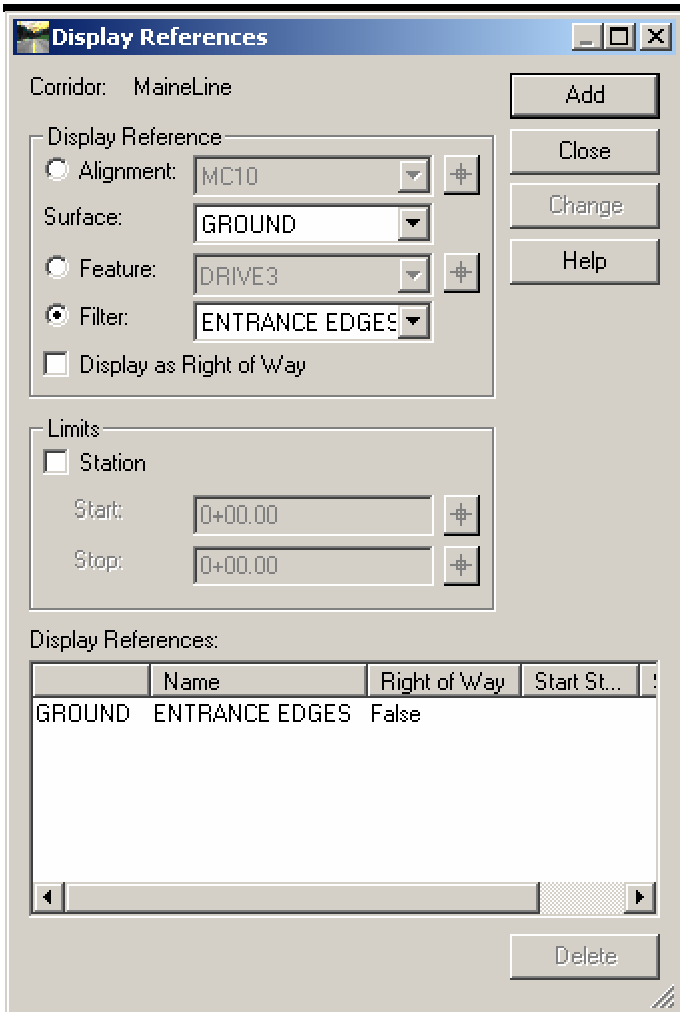


Figure 16-5 Display Reference dialog with Entrance Edges

The plan view portion (Figure 16-6) of the dialog should now contain the drives and edges of pavement and gravel. The cross section view will display diamonds where these lines are crossed with the old ground.

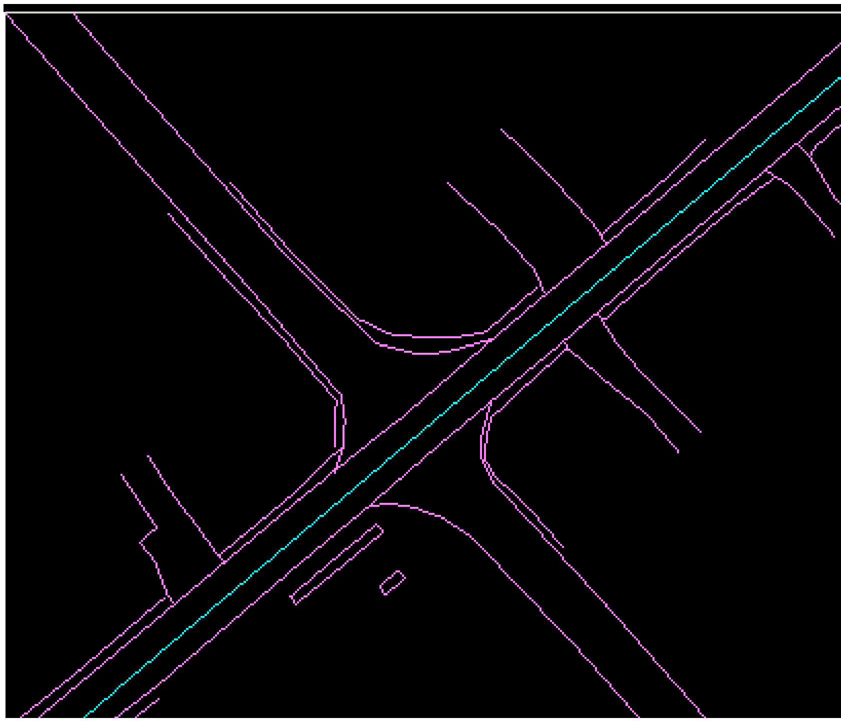


Figure 16-6 Plan view portion of the Roadway Designer with drive edges displayed.

- *Display as Right of Way* check box can be used for a defining feature in the *Ground* surface such as a fence or stone wall. It can be better defined by using the graphics developed from deeds by the Right of Way Mapper.

Display References from EROW Surface

Overview
The existing Right of Way lines can be displayed in the plan view portion of the *Roadway Designer* as well as in the cross section view defined by vertical dashed lines. This requires a few more steps than the items used from the *Ground* surface. When existing Right of Way is done completely in InRoads and the surface is made available, the additional steps won't be necessary.

Step One: Open XXPlan.dgn
Open the XXPlan.dgn from your list of files in your PIN MSTA directory (i.e. **HD**Plan.dgn or **BD**Plan.dgn depending on your workgroup) or attach RWPLAN.dgn as a reference file to the current file you have open. This contains the default references, including Right of Way Lines (RWPLAN.dgn), for a standard project.

Step Two: Import/Create Surface from Graphics
Select **File>Import>Surface Advanced…** from the InRoads main menu. In the Import Surface Advanced dialog (Figure 16-7), add a name for the new surface (i.e. **EROW**) and select **All** from the *Load From* pull down. The *Intercept Surface* should be set to **Ground.**

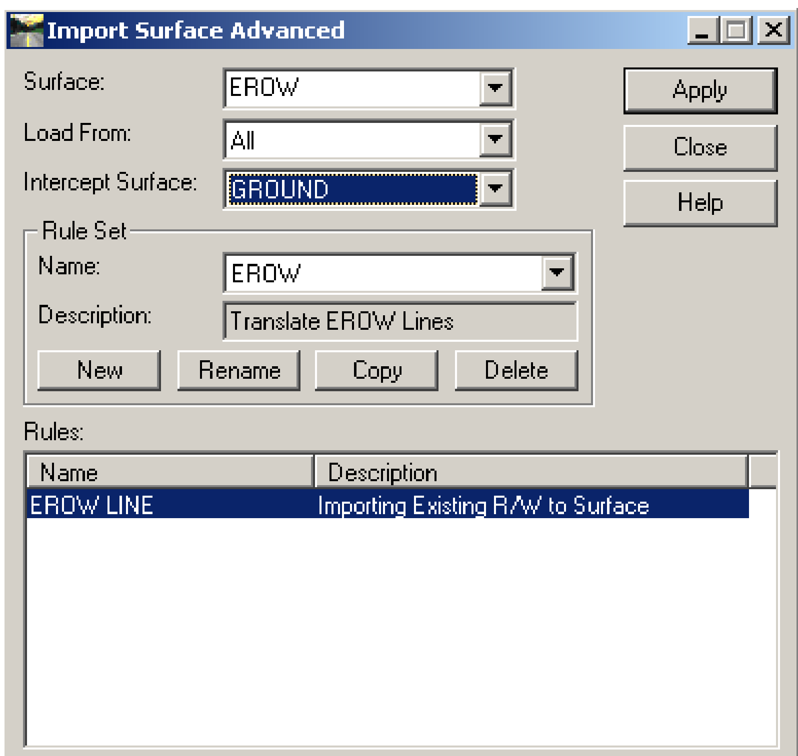


Figure 16-7 Import Surface Advanced dialog.

Now select the predefined rule called **EROW** from the *Rule Set* pull down. This sets the selection criteria for the existing ROW lines and also sets their new symbology within the new surface. Click **Apply.**

Step Three: Display EROW as ROW Line

Open the *Roadway Designer* by selecting **Modeler>Roadway Designer…** from the InRoads menu. Select **Corridor>Display References…** from the *Roadway Designer* menu (Figure 16-8). Select the EROW surface from the *Surface* pull down. Select the *Filter* option and pick **EROW Lines** from the *Filter* pull down. Place a check mark in the box to *Display as Right of Way* and click the **Add** button. Click **Close** to exit the dialog.

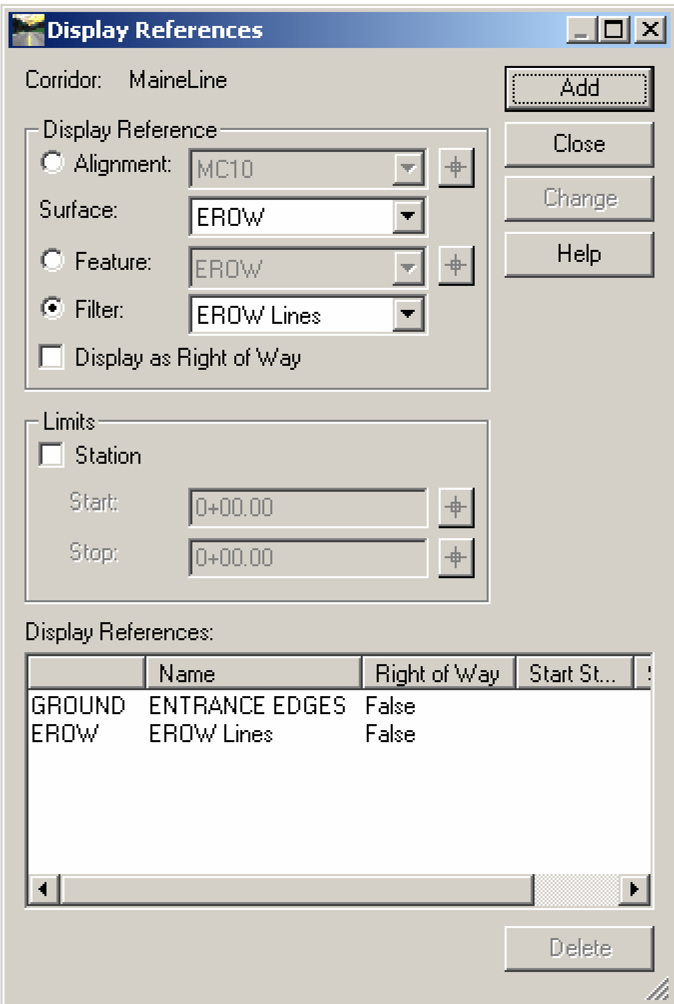


Figure 16-8 Display References dialog to display Existing ROW in Roadway Designer.

The plan view portion (Figure 16-9) of the dialog should now contain the ROW lines and the drives and edges of pavement and gravel.

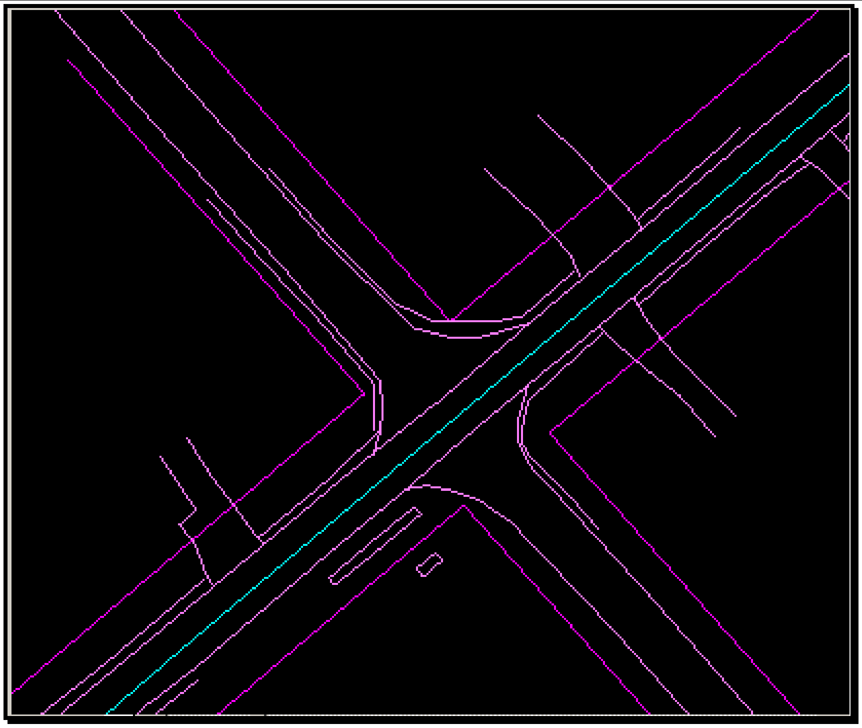


Figure 16-9 Plan view portion of the Roadway Designer with ROW, drives and edges of pavement and gravel.

The cross section view of the *Roadway Designer* should now display the ROW lines (Figure 16-10) as dashed vertical lines.

Figure 16-10 Cross Section view with ROW lines displayed.

✓ ***Refer to page 20-10 for instructions on how to display the EROW lines on your cross sections.***

APPLY SUPERELEVATION

DISPLAY SUPERELEVATIONS

Overview
There are a lot of options and adjustments that can be performed in the *Superelevation* dialog. This portion of the manual is to help a user get started with applying Superelevation from MaineDOT's tables. There will be more detailed documentation available as well as the InRoads *Help* on the more intricate details.

Step One: Open Roadway Designer
Select **Modeler>Roadway Designer…** from the InRoads main menu. Verify that your *Corridor* is set to your Design and *Active Surface* is set to Ground.

Step Two: Display Superelevation
Select **Display Superelevation.** Select **Process All.** The view window inside of the *Roadway Designer* changes to display different aspects of the Superelevation (Figure 16-11).

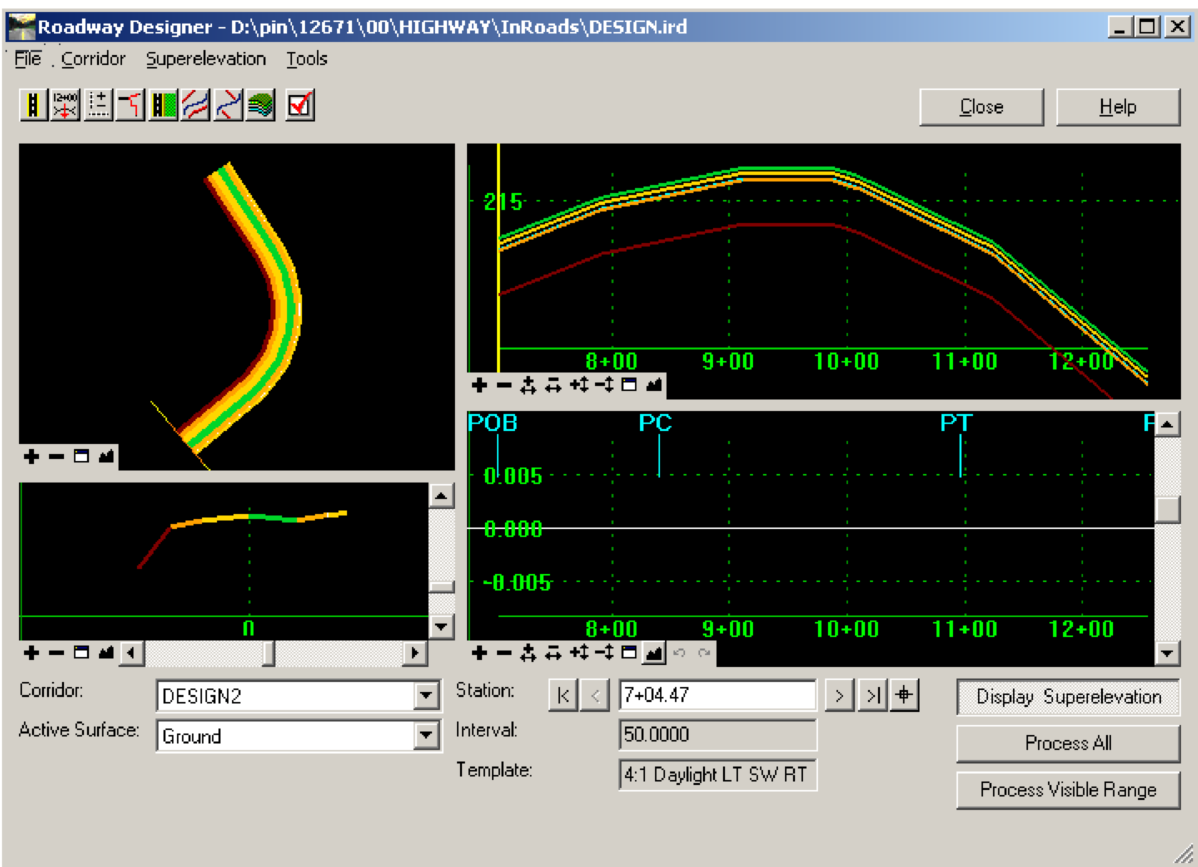


Figure 16-11 Display Superelevation dialog

Step Three: Superelevation Wizard

Select **Superelevation>Create Superelevation Wizard>Table…** (Figure 16-12). MaineDOT has the Superelevation in the format of a *Table.*

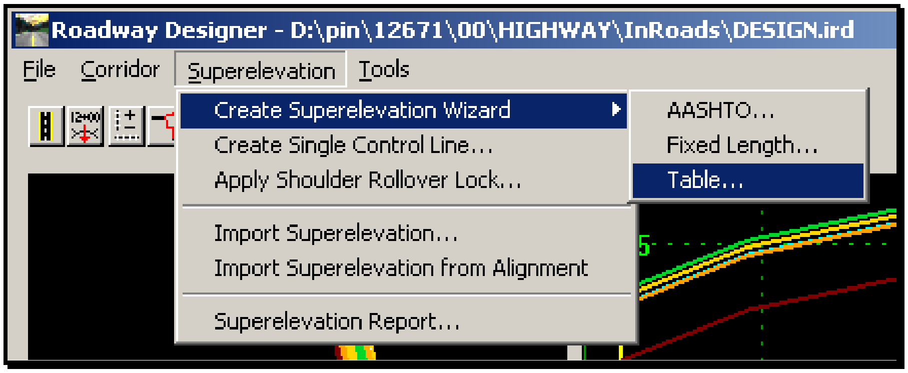


Figure 16-12 Starting the Superelevation Wizard

Step Four: Browse to the Table

Select the **Browse** button and browse to the C:\!msInRoadsconf\standards\InRoadsSTD\Superelevation\ folder (Figure 16-13). Select the Superelevation table that suits your needs.

- ♬ The tables are listed by maximum Superelevation percentage and posted speed (i.e. MeDOT_04_50.sup would be a 4% maximum Superelevation with a posted speed of 50 mph).

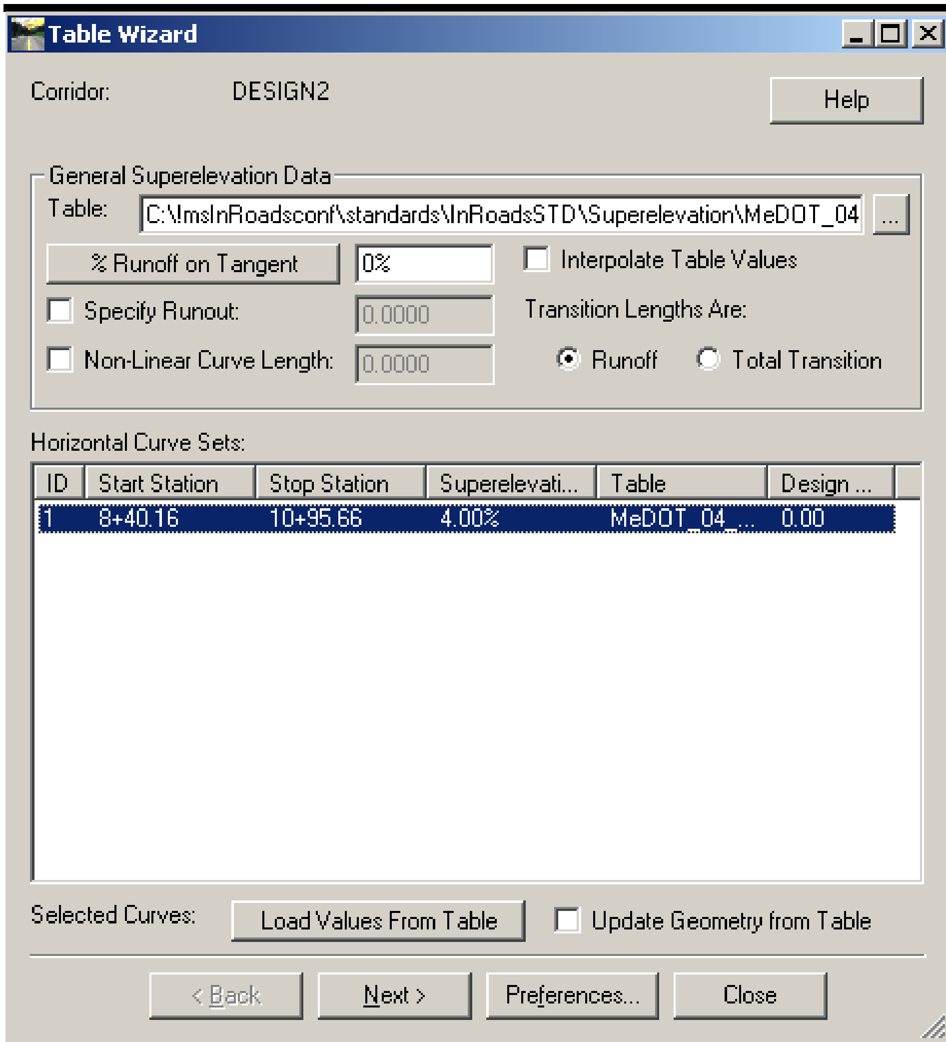


Figure 16-13 Table Wizard dialog

Select **Load Values From Table** then select **Next.**

Step Five: Select the Add Button

Select the **Add** button (Figure 16-14).

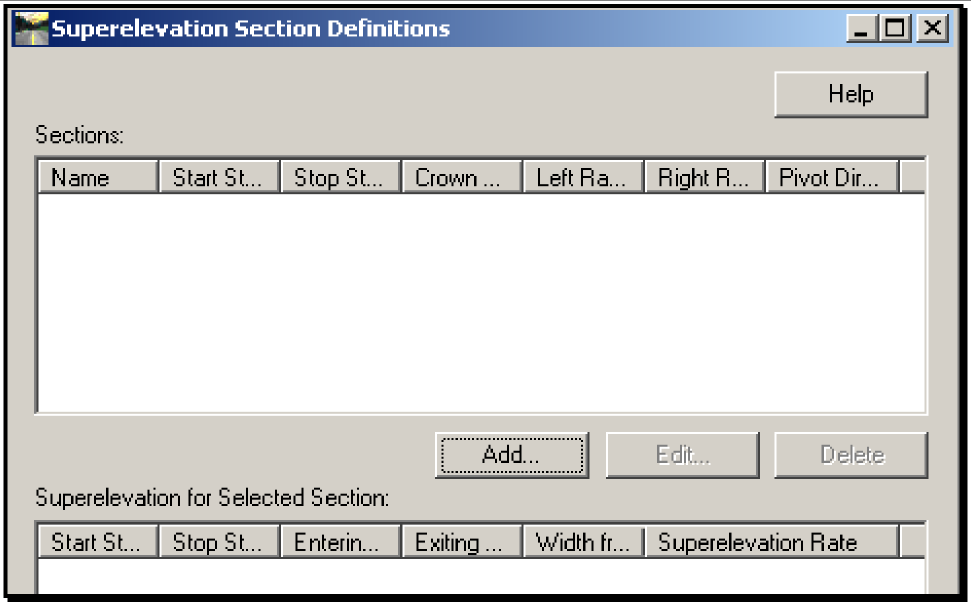


Figure 16-14 Superelevation Section Definition

Step Six: Identify Points on the Template

A new dialog will open and needs input (Figure 16-15). Set the *Crown Point* as the centerline of your template. Set the left and right range points as the edge of the Travelway for the left and right lane.

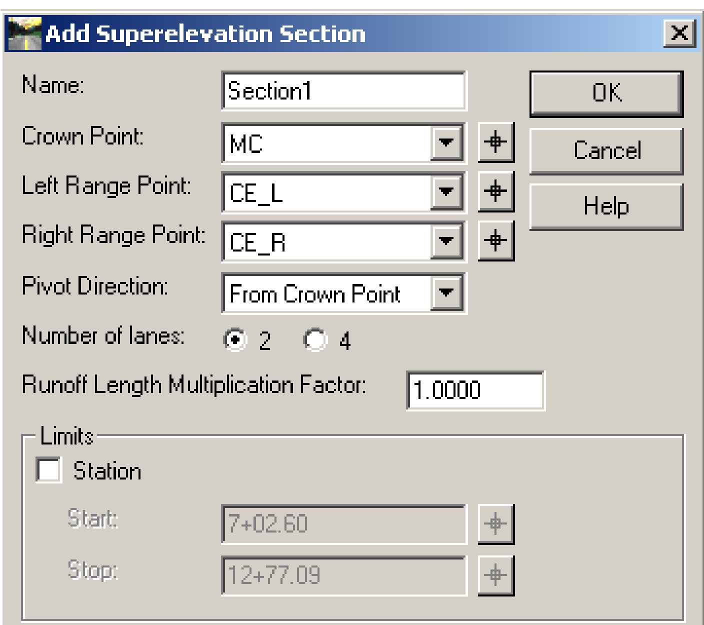


Figure 16-15 Add Superelevation Section Points

Click **OK.** Select **Next** to proceed in the wizard.

Step Seven: Results are displayed

Notice that the results are displayed in the wizard (Figure 16-16). If there were other locations on the project that had different speeds that would require a different table, you can add multiple sections for these areas. Click **Finish.**

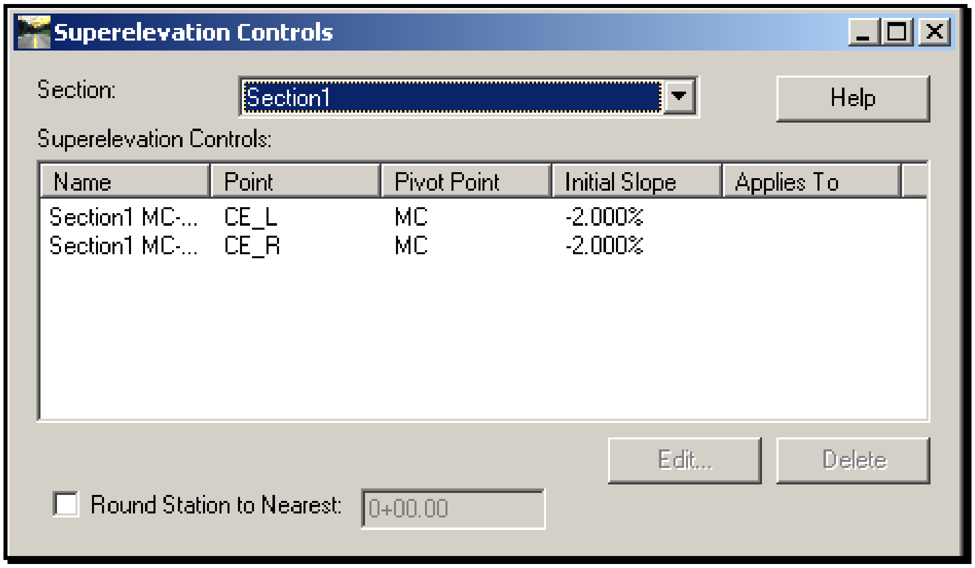


Figure 16-16 Superelevation Controls are displayed for each Section

The *Fix Superelevation Overlap* dialog will appear (Figure 16-17). Click **Apply.**

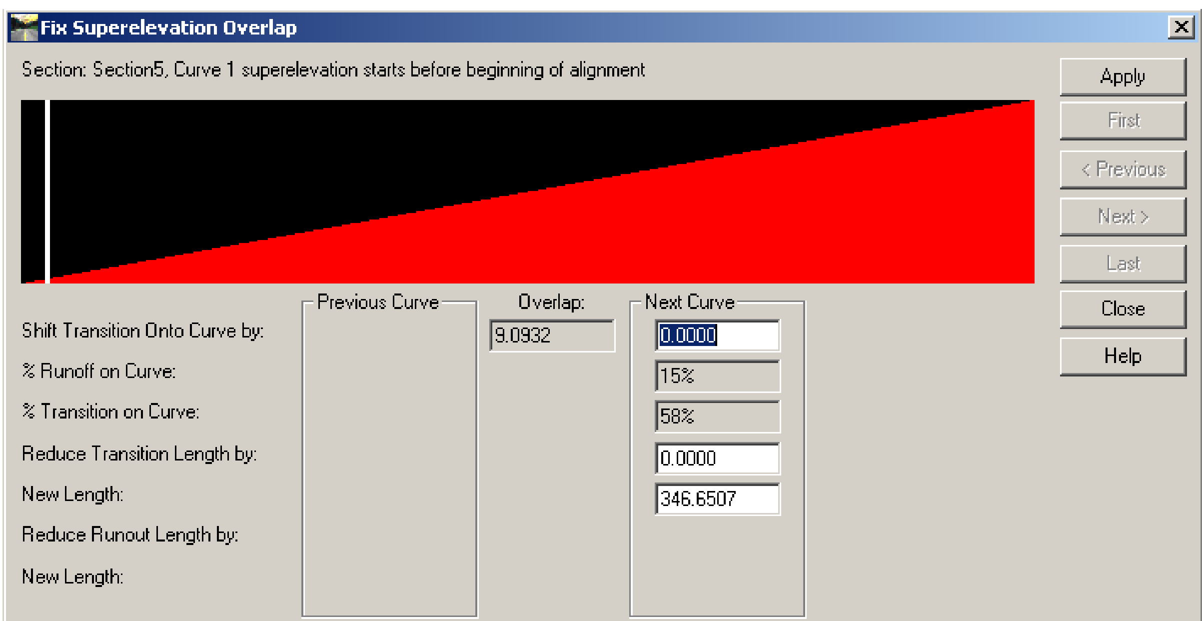


Figure 16-17 Fix Superelevation Overlap dialog - Click Apply

✓ ***Refer to InRoads internal Help program and the InRoads handouts provided for advanced editing until more documentation is available.***

Step Eight: Add Rollover Lock

It is necessary to add a shoulder rollover lock for the Superelevation to display correctly. Select **Superelevation>Apply Shoulder Rollover Lock…** from the *Roadway Designer* menu. Apply an 8.00% rollover lock to the **High** side for the left and right points labeled ES for Daylight Sections and EF for Box Sections and Guardrail Sections (Figure 16-18). Click **Apply** and close to dismiss the dialog.

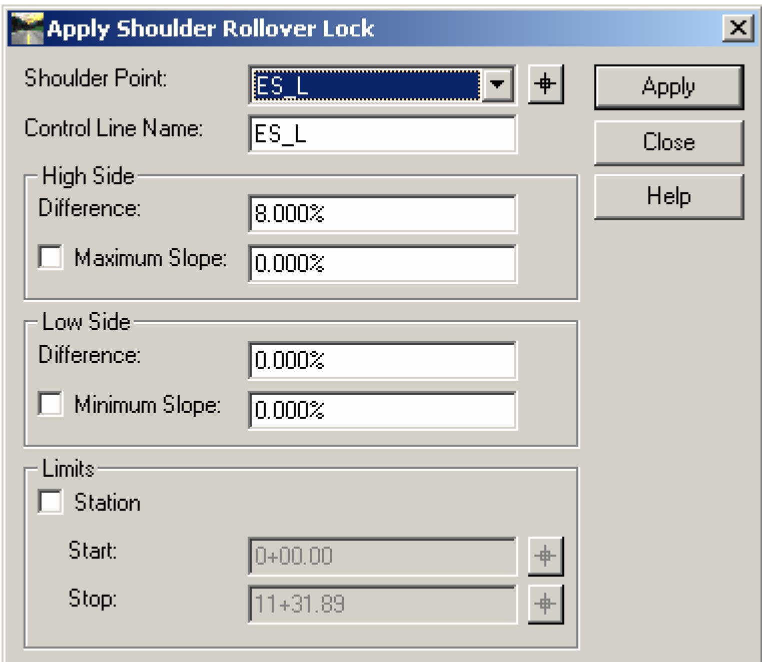


Figure 16-18: Apply Shoulder Rollover adjusted for 8% on high side

♫ There are multiple points at the gutter line and face of guardrail. You may have to add points you do not need from the pull down list so that the ones you want will be available. Go to the Point Control dialog and delete the unwanted points.

Step Nine: View Results

Click the *Display Superelevation* toggle to go back to Cross Sectional View of the *Roadway Designer*. Select **Process All.** Navigate through the Sections in areas of Superelevations. Click the **Display Superelevation** button again to return to the template view of the *Roadway Designer*. Navigate through the sections and view the results.

Step Ten: Save Roadway Designer

Select **File>Save** from the *Roadway Designer* menu. Supply a name for the file. Select **Save** and then **Cancel.**

Step Eleven: Add to RWK

Consider adding this to your RWK file so that it's loaded automatically when you open your project's .rkw file.

✓ ***Refer to page 13-25 for more information on adding to your project's .rwk.***

Create Surface

✓ ***Refer to page 16-28 for instruction on generating your MainLine or Design surface.***

PARAMETRIC CONSTRAINTS (OPTIONAL)

TEMPLATE POINT CONTROLS

Overview

The standard templates, sub assemblies and components have been developed so that adjustments for depths, lane or shoulder widths and side slopes can be adjusted easily from station to station. This prevents the need to place a new *Template Drop* at every point in which the shoulder widens or a truck lane is added. It also narrows down the number of predefined template scenarios that need to be established in the template library. A single box shoulder scenario can cover all possible widths or depths of pavement, base pavement or gravel.

Logic Behind the Labels

The standard *Labels* are grouped by abbreviations such as TW (Travelway), ATW (Auxiliary Lane Travelway), SH (Shoulder), GR (Guardrail), Drive (driveways), SW (Sidewalk), Berm, Ditch, 3:1 (Slopes) etc…

Within the *Label* there may be other abbreviations such as WC (Wearing Course), BC (Binder Course), AG (Aggregate), SUB (Subgrade), DAY (Daylight Slope), Bmp (Drive Bump), etc…

The suffix of the *Label* may indicate a LT (Left) or RT (Right), Slope, Dist, Width, or Depth depending on the *Label.*

Mirrored Labels

Sub Assemblies were originally developed for one side of the road with the idea that they can be placed on the left (reflected) or on the right side of the road. This caused problems with connectivity between templates so instead, we created a LT and a RT scenario for all *Sub Assemblies.* This should eliminate most *mirrored* labels.

Some Typical Labels

The following *Labels* in any given template can be overridden by the *Parametric Constraint* values.

Travelway Labels

- TWWidthRT – Width of the right Travelway.
- TWSlopeRT – Slope of the right Travelway.
- TWWidthLT – Width of the left Travelway.
- TWSlopeLT – Slope of the left Travelway.
- TWwcDepth – Depth of the wearing course for the Travelway.
- TWbcDepth – Depth of the binder course in the Travelway.

- SGDepth – Subgrade depth at CL (for TW)- LT and RT only when TW w/separate values

Shoulder Labels

- SHWidth – Width of the Shoulder.
- SHSlope – Slope of the Shoulder.
- SHwcDepth – Depth of wearing course in the Shoulder.
- SHbcDepth – Depth of the binder course in the Shoulder.
- SHbcSlope – Slope of the binder course in the Shoulder which could be the same as the Travelway but different from the wearing course on the shoulder
- SHCurbWidth – Width of the Box Section with Curb. Depending on the curb type, the box may extend 1 foot beyond gutter line.

Auxiliary Lane Labels

- ATWWidth – Auxiliary Travelway Width
- ATWSlope – Auxiliary Travelway Slope
- ATWwcDepth – Auxiliary Travelway wearing course depth

Median Labels

- MTWSlope(LTorRT) – Median Pavement Slope to curb
- MTWWidth(LTorRT) – Median Pavement Width to curb

Other Labels

- To be continued…

ADJUSTING TRAVELWAY SLOPE /WIDTH/DEPTH

Step One: Open Parametric Constraints

Select **Tools>Parametric Constraints…** from the *Roadway Designer* menu (Figure 16-19).

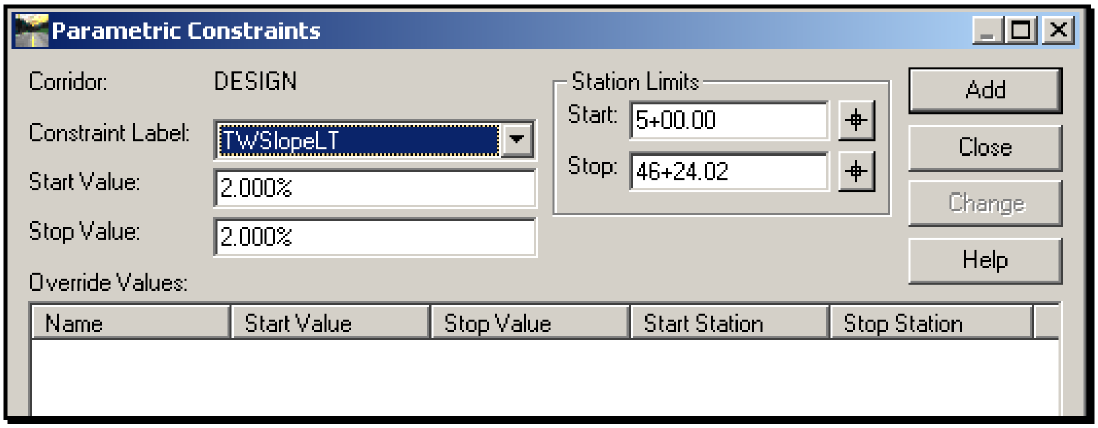


Figure 16-19 Parametric Constraints dialog

Step Two: Locate Label

When the dialog opens, you can start typing the first letter of the *Label* you're after or you can click the pull down and scroll and select the constraint *Label*. The *Constraint Label* pull down list all of the *Labels* available based on the *Template Drops* you added into your project. Locate TWSlopeLT from the list (type "T" to get to the bottom of the list).

Step Three: Adjusts Start and Stop Station

The dialog is very self explanatory. If the adjustment to the *Constraint Label* adjustment is for the whole project, the start and stop stations will cover the whole alignment and the start and stop *Values* will be the same. In this example documentation, it will be for the whole project.

Step Four: Adjust Slope of Travelway

Enter a *Start Value* of 3% and a *Stop Value* of 3% (the decimal slope value works also). You would think of this value being a negative, but with sloped lines, a line that runs right to left and slopes down is a positive slope.

✓ ***Please refer to Page 15-4 for more information on positive and negative values when editing Templates.***

Once you enter the slopes, select the **Add** button to add the adjustment to your project. If you can see past the *Parametric Constraints* dialog and can see the cross section view, you will visually see the change in slope. Repeat for the right Travelway.

Step Five: Adjust Width of Travelway

Select the *Label* called **TWWidthLT** from the list of *Constraints*. Adjust the width to -11'. Click **Add.** Repeat for the right Travelway (w/o supplying a negative value). To add a truck or turning lane with the same cross slope, adjust the widths being sure to add the transition areas (Figure 16-20).

Step Six: Adjust Depths of Pavement and Gravel in Travelway

Pick the *Constraint Label* **TWwcDepth.** Adjust the depth from 3” to 4”. It can be entered as 4” or decimal feet. Adjust the **TWbcDepth** from 3” to 2”. Adjust the depth of Aggregate Subbase Course Gravel **SGDepth** from 1.5’ (18”) to 2’ (24”). In these cases, the value for the left and the right pavement or subgrade will be the same so one label covers both sides. The subgrade depth is a value used for the shoulder components also. This is why it isn’t specific to the Travelway.

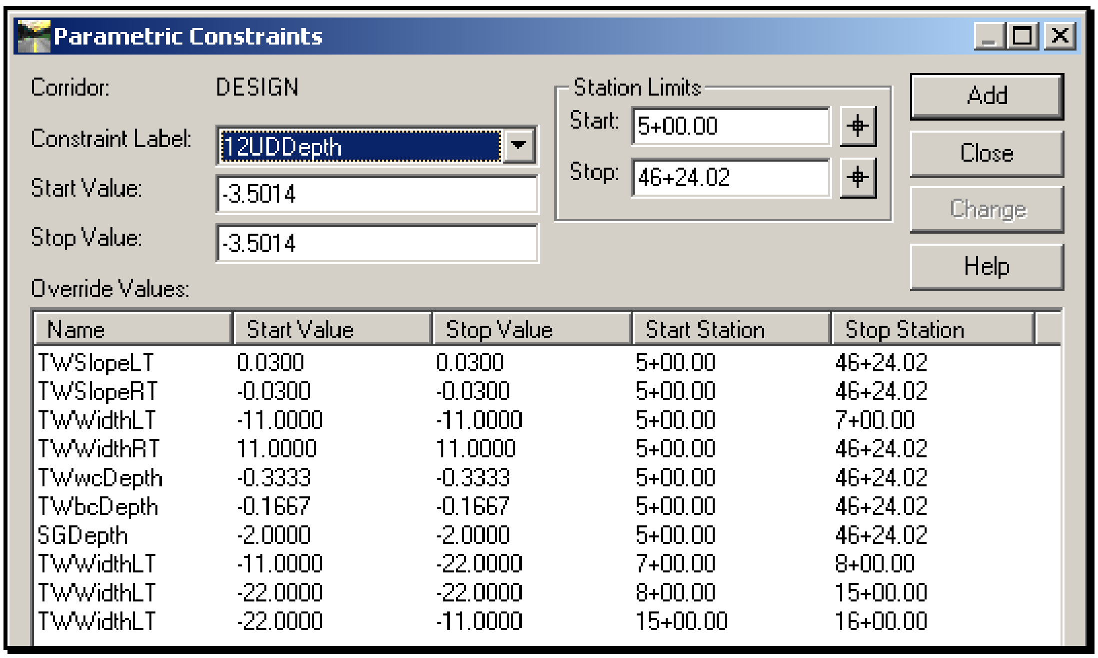


Figure 16-20 Parametric Constraints dialog with examples of adjustments.

♬ If adjustments are made to the Travelway layers of pavement, chances are that you will have to make similar changes to the shoulders.

ADJUST SHOULDER WIDTH/SLOPE/DEPTH

Overview

If the wearing course and binder are at the same depth as the Travelway and adjustments have been made, make the same adjustments to the Shoulder *Constraint Labels* prevent tapering layers of pavement from Travelway to shoulder. Adjust width of binder if necessary.

Step One: Adjust Depths of Pavement

In the previous example, you would need to set the **SHWCDepth** to 4" and the **SHBCDepth** to 2".

Step Two: Adjust Shoulder Width

If the shoulders vary or if they are consistent but are different than the defaulted 8' width, make that change. In this example, make the change to 4' shoulders. The shoulder width on a bituminous curb box section will need to stay a foot wider than any daylight section of shoulder on the project.

Step Three: Adjust Width of Binder Pavement

In some cases the binder doesn't run the full width of the shoulder. It may require that the base course of pavement is adjusted when a shoulder width is adjusted drastically.

GENERATING PRELIMINARY DESIGN SURFACES

DISPLAYING YOUR DESIGN SURFACE

Overview

The *Roadway Designer* contains all of your design information for the project. In order for other team members in various workgroups to see your design, these design features must be written to graphics in a MicroStation file. Typically their default MicroStation files automatically look for the design by a standard name (i.e. Highway.dgn or Bridge.dgn). Though you can have multiple options for your final design, it is important that your latest design or the most likely candidate is called one of the standard file names. To help keep drawings standard, using the correct name and seed file used in its generation, the *Make Sheetz* utility in MicroStation will help accomplish this.

Step One: Create a new Drawing

Part One: Make Sheetz

Select **File>Make Sheetz…** from the MicroStation main menu.

Part Two: Select No Prefix

Select the option for **No Prefix** (Figure 16-21). Click **OK.**

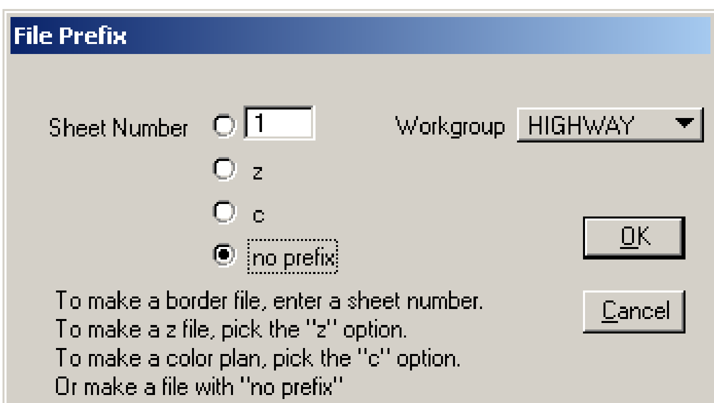


Figure 16-21 Select No Prefix in the Make Sheetz dialog

Part Three: Select the File Name

Select **Highway** (or **Bridge** for Bridge users) (Figure 16-22). Click **OK.**

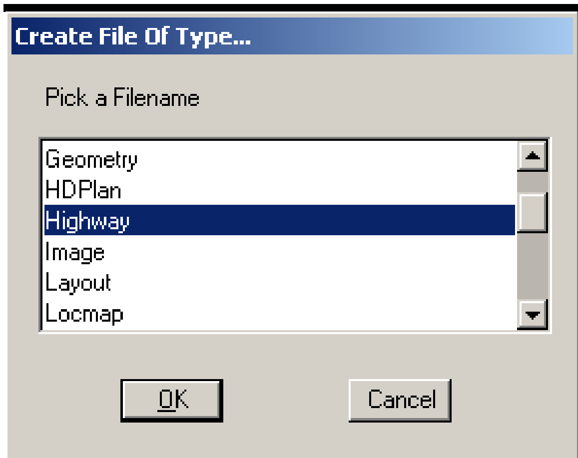


Figure 16-22 Select your drawing name

Part Four: Add Suffix (optional)

The next dialog gives the user the option of adding a suffix to the file name.

If this is simply your preliminary design that you would like to view, consider adding the word **working** (i.e. Highway_working or Bridge_working) as the suffix.

This can also be used for multiple design scenarios on a project, but the latest design or the most likely candidate should not have a suffix (Figure 16-23).

♫ Other scenarios must be communicated to the other team members so that they can manually attach them. Working drawings aren't automatically attached, therefore you can "play" in this drawing.

Click **OK.** The new drawing is opened and ready. Select **Cancel** to stop making new drawings.

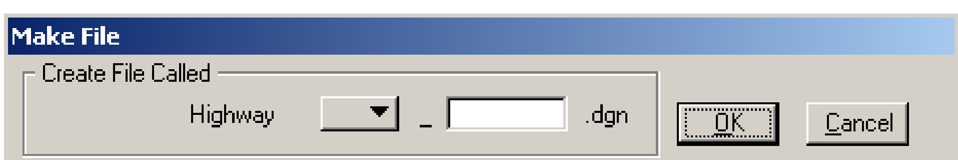


Figure 16-23 Do not add a suffix for standard drawing names

Step Two: Open the Roadway Designer

Open InRoads and select **Modeler>Roadway Designer…** from the InRoads menu.

Step Three: Select Corridor and Active Surface

Select the *Corridor* (i.e. MainLine or Design) and *Active Surface* (i.e. Ground) you have been working with and click **Process All.**

Step Four: Create Surface(s)

♫ After entering your project files you may want to verify your *Global Scale Factors* are set to the desired scale before displaying your design drawing. Select

Tools>Global Scale Factors from the InRoads menu. Plan display should be 300, 300, 300 for 1" = 25' drawings (600, 600, 600 for 1"=50' drawings).

Select **Corridor>Create Surface…** from the *Roadway Designer's* main menu. Supply a name to the *Surface* (i.e. MainLine or Design). Select your corridor from the *Create Surface(s) from:* portion of the dialog. If you desire, place a check in the *Create Alternate Surface* check box to create these alternate surfaces:

- **WearCourse –** Bottom of Wearing Course of pavement
- **BaseCourse –** Bottom of Base Course (Binder or other)
- **Subgrade –** Bottom of Subgrade

All other settings are predefined for you (Figure 16-24). Click **Apply.**

Minimize or close the *Roadway Designer* window.

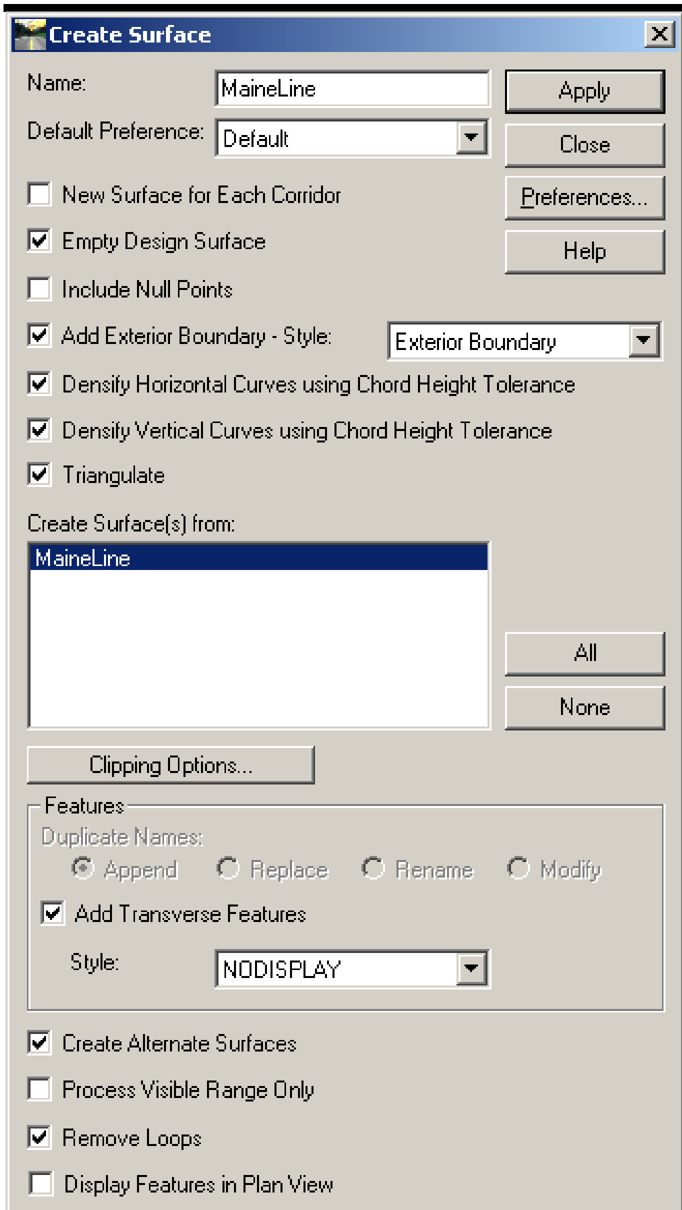


Figure 16-24 Create Surface dialog with default settings

Step Five: Set a Filter

Select a *Filter* called **PLAN DISPLAY** from the list of available filters in the InRoads dialog menu. Turn the *Feature Filter Lock* to the ON position by clicking the filter lock button (Figure 16-25).

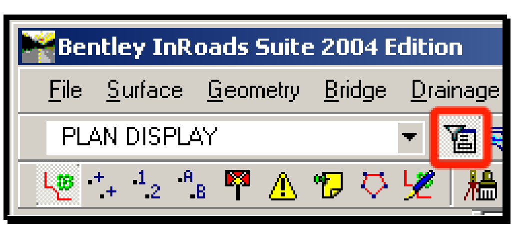


Figure 16-25 Set the active filter to PLAN DISPLAY

Step Six: Display Features

Select **Surface>View Surface>Features…** from the InRoads main menu. Select your surface from the *Surface* pull down in the *View Features* dialog (Figure 16-26). Click **Apply.**

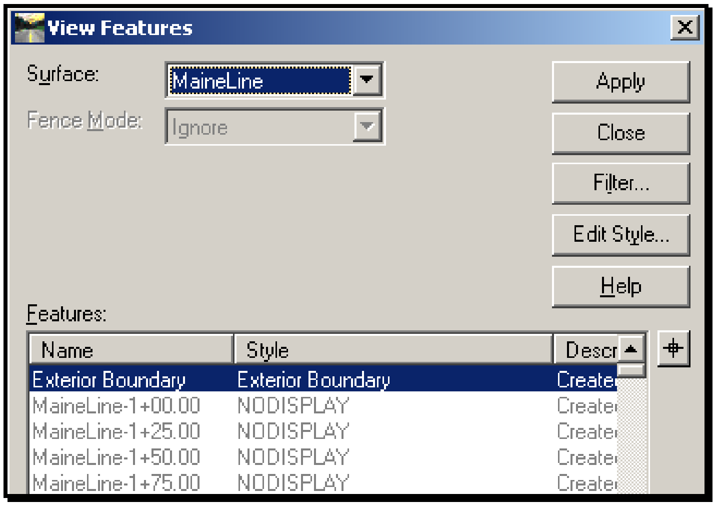


Figure 16-26 View Features dialog with the design surface selected

♫ You can also use the *Surface>View Surface>Triangles or Contours* to view these aspects of your design. Most likely you would want to create a new MicroStation drawing before doing so unless you are in a *working* drawing. You can also view the triangles of *Alternate Surfaces* by selecting a different surface.

Changes to the Design

The display of the design inside of the Highway.dgn or Bridge.dgn is only a snapshot of the design in its current state inside of InRoads. Any changes made inside of the *Roadway Designer* **will not** automatically update the Highway or Bridge drawings, you must select **Process All** in the Roadway *Designer* and recreate surface.

You can update the display in the Highway or Bridge drawings by selecting **Surface>Update 3D/Plan Surface Display** from the InRoads menu. Select your surface and the place a check mark in the *Features* selection. Select all the features you want to update and click **Apply.**

Another way to do it is to first, delete all the graphics in the .dgn, then view the new *Features* for the re-created surface.

Fast Track Projects

In the event that *complete modeling* vs. *scheduling/ learning curve* is tight for the project, consider using this surface to generate the design deliverables and cross sections. Finalize the project using MicroStation tools. If the MainLine corridor from gutter line to gutter line (cross slopes and lane widths) is still valid, the 3D surfaces are still viable for GPS grading.

Editing the Design

All edits to the design should be done inside of the *Roadway Designer* to keep the integrity of the design model. Any edits done to the Highway.dgn or Bridge.dgn using MicroStation’s tools will be over written if the surface is recreated and re-displayed.

Adding Additional Features

Any additional proposed features can be placed in the Highway.dgn or Bridge.dgn and merged into the *Design Surface* for projection onto Cross Sections. The most common features have been established and others can be with your input.

PLOTTING PROPOSED UTILITY POLES

PLOTTING UTILITY POLES

Overview

InRoads has key-in capabilities within MicroStation to place information relative to the alignment. Here we are going to use the **SO=** key-in which stands for Station and Offset to place proposed utility poles in our plan view.

The suggested method of utility pole placement will be to place the proposed poles in a separate drawing from your design. This will isolate them in the event you want to redisplay the design surface features and also lends itself to utility companies or our own Utility Coordinators developing and submitting proposed utility designs and revisions.

Step One: Open InRoads Suite

Double click your **InRoads Suite** icon and select and select your project from the project pull down list. Open any file.

Step Two: Create Utilities drawing

Part One: Create File

Select **File>Makesheetz** from the *MicroStation Main Menu*. Create a **Utilities.dgn** drawing using the no prefix option.

✓ ***Refer to 1-18 for help making drawing files***

Part Two: Reference

Select **File>Reference** from the *MicroStation Main Menu*. Within the *Reference* dialog select **Tools>Attach** and pick the **Alignments.dgn** and attach it using the **Coincident – World** option (Figure 16-27), **True Scale** checked on and *Nested Attachments:* set to **No Nesting**.

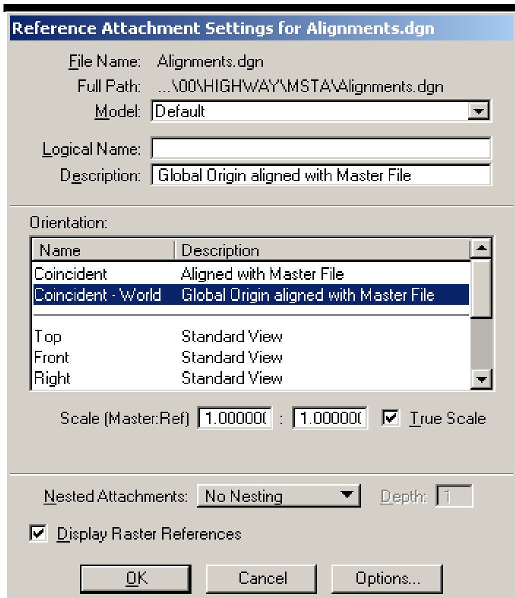


Figure 16-27: Reference Attachment Settings

Repeat this for the design file (i.e. **Highway.dgn** or **Bridge.dgn**) and **Topo.dgn** file in the topo folder.

✓ ***Refer to 2-64 for more on Reference File attachments.***

Part Three: Prepare File

Select **Macros>Set/Lock Z** from the *MicroStation Main Menu* and click **OK** for the 0 elevation (Figure 16-28).

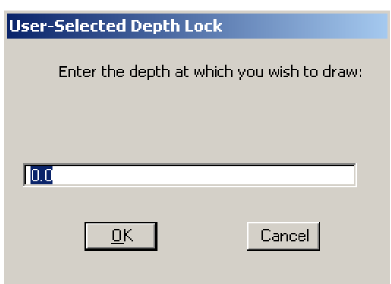


Figure 16-28: User-Selected Depth Lock

Step Three: Load InRoads Project Information

♫ If you are confident that the ***.rwk** file for the project is up to date with the latest InRoads files to be loaded you could load this file and move on to **Step Four**. If not continue on to **Part One**.

Part One: Load Geometry

Select **File>Open** from the *InRoads Main Menu*. Switch the *Files of Type:* to **Geometry Projects (*.alg)** within the **Open** dialog (Figure 16-29). Highlight the geometry project and click **Open**.

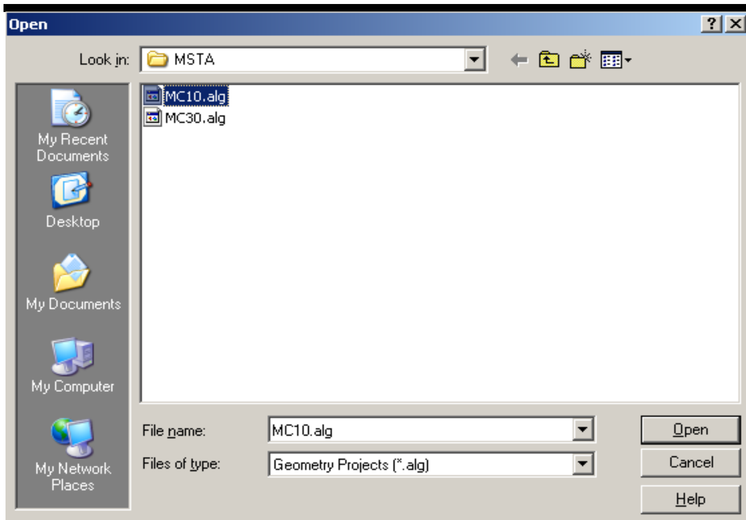


Figure 16-29: Open Geometry Projects

Part Two: Load Surfaces

Switch the *Files of type:* to **Surfaces (*.dtm)**, select the **Design** surface (*.dtm) and click **Open** (Figure 16-30).

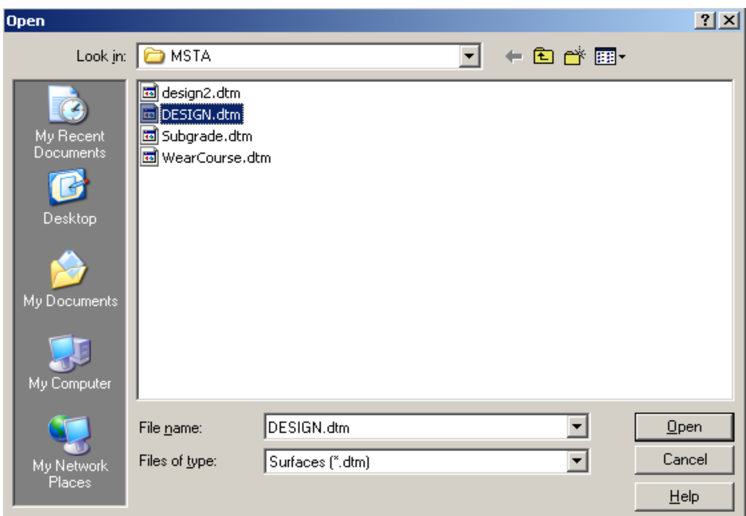


Figure 16-30: Open Design Surface

Repeat the process above by browsing to the **Survey/msta** folder, select the **Ground.dtm** and click **Open**.

Step Four: Set Active Horizontal Alignment

Navigate to the **Geometry Tab** of the *InRoads* dialog and make the alignment relative to the placement of the utility poles the active alignment by right clicking on it and selecting **Set Active** (Figure 16-31).

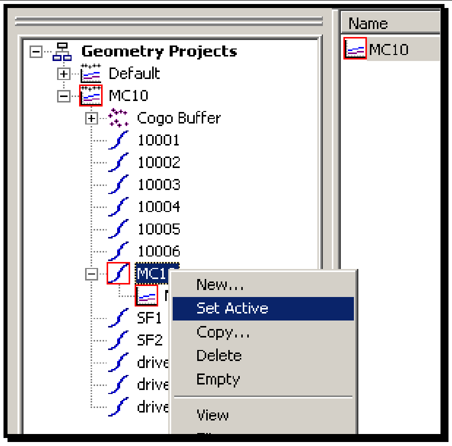


Figure 16-31: Set Active

Step Five: Open Key-in Dialog in MicroStation

Select **Utilities**>**Key-in** from the *MicroStation Main Menu* to launch the Key-in dialog (Figure 16-32).

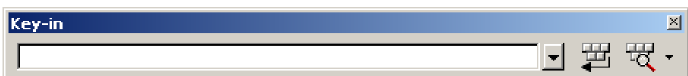


Figure 16-32: Key-in

Dock this dialog so that it is out of the way from the view window.

Step Six: Place Proposed Utility Poles

Typically you would be working from a report provide by Utility Coordinator. In the following example we will place a couple of poles randomly to the left and then to the right.

Right click on the Settings Manager and select **Category>Scale…** and select **1 in. = 25 ft.** (Figure 16-33).

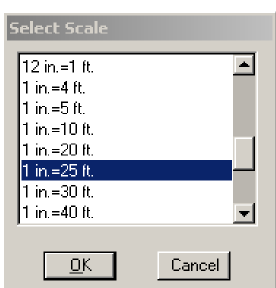


Figure 16-33: Select Scale

From the *Plan Sheet Settings Manager*, select **Utilities**>**Pole Left** (Figure 16-34). Remember to use the appropriate cell for placing the poles left or right of the centerline. This will save work when displaying the poles in section.

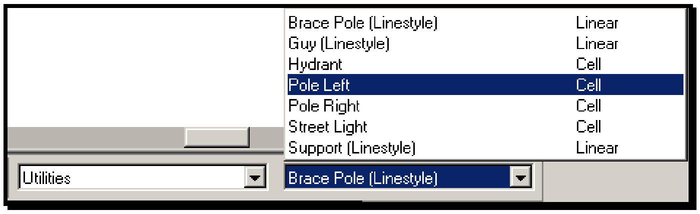


Figure 16-34: Pole Left

With the proposed pole on your cursor click into the **Key-in** dialog and type the station and offset value like this **so=910.25,-42.5** (Figure 16-35), click enter on your keyboard.

♬ You do not have to place the + symbol within the station value. InRoads recognize the station value as a whole number, **910.25 equals 9+10.25**. Negative offset values will place cells left of the alignment and positive values will place cells right of the alignment looking up station. Place **Pole Left** using a negative value for the offset and **Pole Right** with a positive value for the offset.

Figure 16-35: Key-in Value

Gesture your mouse to the view window and use the **Nearest** snap mode on the alignment to complete the rotation of the cell with an accept click (left button) making it roughly 90 degrees to the alignment.

Step Seven: Import Surface Advance to DTM

Overview

Once all of the proposed poles have been placed in the **Utilities.dgn** file graphically you will want to bring this data into a surface within InRoads for reporting and easy placement in the Cross Sections. Before doing this you will want to turn off all Reference File attachments so that you only see the display of the proposed poles.

Part One: Create Surface

Select **File>New** from the *InRoads Main Menu* (Figure 16-36). With the **Surface** tab selected change the following to:

- *Type:* Design
- *Name:* Utilities
- *Description:* Proposed Utilities

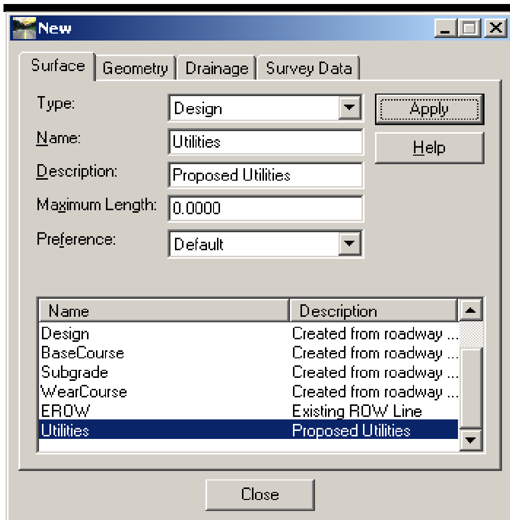


Figure 16-36: New Surface

Click **Apply** and then **Close** the dialog.

Part Two: Import Data to InRoads

Select **File>Import>Surface Advanced…** from the *InRoads Main Menu* (Figure 16-37).

Within the *Import Surface Advanced* dialog set the:

- *Surface:* **Utilities** (this is the new surface that was created earlier.)
- *Load From:* leave set to **All**
- *Intercept Surface:* **Design** (This is the finish grade surface created by the Roadway Designer.)
- *Rule Set: Name:* **Utilities** (If the rule set name does not exist then you will need to update the **MDOT_US.XIN** file for the project pin you are working with.)

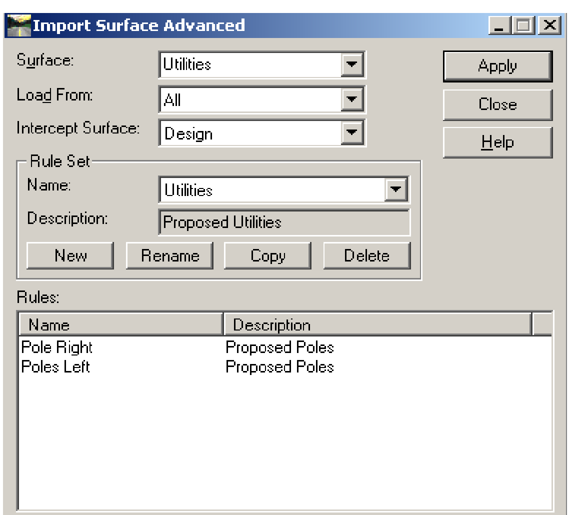


Figure 16-37: Import Surface Advanced

Click **Apply** and then **Close** the dialog.

Step Eight: Save Surface

At this point you will want to save the surface that was created for future use with your Cross Sections. Select **File>Save>Surface** from the *InRoads Main Menu* and save the surface as **Utilities.dtm.**

PLACING PROPOSED UTILITY POLES ON CROSS SECTIONS

Overview:

Before displaying and annotating the new poles remember to set your **Global Scale Factors** to the appropriate scale.

Option A: Display Poles in New Cross Sections

If you are creating new Cross Section drawings then you will need to make sure the Utilities surface is loaded in *InRoads* so that it can be selected in the **General** section of the **Create Cross Sections** dialog. Follow the documentation for **Creating Cross Sections** at this point.

Option B: Display Poles in Existing Cross Sections

Step One: Adding the Proposed Poles

Select **Evaluation>Cross Section>Update Cross Section…** from the *InRoads Main Menu*.

Within the **Update Cross Section** dialog (Figure 16-38) set your *Cross Section Set:* if there is more than one in the existing **Xsect.dgn** file and toggle the *Mode:* to **Display On**.

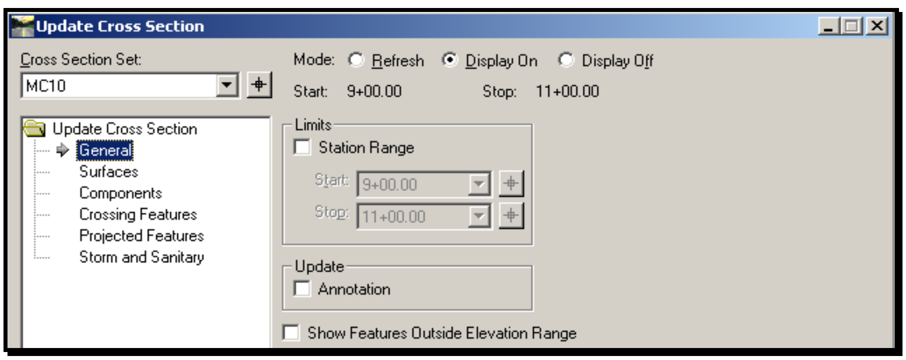


Figure 16-38: Update Cross Section – General

Select the *Projected Features* option in the explorer tree to the left. In the *Surface:* list, pick the **Utilities** surface and right click in the *Feature:* area on a feature and **Select All** (Figure 16-39).

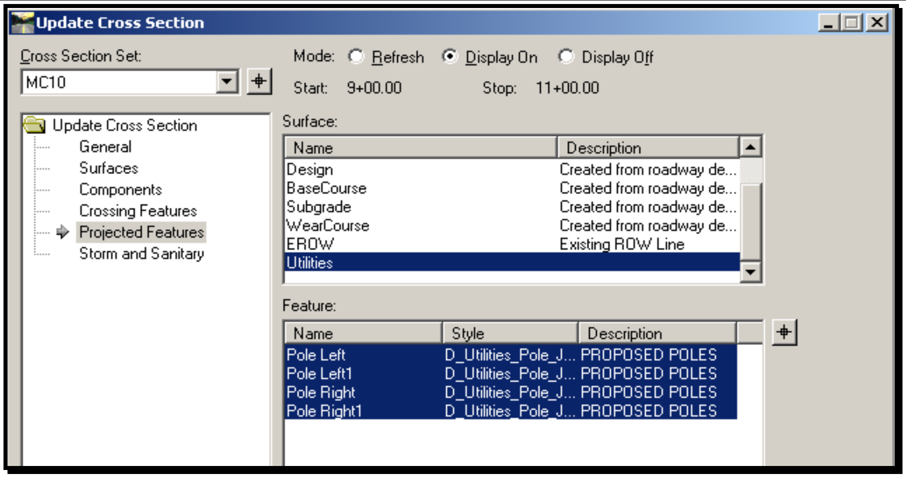


Figure 16-39: Update Cross Section - Projected Features

Click **Apply** and then **Close** the dialog.

Step Two: Annotate Proposed Poles

Select **Evaluation>Cross Section>Annotate Cross Section…** from the *InRoads Main Menu*.

Select the **Preferences…** button at the bottom of the dialog and load the **UTILITIES** preference (Figure 16-40).

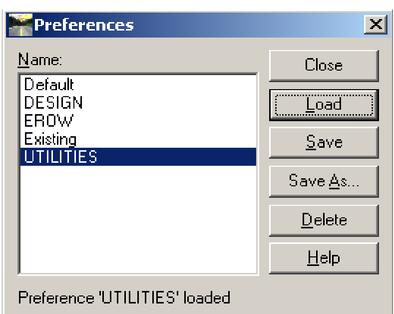


Figure 16-40: Annotate Preferences

Close the dialog.

Within the **Annotate Cross Section** dialog set your *Cross Section Set:* if there is more than one in the existing **Xsect.dgn** file and in the *General* area of the explorer tree select the **Utilities** surface to the right (Figure 16-41).

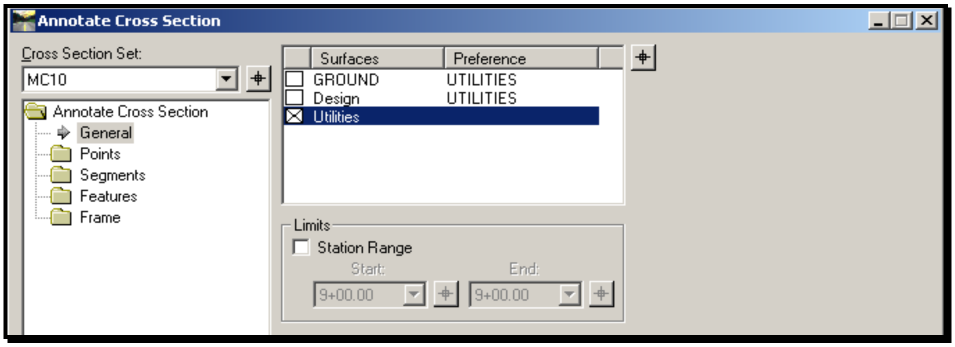


Figure 16-41: Annotate Cross Section – General

Pick the *Features* folder in the explorer tree to the left and highlight *Annotate* under it. Right click on a feature to the right and **Select All** (Figure 16-42).

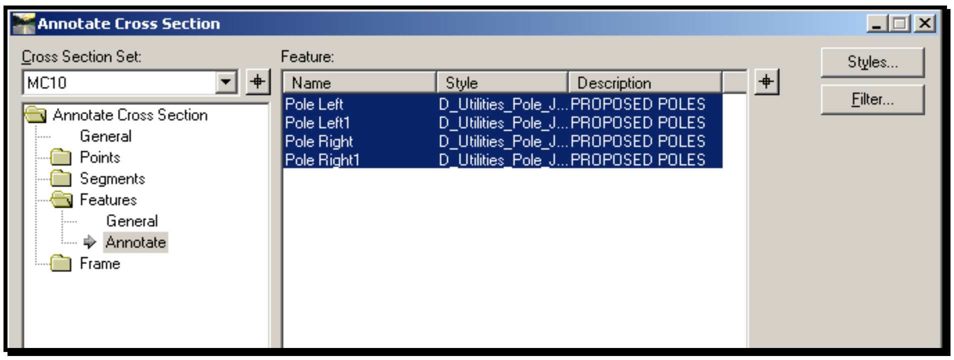


Figure 16-42: Annotate Cross Section – Features

Click **Apply** and then **Close** the dialog. View the results within your Cross Sections to see the new poles and annotation.

Chapter 17 Driveway & Intersection Design

DRIVEWAY DESIGN OPTION 1

OVERVIEW

Driveway Design

This method of Driveway Design works best for the straight and slightly skewed drives. This method uses a driveway sub-assembly attached to the MainLine template drop in the area of the driveway. This method does not require 2 horizontal and vertical alignments for each driveway. This method displays the driveway in cross sections and the quantity is easily attainable.

ⓘ ***A template is always dropped at a 90 degree angle to the centerline. If the template can't locate an edge of the driveway or match point (Figure 17-1) due to the angle of the driveway or the range of the station start or stop, the Driveway Design Option 2 method may be the best option for the driveway.***

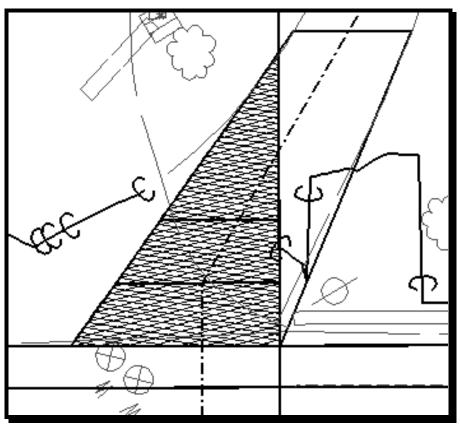


Figure 17-1: Driveway template does not reach the match due to the station of the template drop.

✓ ***Refer to page 17-48 for Driveway Design Option 2.***

Simple Side Road Design

The Driveway Design Option 1 method can be used for simple Side Road design. Adjust the slopes of the bumps, pavement and subgrade depths as required based on current standards.

CREATE DRIVEWAY CROSS SECTIONS

Prerequisites

Project Loaded

Final Alignment Design

Corridor Develop w/"Typical" Templates

Superelevation Applied

MainLine Surface Created

Overview

The intent is to place one of the standard driveway cells in plan view at the center of the existing driveway opening. The edges of the driveway defining the width or skew will be modified later. The line in the center of the driveway cell will be used as a guide when defining the station of the custom cross section. A Custom Cross Section is created for each driveway and can be saved and added to as you build the list of "plus stations" in the final cross section development.

Step One: Create a Working Drawing

Select **File>Make Sheetz** from the MicroStation main menu. Create a *No Prefix* drawing called either **Highway_drives** or **Bridge_drives** based on your workgroup.

✓ ***Refer to page 1-18 for more information on using the Make Sheetz program.***

Select which reference files you want to display (i.e. alignments.dgn, topo.dgn, text.dgn, rwplan.dgn) as well as the levels in each reference file. You may want to shut off the **Highway** or **Bridge** drawing if one has been created. The *features* for the MainLine will be written to this drawing through InRoads.

Step Two: Display MainLine Surface Features

Set the *Filter* to **Plan Display** and turn on the filter. Select **Surface>View Surface>Features…** from the InRoads menu. Select the **MainLine** surface and click **Apply.**

Step Three: Place Standard Cell in Plan (Perpendicular)

Overview

Cells should be placed by visually locating the center of the driveway. There are ways to accurately locate the center of the existing opening or center as defined by the consistent edge, but a simple visual accuracy should be sufficient. To help minimize mouse click, we recommend that you use *AccuSnap* to assist in cell placement.

✓ ***Refer to page 2-8 for more information on AccuSnap.***

Part One: Set the Category Scale

Right click the *Settings Manager* and select **Category>Scale** (Figure 17-2).

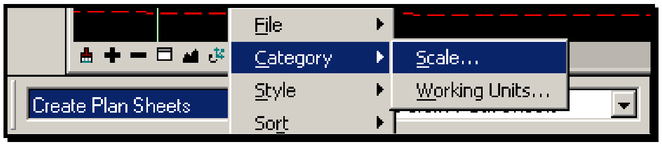


Figure 17-2: Right click anywhere on the Settings Manger and select Category Scale.

Pick the intended scale of the plan drawings (typically 1 in. = 25 ft.) and click **OK** (Figure 17-3).

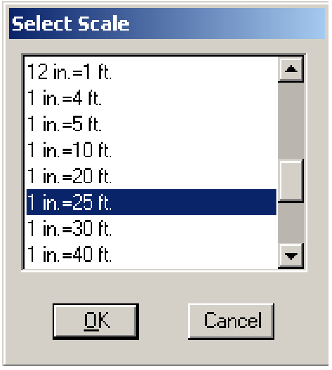


Figure 17-3: Select the intended scale of the plan set.

Part Two: Set Active Depth to "0"

Set the active depth to zero by selecting **Macros>Set/Lock Z** and clicking **OK**.

Part Three: Adjust the Display (Optional)

On project with curbing, you may want to shut off the curb linestyle in order to clearly see the proposed edge of shoulder line where it intersects the existing edge of the driveway or entrance. Select **Settings>Level>Display** from the MicroStation main menu. Right click in the area of the dialog listing the *levels* and select **Off By Element** (Figure 17-4).

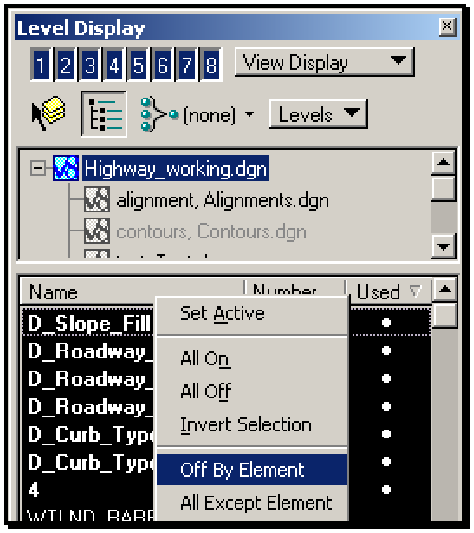


Figure 17-4: Select off by element.

Click on the curb line and any other lines that you'd like to remove from the view while working through this task. Select **File>Save Settings** if you want to come back to this drawing in the future and have these levels turned off then as well.

Part Four: Pick Driveway Scenario

Select the down arrow on the left side of the *Settings Manager* and pick **Driveways.** Now select the down arrow on the right side and select the driveway **Entrance Type (curbed or uncurbed)** that best represents your situation (i.e. Curbed Residential Entrance LT, Uncurbed Commercial Entrance RT) (Figure 17-5).

♫ The width and skew of the driveway can be modified later.

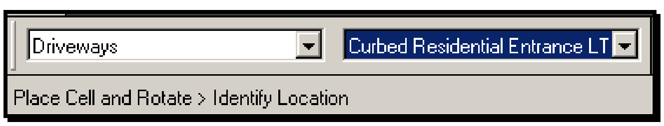


Figure 17-5: The Settings Manager will look like this capture.

There should be a cell on your cursor. You are now prompted for a location of the cell.

Part Five: Place Cell on Curves

♫ To get "focus" in the AccuDraw dialog, hit the ESC key on your keyboard or click in the X, Y or Z fields.

Verify there is focus in the *AccuDraw* dialog. Type "N" to invoke the *Nearest Snap.* Move the cell along the proposed edge of shoulder until you feel it's roughly in the center of the opening. Type "O" for origin. Now type "RQ" to rotate the compass "quickly" around the origin. Type "C" to invoke the center snap. With *AccuSnap* on, simply highlight the centerline and click the left mouse button. Type "RZ" to rotate the driveway 90 degrees and left click the mouse at the center of the *AccuDraw* compass. Right click to *Accept* the placement.

Part Five: Place Cell on Tangents

Verify there is focus in the *AccuDraw* dialog. Type "N" to invoke the *Nearest Snap*. Highlight the centerline. Move the cell along the proposed centerline until you feel it's roughly in the center of the driveway. Supply a left click. The cell will rotate around the point. Use a "N" snap again and move the mouse up station and left click the centerline.

Part Six: Drop the Cell

Drop the cell with the *Drop Element* tool (Qualities>Drop>Complex (Cell, Chain, etc.)) seen in Figure 17-6. Click on the driveway cell. This separates the cell into the minor parts.

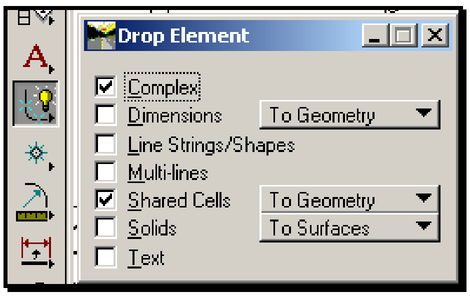


Figure 17-6: Drop Element tool in the main tool frame.

Step Four: Place Standard Cell in Plan (Skewed Drives)

Overview

There are always many ways to do the same thing, so we are outlining two of the easiest ways to get the centerline established for skewed driveways. One way will be to use the standard cell and add a vertex to the driveway centerline minimally at the back of sidewalk, or the first 6' bump outside of the gutter line and then modify the direction of the end of the line. Another way would be to draw a line perpendicular to the centerline minimally out to the back of sidewalk, or the first 6' bump outside of the gutter line. When it comes to designing the edges of the driveways with this method, you would draw them in manually.

Part One: Place Driveway Cell in Plan

Place the standard cells as the perpendicular instructions state previously.

Part Two: Drop the Cell

Drop the cell with the *Drop Element* tool (Qualities>Drop>Complex (Cell, Chain, etc.)) seen in Figure 17-7. Click on the driveway cell. This separates the cell into the minor parts.

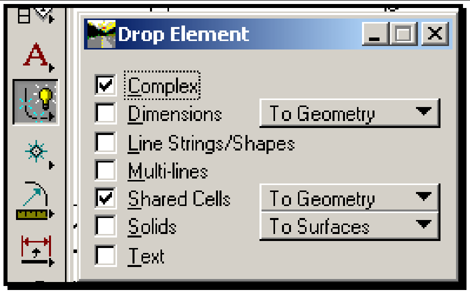


Figure 17-7: Drop Element tool in the main tool frame.

Drives with a Sidewalk

Now insert a vertex (Qualities>Vertex>Add) (Figure 17-8) on the driveway centerline where it intersects the back of sidewalk. Select the centerline of the driveway with a left click and use an "I" – *Intersection* snap to pick the intersection of the centerline and the back of sidewalk. Left click this location to *Accept* the command. This is in order to keep the back of sidewalk bump parallel to the shoulder edge. If the skew doesn't happen until further away from the roadway, insert it at the best location to keep the centerline in the center of the driveway.

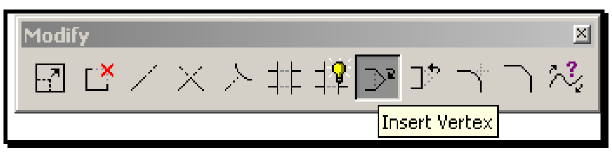


Figure 17-8: Insert Vertex tool in the Modify tool frame.

Use the *Modify* tool (Figure 17-9) to move the end of the driveway centerline to the center of the driveway on the skew. Add additional vertices if necessary.

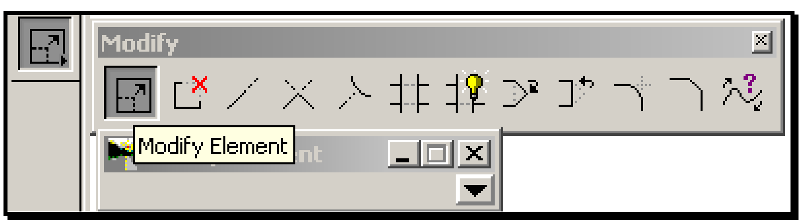


Figure 17-9: The Modify tool located in the Modify tool frame.

Drives without Sidewalk

For non-sidewalk driveways it will take a few more steps. The easiest way to add a vertex would be to utilize *AccuDraw* to insert a vertex minimally 6' off the gutter line. This is in order to keep the first bump parallel to the shoulder edge. If the skew doesn't happen until further away from the roadway, insert it at the best location to keep the centerline in the center of the driveway.

Select the *Insert Vertex* tool (Qualities>Vertex>Add) (Figure 17-8). Following the prompts, *Identify Element* by left clicking on it. This will allow you to move the vertex along the line. Use an "I" – *Intersection* snap to place *AccuDraw's* compass at the intersection of the driveway centerline and the edge of shoulder. Type "O" for "origin" and use the "RQ" command to rotate the compass. Snap to the end of the driveway centerline away from the roadway and *Accept* the rotation. Enter the minimum offset of 6’ (on tight skews maybe 3’ minimally to the paved 3’ apron). Left click to *Accept* the location.

Use the *Modify* tool (Figure 17-9) to move the end of the driveway to the center of the driveway on the skew. Add additional vertices if necessary. The result will resemble the screen capture in Figure 17-10.

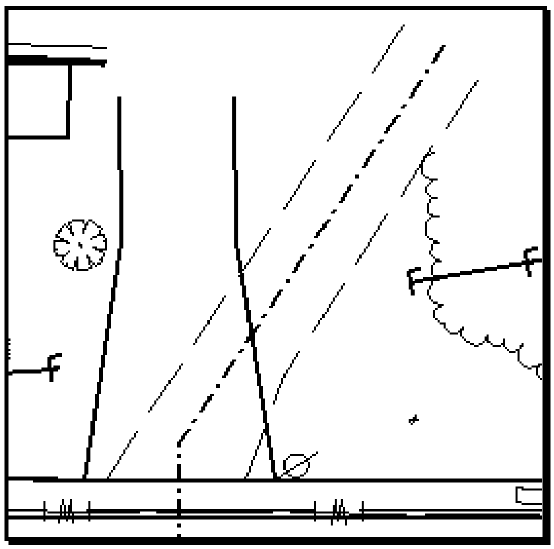


Figure 17-10: Driveway centerline perpendicular to roadway centerline until 3' off the edge of shoulder.

Step Five: Establish Centerline (Manual Method)

♬ This method will require that you establish the driveway edges manually as well.

Part One: Set Symbology from Settings Manager

Select **Driveways (Plans)>Driveway Centerline** from the *Settings Manager* (Figure 17-11).

Figure 17-11: Utilize the Settings Manager to place the driveway centerline.

Part Two: Set Snap Mode to Perpendicular

Set the *Snap* mode to **Perpendicular** by adjusting the snap mode on the button bar (Figure 17-12) or by selecting **Settings>Snaps>Perp** from the main menu.

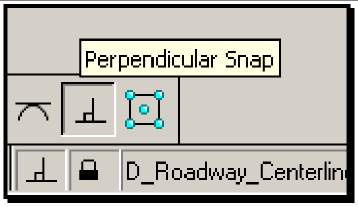


Figure 17-12: Perpendicular snap selected from the button bar.

Part Three: Snap to Centerline

Snap to the centerline of the roadway and *Accept* or with *AccuSnap* move the cursor along the centerline and left click. There should be a line on the end of the mouse dynamically drawing perpendicular from the centerline.

Drives with Sidewalk

Type “N” for the “nearest” snap and left click the back of sidewalk at the center of the driveway. Continue the line adding vertices where necessary staying in the center of the drive.

Drives without Sidewalk

This will require that the AccuDraw compass is also perpendicular to the centerline. Use the “N” shortcut (nearest snap) to decide where the compass should be along the shoulder to represent the center of the driveway and click the “O” shortcut (origin snap). Now use the “RQ” shortcut to “Rotate” the compass “Quick” around its origin. Use the “C” shortcut (center snap) if the centerline is on a curve and snap to the centerline of the road. If on a tangent, snap to another location on the shoulder with an “N” nearest snap. The result will be similar to the example in Figure 17-13.

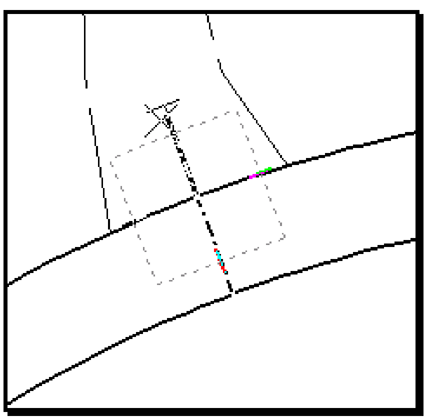


Figure 17-13: Sample of compass rotation perpendicular to roadway centerline.

Enter the minimum distance 6’ beyond the edge of shoulder (on tight skews maybe 3’ minimally to the paved 3’ apron). Left click to *Accept* this distance. The next *Data* point (let click) should be in the center of the driveway on the skew as seen in Figure 17-14. Continue to draw the centerline adding additional vertices as necessary.

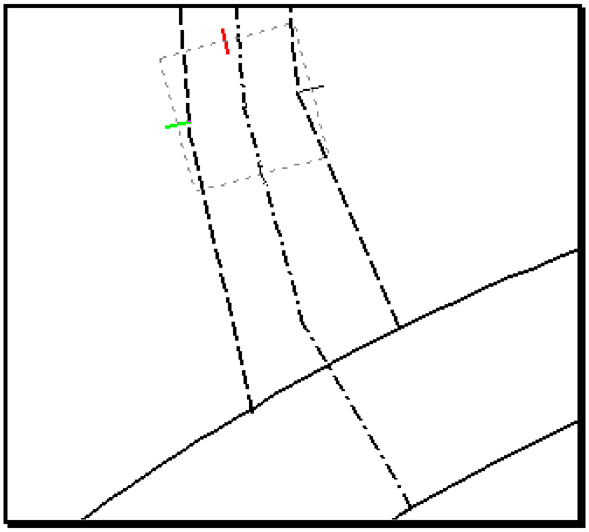


Figure 17-14: Drawing the centerline beyond the perpendicular minimum offset.

Step Six: Create Custom Sections

Overview

This step creates the custom cross sections based on the centerline element of the driveways you created previously. It will be easy to select these globally based on their *Level*. Each of the driveway cells will need to be dropped (Qualities>Drop>Complex) into their finer parts if the haven't been already. You will receive a warning (Figure 17-15) for every cell that hasn't been dropped.

Figure 17-15: Warning if you have some cells that haven't been dropped in the selection set.

✓ ***This section is not intended to replace the Custom Cross Section documentation previously outlined. For more details refer to page 20-19***

Part One: Open Cross Section Dialog

Select **Evaluation>Cross Section>Create Cross Section…** from the InRoads menu.

Part Two: Scale and Orientation of Sections

♬ The Cross Section dialog is setup for horizontal Cross Sections at 1" = 5' by default. If another scale or orientation is desired, set it by picking one of the predefined preferences.

Decide on the scale and orientation of the Cross Sections. Sheets can be vertical or horizontal and either at 1" = 5' (1:60) or 1" = 10' (1:120). Use the *Preference* button at the bottom of the dialog pick and set the defaults for the Cross Sections pages. Select the preference, click **Load** then **Close** the dialog (Figure 17-16).

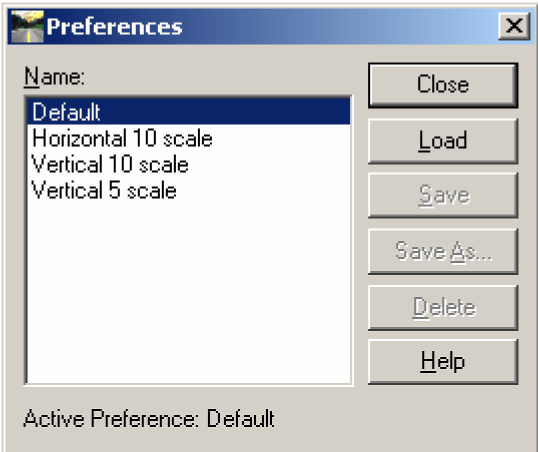


Figure 17-16: Preference dialog for Cross Sections.

Part Three: Set Global Scale Factor

Select **Tool>Global Scale Factor** from the InRoads main menu. Depending on previous step, enter 60 (for Text), 1 (Cell) and 60 (Line Style) for 1" = 5' sections (Figure 17-17) or 120 (for Text), 1 (Cell) and 120 (Line Style) for 1" = 10' sections.

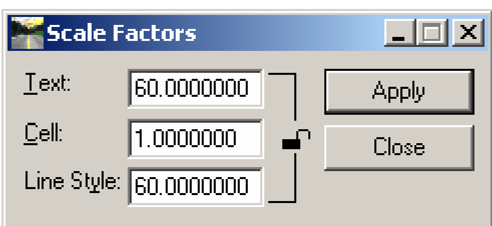


Figure 17-17: Global Scale Factor for 1" = 5' Cross Sections.

Part Four: General Tab

On the *Create Cross Sections* dialog, set the *Surfaces* you want displayed (i.e. Ground and MainLine). Notice the *Left Offset* and the *Right Offset* (Figure 17-18). These same numbers will be used to setup the Custom Cross Section width both sides of the centerline. They can be adjusted if desired. Maximum width of the section is the two widths added together (i.e. 140' for 1" = 5' horizontal).

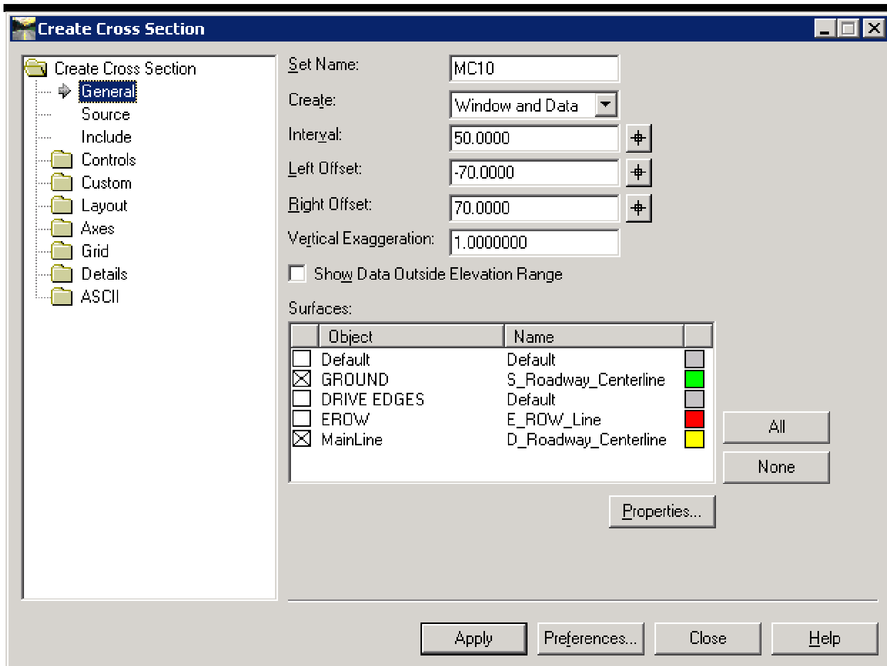


Figure 17-18: General tab of the Create Cross Sections dialog.

Part Five: Select the Controls Leaf

In the *Critical Sections* area of the *Controls* leaf uncheck all options.

Part Six: Select the Custom Leaf

Expand the *Custom* leaf and pick *General* (Figure 17-19).

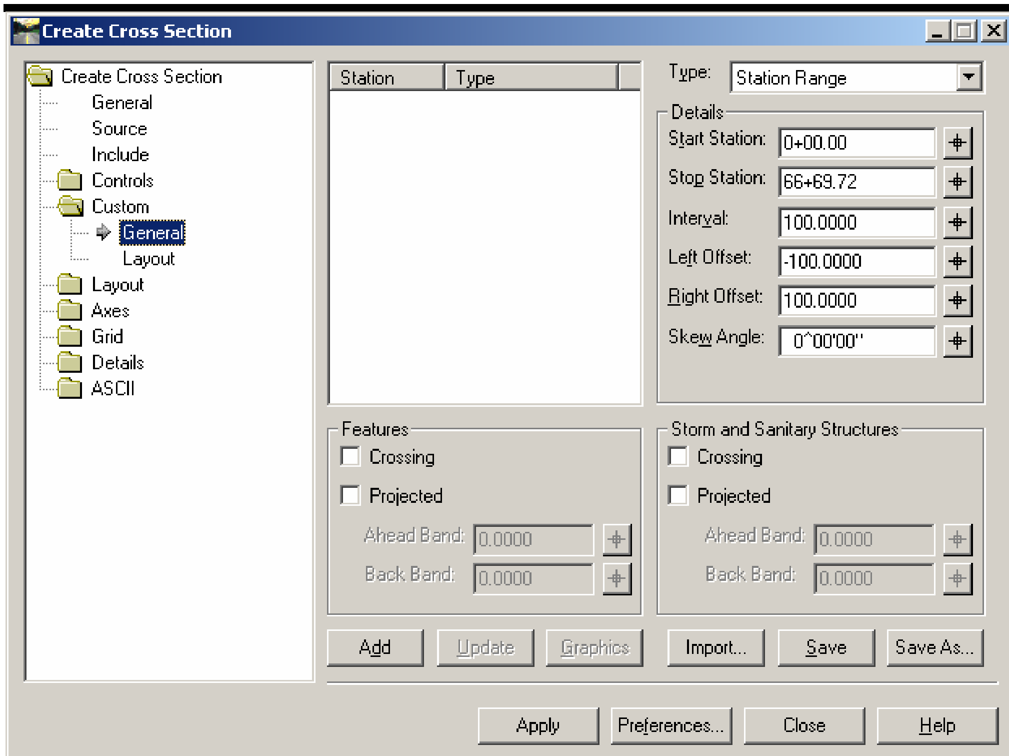


Figure 17-19: Custom Cross Section portion of the dialog.

Part Seven: Power Select Lines

Click on the *Power Selector* tool or activate it from the MicroStation main menu (**Group>Element Selection>PowerSelector**). Click the down arrow on the bottom of the dialog. Select the **Lv** tab. Select the **D_Roadway_Drive_Centerline** from the list of available *Levels* (Figure 17-20).

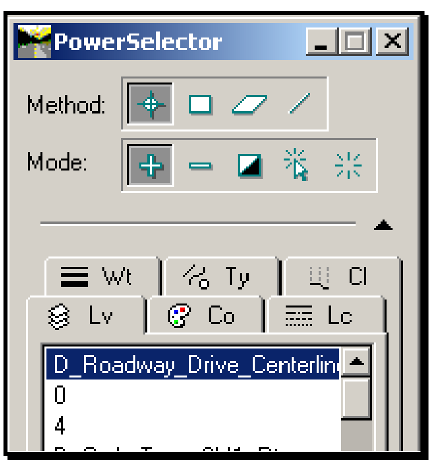


Figure 17-20: Power Selector with the centerline level selected.

Part Eight: Select the Graphics Button

Once the centerlines have been selected change the *Type* pull down to **Linestring** (Figure 17-21).

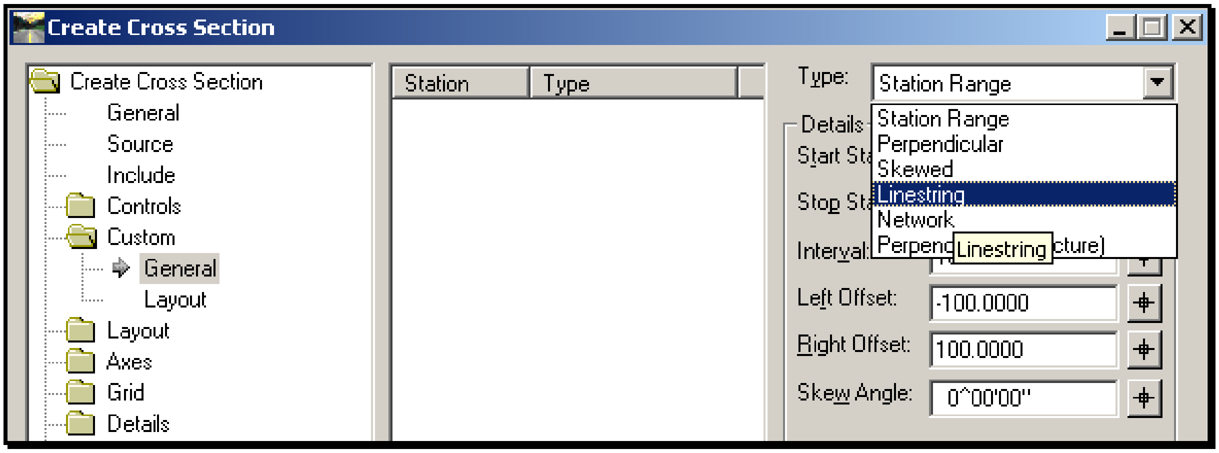


Figure 17-21: Adjust the Type pull down to Linestring.

The *Graphics* button will now be available. Select the **Graphics** button (Figure 17-22).

♬ If the Graphics button doesn't activate, click in the Station/Type area.

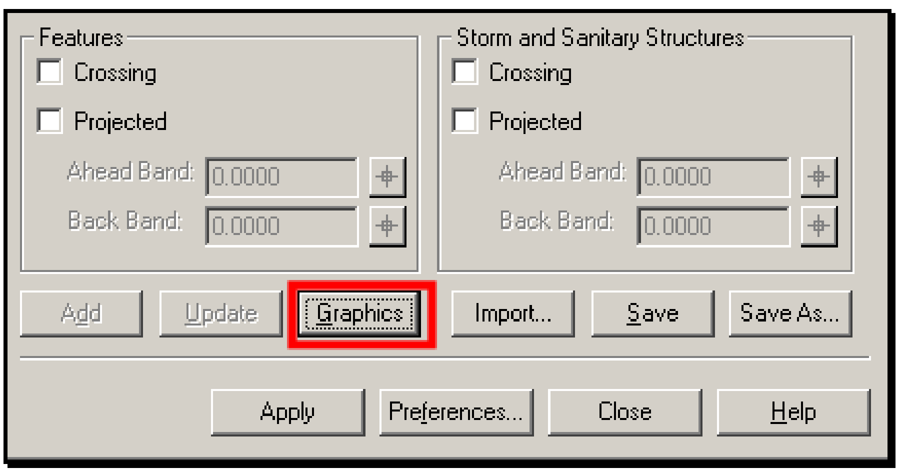


Figure 17-22: Graphics button highlights when there are graphics in a selection set.

This will fill in the *Station* and *Type* portion (Figure 17-23) of the dialog with the stations of every driveway centerline you placed.

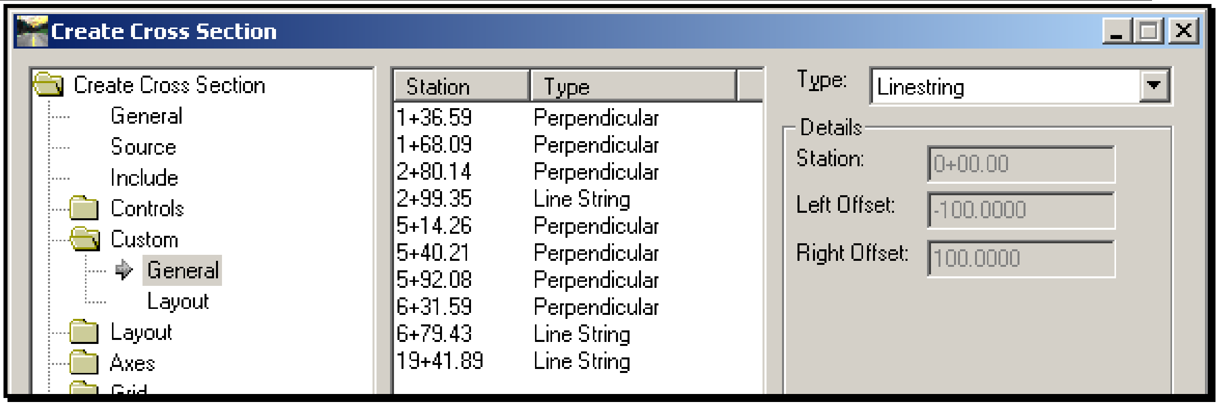


Figure 17-23: Populated Station and Type dialog.

- This dialog will indicate which of the driveways were truly perpendicular to the centerline, which ones were linestrings (3 point line skewed at edge of apron or back of sidewalk) and which are skewed from the centerline.
- Depending on whether or not the placements of the cells were truly perpendicular to the centerline, you may receive more skewed sections than you expect. The angle will most likely be minimal and close enough for government work.

Part Nine: Add Crossing Features and Offsets

Highlight all the stations in the list and place a check in the **Crossing** box to display *Crossing Features* in the cross sections in order to display curbing, Existing ROW lines, houses, etc. Click the **Update** button.

✓ ***Refer to page 20-10 for instructions on adding the Existing ROW lines to the cross sections as a Crossing Features.***

Add the Left and Right offsets to each of the *Perpendicular* and *Skewed* sections based on the *General* tab. Highlight each *Station*, one at a time, add the offsets and select the **Update** button (Figure 17-24).

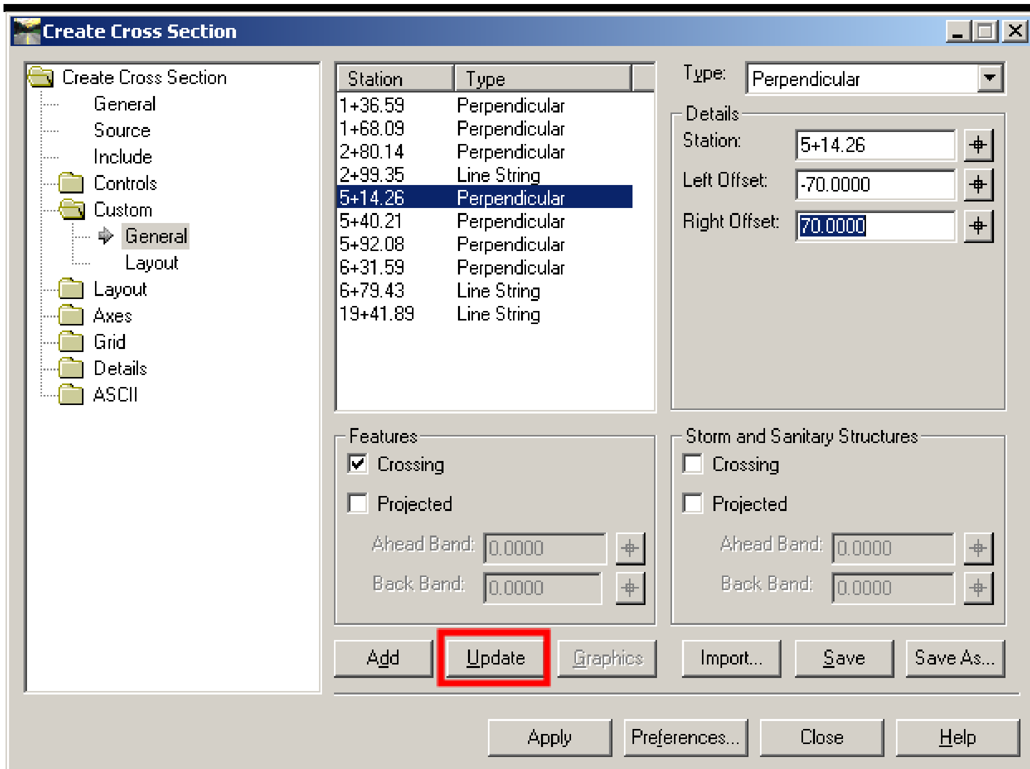


Figure 17-24: Update each Station with the width desired.

In the event you need to match further than the normal width of half of a cross section, adjust the left and right values so that the width necessary is for the side needed. If you go over the maximum width the section will allow, the remainder will be placed as its own section. Cross sections are Left justified, therefore the left half of the cross section will always display with the remainder forced to the next section.

♫ Linestring sections are based on the length of the line therefore you can't adjust the Left and Right values.

Step Seven: Save the Custom Sections

Select the **Save As…** button on the *Create Cross Sections* dialog (Figure 17-25) and save the custom cross sections. *Station Range* sections can be added later.

Figure 17-25: Save the Custom Cross Sections and add additional sections later.

Step Eight: Display the Custom Sections

Rotate the view to a **Top** rotation. Zoom out a bit and click **Apply** in the *Create Cross Section* dialog**.** Left click in the view window to place the sections.

Step Nine: Locking Cross Sections

Power Select (**Group>Element Selection>PowerSelector**) the Cross Sections by placing two left mouse clicks around them and select **Edit>Lock** from the MicroStation main menu. This will lock the cross sections and prevent them from being deleted if the view is ever cleared and also to lock down the existing ground.

ANALYZE DRIVEWAY SECTIONS

Overview

Now you can either *Batch Print* the cross sections and analyze them on paper the old fashion way or do them electronically on the computer. It is recommended that you do this electronically using the following steps.

Step One: Place Driveway Cell

Overview

The standard driveway cells were created from the *Standard Details* to be used as a guide. They display the maximum scenarios. Adjust as dictated by the design guide not to exceed the maximum percentages.

As opposed to using these cells, a user could draw the surface of the drive in each cross section manually using *AccuDraw*.

- ♫ Consider opening a second view window (Window>View>2) and rotating that view to a "Top" rotation so that you can always keep the cross sections handy while being able to rotate the plan view horizontal in the View 1 window.

Part One: Set the Category Scale

Zoom in on the cross section of the first driveway you want to analyze. Right Click the *Settings Manager* and select **Category>Scale** (Figure 17-26).

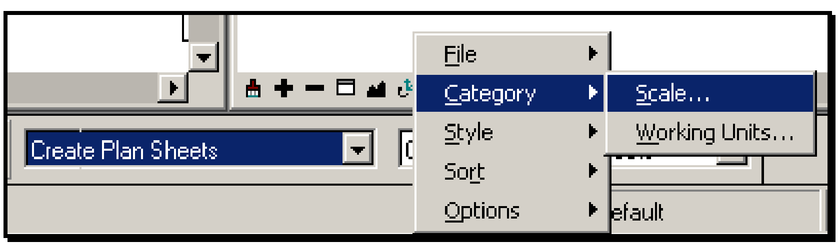


Figure 17-26: Right Click the Settings Manager and select Category>Scale.

This opens the *Select Scale* dialog. Pick the scale that represents the scale of your cross sections. Normally this will be either 1 in. = 5 ft. or 1 in. = 10 ft. (Figure 17-27). Click **OK.**

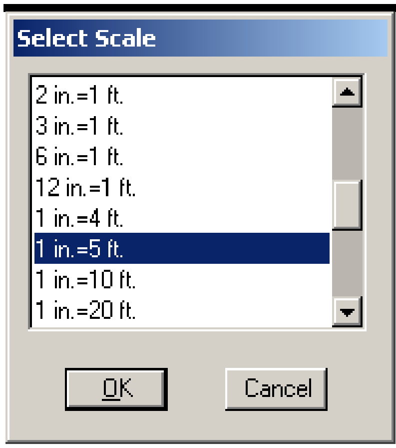


Figure 17-27: Select the scale of your cross sections.

♫ This will add a scale factor to everything selected from the Settings Manager.

✓ ***For more information about the Settings Manager refer to page 2-19.***

Part Two: Select the Cell

Select **Driveways** from the left side of the *Settings Manger*. Select the driveway scenario from the right side of the *Settings Manager* (i.e. Drive Level Left) (Figure 17-28).

Figure 17-28: Select the driveway that best fits the existing slope of the driveway.

Part Three: Place the Cell

Place the driveway cell at the gutter line. There will be a vertex in the shoulder line at this point making it easy to place (Figure 17-29). Depending on the curb type, this will be one foot from the edge of pavement or at the edge of pavement.

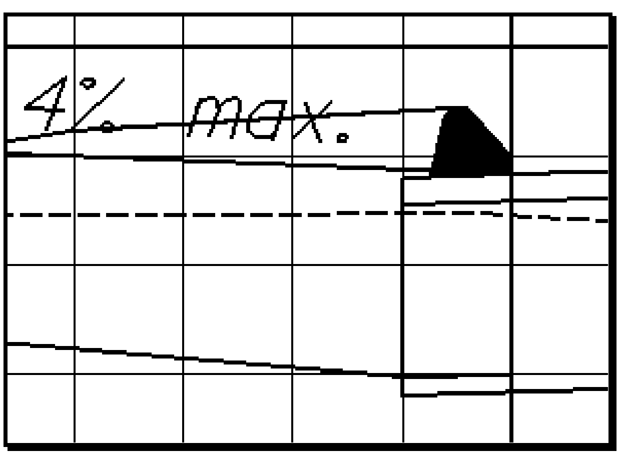


Figure 17-29: Driveway cell place on the gutter line.

Step Two: Manipulate Driveway Cell

The cells can either be *Dropped* and adjusted using the *Modify* tool or left as a cell and manipulated with the *Fence "Stretch"* tool.

Recommended method would be to use a *Fence.* Place a *Fence* (**Group>Fence>Place Block**) around the vertices in the driveway bump. *Stretch* the fence contents by selecting **Group>Stretch Fence** from the MicroStation menu (Figure 17-30). Place a check in the **Stretch Cells** option with the *Fence Mode* set to **Inside.** Stretch the fence contents from the vertex of the bump to the desired location along the existing ground using an "N" nearest snap. Repeat for each vertex you want to move.

♬ If you want to remove a bump, simply move the outer vertex to the previous bump vertex.

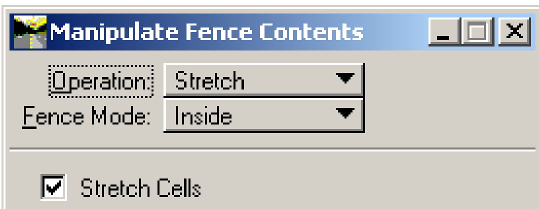


Figure 17-30: Manipulate Fence Contents dialog.

Step Three: Label Proposed Slopes

Load the *Cross Section Settings Manager* by selecting **Settings>DOT SetMgrs> Cross-Sections – Typicals.** Select **Prop. Text and Dims>Slope%** from the *Settings Manager.* Left click on the vertex of the segment you want to label nearest the centerline first then select the next vertex furthest from the centerline. This will correctly label a positive or negative slope. Click on the line segment to place the new text (Figure 17-32).

Step Four: Label Existing Slopes

Part One: Set Global Scale Factor

Use InRoads to annotate the existing ground on all of the driveway cross sections. First verify that the *Global Scale Factor* is set to the correct scale of the cross sections. Select **Tools>Global Scale Factor** and set the values to 60, 1 and 60 for normal 1" = 5' cross sections (120, 1 and 120 for 1' = 10' cross sections) (Figure 17-31).

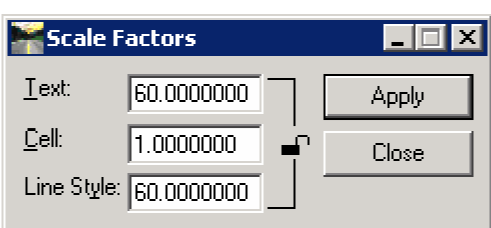


Figure 17-31: Global Scale Factor set up to annotate cross sections.

Part Two: Annotate Cross Sections

To label the slopes for existing ground select **Evaluate>Cross Section>Annotate Cross Section** from the InRoads menu. Select the **Preference** button and select and load the **Existing Drive Grades** preference. Select the **Ground** *Surface* of the *General* tab. Click **Apply.**

Step Five: Analyze Cross Sections

Check to see if the difference between the slopes are within tolerance or decide whether a design exception is warranted.

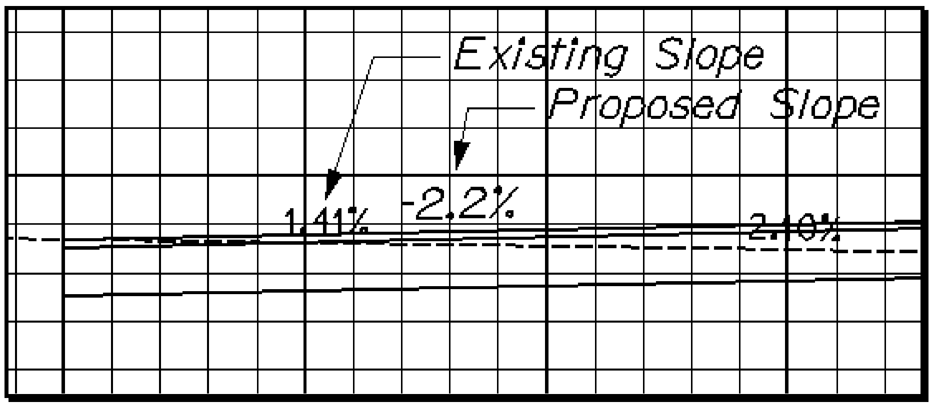


Figure 17-32: Existing and Proposed driveway slopes with percentages labeled.

♬ To set a desired slope and determine its match point, it may be easier to draw the line using the *SmartLine* tool and *AccuDraw*. Snap to the last bump, enter in the rough distance in the “X” field of *AccuDraw*. For positive slopes, gesture the mouse above the first point and enter the same distance in the “Y”. Now use *AccuDraw’s* built in calculator to “*” multiply by the desired slope percent (i.e. * .02). Left click to **Accept** this location. Intersect this line with the existing ground.

Step Six: Label Offset

Select **Drafting>Place Cross Section Note** from the InRoads main menu. Select the **Offset** note from the *Proposed* folder within the *Notes Files* (Figure 17-33).

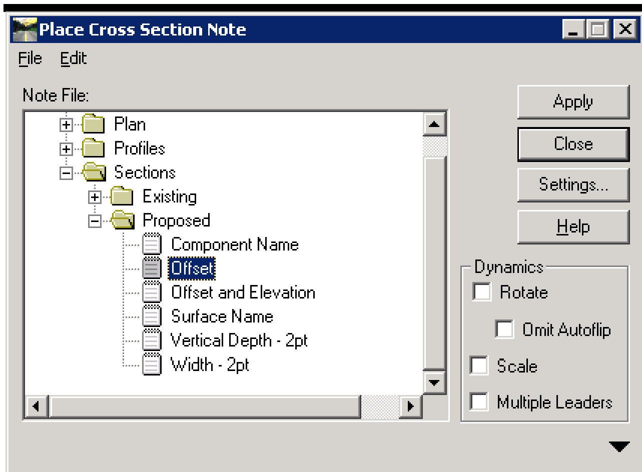


Figure 17-33: Offset note selected from the Proposed folder.

Click **Apply** and place the note by snapping to the intersection of the drive match point and the existing ground. Place the text about the match location (Figure 17-34). Close the dialog.

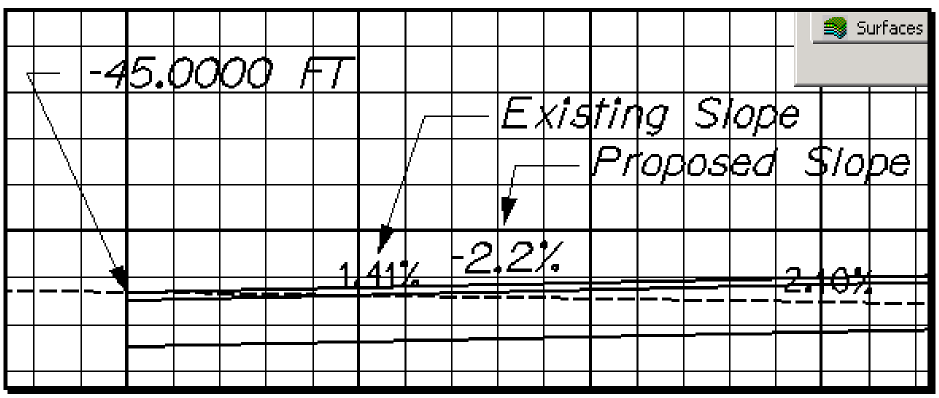


Figure 17-34: Place the offset on the cross section.

Step Seven: Use Tracking to Determine Offset to Match Point (Optional)

Select **Tools>Tracking>Cross Sections** from the InRoads main menu. Snap to the vertex where you matched the driveway. The offset and elevation is reported back at the bottom left of the InRoads dialog (Figure 17-35) as well as the *Message Center* at the bottom of the MicroStation dialog.

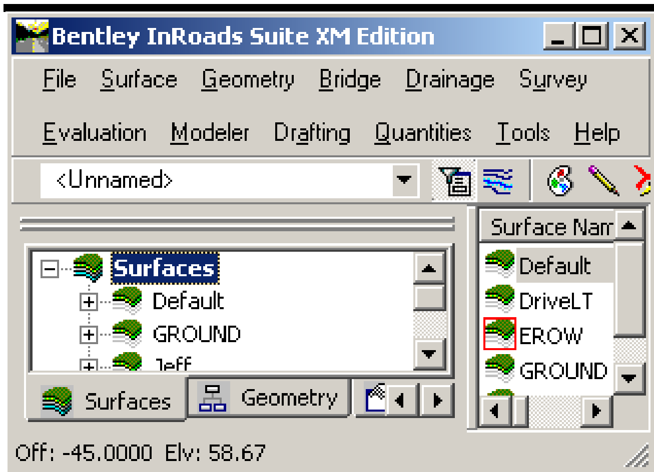


Figure 17-35: Offset and Elevation reported at the bottom of the InRoads dialog.

Step Eight: Lock Cross Sections

In the event you want to clear the display you should now lock the cross sections in order to keep these edits. *PowerSelect* the cross sections and select **Edit>Lock** fro the MicroStation main menu.

ADJUST DRIVEWAY EDGES

Overview

This portion of the document will provide some basic tips on how to manipulate the standard driveway edges in the plan view. Another option would be to draw the driveway edges manually using the *Settings Manager* in order to isolate the driveways on the left of the centerline from the driveways on the right. The ultimate goal is to create a *Driveway Edges* surface to utilize the imported features to limit the driveway template on a radius or tapered edge.

In this drawing we will not be concerned with keeping the 3D aspect. When adjusting the radius of the driveway, it will work best if the elements are all on the same plane… elevation “0”.

Step One: Adjusting Radial Edges

Overview

The match point on the driveway will determine how the edges are configured as well as the existing shape of the driveway. These instructions will aid in drawing a new standard radius while keeping the standard driveway opening.

Part One: Set the Symbology and Lock Elevation

Select **Driveways** from the left side of the *Settings Manager*. Select the **Driveway Edge Paved Right** (or another selection depending on the driveway) (Figure 17-36).

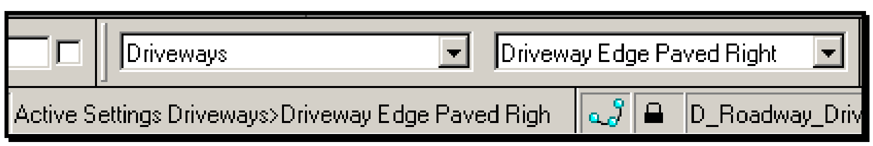


Figure 17-36: Set the symbology through the Settings Manager.

Lock the elevation by selecting **Macro>Set/Lock Z** from the MicroStation main menu and lock the elevation to “0”. This will keep the elements at elevation zero (Figure 17-37).

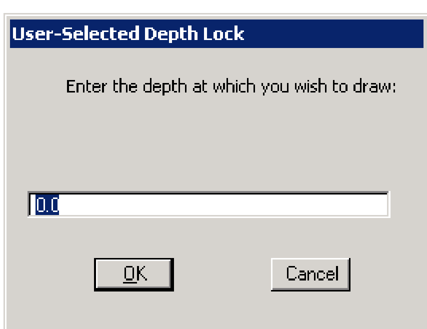


Figure 17-37: Lock the elevation to zero.

Part Two: Copy Parallel Tool

Select the **Copy Parallel** tool from the main tool box or select **Zip>Parallel>Parallel (New Settings)** from the MicroStation menu. Set the *Mode* to **Original.** Uncheck the *Distance* option and make sure that **Copy** and **Use Active Attributes** are checked (Figure 17-38).

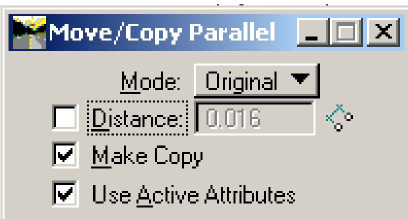


Figure 17-38: Copy Parallel tool settings dialog.

Part Three: Copy Parallel

Use the intersect snap and grab the centerline at the intersection with the driveway centerline. Right click if MicroStation selects the incorrect line initially. Enter the offset to the match point of the driveway by simply gesturing the mouse in the direction and typing the distance. Left click to **Accept** the location (Figure 17-39). Repeat this process to place an additional line with the correct symbology at the proposed edge of shoulder.

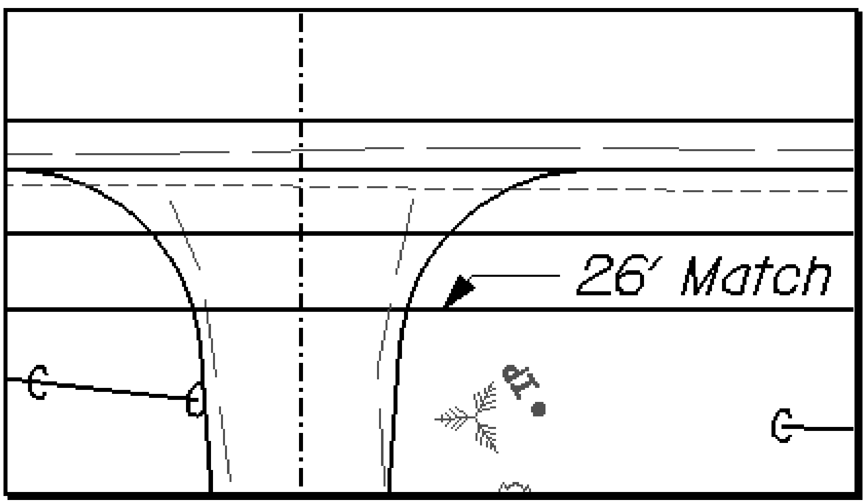


Figure 17-39: Match point copied parallel from the centerline.

Notice in the screen capture in Figure 17-39, that the standard width and radius will not match into the driveway at the specified offset. If you want to keep the radius tangent with the edge of shoulder and the incoming driveway edge, it will be easier to create a new radius using the *Construct Circular Fillet* command.

Part Four: "Trace" Existing Drive Edge

Use the *Place SmartLine* tool to draw on top of the existing driveway edge (Figure 17-40) where it intersects with the match line.

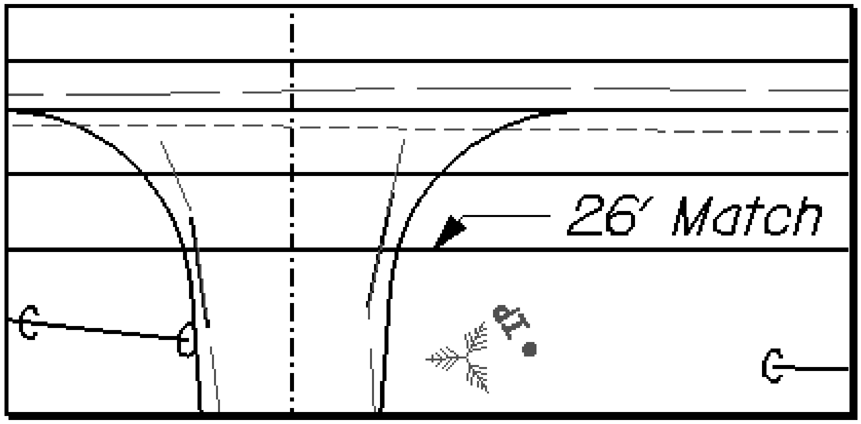


Figure 17-40: Line segment crossing the match line.

Part Five: Delete Partial

Use the *Delete Part on an Element* tool (**Stretch>Delete Partial** from the MicroStation main menu) and delete a small portion of the line you copied parallel onto the shoulder (Figure 17-41).

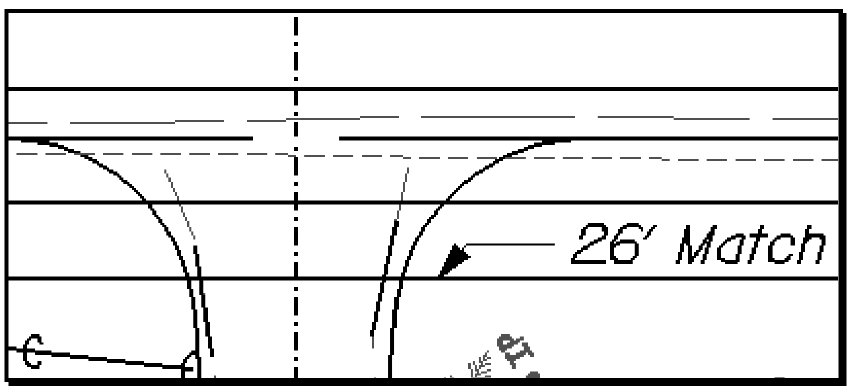


Figure 17-41: Small segment of the drive opening deleted.

♬ To make it easier to hit the correct line, temporarily shut off the **D_Roadway_Edge_Shoulder** *Level.*

Part Six: Construct Circular Fillet

Select the *Construct Circular Fillet* tool or by selecting **Zip>Fillet/Chamfer>Fillet** from the MicroStation menu. Set the radius to 15. Set *Truncate* to both. Concentrating on one edge at a time, left click on the new proposed driveway edge you traced (#1) and then left click on the broken segment representing the edge of shoulder line (#2) (Figure 17-42). Repeat for the other side of the drive.

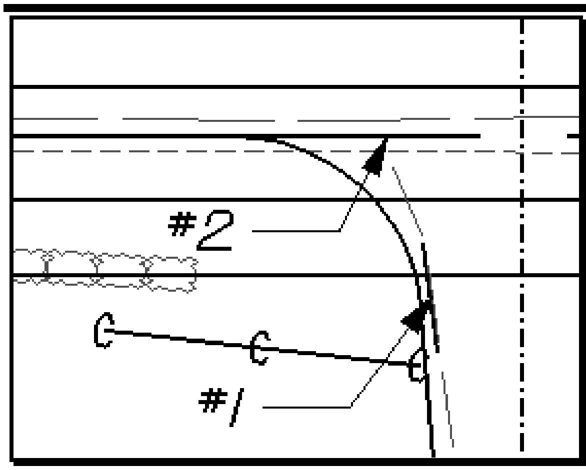


Figure 17-42: Segments to Construct Circular Fillet with.

- If this doesn't work and MicroStation reports that the elements aren't "planer", select **Macros>Flatten** from the MicroStation menu.

Now use the **Extend 2 Elements to Intersection** tool or select **Stretch>Clip at Intersection** from the MicroStation menu to intersect the back of driveway with the new radius just drawn. Delete any remnants of the standard cell that was placed originally as well as the copied centerline at the edge of shoulder. Results of the circular fillet, intersected lines and cleaned up lines are shown in Figure 17-43.

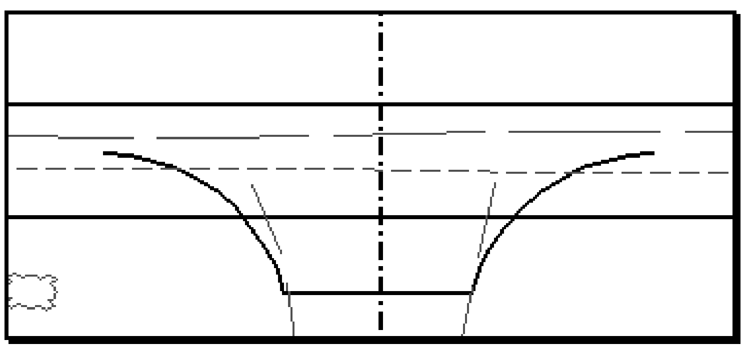


Figure 17-43: Results of the driveway all cleaned up.

Part Seven: Create Complex Chain

Select the *Create Complex Chain* tool or select **Group>Grouping>Create Chain** from the MicroStation menu, set *Mode* to **Manual** and click lines in the "up station" order. Left click to complete the command.

Step Two: Straight Drive Edges

Part One: Wide "Curbed" Drives

Use the intersect snap and grab the centerline at the intersection with the driveway centerline. Right click if MicroStation selects the incorrect line initially. Enter the offset to the match point of the driveway by simply gesturing the mouse in the direction and typing the distance. Left click to **Accept** the location.

On drives wider than the standard width, use the *Move Element* tool to move the driveway edge along the edge of shoulder with an “N” nearest snap or use the “I” intersect snap and intersect the existing drive edge where it meets the shoulder line. For driveways on a curve it may be easier to draw a new driveway edge while using the *Perpendicular* snap to make sure of perpendicular connectivity to the edge of shoulder.

Use the *Modify Element* tool to manipulate the end of the line or middle of a line segment to match the existing driveway edge. Use the *Insert Vertex* tool to add a vertex if necessary.

Part Two: Narrow “Curbed” Drives

Use the intersect snap and grab the centerline at the intersection with the driveway centerline. Right click if MicroStation selects the incorrect line initially. Enter the offset to the match point of the driveway by simply gesturing the mouse in the direction and typing the distance. Left click to **Accept** the location.

Use the *Modify Element* tool to move the midpoint of the line beyond the taper to the existing driveway edge. Use the “N” nearest snap to make connectivity. Use the same tool to modify the end of the driveway.

- ♬ Depending on the offset of the match point, the driveway edge may have to be tweaked to match sooner.

Part Three: Intersect Edges with Match

Now use the **Extend 2 Elements to Intersection** tool or select **Stretch>Clip at Intersection** from the MicroStation menu to intersect the back of driveway with the edges. Delete any remnants of the standard cell that was placed originally.

Part Four: Create Complex Chain

Select the *Create Complex Chain* tool or select **Group>Grouping>Create Chain** from the MicroStation menu, set *Mode* to **Manual** and click lines in the “up station” order. Left click to complete the command.

IMPORT DRIVEWAY EDGES INTO SURFACE

Overview

The goal is to import the driveway edges (which are complex chains) into a new surface so that the template can use the *Features X Y* to control the driveway's offset. They can be imported all at once using pre-established rules through the *Import Surface Advanced* tool.

Step One: Import Edges

Overview

It depends on the order in which you drew the edges that will control the sequence of the incremental *Seed Name* (which is no big deal). The importing will group all left and right drives whether paved or gravel which won't affect the final outcome.

Import Surface Advanced

Select **File>Import>Surface Advanced…** from the InRoads main menu (Figure 17-44). Enter **DRIVE EDGES** as the *Surface*, *Load From* should be set to **All** and the *Intercept Surface* should be set to your **MainLine** surface in order to get the edges close to the correct elevation. Pick the **DRIVE EDGES** rule from the *Rule Set - Name* pull down. The rules have been predefined and shouldn't need manipulation. Click **Apply.**

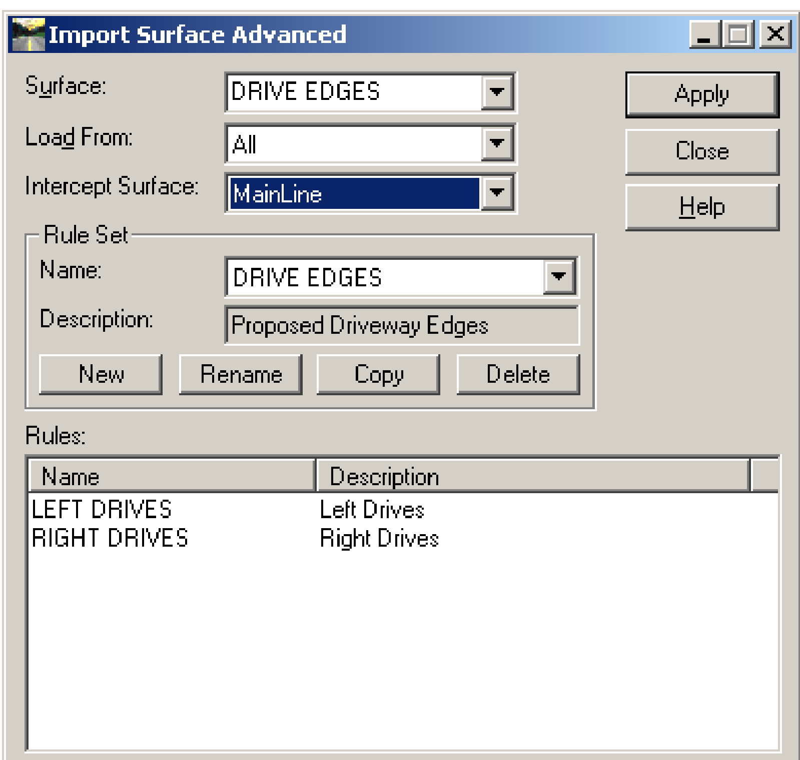


Figure 17-44: Import Advanced dialog set to import left and right driveway edges.

A new *Surface* was created with each complex chain its own feature in the surface.

Step Two: View Results

Clear the display by selecting the area around the roadway and selecting the *Delete Element* tool. **<u>Do not</u>** delete the Cross Sections with the adjustments to the slopes.

- If you've locked the sections previously, select **Edit>Select All** and select the *Delete Element* tool.

Select **Surface>View Surface>Features** (Figure 17-45). Click **Apply** and then **Close.** Verify that the *Feature(s)* completely define the driveway edges.

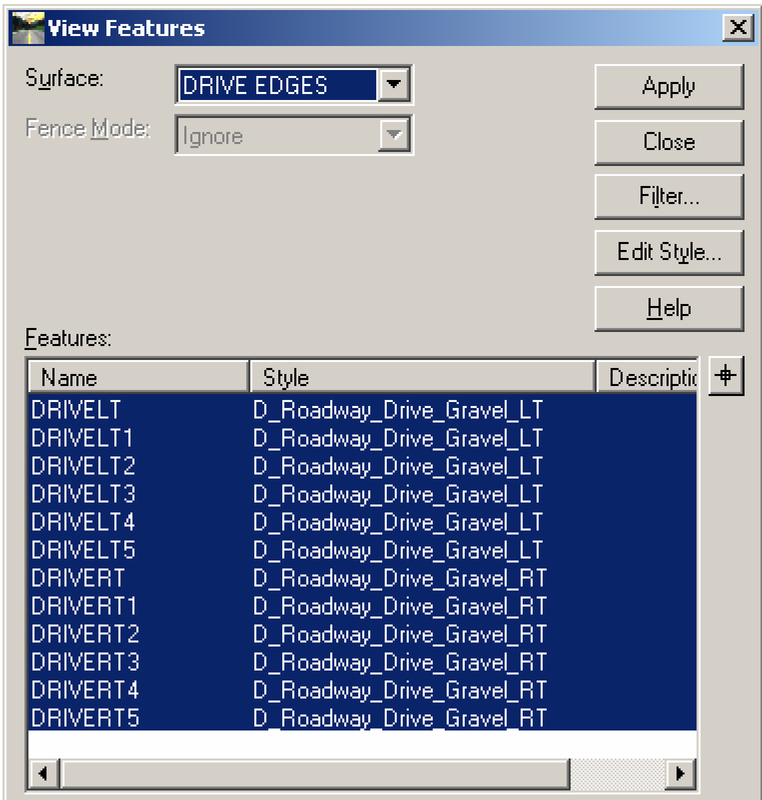


Figure 17-45: View Features dialog with driveway edges.

ADJUST DRIVEWAY TEMPLATES TO REFLECT SECTIONS

Overview

A driveway template will need to be developed for each driveway. This will be done as an edit in the *Template Drop* dialog for the start specific station. The driveway will not reside in the *Template Library*, instead, the edit will reside in the project's IRD specific only to this project. Never synchronize these templates back to the *Template Library*. This is fine due to the fact all driveway edits are only specific to that station range.

Step One: Open MainLine Corridor

Part One: Open Roadway Modeler

Select **Modeler>Roadway Designer…** from the InRoads menu. Open the **MainLine** corridor if not already loaded.

Part Two: Set the Active Surface to Ground

Set the *Active Surface* to **Ground** if not already set (Figure 17-46).

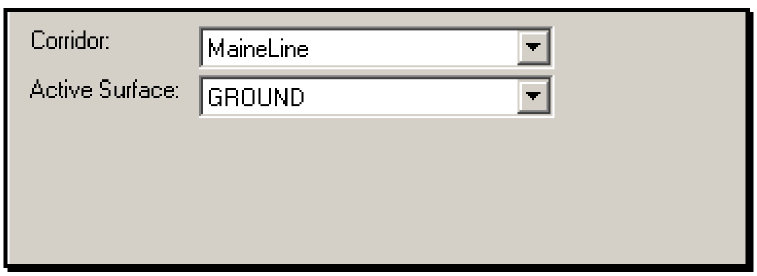


Figure 17-46: Corridor set to MainLine and Active Surface set to Ground.

Step Two: Open Template Drop Dialog

Select **Corridor>Template Drops…** from the InRoads menu.

Step Three: Identify Driveway Start Station

Part One: Highlight the Template Drop

Select the *Template Drop* nearest the location of the driveway that best represent the typical in the area of the driveway if you have multiple templates on the project.

♫ It is important to select this template now otherwise if you select it after you define the beginning driveway station, you will have to repeat this next step.

Part Two: Select the Target Tool

Hold the **Ctrl** key on your keyboard and click the *Target* tool (Figure 17-47). This will allow you to pick the start station of the driveway from the MicroStation graphic.

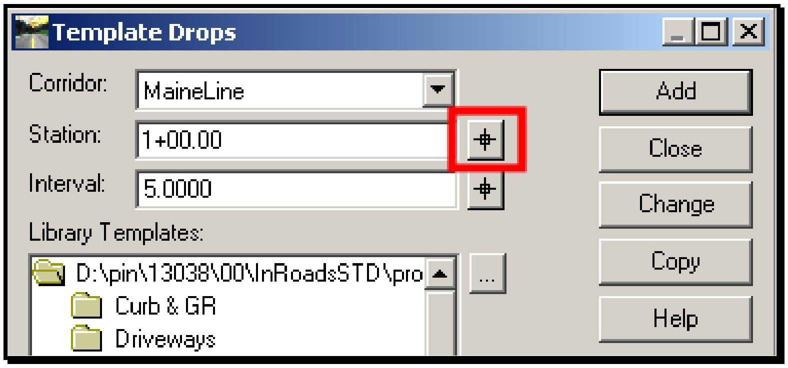


Figure 17-47: Hold CTRL key and click the Target tool.

Part Three: Snap to Beginning of Drive

Snap to the intersection of the driveway edge and the gutter line (Figure 17-48) with an "I" intersect snap. **Accept** the location with a left click.

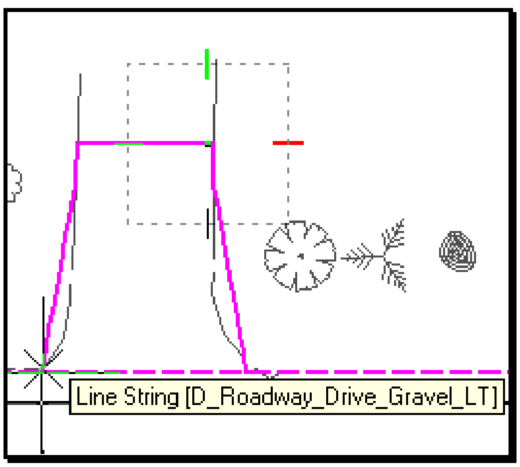


Figure 17-48: Snap and Accept the intersection of the driveway and gutter line.

Step Four: Add the Driveway Template Drop

Part One: Adjust Interval

Set the *Interval* of the drop to 5' as seen in Figure 17-47.

♫ In some cases a 2' or even a 1' interval may give better results.

Part Two: Copy Previous Template

Select the **Copy** button (Figure 17-47). This will copy the previous template to the new station which will be displayed in the list of *Current Template Drops* (Figure 17-49).

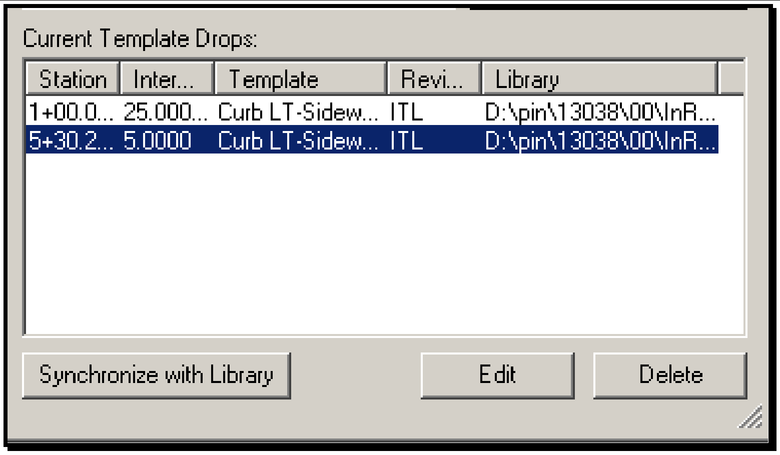


Figure 17-49: Driveway added to the Current Template Drops portion of the dialog.

Step Five: Edit the Roadway Template Drop

Part One: Highlight and Select Edit

Highlight the driveway *Template Drop* and select the **Edit** button.

Part Two: Delete Unnecessary Components

Right click in the gridded area away from all elements in the view and select **Delete Components** (Figure 17-50).

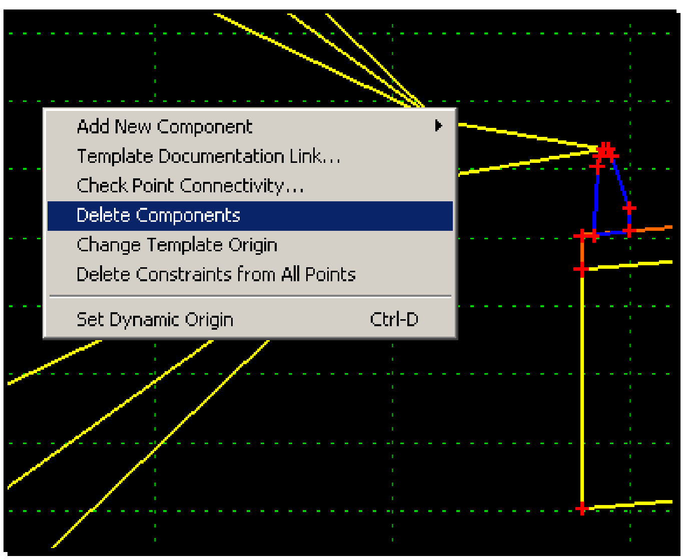


Figure 17-50: Right click in the grid away from all elements in the view and select Delete Components.

Draw a line across the slope end conditions and curb component.

Part Three: Prepare for Driveway Template

Different templates will require different adjustments. This step will require that you make the gutter line (ES point) the furthest point away from the centerline in the template (Figure 17-51). Brief descriptions of the edits depending on the scenario are listed below.

Bituminous Curb

In this case, edit the ESH point and adjust the *Horizontal* offset to zero. Click **Apply.** Right click the CG point, select *Merge* and pick the ES point.

Granite/Concrete Curb

Delete the extended subgrade component underneath the curb. Right click the CG1 or CG2 point, select *Merge,* pick the ES point and then click **Apply.**

Sidewalks

Delete the sidewalk components and point SW1 on bituminous curb or the FC1 point on concrete or granite curb. Depending on the curb type, do one of the previous edits.

Daylight Section

Edit the SS point and change the *Vector Offset* that holds the point to the ES and IF to a *Horizontal* constraint of zero to the ES point.

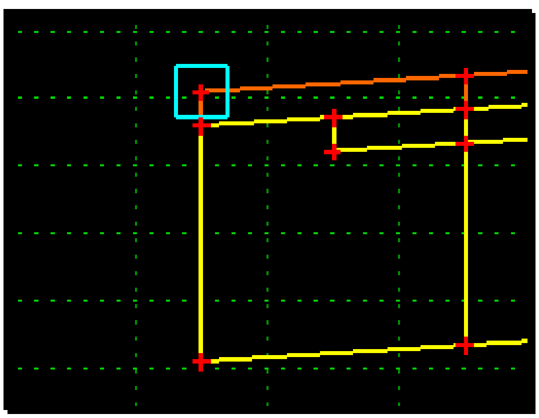


Figure 17-51: MainLine template prepared for driveway template.

Step Six: Place and Edit Driveway Template

Expand the *Template Library* tree and expand the *Driveway* folder. Select the driveway scenario that best represent your driveway situation (i.e. Paved Drive LT).

Part One: Place Driveway Template

Select **Tools>Dynamic Settings** from the InRoads menu and shut off the **Apply Affixes.**

Drag and release the template on the gutter line point when the point is displayed in white.

Part Two: Edit Drive Subgrade

Delete both constraints on the driveway subgrade point at gutter line (i.e. DP2_L or DP2_R) by right clicking the point and selecting **Delete Both Constraints.** Right click this point again and select **Move.** Move this point and release it on the SS point (or outermost point of the subgrade through the main line template). Right click the point and select **Merge.** Pick the DP2 point (Figure 17-52).

Figure 17-52: Merge the DP2 point leaving just the SS point.

Part Three: Adjust Slopes and Offset

This step consists of editing the points so that the driveway template reflects the cross section edits that were made previously. It may consist of deleting a portion of the template depending on the match point and adjusting slopes.

Edit the top most point and adjust as necessary. In this example (Figure 17-53), we deleted the last bump components. Now we'll edit point B3P and adjust the *Slope* constraint to 2.2% and the *Horizontal* constraint to -45' from point **MC** according to the edits done previously to the cross section. Also, make sure that if this is the furthest point from centerline that the *End Condition is Infinite* is now checked. Click **Apply.**

Now adjust the *Slope* constraint to a **Project to Surface** constraint, **Any Direction** and set the *Surface* to **Ground** and then click **Apply** and then **Close.**

- Adjusting the slope of the last bump isn't absolutely necessary because the *Project to Surface* will connect at that slope at that specific station. It just better represents the template in the dialog.

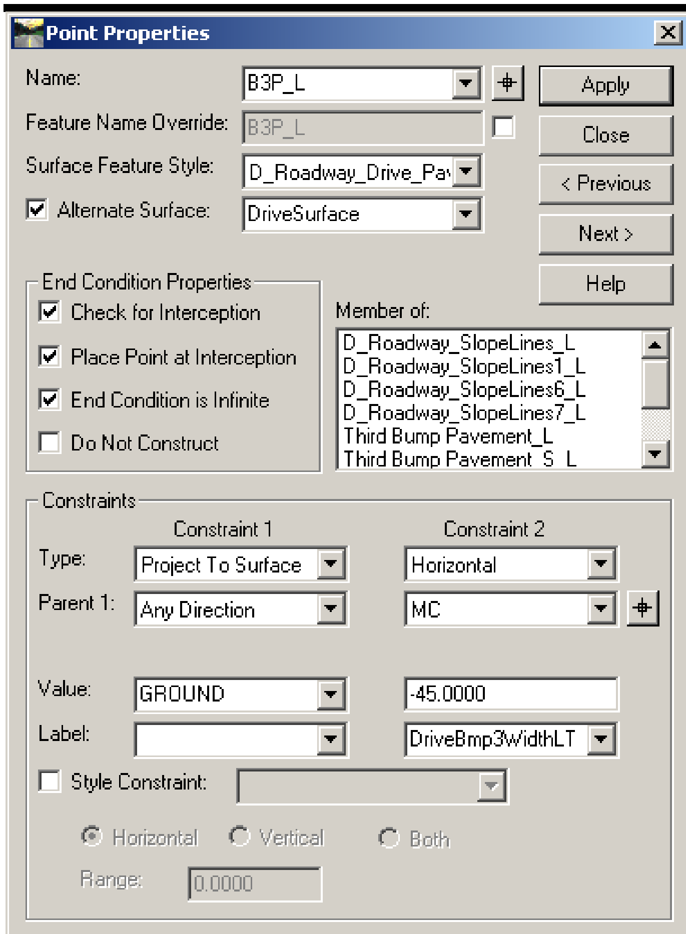


Figure 17-53: Adjustments made to bump point B3P.

The results are shown in Figure 17-54.

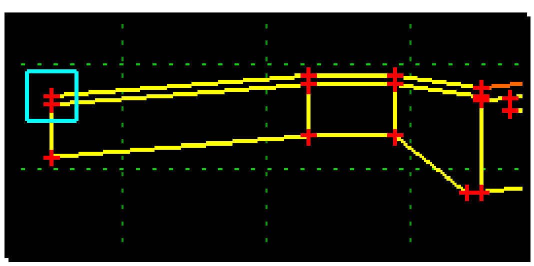


Figure 17-54: Results of the adjustments.

Part Four: Add End Conditions

Expand the *End Conditions* folder of the *Template Library*. Select the **Drives Cut-Fill** end condition and place it at all the bump points that may contact the edge of the driveway (Figure 17-55). The *End Condition* will place either a 4:1 or 3:1 slope. Adjust as necessary.

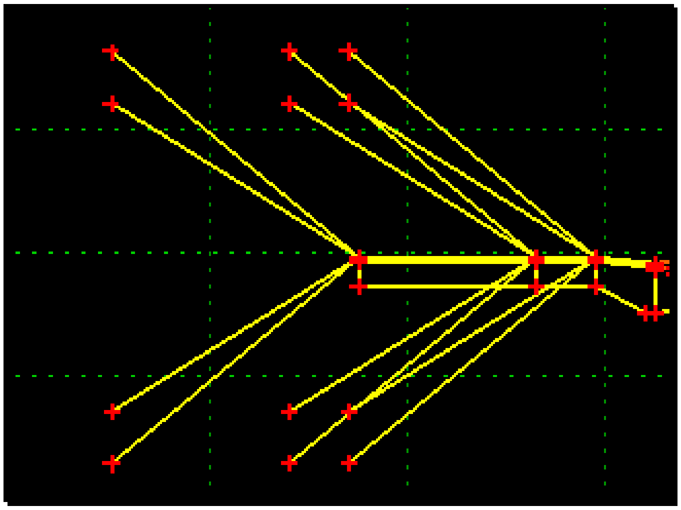


Figure 17-55: Driveway end conditions added to template.

Part Five: Edit Surface of Drive

In Plan View, get information on the driveway feature in the area of the driveway. Depending on your settings, a *tentative snap* will reveal a lot of information about the feature. Note the *Name* of the feature (i.e. DRIVELT) (Figure 17-56).

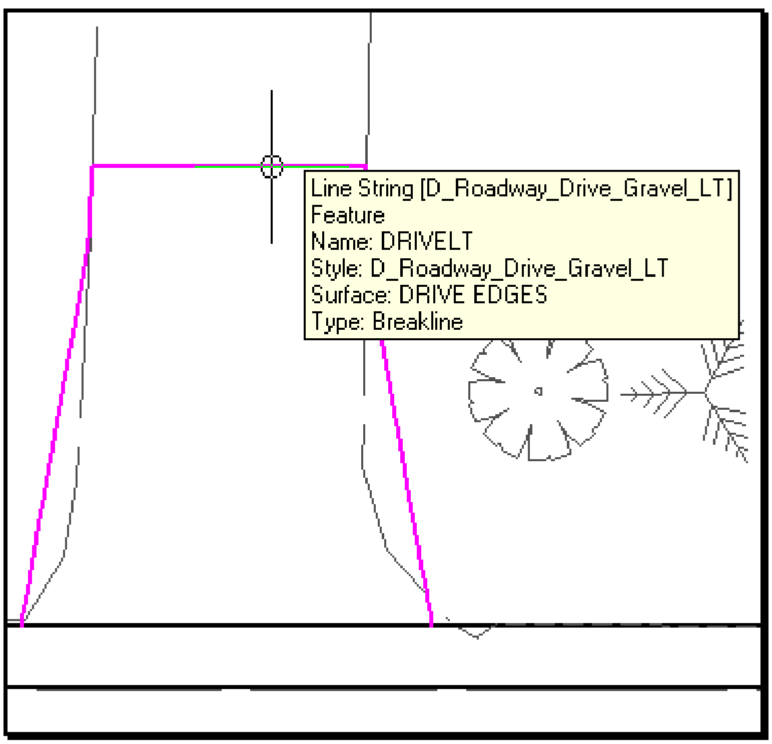


Figure 17-56: Information revealed by a tentative snap.

Double click the surface of each of the driveway bumps (between the points) and edit the **First Bump (_L or _R)** through **Fifth Bump (_L or _R)** components only) (Figure 17-57). These are *End Conditions* that drive the pavement and subgrade components.

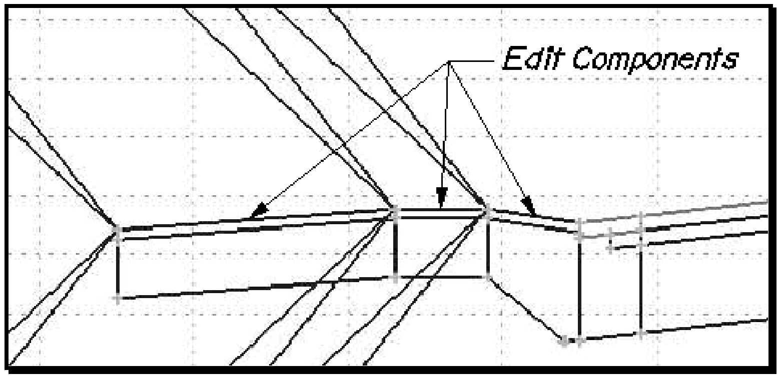


Figure 17-57: Edit bump components labeled here.

In the *Components Properties* dialog (Figure 17-58), set the *Target Type* to **Feature XY,** set the *Surface* to **DRIVE EDGES** and set the *Feature* to the name of the feature for the drive edge in question (i.e. DRIVELT). **Apply** the change to each of the components.

- When you get a list of components and the one you want to edit isn't in the list, hit the ESC key to see other components.
- If you removed a bump or two, edit the remaining bumps. Sidewalks do not have *End Conditions* for the first two bumps. Ignore them.

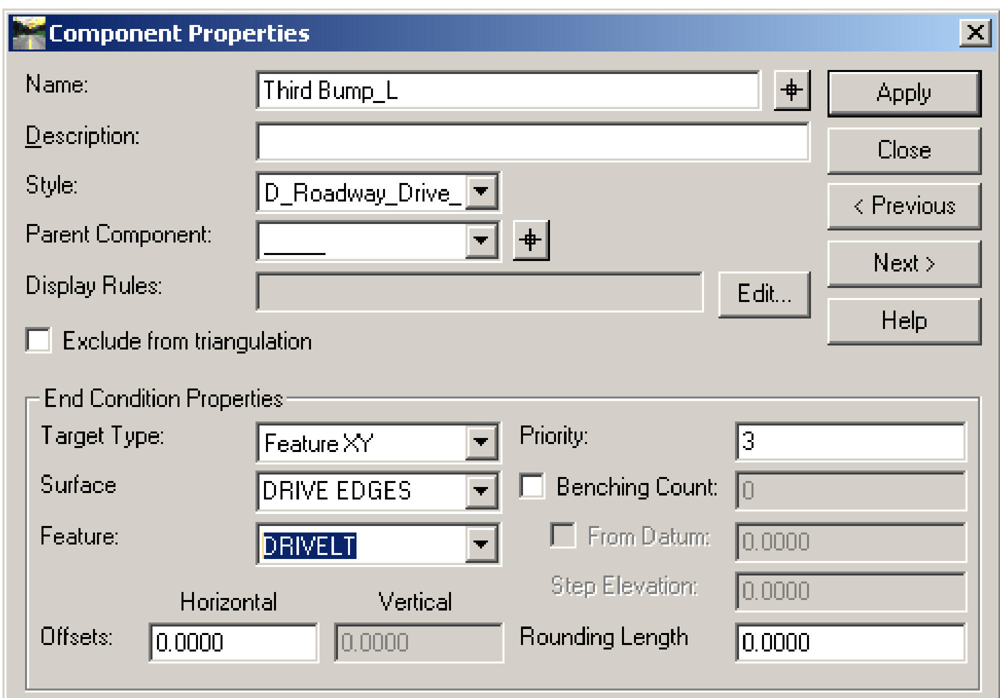


Figure 17-58: Component Properties of the End Conditions to be adjusted.

