MaineDOT MicroStation & InRoads Procedures

TABLE OF CONTENTS

CHAPTER 13 PROJECT WORKFLOW (DESIGN) 13-1

CHAPTER 27 USING PACKAGER (ARCHIVE) 27-1

CHAPTER 28 FINALIZING A PROJECT..... 28-1

CHAPTER 30 AS BUILT DRAWINGS..... 30-1

CHAPTER 31 STANDARDS..... 31-1

Chapter 1 General Procedures

This chapter offers an introduction to the MicroStation working environment that 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, letting 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/caddsupport/msinroads/microstationinroadsmanual.htm

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.

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 *MDOT MicroStation and InRoads Manual* can be accessed from the MaineDOT Cadd Support website by using a shortcut provided in the main menu (looks like a book with a magnifying glass on it) (Figure 1-1).

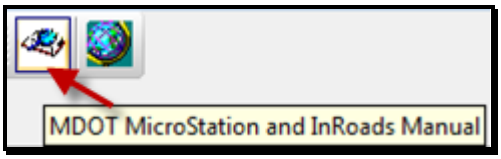


Figure 1-1: MicroStation/InRoads Manual Icon

So that you can access the manual locally and for offline work, download the pdf. If the shortcut for this manual and the adjacent shortcut to the *MDOT Cadd Web Page* are not available (shown above), navigate to **Tools > Maine DOT Online Resources** and left click to display the menu.

Searching the 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.

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.

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

LAUNCHING MICROSTATION

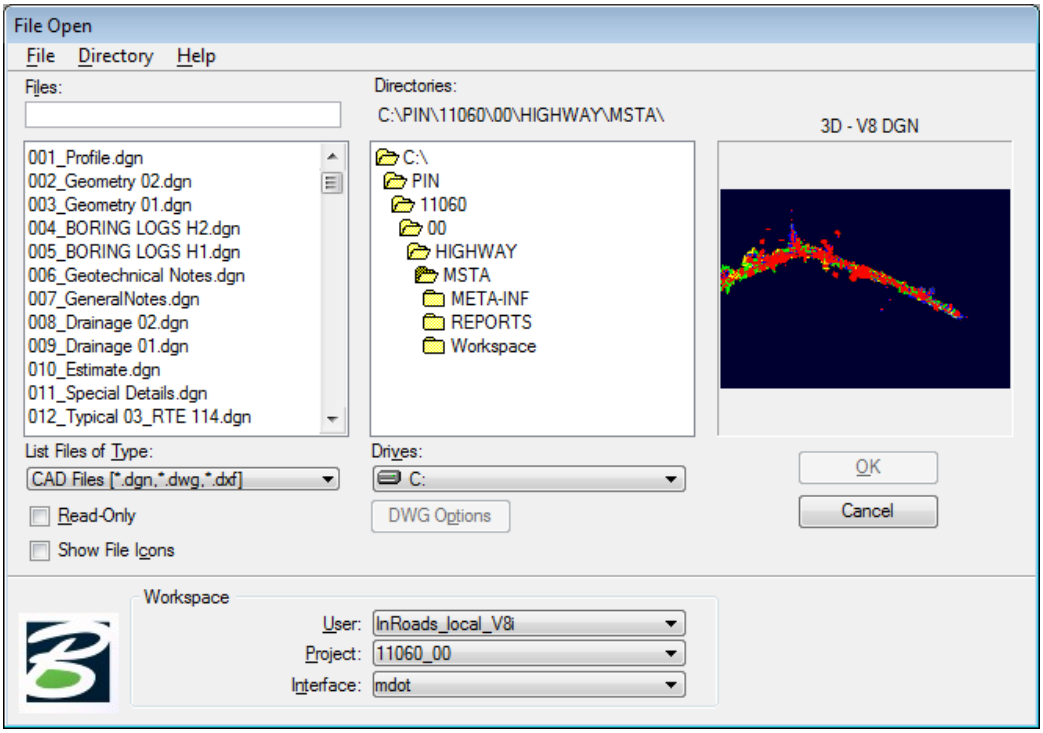
Overview

To work ***only*** in MicroStation (MicroStation tools) on an InRoads project, you should launch the **MicroStation V8i** icon on your desktop. If you decide you need to do design related tasks with InRoads, this can be launched from within MicroStation Applications menu.