Part Six: Repeat for All Drive Templates

Do this same process for all of the driveway templates with each specific DRIVE EDGE feature for the station range.

Part Seven: Save IRD

The MainLine corridor should now contain all driveways as well as the main line templates. Save the projects IRD by selecting **File>Save** from the *Roadway Designer* menu.

Step Seven: Process and Review

Part One: Display DRIVE EDGES

To aid in the review of the design, display the proposed DRIVE EDGES in the *Roadway Designer* plan area by selecting **Corridor>Display References…** from the *Roadway Designer* menu. Set the *Surface* to **DRIVE EDGES** and the *Filter* to **DRIVE EDGES** and click the **Add** button (Figure 17-59). To include the existing drive edges, set the *Surface* to **GROUND** and set the *Filter* to **ENTRANCE EDGES** and click **Add.** Close the dialog.

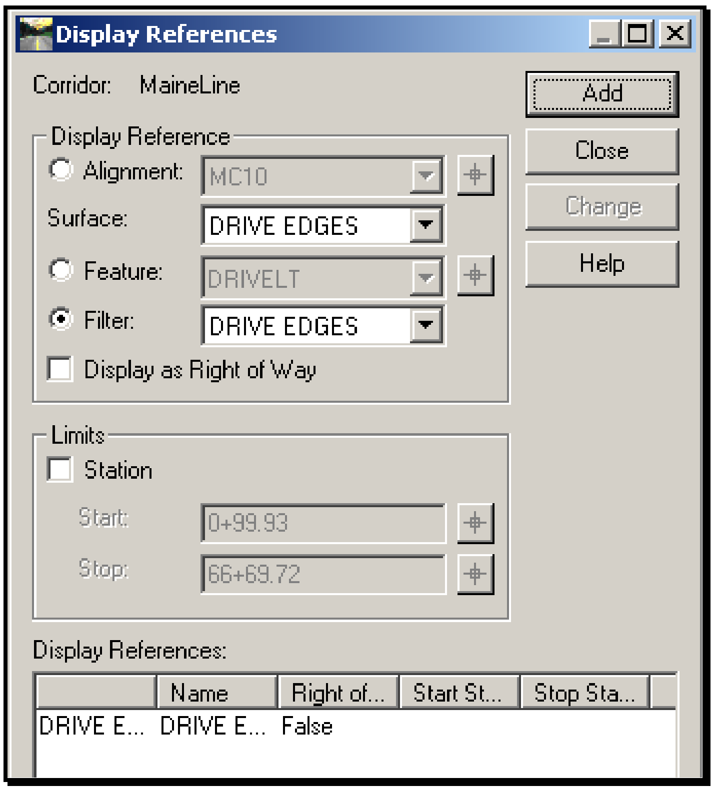


Figure 17-59: Display References dialog set to display the DRIVE EDGES.

Part Two: Process All

Set the *Corridor* to **MainLine** and the *Active Surface* to **GROUND** and select the *Process All* button (Figure 17-60).

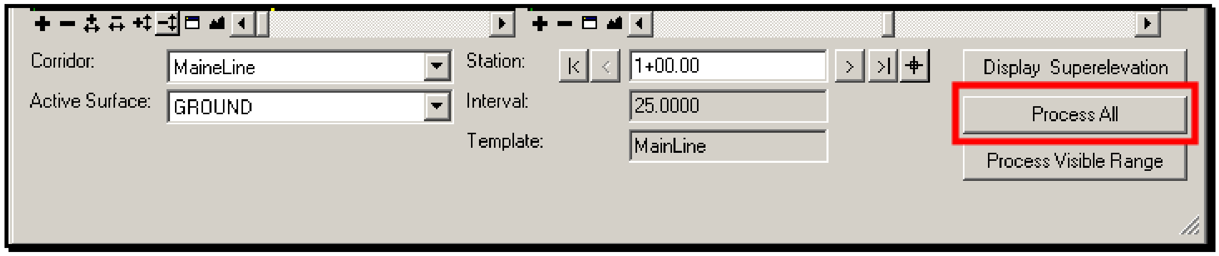


Figure 17-60: Process the corridor against the GROUND surface.

Part Three: Review the Results

Zoom and pan in the plan view area of the *Roadway Designer* to see the touchdown around the driveway edges. A yellow line will display the outer edge of the DESIGN surface should follow the match line of the driveway edges (Figure 17-61).

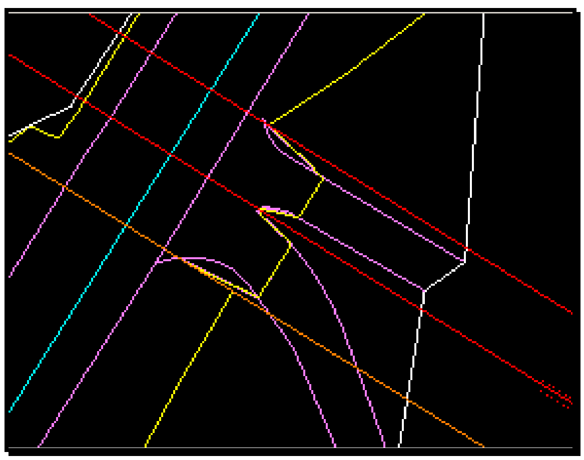


Figure 17-61: Design surface following the DRIVE EDGES.

- If the yellow line of the Design surface doesn’t hit the match line of the driveways, consider changing the *Interval* of the template drop through the driveway to a 2’ or even a 1’ interval.
- If the driveway is on a heavy skew it may be necessary to use the Driveway Option 2 and develop a centerline down the driveway.

CREATE NEW SURFACE AND REVIEW

Overview

Now you should create the **DESIGN** surface and view the results in the plan as well as cross sections. Some final tweaking may need to be done to the template drops as well as additional cross sections added.

Step One: Set Global Scale Factor

Adjust the *Global Scale Factor* by selecting **Tools>Global Scale Factors** and setting the factors to 300, 300, 300 for 1' = 25' drawings (600, 600, 600 for 1" = 50' drawings) (Figure 17-62).

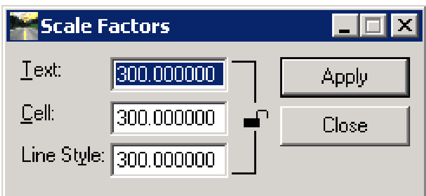


Figure 17-62: Global Scale Factors set for 1'=25' plan display.

Step Two: Create DESIGN Surface

Select **Corridor>Create Surfaces…** from the *Roadway Designer* menu. Enter **DESIGN** as your final surface as a standard. Setup the dialog as seen in Figure 17-63. Click **Apply** and then close the dialog.

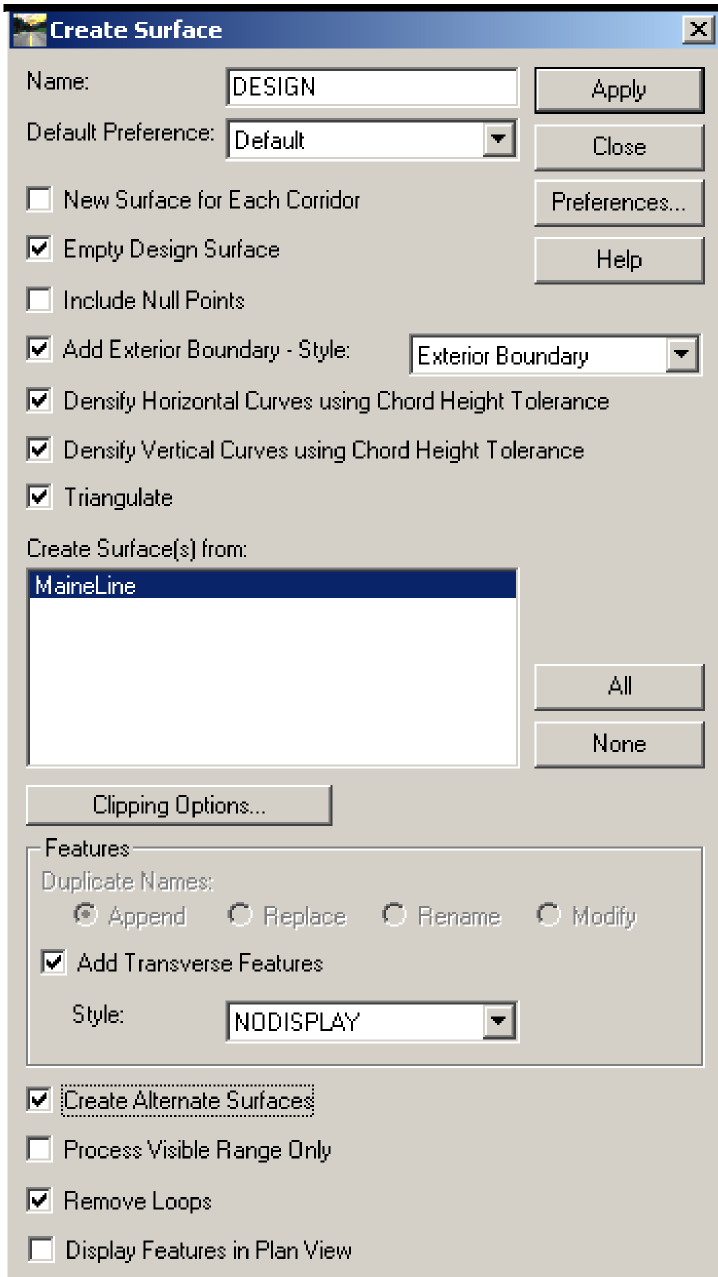


Figure 17-63: Create Surface dialog ready to create the DESIGN surface.

The *Create Alternate Surfaces* can be unchecked to speed up the process, however it should be turned on for the final surface creation.

Step Three: Add Symbology to DESIGN

Browse to the *Surface* tab, right click on the **DESIGN** surface and select *Properties.* On the *Advanced* tab, set the **Cross Section** and the **Profile** *Symbology* to **D_Roadway_Centerline** (Figure 17-64). Click **Apply.**

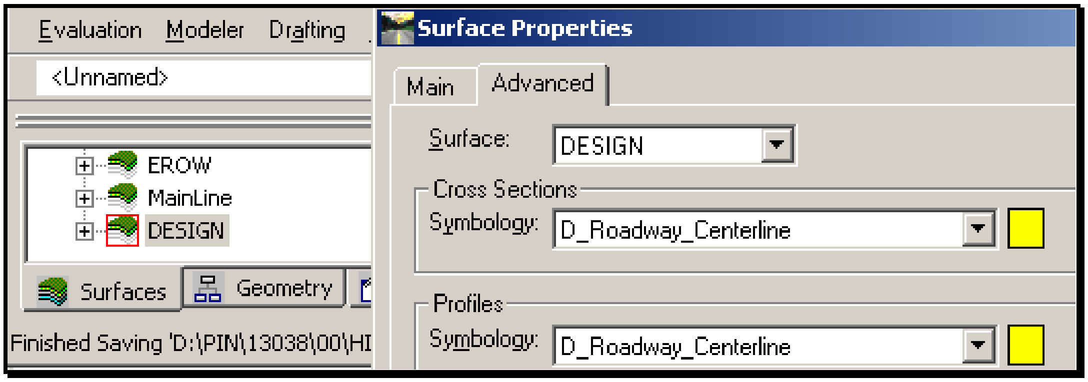


Figure 17-64: Set the symbology for the DESIGN surface.

Step Four: View Surface Features

Turn on the **PLAN DISPLAY** filter. Select **Surface>View Surface>Features…** from the InRoads menu. With the *Surface* set to **DESIGN,** (Figure 17-65) hit **Apply.** Repeat the process for the **DRIVE EDGES** and then **Close** the dialog. Fit the view.

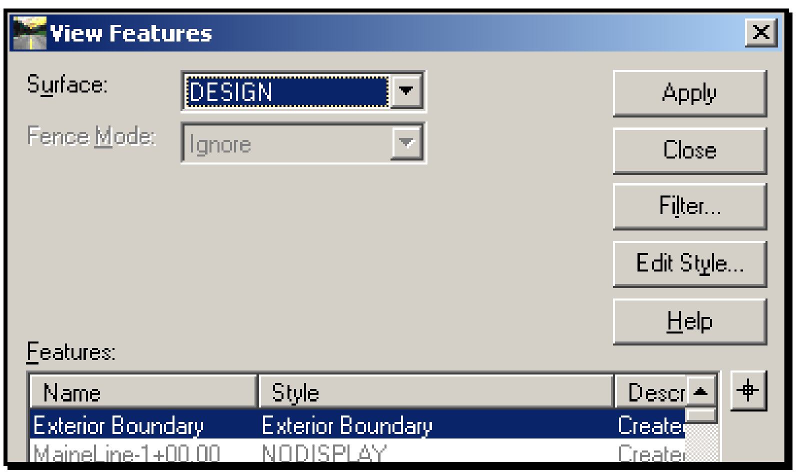


Figure 17-65: View Features of the DESIGN surface.

Step Five: Review Curb Openings

There is a known bug with the stop location of a template drop. The curb in the MainLine template may not extend all the way to the edge of the driveway template drop (Figure 17-66).

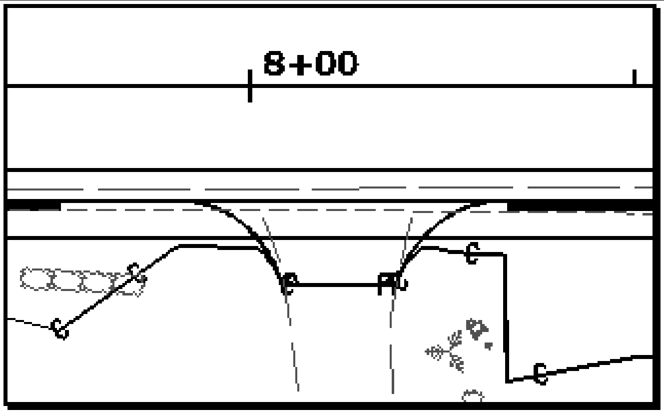
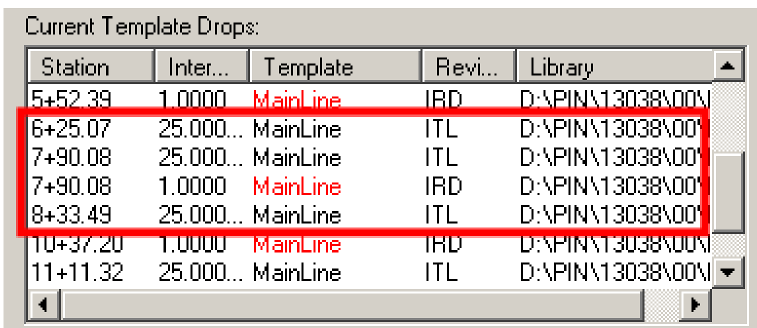


Figure 17-66: Example of curb not extending to drive edge.

To remedy this, **copy** the previous drop to the exact same station of the start of the driveway template drop (Figure 17-67). Re-create the surface.

♫ If the new drop appears after the driveway template drop in station order, change the drop of the station to .01’ prior to the driveway drop.



Current Template Drops:

Station	Inter...	Template	Revi...	Library
5+52.39	1.0000	MainLine	IRD	D:\PIN\13038\00\
6+25.07	25.000...	MainLine	ITL	D:\PIN\13038\00
7+90.08	25.000...	MainLine	ITL	D:\PIN\13038\00
7+90.08	1.0000	MainLine	IRD	D:\PIN\13038\00
8+33.49	25.000...	MainLine	ITL	D:\PIN\13038\00
10+37.20	1.0000	MainLine	IRD	D:\PIN\13038\00\
11+11.32	25.000...	MainLine	ITL	D:\PIN\13038\00\

Figure 17-67: Template drop copied to the exact station of the driveway drop.

The results adjust the curb to the intersection of the radius and the edge of proposed shoulder (Figure 17-68).

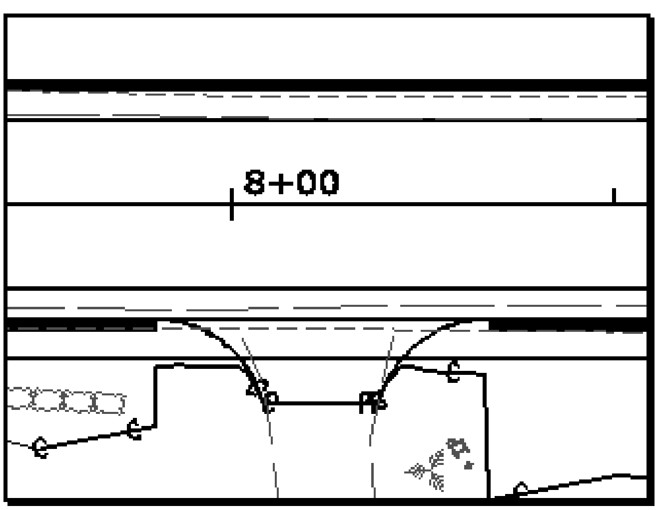


Figure 17-68: Results of the additional template drop.

Step Six: Review the Cross Sections

Part One: Set Global Scale Factors

Select **Tools>Global Scale Factors** from the InRoads menu and set the scale as you previously did (i.e. 60, 1, 60 for 1" = 5' sections or 120, 1, 120 for 1" = 10' sections) (Figure 17-69).

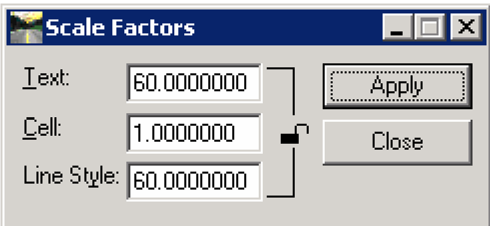


Figure 17-69: Global Scale Factors set for Cross Section display.

Part Two: Turn on Station Lock

Turn on the **Station Lock** from the *Locks* toolbar on the InRoads main dialog (Figure 17-70). This is especially important if your project starts at an odd station (i.e. 0+59.42).

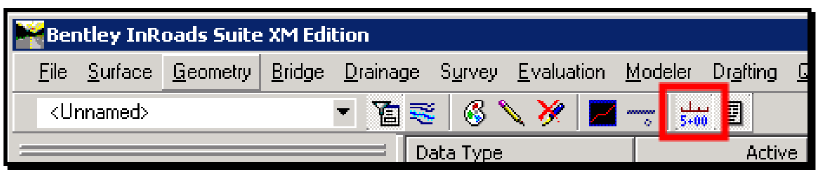


Figure 17-70: Station lock pushed and active.

Select **Evaluation>Cross Sections>Create Cross Sections** and pick the **GROUND** and the **DESIGN** surfaces from the *General* leaf (Figure 17-71).

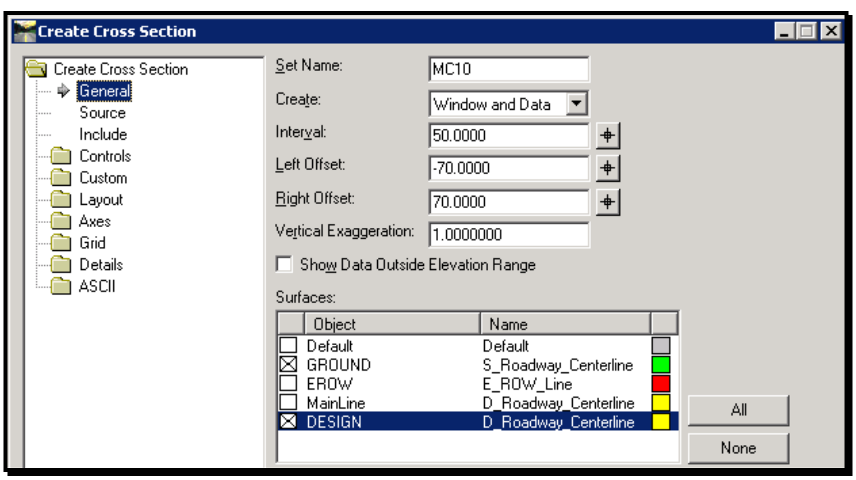


Figure 17-71: Select the Ground and Design surfaces.

Browse to the **Controls>Critical Stations** tab and uncheck all options.

Browse to the **Custom>General** leaf and *Import* your previous custom sections by selecting the **Import** button.

Add a **Station Range** cross section set with a 25’ interval. Adjust the width of the sections as necessary (Figure 17-72). Add **Crossing Features** and **Projected Features** with a 25’ *Ahead* and *Back* band.

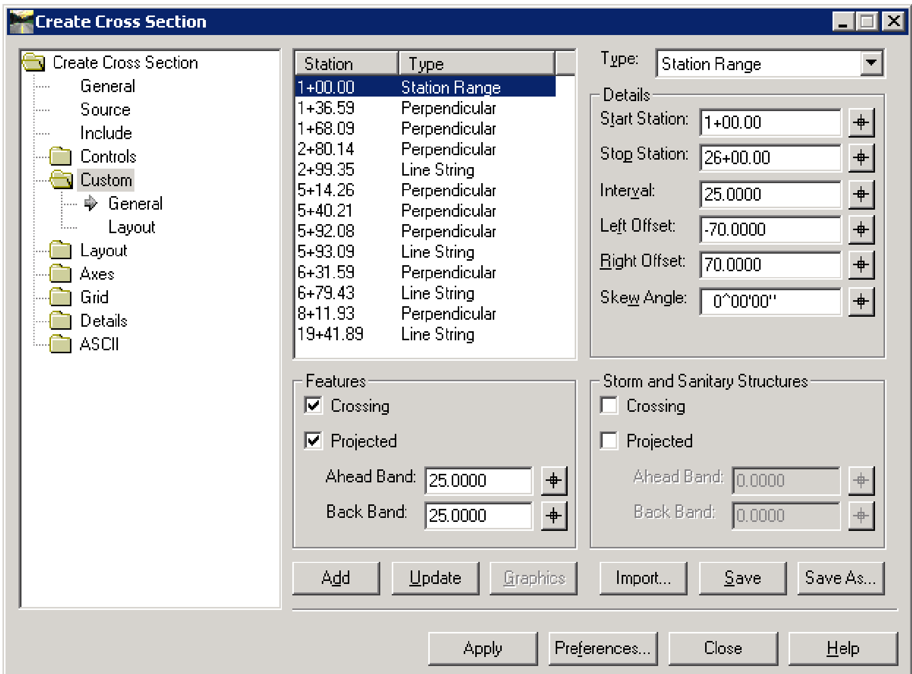


Figure 17-72: Create Cross Sections dialog.

Rotate to a top rotation if necessary. Click **Apply** and place the cross sections in your view. Sections cut at the driveway locations should have the exact slopes as you placed originally. Sections that catch the driveway may have a slightly different slope percentage as it meets the field conditions.

Step Seven: Annotate Section

✓ ***Annotate cross sections as described on page 20-13.***

DRIVEWAY DESIGN OPTION 2 (ALIGNMENT METHOD)

CREATE HORIZONTAL ALIGNMENTS

Prerequisites

Project Loaded

Final Alignment Design

Corridor Develop w/“Typical” Templates

Superelevation Applied

MainLine Surface Created

✓ ***Refer to page 16-28 for instructions on writing the design to a surface.***

Step One: Create a Working Drawing

Select **File>Make Sheetz** from the MicroStation main menu. Create a *No Prefix* drawing called either **Highway_drives** or **Bridge_drives** based on your workgroup.

✓ ***Refer to page 1-18 for more information on using the Make Sheetz program.***

Select which reference files you want to display (i.e. alignments.dgn, topo.dgn, text.dgn, rwplan.dgn) as well as the levels in each reference file. You may want to shut off the **Highway** or **Bridge** drawing if one has been created. The *features* for the MainLine will be written to this drawing through InRoads.

Step Two: Display MainLine Surface Features

Set the *Filter* to **Plan Display** and turn on the filter. Select **Surface>View Surface>Features…** from the InRoads menu. Select the **MainLine** surface and click **Apply.**

Step Three: Make your Geometry Project Active

On the *Geometry* partition in the InRoads explorer, make sure that the **MC10** alignment is active (Red box around it) Figure 17-73. If it isn’t active, make it active by right clicking on the name and selecting **Set Active**.

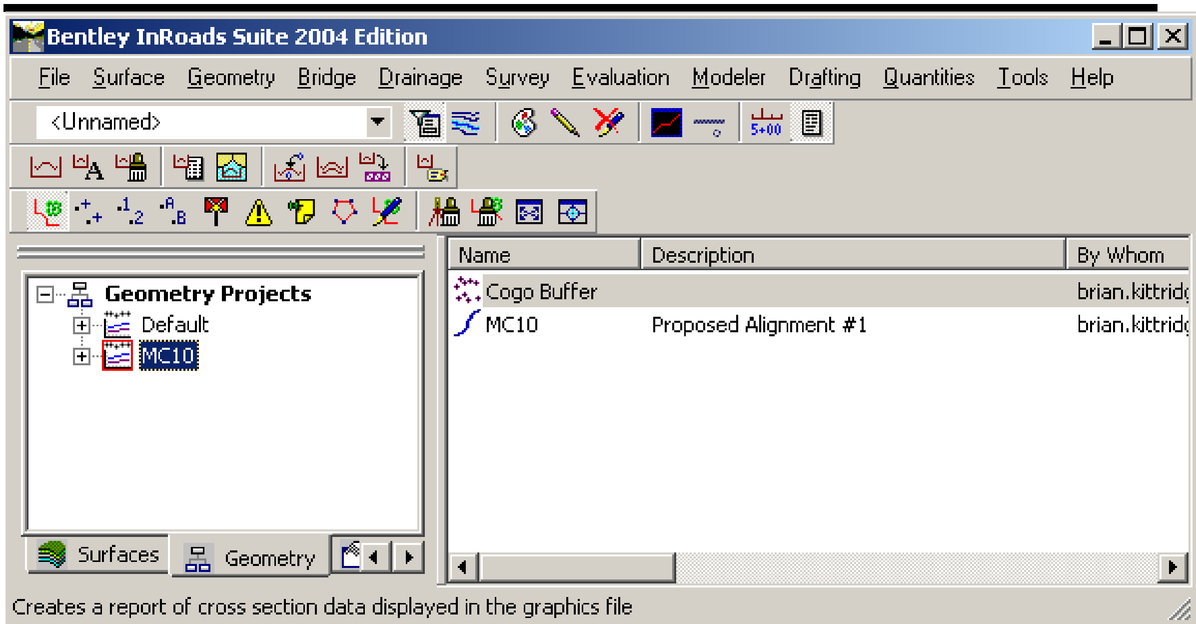


Figure 17-73: Set Geometry Active

Step Four: Draw Drive in Plan Location

Place Standard Cell in Plan View (Option One)

Select **Driveways (Plan)** from the left side of the *Settings Manager*, then select the driveway scenario that best represents the situation (i.e. **UnCurbed Residential Entrance RT** or **Uncurbed Commercial Entrance RT)** and place the cell at the edge of the proposed shoulder in between the two edges of the existing entrance (Figure 17-74). Use the "O - (origin)" and "RQ – (rotate quick)" *AccuDraw* commands to rotate place the drive at center of existing and perpendicular to the centerline. This method is best for drives along a tangent portion of the centerline.

✓ ***For more detailed instructions on cell placement methods, refer to page 17-6.***

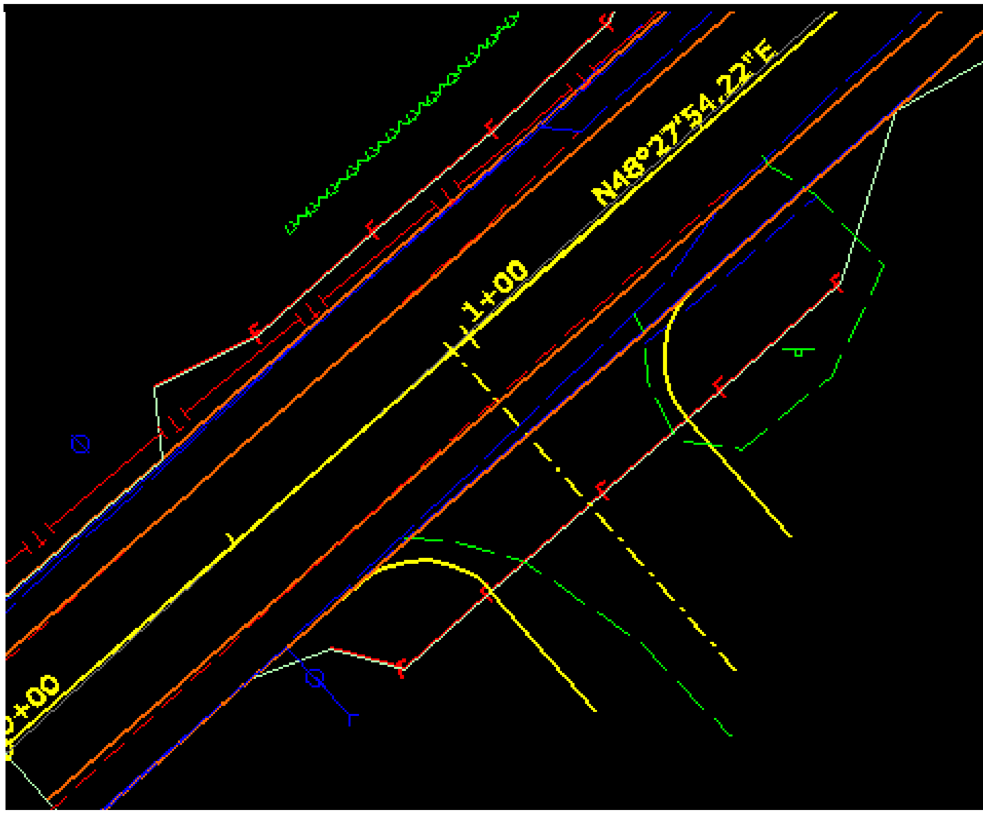


Figure 17-74: Place driveway lines in plan view

Draw drive manually in Plan view (Option Two)

Locate a driveway you want to work with. Select **Driveways (Plans)** from the left side of the *Settings Manager*, then select the "Driveway Edge" scenario that best represent your driveway type (i.e. **Driveway Edge Paved RT** or **Driveway Edge Gravel RT**) to set the *Level, color, Style and Weight.* Now draw the line work for your drive according to the *Standard Details.*

Select **Driveways (Plans)>Driveway Centerline** from *Settings Manager.* Set the *Snap* mode to **Perp** *and* draw the driveway centerline perpendicular to the MainLine alignment down the center of the driveway.

♬ For skewed drives, draw the driveway centerline perpendicular from the main line centerline to the back edge of the sidewalk or 6' into the driveway (3' minimum) to keep first bump or sidewalk parallel with the shoulder edge. Then add an angle point and continue through the drive at the approximate centerline staying within the extents of the existing driveway.

Step Five: Import Drive 1 Edge Left

If you used a predefined cell placed from the *Settings Manager,* drop *Complex* on the cell by selecting **Qualities>Drop>Complex** from *MicroStation's* main menu and click on the cell.

In InRoads, select **File>Import Geometry**. Set the *Type* to **Horizontal Alignment** and enter **Drive01L** in the *Name* field. Set the *Style* to **D_Roadway_Drive_Other** (Figure

17-75). Select **Apply** and identify the first edge of the driveway and **Accept** with a left click anywhere in the view window. Right Click to return to the *Import Geometry* dialog. Repeat for second driveway edge and supply **Drive01R** as the *Name*.

The next driveway's edges should be named Drive02L and Drive02R.

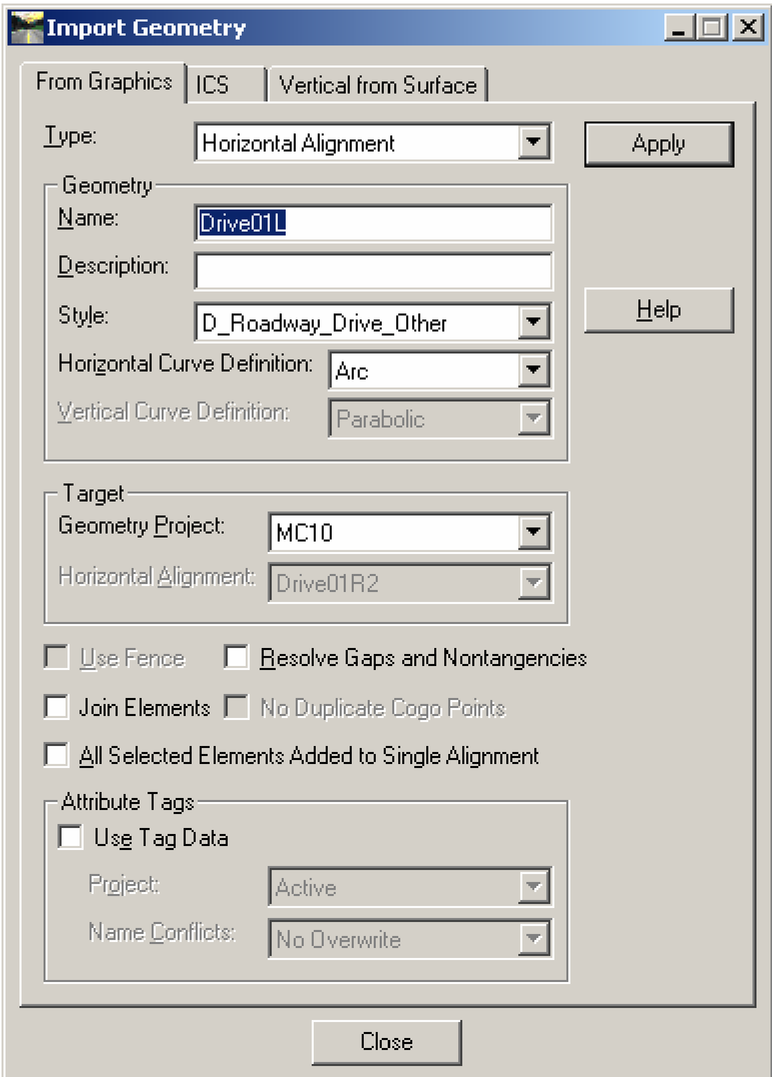


Figure 17-75: Create Drive Edge Horizontal Alignment

This step can be preformed in bulk with a smart selection set.

Step Six: Import Driveway Centerline

The *Import Geometry* dialog box will remain active. Change the *Name* to "Drive01CL" in the *Name* field. Set the *Style* to **D_Roadway_Centerline** (Figure 17-76). Select **Apply** and identify the centerline of the driveway. **Accept** with a left click anywhere in the view window. Right Click to return to the *Import Geometry* dialog. **Close** the dialog box.

- This step can be preformed in bulk with a smart selection set.

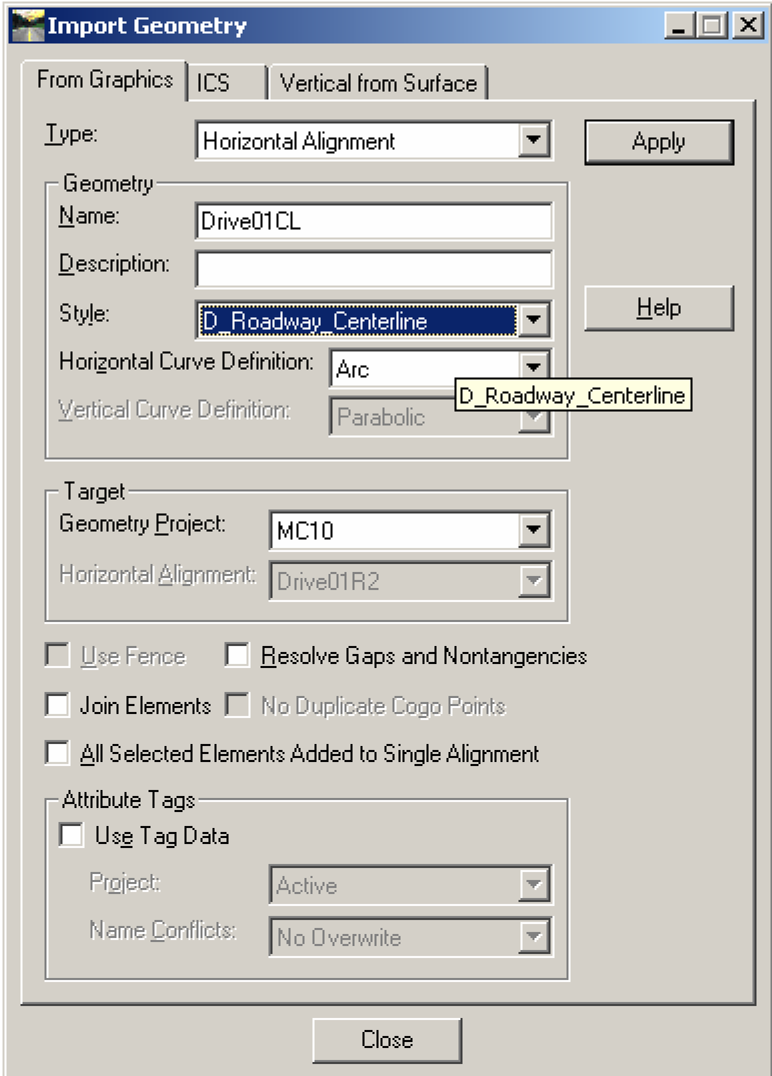


Figure 17-76: Create Driveway Centerline Alignment

Step Seven: Transpose Centerline (Optional)

- If you drew the centerline of the driveway manually (not from cell placement), you will need to *Transpose* the alignment. This will invert the stationing direction since the MicroStation element was draw from Mainline towards property owner. The expected direction should be from property owner to Mainline. Cell placement from the *Settings Manager* takes this into account.

From the InRoads menu, select **Geometry>Utilities>Transpose** (Figure 17-77). Click on the cross hairs and pick the Drive01CL alignment from the drawing. Select **Apply** and **Close** the dialog box.

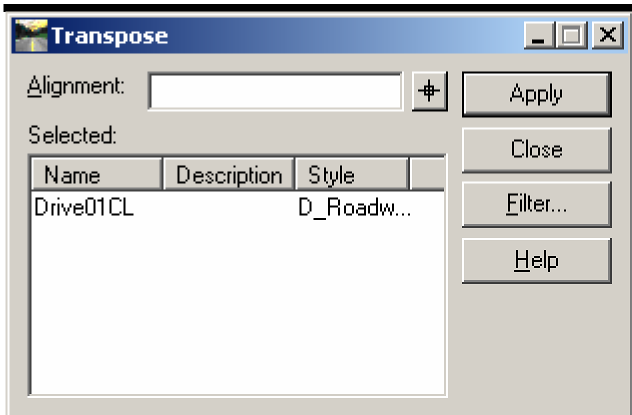


Figure 17-77: Transposing the driveway alignment

EDIT TEMPLATE DROPS IN MAIN LINE

Step One: Open Roadway Designer

Select **Modeler>Roadway Designer** from the InRoads main menu. Display the *Corridor* for your Main Line and set the *Active Surface* to Ground.

Step Two: Display References

From the Roadway Designer menu, select **Corridor > Display References**, select *Alignment* and select the **Drive01CL** alignment (Figure 17-78). Select **Add**.

♬ It's also good to display the ROW and Existing Edges in the plan portion of the *Roadway Designer*.

✓ ***Refer to page 16-11 for details on adding the ROW and page 16-8 for adding existing edges.***

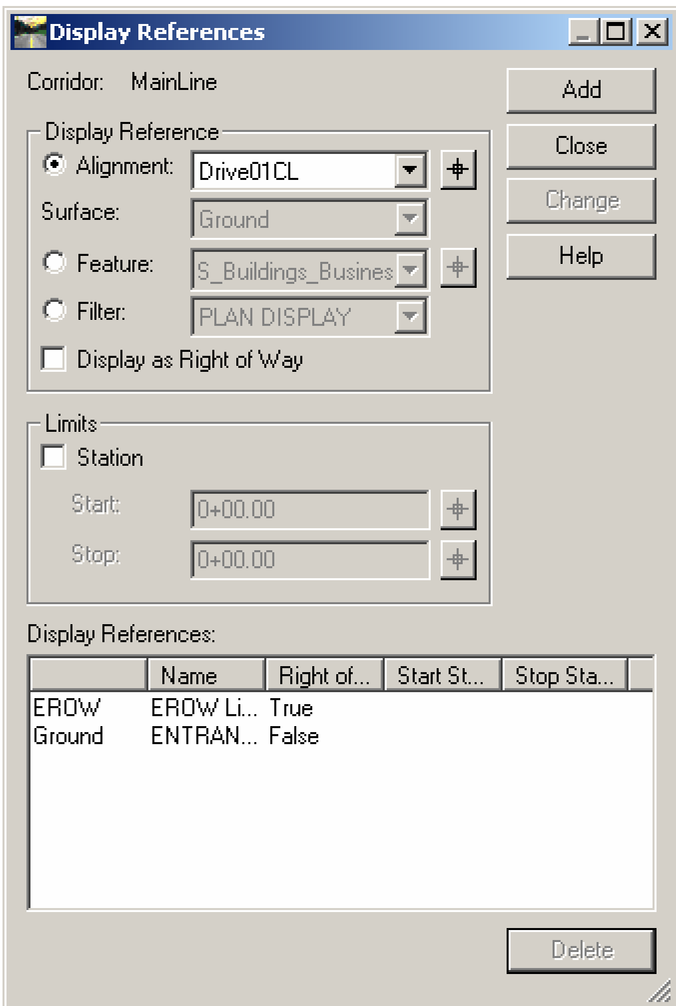


Figure 17-78: Display Driveway Centerline in Roadway Designer

Select the **Drive01L** alignment, select **Add**. Select the **Drive01R** alignment, select **Add** and close the dialog box. The plan view in the *Roadway Designer* view should now look like the caption below (Figure 17-79).

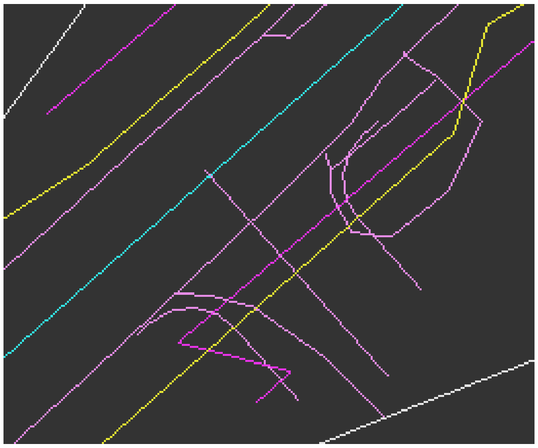


Figure 17-79: Roadway Designer with references displayed

Step Three: Add Template through Drive

From the Roadway Designer menu, select **Corridor>Template Drops** and select the *Template* you dropped for the MainLine through the drive opening (i.e. Box Section).While holding down the **Ctrl** key, click the “target” button. This will allow you to identify a point in the plan view of MicroStation. Snap to the end of the driveway where it meets the edge of shoulder. Set the *Interval* to 1.00 and select **Add** (Figure 17-80).

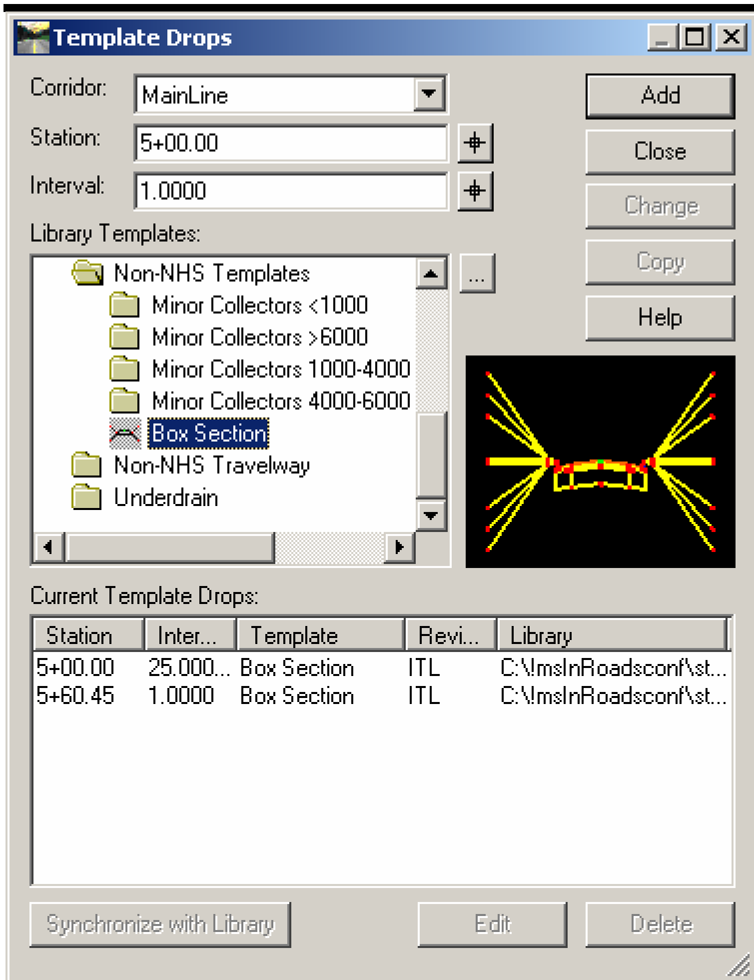


Figure 17-80: Add template used through the driveway

Step Four: Copy Mainline Template

Select the template drop from the *Current Template Drops* list that was used up to the first edge of the driveway. While holding down the **Ctrl** key, click the “target” button. This will allow you to identify a point in the plan view of MicroStation. Snap to the end of the driveway (up-station) where it meets the edge of shoulder. Select **Copy** (Figure 17-81).

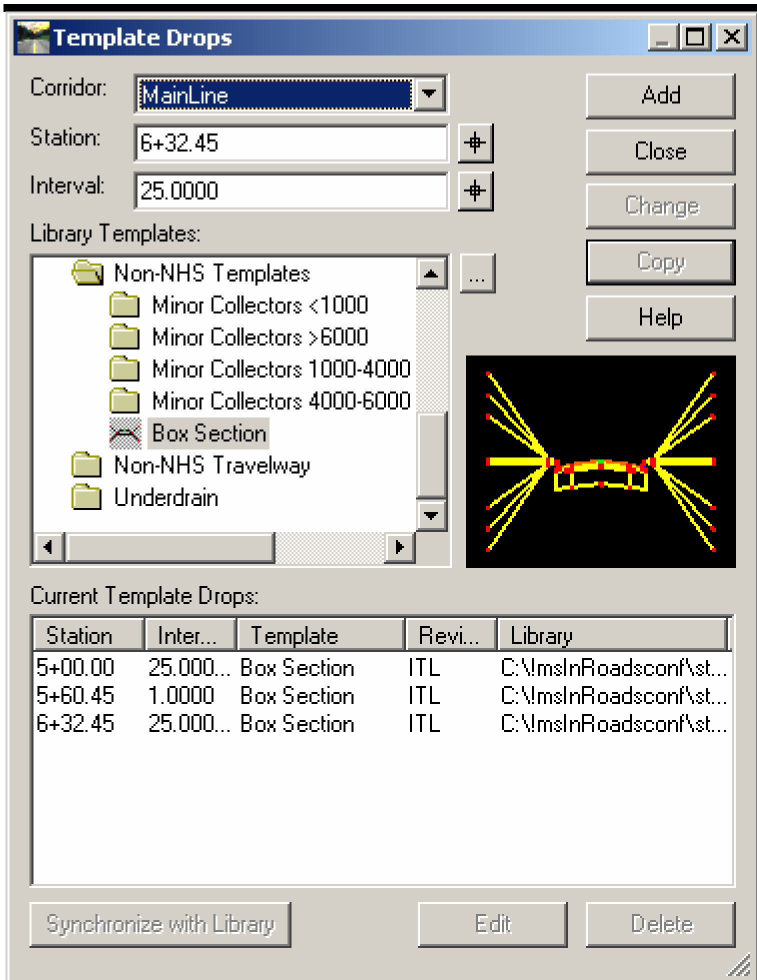


Figure 17-81: Copy template used prior to drive location and Copy to new station

Step Three: Modify Template in Drive Area

Part One: Delete Unnecessary Components

Double Click the template that runs through the drive area (i.e. 5+60.45). This brings up the *Create Template* dialog. Delete the components not needed through the drive. This should be the curb, berm and slope lines and anything outside of the edge of shoulder. Delete by Right Clicking and selecting *Delete Components.* Drawing a line around the components. Delete all remnants of points or components. Below are the before (Figure 17-82) and after (Figure 17-83) screen captures. Select **OK.**

Notice that the template through the driveway is now red. This means that it has been *Revised In* the IRD. **Close** the *Template Drop* dialog.

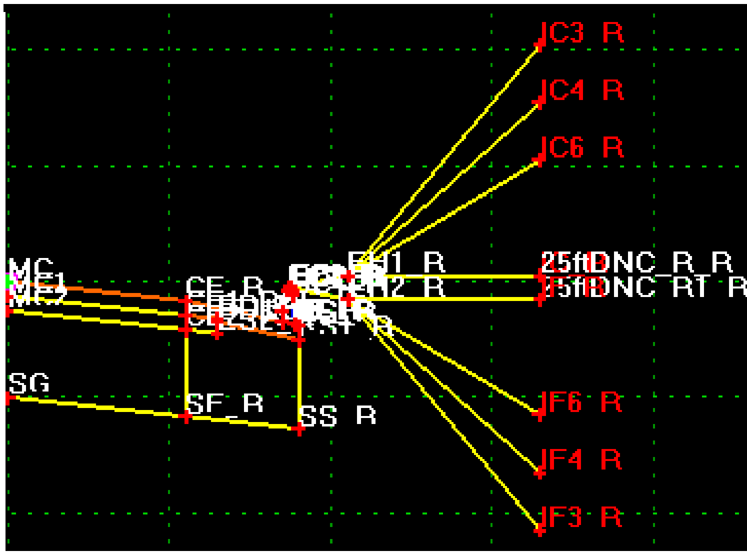


Figure 17-82: Before deleting components

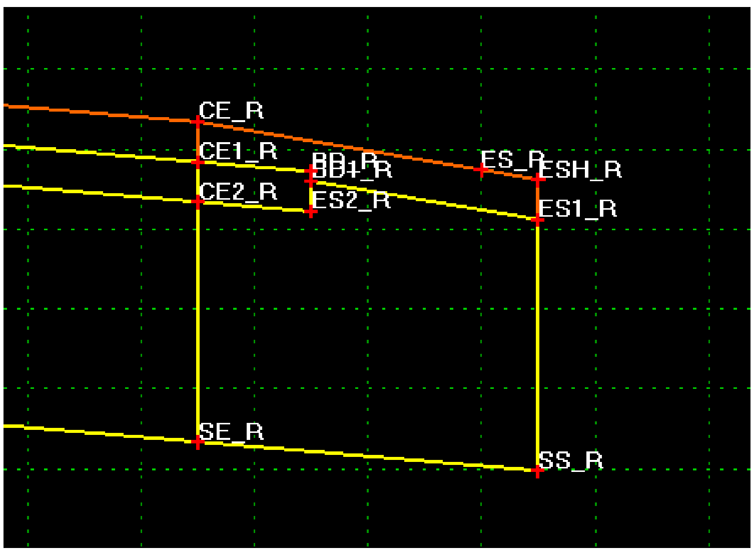


Figure 17-83: After deleting components

Part Two: Adjustments to Points

Different templates will require different adjustments. This step will require that you make the gutter line (ES point) the furthest point away from the centerline in the template (17-60). Brief descriptions of the edits depending on the scenario are listed below.

Bituminous Curb

In this case, edit the ESH point and adjust the *Horizontal* offset to zero. Click **Apply.** Right click the CG point, select *Merge* and pick the ES point.

Granite/Concrete Curb

Delete the extended subgrade component underneath the curb. Right click the CG1 or CG2 point, select *Merge,* pick the ES point and then click **Apply.**

Sidewalks

Delete the sidewalk components and point SW1 on bituminous curb or the FC1 point on concrete or granite curb. Depending on the curb type, do one of the previous edits.

Daylight Section

Edit the SS point and change the *Vector Offset* that holds the point to the ES and IF to a *Horizontal* constraint of zero to the ES point.

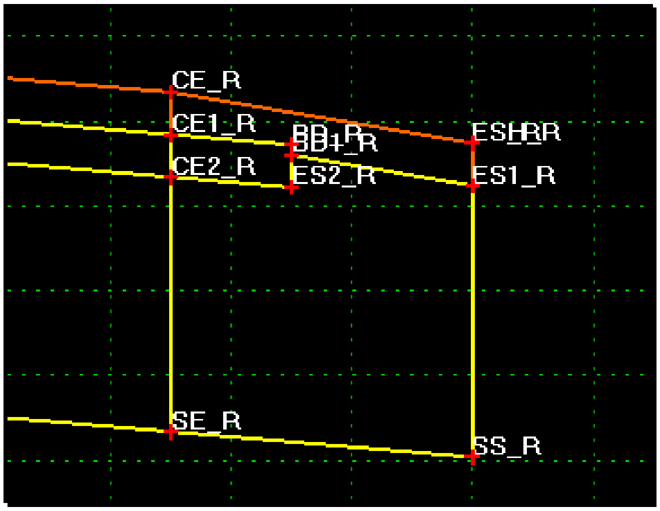


Figure 17-84: ESH point moved to ES point on bituminous curb sections.

CREATE MAINLINE SURFACES

Step One: Process All

In InRoads designer, select the *Process All* button at the bottom right of the window.

Step Two: Create Design Surface

In the Roadway Designer window, select **Corridor>Create Surface.** Type in “Design” for the *Name*, enable *Empty Design Surface, Add Exterior Boundary, Triangulate, and Create Alternate Surfaces. Add Transverse Features* should also be selected and its *Style* set to **NODISPLAY** (Figure 17-85). Select **Apply.**

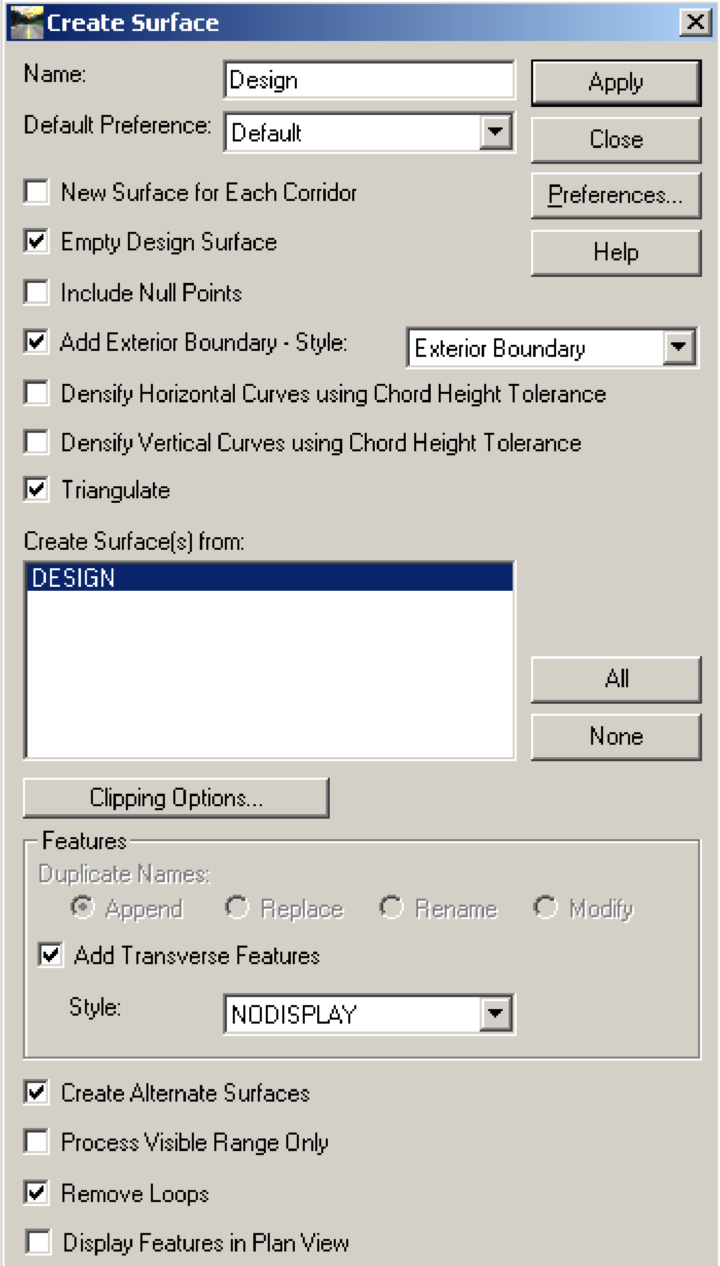


Figure 17-85: Create Design Surface

Minimize InRoads Roadway Designer (clicking on the minus sign at the top right part of the window).

CREATE VERTICAL ALIGNMENTS

Overview

The driveway alignment can be done a number of ways. To help in the process, there are driveways cells based on the *Standard Details* that can be placed and used as a guide during the process. The alignments can also be done without the guides by using a series of InRoads commands. The document will cover using a mixture of both.

Step One: Display Driveway Profile

From the InRoads menu, select **Evaluation >Profile>Create Profile.** On the *General* tab, select the **Ground**, **Design** and **Subgrade** surfaces and set their *Styles* by selecting the *Properties* button. Make sure that the *Vertical Exaggeration* is set to **1.00** (Figure 17-86). From the *Source* tab, select the **Drive01CL** alignment.

♬ Depending on which direction your driveway centerline runs (centerline out to property owner or property owner towards centerline) and whether it's on the left of centerline or on the right, you may want to adjust the *Direction* from **Left to Right** or **Right to Left**.

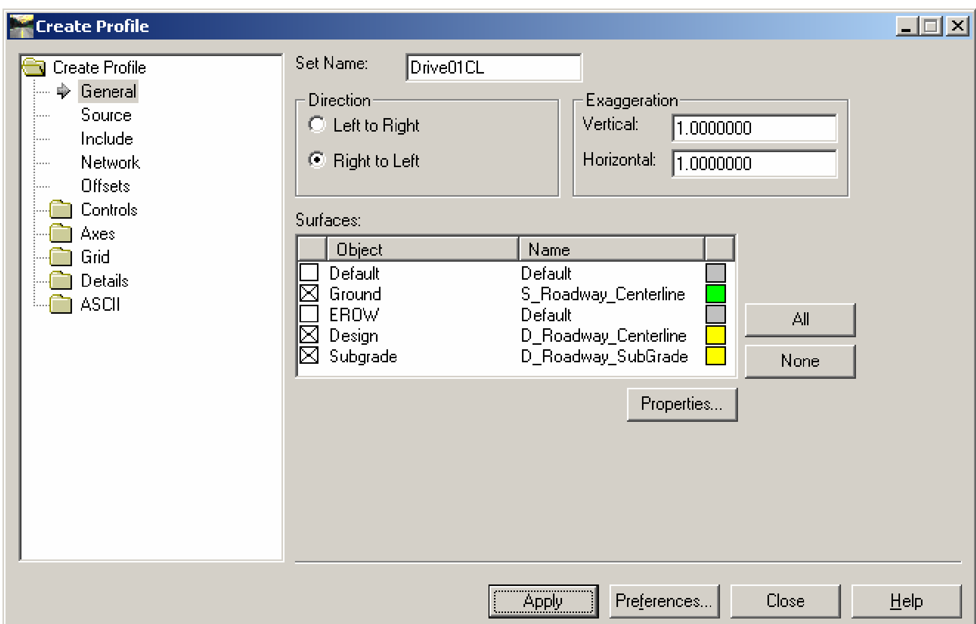


Figure 17-86: Create Profile dialog

Select **Apply** and place the profile (Figure 17-87) window in the drawing.

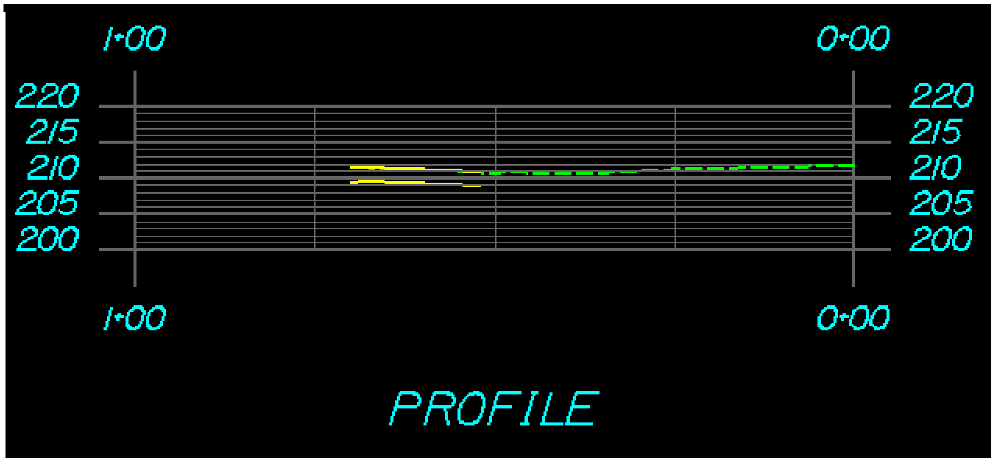


Figure 17-87: Driveway Centerline Profile

Step Two: Place the Driveway Cell (Optional)

Part One:

From the MicroStation's *Settings Manager*, select the appropriate driveway scenario that best fit the conditions. In this case, choose **Driveways (Cross Sections)>Driveway Level Left** from the *Settings Manager*. Place the cell at the top edge of the Mainline Surface (Figure 17-88). This point is the gutter line.

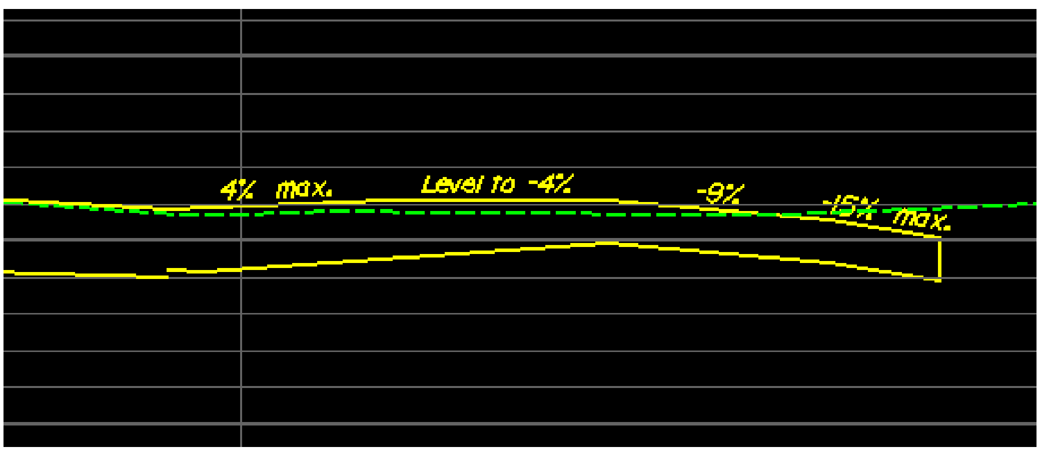


Figure 17-88: Driveway placed at gutter line

Part Two: Adjust the Subgrade

Because the depth of subgrade and pavement layers at the edge of the shoulder can vary, the subgrade of the drive needs to be adjusted to match Main Line subgrade. Select the Main Line subgrade line and the *Ground* with MicroStation's *Element Selection* tool (Figure 17-89) or by selecting **Group>Element Selection>Select Element.** Use the *Ctrl* key to select multiple elements.

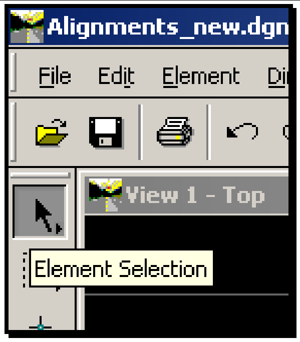


Figure 17-89: Location of the Element Selection Tool

Select **Edit>Lock** from the MicroStation main menu. This will lock the element and prevent it from moving. Place a *Fence* using the *Place Fence* tool (or selecting **Group>Fence>Place Block**) encompassing the bottom portion of the driveway subgrade (Figure 17-90).

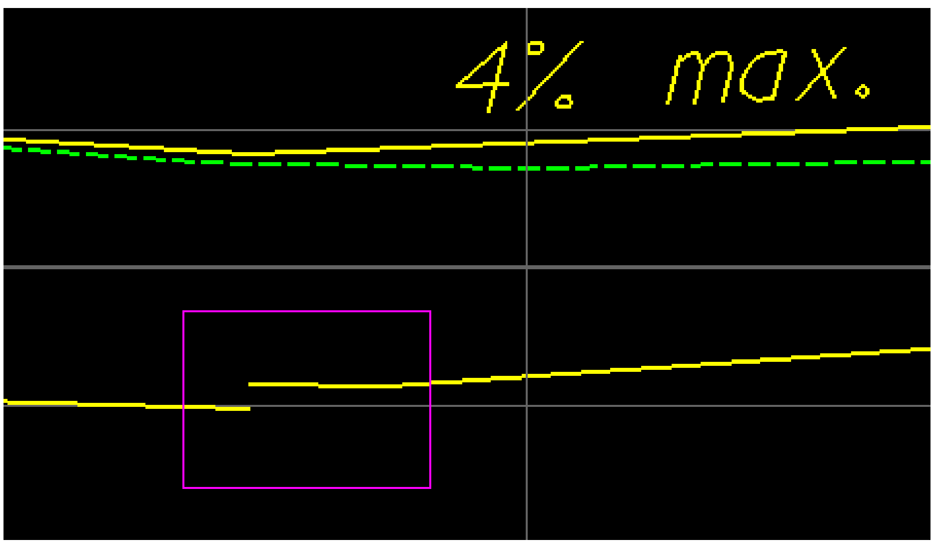


Figure 17-90: Placing a fence around the subgrade

Select the *Manipulate Fence Contents* tool, set the *Method* to *Stretch* and the *Mode* to *Inside* (or select **Group>Stretch Fence**) and snap to the end of the driveway subgrade and **Accept** this point. Now snap to the bottom of the Main Line subgrade point and **Accept** to connect the subgrade points.

Part Three: Adjust Driveway Match Point (Optional)

Depending on the driveways severity, it may be useful to adjust the cell (used as a guide) to visually match the existing ground. Using the same *Place Fence* and the *Stretch Fence* commands, place a fence encompassing the end of the driveway (Figure 17-91).

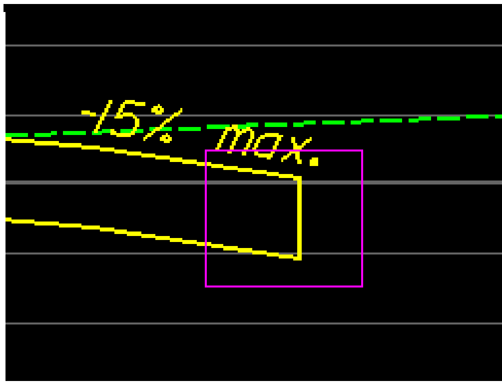


Figure 17-91: Stretching driveway to match point

Adjust the match point by snapping and **Accepting** to the top point of the driveway and *Stretching* it to the original ground. Connect it to the *Ground* by typing “N” on the keyboard to set the *Nearest Snap* mode. Snap and **Accept** to the *Ground.*

- Drop the cell and delete the vertices of the outermost driveway bump if not needed.
- Check the current grade by selecting **Proposed Text and Dims>Slope%** from the *Settings Manager.* Snap and **Accept** to two points on the proposed line segment that meets the *Ground.* The slope of the line segment will display in the *Text Editor* dialog.

Step Three: Create a Vertical Alignment

Verify that the **Drive01CL** alignment is active by right clicking in the InRoads Explorer window and selecting **Set Active.** In the same Explorer window, highlight on the **DriveCL1** alignment and select **New** (Figure 17-92). Set the *Type* to **Vertical Alignment** and type in **Drive01CL**, set the *Style* to D_Roadway_Centerline select **Apply** and close the dialog box.

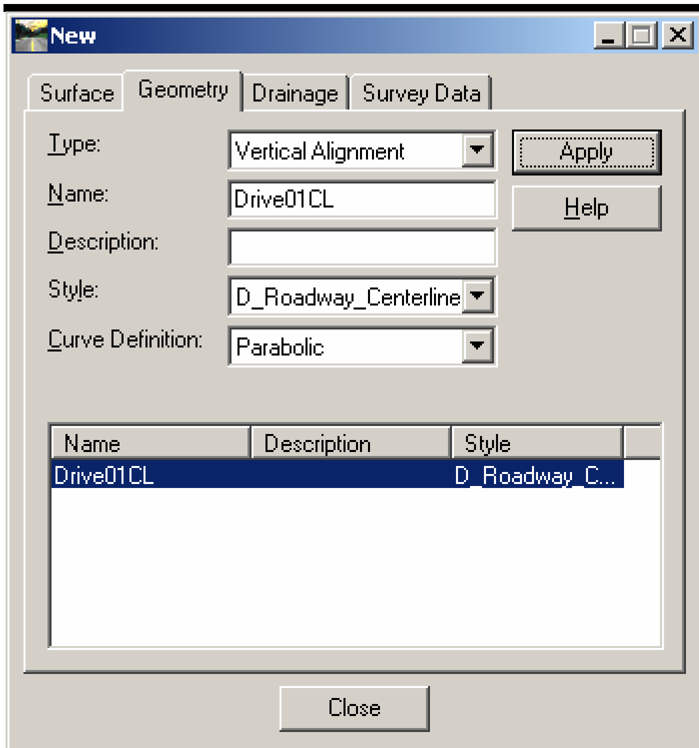


Figure 17-92: Create Vertical Alignment Name

Step Four: Define Vertical Alignment (By Two Points Option)

This option uses the cell placed at the edge of the Main Line shoulder.

From the InRoads menu, select **Geometry>Vertical Element>Add Fixed Line** and set the *Mode* to **By Two Points** (Figure 17-93) and select **Apply.**

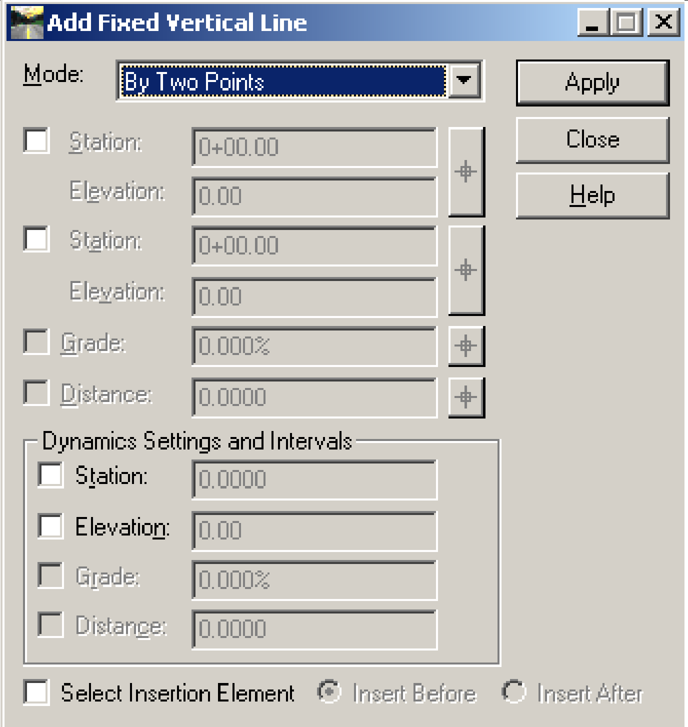


Figure 17-93: Add Fixed Line By Two Points dialog

Snap to the top rightmost point of the cell placed at the Edge of shoulder from the Mainline Surface. For the second point, snap to the end of the segment to the left of the previously selected point, **Accept** the snap and **Accept** the command. Since the Vertical element stays current, snap to the end of the second segment on the cell and **Accept** the snap and **Accept** the command. Continue this process along the cell until you are at the point where you want to match the existing ground surface. Connect it to the *Ground* by typing “N” on the keyboard to set the *Nearest Snap* mode. Snap and **Accept** to the *Ground.* **Accept** one more time to finalize the point. Right click two times to return to the *Add Fixed Vertical Line* dialog.

Step Five: Define Vertical Alignment (By Point, Distance and Grade Option)

This option is for generating a vertical alignment for the driveway by manually generating the bumps at a desired distance and grade.

From the InRoads menu, select **Geometry>Vertical Element>Add Fixed Line** and set the *Mode* to **By Point, Grade and Distance.** Set the grade and distance of the first bump desired (i.e. -2% for -6’) Figure 17-94. Snap to the edge of the Main Line shoulder and **Accept** the snap mode and **Accept** the placement. Right click to get back to the *Add Fixed Vertical Line* dialog.

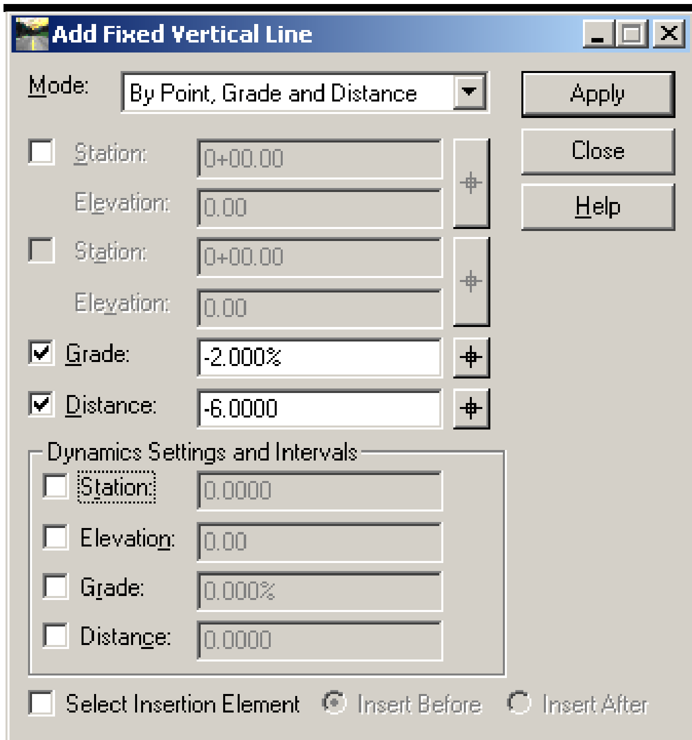


Figure 17-94: Add Fixed Line By Point, Grade and Distance dialog

Next, add the distance and grade for the next bump. Click **Apply** and snap and **Accept** to the end of the first line segment and click **Accept.** Right click to get back to the *Add Fixed Vertical Line* dialog.

Repeat until all the bumps are defined. If you know what the desired final match slope is, set the grade to that slope and do not place a value in the distance field. This will allow you to adjust the distance graphically and use a *Nearest* snap to connect to the existing ground. **Accept** the snap and **Accept** the command. Right click to get back to the *Add Fixed Vertical Line* dialog.

Step Six: Editing the Vertical Alignment (Optional)

This sequence is for adjusting an existing driveway alignment after it has been defined.

Set the vertical alignment active by right clicking on the alignment and selecting **Set Active.** From the InRoads menu, select **Geometry>Vertical Element>Edit Element.** The first segment of the alignment will highlight. Select the **Stop** in the *Define From* radio button. Adjust the *Elevation, Grade or Length* of the vertical alignment. If this is the segment you want to adjust, make the adjustments as necessary. Click *Next* if you want to edit another segment.

Step Seven: Check Integrity

In the InRoads Explorer window, right click on the **Drive01CL** vertical alignment and select *Check Integrity* and review the elements (Figure 17-95).

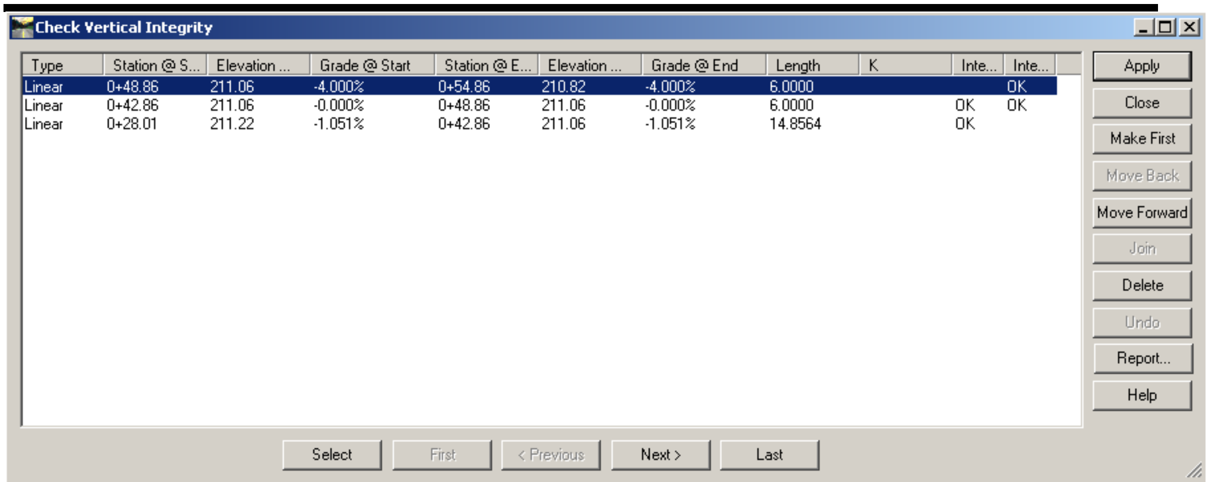


Figure 17-95: Check Vertical Integrity dialog "Wrong Order"

Verify that the first element has the least starting station value. If this is not the case, like the illustration above, highlight the last station (lowest starting station value), and select the *Make First Option* on the right side of the dialog box (Figure 17-96), select **Apply** and close the dialog box. The results will be displayed in the window.

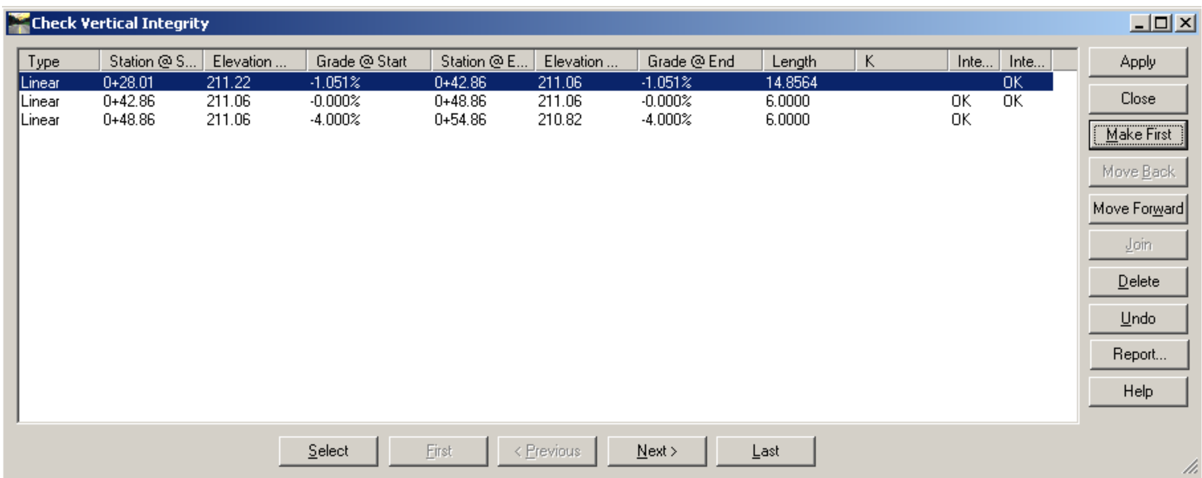


Figure 17-96: Check Vertical Integrity dialog "Correct Order"

Step Eight: Create Vertical Alignment for Subgrade

Right Click on the Drive01CL horizontal alignment and select *New*. Set the Type to *Vertical Alignment*, type in **Drive01Sub** for the *Name*, set the *Style* to D_Roadway_Subgrade (Figure 17-97) and select **Apply**.

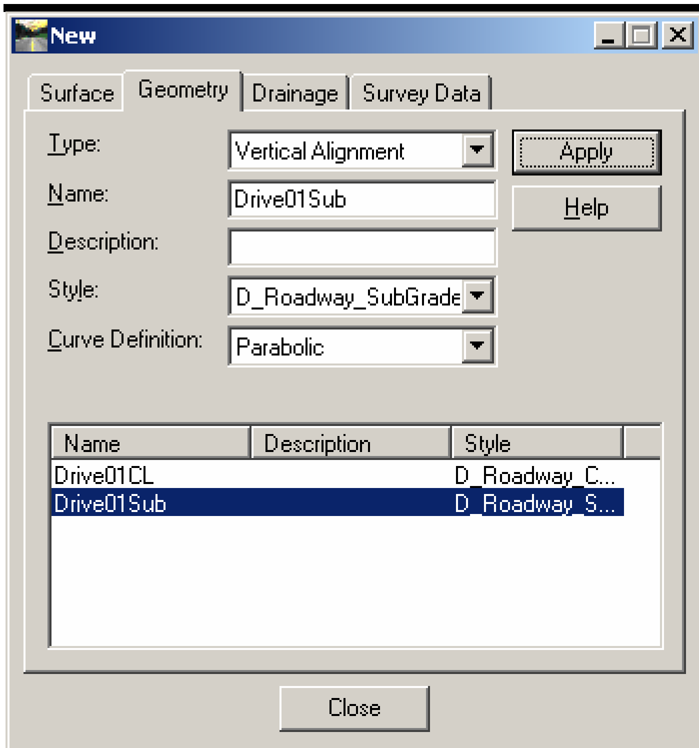


Figure 17-97: Create New Vertical Alignment for Subgrade

Using methods described previously, select **Geometry>Vertical Element>Add Fixed Line**, and either use the *by Two Points or by Point, by Distance and Grade Option.*

To end the alignment, consider using *AccuDraw* to snap to the proposed alignment for the surface of the drive, type "O" for origin, and move the mouse down in the Y direction. Enter the total depth of the subbase and pavement. Use a semicolon to enter this value in subunits. End the command and check the *Integrity*.

Step Nine: Create Vertical Alignments for Drive Edges (Optional)

This is an optional step, but can provide a better model of the driveway if the drive has a cross slope due to existing conditions.

♫ A cross section at the center of the driveway displaying the design is normally all that is needed to build the driveway and to get a rough estimate of quantities. Depending on project scheduling, there may or may not be enough time allotted for this kind of detail.

Repeat previous steps used to create a vertical alignment for driveway centerline and subgrade to create vertical alignments for the drive edges.

PLACE TEMPLATE DROPS – DRIVEWAY

Step One: Verify the Active Alignment

From the InRoads menu, highlight the Drive01CL vertical alignment, right click on it and make it active.

Step Two: Create Driveway Corridor

From the InRoads menu, select **Modeler>Roadway Designer**. Select **Corridor>Corridor Management** from the *Roadway Designer* menu. Type in **Drive01** for the *Name* and make sure that the *Horizontal* and *Vertical* alignment names are set to **Drive01CL** (Figure 17-98). Select **Add** and close the dialog box.

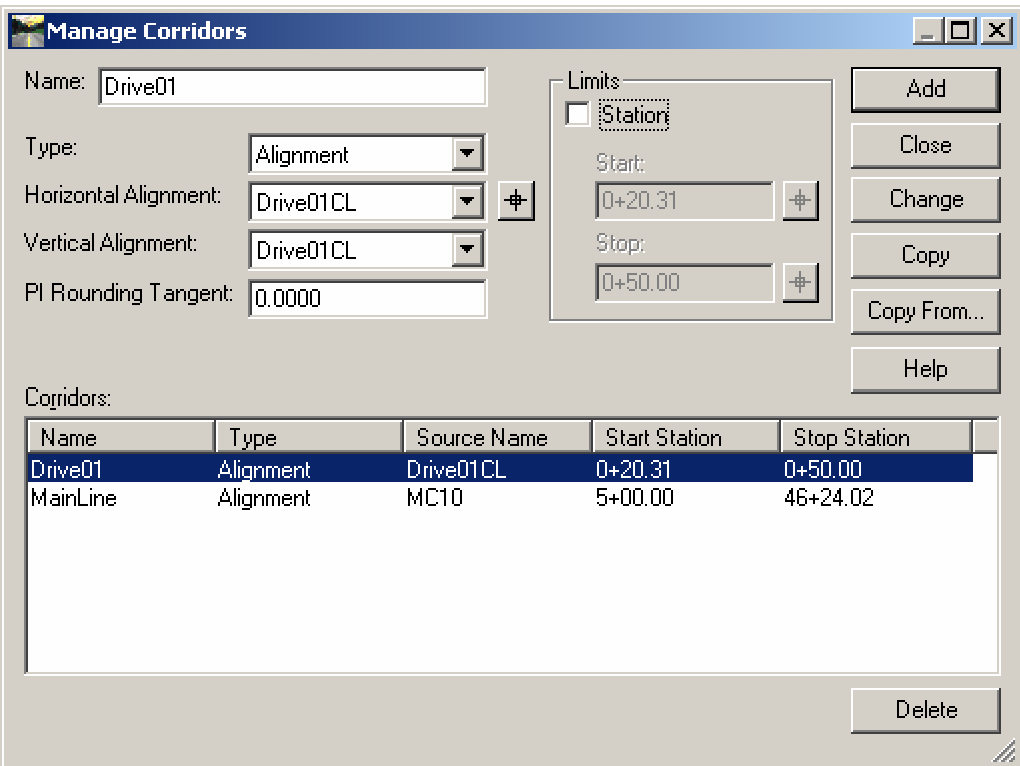


Figure 17-98: Add Drive1 Corridor

Step Three: Add Driveway Template Drop

Select **Corridor>Template Drops**, set the *Interval* to 1.00 and select the **Paved Driveway** template located under the *Driveways* folder (Figure 17-99). Select **Add** and close the dialog box.

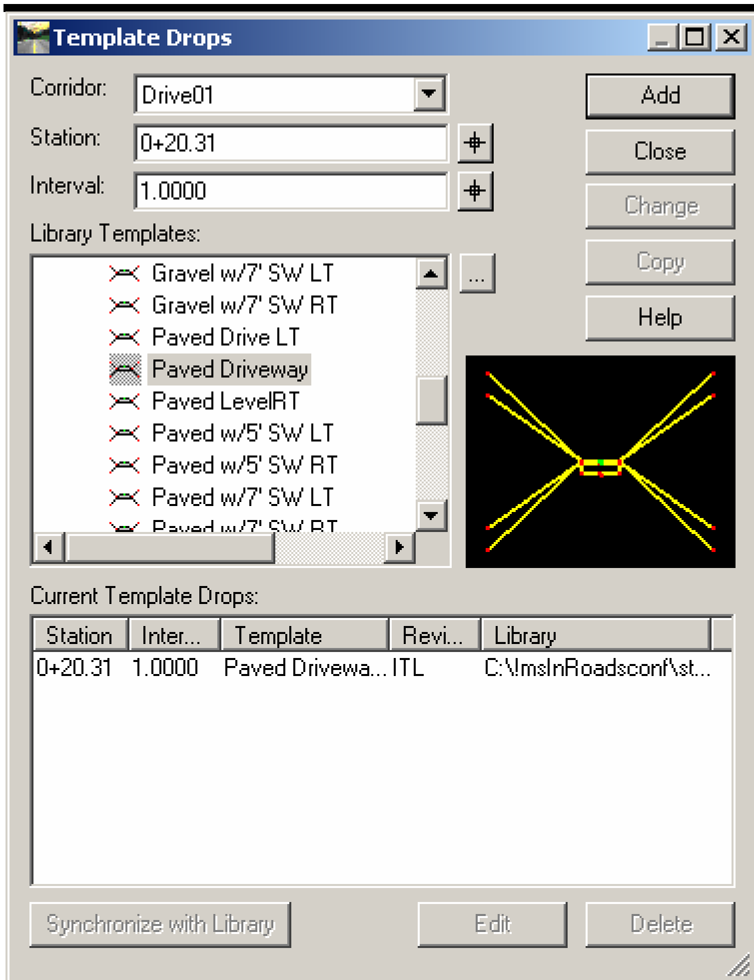


Figure 17-99: Add Template Drop for Paved Driveway

ESTABLISH POINT CONTROLS

Step One: Create Point Controls

From the InRoads *Roadway Designer* dialog, select **Corridor>Point Controls** and establish the following *Point Controls* (Figure 17-100).

Set point **ES_L** *Mode* to **Horizontal**, *Control Type* to **Alignment**, and set the *Horizontal Alignment* to **Drive01L.** Add the definition.

Set point **ES_R** *Mode* to **Horizontal**, *Control Type* to **Alignment**, and set the *Horizontal Alignment* to **Drive01R**. Add the *Point Control* definition and close the dialog box.

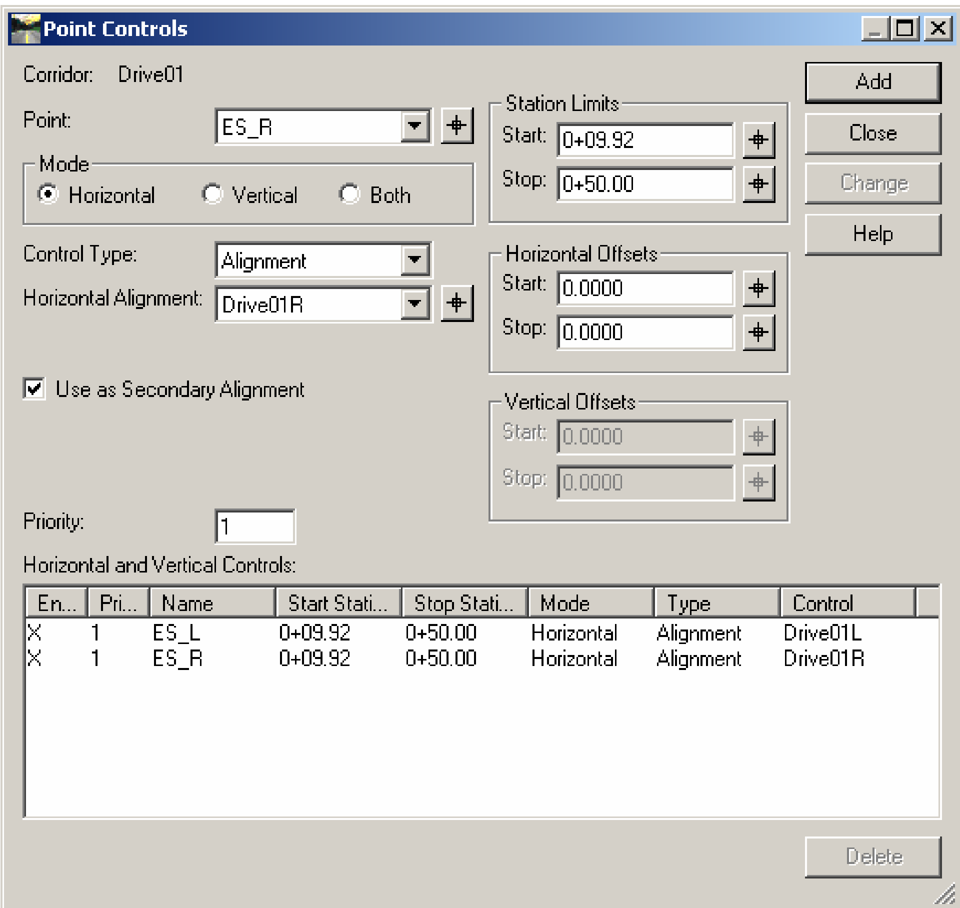


Figure 17-100: Establish Point Controls to edge of Horizontal Alignments

- The driveway template edges will follow the set horizontal edge limits defined by the alignments.
- For critical drives or side roads, consider creating a profile of the driveway edges, developing vertical alignments and set the point controls to follow the ES points both horizontal and vertical.

Step Two: Process All

Select Process All at the bottom of the dialog box.

Step Three: Set Subbase Point Control

Now set a *Point Control* for the centerline point at the subbase so it will be vertically controlled by the subbase vertical alignment **Drive01Sub.**

From the InRoads *Roadway Designer* dialog, make sure that your Drive01 corridor is selected and select **Corridor>Point Controls** from the *Roadway Designer* menu. Set point **SG** (Bottom of Subgrade) *Mode* to **Vertical**, *Horizontal Alignment* to **Drive01CL**, and *Vertical Alignment* to **Drive01Sub** (Figure 17-101). Add the definition and close the dialog box.

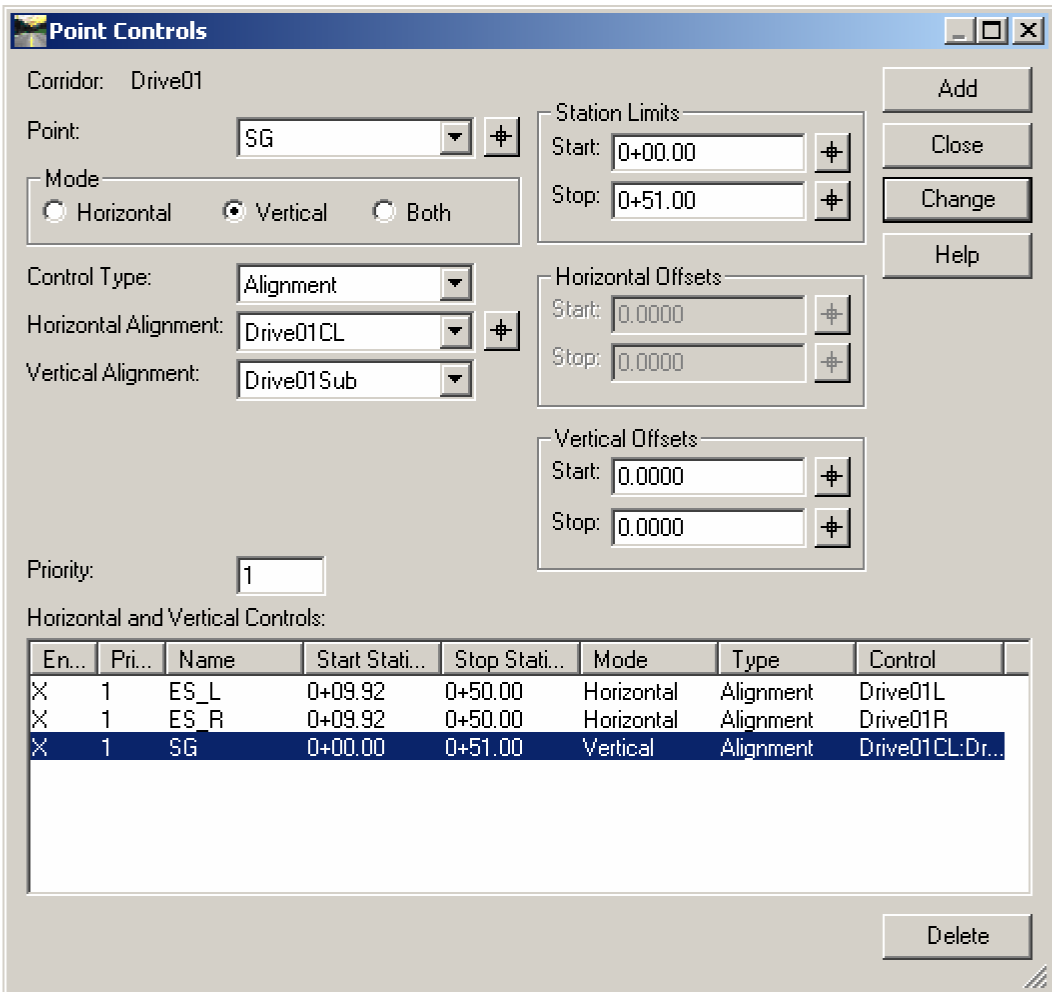


Figure 17-101: Add Point Control for subgrade alignment

♫ The subgrade will now be controlled by the vertical subbase alignment.

Step Four: Set Target Aliasing

From the InRoads *Roadway Designer* dialog, select **Tools>Target Aliasing**. From the left side of the list, highlight **Corridor – MainLine** and select **Add**. Repeat this process for the **Surface – Ground.** Highlight them both (Figure 17-102) once they are on the right side of the dialog (Aliases) and place a check in the *Use Closest* box. Select **OK.**

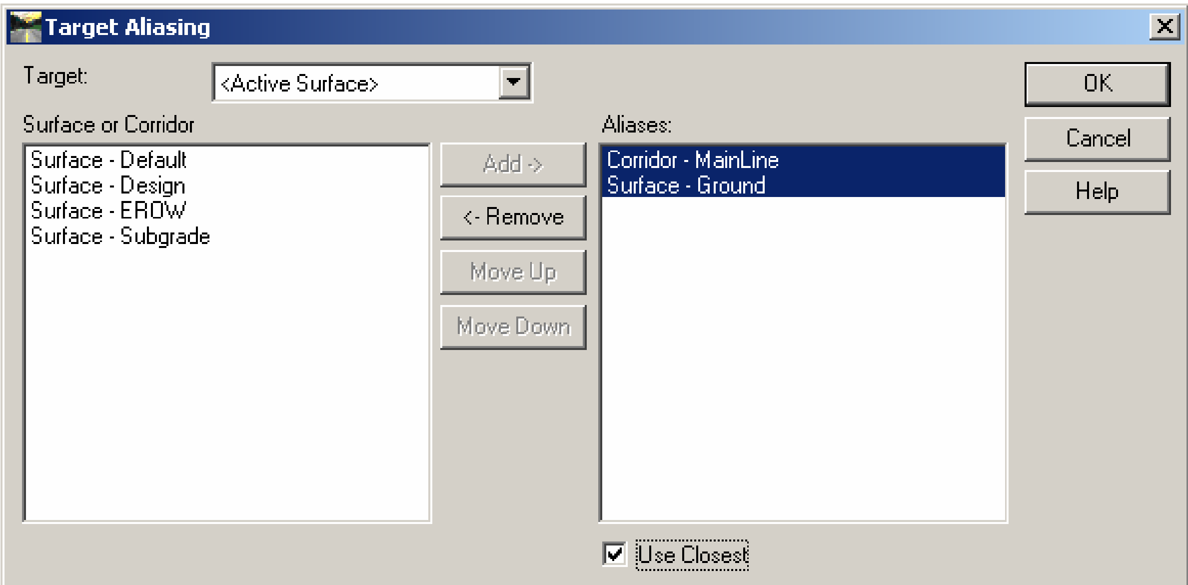


Figure 17-102: Target Aliasing dialog with MainLine and Ground selected

- The driveway surface will be modeled up to the previous mainline run or the existing ground, whichever is closest to the solution on a station per station basis.

CREATE COMBINED SURFACES

Overview
It is necessary to make a single surface out of the two corridor passes.

Step One: Process Corridors
On the bottom left corner of the *Roadway Designer*, switch the *Corridor* to **MainLine**, and select **Process All.**

Now switch the *Corridor* to **Drive01**, the *Target Aliasing* will be processed as it tries this corridor. Select **Process All.**

Step Two: Create Single Surface
From the InRoads *Roadway Designer* dialog, select **Corridor>Create Surface**. In the *Name* field, enter **Design.** In the *Create Surface from* portion of the dialog, highlight both corridors. Place a check in the *Add Transverse Features* and set the *Style* to **No Display** (Figure 17-103).

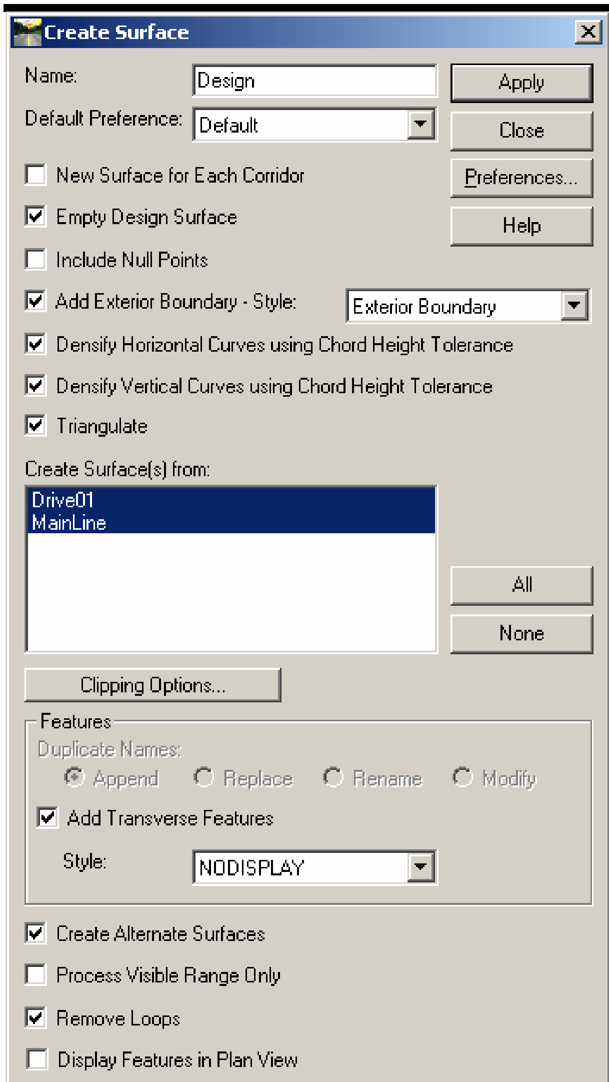


Figure 17-103: Create combined surface named Design

Before applying, select the *Clipping Options* button. Set the *Clipping Option* to **Clip End Conditions Only** (Figure 17-104) by just highlighting the default value (Clip All), select **OK**. Click **Apply** and close the *Create Surface* dialog box.

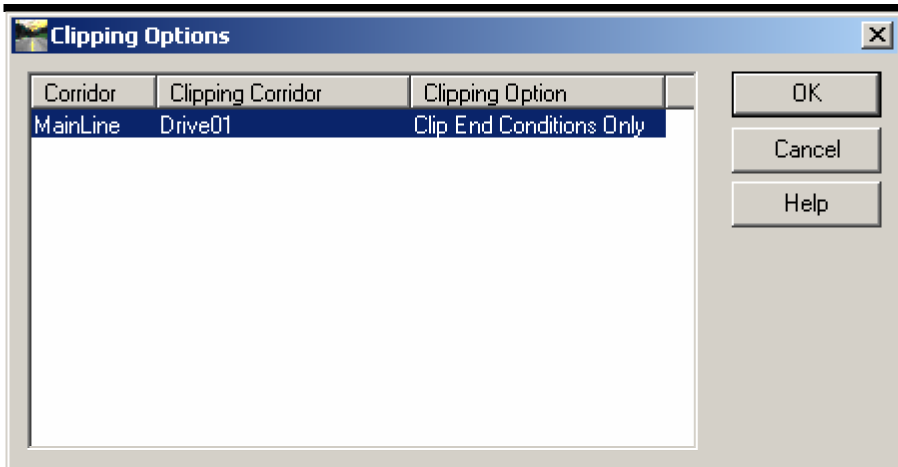


Figure 17-104: Set Clipping Options to Clip End Conditions Only

Step Three: Visualize Surface Triangles

Visualize the triangles in the plan view by selecting **Surface>View Surface>Triangles.** Select **Design** from the *Surface* pull down (Figure 17-105). Click **Apply.** In MicroStation, the triangles should be displayed (Figure 17-106).

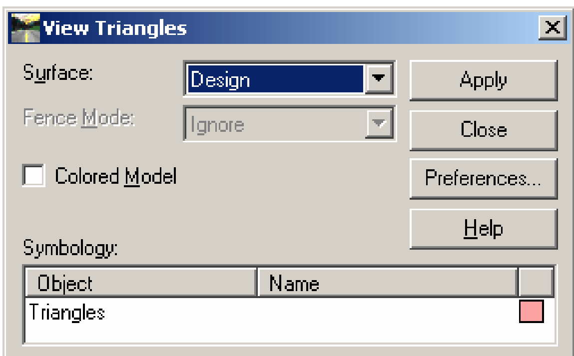


Figure 17-105: View Triangles for the Design Surface

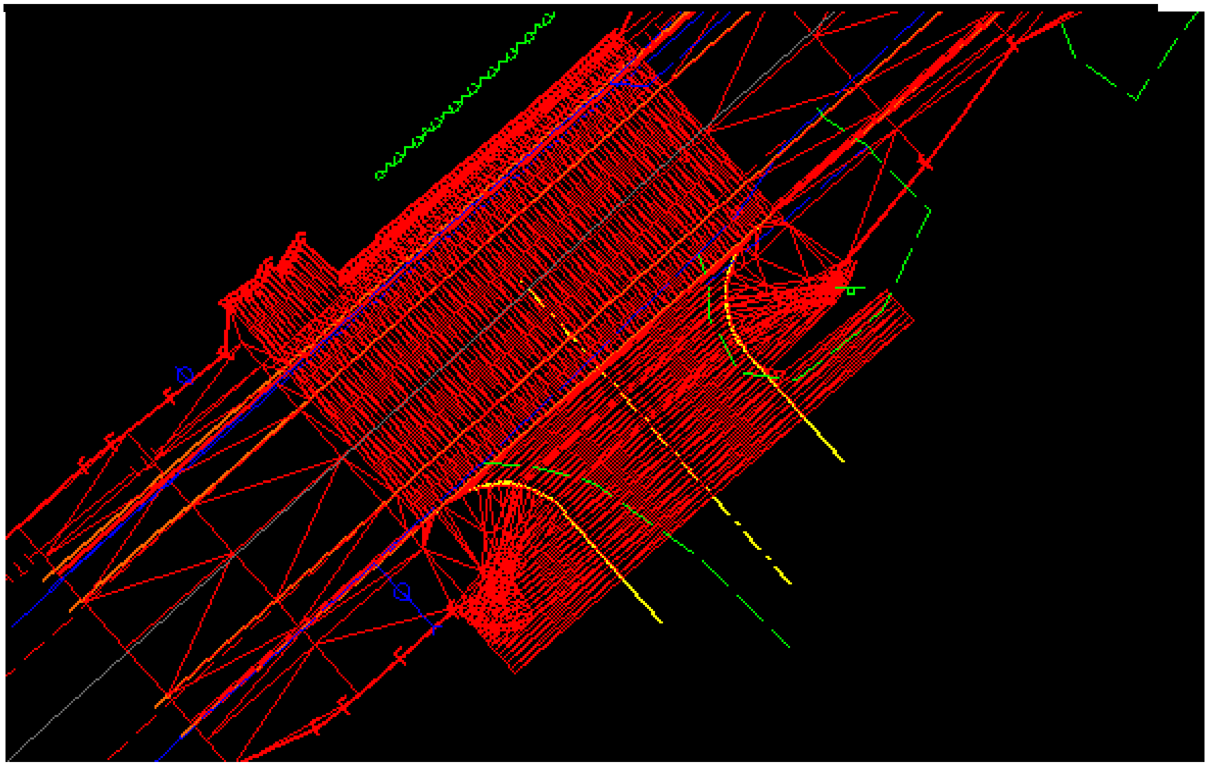


Figure 17-106: Triangles are displayed in MicroStation's view

A new complete surface is created out of both corridors. Volumetrics can now be obtained in the form of *End-Area Volume* component calculations as well as Cut/Fill Values.

Step Four: View Subgrade Triangles

Overview

This method will not show the subgrade lines on the MainLine cross sections unless the Subgrade surface is added as one of the surfaces displayed in the cross sections. The steps that follow will be necessary to add the driveway subgrade to the MainLine subgrade.

Part One: Delete Exterior

When the *Alternate Surfaces* are created for the **Subgrade**, an *Exterior* is created, but it doesn't encompass the whole surface, it only encompasses the last corridor that was processed. This "bug" has been reported to Bentley. Select **Surface>Edit Surface>Delete Feature.** Set the *Surface* to **Subgrade** and select the *Exterior* from the *Feature* list (Figure 17-107). Click **Apply.**

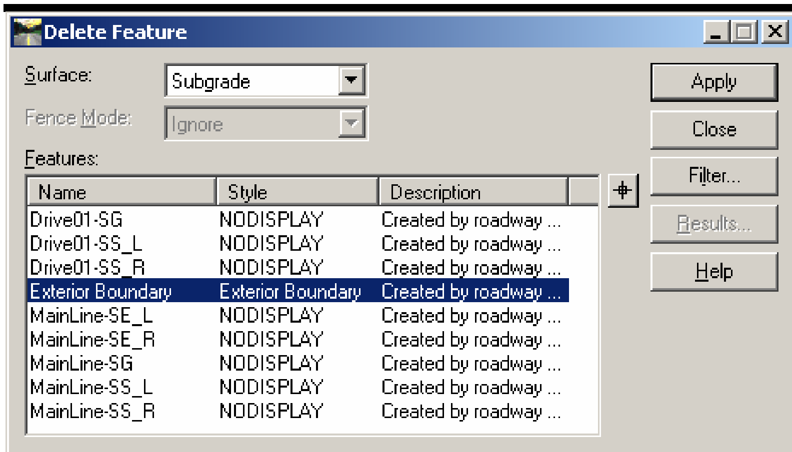


Figure 17-107: Select the Exterior feature and click Apply.

Part Two: Triangulate Subgrade

Select **Surface>Triangulate Surface…** from the InRoads menu. Re-triangulate the Subgrade Surface with a maximum leg length of 50’ (Figure 17-108). Click **Apply.**

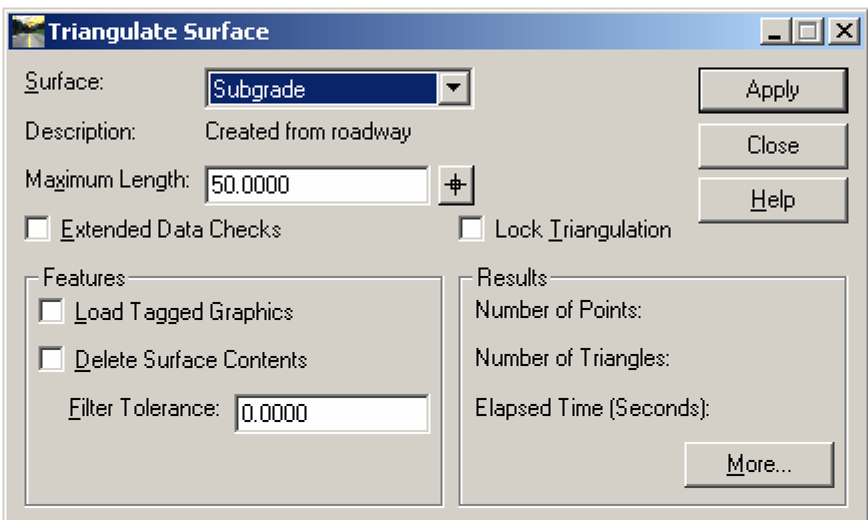


Figure 17-108: Triangulate the Subgrade Surface.

The results of the triangulation creates additional triangles connecting MainLine with the driveway that need to be deleted (Figure 17-109).

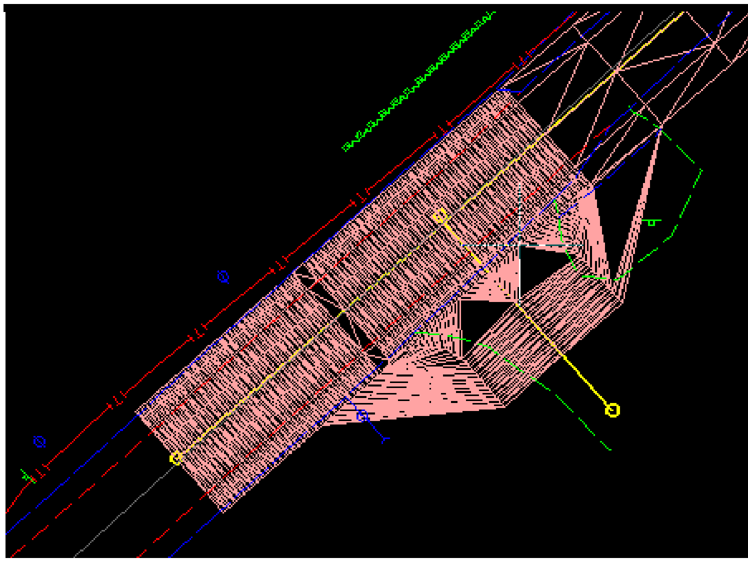


Figure 17-109: Results of new triangles.

Part Three: Clean-up Triangles

Select **Surface>Edit Surface>Delete Triangle** from the InRoads menu. Make sure that the **Subgrade** surface is active. The tool allows you to draw a line across the extra triangles. The results are shown in Figure 17-110.

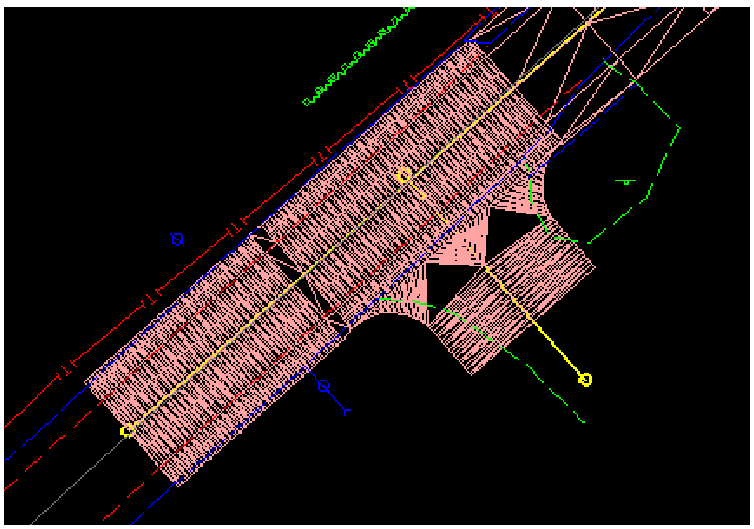


Figure 17-110: Results of cleaned-up triangles.

Part Four: Display the Perimeter

Select **Surface>View Surface>Perimeter** to display the Subgrade's new *Perimeter* (Figure 17-111).

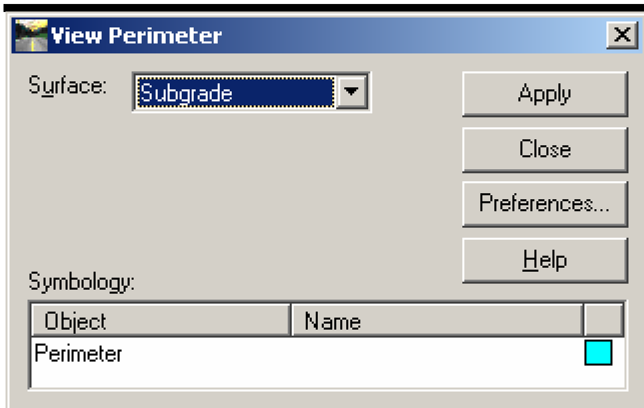


Figure 17-111: Display the new Perimeter around the triangles.

The perimeter will be cyan and encompass the triangles (Figure 17-112).

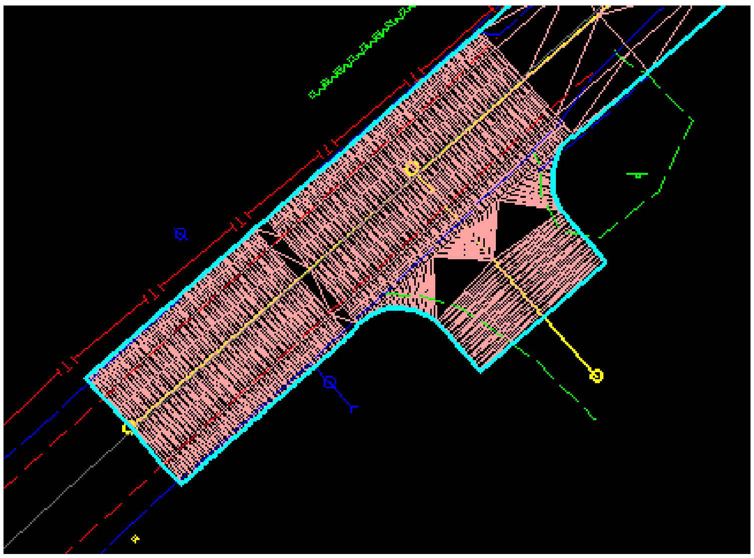


Figure 17-112: Perimeter displayed around the new triangles.

Part Five: Import Perimeter as Exterior

Select **File>Import>Surface** and setup the dialog to import the perimeter, as seen in Figure 17-113, as an *Exterior*. This will maintain the boundary of the cleaned-up triangles.

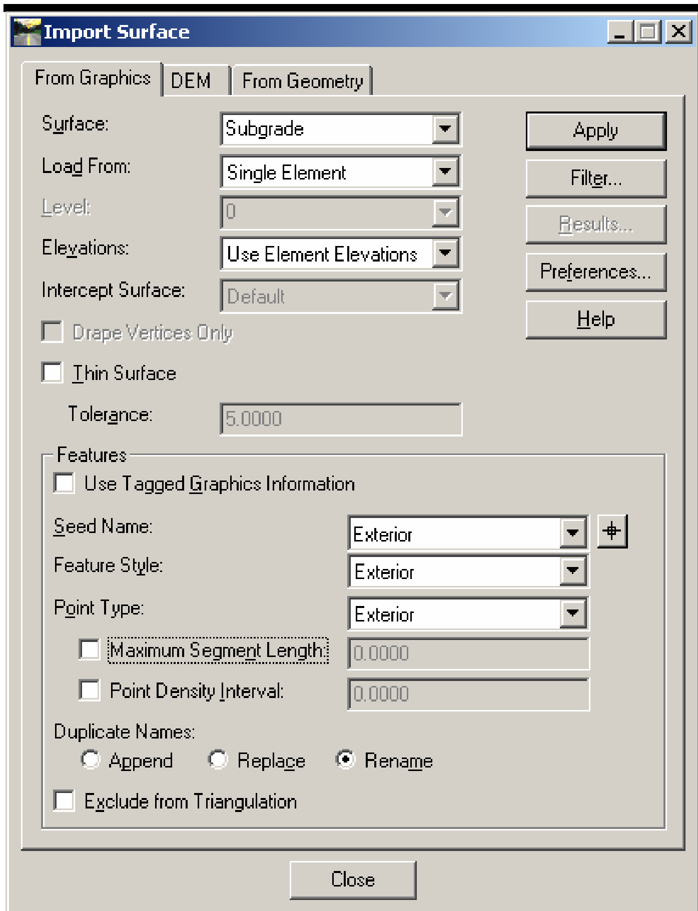


Figure 17-113: Import Surface dialog setup to import the Perimeter.

INTERSECTION DESIGN

INTERSECTION DESIGN

Prerequisites

Final Alignment Design for each Corridor with Side Road Alignment direction ending into the MainLine

Corridors Develop w/"Typical" Templates

Superelevation Applied

MainLine Surface and Side Road Surface Created

Overview

The intent is to create intersections that transition smoothly together using the Roadway Designer. This method is an outline and is not intended to cover every unique situation out there.

The generation of this document was from viewing a video supplied by Bentley for designing intersections using the Roadway Designer. To view the video follow the link provided.
\\Dot0dta1fscadd1\PCPIN1\msworksp\Documentation\MDOT\Training\video\InRoadsXMEditionIntersectionDesign.wmv

Step One: Create a Working Drawing

Select **File>Make Sheetz** from the MicroStation main menu. Create a *No Prefix* drawing called either **Highway_working** or **Bridge_working** based on your workgroup.

✓ ***Refer to page 1-18 for more information on using the Make Sheetz program.***

Select which reference files you want to display as well as the levels in each reference file. You may want to shut off the **Highway** or **Bridge** drawing if one has been created. The *features* for the MainLine and Side Road will be written to this drawing through InRoads. This is intended to be a working drawing and the final display and editing of the features will be in the dtm file and displayed in the **Highway.dgn** or **Bridge.dgn** file.

Step Two: Create and Display MainLine and Side Road Surface Features

♬ This step assumes you have created a MainLine and Side Road corridor in the Roadway Designer, passed a template along each, assigned superelevation and applied shoulder rollover locks.

Select **Modeler>Roadway Designer** from the InRoads main menu. Select **Corridor>Create Surface** from the Roadway Designer. Turn on **New Surface for Each Corridor**, highlight your mainline and side road corridors in the *Create Surface(s) from,* turn on **Add Transverse Features** and pick the *Style:* **NODISPLAY** and turn off **Create Alternate Surfaces** (Figure 17-114).

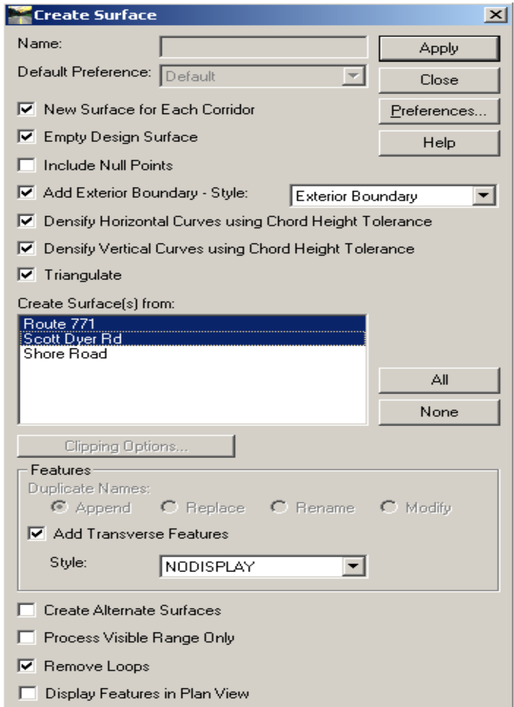


Figure 17-114: Create Surface

Close the *Create Surface* dialog and minimize the *Roadway Designer.*

Set the *Filter* to **Plan Display** and turn on the filter lock from the locks toolbar. Select **Surface>View Surface>Features…** from the InRoads main menu. Select the **MainLine** surface and click **Apply**. Select the **Side Road** surface and click **Apply**. Fit the view to see your graphics (Figure 17-115). Also display your mainline and side road alignments.

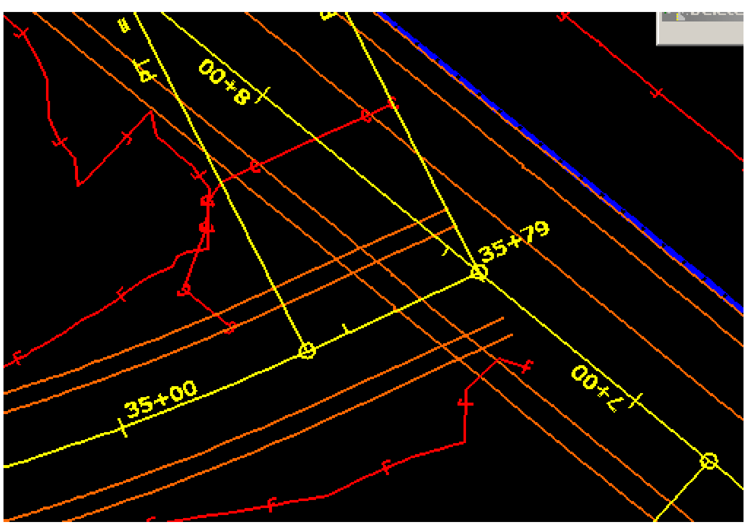


Figure 17-115: Mainline and Side Road Display

Step Three: Using the Multi-Center Curve tool and Review

✓ ***Refer to 33-10 to utilize AutoTrack to determine turning movement radii.***

Part One: Creating Multicenter Curve

Select **Geometry>Utilities>Multicenter Curve** from the InRoads main menu (Figure 17-116). Use of this tool will allow for generating a horizontal and vertical alignment from the mainline and side road surfaces.

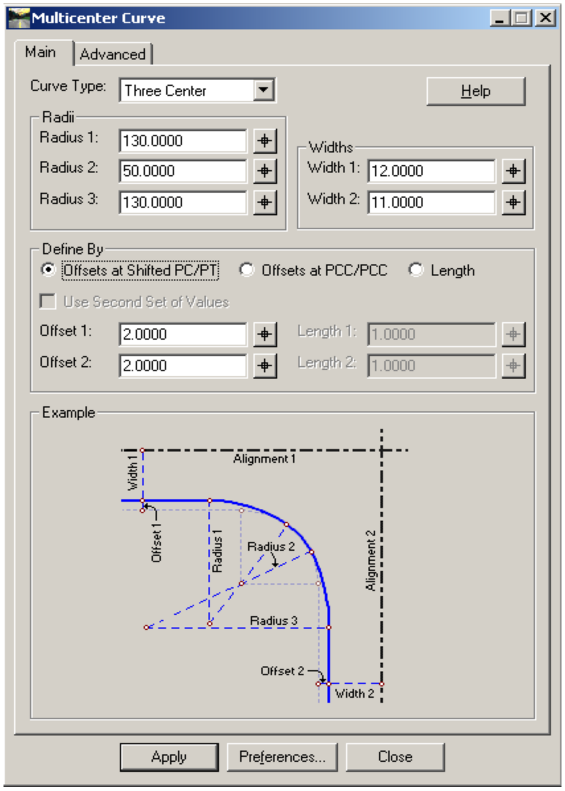


Figure 17-116: Multicenter Curve

In this example we will use *Curve Type:* **Three Center** for one side of the intersection.

♫ For more information about this tool refer to the InRoads Help button within this dialog.

On the *Main* tab set your desired **Radii** in the three radius boxes, for the **Widths** you will want to set the travelway width for the mainline in **Width 1** and your side road travelway width in **Width 2** (Figure 17-117). Refer to the **Example** at the bottom of the dialog for a better understanding of the width relationship to centerline.

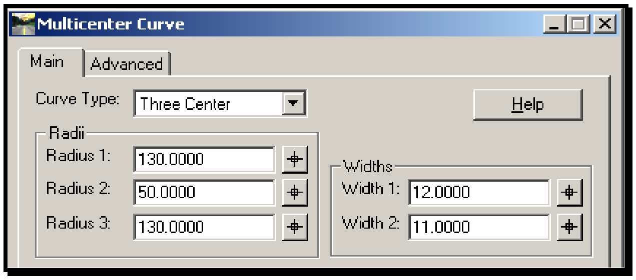


Figure 17-117: Multicenter Curve Radius and Width

Select the *Advanced* tab and assign an **Alignment Name**:, and pick the **Style: D_Roadway_Centerline** (Figure 17-118).

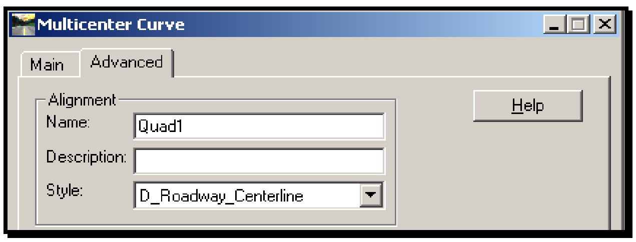


Figure 17-118: Multicenter Curve Alignment Name

Turn on **Create Vertical Alignment** and for the *First Selected Alignment* set the surface to your mainline surface. Set the *Second Selected Alignment* to the side road surface as shown below (Figure 17-119).

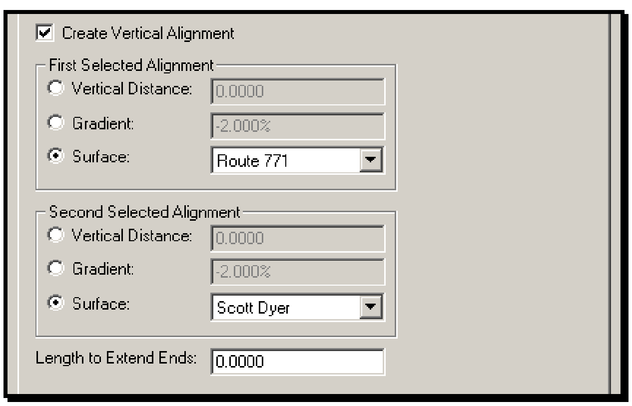


Figure 17-119: Multicenter Curve Create Vertical Alignment

Click **Apply**. You will be prompted to locate the first alignment. Select graphically with a left mouse button the mainline alignment.

Next you will be prompted to identify the second alignment, select the side road alignment with a left mouse button.

Then you will be asked to identify the quadrant for return, send a left mouse button click to the desired quadrant (Figure 17-120).

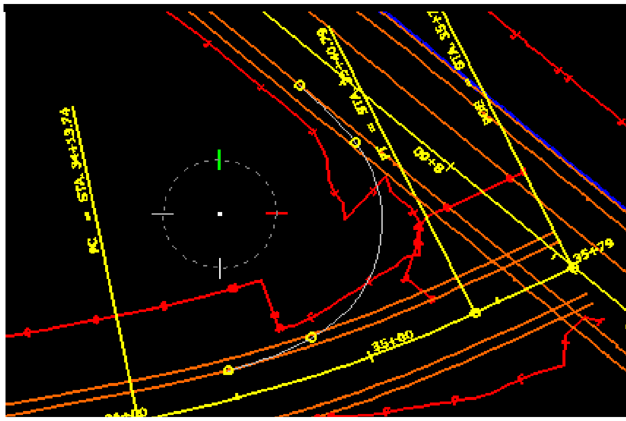


Figure 17-120: Temporary display of Alignment

If you like the alignment then left mouse button click to the view to accept the alignment (Figure 17-121).

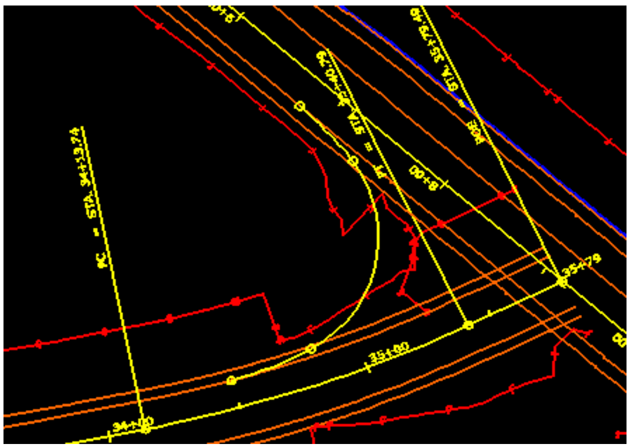


Figure 17-121: Accepting the Alignment

The new alignment ties into the edges of travelway for each roadway surface. Follow the same routine to develop the radius for the other side choosing to do a one, two or three center curve type.

Part Two: Review Vertical Alignment

Select **Evaluation>Profile>Create Profile** from the InRoads main menu. In the *Source* area set the alignment to the edge alignment generated using the Multicenter tool (Figure 17-122).

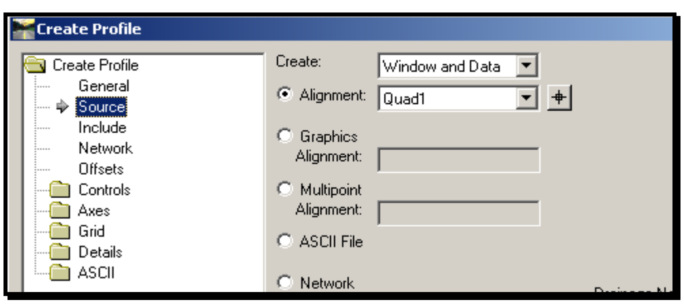


Figure 17-122: Create Profile Source Alignment

Set any style that is not the color yellow to the two surfaces (Mainline and side road surfaces) listed in the *General* section by highlighting the surface and selecting *Properties* (Figure 17-123).

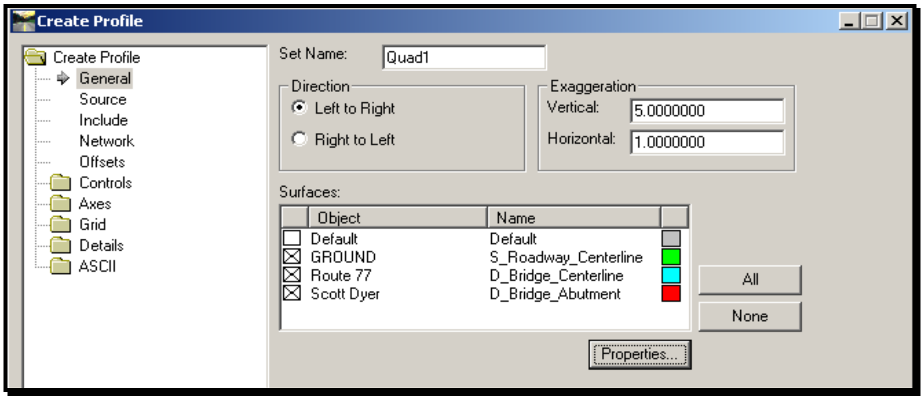


Figure 17-123: Create Profile Quad 1

Click **Apply** and send a left mouse button to the view window to see the profile. Select **Geometry>View Geometry>Active Vertical** to see how the Multicenter Curve tool built the vertical alignment (Figure 17-124).

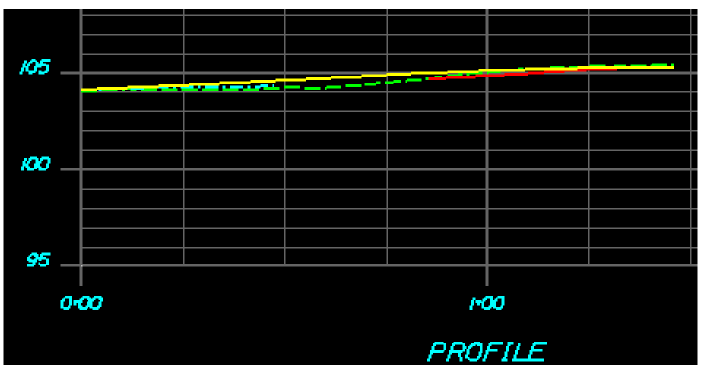


Figure 17-124: Profile Display

If you want to adjust the vertical alignment then refer to the geometry tools to edit or recreate the vertical alignment.

Step Four: Point Control for Edge of Travelways

Now that we have alignments for each edge of travelway for the side road we can control our widths of travelway with the point controls within the Roadway Designer.

Select **Modeler>Roadway Designer** from the InRoads main menu. Pick your side road *Corridor:* and set the *Active Surface:* to **Ground** (Figure 17-125).

Figure 17-125: Setting Corridor and Active Surface

Select **Corridor>Point Controls** from the Roadway Designer main menu. Set *Point:* to **CE_L**, change the *Mode* to **Both**, set the *Control Type:* to **Alignment**, select the **Horizontal and Vertical Alignment** that was developed for the left side of the side road (if you can't remember the name hold down the **Ctrl** key and use the selection button to the right of the Horizontal Alignment drop down box to graphically select it in the MicroStation view window.) and place a check mark in the **Use as Secondary Alignment** (Figure 17-126).

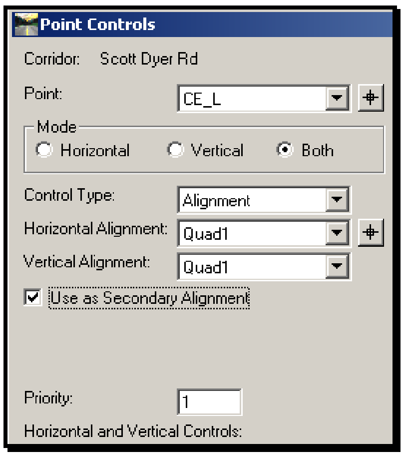


Figure 17-126: Point Controls Travelway Edge

For the *Station Limits* the **Start:** station should be the first point of the Quad1 alignment intersecting the travelway edge of the side road and the **Stop:** should be the intersection point of the Quad1 alignment and the shoulder edge of the Mainline or the last point that can be seen perpendicular to the side road alignment (Figure 17-127).

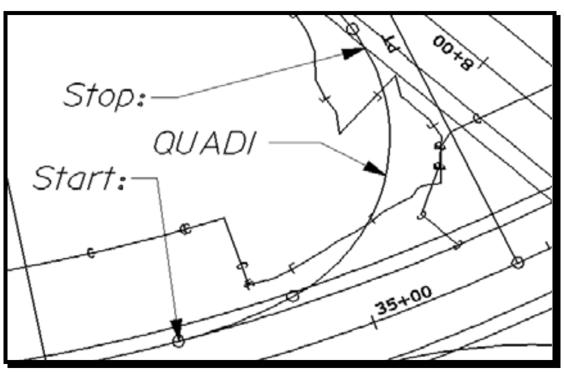


Figure 17-127: Station Limits Start and Stop

Set the *Station Limits* by holding down the **Ctrl** key and use the selection button to the right of the start and stop station to pick the limits graphically (Figure 17-128).

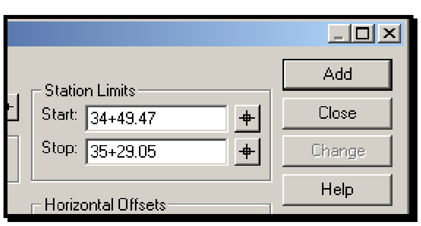


Figure 17-128: Point Controls Start and Stop

Click the **Add** button to populate the **Horizontal and Vertical Controls** area of the dialog (Figure 17-129).

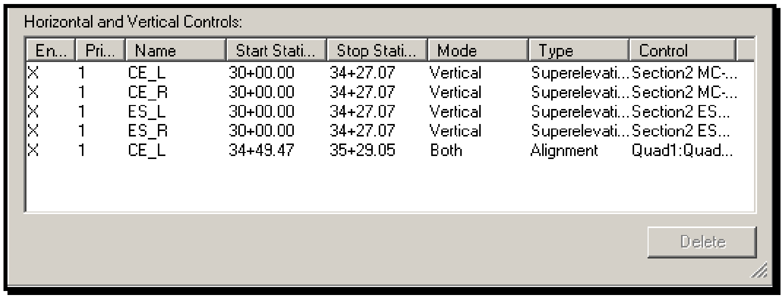


Figure 17-129: Horizontal and Vertical Controls

Repeat this process for the right travelway edge (**CE_R**) click **Add** and **Close** dialog. After setting the right side you should see the secondary alignments displayed within the Roadway Designer (Figure 17-130). By using secondary alignments to control the travelway edge this allows the shoulders and end conditions to come off perpendicular to the secondary alignment for better triangulation.

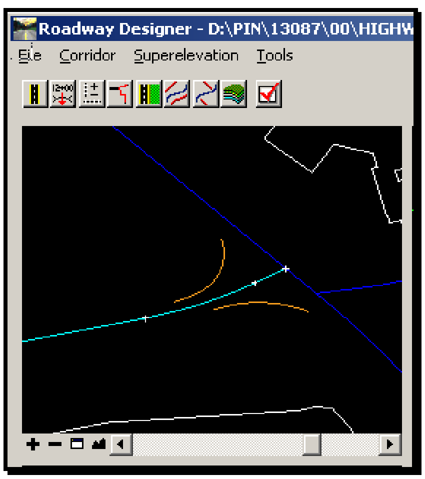


Figure 17-130: Roadway Designer Plan View

Step Five: Adjust Template drops for Side Road

Template Drops and Edits

At this point the side road will need to intercept the edge of should of the mainline. This is done by adding additional template drops and doing additional point controls.

Select **Corridor>Template Drops** from the Roadway Designer main menu. In the *Current Template Drops:* highlight the template drop (if there are multiple drops for the side road then select the last station drop given), set the *Station:* to the closest station intercepting the edge of shoulder of the mainline looking up station (in this case it is the last station given for the point control for the **CE_L** which is 35+29.05) and round it back a bit to 35+29.00 for now. Set the *Interval:* to 2 and click the **Copy** button (Figure 17-131).

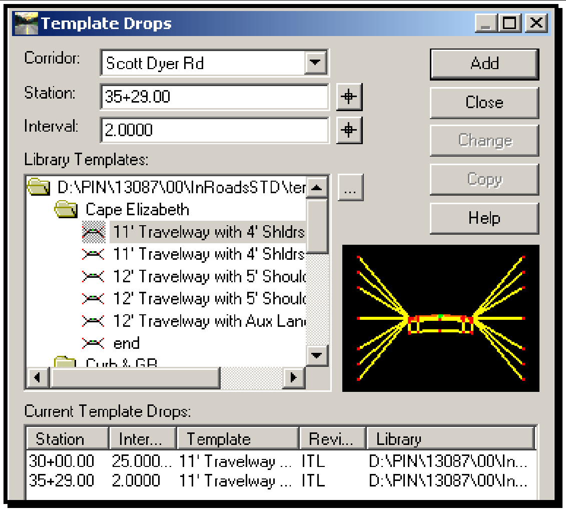


Figure 17-131: Template Drops Copy1

Highlight the new template drop and select **Edit** (Figure 17-132).

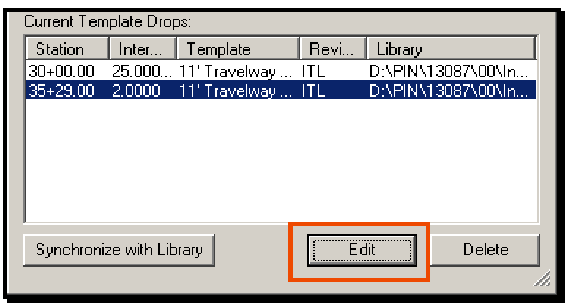


Figure 17-132: Template Drops Edit1

Delete the left end conditions and shoulder from the template drop and click **OK** (Figure 17-133).

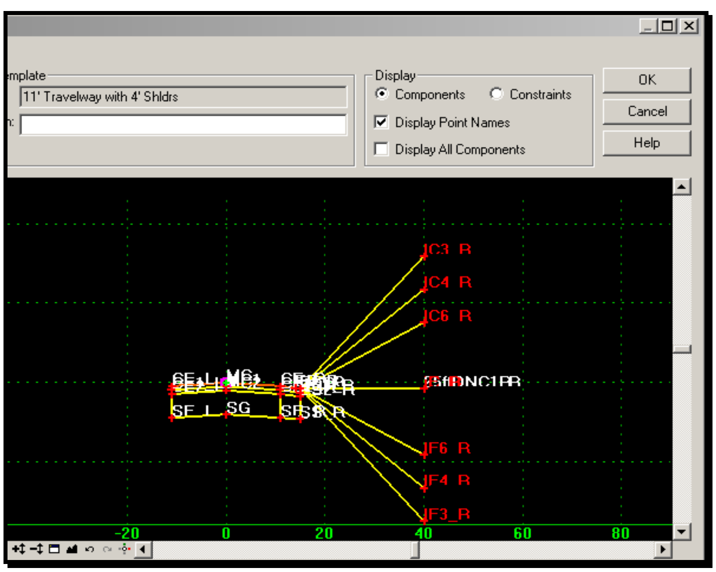


Figure 17-133: Template Edit1

Highlight the edited template drop, set the *Station:* to the intersecting point of the side road alignment and the edge of shoulder of the mainline (hold the **ctrl** key and pick the selection tool to graphically select the intersection point to populate the station) and then back it off an inch plus/minus. Set the *Interval:* to 2 and click the **Copy** button (Figure 17-134).

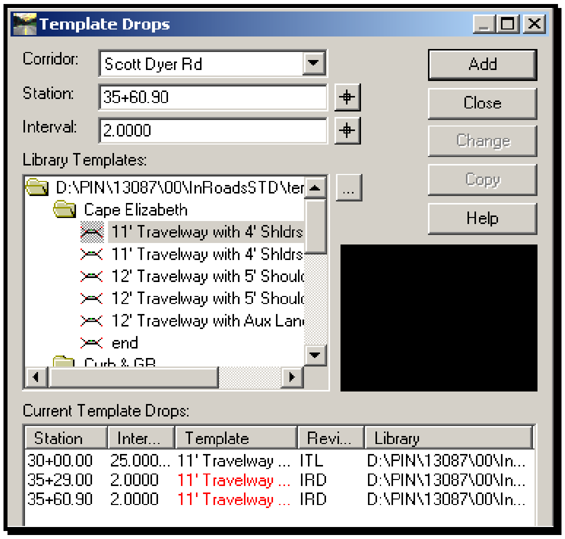


Figure 17-134: Template Drops Copy2

Highlight the new template drop and select **Edit** (Figure 17-135).

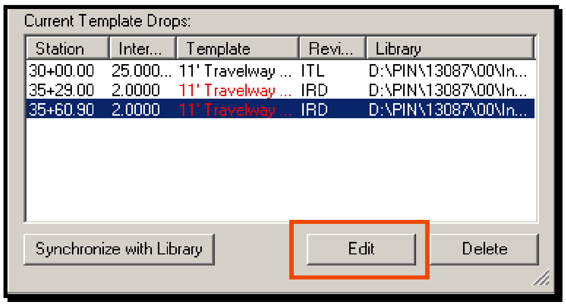


Figure 17-135: Template Drops Edit2

Delete the left travelway edge and sub points from the template drop and click **OK** (Figure 17-136).

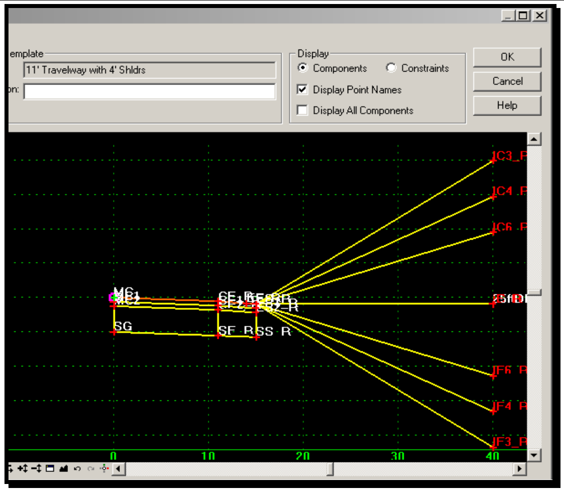


Figure 17-136: Template Edit2

Close the Template Drops dialog.

Point Controls for Edited Template Drops

Select **Corridor>Point Controls** from the Roadway Designer main menu. Set *Point:* to **CE_L**, change the *Mode* to **Both**, set the *Control Type:* to **Corridor Point**, select the Mainline as the *Corridor:* and set the *Reference Point:* to the edge of should point name from the Mainline (**ES_L**) (Figure 17-137).

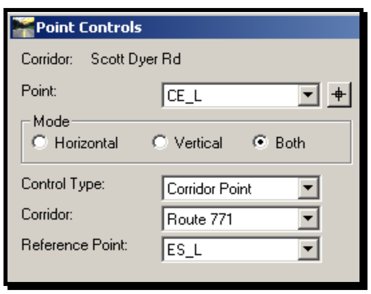


Figure 17-137: Point Controls Edge of Travelway

For the *Station Limits* the *Start:* station should be the same as the first edited station drop and the *Stop:* station should be the last station drop. In the *Horizontal Offsets* set the *Start:* and *Stop:* to **0.1000** (Figure 17-138).

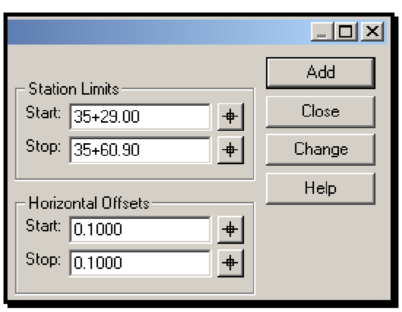
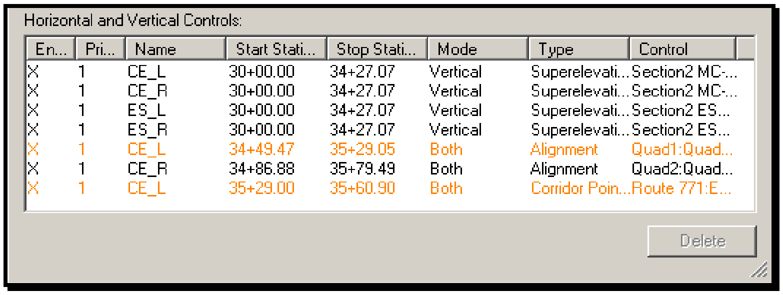


Figure 17-138: Point Controls Station Limits

Click the **Add** button. If some point controls turn orange then that means there is a conflict with the point controls set (Figure 17-139).

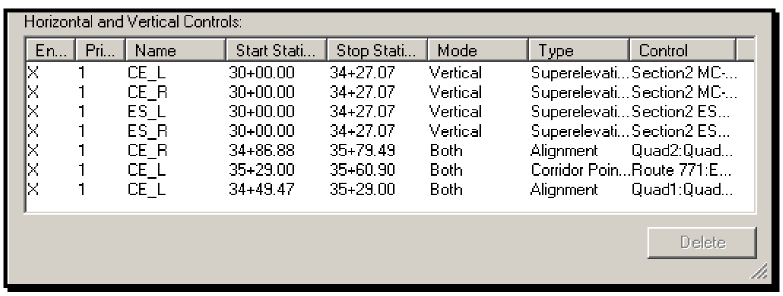

Horizontal and Vertical Controls:

En...	Pri...	Name	Start Stati...	Stop Stati...	Mode	Type	Control
X	1	CE_L	30+00.00	34+27.07	Vertical	Superelevati...	Section2 MC-...
X	1	CE_R	30+00.00	34+27.07	Vertical	Superelevati...	Section2 MC-...
X	1	ES_L	30+00.00	34+27.07	Vertical	Superelevati...	Section2 ES...
X	1	ES_R	30+00.00	34+27.07	Vertical	Superelevati...	Section2 ES...
X	1	CE_L	34+49.47	35+29.05	Both	Alignment	Quad1:Quad...
X	1	CE_R	34+86.88	35+79.49	Both	Alignment	Quad2:Quad...
X	1	CE_L	35+29.00	35+60.90	Both	Corridor Poin...	Route 771:E...

Delete

Figure 17-139: Point Controls Conflict

The initial point control by alignment has a stop station value greater than the start station value of the corridor point control just provided. Highlight the first point control for **CE_L** and adjust the *Stop:* station to match the *Start:* station value and click **Change** (Figure 17-140).


Horizontal and Vertical Controls:

En...	Pri...	Name	Start Stati...	Stop Stati...	Mode	Type	Control
X	1	CE_L	30+00.00	34+27.07	Vertical	Superelevati...	Section2 MC-...
X	1	CE_R	30+00.00	34+27.07	Vertical	Superelevati...	Section2 MC-...
X	1	ES_L	30+00.00	34+27.07	Vertical	Superelevati...	Section2 ES...
X	1	ES_R	30+00.00	34+27.07	Vertical	Superelevati...	Section2 ES...
X	1	CE_R	34+86.88	35+79.49	Both	Alignment	Quad2:Quad...
X	1	CE_L	35+29.00	35+60.90	Both	Corridor Poin...	Route 771:E...
X	1	CE_L	34+49.47	35+29.00	Both	Alignment	Quad1:Quad...

Delete

Figure 17-140: Point Controls Conflict Resolved

You will notice the color going back to black and the point control dropping to the bottom indicating the last edit.

Do the same process for the **MC** point with the same **Mode:,** *Control Type:* **Corridor** and *Reference Point:*. Set the *Station Limits* start station to match the last template drop in the series of drops for the side road, stop station at the farthest point of intersection for the travelway edge and edge of shoulder on the mainline and supply a **0.100 Horizontal Offsets** for both the start and stop (Figure 17-141).

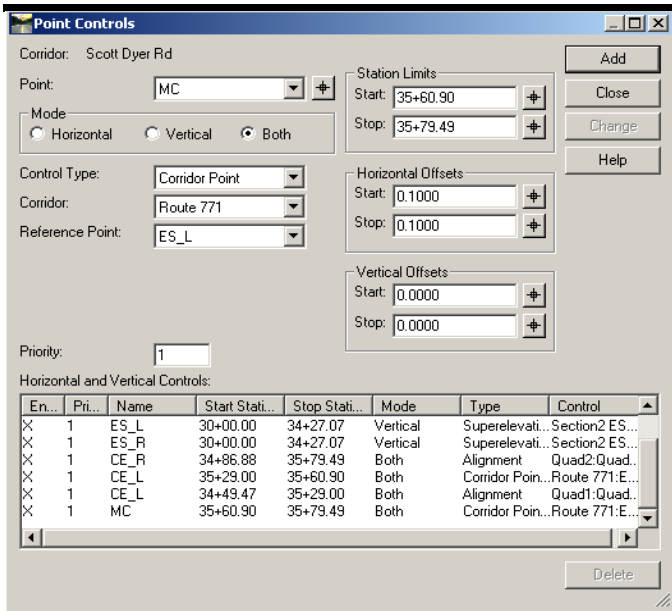


Figure 17-141: Point Controls for MC

Click **Add** to populate the **Horizontal and Vertical Controls** and **Close** the dialog.

In the Roadway Designer and click the **Process All** and view the plan view of the Roadway Designer to see how the interfacing looks (Figure 17-142).

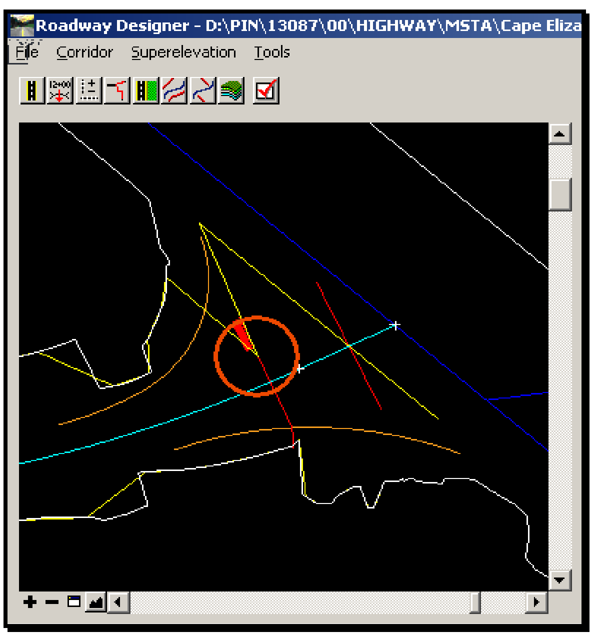


Figure 17-142: Roadway Designer Plan Review Error

In this case there ended up being a spike in the station drops due to the horizontal offset that was applied when controlling the **CE_L** point and maintaining the integrity of the mainline edge of shoulder. To correct this go back to the template drop that matched the original point control at station 35+29.00 and adjust it back by the 0.100 provided for the **Horizontal Offsets** (Figure 17-143).

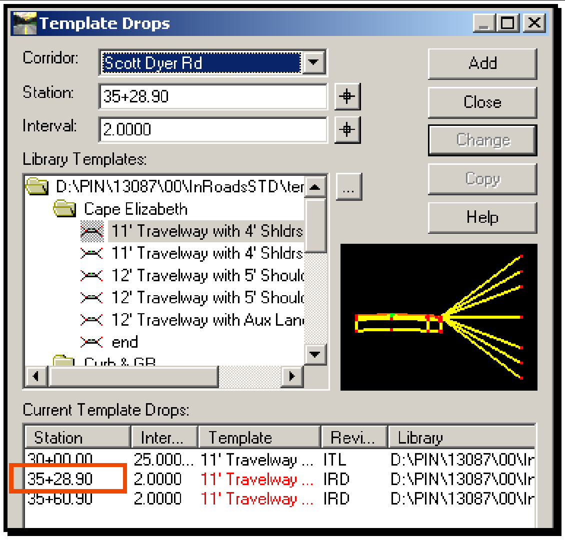


Figure 17-143: Template Adjustment

Next reopen the Point Controls dialog and adjust the *Stop Station* value for the **CE_L** point that is being controlled by an **Alignment** to match the template drop station (Figure 17-144).

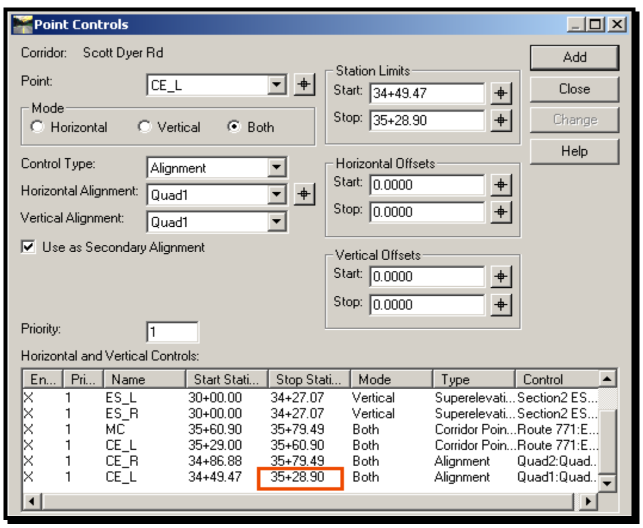


Figure 17-144: Point Controls Adjustment

Close the Point Controls dialog and do another **Process All** within the Roadway Designer and review the plan view again (Figure 17-145).

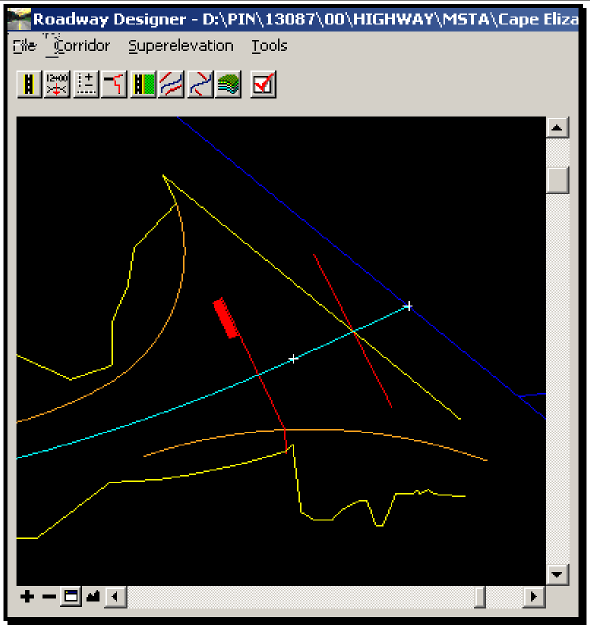


Figure 17-145: Roadway Design Plan Review Fixed

Notice the spike is now gone.

Step Six: Target Alias

Select **Tools>Target Alias** from the Roadway Designer main menu. **Add** the mainline corridor and the existing ground surface to the *Aliases:* area of the dialog. Move the corridor to the top if necessary (Figure 17-146).

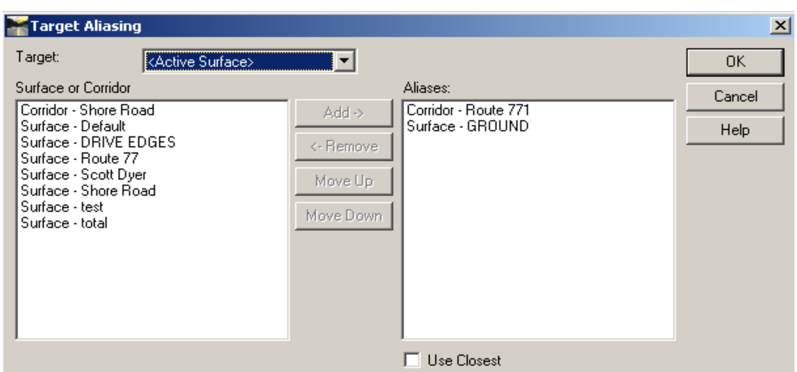


Figure 17-146: Target Aliasing

Click **OK** to close the dialog.

Step Seven: Create Combined Surface

Select **Corridor>Create Surface** from the Roadway Designer main menu. Set the *Name:* to **Design**. Down in the middle of the dialog, click on the **Clipping Options** button to review the settings (Figure 17-147).

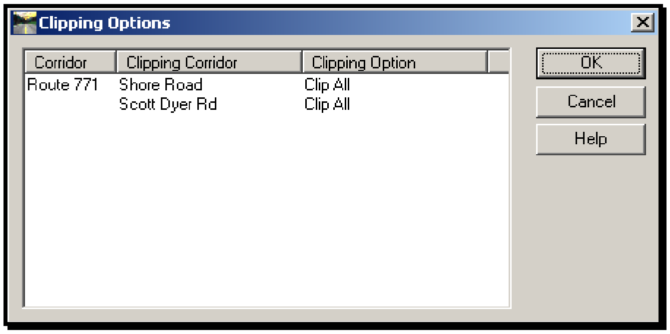


Figure 17-147: Clipping Options

This should be set to **Clip All**. To change it just simply left click the desired row to change in the location of the **Clipping Options** column. Click **OK** to close the dialog box.

Highlight the desired surfaces in the *Create Surface(s) from:* that you want to create the combined surface from (Figure 17-148).

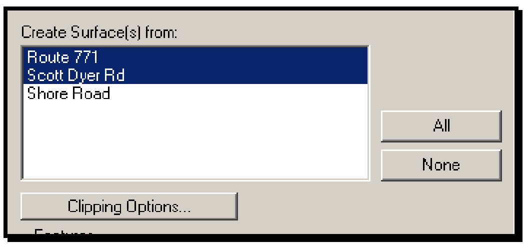


Figure 17-148: Create Surface(s) from

Place a check mark in the *Add Transverse Features* and pick **NODISPLAY** for the *Style:* (Figure 17-149).

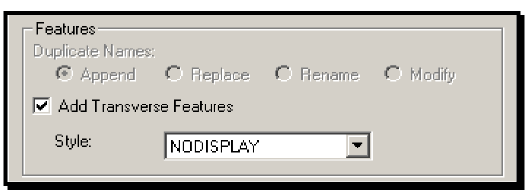


Figure 17-149: Create Surface Transverse Features

You may or may not want to **Create Alternate Surfaces** but if you do then place a check next to this area of the dialog box. The overall look of the Create Surface dialog should look like this (Figure 17-150).

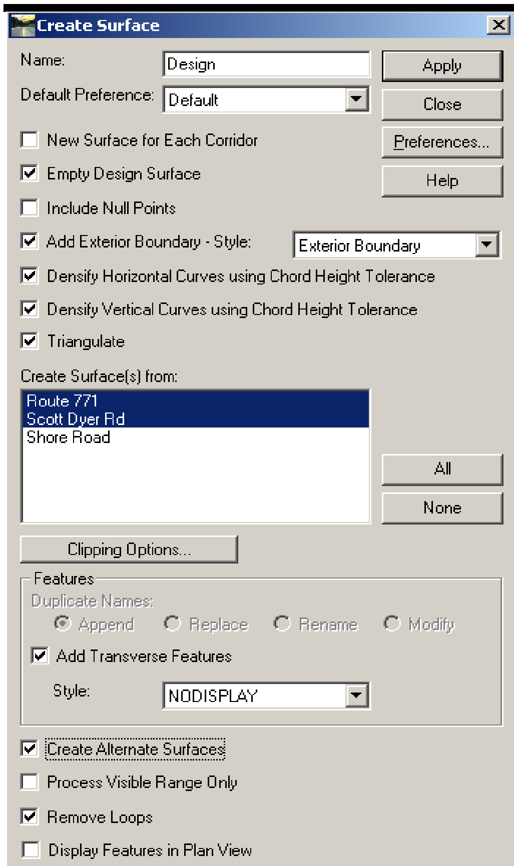


Figure 17-150: Create Surface

Click **Apply** and allow for the processing to finish before closing the dialog. **Close** the Roadway Designer and save your *.ird.

Step Eight: View Features

Select **Surface>View Surface>Features** from the InRoads main menu. Set the *Surface:* to **Design** and click on the **Filter** button. Set the filter to **Plan Display** and click **OK**. (Figure 17-151).

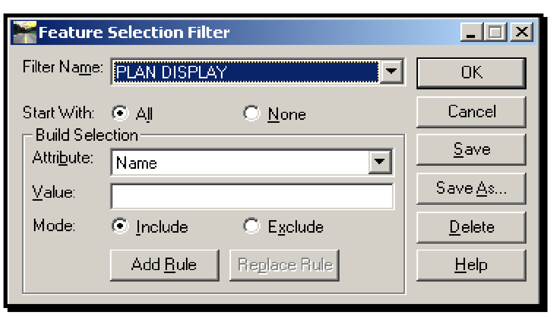


Figure 17-151: Feature Selection Filter

Verify that the **Feature Filter Lock** is on in the Locks toolbar and click **Apply** to display the features of the combined surface (Figure 17-152). Close the dialog.

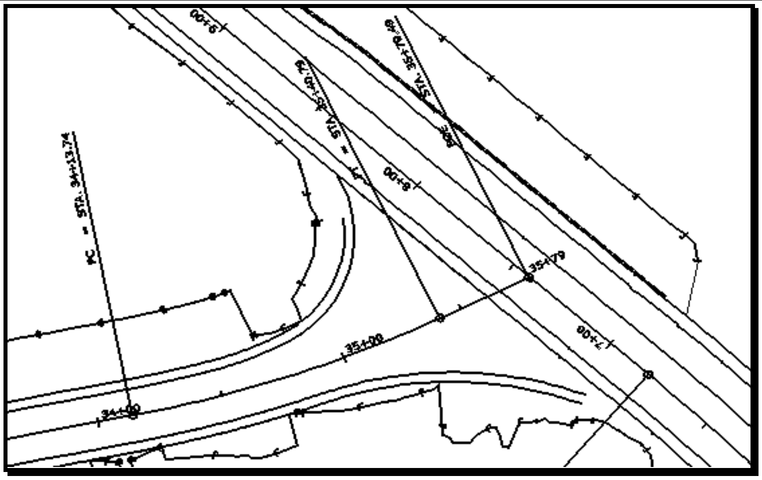


Figure 17-152: Features Display in Combined Surface

As you can see there will still need to be some clean up of the features coming into the edges of the mainline. This could be done using the surface editing and design tools within InRoads or drawing MicroStation lines and importing them to the combined surface.

Step Nine: View Triangles

To view the triangles select **Surface>View Surface>Triangles** from the InRoads main menu. Set your surface to design, select the **Preferences** button and load the **Proposed** preference. Click **Apply** to view the triangles (Figure 17-153).

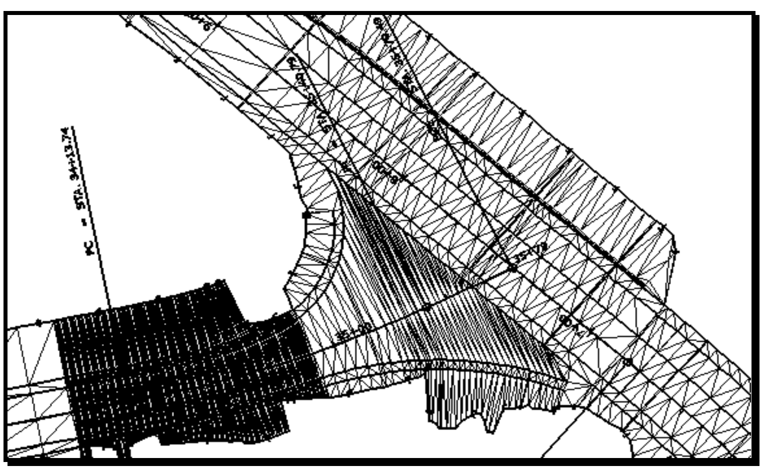


Figure 17-153: Triangle Display

The display of the triangles shows how the side road interfaces to the edge of shoulder of the mainline and also how they turn on the secondary alignments of the travelway edge to create a more accurate model.

Step Ten: Rendering Triangles (Optional)

To render the triangles select the lightening bolt (Change View Display) within the view control icons at the bottom of View 1 (Figure 17-154).

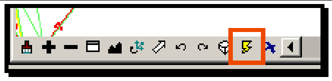


Figure 17-154: Change View Display

Turn on **Graphic Acceleration** and change the *Display Mode:* to **Smooth** (Figure 17-155).

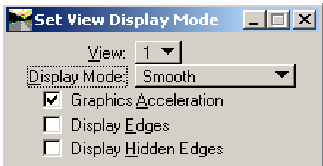


Figure 17-155: Set View Display Mode

This will render the view.

♫ You may need to turn the level off for the Exterior. Turn off the level named (4) in the earlier version of the xin or level name (Exterior) in the latest xin file.

Use the Rotate View tool, set to **Dynamic** and with **Dynamic Display** checked on (Figure 17-156), place a tentative snap near the intersection and accept (left button) to rotate the triangles around viewing the interfacing into the mainline (Figure 17-157).

Figure 17-156: Rotate View

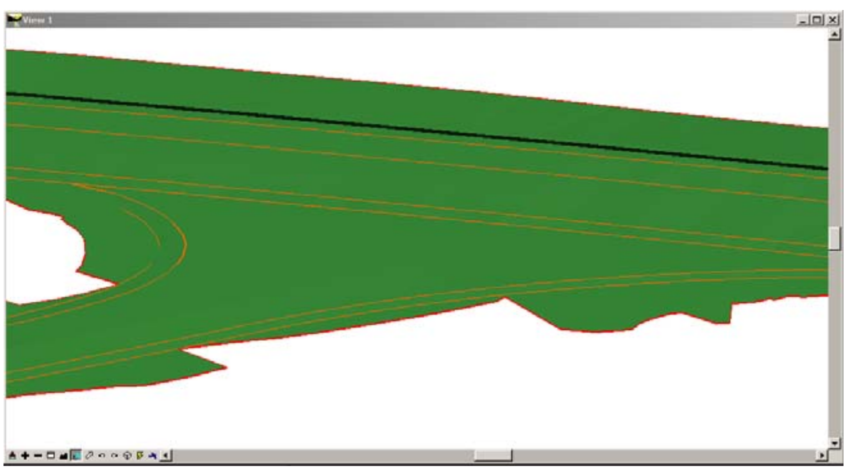


Figure 17-157: Rendering Intersection

Select the Rotate View tool again and change *Method:* to **Top** to set the view back to normal. Reselect the **Change View Display** icon, uncheck **Graphic Acceleration** and set the *Mode:* to **Wireframe** to remove the rendering.

Chapter 18 Plan/Profile Sheet Development

CREATING PLAN AND PROFILE PAGES

OVERVIEW

The **default** preference for this dialog has been setup to establish the station range limits for 25 scale plans. There are other preferences for establishing plan and profile pages, plan only, profile only and 50 scale setups. Remember if you chose to do 50 scale then previous prerequisites will need to be redisplay with the **Global Scale Factors** set to **600 absolute scale**.

CREATE PLAN OVER PROFILE PAGES

Step One: Open MicroStation

To begin, double click your **InRoads Suite** icon and select your project from the project pull down. Open any file.

Step Two: Create or Open a Profile Drawing

Select **File>Makesheetz** from the *MicroStation Main Menu.* Create a **Profile.dgn** drawing (if one doesn't already exist) using the no prefix option.

✓ ***Refer to 1-18 for help making drawing files.***

Step Three: Create Plan Page Layout without Graphics

Not all alignments begin with an even station. For this reason we need to establish how we are going to control the sheet drawing station limits before generating plan over profile drawings. By default we are ready to control station limits for 25 scale drawings. If you intend to do 50 scale plans you will need to change the **Length:** option in the **Station Limits** area of the dialog to **1400** feet.

♬ Deactivate your station lock before you begin the next step.

Part One: Main

From the *InRoads Main Menu* select **Drafting>Plan and Profile Generator…** (Figure 18-1). In the **Main** tab select your alignment in the **Horizontal Alignment:** area and manage the start and stop limits of your project in the **Station Limits** area of the dialog box.

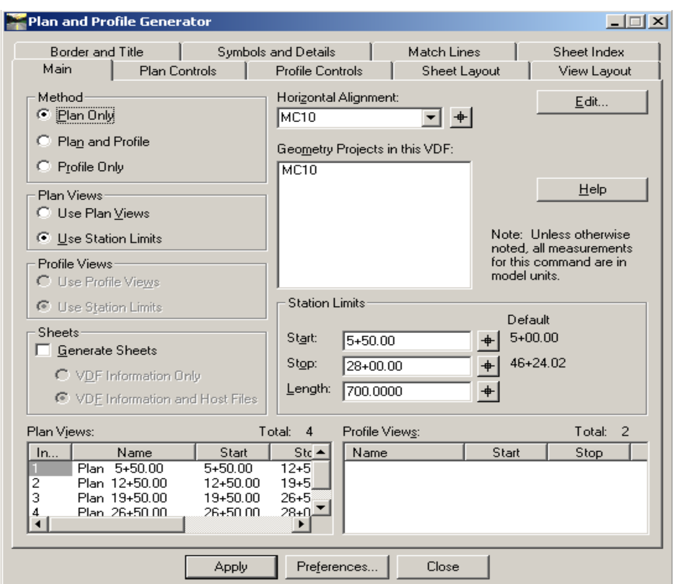


Figure 18-1: Plan and Profile Generator-Main

Part Two: Plan Controls

Place focus on the **Plan Controls** tab (Figure 18-2). Select the **Model Files…** button to the right and pick your workgroups source drawing file i.e. (HDPlan.dgn, BDPlan.dgn or etc.).

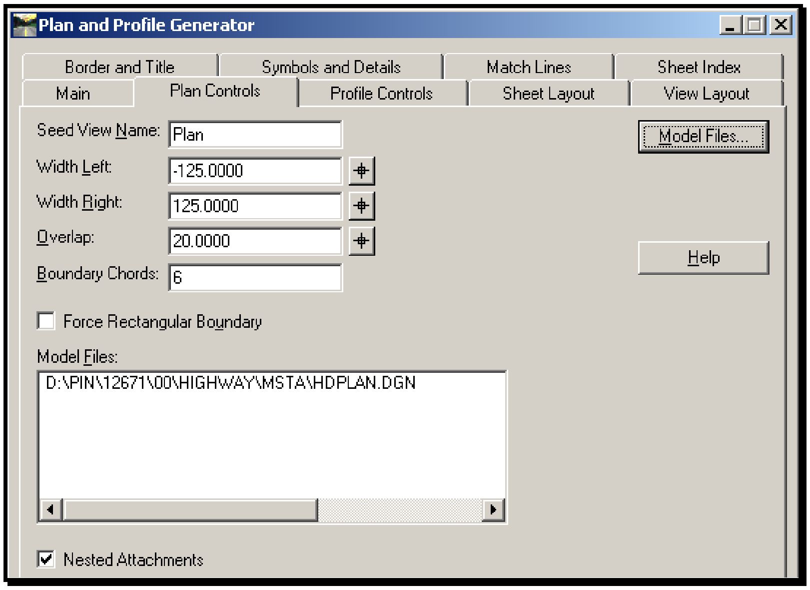


Figure 18-2: Plan and Profile Generator-Plan Controls

Click **Apply**.

Step Four: Create Plan over Profile Pages

The top of the dialog has multiple tabs with certain settings preset for you. We will need to place some information in a few of these tabs.

♫ Before you begin reactivate your station lock button on the **Locks** toolbar.

Located at the bottom of the dialog box select the **Preferences…** button (Figure 18-3) and load **Plan & Profile 25 scale** by either double clicking or highlighting and selecting **Load**.

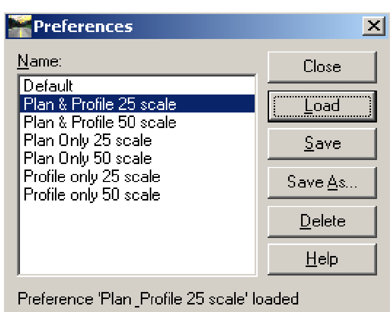


Figure 18-3: Preferences

Press **Close** to return to the **Plan and Profile Generator…** dialog.

Part One: Plan Controls

Place focus on the **Plan Controls** tab (Figure 18-4). The path should already be written into the **Model Files…** area for the source drawing file i.e. (HDPlan.dgn, BDPlan.dgn or etc.).

ⓘ ***If the path shown is pointing to something other than your source drawing file you must reset your preferences back to default and redo the instructions give in Step Three: Create Plan Page Layout without Graphics.***

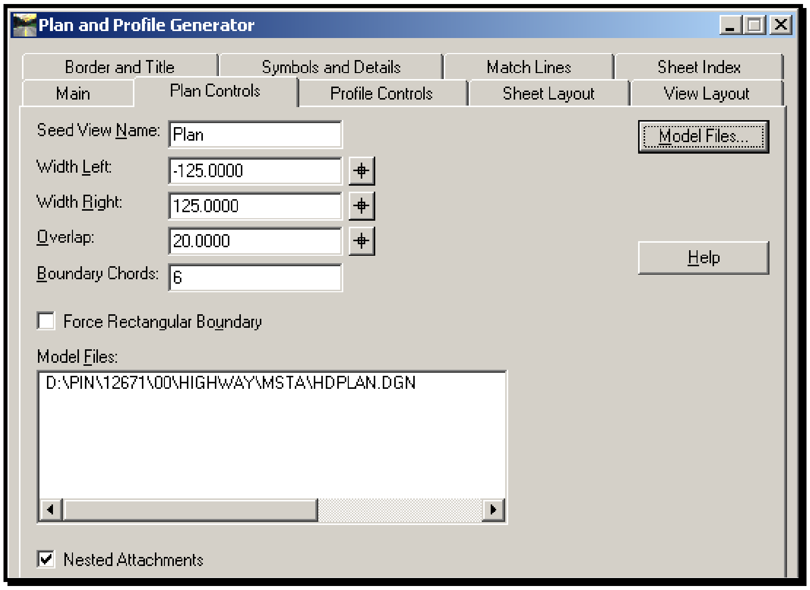


Figure 18-4: Plan and Profile Generator-Plan Controls

♬ Your source drawing file should have the standard files attached to it. At any time you can attach files to the source drawing and have them display within your plan pages.

✓ ***Refer to 2-70 for more information on Reference Attachments.***

Part Two: Profile Controls

Place focus on the **Profile Controls** tab (Figure 18-5). Select your **Vertical Alignment:** from the pull down and pick the existing and proposed surfaces for display.

ⓘ ***Remember to also highlight the Surface names (using the Ctrl key) along with placing the X next to the surface names (i.e. Ground and Design). If this isn't done you will get undesirable results in the way your grid will display with your profiles.***

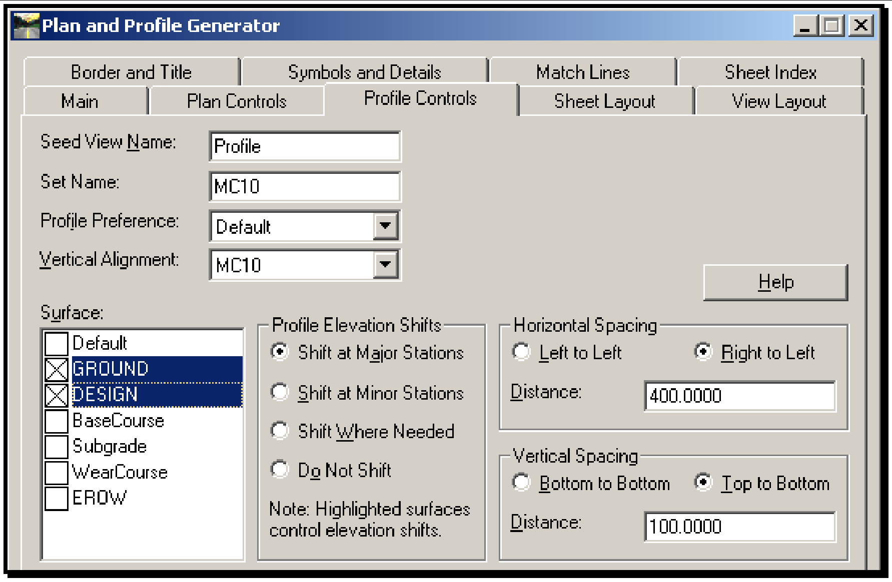


Figure 18-5: Plan and Profile Generator-Profile Controls

Part Three: Sheet Layout

Place focus on the **Sheet Layout** tab (Figure 18-6). Press the **...** button right of the **Host File:** location and select the same file as you did for your plan controls i.e. (HDPlan.dgn, BDPlan.dgn or etc.).

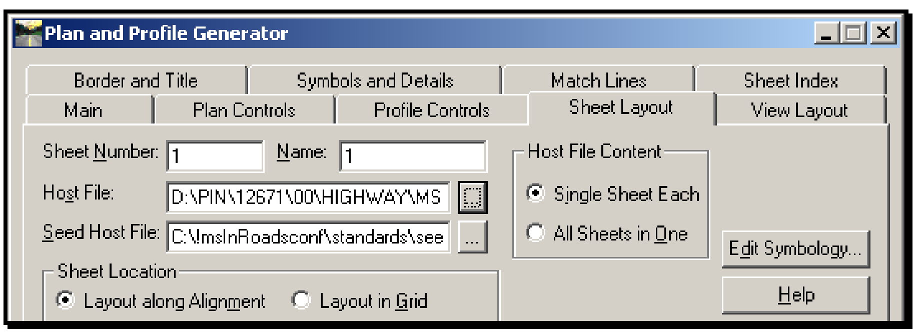


Figure 18-6: Plan and Profile Generator-Sheet Layout

Part Four: Sheeting Drawings

- Remember to toggle the **Station Locks On** from the **Locks** toolbar prior to sheeting your files. If you have changed the start station of your alignment to be something other than an even 100 foot station and this lock is off, your stationing along the profile will increment at even 100 foot intervals based on the start station.

Click **Apply** at the bottom of the **Plan and Profile Generator** dialog. You will be prompted at the bottom right of the MicroStation screen to **Identify Location**, send a left mouse button to the view 1 window to begin the sheet creation process.

When the sheet creation process finalizes the **Plan and Profile Generator** dialog will reappear. Click **Close** and save your **VDF** file for future use.

♬ If you do not have a proposed design surface when generating your P & P, you must go back after and display you active vertical alignment to get the vertical to display.

Part Five: View the Results

Select **File>Open** from MicroStation's main menu and view the sheets (i.e. ??plan1.dgn).

If you are satisfied with the sheet layout, then consider running the *Sheet Renumbering Utility* to place the 3 digit prefixed in front of the file names. Without the 3 digit prefix, the *Border Information* macro can't be run to fill in the border information on each sheet.

✓ ***For detailed instructions on using the Sheet Renumbering Utility, please refer to 1-22.***

✓ ***For detailed instructions on using the Border Information macro, please refer to 1-27.***

If you are not satisfied with the sheet layout, re-open the *Plan and Profile Generator*, select the *Sheet Index* tab and open the saved VDF file. Adjust the *Plan View* and *Profile View* stations or overlaps on the *Main* tab.

✓ ***If you need to adjust any of the plan pages for layout, refer to Bentley InRoads help.***

Step Five: Annotating Profiles

Reopen the **Profile.dgn** file that was created earlier. Fit the view.

Part One: Label Proposed Elevations

From the *InRoads Main Menu* select **Evaluation>Profile>Annotate Profile…** (Figure 18-7). By default we are preset to label the elevations of the proposed vertical design. If you want to label the existing ground elevations also then select the **Preferences…** button and activate the **Proposed and Existing Elevation** option and close the dialog.

Verify your vertical **Profile Set** if you have multiples in the **Profile.dgn** file, set your **Vertical Alignment:** to the vertical design, **Surface:** to the existing ground surface and select **All** under the station ranges listed in the **Profiles:** area.

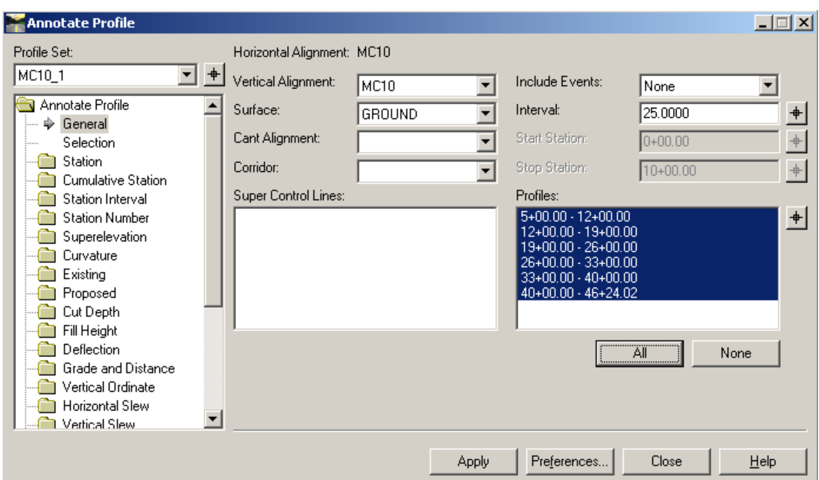


Figure 18-7: Annotate Profile

Click **Apply** and **Close** to exit this dialog.

Part Two: Label Vertical Annotation

From the *InRoads Main Menu* select **Geometry>View Geometry>Vertical Annotation…** (Figure 18-8). Verify your vertical **Profile Set** if you have multiples in the **Profile.dgn** file. You will see a rectangular outline around the profile set to be annotated.

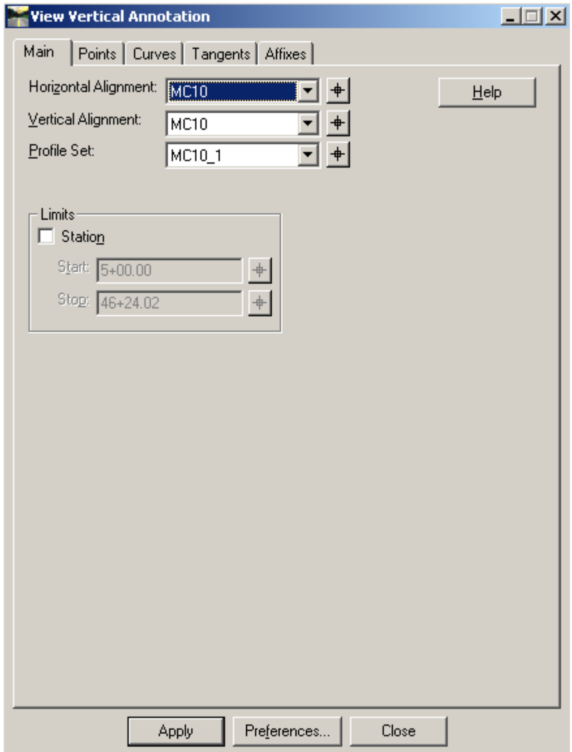


Figure 18-8: View Vertical Annotation

Click **Apply** and **Close** to exit this dialog. There will still be a need to do some clean up through MicroStation tools to fit some of the data into the sheet drawings display area.

CREATING PLAN PAGES ONLY

Step One: Open MicroStation

To begin, double click your **InRoads Suite** icon and select your project from the project pull down. Open any file.

Step Two: Create Plans Only

♫ Before you begin deactivate your **Station Lock** button on the **Locks** toolbar.

From the *InRoads Main Menu* select **Drafting>Plan and Profile Generator…** Select the **Preferences…** button at the bottom and load **Plan Only 25 scale**. This will setup some of the settings automatically.

♫ If you decide to use the **50 scale** option you will need to adjust your **Global Scale Factor** and redisplay your annotation for the alignment and design drawings.

Part One: Plan Controls

Place focus on the **Plan Controls** tab (Figure 18-9). Select the **Model Files…** button to the right and pick your workgroups source drawing file i.e. (HDPlan.dgn, BDPlan.dgn or etc.).

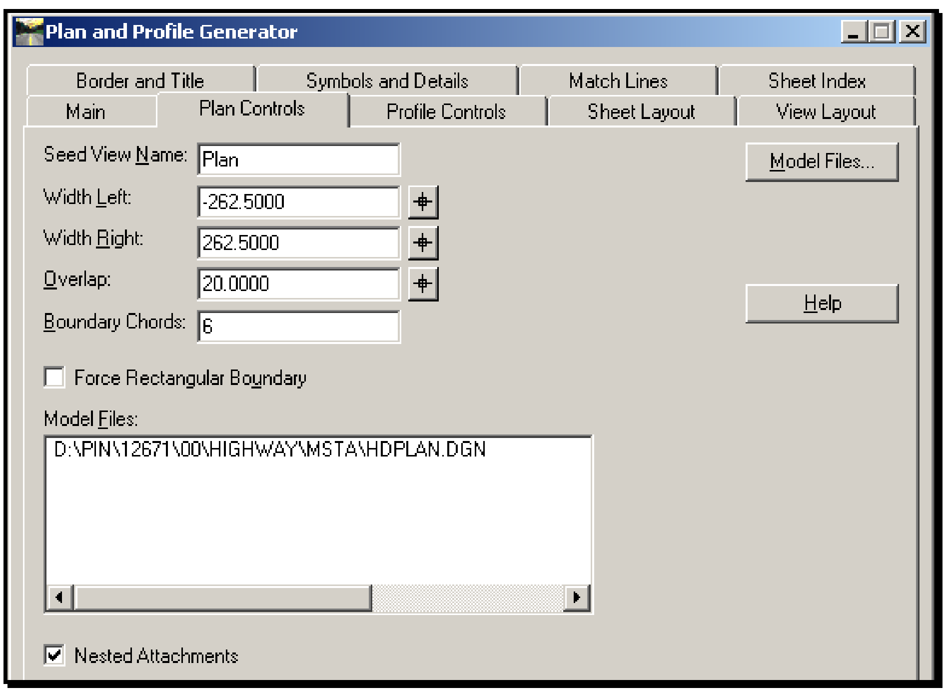


Figure 18-9: Plan and Profile Generator-Plan Controls

♫ Your source drawing file should have the standard files attached to it. At any time you can attach files to the source drawing and have them display within your plan pages.

✓ ***Refer to 2-70 for more information on Reference Attachments.***

Part Two: Sheet Layout

Place focus on the **Sheet Layout** tab (Figure 18-10). Press the **...** button right of the **Host File:** location and select the same file as you did for your plan controls i.e. (HDPlan.dgn, BDPlan.dgn or etc.).

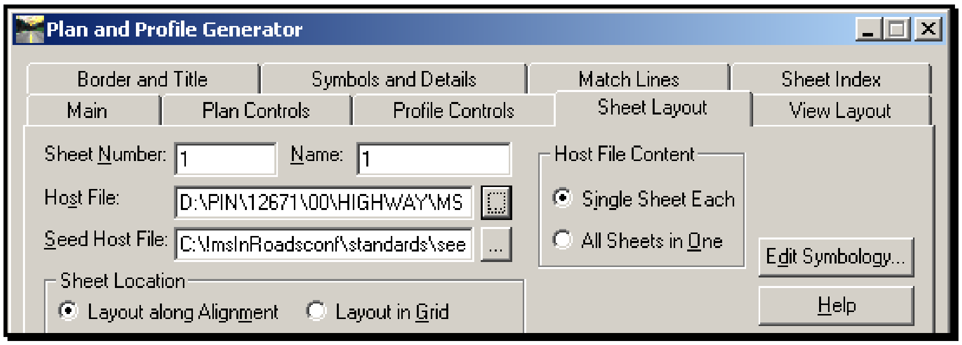


Figure 18-10: Plan and Profile Generator-Sheet Layout

Part Three: Sheeting Drawings

Click **Apply** at the bottom of the **Plan and Profile Generator** dialog to begin the sheet creation process. When the sheet creation process finalizes you will be left in the last sheet created.

Part Four: View the Results

Select **File>Open** from MicroStation's main menu and view the sheets (i.e. ??plan1.dgn).

If you are satisfied with the sheet layout, then consider running the *Sheet Renumbering Utility* to place the 3 digit prefixed in front of the file names. Without the 3 digit prefix, the *Border Information* macro can't be run to fill in the border information on each sheet.

- ✓ ***For detailed instructions on using the Sheet Renumbering Utility, please refer to 1-22.***
- ✓ ***For detailed instructions on using the Border Information macro, please refer to 1-27.***

If you are not satisfied with the sheet layout, re-open the *Plan and Profile Generator*, select the *Sheet Index* tab and open the saved VDF file. Adjust the *Plan View* and *Profile View* stations or overlaps on the *Main* tab.

- ✓ ***If you need to adjust any of the plan pages for layout you will need to reopen the Plan and Profile Generator dialog and adjust per Bentley InRoads help.***

CREATING PROFILE PAGES ONLY

Step One: Open MicroStation

To begin, double click your **InRoads Suite** icon and select your project from the project pull down. Open your **Profile.dgn** file.

- If you do not have a **Profile.dgn** file then open another file and use the **Makesheetz** program from the *Main Menu* to create the drawing file.

Step Two: Create Profiles Only

- Before you begin deactivate your **Station Lock** button on the **Locks** toolbar.

From the *InRoads Main Menu* select **Drafting>Plan and Profile Generator….** Select the **Preferences…** button at the bottom of the dialog and load **Profile Only 25 scale**. This will setup some of the settings automatically.

- If you decide to use the **50 scale** option you will need to adjust your **Global Scale Factor** before you create your drawings and then select **Profile Only 50 scale**.

Part One: Main

In the **Main** tab select your alignment in the **Horizontal Alignment:** area and manage the start and stop limits of your project in the **Station Limits** area of the dialog box (Figure 18-11).

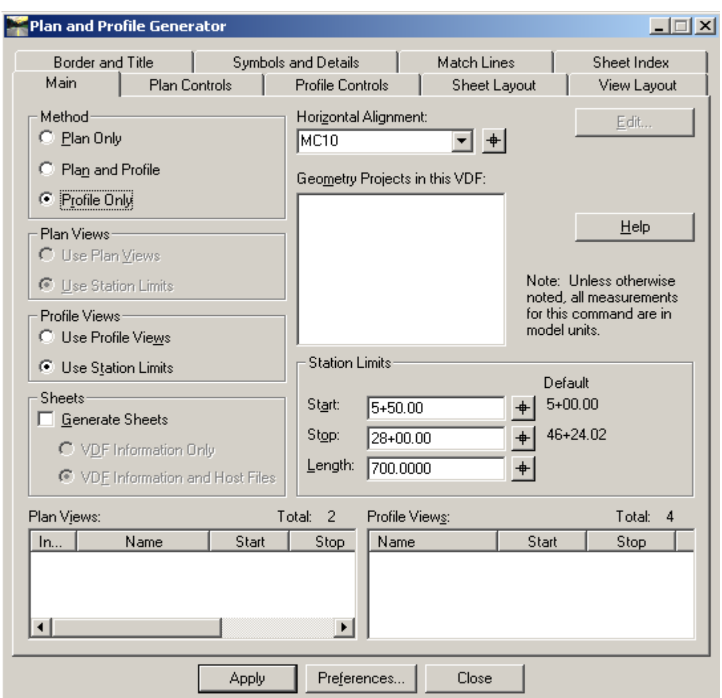


Figure 18-11: Main tab

Part Two: Profile Controls

Place focus on the **Profile Controls** tab (Figure 18-12). Select your **Vertical Alignment:** from the pull down and pick the existing and proposed surfaces for display.

ⓘ ***Remember to also highlight the Surface names (using the Ctrl key) along with placing the X next to the surface names (i.e. Ground and Design). If this isn't done you will get undesirable results in the way your grid will display with your profiles.***

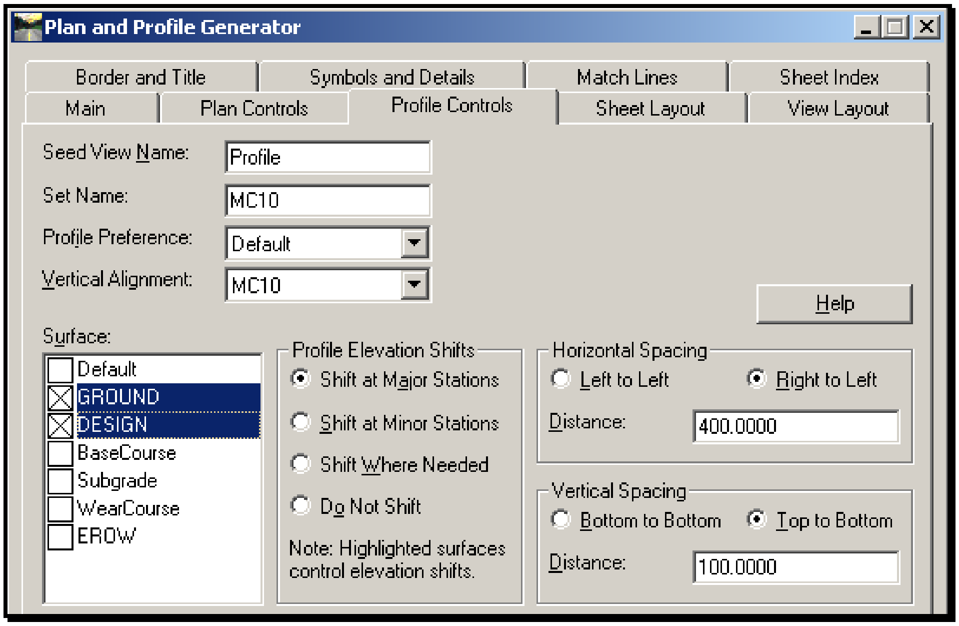


Figure 18-12: Plan and Profile Generator-Profile Controls

Click **Apply** and identify a location within your MicroStation **Profile.dgn** file. Fit the view to see the profile graphics. Next do an undo from either the **Standard** Toolbar or select **Edit>Undo** from the *MicroStation Main Menu*.

♬ The undo is necessary to control the even 100 foot stationing when the project starts with an odd stationing.

Part Three: Main

♬ Before you begin activate your **Station Lock** button on the **Locks** toolbar.

Reselect the **Main** tab within the **Plan and Profile Generator** dialog (Figure 18-13). Set the **Profile Views** to **Use Profile Views** and turn on the **Generate Sheets** in the **Sheets** option.

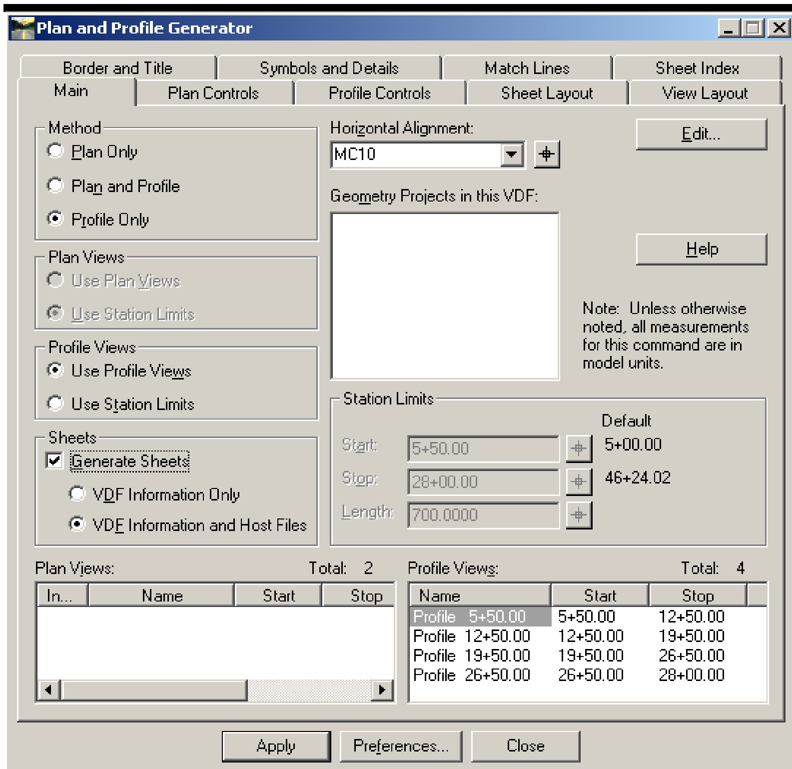


Figure 18-13: Main tab Profile Controls

Part Four: Sheet Layout

Place focus on the **Sheet Layout** tab (Figure 18-14). Press the **...** button right of the **Host File:** location and select **Profile.dgn** from the active directory.

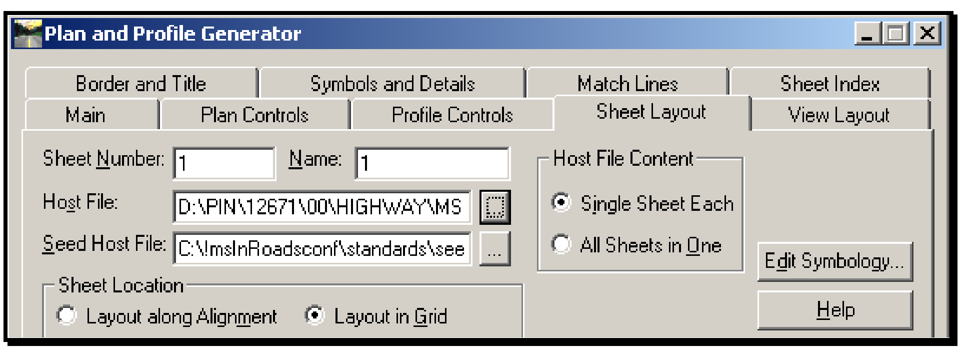


Figure 18-14: Plan and Profile Generator-Sheet Layout

Click **Apply** at the bottom of the **Plan and Profile Generator** dialog. Click **Close** and save your **VDF** file for future use.

Part Five: View the Results

Select **File>Open** from MicroStation's main menu and view the sheets (i.e. Profile1.dgn).

If you are satisfied with the sheet layout, then consider running the *Sheet Renumbering*

Utility to place the 3 digit prefixed in front of the file names. Without the 3 digit prefix, the *Border Information* macro can't be run to fill in the border information on each sheet.

- ✓ ***For detailed instructions on using the Sheet Renumbering Utility, please refer to 1-22.***
- ✓ ***For detailed instructions on using the Border Information macro, please refer to 1-27.***

If you are not satisfied with the sheet layout, re-open the *Plan and Profile Generator*, select the *Sheet Index* tab and open the saved VDF file. Adjust the *Profile View* stations or overlaps on the *Main* tab.

- ✓ ***If you need to adjust any of the profile pages for layout refer to Bentley InRoads help for sheet adjustments.***

Step Three: Annotating Profiles

Reopen the **Profile.dgn** file that was created earlier. Fit view.

Part One: Label Proposed Elevations

From the *InRoads Main Menu* select **Evaluation>Profile>Annotate Profile…** (Figure 18-15). By default we are preset to label the elevations of the proposed vertical design. If you want to label the existing ground elevations also then select the **Preferences…** button and activate the **Proposed and Existing Elevation** option and close the dialog.

Verify your vertical **Profile Set** if you have multiples in the **Profile.dgn** file, set your **Vertical Alignment:** to the vertical design, **Surface:** to the existing ground surface and select **All** under the station ranges listed in the **Profiles:** area.

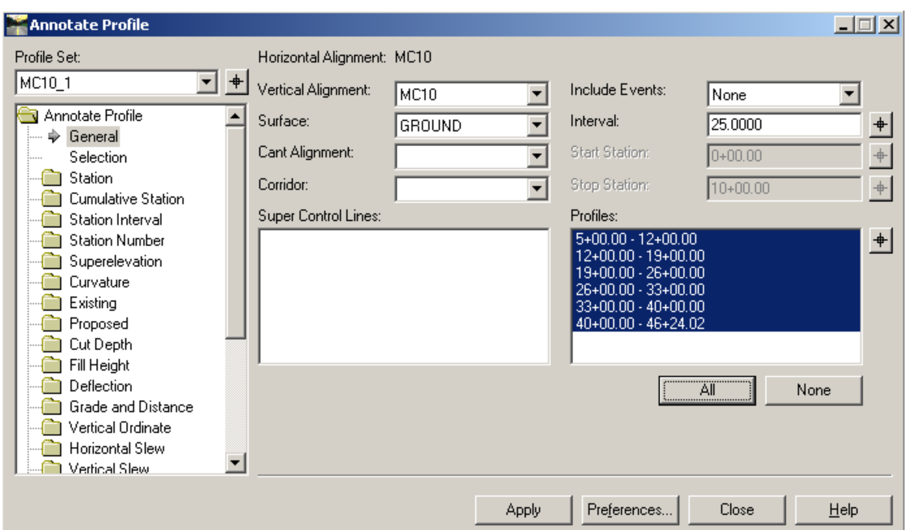


Figure 18-15: Annotate Profile

Click **Apply** and **Close** to exit this dialog.

Part Two: Label Vertical Annotation

From the *InRoads Main Menu* select **Geometry>View Geometry>Vertical Annotation…** (Figure 18-16). Select the **Preferences…** button at the bottom and load **Profile Only**.

Verify your vertical **Profile Set** if you have multiples in the **Profile.dgn** file. You will see a rectangular outline around the profile set to be annotated.

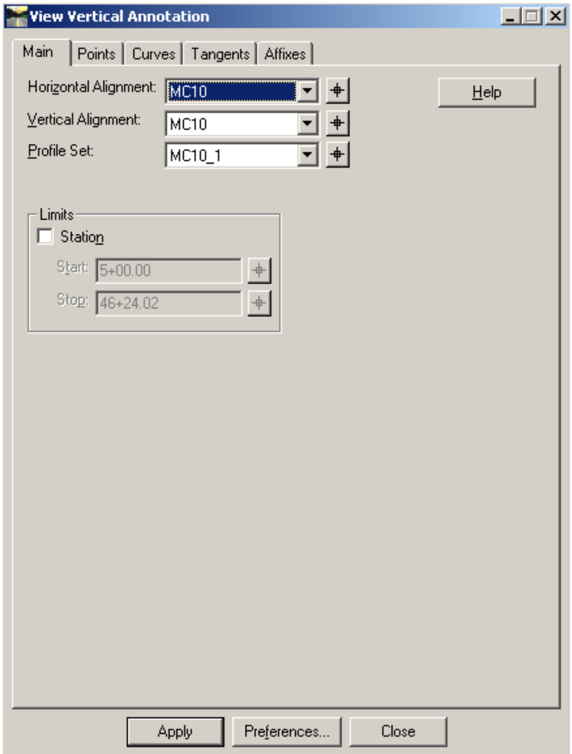


Figure 18-16: View Vertical Annotation

Click **Apply** and **Close** to exit this dialog. There will still be a need to do some clean up through MicroStation tools to fit some of the data into the sheet drawings display area.

Chapter 19 Geometric Sheet Development

Requires further development.

Chapter 20 InRoads Cross Section Development

OVERVIEW

Prerequisites:

- Ground.dtm file loaded in InRoads from Survey MSTA folder.
- A horizontal and vertical alignment developed in InRoads.
- A template design passed through your alignment.

Global Scale Factor

By default when you enter InRoads the **Global Scale Factors** are preset for plan scales at 25 feet to the inch (i.e. 300 absolute scale) in the **mdot_US.xin** file. You can verify what your scales are set to by selecting from the *InRoads Main Menu* **Tools>Options** and select the **Factors** tab. You can also check **Global Scale Factors** if you add the separate dialog through **Tools>Applications Add-ins…** and select **Global Scale Factors Add-In**. This will give you the option to pick **Tools>Global Scale Factors…** and launch an independent dialog.

The **Scale Factors** adjust sizing of your Text, Cell and Line Style placement within your Cross Section drawing set. MaineDOT has two standard scale sizes for Cross Section drawings those scales are 5 feet to the inch (60 absolute scale) and 10 feet to the inch (120 absolute scale).

Locks Toolbar

Feature Filter Lock

Filter locks will aid in displaying what is necessary for the Cross Section presentation. From the *InRoads Main Menu* select **Tools>Customize…** and launch the **Locks** tool bar from the **Toolbar** tab (if it is not already docked within your InRoads platform). Turn the **Feature Filter Lock** on (button next to the pull down will be depressed when on) and select **CROSS SECTION ANNOTATION** from the pull down (Figure 20-1) when you are ready to display annotation within your Cross Section drawing set.

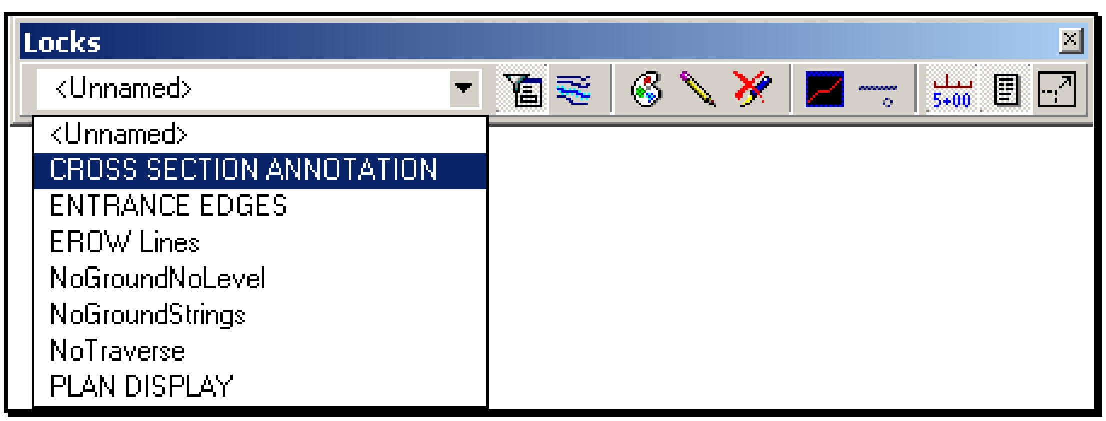


Figure 20-1: Feature Filter lock with various predefined filters.

Station Lock

The Station lock, which is the next to last lock located in the **Locks** toolbar plays an important roll in cutting your cross sections at the even interval specified. The lock should be enabled during Cross Section creation.

Event Stations

Horizontal event stations can be created by the designer for additional sections at critical stations. These sections will be perpendicular to the alignment and will display with either method of developing cross section drawings.

Select from the *InRoads main menu* **Geometry>Horizontal Curve Set>Events…** (Figure 20-2).

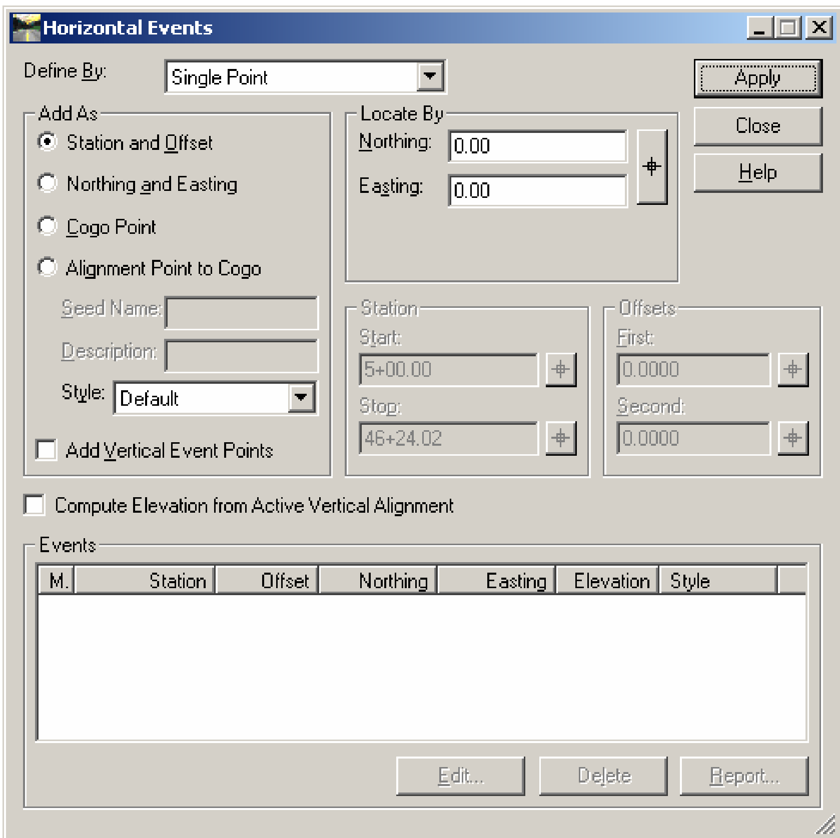


Figure 20-2: Horizontal Events

Set the **Define By:** to **Single Station**, the **Add As** to **Northing and Easting**, toggle on both **Add Vertical Event Points** and **Compute Elevation from Active Vertical Alignment** (Figure 20-3).

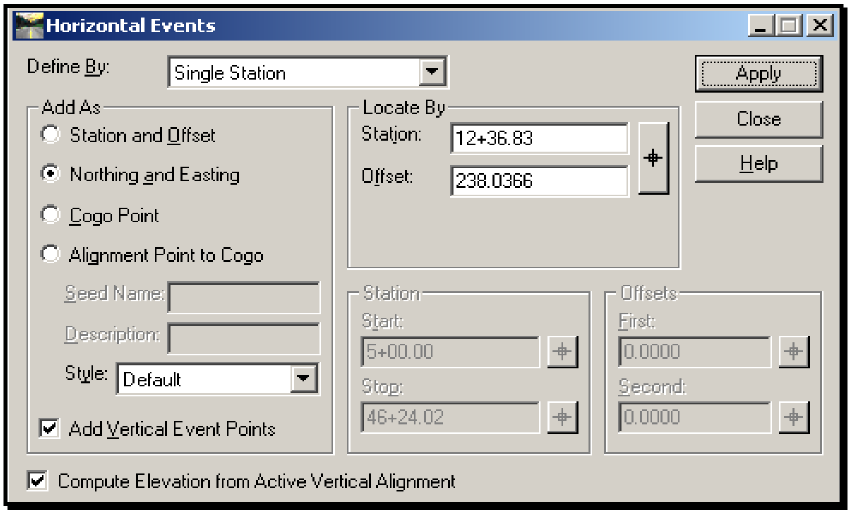


Figure 20-3: Horizontal Events – Settings

Using the target selector in the **Locate By** area of the dialog start selecting areas graphically along the alignment each time selecting **Apply** to populate the bottom portion of the dialog (Figure 20-4).

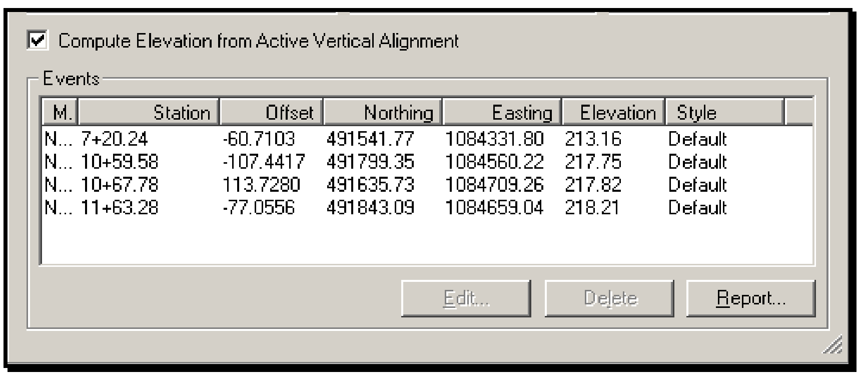


Figure 20-4: Horizontal Events - Events

If there are event stations that are no longer valid to the project than highlight one or more and select the **Delete** button and click **Yes** when prompted. Also existing event stations can edited by highlighting one and selecting **Edit…** to change relative information of that point (Figure 20-5). Remember to click **Apply** as data is changed.

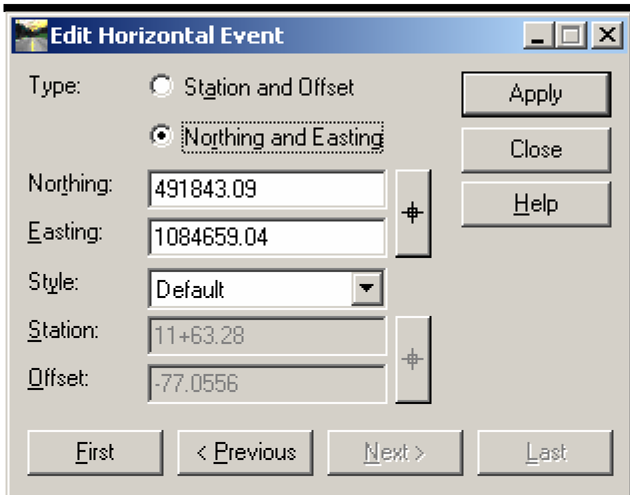


Figure 20-5: Edit Horizontal Event

When done **Close** the dialogs.

CREATING YOUR PRELIMINARY CROSS SECTION DRAWINGS

CREATE CROSS SECTION DRAWINGS

Overview

This is a constant interval set of cross sections for preliminary analysis. These could be stored in your current working **dgn** file or in the **Xsect.dgn** as explained below. Most projects will require special skewed stations which require using the **Custom** portion of the **Create Cross Section** dialog as explained further into this document.

Step One: Open InRoads Suite

To begin, double click your **InRoads Suite** icon. By default the user is set to **InRoads_Network**, if you are working in a local pin setup then you will want to change the user to **InRoads_Local**. Select your project from the project pull down and open your workgroups **??plan.dgn** (i.e. HDPlan.dgn or BDPlan.dgn.). Pick your projects ***.rwk** or load the necessary InRoads files for you project.

Step Two: Create Cross Section Drawing File

Select **File**>**Makesheetz** from the *MicroStation Main Menu.* Select the **no prefix** option and press **OK,** select **Xsect** and press **OK**, press **OK** again in the next dialog and the program will create your **Xsect.dgn** file in the active directory and opens it for you. Click **Cancel** to exit the program.

✓ ***Refer to page 1-18 for help making drawing files.***

Step Three: Create Cross Sections

Select **Evaluation**>**Cross Section**>**Create Cross Section…** from the *InRoads Main Menu* (Figure 20-6).

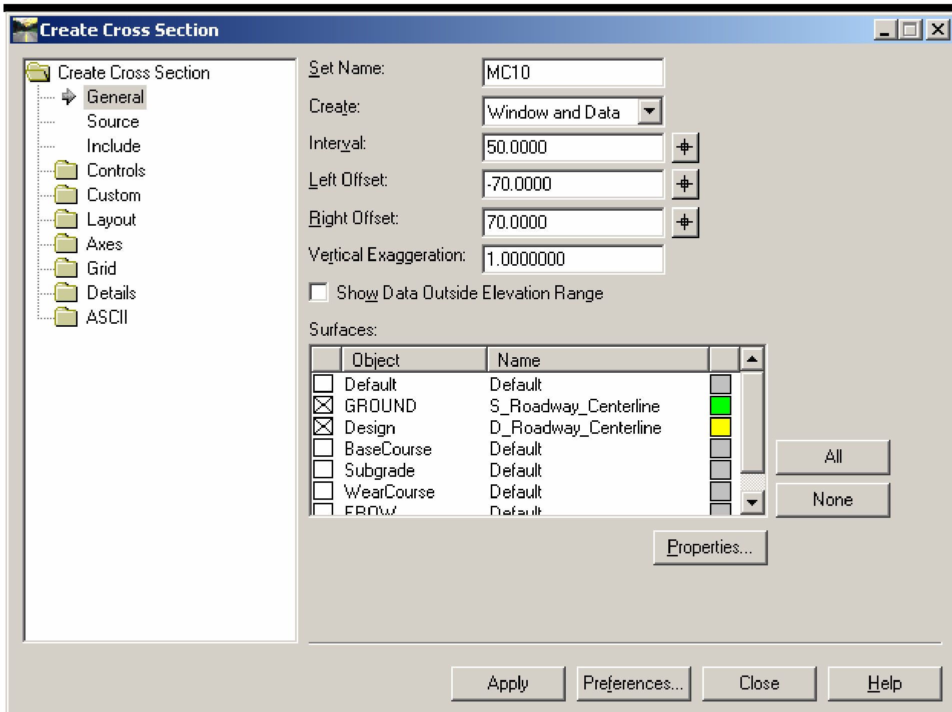


Figure 20-6: Create Cross Section

The default setting for cross section creation is setup for horizontal borders at 5 feet to the inch scale. There are other setups ready for you under the **Preferences…** button of the dialog (Figure 20-7).

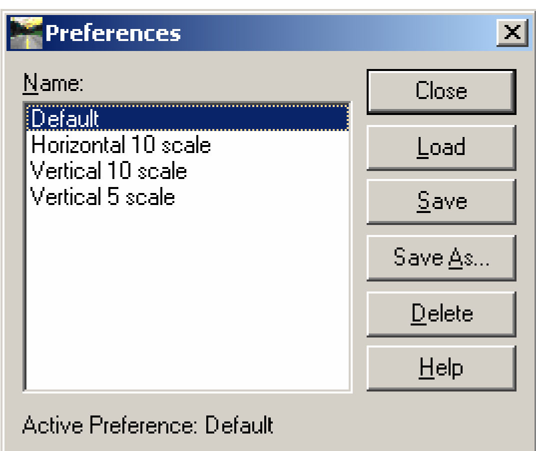


Figure 20-7: Preferences

Select the preference by highlighting it and picking **Load** to the right of the dialog and **Close**.

Step Four: Global Scale Factor

Depending on what you choose to display the cross sections at you will need to set the **Global Scale Factor** before beginning. Select **Tools>Global Scale Factors…** from the *InRoads Main Menu* (Figure 20-8). If you choose to do 5 feet to the inch then set the scales as shown below or set the **Text:** and **Line Style:** scale to **120** for 10 feet to the inch. The **Cell** scale will stay set to **1** for either scale.

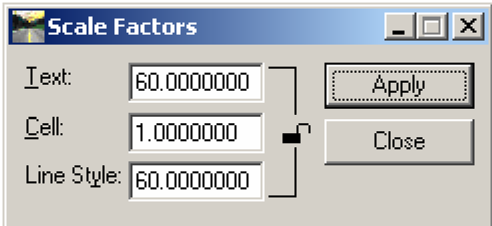


Figure 20-8: Scale Factors

Click **Apply** and **Close** the Scale Factors dialog.

Step Five: Create Cross Section

There are a lot of settings predefined for you in the **Create Cross Section** dialog. There are some items that need to be set before displaying them. To the left of the dialog is an explorer tree of settings. We will discuss the bare minimum to cut sections at 50 foot intervals.

✓ ***For more information on this dialog refer to InRoads help.***

Part One: General

In the **General** area items have been preset for 50 foot intervals. You could choose to change the **Interval:** to 25 feet here. The only other thing is to select what **Surfaces:** you will want to display.

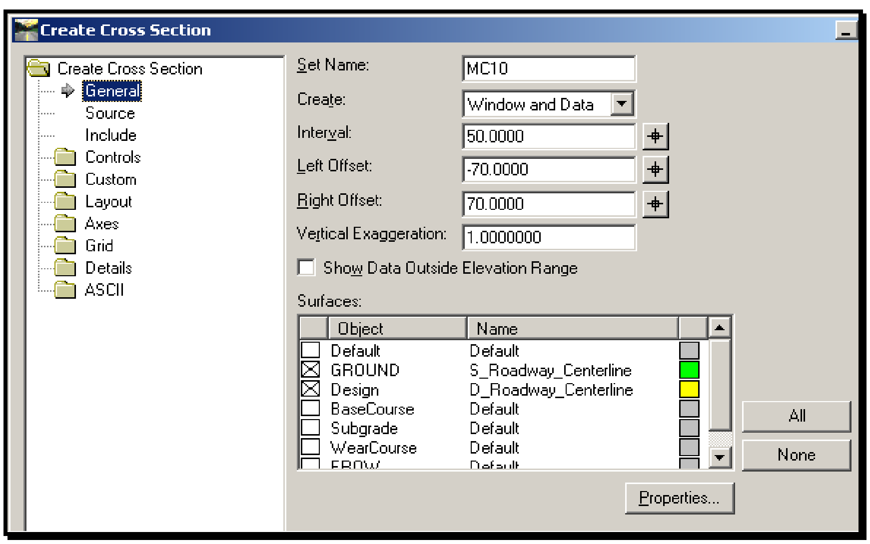


Figure 20-9: Create Cross Section General

The figure above shows that we have **Ground** and **Design** selected for display in sections with an **X** indicating them being selected. If under the **Name** portion the symbology is set to **Default** then you will need to change this by selecting **Properties…** (Figure 20-10).

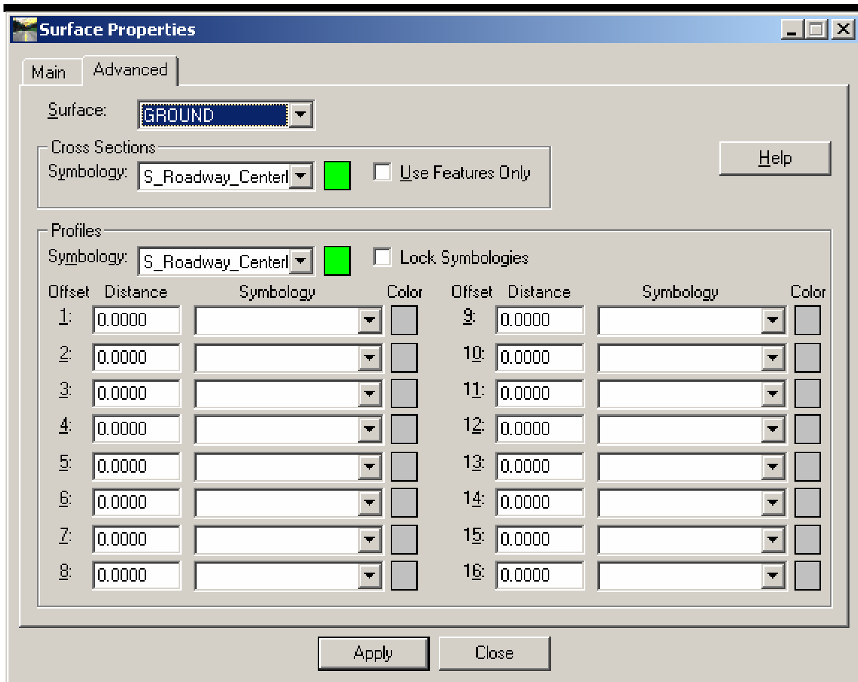


Figure 20-10: Surface Properties

In the **Advanced** tab select the **Ground** surface and set the **Cross Sections** and **Profiles Symbology** to **S_Roadway_Centerline** and click **Apply**. Select your **Design** surface and set the **Cross Sections** and **Profiles Symbology** to **D_Roadway_Centerline** and click **Apply**. **Close** the dialog.

Part Two: Add Existing Right of Way

In order to display the Existing Right of Way in your cross sections, you will have had to create a EROW surface. Include this surface to display it on your cross sections.

✓ ***Refer to page 16-11 for instructions on creating an Existing Right of Way surface.***

Part Three: Source

The Source selection will be set to **Alignment**. By default this field will be populated by the active alignment. If this is not the alignment that sections are to be cut to then use the pull down to select your alignment (Figure 20-11).

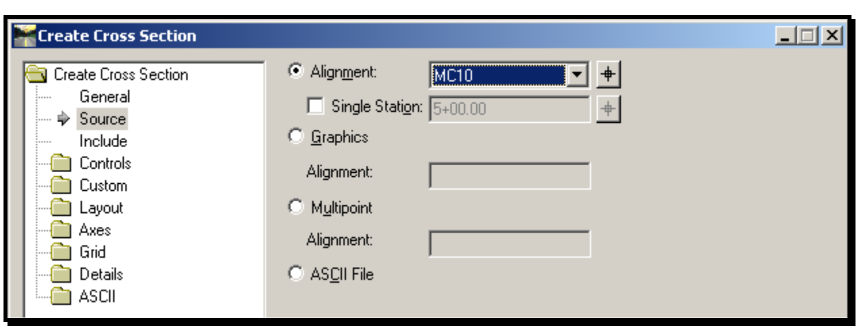


Figure 20-11: Create Cross Section Source

This is the location where you could select **Single Station** to cut a particular section perpendicular to your centerline within a border.

Part Four: Include

In the **Include** section there isn't anything that needs to be at this time. This is where we control how random point features get placed into the cross section drawings.

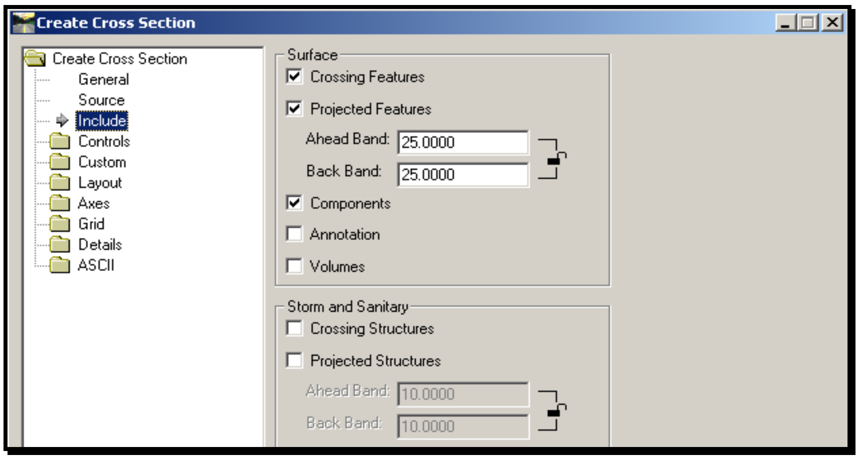


Figure 20-12: Create Cross Section Include

Part Five: Controls - Limits

The controls section by default is setup to cut sections along the whole alignment. In the **Limits** area you could limit the range of sections to display by toggling on **Station** and specifying a start and stop station (Figure 20-13).

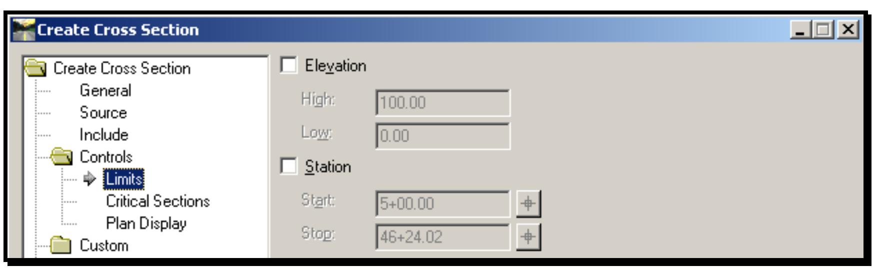


Figure 20-13: Create Cross Section Controls - Limits

Part Six: Controls – Critical Sections

The **Critical Sections** are setup by default to include **Horizontal Event Points** and **Superelevation Event Stations** you could choose to also include other critical sections here (Figure 20-14).

✓ ***For more information on this dialog refer to InRoads help.***

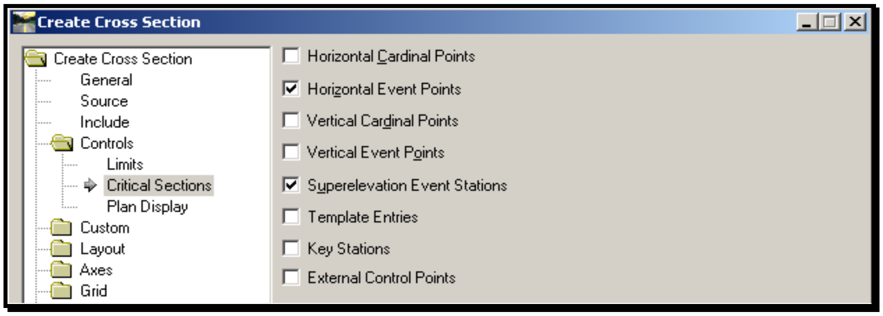


Figure 20-14: Create Cross Section Controls - Critical Sections

Part Seven: Controls – Plan Display

The **Plan Display** section has been predefined to place the cross section drawings at a z elevation of zero. The **Symbology** portion could be toggled on to see the relationship of each section relative to the plan layout (Figure 20-15).

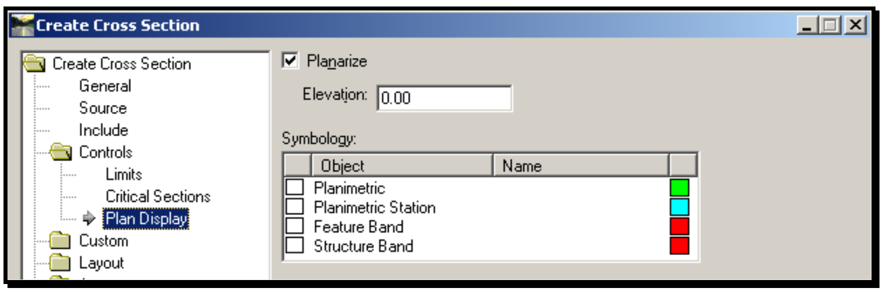


Figure 20-15: Create Cross Section Controls - Plan Display

♬ The rest of the folders in the explorer tree have been predefined and there will be no need for the general user to have to make changes. Further in this document there will be a setup procedure of the Custom folder for cross section displays.

Step Six: Click Apply

Click **Apply** and you will prompted to **Identify Location**. Send a left mouse button (data click) anywhere in the view window of MicroStation.

Step Seven: Clean Up (hold)

All cell placements left of centerline will need to be mirrored to represent proper offset placement within the cross sections. You will wait to do this after you have annotated the existing features in the next step.

CROSS SECTION ANNOTATION

CROSS SECTION ANNOTATION

Step One: Existing Annotation

✓ ***Refer to the Global Scale Factor in the overview to ensure correct annotation scale.***

Select **Evaluation>Cross Section>Annotate Cross Section…** from the *InRoads Main Menu*.

Select the **Preferences** button and load the **EXISTING** preference by double clicking it or highlighting it and selecting **Load** (Figure 20-16).

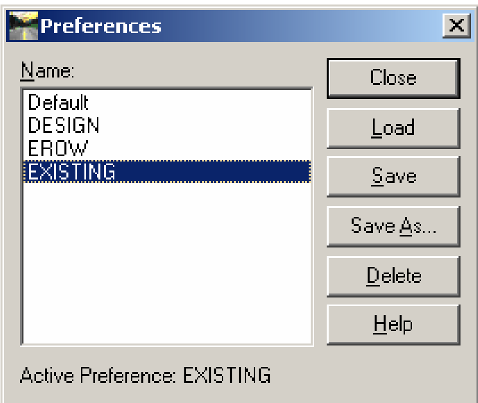


Figure 20-16: Preferences - Annotate Cross Section

Close the dialog.

Set the filter lock to **CROSS SECTION ANNOTATION** (Figure 20-17).

Figure 20-17: Filter Lock Cross Sections

Part One: General

If there are multiple sets of cross sections in the file then verify what **Cross Section Set:** that is intended to be annotated by using the pull down or selecting the cross section set graphically with the target selector (Figure 20-18).

Select your **Ground** surface with an **X**.

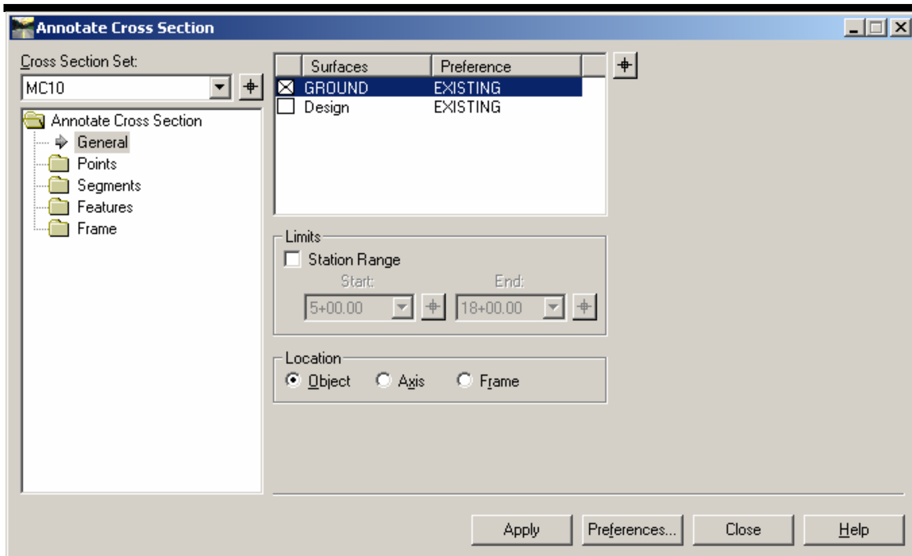


Figure 20-18: Annotate Cross Section - General

Part Two: Features

Select the **Features** folder in the explorer tree and highlight **Annotate** (Figure 20-19). Right click on any Feature in the **Feature:** list area and pick **Select All**.

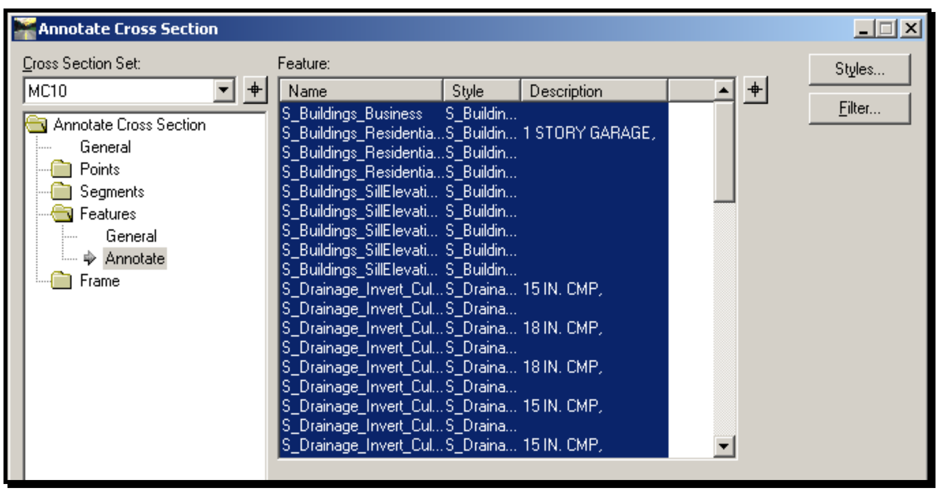


Figure 20-19: Annotate Cross Section – Features

Click **Apply**.

♬ There will be a need to do some clean up of the annotation, removal of commas, changing all the Rt. to Lt. on the left side of the cross section set and any other incidental cleanup for plan presentation.

Step Two: Proposed Annotation

Select the **Preferences** button and load the **DESIGN** preference by double clicking it or highlighting it and selecting **Load** (Figure 20-20).

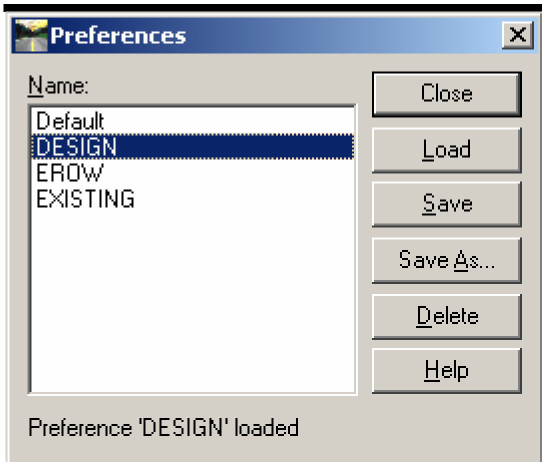


Figure 20-20: Preferences – Design

Part One: General

Select your **Design** surface with an **X**.

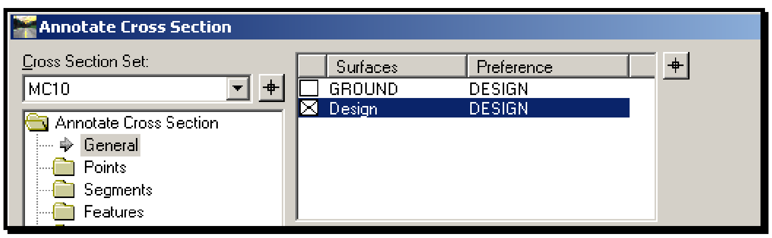


Figure 20-21: Annotate Cross Section - General Design

Part Two: Points

The Points folder has been turned on for the design preference. This folder establishes standards for labeling the centerline station elevation. The general user does not need to change things here.

Part Three: Segments

The Segments folder has been turned on with the design preference. This folder establishes standards for labeling cross slope percents and side slope ratios. The general user does not need to change things here.

Part Four: Features

Select the **Features** folder in the explorer tree and highlight **Annotate**. Right click in the **Feature:** area and **Select All**.

Click **Apply**.

♬ There will be a need to do some clean up of the design annotation for plan presentation.

Step Three: Existing ROW Annotation

Select the **Preferences** button and load the **EROW** preference by double clicking it or highlighting it and selecting **Load** (Figure 20-22).

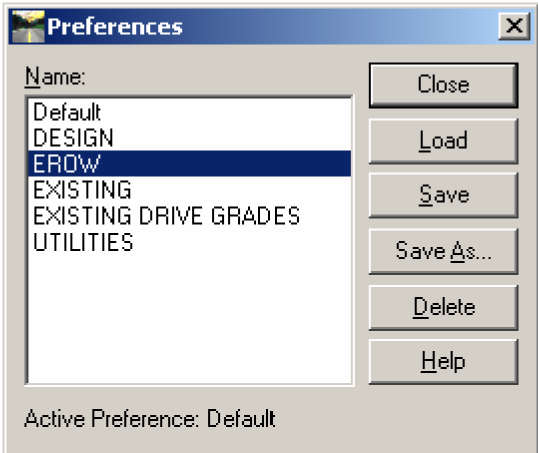
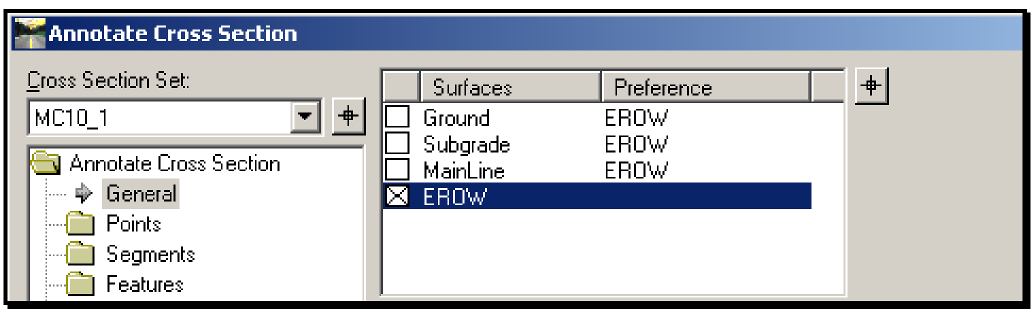


Figure 20-22: Preferences - EROW

Part One: General

Select the **EROW** surface with an X.



Part Two: Features

Expand the **Features** folder and select **Annotate.** Right click on the features in the *Feature* portion of the dialog and **Select All** (Figure 20-23).

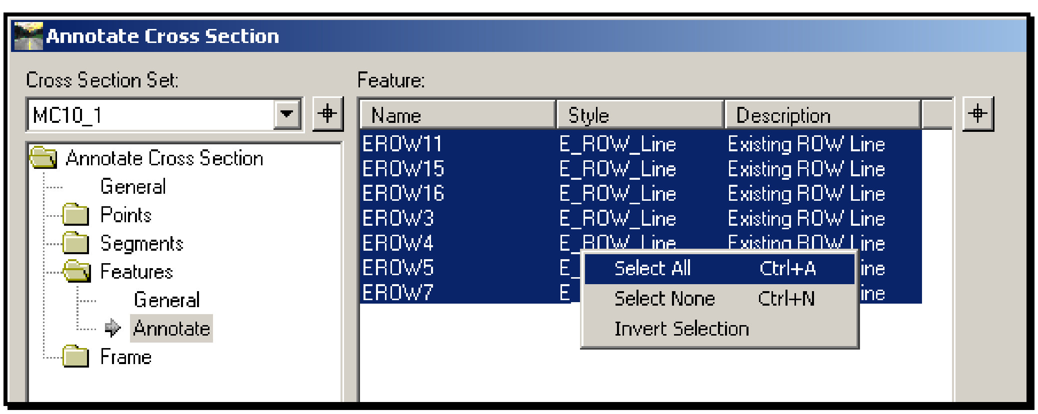


Figure 20-23: Select all of the Features for EROW.

Click **Apply.**

Step Four: Edit Left Side of Cross Sections

All cell placements left of centerline will need to be mirrored to represent proper offset placement within the cross sections and all annotation for existing features will need to be cleaned up to remove the negative value and change the RT. to LT.

Select **InRoads>Edit Left Side Cross Sections** from the *MicroStation Main Menu*. This will launch a **VBA** that will mirror all existing cells placed on the left side of each cross section sheet and will fix the annotation for the left side as well.

♬ If you have run this program before annotating you will have to run it again to fix the text and one more time to readjust the cells.

CREATING YOUR FINAL CROSS SECTION DRAWINGS

OVERVIEW

Custom sections will probably be the way a designer will want to manage the cross section set of drawings. This method allows for multiple ways of controlling what sections are necessary for display throughout the project. **Custom Sections** does look at **Controls>Critical Sections…** in development of the cross section drawings but does not look at the **General** information for standard intervals and offsets but does look at what **Surfaces:** are to be displayed.

- ✓ ***Refer to Step Five: Part One for General settings.***
  - ♬ If you already saved Custom Cross Sections while designing your driveways, select the *Import* button and import your custom sections.

STATION RANGE

Step One: Type

If necessary, re-open the *Create Cross Sections* dialog (**Evaluate>Cross Sections>Create Cross Sections).** There are a few settings that need to be set before clicking the **Add** button. Set the **Type:** to **Station Range**.

Step Two: Details

In the **Details** area of the dialog you can set the **Start** and **Stop Station:** if the project limits are different than the length of alignment developed.

The **Interval:** area will need to be set to desired section cuts (Figure 20-24). In this example we will set it to 50 foot intervals.

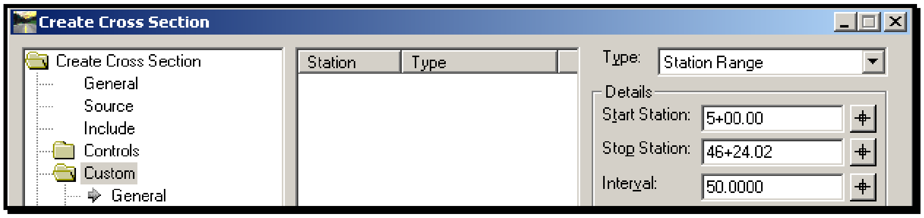


Figure 20-24: Create Cross Section - Custom – General

Depending on what preference was selected will determine the **Left** and **Right Offset:** (Figure 20-25). Refer to **Create Cross Section>General** leaf of this dialog to see what the offsets are and use those values here. Remember to use a negative value for the **Left Offset**.

The **Skew Angle:** will be set at **0 degrees** to maintain perpendicular section cuts along the alignment.

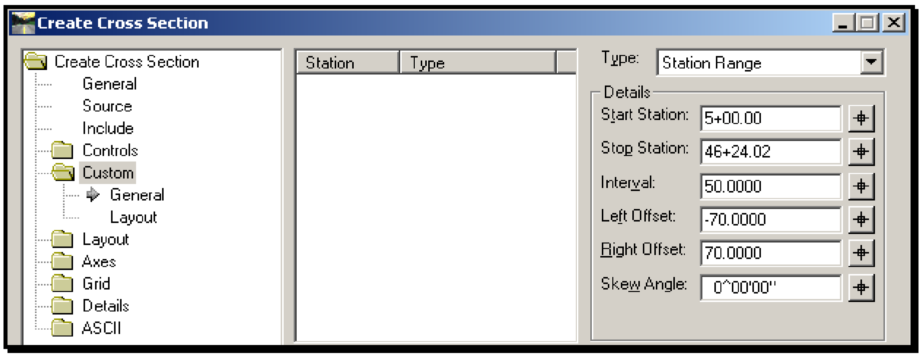


Figure 20-25: Create Cross Section - Custom – Station Range

Step Three: Features

In the **Features** area toggle on both **Crossing** and **Projected** and set the **Ahead Band** and **Back Band** to half the value of the **Interval:** value used. In this case we used 50 foot intervals so we will set these values to **25** (Figure 20-26).

Click the **Add** button to populate the **Station/Type** area.

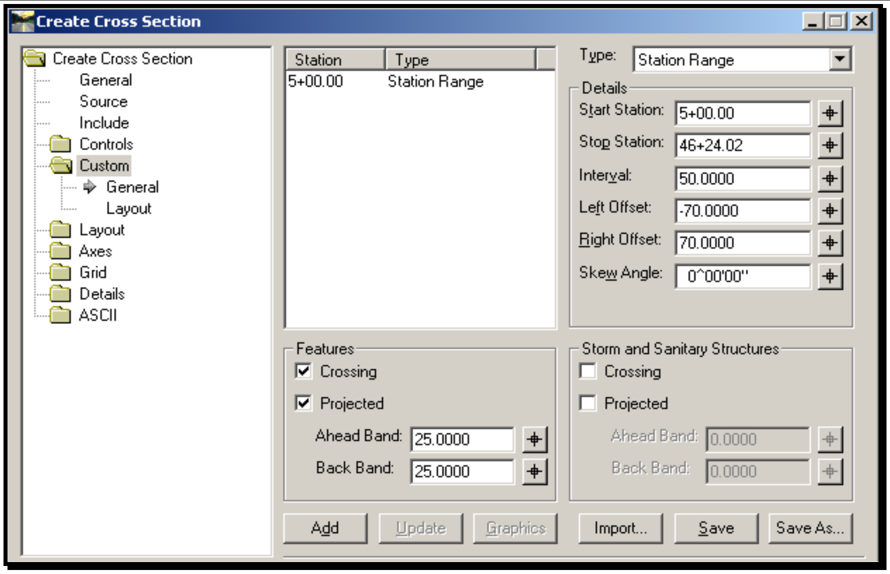


Figure 20-26: Create Cross Section - Custom – Features

- At any time adjustments can be made to the preset values by highlighting the entry in the **Station/Type** area, make the necessary changes and clicking the **Update** button.

PERPENDICULAR

Overview

Horizontal Event stations to cut special sections perpendicular to the alignment takes on the general offsets of the Station Range and does not allow management of the left and right offset values. The Perpendicular option in the custom area allows for manipulation of the left and right offsets.

Step One: Type

Set the **Type:** to **Perpendicular**.

Step Two: Details

Part One: Station

In the **Details** area you can type the station you want or use the picker to graphically select the station within the view window.

Part Two: Left and Right Offset

Depending on what preference was selected will determine the **Left** and **Right Offset:** (Figure 20-27). Refer to **Create Cross Section>General** leaf of this dialog to see what the offsets are and use those values here. Remember to use a negative value for the **Left Offset**.

Part Three: Add

Click the **Add** button to populate the **Station/Type** area.

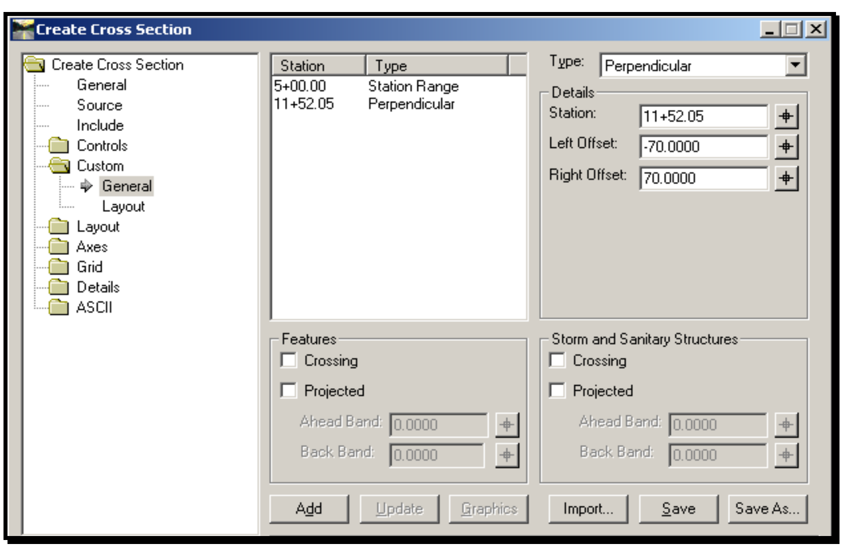


Figure 20-27: Create Cross Section - Custom - Perpendicular

♫ The offsets shown in Figure 20-27 are for a full section matching the standard left and right offsets of the Station Range. If there is a need to have more of a section to the right of centerline the values could be adjusted to reflect the need. For example if the **Right Offset:** needed to be 100 feet then the **Left Offset:** would need to be set to -40 feet giving a total distance of 140 feet.

SKEWED STATIONS

ⓘ ***If you are running InRoads Suite Version 8.8 you will have issues annotating Skewed sections over 60 degrees with design components and will be kicked out of the Bentley package.***

Step One: Type

Set the **Type:** to **Skewed**.

Step Two: Details

Part One: Station

In the **Details** area you can type the station you want or use the picker to graphically select the station within the view window. If there is a feature crossing the alignment then use the *MicroStation* intersect snap to get the exact station.

Part Two: Left and Right Offset

Depending on what preference was selected will determine the **Left** and **Right Offset:**. Refer to **Create Cross Section>General** leaf of this dialog to see what the offsets are and use those values here. Remember to use a negative value for the **Left Offset**.

Part Three: Skew Angle

♫ All skewed stations by default will be skewed back right. If you want a skewed back left section you must place a negative sign in front of the angle measured and InRoads will translate the appropriate angle.

From the *MicroStation Main Menu* load the plan sheet settings manager. Select **Symbols & Linestyles>Junk Lines**.

Place a line along the crossing feature (Figure 20-28) you would want sectioned at a skew (i.e. crossing pipe).

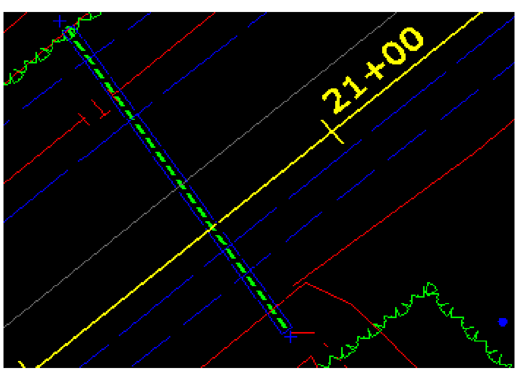


Figure 20-28: Junk Line along Crossing Feature

On Alignment Tangent (Option 1)

Using the SmartLine tool in conjunction with the perpendicular snap place a perpendicular line (Figure 20-29) near the other junk line placed earlier for the crossing feature.

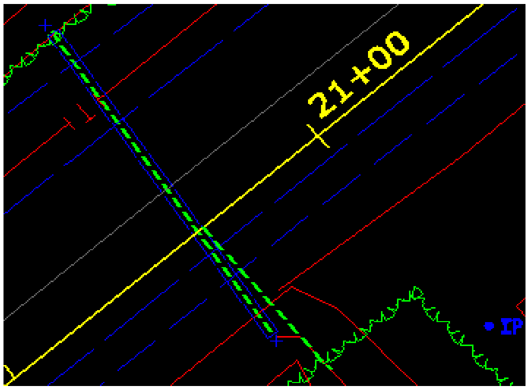


Figure 20-29: Perpendicular Junk Line

From the *MicroStation Main menu* select **Measure>Angle** and follow the prompts in the lower left to measure the angle.

On Alignment Tangent (Option 2):

Using the *MicroStation* SmartLine tool place a perpendicular line starting from the intersection of the structure and centerline out to a random point.

♬ Hint: with AccuDraw having focus use the "**I**" for intersection, "**O**" to set AccuDraws origin, "**RQ**" to rotate AccuDraws compass, "**N**" for a nearest point on alignment and "**Enter**" to lock the compass. Place the line.

✓ ***For more on using AccuDraw refer to page 2-42.***

Highlight the resulting angle (Figure 20-30) to **Copy** and **Paste** it into the **Skew Angle:** area of the **Create Cross Section** dialog.

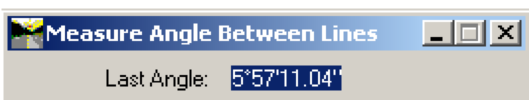


Figure 20-30: Measure Angle between Lines

On a Radius:

Using the **Junk Line** option from the settings manager place a line from the intersection of the alignment and crossing feature to the center of the arc.

♬ Hint: with AccuDraw having focus use the "**I**" for intersection and the "**C**" for center and tentative snap to the arc and accept.

Highlight the resulting angle (Figure 20-30) to **Copy** and **Paste** it into the **Skew Angle:** area of the **Create Cross Section** dialog.

Click the **Add** button to populate the **Station/Type** area.

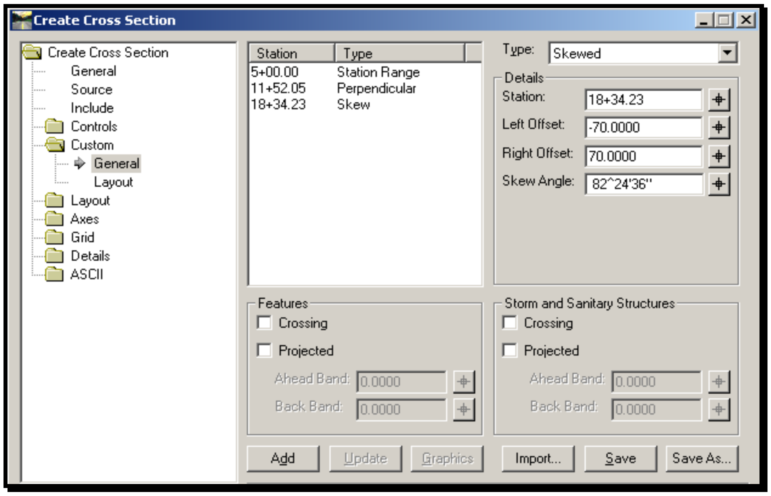


Figure 20-31: Create Cross Section – Custom – Skewed

LINE STRING STATIONS

ⓘ ***If you are running InRoads Suite Version 8.8 you will have issues annotating Line string sections with design components that have a relative skew to the alignment of more than 60 degrees, you will be kicked out of the Bentley package.***

Overview:

A line string is an element that has a start and end point and also has one or more vertices within it. You could use a straight line with this option and InRoads will consider it a skewed section and place it in the dialog as this. One use for Line string sections would be for the centerline driveway alignments.

Step One: Type

Set the **Type:** to **Linestring**.

Step Two: Station/Type

Using the PowerSelector pick the line strings (Figure 20-32) drawn perpendicular from centerline out to the apron and through the driveway.

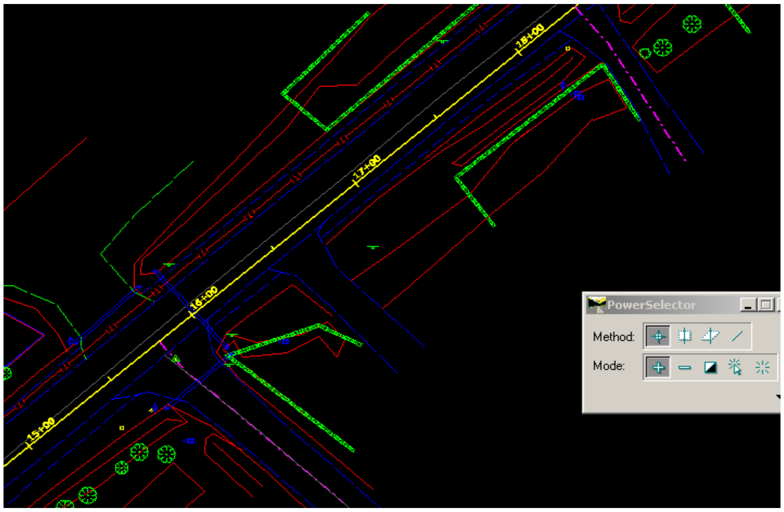


Figure 20-32: Driveway Centerline Line Strings

Having a selection set picked within MicroStation will activate the **Graphics** button in the **Custom** folder of the **Create Cross Section** dialog box. Select the **Graphics** button (Figure 20-33) to populate the **Station/Type** area of the dialog.

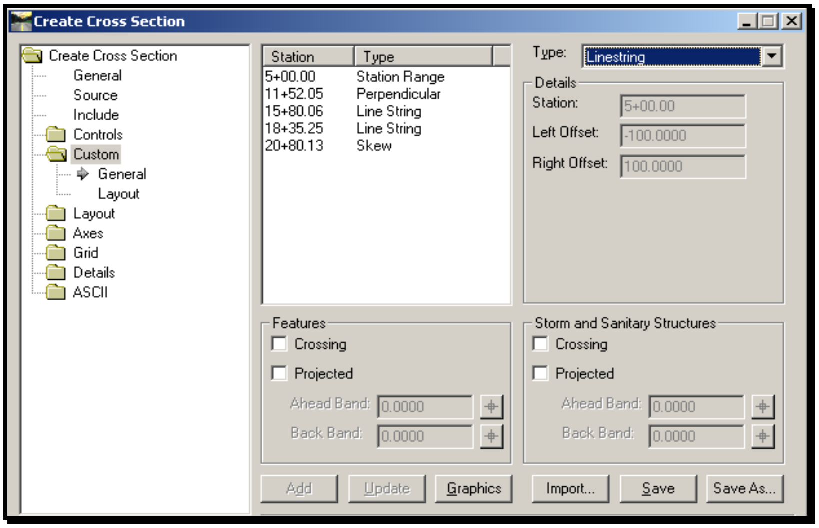


Figure 20-33: Create Cross Section – Custom – Line String

If you highlight one of the line strings within the **Station/Type** area of the dialog (Figure 20-34) you will be able to see the details relative to centerline to the right.

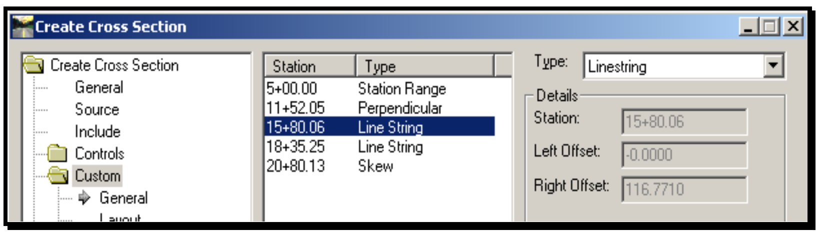


Figure 20-34: Line String Details

If the overall measurement of the **Left** and **Right Offset** values exceed that of the **Station Range** offset value total then you should shorten the overall length of the line string (i.e. 140 foot maximum length for 5 foot horizontal sheets).

♬ If you need to remove a station in the list simply highlight the station and press the **Delete** key on your keyboard.

When done setting up your Custom Sections click on the **Save** button and name the *.xsc for future retrieval.

Step Three: Annotation

♬ Refer back to Annotation portion of this chapter to apply annotation and running the **VBA** application to fix the left sides of your cross section set.

CREATING SINGLE CROSS SECTION FILES

Overview:

By default InRoads places all cross sections within the same file. For efficiency purposes to utilize resources within your team we have created a method to build individual files of each cross section drawing page. These are a copy of the originals and are not linked to the master file.

Creating Single Cross Section Files

Select **InRoads>Create Single Sheet Cross Sections** from the *MicroStation Main Menu*. This will launch a **VBA** that will prompt you for a Starting Page Number (Figure 20-35).

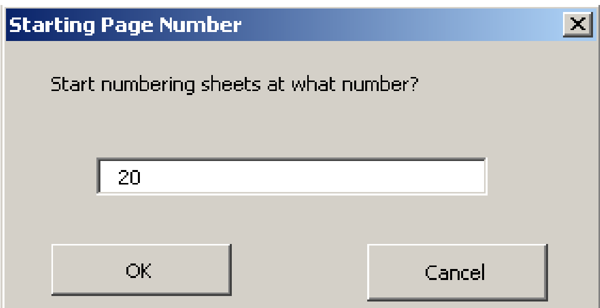


Figure 20-35: Starting Page Number

Determine what number you would like to start with and press **OK**.

The program will loop through all sections placed in the master file based on the priority they were placed in the file and create fence file drawings with a prefix number, a root name of **XSECT**, the first identifiable section on each sheet and an incremental suffix for total number of cross section sheets. For example the file name would look like this: **020_XSECT_5+00_001.dgn**.

You can now process the border information onto each of the drawings through our normal process once these drawings are created. This will turn off the appropriate levels based on what workgroup you belong to, it will fit the view and a Save Settings will be done as it loops through the files.

✓ ***For more on Border Information please refer to page 1-27.***

END AREA VOLUMES

DISPLAY VOLUMES ON SECTIONS

Overview

The *End Area Volumes* are based on the closed components of the *Templates.* If these *Components* are manipulated in the Cross Sections, their end area volume will adjust accordingly. The *Components* have been named appropriately so that like items will be quantified together and eventually quantified with the InRoads *Quantity Manager*.

Some volumes may need manual adjustments to better represent the item estimated. For example, pavement or base pavement layers may consist of multiple items that need to be broken out separately.

For more accurate volumes, it may be necessary to add additional cross sections at certain stations in order to capture the best representation of the surface and sub-surface conditions (i.e. Guardrail widening areas).

Step One: Basic End Area Volumes

Select **Evaluation>Volumes>End-Area Volume…** from the InRoads main menu (Figure 20-36).

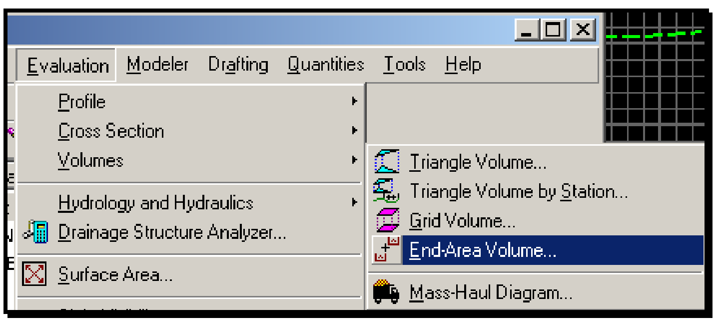


Figure 20-36: End Area Volume menu.

Step Two: Setup the Dialog's General Tab

Verify that the active *Cross Section Set* is set to your Cross Sections your want to create volumes from and your **Ground** and **Design** surfaces are selected. Place a check mark in the *Create XML Report* check box. If the project has a lot of curves in it, place a dot in the *Correct for Curvature* radio button (Figure 20-37).

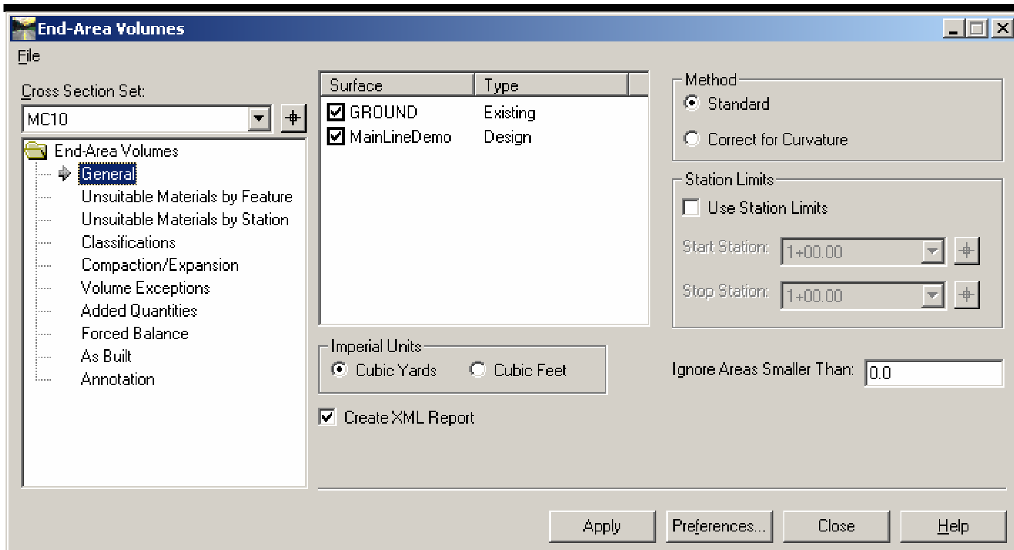


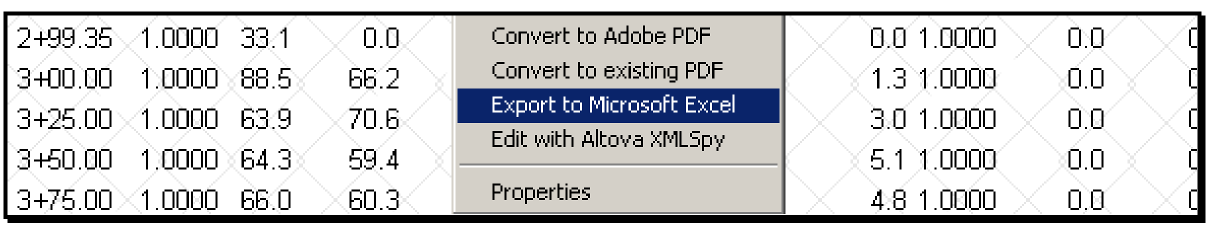
Figure 20-37: End-Area Volumes General tab dialog.

Step Three: Click Apply

Verify that the *Global Scale Factors* are set correctly for Cross Section display (**Tools>Global Scale Factors = 60, 1 and 60).** The remainder of the settings have been set for you. This is assuming that you want text placed on cross sections of Cut and Fill Quantities. Click **Apply** and then **Close.**

View End Area Volume Report

Select which *End Area Volume* style sheet you would like to use (i.e. EndAreaVolumePageTotals.xsl). An option would be to right click on the report and select **Export to Microsoft Excel** and include only the columns you want to display for your estimate.



Other Volumes

Switch the *Style Sheet* to **Volumes.xsl** to view the volumes of all the other closed components. They are listed by their *Styles.* If areas are required for the item you want to estimate, export the report to Excel and manipulate the report in the spreadsheet to the desired output.

Other Adjustments

There are many other adjustments that can be made and quantities calculated. Please refer to InRoads **Help** for a dialog that you want help with.

- **Unsuitable Materials (by Feature or Station) –** This could be used to determine Muck Excavation, Loam Salvage, Pavement Salvage and Waste Storage Areas.
- **Classifications –** This can be used to identify other surfaces such as Rock or Structural Rock Excavation.
- **Compaction/Expansion –** This can be used to add the factors for Cut (1.15) and Fill (0.85) but normally this is calculated within the *Summary of Excavation and Borrow.*
- **Volume Exceptions –** Allows you to deduct a station range from the *End Area Volumes* to be calculated manually.
- **Added Quantities –** Allows you to add additional cut or fill using a station range.
- **Forced Balance** – Allows you to reset the cut or fill values to zero at a specific station.
- **As Built –** Requires that you have an As Built surface to include.
- **Annotation –** This is where you set up what you want annotated as well as add color to the cut and fill shapes.

Volumes for Driveways

In order to get better volumes for driveways, consider creating a cross section set that has a section at the start and stop for every drive. This way the averaging may give more accurate results.

Chapter 21 InRoads XML Reports

ELEVATION DIFFERENCE REPORTS

OVERVIEW

Design Prerequisites:

- Existing Survey – Ground.dtm
- Horizontal and Vertical Alignment

Station Lock

The station lock on the **Locks** toolbar is very important when establishing even stationing on reports. For example if the lock is not on and you report every 25 feet and have an odd start station then it will increment 25 feet from that station giving you odd stationing throughout the report.

CREATE ELEVATION DIFFERENCE REPORT

Step One: Open InRoads Suite

To begin, double click your **InRoads Suite** icon. By default the user is set to **InRoads_Network**, if you are working in a local pin setup then you will want to change the user to **InRoads_Local**. Select your project from the project pull down and open your workgroups **??plan.dgn** (i.e. HDPlan.dgn or BDPlan.dgn.).

Step Two: Load Your Project

Load your project by opening the saved **RWK** file or open the surfaces and geometry project that have been saved.

✓ ***Refer to page 13-25 for more information on managing your RWK.***

Step Three: Settings for Elevation Difference Report

From the *InRoads Main Menu* select **Tools>XML Reports>Station Base**.

Part One: General Settings

Select **General** on the left side of the dialog box (Figure 21-1).

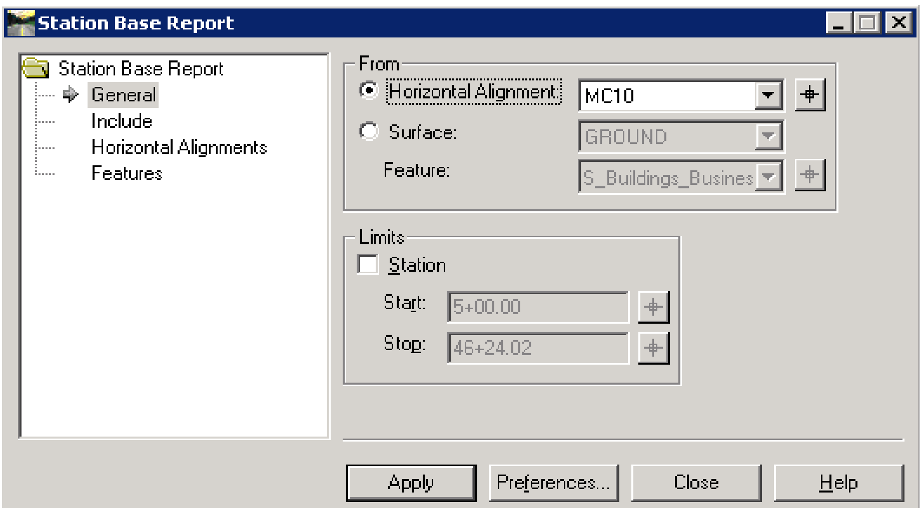


Figure 21-1: Station Base Report General

There are a couple of different settings in this area, for basic reporting of elevation difference you will need to establish what alignment you want to report from. On the right side of the dialog select the radio button for **Horizontal Alignment:** in the **From** area and select your alignment from the pull down arrow or use the cross hair to graphically select the alignment in MicroStation.

The **Limits** area on the right will allow you to control the station range for the report. This report is for the full station range of the vertical alignment so we will leave this unselected.

Part Two: Include Settings

Select **Include** on the left side of the dialog box (Figure 21-2).

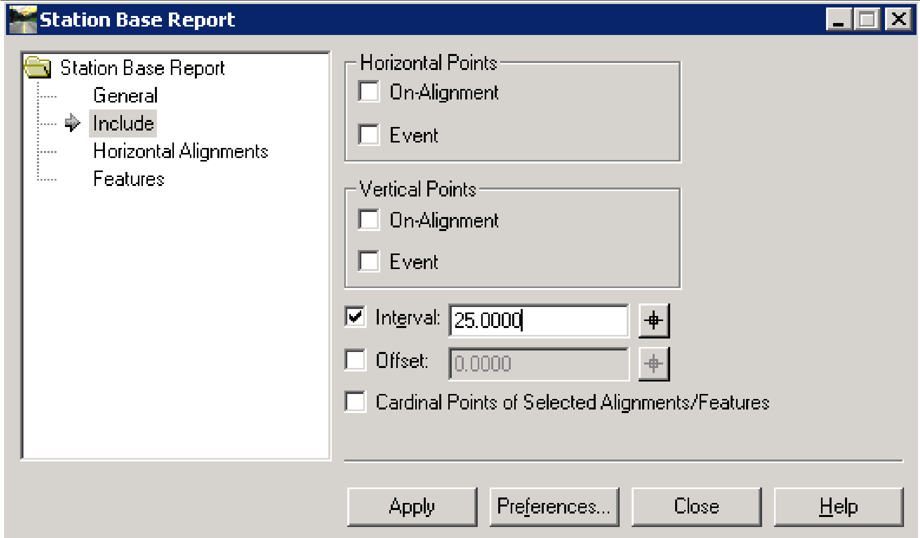


Figure 21-2: Station Base Report Include

On the right side there are some options to include in the report. If you want to include PC, PT, PVC and PVT points in the report select the **On-Alignment** options of **Horizontal/Vertical Points**. If you want to include event points that you have indicated along your alignment in the report then select the **Event** options of **Horizontal/Vertical Points**.

Select the **Interval:** option and place a value in the box next to it. This is the station interval that will be on the report.

Part Three: Horizontal Alignments

Select **Horizontal Alignments** on the left side of the dialog box (Figure 21-3).

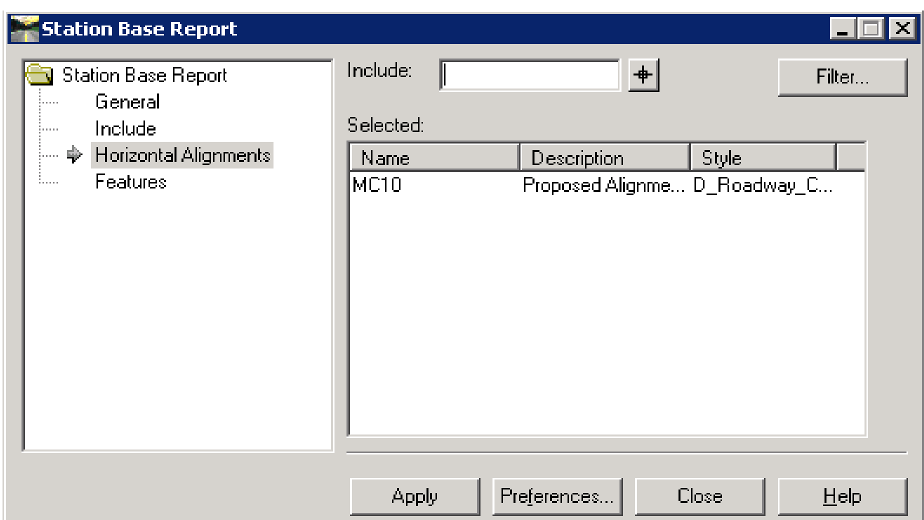


Figure 21-3: Station Base Horizontal Alignments

There are a couple of ways to select your alignment. Place focus in the **Include:** area on the right side of the dialog, select the **Filter…** button, select your alignment in the **Geometry**

Selection Filter dialog at the left, press the **Add->** button to select it to the right and press **O.K.** or use the cross hairs and graphically select your alignment in MicroStation.

Part Four: Features

Select **Features** on the left side of the dialog box (Figure 21-4).

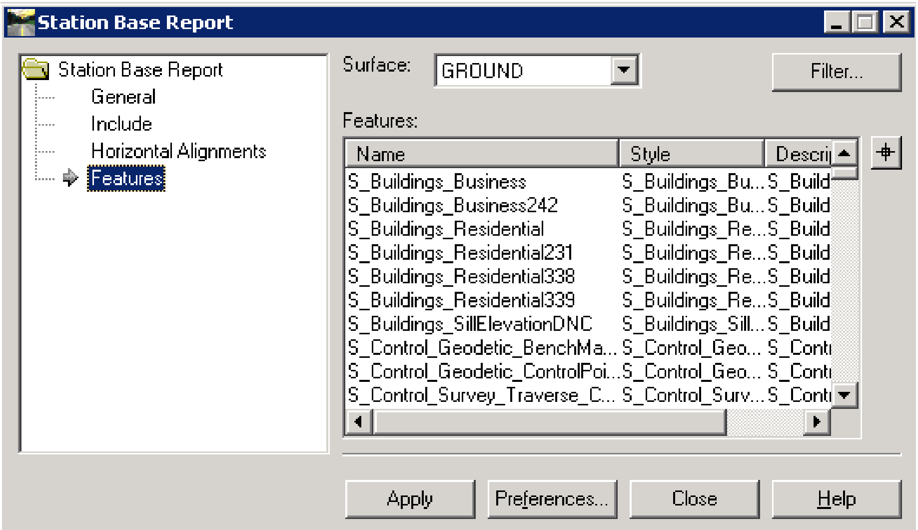


Figure 21-4: Station Base Features

In the **Surface:** area to the right, select your **Ground** surface but do not select any features.

If you wanted reporting relative to a feature here is where you would select this.

Step Four: Creating Report

Click **Apply** to create the report. The **Bentley InRoads Report Browser** will display for you and by default the **StationOffset.xsl** report will be display. Select the **ProfileExistingProposedElevation.xsl** to see your elevations and cut/fill depths along centerline.

Select **File>Save As** from the **Bentley InRoads Report Browser** menu and save your report to your project location on the network.

STATION AND OFFSET REPORT

OVERVIEW

This is a custom report for MaineDOT, therefore you might need to run the MicroStation/InRoads Update Utility to make it available as it wasn't delivered with the original InRoads install.

✓ ***Refer to page 3-10 for information on using the Update Utility. Place a check in the last option to Installs/Updates InRoads Style Sheets.***

Design Prerequisites:

- Existing Survey – Ground.dtm
- Horizontal and Vertical Alignment

♬ The report is designed to display the description of the features based on the Survey Notes established in the field. This will only be available if the Survey was fully edited within InRoads.

CREATE STATION AND OFFSET REPORT

Step One: Open InRoads Suite

To begin, double click your **InRoads Suite** icon. By default the user is set to **InRoads_Network**, if you are working in a local pin setup then you will want to change the user to **InRoads_Local**. Select your project from the project pull down and open your workgroups **??plan.dgn** (i.e. HDPlan.dgn or BDPlan.dgn.).

Step Two: Load Your Project

Load your project by opening the saved **RWK** file or open the surfaces and geometry project that have been saved.

✓ ***Refer to page 13-25 for more information on managing your RWK.***

Step Three: Settings for Station and Offset Report

From the *InRoads Main Menu* select **Tools>XML Reports>Clearance**.

♫ There is an issue with choosing *Station Offset* from the *XML Reports* menu. This issue is resolved in the next version of InRoads. Until it is deployed, we will be accessing this report through the *Clearance* reporting.

Part One: General Settings

Select **General** on the left side of the dialog box (Figure 21-5).

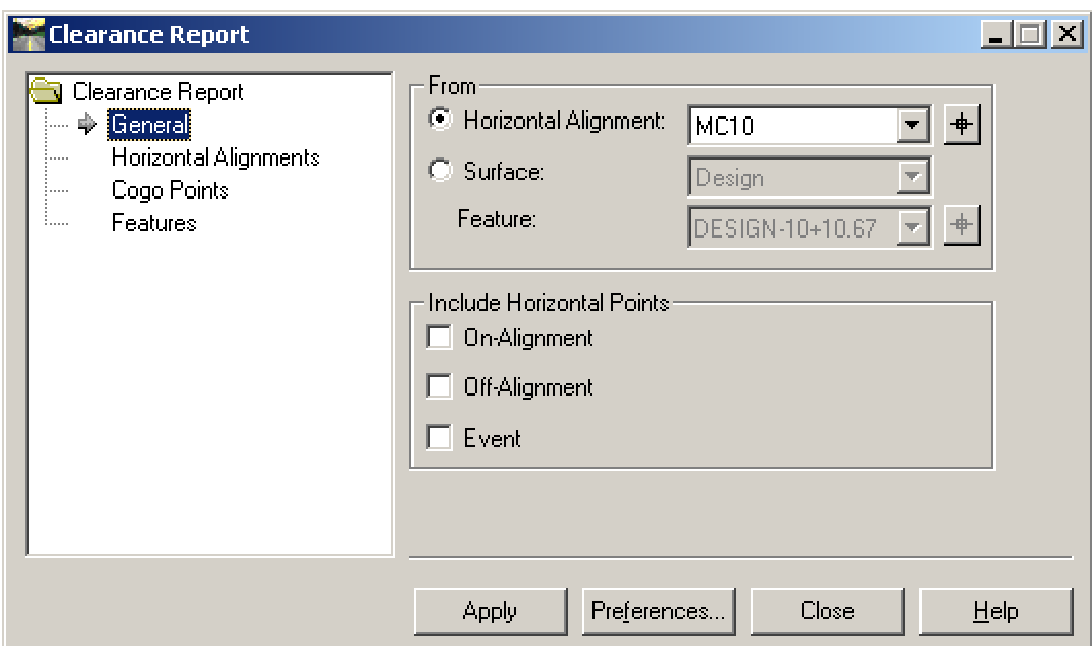


Figure 21-5: Clearance Report General

On the right side of the dialog select the radio button for **Horizontal Alignment:** in the **From** area and select your alignment from the pull down arrow or use the cross hair to graphically select the alignment in MicroStation.

Part Two: Features

Select **Features** on the left side of the dialog box (Figure 21-6).

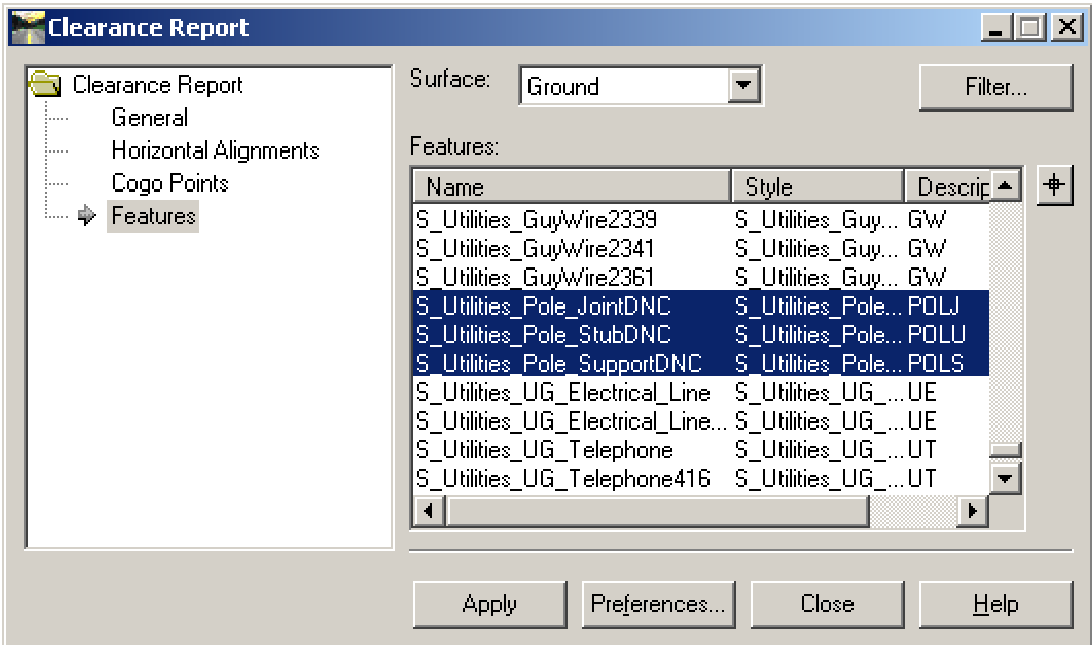


Figure 21-6: Clearance Report Features

In the **Surface:** area to the right, select your **Ground** surface. Now select the feature in the surface you wish to report on (i.e. S_Utilities_Pole_Joint).

♬ In the future, there will be *Filters* developed of all the common features that are typically reported on.

Step Four: Creating Report

Click **Apply** to create the report. The **Bentley InRoads Report Browser** will display the default *Clearance* report for you. You will need to select the **MaineDOT StationOffset.xsl.**

Select **File>Save As** from the **Bentley InRoads Report Browser** menu and save your report to your project location on the network.

VOLUME REPORTS

TRIANGLE VOLUMES

Overview
This is a perfect method for computing ledge volumes from a surveyed ledge surface to the subgrade surface of the design or stock piles and pit calculations.

Step One: Activate Report
Select **Evaluation>Volumes>Triangle Volumes…** from the InRoads main menu.

Step Two: Setup Dialog
Set the *Mode* to the desired method. Entire surface will compare the two surfaces where they have common coverage (Figure 21-7). If the edges of the two surfaces do not touch, a vertical line will represent the connection and volumes are produced within this boundary. Other methods are self explanatory.

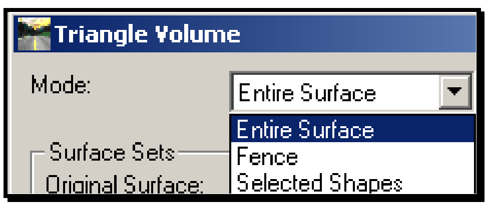


Figure 21-7: Set Mode to desired method.

Set the *Original Surface* to **Ledge** or the top most surface you are comparing. Set the *Design Surface* to **Subgrade** and the bottom most surface. Click **Add.** Consider adding the **Design** surface as a *Design Surface* as well in the event that ditching encounters ledge as well. Add these quantities together (Figure 21-8). Click **Apply** and then **Close.**

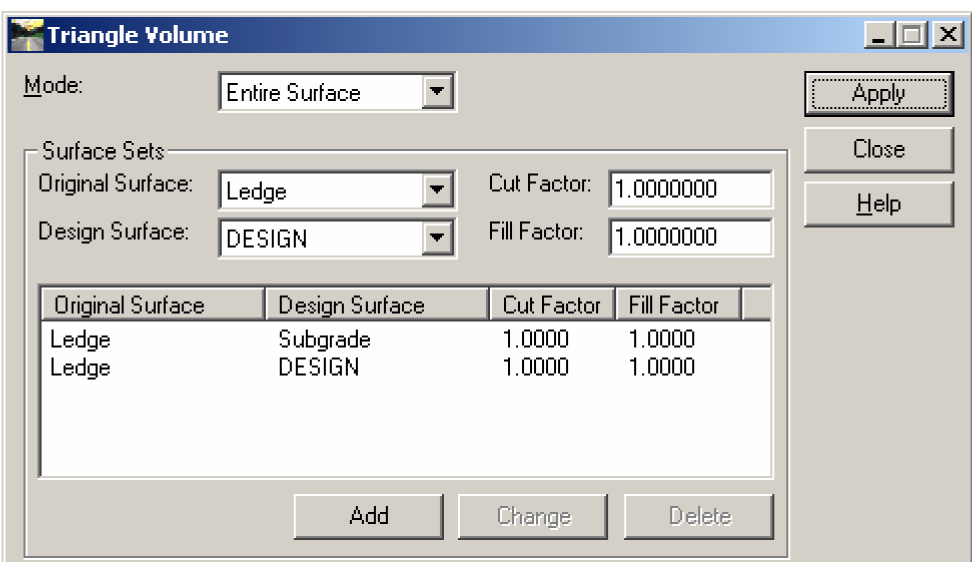


Figure 21-8: Ledge and Subgrade surfaces as well as Ledge and Design.

This calculation may take a while. You may get a warning that you do not have a *Style Sheet* assigned to the Triangle Volume reporting. Click **OK** and browse to the

Evaluation>Triangle Volumes.xls report. Right click and set it as the *Default Triangle Volume* report if desired. View results.

END AREA VOLUMES

Step One: Activate Report

Select **Evaluation>Volumes>End Area Volumes** from the InRoads menu.

Step Two: Setup Dialog

Adjust the *Surfaces* you are calculating and place a check box in the *Create XML Report* check box (Figure 21-9). Click **Apply** and then **Close.**

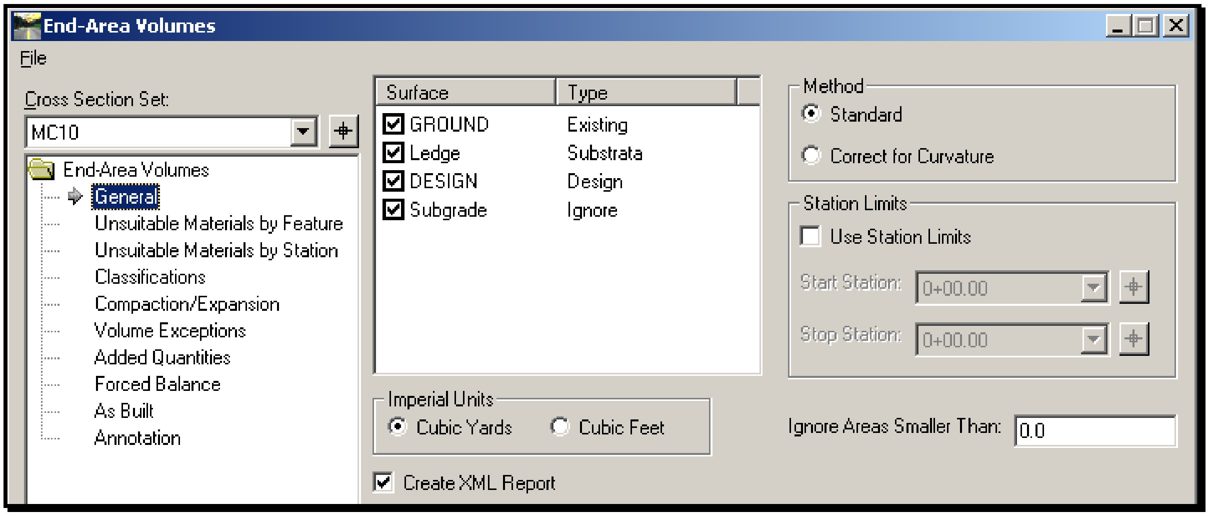


Figure 21-9: End Area Volumes dialog.

✓ ***Refer to page 20-31 for more information about End Area Volume Reports.***

Chapter 22 ROW Sheets

OVERVIEW

CONSTRUCT STATION AND OFFSET

The **F12** key runs a customized macro that is going to make it possible for us to construct points at a specific distance along an existing alignment. From these points, we'll be able to draw a line perpendicular to the alignment at a specific distance.

Starting Point

Run the *Pointalong* macro by hitting your **F12** key. You will be prompted to "Identify Point to Construct Distance From." (Figure 22-1)

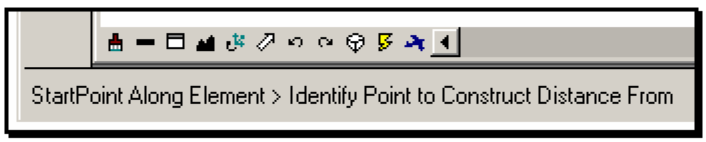


Figure 22-1: Start Point Along Status Prompts

The Macro is expecting a data point on your "alignment." Note that you can construct distances along many different kinds of elements: arcs, lines, line strings and complex chains and shapes are all legitimate elements to construct a distance along. This will let you construct distances along baselines, ROW lines, property lines, etc.

You are quite possibly going to be entering this start point based on an intersection of another line with your alignment. For instance, you may want to construct a Plus and Offset starting at the intersection of a tick mark with a baseline.

Entering the Distance and Direction

Once you've entered a data point telling the macro the start point, it will prompt you to "Enter Distance Along Element." (Figure 22-2)

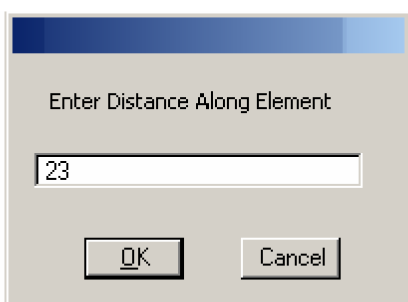


Figure 22-2: Input Distance

If you were trying to construct Station 1+35.240 from a tick mark at Station 1+20.000, the distance to construct would be 15.240. Enter in your desired value and press the **OK** button.

Choosing the Direction

This next step is very important. The macro isn't smart enough to know whether or not you want to construct a point to the left or to the right of the point that you just chose. Look down in your *Status Bar* to see that the macro is now prompting you to "Identify Direction for Construction." (Figure 22-3)

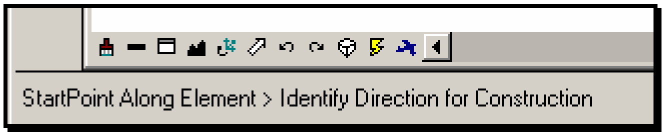


Figure 22-3: Status Bar Message

What it is asking for is a data point either to the left or to the right, or, in the case of a vertical line, above or below the first point you entered. Put your cursor on the baseline near the first point, but clearly to one side or the other (Figure 22-4) and enter in a data point (left button). There is no need to snap to enter this point.

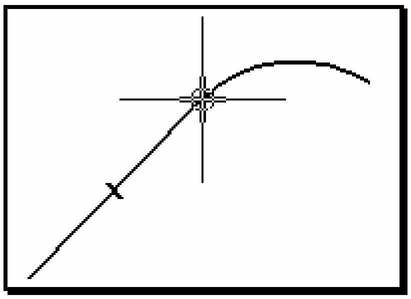


Figure 22-4: Identify Direction for Construction

When you enter a data point, MicroStation will start drawing a line at the specified offset and direction from the first point you entered (Figure 22-5).

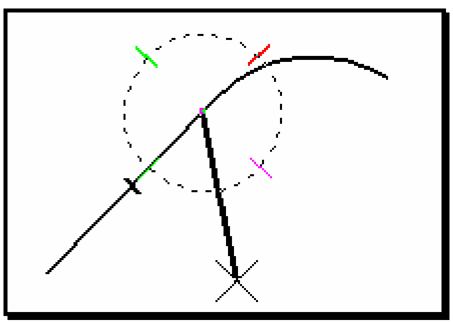


Figure 22-5: Point Constructed

It will also put the **AccuDraw** compass on the line, rotated to make it easy for you to construct a line perpendicular to your baseline.

Choosing the Offset Distance

Now that we are drawing a line, we can choose to go either to the right or to the left of the baseline. Just put your cursor graphically near where you want the line to go. Keep your cursor near the axes of **AccuDraw** and it will ensure that you are drawing perpendicular to the baseline.

Enter your Offset into the **Distance** field of your **AccuDraw** window (Figure 22-6).

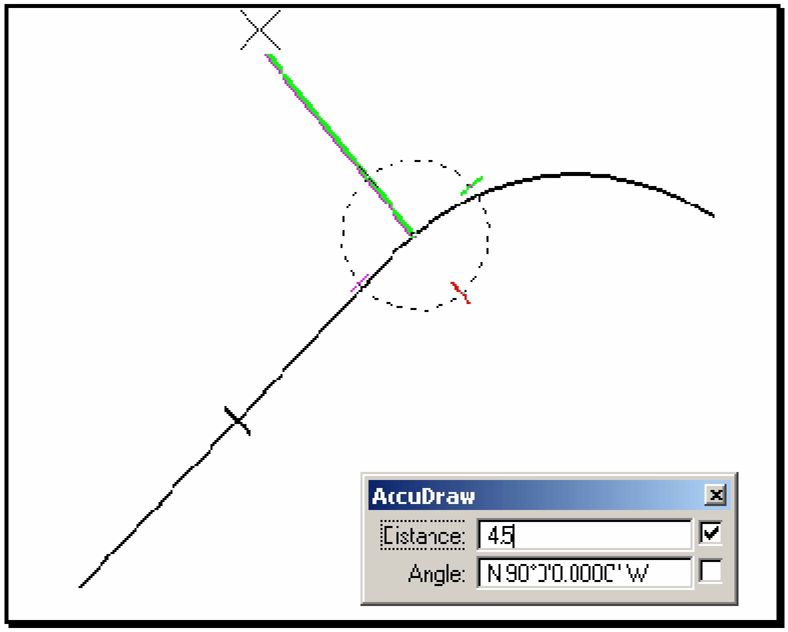


Figure 22-6: Constructing a Distance off the Baseline

Notice that the angle is 90°. Enter a *Data Point* to complete the command. *Reset* to stop drawing lines and press **F12** to start again!

Troubleshooting

There is a **Warning Dialog** (Figure 22-7) that you will get from time to time when you construct distances using this macro.

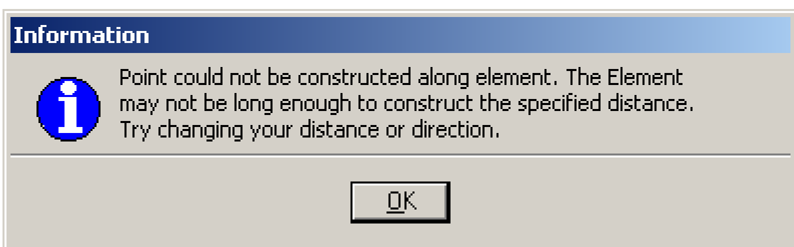


Figure 22-7: Pointalong Warning Dialog

It lets you know that the point you are trying to construct cannot be constructed because your Element is too short. This could happen for a couple of reasons.

1) You may have just chosen the wrong direction to construct from. Your baseline may run 16 kilometers to the right and only 16 centimeters to the left of your offset point. You can't construct a point 10 meters to the left of that first point.

2) You may have picked the wrong element to construct the distance along. Choose the point again and make sure that you *Accept* only the element you want to construct along.

3) You may have used the *Drop Element* tool to drop *Complex Status* of the baseline. This would have broken up the lines and arcs that are joined together in a "complex chain" of a baseline, leaving only individual lines and arcs. The resulting elements are much shorter than a typical baseline.

You can put dropped baselines back together using the *Create Complex Chain* tool. Set your method in the *Tool Settings Window* to **Automatic.**

✓ ***Refer to 2-12 for using the Complex Chain Tool***

4) You may be confusing Metric and English units. Make sure you're not trying to go 75 feet along a 40-meter line. MicroStation reads that "75" distance as 75 meters if you're working in a metric drawing.

PROCEDURES

CREATING ROW PLAN SHEETS

Step One: Open RWPLAN-clips.dgn

Select your project from the list of projects in the **Project** pull down at the bottom of the *MicroStation Manager*.

Select **RWPLAN-clips.dgn** from the list of files on the left and press **OK**. If the **RWPLAN-clips.dgn** does not exist the file will have to be created. Open the **RWPlan.dgn**.

Select: > **File** > **Make Sheetz** > click on **no prefix** (Figure 22-8) and click **OK.**

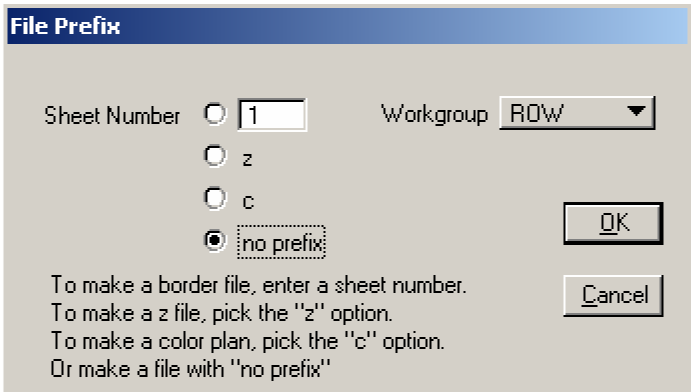


Figure 22-8: File Prefix Dialog

Choose **RWPlan-Clips** (Figure 22-9) and click **OK** in the **Create File Of Type…** Dialog.

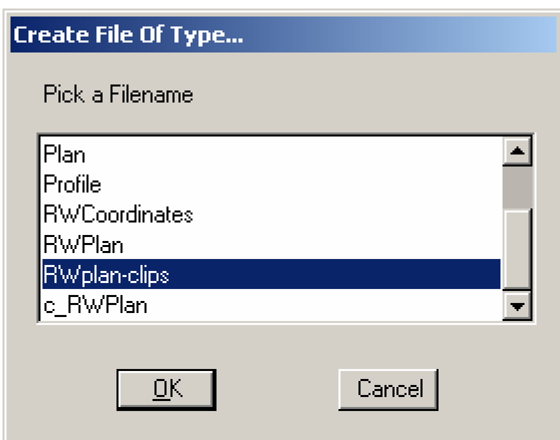


Figure 22-9: Create File Of Type Dialog

Click **OK** in the **Make File** Dialog (Figure 22-10).

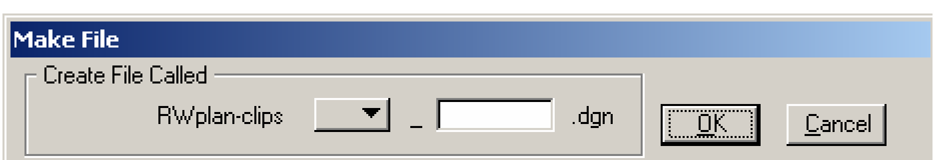
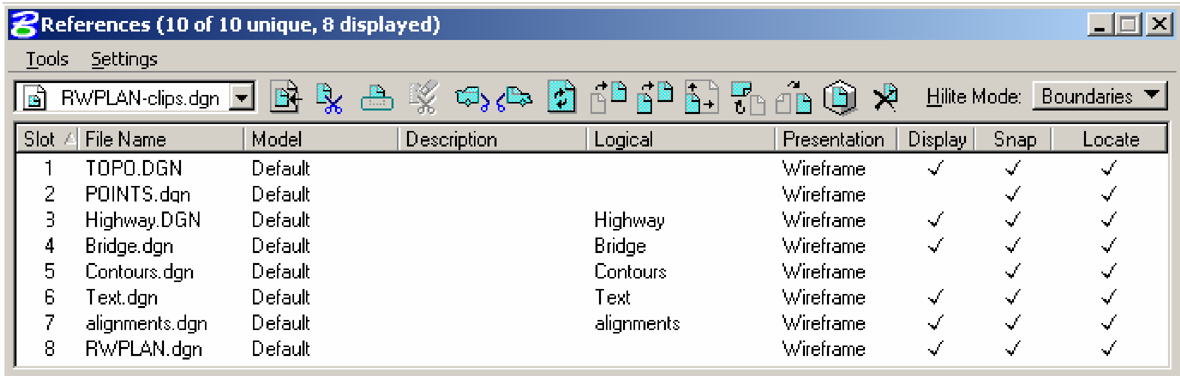


Figure 22-10: Make File Dialog

Click **Cancel** in the **File Prefix Dialog** to exit the **Make Sheetz** program.

In the **RWPlan-clips.dgn** look in the **Reference Dialog** (Figure 22-11) to confirm the attached Reference Files.

Select: **Files** > **Reference(DOT)** > **Dialog**



Slot	File Name	Model	Description	Logical	Presentation	Display	Snap	Locate
1	TOPO.DGN	Default			Wireframe	✓	✓	✓
2	POINTS.dgn	Default			Wireframe		✓	✓
3	Highway.DGN	Default		Highway	Wireframe	✓	✓	✓
4	Bridge.dgn	Default		Bridge	Wireframe	✓	✓	✓
5	Contours.dgn	Default		Contours	Wireframe		✓	✓
6	Text.dgn	Default		Text	Wireframe	✓	✓	✓
7	alignments.dgn	Default		alignments	Wireframe	✓	✓	✓
8	RWPLAN.dgn	Default			Wireframe	✓	✓	✓

Figure 22-11: Reference File Dialog

♫ This dialog already shows that you have topo, text, bridge, highway, etc. files attached. If these files are not attached or other files are needed, refer to page 2-70 for Reference Attach Methods.

Step Two: Cut Sheets

Introduction

At this stage we are going to be placing rectangles along the alignment that will correspond to our sheets. We will be using the *Settings Manager* to accomplish this. The *Settings Manager* is docked at the bottom or top of your screen. If the *Settings Manager* is not displayed, it can be launched from the menus by **Settings >DOTSetMgrs > Right-of-Way**. Based on the file name, the correct *Settings Manager* should be automatically loaded.

Part One: Set Category Scale

Right Click anywhere on the *Settings Manager* and select **Category>Scale.** Select the intended plot scale for the plan sheets (i.e. 1 in. = 25 ft. or 1 in. = 50 ft. (1:250 or 1:500 for metric projects)).

♫ You should be the same scale that other programs are using for the project. When Survey Editors create the topo and text for the projects, this governs the scale.

Part Two: Place Clip Boundaries

From the *Settings Manager* select **Borders >Clip Boundary**. This selects our sheet boundary cell and activates a cell placement command that will make it easy to place a bunch of these rectangles along the alignment.

Notice the box on the end of your cursor. When you send a Datapoint to MicroStation, the box will be placed at that location. (You might want to set your snap mode to *Nearest* and snap to the centerline of road.) The box you just placed will immediately begin to rotate by the origin point (the point you just entered.) Move your mouse around and notice how it spins. When it is aligned with the roadway, enter another Datapoint (again, you might want to *Nearest* snap to the centerline) and it will immediately prompt you to place the next boundary.

Don't worry if they're not in exactly the right place -- you can go back and clean up any mess later by using the move and rotate tools. It is important, however, that you place these boundaries in the order that you want your sheets to be numbered. We have a routine that automatically creates plot drawing files for us, and it will number them in the same order that you place these clip boundaries.

Step Three: Make new Plan Files

From the *Settings Manager* select **Tools > Plan File Maker**. This macro is doing a number of things. First off, it is creating saved views in RWPlan-clip.dgn that are aligned with the clip boundaries we just placed. It asks you what number you want to use for the starting number of the ROW plan sheets. If you know where the sheets will fall in your plan set, enter this number here. The default will be "1". If you don't know yet where they will fall, use the default and we will utilize the **Sheet Renumbering** routine to organize the files outside of MicroStation.

When you have finished, the program will drop you back into rwplan-clips.dgn. Open up the files you've just created and see how they look!

- ✓ ***Refer to page 1-22 about the Sheet Renumbering Utility.***
- ✓ ***Refer to page 1-25 about PCF editing.***
- ✓ ***Refer to page 1-27 about the Border information macro.***
- ✓ ***Refer to page 1-30 about disabling the Borderinfo Substitution.***

Troubleshooting

This macro has very specific expectations, and anything different about your input has the potential of giving you bad output.

It can only sheet up files in the order that the clip boundaries were placed in the file. If you need to add sheets at the beginning of the project, it might be easier to delete all your clip boundary cells that you placed and start again from scratch.

CREATING ROW INFORMATION PLAN

Overview

As a new requirement Right-of-Way Mappers will be required to generate a **001_RWCoordinates.dgn** file which contains control information for a project. This will require communication with the ***Project Designer/Technician*** to receive the necessary file to read into the dgn.

Step One: Creating 001_RWCoordinates.dgn

From the main menu select **File>Makesheetz**. Leave the dialog toggled to **Sheet Number** and select **OK** (Figure 22-12).

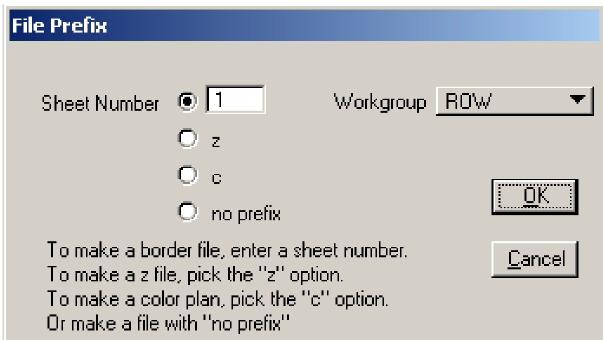


Figure 22-12: File Prefix Dialog

Choose **RWCoordinates** (Figure 22-13) and click **OK** in the **Create File of Type…** Dialog.

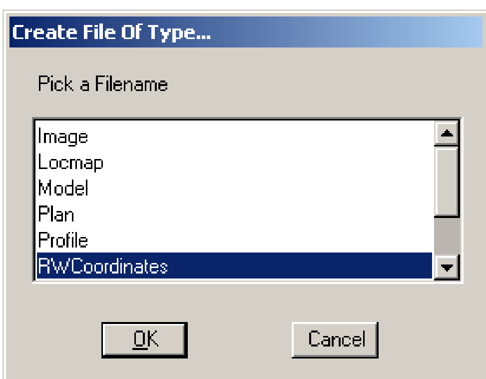


Figure 22-13: Create File of Type… Dialog

Click **OK** in the **Make File** Dialog (Figure 22-14).

Figure 22-14: Make File Dialog

Now that the file is created select **Cancel** to end the process of creating files.

Step Two: Placing Coordinate Information

In the Right-of-Way *Settings Manager* select **Tools>Create ROW Coordinate Info.** (Figure 22-15).

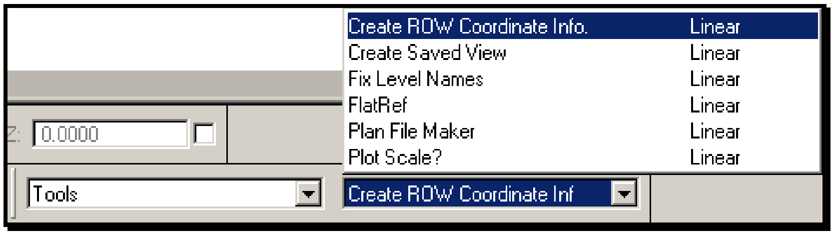


Figure 22-15: Right-of-Way Settings Manager

The information will be developed on the sheet drawing automatically if the file is found. The program also looks for any overrun of information and will create, if necessary, a second drawing to finish the process.

♬ This program was created to look for a **RWInformation.txt** file created in the **MX/Reports** folder of the specific work group. (i.e. Bridge or Highway) If the program can not locate the file you will receive a message stating you need to talk to the Project Designer. They are required to run a program within **MX** called **MaineDOT Right of Way Sheet** to generate this file.

✓ ***Refer to page 1-22 about the Sheet Renumbering Utility.***

✓ ***Refer to page 1-25 about PCF editing.***

✓ ***Refer to page 1-27 about the Border information macro.***

✓ ***Refer to page 1-30 about disabling the Borderinfo Substitution.***

✓ ***Refer to page 7-4 about creating your Location Map.***

CONSTRUCT A METES AND BOUNDS DESCRIPTION

You will use this routine to construct county layouts and surveys. When you need to construct a Metes and Bounds, there are only a couple of things you're going to need to bear in mind.

Tools

You're going to be using *Smartline* and *AccuDraw*. Make sure that you are in **Bearing** mode by hitting your **F9** function key.

Setup

First off, make sure you're in a *Top View*.

Choose **Rotate View** icon from the tools at the bottom of your View 1 - Top Window (Figure 22-16).

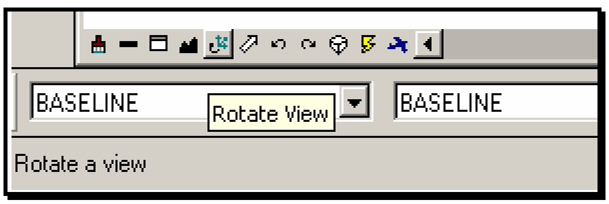


Figure 22-16: Rotate View Dialog

Look at your **Tool Settings Dialog** and make sure you have *Top* selected as your rotation **Method** (Figure 22-17).

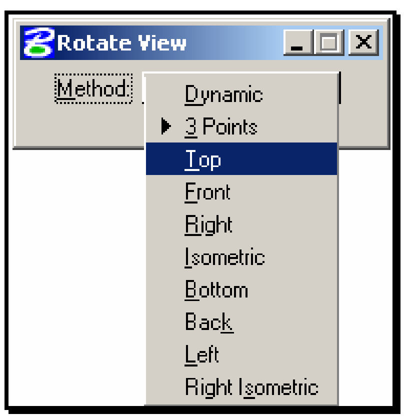


Figure 22-17: View Rotation Top Dialog

Enter a *Data Point* to begin your line, then type your bearing and distance into the **AccuDraw Dialog**. Make sure you are in **Distance/Angle** mode. Hit your **Spacebar** if you aren't (Figure 22-18).

Figure 22-18: Toggle AccuDraw Mode Dialog

Placing Lines

As you go, your **AccuDraw Compass** is going to rotate to align with line that is being placed.

♬ You have to make sure that it is always rotated back to horizontal between every segment: type **V** with active **AccuDraw** to rotate the **Compass** to the view (Figure 22-19).

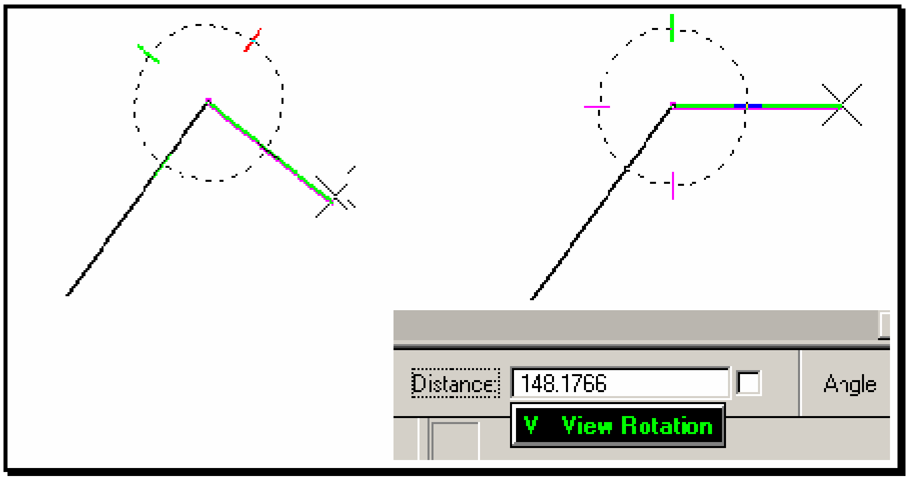


Figure 22-19: Rotate AccuDraw to the View

For More Information

✓ ***Check page 22-17 for more information on working with Baselines.***

Offset Using Copy Parallel

Once your line is constructed, you're going to want to offset the line by some distance. Use the **Move Parallel** tool from the **Manipulate** toolbox (Figure 22-20).

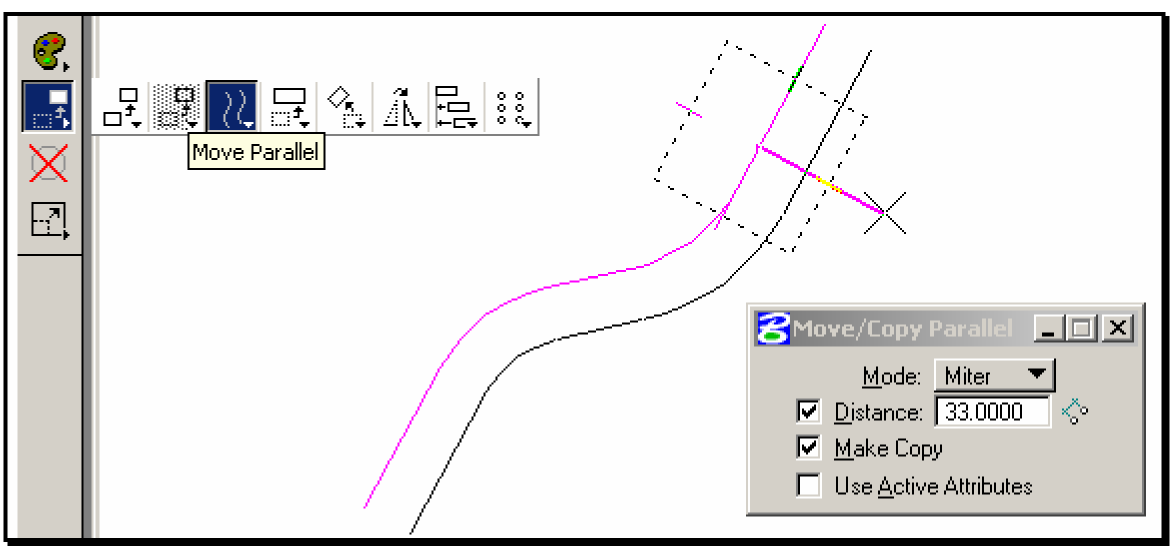


Figure 22-20: Move/Copy Parallel Dialog

In your **Tool Settings Window**, make sure that **Distance** and **Make Copy** are turned on. Type the offset distance into the **Distance** field and identify the element you want to copy by *Data Pointing* on it. Move your mouse and watch the line pop back and forth to either side of your original line. Once it is displaying on the proper side, *Data Point* again to accept the final location. *Reset* to complete.

Fitting the Layout

Once the layout has been constructed, you're going to need to rotate and move it into place over the survey information. There are only a couple steps to this process.

First, use the *Element Selection* tool or *PowerSelector* to pick all the elements in your layout (Figure 22-21).

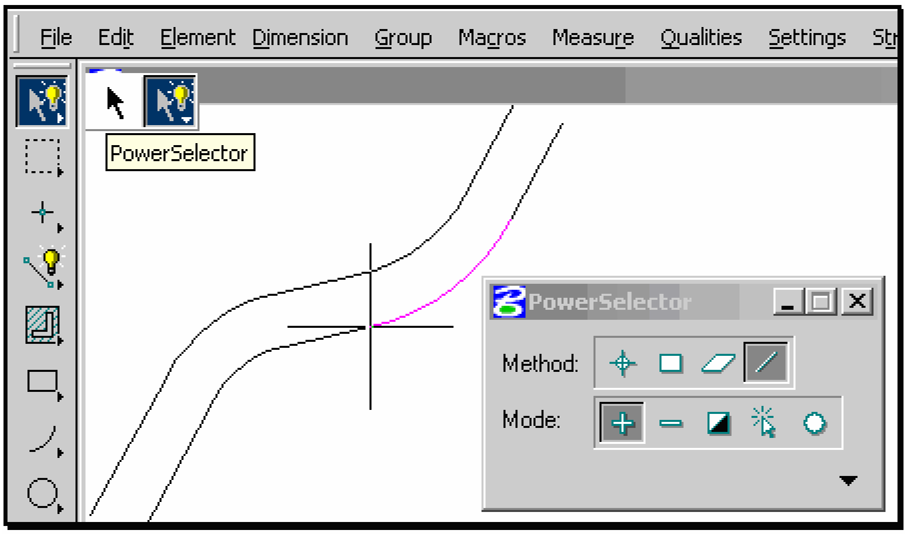


Figure 22-21: Pick the Elements in your Layout

Snap (but do not *Accept*) to your layout at the point you want to pick it up from.

Second, choose **Edit > Cut** (**Ctrl+X**) from your **Main Menu**.

Now, choose **Edit > Paste** (**Ctrl+V**) from your **Main Menu**. You should see your layout hovering over your drawing, hanging off your cursor from the point you gave it in step one (Figure 22-22).

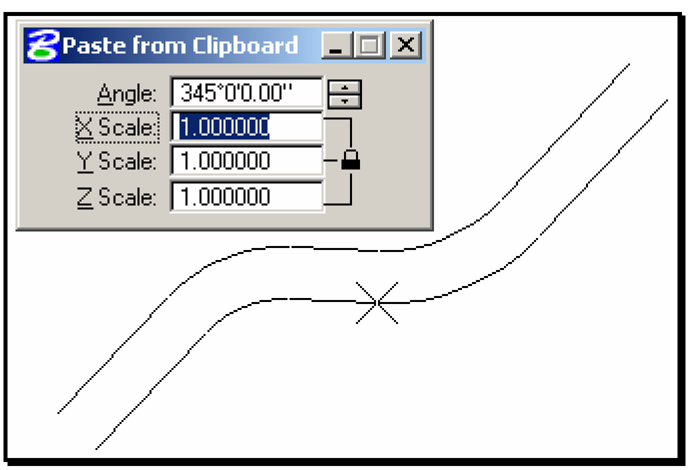


Figure 22-22: Paste your Layout Down

Look at your **Tool Settings Window** and be sure that your **Scales** are all set to 1 (otherwise, your layout will be made bigger or smaller.) Change the **Angle** field and move your layout around your drawing until you get a good fit. **Data Point** to place the layout in your drawing.

Fine Tuning

If you want to make changes to individual components of your layout after you've got it into place, use the **Modify** command from the **Manipulate** toolbox (Figure 22-23).

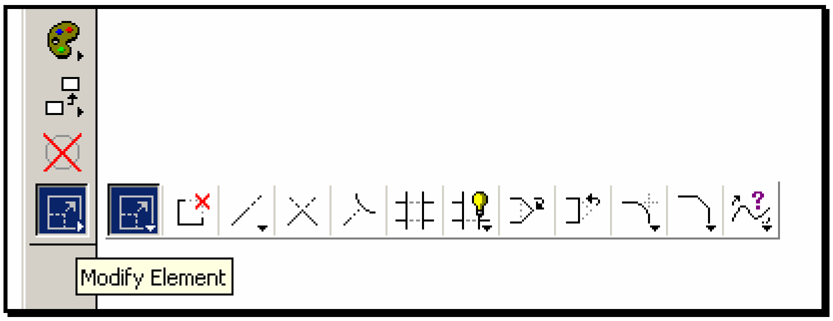


Figure 22-23: The Modify Command

With this command you can flatten or sharpen angles and shorten or lengthen lines. It basically will allow you to move any vertex to any other point. *AccuDraw* sometimes interferes with these kinds of “eyeball” commands -- press your **F7** key until you see your **AccuDraw Window** disappear. When you’re done, press **F7** and it will come back again.

It’s going to be tough to use *Modify* to make your second line be parallel to a *Modified* line. Use *Delete* to get rid of your second line entirely, and then use *Copy Parallel* to create another parallel copy of your *Modified* line.

BASELINE OVERVIEW

As with most things in MicroStation, there is more than one possible approach to constructing a baseline. What we are presenting here is the method that is going to minimize the amount of hand calculating required.

Baseline Geometry:

First we're going to construct the baseline using *Smartline* and *AccuDraw*. We're only going to need a few pieces of information to complete a Baseline. For starters, we're going to need a Bearing and Distance of a tangent. After that, all we need is the Radius and Delta Angle for each curve and a distance for further tangents.

Checking and Cleaning Up Geometry:

After we have constructed a Baseline, we're going to drop it into its components to make sure we've drawn it correctly. If we've made any mistakes, we'll correct them with the *Modify* and *Rotate* tools. Then we'll group the Baseline back together as a *Complex Chain*.

Stationing and Annotating:

Next we'll place PC and PT lines. We'll label them from the *Settings Manager*.

✓ ***Check page 2-19 for an overview of the Settings Manager.***

From those we'll find a beginning station and we'll put station marks along the length of the baseline. Then we'll edit the text of our Station Marks and place Curve Data.

BASELINE TOOLS

There are a number of tools that we're going to be using to construct our Baseline. Some of them have some very specific capabilities that we should review and clarify before you get started working with them.

Smartline

We're going to be relying on *Smartline* to create our baselines. *Smartline* is capable of creating a series of lines and arcs (Figure 22-24). We are going to be constructing lines based on *Distance* and *Bearing* and constructing arcs based on *Radius* and *Delta*. With a little help from *AccuDraw*, it's going to be simple to build "on the fly" lines that are tangent to arcs as well as arcs that are tangent to other arcs.

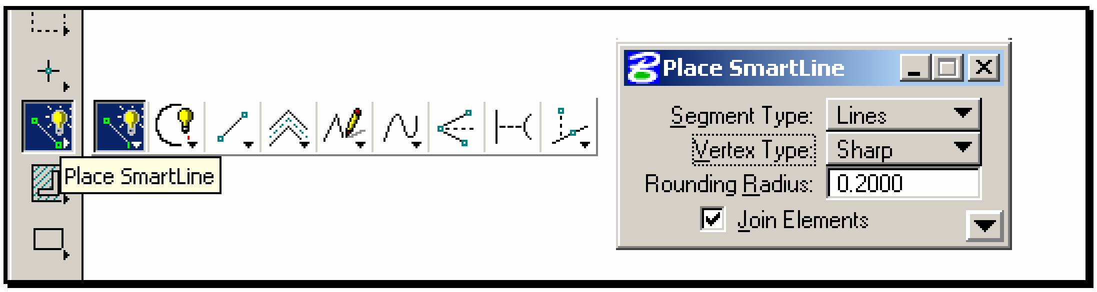


Figure 22-24: Smartline Segment Type Options

As we work we are going to be toggling *Smartline's Segment Type* back and forth from **Lines** to **Arcs**. We are not going to be making any changes to *Smartline's* **Vertex Type**. We are going to make sure it's set to **Sharp** and leave it at that.

Something that isn't going to be obvious at first about drawing with *Smartline* is that you should try to do all of your construction without hitting your *Reset* key (right mouse button.) With **Join Elements** selected in your *Smartline Tool Settings Window*, constructing your entire baseline without hitting *Reset* means that the resulting series of lines and arcs is going to be joined together as one element (a *Complex Chain*). Another benefit of constructing the *Smartline* as one element is that *AccuDraw* is going to be more helpful. It's going to do this by keeping constant tabs on our latest distance and direction of construction.

A Word About AccuDraw

AccuDraw is a critical part of this process. There are a couple of things to keep in mind when you're using *AccuDraw*.

First off, when you type angles into *Accudraw's* **Angle** field, you have to make sure you're typing in the right **Angle Mode**. Since we're going to be entering angles in both **Bearing** (N 23° W) and **Conventional** (113°) we need to be able to toggle back and forth between these two **Angle Modes** quickly.

We've set up *Function Keys* to accomplish this. **F8** will set the Angle Mode to *Conventional*; **F9** will set the Angle Mode to *Bearing*. When you are typing in Angles in *Bearing* mode, make sure to start your angle with either an **N** or an "S" and end your angle with either an "E" or a "W." In both *Bearing* and *Conventional* mode, you need to separate Degrees, Minutes, and Seconds with an appropriate symbol. MicroStation uses the ^

character to represent degrees (**Shift+6**). MicroStation uses the ‘ character for minutes and the “ character for seconds.

♬ Make sure that when you type a distance or an angle into *AccuDraw* that you do not use the **Enter** key to “submit” your values to *AccuDraw*. **Enter** has a very specific function to *AccuDraw*. It is the *Smartlock* function. What this does is to lock the **Angle** of whatever you’re constructing to be either horizontal or vertical (relative to the **AccuDraw Compass**.) We will be using the **Enter** key for **Smartlock**, but not for entering numbers in the window.

Also, keep your eye on your **AccuDraw Window** when you’re entering in distances and angles to keep from typing angles into the distance field and vice versa. It takes a good long time to type an angle in bearing format right down to the nearest tenth of a second. It’s a shame to have to type it all over again because you entered it into the distance field instead of the angle field. The easiest way to get into the distance field from the angle field is by using your **Tab** key (just to the left of the letter Q).

AccuDraw Shortcuts

AccuDraw Shortcuts are single (or occasionally double) key strokes that you type while **AccuDraw** is active. A common example of a shortcut is the **Spacebar**. When *AccuDraw* is active and you hit the **Spacebar**, *AccuDraw* shifts back and forth between **Distance/Angle** and **XYZ** mode.

Another shortcut that we’re going to get a lot of mileage out of is the **tilde** key (~). This is the key that’s just to the left of the number 1 at the top of your keyboard. This shortcut is called *Bump Tool Setting*, and we’re going to use it when we swap back and forth between drawing arcs and lines as we’re using the *Smartline* tool. It’s worth noting that you don’t have to hold down the **Shift** key to get this shortcut to work -- even though the “~” character is usually typed by holding down the **Shift** key.

Conclusions

These tools are going to be able to do just exactly what we need them to do to help us minimize the amount of hand calculations required to lay out a Baseline. However: they’re finicky. You’re going to have to keep a constant eye out on your **AccuDraw** window and your **Tool Settings Window** to make sure that your options are set correctly as you go.

BASELINE GEOMETRY

Step One: Bearing and Distance

From the *Settings Manager* select **Baseline** > **Baseline** (Figure 22-25).

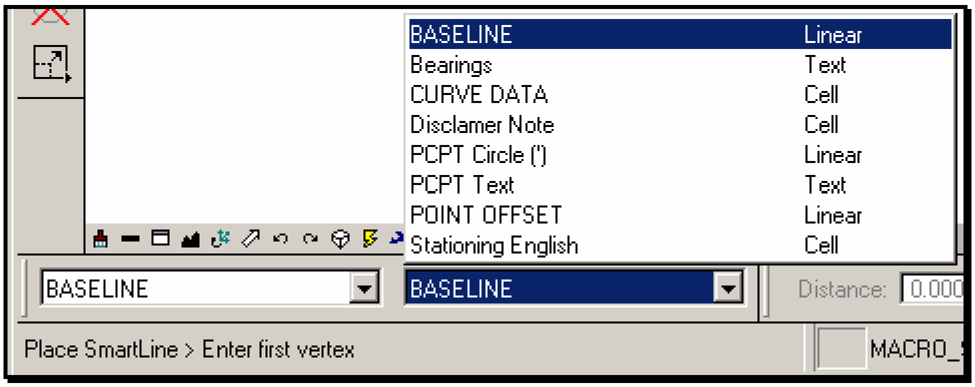


Figure 22-25: ROW Settings Manager

This will put you in the correct level, color, style and weight for drawing Baselines, as well as activating the *Place Smartline* command.

It's a good idea to start every baseline with a Bearing and Distance if at all possible. Start by entering a Data Point to begin your line. Take a look at your **AccuDraw Window** and make sure that you are in *Bearing* mode (look for an **N** or an **S** in the angle field.) If you're not, press **F9**. This will run a MACRO that sets your active **Angle Mode** to **Bearing**. Then enter your **Bearing** and **Distance** into your **AccuDraw Window**.

Note that you can still draw the line either to the left or the right of the origin point, as illustrated in Figure 22-26 and Figure 22-27. Make sure that your line on the screen visually agrees with the baseline you intend to draw by moving your cursor either to the left, right, up, or down to get the direction correct.

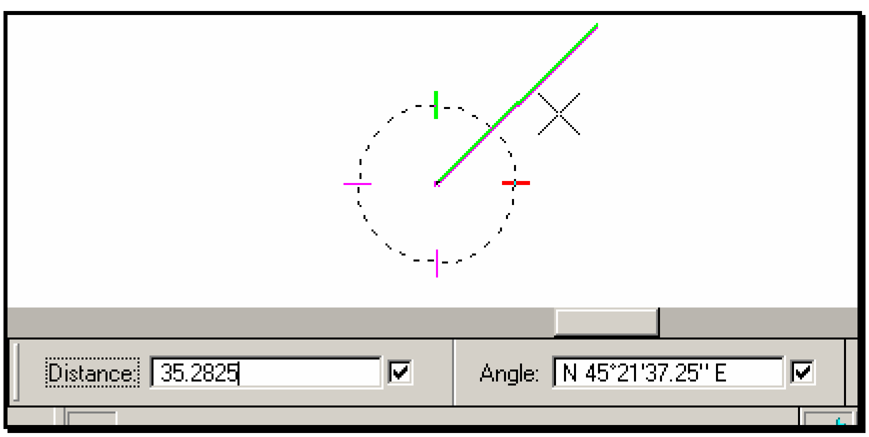


Figure 22-26: Drawing to the Right at a Fixed Angle

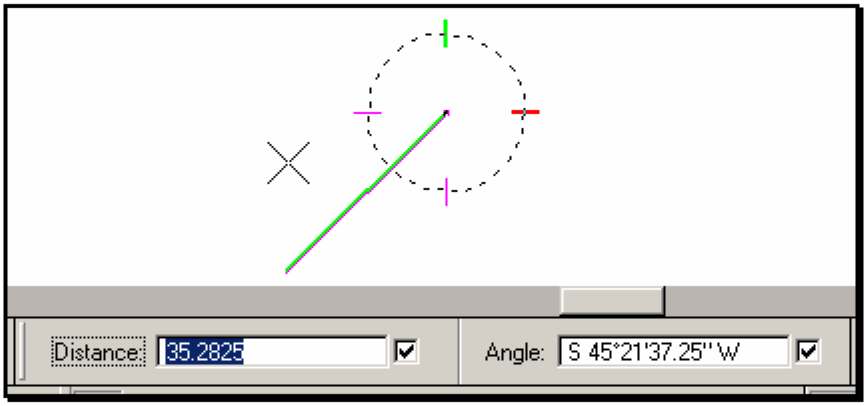


Figure 22-27: Drawing to the Left at the Same Angle

ⓘ ***Don't enter a Data Point until you're satisfied that you're drawing in the right direction.***

Step Two: Troubleshoot and Prepare to Draw a Curve

You have now successfully entered the first segment of your Baseline. Do not hit your *Reset* button (right mouse button.) MicroStation should now be in the middle of drawing a *Smartline* (Figure 22-28) Your **Status Bar** (bottom of your screen) should be prompting you to "Enter next vertex or Reset to complete."

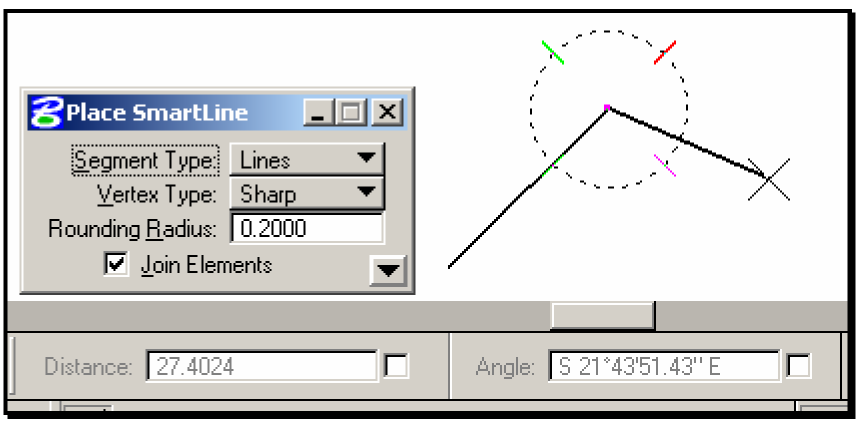


Figure 22-28: First Line Complete

Even if you have screwed up this first portion, do not hit your *Reset* button -- go to your *Main Menu* and select **Edit > Undo Last Data Point**. This is important to keep in mind now and for the rest of this creation process: if you make a mistake, **UNDO**. Do not *Reset*. You can also **Undo** by typing **Ctrl+Z**.

If you do (accidentally) hit your *Reset* at this stage, it's not the end of the world. All you have to do is start drawing again. Snap to the end point of the baseline you just constructed and *Accept*. This will put your **AccuDraw Compass** at the correct point but it will probably not be rotated.

Tentative Point. Instead, type "RQ." This will activate **Accudraw's** *Rotate Quick Shortcut* and spin the **Compass** to the proper rotation.

♬ Use the **Tilde** key (~) to toggle *Smartline* from **Segment Type Lines** to **Segment Type Arcs** (Figure 22-29).

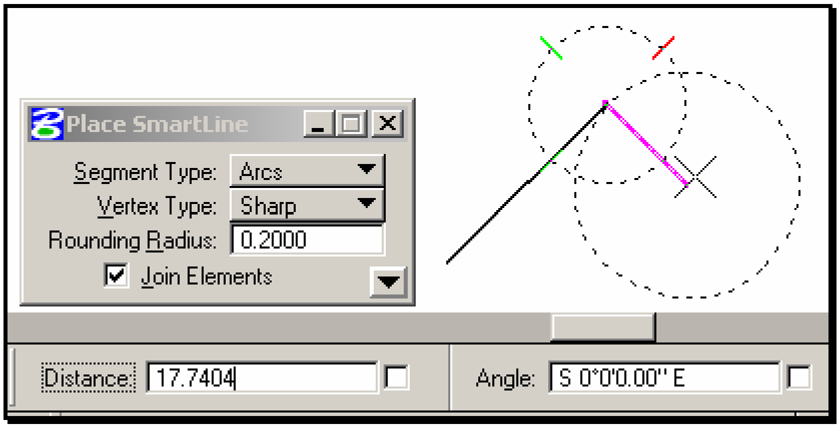


Figure 22-29: Swap to Smartline Arcs

Now type **F8** to change your angle mode back to *Conventional* from *Bearing*. This is going to help us enter in curve deltas (as arc sweep angles.)

Step Three: Draw a Curve

Move your mouse around a bit to notice a couple of specific features here. First off, you're going to see a dotted circle moving around the screen. Notice that your cursor is at the center of this circle.

Notice also that the **AccuDraw Compass** is at the edge of this circle at the point where the circle intersects the line you just drew. Move your mouse around until the dotted circle looks like it's perpendicular to the line you just drew. Notice that as you get close to this point, **AccuDraw** is going to tend to "snap" you in along one of its axes. This is going to help us lock in our curve to be tangent to our baseline.

Moving your mouse around, line up the dotted circle so that it is curving in the right direction. Also make sure it is at least visually perpendicular to the baseline, then hit **Enter**. This is **Accudraw's Smartlock**, and it will nail down the location of the center of the curve. Now you're ready to enter in the Radius of the curve.

ⓘ ***Make sure that you are typing in Accudraw's* Distance *field (if there is a cursor blinking in the* Angle *field, hit your* Tab *key to put it in the* Distance *field.), then type the radius of the curve.***

What you are entering at this point is the center point of the curve. As you know, the center of the curve can be a long way away from the baseline. What this means to us in MicroStation is that the point you are about to enter may be way out of your *Window*. This is not a problem. Enter in a Data Point to accept the point you've just constrained, and let's see where we are.

What you're going to see is probably going to be something like the picture in Figure 22-30. As you move your mouse around you'll notice you're constructing an arc. You'll notice a couple of dotted lines that are radial to the arc, one of them at the tangent point to the baseline, one of them near your cursor.

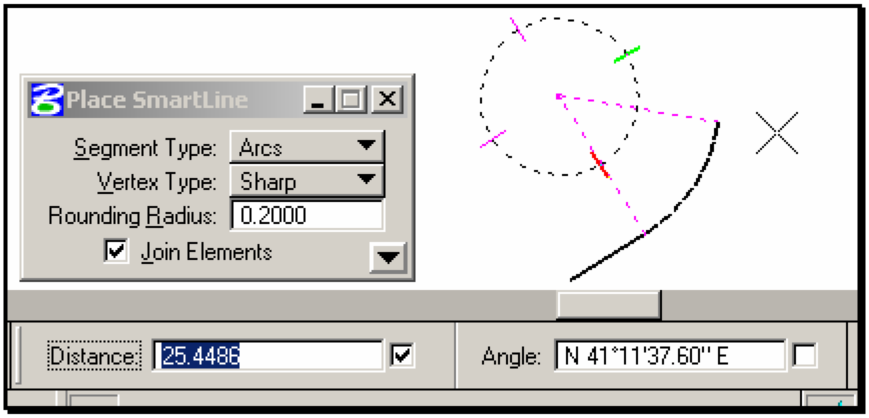


Figure 22-30: Sweep an Arc

What you need to do here is make sure that you are drawing this curve in the right direction. You may have to use the **Zoom Out** command to get the center of your arc in your view. Type **F3** and *Data Point* in your window.

Zoom Out. You may need to click a few times to **Zoom Out** a number of times. *Reset* (just once) and MicroStation will drop you out of your **Zoom** command and back into the **Place Smartline** command and it will show you a more complete picture of the curve you are constructing.

Once you can see the **AccuDraw Compass** at the center of the arc, move your mouse around a bit. Notice that the arc sweeps around with the mouse. To change the direction of the arc, sweep your cursor around the **Compass** point until you see the arc begin to look a little bit more like you want it to. Now you're ready to enter in the Delta of the curve.

Make sure you are typing in **Accudraw's** *Angle* field. Again, if you are in the *Distance* field, just type *Tab* to get to the *Angle* field. Now type the Delta value for the curve into the field. Enter a **Data Point** when you are done.

Step Four: Troubleshoot and Prepare for Another Curve or Tangent

You have now successfully placed a Curve on to your Baseline.

♬ If you made a mistake in this portion of construction, remember NOT TO HIT YOUR **RESET** (Right mouse button.) All you need to do is **Undo** (**Ctrl+Z**) to gracefully step back in the command and pick up your construction from the last correct point. You can **Undo** more than once, if need be, but take it slow and be sure not to **Undo** too far.

If you did (Accidentally) hit your *Reset* key, you can start up again like you did in **Step 2** with one notable exception. You're going to snap to the end of your baseline and Accept to start placing your *Smartline* again. Then you need to get the **AccuDraw Compass** rotated correctly again. Instead of snapping to the center of the last tangent, you're going to want to snap to the center of the last curve that you placed (use the *Center Snap* by typing **C** into *AccuDraw*). Note that this center point is usually far away from the baseline. Once you've snapped, type **RQ** to rotate *Accudraw's* compass.

At this stage of the game you're totally set up to repeat **Step 3** and construct another curve. Your *AccuDraw Compass* should be all set up and your *Angle Mode* should be correct and ready for curve placement. Go back to the beginning of **Step 3** if you're going to lay in another curve.

If, however you are going to construct a tangent from this point, you need to toggle *Smartline* back to its **Segment Type Lines** mode by typing a **Tilde** (~) into **AccuDraw**. Check that the change has been made in the **Tool Settings Window**.

It is not going to be necessary to enter in the *Bearing* for this next tangent. If we have constructed our curve correctly we can just let *AccuDraw* get the *Bearing* right for us.

Move your mouse around until *Smartline* looks like it's going to draw a tangent in the right direction (Figure 22-31). Hit the **Enter** key to activate *Accudraw's* **Smartlock**.

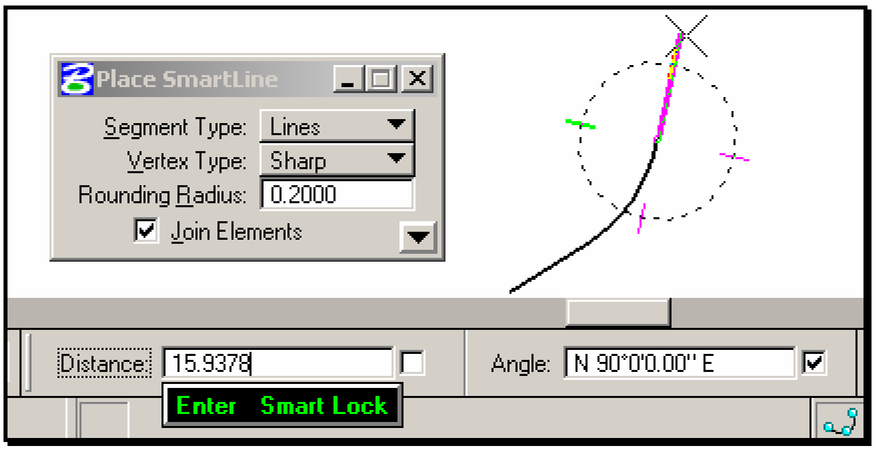


Figure 22-31: Construct Tangent Direction

Make sure you are in the **Distance** field by hitting your **Tab** key and type in the length of the Tangent

Note that this tangent distance is just the distance between the PT and the next PC or end of project. Enter a *Data Point* to accept this point.

Step Five: Troubleshoot and Prepare for Another Curve or Tangent

Again, make sure not to hit your *Reset* until you're done with your whole baseline. If you do hit your *Reset*, check out **Step 2** for a method of getting back on track.

From this point, you now have all the construction tools you need to create any sort of baseline. The next step will be to double-check the geometry you have laid out and make any necessary corrections. Then we'll go on to Stationing and Annotating

BASELINE CHECKING/CHANGING

Once you have your baseline constructed you're going to want to make sure you haven't made any mistakes. If you have, you're going to need to fix it up.

Drop Complex

It's going to seem strange since we went to all that trouble to make sure our alignment was a single element, but the first thing we're going to do when we check our baseline is to drop it up into separate elements. We're going to do this to make it easier to check the length of individual elements.

Pick the **Drop Element** tool from the **Main Tool Frame**. Check your **Tool Settings Window** and make sure that *Complex* is checked off (Figure 22-32). This ensures that *Complex Chains* will be dropped into their individual components.

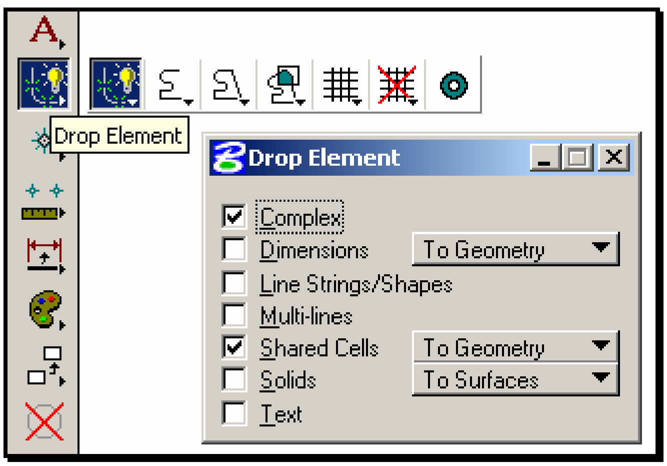


Figure 22-32: Drop Elements Complex

Check your *Status Bar* (at the bottom of your screen) for prompting about what to do next. It should tell you to "Identify element."

Data Point on the baseline. It will highlight, and your *Status Bar* will prompt you to "Accept/Reject (select next input)". *Data Point* to *Accept* and your baseline will be broken up into a series of lines and arcs. If there was an angle point on your baseline, you may have constructed a baseline that has two intersecting tangents. When you drop complex status of this baseline, this "elbow" is going to be preserved as a *Line String*. To drop that *Line String*, use *Drop Complex* again, making sure to have *Line Strings/Shapes* toggled on in your **Tool Settings Window**.

Measure Lengths

From the *Measure* toolbox, pick the *Measure Length* tool. This is a great tool for measuring the components of a baseline. It will tell us the length of tangents and curves, as well as the bearing of tangents. Make sure that you are reading angles in *Bearing* mode by pressing **F9**.

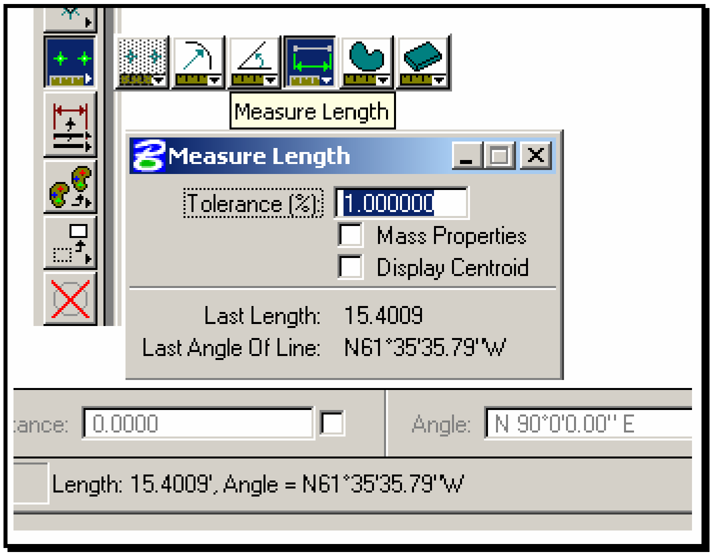


Figure 22-33: Measure Length

Your *Status Bar* will be prompting you to “Identify Element”. It is not going to be necessary to snap to the element to pick it here, just *Data Point* on the element you want to measure. It will highlight, and you’ll be prompted to "Accept/Initiate Measurement." *Data Point* to *Accept*, and MicroStation will display some information for you regarding this element. Look to the lower middle of your *Status Bar or the Measure Length Dialog* for the length of lines and arcs, as well as the bearing of lines (Figure 22-33).

Measure Radius of Curves

Once you have established the bearing of lines and the length of lines and arcs, you should double-check the radii of the curves of the baseline. From the **Measure** toolbox, choose **Measure Radius**. The *Status Bar* will prompt you to "Identify Element."

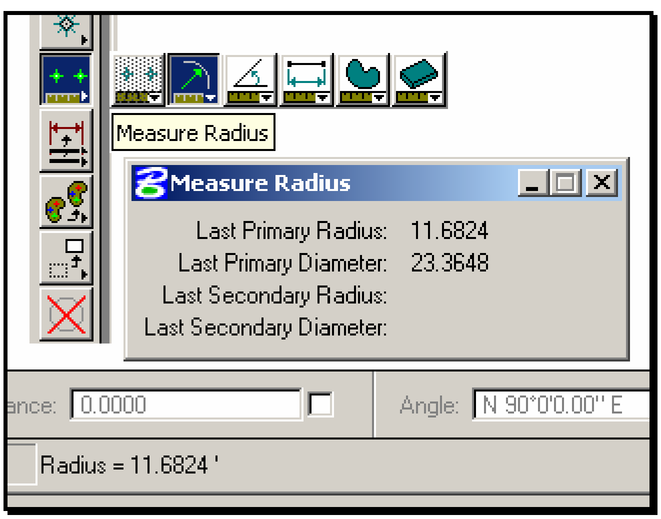


Figure 22-34: Measure Radius

Data Point on an arc and it will highlight. You'll be prompted to "Accept/Initiate Measurement." *Data Point* again and you will see the Radius being displayed in the lower middle of the *Status Bar or the Measure Radius Dialog* (Figure 22-34).

Fix the Problems

So you've found out that something isn't quite right with the baseline you've just constructed. There are a number of tools that we can use to fix it up.

Modify

The *Modify* tool is going to let us change the distance and bearing of lines, as well as the sweep angle (delta) and radii of curves. From the **Modify** toolbox on the **Main Tool Frame**, choose the **Modify** tool (Figure 22-35).

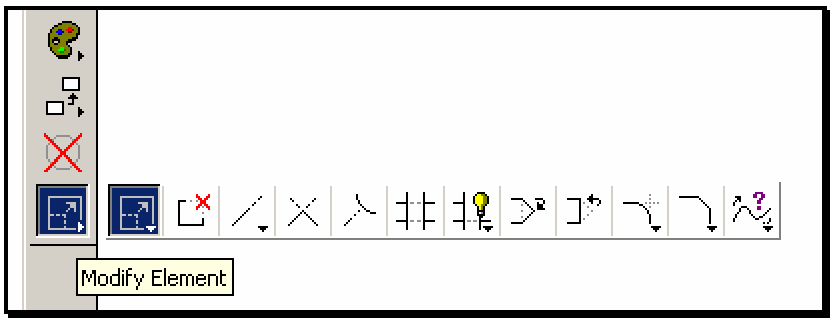


Figure 22-35: Modify Element

Rotate

Say you've made a change to the bearing of a tangent line. That is going to affect the curve that you previously constructed from that tangent. You need to use the *Rotate* tool to reorient that curve to align with your modified tangent.

From the **Manipulate** toolbox on the **Main Tool Frame**, choose the **Rotate** tool (Figure 22-36). From the **Tool Settings Window** make sure to set the **Method** to **3 Points**.

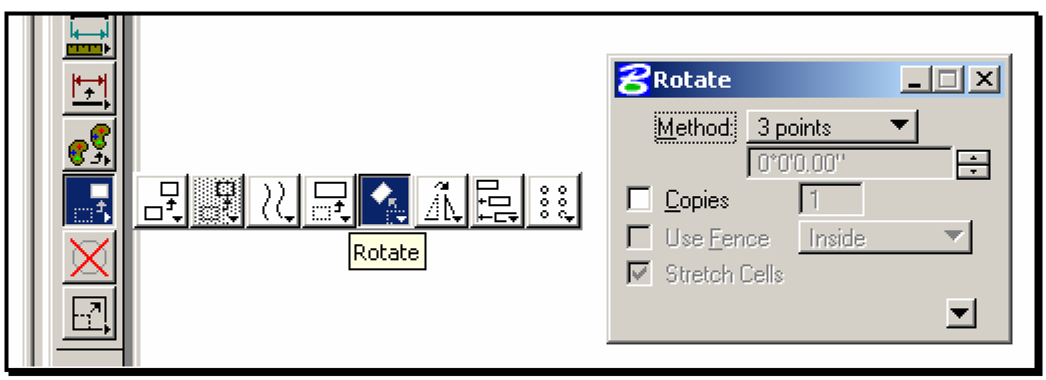


Figure 22-36: Rotate Element

It is also possible that you made a mistake on your initial bearing and need to reorient the rest of your baseline. You might have too many segments to want to fix them one at a time. You can use the *PowerSelector* to pick all of the elements that need to be reoriented (Figure 22-37). That makes it possible to rotate the entire baseline at once.

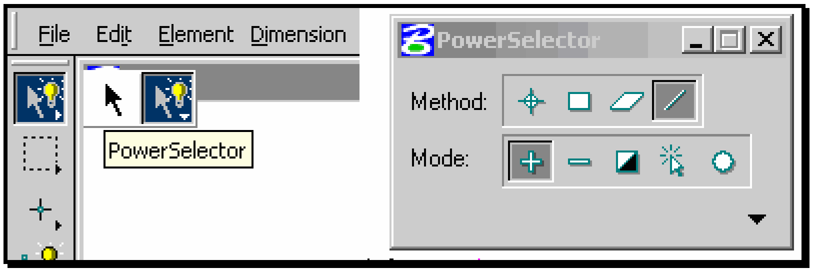


Figure 22-37: Power Selector

Punt

If it looks like it's going to be too complicated to modify and manipulate your baseline into shape, you can always wipe it out and start again. Practice is good.

Put It Back Together Again

Now that we've checked and rechecked and fixed all of the problems in our baseline, we're going to want to reassemble it into a *Complex Chain*. From the **Groups** toolbox, choose **Create Complex Chain**. In the **Tool Settings Window**, make sure to set the **Method** to **Automatic** instead of **Manual** (Figure 22-38). Your **Status Bar** is going to be prompting you to "Identify Element". Pick the first element in the baseline with a *Data Point*. The element will highlight. *Data Point* away to *Accept*.

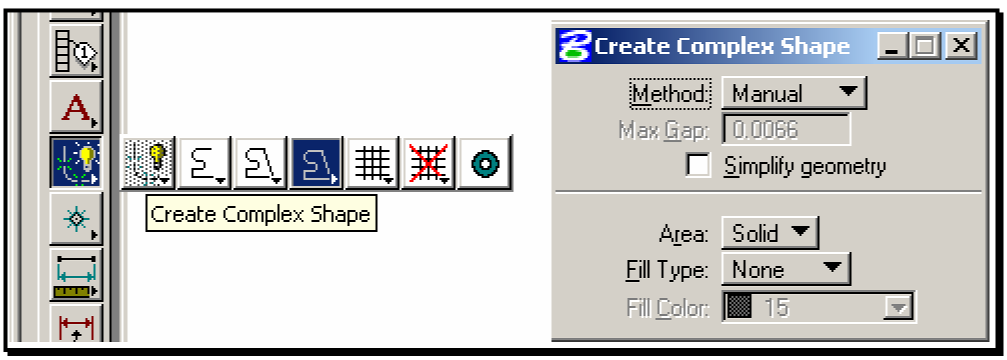


Figure 22-38: Create Complex Chain

Now MicroStation will look for another element to attach onto the end of this first element. Whatever element it can find at the end of that first element (within a certain distance: the "*Max Gap*") will be highlighted, and MicroStation will prompt you to "Accept Chain Element." *Data Point* to *Accept* each portion of the baseline as MicroStation finds it. If MicroStation cannot find an element, it will finish up the *Complex Chain*.

If for some reason MicroStation doesn't find elements that should be part of the baseline, the first thing you need to do is **Undo** the **Complex Chain** that you just created. If you don't do this, you're going to end up with lots of elements on top of each other by the time you're through recreating your baseline.

MicroStation may not have found elements to put on the end of the chain because they were too far away from the end of the element preceding them. This could be as simple as a missed snap or as complicated as a 3D issue. You should be able to resolve it by using the *Move* command (make sure to *PowerSelector* if you want to move the entire alignment together) and carefully put the problem elements into place at the end of the baseline. If this doesn't work, try flattening the file (**Macros>Flatten)**. Then go back and recreate the *Complex Chain* from the first element again.

BASELINE STATIONING

There are going to be a couple of steps involved in Stationing. First we're going to label the PCs and the PTs. Then we'll use those points along with the *"Pointalong"* macro to find a beginning station. From there, we'll use the *Settings Manager* to place our stations.

Construct the PCs and PTs

Choose **BASELINE** from the *Settings Manager* to set the element attributes**.** The way to find the PCs and PTs is to snap to the ends of your curves. Place your cursor *near* the intersection of a tangent with a curve but ON the tangent and hit your middle button. You should see the tangent highlight and a crosshairs will appear at the end of the tangent (Figure 22-39). *Accept* this point with a *Data Point* to start the PC line.

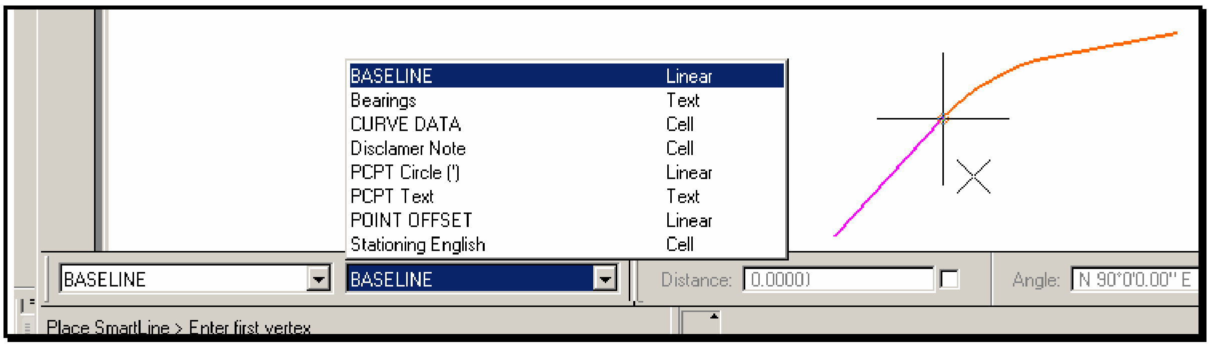


Figure 22-39: Snap to the End of a Curve

Choose **Center** as your *Snap Mode* and *Tentative snap* to the curve. Make sure **AccuDraw** is in **Distance/Angle** mode (the *AccuDraw Compass* will be a circle if it is). Type "150" (50 for metric) as your distance (making sure your cursor is in the *AccuDraw Distance* field.) This will lock your line to be pointed at the center of the curve (perpendicular to the Baseline) and 150 feet (50m metric) long. Accept by entering a *Data Point*.

Repeat this process for all PCs and PTs along the Baseline.

Double Check Your Baseline Chain

Step Zero at this phase is to make sure that your Baseline is all one element (*Complex Chain*). From the **Primary Tools,** pick the **Element Information** tool. MicroStation will prompt you to "Identify Element." Pick on your Baseline with a *Data Point. Data Point* again to *Accept*. A dialog box will appear that will tell you (at the top) what kind of an element your Baseline is. The top of the dialog should say "Element Information for Complex Chain [Type 12]". If it does, close the dialog and continue. If it doesn't, make it into a *Complex Chain*.

Generate a Station Marker

Once the PC's and PT's lines are drawn, you're going to use the Station of a PC or PT to locate an even 100' (20m metric) Station on the Baseline. Press the **F12** key to run the *Pointalong* macro.

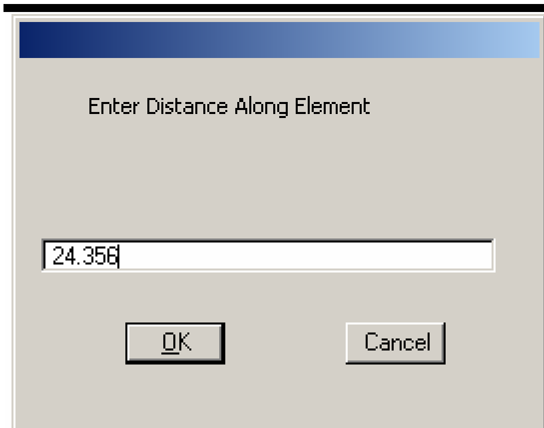


Figure 22-40: Point Along Distance

Data Point to *Accept* and MicroStation will prompt you to enter in a distance (Figure 22-40). Take the station of your PC or PT and calculate the distance to a nearby 100’ (20m for metric) station (you do the math.) Enter this distance and push **OK.** MicroStation will prompt you to “Identify Direction for Construction.” Enter a *Data Point* on the Baseline in the direction of the Station you want to place. Finish drawing the line at this point. This will serve as a *Station Marker Construction Line* for placing your Stationing in the next step.

Place Generic Stations

Now that we have a marker on an even Station, we can use the Stationing tools in the *Settings Manager* to begin to annotate. From the **Settings Manager**, choose **Baseline > Stationing Metric.**

MicroStation is going to prompt you to “Place Cell Along > Identify Element.” We want to pick the Baseline, but we want to be certain to pick it at the point where our Station Marker Construction Line intersects the Baseline. We’re going to do this by using the *Intersection* snap again. Make sure to snap to the Construction line first, then the Baseline. *Data Point* to *Accept* and it will show generic station markers at even intervals along your Baseline. At this point you will need to **Data Point** one more time to Accept this configuration.

Fill in the Station Information

What you have just placed is a series of tick marks along your Baseline. These tick marks are labeled by stations marked 0+00 (0+000 for metric). The next thing we have to do is change these stations to the proper values. These Underlined letters are a special kind of MicroStation text called *Enter-Data Fields.*

We are going to make changes to these Fields by using tools from the **Text** toolbox from the **Main Tool Frame** (Figure 22-41).

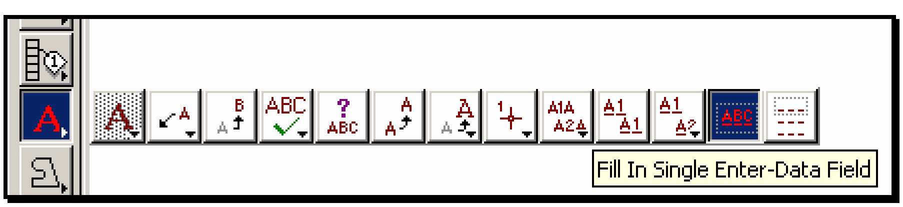


Figure 22-41: Fill in Single Enter Data Field

We’re going to start by changing the value of the first Station on our Baseline. From the **Text** toolbox, choose the **Fill In Single Enter-Data Field** tool. MicroStation will prompt you to "Identify Element". Pick on the underlined characters of your first Station with a single *Data Point*. MicroStation will open the **Text Editor**. Type your Station into the **Text Editor** and hit **Enter** (Figure 22-42).

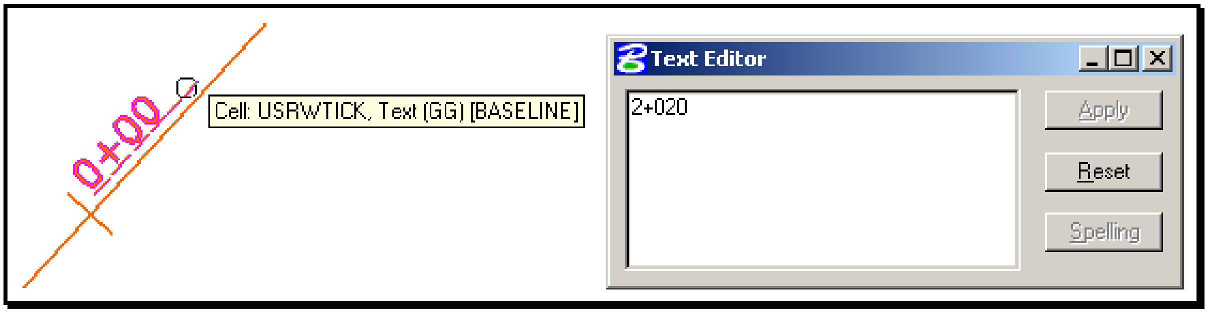


Figure 22-42: Pick an Enter Data Field (Metric Example)

MicroStation will put the text you typed into the **Text Editor** into the **Enter-Data Field** (Figure 22-43).

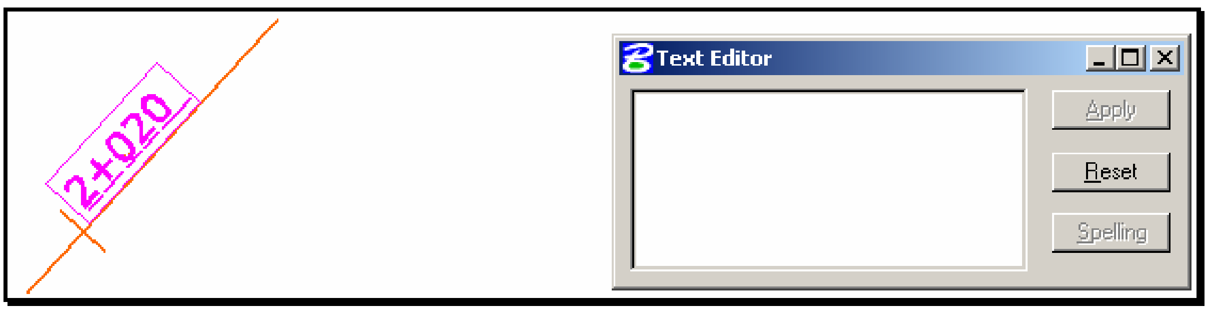


Figure 22-43: Data Point to Change the Field (Metric Example)

Once we have the first Station correct, it's going to be easy to fill in the rest of our Stations. We're going to use a tool that will copy our Data from that one field into each Station. For each Station we fill, MicroStation is going to add 100 to the value of the previous Station.

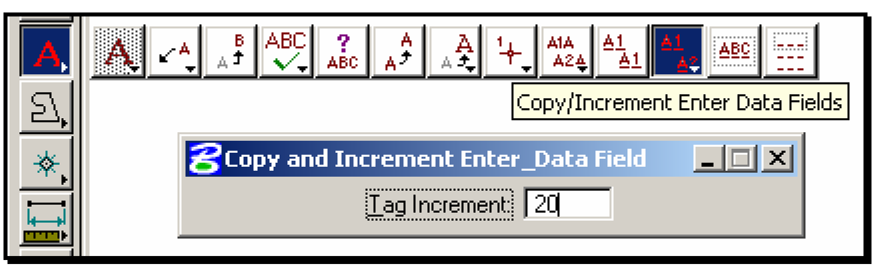


Figure 22-44: Copy/Increment Enter Data Fields

From the **Text** toolbox, pick the **Copy/Increment Enter-Data Fields** tool (Figure 22-44). On your **Tool Settings Window**, set your **Tag Increment** to 100 (20 for metric). MicroStation will prompt you to "Select enter data field to copy." *Data Point* on the field you just entered.

The Station value should appear in your Status bar. Now *Data Point* on the next Station. MicroStation will change the value of that Station to the next appropriate value.

Keep picking stations (in order) until you get station 2+100. MicroStation is not smart enough to put that hundred marker on the left side of the plus sign. Go back to the *Fill In Single Enter-Data Field* tool and change the station to 3+00. Then use the **Copy/Increment Enter-Data Fields** tool to continue stationing.

PTS AND CURVE DATA

There are only a couple of tricks to labeling the PCs, PTs and Curve Data.

Text Placement Options

The first step here is to label the PCs and PTs. MicroStation has a couple of text placement features that are going to make this an easy process. When you place text, you have a number of options about how that text is going to get stuck into the drawing. By default, your text placement method is **By Origin**. This method hangs the text off the end of your cursor and stamps it into the drawing wherever you click.

The methods that we're going to be using to label the PCs and PTs are **Above Element** and **Below Element** (Figure 22-45). When you use these methods, you type in the text you'd like to place, and then *Data Point* on an element. MicroStation will then place in the text you've typed either *Above* or *Below* that element.

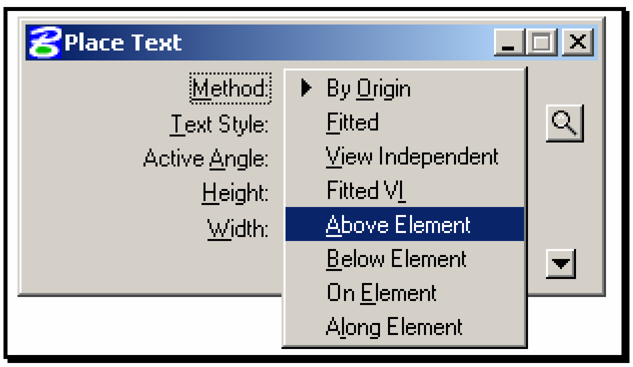


Figure 22-45: Text Placement Methods

We will also be setting the **Justification** value to either a **Right Top** or a **Left Top Justification**. If the PC/PT line is on the Right of the Baseline, we'll be using the **Right Top Justification**. If the PC/PT line is on the Left of the Baseline, we'll be using the **Left Top Justification**. To set the *Justification*, expand by click the arrow in the lower right corner of the *Place Text Dialog*.

Label the PCs and PTs

From the **Settings Manager** choose **Baseline > PCPT Text**. This will set your active text height, width, and font and will launch the *Place Text* command. Based on the desire to keep the PC and PT labels to the INSIDE of the curve, make a decision about whether your current PC or PT should be **Above** or **Below** the PC/PT line. Select **Above** or **Below** from the **Method** section of the **Place Text Tool Settings Window**. Select a **Justification** from the same **Tool Settings Window** (Figure 22-46).

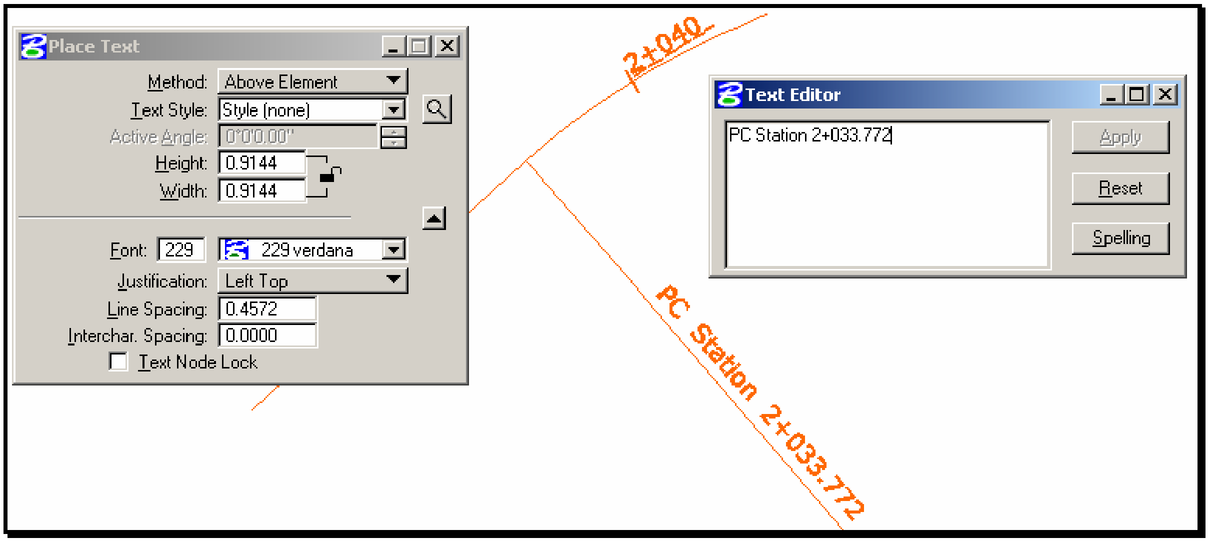


Figure 22-46: Labeling a PC (Metric Example)

Type your text into the **Text Editor** and place it on your PC/PT line by snapping (*Keypoint*) to the end of the line. **Data Point** to Accept and MicroStation will highlight the line (Figure 22-46). **Data Point** again and it will place the text.

Place PC/PT Circles

Next we need to place circles (of radius 2.5' (.75m metric) at the PC and PT point on the Baseline. From the **Settings Manager** choose **Baseline** > **PCPTCircle (m)** or **>PCPTCircle (')**. This will stick the appropriately sized circle on the end of your cursor. Stamp it into place by snapping to the ends of the PC/PT lines.

Place and Edit Curve Data

Once you have labeled the PC and PT lines with text and circles, it's time to place Curve Data on the Baseline. Our Curve Data is stored in a cell in our ROW cell library. We're going to place the cell onto our drawing as many times as necessary to label all of our curves. For each one, we're going to want to try to rotate the cell such that it's aligned with the radius of the curve at the center of the curve's length.

From the **Settings Manager**, choose **Baseline > Curve Data** (Figure 22-47). This will pick our Curve Data cell from our cell library and stick it on the end of your cursor.

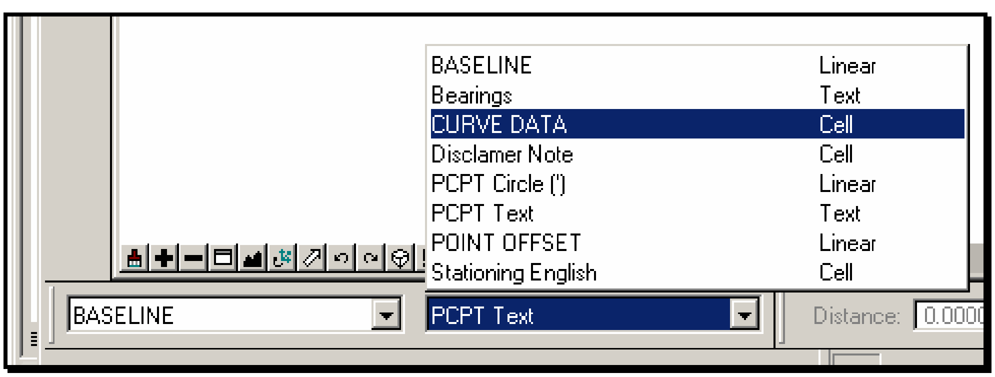


Figure 22-47: Choose Baseline>Curve Data

When the *Cell Tools Dialog* appears click on the **Place Cell and Rotate Icon** (Figure 22-48). By adjusting the number of degrees in the **Angle** field of the **Place Cell and Rotate Dialog** can be placed between the PC and PT of the curve with a *Data Point*.

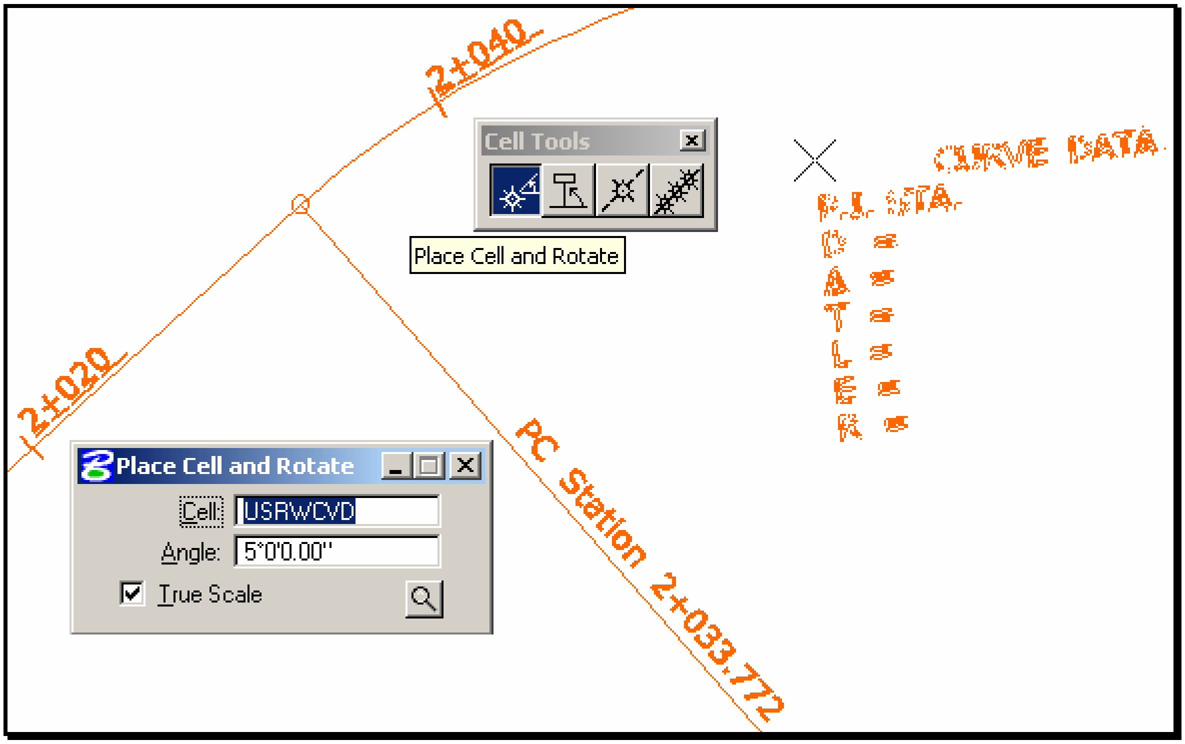


Figure 22-48: Placing Curve Data

Once your Curve Data is in the right place on your drawing, you are going to have to edit it to the correct values. Since you can't edit text that is in a cell, we're going to have to start by *Dropping* the cell into its *Components*.

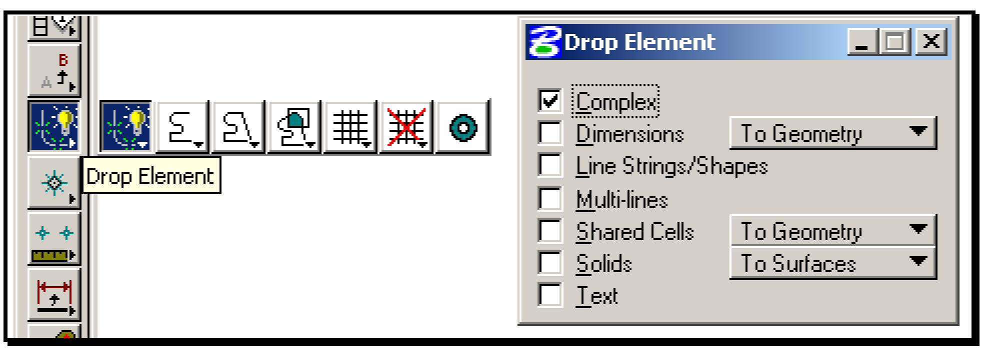


Figure 22-49: Drop Element Tool Settings

From the **Main Tool Frame**, pick **Drop Element**. Look at your **Tool Settings Window** and make sure that **Complex** is turned on (Figure 22-49). MicroStation will prompt you to "Identify Element." Pick on the Curve Data Cell. It will highlight, and you will *Accept* with a *Data Point* to complete the *Drop*.

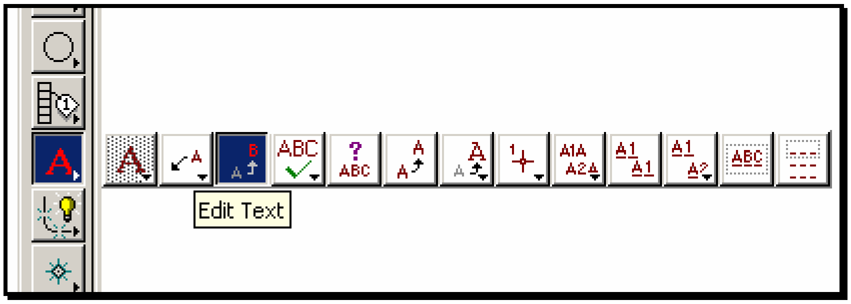


Figure 22-50: Edit Text Button

Once the Curve Data has been dropped, use your *Edit Text* tool to change the values to reflect your current curve (Figure 22-50).

RESOURCES

ROW FUNCTION KEYS

F1	Flatten Flattens your active file to 0 elevation
F2	Window in
F3	Zoom Out
F4	Update View
F5	*PowerSelector*
F6	Fence
F7	*AccuDraw* On/Off
F8	Set Angle Mode to Conventional
F9	Set Angle Mode to Bearing
F10	Distance Macro measures along element and gives you options on how you can label distances.
F11	Perpendicular Snap
F12	Construct Point at Distance and Offset
Alt+F1	Works similar to a refresh/ clear
Alt+ F2	Acre/square Feet Macro Automatically changes Square meters to feet or acres and places on your pointer.
Alt+ F3	/actan2 changes your active angle with 2 hit points for placing text.
Alt+ F4	Reserved for Closing Windows/Files
Alt+ F5	Copy Parallel & Change Attributes (Color, Style, Level, Etc.)
Alt+ F6	
Alt+ F7	
Alt+ F8	
Alt+ F9	
Alt+ F10	
Alt+ F11	
Alt+ F12	Copy Parallel
Shift+F1	
Shift+ F2	
Shift+ F3	

Shift+ F4	
Shift+ F5	
Shift+ F6	
Shift+ F7	
Shift+ F8	
Shift+ F9	
Shift+ F10	
Shift+ F11	
Shift+ F12	
Ctrl+F1	
Ctrl+ F2	
Ctrl+ F3	
Ctrl+ F4	
Ctrl+ F5	
Ctrl+ F6	
Ctrl+ F7	
Ctrl+ F8	
Ctrl+ F9	
Ctrl+ F10	
Ctrl+ F11	
Ctrl+ F12	Move Parallel

BOUNDARY SURVEY VERIFICATION

LAUNCH INROADS SUITE

♬ All instructions are based upon the project folder being created using the InRoads Survey Project setup icon.

✓ ***Refer to page 4-2 for information about the InRoads Survey Project setup program.***

Step One: Launch InRoads

Start InRoads using the desktop icon (Figure 22-51).

Figure 22-51: InRoads Suite Desktop icon

Step Two: Adjust User

In the *Workspace* portion of the *MicroStation Manager* dialog (Figure 22-52), adjust the *User* pull down to **InRoads_Local.**

Step Three: Pick your Project

Select your project from the *Project* pull down.

♬ This should adjust your directory path to your project's SURVEY/MSTA directory.

ⓘ ***Never browse for your project in the directory portion of the dialog. If your directory doesn't point you to your project, contact CADD Support personnel.***

Step Four: Select a File to Open

The *Interface* pull down should always read **mdot.** Select the **Survey.dgn** from the list of files to open (or another file if this one doesn't exist). Click **OK.**

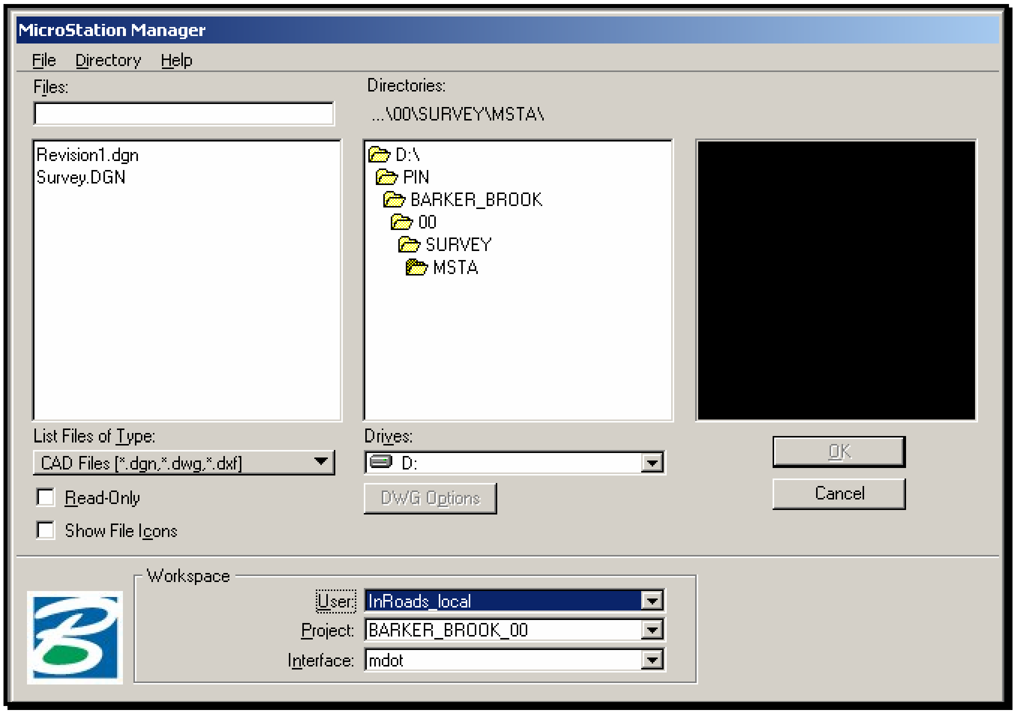


Figure 22-52: Workspace area of the MicroStation Manager dialog

Step Five: Upgrade the File (if necessary)

- If the *Information* message appears (Figure 22-53), alerting the user that the chosen *.dgn is not in the correct units of resolution, then the file must be corrected before being used in the InRoads software.

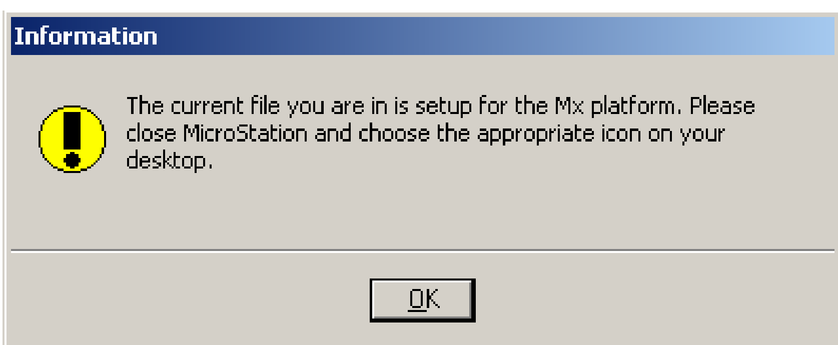


Figure 22-53: Information dialog stating that the file was created for the MX platform

Click **OK.**

After the file opens, select **InRoads>Update UOR and units** from *MicroStation's* main menu (Figure 22-54).

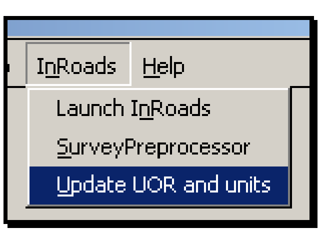


Figure 22-54: Run the Update UOR and Units from the MicroStation menu

The *Update MaineDOT Foot File* dialog will open displaying information about the program (Figure 22-55). Select **Proceed.**

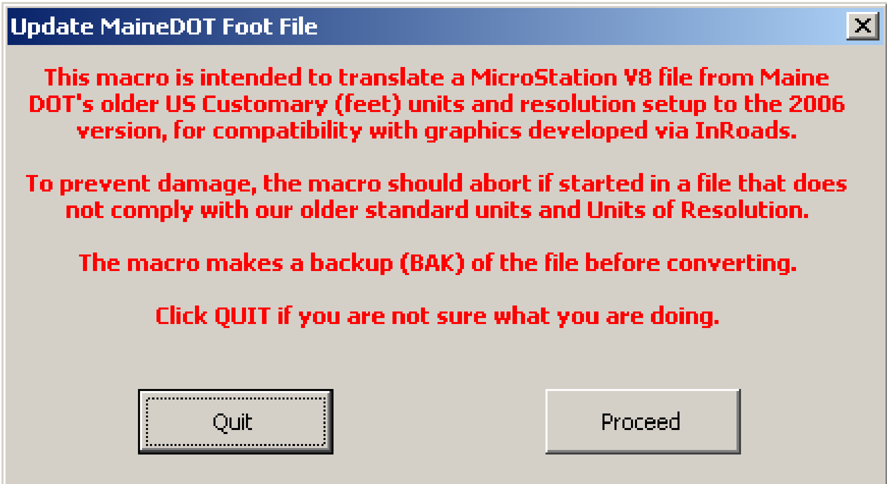


Figure 22-55: Update MaineDOT Foot File program dialog

Once the program is done processing, a message will appear (Figure 22-56). Click **OK.**

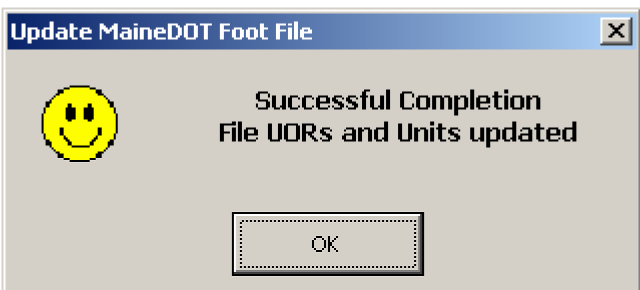


Figure 22-56: Successful Completion message

CREATE A GEOMETRY MODEL

Overview

InRoads handles a boundary as an alignment, therefore, a *Geometry Project* must be created to store the bearings and distances needed to verify boundary information. This process will allow for checking of closure tolerances.

Step One: Create a Geometry Project

Using the tabs located at the lower left of the InRoads panel, select **Geometry** (Figure 22-57).

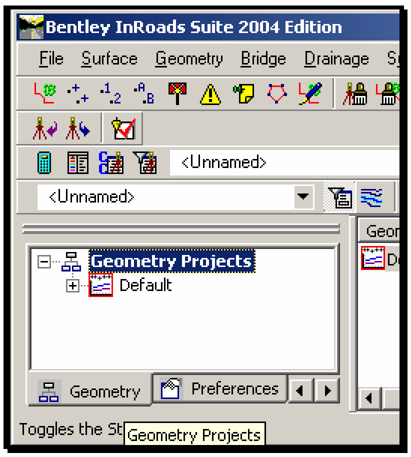


Figure 22-57: Select the Geometry tab

Right-click on the **Geometry Projects** name and Select **New…** (Figure 22-58).

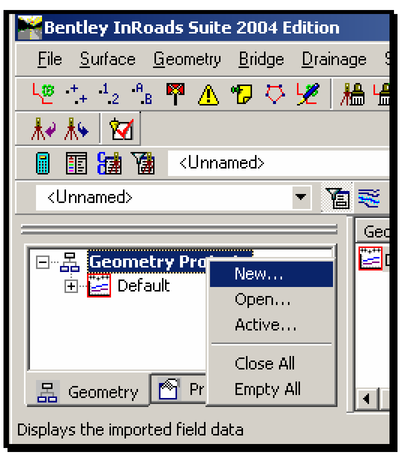


Figure 22-58: Right Click and select New

The *New* panel will allow the user to create and name the geometry project (Figure 22-59). Verify that the *Type* is set to **Geometry Project.** The *Name* for this example will be **Parcel 1**. The *Description* is **Barker Brook Easements**. Click **Apply.**

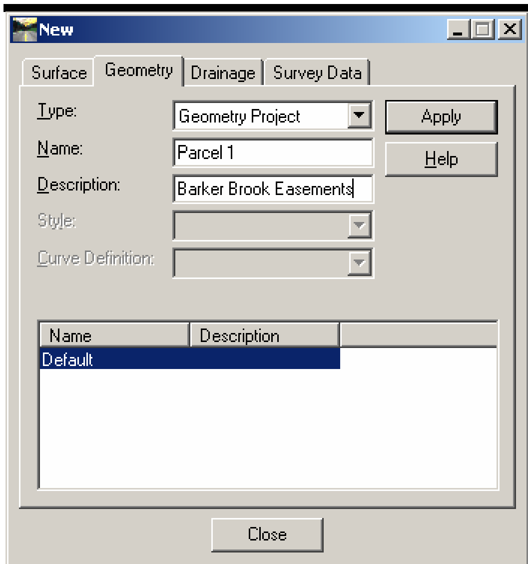


Figure 22-59: Create the Geometry Project called Parcel 1

Step Two: Create a Horizontal Alignment

In the *Type* field, select the pull down and change the *Type* to **Horizontal Alignment** (Figure 22-60). Enter **Parcel 1 alignment** in the *Name* field. Set the *Style* to **E_Property_Easement_line**. The *Curve Definition* is **Arc**. Click **Apply.** Click **Close.**

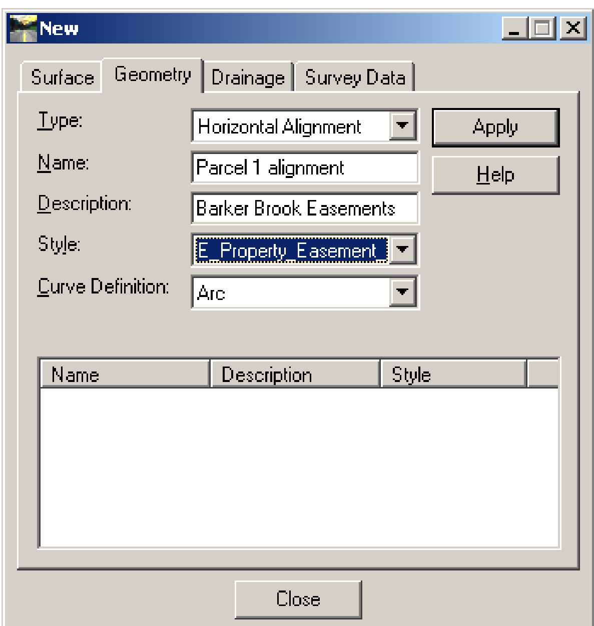


Figure 22-60: Create a Horizontal Alignment

Step Three: Set the Active Alignment

Expand the Explorer view of the project located at the left side of the InRoads panel. With the alignment name selected, right-click with the mouse and **Set Active** (Figure 22-61).

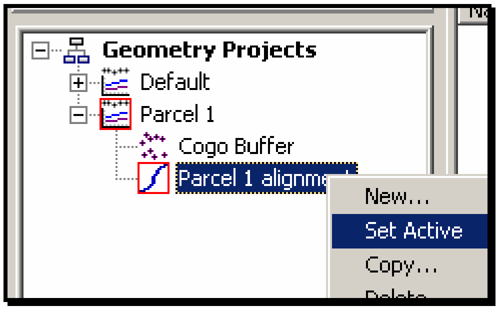


Figure 22-61: Right Click Alignment and Set Active

Step Four: Create a Traverse

Select **Geometry>Traverse** from InRoads main menu (Figure 22-62).

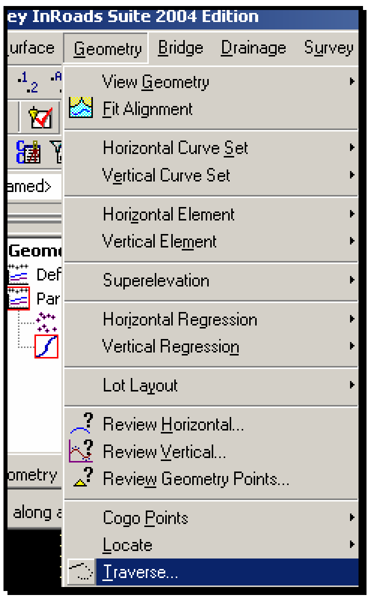


Figure 22-62: Select Traverse from the InRoads main menu

In the *Traverse* dialog (Figure 22-63), set the *Method* to **Direction.** Set the *Insert Point Mode* to **After Alignment.**

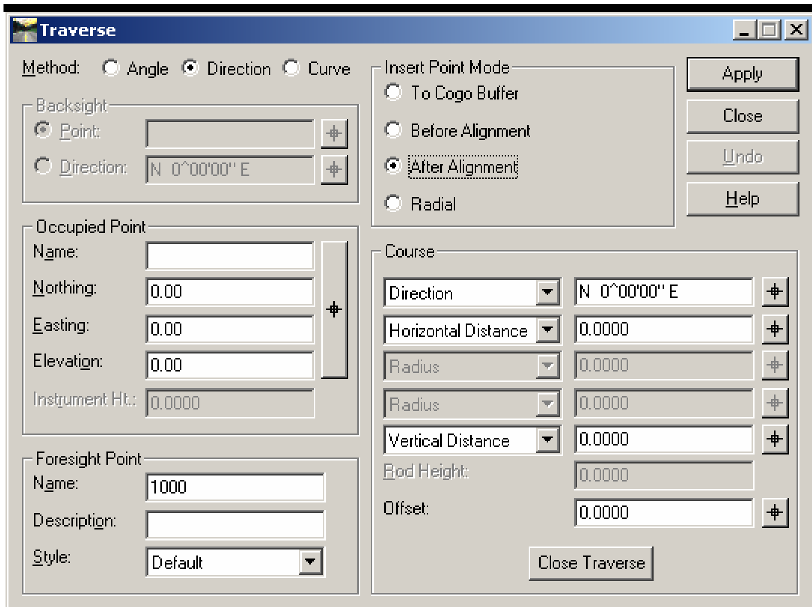


Figure 22-63: Adjust the Traverse dialog

Step Five: Identify Starting Point

Using the *Occupied Point* selection button (target symbol), click on the starting position of the boundary. This will populate the *Northing* and *Easting* fields with the starting coordinates.

Step Six: Set Point Name and Style

Set the *Foresight Point Name* to **1000.** Set the *Description* to **Start.** Set the *Style* to **E_Property_Easement_line** (Figure 22-64).

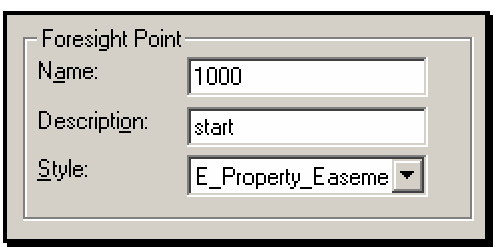


Figure 22-64: Enter Point Name, Description and Style

Step Seven: Enter Deed Description

With the Occupied point and foresight point information set, follow the boundary description and enter in the necessary bearing and distance information (Figure 22-65).

In the *Course* portion of the dialog, set the *Direction* to the first bearing (i.e. N 16 15 W). Set the *Horizontal Distance* (i.e. 80.1). Click **Apply.**

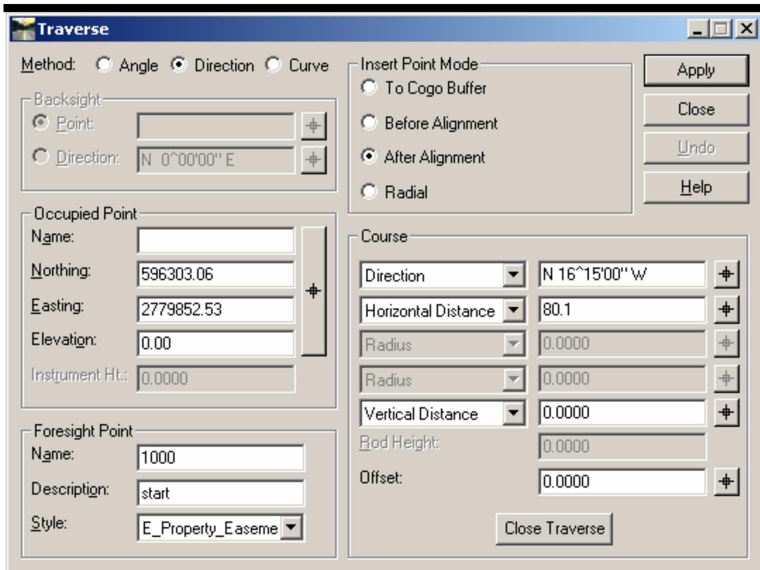


Figure 22-65: Enter the deed description's bearing and distance

A Results panel (Figure 22-66) will appear automatically if the InRoads Report lock is on. This can be minimized during this operation and viewed at a later time.

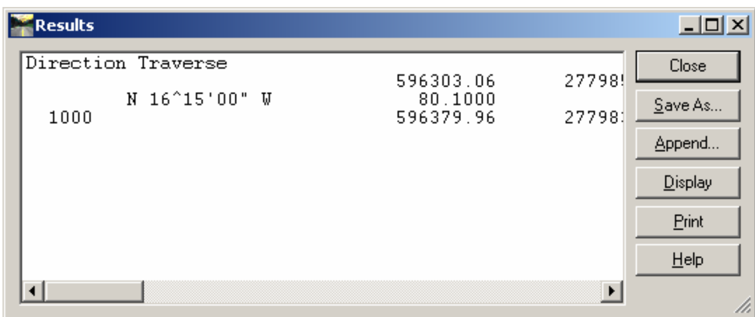


Figure 22-66: The Results dialog displaying the current traverse

The Traverse panel has been updated so that the *Occupied Point* information now reflects point number 1000 and the foresight point name is automatically incremented to point 1001 (Figure 22-67). The description can be modified to reflect the new description for the next point of the boundary (i.e. *Angle Point*). Enter the next set of course direction and distance, then click **Apply.**

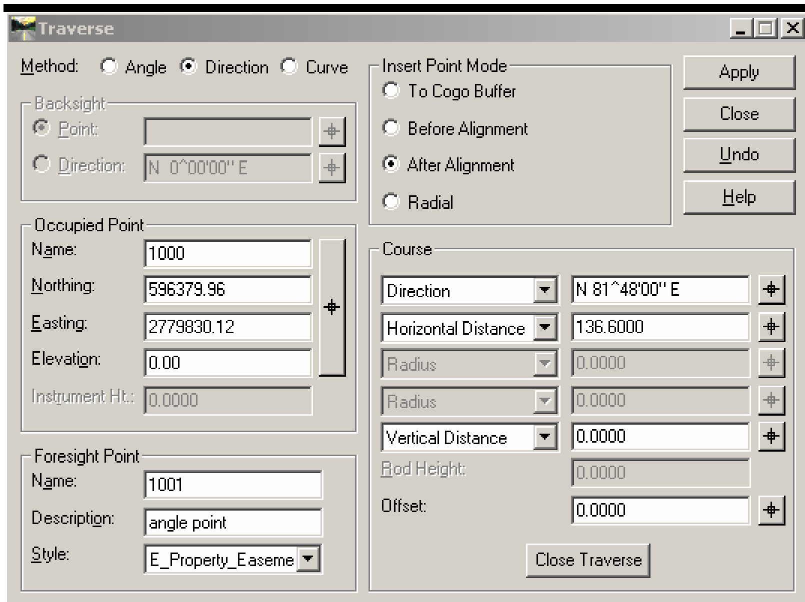


Figure 22-67: Traverse dialog auto incremented and ready for next description

- The direction field can be easily changed by double-clicking on the numbers. This does not change the course direction though, but if there were a number of values to be entered in the same quadrant, this is a quick way to type those in.
- The Tab key will move from the direction field to the distance field and highlight the number so the user can type in the new distance.

Following the boundary description documentation, continue in this manner until all sides have been entered. At any given time the user may expand the minimized Report window to view the data that has been entered.

With the last bearing and distance values added, the user can close the Traverse Panel.

ⓘ ***Do not click the Close Traverse button, if this process was done to check the boundary for closure. By using the Close Traverse button, the boundary traverse will automatically close with whatever the necessary bearing and distance needs to be, eliminating any error.***

Step Eight: Annotate the Boundary

To graphically view the bearings and distances on the boundary just created, select **Geometry>View Geometry>Horizontal Annotation** from the InRoads main menu (Figure 22-68).

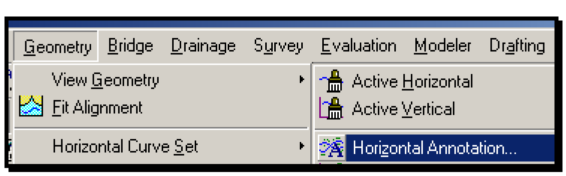


Figure 22-68: View Horizontal Annotation to graphically view annotation

Use the data point button (target icon) to pick the alignment from the screen display. The alignment will be added to the *Selected:* area of the dialog (Figure 22-69).

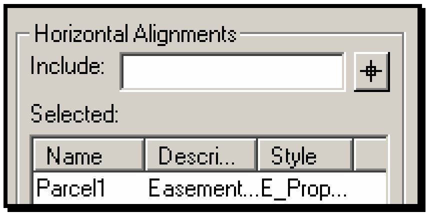


Figure 22-69: The list of alignments selected to be annotated

CADD Support created a preference to view this annotation with the correct display properties. Select **Preferences** from the lower portion of the dialog (Figure 22-70).

Figure 22-70: Select a custom preference

Select the preference for **Property** (Figure 22-71). Click **Load.** Select **Close** to dismiss the dialog.

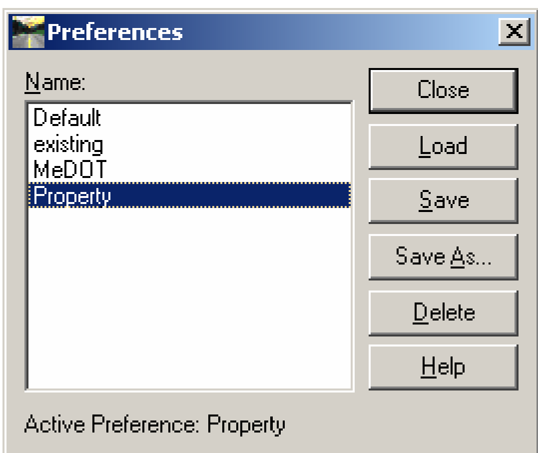


Figure 22-71: Select and Load the Property preference

The *View Horizontal Annotation* dialog is now adjusted to match the Property preference (Figure 22-72). Click **Apply.** Select **Close.**

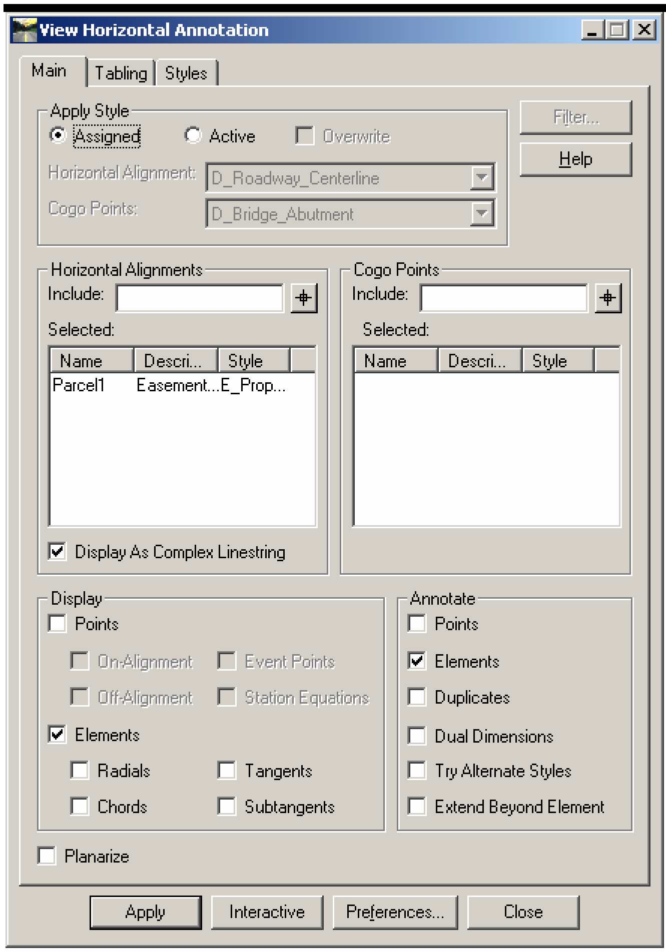


Figure 22-72: View Horizontal Annotation adjusted by the Property Preference

The annotation is displayed with the bearing and distance (Figure 22-73).

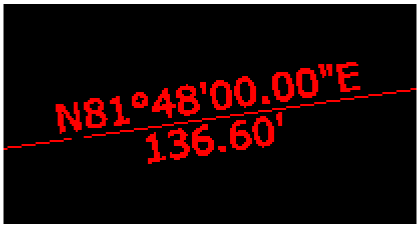


Figure 22-73: Bearings and Distances annotation are displayed

CLOSURE CHECKING

Step One: Open Traverse Edit

To check the closure error, select **Geometry>Utilities>Traverse Edit** from the InRoads main menu (Figure 22-74).

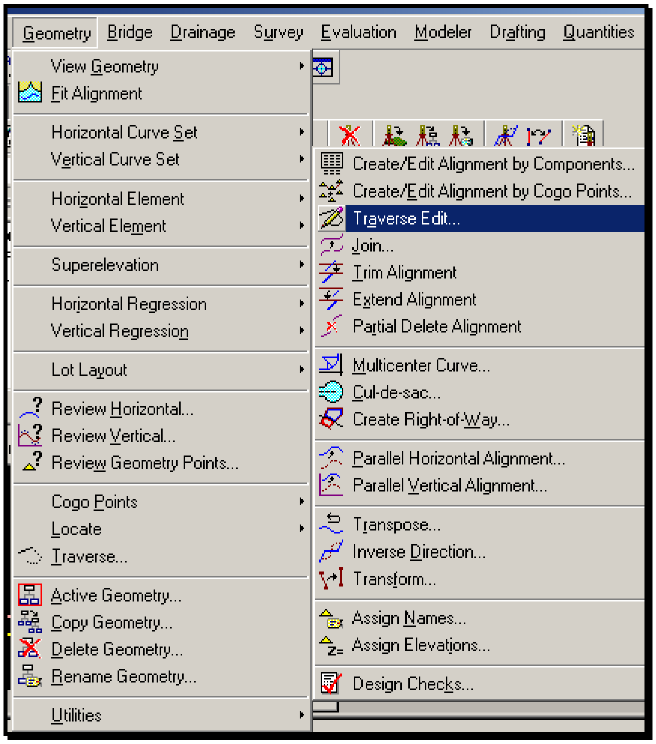


Figure 22-74: Open the Traverse Edit dialog

Step Two: Select Geometry Project

Select your *Geometry Project* from the pull down if it's not already set as your *Active* geometry project (Figure 22-75). The *Traverse Edit* dialog offers the user a chance to check the closure results.

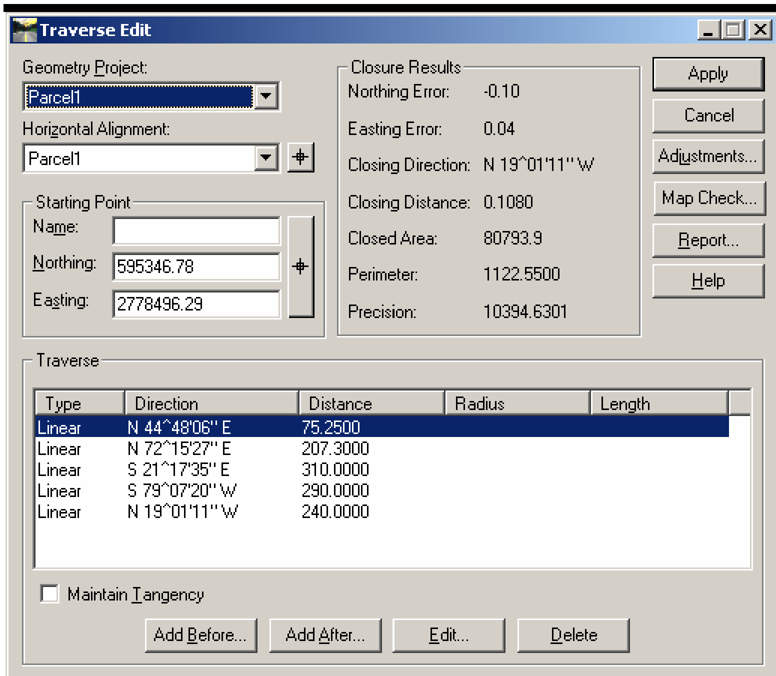


Figure 22-75: Traverse Edit dialog

Step Three: Make Adjustments (if necessary)

Adjustments may be made by selecting the boundary course in the *Traverse* portion of the dialog. To adjust the *Direction* or *Distance*, highlight the boundary course and select **Edit** at the bottom portion of the dialog.

Part One: Modify Existing Boundary Lines (if necessary)

Modifications are made in the *Edit Element* dialog (Figure 22-76). Once changes are made the user must click **Apply,** and then **Cancel.**

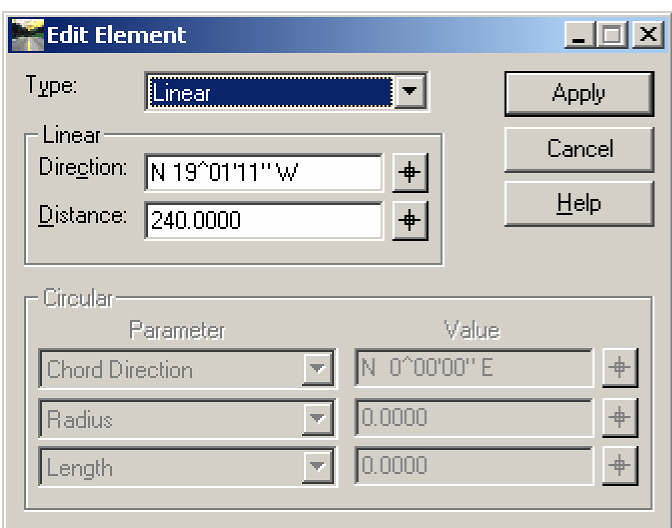


Figure 22-76: Edit Element dialog allows adjustment to existing boundary lines

Part Two: Add Elements (if necessary)

If the user needs to add another element to the boundary, highlight an adjacent element and select either *Add Before* or *Add After* from the lower portion of the *Traverse Edit* dialog (Figure 22-75). This opens the *Add Element After or Before* dialog (Figure 22-77). Add the new element and select **Apply** and then **Cancel.**

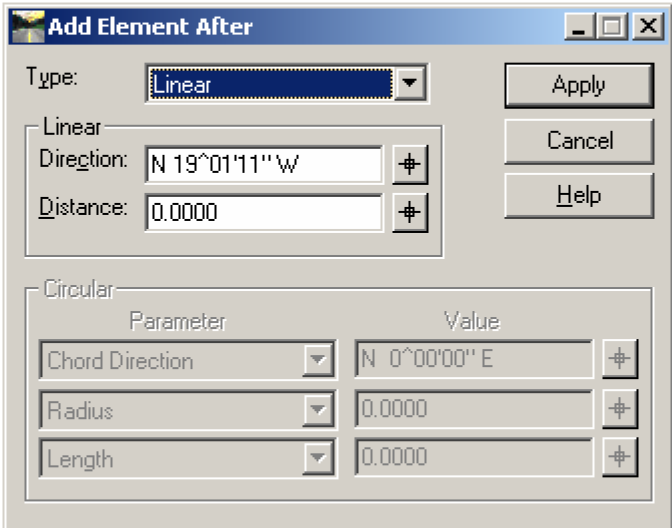


Figure 22-77: Add Element Before or After dialog

Part Three: Apply Changes to the Boundary

For the boundary to retain the changes made, select the **Apply** button on the *Traverse Edit* dialog (Figure 22-75).

Step Four: View Report

A report of the boundary can be generated by clicking the **Report** button in the *Traverse Edit* dialog. The report opens in the *Results* dialog (Figure 22-78). This is an example of the report that is generated.

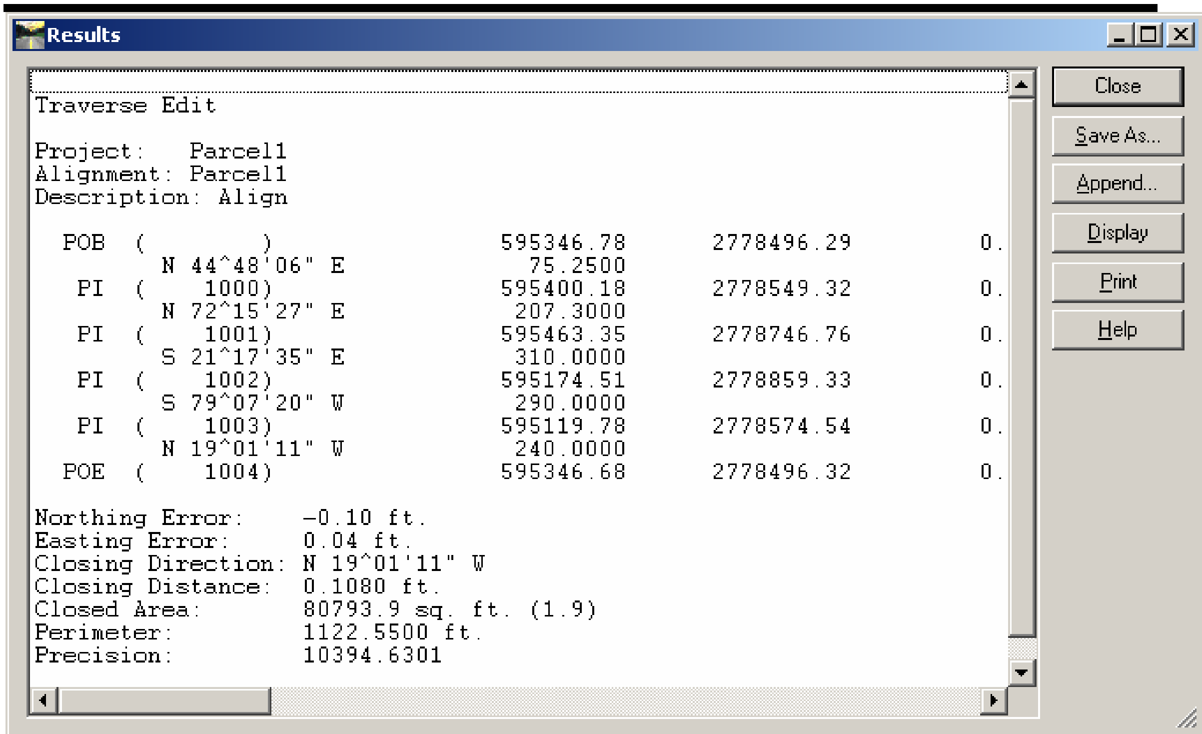


Figure 22-78: The Results dialog displays a report of the boundary

XML REPORTS FOR BOUNDARIES

CREATE PROPERTY BOUNDARY REPORTS

Overview

InRoads has the ability to generate XML reports containing a variety of different formats of boundary descriptions. The boundary must be completed as an active *Alignment* and saved.

Step One: Open the XML Reports dialog

Select **Tools>XML Reports>Legal Description** from InRoads main menu (Figure 22-79).

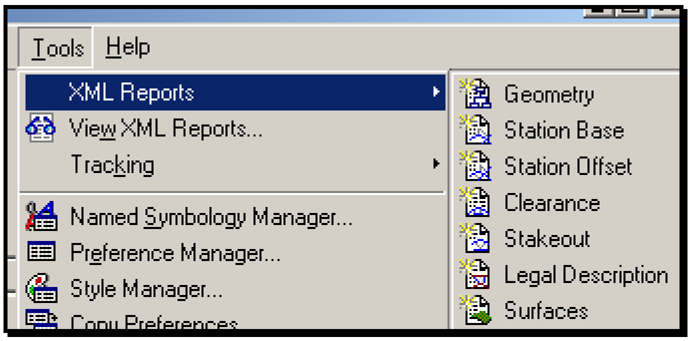


Figure 22-79: Opening the Legal Descriptions dialog

Step Two: Select the Alignment

Graphically select the boundary (alignment)

Using the Data point button (target icon) select the *Alignment* that represents the parcel boundary graphically from the view window (Figure 22-80).

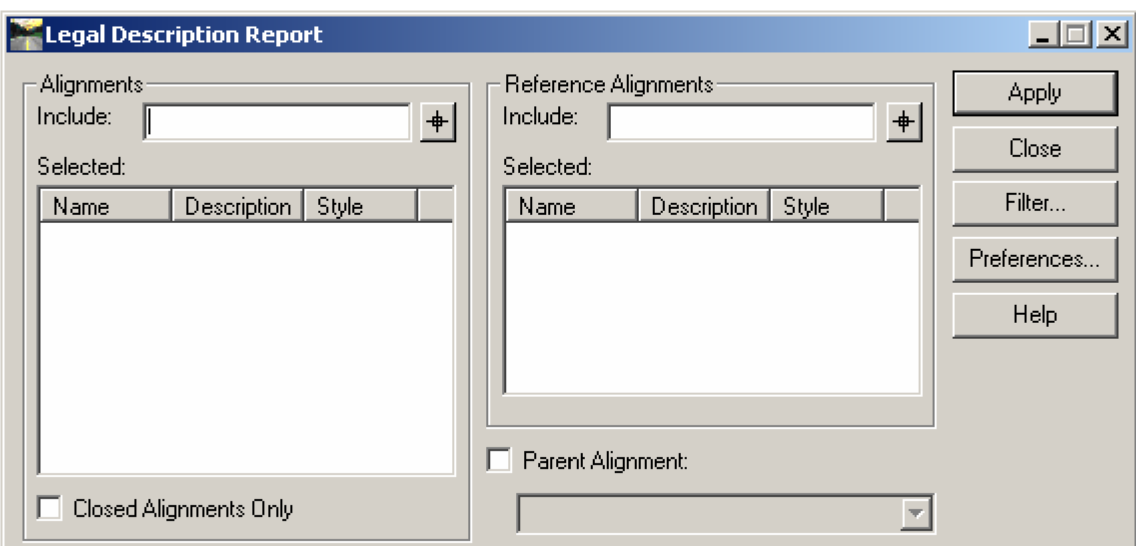


Figure 22-80: Example of Legal Description Reports panel

ⓘ ***If the alignment won't select from the screen, be sure to verify that it is an open/ active geometry project in InRoads. If the report is being generated at a later time, the user will have to open the Geometry Project first (Figure 22-81).***

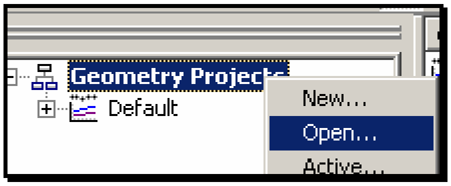


Figure 22-81: Opening a Geometry Project

Re-Opening an Alignment (if necessary)

If you need to re-open your *Geometry Project*, right-click on the *Geometry Projects* folder in the InRoads explorer, and click **Open.** At the *Open* dialog (Figure 22-82), select the alignment name (i.e. Parcel1.alg), click **Open** and then **Cancel.**

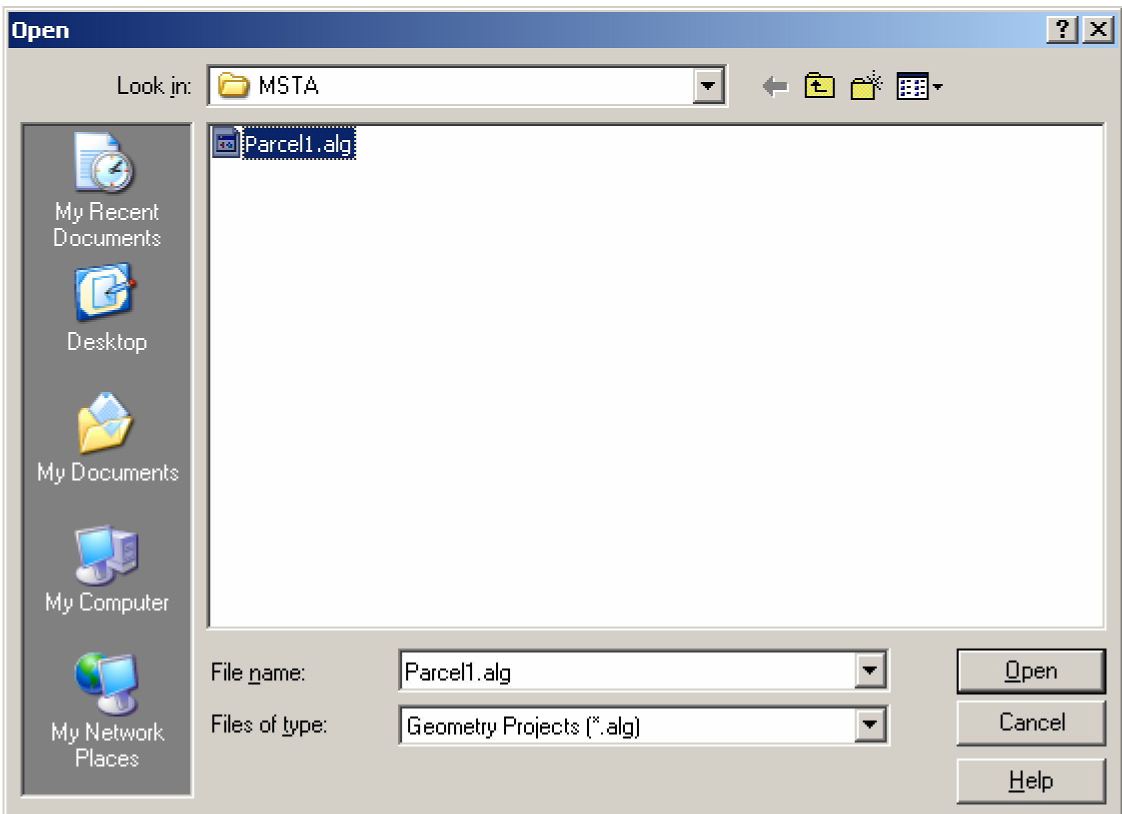


Figure 22-82: Open Geometry Project dialog

Step Three: Select Apply

With the boundary alignment highlighted in the *Selected* portion of the dialog (Figure 22-83), click **Apply.**

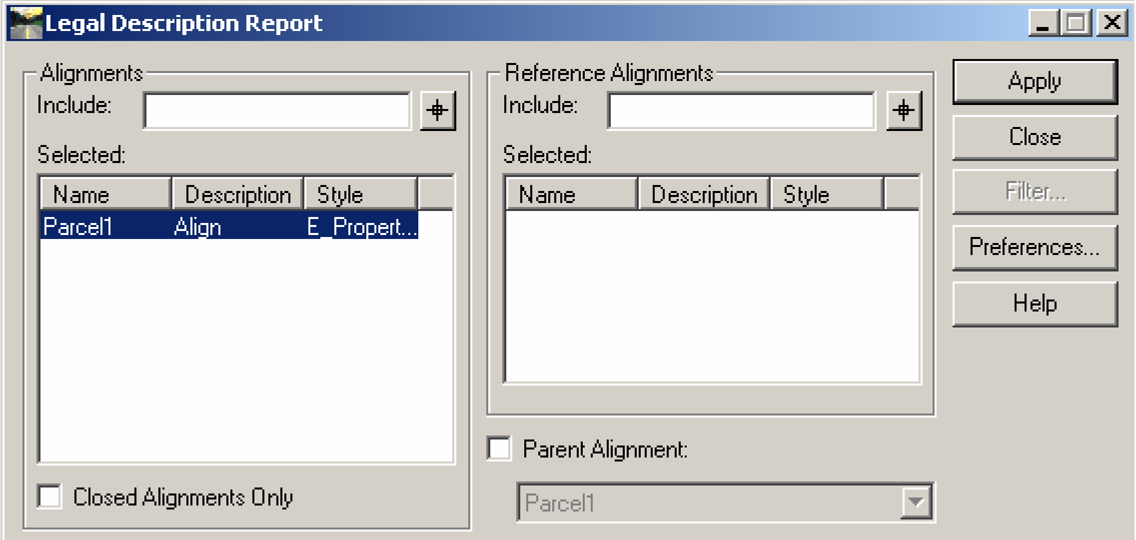


Figure 22-83: Select your alignment and click Apply

Step Four: Choose XML Format Type

The XML report displays automatically. Different report formats can be displayed by selecting from the choices listed in the left hand explorer view (Figure 22-84).

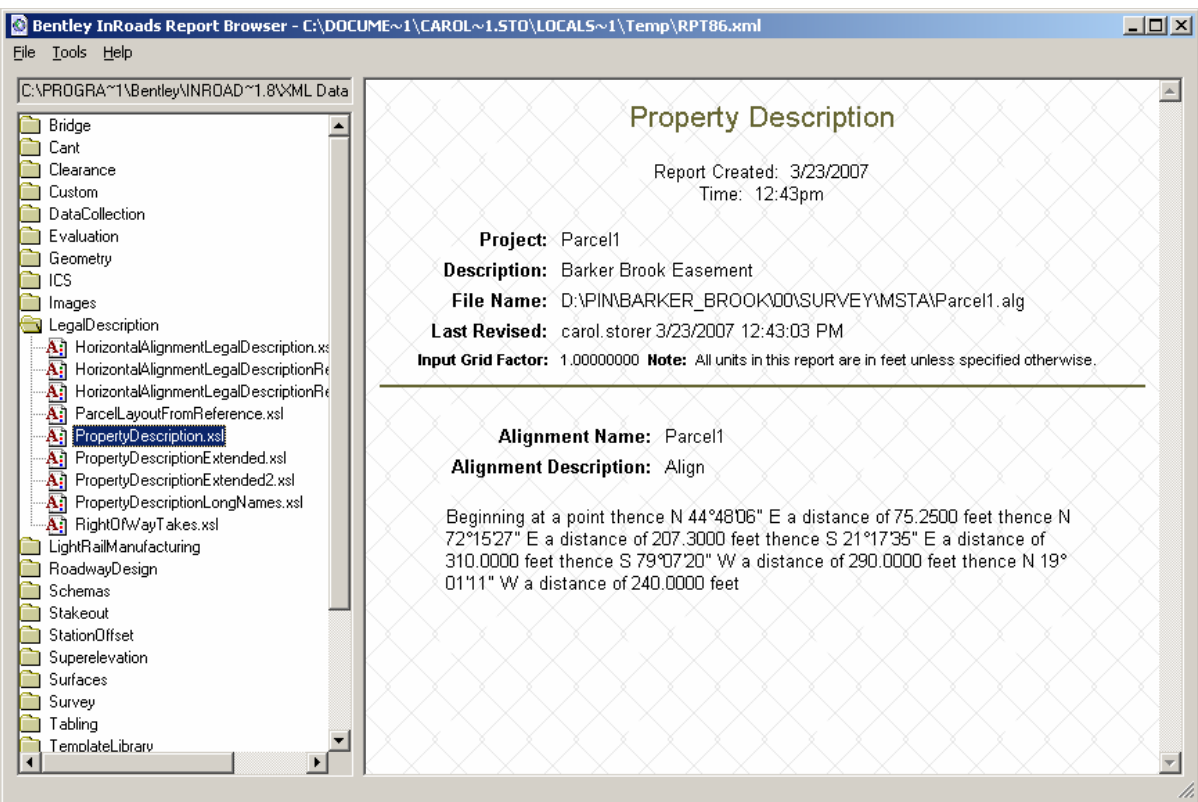


Figure 22-84: XML Report is displayed with current style sheet

Step Five: Save As…

Once the type of report has been selected, the user can choose to save it by clicking **File>Save As…** (Figure 22-85). Browse to the correct folder location to save the document. This should be the **Reports** folder located within the project's directory folder (i.e. \SURVEY\MSTA\REPORTS). Select the **Close** button to dismiss the dialog.

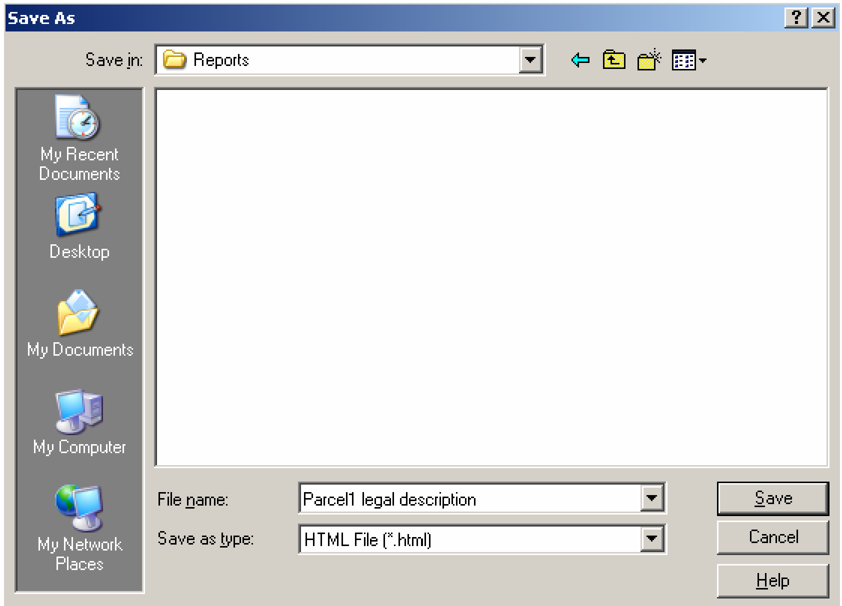


Figure 22-85: Save As dialog waiting for file name and type

Chapter 23 Structural Sheets

OVERVIEW

DETAILING TO SCALE

Introduction

We'd like to make it as easy as possible to draw our structural details. The biggest problem we face in doing this is the issue of controlling text and dimension size relative to plot scale. To make sure we're always drawing 1:1 (full size), we've adopted a workflow that relies on MicroStation's built-in use of reference files, as well as a heavily customized *Settings Manager*.

File Segregation

Let's look at an abutment as an example of how we're going to segregate files. Say we have three sheets for abutment one: a footing sheet, an abutment sheet and a wing sheet. In our bridge\msta\ folder for this project, we will have one .dgn file that corresponds to each of these sheets. They might be named "016_abutment1.dgn" "017_pier_1.dgn" and "018_framing.dgn." These files would be empty except for a border that contains the title block, signature block, etc. All of the detailing work that we've done for this abutment will be other files, which might be called "z_abut_1.dgn", "z_pier_1.dgn" and "z_framing.dgn." These files contain the lines, text and dimensions that make up our details.

Creating A Detailed Drawing

The first step in detailing our abutment is to create the drawing file that is going to contain our lines, text and dimensions.

✓ ***Refer to page 1-18 for Creating Drawing Files.***

Now we are ready to do our detailing work. We will discuss this in detail elsewhere, but for now, note that we will be using the *Settings Manager* to control our level, color, style and weight. From the *Settings Manager*, select **Structural Detailing** > **Abutments** and draw up your abutment plan.

Now it's time to decide what scale we're going to want to plot this plan. Until we have placed text or dimensions on this plan, we can plot it out at any scale. It is the size of text and dimensions that lock us down to a fixed plot scale.

If your *Settings Manager* is docked at the bottom or top of your screen, right-click on it to pop up the menu choices (Figure 23-1).

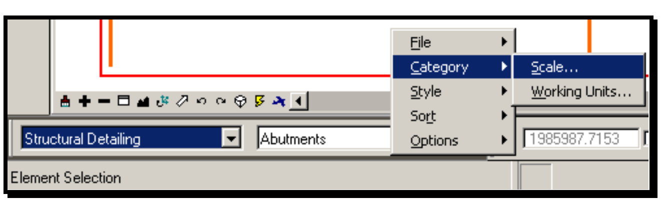


Figure 23-1: Right Click on your Settings Manager

From the menus, select **Category > Scale** to select the working scale for your detail. This brings up the **Select Scale** dialog (Figure 23-2).

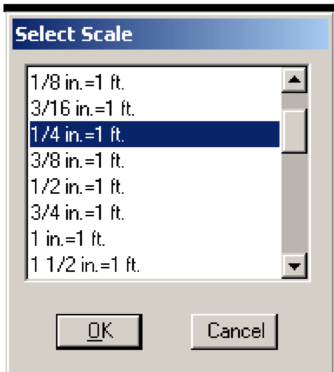


Figure 23-2: Select Scale

Let's select a scale of ¼ in. = 1 ft. and push **OK**.

✓ ***Check page 2-22 for more information on the Settings Manager Scale.***

Once you have selected your scale, it is time to annotate your detail. Using the **Prop. Text and Dims** > **Dimension Ft./In. (1/4 accuracy)** (Figure 23-3), this will setup your dimension sizes and your text size. Finish up your detailing work.

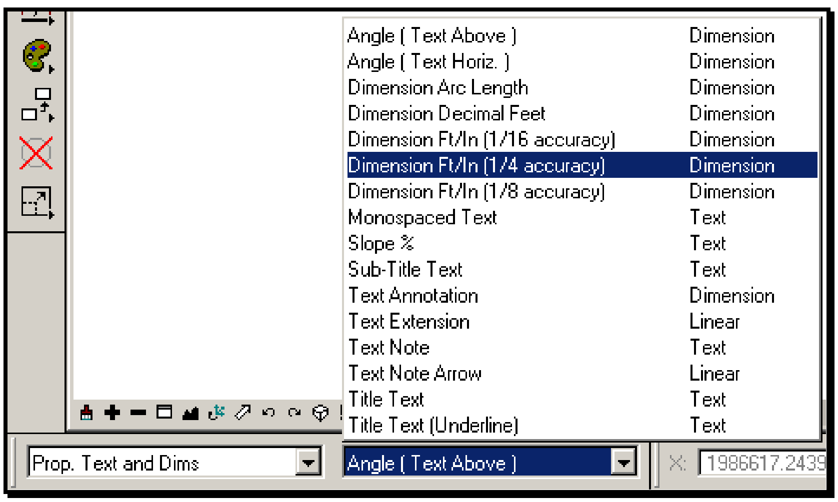


Figure 23-3: The Prop. Text and Dims Group

Once you have finished your annotation, we are going to set up a *Saved View* that contains our detail. From the *Settings Manager*, choose **Tools > Saved View Maker**.

This will run a macro to quickly create a saved view for you. It will prompt you to enter the lower left and upper right hand corners of a box that contains all of the lines and text that make up your detail (Figure 23-4).

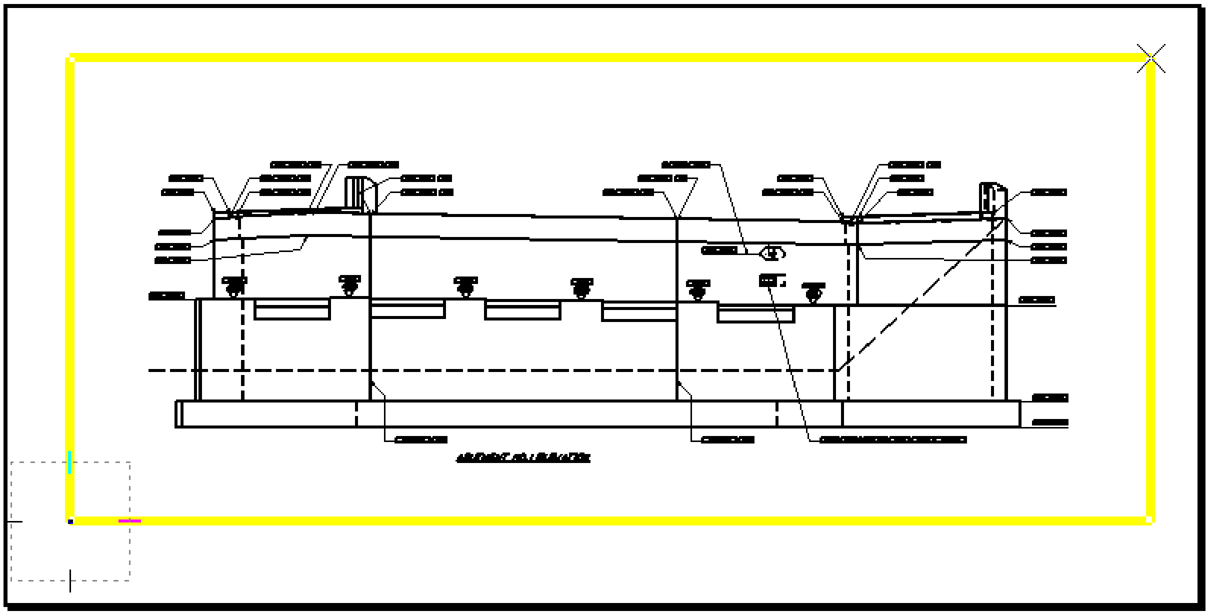


Figure 23-4: Define the Extents of your Saved View

Once you enter in both of these points, the macro will then resize your open window to the aspect ratio of your detail and open up a **Saved View** dialog to ask you for a name and a description of your view (Figure 23-5).

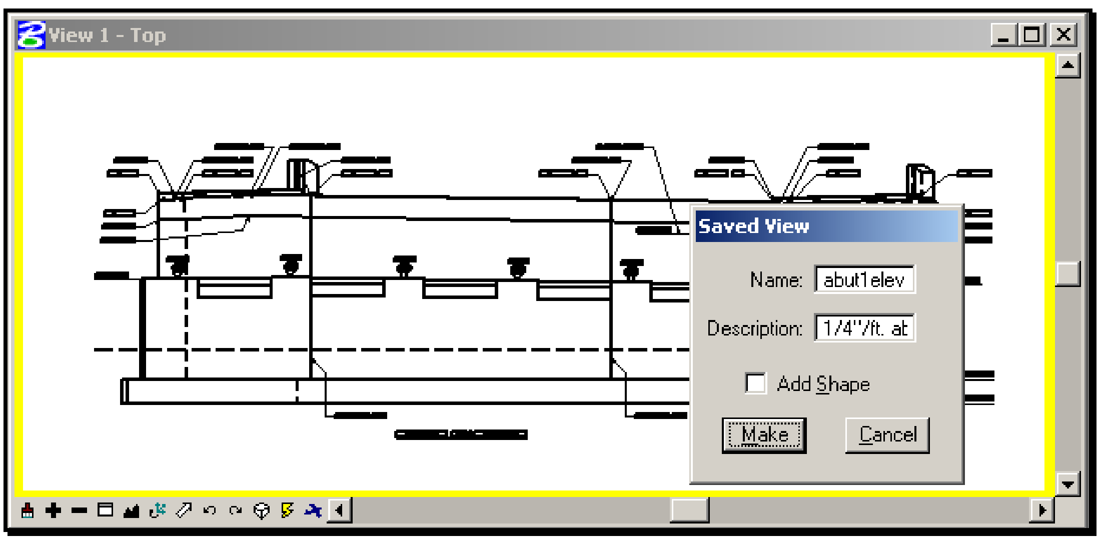


Figure 23-5: Naming a Saved View

♬ In the description field, make sure to include a reference to the scale of the detail, as you will need that information later.

This completes the work that needs to be done in this file. Now we are going to create a Sheet File and attach our detail to it.

Creating a Numbered Border File

✓ ***Refer to page 1-18 for creating your Border File***

Fill in the information in the border by selecting **Macros > Border Information** from your main menu.

♬ If you find the information on your border to be incorrect then it will be necessary to edit your "Project Configuration File". This can be accomplished by going to the main menu and selecting **Workspace>Edit Project Data (PCF).**

✓ ***Refer to page 1-25 for more information about PCF Editing.***

Now it's time to attach our detail to this drawing. Select **File > Reference (DOT) > Attach.**

This will bring up the **Preview Reference** dialog (Figure 23-6).

Select your drawing file and push **OK**.

♬ Using this selection instead of the out-of-the-box **File > Reference** allows us to go directly to the project directory that we are working in and keeps us from having to browse to the directory.

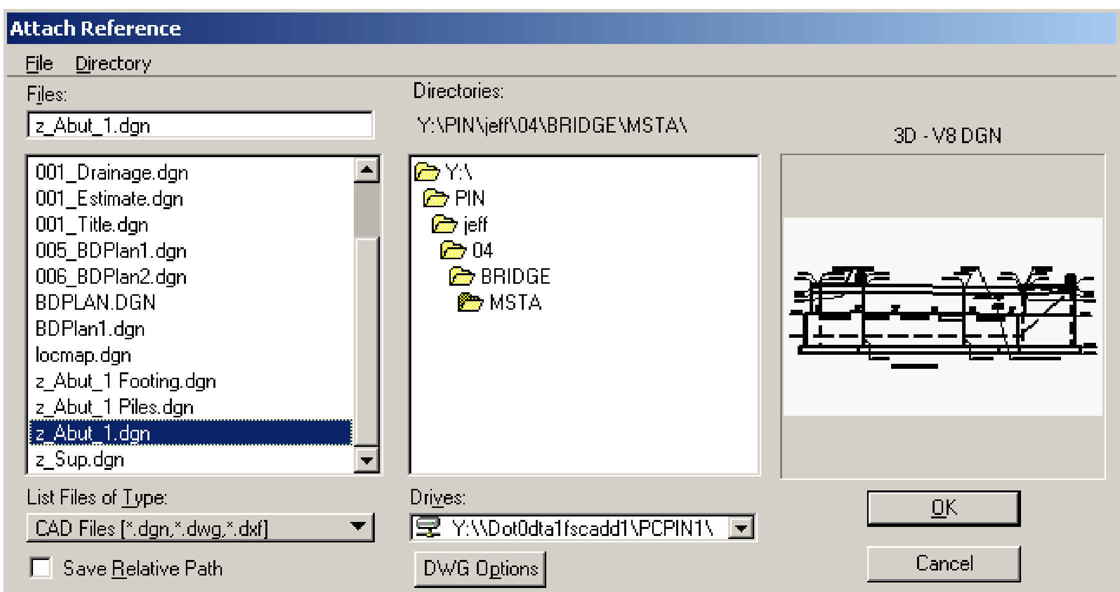


Figure 23-6: The Preview Reference Dialog

This will bring up the **Attach Reference File** dialog (Figure 23-7).

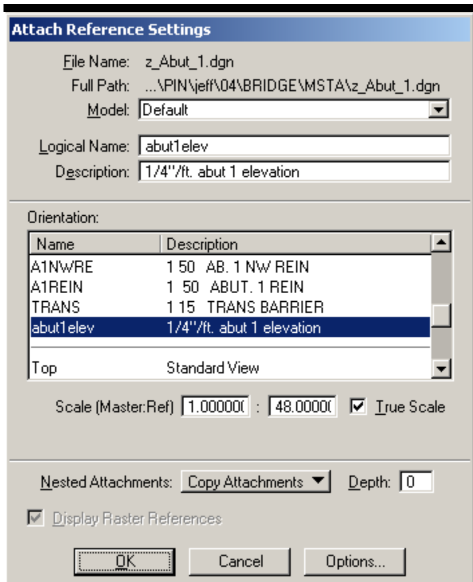


Figure 23-7: The Attach Reference File Dialog

We will need to make a number of selections here. First off, pick your saved view from the **Orientation** portion of the dialog. When picking a *Saved View* you will notice that the *Logical Name* and the *Description* will fill in automatically. Finally, set your **Scale (Master:Ref)** to be equivalent to the *Settings Manager* scale that you used when annotating your detail. (In this case, our ¼ in.=1 ft. *Settings Manager* scale translates to a 1:48 Master:Ref scale.) Push **OK**.

✓ ***Refer to page31-2 for the table of U.S. Customary detailing scales.***

This will dump you back into your file with a box hovering on the end of your cursor (Figure 23-8).

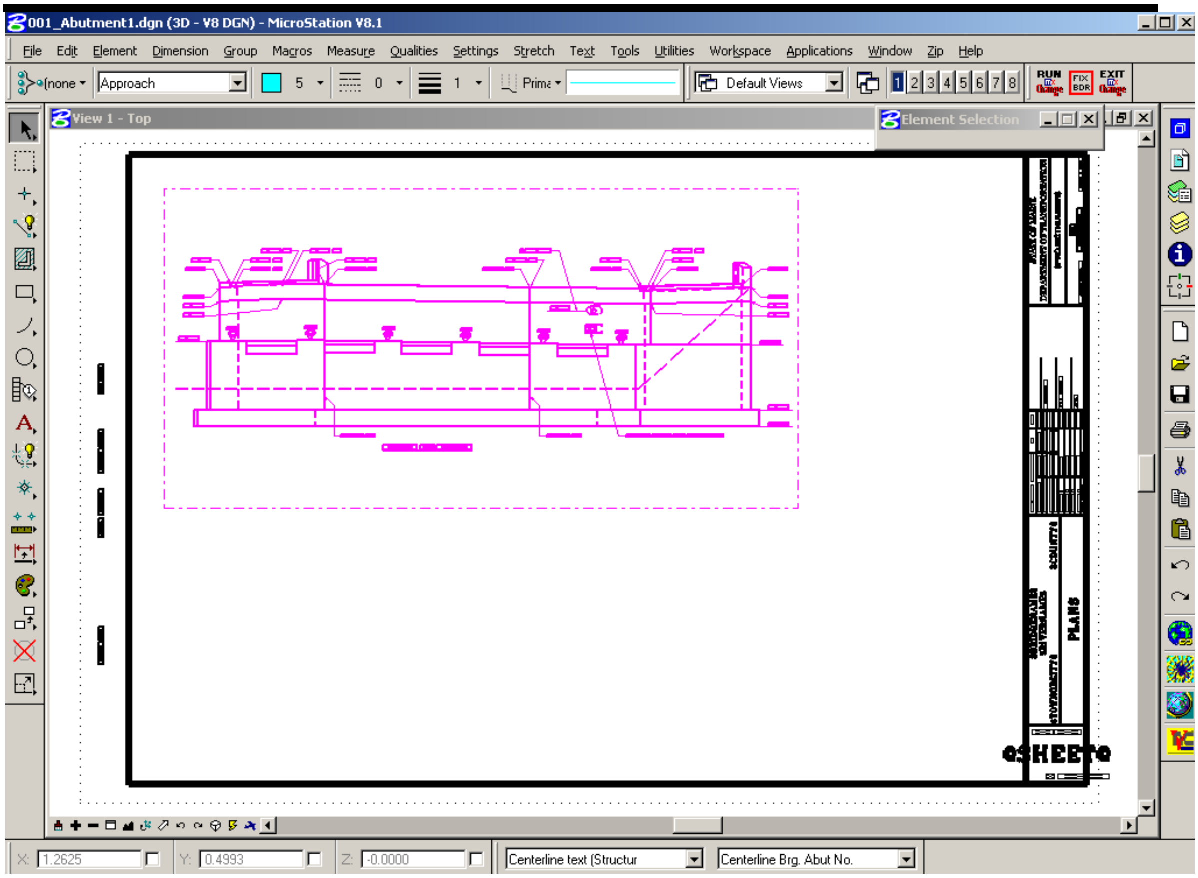


Figure 23-8: Reference Placement by Saved View

Datapoint somewhere on your border to place your detail in an acceptable location.

Adding Further Details, Different Scales

To continue with the previous example, you might go back into your z_abut_1.dgn and create an abutment elevation. Since the abutment plan and elevation may be at the same scale, you should have no trouble working on both of those details in the same file for the life of the project. You would set up a saved view for the elevation and attach that saved view to your 017_abutment1.dgn. Then any changes that needed to be made to those two sections would be made by opening up z_abut_1.dgn drawing file.

However, the abutment section is often at a different scale than the plan and elevation. There are two choices for detailing this section. One method would be to create a new design file ("z_abut1_sect.dgn") and choose something like "1/2in.=1 ft." for the scale. Then draw and annotate as we just explained, creating a saved view and attaching that file to 017_abut1_plan.dgn.

The other method would be to draw the abutment section in the same file as the abutment plan and elevation. Then, when you wanted to place text on the section, you would choose "1/2in.=1 ft." as you *Settings Manager* Scale and reselect **Prop. Text and Dims** > **Dimension Ft./In. (1/4 accuracy)** to establish the correct dimension and text size for annotating your section detail.

♬ Remember, this won't affect the text that we've already placed on the ¼ in=1 ft. details. It only impacts text that we are going to place from here on out.

The only drawback to this method arises when you want to add more annotation to the ¼ in.=1 ft. details. You **MUST** select the proper *Settings Manager* Scale before using the *Settings Manager* to place additional text, dimensions, custom linestyles, or cells. This means that as you work on this drawing you will need to continually flop back and forth between scales.

To check your current *Settings Manager* scale, go to the *Settings Manager* and choose **Tools > Plot Scale?** (Figure 23-9)

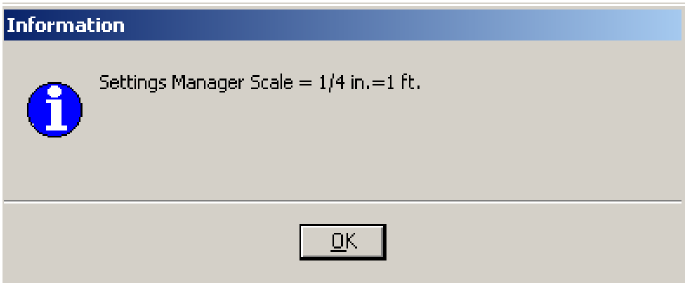


Figure 23-9: Settings Manager Scale Information

TOOLS IN THE SETTINGS MANAGER

The **Tools** section of the **Settings Manager** (Figure 23-10) has a couple useful automation routines.

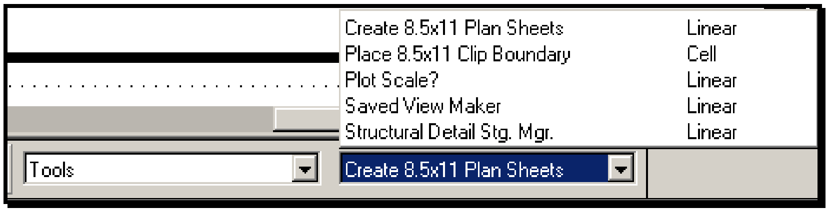


Figure 23-10: Settings Manager > *Tools*

The File Making Macros

File creation has been removed from the Structural Settings Manager. Cut sheets will be created from the **USPlan** *Settings Manager* and all other file creation will be handled through the **makesheetz.bas** macro (**File > Makesheetz**).

✓ ***Check page 1-18 for a description of the makesheetz macro.***

♫ There is a file creating process within the Tools group that allows for developing 8.5 x 11 detail sheets for the purpose of developing Coast Guard permit plans. This works very similar to creating plan sheets. You would use the option Place 8.5x11 Clip Boundary around your specific details and then process them to sheet drawings by using the option Create 8.5x11 Plan Sheets.

Plot Scale

The **Plot Scale?** *Component* reminds you of your current **Settings Manager Plot Scale** (Figure 23-11).

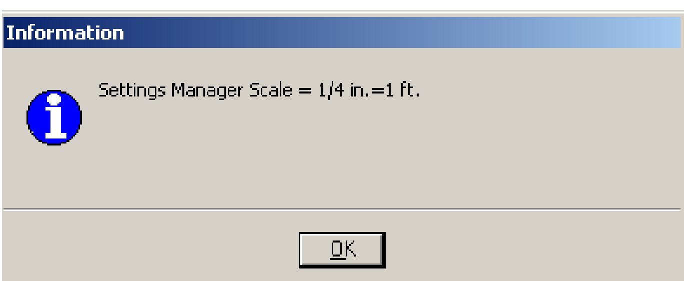


Figure 23-11: Settings Manager Scale Information

Make Saved Views

The **Saved View Maker** is a way of automatically creating a *Saved View* of a specific size and aspect ratio.

Saved Views are a little bit like bookmarks in a MicroStation .dgn file. They help you get back to a specific location in your file by storing the coordinates in a utility called **Saved Views**.

The default way of accessing *Saved Views* is by opening the dialog from the Menus under **Utilities** > **Saved Views** (Figure 23-12).

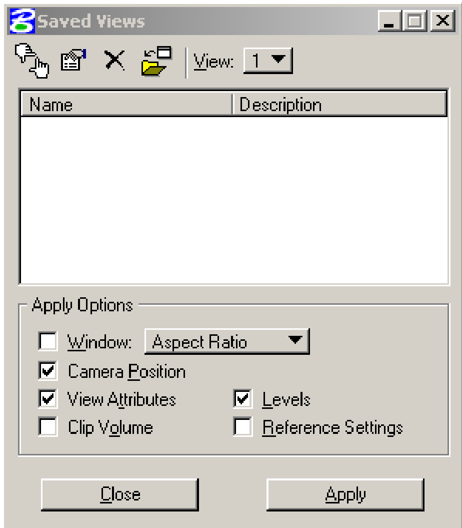


Figure 23-12: Saved View Dialog

Structural Detail Settings Manager

When selecting **Structural Details Stg. Mgr.** you will launch another *Settings Manager* that will allow you to place structural detail cells that have been built into a cell library for you. They are categorized by bridge components.

♫ If there are any details that you develop while detailing that would be pertinent to be created as cells please contact your support staff to develop and make them accessible to all others.

DIMENSIONS AND THE SETTINGS MANAGER

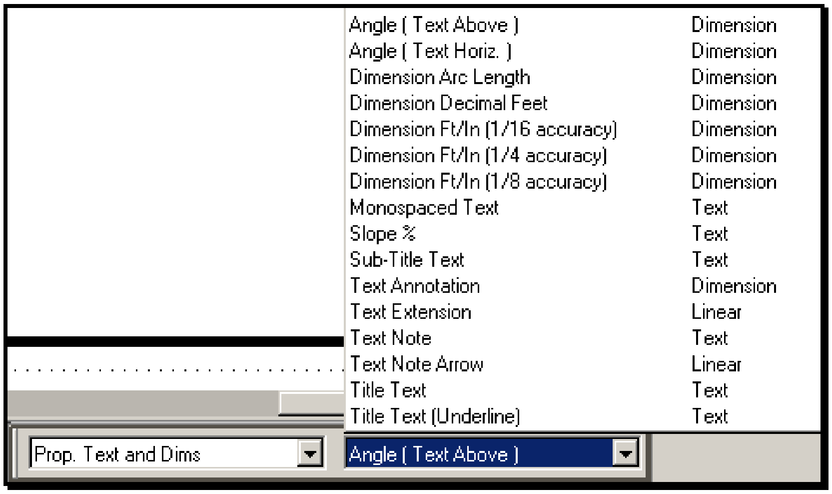


Figure 23-13: Dimensions

Dimensions With Arrows

There are currently four options for placing Dimensions with Arrows.

- **Dimension Decimal Feet** lays out dimensions to hundredths of inch accuracy.
- **Dimension Ft/In (1/16 accuracy)** lays out dimensions to a 1/16” accuracy.
- **Dimension Ft/In (1/4 accuracy)** lays out dimensions to a 1/4” accuracy.
- **Dimension Ft/In (1/8 accuracy)** lays out dimensions to a 1/8” accuracy.

Selection of any of these options will setup your active level, color, style and weight, as well as setting an appropriate dimension text height for your active **Settings Manager Scale**. It will also launch the appropriate tool for dimensioning (in this case, the *Dimension Size Arrow* tool (Figure 23-14).)

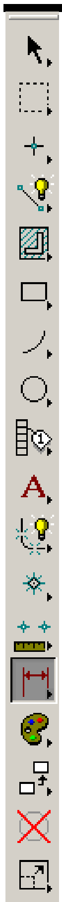


Figure 23-14: Dimension Size Arrows Command

Angle (Text Above) & Angle (Text Horiz.)

These Components set us up for dimensioning the angle between two lines. The **Text Above** option places the text in-line with the dimension arc. The **Text Horizontal** option cuts the dimension arc and always draws in text horizontal (Figure 23-15).

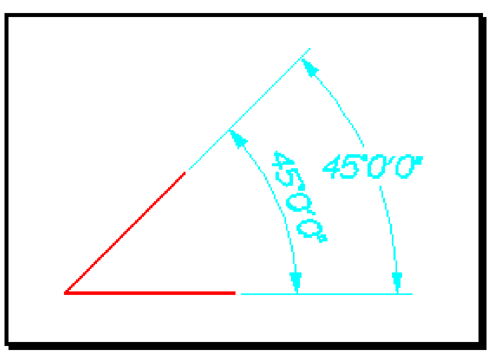


Figure 23-15: Angular Dimension Examples

♫ This command can be used to dimension obtuse as well as acute angles, depending on the order in which you identify the lines. In the pictorial, I identified the horizontal line first, and then the slanted line and I got the angle that was less than

180°. This is because MicroStation always dimensions angles in a *counter-clockwise* direction, if I had identified the slanted line first, I would have gotten the angle that was greater than 180°.

Dimension Arc Length

This tool allows for dimensioning an arcs length with a radial dimension (Figure 23-16).

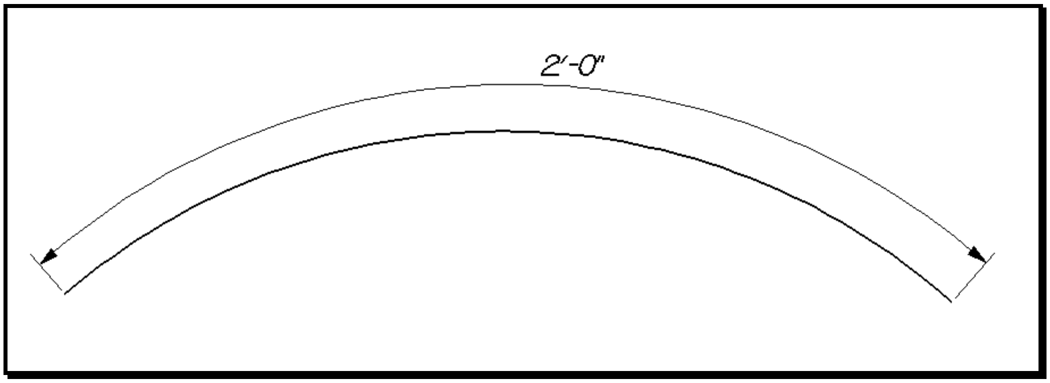


Figure 23-16: Dimension Arc Length

STRUCTURAL DETAILING AND THE SETTINGS MANAGER

The **Structural Detailing** component of the **Settings Manager** (Figure 23-17) is set up to help us control level, style, color, and weight of elements that we place on our drawings as we draw details.

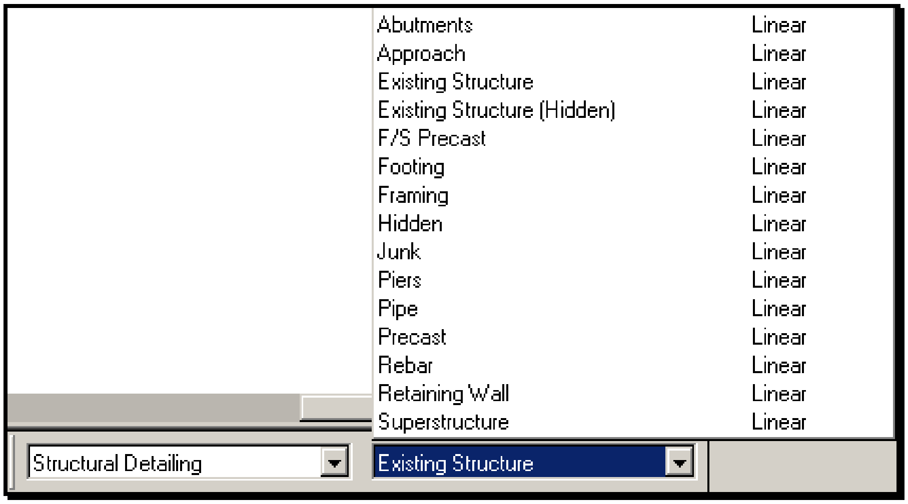


Figure 23-17: Structural Detailing Settings Manager

Nuts and Bolts

Selecting any component from the **Structural Detailing** portion of the *Settings Manager* does a number of things.

Most of the components set you active color, level, style and weight. You can watch these attributes change on your **Attributes** tool box (Figure 23-18).

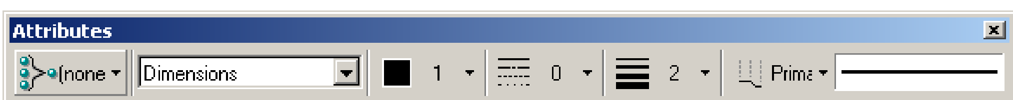


Figure 23-18: The Primary Tool Box

The only exception to this is the **Hidden** component, which only changes your style to dotted and weight to thin. (This allows you to draw a **Hidden** line of any of the other types: **Abutment**, **Framing**, etc.)

Some Typical Uses

New Elements:

Probably the most common workflow will be simple. Decide what kind of detail you're working on. See which *Component* best corresponds to the work you're going to be doing, and pick that item from the **Settings Manager**. This will set up the proper *Symbology* and level for you.

♫ *Symbology* is MicroStation's collective term for color, style and weight.

Now choose your drawing commands (place circle, place *Smartline*, etc.,) and start drawing.

Changing Existing Elements:

You’ll also use the **Structural Detailing** *Group* for cleaning up elements that may have been drawn wrong. Maybe you constructed lines parallel to a centerline, and now you need to change them to an **Abutment** style.

From the **Settings Manager**, choose **Structural Detailing > Abutments** to set the appropriate level, color, style and weight.

Then, choose the *Change Attributes* tool either from the **Main Tool Frame** or from the Menus (**Qualities > Change > All**). This will prompt you to *Identify Element*. Pick the element that you want to change. (Make sure to *Accept* the change by entering a *Datapoint*.)

Adding New Detailing Types

If there is a detail type that you think needs to be added, please bring it to the attention of your support group.

CHANGING DETAIL SCALE

So you've finished drawing up your detail. You've got it all dimensioned. You've got it all annotated. Now you've changed your mind about what scale you need to use, and all your text, dimensions, and linestyles look wrong.

No Quick Solution

There's no one-step program to fixing this problem. It's going to take some work. But here are the things you need to do:

Scale

First off, let's make sure you pick your new scale. From the **Settings Manager**, choose **Category > Scale** and pick your new scale (Figure 23-19).

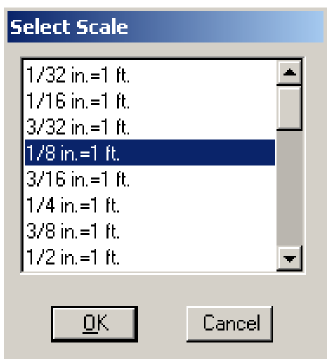


Figure 23-19: Pick a Settings Manager Scale

✓ ***Check page 2-22 for more information on the Settings Manager Scale.***

Text

Now let's get the text out of the way. You've already got a lot of text on the drawing; you just need to change it. We're still going to start by going to the **Settings Manager** and choosing **Prop. Text and Dims > Text Note** (Figure 23-20).

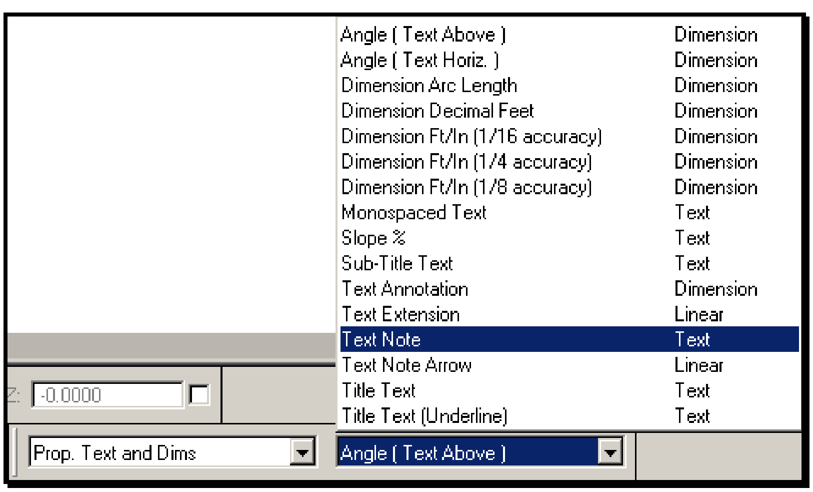


Figure 23-20: Structural Settings Manager

This will open up the **Text Editor** (Figure 23-21).

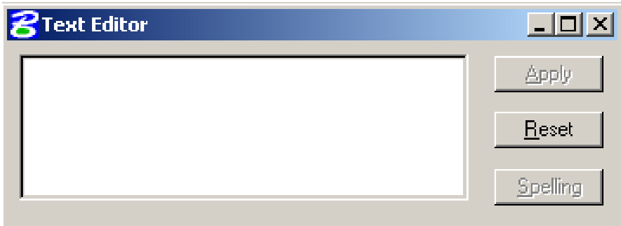


Figure 23-21: The Text Editor

It opens up because that *Component* launched the *Place Text* command. We're not going to use the *Place Text* command, however. Go to your Main Menu and choose **Text > Update Text**. (This is the same as the **Change Text Attributes** command (Figure 23-22) from the **Text** tool box.).

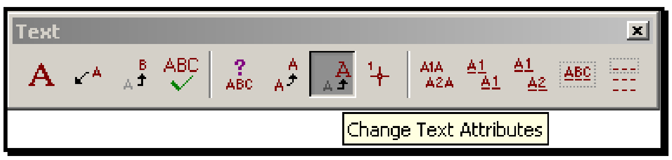


Figure 23-22: Change Text Attributes

This tool is used to change the *Text Attributes* of an existing text item. The status bar will prompt you to "Identify Element." Go around your detailing, picking on all the text that needs to be changed. Or, if you prefer, place a fence that encompasses all of the text items that you want to change and check off the **Use Fence** option in your **Tool Settings Window**. This will let you change a whole bunch of text items at once.

Once that's done, you're going to notice that some of the text doesn't fit into spaces where it used to fit, or text will overlap other text or parts of the detail. This is going to require some cleanup. I recommend the Main Menu **Zip > Move** to move text items back into place. Make sure to use *AccuDraw* to keep them in proper horizontal and vertical alignment.

Dimensions

We're going to use a similar procedure for all the dimensions that need to be changed. First, go to the **Settings Manager** and choose the dimension *Component* that corresponds to the dimension that you need to change.

Once you have selected a *Component*, MicroStation is going to launch a *Place Dimension* command. We're going to ignore that command and go on to select *Update Dimension* either from the **Dimension** toolbox (Figure 23-23) or from the Main Menu **Dimension > Update**.

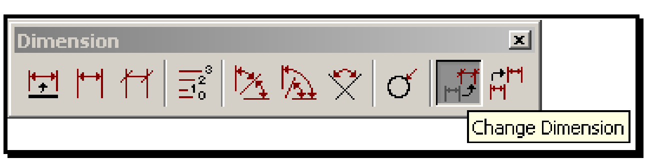


Figure 23-23: The Dimension Toolbox

This command works very similar to the *Change Text Attributes* command. It will prompt you to identify a dimension to change. Go around your detail, picking on every dimension that needs to be updated to your current settings. Note that there is no way to change a fence full of dimensions at once. However, you can use the *Element Selection* tool or the *PowerSelector* to pick a whole bunch of dimensions, and then issue the *Update Dimension* command to change the whole lot of them.

Linestyles

The last thing that needs to be changed may not be obvious at first. Your Arrow and Bullet linestyles should always be the same size relative to your text. So if your text size changes, you should make sure to change your linestyles as well.

Do this by going to the **Structural Linestyles** *Group* from the *Settings Manager* and picking the linestyle that you want to update (Figure 23-24).

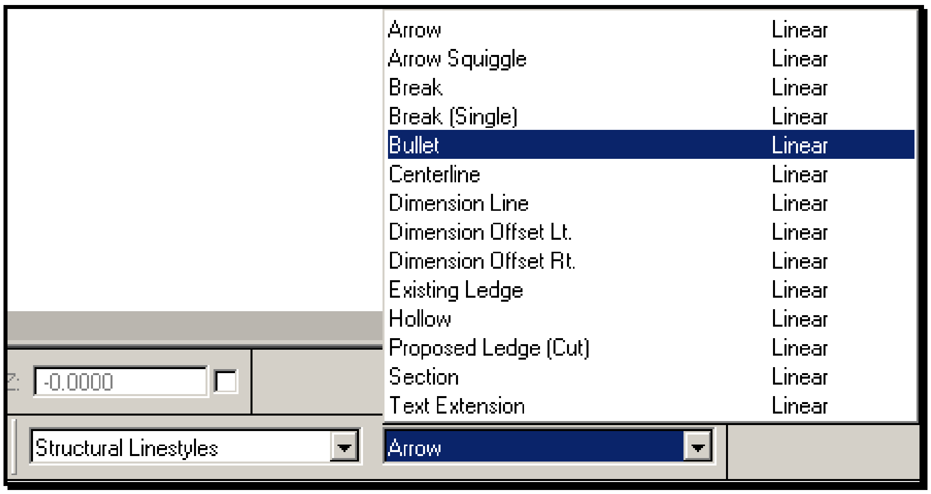


Figure 23-24: Structural Linestyles

This will set your active settings appropriately. It will also issue the *Place Smartline* command. Again, we're going to ignore the command launched by the *Settings Manager* and go on to select *Change Element Attributes*.

This can be selected from the **Main Tool Frame** or from the Main Menu **Qualities** > **Change** > **All**. Now identify each line that needs to be changed.

Speeding up the Process

It is possible to use the *Select By Attributes* command from the **Edit** menu (Figure 23-25) to speed up the process of selecting elements that need to be changed.

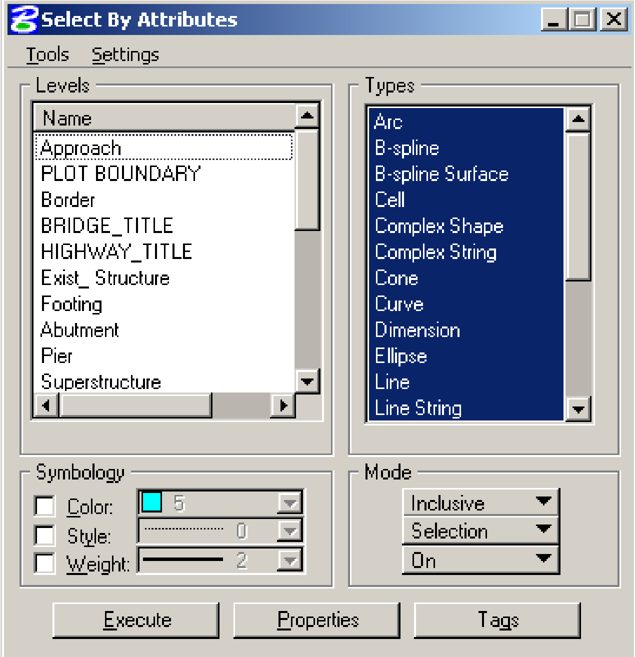


Figure 23-25:Select By Attributes

This utility allows you to select elements by Level, Symbology, and Type (Line, Arc, etc.)

✓ ***Refer to page 2-31 for a thorough discussion of Selecting by Attributes.***

TEXT AND THE SETTINGS MANAGER

One of the primary functions of the *Settings Manager* is to help us control text size on details of various scale. We have programmed a number of text settings into the *Settings Manager*. They are accessed through the **Prop. Text and Dims** *Group*.

A Word on Scale

Before you place text on a detail, make sure that you have determined what scale you want that detail plotted at. Make sure you have selected that scale from the *Settings Manager* by choosing **Category > Scale**.

✓ ***Check page 2-22 for more information on the Settings Manager Scale.***

Text Components

There are basically four different types of text we'll be placing on our drawing. All of our annotation will be done with the **Text Note** option. This sets up our standard normal text size and activates the text placement command. The other text size options are the **Title Text** options: **Title Text** and **Title Text (Underlined)** and the **Sub-Title Text**.

♬ It is no longer necessary to underline text by drawing a line underneath it. MicroStation will automatically underline text for you. If you are going to place a detail label, make sure to use the **Underlined** option.

There may be cases where you want larger text that is not underlined, and that is where the **Title Text** *Component* comes in, also you may find an instance where you want a text size that falls between our standard normal size and the title text size. This is when the **Sub-Title Text** option would be handy.

Behind the Scenes: The Long Way Around

What are these *Components* really doing for you? They are setting up text attributes like font, height and width. To see the changes that are made when you select the text *Components*, open up the **Text Dialog** by choosing **Element > Textstyles** from the Main Menu (Figure 23-26).

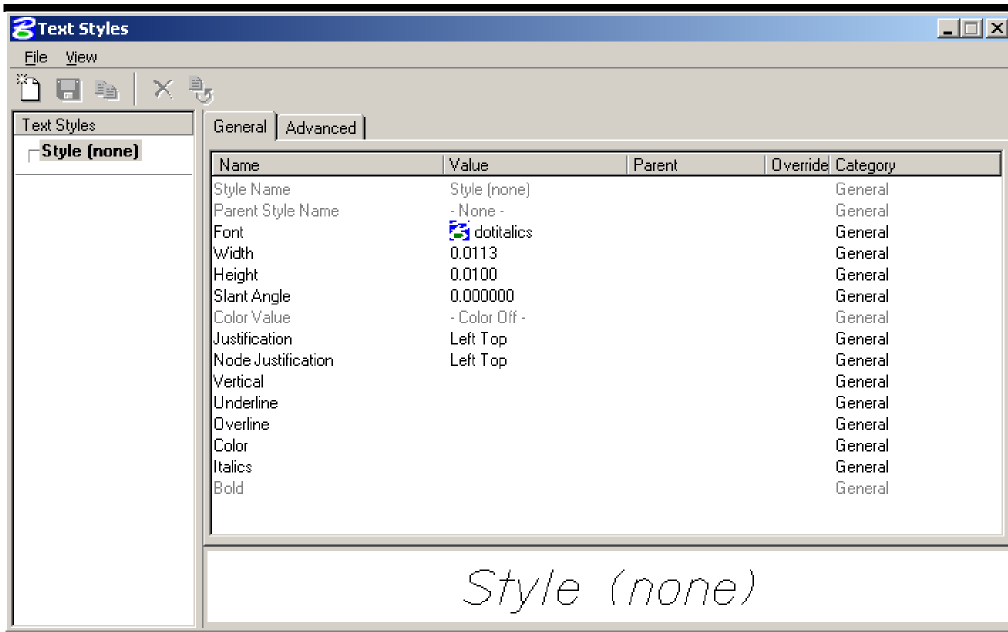


Figure 23-26: The Text Styles Dialog

Placing Text Annotation

Much of the text that we're going to be placing on our drawings is going to be in the form of annotation: a label with an arrow or bullet that extends to a detail. We have decided to approach this matter as simply as possible. First, place your text around your detail. Then, from the **Settings Manager**, select one of the **Text Note** linestyles (like **Text Note Arrow)**.

♬ Selecting the **Note/Linestyle** component does two things. First off, it sets your active color, style, weight and level -- just like the **Structural Detailing** *Component*. Second, it runs the *Place Smartline* command.

MicroStation is now ready to help you draw a leader line from your text to your detail. Use *AccuDraw* and your snaps to control the geometry of the leader line (Figure 23-27).

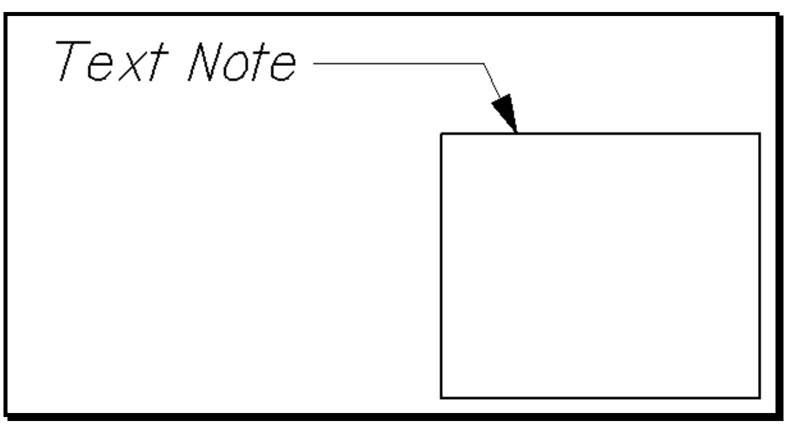


Figure 23-27: Sample Leader Line

Some Difficulties

First off, you can't snap to text in a very useful way for placing notes. The only points you can snap to on text are the origin, the center, and the midpoint. These probably aren't going to help you locate the perfect spot to start placing your leader lines. This means eyeballing is the answer.

Changing Your Mind About Scale

If you change your mind about the scale that a detail is going to be, it’s going to screw up your text. There’s no way around it.

Chapter 24 Environmental Sheets

MHPC DOCUMENTATION

Quick Punch List

- Create a MHPCPlan.dgn using Make Sheetz
- Copy or Place New Clip Boundaries
- Create Cut Sheets
- Run Border Macro
- Place Legend
- Edit Sheet Info. (Title Only)
- Send to Color Plotter

VIEWING A PROJECT USING MHPC COLOR SCHEME

Step One: Start MicroStation

Double-click your *MicroStation new InRoads config* icon. Click the ***Project*** pull-down and pick on your PIN. Select **EnvPlan.dgn** from your list of files and click OK.

Picking your project from the pull down should bounce you to your project's Environ\MSTA folder. If it doesn't, contact CADD Support.

Step Two: Creating a MHPC File

Go to **File>Make Sheetz.** When the dialog opens, select "No Prefix" and pick "Environ" as your workgroup (Figure 24-1). Click OK.

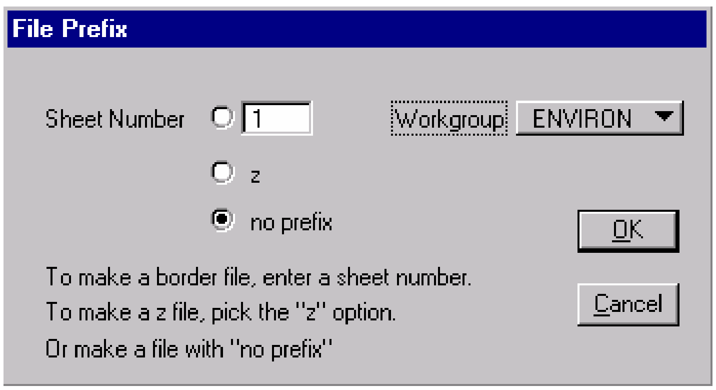


Figure 24-1: File Prefix and Workgroup Selected

From the list of available drawings pick MHPCPlan and click OK (Figure 24-2). This creates the new file and opens it.

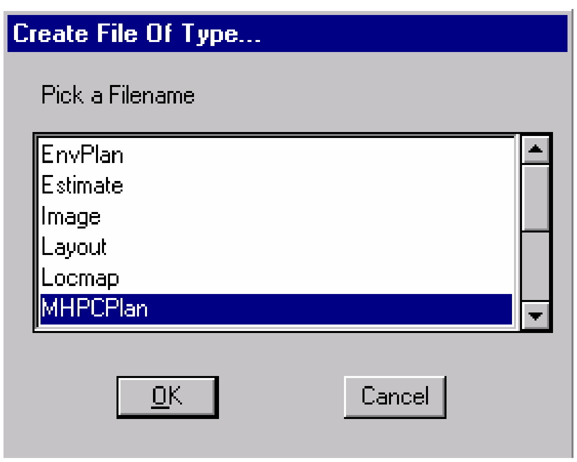


Figure 24-2: Select MHPCPlan

Step Three: Adjust Background to White

Select **Workspace>Preferences** from the Main Menu. In the next dialog, select **View Windows** from the left side of the dialog. On the right, place a check in the *Black Background->White* box. Click OK (Figure 24-3).

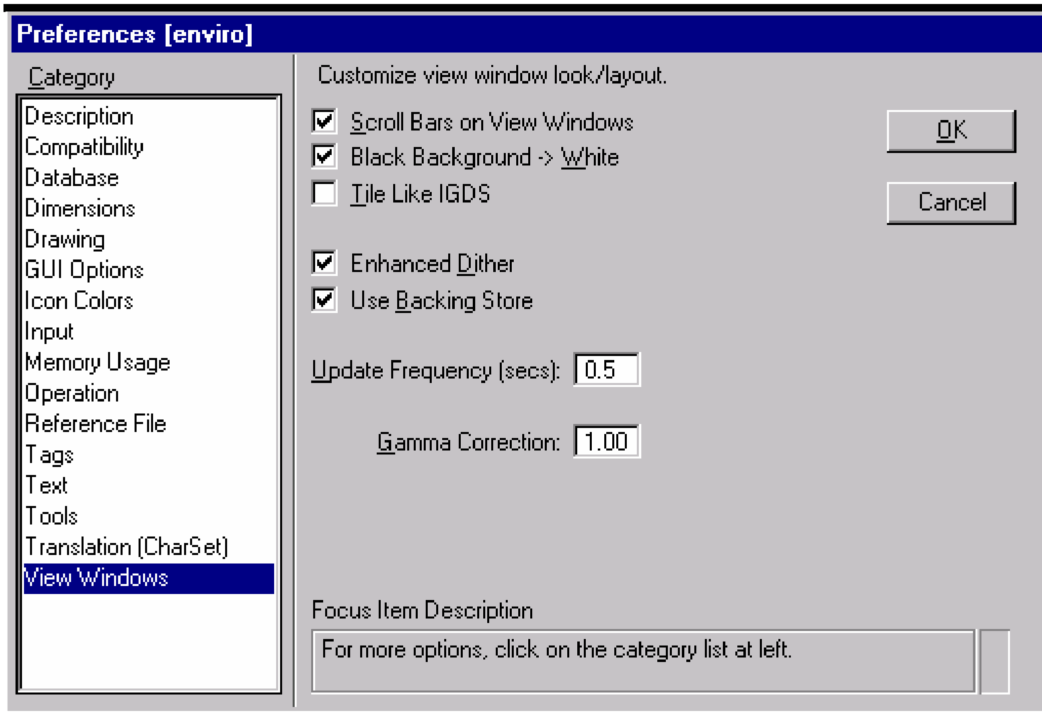


Figure 24-3: Preference set to White Background

Check your colors for accuracy. Sometimes you will find that standardization is not followed and you will need to adjust the colors of levels in a reference file or two. Do this in this file.

✓ ***Please refer to 24-8 for more information on Changing colors Manually.***

♬ If your color scheme doesn't appear to be correct, make sure that your view attributes (**Settings>View Attributes)** has *Level Symbology* checked. It should set correctly by default. Contact CADD Support for more assistance.

ⓘ ***In attempts to stabilize this process, we created a pentable that will not use Symbology. Instead, the pentable will adjust colors at plot time only. If the colors do not appear to be accurate using Symbology, instead, turn off Symbology and hit the Print Icon. Browse to the correct plotter and attach the "MHPC-no Symbology" pentable. Use your preview in the print dialog to see if the colors are better represented.***

CREATING MHPC PLAN SHEETS

Step One: Temporarily Attach HDPLAN or BDPlan.dgn (Optional)

As a time saver you can use another programs *Clip Boundaries* instead of placing your own manually. Depending on the type of project *Bridge or Highway*, use **File>Reference DOT>Attach** and browse to the appropriate groups \MSTA directory and select **bdplan.dgn** or **hdplan.dgn.** No logical is needed, set the nesting to **Copy Attachments** and **depth** to “0” (or use **No Nesting)** and click OK.

♬ If there aren’t any clip boundaries in the bdplan.dgn or the hdplan.dgn, you will have to place your own boundaries manually.

Step Two: Copy Clip Boundaries

Now we need to merge the clip boundaries into the active file. This will produce clip boundaries for the MHPC plans that cover the same area as the plans sheets for the project. This procedure is assuming that you want a MHPC plan for every plan sheet. If you only need a MHPC plan for specific areas on your project, place clip boundaries manually in your active file as you would when creating the normal plan drawings.

✓ ***Refer to page 12-5 for the procedure on placing clip boundaries manually.***

In the Reference File dialog, highlight the reference file (**plan.dgn) then select **Tools>Merge Into Master** from the Menu Bar. Now you will be prompted to select a view by clicking a data point anywhere on your top view. An informational dialog will open telling you that you are about to merge one reference file into the current design file. This is what you want to do. Select **OK** to start the procedure. Refresh your window to update the view in order see your clip boundaries in the active file.

Step Three: Create the Cut Sheets

Part One: Activate Macro

From the *Settings Manager* select **Create Plan Sheets > Create Cut Sheets**.

Part Two: Supply Starting Number

It asks you what number you want to use for the starting number of the MHPC plan sheets (Figure 24-4). Use the default “1”. This will appear in your border as your sheet number.

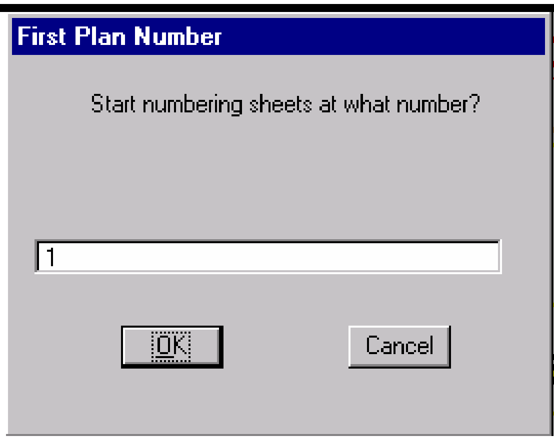


Figure 24-4: Start Numbering At?

Part Three: Sit Back and Watch

When the program is finished, it will drop you back into MHPCPlan.dgn. Open up the files you've just created and see how they look!

Step Four: Troubleshooting

If you open a MHPC plan sheet drawing and the graphics within the sheet are not correct, it could mean that one the drawings that is referenced in is not at the same Global Origin as the other drawings. If the graphics aren't aligned with your border, try and re-cut the sheets again. It won't be necessary to place new boundaries. Normally this will fix the problem. See CADD Support for assistance if needed.

EDITING MHPC PLAN SHEETS

Step One: Run the Border Information macro

The Border contains variables that can be replaced by a macro. It is not necessary to edit anything on this drawing that contains a $ or @ (i.e. $TOWNORCITY$). Select **Macros>Border Information** to run the macro. Process all of your sheets.

✓ ***Please refer to PCF Editing on page 1-25 if the variables do not get filled in with the proper information.***

Step Two: Place MHPC Legend

Right click on the *Settings Manager* and select **Category>Scale.** Set the scale to 1 in. = 25 ft. (1:250 for metric) or 1 in. = 50 ft. (1:500 for metric). Select **Create Plan Sheets** from the left hand side of the *Settings Manager* (Figure 24-5).

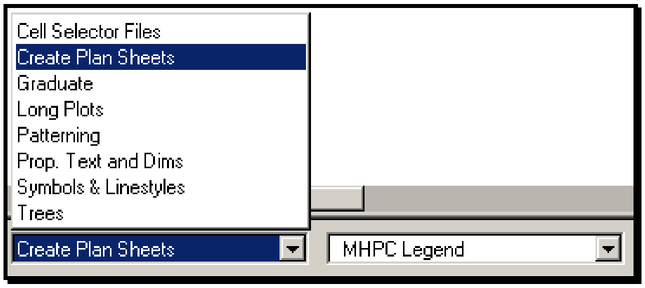


Figure 24-5: Create Plan Sheets

Select **MHPC Legend** from the right (Figure 24-6).

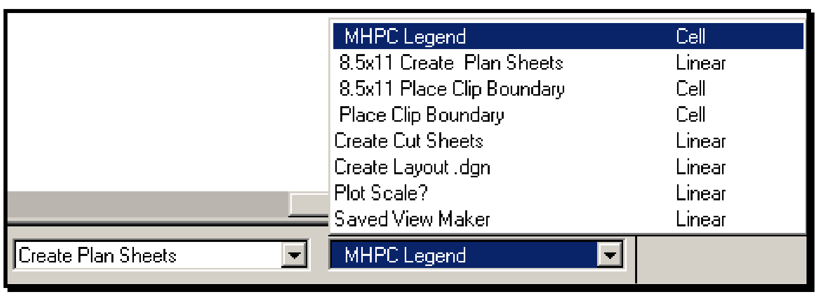


Figure 24-6: Pick MHPC Legend

Place the cell down where you want it with a left mouse click.

Step Three: Edit the Plan Type in the Title Box

The only text that needs to be edited on the border is the word “PLANS”. Select **Text>Edit Text** from the menu and click on the word PLANS. When it highlights, click again to accept. When the *Text Editor* window opens, type MHPC in front of the words PLAN and hit *Apply*. Right Click to stop editing the text.

Step Four: Repeat as Necessary

Repeat **Step One** and **Step Two** on all of your ###_MHPCPlan#.dgn drawings.

ADJUSTING COLORS MANUALLY IN REFERENCE FILES

Sometimes you will find that standardization is not followed and you will need to adjust the colors of levels in a reference file or two.

ⓘ ***In attempts to stabilize this process, we created a pentable that <u>will not</u> use Symbology. Instead, the pentable will adjust colors at plot time only. If the colors do not appear to be accurate using Symbology, instead, turn off Symbology and hit the Print Icon. Browse to the correct plotter and attach the "MHPC-no Symbology" pentable. Use your preview in the print dialog to see if the colors are better represented.***

If you need to adjust the symbology (colors) of a reference files, do this in the **<u>MHPCPlan.dgn</u>** file and the change will reflect on all of your plan sheets. Open your *Level Manager* by selecting **Settings>Level Manager** from the *Main Menu* (Ctrl+L). Make sure that the *Symbology* pull down is set to **Overrides.**

Use **Quality>Analyze Element** and click on the element in question to find out what reference file the element resides in and the level it is on.

In the example below (Figure 24-7), the topo.dgn has two levels, **UTILS GRND** and **UTILS AERIAL,** that are the wrong color. They should be color "14". Expand the directory tree on the left and select **topo.dgn.** Select a single or multiple levels on the right and click on either of the color boxes. A color chart will open (Figure 24-8) allowing you to pick the color to change it to. Click on the color to see the number associated to it. Click OK.

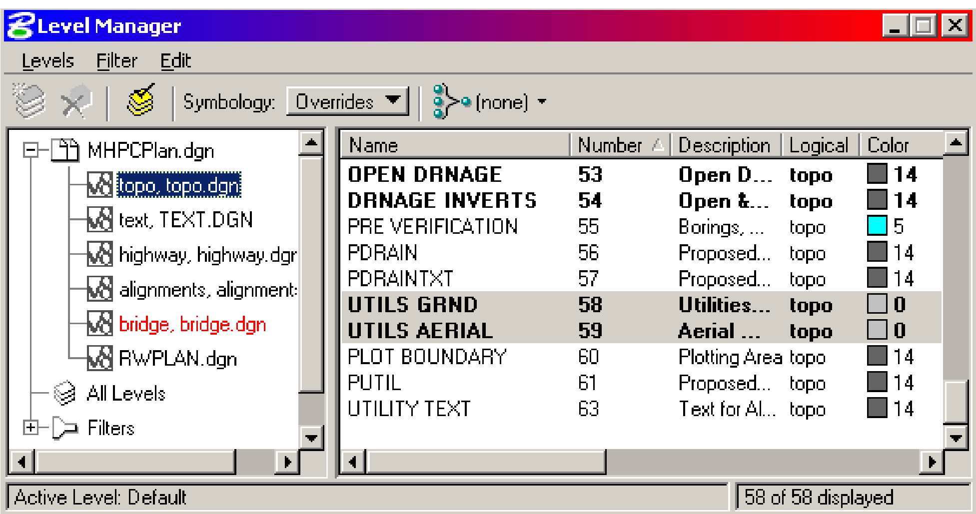


Figure 24-7: Example of selecting two levels within the topo reference file

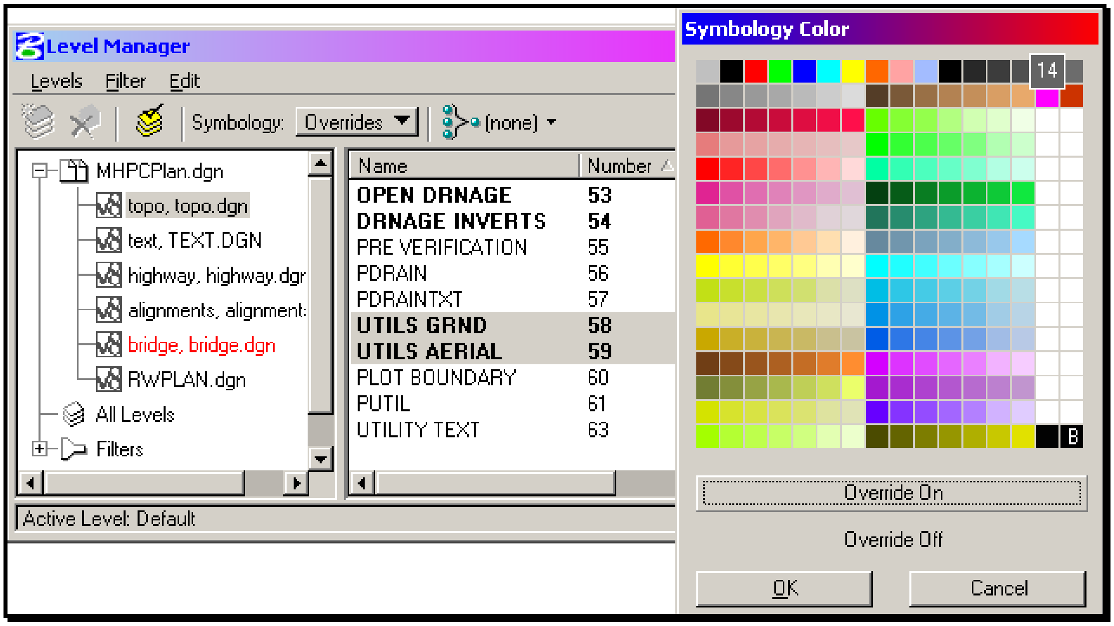


Figure 24-8: Example of selecting a new color for a level(s) within a reference file

Select **File>Save Settings** to save the adjustment.

BATCH PRINTING MHPC PLANS SHEETS

Step One: Open Batch Print Dialog

Select **File>Batch Print/Plot (DOT)** from the dialog Menu. Click Cancel at the *Open job Set* dialog window.

Step Two: Select a Printer

Highlight *Printer* from the *Specifications Controlling Plotting* area of the dialog. Select **Specifications>Select** from the menu or click the little green icon. Choose **US_HPCOLORRoom303** (**HPCOLORRoom303** for metric). Click OK.

Step Three: Select Print Area

Default *Print Area* **MDOT Standard** is correct by default for U.S. Customary projects. (Change this to **Divisions** for metric projects.)

Step Four: Select a Display (Pentable)

Pentable that uses Level Symbology

Highlight *Display* from the *Specifications Controlling Plotting* area of the dialog. Select **Specifications>Select** from the menu or click the little green icon. Choose **Color_MHPCplans** and click OK. This pentable utilizes *Level Symbology*.

Pentable without Level Symbology

Highlight *Display* from the *Specifications Controlling Plotting* area of the dialog. Select **Specifications>Select** from the menu or click the little green icon. Choose “MHPC-no Symbology” and click OK. This pentable does not utilize *Level Symbology*. Test this using method below.

ⓘ ***In attempts to stabilize this process, we created a pentable that <u>will not</u> use Symbology. Instead, the pentable will adjust colors at plot time only. If the colors do not appear to be accurate using Symbology, instead, turn off Symbology and hit the Print Icon. Browse to the correct plotter and attach the “MHPC-no Symbology” pentable. Use your preview in the print dialog to see if the colors are better represented.***

Step Five: Add Design Files

Select **Edit>Add Files** from the menu. Select all of your numbered MHPCplan drawings. Click the *Add* button. Click Done.

Step Six: Send the Plots

Click the printer icon or select **File>Print** from the *Batch Print dialog* menu to send all sheets to the plotter.

If you don’t want to send them all, highlight only the files you want to plot. At this point you can send just the ones you have selected. Click OK.

WETLAND PLANS

Quick Punch List

- Copy or Place New Clip Boundaries
- Use Others or Create Cut Sheets
- Run Border Macro
- Send to Color Plotter

Need to Find Wetland Drawings?

The wetlands should be automatically attached if they were surveyed with the original topo.dgn or if the Topoadd and Textadd files have been cleaned up and merged properly. If not, they were picked up with other means (GPS) and they may be residing in a Topoadd# and Textadd# files sitting in the Survey/MSTA folder. Browse to the Survey/MSTA and open the Topoadds to see which one contains the wetland information. There may be an **OrigWetlands** file in the folder. In either case, these files need to be cleaned-up and either merged into the topo.dgn or copied into the topo folder.

✓ ***Users should refer to Chapter 3 Survey Clean-up and treat an OrigTopoAdd# and OrigTextAdd# file as "Additional Topo Clean-up" (6-27).***

✓ ***Users should refer to Chapter 3 Survey Clean-up and treat an OrigWetlands as "Initial Wetlands Clean-up" (6-41).***

For a quick plot use **File>Reference (DOT) Attach** and attach the files directly from the Survey\MSTA folder to your EnvPlan.dgn or Wetlands-clips.dgn using **Coincident World** method. These files will not stay attached for future plotting as the Survey folder is not recognized as a valid path to reference files. Consider cleaning up these files to avoid this from happening.

♬ In the near future, there will be a separate drawing for wetlands. Cleaning up the wetlands.dgn will be the responsibility of the Environmental staff. Details of the cleanup will be in Topo Cleanup section of this manual. The wetlands.dgn will be attached to EnvPlan.dgn and Wetlands-clips.dgn by default, however there are many old projects that will require the users to attach it manually. The wetlands.dgn will exist in the **Survey\MSTA** folder within your PIN and will be copied into your **topo** folder and cleaned up. Additional wetlands will be handled very similar to the Topoadds.

✓ ***Please refer to 6-41 for information on Wetlands cleanup.***

PLOTTING WETLAND PLANS FOR BIOLOGIST'S (USING OTHERS PLAN SHEETS)

Introduction

When plotting wetlands for checking purposes, it may be easier to use the plan sheets cut by another workgroup as opposed to creating your own. You can open someone else's plan sheets (i.e. 011_hdplan1.dgn or 005_bdplan1.dgn) to check and see if the information you need is displayed on them. If topo cleanup is done properly, wetland lines and flags should be displayed. If not, you can ask the Program (Urban and Arterial, Bridge or Regional) to go through the process of cleaning up the additional topo and text files or consider cleaning them up yourself.

Step One: Start MicroStation

Double-click your *MicroStation new InRoads config* icon. Click the ***Project*** pull-down and click on your PIN.

Step Two: Open Any Drawing

Select any file in your list of files in your workgroups \MSTA folder (i.e. EnvPlan.dgn). Click OK to open it.

Step Three: Batch Printing - Create a New Batch Job

Part One: Open Batch Print Dialog

Select **File>Batch Print/Plot (DOT)** from the dialog Menu. Click Cancel at the *Open job Set* dialog window.

Part Two: Select a Printer

Highlight *Printer* from the *Specifications Controlling Plotting* area of the dialog. Select **Specifications>Select** from the menu or click the little green icon. Choose **US_OCE9800FULL** or **US_OCE9400FULL** (OCE9800FULL or OCE9400FULL for metric). Click OK.

Part Three: Select Print Area

Default *Print Area* **MDOT Standard** is correct by default for U.S. Customary projects. (Change this to **OCE** for metric projects.)

Part Four: Select a Display (Pentable)

Highlight *Display* from the *Specifications Controlling Plotting* area of the dialog. Select **Specifications>Select** from the menu or click the little green icon. Choose **graysurvey_wetlands** and click OK.

Part Five: Add Design Files

Select **Edit>Add Files** from the menu. Depending on the type of project and who has cut the plan sheets, browse to the workgroup's MSTA folder (i.e. highway\MSTA or bridge\MSTA). Select all of the plan sheet drawings (i.e. 011_hdplan1.dgn or 005_bdplan1.dgn). Click the *Add* button. Click *Done*.

Part Six: Save your Batch Print job

Select **File>Save As…** and give you Batch Print a logical name so you can print it again if the need arises (i.e. Wetland_ck_OCE9800.job).

Part Seven: Send the Plots

Click the printer icon or select **File>Print** from the *Batch Print dialog* menu to send all sheets to the plotter.

If you don’t want to send them all, highlight only the files you want to plot. At this point you can send just the ones you have selected. Click OK.

CREATING WETLAND PLAN SHEETS FOR BIOLOGIST'S

Introduction

If you are required to create plan sheets for checking Wetlands and are unable to get what you need through another workgroups existing plan sheets, you can place your own clip boundaries or copy another workgroups clips into the Wetlands-clips.dgn without effecting other work to be done in the file (i.e. Army Corps. 8 ½ x 11 sheets).

Step One: Create a Wetlands-clips Drawing

It is now necessary to create a Wetlands.dgn within the ENVIRON\MSTA folder to create cut sheets for the Wetlands. Use the **File>Make Sheetz** macro to create a Wetlands-clips.dgn file. Select "No Prefix" and select "Wetlands-clips" from the list of available drawings. Hit *Cancel* to stop making sheets.

Step Two: Temporarily Attach HDPLAN or BDPLAN.dgn (Optional)

As a time saver you can use another programs *Clip Boundaries* instead of placing your own manually. Depending on the type of project *Bridge or Highway,* use **File>Reference DOT>Attach** and browse to the appropriate groups \MSTA directory and select **bdplan.dgn** or **hdplan.dgn.** No logical is needed, set the nesting to **Copy Attachments** and **depth** to "0" (or use **No Nesting)** and click OK.

♬ If there aren't any clip boundaries in the bdplan.dgn or the hdplan.dgn, you will have to place your own boundaries manually.

✓ ***Refer to page 12-5 for the procedure on placing clip boundaries manually.***

Step Three: Copy Clip Boundaries

Now we need to merge the clip boundaries into the active file. This will produce clip boundaries for the Wetland plans that cover the same area as the plans sheets for the project. This procedure is assuming that you want a Wetland plan for every plan sheet. If you only need a Wetland plan for specific areas on your project, place clip boundaries manually in your active file as you would when creating the normal plan drawings.

✓ ***Refer to page 12-5 for the procedure on placing clip boundaries manually.***

In the Reference File dialog, highlight the reference file (??plan.dgn) then select **Tools>Merge Into Master** from the Menu Bar. Now you will be prompted to select a view by clicking a data point anywhere on your top view. An informational dialog will open telling you that you are about to merge one reference file into the current design file. This is what you want to do. Select **OK** to start the procedure. Refresh your window to update the view in order see your clip boundaries in the active file.

Step Four: Create the Cut Sheets

Part One: Activate Macro

From the *Settings Manager* select **Create Plan Sheets > Create Cut Sheets**.

Part Two: Supply Starting Number

It asks you what number you want to use for the starting number of the Wetland plan sheets. Use the default "1" (Figure 24-9). This will appear in your border as your sheet number.

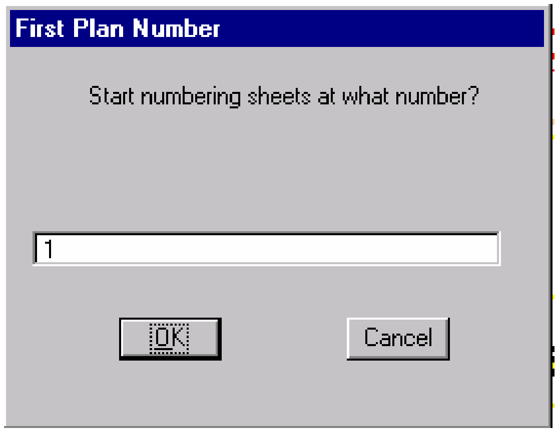


Figure 24-9: Start Numbering At?

Part Three: Sit back and watch

When the program has finished, it will drop you back into Wetlands.dgn. Open up the files you've just created and see how they look!

Live Nesting

What is Live Nesting? This is a new method in MicroStation V8 of attaching a file with references to another file like our border sheets. By using Live Nesting you no longer need to use the old methods of **Batch>Attach** and **Batch>Settings** to manipulate the way you want your cut sheets to appear for plotting purposes. Now if you want to turn off certain levels, adjust displays of reference files or attach/detach additional reference files, you can simply do this in your source drawing (i.e. Wetlands-clips, HDPlan, BDPlan, Envplan, etc.) and all of your border files will be displayed in the same manner.

Step Five: Troubleshooting

If you open a Wetland plan sheet drawing and the graphics within the sheet are not correct, it could mean that one the drawings that is referenced in is not at the same Global Origin as the other drawings. If the graphics aren't aligned with your border, try and re-cut the sheets again. It won't be necessary to place new boundaries. Normally this will fix the problem. See CADD Support for assistance if needed.

Step Six: Batch Printing - Create a New Batch Job

Part One: Open Batch Print Dialog

Select **File>Batch Print/Plot (DOT)** from the dialog Menu. Click Cancel at the *Open job Set* dialog window.

Part Two: Select a Printer

Highlight *Printer* from the *Specifications Controlling Plotting* area of the dialog. Select **Specifications>Select** from the menu or click the little green icon. Choose **US_OCETDS860FULL** or **US_OCETDS600FULL** (OCETDS860FULL or OCETDS600FULL for metric). Click OK.

Part Three: Select Print Area

Default *Print Area* **MDOT Standard** is correct by default for U.S. Customary projects. (Change this to **OCE** for metric projects.)

Part Four: Select a Display (Pentable)

Highlight *Display* from the *Specifications Controlling Plotting* area of the dialog. Select **Specifications>Select** from the menu or click the little green icon. Choose **graysurvey_wetlands** and click OK.

Part Five: Add Design Files

Select **Edit>Add Files** from the menu. Select all of the plan sheet drawings you just created (i.e. 001_Wetlands1.dgn). Click the *Add* button. Click *Done*.

Part Six: Save your Batch Print job

Select **File>Save As…** and give you Batch Print a logical name so you can print it again if the need arises (i.e. Wetland_ck_OCETDS860.job).

Part Seven: Send the Plots

Click the printer icon or select **File>Print** from the *Batch Print dialog* menu to send all sheets to the plotter.

If you don’t want to send them all, highlight only the files you want to plot. At this point you can send just the ones you have selected. Click OK.

ARMY CORP. DOCUMENTATION

Quick Punch List

- Cross Hatch Areas
- Measure Areas/Place Text
- Place 8 ½ x 11 Clip Boundaries
- Create Cut Sheets
- Run Border Macro
- Send to Color Plotter

CROSS HATCHING WETLANDS

Introduction

This section is intended to provide assistance with some of the tasks related to the production of plans for submittal to the Army Corp. of Engineering. There are many ways to do the same thing in MicroStation, however to create standardization and efficiency, we encourage you to follow the steps outlined below.

Step One: Start MicroStation

Double-click your *MicroStation new InRoads config* icon. Click the ***Project*** pull-down and pick on your PIN. Select **EnvPlan.dgn** from your list of files and click OK. Click your *Fit View* icon.

Step Two: Locate the Wetlands

Check and see if the information you need is displayed on your EnvPlan.dgn. If topo cleanup is done properly, wetland lines and flags should be displayed. If not, you can ask the Program (Urban and Arterial, Bridge or Regional) to go through the process of cleaning up the additional topo and text files or consider cleaning them up yourself.

- ♬ In the near future, there will be a separate drawing for wetlands. Cleaning up the wetlands.dgn will be the responsibility of the Environmental staff. Details of the cleanup will be in Topo Cleanup section of this manual. The wetlands.dgn will be attached to EnvPlan.dgn by default, however there are many old projects that will require the users to attach it manually. Use **File>Reference (DOT) Attach** and attach them to your EnvPlan.dgn using **Coincident World** method.

Step Three: Lock "Z" to Zero

From the *Main Menu* select **Macros>Set/Lock Z** to force MicroStation to place all elements at "0.00" elevation in the file. Click **OK** for the defaulted "0".

- ♬ This will prevent MicroStation from jumping to elements at different depths in the file.

Step Four: Set the Category Scale

Right Click on your *Settings Manager* and select **Category>Scale.** From the list of available scales, select the scale that you intend on plotting your sheets. Normally a good scale that is still legible on 8 ½ x 11 plan sheets is 1" = 50 ft. for U.S. Customary (1:500 metric).

- ♬ If you use the *Settings Manager* for almost any activity, it is required that you set the **Category Scale** first. This has to be set once in every file.

Step Five: Cross Hatching Wetlands

Part One: Select Hatching

Use the *Settings Manager* and select **Patterning>45^Hatching** for "Wetland Impacts" or use **Patterning>45/135XHatching** for "Wetlands of Special Significant Impacts". (These types coincide with the legend on the 8 ½ x 11 plan sheets.)

Part Two: Set Hatching Method

The setting in the *Hatch Area* or *Cross Hatch Area* dialog should be correct based on the *Category Scale* set in the *Settings Manager.* Adjust the *Method* to **Points** (Figure 24-10).

♫ Using *Points* method instead of *Flood* will place a bounding element around the area you are hatching which will allow you to label the areas all at once.

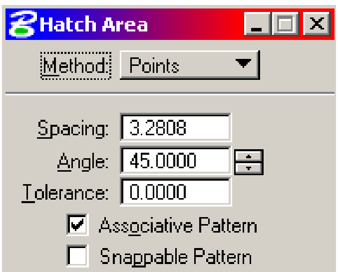


Figure 24-10: Hatch Area/Cross Hatch Area Dialog Settings

Part Three: Create Hatch Area

Using *AccuDraw* and the available snap methods, hit the intersection and the vertices of the elements that bound your area. Right click when you've hit them all to finish the command.

♫ If you have missed a point and need to add a vertex or want to modify and existing vertex, use the tools in the *Modify Tool Box* to accomplish this. Because we used *Associative Patterning*, the pattern will adjust itself to the new shape.

ADDING FILLED SHAPES

Step One: Set the Shade Type
Select **Patterning>Shade 20%** (or another degree of shade). By Default, the settings for this tool should be correct.

Step Two: Create the Shape
Using *AccuDraw* and the available snap methods, hit the intersection and the vertices of the elements that bound your area. Return to beginning point or hit *Close Element* to end command.

♬ If you have missed a point and need to add a vertex or want to modify and existing vertex, use the tools in the *Modify Tool Box* to accomplish this.

Step Three: Send Fill Back
From the *Main Menu*, select **Macros>Send Fill Back**. This will allow other line work and text to be seen in front of the shading. Hit **Refresh.**

Step Four: Reset the Fill Type
If you are finished using the Shape command, you need to tell MicroStation to stop using **Opaque** fill otherwise future areas or hatching that you do will be filled solid. To do this, select **Qualities>Change>Fill** from the *Main Menu*.

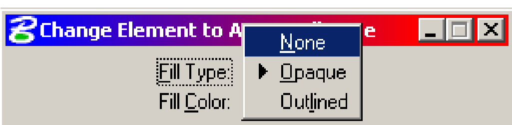


Figure 24-11: Change Fill Type to None

In the dialog (Figure 24-11), change *Fill Type* to **None.**

MEASURING AREAS AND PLACING TEXT

Step One: Lock "Z" to Zero

From the *Main Menu* select **Macros>Set/Lock Z** to force MicroStation to place all elements at "0.00" elevation in the file. Click **OK** for the defaulted "0".

♬ This will prevent MicroStation from jumping to elements at different depths in the file.

Step Two: Set the Category Scale

Right Click on your *Settings Manager* and select **Category>Scale.** From the list of available scales, select the scale that you intend on plotting your sheets. Normally a good scale that is still legible on 8 ½ x 11 plan sheets is 1" = 50 ft. for U.S. Customary (1:500 metric).

♬ If you use the *Settings Manager* for almost any activity, it is required that you set the **Category Scale** first. This has to be set once in every file.

Step Three: Set the Text Attributes

Using the *Settings Manager*, select **Prop. Text and Dims>Text Note.** This will set your text to the correct height, width, color, level, style and weight.

Step Four: Open Measure Area Tools

Select **Measure>Area Tools** from the *Main Menu.* A new set of tools should open.

In the rightmost tool in the *Tool Box* (Figure 24-12), set some *Parameter Settings*.

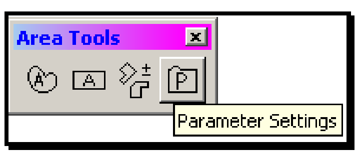


Figure 24-12: Area Parameter Settings

Part One: Set the Default Text Font

While in the **Text** tab, set the **Font** to **123 dotitalics** (Figure 24-13). This is the only setting necessary on the tab.

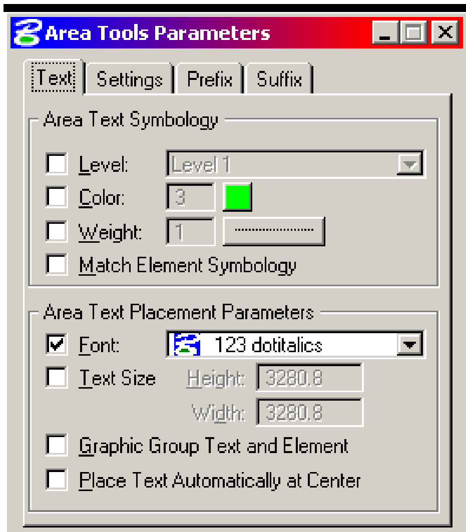


Figure 24-13: Adjust Text Font to 123 dotitalics

Part Two: Set the Default Prefix

Click on the *Prefix* tab (Figure 24-14). Add a prefix that you would like to use (i.e. Wetlands =). You're limited to ten characters.

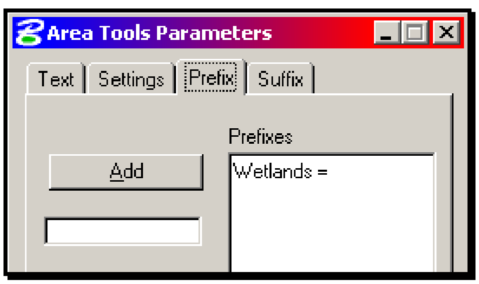


Figure 24-14: Add a prefix

Part Three: Set the Default Suffix

Click on the *Suffix* tab (Figure 24-15). Add a suffix that you would like to use. (i.e. s.f. or m\178 for metric). You're limited to ten characters.

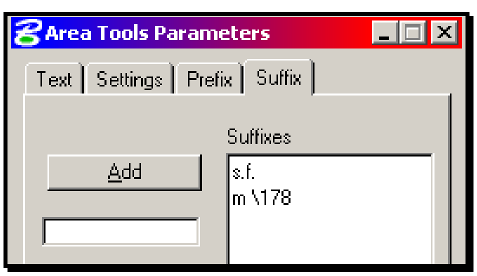


Figure 24-15: Add Suffixes

Step Five: Select by Attributes

You can select all of your hatched areas, measure and label them all at once with one click to the screen.

Select **Edit>Select By Attributes** from the *Main Menu.* Select **Tools>Set Select By from Element** in the *Select by Element* dialog box. Click on one of the hatched areas. Click again to *Accept.* Now hit **Execute.** This should highlight all of the hatched areas.

♫ If you want to measure and label shaded area, you will have to select one of those areas and hit execute to select them all.

Step Six: Select Measure Area Tool

From the *Area Tools* toolbox (Figure 24-16), select *Measure Area.*

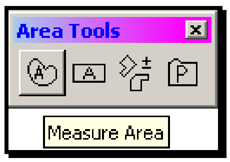


Figure 24-16: Measure Area Tool

Configure area tool for the method, prefix and suffix. Select **Element** from the *Method* pull down and place a check in the *Prefix* and *Suffix* boxes and select the corresponding pull down and pick one of your preset options. **Click** in your view to *Accept* the command.

This should label all of your areas. The orientation of the text will be horizontal to your current view window which means you will have to rotate and possibly move text. Use the **Rotate Element** tool and set method to either **2 points** or **3 points.** Follow the prompts.

ⓘ ***If you cannot see the text for your areas, check that you have done all the steps in this section.***

Step Seven: Select None

Select **Edit>Select None** to unselect your hatching. Close the **Select by Attributes** dialog and click **Cancel** to tell MicroStation to stop filtering by the hatched attributes.

Step Eight: Edit the Text (Optional)

You can use the *Edit Text* tool to add additional verbiage to your area text. While the text is in your *Text Editor* window, you can click on another type of text placement such as *Place Note* (Figure 24-17). This will allow you to point with an arrow to small areas that cannot be labeled clearly.

♫ You may have to select a dimension placement from your *Settings Manager* first in order for the arrowhead to be filled in.

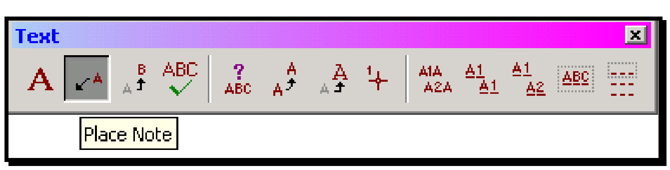


Figure 24-17: Place Note tool

Consider changing the default setting of the tool and selecting **Box** as a *Text Frame* (Figure 24-18). This will make your text stand out and if masking is required, it will make it easy to place a fence around your text.

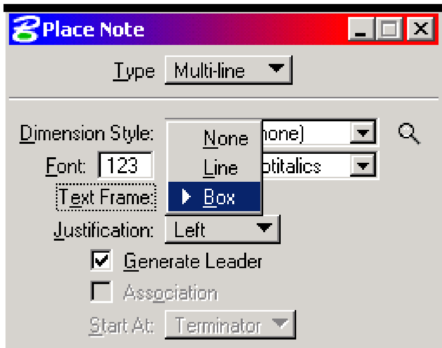


Figure 24-18: Using a Box text Frame

Place the text and delete the old text.

Step Nine: Masking References (Optional)

If the text you placed is obscured by reference files, place a fence around your text and select **File>Reference (DOT)>Clip>Mask>All** if you want to mask all elements in all references or **File>Reference (DOT)>Clip>Mask>Single** and click on the specific reference file you want to mask. Click on the view to *Accept.*

Or, you can also open your reference file dialog and highlight the specific reference file(s) you want to mask and select **Tool>Clip Mask.**

CREATING 8 ½ X 11 CUT SHEETS

Step One: Set Category Scale

Right click on the *Settings Manager* and select **Category>Scale.** Select the scale you want to use for your cut sheets. 1 in. = 50 ft. (1:500 metric) is a good scale to use. This scale will still allow the stationing and existing text to be legible. This should be the same scale you used to place your text for the areas.

Step Two: Place 8 ½ x 11 Clip Boundaries

Select **Create Plan Sheets**> **Place Clip Boundary 8.5x11** from the *Main Menu*. You will have a rectangle on your cursor waiting for placement. You are holding the portrait page by the bottom edge of an 8 ½ x 11 piece of paper. With your first click, place the boundary along the centerline and move your cursor up-station to rotate the page. Click again to define the amount of rotation. Continue placing boundaries for the length of your project.

♬ You can stop at any time (by right clicking) and move and/or rotate your boundaries. Restart the placement if necessary.

ⓘ ***You must keep the boundaries in order! This will determine the creation order of the cut sheets.***

✓ ***Refer to page 12-3 for the procedure on placing clip boundaries manually.***

Step Three: Create the Cut Sheets

Part One: Activate Macro

From the *Settings Manager* select **Create Plan Sheets** > **Create 8.5x11 Cut Sheets**.

Part Two: Supply Starting Number

The macro asks you what number you want to use for the starting number of the cut plan sheets. Use the default "1" (Figure 24-19). This will appear in your border as your sheet number (consider using "2" if you plan on including a Title Sheet, "3" if you plan on having a *Layout* sheet).

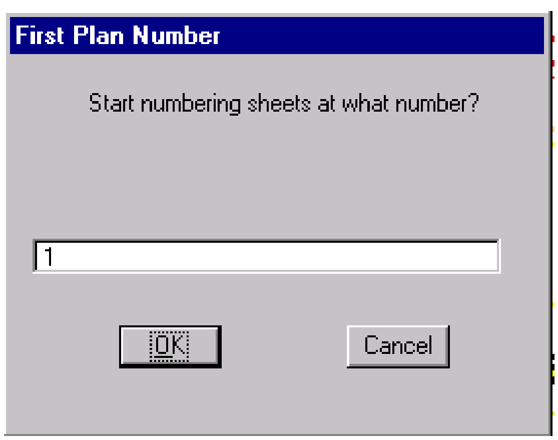


Figure 24-19: Start Numbering At?

Part Three: Sit back and watch

When the program has finished, it will drop you back into EnvPlan.dgn. Open up the files you've just created and see how they look!

Step Four: Troubleshooting

If you open a plan sheet drawing and the graphics within the sheet are not correct, it could mean that one the drawings that is referenced in is not at the same Global Origin as the other drawings. If the graphics aren't aligned with your border, try and re-cut the sheets again. It won't be necessary to place new boundaries. Normally this will fix the problem. See CADD Support for assistance if needed.

Step Five: Run the Border Information macro

The Border contains variables that can be replaced by a macro. It is not necessary to edit anything on this drawing that contains a $ or @ (i.e. $TOWNORCITY$). Select **Macros>Border Information** to run the macro. Process all of your sheets.

✓ ***Please refer to PCF Editing on page 1-25 if the variables do not get filled in with the proper information.***

CREATE A TITLE SHEET

Step One: Create a Title Sheet

Using **File>Make Sheetz,** create a title sheet.

- ✓ ***Refer to page 7-1 for more information on creating a title sheet.***

Step Two: Create a Location Map

Select **File>Open Location Map,** select **Macro>Location Map** and place the square defining the project area.

- ✓ ***Refer to page 7-4 for more information on creating a Location Map.***

Step Three: Paste Map

Open the *001_Title.dgn* and select **Edit>Paste.** Adjust the scale to **0.00000789** and place the map into the square provided by *snapping* to the corner.

- ✓ ***Refer to page 7-6 for more information on pasting a location map into your title sheet drawing.***

CREATE A LAYOUT DRAWING

Step One: Open EnvPlan
Open the drawing that contains your *Cut Sheets (i.e. EnvPlan.dgn).*

Step Two: Create Saved View
Create a *Saved View* called **Layout.**

✓ ***Refer to page 7-8 for more information on creating a saved view.***

Step Three: Create 002_Layout Drawing
Using **File>Make Sheetz,** create a numbered drawing called **Layout.**

✓ ***Refer to page 1-18 for more information on creating drawings.***

Step Four: Attach Saved View
Select **File>Reference (DOT)>Attach** and attach the drawing that contains your saved view. Set the scale based on the number of clips boundaries in combination with the scale in which you placed them. In this example, 10 (clip boundaries) x 600 (scale of the clips) = 6000 (scale of the reference attachment). Set the *Nesting* to **Copy Attachment 1.**

✓ ***Refer to page 2-70 for more information on attaching, scaling and rotating your saved view.***

Step Five: Adjust Level Display (if necessary)
Users may want to limit the levels that are displayed and drawings displayed to better represent the layout drawing.

BATCH PRINTING 8 ½ X 11 CUT SHEETS

Step One: Open Batch Print Dialog
Select **File>Batch Print/Plot (DOT)** from the dialog Menu. Click Cancel at the *Open job Set* dialog window.

Step Two: Select a Printer
Highlight *Printer* from the *Specifications Controlling Plotting* area of the dialog (Figure 24-20). Select **Specifications>Select** from the menu or click the little green icon. Choose **Standard Details**. Click OK.

Step Three: Select Print Area
Highlight *Print Area* from the *Specifications Controlling Plotting* area of the dialog (Figure 24-20). Select **Specifications>Select** from the menu or click the little green icon. Change the default *Print Area* to **Standard Details** and click OK**.**

Step Four: Select a Display (Pentable)
Highlight *Display* from the *Specifications Controlling Plotting* area of the dialog (Figure 24-20). Select **Specifications>Select** from the menu or click the little green icon. Choose **Standard Details** and click OK.

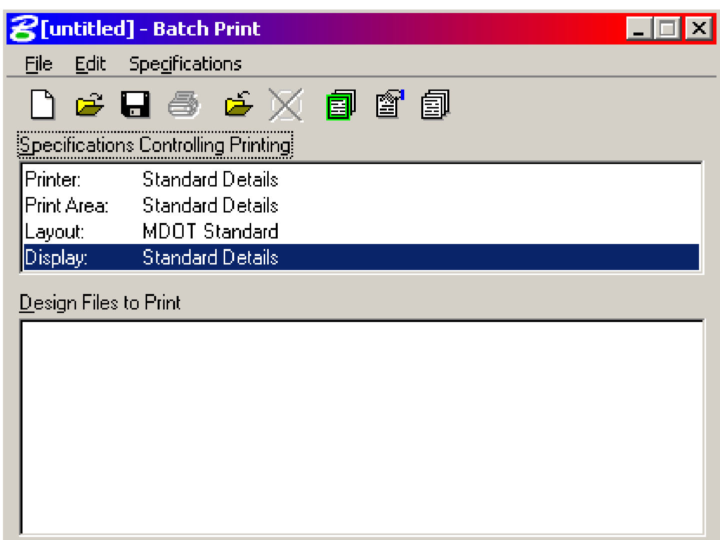


Figure 24-20: Batch Print Setup

Step Five: Add Design Files
Select **Edit>Add Files** from the menu. Select all of the plan sheet drawings you just created (i.e. 001_EnvPlan1.dgn). Click the *Add* button. Click *Done*.

Step Six: Save your Batch Print job
Select **File>Save As…** and give you Batch Print a logical name so you can print it again if the need arises (i.e. EnvPlan_ArmyCorp_printer.job).

Step Seven: Send the Plots

Click the printer icon or select **File>Print** from the *Batch Print dialog* menu to send all sheets to the plotter.

If you don't want to send them all, highlight only the files you want to plot. At this point you can send just the ones you have selected. Click OK.

♬ This printer setting will send your plots to your default Windows printer.

After you click OK, you can pick which Windows printer to use by selecting *Set Up System Printer* from the *Print Batch* dialog (Figure 24-21).

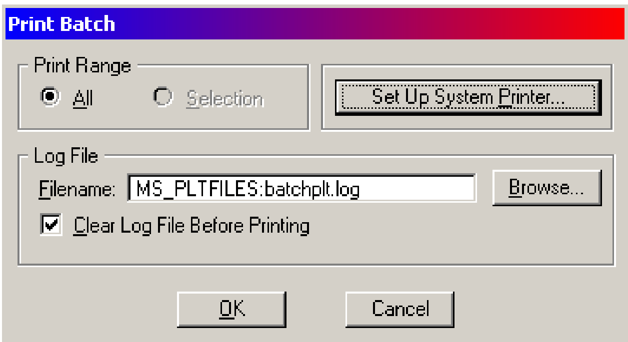


Figure 24-21: Select Set Up System Printer

Select one of your system printers from your list of available printers. Consider using a black and white photocopier. Click OK.

Chapter 25 Geotechnical Plan Development

To be documented in the future.

Chapter 26 Public Hearing Plans

To be documented in the future.

Chapter 27 Using Packager (Archive)

PACKAGING A MICROSTATION FILE(S) – (VERSION 8 AND HIGHER)

This document is intended for the general user as a guideline to creating a “snapshot” of a project as it has reached a critical stage that needs to be preserved or as a means to transfer design files to a consultant that does not have our resource (linestyles) and cell libraries copied into their MicroStation configuration. In a sense, an archive is a zipped up copy of your original file or files and all reference attachments. It compacts the files into a single file about half the size of all files uncompressed.

The MicroStation *Packager* can package a single or multiple design files, with or without all of their reference files. A good example is a plan sheet. If you package a plan drawing (i.e. 011_HDPlan1.dgn), the *Package Utility* can include all files that need to be packaged to reproduce the drawing. You can also include *Workspace* items like cell libraries, linestyles, fonts and more, however, if the files are going to be used in-house, we will always be using our configuration so these options do not need to be stored in the package. If the package is going to be shared with consultants, these options will display our files with our symbology.

Packaging Single or Multiple Files

Step One: Open File to Package (Archive)

Open MicroStation. Pick your project from the project pull down. Open a file.

- If you are packaging a single file, open that file. If you are packaging multiple files, it doesn't matter which file that you open.

Step Two: Open Packaging Utility

From the main menu, select **Utilities>Packager…** . This opens the *Welcome* dialog (Figure 27-1). Select **Next.**

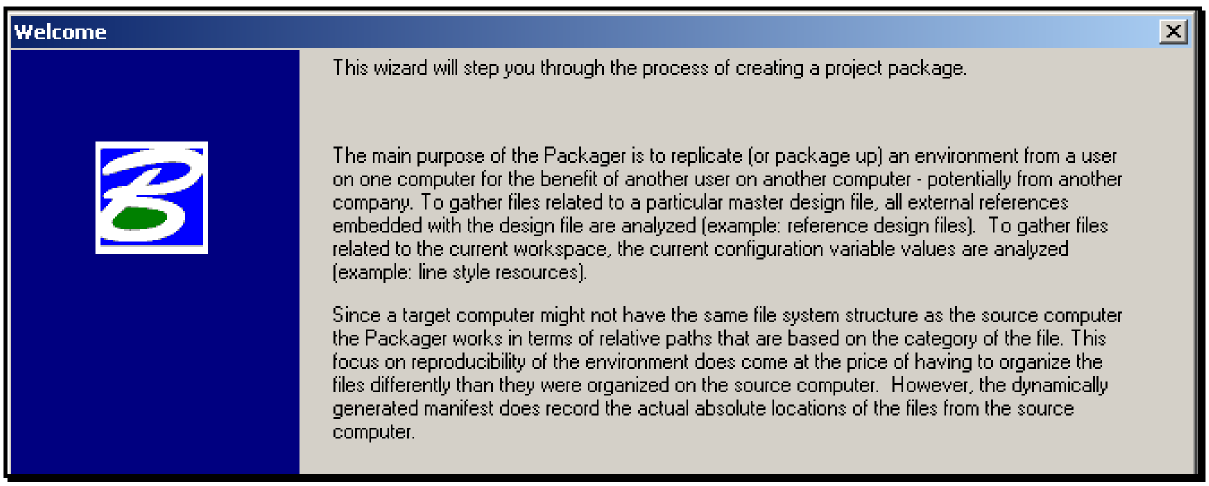


Figure 27-1: Create Package Welcome dialog

Step Three: Enter Package Name

Use a name that will identify the project from others. A good standard to follow is the PIN-TownName (i.e. 8467-Topsham). Do not use decimals in the file name. It is not necessary to enter a description, but it could be helpful to identify at which milestone it was archived. Select **Next.**

Step Four: Select Design Options

Select which design options you want to use. Normally, *Reference Files* is the only box you want to check (Figure 27-2). Select **Next.**

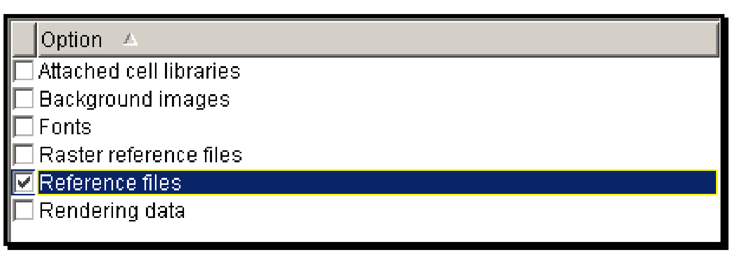


Figure 27-2: Design Options

- If you have images in your drawings, you will want to select *Raster Reference Files* also. If the package was going to be shared with consultants, you may want to include other options so it will be displayed correctly with our symbology.

Step Five: Gather Design Data

In this step (Figure 27-3), it gives you the option to select the *Current Design File*, *Current Directory or Browse* to select multiple files to *Package.* Remove the check mark in the *Recursive* box. This will prevent the *Packager* from digging down from the current directory into sub directories for design files. Make your selection, wait for it to finish processing, and then select **Next.**

Figure 27-3: Create Package dialog – Recursive un-checked

Current Design File – This option will package the current design file with its reference files.

Current Directory – This option will package all MicroStation design files, AutoCAD .dwg and .dxf files.

Browse – This option allows you to select single or multiple design files to package. Use the **Ctrl** key on your keyboard to pick multiple files.

Refresh – This will refresh the list of files you have selected. If you uncheck a file that you do not want to be packaged, you must hit *Refresh* to remove it from the dialog window.

Step Six: Select Workspace Options

Normally we want to uncheck <u>all</u> of the *Workspace Options* (Figure 27-4). If the file(s) is to be shared with a consultant that doesn't use our configuration, you may want to select all of these options. Make your selection and select **Next.**

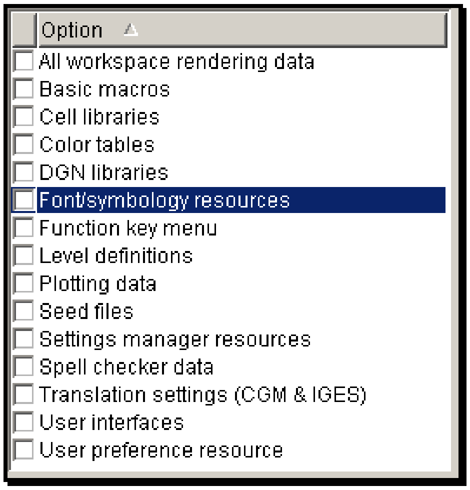


Figure 27-4: Workspace Options

Step Seven: Review Selections

This is the last opportunity to change your selections (Figure 27-5). You can still hit the *Back* button to go back through the steps. A few extra files get generated automatically. Do not delete these files. If all looks good, select **Next.**

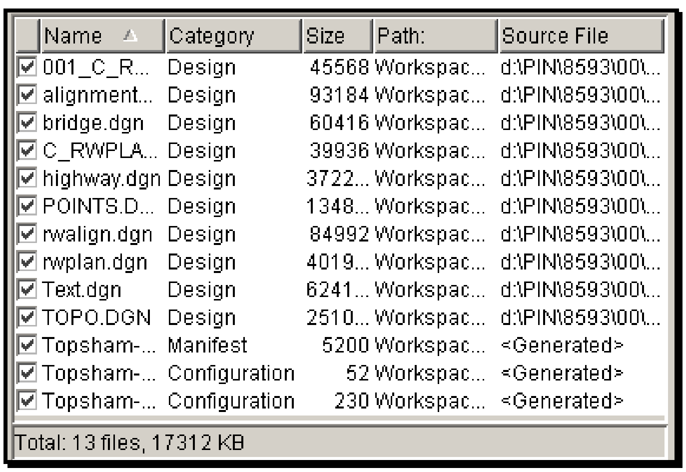


Figure 27-5: Review Selections dialog

Step Eight: Packaging Options

This step gives you the opportunity to adjust the location of the package file (Figure 27-6). The defaults are usually good unless you want to change the path to another folder location. Select **Next.**

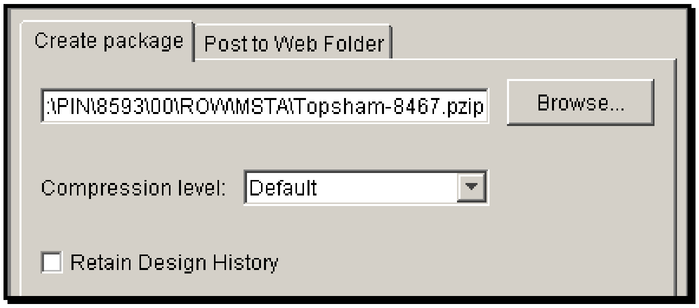


Figure 27-6: Adjust Path Options

- The *Retain Design History* box is to include the *Design History* of a file. It is basically a history of changes that have happened to the files. It is only as good as the information typed in by a user. (Full V8 files only).

Step Nine: Finish

Select *Finish* to begin the *Packaging* process.

OPENING A MICROSTATION V8 PACKAGE (.PZIP) FILE

It is not necessary to have MicroStation open during the extraction process, however it won't matter either way. These files can also be opened with any Zipping utility (i.e. WINZip).

EXTRACTING A PACKAGE FILE

Step One: Locate Package File

Browse to the location of the package file using Windows Explorer. The file has a .pzip file extension.

Step Two: Open the Package File

Double click the file to open it. The *Properties* tab (Figure 27-7) gives you a brief rundown of the file.

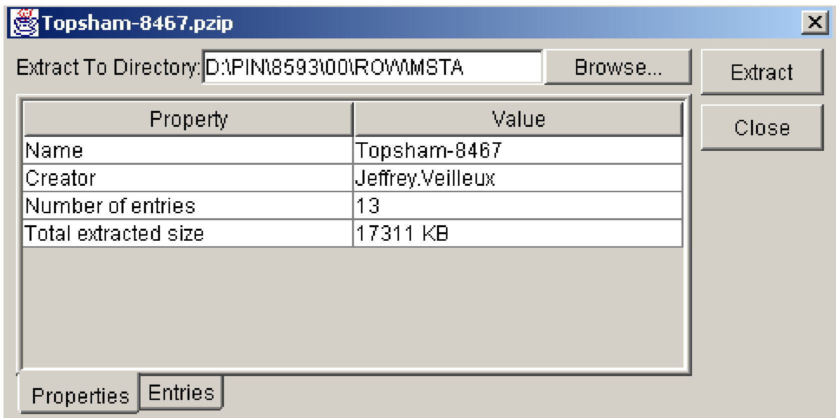


Figure 27-7: properties Tab in the PZIP

The *Entries* tab (Figure 27-8) displays the files that have been packaged.

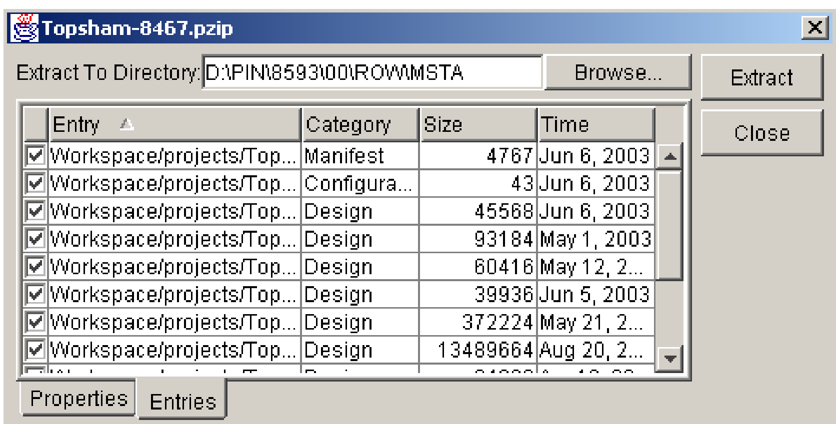


Figure 27-8: Entries Tab

Step Three: Set the Location for Extraction of Files

Notice the *Extract To Directory* portion of the dialog (Figure 27-8). Adjust the path to suit your needs by typing the new path or by hitting the *Browse* button.

♫ If you do not change the directory, you will not overwrite any existing files. It creates a folder structure of it's own within the target folder.

Step Four: Extracting the Package File

Click the *Extract* button (Figure 27-8). When Prompted to "Launch MicroStation?", say **NO!** (Figure 27-9)

Figure 27-9: Do Not Launce MicroStation – Click NO!

- ♫ If you say yes, MicroStation will be opened, however, it will not use any of our configuration files, therefore will not have our symbology.

Step Six: Finding the Extracted Files

When the files are extracted, they are placed in the folder you specified in Step Three, however, it creates a series of subfolders within the target folder. (i.e. Y:\PIN\8467\00\Highway\MSTA**Workspace\projects\Topsham-8467\dgn).** In this example, the characters in **bold** type represent the new folders created.

Step Seven: Opening, Moving or Copying the Extracted Files

Open the extracted files by select **No Project** from the *Project* pull down. You will have to browse to the files because they are buried in a subfolder. Because all the files live in the same folder, they will automatically display all of its reference files.

Use Windows Explorer to Move or Copy the files to a desired location. One possibility of its use is to replace files that have been corrupted, changed unintentionally, etc.

MICROSTATION ARCHIVING PROCEDURES (PRIOR TO V8)

EXTRACTING AN ARCHIVE

Prior to Version 8 (V8), MicroStation used a different program for Archiving. V8 does not allow you to create an archive, however, it does allow you to access an existing archive and extract the files. After identifying the files you wish to restore from the archive file, the Archive utility extracts those files from the archive file and copies them to a directory specified by the user.

Step One: Start Utility

Select **Utility>Archive** from the main menu.

Step Two: Open the Archive

In the Archive dialog box, click the Open Archive icon. 
The Open Archive File dialog box opens. Browse to your PIN’s Archive folder. Select the archive file from which files are to be extracted and click OK.

- The files which constitute the archive file are displayed in the Archive dialog box's list box.

Step Three: Select Files to Extract

In the list box, select the files to be extracted. Standard list selection techniques can be used to select more than one file. To select all files in an archive use the Select All item in the Archive Edit menu.

Step Four: Extract

Click the Extract Files icon.  The Extract Archive Files dialog box opens (Figure 27-10), displaying information about the selected files along with destination options.

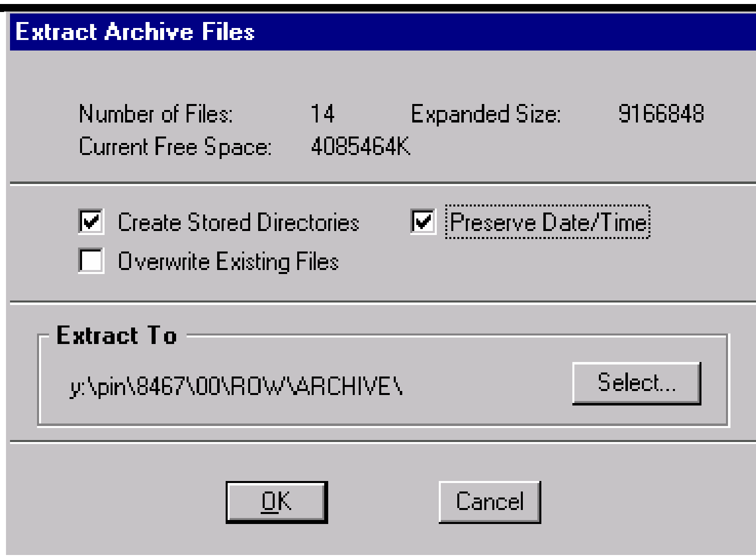


Figure 27-10: Extract Archive Files dialog

Step Five: Adjust Settings

Select the Create Stored Directories option. By default, the Archive utility will not use any directories stored as part of the archived file's path. By selecting this option, you direct the Archive utility to use stored directories as the destination path.

♬ If extracting drawings without referenced files attached, do not select this option.

Do not select the Overwrite Existing Files option unless your intension is to update the files on the network, whether the working drawings or an existing extracted archive. Destination will depend on which directories to overwrite. Permissions on the files should prevent you from overwriting files in another workgroup.

ⓘ ***Overwrite should be used with extreme caution. Be absolutely positive that you will not overwrite someone else’s work on the network***

ⓘ ***When this option is selected, the extracted file will overwrite an existing file with the same name.***

Step Six: Preserve Date and Time

Select the Preserve Date/Time option. If on, the date/time of the extracted file will be copied from the compressed file, preserving its original values.

Step Seven: Set the Destination

In the Extract To section (Figure 27-10), click the **Select** button. The Extract To dialog box opens (Figure 27-11). Select a new path for the target directory to which the selected design files will be restored and click OK. This path should be to your workgroup's archive folder in the PIN directory.

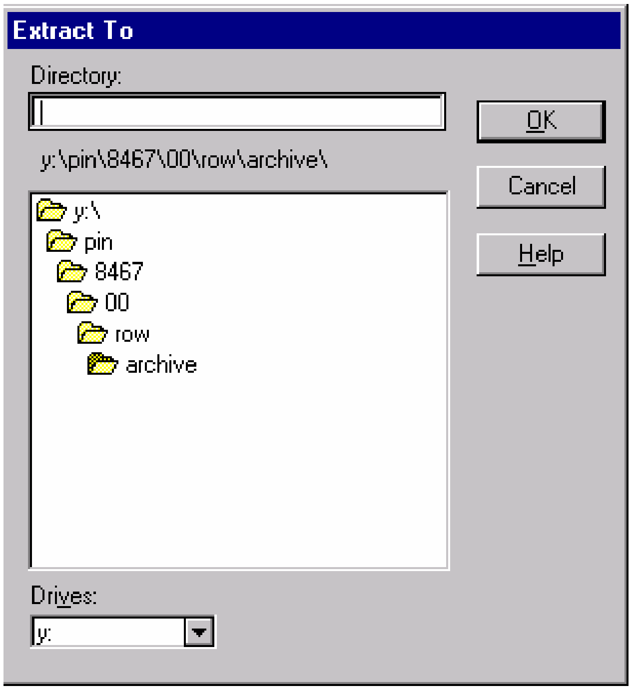


Figure 27-11: Extract To dialog

In the Extract Archive Files dialog box, click OK to begin the file extraction process (Figure 27-11).

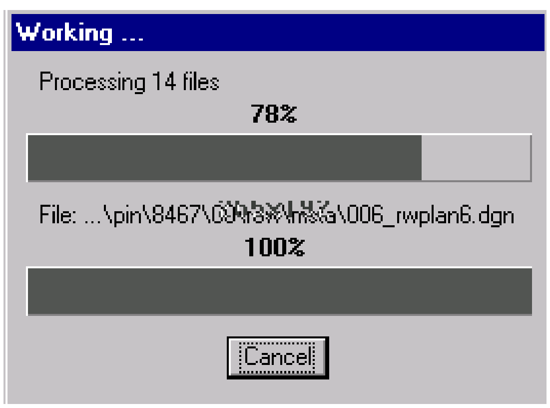


Figure 27-12: Working…

The working graphic is displayed (Figure 27-12).

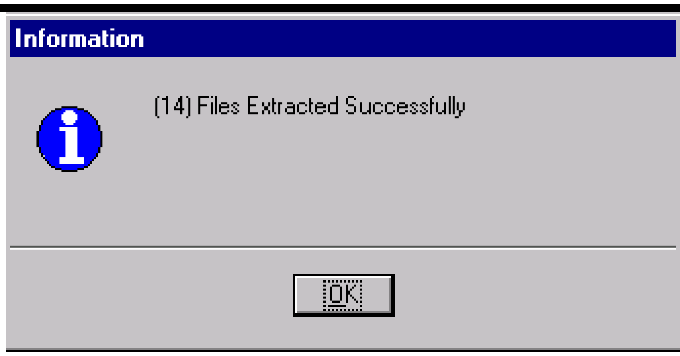


Figure 27-13: Information dialog

The information dialog (Figure 27-13) tells you if MicroStation was successful in extracting the files. Click **OK.**

Step Eight: Close the Archive Window

Click the “X” or **File>Exit** from the MicroStation Archive Window.

Chapter 28 Finalizing a Project

PROJECT WRAP UP

This portion of the MicroStation Manual is intended to provide the general workflow of a project once it has been completely designed and detailed in accordance to the MaineDOT standards. It makes reference to many topics already described in previous chapters of the manual. As opposed to duplicating this information, we briefly describe the steps involved and reference the pages where we describe the topic in great detail. The *Sheet Re-numbering Utility*, the *Border Information* macro, *Batch Printing* and the *MicroStation Packager* will be used in this chapter.

RE-NUMBERING UTILITY

Overview

MaineDOT uses a 3 digit prefix followed by an underscore "_" on every .dgn file that is going to be placed in a printed plan package. After the underscore is a standard, sheet type identifier (i.e. 001_title.dgn). Sometimes this is immediately followed by numbering for sheets of similar types (i.e. 011_HDPlan15.dgn).

✓ ***For a complete list of acceptable file names, please refer to the CADD Webpage at the following address: http://www.maine.gov/mdot/cadd-support/microstation/std_filename.php .***

With the MaineDOT configuration, we take the 3 digit prefix and use it as the page number that appears in the title block for each sheet. Therefore, each drawing with the 3 digit prefix has a border in it. We have a custom program called the *Sheet Renumbering Utility* to make it easier to renumber/rename your sheets to get them in the correct order. All MicroStation users should have this program installed at the same time MicroStation is installed. Contact CADD Support if this program is not installed.

♬ Regional offices that produce projects that are partially a book job and partially a plan package should still use this numbering sequence, but only on the sheets that are going to be printed for the final contract drawings. All other areas that are covered by the book portion of the project should have the 3 digit prefix stripped from the file name. This can be accomplished easily by using the *Sheet Renumbering Utility*.

ⓘ ***<u>Do not</u> create sub folders to separate the two portions of a Book/Plan Package. All final MicroStation drawing should remain in your workgroup's /MSTA folder.***

Step One: Start Re-numbering Utility Program

If the Ying-yang icon is not on your *Desktop*, you can launch the program by selecting **Start>Programs>MDOT Utilities>MDOT MicroStation Sheet Renumbering Utility.**

ⓘ ***Close all MicroStation files and be sure that no one is accessing files in your workgroups MSTA directory. The program needs to rename the files and cannot if someone has one open.***

Step Two: Arrange Files

Arrange the files that are going to be submitted in the correct ascending order that they will fall in the plan package.

Step Three: Renumber Files

Click on **Renumber Plot Files** and the program will place or replace the 3 digit prefix with the number in which it falls in the list.

✓ ***Please refer to page 1-22 for more detailed instructions on the Sheet Renumbering Utility.***

Coordinate ROW Plans or Other Plans

After the last page number of the plan package is known, let the Right of Way team member (or other workgroup) know what number to start numbering his or her plan set with. They will then run the *Renumbering Utility* on their plans. It may be necessary for them to *Remove* the prefixes from their plans (not the colored version) and open *Windows Explorer* and manually add the first number and underscore (i.e. 242_) to the first file name in the ROW plan set. In the example above, this will add 241 placeholders prior to the first file. Adding this manually would be very time consuming.

BORDER INFORMATION MACRO

Overview and Benefits

The *Border Information* macro is used to write the page number into the drawing's title boxes. It also handles placement of many other variables. If this macro isn't run, many of the variables will get filled in automatically at plot time, however, without running the macro, the border still retains variables (i.e. @SHEET@, $TOWNORCITY$, $PINNUMBER$, etc.) and would get archived that way.

The benefits are many with this macro. All common title box information is entered only once and the macro will populate all the title boxes in all of the border drawings in a matter of minutes. If a variable needs to be changed, it can be updated just as fast.

Step One: Launch MicroStation

Launch MicroStation from the icon on your desktop or from the **Start** menu. Select your project from the *Project* pull down.

Step Two: Select a Numbered File

Select a file in the list with a 3 digit prefix and an underscore. Click **OK.**

Step Three: Start Macro

From the *Main Menu* select **Macros>Border Information.**

♬ If you get warning stating that you need to "Close MicroStation and choose a project (PIN) that is consistent with your file location" (Figure 28-1), it means that you entered MicroStation incorrectly. This is a safety measure to insure that the user is going to write the correct information into the title boxes. This is all based on the *Project* pull down matching the PIN you are working on. Close MicroStation if you get this error and go back to **Step One** and try again. If you still get an error, contact CADD Support personnel.

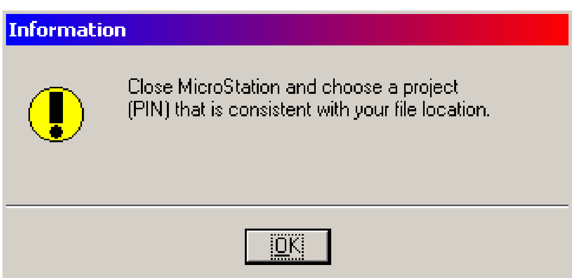


Figure 28-1: Close MicroStation and pick correct PIN.

Step Four: Single or All

If you don't get an error, you will be asked if you want to *Change Current File* or *Change Project Files.* This will enable you to process just a single file or process all of the files in the directory that meets the 3 digit prefix requirement. Make your selection.

Step Five: Review List

There is an opportunity to review and remove any files from the list of drawing to be processed.

Step Six: Process Drawings

Click **Cancel** to process the list of drawings. This usually takes less than 5 minutes even on long jobs.

✓ ***Refer to page 1-27 for more information on the Border Information Macro.***

CLEANUP MSTA DIRECTORY

All Projects (In-house, Regional and Consultant)

We would like to preserve the drawings that are used in the plan set (Sheet Files) and those used to build the plan set (Reference Files). Drawings that were used temporarily, for example, the portion of a book job or unused alternatives, should be deleted if not needed. The best time to clean up a project directory is immediately after working on the project while you're still familiar with it. According to the General Consultant Agreement (GCA), consultants are required to submit electronic files in addition to hard copies. Please treat these projects as if they were designed in-house.

✓ ***Please refer to page 32-1 for more information on Consultant Coordination of CADD drawings.***

Delete Temporary files

Throughout the life cycle of a project, additional cross sections are sometimes produced, the design may have been sent in two pieces, multiple alignment files are combined into one file and a project could be shortened removing a number of drawings. Any drawings, spreadsheets, or text files in the MSTA directory that are not needed and are not referenced should be deleted or moved into an "old" folder. Any MicroStation files with a .bak, .old, .xxx, etc., can be deleted as they are no longer needed.

Delete Old Folders

We create a folder named "old" as a temporary storage bin for copies of older versions of files until we know the newest version is OK. If you are certain that all files that are needed are in the MSTA directory and only junk exists in the old folder, delete the old folder. If you are uncertain of the necessity of the contents of the "old" folder, leave it alone or have someone more familiar look at it. If space on the server ever becomes an issue, we could delete all "old" folders in the whole PIN structure programmatically.

FINAL PLAN SUBMITTAL TO CONTRACTS

FINAL PRINTING

Send Title Sheet for Signatures

The title sheet is the only sheet in the plan package that needs *hand written* signatures. Circulate the hardcopy to the appropriate team members. There is a location on every plan page for an Engineer to stamp each sheet if necessary. This will only occur if a certain portion of the plan set was approved by an Engineer other than the one approving the Highway or Bridge work. Otherwise, the Engineer Stamp on the Title Sheet governs the internal plans in the plan package.

Once all team members have signed the Title Sheet, deliver it to the Chief Engineer's Office for the final stamp and signature.

Scan the Title Sheet and Others

Any sheet that has an Engineer stamp and signature will need to be scanned to the project's **CONTRACTS** folder (i.e. Y:\PIN\12671\00\CONTRACTS) by the Reproduction staff to be included in the final plan package as a PDF document and/or .tiff image.

♬ If the PIN number doesn't contain a CONTRACTS folder or if the permissions to the folder will not allow you to scan to the folder, contact CADD Support and the permissions will be adjusted.

CREATE A MULTI-PAGE PDF

Overview

We will use MicroStation's *Batch Print* utility to create a multi-page PDF file. This will provide a viewable plan set to anyone that has a computer and the free **Adobe Reader** software. This also provides a PDF file available for posting on the web for on-line bidding.

♬ A .pdf file is only a "snapshot" of the file at its present state. Any changes made to the MicroStation file will not be represented in the .pdf without recreating it.

Batch Printing to a Multi-page PDF

Step One: Open Batch Print (DOT)

Select **File>Batch Print (DOT)** from MicroStation's main menu. If you have a saved *Batch Print* "job" file of your final plans, select that or select **Cancel** and create a new one.

Step Two: Select the Printer

Highlight the *Printer* from the *Specifications Control Printing* portion of the dialog. Select **Specification>Select…** from the *Batch Print* dialog. Select the **pdf_bwFull** printer from available printers (Figure 28-2).

♬ All other *Specifications Control Printing* should say **MDOT Standard** for U.S. customary projects or **OCE** for metric projects.

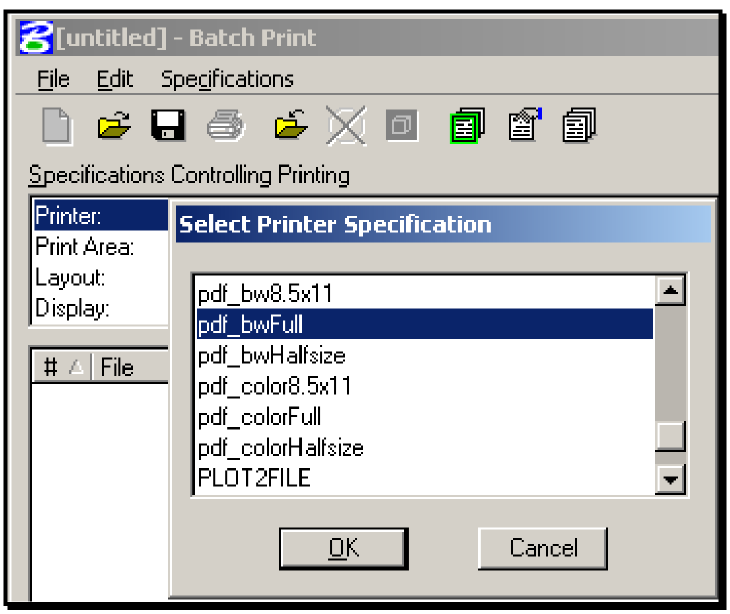


Figure 28-2: Selecting a printer from the Batch Print utility.

Step Three: Add Files

Select **Edit>Add Files…** and add the files you want to print. The list of files should include all drawings with a 3 digit prefix. These are the drawings with a border to be included in the final plan set. Browse to the ROW/MSTA folder and select all 3 digit prefix drawings with the exception of a plan set used for presentation purposes. These are identified by a higher numbering sequence than the plan package set and are followed by the c_RWPlan root file name. If there are other workgroups submitting plans for the plan package, select these sheets also (provided that they have been numbered correctly).

Step Four: Print to Multi-Page PDF

Select **File>Print…** from the *Batch Print* dialog (Figure 28-3).

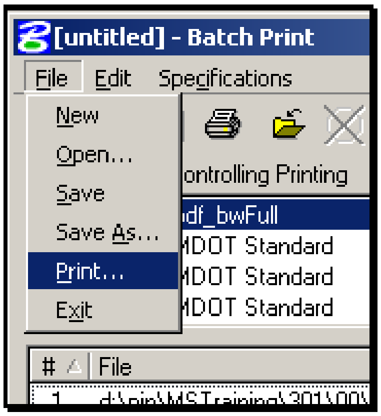


Figure 28-3: Select File>Print from the Batch Print dialog.

Step Five: Add PDF File Name

When the *Print Batch* dialog opens, select the *Browse* button in the *Document Set Single File Output* portion of the dialog (Figure 28-4).

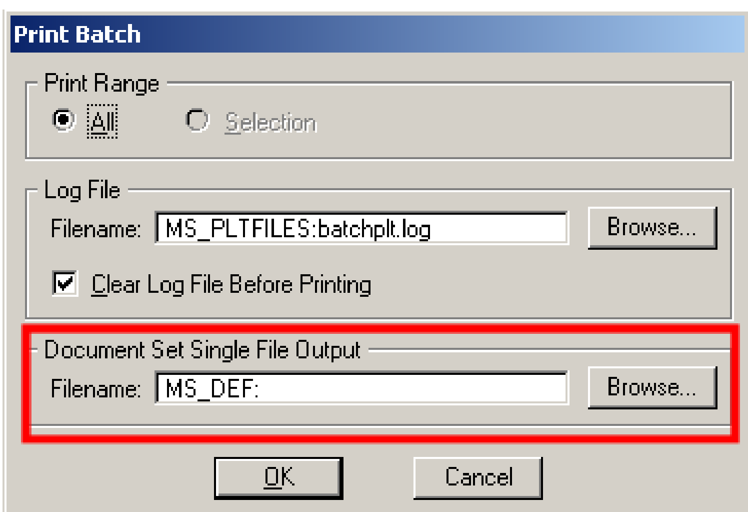


Figure 28-4: Browse to the Contracts folder of your PIN.

Browse to your project's **CONTRACTS** folder. Add a **file name** and **.pdf** extension (i.e. \CONTRACTS\12671-FinalPlans.pdf) in the *Files:* portion of the dialog (Figure 28-5). Click **OK.**

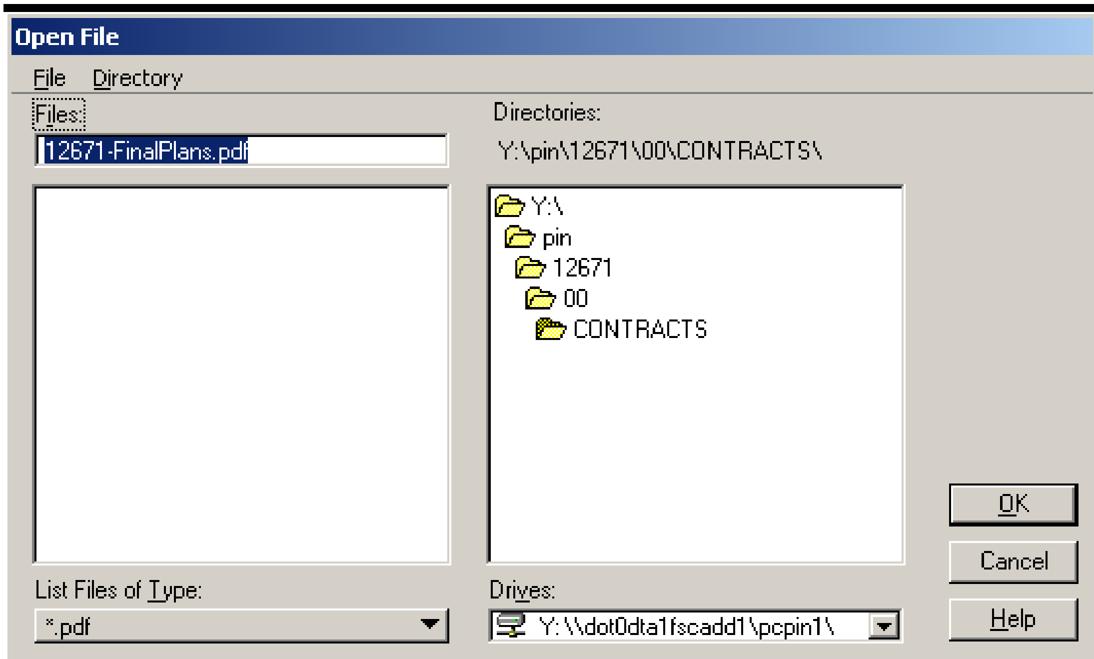


Figure 28-5 Print Batch dialog. Add the filename with the .pdf extension.

Once the path has been set, it will be displayed in the *Print Batch* dialog (Figure 28-6). Select **OK** to start the printing.

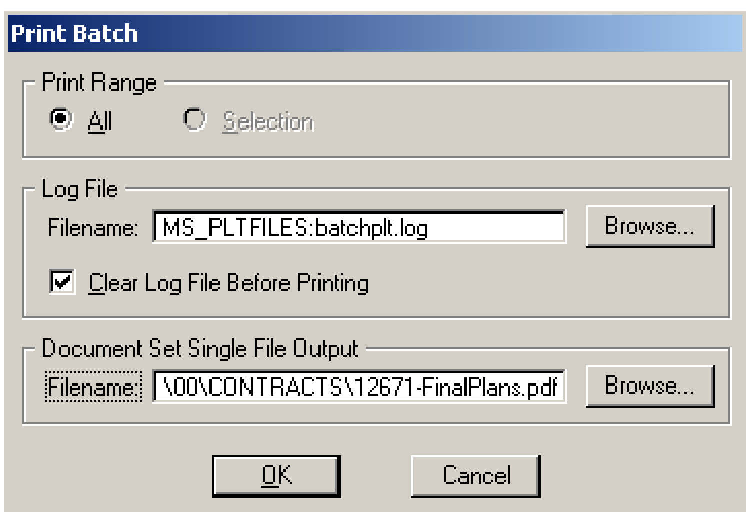


Figure 28-6: Batch Print dialog with the path and file name established.

The multi-page PDF file will be created in the **CONTRACTS** folder.

Select **File>Save As…** and save the job file as **PIN- FinalPlans.** Close the utility.

ADJUST AND PRINT THE MULTI-PAGE PDF

Overview

Prior printing the PDF, it will require some editing. This can only be done by someone with PDF Writer software. Either the Reproduction staff or someone with this software can finalize the PDF for printing.

Replace Title Sheet and Others

Any sheets that required stamps and signatures will have to be replaced. Open the PDF document and select the *Pages* tab. Right-click on a page that needs to be replaced and select **Replace Pages…** (Figure 28-7).

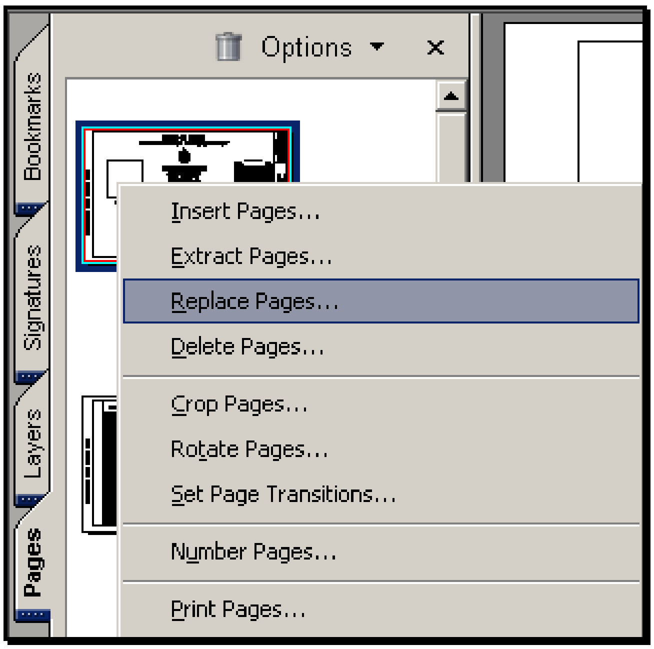


Figure 28-7: Right click to replace a page

Browse to the replacement sheet that was scanned separately, select it and click the **Select** button. A dialog will open allowing the user to replace the single page or multiple pages at once. If all replacement sheets were scanned into individual PDF documents and only one image was selected to be replaced, then the dialog doesn't need adjustment. Click **OK** (Figure 28-8).

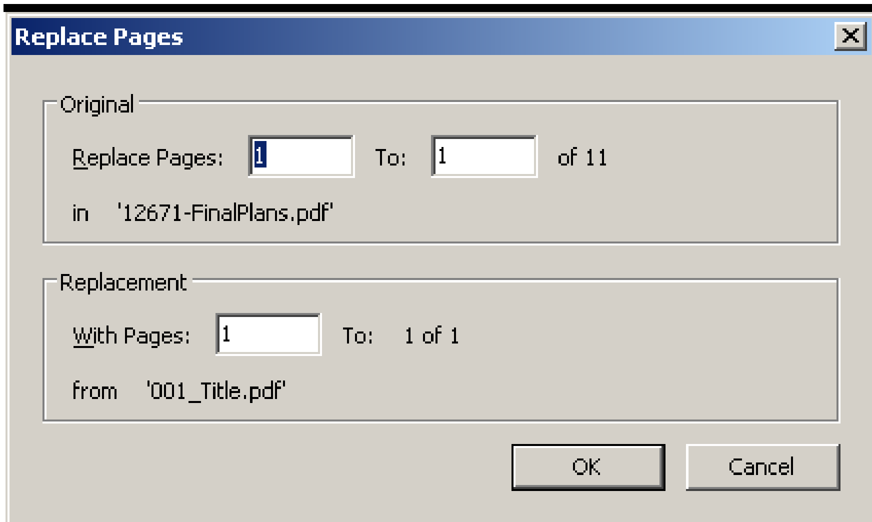


Figure 28-8: Replace Pages dialog

A *Warning* dialog will appear needing confirmation (Figure 28-9). Click **OK.**

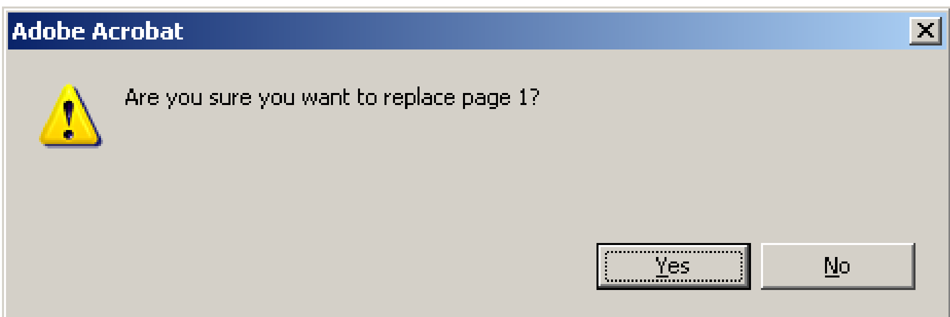


Figure 28-9: Adobe Acrobat warning dialog

Repeat for other pages if necessary.

Rotate Vertical Pages

Vertical Cross Section pages need to be rotated 90 degrees counter-clockwise so that they are printed correctly with the binding edges matching all the other pages in the plan set.

Select the *Pages* tab and locate the vertical pages (if any exist). Select the first sheet that requires rotating. While holding the *Shift* key, scroll to the last vertical page. Release the *Shift* key. Right-click on the selected pages and select **Rotate Pages…** (Figure 28-10).

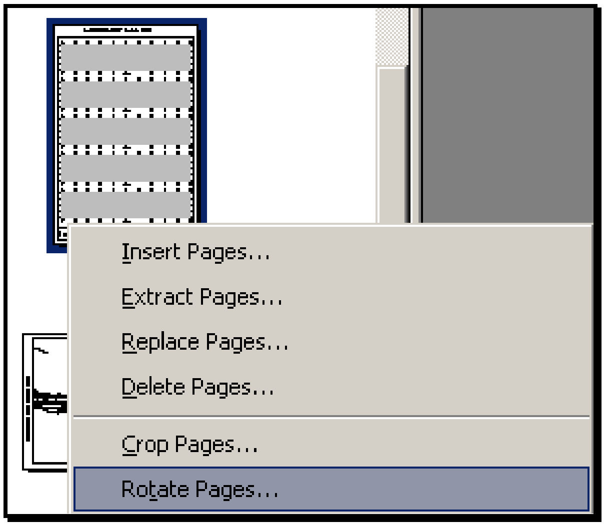


Figure 28-10: Right-click and select Rotate Pages

In the *Rotate Pages* dialog (Figure 28-11), adjust the *Direction* to **Counterclockwise 90 degrees.** Verify that the *Page Range* is set to **Selection.** Click **OK.**

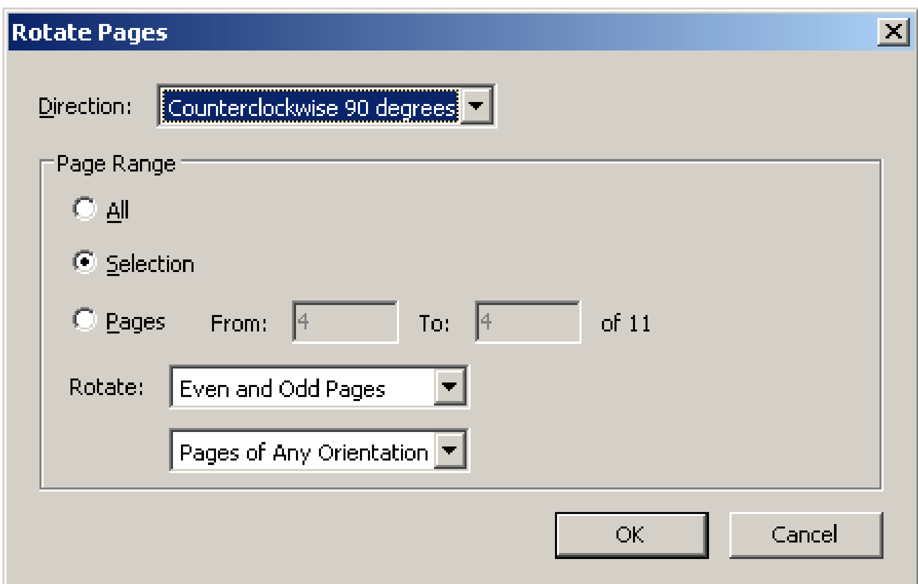


Figure 28-11: Rotate Pages dialog

Save the PDF Document

Select **File>Save** from the main menu.

Print to OCETDS800

Printing the PDF will require that the OCETDS800 has been added as one of your available printers. If it isn't, open *Windows Explorer* and browse to the \\Dot0dta1psprint\ folder (or click the underlined link in the electronic document). Double click the **OceTDS800-Rm126** printer in the list (Figure 28-12).

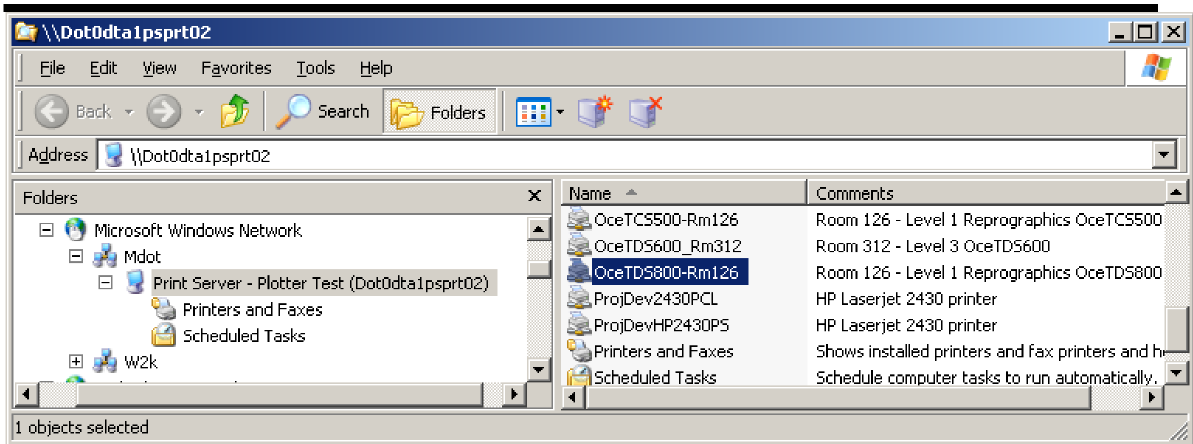


Figure 28-12: Double click the OceTDS800-Rm126 to add the printer

Open the PDF document. Select **File>Print.** Select the printer from the *Printer Name* pull down. Set the *Print Range* to **All.** Place a check mark in the **Reverse pages** box. In the *Page Handling* portion of the dialog, set the number of copies desired (if more than one, place a check mark in the collate box), set the *Page Scaling* to **None**, place a check mark in the *Auto-Rotate and Center* box and place a check mark in the *Choose Paper Source by PDF page size* box (Figure 28-13).

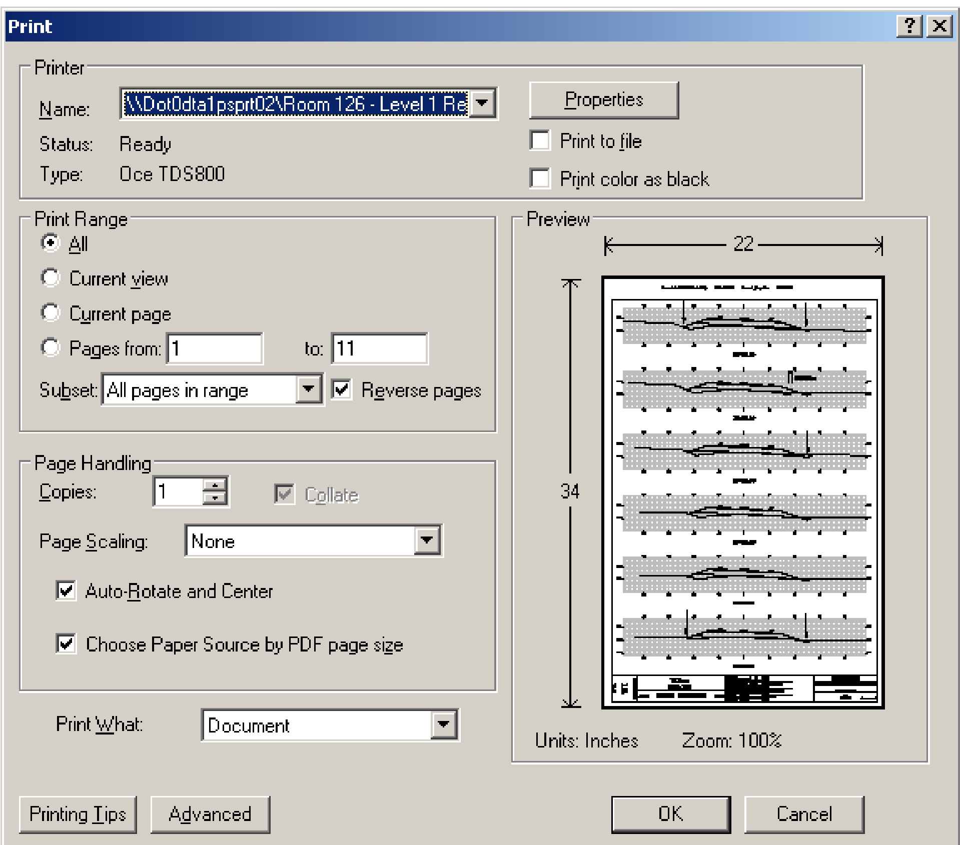


Figure 28-13: Print dialog with adjustment made for a Full Size US Customary project

Select *Properties.* Depending on whether you want a Full Size or Half size plot or whether it's a metric or U.S. Customary project, will depend on the settings you choose. Select the

Refresh button on the *Basic* tab to refresh the list of page sizes available and make the adjustments necessary.

- **Full Size U.S. Customary Project –** Set the page size to **Oce D 22x34 in.**
- **Full Size Metric Project –** Set the page size to **Oce D+ 24x36 in.**
- **Half Size U.S. Customary Project –** Set the page size to **Oce B 11x17 in.**
- **Half Size Metric Project -** Set the page size to **Oce B+ 12x18 in.**

In addition to these setting, the half size plots will need one more adjustment. Select the *Layout* tab (Figure 28-14). In the *Custom Scale* portion of the dialog, place a check mark in the *Keep Aspect Ratio* box. Adjust the *Custom Scale* to **50%.** Click **OK.**

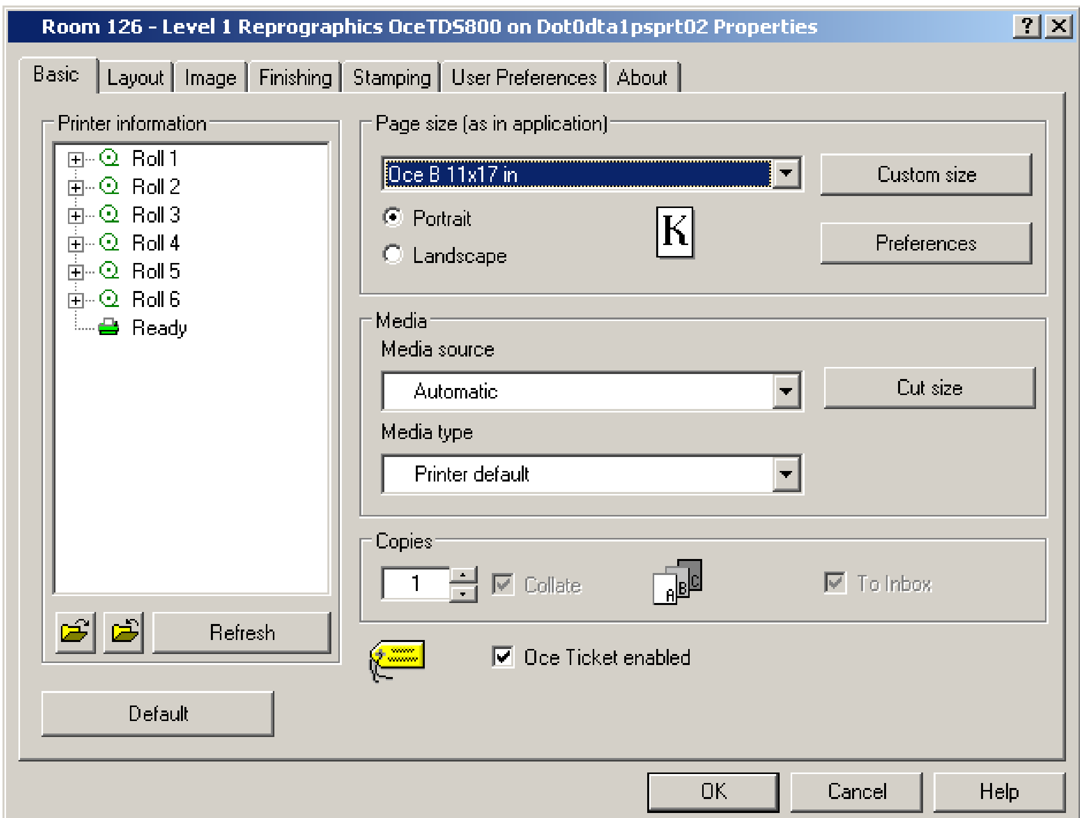


Figure 28-14: Adjusting the Custom Scale for Half size plots

♫ The *Preview* portion of the *Print* dialog will not display the correct dimensions for a half size plot, however, the 50% scale will happen when it reaches the plotter.

Select **OK** to start printing the PDF. A progress bar will appear displaying the printing progress.

SECURE MICROSTATION DRAWINGS

ACTIVATE DESIGN HISTORY

Overview

After the PDF is created, we want to activate *Design History* on all of the files in your Workgroups MSTA directory. What this does is it establishes a point in the files that MicroStation can restore to. From this point on, anyone that makes a change in the file will need to commit their changes and document a description of the change or exit with out committing the changes. This will ensure that any unintentional changes made to any of the files can restore back to the Contract deliverables. Any changes made to the legally binding electronic drawings will need to be more deliberate.

Activating *Design History* in the drawing files will allow the use of the same set of drawing files for most of the life-cycle of a project from conception to bid letting. Way too often files get altered by the time ROW plans are shipped to the registry for recording.

- ♬ *Design History* will enable users to roll-back any changes made to a file at any point during the design process. We are enabling *Design History* at the time of plan submittal to Contracts. In the future, we may enable *Design History* in every file as a PIN is created.

✓ ***For more information on Design History, please refer to MicroStation Help.***

Avoiding Errors

If your *MicroStation Preferences* are set to *Save Settings on Exit*, you will get an error when running the Batch Processor. It's recommended that you disable this setting temporarily prior to running the *Command File.* Select **Workspace>Preferences…** from the MicroStation main menu and select **Operation.** Uncheck **Save Settings on Exit.** Click **OK.**

Step One: Open *Batch Process*

From the *Main Menu* select **Utilities>Batch Process…** to open the *Batch Process* dialog (Figure 28-15).

Step Two: Select Command File

We created a standard command file for the purpose of activating *Design History* for all files in your workgroup's directory after a Contract Submittal. This file also sets a description in the *Design History* that describes the milestone. Select the magnifying glass to browse to the C:\!msInRoadsconf\standards\data folder and select **Set Design History.txt** *Command File.* Click **OK.**

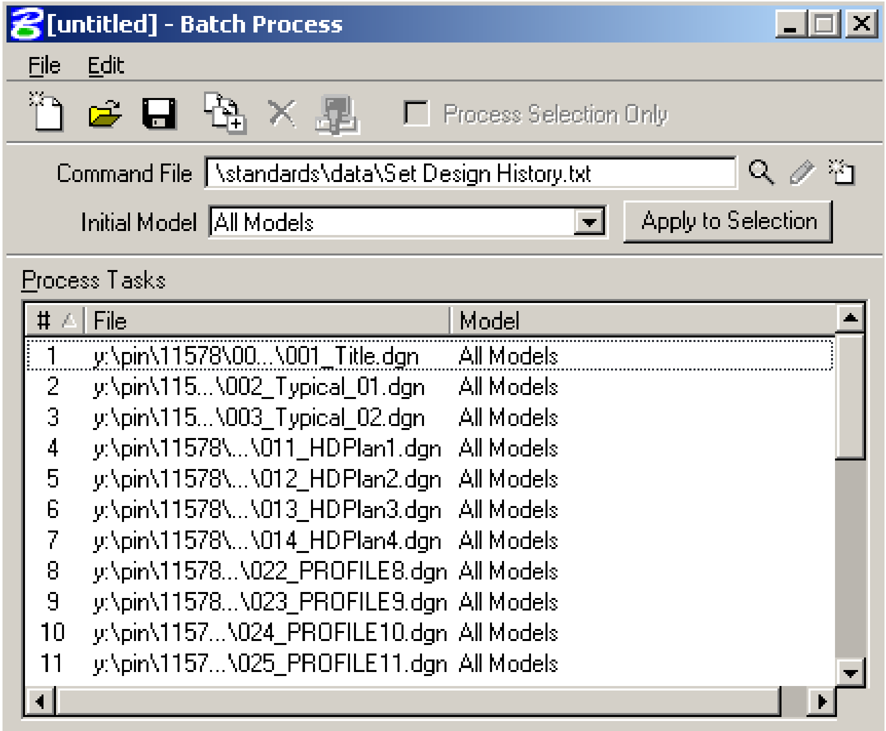


Figure 28-15: Batch Process Dialog.

Step Three: Add Files

From the *Batch Process* dialog menu, select **Edit>Add Files…** and select all MicroStation design files (.dgn's) in your workgroup's MSTA folder.

Step Four: Select All Files

Select all files in the list.

Step Five: Process Files

Select **File>Process…** from the *Batch Process* dialog or click the **Process Batch Process Job** button (Figure 28-16).

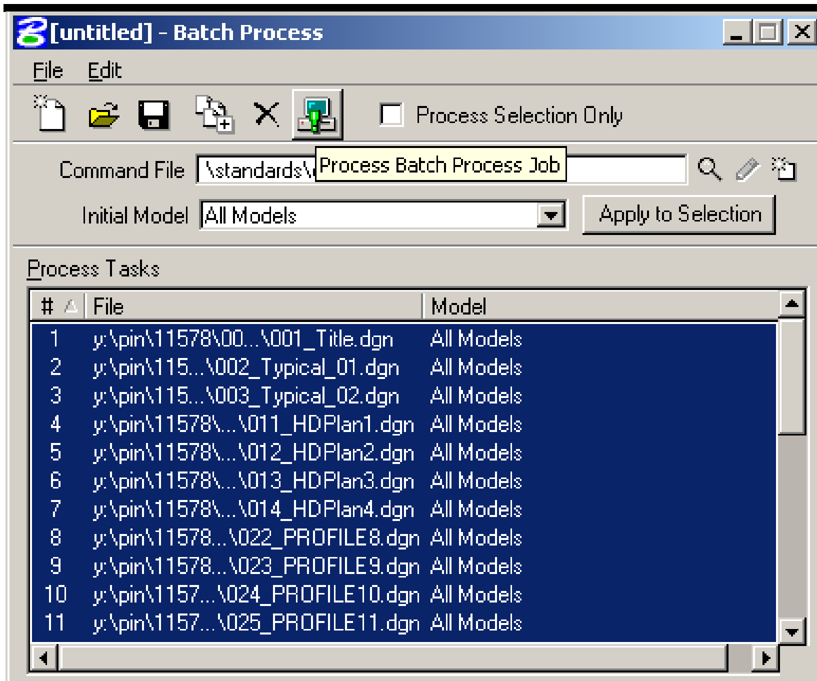


Figure 28-16: Batch Process dialog displaying Process Batch icon.

Step Six: Review Selection – Click Process

A new dialog will appear displaying all the files (Figure 28-17). Click **Process** to start the command. Each file will open and run the command specified in the command file. When the process is complete, the *Process* button will change to a *Done* button. Close the *Batch Process* dialog.

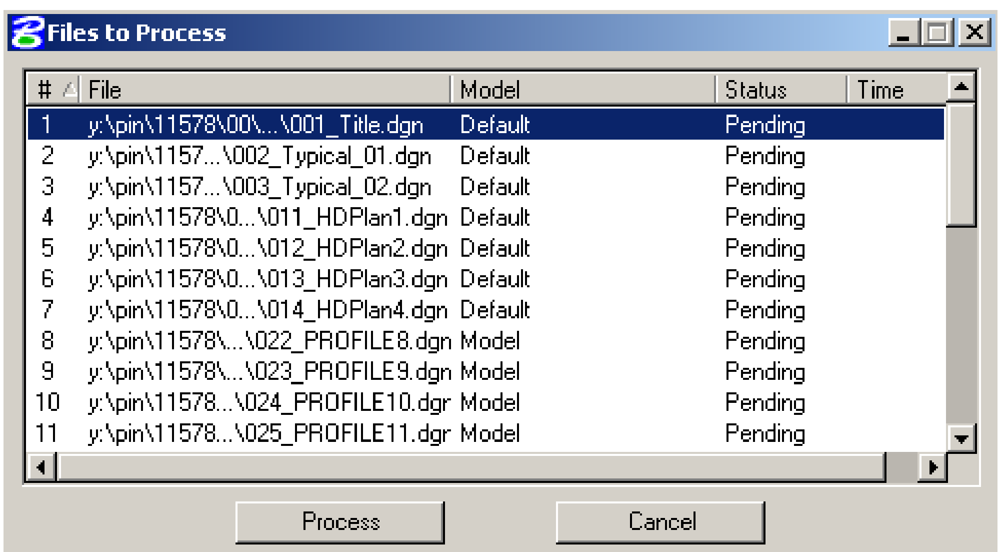


Figure 28-17: Files to process dialog.

♫ It is not necessary to *Save* the *Batch Process* session. This is easily created again if the need arises.

MICROSTATION PACKAGER

Overview

The *MicroStation Packager* is a utility used as a means of creating a "snapshot" of a project as it reaches a critical stage that needs to be preserved. The *Package* is a zipped copy of your original files and all reference attachments. It will compact the files into a single ".pzip" file about half the size of all files uncompressed.

- ♬ The .pzip file extension can be renamed to ".zip" and opened with any zipping software (WinZip or Windows XP's Compressed Folder Utility) if the need arose.

Step One: Start MicroStation

Launch MicroStation from the icon on your desktop or from the **Start** menu. Select your project from the *Project* pull down. Select a file in the list with a 3 digit prefix and an underscore. Click **OK.**

Step Two: Create New Package

Select **Utilities**>**Packager…** from MicroStation's *main menu.* This opens the *Create Package* dialog (Figure 28-18). Click **Next.**

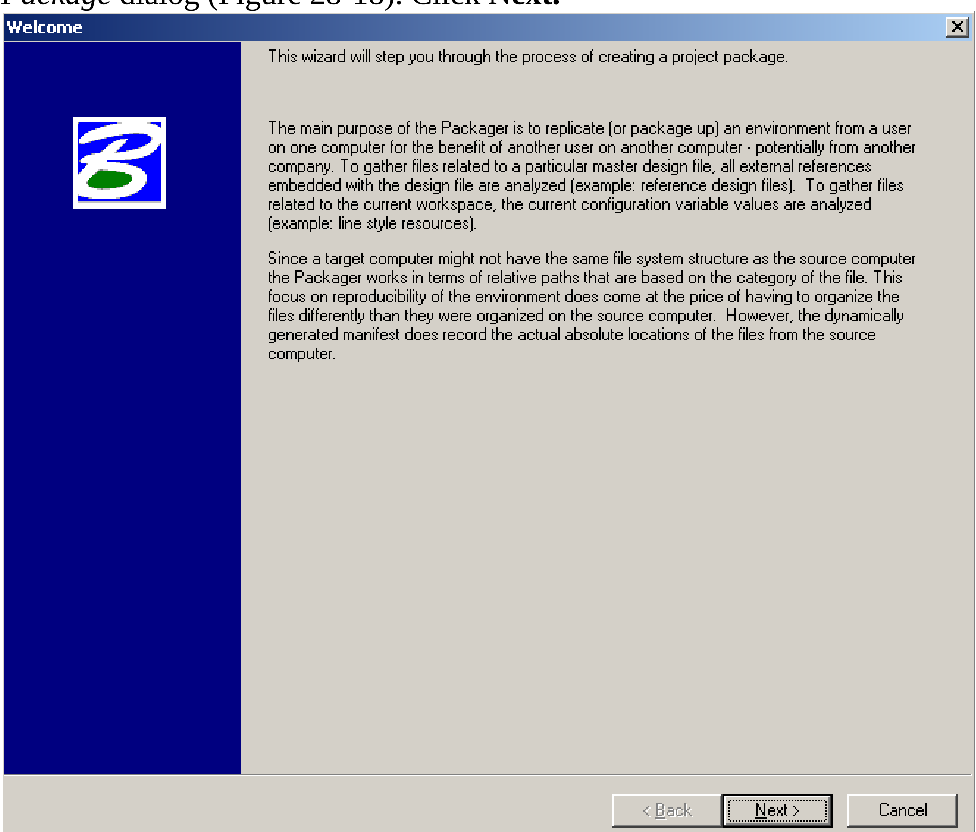


Figure 28-18: MicroStation Packager's Welcome screen.

Step Three: Enter Package Name

Use a name that will identify the project from others. A good standard to follow is PIN-SubmittalType (i.e. 12345-FinalPlans). Do not use decimals in the file name. It is not necessary to enter a description in the *Description* field, but it could be helpful to identify at which milestone it was archived (Figure 28-19). Click **Next.**

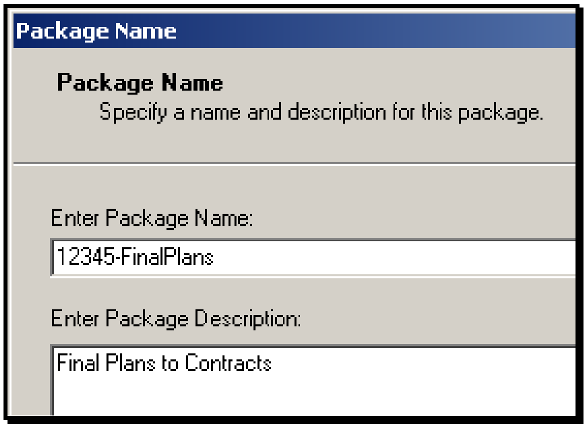


Figure 28-19: Enter the Package Name and Description

Step Four: Select Design Options

Select which design options you want to use (Figure 28-20). Normally, *Reference Files* is the only box you want to check. Click **Next.**

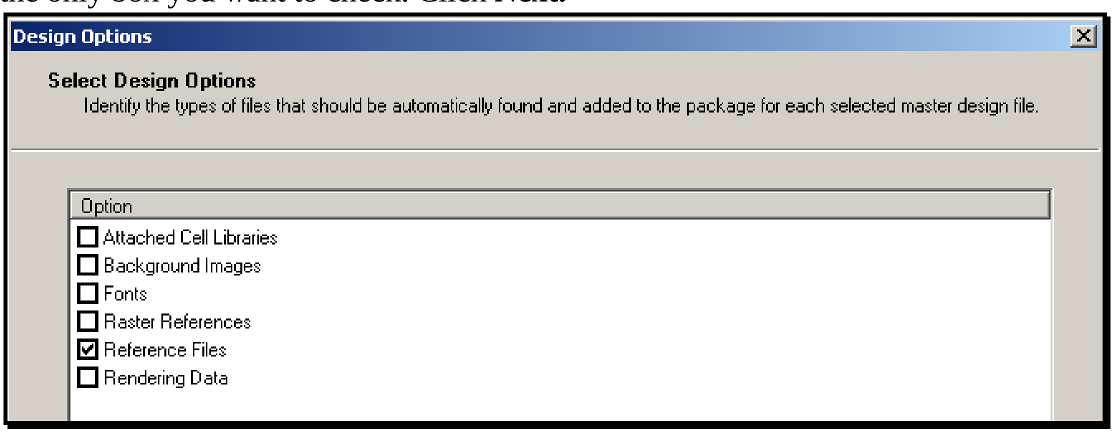


Figure 28-20: Select Reference Files as the only Design Option

Step Five: Select Project Files

The *Add Design* button allows the user to **Browse** and select the files you want to package. Select all of the 3 digit prefix files in your workgroup's MSTA directory used for the final plan set (Figure 28-21). Select **Open.**

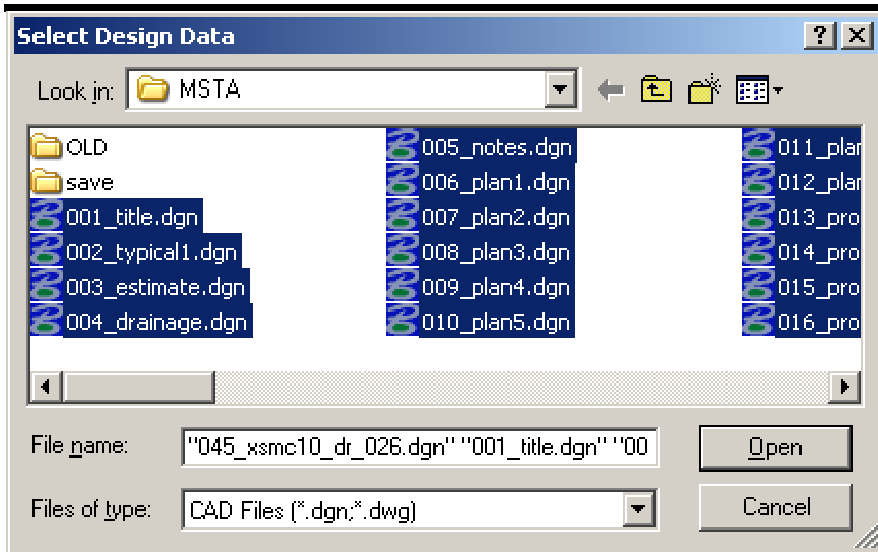


Figure 28-21: Browse and select all 3 digit prefix drawings only

Browse to the ROW/MSTA folder and select all 3 digit prefix drawings with the exception of a plan set used for presentation purposes. These are identified by a higher numbering sequence than the plan package set and are followed by the c_RWPlan root file name. If there are other workgroups submitting plans for the plan package, select these sheets also (provided that they have been numbered correctly).

Uncheck the *Recursive* option so that all files will fall within a single folder instead of reproducing the original folder structure.

Step Six: Unselect Workspace Options

Uncheck all of the *Workspace Options.*

♬ If the files are to be shared with a consultant that doesn't use our configuration, you may want to select all of these options. Make your selection and click **Next**.

Step Seven: Review Selections

This is the last opportunity to change your selection. You can still select the *Back* button to go back through the steps. A few extra files get generated automatically. Do not delete these files. If all looks good, click **Next**.

Step Eight: Package Options

This step gives you the opportunity to adjust the location of the package file. The defaults are usually good unless you want to change the path to another folder location. Place a check in the *Retain Design History* box if not already checked. Click **Next**.

Step Nine: Finish

Click *Finish* to begin the *Packaging* process.

✓ ***For more detailed instructions on the MicroStation Packager, please refer to page 27-1***

Step Ten: Extract Archive to Contracts Folder

Once the *Package* has been created it needs be extracted to your PIN’s \Contracts folder. This will provide Contracts with the drawings that are needed to be archived into *Digital InterPlot* for future document retrieval via the intranet Webpage. Using *Windows Explorer*, locate the MicroStation *Package (.pzip)* file that should be in your workgroups MSTA folder (i.e. 12345-FinalPlans.pzip). Double-click the file and you will see a dialog describing the package. Adjust the “Extract To Directory” path by clicking the *Browse* button. Set the path to your PIN’s \Contract folder. Click **Extract** and you will be prompted to “*Launch MicroStation?”* Select ***NO***.

Step Eleven: Notify Contracts

Once the files are extracted to the *Contracts* folder, notify someone in that section so they can apply proper permissions to the folder to prevent accidental editing of the final contract plans.

Chapter 29 Changes During Advertising (Amendments)

WORKING WITH AMENDMENTS

AMENDMENTS OVERVIEW

Overview

Occasionally revisions need to be made to the plans after the contract has been advertised. Sometimes the problem can be remedied by an Amendment to the contract book, other times the change(s) needs to be made on the plans. This portion of the manual will instruct users on how to deal with these changes or Addendums which are now being called Amendments.

Edits

It is necessary to "cross out" graphics and notes for all items that have changed. New features will be entered using the *Settings Manager* as normal workflow dictates. A revision triangle should be added with a revision cloud if necessary so that all changes are apparent to those who have the original set of plans. If the compounded changes result in obliteration of the sheet, the word VOID should be written across the page and a full replacement sheet provided.

Incrementing Sheets

All sheets that have been changed will have a new sheet designation. This is done by adding a letter suffix to the original sheet number in the bottom right hand corner of the sheet and the actual filename. If the original sheet number was 3, then the revised sheet number will be 3A. Likewise, if the original filename was 003_Typical02.dgn, then the new filename will be 003A_Typical02.dgn.

Place Copies with Originals

When the Amendments are complete, only the files adjusted will be copied into the CONTRACTS folder with the rest of the Contract Plans for the project.

USE FILES IN WORKGROUP'S MSTA FOLDER

Overview

Users should always use the "Legally Binding" original set of drawings that were printed for the bidding process. Working on the files requires that the original set were unaltered since the final printing. The potential of someone editing or adjusting a file since the final printing is high. By applying *Design History* to all files in the workgroup's MSTA directory, this gives users a record of changes to any given file (if any were made) and the opportunity to undo those changes resorting back to the original set at time of Final Plans. If a file has been altered since it was printed, the user will receive a warning saying that someone else has not committed changes to the file, would you like to take over the changes. The user may review the *Design History* to view a description of changes made if someone made a change deliberately. The user can determine what changes have been made and visually see and undo the changes. Likewise, when a user consciously makes a change considered to be an Amendment, they are prompted to enter a short description of the change.

If the user doesn't want to rely on these files because too many changes may have been made, the .pzip can be re-extracted into the workgroup's MSTA directory to recover the original files. This places all original files needed to re-generate the final plans into a sub folder. A restore can also be done from backup tapes if necessary.

✓ ***For more information on Design History, please refer to MicroStation's internal HELP.***

Saving the Files – Commit Design Changes

When a user exits a file that has been edited, the *Commit Changes* dialog opens waiting for a description of the change (Figure 29-1). It's a must to enter a brief description. If the user plans on making many changes and wants to enter the description later, he or she can select *Cancel* and still save the changes to the file. Remember to return to the file and make a note of the overall changes.

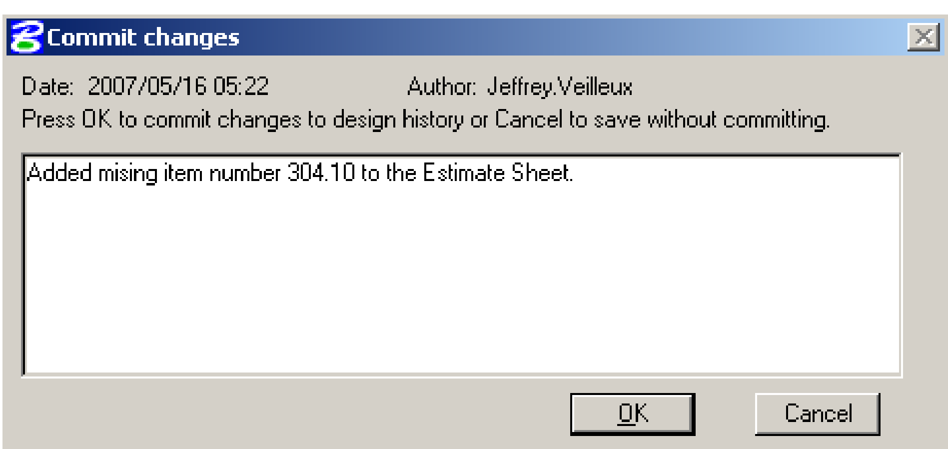


Figure 29-1: Add a brief description to the Commit Changes dialog

- If users have their *Preference* set so that they *Save Settings on Exit,* they will receive this message regardless if a change has been made to the file. Consider removing this preference by selecting **Workspace>Preferences** from the MicroStation main menu and adjusting the *Operation* category by un-checking the *Save Settings on Exit* option.

Adding Elements with the Settings Manager

Make all the changes that are needed as you normally would during the design phase within the proposed design files (i.e. Highway, Bridge, Alignment, etc.).

Some additional cells (Revision Triangles), linestyles (Cross Outs and Revision Clouds) and text (Revision Text) have been added to help the changes stand out from original data. These items, when printed in color, will be printed green.

- When editing the sheet files (files beginning with a 3 digit prefix) remember that some sheets do not contain any editable graphics besides the border elements. These will be the “plan view” Sheets, Geometric Sheets (Curb Layout Sheets) and Structural Detail sheets. The “plan area” visible in Plan Sheets actually reside in other files. These changes will need to be made in the proposed design file(s) (i.e. Bridge.dgn, Highway.dgn, Multimode.dgn, Alignments.dgn, etc.). Structural details usually reside in a “z_” file.

Add Revision Triangles

Overview

If changes span a number of plan sheets, each and every sheet affected by the change needs to have a revision triangle, date, description and initials. If the change on a “plan view” sheet can be handled with a note or additional graphics, then it would be OK to work on the individual plan sheet drawings.

Revision Triangles

Each collective change that is made needs to be marked with a triangle that is numbered. If a new cross pipe is added to a project, the numbered triangle that represents the change in plan view is the same number that will be used on the Cross Section, Estimate Sheet and Drainage Sheet for that specific change. Each of the respected sheets needs the triangle label. If Riprap is also added to the pipe ends, this item will also use the same numbering as the plan view drawing. If a ditch, driveway, catch basin is relocated a new number is assigned to the triangle. From the *Settings Manager* select **Symbols & Linestyles>Revision Triangle (Large)** to label the area in the drawing and select **Symbols & Linestyles>Revision Triangle (Title Block)** to place a triangle in the Signature Blocks. Select **Qualities>Drop>Complex (Cell, Chain, etc.)** from the *Main Menu* and left-click on the triangle, and left-click again any where in the view to *Accept* the command. Use the *Edit Text* tool or select **Text>Edit Text** from the *Main Menu* to edit the text within the revision triangle.

Revision Clouds

A revision “cloud” can also be used to better display the area that has changed if it isn’t completely apparent with just a revision triangle. Place revision clouds from the *Settings Manager* by selecting **Symbols & Linestyles>Revision Cloud** and left-click to place a shape encompassing the area of change.

Signature Blocks

Every file in the list with a 3 digit prefix has a border with a signature block. U.S. Customary borders have been expanded to accommodate more revisions whether they are Amendments or As-builts. There are lines in the signature block dedicated to revisions and a single box for Field Changes (Figure 29-2). The Field Changes section is reserved for the governing signatures of the revisions. This is where the Project Manager, Asst. Project Manager or Resident would sign the plans as final approval of the As-built plans.

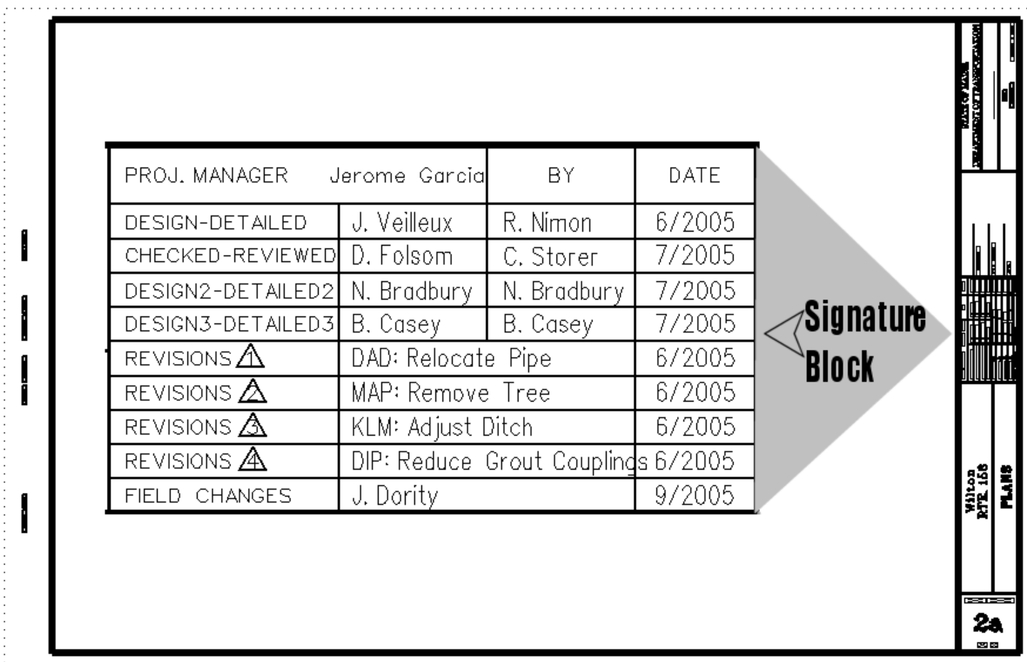


Figure 29-2: US Customary signature block with revision triangles

Metric plan sets may require an expansion to the signature block to cover the revisions (Figure 29-3). Use a variety of MicroStation tools to accomplish this.

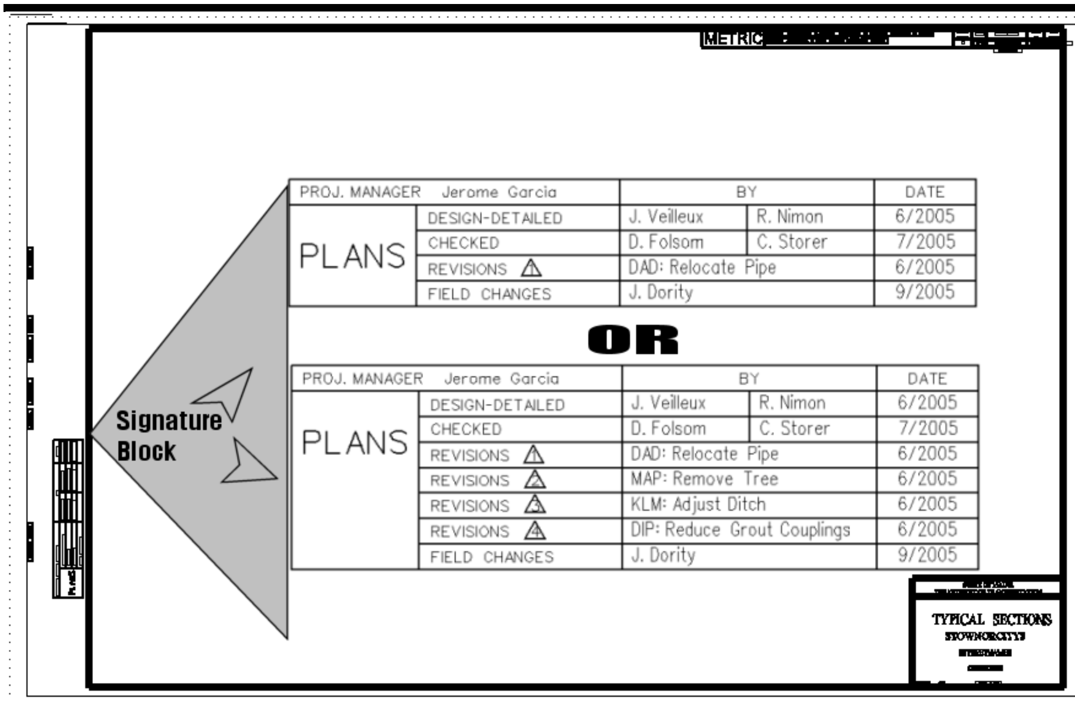


Figure 29-3: Metric signature block - before and after expanding

Additional Sheets

When a new sheet needs to be added into the plan package, whether it's a full replacement or a sheet unintentionally left out, it should fall after the sheet that it normally would and labeled using the letter "A" as an increment to the sheet number (i.e. 11A). The file name will also use the letter "A" as an increment (011A_HDPlan01.dgn).

Rename and Copy Files to Contracts Folder

Part One: Rename Sheets That Contain Changes

Once all the changes to the plan set have been made, and all sheets have been labeled with revision triangles and page numbering updated, open *Windows Explorer* and manually add the letter suffix to the filenames of any sheet that has a revision (i.e. 011A_HDPlan01.dgn, 101A_XSMC10_dr_001.dgn, etc.). Do not change the file extension or rename a file without a border, only a 3 digit prefix drawing.

ⓘ ***Do not rename any other files besides the sheet type drawings. These are the drawings that begin with a 3 digit prefix followed by an underscore. Do not rename "z_" files or the state plane correct files (i.e. highway.dgn, bridge.dgn, alignments.dgn, etc) as their standard file names are important to maintain.***

Copy Files into Contracts Folder

Notify the Contract Section that the Amendments have been made. They may need to adjust permissions to allow you to place the new files into the CONTRACTS folder of the PIN. Select all new sheet files that have changed. They all will have a letter “A” as the suffix on the sheet number. Select all the additional drawings that have had changes made to them. These additional may be files such as Bridge.dgn, Highway.dgn, Rwplan.dgn, Alignments.dgn, etc. Viewing the modified date on the files may help you tell the difference.

Once all the files that have had revisions have been selected, select **Edit>Copy** from the menu. Browse to the CONTRACTS folder within your PIN (i.e. CONTRACTS\Workspace\Projects\12671_FinalPlans\dgn). Select **Edit>Paste** from the menu. You will be prompted to overwrite some files. Select **Yes.**

Batch Printing to a Multi-page PDF

All Amendments needs to be mailed out to all original bidders and added to the web page for on-line bidding. Using MicroStation’s *Batch Print/Plot Utility,* select all of the revised sheets and print them to a new multi page PDF file. Browse to the **CONTRACTS** folder and supply a standard name that includes the **PIN-Amendments01.pdf** (i.e. 12345-Amendments01.pdf) to describe the new document. Notify the Reproduction staff that the Amendments are available for printing.

✓ ***Refer to page 28-10 for detailed instructions on creating a multi-page PDF.***

Print Amendments

The Amendment plans can be printed a variety of ways, but are most efficiently printed from the PDF document to the OCETDS800 by the Reproduction staff or anyone with Adobe writer software. Rotation of the Vertical Cross Sections may be necessary.

✓ ***Refer to page 28-13 for instructions on printing the multi-page PDF.***

Chapter 30 As Built Drawings

CHANGE ORDERS/AS BUILTS

OVERVIEW

Overview

A *Change Order* is issued when changes are needed on the plan set during the Construction phase of your project. This *Change Order* may require re-engineering a structure, retaining wall or other detail. Because this project has already been awarded, the revisions made to the plan set now will be considered **As-Built plan work**. The work performed on the files will be done in the Const/MSTA folder as a standard.

The electronic As-Built drawings will be printed using the MicroStation drawings directly into the *Digital InterPlot Archive* and will be printed in color. When printed, all As-Built elements will be red, any Amendments will be printed green, existing topography will be gray, and the design and Right of Way elements will be black.

Some final “paper As-Builts” may not get transferred into electronic As-Builts, but if they are done using the same concepts and written with RED ink or dark RED pencil, they can be scanned in color and placed into the *Digital InterPlot Archive.* The end product of either a scanned paper or an electronic As-Built will be nearly identical when view through a web browser.

♬ Until electronic signatures are accepted by MaineDOT’s Legal Division and the State’s Archivist, plan sheets that require an Engineer’s stamp and signature will need to be hand editing (using red pen or dark red pencil) and re-scanned to preserve the legal binding document. When the multi-page PDF is created from the electronic CADD files, the sheets that have been re-scanned can replace the sheets without signatures.

RETRIEVE THE LATEST PLAN SET

Overview

To work on the plans for a *Change Order*, we want to start off with the latest plan set. If previous steps are followed properly, the CONTRACTS folder should contain the latest plan set with the latest revisions (Amendments). These files will be copied into the Const/MSTA folder.

Copy Contracts Folder Contents to Const/MSTA Folder

Using *Windows Explorer*, browse to your projects CONTRACTS folder and browse internally to the MicroStation files (i.e. CONTRACTS\Workspace\Projects\PIN_FinalPlans\dgn). Select all of the files in this folder. Select **Edit>Copy.** Browse to your PIN's Const/MSTA folder. Select **Edit>Paste.**

End Result

Use the documentation that follows to make the edits for the Change Order. The end result will be all contract plans will exist in the CONTRACTS folder and all of the Change Orders/As-Built plans will exist in the CONST/MSTA folder for ease of Archiving through *Digital InterPlot*.

CHANGE ORDER/AS BUILT GENERAL WORKFLOW

Overview
The files adjusted will be considered the start of As-Builts for the project. Each change will be labeled with a revision triangle, encompassed with a revision cloud if necessary for clarity and the border initialized with a short description of the change, revision number and date.

An As-Built *Settings Manager* (Settings>DOT Setmgrs>As-Builts>Type) has been created to help users standardize the *Level* in which new elements are placed for symbology purposes**.**

Launch MicroStation
Launch MicroStation from the icon on your desktop or from the **Start** menu. In the *Workspace* portion of the dialog, use the pull-down next to the *User* and select **As-builts.** This will point you to the Const/MSTA folder of the PIN you pick from the *Project* pull-down. Pick your PIN from the *Project* pull down. Verify that you are now pointing to the path to your PIN's Const/MSTA folder.

As-Built Settings Manager
We have an As-Built *Settings Manager* that will be used when conducting Change Order/As-Built mark-ups. This will automatically load based on the *User* selection being set to As-Builts. The As-Built work done on the paper copy of the plan set will be reproduced using the *Settings Manager* and a combination of MicroStation tools.

MAKING CORRECTIONS

Overview

This section of the manual was interpreted from a Construction Manual dated 2002. We will use these guidelines for doing As-Builts on paper or electronically using our CADD package.

An extra set of full size plans will be furnished to the Resident for use as As-Built plans. The Resident may request an additional set of plans from the MaineDOT's reproduction room for As-Builts if needed. Preparation of As-Built plans done on paper shall be done using RED pen or DARK RED pencil only. The As-Built plans shall be an exact representation of the completed work. All revised plan sheets and sheets with no change must be included in the complete As-Built plan set. The Estimate Sheet needs to be corrected to show the Final Quantities including additional items of work.

Saving the Files – Commit Design Changes

When a user exits a file that has been edited, the *Commit Changes* dialog opens waiting for a description of the change (Figure 30-1). It's a must to enter a brief description. If the user plans on making many changes and wants to enter the description later, he or she can select *Cancel* and still save the changes to the file. Remember to return to the file and make a note of the overall changes.

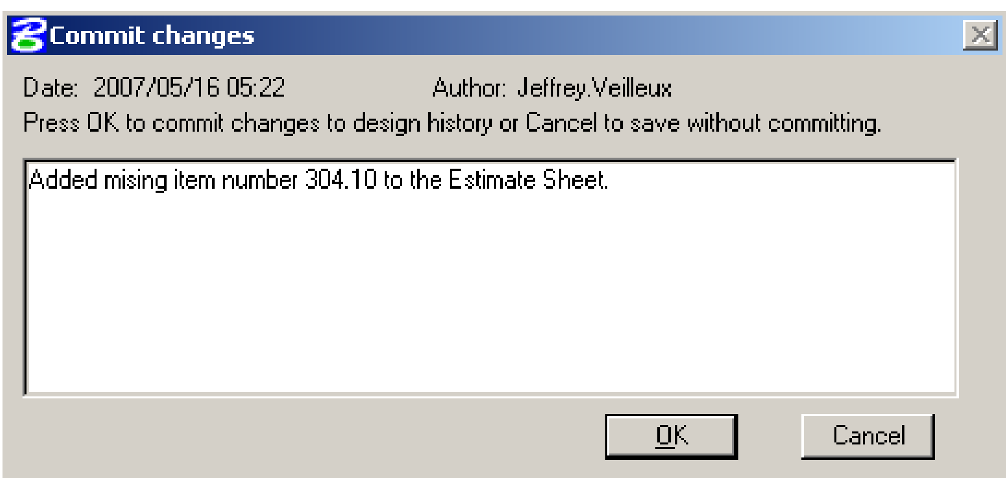


Figure 30-1: Add a brief description to the Commit Changes dialog

✓ ***For more information on Design History, please refer to MicroStation's internal HELP.***

♬ If a user has their *Preference* set so that they *Save Settings on Exit*, they will receive this message regardless if a change has been made to the file. Consider removing this preference by selecting **Workspace>Preferences** from the MicroStation main menu and adjusting the *Operation* category by un-checking the *Save Settings on Exit* option.

Title Sheet/Others

Updating Sheets with Signatures

Some sheets in the plan set may have required signatures and stamps by an Engineer. These sheets will require hand written adjustments in either red pen or dark red pencil.

The title sheet shall bear the following label in some convenient blank space: AS-BUILT PLANS. The initial box will also include who the work performed by (Contractor, if more than one contract has been let to complete the work, list all prime contractors), the person who prepared the As-Builts (listed in the Revisions box) and the approving signature by the Project Manager in the FIELD CHANGES section.

Scan the Sheets

These sheets will need to be re-scanned by the Reproduction staff directly to individual PDFs and placed into the CONST\MSTA folder. They will need to be included in the As-Built multi-page PDF document.

♬ This process will be required until electronic signatures are accepted by the Legal department and the State's Archivist.

Editing the Proposed Design

Overview

Lines, dimensions and notations shown in the original plans which have been eliminated or corrected shall be "X ed" (crossed out) and encompassed with a revision cloud. The As-Built *Settings Manager* contains the same tools and settings that a detailer or designer used throughout the life cycle of a design with the addition of some *Linestyles and Symbols* to help standardize the look of As-Built drawings. Select **Symbols and Linestyles** from the left side of the *Settings Manager* and select one of the components needed from the right.

Adding "As Built" Elements

In the past, dashed lines were used to indicate any as-built lines, dimensions, or tie points which do not conform to the original plans. Now, all As-Built lines will look identical to the previous work done with the exception of its *Color (red)* and the *Level (As-Builts).* These things may not be evident when looking and working on the As-Builts, but they will be when they are plotted in color to the web archive. *Level Symbology* can be used to better display the corrected colors when working on the files.

When correcting a cross pipe for example, a 2' x 65' 8" (600 mm x 20.0 m) pipe culvert was constructed at Station 103+50, whereas the plans called for a 2' x 63'-3" (600 mm x 19.25 m) pipe culvert at Station 101+50. The culvert line and the notations describing the work at Station 101+50 shall be "X ed" (crossed out). In striking out figures and notations, care should be used to avoid obliterating the original figures. From the *Settings Manager,* select **Symbols and Linestyles>Cross Out Linestyle** to place a series of "X"s over an existing element whether lines or text. The new As-Built culvert and corrected description notation should be shown at Station 103+50 by using the **As-Built** *Settings Manager* for electronic As-Builts or red ink (or dark red pencil) for paper As-Builts. A revision triangle will be added and possibly a revision cloud to better display the area that has changed.

Revision Clouds

A revision "cloud" can be used to better display the area that has changed if it isn't completely apparent with a revision triangle. From the *Settings Manager*, select **Symbols and Linestyles>Revision Cloud** to place a cloud around a change to help make it apparent to anyone reviewing the plans.

Revision Triangles

From the *Settings Manager,* select **Symbols and Linestyles>As-Built Triangle (Large)** and place a revision triangle in a visible location near the change or the cloud if one is necessary. Use **Qualities>Drop>Complex** from the main menu to drop the triangular cell and the *Edit Text* tool or **Text>Edit Text** from the main menu to edit the text in the cell to the desired number sequence. Each collective change that is made needs to be marked with a triangle that is numbered. If a pipe is added to a project, the numbered triangle that represents the change in plan view is the same number that will be used on the Cross Section, Estimate Sheet and Drainage Sheet. Each of the respected sheets needs the triangle label. If Riprap is also added to the pipe ends, this item will also use the same numbering as the plan view drawing. If a ditch, driveway or catch basin is relocated, a new number is assigned to the triangle.

Mandatory Inclusion List

Grading:

1. All changes in alignment.
2. All equations in stationing used during construction.
3. ?All permanent references for control points. Also, all control points required to establish centerline shall be perpetuated. Brass caps and pipe are available for this.
4. All changes in grade lines and elevations.
5. Locations and elevations of all benchmarks used during construction or permanently established in taking final cross sections. Permanent benchmark should be identified by the word "Permanent'. Benchmarks shall be established at box culverts, bridges and other locations where they may be considered permanent.
6. Location and number stamped on brass disc of all Government Survey benchmarks. The elevation based on the project level datum, if available.
7. ?Location of all Right-of-Way markers installed.
8. Location of all land corner witnesses, existing, or installed by the Project Manager.
9. Location of all farm entrances constructed showing lengths, diameters and type of culverts laid or re-laid.
10. Location of limits of construction of all borrow pits, channel changes, dikes, intercepting ditches, etc., outside the Right-of-Way not covered by extended roadway cross sections. The stationing and location of the base line with respect to the project centerline shall also be shown.

Culverts:

1. All changes in location.
2. All changes in lengths or dimensions.
3. The type of pipe installed (CMP, RCP, etc.).

Bridges and Special Culverts:

1. All changes in stationing.
2. All changes in design.
3. All revised dimensions.
4. Deck and bridge seat elevation of bridges.
5. Maximum and minimum length of piling in each footing.
6. The description, location and elevation of all permanent benchmarks.

Surfacing:

1. Beginning and ending stationing of each type and width of surfacing constructed.
2. Location of all option pits used in connection with the construction of the project. If any plan pits are not used, designate by the words "Not Used".

Initial Borders

Every file in the list with a 3 digit prefix has a border with an initial box. For U.S. Customary projects, the initial box has been expanded to accommodate more revisions whether there are Amendments or As-builts. Currently we have lines in the initial box dedicated to revisions and a single box for Field Changes (Figure 30-2). The Field Changes section is reserved for the governing signatures of the revisions. This is where the Project Manager, Asst. Project Manager or Resident would sign the plans as final approval of the As-built plans. From the *Settings Manager,* select **Symbols and Linestyles>As-Built Triangle (Title Block)** to place a triangle in the *Signature Block* of the plan sheet. Use **Qualities>Drop>Complex** from the main menu to drop the triangular cell and the *Edit Text* tool or **Text>Edit Text** from the main menu to edit the text in the cell to the desired number sequence. Enter your initials and a brief description of the change.

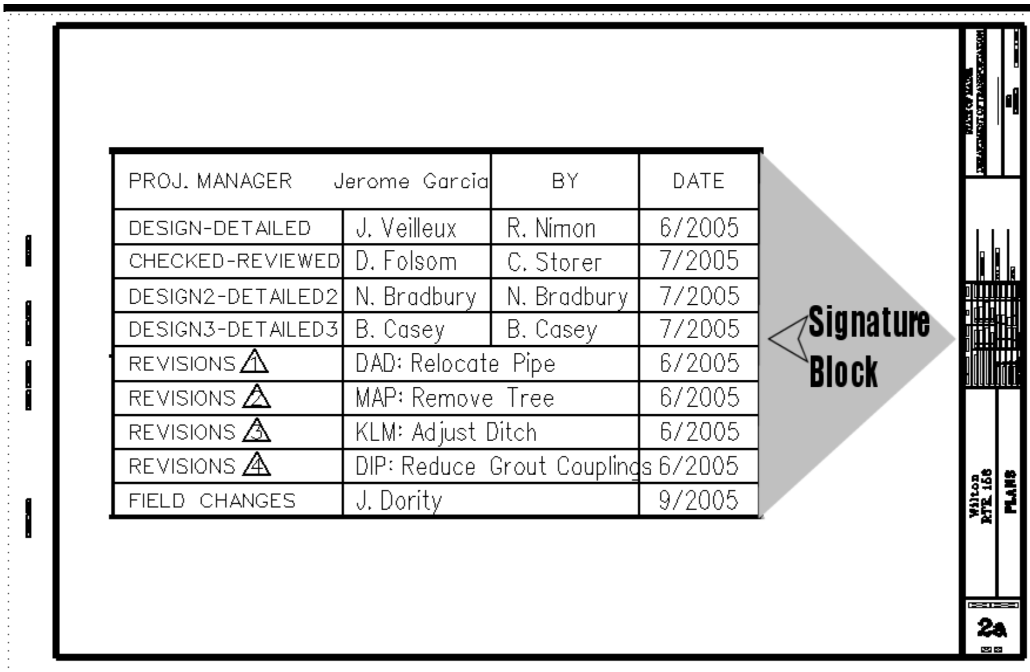


Figure 30-2: US Customary signature block

Metric plan sets may require an expansion to the initial box to cover the revisions (Figure 30-3).

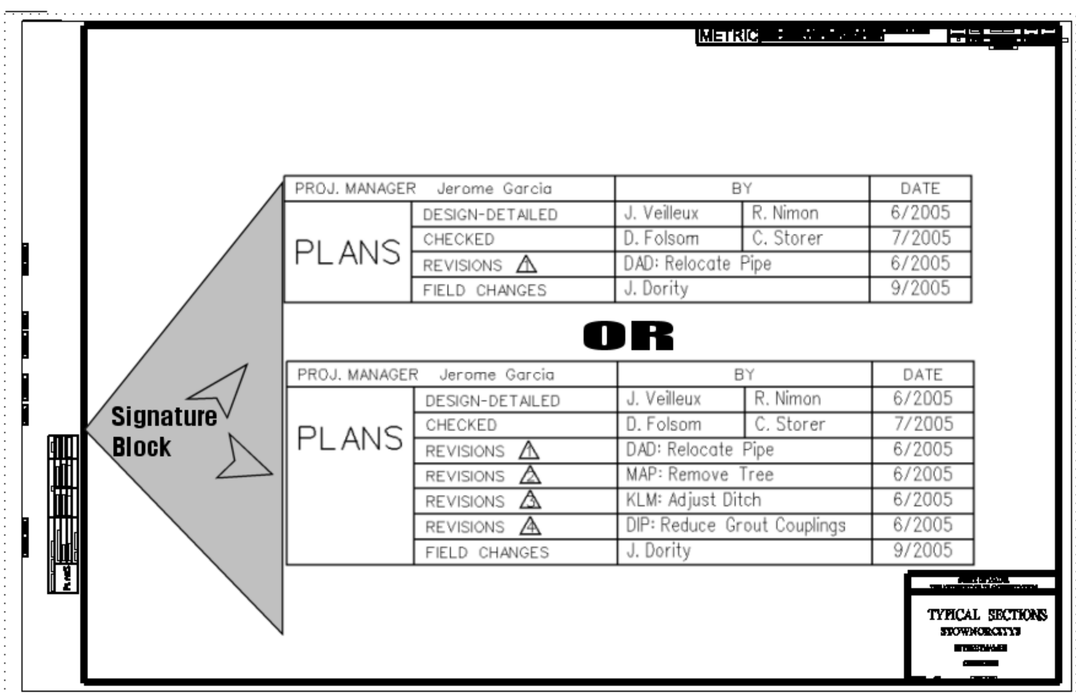


Figure 30-3: Metric signature block

Renaming the Drawing Files

All sheets that have been changed will have a new sheet designation. This is done by adding a letter suffix to the original sheet number in the bottom right hand corner of the sheet and the actual filename. If the original sheet number was 3, then the revised sheet number will be 3A. Likewise, if the original filename was 003_Typical02.dgn, then the new filename will be 003A_Typical02.dgn.

ⓘ ***Do not rename any other files besides the sheet type drawings. These are the drawings that begin with a 3 digit prefix followed by an underscore. Do not rename "z_" files or the state plane correct files (i.e. highway.dgn, bridge.dgn, alignments.dgn, etc) as their standard file names are important to maintain.***

Batch Printing to a Multi-page PDF

Using MicroStation's *Batch Print/Plot Utility,* select all of the sheets (3 digit prefix drawings) and print them to a new multi page PDF file using the **pdf_ColorFull** plot driver and the **As-Built** *pentable.* Supply a standard name that includes the PIN-As-Builts (i.e. 12345-As-Builts.pdf) to describe the new document.

✓ ***Refer to page 28-10 for detailed instructions on creating a multi-page PDF. Use the settings described above to create the color PDF.***

♬ Any sheets requiring an Engineer's stamp and signature will need to replace non-signed sheets in the PDF document (i.e. 001_Title, others that require stamp).

Stamped and signed sheets will need to be replaced and vertical cross sections rotated by the Reproduction staff or someone with the Adobe writer software.

✓ ***Refer to page 28-13 for instructions replacing sheets, rotating vertical cross sections, and printing the multi-page PDF.***

Printing As-Builts

Hand written As-Builts

These As-Builts can be scanned and re-produced by the Reproduction staff. These can eventually be added into the E-Plans Archive through *Digital InterPlot* and reproduced at a later date.

Printing (No Signatures)

The As-Builts can be printed directly from MicroStation to a variety of color plotters, however the pages will lack the signatures and stamps. The OCETCS500 plotter located in the Reproduction room is an available plotter from within MicroStation.

Official Electronic As-Builts (with Signatures)

Once the PDF has been adjusted by replacing sheets with stamps and signatures and rotating vertical pages, it is ready for reproduction.

The As-Builts can be most efficiently reproduced from the PDF document to the **OCETCS500** by the Reproduction staff. The OCETCS500 plotter produces a high quality print in less time than any other color plotters we currently have available. Printing the **color** PDF will require that the OCETCS500 has been added as one of your available printers. If it isn't, open *Windows Explorer* and browse to the \\Dot0dta1psprint\ folder (or click the underlined link in the electronic document). Double click the **OceTCS500-Rm126** printer in the list.

Create a MicroStation Package

Use the MicroStation *Packager* to create a new package of the As-Built drawings using the standard file name PIN-As-Builts (i.e. 12345-As-Builts.pzip).

✓ ***Refer to page 28-22 for detailed instructions on creating a package.***

Final Review

The final review will be performed. After the final review is completed, the specified sheets or complete copies, as requested by the District, will be copied in half-size sets. The copies will be returned to the District within three (3) to four (4) weeks after submittal to the Project Manager (Is this still done? What District?). Consider sending a Portable plan sets from Digital InterPlot.

Distribution of Plans

The As Builts will be submitted to the Project Manager with the final records for filing with notification of the number of complete copies or specified sheets desired.

Cities, counties, etc. that have money involved or a special interest in the project will be asked by the Project Manager if they need/want a complete copy of the As Builts or only specified sheets. Electronic copies will be available as *Portable Plan* sets from *Digital InterPlot* once the As-Built archive is complete.

Submit a copy of the As Builts to the Transportation Planning Division for their use. (Is this still done?) Upon completion of their work, the Transportation Planning Division will periodically return the full-size As Builts to the District, via truck.

Lighting and Signals - On all roadway lighting and signal projects, a set of "as-builts" will be prepared, pertinent to the wiring alignment, showing the exact location of conduit or cable runs, pull boxes, and any other information which would be beneficial in case of maintenance problems or construction activities in the area. When "as-builts" are submitted to the agency at the time the agency is notified by letter of the acceptance of the installation and to assume the maintenance.

Chapter 31 Standards

U.S. CUSTOMARY SCALES

SETTINGS MANAGER SCALES

Overview

The following scales are available through MicroStation's Settings Managers. The scales described will inform you on what the absolute scale will be when referencing saved views to paper space borders.

1/32"=1' ________ 1:384

1/16"=1' ________ 1:192

3/32"=1' ________ 1:128

1/8"=1' ________ 1:96

3/16"=1' ________ 1:64

1/4"=1' ________ 1:48

3/8"=1' ________ 1:32

1/2"=1' ________ 1:24

3/4"=1' ________ 1:16

1" =1' ________ 1:12

1½"=1' ________ 1:8

2" =1' ________ 1:6

3" =1' ________ 1:4

6" =1' ________ 1:2

12" =1'	1:1
1"= 4'	48
1"= 5'	60
1"= 10'	120
1"= 20'	240
1"= 25'	300
1"= 30'	360
1"= 40'	480
1"= 50'	600
1"= 60'	720
1"= 100'	1200
1"= 200'	2400
1"= 400'	4800
1"= 500'	6000
1"= 1000'	12000

TYPICAL U.S. CUSTOMARY DRAWING SCALES

Description	**US. Cust.**
Title Sheet	12"=1ft.
Typicals	1" = 4' or 1/4" =1' (48)
Estimate	12"=1ft.
Drainage	12"=1ft.
Notes	12"=1ft.
Plans	1"=25' (300) or 1"=50' (600)
Geometrics	1"=25' (300) or 1"=50' (600)
Profiles	1"=25' (300) or 1"=50' (600)
Cross Sections	1"=5' (60) or 1”=10’ (120)

CUSTOM FONTS

ACCESSING CUSTOM SYMBOLS

We have added a number of characters to our fonts. They can be accessed from the text editor by typing a "backslash" and then the number corresponding to the character.

Note that in these tables, the number corresponding to a symbol is the number above the symbol. So to type the Centerline symbol, type "\201"

The Degrees Symbol

The degrees symbol can be accessed by typing **Shift + 6** (the ^ symbol).

FONT 32: DOT_ENG

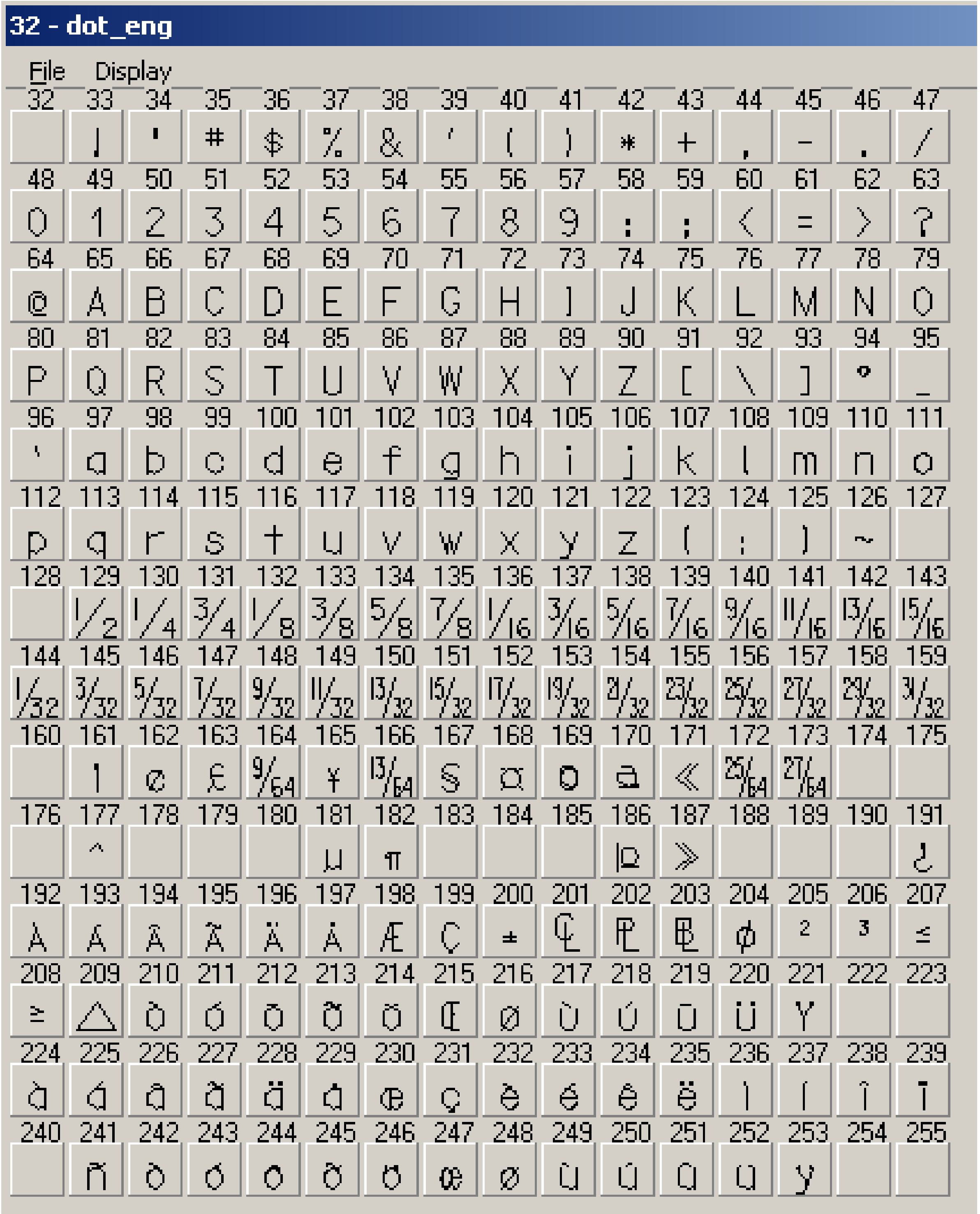


Figure 31-1: Character Map of Font 32, DOT_ENG

FONT 123 DOTITALICS

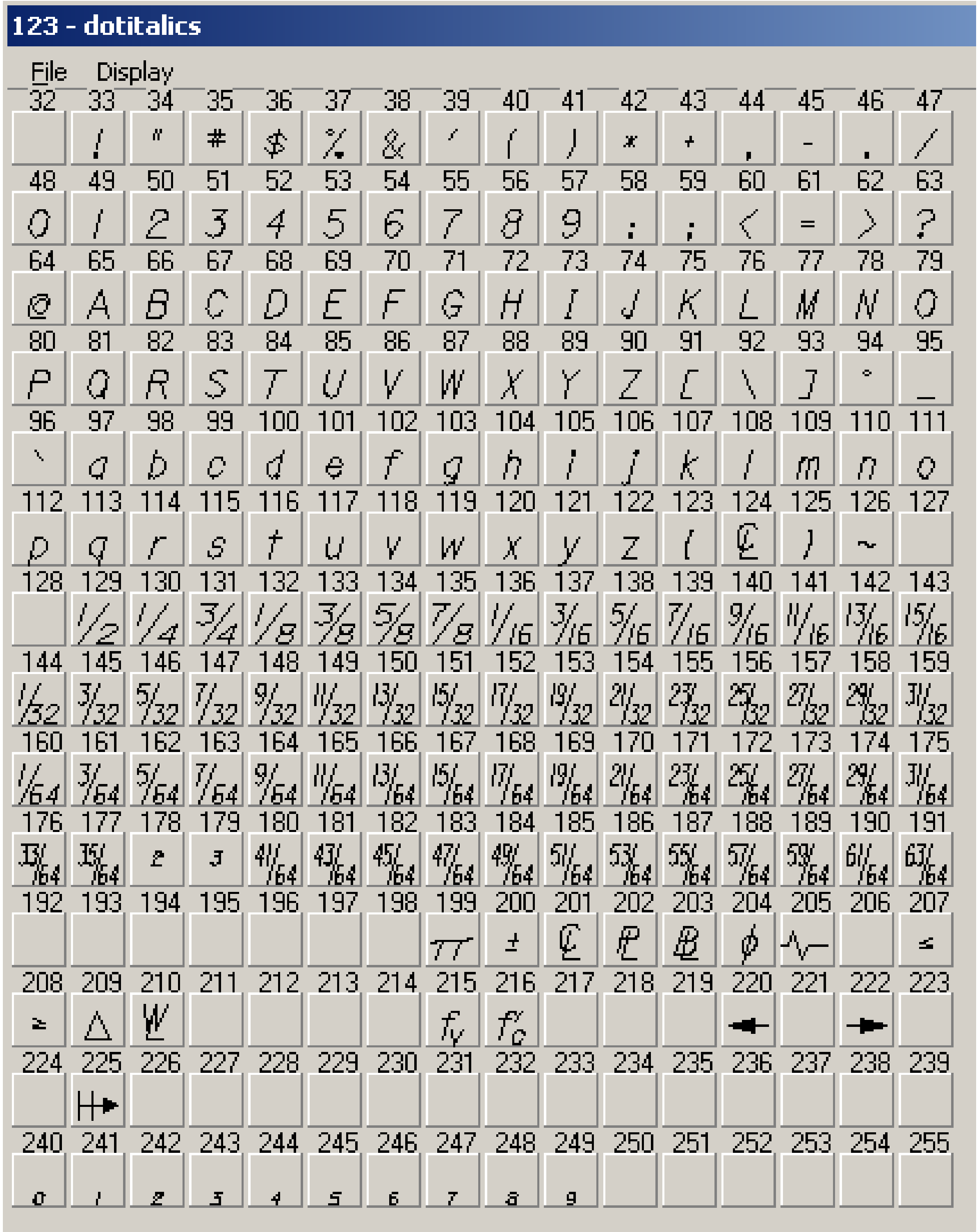


Figure 31-2: Character Map of Font 123, dotitalics

FONT 229 (VERDANA)

Figure 31-3: Character Map of Font 229, Verdana

FONT TABLE

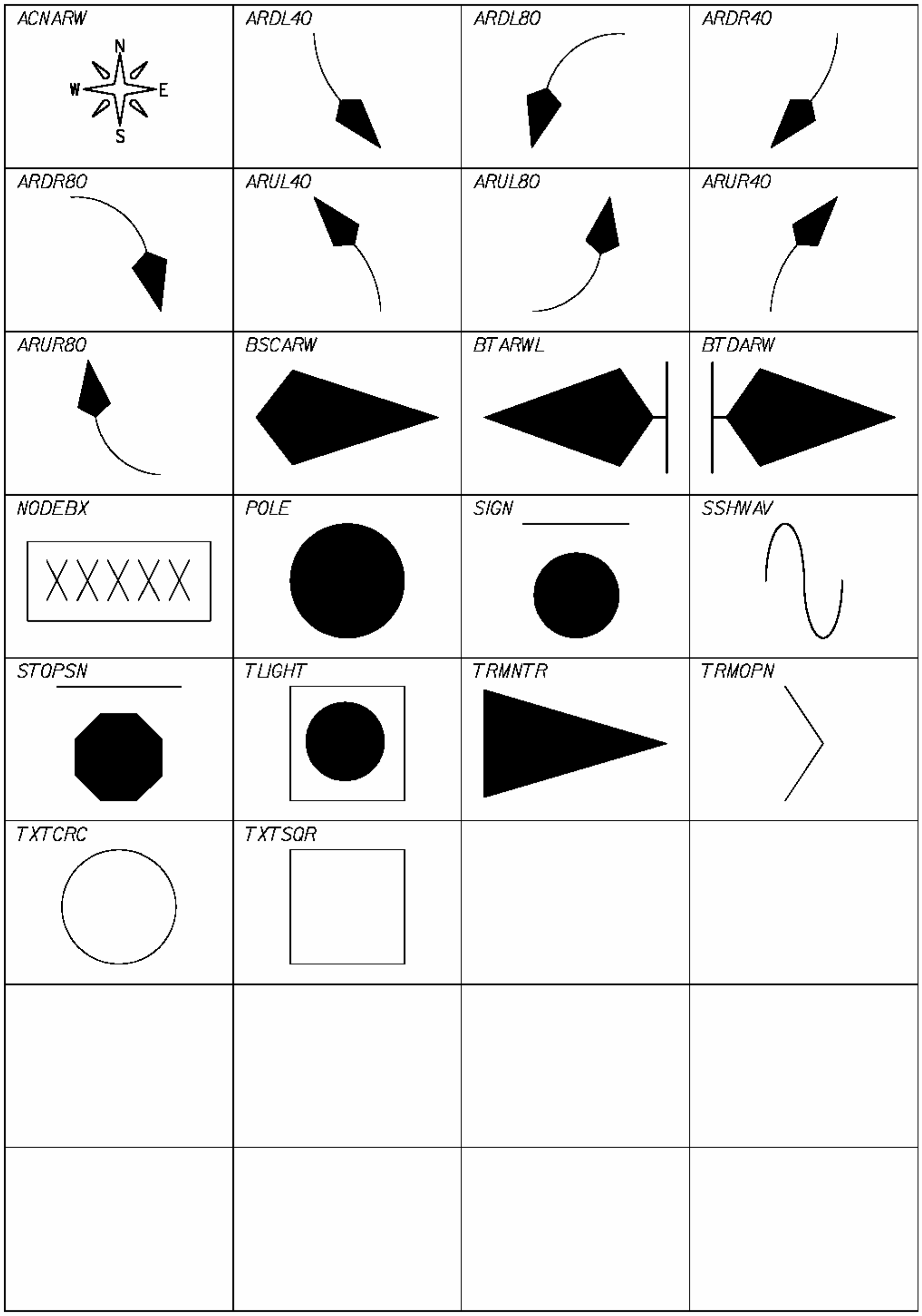
U.S. Customary Font Table							
Drawing Type	Type	Font	Height	Width	Line Spacing	*Slant	Sample
US 22x34 Pages (12"=1')	Monospaced Text	engineering	0.01	0.01	0.0067	0º	Samp l e
(i.e. Title, Estimate,	Standard Text	dotitalics	0.01	0.0113	0.0067	16.88º	Sample
Drainage and Notes)	Title Text	dotitalics	0.0146	0.0165	0.0097	16.88º	Sample
	Title Text (Underlined)	dotitalics	0.0146	0.0165	0.0097	16.88º	Sample
	Sub-Title Text	dotitalics	0.0117	0.0132	0.0078	16.88º	Sample
	Existing Text	dot_eng	0.01	0.01	0.0067	0º	Sample
	Alignment Text, etc.	verdana	0.01	0.0113	0.0067	0º	Sample
US Typicals 1"=4' (1:48)	Monospaced Text	engineering	0.48	0.48	0.32	0º	Samp l e
	Standard Text	dotitalics	0.48	0.544	0.32	16.88º	Sample
	Title Text	dotitalics	0.7	0.7932	0.4668	16.88º	Sample
	Title Text (Underlined)	dotitalics	0.7	0.7932	0.4668	16.88º	Sample
	Sub-Title Text	dotitalics	0.56	0.6348	0.3732	16.88º	Sample
	Existing Text	dot_eng	0.48	0.48	0.32	0º	Sample
	Alignment Text, etc.	verdana	0.48	0.544	0.32	0º	Sample
US Plan 1"=25' (1:300)	Monospaced Text	engineering	3	3	2	0º	Samp l e
(i.e. Plans, Geometrics,	Standard Text	dotitalics	3	3.4	2	16.88º	Sample
and Profiles)	Title Text	dotitalics	4.375	4.9575	2.9175	16.88º	Sample
	Title Text (Underlined)	dotitalics	4.375	4.9575	2.9175	16.88º	Sample
	Sub-Title Text	dotitalics	3.5	3.9675	2.3325	16.88º	Sample
	Existing Text	dot_eng	3	3	2	0º	Sample
	Alignment Text, etc.	verdana	3	3.4	2	0º	Sample
US Plan 1"=50' (1:600)	Monospaced Text	engineering	6	6	4	0º	Samp l e
(i.e. Plans, Geometrics,	Standard Text	dotitalics	6	6.8	4	16.88º	Sample
and Profiles)	Title Text	dotitalics	8.75	9.915	5.835	16.88º	Sample
	Title Text (Underlined)	dotitalics	8.75	9.915	5.835	16.88º	Sample
	Sub-Title Text	dotitalics	7	7.935	4.665	16.88º	Sample
	Existing Text	dot_eng	6	6	4	0º	Sample
	Alignment Text, etc.	verdana	6	6.8	4	0º	Sample
US Sections 1"=5' (1:60)	Monospaced Text	engineering	0.6	0.6	0.4	0º	Samp l e
	Standard Text	dotitalics	0.6	0.68	0.4	16.88º	Sample
	Title Text	dotitalics	0.875	0.9915	0.5835	16.88º	Sample
	Title Text (Underlined)	dotitalics	0.875	0.9915	0.5835	16.88º	Sample
	Sub-Title Text	dotitalics	0.7	0.7935	0.4665	16.88º	Sample
	Existing Text	dot_eng	0.6	0.6	0.4	0º	Sample
	Alignment Text, etc.	verdana	0.6	0.68	0.4	0º	Sample
US Sections 1"=10' (1:120)	Monospaced Text	engineering	1.2	1.2	0.8	0º	Samp l e
	Standard Text	dotitalics	1.2	1.36	0.8	16.88º	Sample
	Title Text	dotitalics	1.75	1.983	1.167	16.88º	Sample
	Title Text (Underlined)	dotitalics	1.75	1.983	1.167	16.88º	Sample
	Sub-Title Text	dotitalics	1.4	1.587	0.933	16.88º	Sample
	Existing Text	dot_eng	1.2	1.2	0.8	0º	Sample
	Alignment Text, etc.	verdana	1.2	1.36	0.8	0º	Sample

* The Custom font "dotitalics" has a slant built into the font, therefore a "0" slant is applied. The slant is only displayed here for those trying to reproduce our custom font.

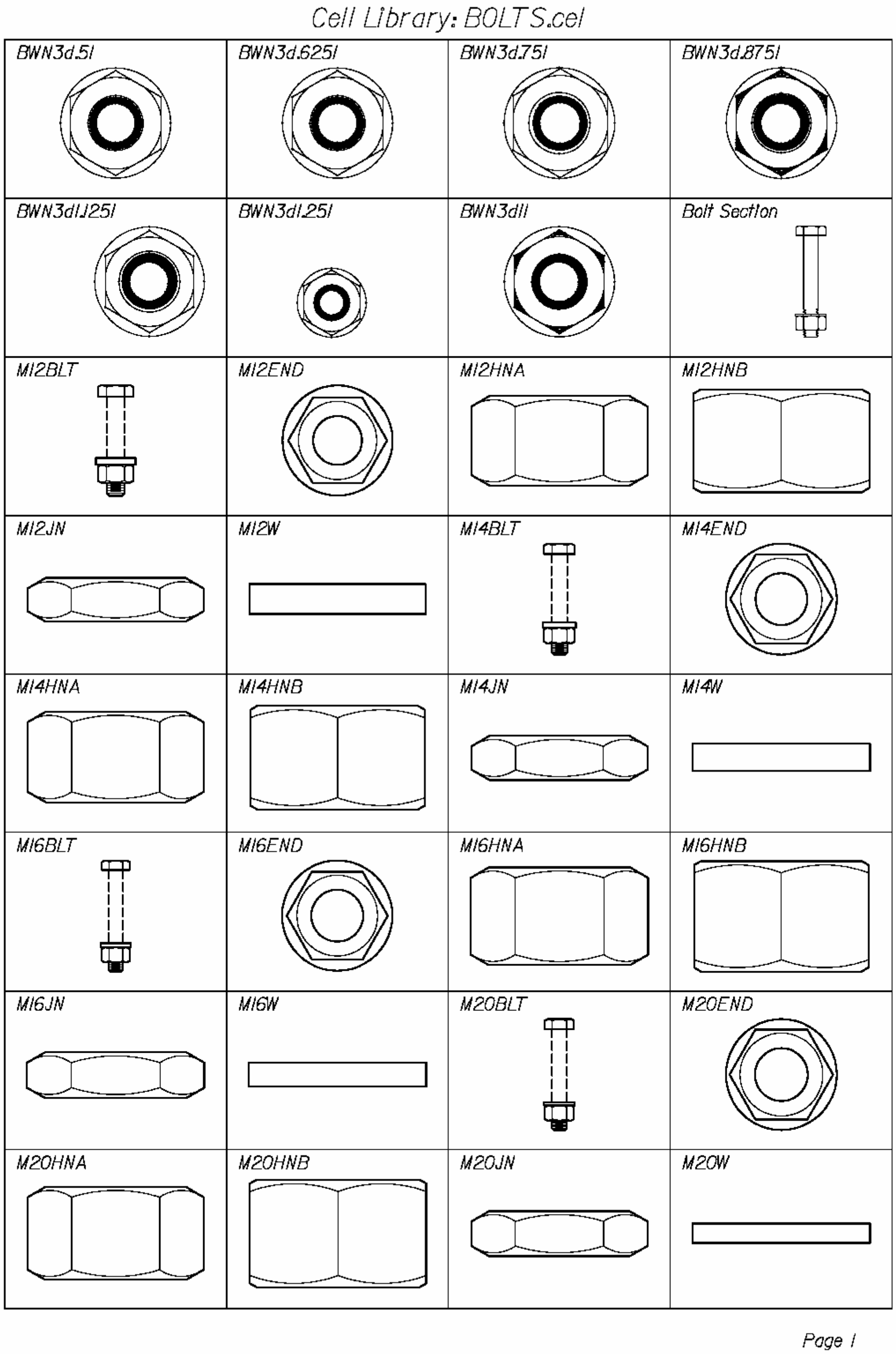
Figure 31-4: MaineDOT table of fonts

CELL LIBRARIES

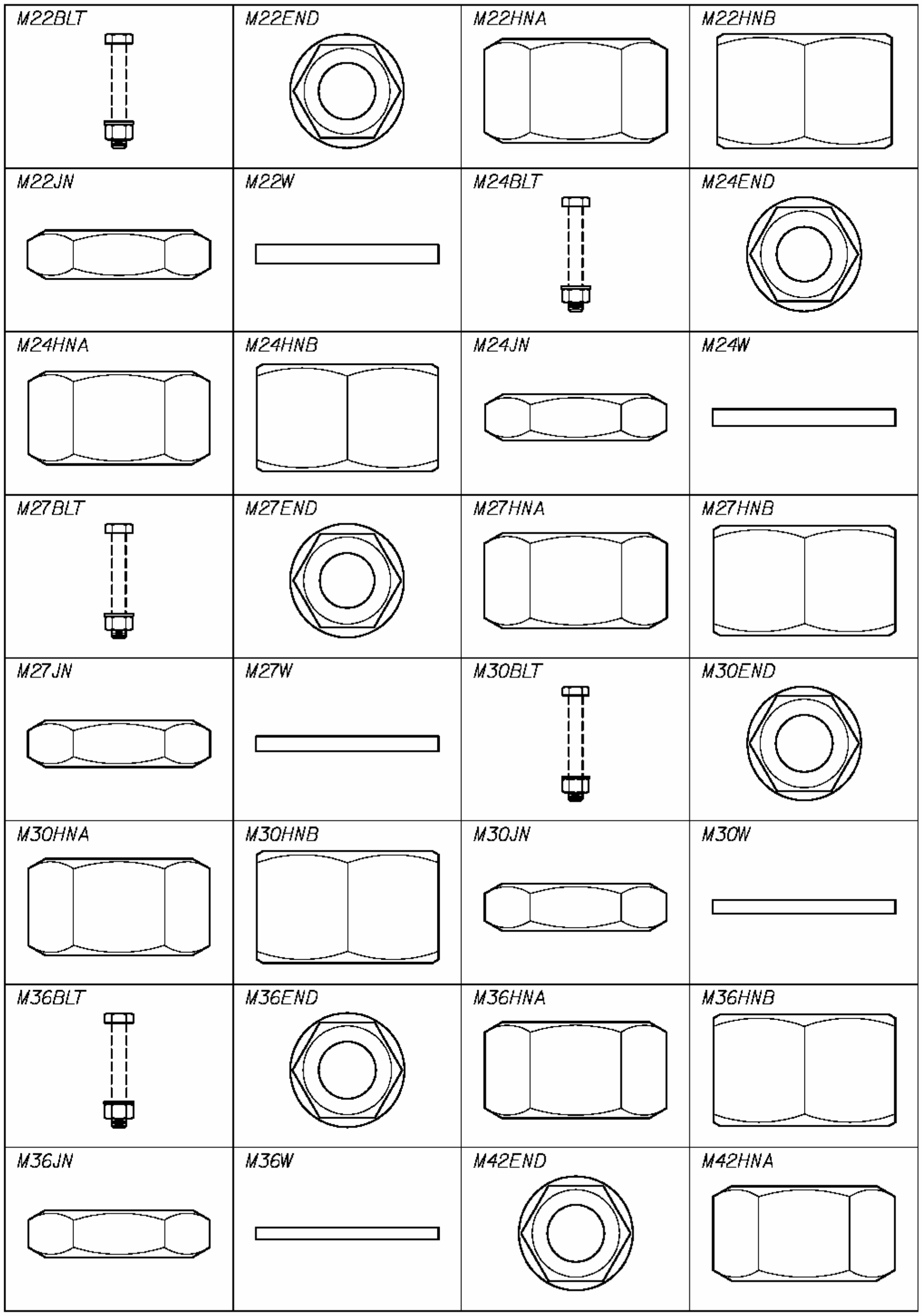
Cell Library: Accid2d.cel



Page 1

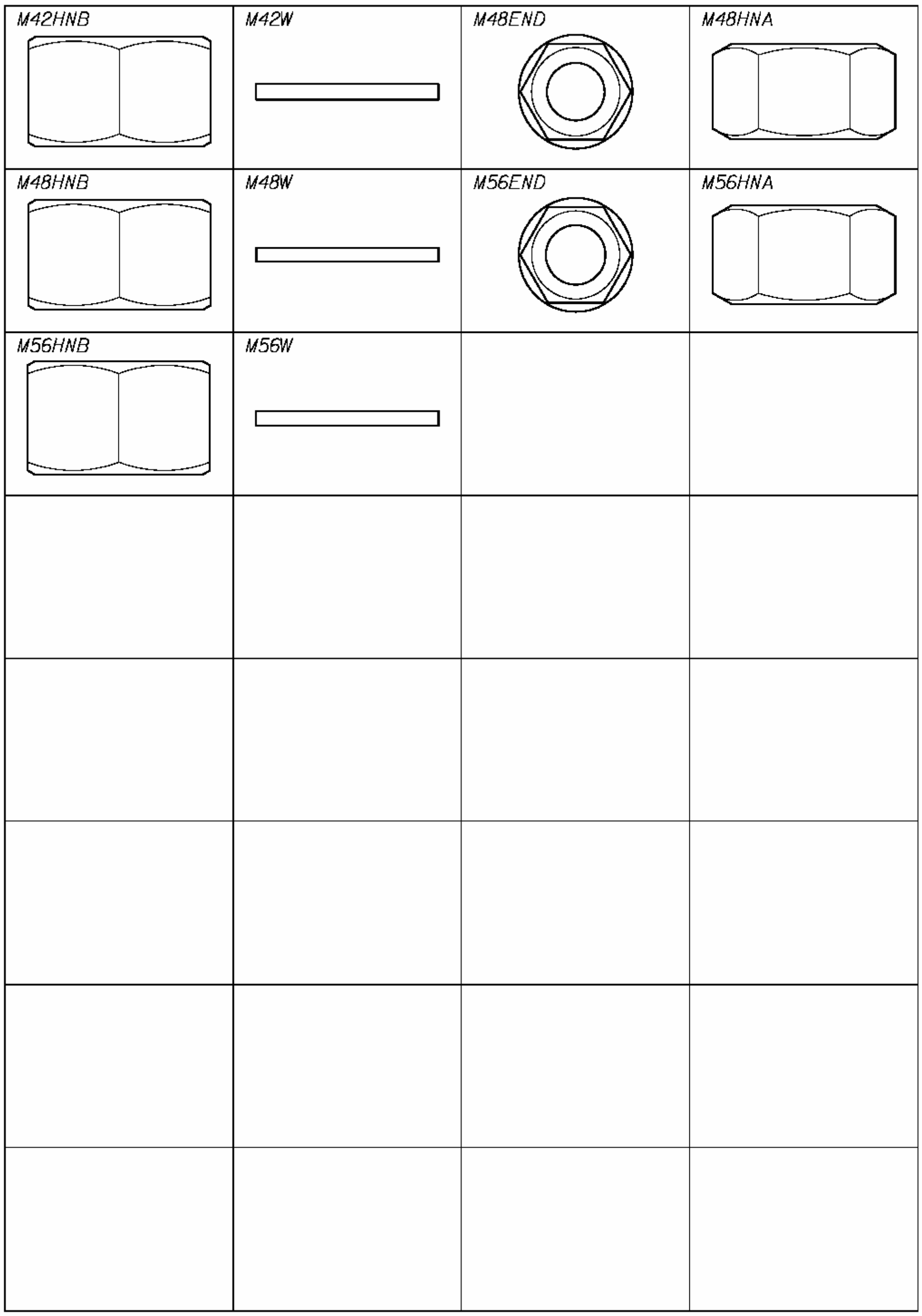

Cell Library: BOLTS.cel
BWN3d.5I
BWN3d.625I
BWN3d.75I
BWN3d.875I
BWN3d1.125I
BWN3d1.25I
BWN3d1I
Bolt Section
M12BLT
M12END
M12HNA
M12HNB
M12JN
M12W
M14BLT
M14END
M14HNA
M14HNB
M14JN
M14W
M16BLT
M16END
M16HNA
M16HNB
M16JN
M16W
M20BLT
M20END
M20HNA
M20HNB
M20JN
M20W
Page 1

Cell Library: BOLTS.cel



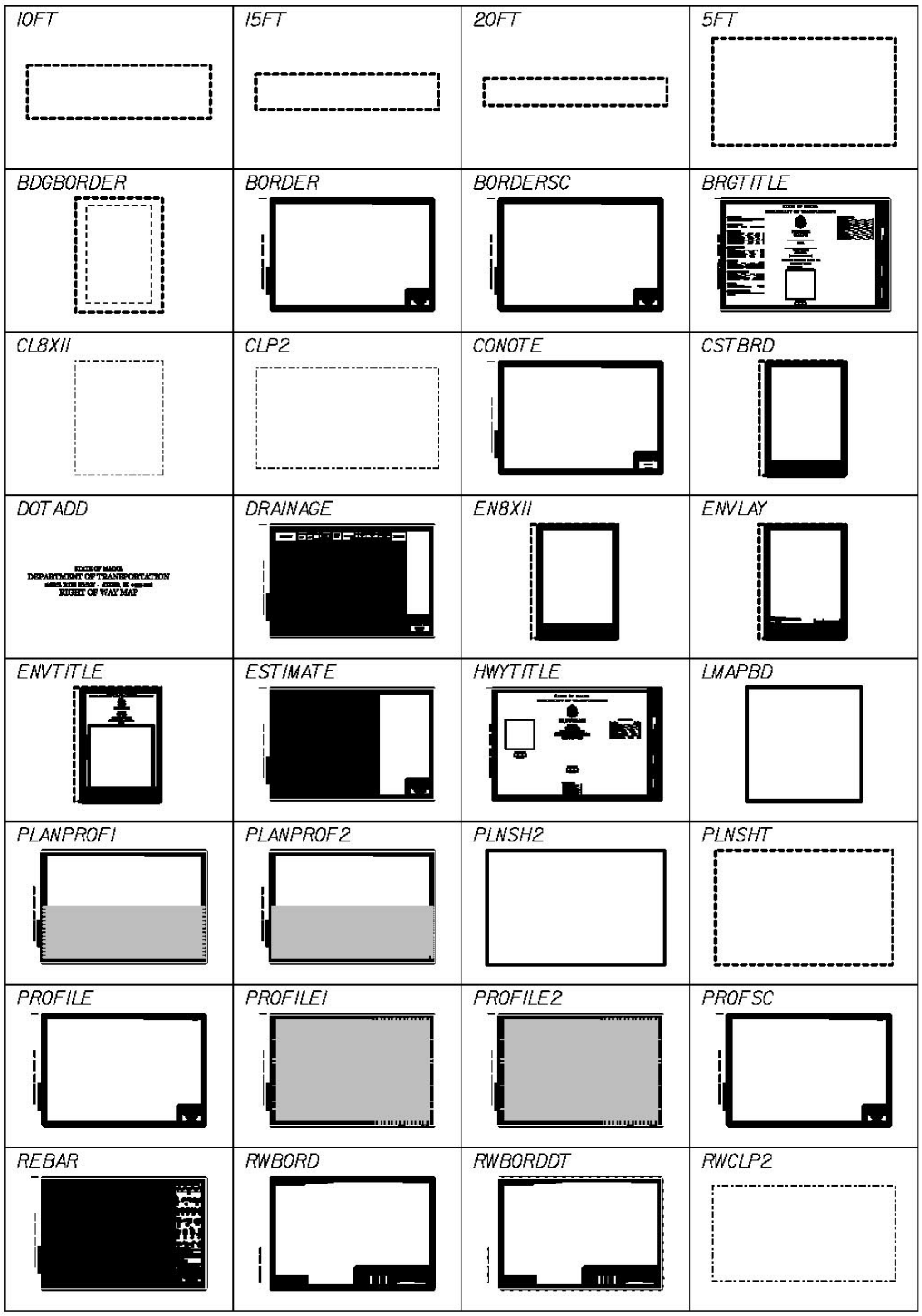
Page 2

Cell Library: BOLTS.cel



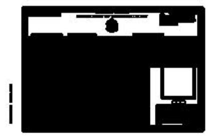
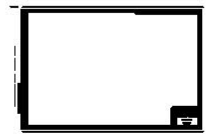
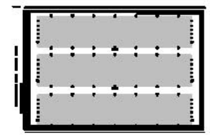
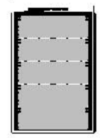
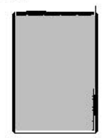
Page 3

Cell Library: Border.cel



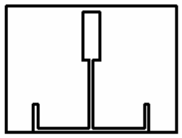
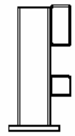
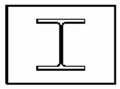
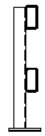
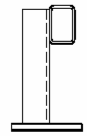
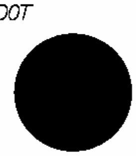
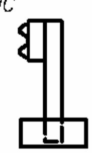
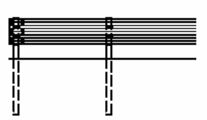
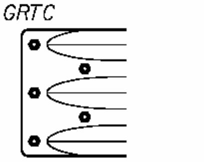
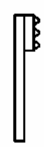
Page 1

Cell Library: Border.cel

RWCOORD 	STDDTL 	TYPICAL 	XSECTH 
XSECTHF 	XSECTION 	XSECTV 	XSECTVF 

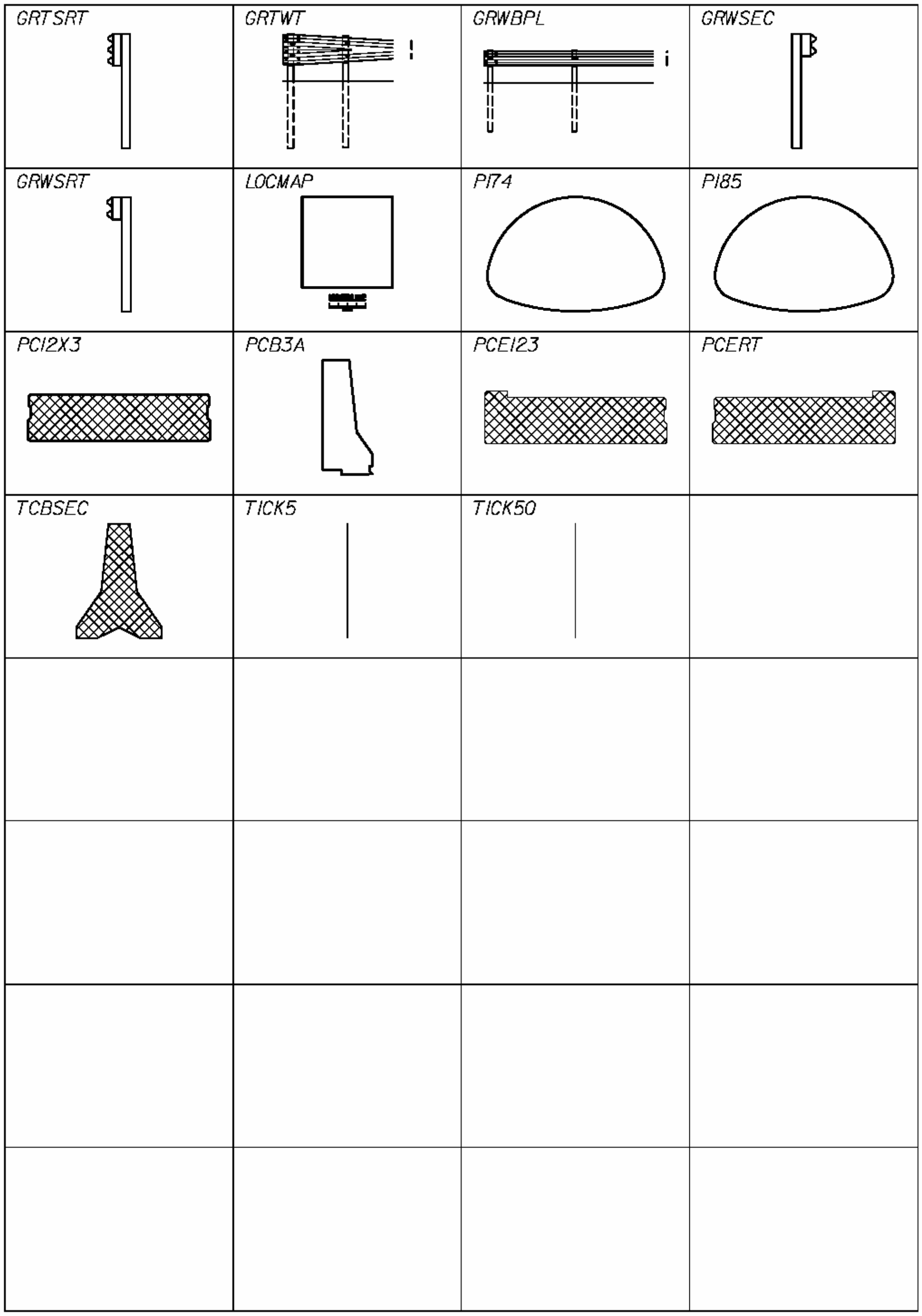
Page 2

Cell Library: BRDETLIB.CEL

ARP 	BR2T 	BR4TB 	BR4TP 
BRBASE 	BRBMB 	BRBMP 	BRTRI 
CL ℄	CLBGA1 ℄ Brg., Abut. No. 1	CLBGA2 ℄ Brg., Abut. No. 2	CLBGP1 ℄ Brg., Pier No. 1
CLBGP2 ℄ Brg., Pier No. 2	CLBGP3 ℄ Brg., Pier No. 3	CLBGP4 ℄ Brg., Pier No. 4	CLBGP5 ℄ Brg., Pier No. 5
CLCON ℄ Const.	CLCONS ℄ Construction	CLPR1 ℄ Pier No. 1	CLPR2 ℄ Pier No. 2
CLPR3 ℄ Pier No. 3	CLPR4 ℄ Pier No. 4	CLPR5 ℄ Pier No. 5	CLPR6 ℄ Pier No. 6
CLPR7 ℄ Pier No. 7	CLPR8 ℄ Pier No. 8	DIMDOT 	DOWEL 
GRCONC 	GRTBPL 	GRTC 	GRTSEC 

Page 1

Cell Library: BRDETLIB.CEL



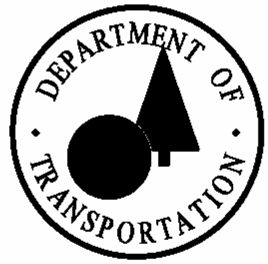
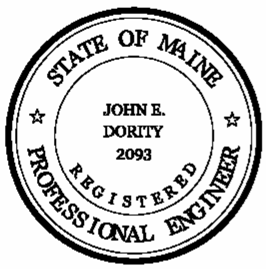
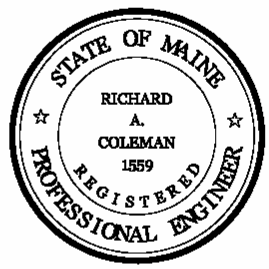
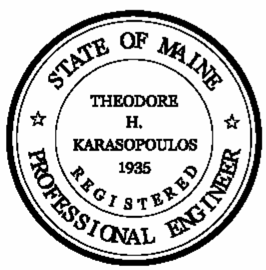
Page 2

Cell Library: BridgeStNotes.cel

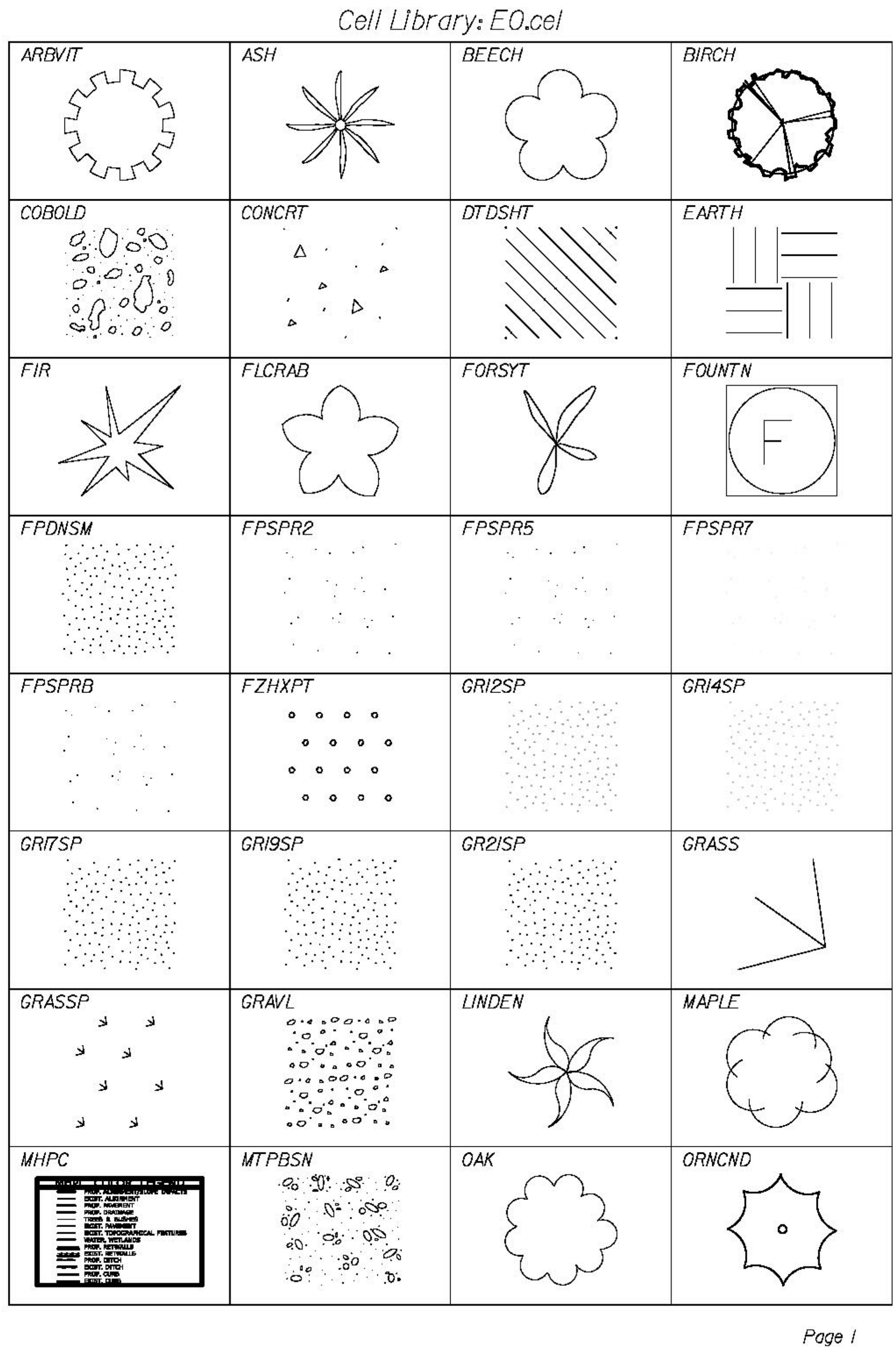
SNABUT	SNARBX	SNBDST	SNBOX
SNCOFF	SNDESG	SNDESL	SNDRAN
SNELBR	SNGENC	SNHYDF	SNHYDP
SNMATR	SNMOTR	SNPIER	SNPILE
SNPREC	SNSPEC	SNSTL	SNSTPL
SNSUP	SNTRAF	SNTWAL	SNUTIL

Page 1

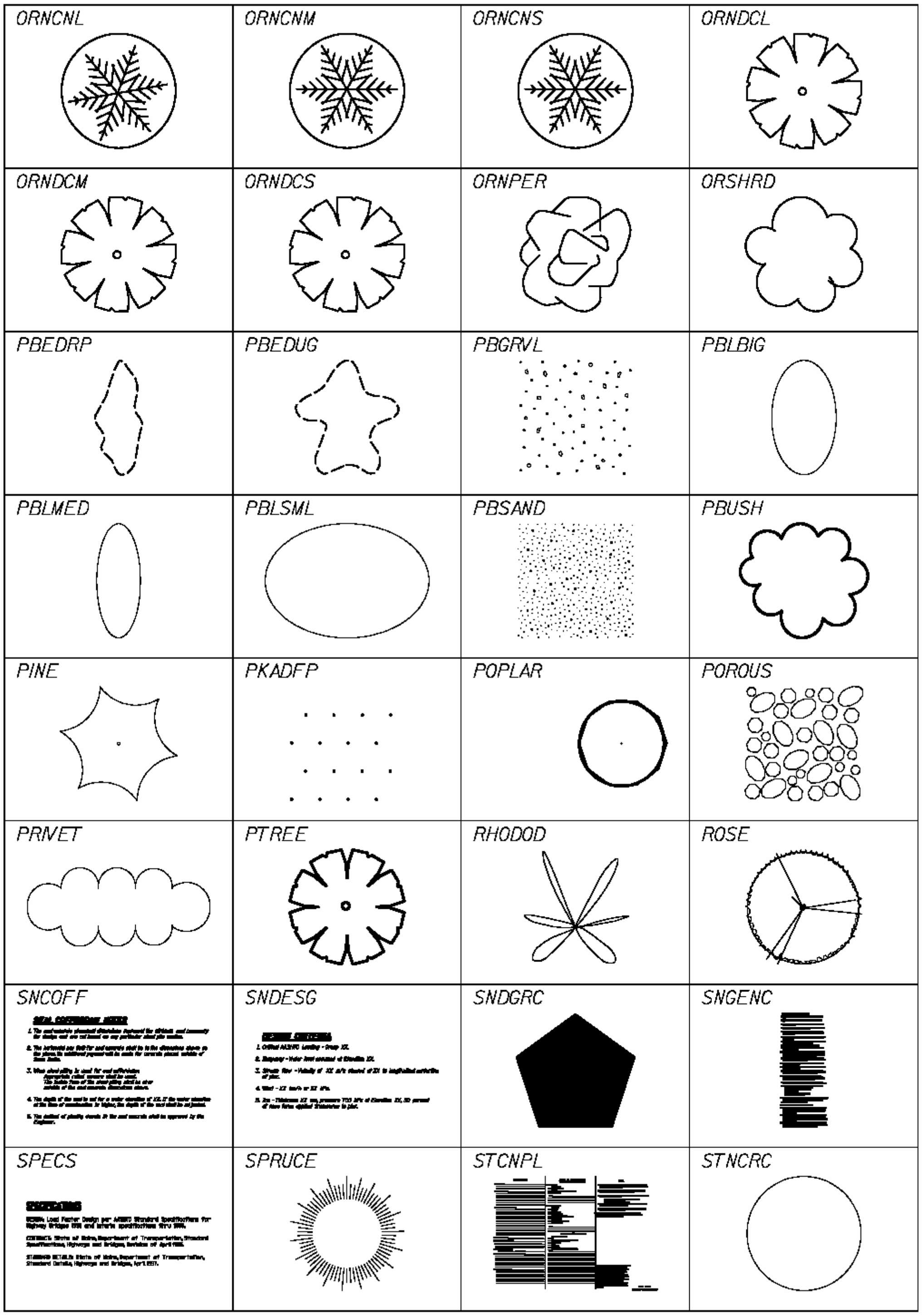
Cell Library: CHIEFENGRSEALS.cel

Cell Name: LOGOCA 	Cell Name: LOGODE 
Cell Name: RWSJD 	Cell Name: RWSRC 
Cell Name: RWSTK 	

Page 1

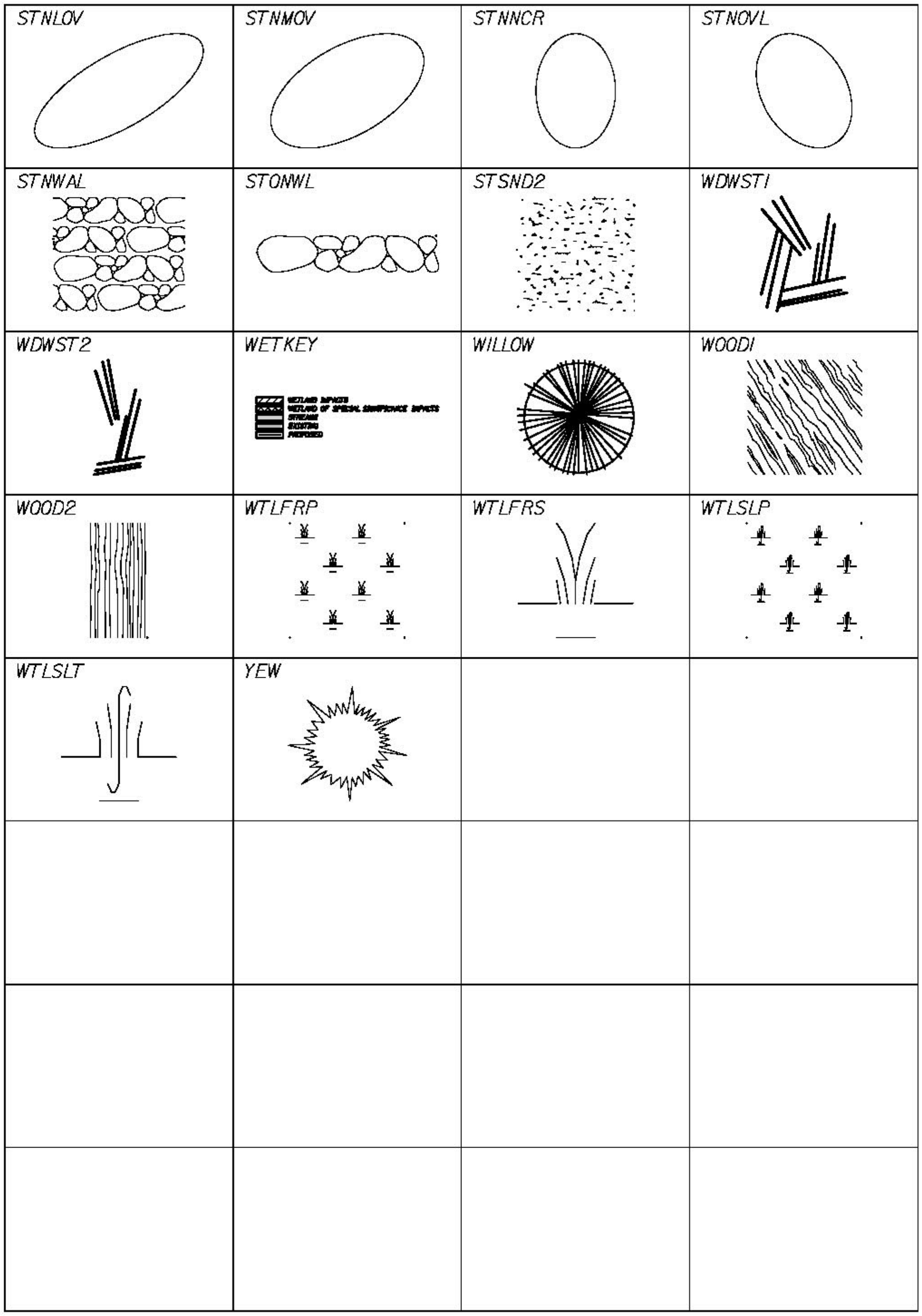

Cell Library: EO.cel
ARBVIT
ASH
BEECH
BIRCH
COBOLD
CONCRT
DTDSHT
EARTH
FIR
FLCRAB
FORSYT
FOUNTN
FPDNSM
FPSPR2
FPSPR5
FPSPR7
FPSPRB
FZHXPT
GRI2SP
GRI4SP
GRI7SP
GRI9SP
GR2ISP
GRASS
GRASSP
GRAVL
LINDEN
MAPLE
MHPC
MTPBSN
OAK
ORNCND
Page 1

Cell Library: EO.cel



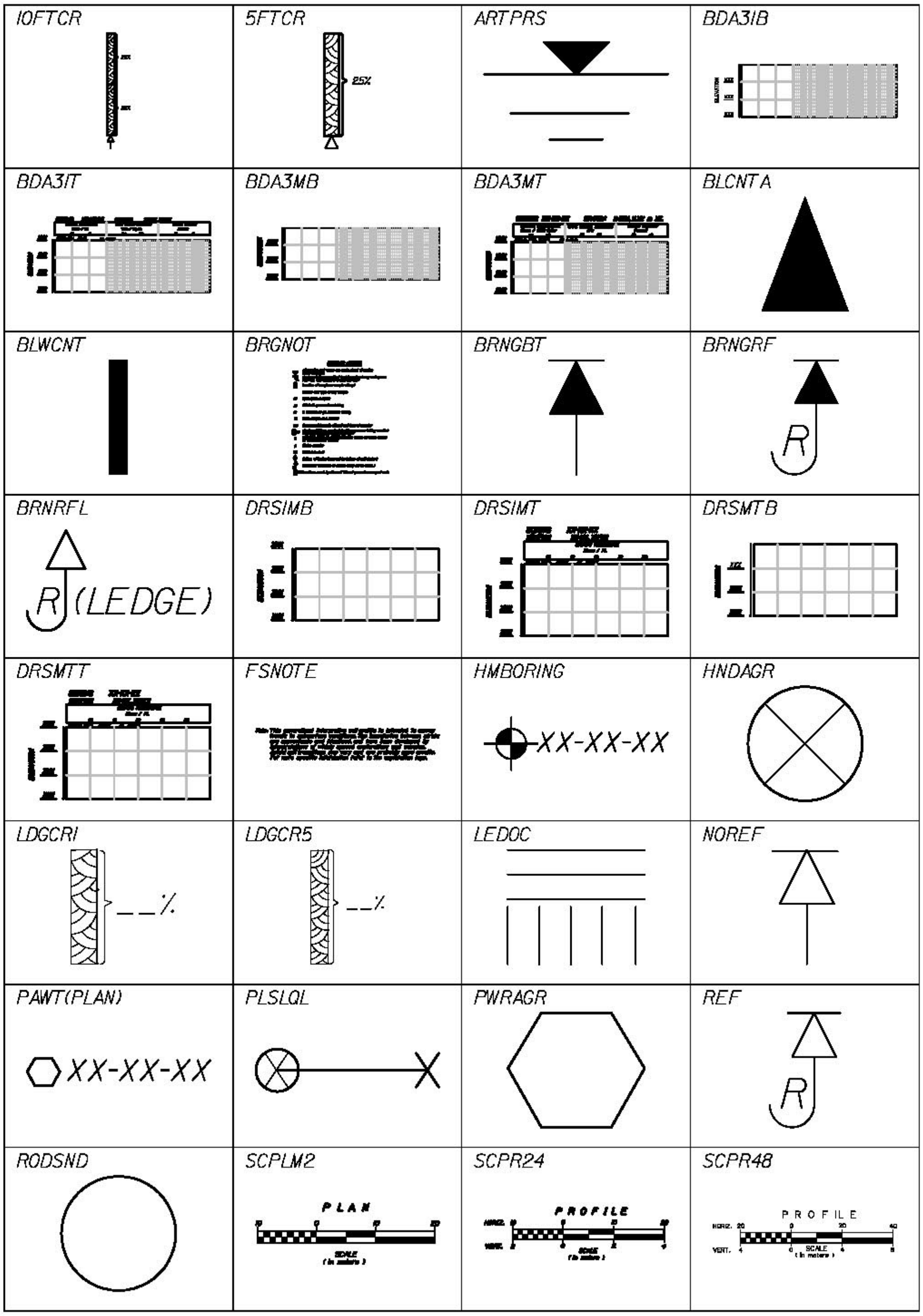
Page 2

Cell Library: EO.cel

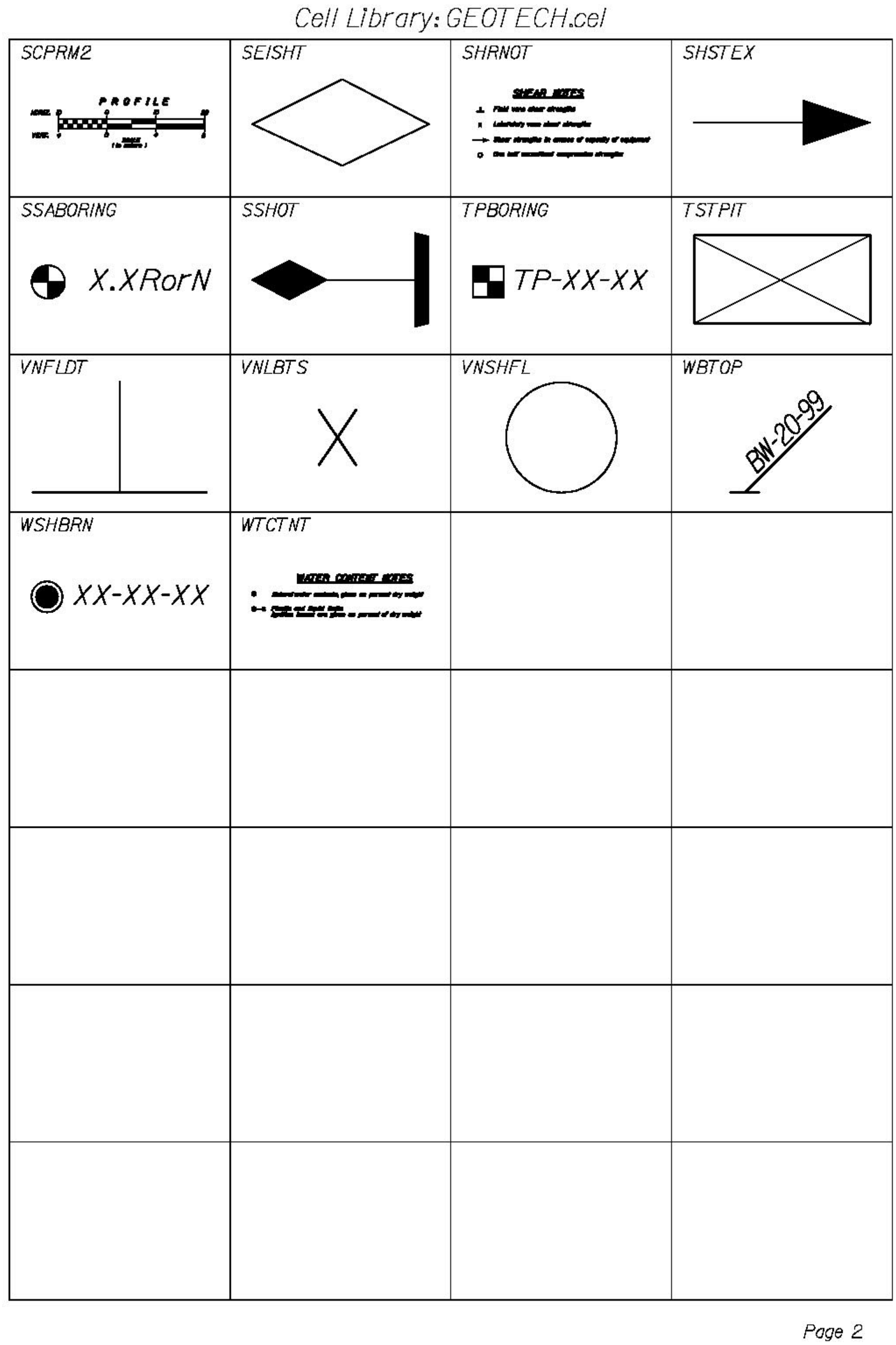


Page 3

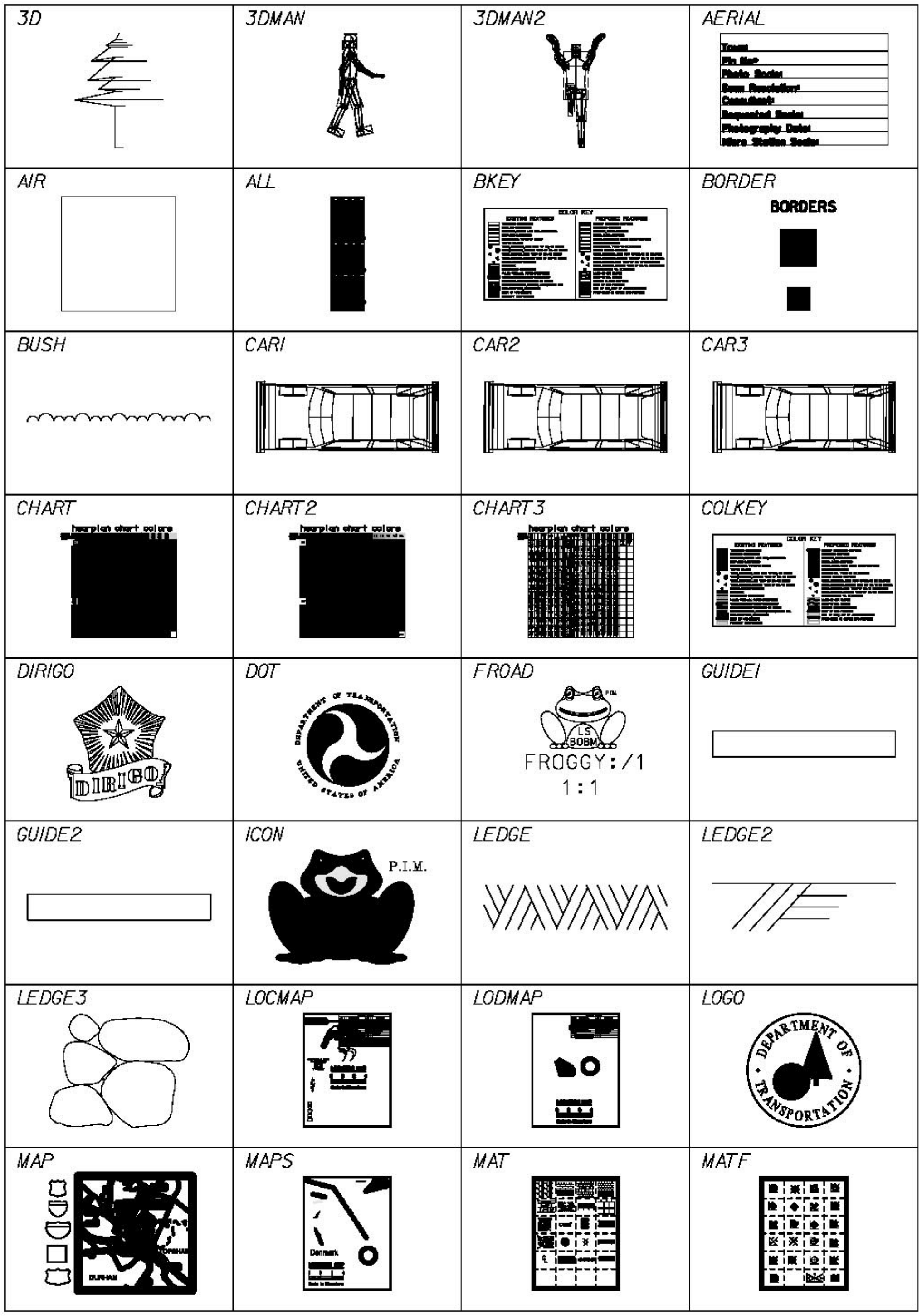
Cell Library: GEOTECH.cel



Page 1

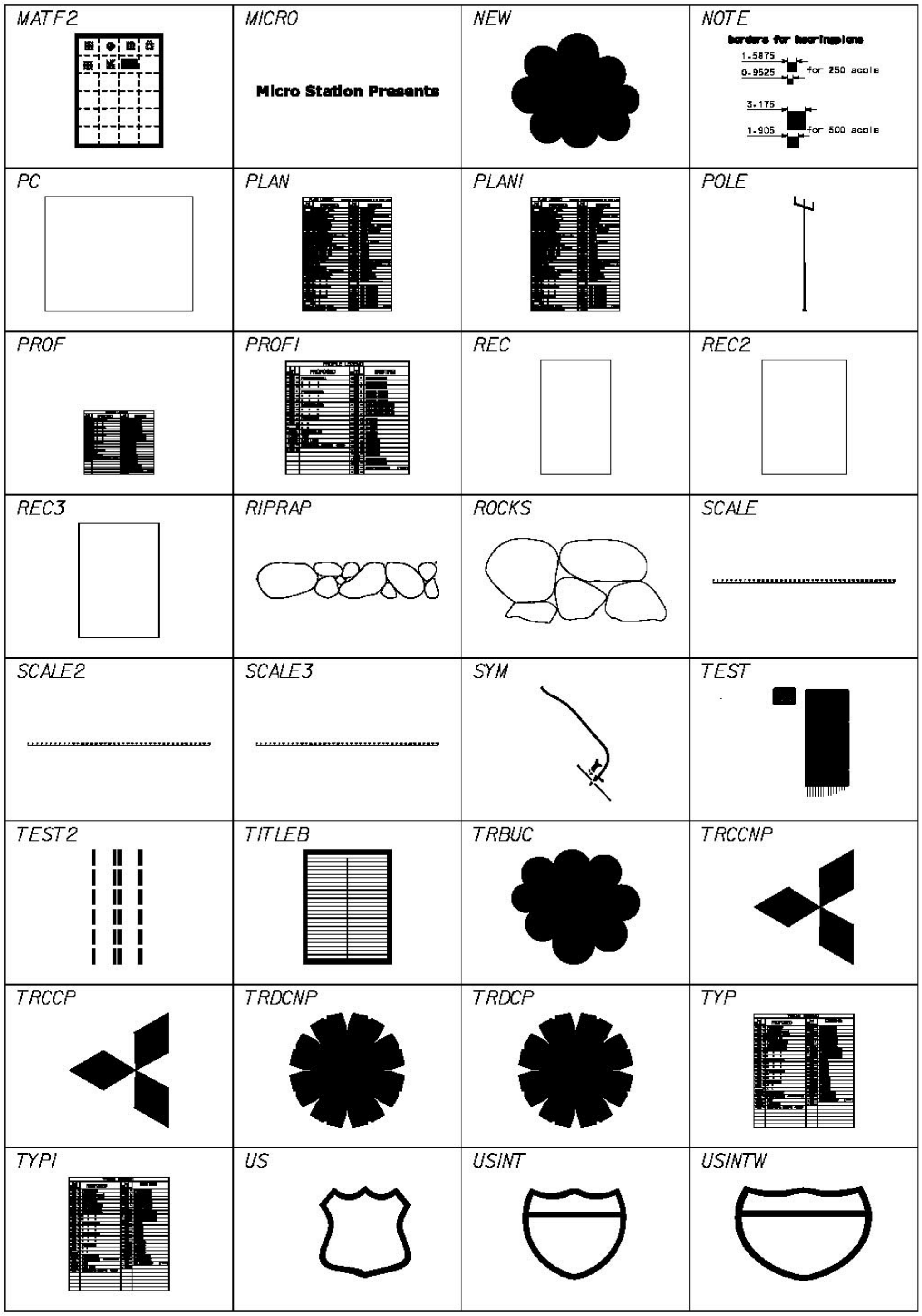

Cell Library: GEOTECH.cel
SCPRM2
PROFILE
SEISHT
SHRNOT
SHEAR NOTES
SHSTEX
SSABORING
X.XRorN
SSHOT
TPBORING
TP-XX-XX
TSTPIT
VNFLDT
VNLBTS
VNSHFL
WBTOP
BW-20-99
WSHBRN
XX-XX-XX
WTCTNT
WATER CONTENT NOTES
Page 2

Cell Library: HEARING.CEL

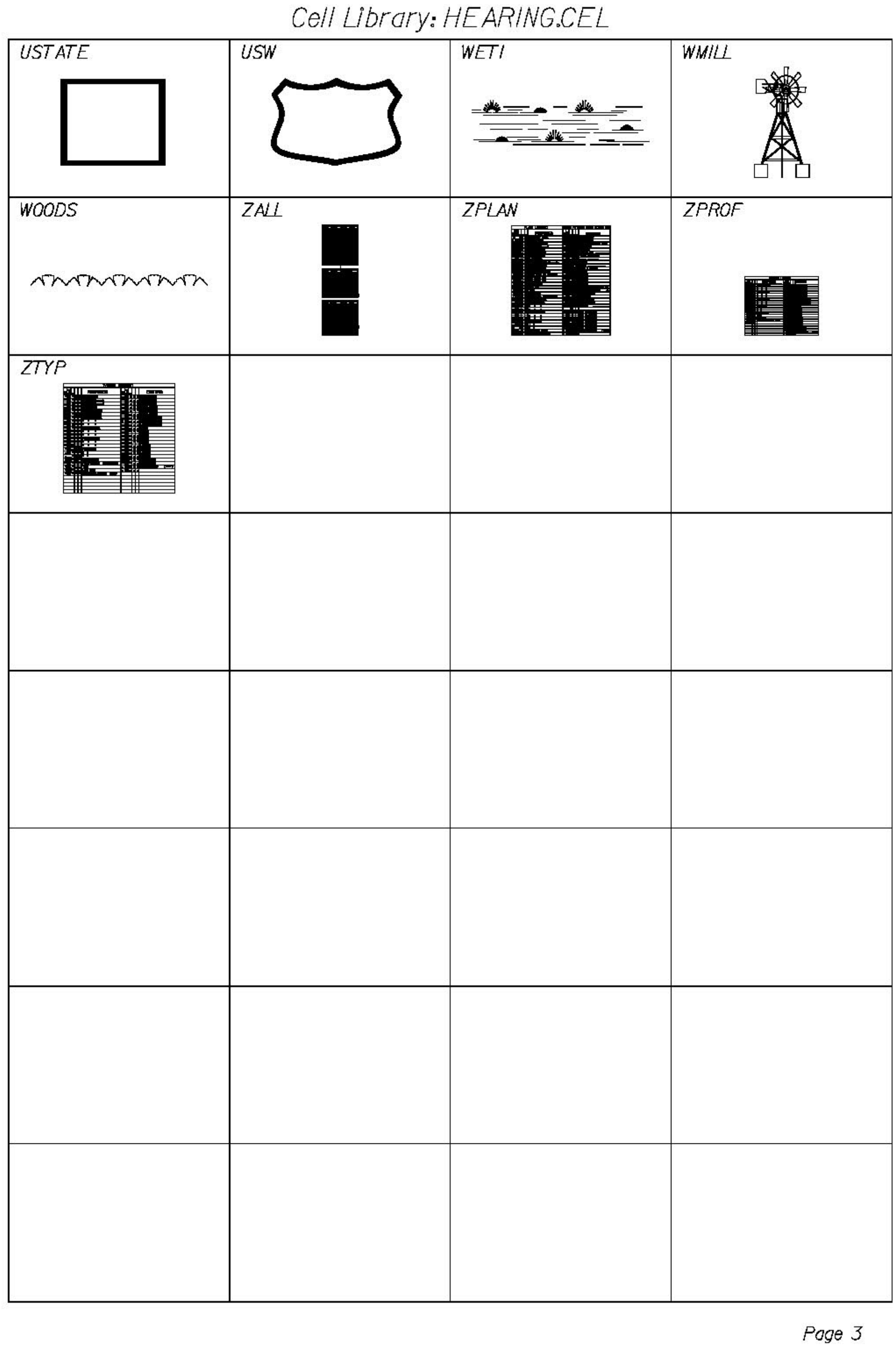


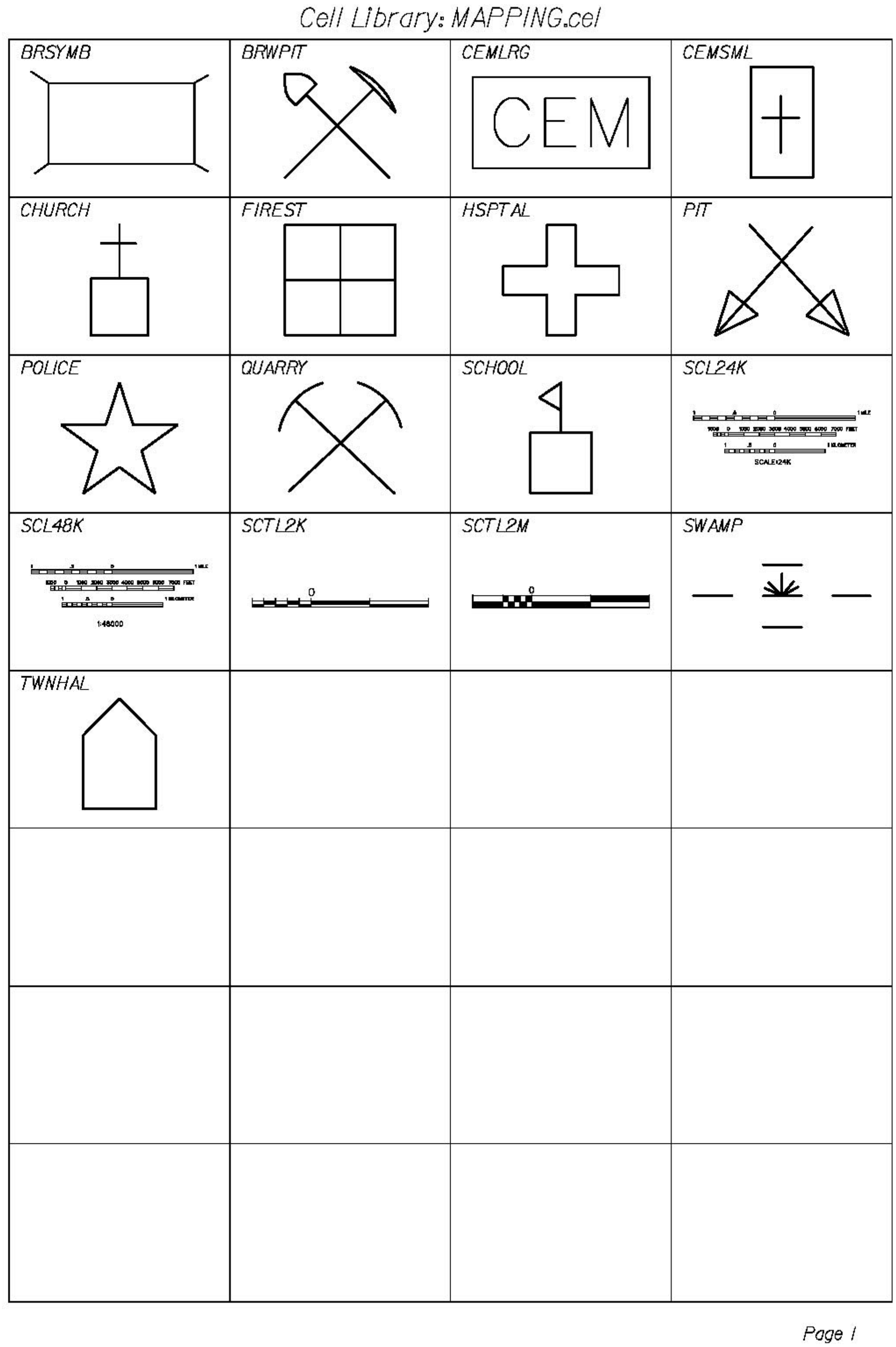
Page 1

Cell Library: HEARING.CEL

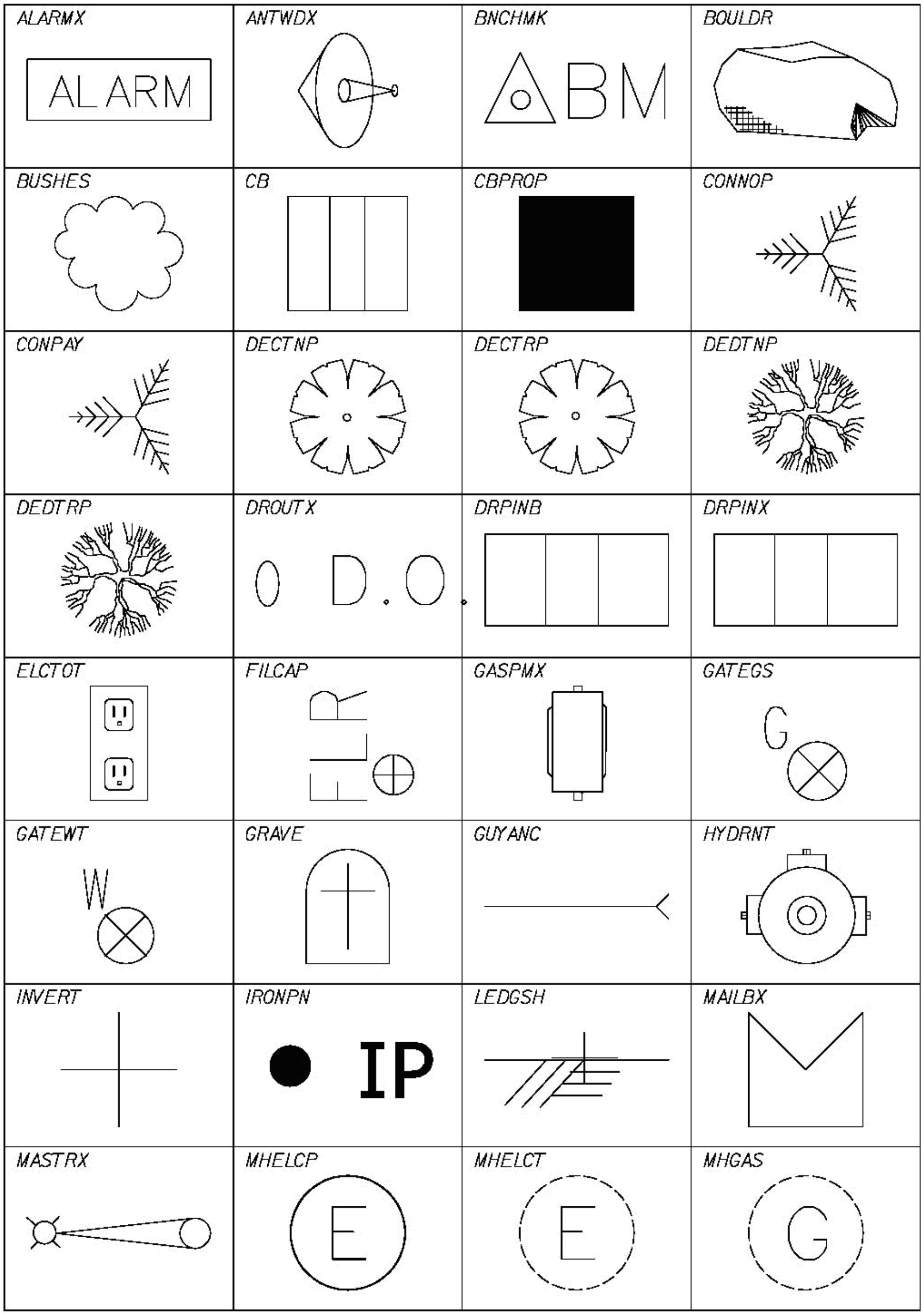


Page 2


Cell Library: HEARING.CEL
USTATE
USW
WETI
WMILL
WOODS
ZALL
ZPLAN
ZPROF
ZTYP
Page 3

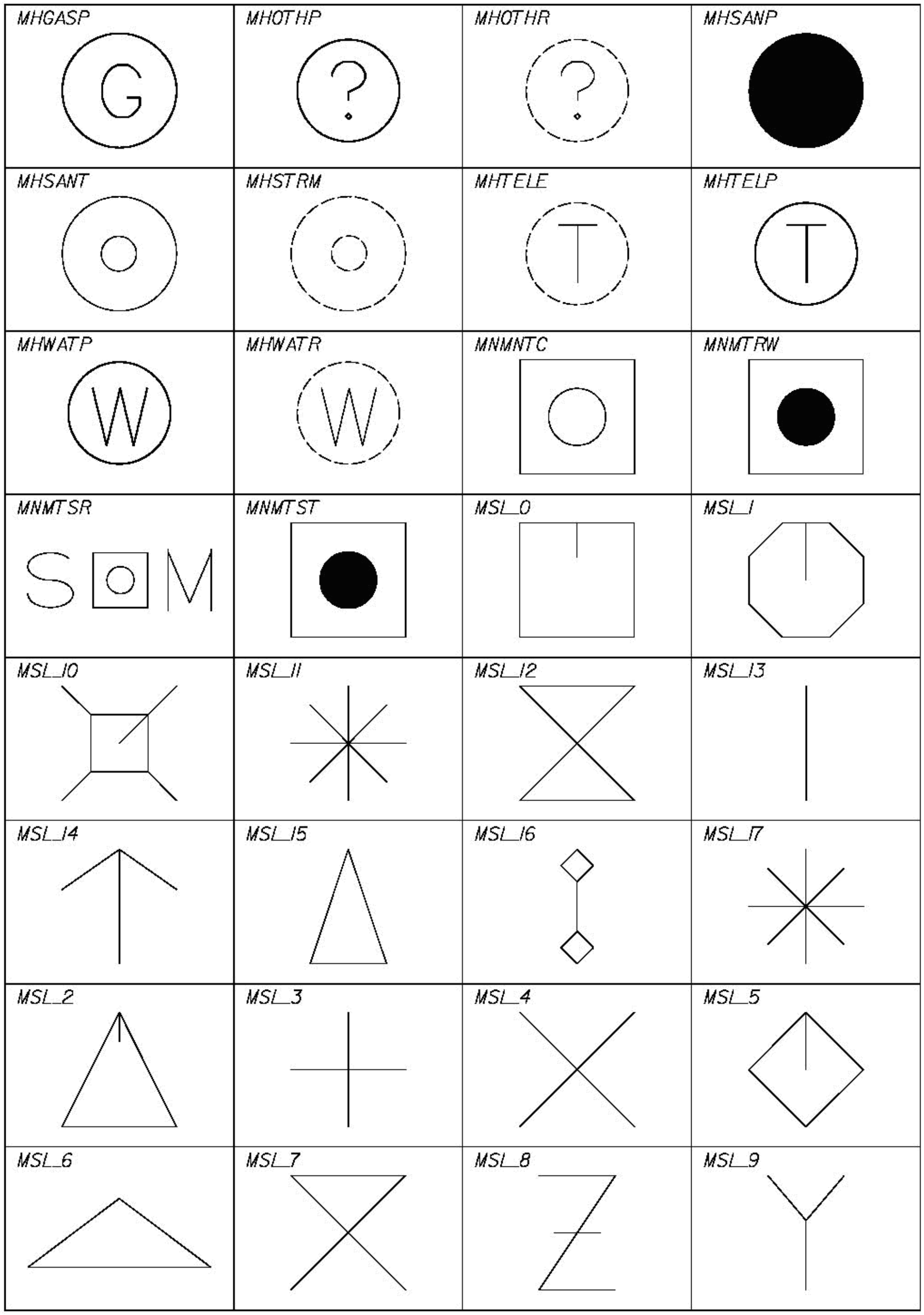

Cell Library: MAPPING.cel
BRSYMB
BRWPIT
CEMLRG
CEM
CEMSML
CHURCH
FIREST
HSPTAL
PIT
POLICE
QUARRY
SCHOOL
SCL24K
SCL48K
SCTL2K
SCTL2M
SWAMP
TWNHAL
Page 1

Cell Library: **PLAN.cel**



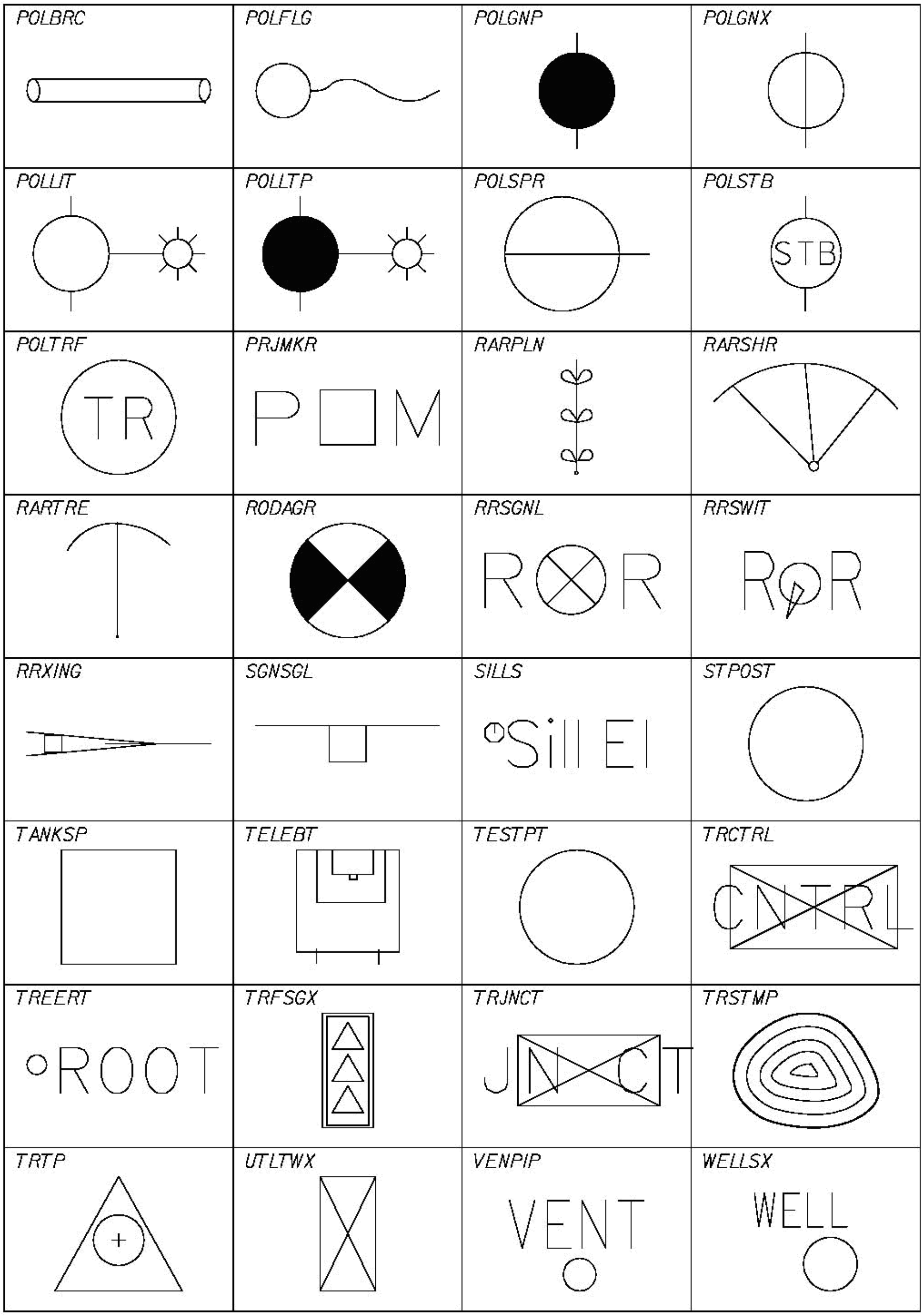
Page 1

Cell Library: PLAN.cel



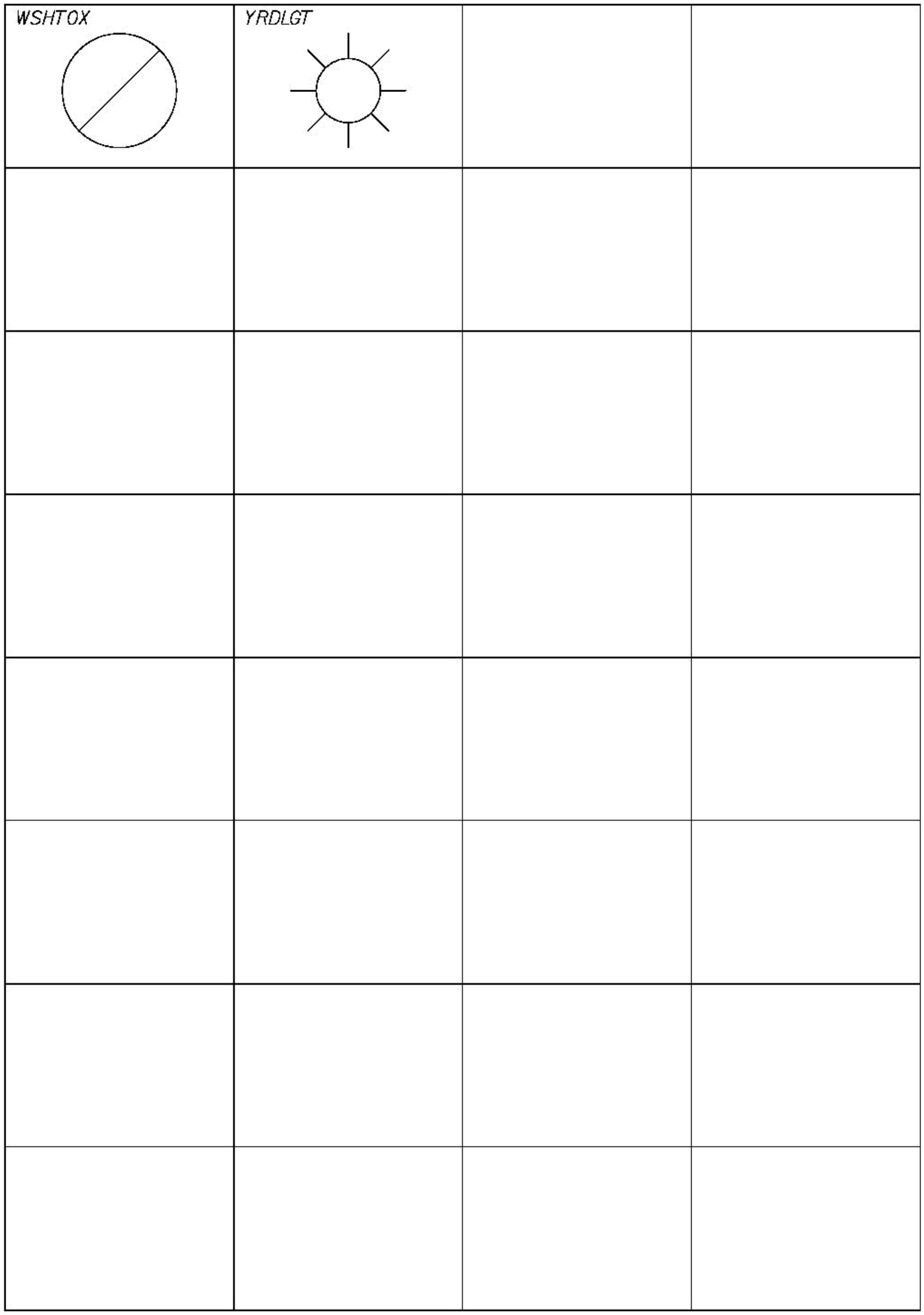
Page 2

Cell Library: **PLAN.cel**

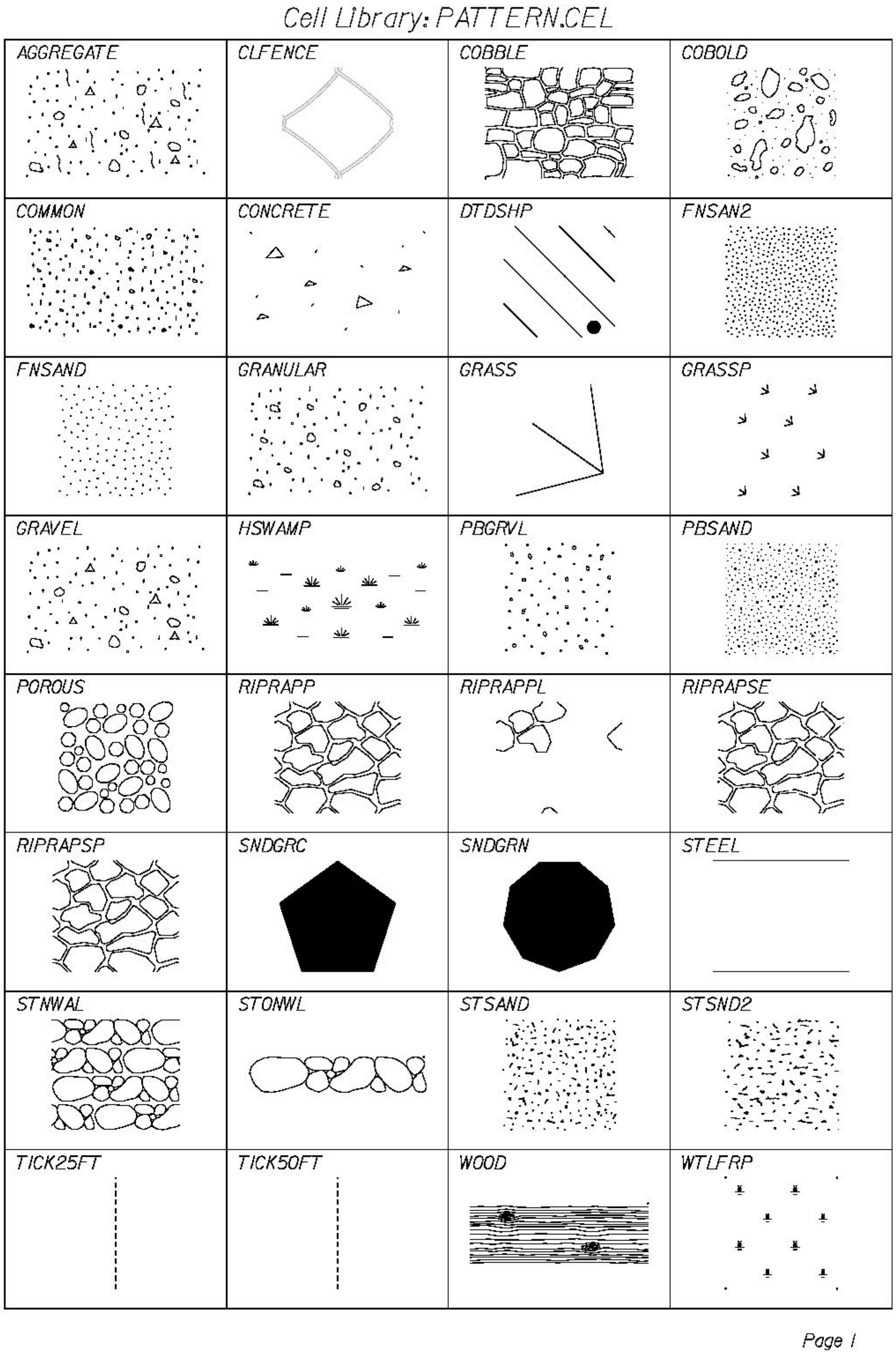


Page 3

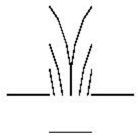
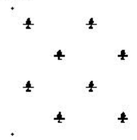
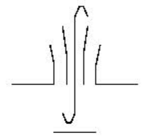
Cell Library: **PLAN.cel**



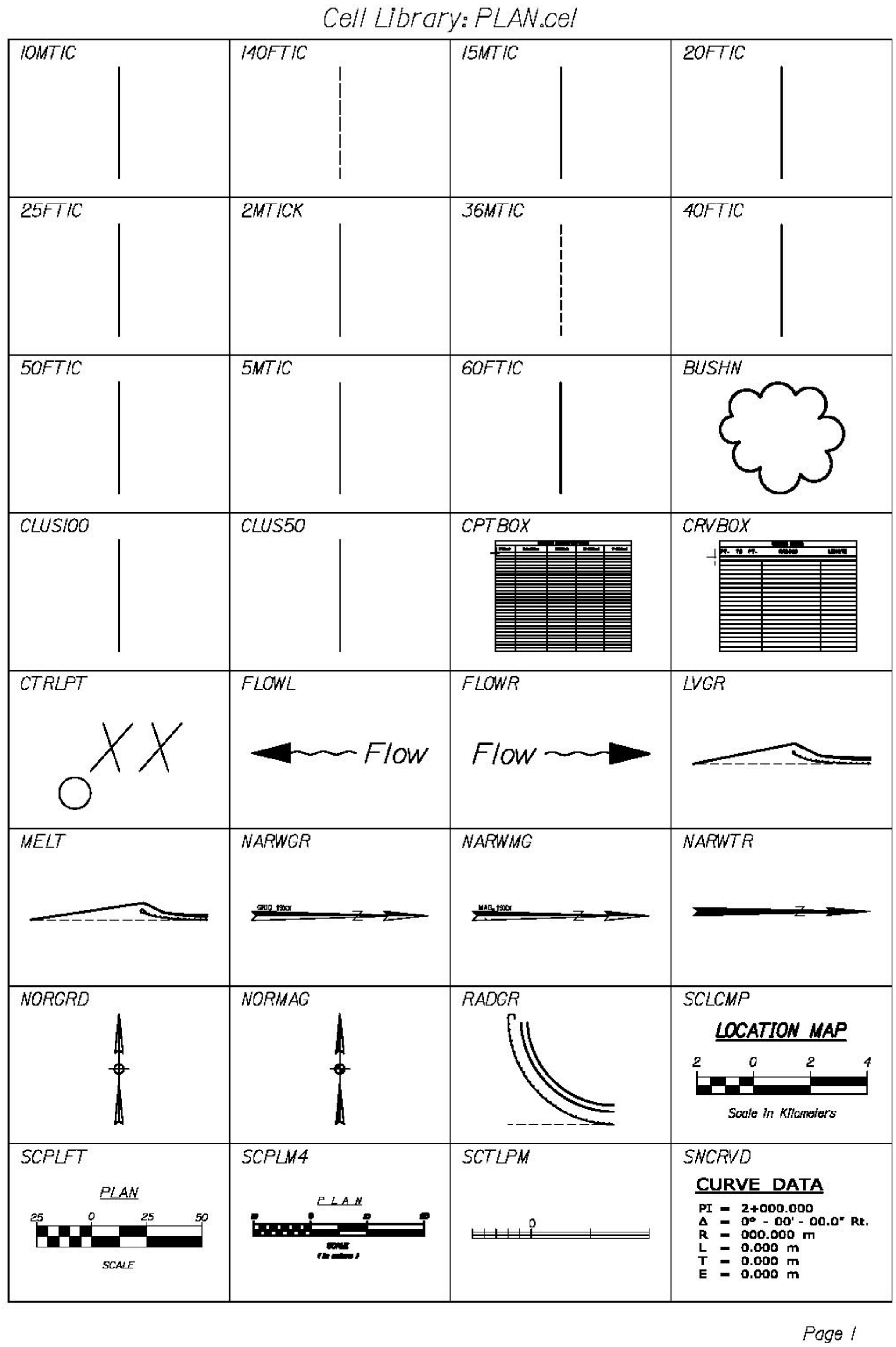
Page 4

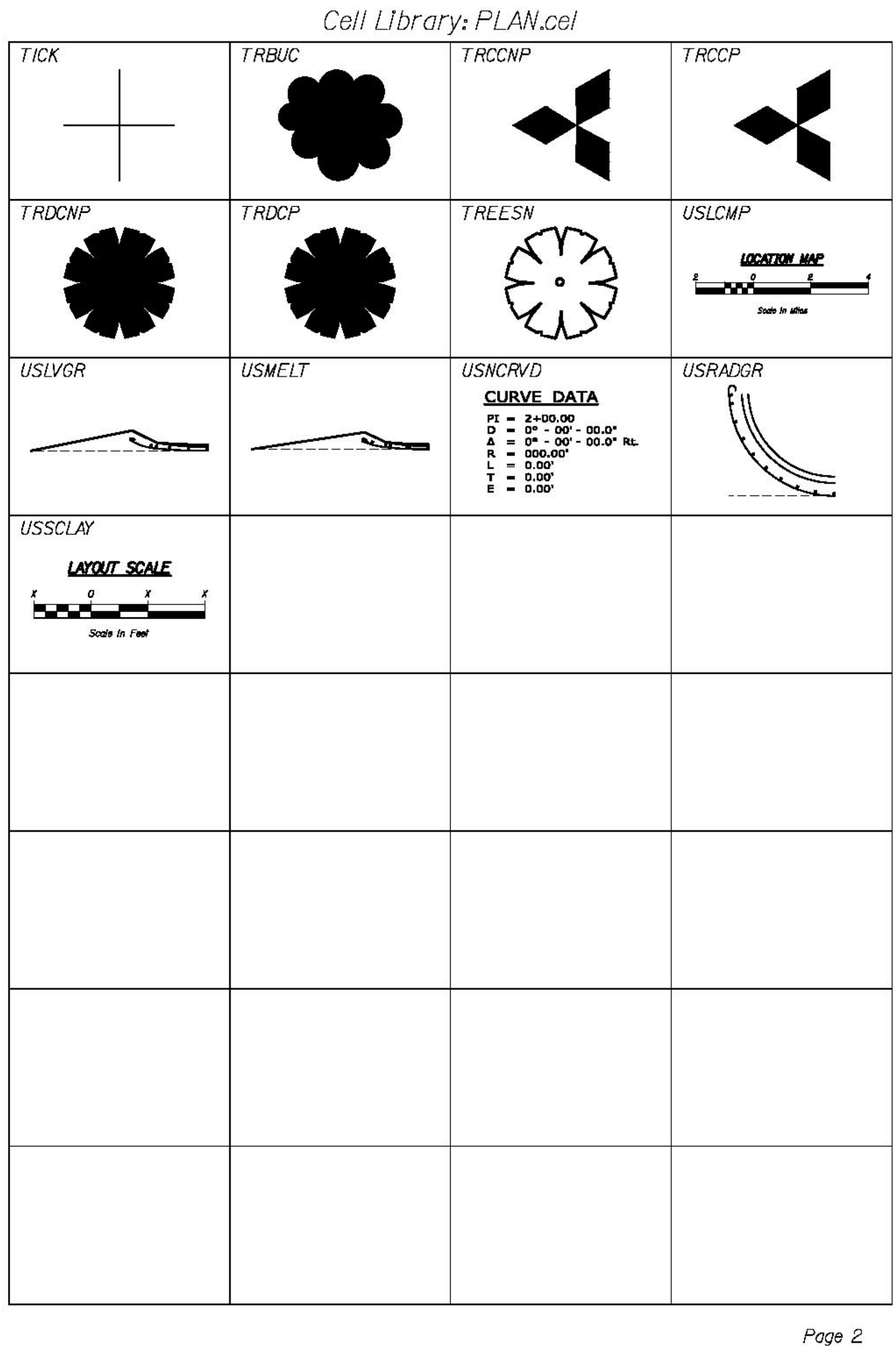

Cell Library: PATTERN.CEL
AGGREGATE
CLFENCE
COBBLE
COBOLD
COMMON
CONCRETE
DTDSHP
FNSAN2
FNSAND
GRANULAR
GRASS
GRASSP
GRAVEL
HSWAMP
PBGRVL
PBSAND
POROUS
RIPRAPP
RIPRAPPL
RIPRAPSE
RIPRAPSP
SNDGRC
SNDGRN
STEEL
STNWAL
STONWL
STSAND
STSND2
TICK25FT
TICK50FT
WOOD
WTLFRP
Page 1

Cell Library: PATTERN.CEL

WTLFRS 	WTLSLP 	WTLSLT 	

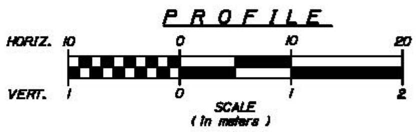
Page 2


Cell Library: PLAN.cel
IOMTIC
I40FTIC
I5MTIC
20FTIC
25FTIC
2MTICK
36MTIC
40FTIC
50FTIC
5MTIC
60FTIC
BUSHN
CLUSIOO
CLUS50
CPTBOX
CRVBOX
CTRLPT
FLOWL
Flow
FLOWR
Flow
LVGR
MELT
NARWGR
NARWMG
NARWTR
NORGRD
NORMAG
RADGR
SCLCMP
LOCATION MAP
2 0 2 4
Scale In Kilometers
SCPLFT
PLAN
25 0 25 50
SCALE
SCPLM4
PLAN
SCTLPM
SNCRVD
CURVE DATA
PI = 2+000.000
Δ = 0° - 00' - 00.0" Rt.
R = 000.000 m
L = 0.000 m
T = 0.000 m
E = 0.000 m
Page 1

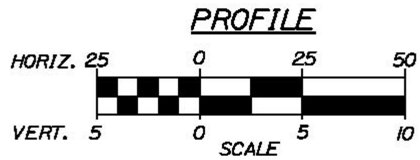

Cell Library: PLAN.cel
TICK
TRBUC
TRCCNP
TRCCP
TRDCNP
TRDCP
TREESN
USLCMP
LOCATION MAP
Scale In Miles
USLVGR
USMELT
USNCRVD
CURVE DATA
PI = 2+00.00
D = 0° - 00' - 00.0"
Δ = 0° - 00' - 00.0" Rt.
R = 000.00'
L = 0.00'
T = 0.00'
E = 0.00'
USRADGR
USSCLAY
LAYOUT SCALE
X 0 X X
Scale In Feet
Page 2

Cell Library: PROFILE.cel

Cell Name: SCPR22



Cell Name: SCPRFT

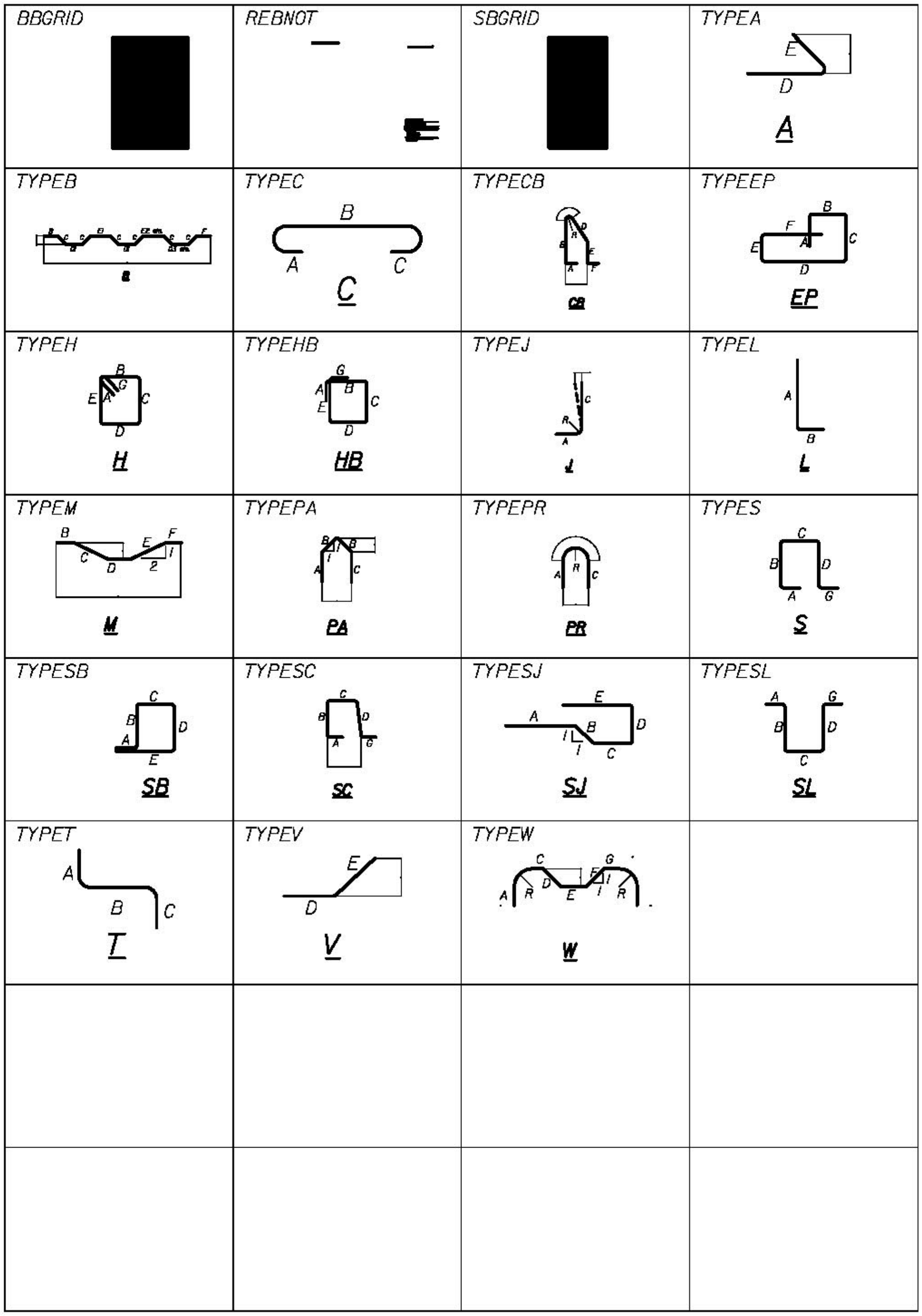


Cell Name: VCL

V.C.L. =

Page 1

Cell Library: REBAR.CEL



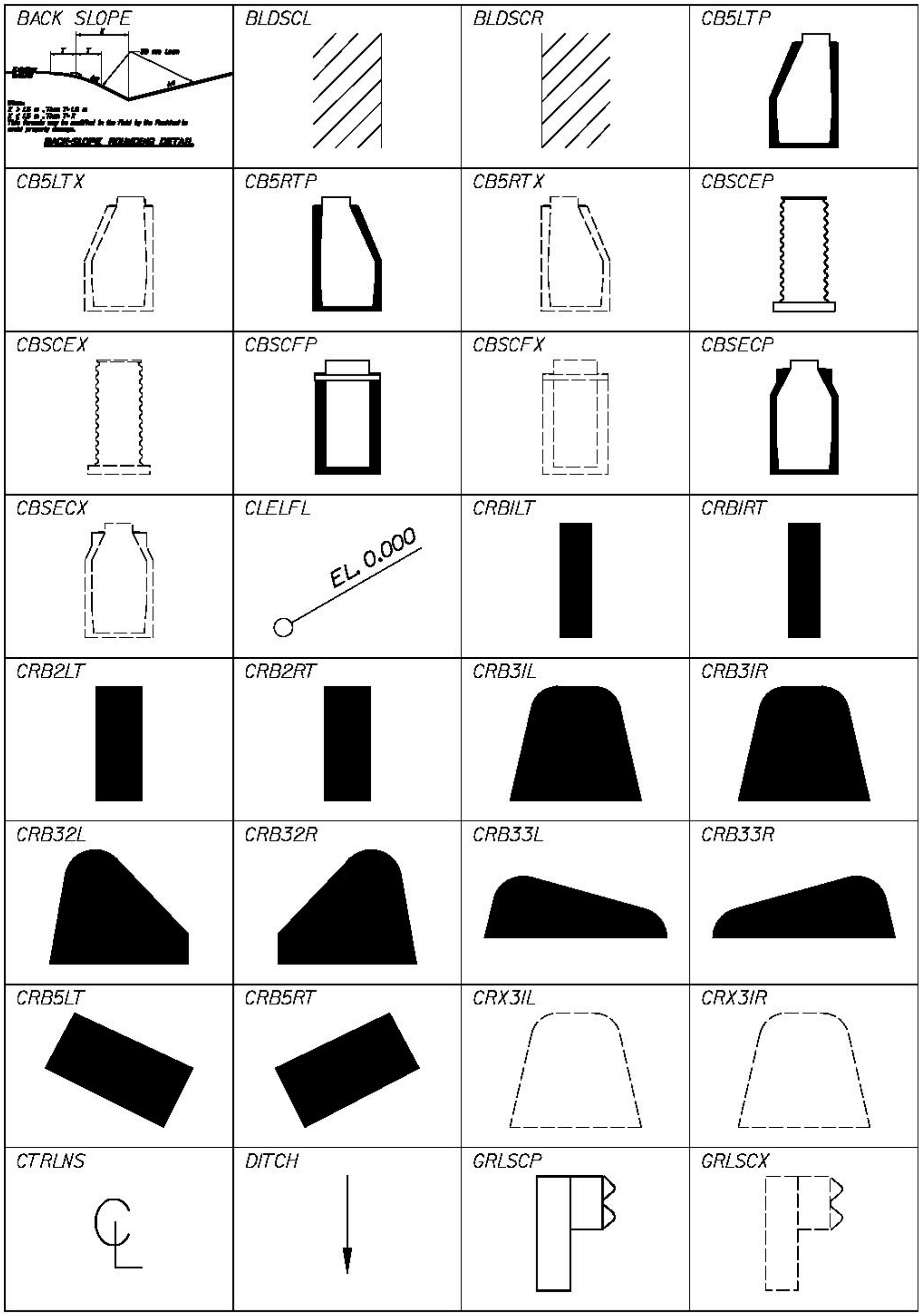
Page 1

Cell Library: ROW.cel

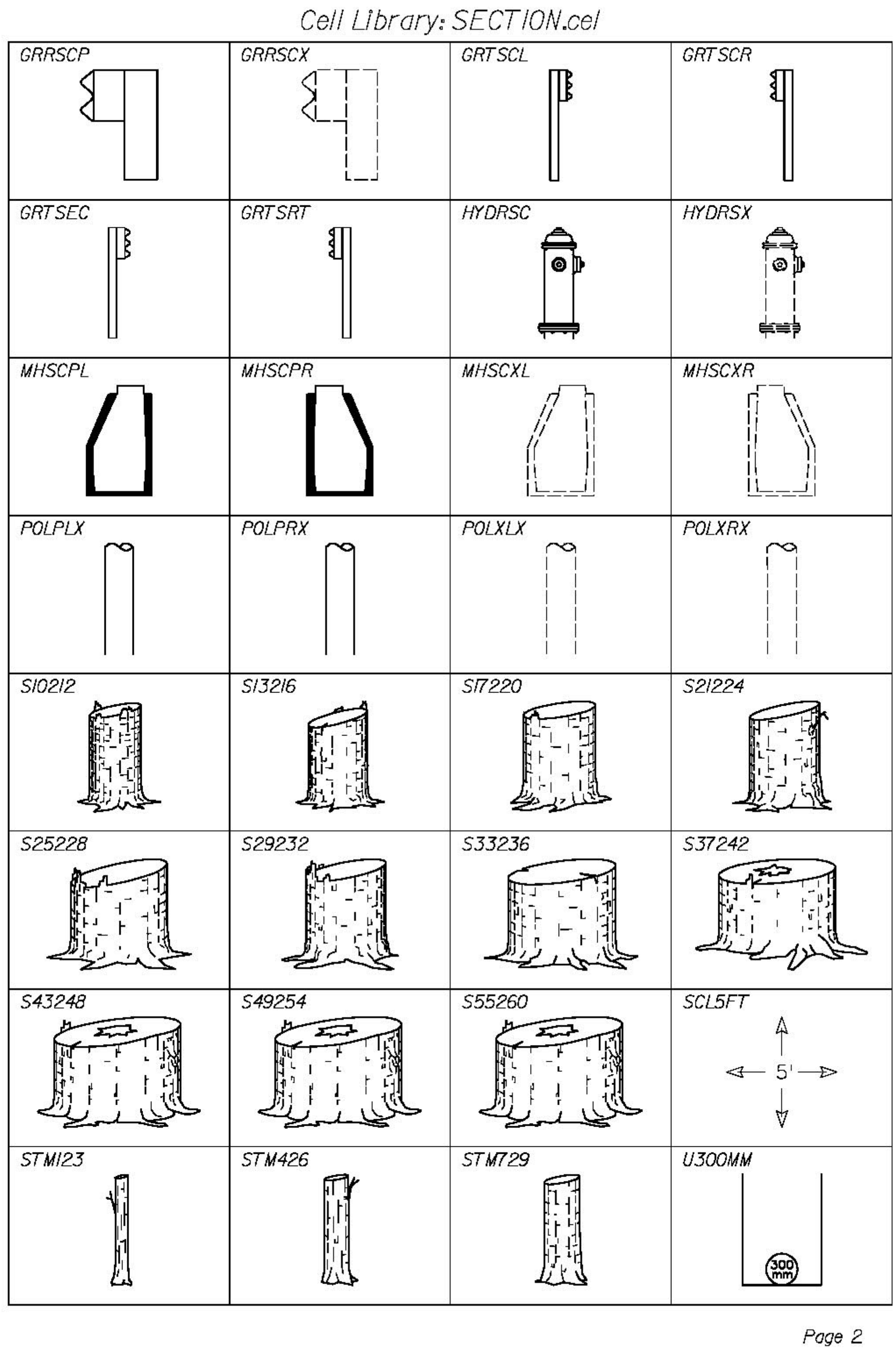
FINAORD	NOSCALE NOTE: THIS PLAN IS NOT TO SCALE	NOTE1	ROWCOL PERMANENT EASEMENT TEMPORARY EASEMENT TEMPORARY ROAD EASEMENT
ROWCOL2 DRAINAGE EASEMENT PERMANENT EASEMENT TEMPORARY EASEMENT TEMPORARY ROAD EASEMENT	RWBIRD	RWCVD CURVE DATA P.I. STA. Δ = T = L = E = R =	RWNAGRID GRID 19XX
RWNAMAG MAG. 19XX	RWNM1	RWNM2	RWNM3
RWNRES NOTE: USE OF LAND AND BUILDING WITHIN AREA INDICATED RESERVED TO OWNER UNTIL	RWNRR1 NOTE: RIGHTS TAKEN TO RAZE AND REMOVE THAT PORTION OF THE BUILDING THAT LIES OUTSIDE OF THE NEW BOUNDARIES OF STATE HIGHWAY " " AT ABOUT STA. X	RWNRR2 NOTE: RIGHTS TAKEN TO RAZE OR REMOVE BUILDING AT STA. X	RWNWP NOTE: PRESCRIPTIVE EASEMENT FOR HIGHWAY PURPOSES WITHIN LIMITS OF WROUGHT PORTION
RWSCOA CONTROLLED ACCESS LIMIT CONTROLLED ACCESS LIMIT LINE ALONG R/W LINE R/W LINE CONTROLLED ACCESS LIMIT LINE NOT ON R/W LINE NO ACCESS WILL BE PERMITTED TO OR FROM STATE HIGHWAY "X" AND ADJOINING PROPERTIES WITHIN BOUNDARIES DEFINED BY CONTROLLED ACCESS LIMIT LINES	RWSREG STATE OF MAINE REGISTRY OF DEEDS COUNTY ____ RECEIVED ____, ____ at ____h____m____ M and recorded in Plan Book ____, Page ____ Attest: ____ REGISTER	RWSU PARCEL NO. ( ) LAND TAKEN = SLOPE EASE. = TEMP. CONST. RIGHTS = TOTAL AREA = REM. AREA =	RWSUIT ITEM NO. ( ) GRADING RIGHTS = TOTAL AREA =
RWSUTC ITEM NO. () TEMP. CONST. RIGHTS = TOTAL AREA =	RWSUWP PARCEL NO. ( ) LAND TAKEN = (PRESC. EASE.) LAND TAKEN = (OTHER) TOTAL LAND TAKEN = SLOPE EASE. = TEMP. CONST. RIGHTS = TOTAL AREA = REM. AREA =	RWTICK 0+000	

Page 1

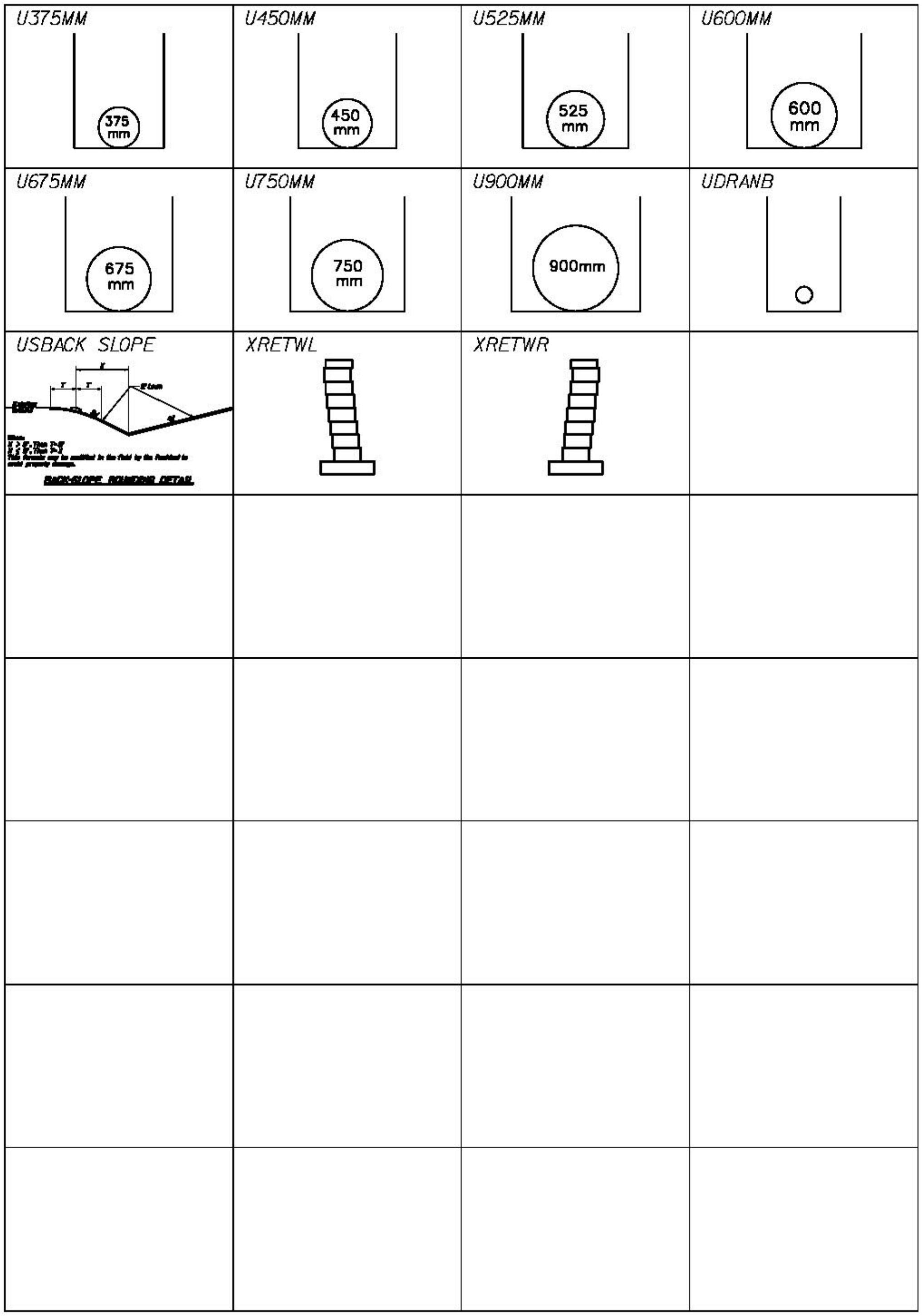
Cell Library: SECTION.cel



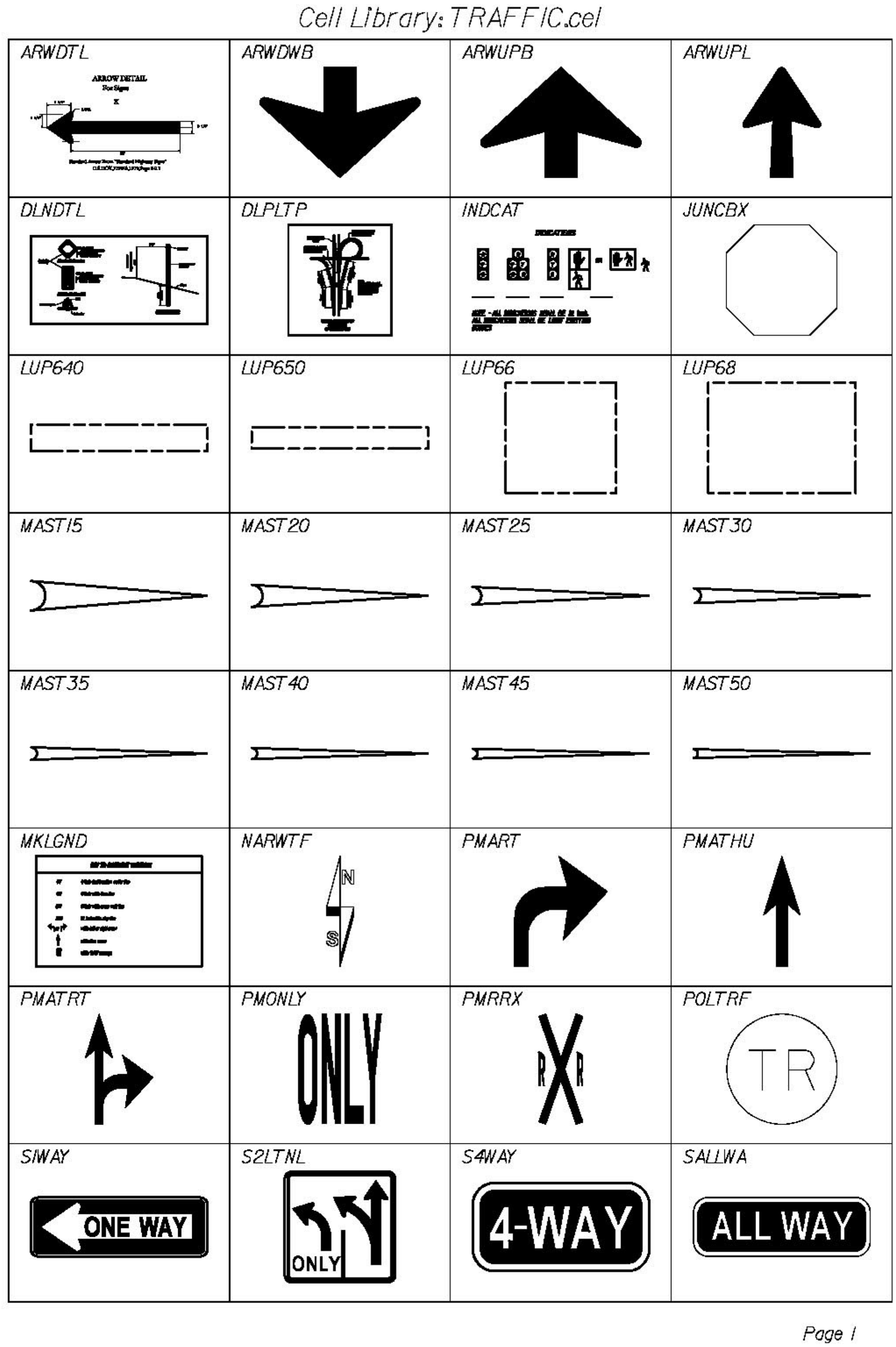
Page 1


Cell Library: SECTION.cel
GRRSCP
GRRSCX
GRTSCL
GRTSCR
GRTSEC
GRTSRT
HYDRSC
HYDRSX
MHSCPL
MHSCPR
MHSCXL
MHSCXR
POLPLX
POLPRX
POLXLX
POLXRX
S10212
S13216
S17220
S21224
S25228
S29232
S33236
S37242
S43248
S49254
S55260
SCL5FT
5'
STM123
STM426
STM729
U300MM
300 mm
Page 2

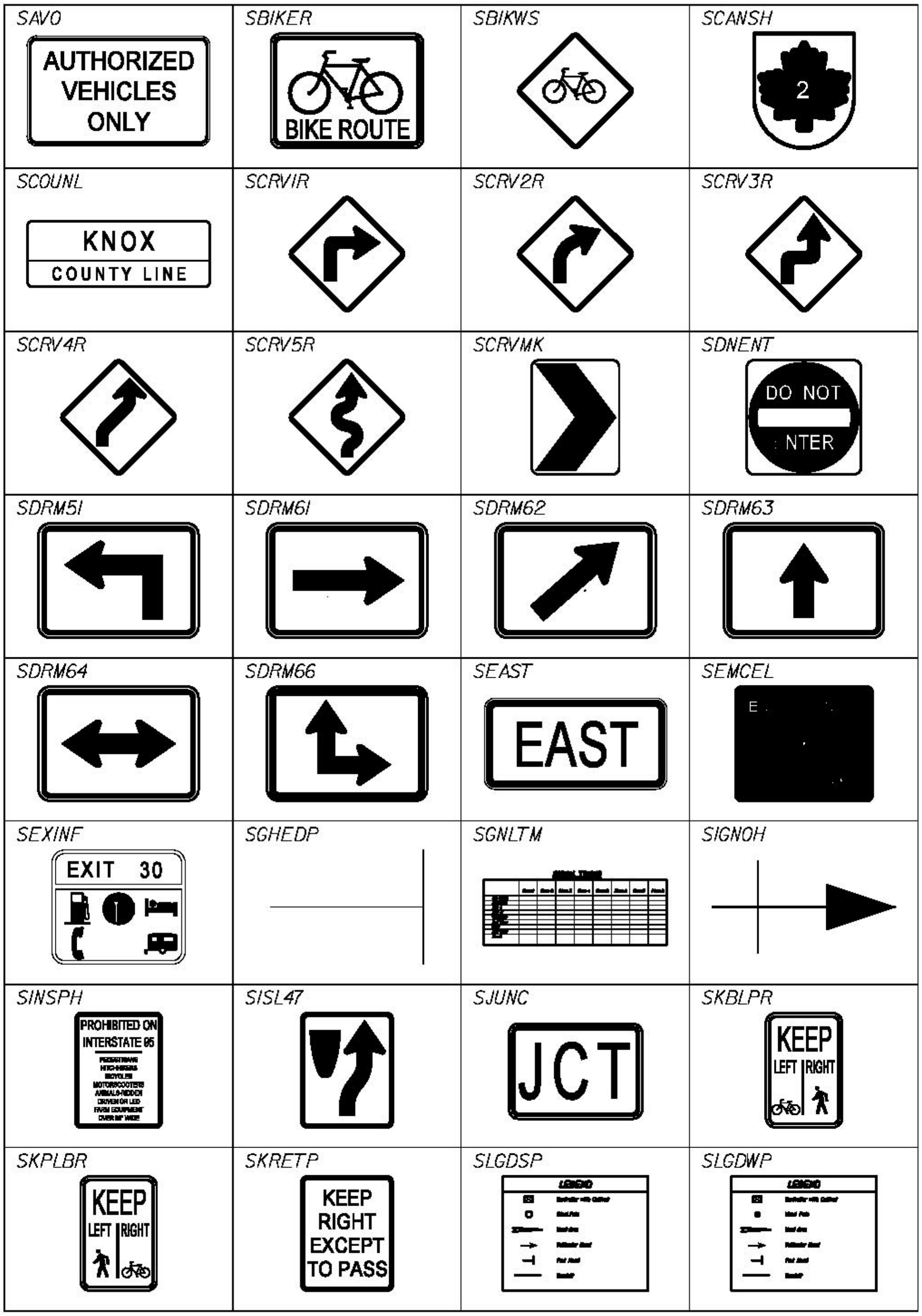
Cell Library: SECTION.cel



Page 3


Cell Library: TRAFFIC.cel
ARWDTL
ARROW DETAIL
ARWDWB
ARWUPB
ARWUPL
DLNDTL
DLPLTP
INDCAT
JUNCBX
LUP640
LUP650
LUP66
LUP68
MAST15
MAST20
MAST25
MAST30
MAST35
MAST40
MAST45
MAST50
MKLGND
NARWTF
N
S
PMART
PMATHU
PMATRT
PMONLY
ONLY
PMRRX
R
R
POLTRF
TR
S1WAY
ONE WAY
S2LTNL
ONLY
S4WAY
4-WAY
SALLWA
ALL WAY
Page 1

Cell Library: TRAFFIC.cel

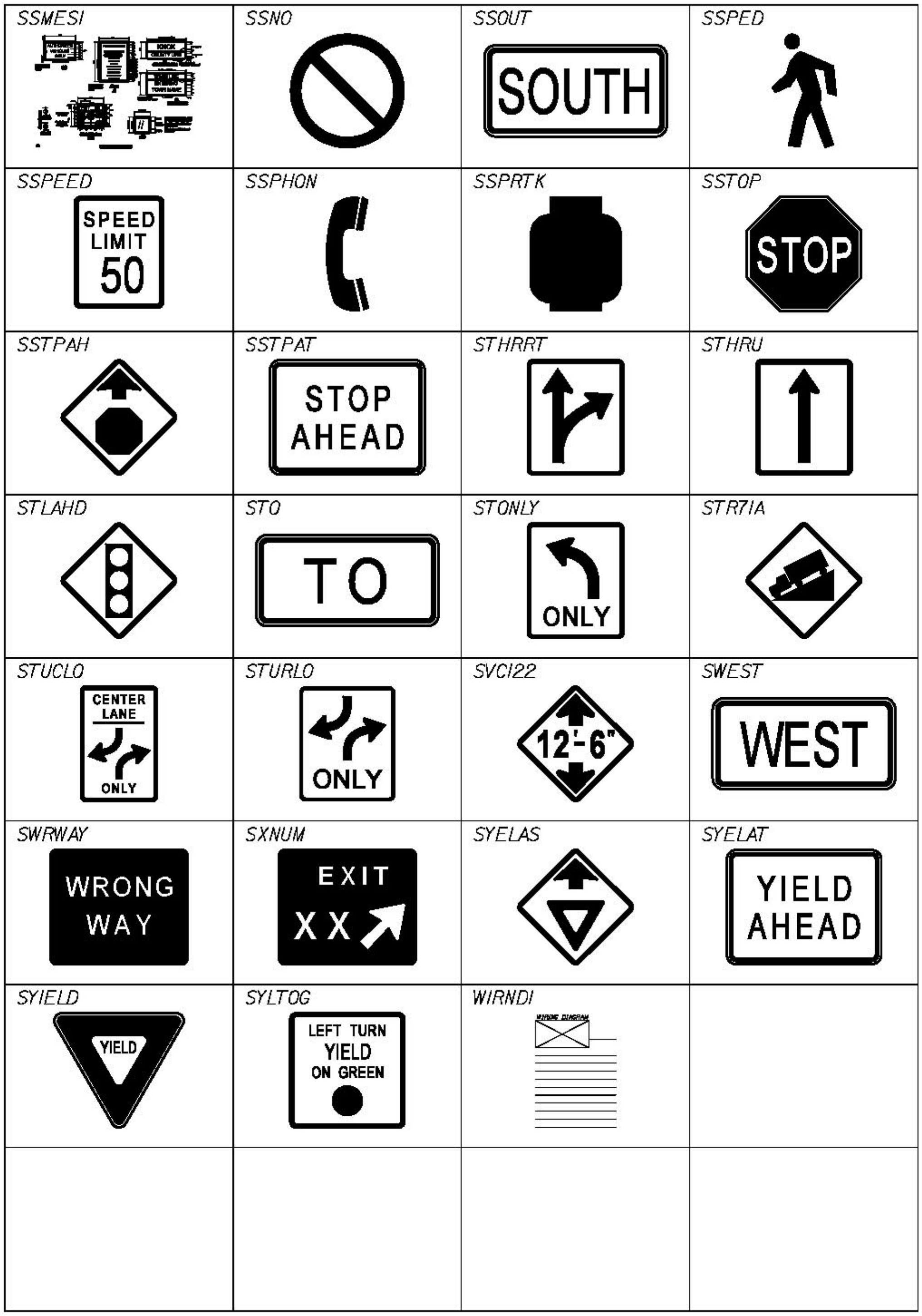


Page 2

Cell Library: TRAFFIC.cel

Page 3

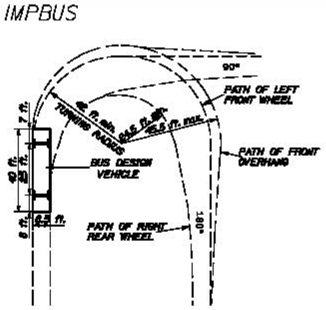
Cell Library: TRAFFIC.cel



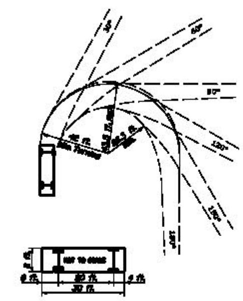
Page 4

Cell Library: turnradii.cel

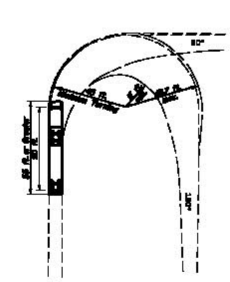
Cell Name: IMPBUS



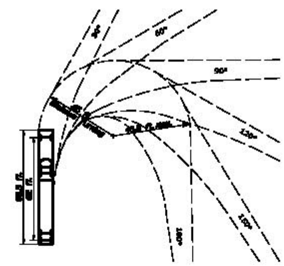
Cell Name: IMPSU



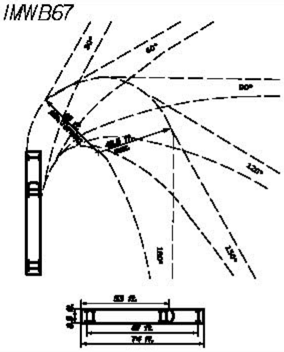
Cell Name: IMWB50



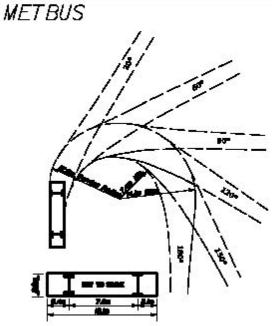
Cell Name: IMWB62



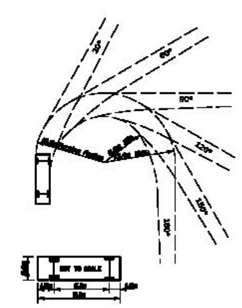
Cell Name: IMWB67



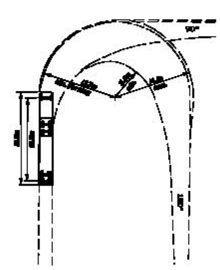
Cell Name: METBUS



Cell Name: METSU

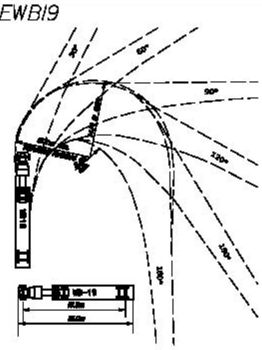
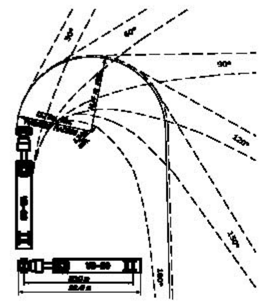


Cell Name: MEWBI5



Page 1

Cell Library: turnradii.cel

Cell Name: MEWBI9 	Cell Name: MEWB20 

Page 2

Cell Library: US_BridgeStNotes.cel

USNABUT	USNARBX	USNBDST	USNBOX
USNCOFF	USNDESG	USNDESL	USNDRAN
USNELBR	USNGENC	USNHYDF	USNHYDP
USNMATR	USNMOTR	USNPIER	USNPILE
USNPREC	USNSPEC	USNSTL	USNSTPL
USNSUP	USNTRAF	USNTWALL	USNUTIL

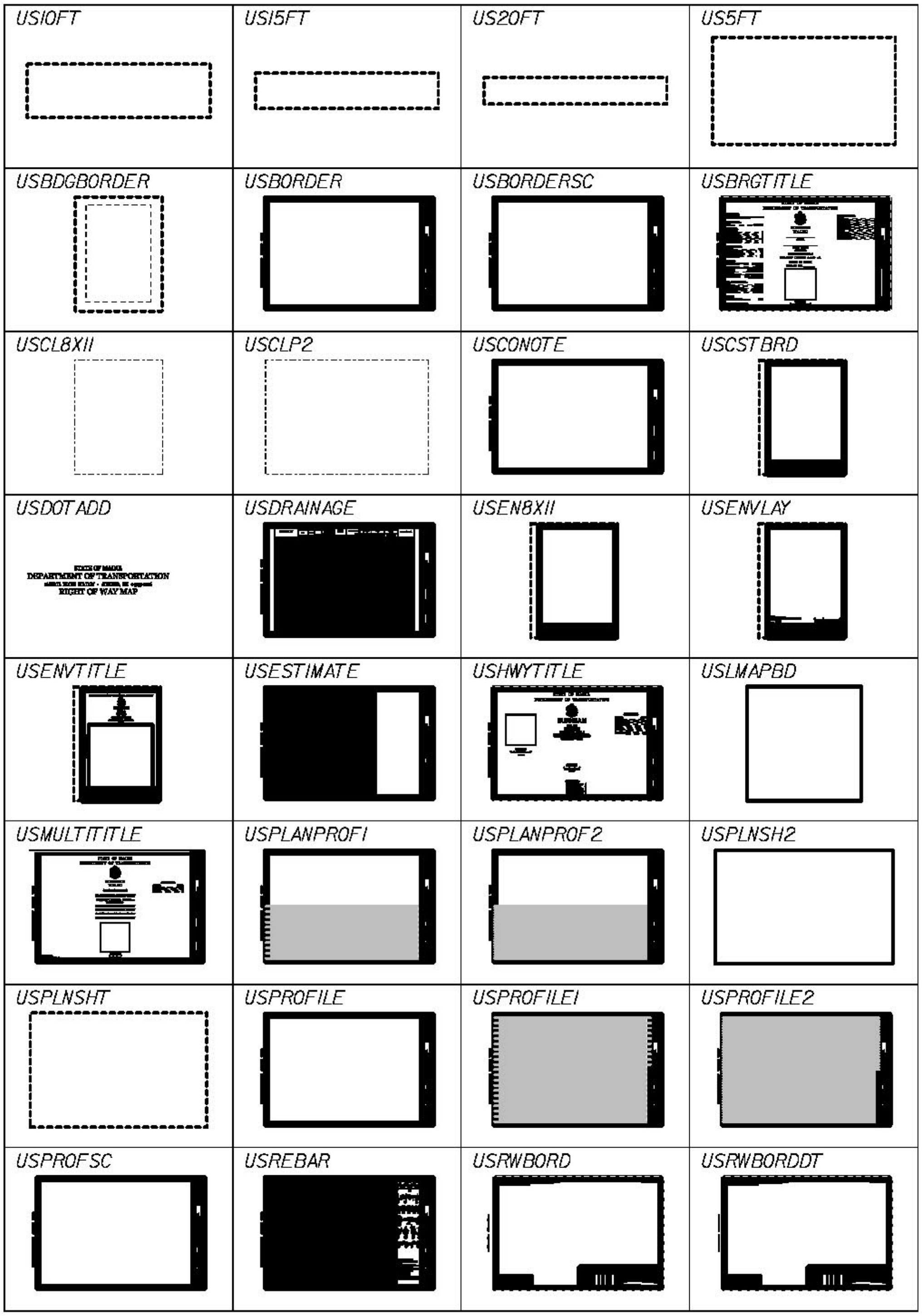
Page 1

Cell Library: US_ROW.CEL

USFINAORD	USNOSCALE NOTE: THIS PLAN IS NOT TO SCALE	USNOTEI	USROWCOL DRAINAGE EASEMENT PERMANENT EASEMENT TEMPORARY EASEMENT TEMPORARY ROAD EASEMENT
USRWBIRD	USRWCVD CURVE DATA P.I. STA. D = Δ = T = L = E = R =	USRWNAGRID GRID	USRWNAMAG MAG.
USRWNMI	USRWNM2	USRWNM3	USRWNRES NOTE: USE OF LAND AND BUILDING WITHIN AREA INDICATED RESERVED TO OWNER UNTIL
USRWNRRI NOTE: RIGHTS TAKEN TO RAZE AND REMOVE THAT PORTION OF THE BUILDING THAT LIES OUTSIDE OF THE NEW BOUNDARIES OF STATE HIGHWAY " " AT ABOUT STA. X	USRWNRR2 NOTE: RIGHTS TAKEN TO RAZE OR REMOVE BUILDING AT STA. X	USRWNWP NOTE: PRESCRIPTIVE EASEMENT FOR HIGHWAY PURPOSES WITHIN LIMITS OF WROUGHT PORTION	USRWSCOA CONTROLLED ACCESS LIMIT CONTROLLED ACCESS LIMIT LINE ALONG R/W LINE R/W LINE CONTROLLED ACCESS LIMIT LINE NOT ON R/W LINE NO ACCESS WILL BE PERMITTED TO OR FROM STATE HIGHWAY "X" AND ADJOINING PROPERTIES WITHIN BOUNDARIES DEFINED BY CONTROLLED ACCESS LIMIT LINES
USRWSREG STATE OF MAINE REGISTRY OF DEEDS COUNTY RECEIVED At ___ h ___ m ___ M and recorded in Plan Book ___, Page ___ Attest: ___ REGISTER	USRWSU PARCEL NO. ( ) LAND TAKEN = SLOPE EASE. = TEMP. CONST. RIGHTS = TOTAL AREA = REM. AREA =	USRWSUIT ITEM NO. ( ) GRADING RIGHTS = TOTAL AREA =	USRWSUTC ITEM NO. () TEMP. CONST. RIGHTS = TOTAL AREA =
USRWSUWP PARCEL NO. ( ) LAND TAKEN = (PRESC. EASE.) LAND TAKEN = (OTHER) TOTAL LAND TAKEN = SLOPE EASE. = TEMP. CONST. RIGHTS = TOTAL AREA = REM. AREA =	USRWTICK 0+00		

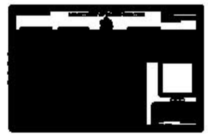
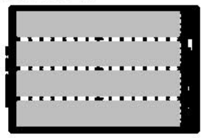
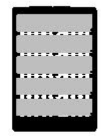
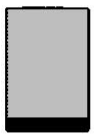
Page 1

Cell Library: usBorder.cel

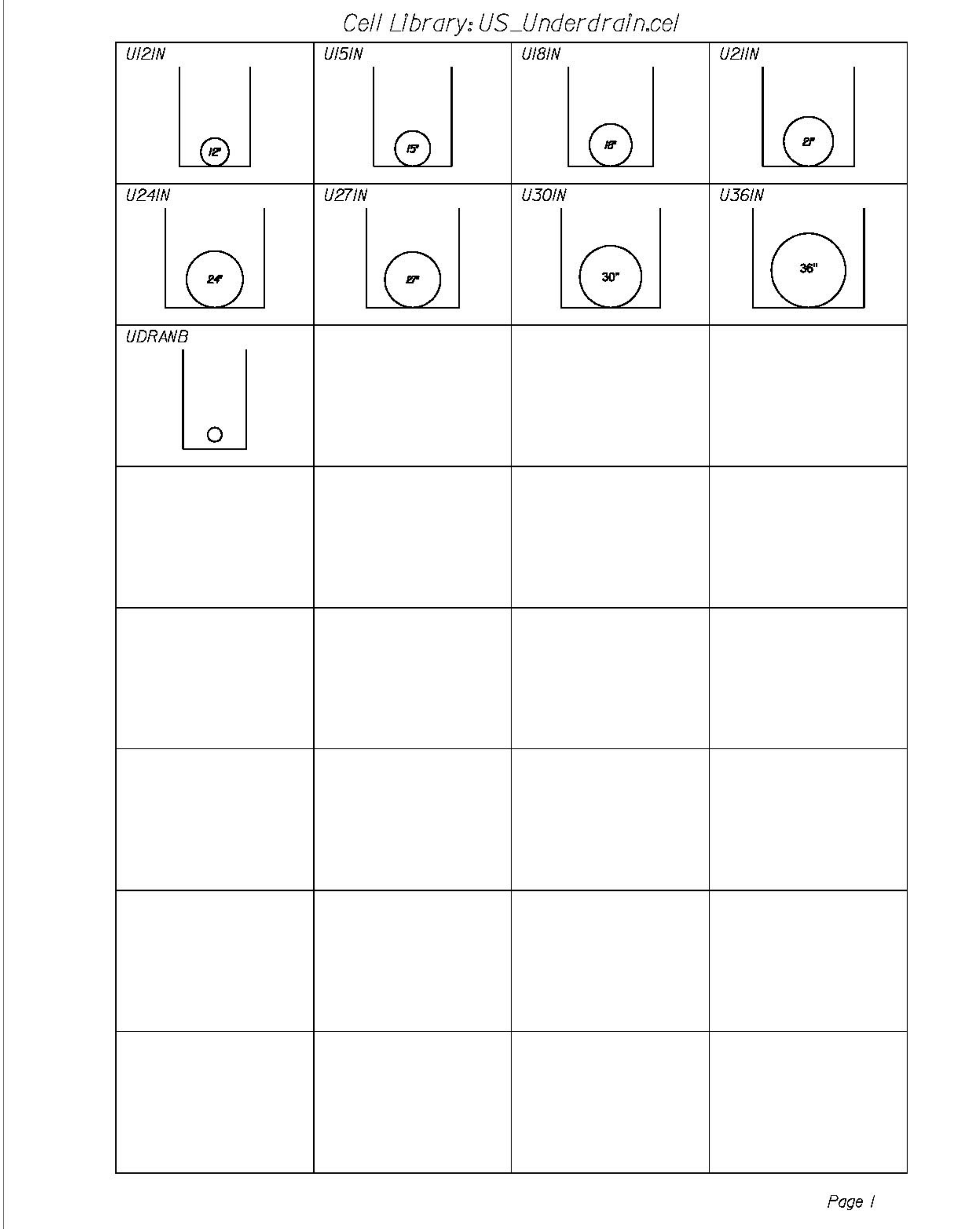


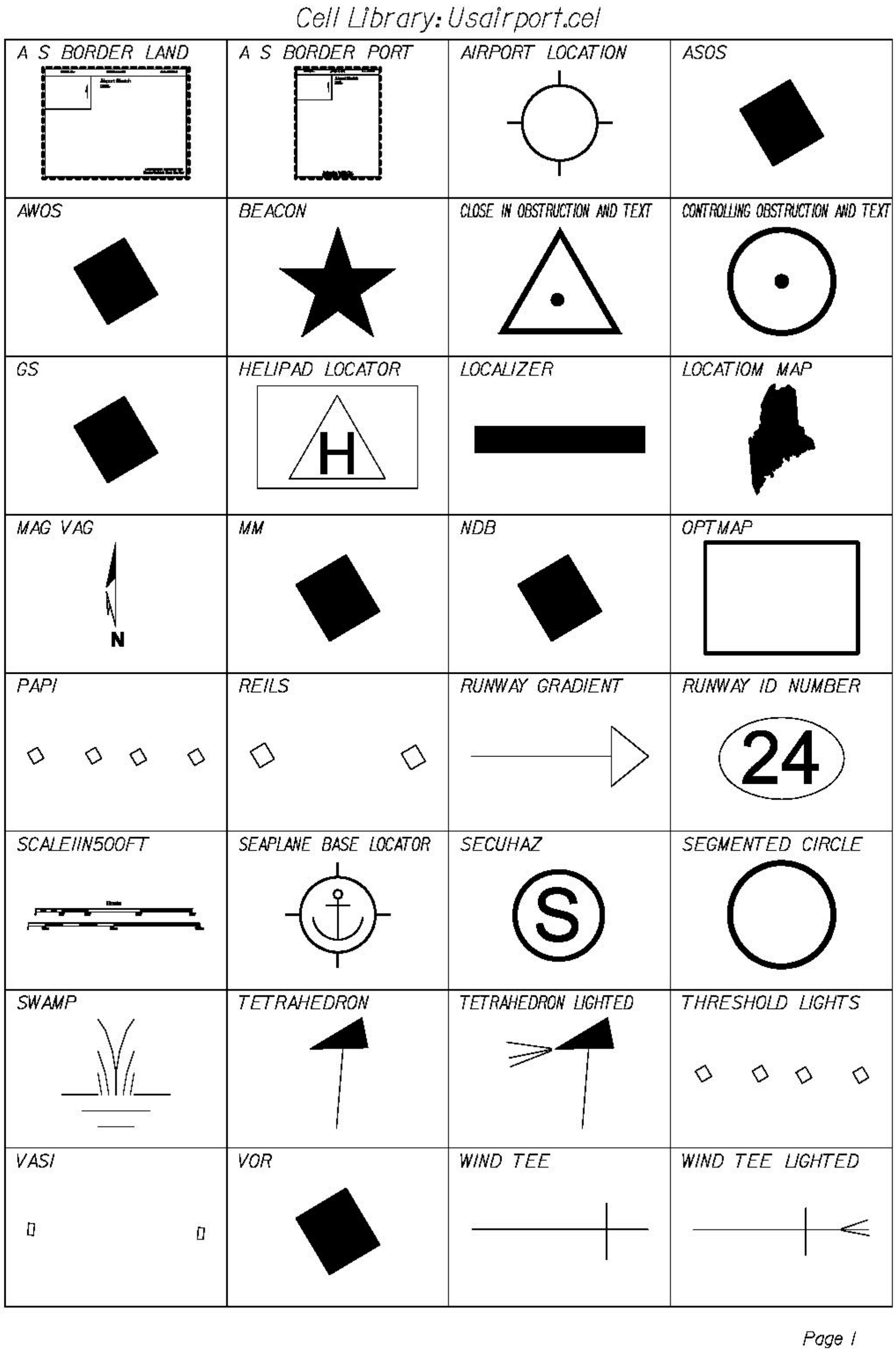
Page 1

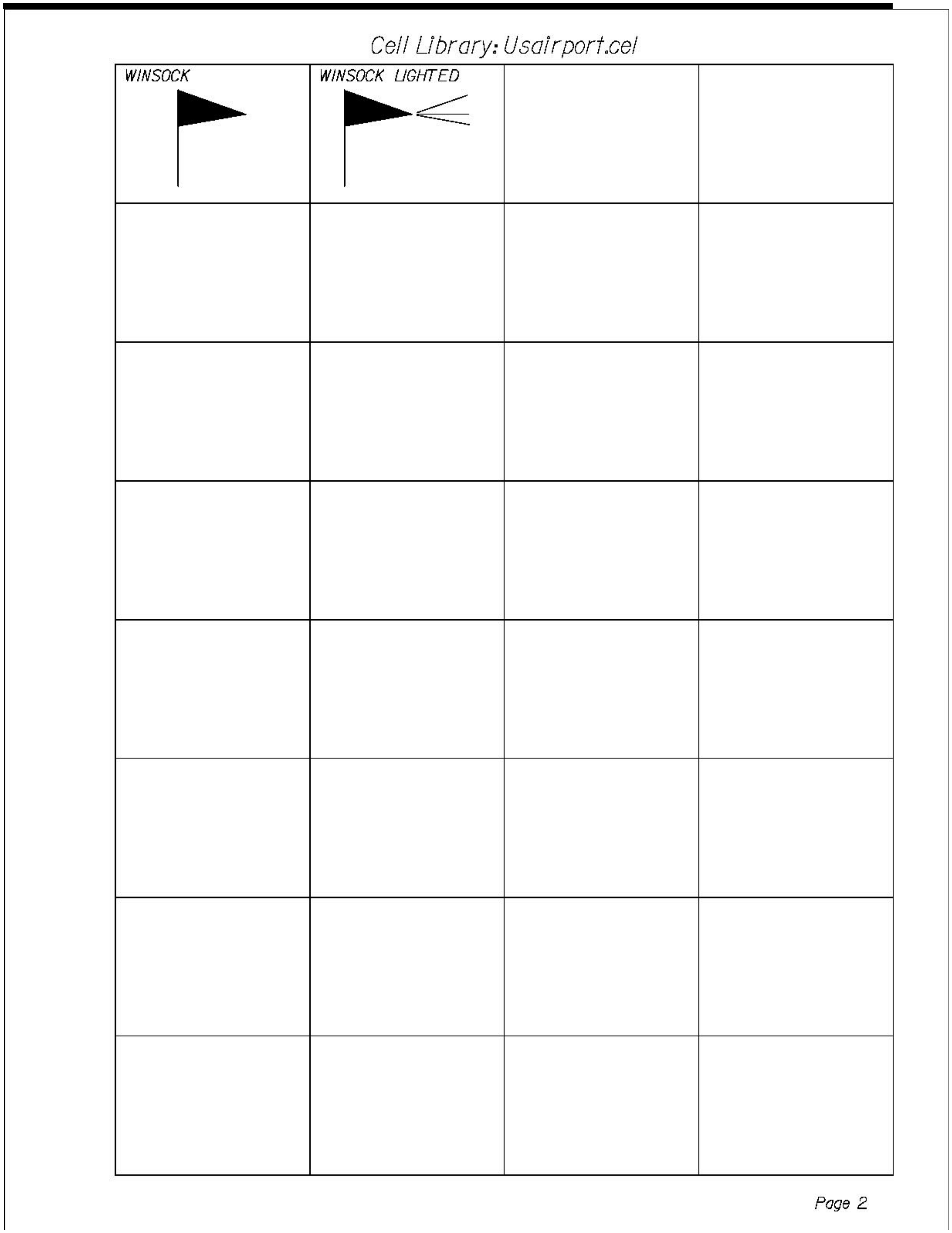
Cell Library: usBorder.cel

USRWCLP2 	USRWCOORD 	USSTDDTL 	USTYPICAL 
USXSECTH 	USXSECTHF 	USXSECTION 	USXSECTV 
USXSECTVF 			

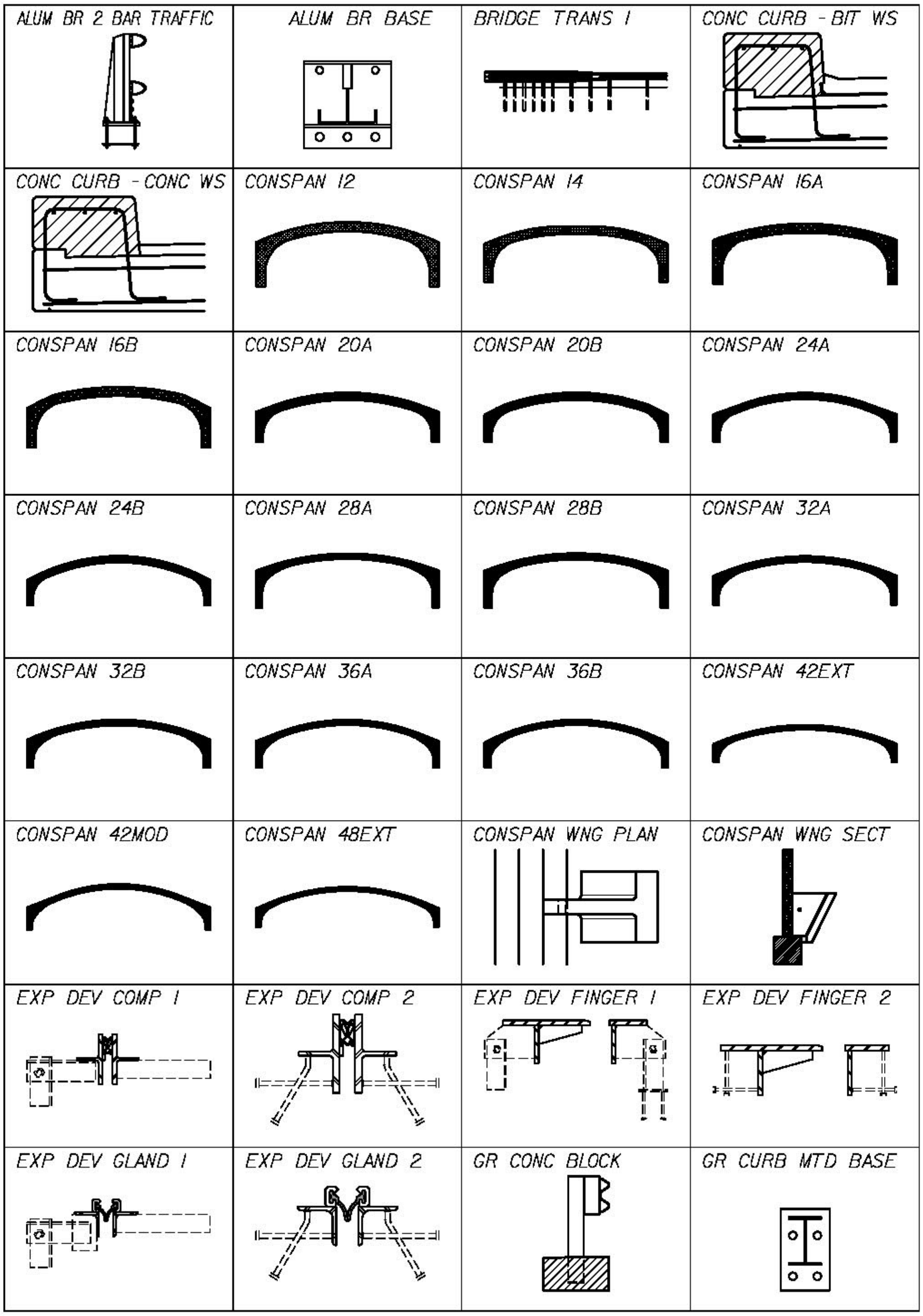
Page 2


Cell Library: US_Underdrain.cel
U12IN
U15IN
U18IN
U21IN
U24IN
U27IN
U30IN
30"
U36IN
36"
UDRANB
Page 1


Cell Library: Usairport.cel
A S BORDER LAND
A S BORDER PORT
AIRPORT LOCATION
ASOS
AWOS
BEACON
CLOSE IN OBSTRUCTION AND TEXT
CONTROLLING OBSTRUCTION AND TEXT
GS
HELIPAD LOCATOR
H
LOCALIZER
LOCATIOM MAP
MAG VAG
N
MM
NDB
OPTMAP
PAPI
REILS
RUNWAY GRADIENT
RUNWAY ID NUMBER
24
SCALEIIN500FT
SEAPLANE BASE LOCATOR
SECUHAZ
S
SEGMENTED CIRCLE
SWAMP
TETRAHEDRON
TETRAHEDRON LIGHTED
THRESHOLD LIGHTS
VASI
VOR
WIND TEE
WIND TEE LIGHTED
Page 1

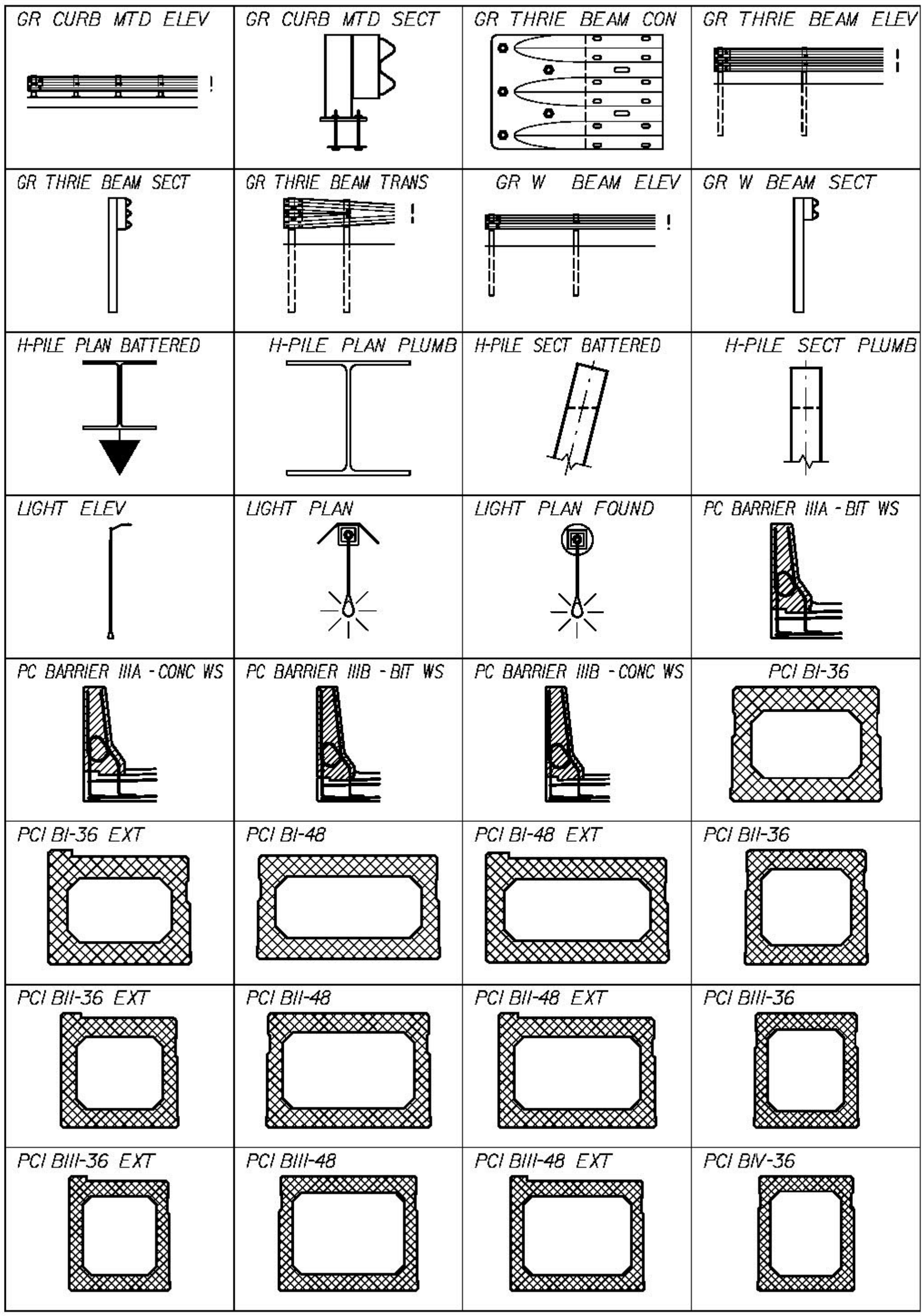

Cell Library: Usairport.cel
WINSOCK
WINSOCK LIGHTED
Page 2

Cell Library: USBRDETLIB.cel

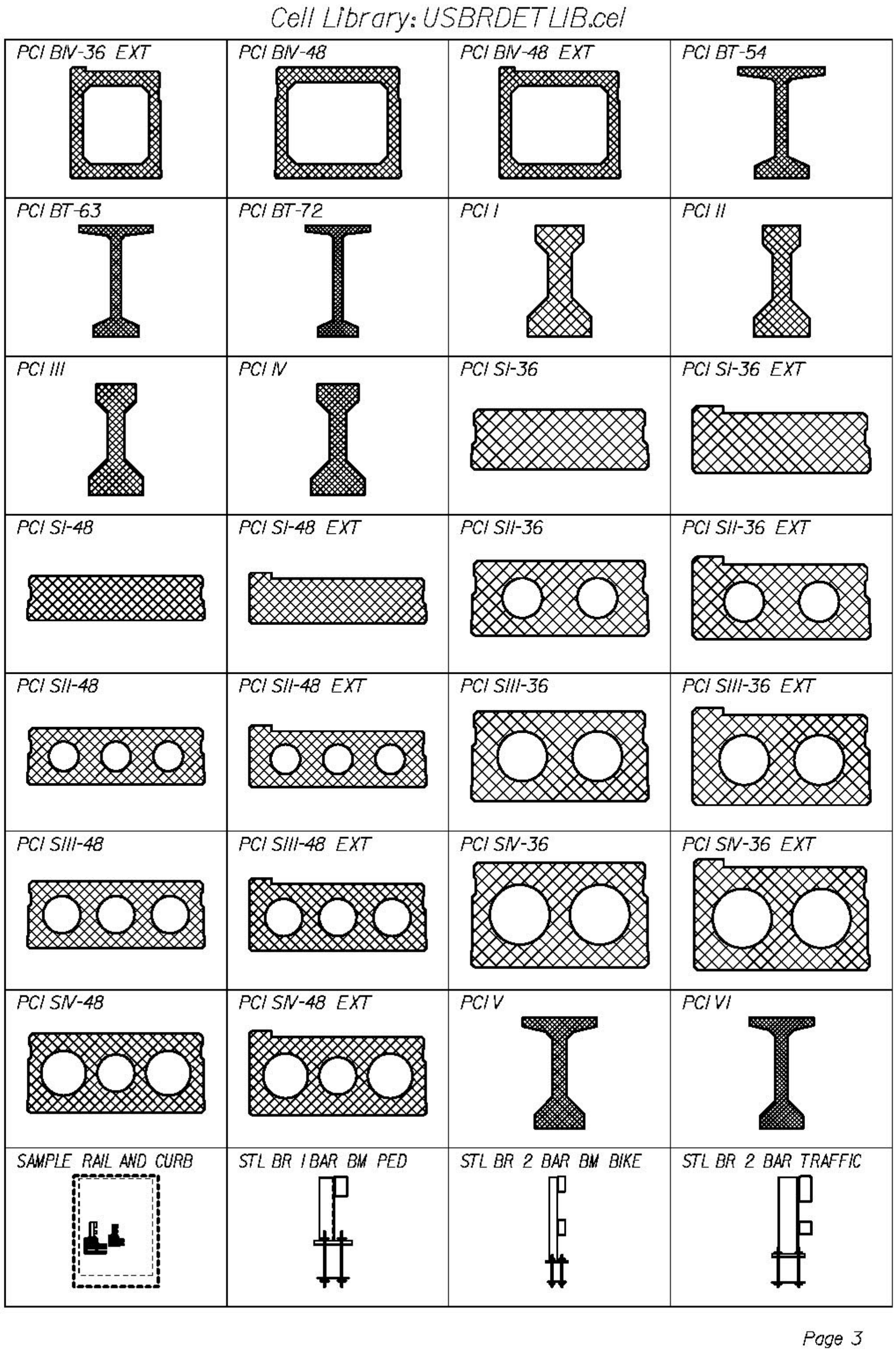


Page 1

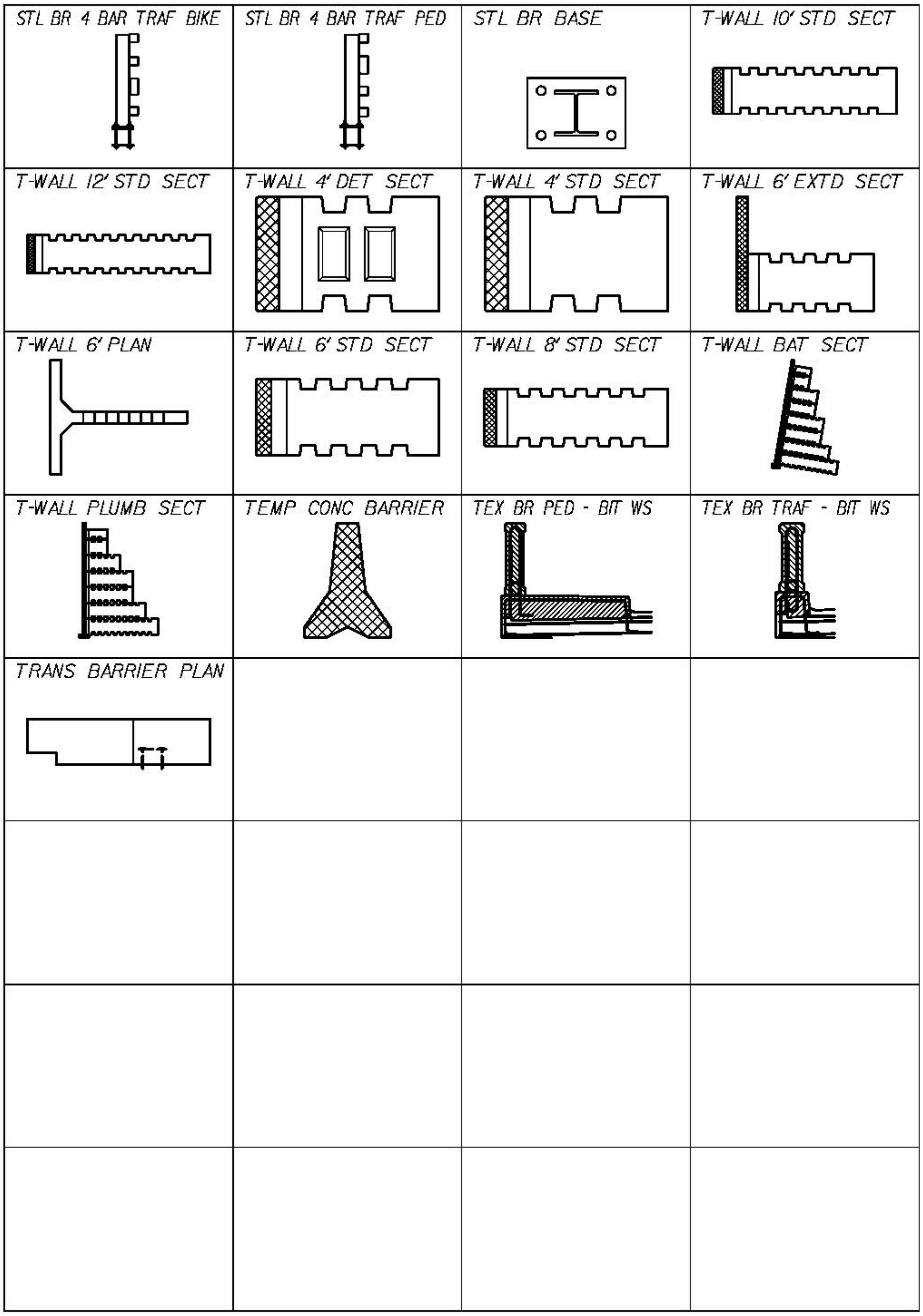
Cell Library: USBRDETLIB.cel



Page 2

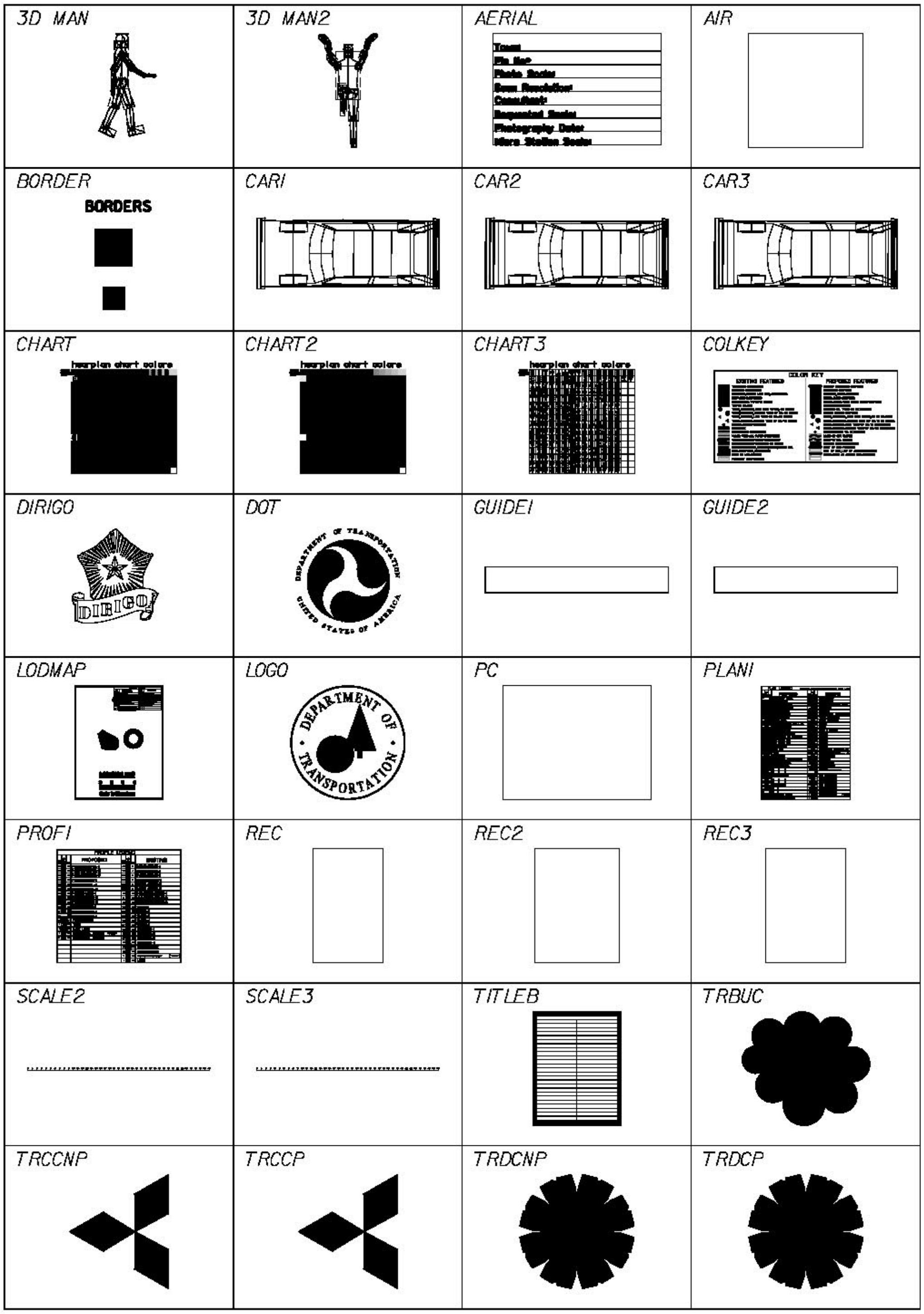

Cell Library: USBRDETLIB.cel
PCI BIV-36 EXT
PCI BIV-48
PCI BIV-48 EXT
PCI BT-54
PCI BT-63
PCI BT-72
PCI I
PCI II
PCI III
PCI IV
PCI SI-36
PCI SI-36 EXT
PCI SI-48
PCI SI-48 EXT
PCI SII-36
PCI SII-36 EXT
PCI SII-48
PCI SII-48 EXT
PCI SIII-36
PCI SIII-36 EXT
PCI SIII-48
PCI SIII-48 EXT
PCI SIV-36
PCI SIV-36 EXT
PCI SIV-48
PCI SIV-48 EXT
PCI V
PCI VI
SAMPLE RAIL AND CURB
STL BR 1 BAR BM PED
STL BR 2 BAR BM BIKE
STL BR 2 BAR TRAFFIC
Page 3

Cell Library: USBRDETLIB.cel

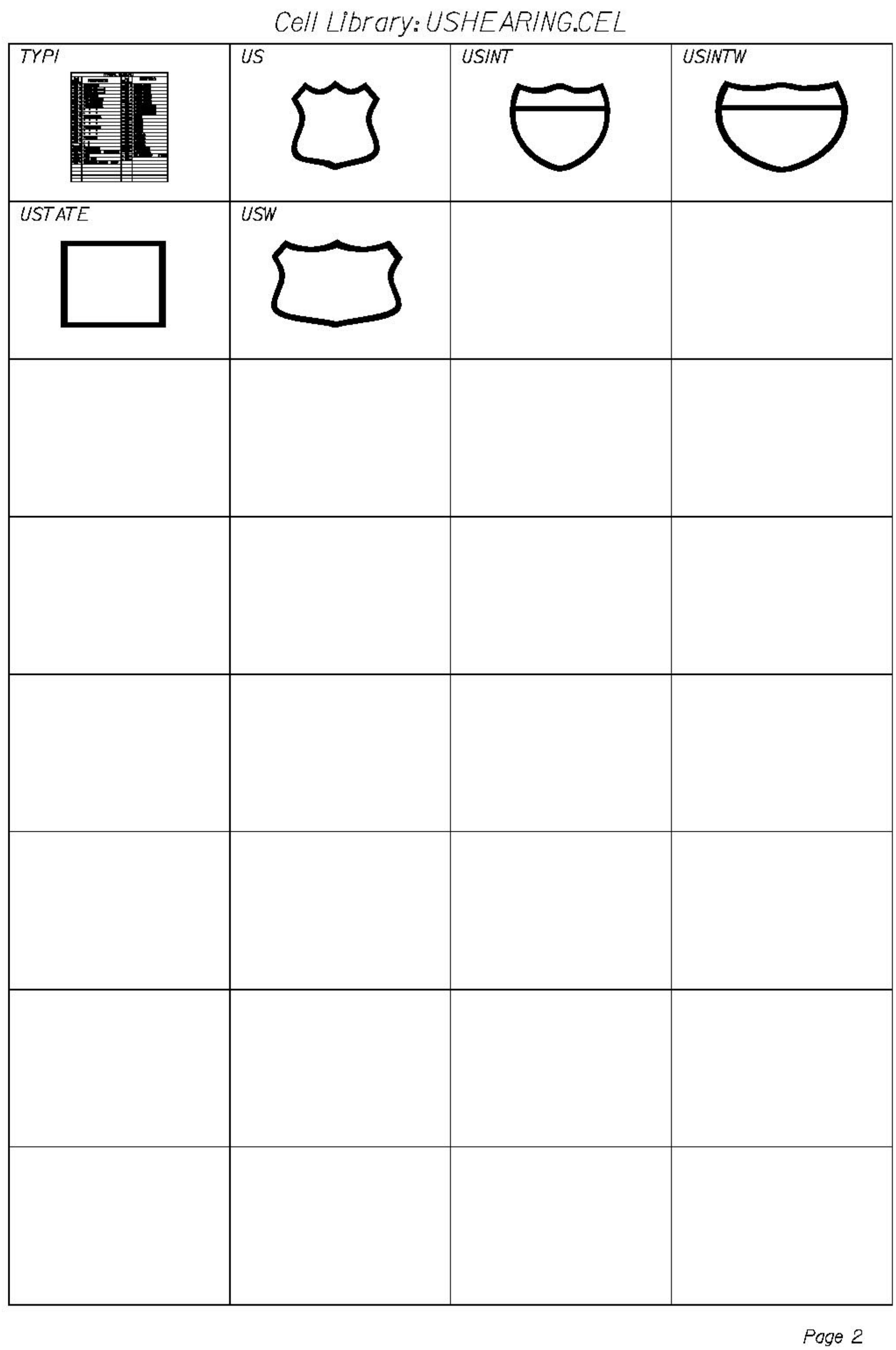


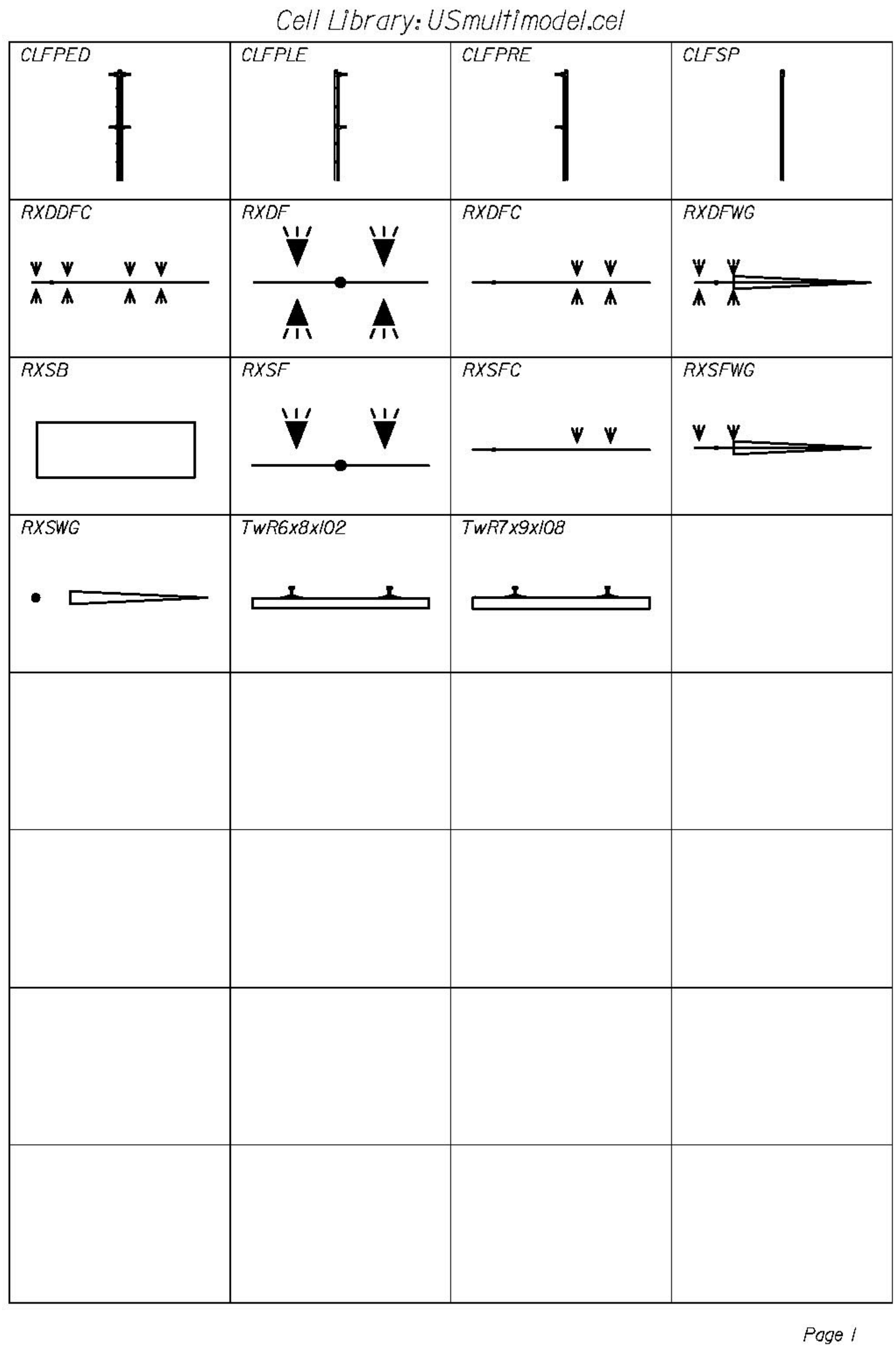
Page 4

Cell Library: USHEARING.CEL



Page 1


Cell Library: USHEARING.CEL
TYPI
US
USINT
USINTW
USTATE
USW
Page 2


Cell Library: USmultimodel.cel
CLFPED
CLFPLE
CLFPRE
CLFSP
RXDDFC
RXDF
RXDFC
RXDFWG
RXSB
RXSF
RXSFC
RXSFWG
RXSWG
TwR6x8x102
TwR7x9x108
Page 1

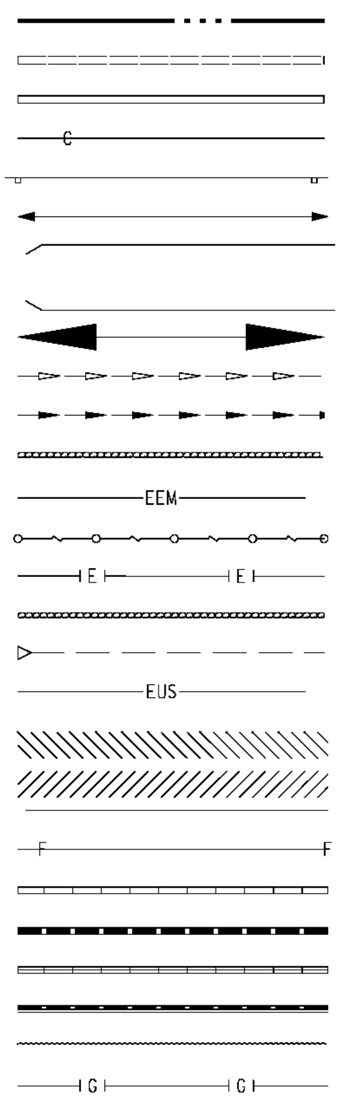
LINE STYLES

MDOT STANDARD U.S. CUSTOMARY LINESTYLES

USARROW	IARROW	IMARROW
USARRWIDE	IARRWIDE	IMARRWIDE
USBCURB	IBCURB	IMBCURB
USBCURBP	IBCURBP	IMBCURBP
USBFENCE	IBFENCE	IMBFENCE
USBLAZED	IBLAZED	IMBLAZED
USBOG	IBOG	IMBOG
USBOX	IBOX	IMBOX
USBOXP	IBOXP	IMBOXP
USBREAKDOUBLE		
USBREAKSINGLE		
USBRWALL	IBRWALL	IMBRWALL
USBUILD	IMBUILD	USBUILD
USBUSH	IBUSH	IMBUSH
USBUSHH	IBUSHH	IMBUSHH
USCATV	ICATV	IMCATV
USCCL	ICCL	IMCCL
USCCURB	ICCURB	IMCCURB
USCCURBP	ICCURBP	IMCCURBP
USCD	ICD	IMCD
USCFENCE	ICFENCE	IMCFENCE
USCITY	ICITY	IMCITY
USCITY2A	ICITY2A	IMCITY2A
USCITY3A	ICITY3A	IMCITY3A
USCOA	ICOA	IMCOA
USCOMBI	ICOMBI	IMCOMBI
USCONSLIM	ICONSLIM	IMCONSLIM
USCOUNTY	IMCOUNTY	IMCOUNTY

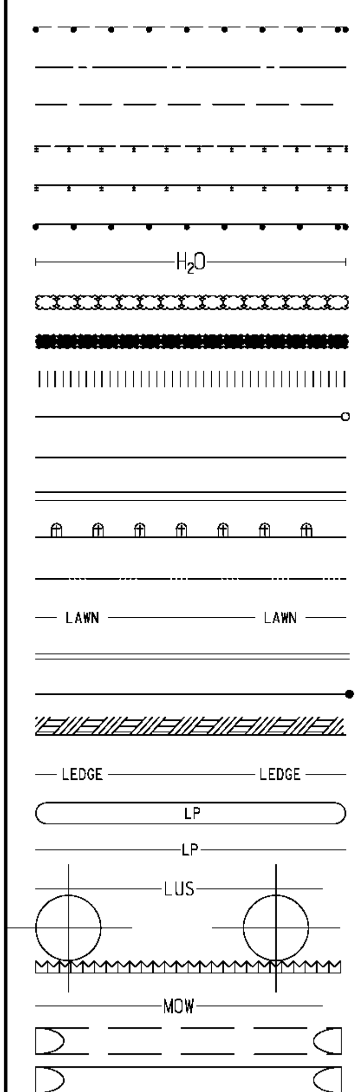
Line samples shown include the labels BLAZED, TV and CLL.

MDOT Linestyles	FILE NAME: US_LINESTYLES, I_LINESTYLES and IM_LINESTYLES	DATE: July 8, 2003	PAGE: 1
	NOTE: US are 1:1, I are 1:300 and IM are 1:600 scale		



USCREEK	ICREEK	IMCREEK
USCULV	ICULV	IMCULV
USCULVP	ICULVP	IMCULVP
USCUT	ICUT	IMCUT
USDBLPOST	IDBLPOST	IMDBLPOST
USDIM	IDIM	IMDIM
USDIMOFFSETLT		
USDIMOFFSETRT		
USDIMWIDE	IDIMWIDE	IMDIMWIDE
USDITCH	IDITCH	IMDITCH
USDITCHP	IDITCHP	IMDITCHP
USDPRIPRAP	IDPRIPRAP	IMDPRIPRAP
USEEM	IEEM	IMEEM
USEFENCE	IEFENCE	IMEFENCE
USELEC	IELEC	IMELEC
USERIPRAP	IERIPRAP	IMERIPRAP
USESLOPE	IESLOPE	IMESLOPE
USEUS	IEUS	IMEUS
USEXCONREM		
USEXCONREM2		
USEXTENSION		
USFILL	IFILL	IMFILL
USG1CURB	IG1CURB	IMG1CURB
USG1CURBP	IG1CURBP	IMG1CURBP
USG5CURB	IG5CURB	IMG5CURB
USG5CURBP	IG5CURBP	IMG5CURBP
USGARDEN	IGARDEN	IMGARDEN
USGAS	IGAS	IMGAS

MDOT Linestyles	FILE NAME: US_LINESTYLES, I_LINESTYLES and IM_LINESTYLES	DATE: July 8, 2003	PAGE: 2
	NOTE: US are 1:1, I are 1:300 and IM are 1:600 scale		



USGR	IGR	IMGR
USGRADLIM	IGRADLIM	IMGRADLIM
USGRAV	IGRAV	IMGRAV
USGRB	IGRB	IMGRB
USGRBP	IGRBP	IMGRBP
USGRP	IGRP	IMGRP
USH20TANK	IH20TANK	IMH20TANK
USHEDGE	IHEDGE	IMHEDGE
USHEDGEH	IHEDGEH	IMHEDGEH
USHILL1	IHILL1	IMHILL1
USHOLLOW	IHOLLOW	IMHOLLOW
USINTRD1	IINTRD1	IMINTRD1
USINTROAD	IINTROAD	IMINTROAD
USIRFENCE	IIRFENCE	IMIRFENCE
USISTREAM	IISTREAM	IMISTREAM
USLAWN	ILAWN	IMLAWN
USLDROAD	ILDROAD	IMLDROAD
USLEADER	ILEADER	IMLEADER
USLEDGE	ILEDGE	IMLEDGE
USLEDGEL	ILEDGEL	IMLEDGEL
USLP	ILP	IMLP
USLPGAS	ILPGAS	IMLPGAS
USLUS	ILUS	IMLUS
USMATCH	IMATCH	IMMATCH
USMMXB	IMMXB	IMMMXB
USMOW	IMOW	IMMOW
USMULTI	IMULTI	IMMULTI
USMULTIP	IMULTIP	IMMULTIP

MDOT Linestyles	FILE NAME: US_LINESTYLES, I_LINESTYLES and IM_LINESTYLES	DATE: July 8, 2003	PAGE 3
	NOTE: US are 1:1, I are 1:300 and IM are 1:600 scale		

USNATION	INATION	IMNATION
USNATPARK	INATPARK	IMNATPARK
USOTH	IOTH	IMOTH
USPARKL	IPARKL	IMPARKL
USPARKS	IPARKS	IMPARKS
USPAVE	IPAVE	IMPAVE
USPEM	IPEM	IMPEM
USPETRO	IPETRO	IMPETRO
USPETTANK	IPETTANK	IMPETTANK
USPFO	IPFO	IMPFO
USPGFENCE	IPGFENCE	IMPGFENCE
USPICFENC	IPICFENC	IMPICFENC
USPOWER1	IPOWER1	IMPOWER1
USPRFENCE	IPRFENCE	IMPRFENCE
USPRIPRAR	IPRIPRAR	IMPRIPRAR
USPIROAD	IPIROAD	IMPIROAD
USPROPERT	IPROPERT	IMPROPERT
USPSS	IPSS	IMPSS
USRIPRAP	IRIPRAP	IMRIPRAP
USRAILROAD	IRAILROAD	IRAILROAD
USREBARDIM		
USREBAREXT		
USRETWALL	IRETWALL	IMRETWALL
USRETWALLP	IRETWALLP	IMRETWALLP
USROCK		
USROCKCUT		
USRR	IRR	IMRR
USRR2	IRR2	IMRR2

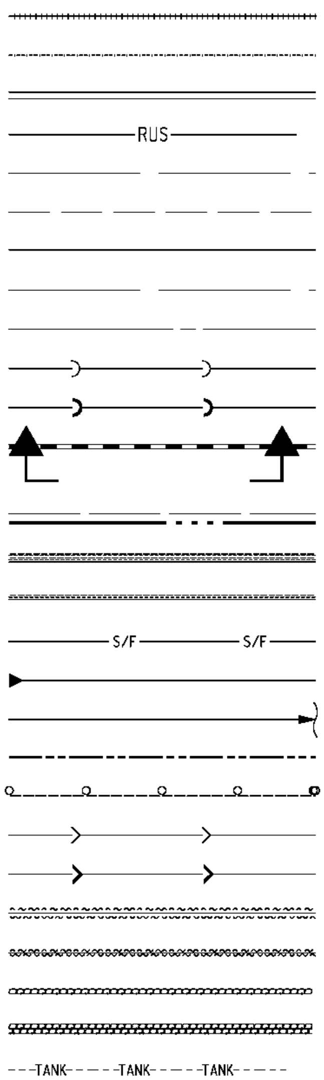
MDOT
Linestyles

FILE NAME: US_LINESTYLES, I_LINESTYLES and IM_LINESTYLES

DATE: July 8, 2003

PAGE: 4

NOTE: US are 1:1, I are 1:300 and IM are 1:600 scale



USRRABD	IRRABD	IMRRABD
USRRGRADE	IRRGRADE	IMRRGRADE
USRUN	IRUN	IMRUN
USRUS	IRUS	IMRUS
USRW	IRW	IMRW
USRWEP	IRWEP	IMRWEP
USRWP	IRWP	IMRWP
USRWPE	IRWPE	IMRWPE
USRWRR	IRWRR	IMRWRR
USSANI	ISANI	IMSANI
USSANIP	ISANIP	IMSANIP
USSECROAD	ISECROAD	IMSECROAD
USSECTION		
USSHORE	ISHORE	IMSHORE
USSHORE1	ISHORE1	IMSHORE1
USSHORE2	ISHORE2	IMSHORE2
USSILTF	ISILTF	IMSILTF
USSLOPE	ISLOPE	IMSLOPE
USSQUIGARROW		
USSTATE	ISTATE	IMSTATE
USSTFENCE	ISTFENCE	IMSTFENCE
USSTORM	ISTORM	IMSTORM
USSTORMP	ISTORMP	IMSTORMP
USSTREAM1	ISTREAM1	IMSTREAM1
USSTREAM2	ISTREAM2	IMSTREAM2
USSTWALL	ISTWALL	IMSTWALL
USSTWALLM	ISTWALLM	IMSTWALLM
USTANK	ITANK	IMTANK

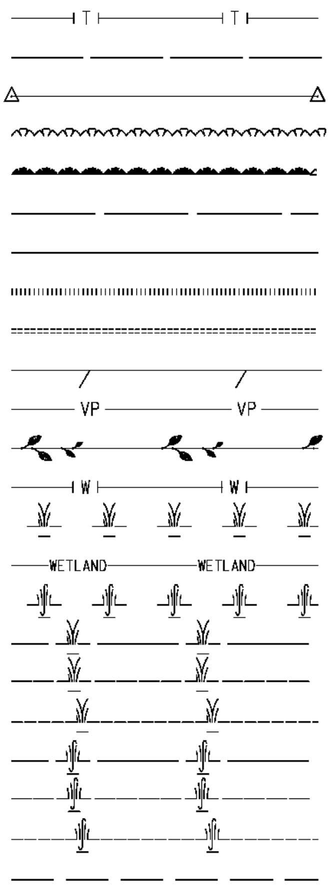
MDOT
Linestyles

FILE NAME: US_LINESTYLES, I_LINESTYLES and IM_LINESTYLES

DATE: July 8, 2003

PAGE: 5

NOTE: US are 1:1, I are 1:300 and IM are 1:600 scale



USTELE	ITELE	IMTELE
USTOWN	ITOWN	IMTOWN
USTRAV	ITRAV	IMTRAV
USTREE	ITREE	IMTREE
USTREEH	ITREEH	IMTREEH
USTW	ITW	IMTW
USWTROAD	IWTROAD	IMWTROAD
USUNINVRD	IUNINVRD	IMUNINVRD
USUNROAD	IUNROAD	IMUNROAD
USURBAN	IURBAN	IMURBAN
USVERNALPL	IVERNALPL	IMVERNALPL
USVINE	IVINE	IMVINE
USWATER	IWATER	IMWATER
USWETF	IWETF	IMWETF
USWETLAND	IWETLAND	IMWETLAND
USWETS	IWETS	IMWETS
USWLANDF1	IWLANDF1	IMWLANDF1
USWLANDF2	IWLANDF2	IMWLANDF2
USWLANDF3	IWLANDF3	IMWLANDF3
USWLANDS1	IWLANDS1	IMWLANDS1
USWLANDS2	IWLANDS2	IMWLANDS2
USWLANDS3	IWLANDS3	IMWLANDS3
USWP	IWP	IMWP

MDOT Linestyles	FILE NAME: US_LINESTYLES, I_LINESTYLES and IM_LINESTYLES	DATE: July 8, 2003	PAGE
	NOTE: US are 1:1, I are 1:300 and IM are 1:600 scale		6

STRUCTURAL LINESTYLES

Samples

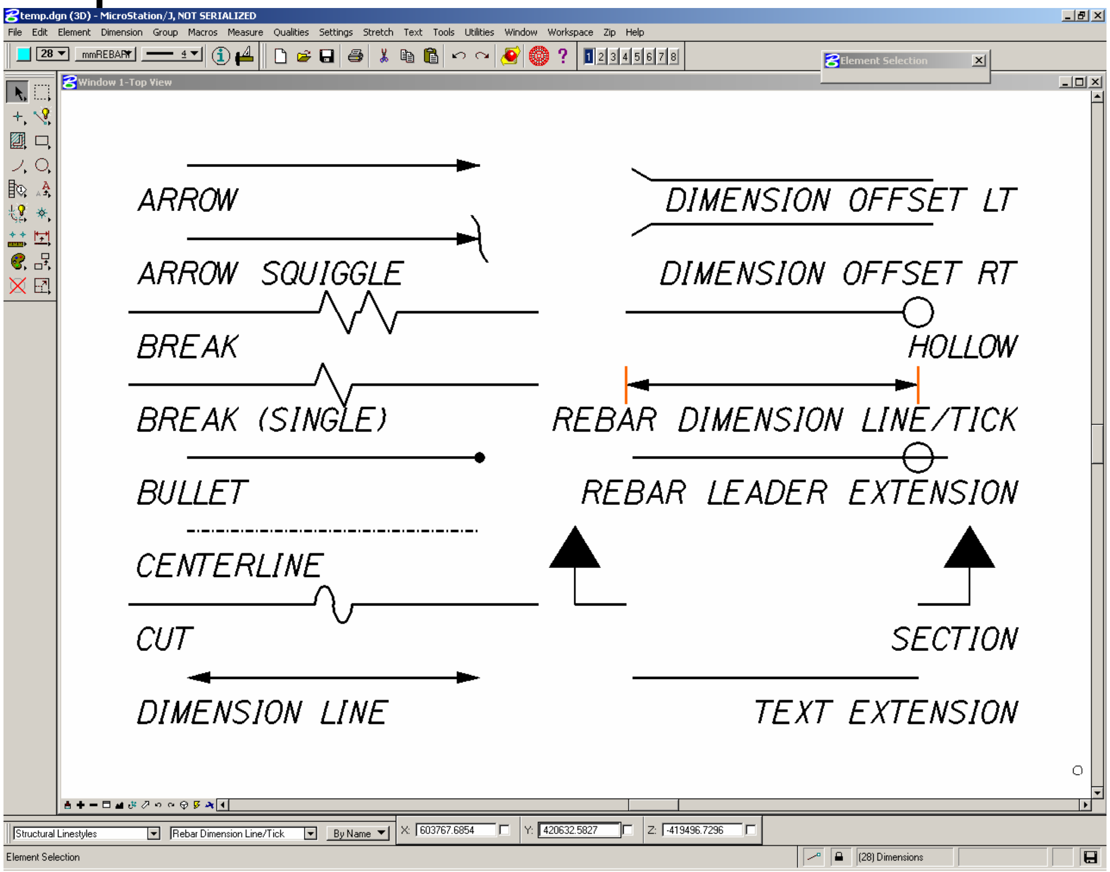


Figure 31-5: Structural Linestyles

Using Custom Linestyles

Linestyles are activated from the **Settings Manager**, **Structural Linestyles** group (Figure 31-6).

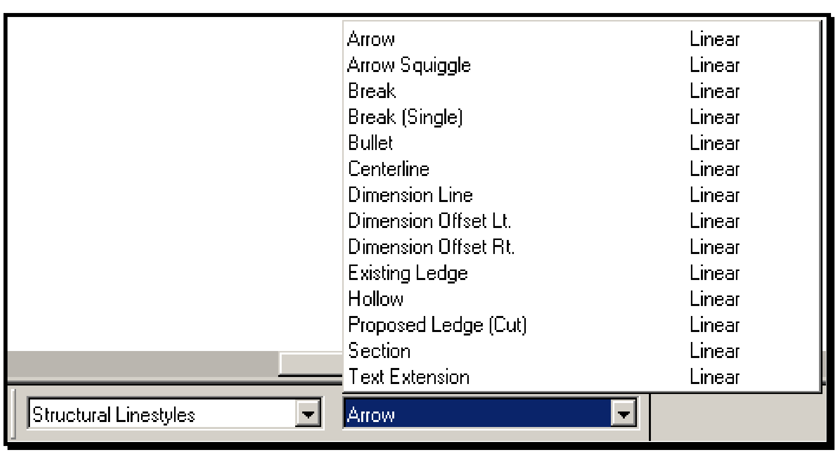


Figure 31-6: Structural Linestyle Options

Line styles are scale-dependent. Make sure you select the appropriate scale from the **Settings Manager** (by right-clicking and choosing **Category > Scale** from the **Settings Manger**) before you make a line style selection.

Tweaking Line style Size

Sometimes your lines are going to show up either bigger or smaller than you'd like them to be. The Break and Cut line styles are most likely going to be the culprits here -- you may want to squeeze a break line into a small area.

Go through the routine outlined above as a starting point. If the Break line is too big for example, select **Element>Line Style>Custom** from the *Main Menu.*

This will open up the **Line Styles** dialog (Figure 31-7).

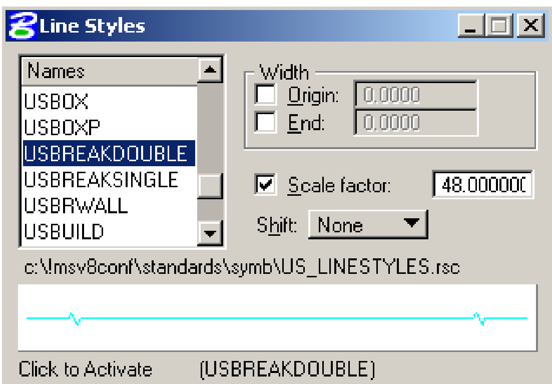


Figure 31-7: Line Styles Dialog

Note that there is an on/off switch labeled **Scale Factor:** followed by a text field. This is the scale, as determined by the **Settings Manager**, to place your line style.

♬ If you want your line style, to be smaller, edit the number in the **Scale Factor** text field. If it is currently 48, changing it to 24 will make it smaller (half as big) and changing it to 96 will make it bigger (twice as big.)

LEVELS

There are too many levels to display here. Please refer to our CADD Support webpage http://www.maine.gov/mdot/cadd-support/cadd-home.php for a complete listing.

Chapter 32 Consultant CADD Coordination

CONSULTANT CADD COORDINATION

DETERMINE THE CONSULTANTS DUTIES (PROJECT BY PROJECT BASIS)

What is their responsibility?

Consultant Doing Survey

Aerial Photogrammetric Mapping - Consultants will coordinate through Brian Casey. They submit their information back to Brian and no information is necessary from the Consultant Coordinator.

Traditional Surveying - Consultants will coordinate through the Area Survey supervisors to get specifications. They submit their information back to the Area Survey supervisors and no coordination is necessary.

Consultant Doing ROW

Existing ROW - Consultants will coordinate through the Real Estate Manager in the Programs. They will require CADD drawings of existing topography and text.

Proposed ROW - Consultants will coordinate through the Real Estate Manager in the Programs. If they are doing the proposed ROW, chances are they are doing existing also. They will require CADD drawings of existing topography, text, existing ROW (if necessary), alignment, design (highway.dgn or bridge.dgn) and cross sections.

Consultant Doing Design

Bridge Projects - Consultants will coordinate through the Consultant Coordinators in the Program. They will require CADD drawings (both 2D and 3D) of existing topography, text, contours, points, triangles and existing ROW. The agreement may or may not require the consultants to “clean-up” topo and text drawings. For all new projects, consultants will follow the current General Contract Agreement.

Highway Projects - Consultants will coordinate through the Consultant Coordinators in the Program. They will require CADD drawings (both 2D and 3D) of existing topography, text, contours, points, triangles and existing ROW. The agreement may or may not require the consultants to “clean-up” topo and text drawings. For all new projects, consultants will follow the current General Contract Agreement.

Multimodal Projects – Similar to the Highway and Bridge projects.

Traffic Projects - Similar to the Highway and Bridge projects.

What do they need from us?

Link to Web page

All of our CADD customization is available online for consultants to download. This includes seed files, linestyle resource files, cell libraries and font resources. The web address is as follows: www.maine.gov/mdot/cadd-support/cadd-home.php . We highly encourage them to use our customization. For more information, have them call ESSG's CADD support personnel.

Seed Files

We have quite a few seed files in our configuration. Instruct consultants to use our standard seed file called "usMDOT_SEED.dgn" for all U.S. Customary projects (MDOT_SEED for metric projects). These can be found on the CADD download page at the following address: www.maine.gov/mdot/cadd-support/microstation/downloads.php .

Our Standard file Structure/File Names

Consultants should follow our standard naming convention which is laid out on our webpage. The address is www.maine.gov/mdot/cadd-support/microstation/std_filename.php .

SENDING SURVEY FILES TO A CONSULTANT

MAINEDOT Survey Data

Most of the consultants will require our survey data with the exception of Survey Consultants. When a Survey Editor is done editing the survey data and creating MicroStation design files, they zip all the pertinent files into a single Zip file and place them in a consultant folder under the survey folder on the y:drive (i.e. y:\pin\8467\00\Survey\consultant\). The zip file will be named PINTOWN.zip (Figure 32-1). See breakdown below for explanation of the files included in the zip.

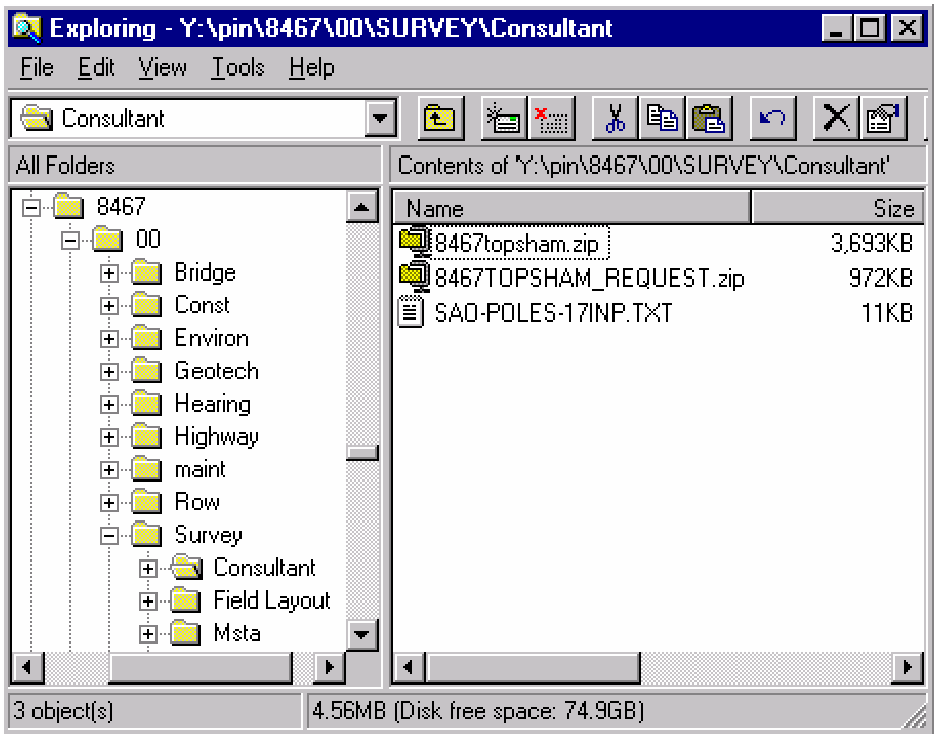


Figure 32-1: Example of zipped Survey Files ready to be sent to a consultant

Breakdown of files sent to a consultant

InRoads Files:

Ground.dtm – Complete ground surface with all updates.

Ground.fwd – Combined InRoads *Fieldbook* containing all original and updated data.

MicroStation files:

Topo.dgn is the features collected from Survey (cleaned-up). This file, if cleaned-up, is located in the **topo** folder of the PIN number.

Text.dgn is the text associated with Survey data (cleaned-up). This file, if cleaned-up, is located in the **topo** folder of the PIN number.

Points.dgn is the field Survey point numbers. This file resides in the Survey\MSTA folder.

Wetlands.dgn is the name of the cleaned up version of the wetlands drawing. It is located in the topo folder. If the file has not been cleaned up, the file will reside in the Survey/MSTA folder and is called **OrigWetlands.dgn.**

Contours.dgn is the 3D contours drawing. This would also include Aerial Mapping Contours. The file resides in the Survey\MSTA folder.

3DtopoMMDDYY.dgn is the 3D MicroStation design file (.dgn) of the Survey. This file resides in the Survey\MSTA folder. Select the file with the most recent date in the file name. It will include any additional topography if any was taken.

3DMappingMMDDYY.dgn is the 3D MicroStation design file of the Aerial Mapping (only on Photogrammetric Mapping projects). This file resides in the Survey\MSTA folder. Select the file with the most recent date in the file name. It will include any additional topography if any was taken.

Origtext.dgn is the 3D MicroStation design file of the text associated with ground survey data and Aerial Mapping. This file resides in the Survey\MSTA folder.

♬ If any additional topography was taken prior to distribution to a consultant, there may be **Origtextadd#.dgn.** Include these files also.

Triangles.dgn is the 3D triangulation file for the project. This would also include Aerial Mapping Triangles. This file resides in the Survey\MSTA folder.

ⓘ ***When a design consultant requests survey information for a project, the 3DtopoMMDDYY with the most recent date is the one file containing all the latest 3D topographical data. It will not be necessary to send any of the Origtopoadd#.dgn files.***

Step One: Posting files to Outgoing FTP site

Click your **Start** button and go to **Programs>WS_FTP LE>WS_FTP LE** or double click the icon (Figure 32-2) on your desktop.

Figure 32-2: FTP Icon

When the program opens you should see a **Session Properties** dialog. Press **OK** (Figure 32-3) to log into the FTP site.

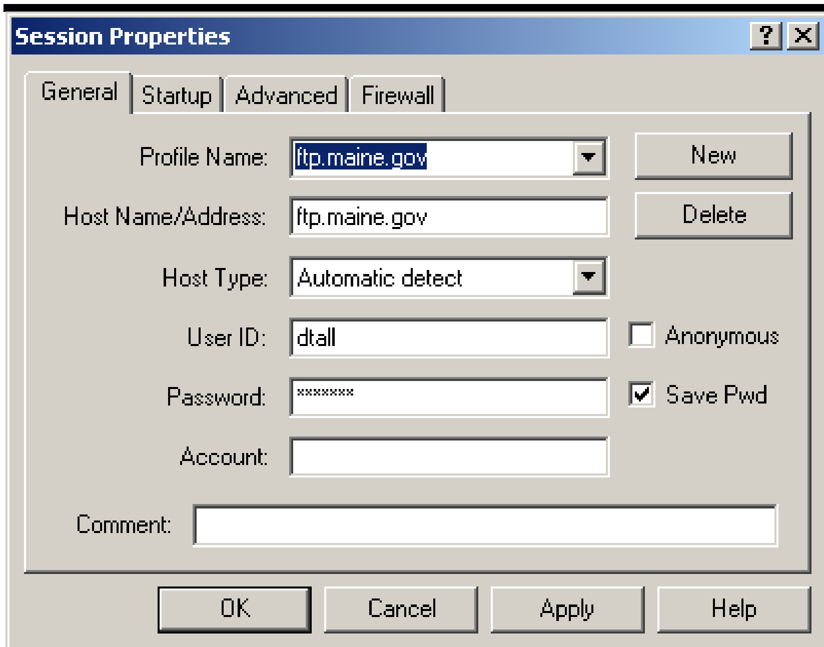


Figure 32-3: Session Properties

Step Two: Browse and Push Files to FTP

On the right side (**Remote Site)**, you should see the folder list, (incoming, outgoing, etc.) and on the left **(Local System)**, see a list of available drives. These are the drives you currently have mapped to your computer.

We have a folder for all **outgoing** files and a folder for all **incoming** files. Open the appropriate folder for the action you are taking.

In the **Local System** window, browse to the y:drive and folder where the file exists that requires transferring (i.e. y:\pin\8467\00\survey\consultant\). When the contents of the folder are displayed in the left section of the dialog area, highlight the desired file and click on the directional arrow (Figure 32-4) between the two view areas.

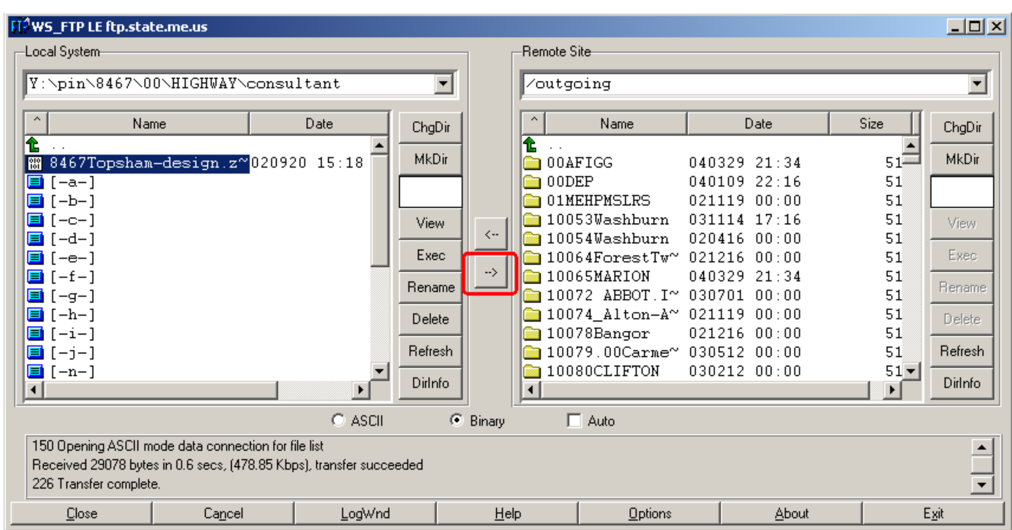


Figure 32-4: WS_FTP LE ftp.maine.gov

Step Three: Send Email with Link to File

Introduction

We can send a hyperlink in an email document that points directly to the file you posted, starting the download on their end automatically.

Or, we can also notify clients when a file is posted and provide them with the HOST (ftp.maine.gov) with the user (anonymous) and the password (anonymous). Then, by using a normal Internet browser or some type of FTP software, they can connect to our site and find the file and download it manually.

Part One: Type address to FTP in email

Type the complete address path and file name, within the body of an email message area and the recipient can click the link and start downloading to a specified location on their computer.

Here is an example: ftp.maine.gov/outgoing/8467topsham.zip.

ⓘ ***Always test the link by sending this to a coworker or to yourself. It doesn't always work in the draft email that you are preparing.***

♬ Use forward slashes between folders and never use spaces in the file names. Use lowercase for the ftp address and outgoing folder. Match the case of the file name you created.

Part Two: Add Subject Line and Send

Add the filename in the Subject line of your email. Provide a brief description of files attached. Click **Send.**

SENDING OTHER FILES TO A CONSULTANT

Step One: Create Consultant "Out" Folder

Open **Windows Explorer** and browse to your *Workgroup's* folder (i.e. Y:\pin\8467\00\HIGHWAY). **Right Click** and select **New>Folder.** Name this folder **Consultant.** Open this folder and **Right Click** and select **New>Folder.** Name this folder **OUT.** Open this folder. An example is shown in Figure 32-5.

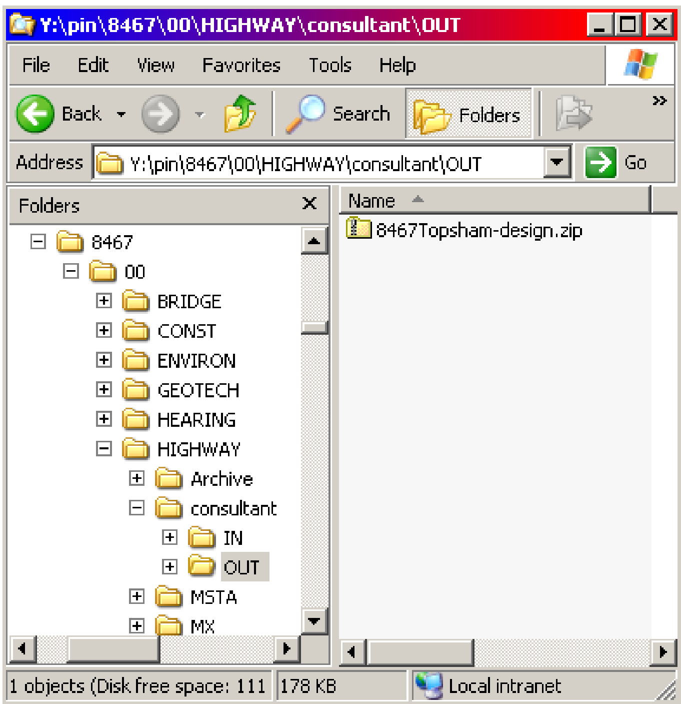


Figure 32-5: An example of a consultant folder structure

Step Two: Create a Zip file

Creating a Zip file is as easy as Right clicking and selecting **New>Compressed (zipped) Folder** in the folder where you want the zip file to exist (i.e. Y:\pin\8467\00\HIGHWAY\consultant\OUT). This will create a Compressed (zipped) file called "New Compressed (zipped) Folder.zip. Select the file and pick **File>Rename.** Supply a new name by typing the name and hitting enter. Be sure to add the ".zip" extension to the file name.

ⓘ ***Use good judgment when naming files. Rather than dumping random files without unique names to the FTP site, always use naming that will make it easy to identify your files from someone else's (i.e. 8467topsham.zip or 8467rwplan.zip).***

Select one or more files in Windows Explorer and drag and drop them onto the Zip file, or double click the zip file to open it, then drag and drop files from Windows Explorer into the Zip folder.

Step Three: Post to Outgoing FTP site

General Rules of Thumb!

1) Send a zip (compressed) file when sending more than one file, or files large in size.

2) Use good judgment when naming zip files. Do not dump random files (i.e. topo.dgn, Rwplan.dgn, text.dgn, highway.dgn, etc.) to the FTP site, always try and use unique naming that will make it easy to identify your zip file's from someone else's. (i.e. 8467topsham.zip)

3) Do not create a folder.

4) Clean up you own mess! BIS does house cleaning only when the server is too full to function. By then it's a crisis. Delete incoming files after you have downloaded them.

Open FTP Site

Follow steps previously documented in the **Sending Survey Files to a Consultant** section.

RECEIVING PROJECT FILES FROM A CONSULTANT

File Format

Older project that were started before the current GCA are grand fathered and we will accept .dwg or .dxf files. MicroStation can open/attach these files in their native format. If the consultant uses AutoCAD, request that they send MODEL SPACE drawings in our State Plane Coordinate System.

Newer contracts that are governed by the current GCA require that consultants send .dgn (MicroStation) files.

Drawings to Receive

The Department separates drawings by discipline and use referencing to combine all drawings necessary to produce a plan set. As previously stated in this document, consultant duties vary from project to project. Consultants doing ROW work should send back only the existing and/or proposed ROW files. If a consultant is doing proposed design for a project, they should be sending back an **alignments.dgn** and a **highway.dgn** or **bridge.dgn**. As the project nears completion, they should send all files relative to the project. They may or may not use our naming convention. We encourage them to follow our standard naming convention which is laid out on our website (www.maine.gov/mdot/cadd-support/microstation/std_filename.php). If they do not, it may be necessary that they include a text document that describes their filenames. It's up to you to rename these files if necessary and place them where they belong in the project directory.

What don't we want back?

Because we usually supply the consultant with Survey data, we do not want it back unless they have made significant changes to the topo and text files due to field review or inspection. If the consultant is required to clean up the topography, we would want the cleaned up version back from them and placed on our network. If they have added topography, have them send only the things that they have added. These items can be merged into our topo.dgn. Someone in-house may have cleaned up our copy of the topo.dgn so we may not want to replace it.

Step One: Create a Consultant Directory

Now we need to create a folder in the projects PIN structure for the consultants ".zip" file. This will be a record of what was received from them and the date of submittal.

Open **Windows Explorer** and browse to your *Workgroup's* folder (i.e. Y:\pin\8467\00\HIGHWAY). **Right Click** and select **New>Folder.** Name this folder **Consultant.** Open this folder and **Right Click** and select **New>Folder.** Name this folder **IN.** Open this folder. An example is shown in Figure 32-6.

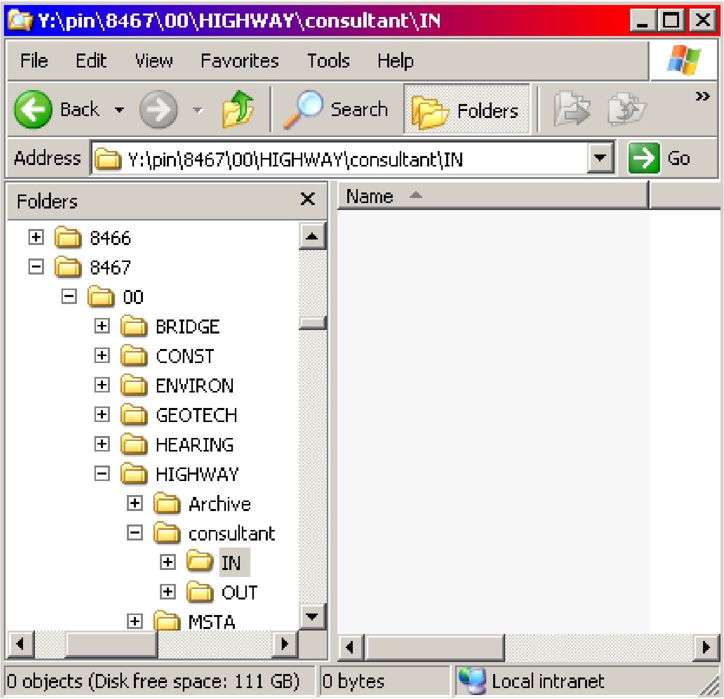


Figure 32-6: Consultant/IN folder in your Workgroup's folder

Step Two: Download Files From Incoming FTP Site

Part One: Open FTP software

Click your **Start** button and go to **Programs>WS_FTP LE>WS_FTP LE** or double click the icon (Figure 32-7) on your desktop.

Figure 32-7: FTP Icon

When the program opens you should see a **Session Properties** dialog. Press **OK** (Figure 32-8) to log into the FTP site.

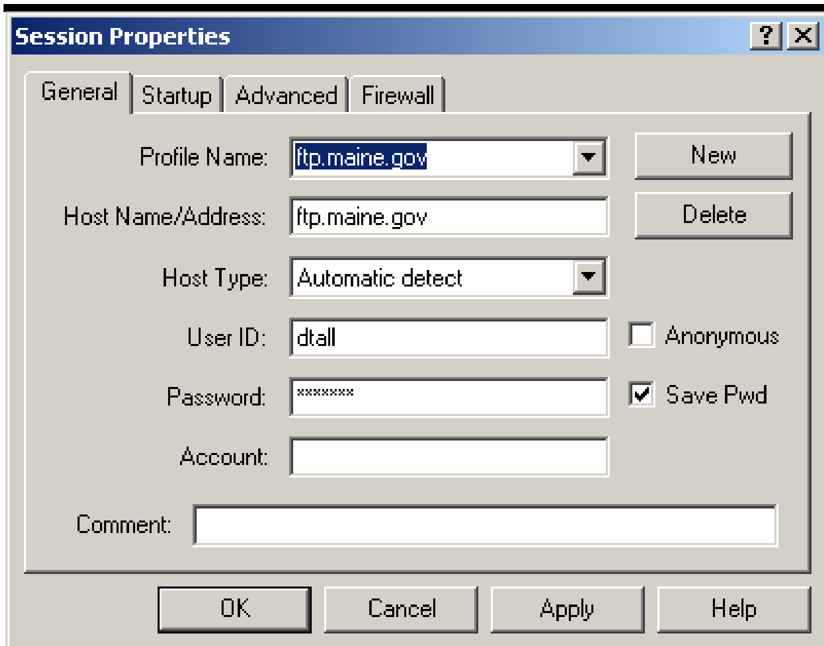


Figure 32-8: Session Properties

Part Two: Browse and Pull Files From FTP Site

In the **Local System** window, browse to the y:drive and to the folder you just created (i.e. y:\pin\8467\00\Highway\consultant\IN).

On the right side (**Remote Site)**, you should see the folder list, (incoming, outgoing, etc.). Open the **incoming** folder.

Locate the file that the consultant posted for you in the incoming folder and click on the directional arrow (Figure 32-9) between the two view areas. You should start to see the progress of the download. If you feel confident that the file was copied to the **Consultant\IN** folder, delete the file from the incoming folder. Close the FTP session.

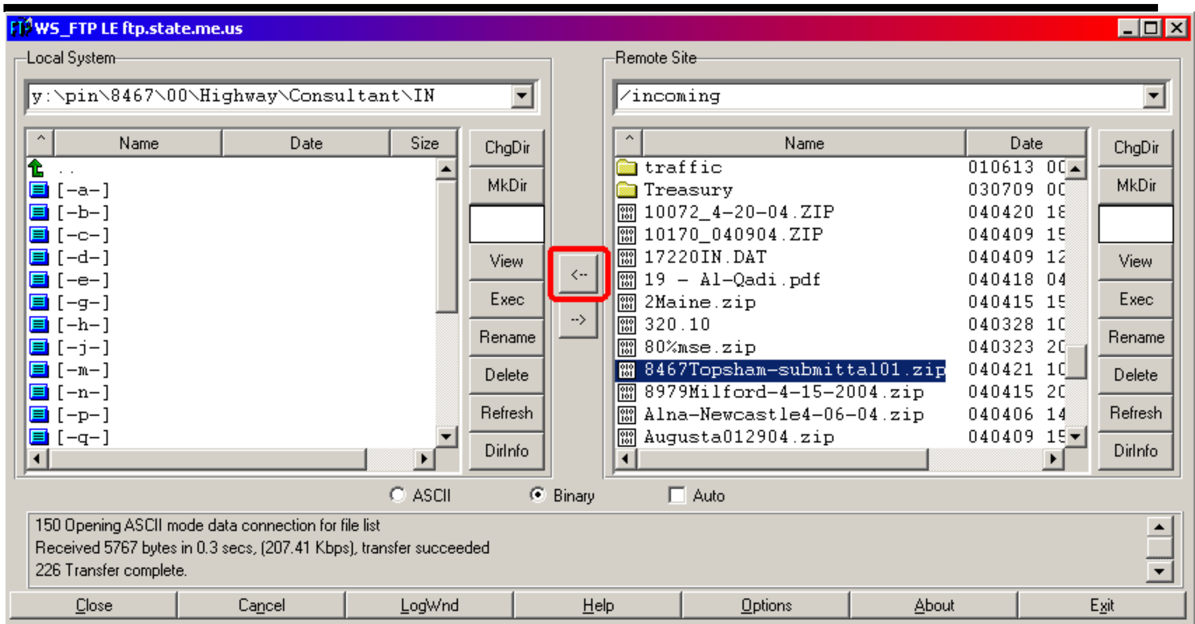


Figure 32-9: Incoming folder using WS_FTP LE ftp.maine.gov

Step Three: Extract Files from the Zip folder

Part One: Browse to your PIN's Consultant\IN Folder

Navigate to the **Consultant\IN** folder that you created in your project's PIN number. Locate the file that you just copied from the FTP site. Double click this file to display its contents (Figure 32-10).

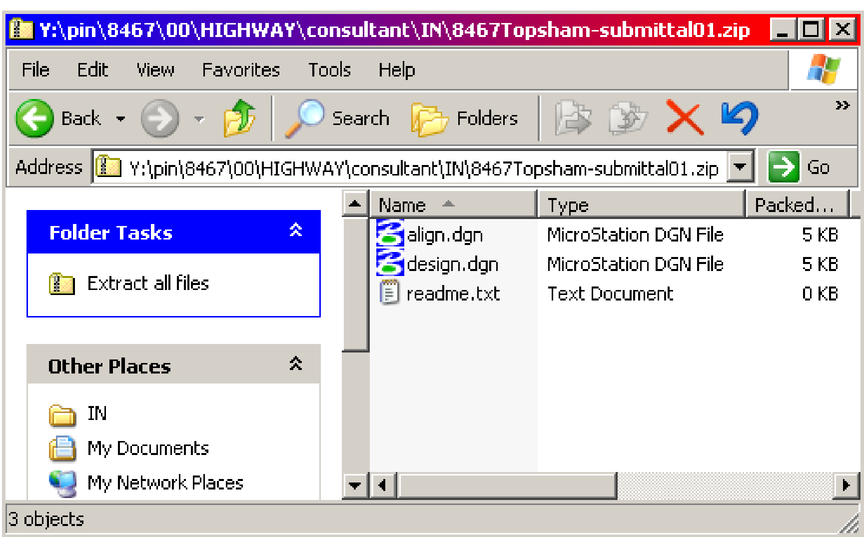


Figure 32-10: Contents of the zipped folder

Part Two: Extract Files to Consultant directory

From the Explorer menu, select **File>Extract All… .** The *Extraction Wizard* will open. Click **Next.** The next dialog window allows you to either browse to where you want to place the extracted files or simply remove a portion of the path in the "*Files will be extracted to this directory*" window. Trim off the end of the path until you reach the **Consultant** folder (i.e. y:\pin\8467\00\highway\consultant). Click the **Next** button (Figure 32-11).

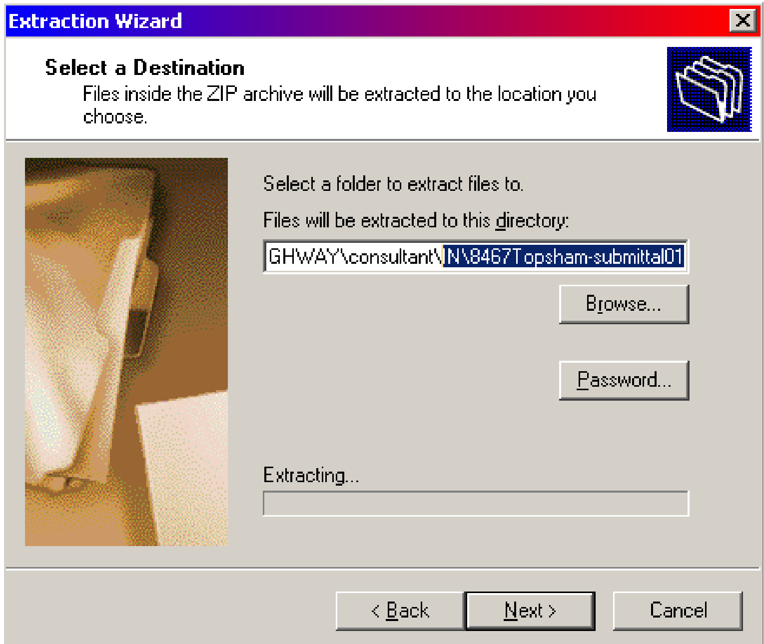


Figure 32-11: Remove part of the path to the desired directory in the Extraction Wizard

- ♬ We want to extract to the consultant directory temporarily.

Step Four: Rename Consultant files in Consultant\In Folder

Standard Naming Convention

We have standard names for files. We ask that consultants follow our naming convention, but chances are some won't. A complete list of acceptable file names is listed on our web site. Here is the address: www.maine.gov/mdot/cadd-support/microstation/std_filename_root.php. It is up to the Consultant Coordinator to rename the files if necessary. Common file names are listed below.

Alignments.dgn - This is the proposed alignment file. It contains all Main Line and Side Road alignments including Curve Data and Bearings.

Highway.dgn - This is the proposed design file for a Highway project.

Bridge.dgn - This is the proposed design file for a Bridge project.

Rwplan.dgn - This is the file that will contain both existing and proposed ROW.

Renaming the Files

To rename a file, select the file and pick **File>Rename** from Windows Explorer's Main Menu. Type the new file name and be sure to include the file extension. Hit enter to complete this process.

Step Five: Move Files to Bridge\MSTA, Highway\MSTA or ROW\MSTA

MicroStation requires that files be in a certain place for them to be viewable to everyone as a reference file. Now you will have to **move** them into the correct location. Highlight the design files in the consultant folder. From the Main Menu, select **Edit>Cut.** On the left side of the window, click on the MSTA folder next to the consultant folder to display it's contents on the right. Select **Edit>Paste** to place the files into the MSTA folder.

ⓘ ***You may get a warning stating that there are files in the folder with the same names, "Do you want to overwrite them?". Consider moving the files into an "old" folder unless you are sure that they are complete replacements.***

♬ If you receive a Right of Way file, you may not have permissions to move it to the correct folder. Have your ROW technician move this file into the ROW\MSTA folder.

ⓘ ***It is important that all MicroStation files relative to the project exist in a MSTA folder. This is where MicroStation will look for files to reference.***

Step Six: Compare with our Files (Optional)

This is an optional step that might save a lot of headaches for someone in the future. If the drawing doesn't follow our standards, it will be apparent immediately when a person views it with our standard drawing files.

Open MicroStation

Click the MicroStation icon on your desktop. Select your project number from the project pull down.

Select a File to Open

Open a file that should be referencing the topography files and the proposed design files (i.e. hdplan.dgn or bdplan.dgn). Fit view. The files should line up correctly.

If all looks good…

If the files line up good, skip to the next step. If it doesn't, contact ESSG's CADD support for additional troubleshooting.

Step Seven: Send Message to Team Members

After the files have been named correctly and placed in the correct directory, it would be a good idea to send a message to team members notifying them that the files are ready to be used.

RECEIVING UPDATES FROM A CONSULTANT

Communication

Communication is the key for receiving updates from a consultant. The update process is when a file can be unintentionally overwritten.

Is this a Complete Replacement?

Ask the consultant if the file is a replacement of a previous submittal, or if it's an addition to an existing file or simply a file to be added to the project files. It is better to receive a complete replacement unless it took a lot of manual editing on our end to get their file to meet our standards. In this case, we can reference and merge only the changes into the previous submittal.

Readme file

A readme.txt file is a good way for a consultant to describe what their intentions are. Encourage your consultant to include this in zip files that they submit.

Step One: Create an OLD folder

In order to keep a running record of what was submitted by a consultant, create an OLD folder under the workgroups MSTA folder (i.e. \Highway\MSTA\OLD).

Step Two: Move Older file(s) into the OLD folder

If a file is going to be completely replaced by a new one, move the older file into the old folder. In Windows Explorer, find the file to be replaced. Select it and pick **Edit>Cut** from the Main Menu. Click on the OLD folder on the left side of the Explorer window displaying the contents on the right. Select **Edit>Paste** from the Main Menu to paste it into the "old" folder.

♬ If you have placed files in the "old" folder already, and they have the same name of the files you are pasting, Windows may ask you if you to overwrite them. Select "OK" (Yes) to overwrite them. Keep only the latest "old" file.

Step Three: Copy File From FTP to Consultant folder

Use the same procedures as previously outlined for copying files from the incoming FTP site. This was outlined in the "Receiving Project Files from a Consultant" portion of this manual. If the consultant used the same file name as a previous zip, create an old folder under the Consultant\IN folder and move the older zip into the "old" folder. If the zip file name is different from any previous, leave all zip files in the consultant\IN folder.

Step Four: Extract files, Rename Accordingly and move to MSTA Folder

Use the Extracting procedures as outlined previously in this document ("Receiving Project

Files from a Consultant”). Rename the file if necessary to follow our standard file naming.

Step Five: Compare with our Files (Optional)

This is an optional step that might save a lot of headaches for someone in the future. If the drawing doesn’t follow our standards, it will be apparent immediately when a person views it with our standard drawing files.

Open MicroStation

Click the MicroStation icon on your desktop. Select your project number from the project pull down.

Select a File to Open

Open a file (i.e. hdplan.dgn or bdplan.dgn) that should be referencing the topography files and the proposed design files (alignments, highway, bridge and rwplan). Fit view. The files should line up correctly.

If all looks good…

If the files line up good, skip to the next step. If it doesn’t, contact ESSG’s CADD support for additional troubleshooting.

Step Six: Send Message to Team Members

Many team members may be using the files received from the consultant. It is a good idea that you send a message to them stating a revision has been made. This will keep the project flowing smoothly.

CREATING A .DWG

PROCESS OF SAVING A SINGLE FILE AS A DWG

Introduction

Occasionally a consultant may require an AutoCAD file. Find out what version of AutoCAD they are using. MicroStation can create the drawing using our file standards. It uses the active file's Global Origin, Level Structure, Units and Color table. It is recommended that you use the *Batch Converter* utility to convert multiple files or files that you haven't got permissions to.

Step One: Open file to be Converted

Open MicroStation, pick your project from the project pull down and open the file you wish to convert.

Step Two: Select File Save As…

Choose **File>Save As…** from the Main Menu. A dialog will open (Figure 32-12) giving you the opportunity to change the file type and directory path. From the "**Select Format to Save"** pull down, select **AutoCAD drawing file (*.dwg).** Browse to your *Workgroup's* **Consultant\OUT** directory (i.e. Y:\pin\8467\00\Highway\Consultant\OUT).

ⓘ ***If you are trying to convert reference files that you do not have permissions to (i.e. RWPlan.dgn), you may not be able to convert these files. MicroStation will attempt to write them to their original directory. In this case, browse to somewhere on your hard drive and all the files will be written there. Consider using the Batch Converter to define an Output directory that you have privileges to.***

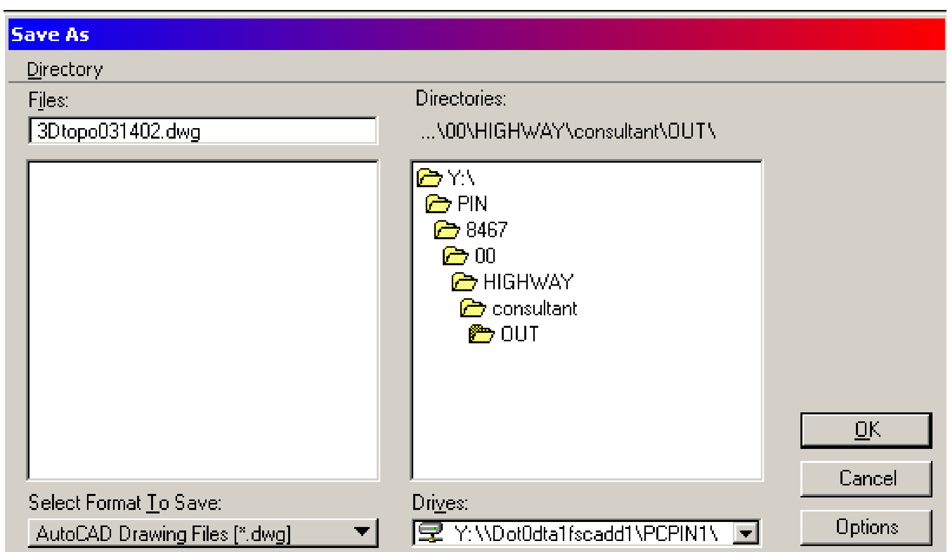


Figure 32-12: Save As dialog (.dwg File Format) pointing to the Workgroups Consultant/OUT directory*

♬ Put the file(s) in the consultant\OUT directory. This is where you will zip up the file(s) prior to placing them onto the FTP site.

Step Three: Adjust Options

Select the *Options* button in the **Save As…** dialog. In the *General* tab (Figure 32-13), pick the version of AutoCAD the consultant is using by clicking on the current value in the row. *Units* should be set to **Feet** or **Meters.** In the **DWG Seed File** area, click the current value to browse to MaineDOT's standard seed file folder (i.e. c:\!msv2004conf\standards\seed\DWG seed\). Depending on the project type, choose either the usMDOT_SEED.dwg or the MDOT_SEED.dwg (metric projects). Place a check mark in the *Drop Unsupported Linestyles* box. This will display our linestyles even though the consultant may not have them configured or mapped appropriately.

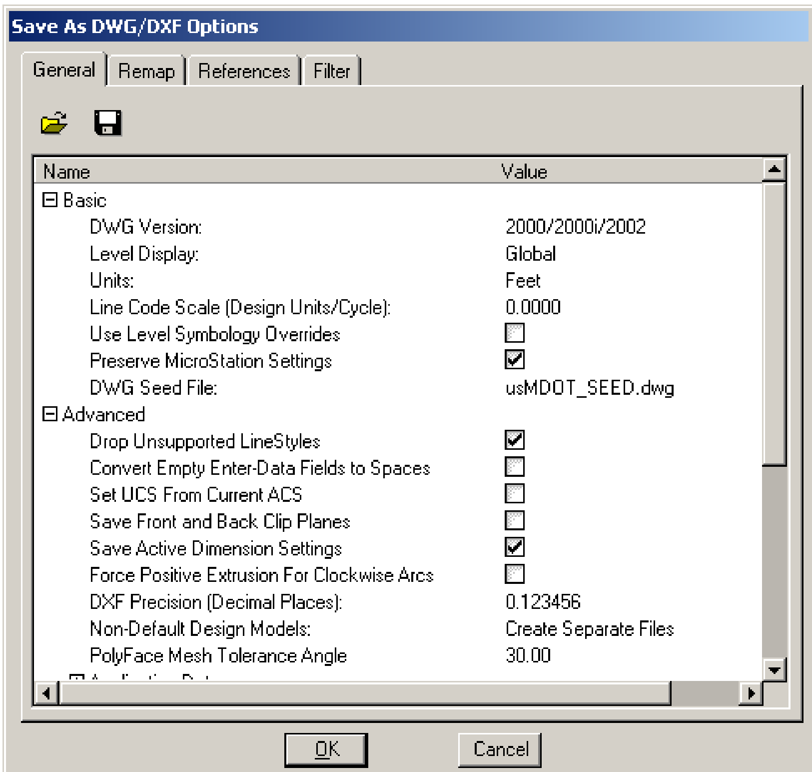


Figure 32-13: General tab with appropriate selections

Scroll down to the *Fonts* portion of the dialog (Figure 32-14). Expand the selection. Place a check mark in the box to *Convert MicroStation fonts to AutoCAD fonts.* Adjust the *SHX Output Directory* to point to the c:\temp folder.

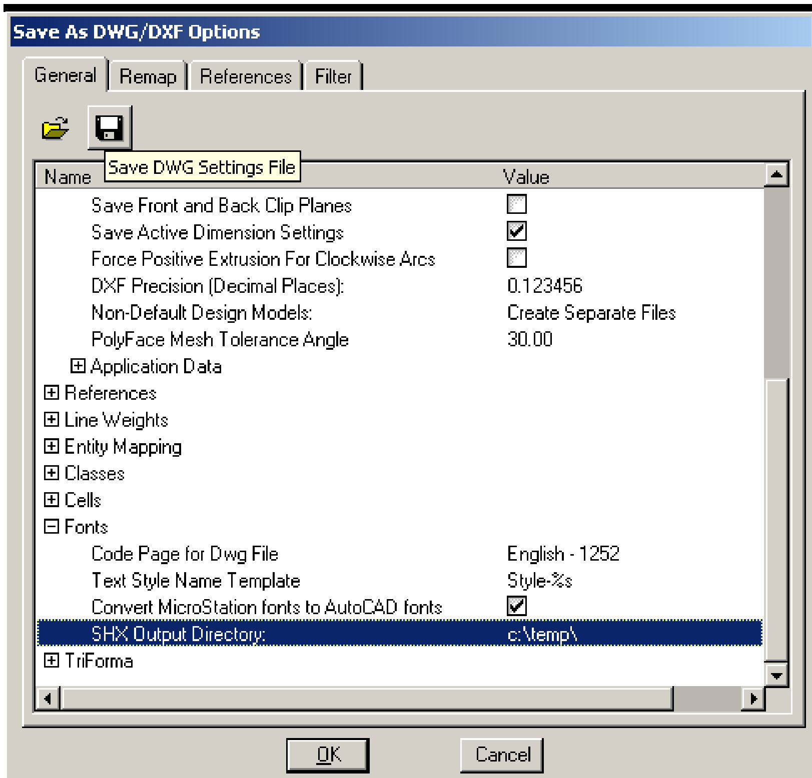


Figure 32-14: Adjust the Fonts portion of the dialog

There are many more adjustments possible on the *General* tab (Figure 32-14), however it's not recommended that you make other changes unless you are advised to do so from the consultant or CADD Support personnel.

The *Remap* tab is fine by default. Click on the *References* tab and adjust your options to those seen in Figure 32-15.

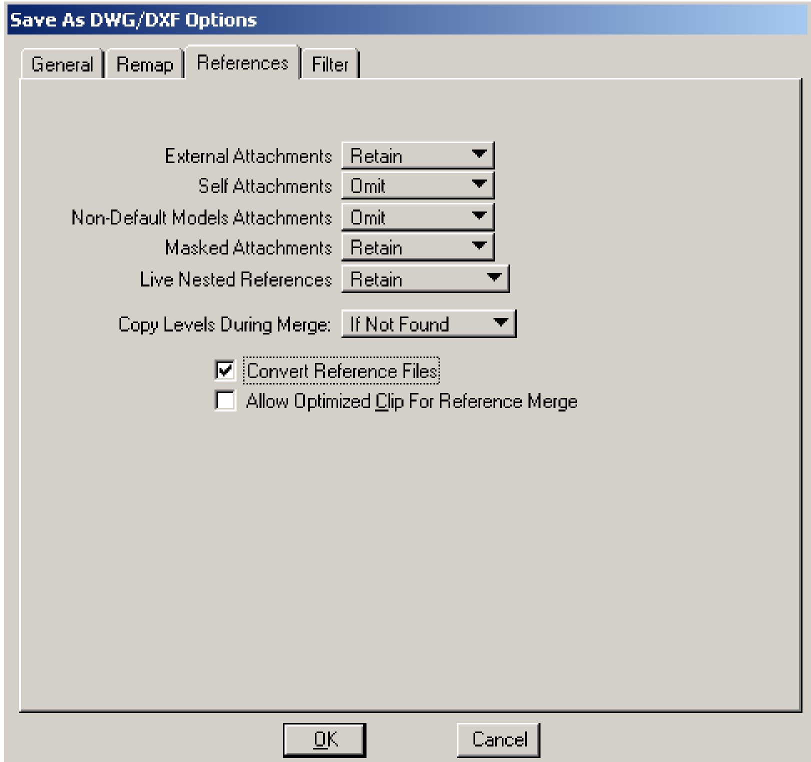


Figure 32-15: Save As Reference Tab options

Select the *Filter* tab and adjust your options to those seen in Figure 32-16.

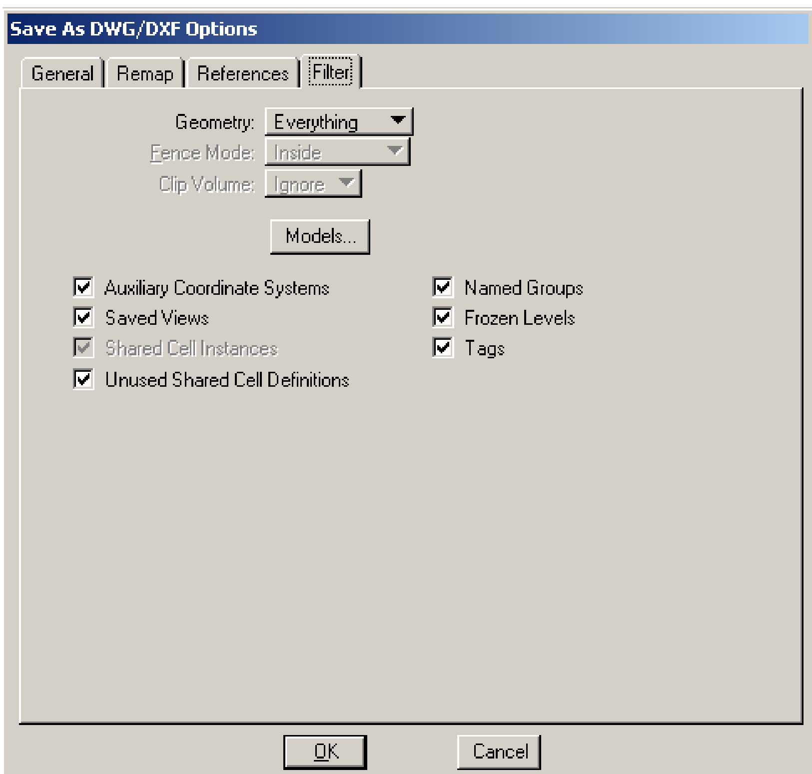


Figure 32-16: Save As Filter Tab options

Click **OK** and then **OK** again. The file(s) will be created in the same folder as the .dgn.

Step Four: Zip and FTP the File

MicroStation will also create resource file that AutoCAD can use to display the same Fonts and Linestyles in their drawing. Open Windows Explorer and browse to your C:\temp folder and copy all of the .shx files to your *Workgroup's* Consultant\OUT folder.

Browse to your *Workgroup's* consultant\OUT folder and Right Click and select **New>Compressed (zipped) Folder.** Rename it appropriately copy your .dwg and .shx files into it. Post it to the FTP site. Now that you have a record of what you sent in the Zip file, delete the single .dwg file and .shx files.

BATCH PROCESSING MULTIPLE FILES TO DWG

Introduction

If you need to create many DWG files it is quicker to setup a Batch job to do this. Sometimes you may need to convert and send the survey files as .dwg. You can add files from different directories for conversion also.

Step One: Open a File

Open MicroStation, pick your project from the project pull down and open any file, preferable one that you do not need to convert.

Step Two: Start Batch Utility

From the *Main Menu*, select **Utilities>Batch Converter…** The *Batch Convert* dialog will open. Select **DWG** from the *Default Output Format* pull down (Figure 32-17).

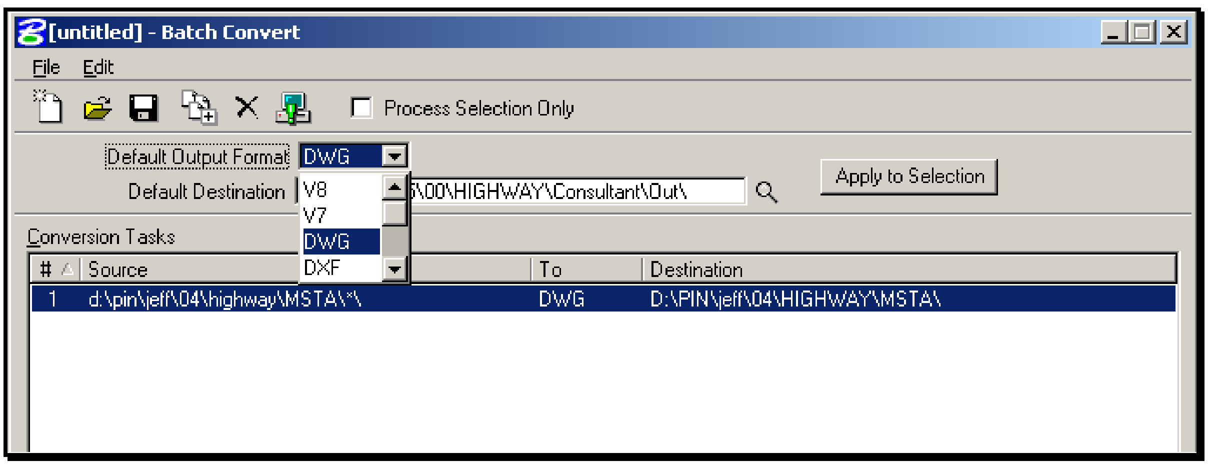


Figure 32-17: Changing the Default Output Format to DWG

Step Two: Adjust Options

Adjust the DWG output preferences by selecting **Edit>DWG Save Options.** These options should be set the same as you would for a single file conversion. See figures Figure 32-13, Figure 32-14 and Figure 32-15.

Step Three: Adjust Destination

In the *Default Destination* field, click the magnifying glass and browse to your *Workgroup's* consultant\OUT folder.

♫ If you change your mind about the destination you must highlight all of the files and select *Apply to Selection.*

Step Four: Add Files to Convert

Select **Edit>Add Files** from the *Batch Convert* dialog. A new dialog will open. Browse to the directory that contains the files you want to convert. Select them and click the **ADD** button (Figure 32-18). Browse to other directories and add more files if necessary.

Select a whole directory of files by selecting a folder in the right panel of the dialog and placing a check mark in the *Include Subdirectories* box (Figure 32-18). Click the **Add** button. Click the **Done** button when you're finished adding files or directories.

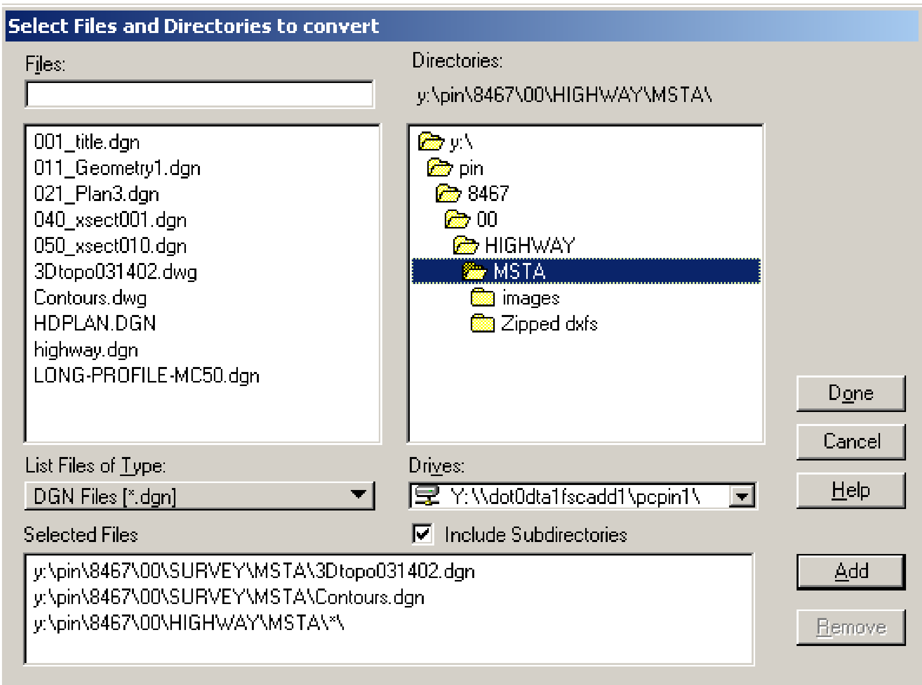


Figure 32-18: Select Files and Directories to Convert dialog

Step Five: Process Files

Select **File>Process…** from the *Batch Convert* menu. The *Files to Convert* dialog will open (Figure 32-19). Click the **Convert** button and it will show you the progress as it process the files.

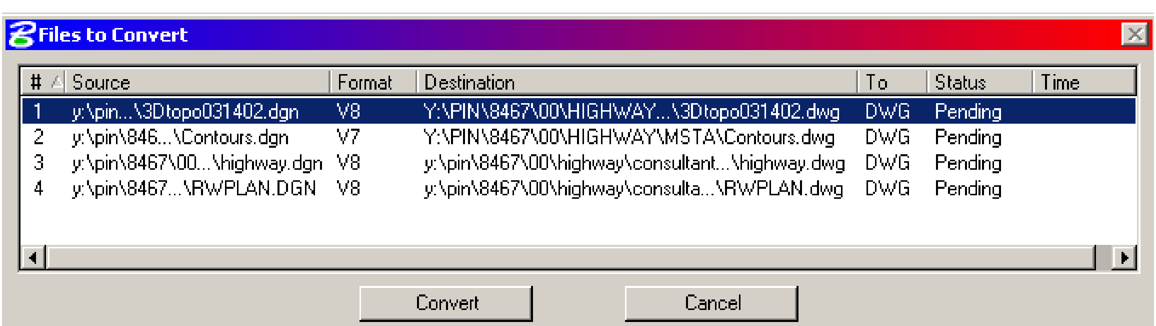


Figure 32-19: Files prepared to convert

ⓘ ***Occasionally you will receive a message (Figure 32-20) when a file doesn't get converted. Make note of which files fail during the conversion process. This message***

is very common. It may be because you are in a file that is referencing a file you are converting. Click OK.

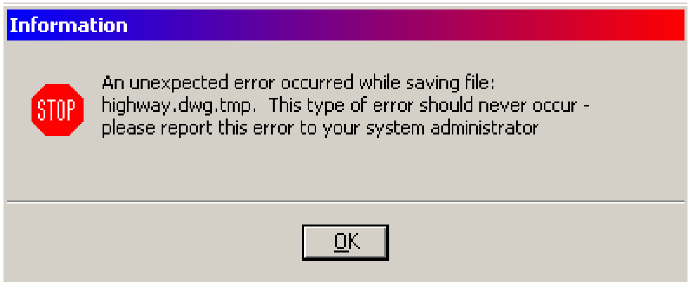


Figure 32-20: Unexpected Error message – Make note of file name

When the files have all been processed, the dialog (Figure 32-21) will display which files that were converted and which ones may have failed. Click DONE.

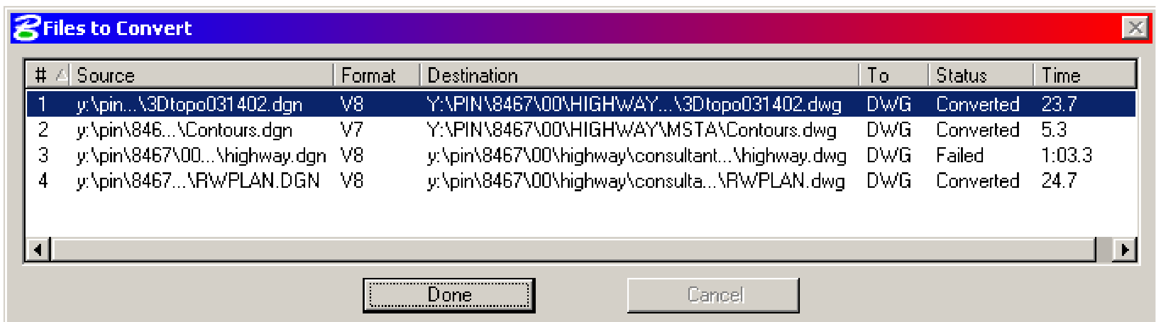


Figure 32-21: Dialog displaying the results

Re-process the file(s) that have failed. This time, select only the file or files that failed and place a check mark in the *Process Selection Only* box (Figure 32-22). Select **File>Process…** to start the conversion on the individual file(s). Second time usually works fine.

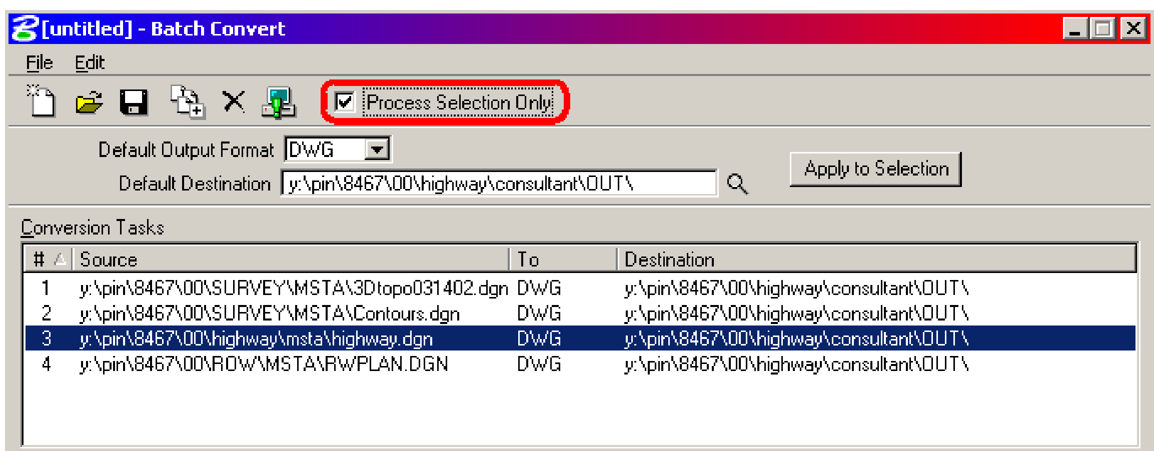


Figure 32-22: Selecting files and using the Process Selection Only box

When you have finished processing all of the files, close the dialog. It is not necessary to save the *Batch Convert* session.

Step Six: Zip and FTP the File

MicroStation will create resource files that AutoCAD can use to display the same Fonts and Linestyles in their drawing. Open Windows Explorer and browse to your C:\temp folder and copy all of the .shx files to your *Workgroup's* Consultant\OUT folder.

In your *Workgroup's* consultant\OUT folder and Right Click and select **New>Compressed (zipped) Folder.** Rename it appropriately copy your .dwg and .shx files into it. Post it to the FTP site. Now that you have a record of what you sent in the Zip file, delete the single .dwg file and .shx files.

Chapter 33 Using Other Software

FILE TRANSFER USING THE FTP SITE

GENERAL INFORMATION

What is an FTP (File Transfer Protocol) site? It's a secure drive on a computer, protected by a firewall, where files are temporarily stored completely accessible by any outside Internet connection. This allows consultants to do business with us while exchanging large amounts of data directly from computer to computer. Our FTP Internet address is ftp.maine.gov . This can be accessed through *Internet Explorer* if the recipient doesn't have FTP software. At that point, dragging and dropping files works best instead of Edit>Copy and Edit Paste. Consider sending a link in an email to files that are place on our FTP site.

Files over 10 Mb cannot be transferred via email. The State's email system stops the transfer of large files due to their size and the systems restraints. It is recommended that files over 10 Mb be transferred to outside sources by using this process.

General Rules of Thumb!

- Send a zip (compressed) file when sending more than one file, or files large in size.
- Use good judgment when naming files. Rather than dumping random files without explicit names to the FTP site, always use naming that will make it easy to identify your files from someone else's. (i.e. 8467topsham.zip)
- Do not create folders on the FTP site. Folders can be created within the outgoing folder, but are impossible to remove, due to protections that are set by BIS. Only *they* have privileges to remove them, regardless of who created them.
- Clean up you own mess! OIT does house cleaning only when the server is too full to function. Delete incoming files after you have downloaded them. Tell the consultant/recipient that they have permissions to delete the files you posted after they download them.

USING FTP

Step One: Open FTP Software

Click your **Start** button and go to **Programs>WS_FTP LE>WS_FTP LE** or double click the icon (Figure 33-1) on your desktop.

Figure 33-1: FTP Icon

When the program opens you should see a **Session Properties** dialog. Press **OK** (Figure 33-2) to log into the FTP site.

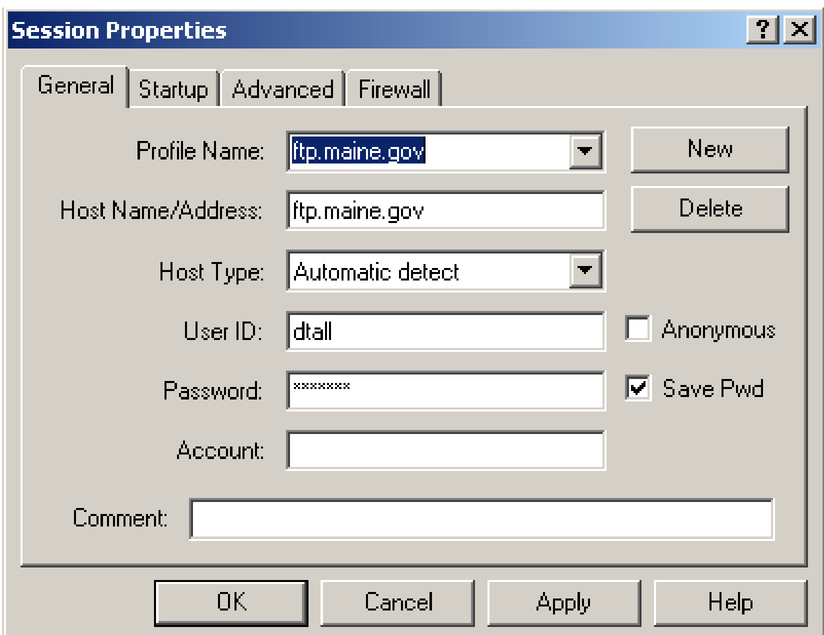


Figure 33-2: Session Properties

Step Two: Browse and Push Files to FTP

On the right side (**Remote Site)**, you should see the folder list, (incoming, outgoing, etc.) and on the left **(Local System)**, see a list of available drives. These are the drives you currently have mapped to your computer.

We have a folder for all **outgoing** files and a folder for all **incoming** files. Open the appropriate folder for the action you are taking.

Scroll and browse to the drive and folder where the file exists that requires transferring (i.e. y:\pin\8467\00\highway\consultant\topsham-design.zip). When the contents of the folder are displayed in the left section of the dialog area, highlight the desired file and click on the directional arrow (Figure 33-3) between the two view areas.

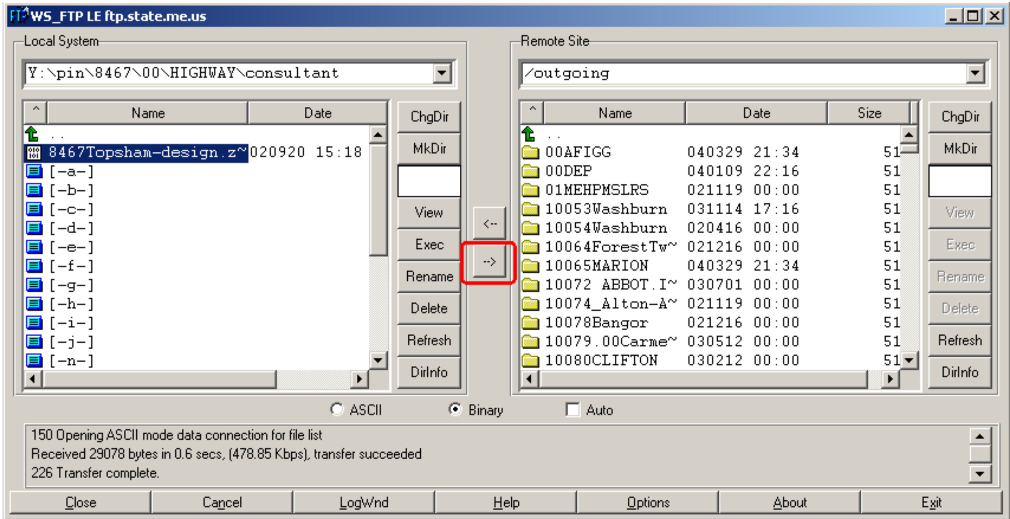


Figure 33-3: WS_FTP LE ftp.maine.gov

Use the same techniques to copy files from the incoming folder on the FTP site to a drive letter on the network or to your local hard drive.

SENDING LINKS IN EMAIL MESSAGES (OPTIONAL)

We can send a hyperlink in an email document that points directly to the file you posted, starting the download on their end automatically.

Or, we can also notify clients when a file is posted and provide them with the HOST (ftp.maine.gov) with the user (anonymous) and the password (anonymous). Then, by using a normal Internet browser or some type of FTP software, they can connect to our site and find the file and download it manually.

Step One: Type address to FTP in email

Type the complete address path and file name, within the body of an email message area and the recipient can click the link and select **Save** to start downloading to a specified location on their computer.

Here is an example: ftp.maine.gov/outgoing/8467topsham.zip.

- ♬ Use forward slashes between folders and never use spaces in the file names. Use lowercase for the ftp address and outgoing folder. Match the case of the file name you created.

Step Two: Test the Link

Even though the link shows up in the body of the email message, clicking it will not accurately verify that the link works. Send the email to yourself and test the link the email. If it works, send the email to the recipient.

Step Three: Add Subject Line and Send

Add the filename in the Subject line of your email. Provide a brief description of files attached. Click **Send.**

USING AUTOTRACK – TURNING RADIUS SOFTWARE

AutoTrack is an add-on program for MicroStation, which is used for evaluating a design for turning movements of trucks, and any other large vehicles. We have purchased a 2 user network license, which means that only two users can be running AutoTrack at the same time on our network. Depending on the usefulness and demand for the product, we may increase the number of licenses in the future. AutoTrack must be separately installed on the PC of each user that is going to run it.

AUTOTRACK INSTALLATION

Introduction

The AutoTrack licensing system has been set up on the **Dot0dta1fscadd1** server. The installation steps below set up a client PC that will look to that server for its license. To avoid problems with our own customized MicroStation interface, we prefer not to let the AutoTrack install procedure “configure” the CAD system for us. Therefore, please follow these instructions carefully.

Step One: Browse to Folder

Using **Windows Explorer**, browse to the Y:\msworksp**AutoTrack** folder.

Step Two: Launch Setup

Double-click on **atr###.exe** to launch the installation process (i.e. atr700a.exe). These numbers will change as new versions become available. Click **RUN** to bypass the security warning. If a previous version is found, you will be asked if you want to install manually, uninstall previous versions without migrating your custom settings or uninstall and migrate your custom settings. If you’ve consciously made adjustments, then migrate your settings, otherwise, it may be a good time to start with a fresh install.

You will be asked if you want to install a Full copy. Choose **Yes**.

Click **Next** to begin the install program and click **Yes** to agree to the license terms. At the Customer Information page, enter State Of Maine as the *User Name* and enter Department Of transportation as the *Company Name.* Click **Next.**

When you get to the *Setup Type* screen, choose **Custom**.

Uncheck the *SavoyCAD (Stand alone version)* box and hit **Next.**

Click **Next** through to the last of a set of 5-6 pages, where you should see the version of MicroStation that we are using checked as an item in the list, with the path to the USTATION.EXE file listed to the right. Click **Next.**

Click **Next** to confirm the installation path.

Click **Next** again to confirm the selected components, and **Next** once more to install support for earlier versions of vehicle libraries.

Step Three: Adjust IP Address

You should now be at the *Network License Setup* page. Place a checkmark to signify that this is a network version. In the first IP Address line, enter the address of our **Dot0dta1fscadd1** server, which is **10 10 19 11**. Click **Next.**

Step Four: Update Advise

Uncheck the top box to prevent users from being able to run updates. All updates will be downloaded, tested and approved for use by the CADD Support Staff. Click **Next.**

ⓘ ***Do not attempt to upgrade/download a newer version of the software. Our server license is relative to the version we are using at any given time. We will notify you in the event of an upgrade that affects us.***

Step Five: CADD Configuration

You should now be at the **Configuration of CADD Systems** page. **Uncheck both** of the options on this page and click **Next** and click **Next** again to confirm the default program folder.

Step Six: Finishing up

On the next page, you can skip the Readme file and click **OK** to the next dialog mentioning the USB license install screen.

You will need to reboot the PC after the procedure completes.

USING AUTOTRACK (BASICS)

Introduction

We have purchased a 2 user network license. Only two users can be running AutoTrack at the same time. We've added menu items to load and unload AutoTrack during a MicroStation session. Use AutoTrack then unload it to release the license. Closing the file unloads it also.

Open MicroStation

Always open MicroStation from your desktop icon or from the *Start* menu. Select your project from the *Project* pull down. Open any file in your list of drawings.

Create a New Drawing

Use **File>Make Sheetz** to create a new drawing with *no prefix* called **Turning Radius.**

✓ ***Refer to 1-18 for more information on the Make Sheetz process.***

♫ Using a new drawing to design your turning movements keeps this information separate from the files that another unit references by default.

Load AutoTrack

Start AutoTrack by selecting **Utilities>AutoTrack>Load AutoTrack.**

The Welcome dialog (Figure 33-4) should open as well as a new tool bar for AutoTrack (Figure 33-5) and an additional menu item called **Applications**.

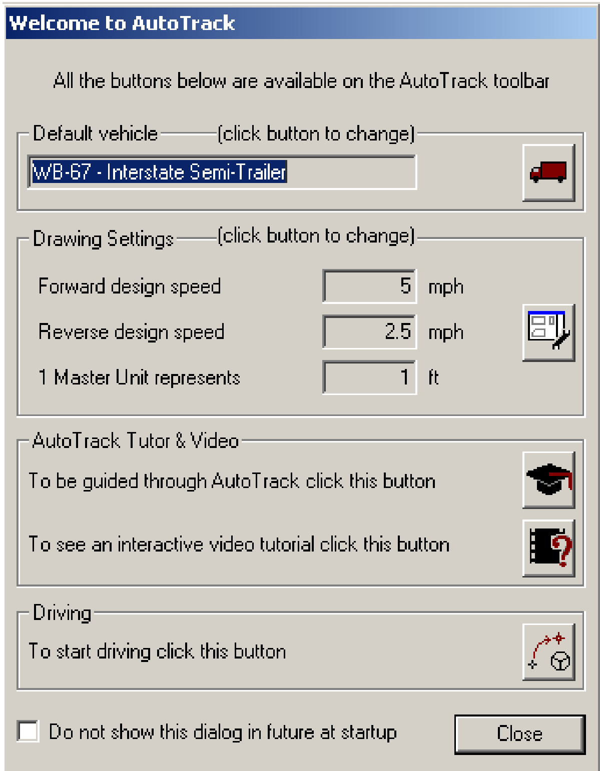


Figure 33-4: AutoTrack Welcome dialog

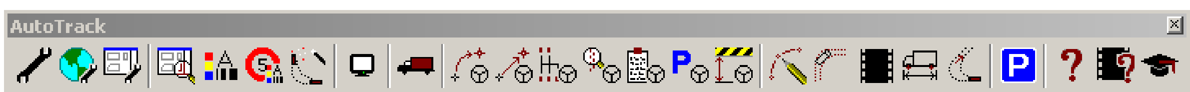


Figure 33-5: AutoTrack Toolbar for MicroStation

Set Default Vehicle (Optional)

It isn't necessary to select a default vehicle (Figure 33-4). You will be prompted for a vehicle when you hit any of the *Drive* options. If you do set a default, you will have an opportunity to change it after selecting a drive option.

Set Drawing Settings

You should always verify your *Drawing Settings* (Figure 33-4) during each session to set your units for AutoTrack, especially since we are producing both metric and U.S. Customary projects.

Start AutoTrack Tutor

Click on the AutoTrack Tutor icon (Figure 33-4) for guidance in using AutoTrack for the first time. It will provide a help screen that is relative to the dialog you are on.

For More Assistance, Read the Manual

The manual and tutor will be your best friend through the first few uses. Contact CADD Support for assistance.

VIEW AN AUTOTRACK DEMO (OPTIONAL)

Step One: Start Demo

Click Window's **Start** button and browse to the **\Programs\AutoTrack#\AutoTrack Tutorial Demonstration** program.

Step Two: View at Your Leisure

The demo is a good rundown of AutoTrack's functionality and multiple settings. It's a good idea to watch this 40 minute demonstration.

USING AUTOTRACK'S MANUAL AND HELP

AutoTrack On-Line Manual

An On-line Manual (in PDF format) can be launched independently from MicroStation by selecting **Start>Programs>AutoTrack #>AutoTrack Manual In PDF Format…**

It also can be launched from within MicroStation by selecting **Applications>AutoTrack>Help>AutoTrack Help…** from the *Main Menu.*

♬ The Table of Contents is linked to the rest of the document. The PDF document is fully searchable also.

ⓘ ***Do not attempt use the PDF installation instructions. Our installation instructions are specific to our workflow and licensing.***

AutoTrack's Webpage Knowledge Base

Use AutoTrack's websites (http://www.savoy.co.uk) to provide assistance also. Once you are at this site, you can select SUPPORT, then KNOWLEDGE BASE or KNOWN PROBLEMS and even ask for email support.

Chapter 34 EPLANS Archive (General Users)

USING MAINEDOT EPLANS ARCHIVE

ABOUT THE EPLANS ARCHIVE

Overview

The *E-Plans Archive* is MaineDOT's Electronic Plans Archive. It is a web-based, large format document management system similar to TEDOCS. They are viewable, measurable and ready to be plotted to scale through a web browser (i.e. *Internet Explorer).* The software powering the web archive is called *Digital InterPlot,* which is a product of Bentley Systems, Inc (the owners of MicroStation, InRoads and MX). *Digital InterPlot* (D.I.) is available to all MaineDOT employees who have access to the Intranet. Users can search for projects based on over a dozen filtering options and print them if necessary. The *E-Plans Archive* is currently organized in categories such as Vault Plans and Property Plans (R/W). There may be additional categories in the future. D.I. may also facilitate in producing an electronic set of plans for the on-line bidding process available to Contractors on the Internet. You can access D.I. by clicking the following hyperlink → http://dot0dta1asiis03/plansweb/dpr.asp. You can also access from the MaineDOT intranet Home Page by selecting **E-Plans Archive**.

Vault Plans

The **Vault Plans** archive originated from the scanning of the bridge and highway project plans (both Contract and As-Builts) hanging in the physical vault. Vault Plans were organized in hanging file racks. Their rack number is listed as their *Source File Location* (i.e. AA01) in the E-Plans Archive**.** The *Source File Location* will vary depending on the source of the plan set. All future "Contracts" that have been advertised will have a *Source File Location* of **Contract Plans.** Any Amendments to these "Contract" drawings will have a *Source File Location* of **Amendments.** As-Built drawings for any given project will have a *Source File Location* of **As-Built Plans.**

The **Vault Plans** archive will include other documents for retrieval. There are Maintenance Facilities, Rail Road Maps and Airport Plans.

Property Plans

This *Archive* will be where Right-of-Way property maps (old hanging files), miscellaneous Survey documents, POR documents and tax maps will be stored and made available through the *E-Plans Archive.* Recently included will be ROW PLAN REVISIONS. If the archive is searched properly, these revised plans will be included with the original plans. When searching for a *ROW File Name,* always use wild cards before and after the *ROW File Name* (i.e. *160150*). These revisions will immediately follow the originally archived sheet. They can be identified by their *Source File Location* as well as the REV# incremented onto the *ROW File Number*.

GETTING STARTED

Accessing the Web Page

The link to our Electronic Plans system on Digital InterPlot is: http://dot0dta1asiis03/plansweb/DPR.asp . We recommend that you save this link as a Favorite in your web browser.

A link to the page can also be found on the MaineDOT Intranet page (MDOTWEB) Figure 34-1.

Figure 34-1: E-Plans archive via MDOTWEB page

One Time Installation

On the "home page" of our Electronic Plans system, you will see a list of available archives. You can either **Browse** or **Search** these archives. These instructions are intended get you started as well as how to refine your searches to access the plans you need.

On your first time in to Digital InterPlot, your PC will need to install the Bentley Web Viewing Control after you click on a thumbnail image. You may get a **Security Warning** asking if you want to install this control. If so, click **Yes.**

Check **Yes, I accept the agreement**

Click **OK**

♬ The above is a one-time procedure. Afterward, you go directly to the plan sheet that you select.

BROWSING AN ARCHIVE

Simple Browsing and Viewing

The archive that we are using for this example is called **VaultPlans**. This archive contains plan sets that were scanned from our Vault as well as Contract plans and As-Builts. You can use either the **Folder** icon or the **Browse** tab (or binoculars) to get to a page that lists the plot sets within the archive (Figure 34-2). In that list, the items in the **Plot Set Name** column are linked to the corresponding plot sets.

Figure 34-2: Browsing an Archive

Click on a **Plot Set Name** to select a plot set. You are then presented with a list of thumbnail images of the sheets in the set. Click on an image to view the full sheet.

♬ Note the index data for the plot set is listed at the top of a **Table of Contents frame** on the left of your screen (Figure 34-3).

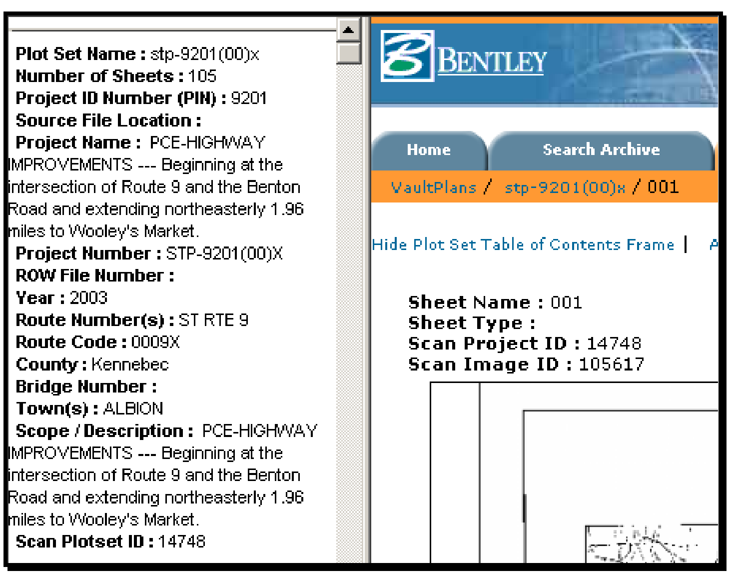


Figure 34-3: Table of Contents Frame

Viewing a Selected Sheet

Notice that there is a link titled "Hide Table of Contents Frame" near the top left of the main frame (Figure 34-3). This will provide more room on your screen to browse the sheet you have selected. There are several controls available in a right-click menu to Pan, Zoom, Window an Area, Fit View, Rotate, Plot, Measure, etc (Figure 34-4).

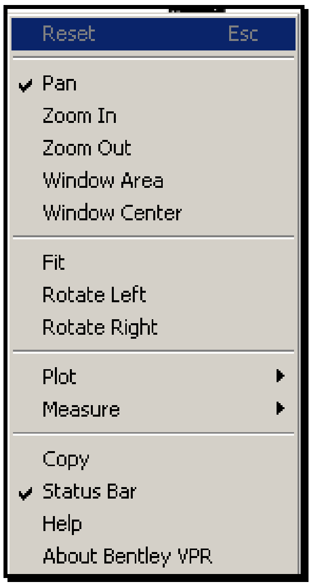


Figure 34-4: Right Click menu items

Icons are also available at the lower left of the view screen (Figure 34-5) to do some of these functions. These icons will be familiar to MicroStation users.

Figure 34-5: View controls

Advanced Searching - Two Stage Search

If you don't know the specific Project Number or PIN that you are looking for, it will be more efficient to do your search in two stages. In the first stage, you will search for title sheets of all the projects that meet your criteria in a specific town. When you have found the title sheet for the project you are interested in, note the **Scan Project ID**. The second stage will be to search on that number as a **Plotset ID**. This results in all the sheets archived from the selected project.

Example:

Sheet Type: **Title**

Town(s): **Topsham**

Among the results is project **I-95-5(47)74**. The plans for this project have *Scan Project ID* of **1185**. A second search, on *Plotset ID* **1185**, yields 22 sheets from that project. If we had done a single search for plan sheets in Topsham, we would have had 266 sheets to wade through in order to find what we need.

The advantage of this Two Stage search procedure is that you don't have to browse through a huge number of sheets to find your project!

♬ Due to the design of the index database, there is a field, shown as **Scan Project ID**, associated with individual sheets, and another field, shown as **Plotset ID**, associated with plot sets. While these are technically different fields, their meaning to us is the same, and they can be used as a key to retrieving the sheets from a particular project, as in the above example.

State Aid Plans

We have scanned some State Aid plans into the VaultPlans archive, which do not have title sheets. Therefore, you can't find them via the Two Stage Search described above. However, we have Region, Division, and SA designations in the *Source File Location* field. Use the following example to search for all of the State Aid plans in a particular town

Example:

Source File Location: **SA**

Town(s): **Winthrop**

You can then use the **Sort By** pull down in the Results page to help in focusing in on the plans you need.

Right of Way File Numbers

Right of Way plans are located in the **Property Plans** archive. Most of the plans have a ROW File Number. The file number in Digital InterPlot will consist of a six digit number. The ROW File Number contains a hyphen. You will need to substitute a zero “0” in place of the hyphen. Add a preceding zero to the number to the left of the hyphen if the number is a single digit. Add one or more preceding zeros to the number to the right of the hyphen so that the number is a total of 3 digits.

ⓘ ***In all examples below, the file numbers should be preceded and followed by and asterisk (*) in order to produce all possible results. Right of Way files that are REVISED will be added to the same Scan Plotset ID, however their ROW file number will be incremented by _REV#. If searching by the ROW file number, add the asterisks in order to locate these revised plan sheets.***

Example

ROW File Number: 2-58

Digital InterPlot #: *020058*

In some cases there will be a letter included at the end of a ROW File number. Tack this letter to the end of the file number (no space).

Example

ROW File Number: 2-129 A

Digital InterPlot #: *020129A*

In some cases there will be the letter “S” at the beginning of a ROW File number. Tack this letter to the front of the file number and add a space. Do not use a hyphen.

Example

ROW File Number: S-2-179

Digital InterPlot #: *S 020179*

- In order to retrieve only the revised plans for any given ROW file number, do a two stage search by entering *Rev* in the *Source File Location* field as well as the ROW file number with asterisks.

Limit Your Criteria Fields

Fill in only the fields that are important in defining your search, using wildcards appropriately (see below). Filling in too many fields may limit your search in ways that you do not intend.

Wildcards

Originally, the % sign was used as the wildcard character in the search criteria, and searches were case sensitive. We have modified the programming to allow the asterisk (*) as a wildcard, and to make the search insensitive to the case of the entered search criteria.

It's generally a good idea to use a wildcard on either side of the text in a criteria field. For example, **Brewer** in the Town(s) field would return plan sheets in any plot set where "Brewer" is included in the field, including entries like "Bangor, Brewer". Specifying a town name without the wildcards will cause the search to miss records where the specified town is one of several in a list.

Practice

As you experiment with searching the archive, you will get a better feel for what works and what doesn't. Maybe you'll even come up with some suggestions we can use in this Hints and Tips list!

MEASURING A E-PLAN IMAGE

Overview

Digital InterPlot assumes a 300 dpi image when it calculates scales. Our Black and White images are 300 dpi. However, our color images are 200 dpi. Therefore, when setting scales for plotting or for measuring (color images only), there is a "fudge factor" involved. We, and some of the other customers, are urging Bentley to modify their software to automatically adjust the calculation, depending on the image resolution, without the need for a fudge factor. Until that is done, there is a ratio of 300/200 (or 150%) that needs to be applied to the scale setups for color images.

If you see shades of gray in the image, especially in the background, it is most likely a color image. The black & white images have no gray in them and have a crisp white background.

♬ Newly scanned color images that have been scanned in-house will not require a "fudge factor". They have been scanned at the same resolution as previously scanned color images, but maintain their paper size dimensions.

Configure Ruler

Before measuring either distances or areas, you need to complete the settings under **Configure Ruler** in the **Measure** menu. You first enter this menu system by a **Right-Click** on the image and then choose **Configure Ruler** (Figure 34-6).

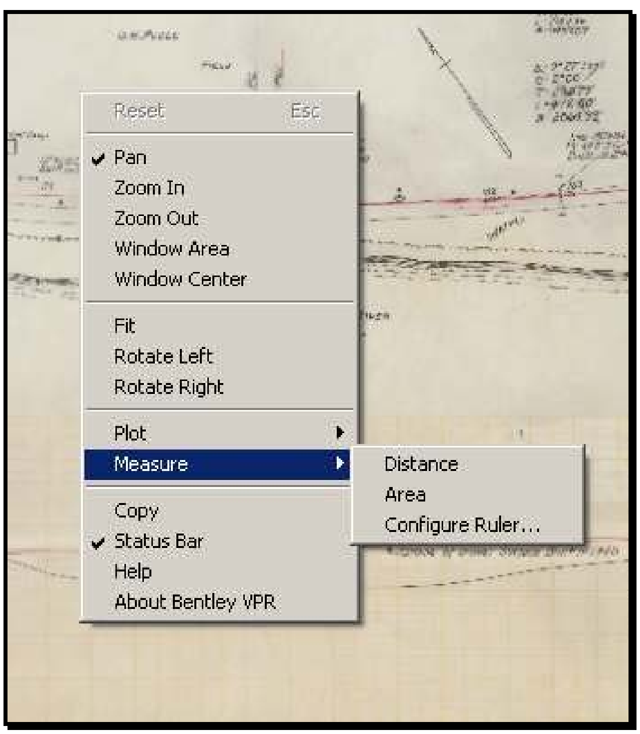


Figure 34-6: Entering the Ruler Configuration

Example 25 ft per 1 Inch

The image below (Figure 34-7) illustrates the setup for a scale of 25 feet per inch. Note that we have indicated that we will measure in **Model Units**, and that **1.00 inches** on the paper equals **25.00 feet** in the model (or on the ground in our case). For a color image, the settings would be 1.00 inches on the paper equals 37.5 feet in the model, due to the "fudge factor" discussed above.

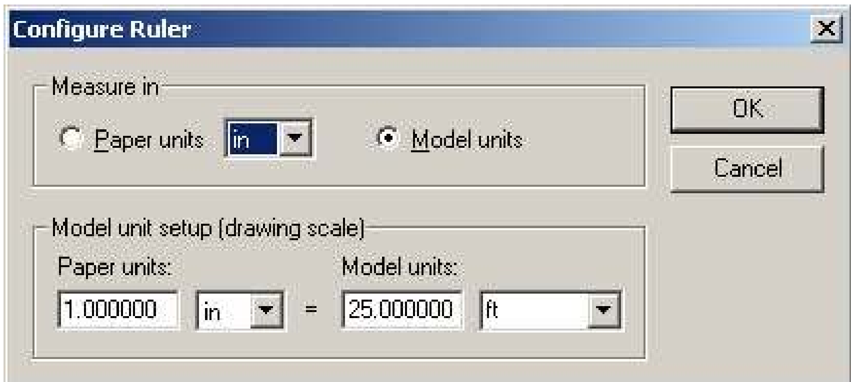


Figure 34-7: Setup for 25 feet per Inch

♬ We recommend that you do a test measurement on a known distance, such as a station interval, to confirm that your ruler setup is correct before you do a series of measurements.

Other Setups

You need to know the scale of the drawing you are measuring, in order to set the Ruler correctly. It is possible to set up for any scale ratio. You must remember to add the 150% "fudge factor" when measuring on our color images. Here are some typical setups for plan view drawings (Figure 34-8).

	Paper Units	Model Units
B&W 25 Scale	1.00 in	25.00 ft
Color 25 Scale	1.00 in	37.50 ft
B&W 50 Scale	1.00 in	50.00 ft
Color 50 Scale	1.00 in	75.00 ft
B&W Metric 250 Scale	1.00 mm	0.25 m
Color Metric 250 Scale	1.00 mm	0.375 m

Figure 34-8: Typical drawing scale setups

Measuring Distance

Choose **Measure - Distance** from the **Right-Click** menu. Click on the first point and then click on the second. You should see the measured distance in the lower-right border of the drawing window (Figure 34-9). You can continue measuring a cumulative distance, from point to point to point. One tap on the **ESC** (Reset) key will reset the measurement to zero.

Two taps on the **ESC** key will back you out of the Measure Distance command.

Figure 34-9: Distance is displayed in the lower right hand corner

Measuring Area

Choose **Measure** - **Area** from the **Right-Click** menu. Click on the first point, then click on the second, and continue to define a polygon to be measured. You should see the measured area in the lower-right border of the drawing window (Figure 34-10). One tap on the **ESC** (Reset) key will reset the measurement to zero and clear the polygon.

Two taps on the **ESC** key will back you out of the Measure Area command.

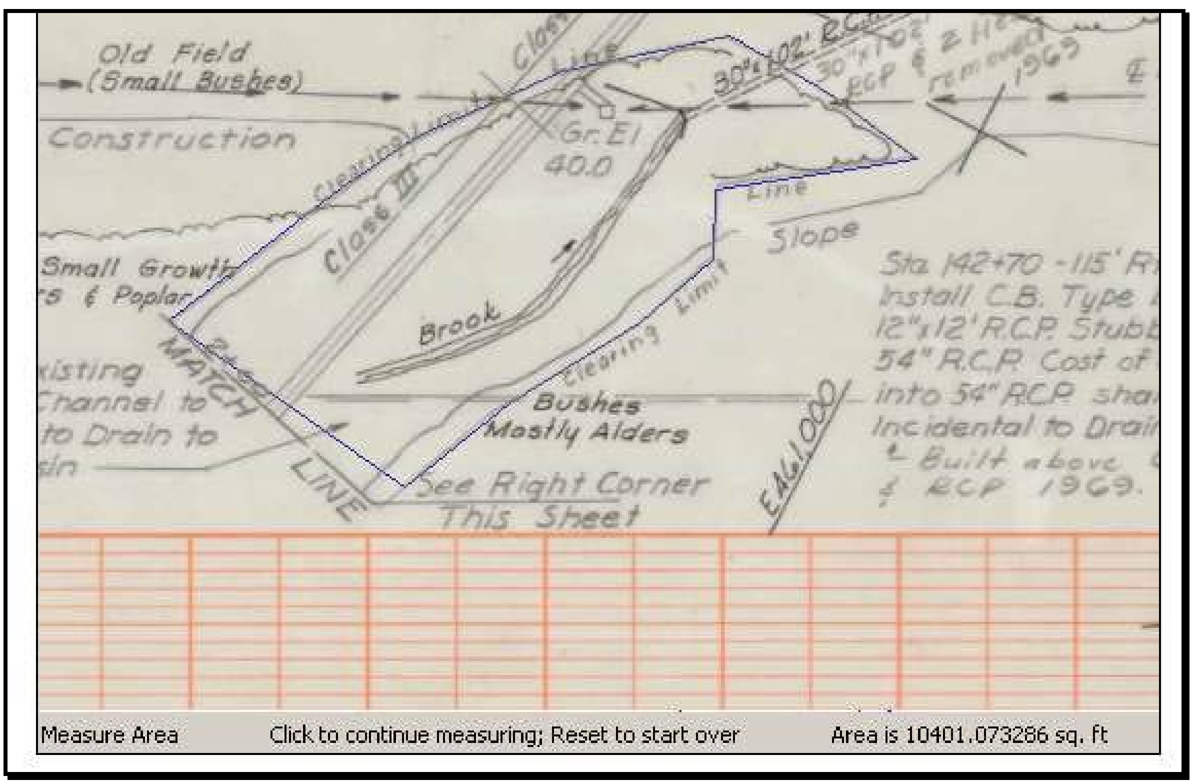


Figure 34-10: Area measurement displayed in lower right hand corner

PLOTTING (PRINTING) A SELECTED SHEET

Overview

There are several variations available in methods for printing and plotting. We'll discuss a method here that should be appropriate for most situations.

Plot to Form

From the right-click menu, select **Plot to Form** (Figure 34-11). You can choose any printer or plotter that is set up in Windows on your PC.

Figure 34-11: Right Click, select Plot to Form

✓ ***Refer to the MicroStation manual for a list of available plotters and how to add them as a Windows Printer or place a Customer Support Ticket to request OIT to setup additional plotters.***

Once you choose a printer or plotter, you should click on the **Properties** button to select the appropriate sheet size (normally *D+* or *Arch D*) and orientation (normally Landscape).

♬ To plot only a portion of the sheet, select a different page size such as 8 ½ x 11. The shape on your cursor will be adjusted to this size.

After you click OK on Properties, you need to set up the scaling of the plot.

Black and White Images

Digital InterPlot scales correctly with our black & white images, which were scanned at 300 dpi. If you are printing from a black & white image, select **Plot at Original Scale** or **Scale Percentage** of **100.** To get a half size plot, use 50.0 in the *Scale Percentage* field.

Color Images (old vault plans)

We have to set a scaling factor to get the proper sizes when printing our older vault plan color images. To get a plot from a color image at full scale, use 150.0 in the *Scale Percentage* field. To get a half size plot, use 75.0 in the *Scale Percentage* field.

Newer color scans (As-Builts) will be scanned at 200 dpi, but the size of the image will be identical to the black and white images. Select **Plot at Original Scale** or **100.0.** To get a half size plot, use 50.0 in the *Scale Percentage* field.

Place the shape

Place the sheet frame on the image with a left-click of the mouse. The original may have been wider than the sheet frame. This procedure lets you decide which margins to crop off to make the plot fit well.

Confirm by responding **Yes** to the *Plot Selected Area* question (Figure 34-12).

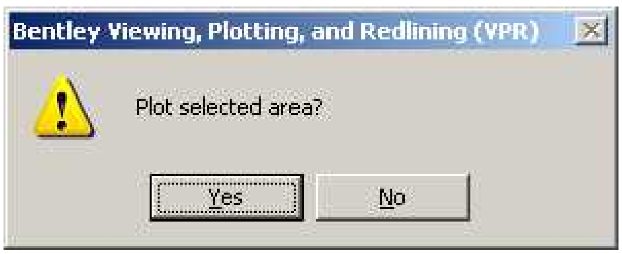


Figure 34-12: Plot selected area?

♫ You can answer No at this time if you have changed your mind.

USING A DOCUMENT POOL

Overview

A *Document Pool* is a collection of digital plots (DPR files). The following is a summary of the use of the Document Pool for printing:

Add Single files to the Document Pool

From the "Plot Set Table of Contents" page or the "Archive Results" page, click the check box next to the thumbnail. Check as many sheets as you want on this page (Figure 34-13).

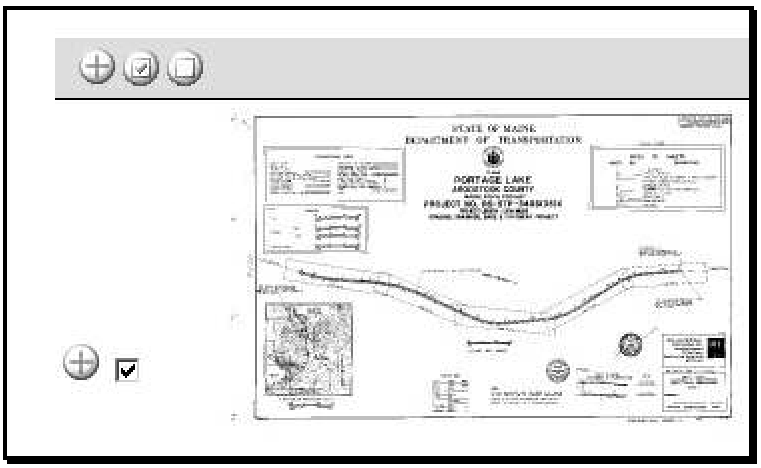


Figure 34-13: Place a check in the box next to the image

Click the "Add to Document Pool" icon (+) next to the check box (Figure 34-14) to add the document(s) to the document pool.

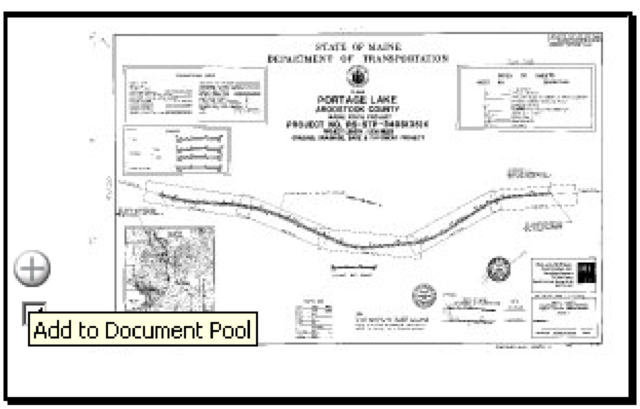


Figure 34-14: Click the Plus sign (+) next to the check box of the image

♫ You can repeat these first two steps to add sheets from other pages to the Document Pool.

Add Multiple files to the Document Pool

Part One: Display all Documents on one Page

If you have isolated the search to display only the pages you wish to print, you can add them all at once to the *Document Pool.*

Only five images are displayed in the thumb nail view by default when the results of a search are displayed in *Digital InterPlot.* Towards the top left of the window (Figure 34-15) you will notice the *Number of Records Found* for the search (i.e. 65). The *Records per page* is only displaying 5 at a time.

Figure 34-15: Number of Records Found and the Records per Page

Part Two: Change the Records per Page

Change the *Records per page* to the *Numbers of Records Found.* Type in 65 in the *Records per page* box and hit *Enter.* The page should now display all 65 images (Figure 34-16).

Figure 34-16: Records per page matching the Number of Records

Part Three: Select all Documents

Select all the images at once by clicking the *check* mark in gray bar above all the images (Figure 34-17). This will place a *check mark* next to all the images on the page.

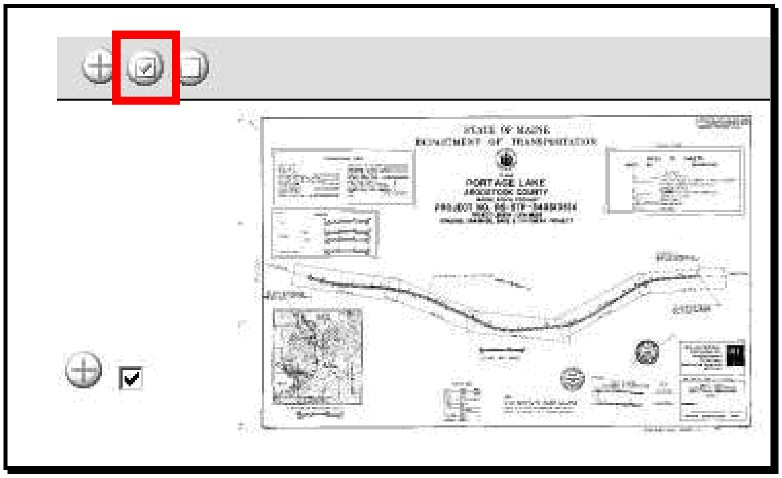


Figure 34-17: Select all the images at once

Part Four: Add to the Document Pool

Click the *Plus Sign* (Figure 34-18) next to the *Check Mark* to add all the images to the *Document Pool.*

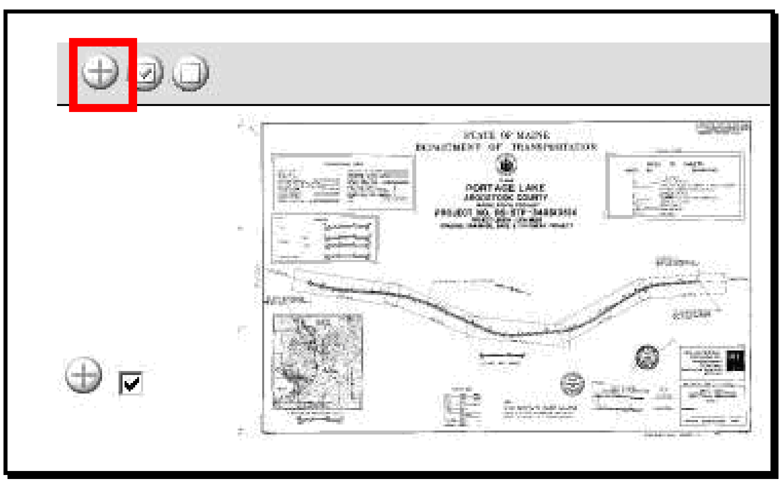


Figure 34-18: Click the Add button to add all images to the Document Pool

♬ The last icon next to the *Check Mark* will *Clear all* of the documents (removes the *check mark* next to all the images).

Removing Documents from the Pool

From the Digital InterPlot page, click the "Document Pool" tab. Click the check box next to the thumbnail to select the document (Figure 34-19).

Click the "Remove from Document Pool" icon (-) next to the document name.

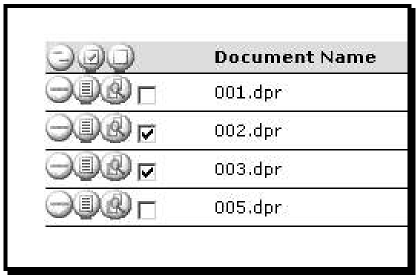


Figure 34-19: Images in the Document Pool

Printing Documents in the Document Pool

If you are satisfied with the documents in the pool, select the *Check Mark* above all the images to select them all (Figure 34-20).

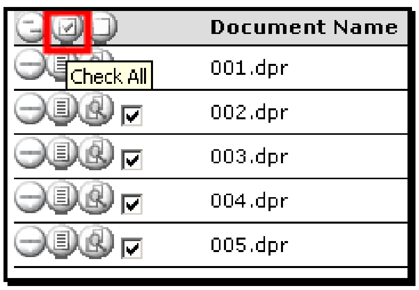


Figure 34-20: Check All button

Pick *Print Pool* towards the top right of the page. This opens the *Digital InterPlot Document Pool Printing* window (Figure 34-21). By right clicking, you have an option of sorting, deleting or moving a document to get them in the correct order.

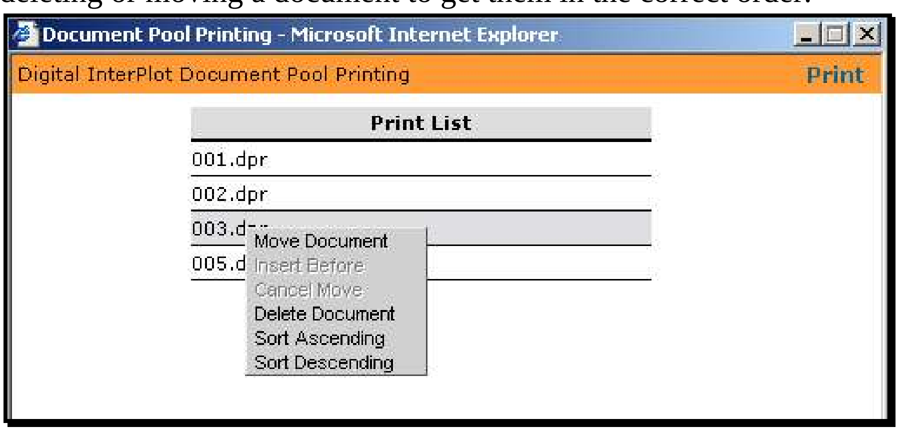


Figure 34-21: Right Click to sort or move a document

To print all the documents in the Print Pool, click Print.

The print dialog box then comes up, where you can make settings, as you do for other methods of printing.

✓ ***Refer to page 34-13 for picking a plotter and adjusting the settings.***

SAVING AN IMAGE TO DISK

Saving a JPG Copy of Image

At the very bottom of the view page, there is a link to a JPEG image file of the selected plan sheet. As with many web sites, you can **right-click** and do a **Save As** to get your own copy of the image to use however you need. These can be emailed to anyone requesting the images.

✓ ***Refer to page 2-75 for instruction on attaching images to scale in MicroStation.***

DISPLAY FIX

Overview

On some PC's, especially some of Maine DOT's laptops, you may see a display problem when viewing a sheet through *Digital InterPlot*, *InterPlot Organizer*, or the *Portable Plan Set* viewer. The image will appear as if it has been "shredded" (Figure 34-22) or doesn't display at all. The fix for that problem is to set the following two variables in Windows at the System level: QV_SWCONTEXT=1 and QV_NOPBUFFER=1.

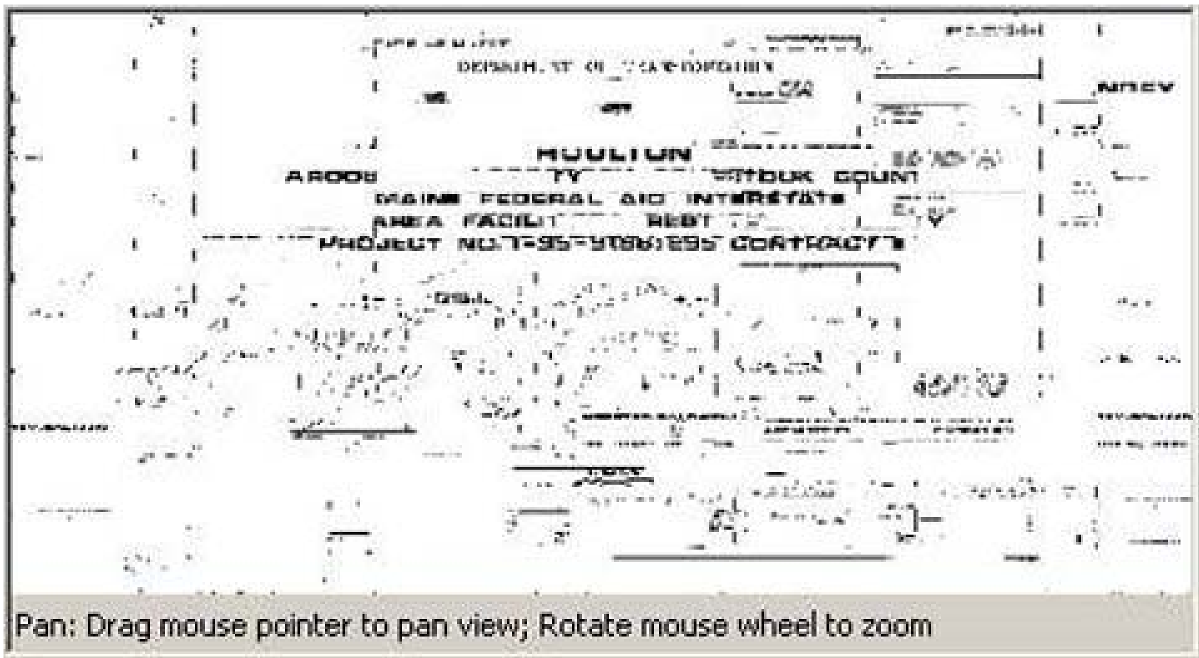


Figure 34-22: Image on a PC that requires the Windows System Variable

Add Windows System Variable

Part One: Right Click My Computer

Right click the *My Computer* icon and select *Properties.*

Part Two: Select Advanced Tab

Select the *Advanced* tab and click on *Environmental Variables* (Figure 34-23).

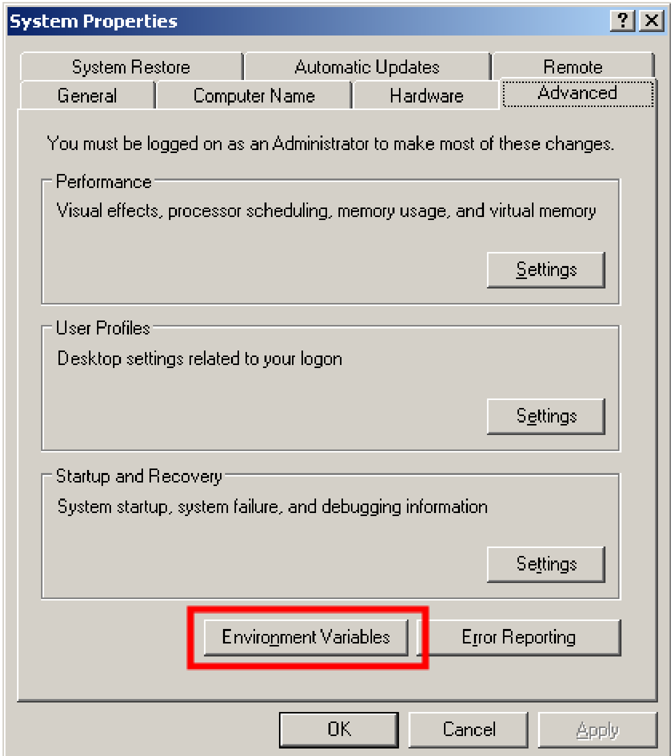


Figure 34-23: select the Environmental Variables button

Part Three: Add new System Variables

Select the **New** button in the **System Variables** section. Add the two new variables (QV_SWCONTEXT=1 and QV_NOPBUFFER=1) and their values as shown in Figure 34-24.

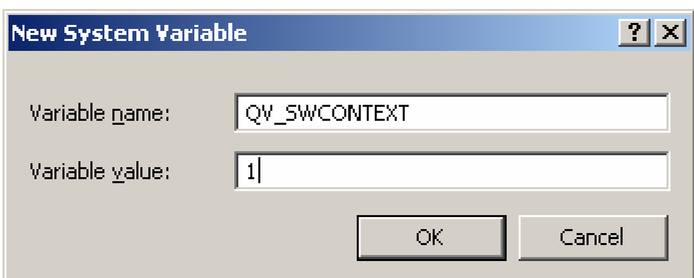


Figure 34-24: Add the variables and their values

Once the variables have been added, you should be able to locate them in the list of System Variables (Figure 34-25). Click **OK.**

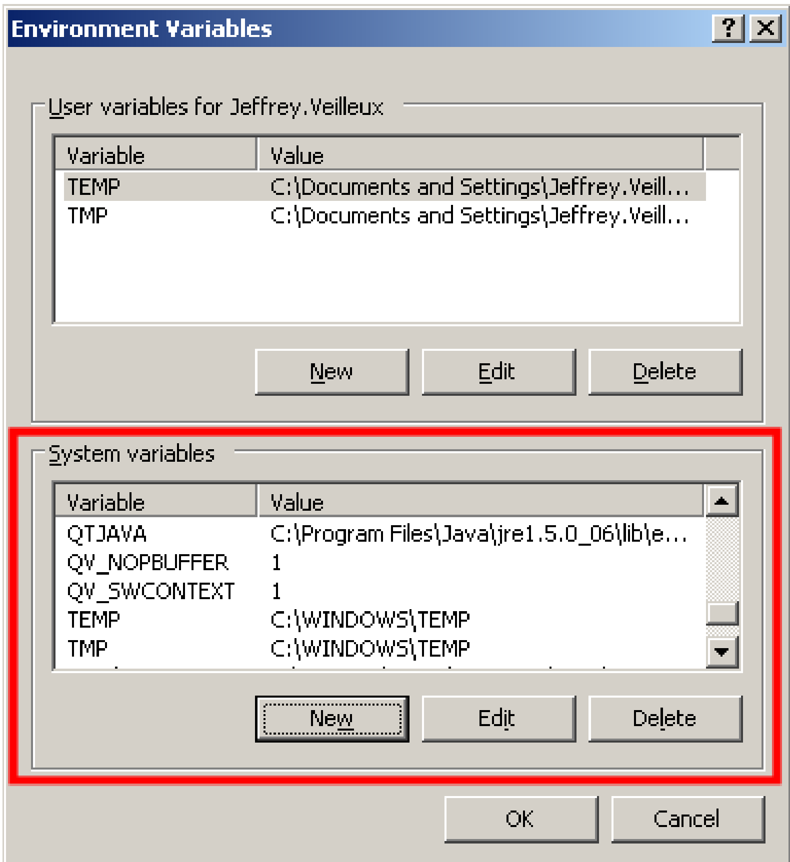


Figure 34-25: New variables added to the System Variables

DATA FIELD DICTIONARY

Fields in Search Page

Plot Set Name

This field comes from the file name of the IPS file used to create the plot set. For our scanned Vault Plans, this filed is derived from the Project Number. In the Browse Page, this is the field with the attached link to go to the plan sheets in the set.

Sheet Name

This field comes from the file name assigned to the image when Smooth Solutions did the scanning. It is normally the sheet number, padded to at least 3 places. For example, sheet 2 of the plan set becomes 002. When there are sheets added in between, or the scanners found two or more of the same sheet number, Sheet Names like "002A" are created.

Sheet Type

This is the type of sheet, as interpreted by the scanners, from the following list:

Title, Typical Sections, Standard Details, Estimate, Drainage, Plan, Profile, Plan_Profile, Xsections, Geometry, Highway_Other, RWPlan, Bridge_Abutment, Bridge_Pier, Bridge_Superstructure, Bridge_Details, Bridge_Other, Other.

Project ID Number (PIN)

This field is the PIN that we use on newer projects. Projects started before 1982 did not have PINs assigned.

Source File Location

In the case of the original Vault Plans, this field was used for the "Rack ID" where the plans were stored. It can be useful in comparing with the earlier Vault Plans Index.

Contract Plans, Amendments and **As-Built Plans** will be used for all Highway, Bridge, Traffic and Multimodal plans.

In the case of the original Right of Way Plans stored in racks, this field was used to indicate where the scanned plan was stored. This field, along with the ROW File Number can be used in comparing with the old RW Plans Index. All new Right of Way Plans will have either ROW Plan or ROW Plans Revision as the Source File Location.

Project Name

This field was intended for the name and/or description on the title sheet of the plans. However, the process of transferring data from the old Vault Plans Index has resulted in the contents of this field usually being the same as the Scope/Description field (which is normally the same information).

Project Number

This is the Project Number as shown on the Title Sheet. This is likely to be a Federal-Aid

Project Number with various initials or abbreviations in it. The format of these numbers varies widely. The early projects had very cryptic numbers.

ROW File Number

This field contains a number assigned by our Right of Way staff to track the RW Plans. It will be blank in plot sets that are not RW Plans.

Year

Ideally, this is the year that the project was constructed. However, the old index was incomplete and lacked this information on many projects. In these cases, we have instructed Smooth Solutions to use the latest year they can find on the plans. If they have searched and cannot find a date, they are to enter "NONE" to indicate that the search was made and no date was found.

Route Number(s)

This field contains the route number, from a standard list, for most highway projects. Unfortunately, most of our bridge projects do not list a route number on the plans, relying only on the bridge number. There can be multiple route numbers listed on a project.

Route Code

This field contains an MDOT route code, which has been used by Planning and others, and relates directly to the route number. This field will provide more precise search results if you know the code for the route you are looking for.
On projects which did not have a Route Number listed in the old index, we do not have a Route Code entered.

✓ ***Refer to page 34-34 for a list of route codes.***

County

This field can have more than one county in it, when projects cross county lines.

Bridge Number

This field can have more than one bridge number in it, when multiple bridges are involved in the project.

Town(s)

This field can have more than one town in it, when projects cross town lines.

Scope / Description

The contents of this field were taken from the old indexes. Many of these entries include four letter "scope codes."

✓ ***Refer to page 34-36 for a list of scope codes.***

Scan Plotset ID

This field is essentially a "serial number" for the Plot Set (project) as it is processed into the Digital InterPlot system. Each plot set will have only one Scan Plotset ID. This field can be useful in doing a two-step search, where you get a list of title sheets meeting your search criteria, identify the project you want, then search for all sheets belonging to that plot set.

Sheet Fields

Sheet

This field is a number generated by Digital InterPlot. A “3” in this field means that this is the 3rd sheet entered. When additional sheets are inserted, such as sheet 3A, or when sheets are missing from the set, this number does not match the sheet number on the plans.

Sheet Name

This field comes from the file name assigned to the image when Smooth Solutions did the scanning. It is normally the sheet number, padded to at least 3 places. For example, sheet 2 of the plan set becomes 002. When there are sheets added in between, or the scanners found two or more of the same sheet number, Sheet Names like “002A” are created.

Scan Project ID

This field is the “serial number” for the Plot Set, and is the same number as the Scan Plotset ID.

♬ Due to the structure of the database, this sheet field has a different name than the corresponding field in the plot set. There is a “hidden” field which serves as the index on which the relationship between plot sets and sheets is technically established.

Scan Image ID

This field is a “serial number” for the image. Each image has a unique Scan Image ID, which can be used for system management purposes. This is required because the image file names are not unique.

Other Fields

Number of Sheets

This is the number of sheets in a Plot Set in Digital InterPlot. It is very likely not the same as the number of sheets in the original plan set. For most projects, the cross section sheets were pulled out and microfilmed years ago. Other sheets may be missing, for whatever reason.

Sheet __ of __

This is based on the sheet numbering generated by Digital InterPlot, and likely does not coincide with the original numbering of the plan set.

DPR

For a sheet, this is a link to an image file in the DPR format that Digital InterPlot uses. For a plot set, this field is a link to the IPS file that defines the makeup of the plot set.

JPEG

For a sheet, this is a link to an image file in the JPG format, which is a popular industry standard. You can Right-Click and Save As to get your own local copy of the image file, to be used with MicroStation, or almost any software that handles images. For a plot set, this field is a link to the IPS file that defines the makeup of the plot set.

PORTABLE PLAN SET UTILITY

INSTALLING PORTABLE PLAN SET UTILITY

Overview

If you receive requests from clients outside of MaineDOT for multiple images stored in the E-Plans archive, a **Portable Plan Set (PPS)** is the perfect solution to providing the images. PPS is a program delivered with *Digital InterPlot* that enables the packaging of images produced from a search of an archive. This program needs to be installed as a separate application on a user's computer.

Step One: Starting the Batch File

We created a batch file that users can run to do the install for themselves. If viewing this as an electronic document, click this link (\\dot0dta1fscadd1\pcpin1\msworksp\DigitalInterPlot\) to browse to the directory where the batch file is stored or type the address into a *Windows Explorer* address bar. Double click the **InstallPPS.bat** to start the program.

Step Two: Click any Key to Continue

A black command prompt dialog will open. Read the short description and click any key to continue. After a few commands run, you will be prompted to click any key again.

Step Three: Add Info to Registry

After clicking any key the second time, you will receive the message shown in Figure 34-26. Click **Yes.**

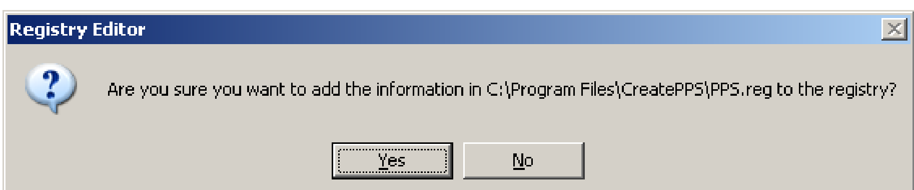


Figure 34-26: Add information to Registry prompt.

Step Four: Confirmation of Registry Addition

Almost immediately you will receive another message stating the information was added successfully (Figure 34-27). Click **OK.**

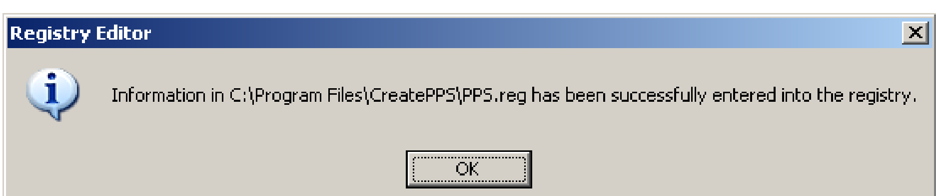


Figure 34-27: Confirmation of Registry information

Step Five: Click any Key to Finish

The command prompt dialog will send a message stating that the installation was successful. Click any key to continue and exit the program.

ⓘ ***Contact CADD Support personnel with assistance if necessary.***

USING PORTABLE PLAN SET UTILITY

Overview

The Portable Plan Set utility looks and acts the same as the regular E-Plans archive. Do the searching with this utility instead of with the E-Plans archive.

- Creating a Portable Plan Set is great for sending multiple images to an outside source. It will contain the indexing information as well as the image(s). If only a single image is needed, it may be just as easy to save the .jpg and email the image. No indexing information is available with a .jpg.
- The file sent will not contain an image that can be saved out of the program, however if the recipient has **Adobe Professional,** they can print to a PDF and save to a tiff image.

✓ ***Refer to page 34-19 for instruction on saving a .jpg image from the E-Plans archive.***

Step One: Launch PPS

Launch the Portable Plan Set (PPS) utility from the *Desktop* icon or select **Start>Programs>Create Portable Plan Set.** The interface is very similar to the regular E-Plans archive (Figure 34-28).

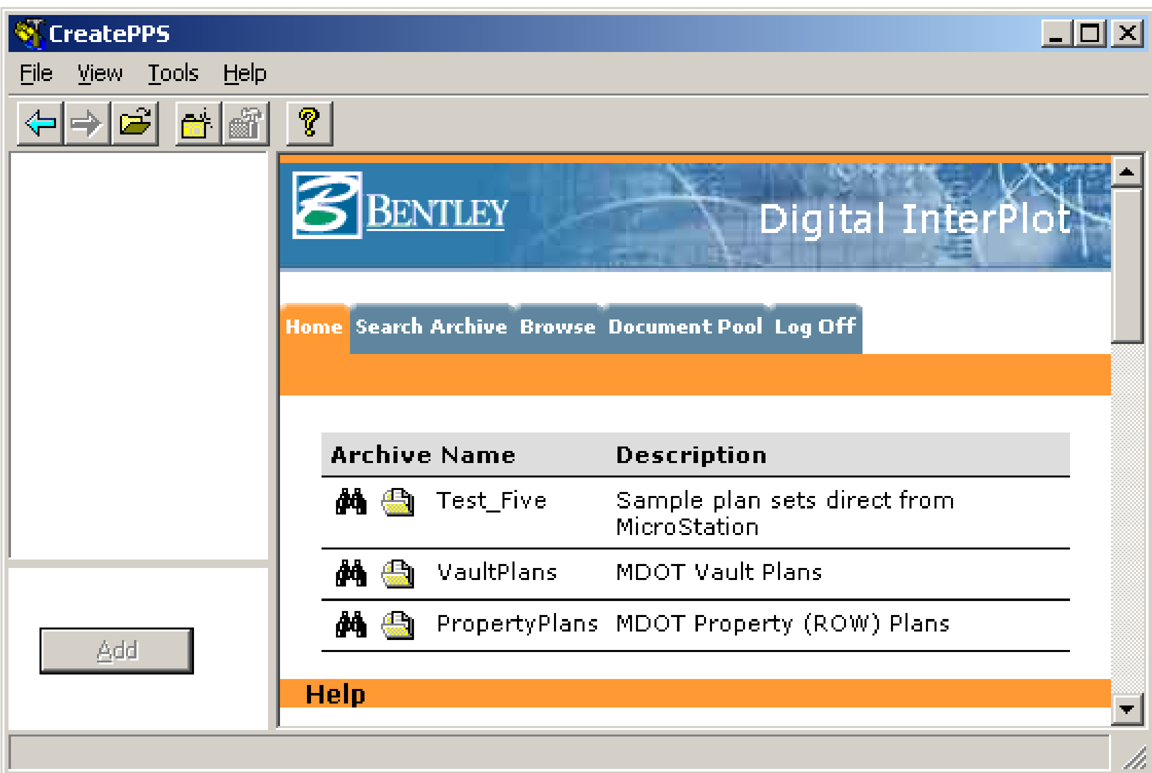


Figure 34-28: CreatePPS dialog

Step Two: Locate Plan Set(s)

Using the normal search routines, locate the desired plan set. Once a plan sheet is located, click the thumbnail image to enlarge it.

✓ ***Refer to page 34-6 for information on searching an archive.***

Step Three: Create Folders (Optional)

Overview

We recommend that the user creates a folder to contain the images even if they are all for the same project location. This is optional, but when gathering multiple images from different projects or Right of Way Files, we highly recommend creating folders and sub folders to better organize the images.

Part One: Add Folder

Select **Tools>Add Folder** from the CreatePPS menu or select the *Add Folder* icon (Figure 34-29).

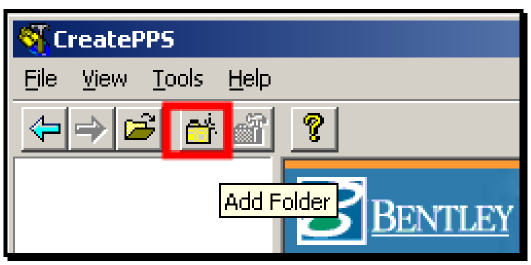


Figure 34-29: Add Folder icon from the CreatePPS tool bar.

Enter a folder name (i.e. PIN-Town or Town) and click **OK.**

Part Two: Add Sub Folders (if necessary)

If adding multiple images from different projects, add a sub folder. Highlight the newly created folder and select *Add Folder* again. Enter the new folder name and click **OK.** The result will be similar to Figure 34-30.

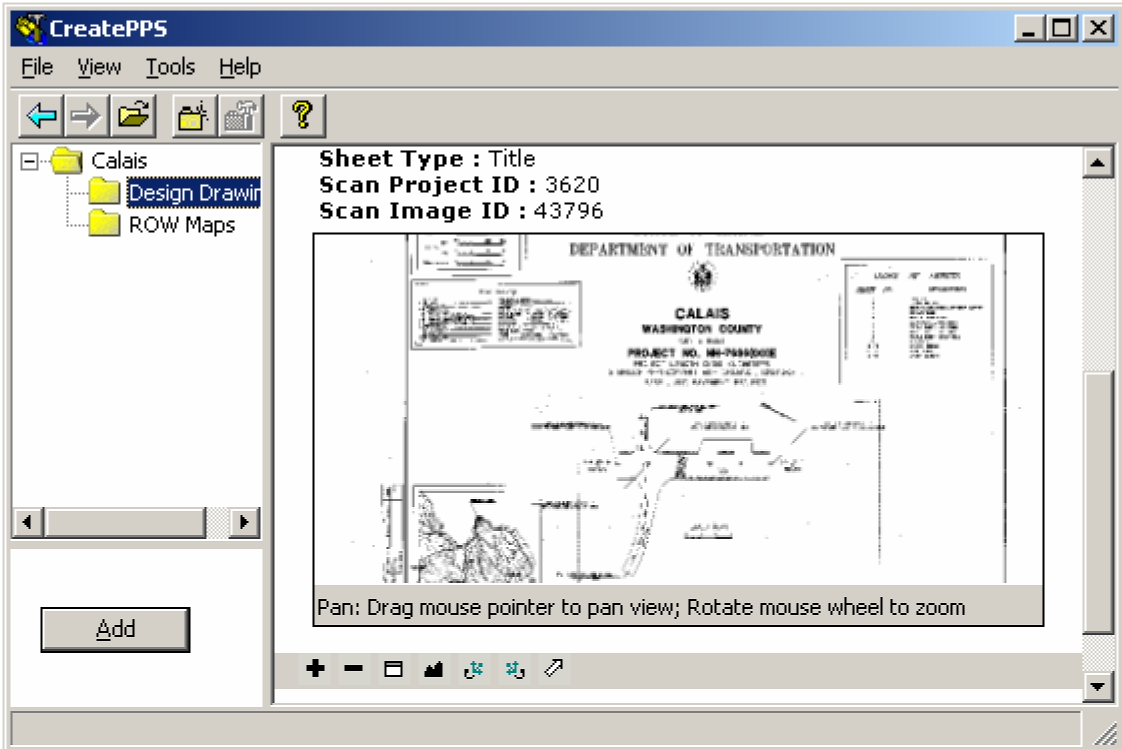


Figure 34-30: Folder structure to organize the images.

Step Four: Add Image to Folder

Once an image is selected (enlarged from the thumbnail view), the **ADD** button is activated. Select which folder you want the image placed in and click **ADD.**

Images and folders can be moved around simply be dragging and dropping to better organize the content. They can also be deleted, renamed or sorted by right clicking on the image or folder and picking from the sub menu.

Step Five: Adding Additional Images

With practice, you will find how fast you can click on a thumbnail drawing and add it to the PPS. If you go too fast, you will "get ahead" of the software and add multiple copies of the same sheet. On the other hand, you don't have to wait for each sheet to fully "draw up" each time. You can also delete extra copies, if you added some inadvertently.

Step Six: Create Plan Set

Once all the images have been added and are organize the way you want, select **Tools**>**Create Plan Set** from the PPS main menu or click the icon with the picture of a folder with a hammer (Figure 34-31).

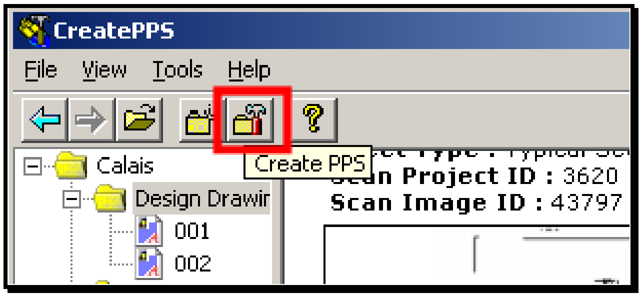


Figure 34-31: Create Plan Set tool on the tool bar.

The *Save In* dialog will open giving the user the opportunity to browse to a location to save the file and supply a name for the PPS. The recommended location to place the files is the C:\temp folder. Double click the file to view the results.

Step Seven: Send the PPS

Overview

There are multiple ways to send the Portable Plan Set. Depending on the size of the PPS may help you determine the best method. If you aren't showing the details of all files, right click and select *Properties*. The size is displayed.

Send via Email

If the size of the PPS is less that 10MB it can be sent through our email system, however the recipients maximum file size may be smaller.

> ♬ IMPORTANT NOTE: Most email systems will not allow an **.exe** file to be sent or received. Simply right click the file and select. Rename the files extension in the C:\temp folder from **.exe** to **.txt**. Windows will ask if you want to do this. Select **Yes.** Attach the file to the email message and instruct the user to save the file locally and rename it back to the .exe extension.

FTP Site

The FTP site can handle almost any file size and files with an .exe extension. This is a good method for sending large files.

✓ ***Refer to page 33-2 for instructions on sending a file using the FTP site.***

Burn a CD

Another option is to burn a CD and mail it.

✓ ***Refer to Windows HELP for instructions on burning a CD.***

REFERENCES

ROUTE CODES

Route name	Rte code
INT 195 EB	0195E
INT 195 WB	0195W
INT 295 NB	0295X
INT 295 SB	0295S
INT 395 EB	0395X
INT 395 WB	0395W
INT 495 EB	0495X
INT 495 WB	0495W
INT 95 NB	0095X
INT 95 SB	0095S
ST RTE 10	0010X
ST RTE 100	0100X
ST RTE 100A	0100A
ST RTE 100S	0100S
ST RTE 101	0101X
ST RTE 102	0102X
ST RTE 102A	0102A
ST RTE 103	0103X
ST RTE 104	0104X
ST RTE 105	0105X
ST RTE 1051S	1051S
ST RTE 106	0106X
ST RTE 107	0107X
ST RTE 108	0108X
ST RTE 109	0109X
ST RTE 11	0011X
ST RTE 110	0110X
ST RTE 111	0111X
ST RTE 112	0112X
ST RTE 113	0113X
ST RTE 114	0114X
ST RTE 115	0115X
ST RTE 116	0116X
ST RTE 117	0117X
ST RTE 118	0118X
ST RTE 1186S	1186S
ST RTE 119	0119X
ST RTE 11A	0011A
ST RTE 11C	0011C
ST RTE 11S	0011S
ST RTE 120	0120X
ST RTE 1207W	1207W
ST RTE 121	0121X
ST RTE 121S	0121S
ST RTE 122	0122X
ST RTE 123	0123X
ST RTE 124	0124X
ST RTE 125	0125X
ST RTE 126	0126X
ST RTE 126W	0126W

Route name	Rte code
ST RTE 127	0127X
ST RTE 127W	0127W
ST RTE 128	0128X
ST RTE 129	0129X
ST RTE 130	0130X
ST RTE 131	0131X
ST RTE 132	0132X
ST RTE 133	0133X
ST RTE 134	0134X
ST RTE 135	0135X
ST RTE 136	0136X
ST RTE 137	0137X
ST RTE 137C	0137C
ST RTE 137S	0137S
ST RTE 138	0138X
ST RTE 139	0139X
ST RTE 140	0140X
ST RTE 141	0141X
ST RTE 142	0142X
ST RTE 143	0143X
ST RTE 144	0144X
ST RTE 145	0145X
ST RTE 146	0146X
ST RTE 148	0148X
ST RTE 1484W	1484W
ST RTE 149	0149X
ST RTE 15	0015X
ST RTE 150	0150X
ST RTE 151	0151X
ST RTE 152	0152X
ST RTE 153	0153X
ST RTE 154	0154X
ST RTE 155	0155X
ST RTE 156	0156X
ST RTE 157	0157X
ST RTE 158	0158X
ST RTE 159	0159X
ST RTE 15S	0015S
ST RTE 16	0016X
ST RTE 160	0160X
ST RTE 161	0161X
ST RTE 161S	0161S
ST RTE 162	0162X
ST RTE 163	0163X
ST RTE 164	0164X
ST RTE 164S	0164S
ST RTE 166	0166X
ST RTE 166A	0166A
ST RTE 167	0167X
ST RTE 168	0168X

Route name	Rte code
ST RTE 169	0169X
ST RTE 17	0017X
ST RTE 170	0170X
ST RTE 171	0171X
ST RTE 172	0172X
ST RTE 173	0173X
ST RTE 174	0174X
ST RTE 175	0175X
ST RTE 176	0176X
ST RTE 177	0177X
ST RTE 178	0178X
ST RTE 179	0179X
ST RTE 17S	0017S
ST RTE 180	0180X
ST RTE 181	0181X
ST RTE 182	0182X
ST RTE 183	0183X
ST RTE 184	0184X
ST RTE 185	0185X
ST RTE 186	0186X
ST RTE 187	0187X
ST RTE 188	0188X
ST RTE 189	0189X
ST RTE 190	0190X
ST RTE 191	0191X
ST RTE 192	0192X
ST RTE 193	0193X
ST RTE 194	0194X
ST RTE 195	0195X
ST RTE 196	0196X
ST RTE 196S	0196S
ST RTE 197	0197X
ST RTE 198	0198X
ST RTE 199	0199X
ST RTE 1AS	001AS
ST RTE 1C	0001C
ST RTE 1CW	001CW
ST RTE 200	0200X
ST RTE 203	0203X
ST RTE 2037S	2037S
ST RTE 204	0204X
ST RTE 205	0205X
ST RTE 206	0206X
ST RTE 207	0207X
ST RTE 208	0208X
ST RTE 208W	0208W
ST RTE 209	0209X
ST RTE 210	0210X
ST RTE 212	0212X
ST RTE 213	0213X

ROUTE CODES (CONTD.)

Route name	Rte code
ST RTE 214	0214X
ST RTE 215	0215X
ST RTE 215S	0215S
ST RTE 216	0216X
ST RTE 217	0217X
ST RTE 218	0218X
ST RTE 219	0219X
ST RTE 22	0022X
ST RTE 220	0220X
ST RTE 221	0221X
ST RTE 222	0222X
ST RTE 223	0223X
ST RTE 224	0224X
ST RTE 225	0225X
ST RTE 226	0226X
ST RTE 227	0227X
ST RTE 227 WEST	0227W
ST RTE 228	0228X
ST RTE 228T	0228T
ST RTE 229	0229X
ST RTE 22S	0022S
ST RTE 23	0023X
ST RTE 230	0230X
ST RTE 231	0231X
ST RTE 232	0232X
ST RTE 233	0233X
ST RTE 234	0234X
ST RTE 235	0235X
ST RTE 236	0236X
ST RTE 236S	0236S
ST RTE 237	0237X
ST RTE 237S	0237S
ST RTE 238	0238X
ST RTE 2380W	2380W
ST RTE 24	0024X
ST RTE 24S	0024S
ST RTE 25	0025X
ST RTE 2510W	2510W
ST RTE 25C	0025C
ST RTE 25CE	025CE
ST RTE 25E	0025E
ST RTE 25W	0025W
ST RTE 26	0026X
ST RTE 26A	0026A
ST RTE 26S	0026S
ST RTE 27	0027X
ST RTE 27S	0027S
ST RTE 2C	0002C
ST RTE 2W	0002W
ST RTE 3	0003X

Route name	Rte code
ST RTE 3006W	3006W
ST RTE 32	0032X
ST RTE 32S	0032S
ST RTE 35	0035X
ST RTE 37	0037X
ST RTE 3W	0003W
ST RTE 4	0004X
ST RTE 41	0041X
ST RTE 4195S	4195S
ST RTE 43	0043X
ST RTE 46	0046X
ST RTE 4A	0004A
ST RTE 4S	0004S
ST RTE 5	0005X
ST RTE 516W	0516W
ST RTE 5195S	5195S
ST RTE 52	0052X
ST RTE 5A	0005A
ST RTE 5B	0005B
ST RTE 5S	0005S
ST RTE 6	0006X
ST RTE 69	0069X
ST RTE 6W	0006W
ST RTE 7	0007X
ST RTE 73	0073X
ST RTE 77	0077X
ST RTE 77W	0077W
ST RTE 8	0008X
ST RTE 8239	8239E
ST RTE 8239W	8239W
ST RTE 85	0085X
ST RTE 86	0086X
ST RTE 88	0088X
ST RTE 8888	8888X
ST RTE 88S	0088S
ST RTE 89	0089X
ST RTE 89W	0089W
ST RTE 9	0009X
ST RTE 90	0090X
ST RTE 91	0091X
ST RTE 92	0092X
ST RTE 9208W	9208W
ST RTE 93	0093X
ST RTE 94	0094X
ST RTE 96	0096X
ST RTE 97	0097X
ST RTE 98	0098X
ST RTE 99	0099X
ST RTE 9A	0009A
ST RTE 9B	0009B

Route name	Rte code
ST RTE 9W	0009W
ST RTE A001	A001X
ST RTE A005	A005X
ST RTE A186W	A186W
ST RTE B001	B001X
ST RTE B001C	B001C
ST RTE B100S	B100S
ST RTE C100	C100X
ST RTE G001A	G001A
ST RTE G100S	G100S
ST RTE J001A	J001A
ST RTE M001	M001X
US 1	0001X
US 1 SB	0001S
US 1A	0001A
US 1B	0001B
US 2	0002X
US 201	0201X
US 201 SB	0201S
US 201A	0201A
US 202	0202X
US 202 SB	0202S
US 2A	0002A
US 302	0302X
US 302 SB	0302S

SCOPE CODES

Scope Codes for Vault Plans Inventory **6/10/2004**

ABBR	SCOPE	OTHER CODES (Found in Inventory)	INDEX
APPN	APPROACH CONSTRUCTION	BRAP	0110
APPR	APPROACH-RECONSTRUCTION		0215
BDRH	BRIDGE DECK REHABILITATION	WRSK	0451
BKWY	BIKEWAY		0660
BNEW	BRIDGE CONSTRUCTION-NEW	BRTM	0410
BR&C	BRIDGE RAIL & CURB IMP		0470
BRCL	BRIDGE CULVERT REPLACEMENT		0425
BRDG	BRIDGE IMPROVEMENT		0400
BRDK	BRIDGE DECK REPLACEMENT	BDR	0450
BREM	BRIDGE REMOVAL		0490
BRHB	BRIDGE REHABILITATION		0430
BRPL	BRIDGE REPLACEMENT		0420
BRPT	BRIDGE PAINTING		0475
BRSB	BRIDGE SUBSTRUCTURE REHABILITATION		0435
BRSR	BRIDGE SUPERSTRUCTURE REPLACEMENT		0440
BRWI	BRIDGE WIDENING		0480
CRKS	CRACK SEALING	CS	0275
CULV	CULVERT REPLACEMENT		0850
EMBK	EMBANKMENT RECONSTRUCTION		0205
GARD	GUARDRAIL		0670
HGWY	HIGHWAY IMPROVEMENTS		0200
HNEW	NEW HIGHWAY CONSTRUCTION	GDB, GDBP	0100
INSG	INTERSECTION IMP W/ SIGNAL		0310
INTR	INTERSECTION IMP W/O SIGNAL		0290
ISIG	INSTALL TRAFFIC SIGNALS	TS	0330
LSCP	LANDSCAPING	LA, LS	0650
LTNG	LIGHTING		0360
LTSG	LIGHTING & SIGNING	LISG	0350
MISC	MISCELLANEOUS SPECIAL PROJ		0700
MSIG	MODIFY TRAFFIC SIGNALS		0340
P&RI	PARK & RIDE FACILITY IMPROVEMENT		0607
PEBF	PEDESTRIAN/BICYCLE FACLITIES	BKRT, BKPT	0661
PNEW	PARK AND RIDE FACILITY CONSTRUCTION		0606
PVRB	PAVEMENT REHABILITATION		0225
RBRB	RAIL BRIDGE REHABILITATION		0573
RCST	HIGHWAY RECONSTRUCTION		0210
REHB	HIGHWAY REHABILITATION	R	0220
REST	REST AREA		0620
RNEW	RAIL LINE-NEW CONSTRUCTION		0570
RRHB	RAIL LINE REHABILITATION	EMRR	0571
RSRF	HIGHWAY RESURFACING	HVYR, MEDR, LHTR, PAVE, O, HBO, LR, SLRS	0280
SIGN	SIGNING		0370
SNEW	SIDEWALK-CONSTRUCTION		0666
SNTO	SCENIC ENHANCEMENTS		0625
SRHB	SIDEWALK FACILITY IMPROVEMENTS		0667
TICN	TOURIST INFORMATION CENTER		0610
TOSI	TOPSI TRAFFIC ENG IMPROVMNT		0300
TRNF	TRANSFER FACILITY		0608
TWAR	TRUCK WEIGH AREA		0630
W&OV	HIGHWAY WIDENING & OVERLAY		0230
WETL	WETLANDS MITIGATION		0655
WRSF	BRIDGE WEARING SURF REPLACE	BWSR	0460
XING	R/H X-ING IMPROVEMENT	XRWS, XHWS, XRNS, XHNS, XINS, XRHS, RRX	0500
XNEW	R/H X-ING CONSTRUCTION NEW		0505
XREM	R/H X-ING REMOVAL		0560

EPLANS Archive (Admin. Users)

INTERPLOT CLIENT SETUP

Overview

The InterPlot Client setup is for those who will be archiving plans into the E-Plans Archive (Digital InterPlot). The steps listed below are for a new installation (version 08.05.02.19). If you are doing an Upgrade of an existing installation, see the Upgrade Notes section of this document.

Step One: Test E-Plans Viewing

View a plan sheet through the Digital InterPlot Archive (E-Plans).

✓ ***If there are problems, go to the Fix for Display Problem section on page 34-20.***

Step Two: Install InterPlot Client from Disk

If viewing this as an electronic document, click this link (\\dot0dta1fscadd1\pcpin1\msworksp\DigitalInterPlot\Software Install\ipc08050219en\Install) to browse to the install directory or type the address into a *Windows Explorer* address bar. Double click the **Setup.exe** program.

Install everything with the exception of APLOT (AutoCAD), MicroStation J Support and Bentley View (scroll down). Restart Computer.

Step Three: Copy Icon to Desktop

To create a shortcut to the desktop, browse to but do not click on **Start>Programs>InterPlot Utilities>InterPlot Organizer.** Right-click and select **Send to>Desktop (create shortcut).**

Step Four: InterPlot Client Configure

Select **Start>Programs>InterPlot Utilities>InterPlot Client Configure.** Select the **Integrate** button. There, you will confirm that you are integrating with the installed copy of MicroStation. Click **OK** and **Exit Configure.**

Step Five: Add the Plot Server Printer

Establish a connection to **InterPlot to Oce TDS 600** on **\\dot0dta1asplot1** . This printer provides access to the drivers needed by Digital InterPlot, even when “printing” only to the archive. To install this printer, click the link in the document link in this document and double click the IPTDS600 plotter in the list. If it doesn’t work, type the address in *Windows Explorer* and double click the IPTDS600 plotter in the list.

♬ This is not the same as the plotter share on the regular print server, dot0dta1psprint.

Alternatively, you can add a network printer and enter the *wildcard* ***TDS 600*** in the name field. Highlight the printer and click **OK.**

♬ Note that there must be a space between "TDS" and "600". If you leave out the space, you will get the "regular" connection to the same plotter, which uses the OCE driver, but does not work with DI.

Step Six: Run Batch File

Browse to the batch file located at the following location (\\dot0dta1fscadd1\pcpin1\msworksp\DigitalInterPlot\ . Double click the **IPClient.bat** file to install the license and custom files.

Step Seven: Setup InterPlot Organizer Printer

Part One: Create Folder

Part of the setup will require an output directory. Create a folder called **dprfiles** at the root of the D:drive.

Part Two: Add Printer

Select **Start>Printers and Faxes**. Click **Add Printer** [Next] and select **Local Printer Attached to this Computer** [Next]**.** Select **Create a new port:** and set the port to **InterPlot Organizer Port** [Next].

Enter a port name, (i.e. InterPlotPort) and then click **OK**.

From the *Job Storage Definition* dialog box (Figure 34-32), select the output directory for the DPR files. (i.e. D:\dprfiles). Click *Pattern Setup* to change the file-naming pattern for the DPR files. Click **OK.**

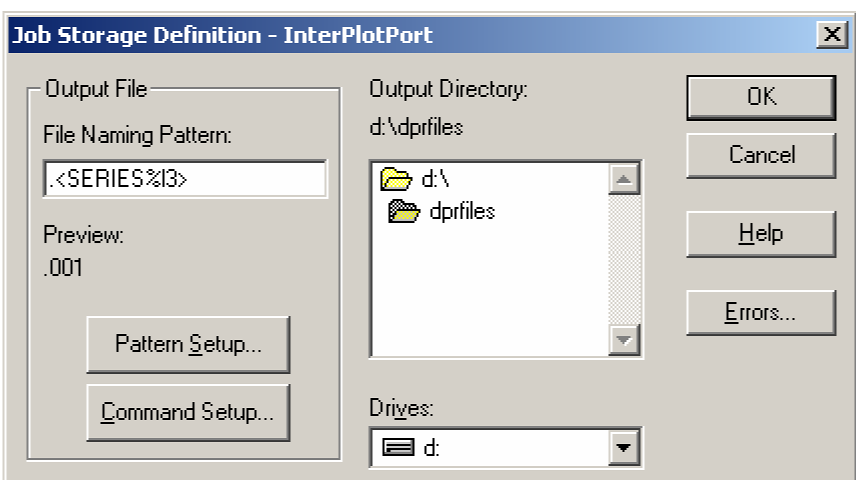


Figure 34-32: Job storage definition dialog.

Click Next.

Select **Bentley** from the Manufacturers list box, and the **InterPlot Organizer Printer Driver** from the Printers list box, and then click **Next.**

Select **Keep Existing Driver** and then click **Next.**

Enter the printer name (i.e. InterPlot Organizer Printer Driver), and then click **Next.** Do not set it as the default printer. Click **Next.**

Select **Do not share this printer** then click **Next**.

Select **No** so as not to print a test page. Click **Next** and then click **Finish.**

Part Three: Test

Open *InterPlot Organizer*. Pick **Create a new plot set from files you select**. Select the **Add** button and browse to an image file. Select **OK.** Select **OK** again. The image will populate in the InterPlot Organizer dialog. Right click the image and select **Print Preview.** If the image doesn't display, then there is a problem with the setup. Contact CADD Support. Close the dialog w/o saving changes.

INDEXING AN IMAGE/DGN TO BE ARCHIVED

Overview

In order to perform complex searching easily in the E-Plans archive, standard information must be gathered from the original plan set. There are standard fields and standard responses to these fields. This portion of the manual is intended to provide instructions as to where to find the appropriate index sheets and specific instructions based on the type of plan you are indexing. There is an Example Index for each type of plan to be indexed.

Location of Index and IPS files

We have created folders to keep settings files, specific instructions, Indexing Examples, Standard Forms, and Master IPS files separated. This location is on the CADD server which is normally mapped as the Y: drive. Consider mapping the Y: drive to the following location \\dot0dta1fscadd1\pcpin1\ . The Digital InterPlot folder contains these folders Amendments, As-Builts, Contracts, Maintenance, Multimodal and Property Plans. Follow specific instructions within these folders based on the type of sheets to be archived.

Paper Index Sheets

The paper indexing documents can be printed and used to gather the information off the plan sheets. It's easier to gather this ahead of time instead of when you are adjusting the values electronically. You can't perform print preview and enter the values at the same time. Each end every sheet should have an index form with the exception of a range of the same sheet type (i.e. Cross Sections). Fill out the "constant", project specific values and make photocopies. Adjust only the values that change per sheet.

Electronic Index Sheets

We made it easy to enter the information electronically in a Word document for those who are computer savvy. These standard documents can be edited easily electronically and the content copied and pasted into the Attributes inside of the IPS file.

Archiving From a Scanned Image

This procedure will utilize the *Settings File* that has the same name as the folder that it's in. Pages scanned at MaineDOT will be either B/W at 300 dpi or color at 200 dpi. If the sheet is larger than a 24" x 36" page size, we may need to add additional *Settings Files* with other page sizes. Refer to the instructions within each folder titled **PlanType.doc**.???

Archiving MicroStation Drawings

This procedure will utilize the *Settings File* that has a MS and the units of the file in the name (i.e. MS_ROW_metric). The MicroStation files are added and printed through the InterPlot Organizer. Refer to the instructions within each folder titled **MS_PlanType_units.doc.**

Archiving MicroStation Drawings with Images

This procedure will utilize the *Settings File* that has a MS, the units of the file and the word image in the name (i.e. MS_ROW-image_metric.set). The MicroStation files are added and printed through the InterPlot Organizer. These MicroStation files have a raster image in the background and require a different settings file. Refer to the instructions within each folder titled **MS_PlanType_units.doc.**

GENERAL ARCHIVE INSTRUCTIONS

Step One: Open the ???_Master.IPS file

Open *Windows Explorer* and browse to the **Y:\Digital InterPlot** folder. Open the folder containing the type of drawing you plan to archive (i.e. Amendments, As-Builts, Contracts, Maintenance, Multimodal or Property Plans). Open the ???_Master.ips file in the folder (i.e. PORMAPS_MASTER.IPS, MaintF_MASTER.IPS, Contracts_MASTER.IPS, AsBuilt_MASTER.IPS, ROW_Master.IPS, etc.).

Step Two: File>Save As...

Select **File>Save As...** and supply a new file name based on the type of archiving you are doing. For PORMAPS, enter the PORMAPS_wholepin_decimal.IPS (i.e. PORMAPS_12671_00.IPS). For Maintenance Facilities, enter Town_TypeFacility.IPS (i.e. AUBURN PICNIC AREA.IPS or ALFRED MAINT LOT.IPS). For CONTRACTS, enter Contracts_wholepin_decimal.IPS. For ROW, enter ROW_FileNumber.IPS or ROW_FileNumber_REV#.IPS. Try to keep consistent with other types of file names in the list.

Step Three: Browse to Images

Select **File>Create Plots**. Select **Add** and browse to select images. Some scanned images may come from disk or have been scanned and place into the OCE Scan Pool folder on the E-Plans server \\dot0dta1fseplan\OCEscanPool\ folder. Select and add the image(s).

Step Four: Pick Settings File

In the *Plot creation options* portion of the dialog, select the **Browse** button next to the *Settings file name* field. Browse to the **Y:\Digital InterPlot** folder. Open the folder containing the type of drawing you plan to archive (i.e. Amendments, As-Builts, Contracts, Maintenance, Multimodal or Property Plans). Select the appropriate settings file for the type of archiving you are doing (Archiving_POR.set, Maintenance.set, Contracts.set). Select **Open.**

♫ If the wrong *Settings File* was chosen, select **Edit>Select>All Plots.** Then select **Edit>Settings File>Apply** and browse to choose the correct *Settings File.*

Step Five: Review File Names

Look at the sheet names. These files should be pre-named appropriately. For regular plans use 001, 002, 003, or Title Sheet, Typical01, etc. Right of Way Plans use the actual sheet number in the ROW File Number (i.e. sheet1, sheet2, etc). Are they in order? Select **Edit>Select>All Plots.** Select **File>Print Preview.** View the order of the plans.

Step Six: Rename Plot Name (if necessary)

Rename the *Plot Name* in the InterPlot Organizer by selecting an image then selecting **Edit>Rename.** Once the images are renamed in ascending order with the naming convention or 001, 002, 003, etc, re-sort the images by clicking on the *Plot Name* column.

Step Seven: Edit Attributes (For Whole Plot Set)

Select **File>Attributes** and supply the values from the hand written index page or from the page to be scanned.

ⓘ ***The PSPROJID should be verified by checking the E-Plans Archive. Depending on the type of image being scanned, we have setup a number range for the plotset. Maintenance Facilities archives for example, start with a number greater than 25000. View the E-Plans archive to determine the last number that was used for the most recent archive. This number can be found in the rightmost column of the archive. Add the next available number.***

♬ You do not have to select all of the images.

Step Eight: Individual Image Variables

Each image has its own variables that need to be adjusted. Right click the first image in the list and select **Properties.** Select the *Variables* tab. Select the *PROJID* lines in the top portion of the dialog. Adjust the *PROJID Value* field to the same number that was determined from the previous step. Click **Set.**

♬ As a time saver, select all of the images go to **Edit>Properties.** Click on the *Variables* tab and manually add in PROJID in the name field and add the variable to the image's *PROJID* values all in one edit.

Select a single image and select the *Type* line from the top portion of the dialog. Adjust the *Value* from "plan" to the type of sheet that the image represents (i.e. Title Sheet, Plan Sheet, Typical Section, Cross Section, etc.). Select **Set.** Close the *Properties* dialog.

Step Nine: Save the IPS File

Select **File>Save** from the InterPlot Organizer menu.

Step Ten: Print to Archive

Select all the images in the list. Select **File>Print.** Adjust the printer to the **\\dot0dta1asplot1\InterPlot to OCE TDS** 600.

In the *Digital Archiving* portion of the dialog, place a check in the **Archiving** box. In the *Archiving Name* pull down, select **Vault Plans** (or Property Plans)**.** Place a check in the *Archive without Printing* box.

Step Eleven: Verify it's in the Archive

After allowing the print some time to process, verify that the archive made it into the Digital InterPlot archive (http://dot0dta1asiis03/plansweb/dpr.asp). Do a search in the Vault Plans archive by selecting the binoculars icon and entering the *Scan Plotset ID* in the *Scan Plotset ID* box (i.e. 30000). Click **Search.**

REPLACING A SHEET IN AN ARCHIVE

Overview

You will need to login to a computer as MDOT.dpruser to perform certain activities. To replace a sheet in an archive, you will need to plot to a new “temporary” archive. This will build the images (DPR, PDF, Thumbnail, TIFF_G4, JPEG) that you need to replace the old images.

Step One: Create Temporary Plot Set

Open the ???_Master.IPS file. Save it as a temporary name (i.e. Temp_S 050203.IPS) in a temporary location. Use the normal sequence of adding images or MicroStation files to the temporary IPS file. Pick the settings file for the type of image.

Step Two: Archive to Test Archive

Archive the temporary plot set to a "test" archive, such as Test_Five.

Step Three: View the Sheet

View the sheet, as it sits in the temporary plot set within the E-Plans Archive, through the browser’s interface, to make sure it's OK.

Step Four: Browse to Eplans Server

In the \\DOT0DTA1FSEPLAN server, find the folder structure for the "target" plot set (the one where the replacement will be made) (i.e.**dprfile_store\PropertyPlans**\none21982).

- ♬ Locating the target folder may be the hardest part of replacing an image. It’s best to locate the old image you want to replace in the E-Plans Archive. Click the image thumbnail then jot down the PID# (i.e. PID=21982) located in the address bar of the Internet Explorer window. Now through Windows Explorer, search the Property Plans folder for a file with this number in it (i.e. *21982*).

Step Five: Make sub-folders

Make sub-folders named "OLD" under each of the "image" folders in the target plot set (DPR, PDF, Thumbnail, TIFF_G4, JPEG).

Step Six: Move old Images (Requires Login as MDOT.dpruser)

In each of the image folders in the target plot set, move the original file (for the sheet to be replaced) to the OLD subfolder.

Step Seven: Copy New Images

Copy the corresponding image files from the temporary plot set in the test archive to the image folders in the target archive. Rename these files, if necessary, so that their name is exactly the same as the original files (that were moved to the OLD folders).

Step Eight: Test

Test by viewing the replaced sheet through the web browser interface.

Step Nine: Delete Temporary Plot Set

Delete the temporary plot set from the test archive.

- ♬ Due to the fact that the quality of the edited replacement image may not be as good as the original, it is wise to keep the originals in the OLD folders

Chapter 35 CADD Data and GIS

CONNECTIONS AND GEODATABASES

ADD A CONNECTION TO CADD DATA

Open ArcCatalog

Start ArcCatalog by using your desktop icon.

Setup Connection to PIN

From the main menu (Figure 35-1), select **File>Connect to Folder…**

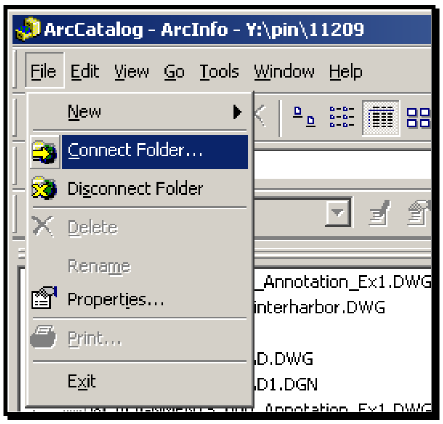


Figure 35-1: Selecting Connect to Folder from the File Menu.

When the *Connect to Folder* dialog opens, browse to the Y: drive (dot0dta1fscadd1\pcpin1). Locate your PIN (i.e. Y:\pin\11584). Select your PIN's folder, click **OK** (Figure 35-2). Now you should see the connection alphabetically in your list of files and folders within ArcCatalog.

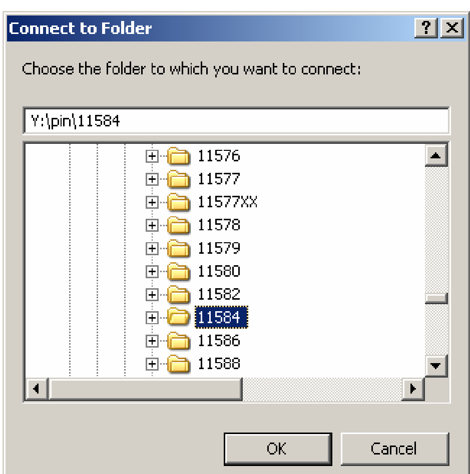


Figure 35-2: Connect to Folder dialog box.

ⓘ ***It is not recommended to make a connection to the root of the Y: drive or the Y:pin folder. ArcCatalog takes a long time to analyze all of the data it finds. It's best to have it look to the PIN you are working with.***

ADD CONNECTION TO GISDATA\CADD FOLDER G:DRIVE

Setup Connection to GISDATA

From the main menu (Figure 35-3), select **File>Connect to Folder…**

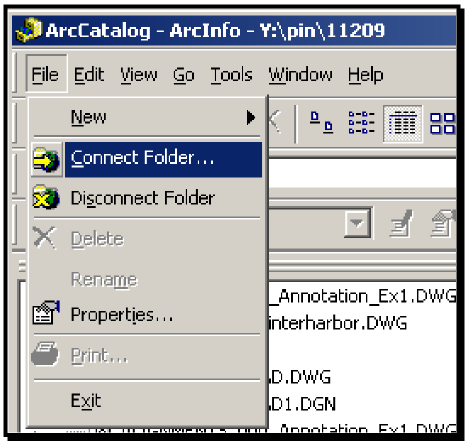


Figure 35-3: Selecting Connect to Folder from the File Menu.

When the *Connect to Folder* dialog opens, browse to the G: drive (dot0dta1fsaug01\gisdata). Expand the G: drive to locate the CADD folder. Select it and click **OK** (Figure 35-4).

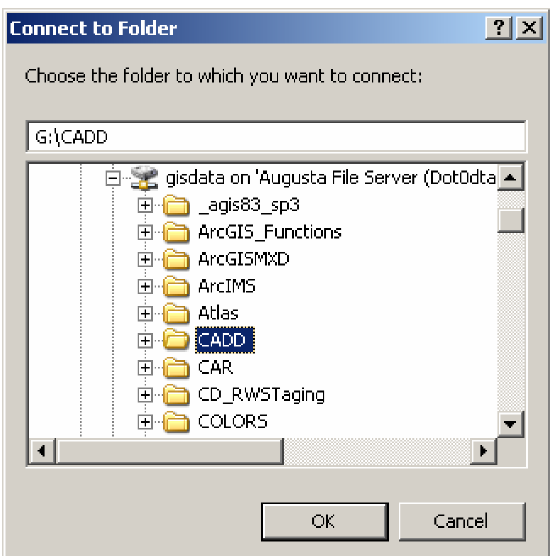


Figure 35-4: Connect to Folder dialog box.

Now you should see the connection alphabetically in your list of files and folders within ArcCatalog (Figure 35-5).

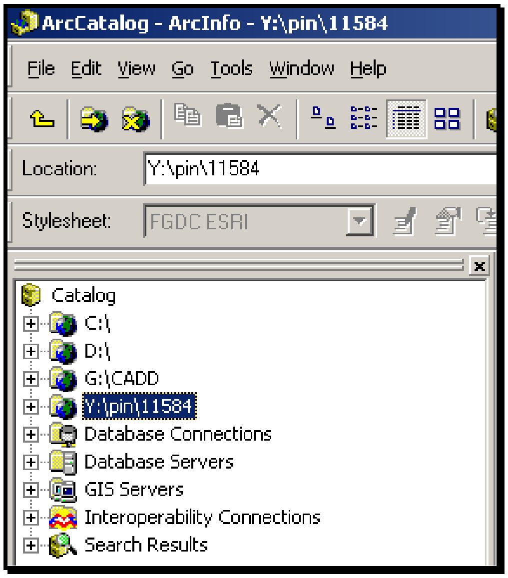


Figure 35-5: Connected folders in ArcCatalog

COPY PREDEFINED GEODATABASE TEMPLATES

Overview

We have created three predefined Geodatabases for use with our CADD files. Two of the Geodatabases contain Feature Datasets with spatial extents for our common coordinate systems we use for CADD data. The difference is one uses Metric units and the other uses U.S. Customary units. The third Geodatabase is for the UTM zone for the state of Maine (NAD83_UTM_19N_Meters). Since most of the GIS world maps data using the UTM datum, we will project our data into this Geodatabase's Feature Dataset. From there, the data can be re-projected into any coordinate system in any units. Likewise, we can take UTM data from the GIS world and *project* it back into the State Plane Coordinate system for all MaineDOT projects.

Step One: Open ArcCatalog

Start ArcCatalog by using your desktop icon.

Step Two: Browse to G: drive

In ArcCatalog's *Catalog Tree*, browse to **G:\CADD.**

Step Three: Copy MaineDOT's UTM Geodatabase

There should be 3 MDOT Geodatabases at this location. Right click the *MDOT-NAD83_UTM_19N_Meters* Geodatabases and select **Copy.** Browse to your PIN's GIS folder (i.e. Y:\pin\11584\00\GIS). Right click this folder and select **Paste.**

♬ If you are unable to copy into this folder, it may be because you don't have permissions to the folder. Contact CADD Support and you will be added to the permission group.

Step Four: Copy MaineDOT's State Plane Geodatabase

Determine is your project is in US Customary or Metric units by referring to the Status.rtp or Status.doc file if necessary.

✓ ***Refer to page 35-9 for more information on the Status report.***

The units will determine which of the remaining two Geodatabases you will copy into the GIS folder. All new projects will be US Customary but some of the older data is metric. Right click the MDOT-StatePlane_Feet Geodatabase and select **Copy.** Browse to your PIN's GIS folder (i.e. Y:\pin\11584\00\GIS). Right click this folder and select **Paste.**

♬ If you are unable to copy into this folder, it may be because you don't have permissions to the folder. Contact CADD Support and you will be added to the permission group.

Step Five: Remove Unused Datasets (optional)

The two State Plane Geodatabases contain multiple *Feature Datasets* for all of the possible renditions of the State Plane coordinates for that unit of measure. To keep the size of the

Geodatabase down, right click the *Feature Datasets* that you will not be using and select **Delete** (Figure 35-6). Delete all but the *Feature Dataset* you will be using for your project.

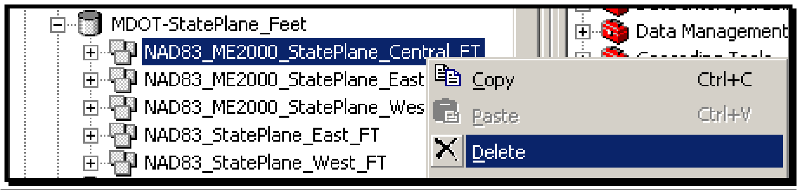


Figure 35-6: Delete unused Feature Datasets.

Verification Process

The Geodatabases can be used as a verification tool as you work with the CADD data. Each Geodatabase has a map of the state (metwp24) as a Feature Class. Use ArcMap to map the data and visually see that your data is in the correct town. If the data is re-projected, check it against the map in new Feature Dataset.

ADD SPATIAL REFERENCE TO CADD DATA

OVERVIEW OF SPATIAL REFERENCE AND CADD FILES

What CADD Files should be used?

There are only a handful of files in any PIN directory that will be useful for GIS. These are the files that represent the existing ground conditions or proposed conditions. We will never be bringing plan sheets (i.e. 001_RWPlan1.dgn), Cross Sections (069_XSMC10_dr_001.dgn) or Profile Drawings (038_PROFMC10_dr_001.dgn) into GIS. None of the files with a 3 digit prefix are spatially located. Instead, select files like alignments.dgn, bridge.dgn, highway.dgn, topo.dgn, text.dgn, RWPlan.dgn, etc. These files can be laid on the face of the earth.

Coordinate System of MaineDOT CADD Data

MaineDOT has used a variety of State Plane coordinate systems throughout the years. In order to use data from one coordinate system and reference it to another, it's important to know both the source coordinate system and the destination coordinate system. Using *Windows Explorer,* browse to your PIN's Survey/MSTA folder (Survey/MX folder for older projects). In one of these directories there will be a file called **Status.doc** or **Status.rpt.** Open the file (it will be read only). In the document you will find the working units (U.S. Survey Feet or METRIC) and you will find a Control Summary. The Control Summary section holds the coordinate description. Write down the units and the coordinates for this project for future reference (i.e. U.S. Survey Feet & NAD83(1996) 1804 ME2000 WEST Zone).

Methods of Applying Spatial Reference to CADD Files

The CADD files do not have the spatial reference in the file header. In the future they may, but until then, you can apply the *Spatial Reference* to a CADD Feature Datasets manually. There are a few methods of applying spatial reference to CADD data. The latest version of ArcGIS now provides an option to save the .prj file with the CADD dataset. This option works great for one or two files, however, if you plan on adding spatial reference to many files, it might be quicker to try *Option Two.* The *Option Two* method would be to copy the proposed projection file (.prj) into the same directory as the CADD file. Rename the projection file to the same name as the CADD file maintaining the .prj extension. Both of these options will require that you have privileges to the folder that contains the CADD dataset in order to save the .prj to the directory. *Option Three* is using the *Conversion Tools* which now provides the option of adding spatial reference as you're creating the *Staging Geodatabase.* The three methods are described below.

The recommended method would be to copy the CADD files and Geodatabases into the GIS folder of a PIN and use *Option Two.* This way other users will not have to repeat the process, they can take advantage of files already spatially referenced. They can also use the files in the Geodatabases that have been re-projected. CADD GIS permissions are required to do this. Contact CADD Support.

APPLY SPATIAL REFERENCE (OPTION ONE)

Step One: Right Click the DGN (CAD Feature Dataset)

In the list of files, scroll down beyond all the files that start with a 3 digit prefix, right-click the file RWPLAN.dgn and select **Properties…** (Figure 35-7).

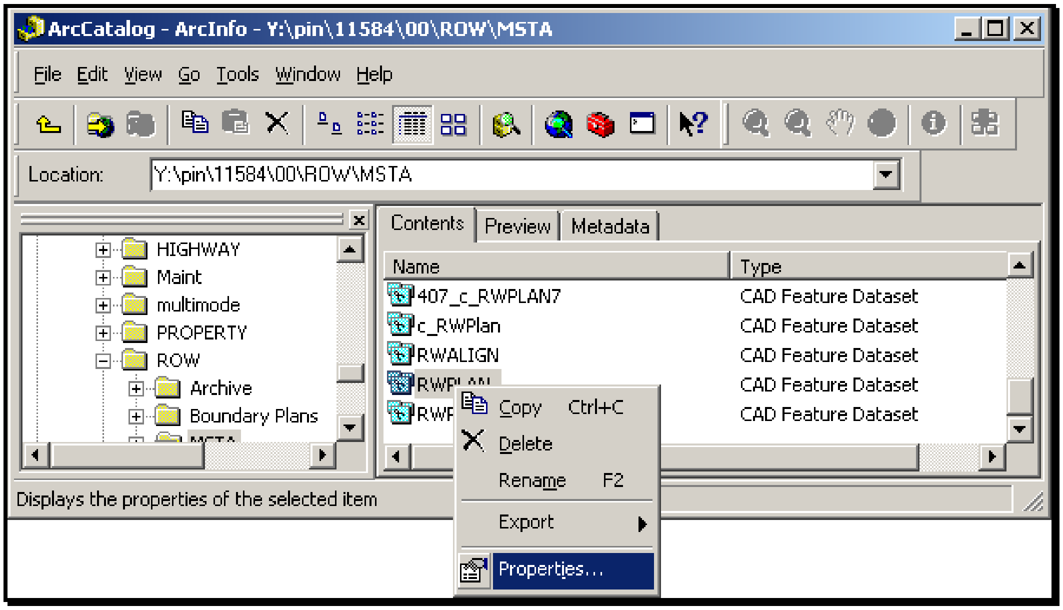


Figure 35-7: Accessing Properties of a CAD Feature Dataset.

When the *CAD Feature Dataset Properties* panel appears (Figure 35-8), notice that the *Spatial Reference* indicates that there isn't a default projection file associated to the CADD file.

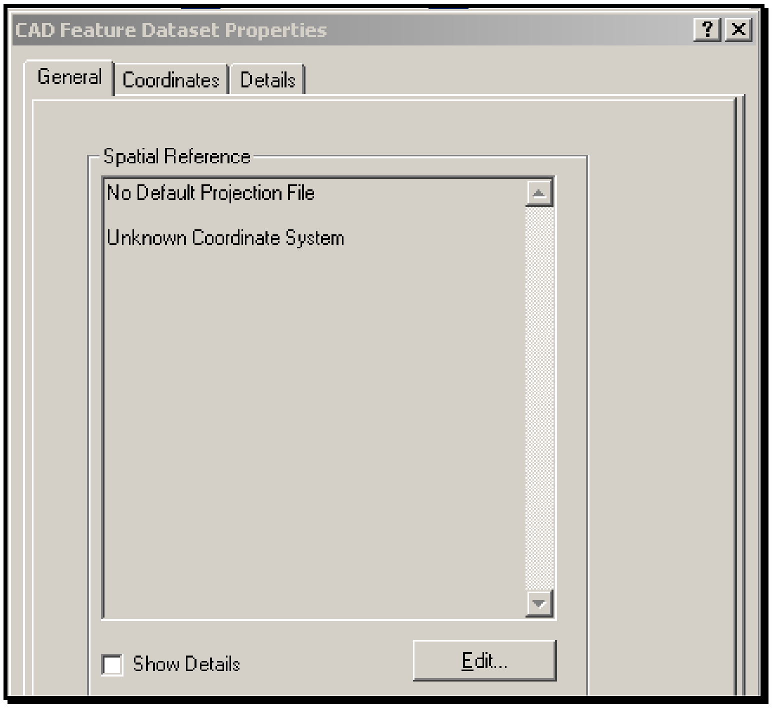


Figure 35-8: CAD Feature Dataset Properties dialog.

Click the **Edit…** button. This opens the *Spatial Reference Properties* dialog (Figure 35-9). Select the **Import** button.

♫ Another option would be to pick the **Select** button and browse to a projection (.prj) file. We have placed the common projection files within the G:\CADD folder on the network.

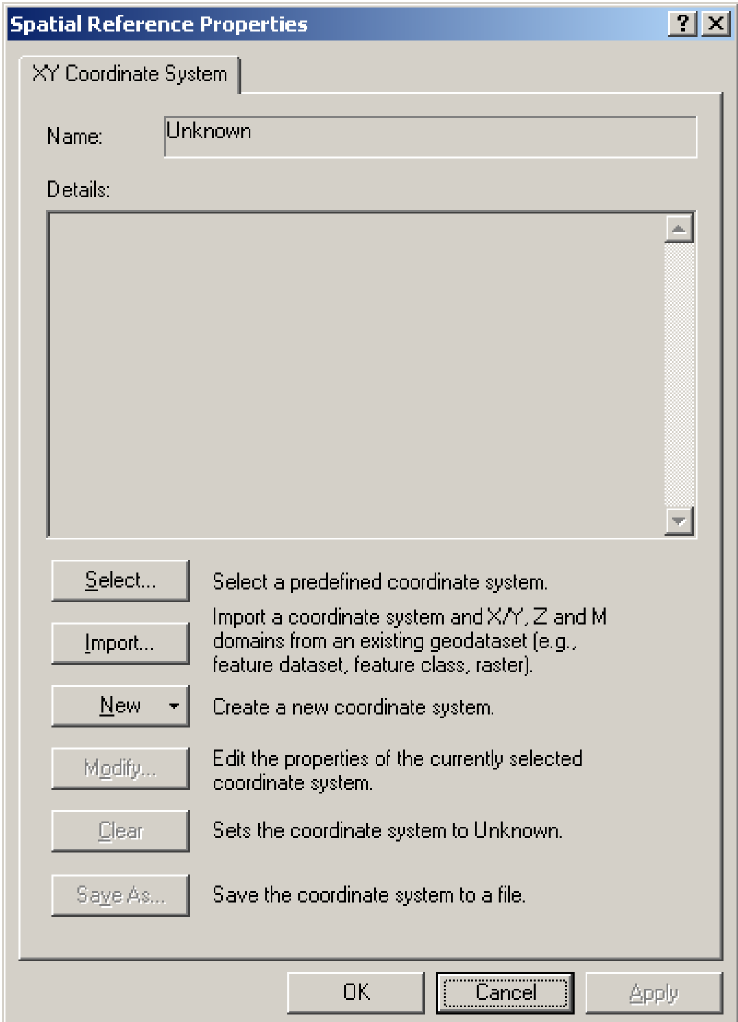


Figure 35-9: The Spatial Reference Properties dialog.

Step Two: Add Coordinate System info to the CAD Feature Dataset

Browse the State Plane Geodatabase within your project's GIS folder. Double click the Geodatabase and select the dataset internally that is named the same coordinate system as your project (Figure 35-10). Click the **Add** button.

✓ ***Refer to page 35-9 for information on determining the coordinate system of your project.***

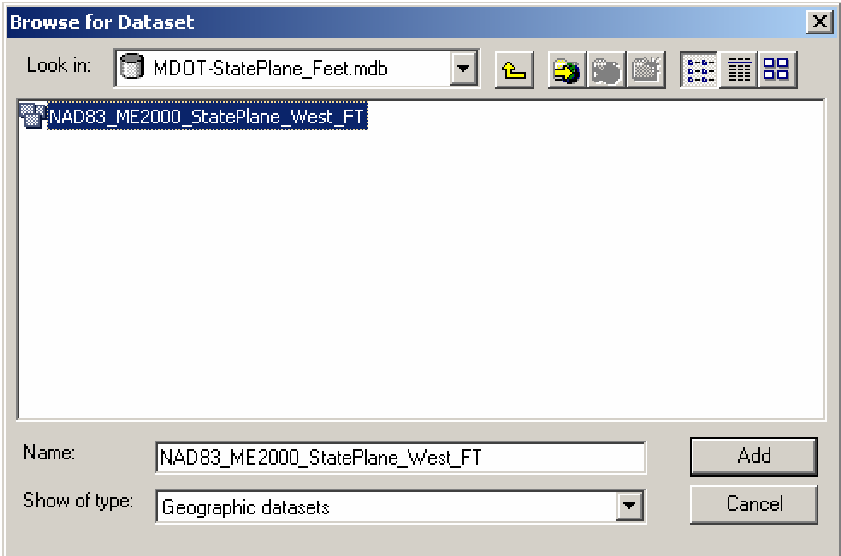


Figure 35-10: Select the Dataset that matches your project's coordinate system.

Then click **OK** at the *Spatial Reference* dialog**.** Next you have an option to **save** a .prj specifically for the file that assigns the coordinate system (Figure 35-11). It's the same name of the original CADD Feature Dataset with the .prj extension. Select **Save.**

ⓘ ***If you do not have permissions to copy the .prj file(s) into the project's MSTA folder, consider copying the files into the GIS folder.***

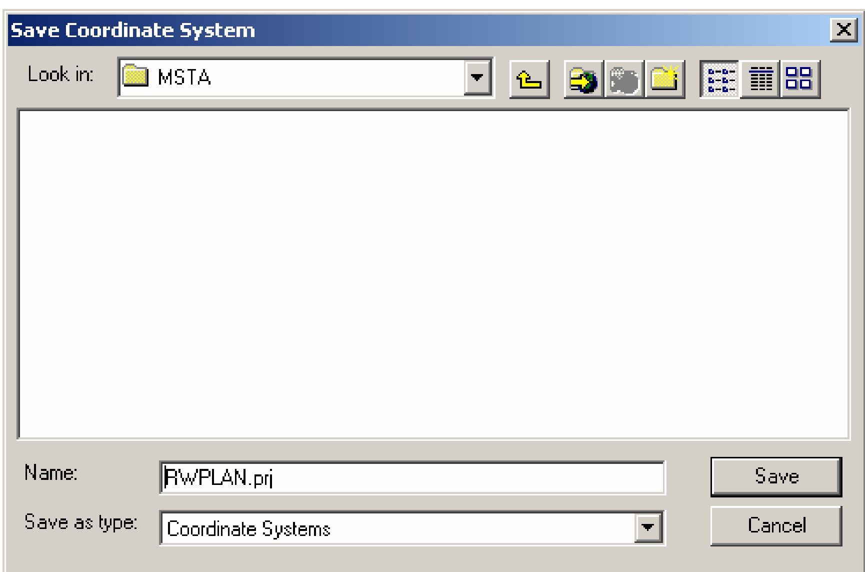


Figure 35-11: Save coordinate system to your files.

Click **OK** to close the *CAD Feature Dataset Properties* dialog.

Step Three: Repeat as Necessary

Adding spatial data need to be done for all CAD drawings that you intend on re-projecting to GIS.

APPLY SPATIAL REFERENCE (OPTION TWO)

Step One: Add .PRJ files to File Directory

Browse to the G:\CADD\Std-filename-projections folder (Figure 35-12). The G: drive is mapped as dot0dta1fsaug01\gisdata.

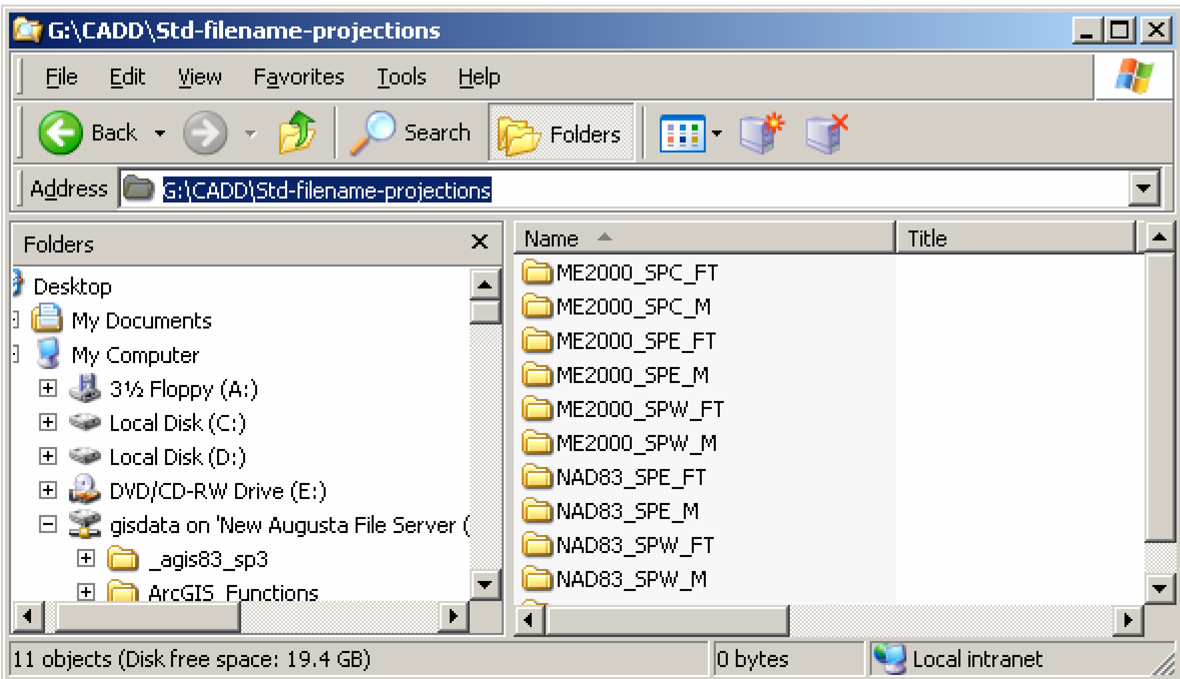
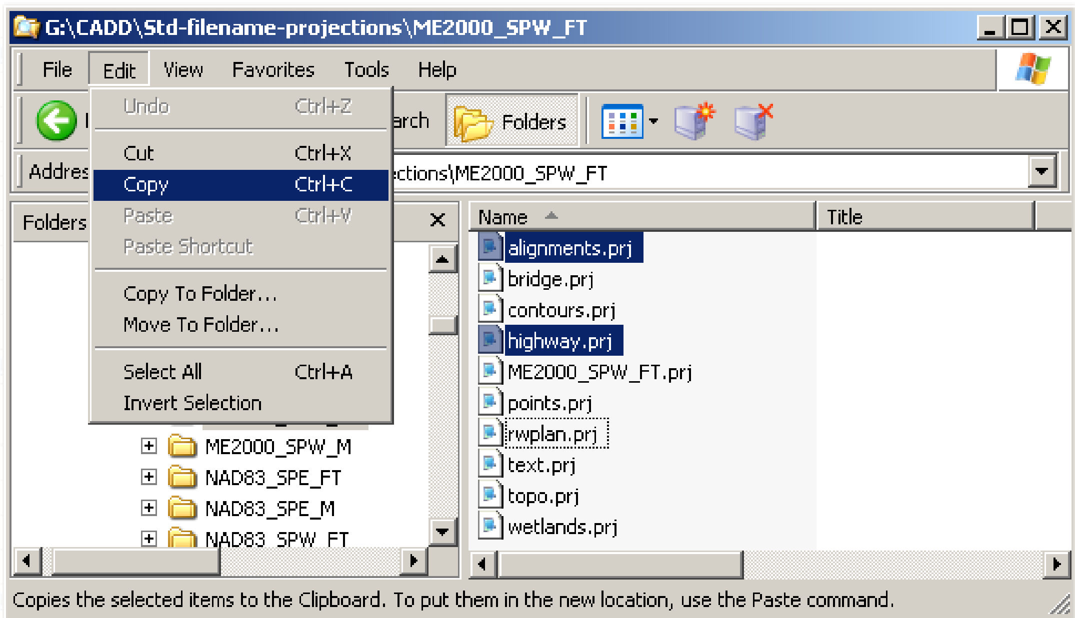


Figure 35-12: The folder containing common file name projections.

✓ ***Refer to page 35-9 for information on determining the coordinate system of your project.***

Step Two: Copy necessary files

Double click on the folder whose name is the same as the coordinate system used for the project. Select the files that you will be re-projecting. Select **Edit>Copy.**



Step Three: Paste the files

Browse to the Y:\pin\#####\## folder and to the workgroup's MSTA folder that contains the dataset (i.e. Y:\pin\11584\00\Highway\MSTA). The Y: drive is mapped as dot0dta1fscadd1\pcpin1. Select **Edit>Paste.**

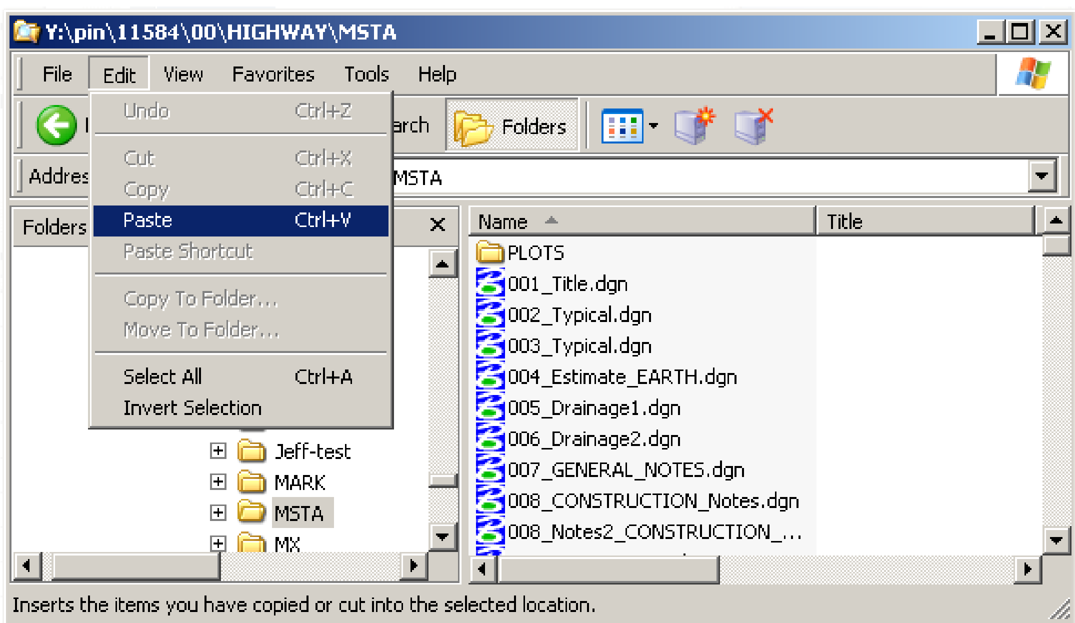


Figure 35-13: Project's folder on the Y: drive.

ⓘ ***If you do not have permissions to copy the .prj file(s) into the project's MSTA folder, consider copying the files into the GIS folder. Contact CADD Support for assistance.***

APPLY SPATIAL REFERENCE (OPTION THREE)

Overview

This method is done on the fly while using the *ArcToolbox>Conversion Tools>To Geodatabase>Import From CAD*. It doesn't require that you have permissions to the directory that contains the CADD data. Steps are described below.

♬ Be aware that this method of applying spatial reference doesn't maintain connectivity to the CADD data. It would need to be applied again for another instance.

IMPORT CAD DATA INTO GEODATABASE

Overview

ArcCatalog separates a CADD drawing into 5 different groupings; Annotation, MultiPatch, Points, Polygons and polylines. When *Importing From CAD to Geodatabase*, we will be selecting just the just the CAD Feature Dataset.

♫ At this point, the annotation class doesn't display the text, it displays points that represent the origin of the text. The actual text has to be handled differently in order to get the sizing, font and rotations to come in correctly. This will be dealt with later.

Step One: Copy Geodatabase to PIN's Subfolder (if not already done)

✓ ***Refer to page 35-6 for complete instructions on copying the Geodatabases into the GIS folder.***

♫ You will need to have permissions to this folder. Contact CADD Support personnel.

Step Two: Import From CAD to Geodatabase

Select the *ArcToolbox>Conversion Tools>To Geodatabase>Import From CAD* tool (Figure 35-14).

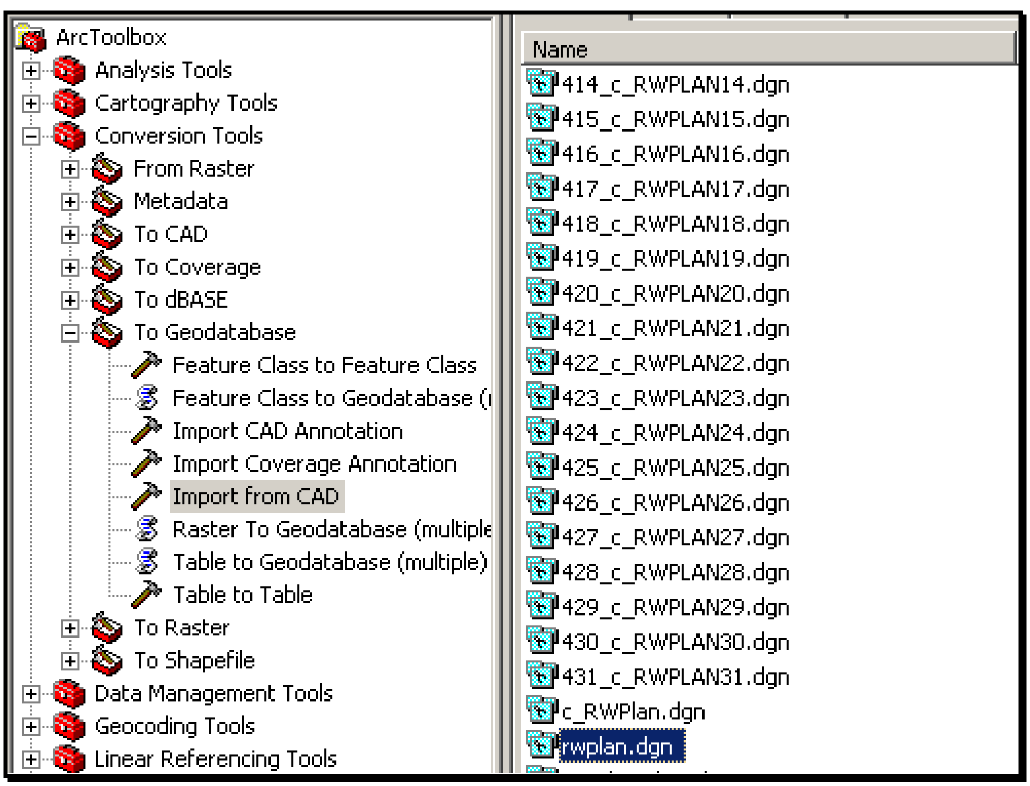


Figure 35-14: Select the ArcToolbox>Conversion Tools>To Geodatabase>Import From CAD tool.

Step Three: Browse to CADD Feature Dataset

Select *Browse* button next to the *Input Files* field (Figure 35-15).

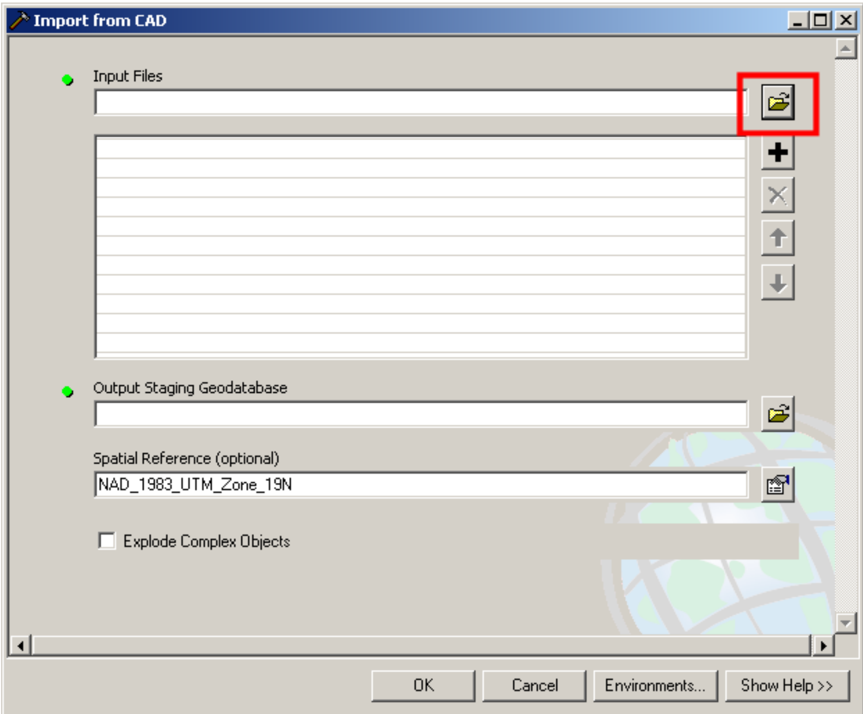


Figure 35-15: Import from CAD dialog.

Locate the CAD Feature Dataset by browsing to your PIN's workgroup/MSTA folder that contains the data needed in GIS (Figure 35-16).

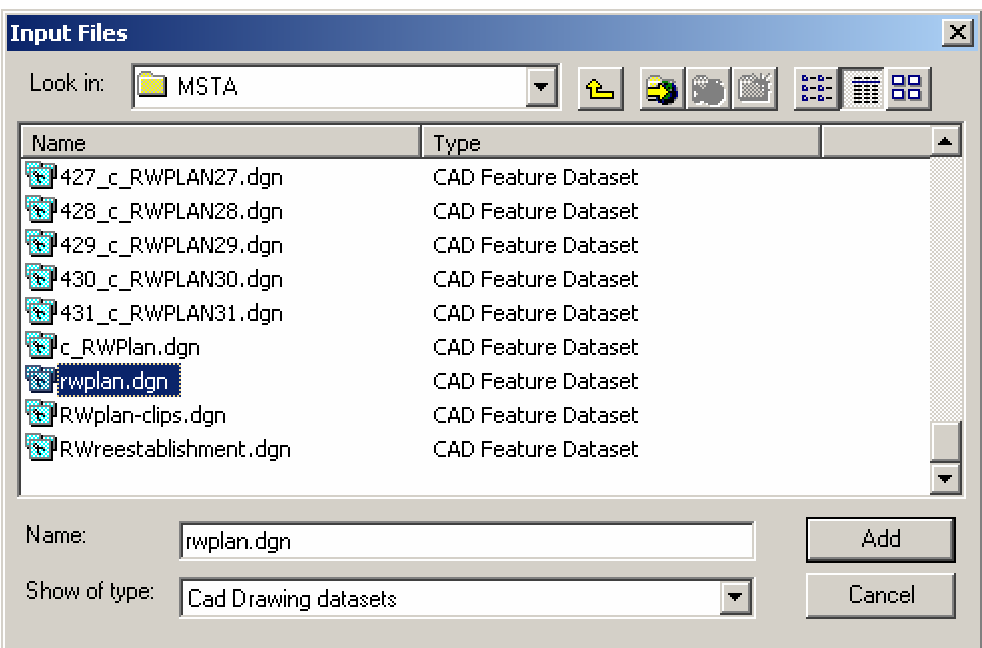


Figure 35-16: Browse to the CAD Feature Dataset needed in GIS.

Step Four: Output Staging Geodatabase

Accept the *Output Staging Geodatabase* as is. You can copy and paste the CAD Feature Dataset from the Staging Geodatabase to the UTM Geodatabase once the process is complete to keep all the data within one Geodatabase.

Step Five: Add Spatial Reference

Depending on whether or not you added spatial reference to the CAD files in a previous step, this field may or may not be correct. This spatial reference will be the State Plane Coordinate System of your project, **not** the intended coordinate system you are projecting to.

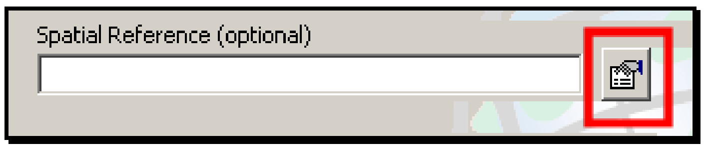


Figure 35-17: Select the Browse button next to the Spatial Reference field.

Select the Browse button next to the Spatial Reference field. Click the **Select** button, browse to the G:\CADD folder and select the State Plan coordinate projection file that is unit and zone specific (Figure 35-18). Select **Add.** Click **Apply** at the *Spatial Reference Properties* dialog.

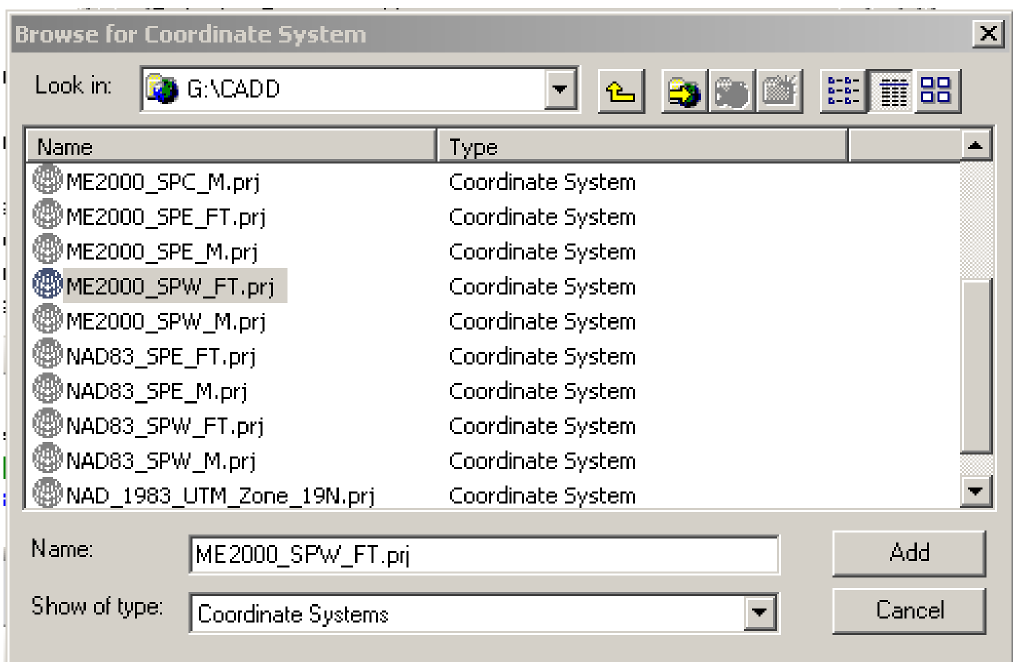


Figure 35-18: Select the coordinate system of the CADD data.

Step Six: Uncheck Explode Complex Objects

It is recommended that you uncheck this feature. This pertains to cells within the .dgn. If a cell is made up of many elements, it will leave it intact and place it at its insertion point in the file as opposed to breaking it apart into multiple elements.

Step Seven: Adjust Environments

Select the *Environments* button. In the *General Settings*, set the *Output Coordinate System* to **As Specified Below.** Select the Browse button next to the Spatial Reference field. Click the **Select** button, browse to the G:\CADD folder and select the NAD_1983_UTM_Zone_19N.prj file. Select **Add.** Click **Apply** at the *Spatial Reference Properties* dialog. Click **OK** in the *Environment Settings* dialog.

Step Eight: Process the File

Click **OK** at the *Import From CAD* dialog. At this point, ArcCatalog will show you the progress and report on the status of each imported Feature Class. If you receive red text in the progress box, it indicates that there have been errors processing the data. If the error indicates that there are some elements that do not fit spatially, there may be actual elements that inadvertently got placed outside of the zone (either in NH or in the ocean). Opening the MicroStation file and doing a fit view may show the elements that are outside of the drawing area. If this is found, the elements should be deleted.

Once the process is complete, you should see a message like the one below (Figure 35-19).

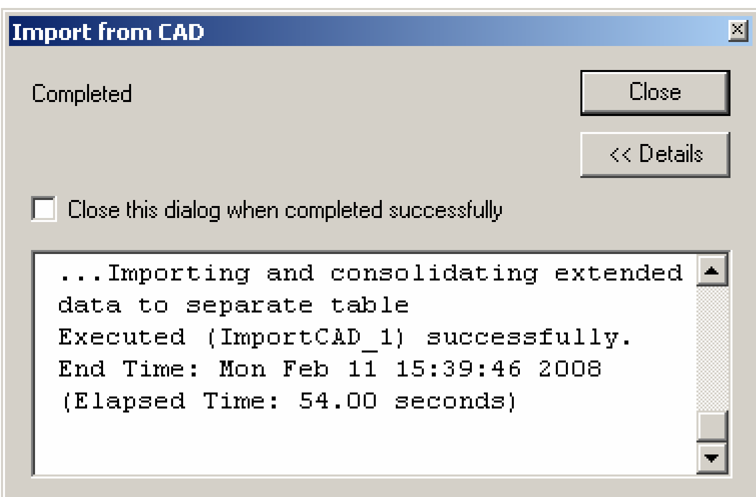


Figure 35-19: Completed dialog once the data has been processed.

Step Nine: Verify by Mapping the Data (Optional)

Now you can verify that your project has been projected into the UTM (metric) coordinate system. Start ArcMap and create a new map. Select the **Add Data** icon and browse to your Geodatabase in your PIN folder. Double-click the Geodatabase and select your Feature Dataset. Click the **Add** button.

The Geodatabase has a map of the state as one of its default Feature Classes so when the map is displayed, you should see your data (points only while zoomed out). If you zoom in on the data, more details will become visible. Verify that it falls in the correct town or city by selecting the “i” for the information tool and click in the shaded polygon that encompasses the project. The information box should display what town your project is in.

- Depending on the order you added the data, you may have to move the Map to the bottom of the list in ArcMap.

Troubleshooting

There seems to be some trouble with the latest version of ArcGIS with the MicroStation CAD feature datasets. If everything seems to process but no data is present, consider opening the MicroStation file and saving it as an AutoCAD file (.dwg) and trying it again. The interoperability with AutoCAD currently provides better results. If you've added a projection file to the directory and name the file the same, ArcCatalog will pick up on the projection of the file.

CREATING A FEATURE CLASS FOR ANNOTATION

Overview

When creating annotation for CADD data, you need to treat the annotation and dimensions separately from the line work. ArcToolbox has a conversion tool that handles the text very well. The steps that follow will instruct how use this tool.

For best results, follow the process outlined below. First add the annotation into the Geodatabase setup with the original coordinates and units of the project. Then right click and Export to the UTM Geodatabase or other proposed coordinate system. This gives better control over the text size.

Step One: Open ArcToolbox

Select the *ArcToolbox* icon or by selecting **Window>ArcToolbox** from the main menu. Expand the *Conversion Tools* category. Select the *To Geodatabase* grouping.

Step Two: Import CAD Annotation

Select the Import CAD Annotation tool.

Step Three: Browse for Annotation Feature Class

Select the Feature Class to import by browsing to the workgroups/MSTA folder that contained the original CAD Feature Datasets. Open the Feature Dataset (i.e. rwplan.dgn). It should contain an Annotation Feature Class identified by a blue icon with the letter “A” on it. Select the *Feature Class.* Click **OK.**

♬ Each and every drawing file that gets exported to the UTM Geodatabase will need to have the text brought over as well (if is necessary).

Step Four: Browse for Output Feature Class Location (State Plane)

Select the **Browse** button next to the *Output Feature Class* field and browse to your project’s GIS folder on the y: drive. Double click the Geodatabase (i.e. MDOT-StatePlane_Feet) and to the *Feature Dataset* that resembles the coordinates and units of your project (i.e. NAD83(1996) 1804 ME2000 WEST Zone).

Supply a name for the Annotation Feature Class. Use a logical name that is similar to the other feature classes for that same drawing (i.e. rwplan_dgn_text). Use underscores instead of hyphens. Select **Save.**

Step Five: Add a Reference Scale

In this step, enter **300** as a scale value.

Step Six: Create Class from Levels

There already should be check in this checkbox by default. If there isn’t, add the check. Click

OK (Figure 35-20).

♫ This will breakdown the text based on the level it is found in. This will give more flexibility when mapping the data.

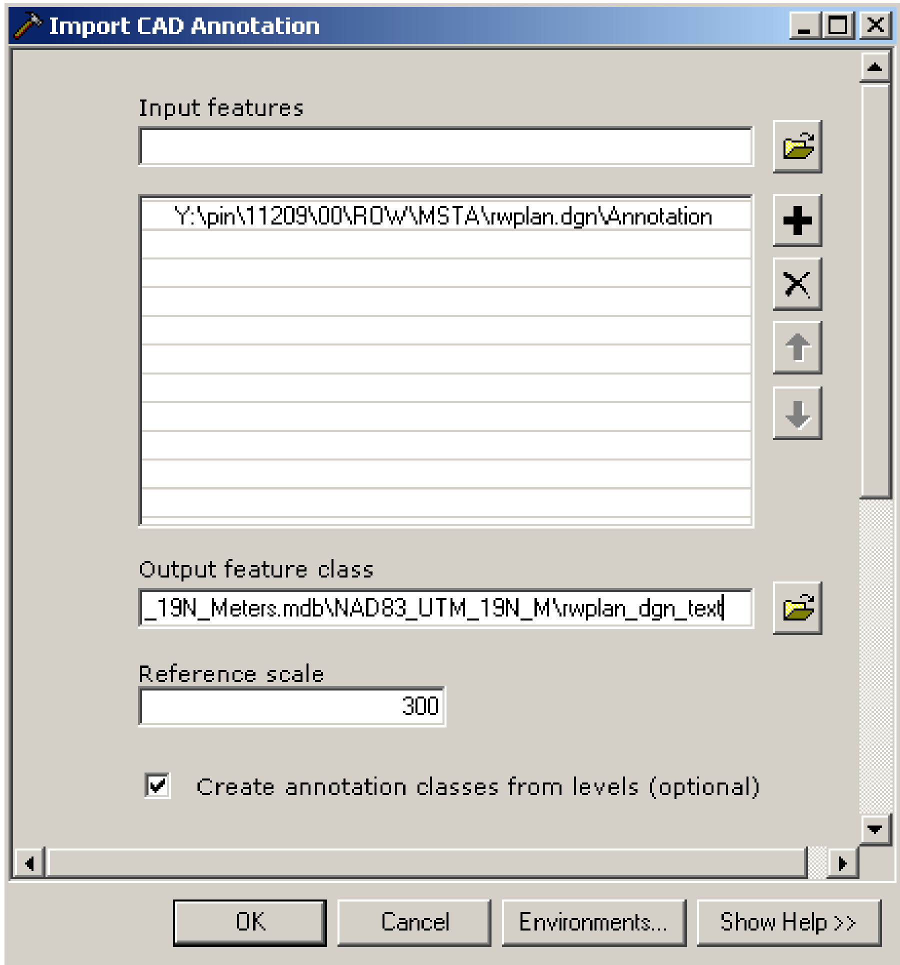


Figure 35-20: Import CAD Annotation dialog.

Step Seven: Preview Annotation

Using ArcCatalog, browse to your PINs Geodatabase by utilizing the preset connection (Y:\pin\11584). Expand the Geodatabase by hitting the plus (+) sign. Expand the Feature Dataset. Select the annotation Feature Class. On the right side of the dialog, click the *Preview* tab. Use your zoom in tools to look at the data.

Step Eight: Re-Project the Annotation

Right click the *Annotation Feature Class* and select **Export>To Geodatabase (single)** (Figure 35-21).

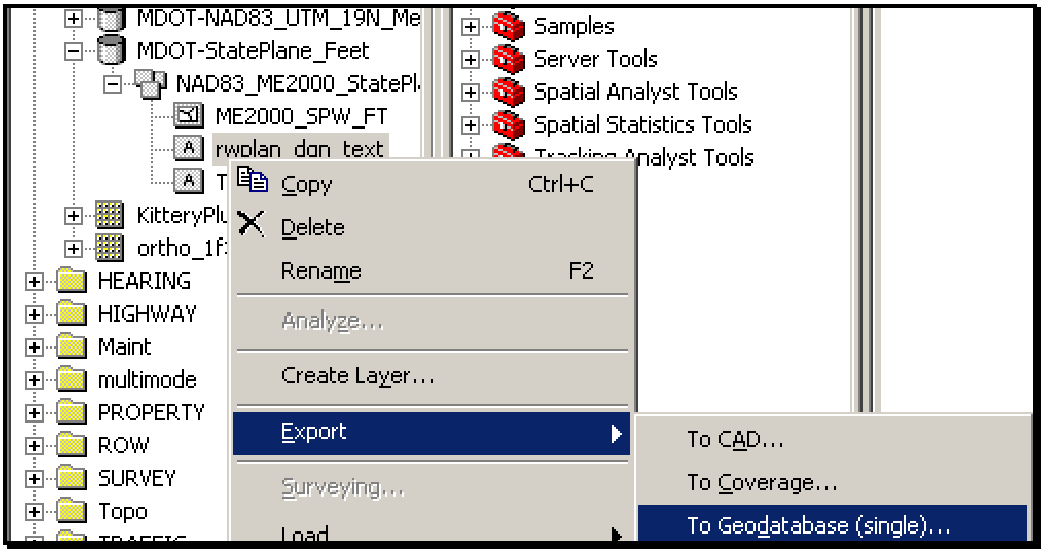


Figure 35-21: Export the Annotation to another Geodatabase.

Step Nine: Set Output Location and Name

In the *Feature Class to Feature Class* dialog, select the browse button next to the *Output Location* field and browse to the UTM Geodatabase located in the GIS folder of your project. Double click the Geodatabase and select the UTM *Feature Dataset* (Figure 35-22). Click **Add.**

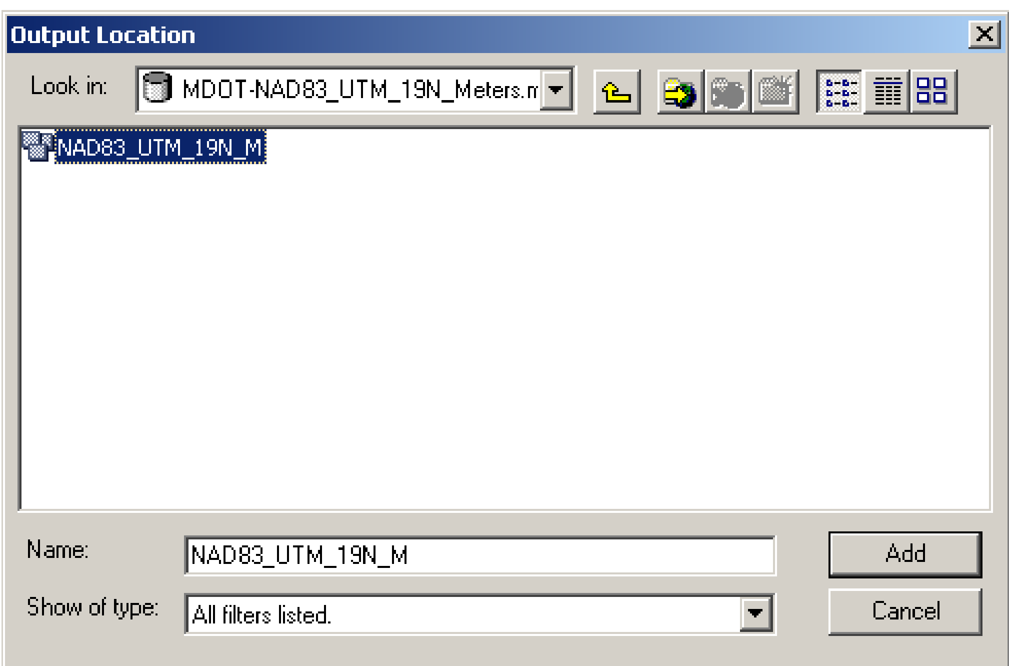


Figure 35-22: Browse to the UTM dataset for an output location.

In the *Output Feature Class* field, supply the same name that was supplied earlier (i.e. rwplan_dgn_text). This will create a *Feature Class* with the same name in both Geodatabases.

Verify by Mapping the Data

You can verify that your project has been projected into the UTM (metric) coordinate system by starting ArcMap and creating a new map. Select the **Add Data** icon and browse to your UTM Geodatabase in your PIN's GIS folder. Double-click the Geodatabase and select your Feature Dataset. Click the **Add** button. If the annotation lines up with the rest of your data then you are done or repeat as necessary with the remaining Annotation Feature Classes.

UTM DATA TO STATE PLANE COORDINATES

Download Aerial Photography (Raster Images)

Overview

Raster images come in a variety of formats with various compressions. The most important thing to know about the image is its *Spatial Reference*. Knowing this will enable the image to be re-projected to another known coordinate system. Without this information the image will have to be placed manually and will require moving and rotating to best fit with the CADD data. The following portion of the document will describe retrieving an image from the MEGIS website with the *Spatial Reference* of NAD83_UTM_19N (meters) and re-projecting the image to State Plane coordinates of NAD83(1996) 1804 ME2000 WEST Zone (feet).

Step One: Browse to MEGIS Website

MEGIS is a good location to get aerial photography, but it may not be the most recent images available and the quality can vary depending on the area of the state. As long as the image has *Spatial Reference*, this documentation will work.

Open an Internet Browser and enter http://megis.maine.gov. On the left portion of the page, select **Maps** (Figure 35-23).

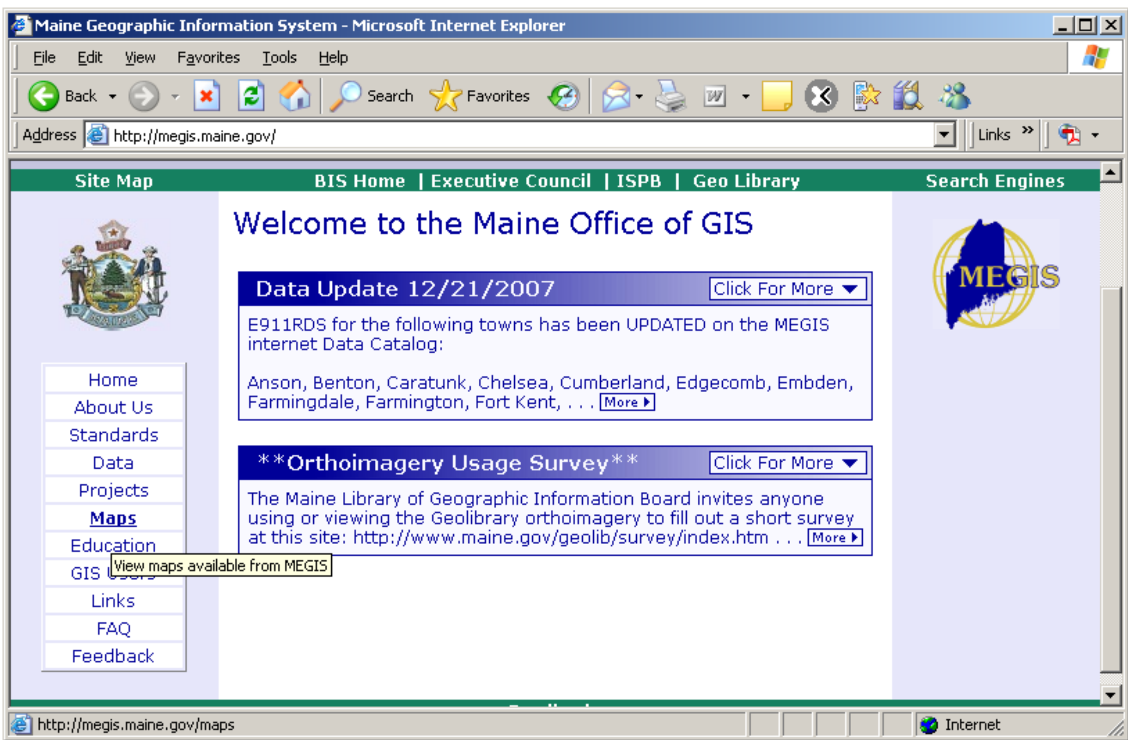


Figure 35-23: MEGIS webpage.

Step Two: Open Aerial Photography Viewer

Select the **Aerial Photography Viewer** under the *Interactive Online Maps* heading. When the new page loads, close the welcome screen (Figure 35-24).

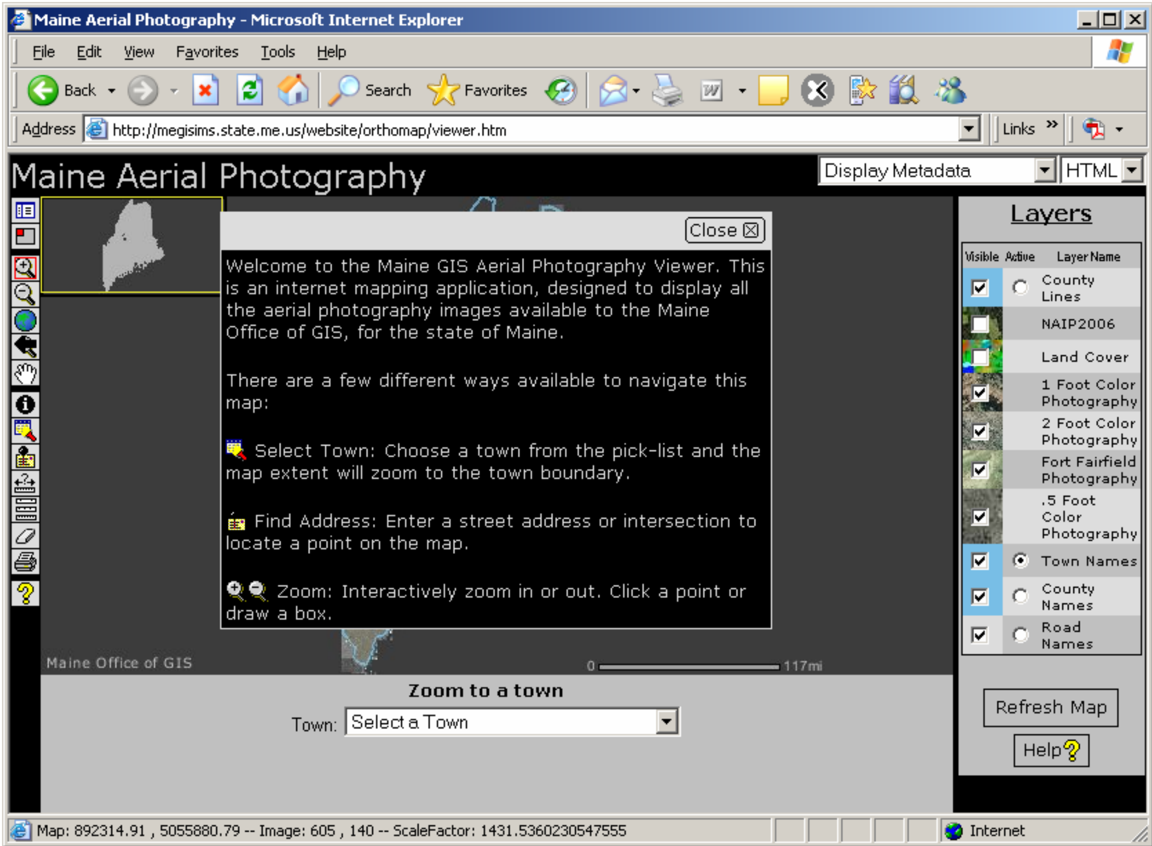


Figure 35-24: Maine Aerial Photography Viewer welcome page.

Step Three: Select a Town

Using the pull down at the bottom of the map (Figure 35-25), select the town you are interested in (i.e. Kittery).

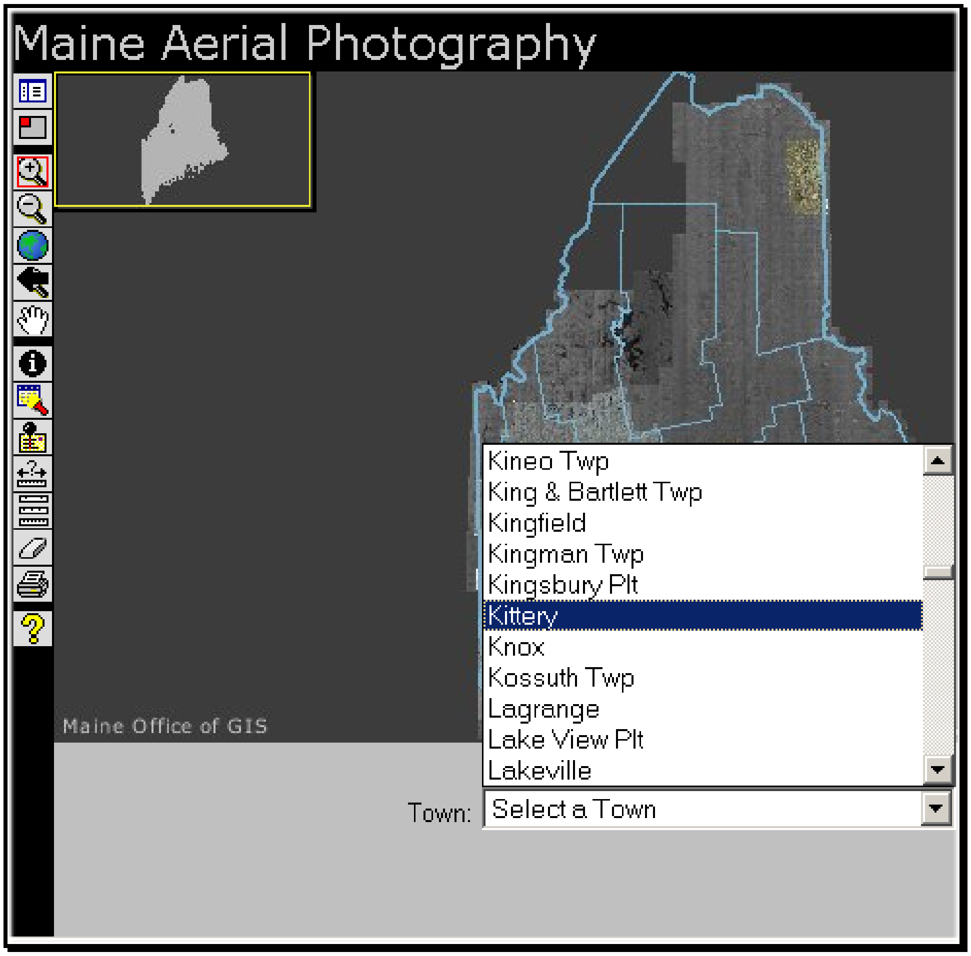


Figure 35-25: Select a town from the Zoom to town pull down.

Step Four: Adjust the Legend and Active Layer

Overview

This step will determine the quality of image that is available for the town. In the *Legend* portion of the dialog, you will need to experiment by "checking" and "un-checking" the *Visible Layers* that control the viewing Color Photography on the map.

Part One: Test for Highest Quality

Start by un-checking all but the *Town Lines, .5 Foot Color Index, .5 Foot Color Photography, Town Names and Road Names.* The highest quality image available will be the **.5 Foot Color Photography.** If this quality is available, you should see color map and a grid representing "tiles" that are available for download (it may require zooming in or out a bit). If no grid displays and the map is black and white, check for Next Highest Quality.

Part Two: Test for Next Highest Quality

Uncheck the *Visible Layers* .5 Foot Color Photography and .5 Foot Color Index and place a check in the **1 Foot Color Index** and the **1 Foot Color Photography** for the next highest quality images. Now there should be a grid of "tiles" that are available for download (it may require zooming in or out a bit) and a color map. If this isn't available, try the 2 Foot Color Photography which is less desirable.

Part Three: Set the Active Layer

Make the highest quality **Color Index** *Active* by placing a dot in the "radio" button next to the index (i.e. 1 Foot Color Index) as seen in Figure 35-26.

Figure 35-26: Layers set to the highest quality image currently available for the town of Kittery.

Step Five: Download the Image(s)

Part One: Click on the Tile

Select the *Identity* tool in the toolbar (Figure 35-27). Click anywhere within a "tile".

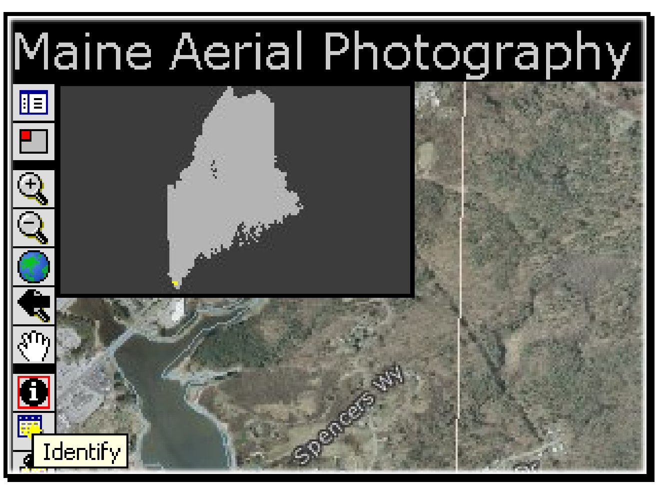


Figure 35-27: Identify tool represented by the letter "i".

This will display some image information at the bottom of the map (Figure 35-28) including the date and a link to the image.

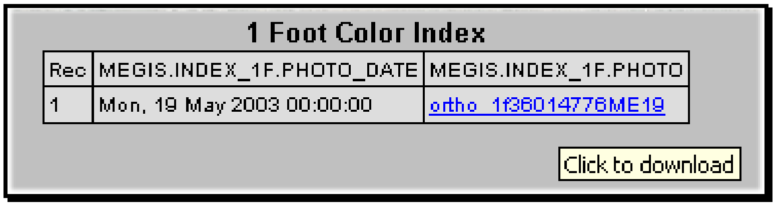


Figure 35-28: Click link to download the zip file.

Part Two: Download the Image(s)

Click the link to download and save the image that's in the form of a zip (compressed file). Select **Save** and browse to the desired location (Figure 35-29). The recommendation is to the GIS folder within your project's PIN directory on the Y: drive (i.e. Y:\pin\11584\00\GIS). Repeat for all tiles needed.

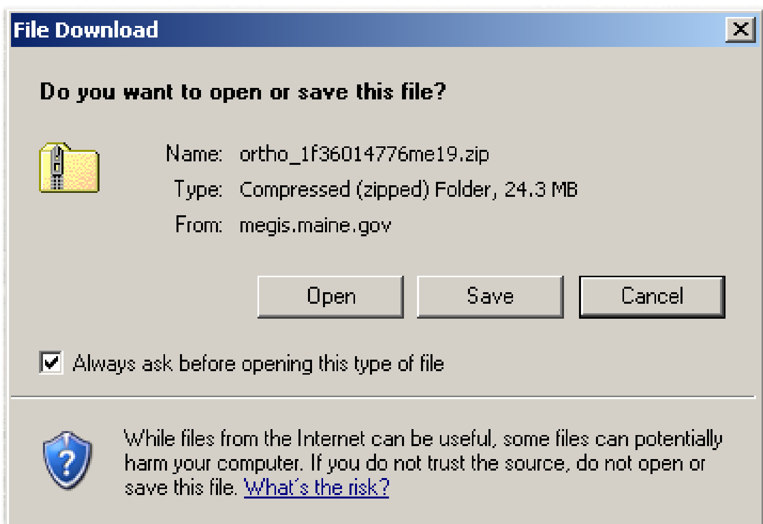


Figure 35-29: Save the zip file to the desired location.

Part Three: Extract Images

Open *Windows Explorer* and browse to the image location. Extract the images by right clicking the zip file and selecting **Extract all** (Figure 35-30). When the *Extraction Wizard* dialog appears, click **Next.**

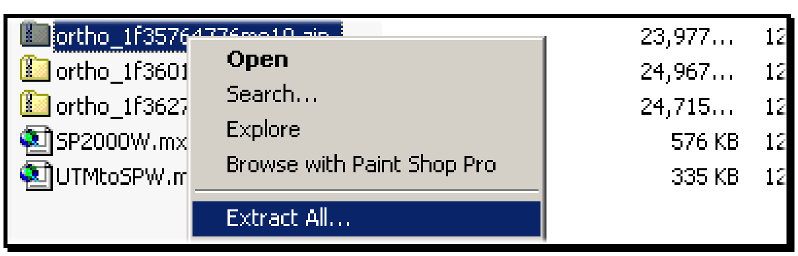


Figure 35-30: Right click and select Extract All.

Clicking **Next** again (Figure 35-31) will extract the image(s) into folder(s) that are named the same name as the original zip file(s). Click **Finish** when the extraction is complete.

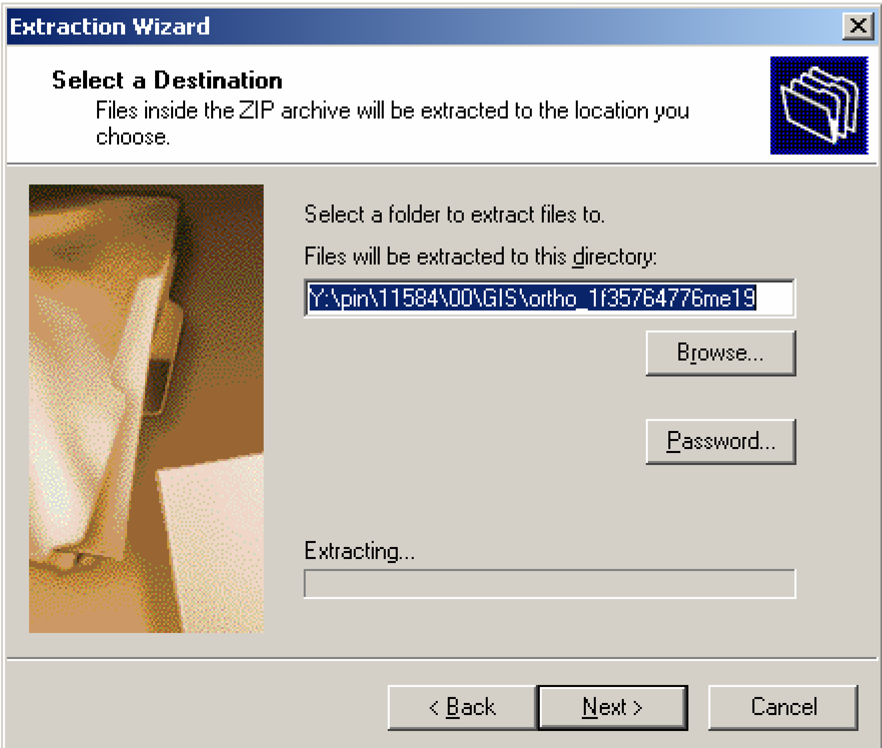


Figure 35-31: Extraction Wizard ready to extract to new folder.

RE-PROJECT AERIAL PHOTOGRAPHY

Overview

This next process requires that you have ESRI (GIS) software installed on your PC. It's also helpful to setup connections the data.

Step One: Open ArcCatalog

Open ArcCatalog. Setup a connection to the location of the images (i.e. Y:\pin\11584).

✓ ***Refer to page 35-3 for detailed information on setting up connections within ArcCatalog.***

Step Two: Open ArcToolbox

Click the **ArcToolbox** icon from the *Standard* toolbar within ArcCatalog (Figure 35-32).

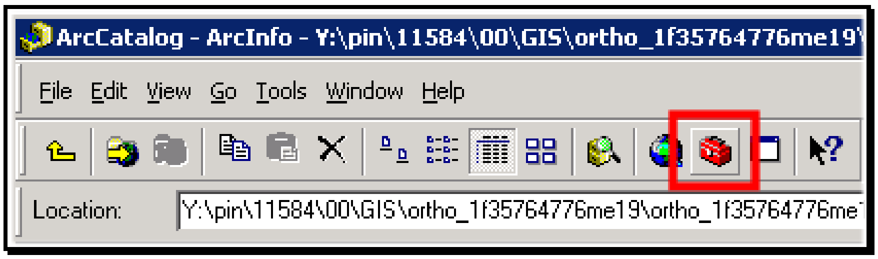


Figure 35-32: Click the ArcToolbox from the Standard toolbar.

Step Three: Open Composite Bands Tool

Expand the **Data Management Tools** to expose the **Raster>Composite Bands** tool (Figure 35-33). Double Click this tool.

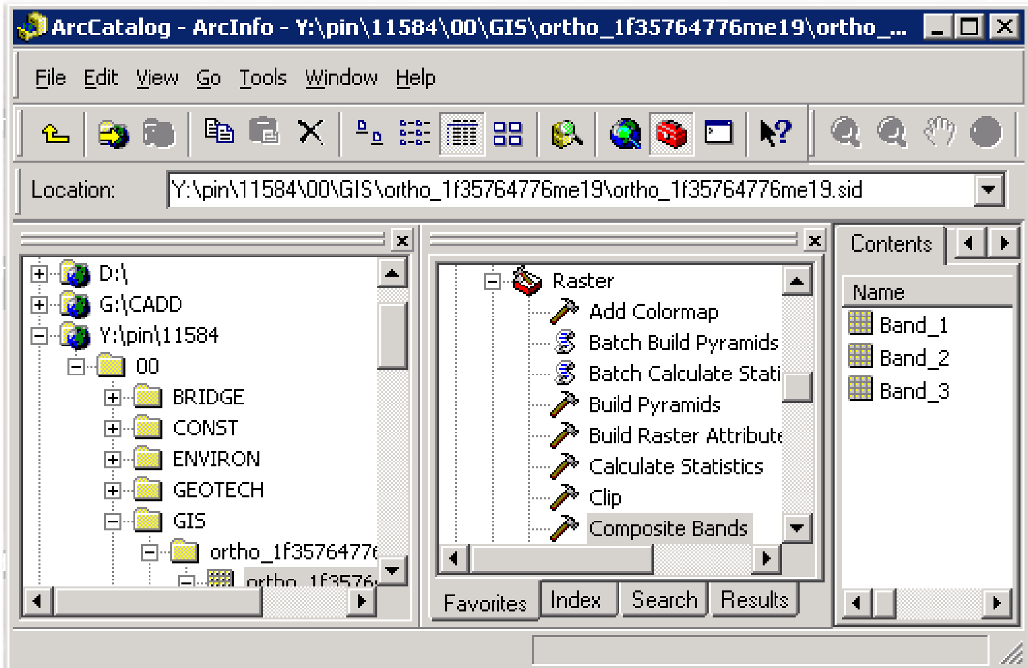


Figure 35-33: Composite Bands tool within ArcToolbox.

Step Four: Select Raster Bands

Browse to the location of the raster image (i.e. Y:\pin\11584\00\GIS\ortho_1f35764776me19). Double click the image displaying its bands. Select the image's Bands and click **Add** (Figure 35-34).

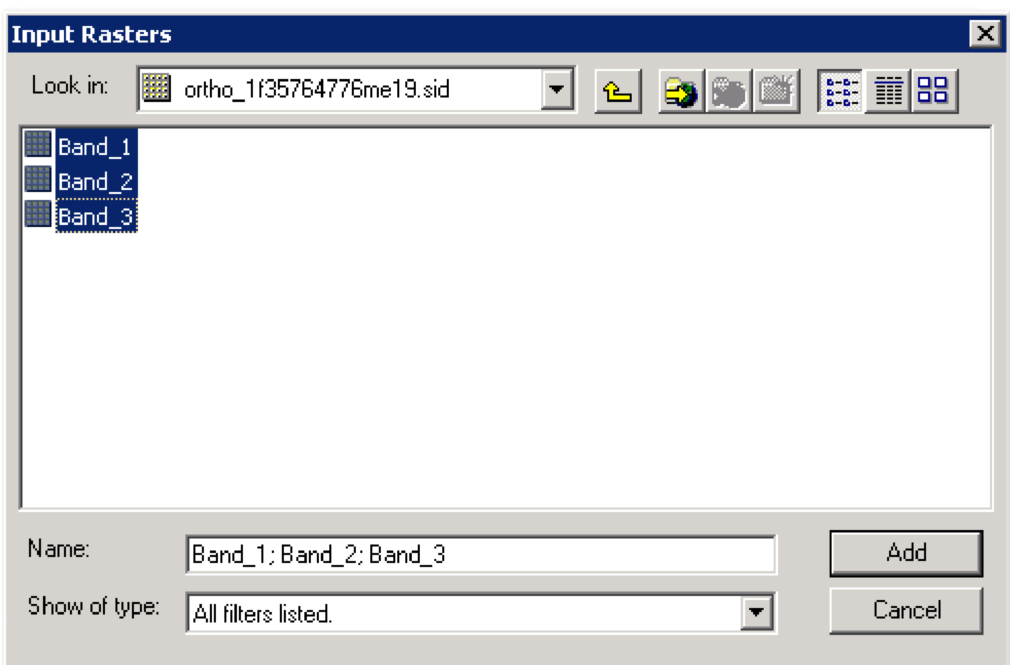


Figure 35-34: Browse to the image.

Step Five: Adjust Output Raster

Adjust the *Output Raster* by stripping the name down to the original raster name followed by a **.tif** file extension (Figure 35-35).

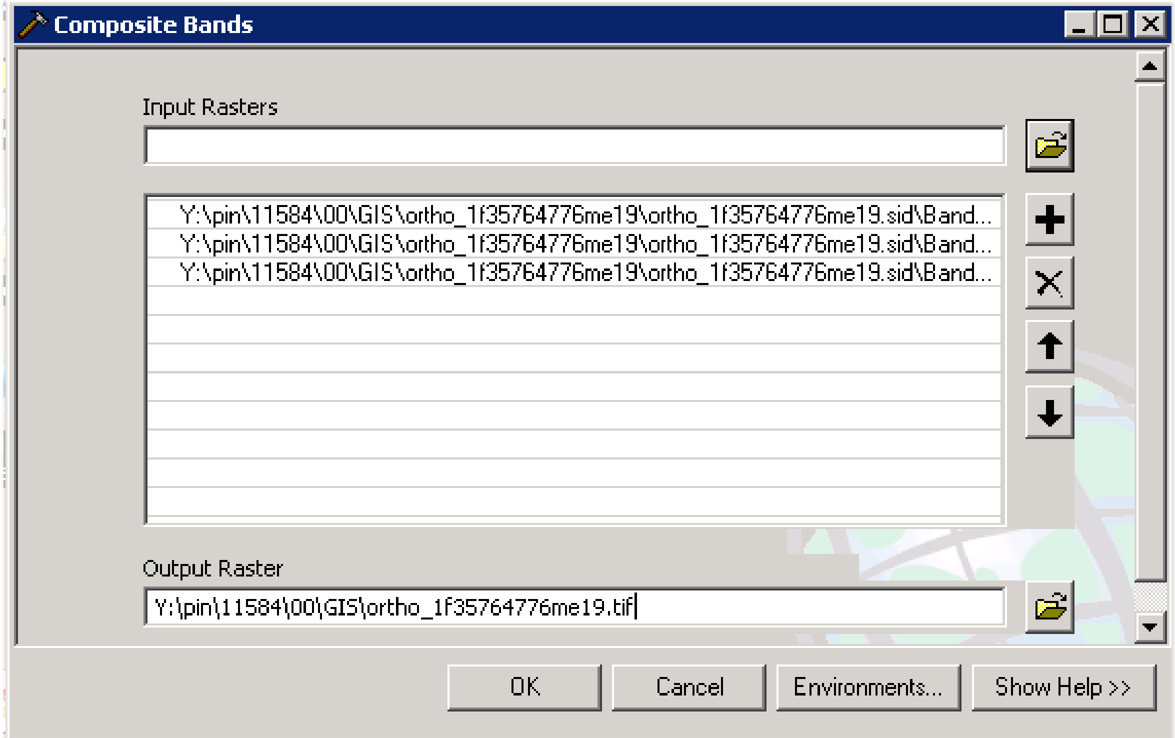


Figure 35-35: Adjust Output Raster name and location.

Step Six: Adjust Environments…

Click the **Environments** button. Adjust the following settings:

Part One: General Settings

Under *General Settings,* change the **Output Coordinate System** to **As Specified Below.** Click the *Browse* button (Figure 35-36).

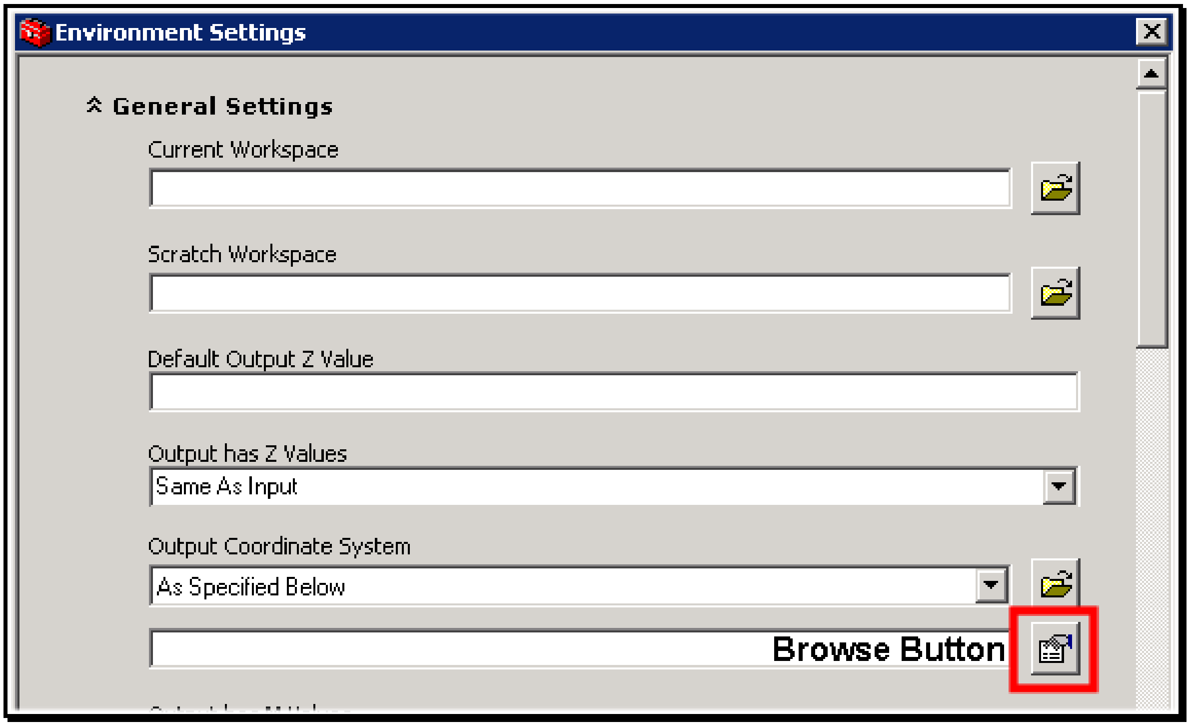


Figure 35-36: Click the Browse button.

Select the **Import** button and browse the State Plane Geodatabase within your project's GIS folder. Double click the Geodatabase and select the dataset internally that is named the same coordinate system as your project. Click the **Add** button. Click **OK.** The result should be the proposed coordinate system (Figure 35-37).

♫ Another option would be to pick the **Select** button and browse to a projection (.prj) file. We have placed the common projection files within the G:\CADD folder on the network.

Figure 35-37: The result will be the desired output coordinate system.

Part Two: Adjust the Raster Storage Settings

Scroll down the **Environments** settings and expand the **Raster Storage Settings.** Remove the check mark next to the *Build Pyramids* and the *Calculate Statistics.* Change the *Compression* to **None** (Figure 35-38). Click **OK.** Click **OK** again to start the process.

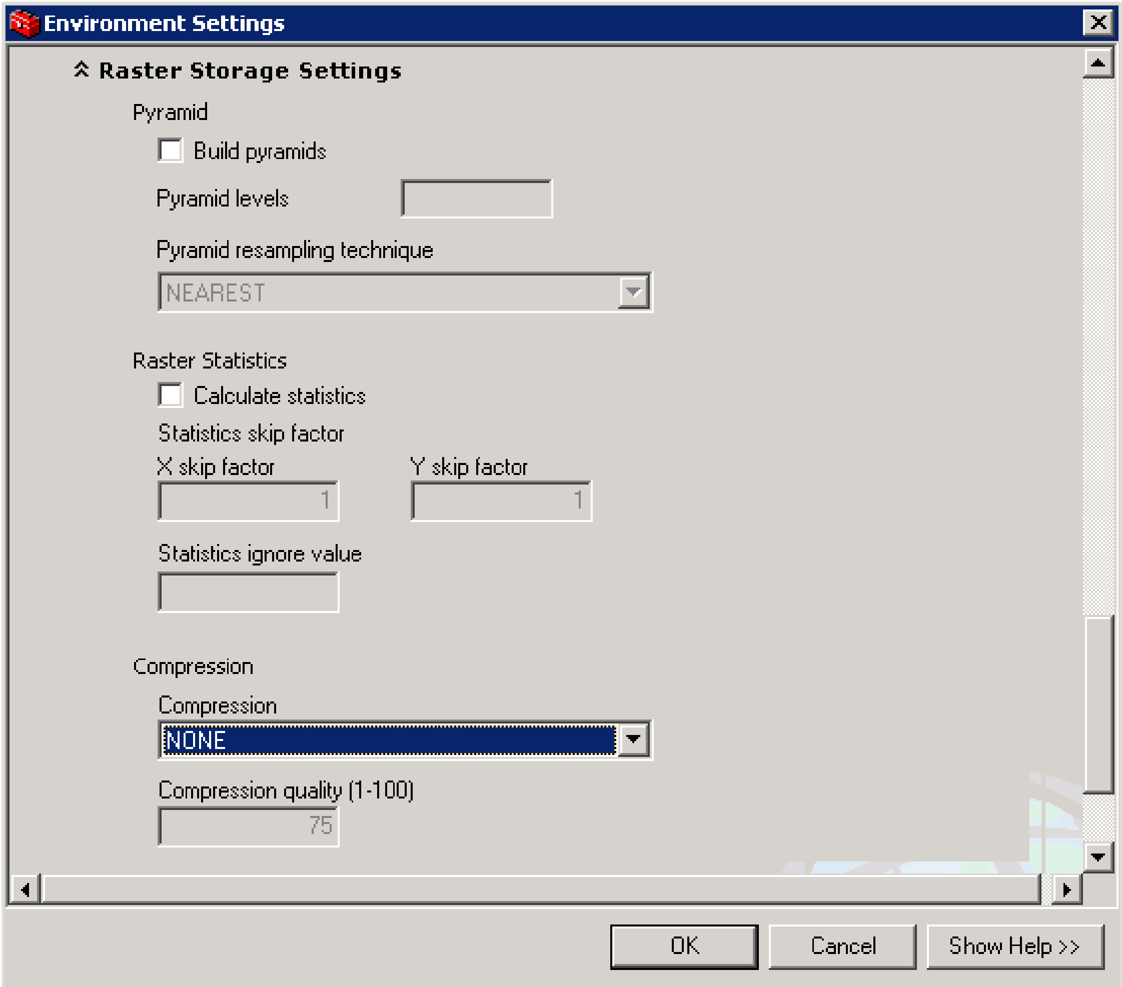


Figure 35-38: Adjust the Raster Storage Settings.

When the process is complete, the dialog will display the *Competed* message (Figure 35-39).

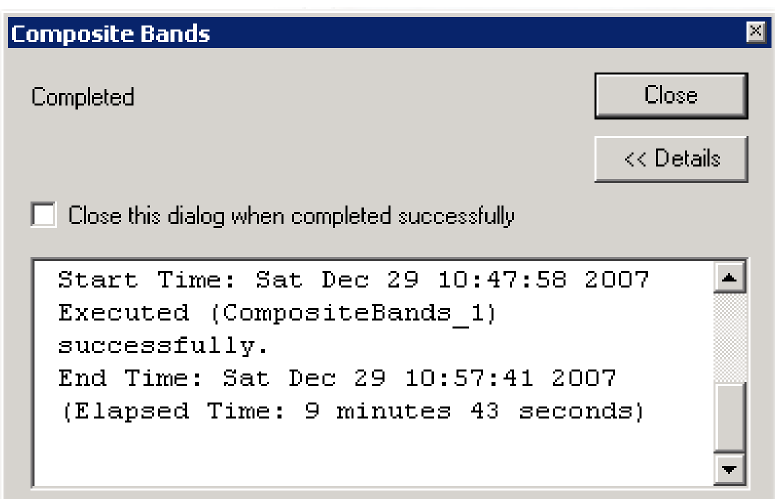


Figure 35-39: Completed message once the process has been completed.

ATTACHING TO MICROSTATION FILE

Step One: Open MicroStation

Launch MicroStation from the Desktop icon. Select the project from the project pull down. Open a file that has relativity to the ground and individual plan sheets (i.e. HDPLAN.dgn, BDPLAN.dgn or RWPLAN-Clips.dgn).

Step Two: Adjust MicroStation Preferences (if necessary)

Open MicroStation. Select **Workspace>Preferences** from the MicroStation main menu. Select the **Raster Manager** *Category*. Adjust the preferences to match the dialog shown in Figure 35-40.

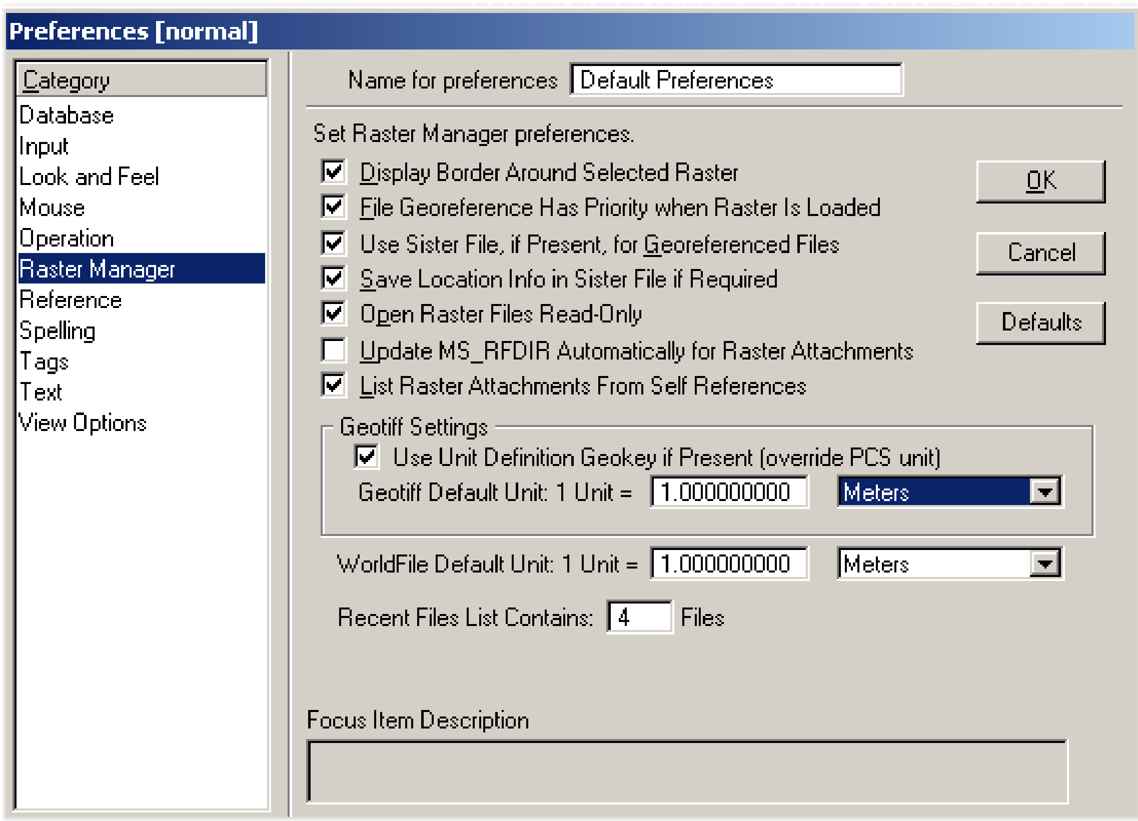


Figure 35-40: Raster Manager preferences adjusted to handle re-projected raster.

Step Three: Import Raster

Select **File>Raster Manager.** Browse to the image within the GIS folder of your project. Select the image. Uncheck the *Place Interactively* option (Figure 35-41). Click **OK.**

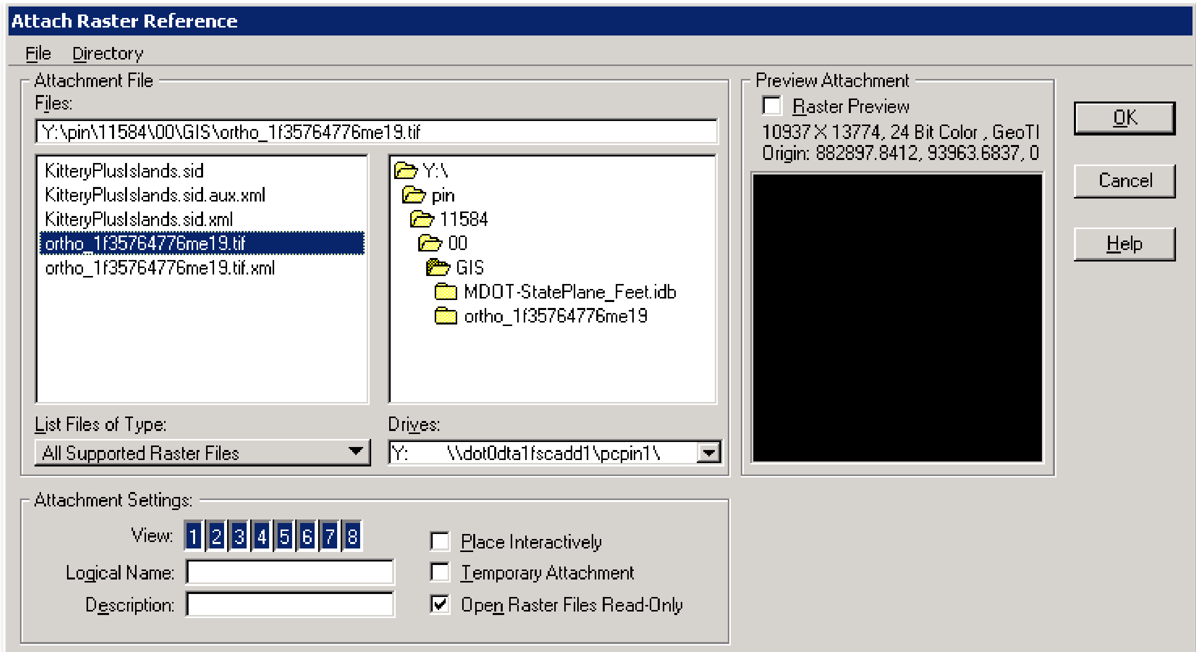


Figure 35-41: Attach Raster Reference dialog.

Repeat as necessary.

Step Four: Adjust Transparency (if Necessary)

If more than one image is used, it may be necessary to adjust transparency of one or more images so that the images match together without a black space between them (Figure 35-42).

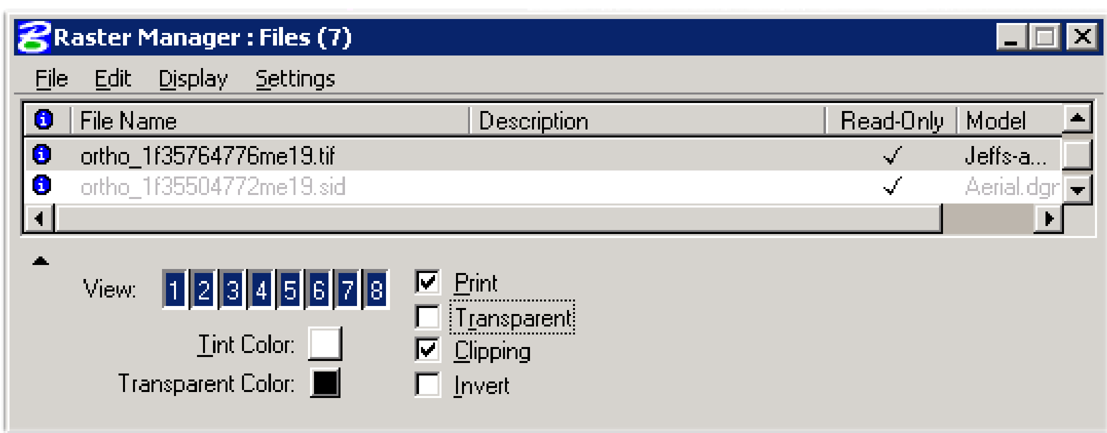


Figure 35-42: Raster Manager with image attached. Transparency unchecked.

EXPORTING UTM DATA TO CADD

Overview

Whether you take the whole GIS layer/feature class/shape file or a selection set of one of these through ArcMap, the process of re-projecting the layer is the same. For best results, the layer should be re-projected into a Geodatabase that contains a *Feature Dataset* at the proposed State Plane Coordinate System and units. Once there, it can be *Exported to CAD* while using the correct MaineDOT's MicroStation or AutoCAD seed file.

GIS data comes from a variety of sources and in a variety of types. ESRI is used to perform the following steps. The most important thing about the data is its *Spatial Extents* or coordinate system. Knowing this will allow the re-projection into the State Plane coordinates for the project.

Step One (Option One) - Using ArcMap

Part One: Select data

If all of the data is currently displayed within ArcMap, and you only want a certain area to be included within the CADD drawing, a new layer can be made. Select the **Select Features** tool in the *Tools* tool box (Figure 35-43). Click opposite corners to make a rectangle crossing the data you want to select. The lines will highlight.

Figure 35-43: Select Features tool on LT and selected features on the RT.

Part Two: Create New Layer from Selection

Create a new layer based on the selection set by Right Clicking the data set and selecting **Selection>Create Layer From Selected Features** (Figure 35-44).

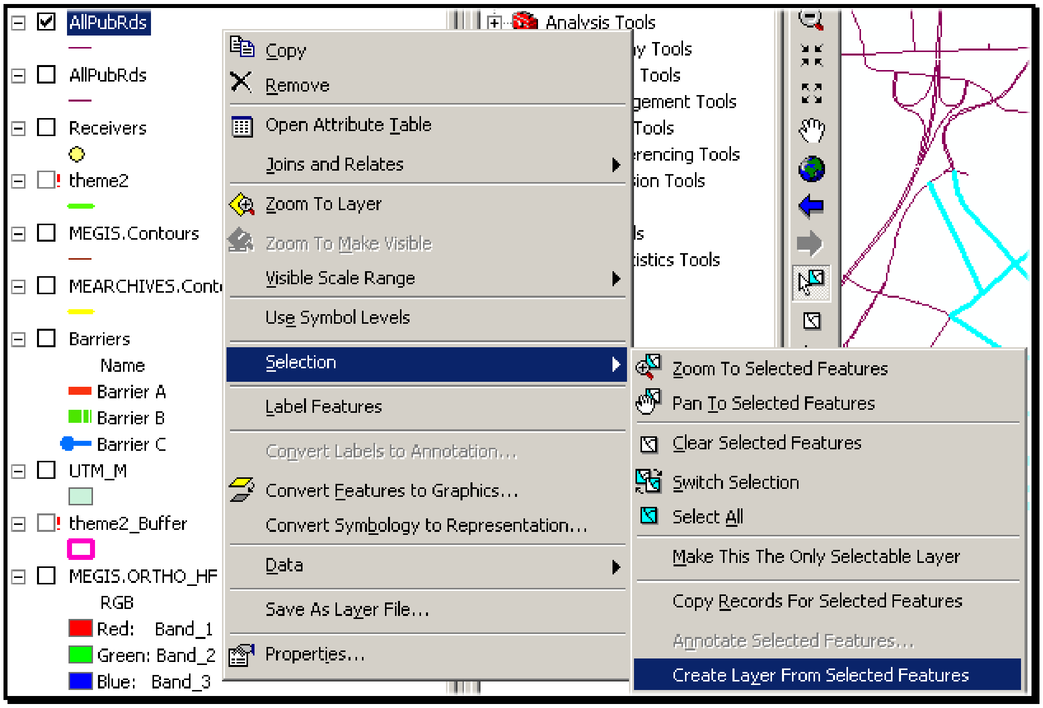


Figure 35-44: Create a new layer from selected features.

Part Three: Send Feature Class to new Geodatabase Feature Class

Select **Conversion Tools>To Geodatabase>Feature Class to Feature Class** tool from the *Arc Toolbox.* Fill in the dialog box with appropriate information (Figure 35-46).

Select the *Input Features* from the pull down.

Select the *Output Location* browse button and browse to the *Geodatabase* that contains the *Feature Dataset* that has been setup for your project's State Plane Coordinate system (Figure 35-45).

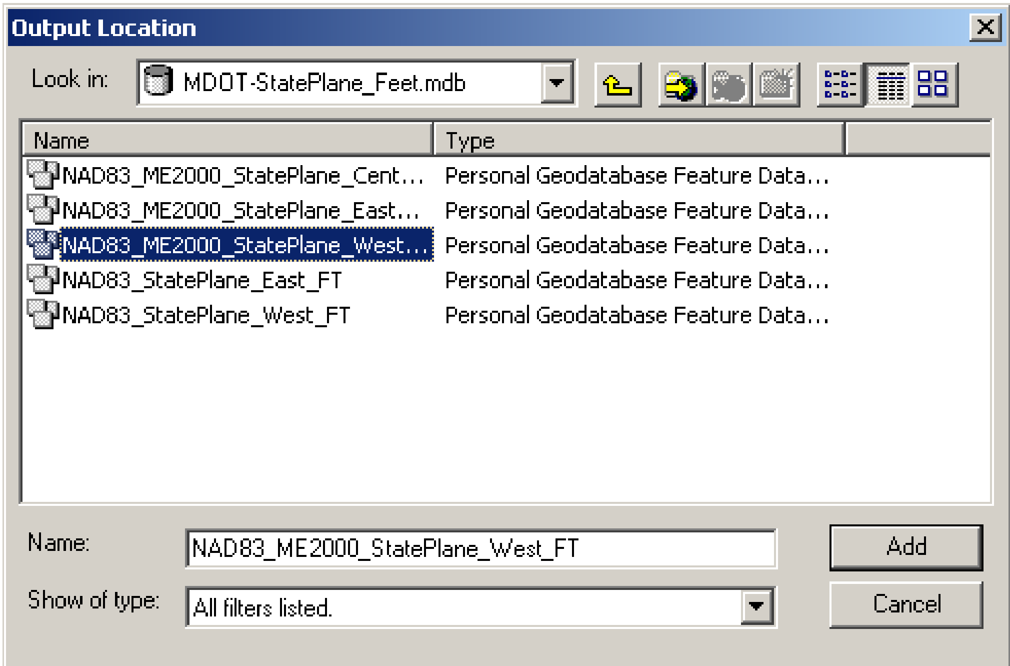


Figure 35-45: Set the Output Location to your Project's Geodatabase Feature Data Set.

Supply a name for the *Output Feature Class.*

The dialog should resemble the one in Figure 35-46. Click **OK.**

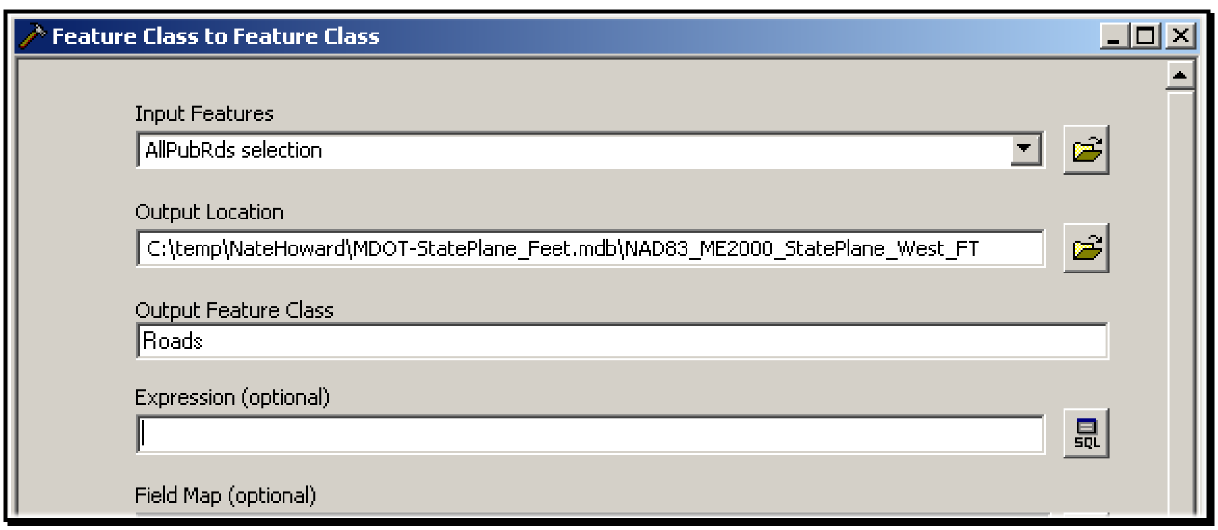


Figure 35-46: Dialog setup with the sample data.

Step One (Option Two) - Using ArcCatalog

Part One: Right Click Data to Export

Open ArcCatalog and browse to the layer to be re-projected. Right click the layer and select **Export>To Geodatabase (single)** (or multiple depending on the data) (Figure 35-47).

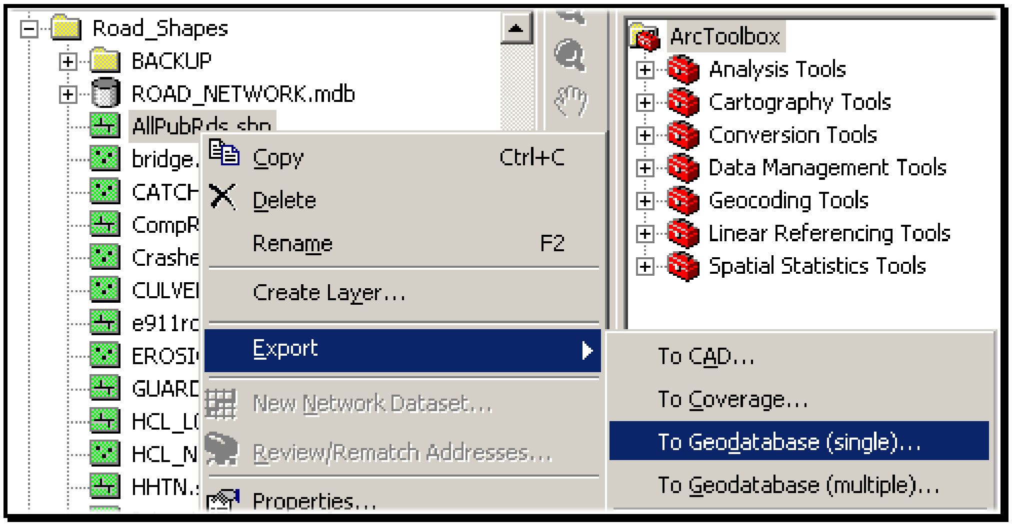


Figure 35-47: Exporting data to Geodatabase.

Part Two: Adjust Feature Class to Feature Class Dialog

Select the *Output Location* browse button and browse to the *Geodatabase* that contains the *Feature Dataset* that has been setup for your project's State Plane Coordinate system (Figure 35-48).

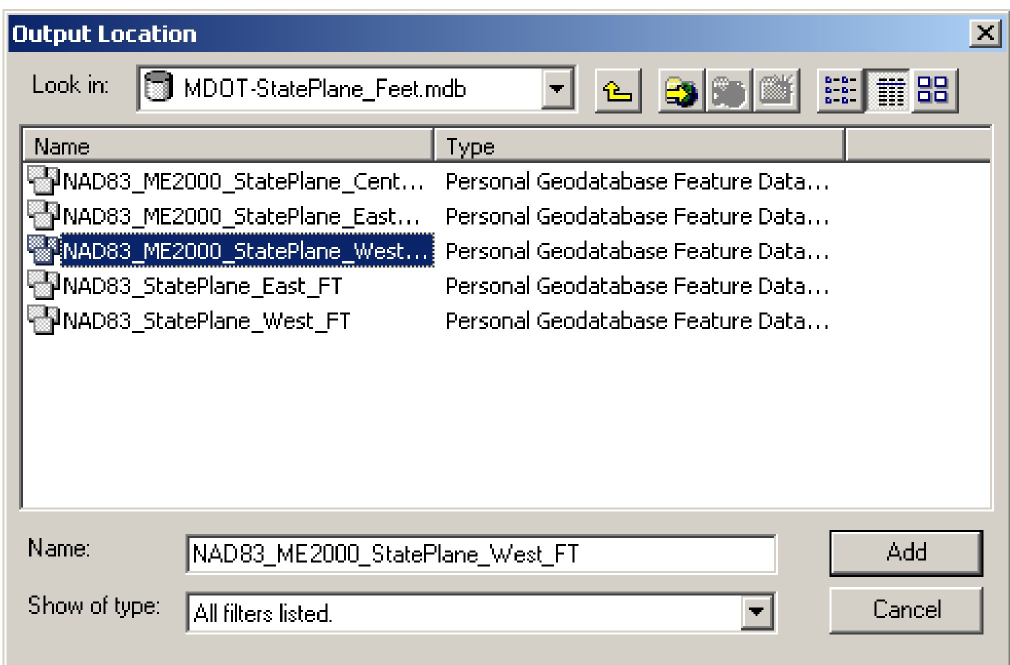


Figure 35-48: Set the Output Location to your Project's Geodatabase Feature Data Set.

Supply a name for the *Output Feature Class.*

The dialog should resemble the one in Figure 35-49. Click **OK.**

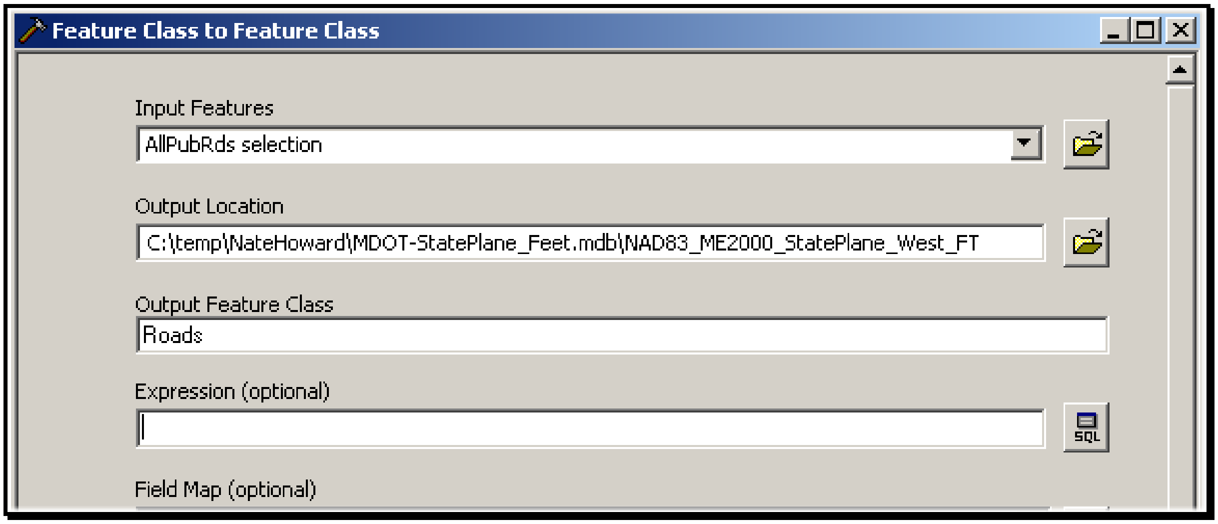


Figure 35-49: Dialog setup with the sample data.

Step Two: Test with ArcMap (optional only)

If you would like to test the resulting file, open ArcMap and select the *Add Data* button and browse to the State Plane Geodatabase's *Feature Dataset* and select the map (i.e. ME2000_SPW_FT) and the new *Feature Class* you just created. When mapped together, the data should fall in the correct location on the map. The Map will need to be the last thing listed in ArcMap.

Step Three: Export to CAD

Browse to the Geodatabase containing the GIS data that was re-projected. Right click the *Feature Class* within the *Feature Dataset* and select **Export>To CAD** (Figure 35-50).

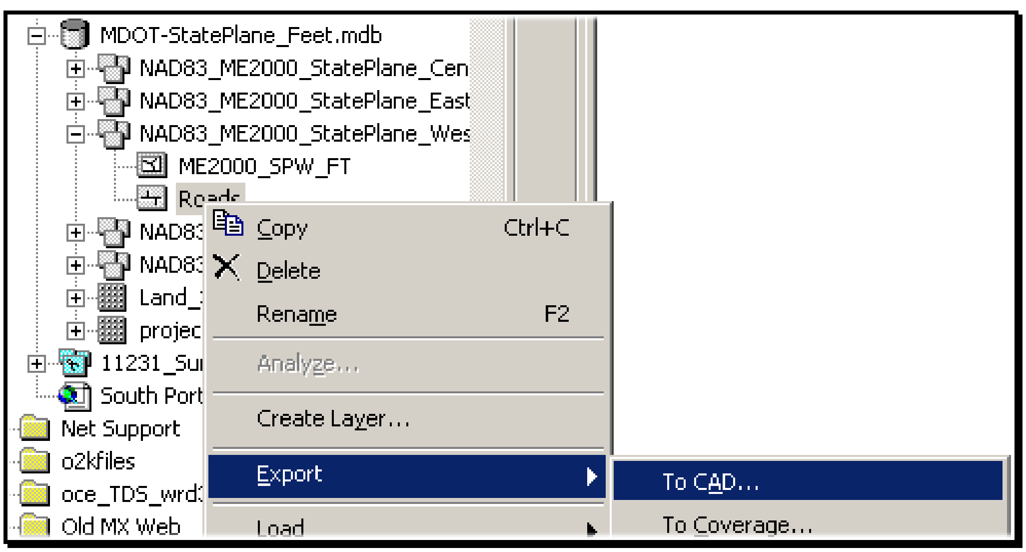


Figure 35-50: Right Click and select Export>To CAD.

Step Four: Adjust the Export to CAD Dialog

Part One: Adjust the Output Type

Select the *Output Type* down-arrow and select **DGN_V8** from the list of options (Figure 35-51).

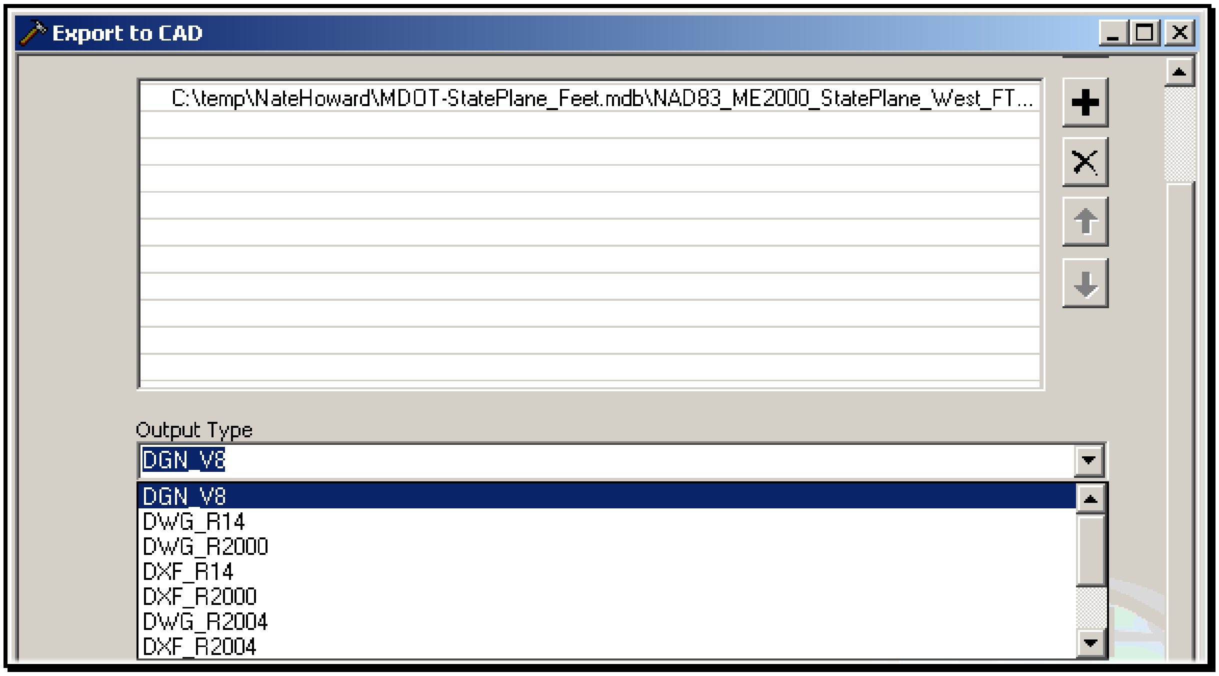


Figure 35-51: Adjust the Output Type to DGN_V8.

Part Two: Adjust the Output File Location/Name

Select the browse button next to the *Output File* field and browse to the proposed location of the output file and supply a name **<u>including the file extension .dgn</u>** as seen in Figure 35-52.

♬ It is recommended that you place the new .dgn within the project directory. Certain privileges may prevent you from placing into a workgroup folder. Place this in the topo folder for the project and someone else can move it if necessary.

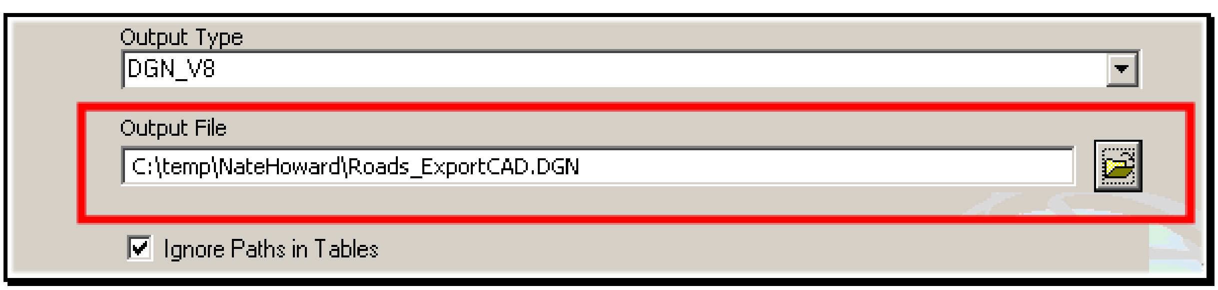


Figure 35-52: Adjust the file location and name. Add the .dgn extension.

Part Three: Browse and Add MaineDOT Seed File

Select the browse button next to the *Seed File (optional)* and browse to the G:\CADD\StdCADDSeeds\ folder and select the usMDOT_SEED.DGN from the list and click **Add** (Figure 35-53).

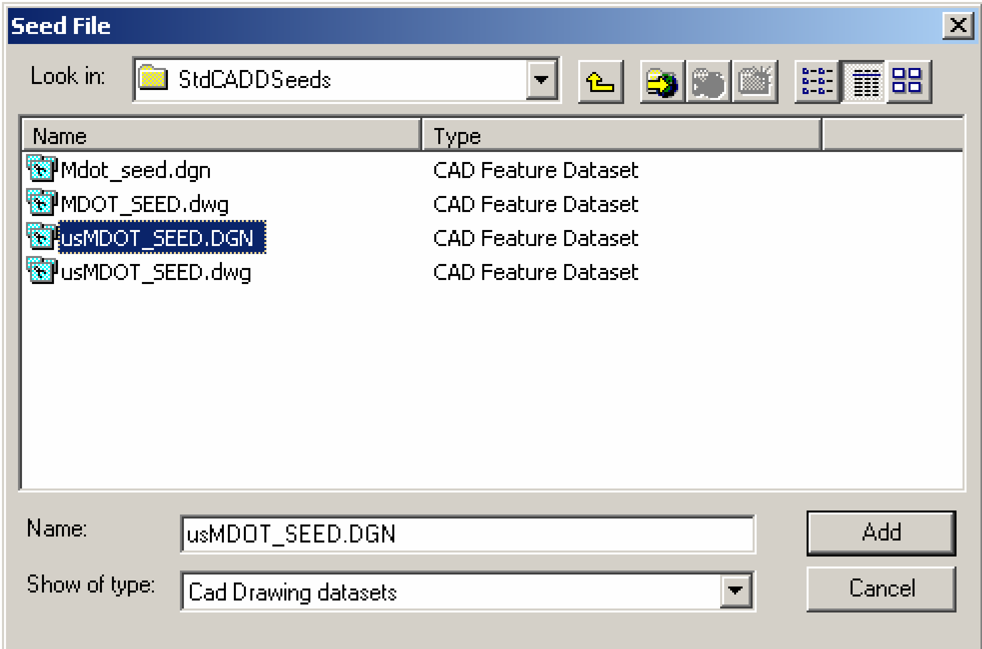


Figure 35-53: Select the appropriate seed file based on units and file type.

Part Four: Click OK to Process

Click **OK** to process the file.

Step Five: Test with ArcMap (optional only)

If you would like to test the resulting file, open ArcMap and select the *Add Data* button and browse to the Geodatabase's *Feature Dataset* and select the map (i.e. ME2000_SPW_FT). Now browse to the CADD file that was exported. You may get an error stating that there is no spatial reference for the file, but it should fall in the correct location.

Step Six: Reference to CADD Files

Within MicroStation, you or others can open an existing MicroStation file and select **File>Reference (DOT) Attach** to view the information with other CADD drawings for the project.