Launch MicroStation V8i

Part One:

Launch **MicroStation V8i** from your desktop icon. The first dialog to open is the *File Open*.



At the bottom of this dialog you will notice the *Workspace* area. *User* should be set to your appropriate group. If working on your project locally, this can be switched to **InRoads Local_V8i.** *Interface* should be set to **mdot**.

Part Two:

Select the down arrow next to *Project* and select your project number from the list.

ⓘ ***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.***

Part Three:

Select a .dgn from the left side of the *File Open* and click **OK.**

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.

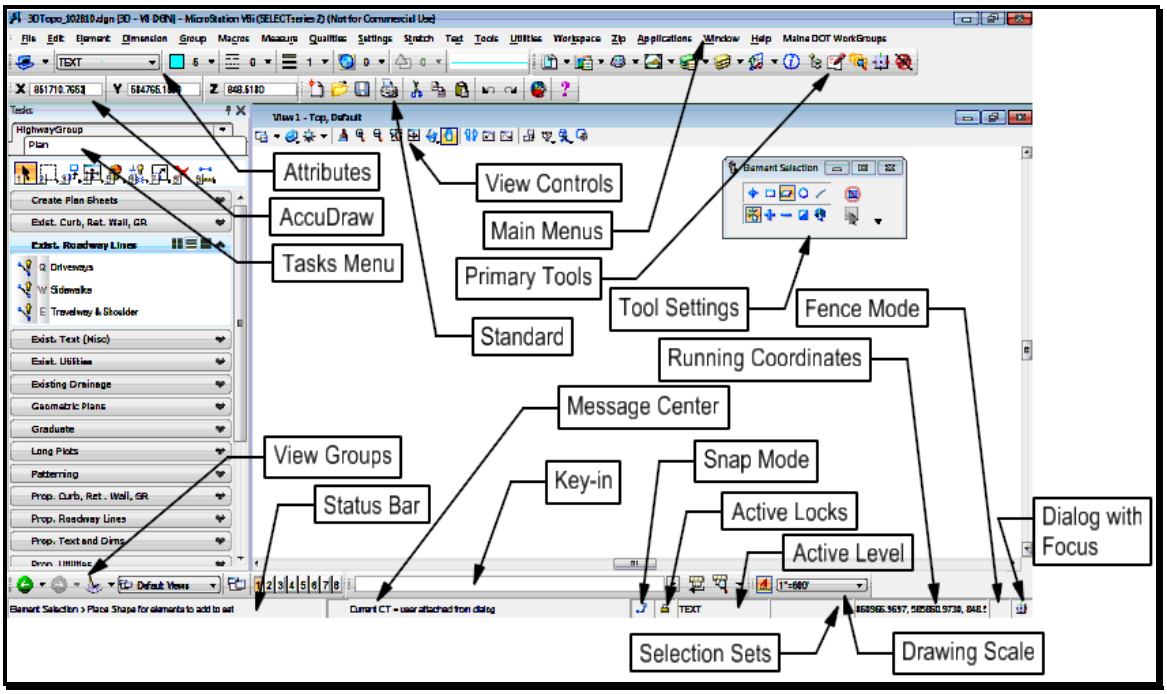


Figure 1-2: Interface Components

Main Menu

Overview

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. We've tried to maximize the keystrokes accessible with your left hand in order to keep one hand on the mouse.

Let's look at the menu structure, including important modifications we've made to existing menus as well as menus we've added:

Menus

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 **Macros** menu is used to launch custom applications and enhancements.

The **Measure** menu measures distances, angles, areas and volumes.

The **Qualities** menu matches and changes color line style and other attributes.

The **Settings** menu has been modified to give you access to a wide range of tools.

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.

Status Bar

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.

View Controls

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.

Step One: View Controls

Starting left to Right, hover over the view controls to get a description of the tool. Click on each one of the tools. Follow the prompts. We will explore the *Rotate View* tool in more detail.

Step Two: Rotate View Tool

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

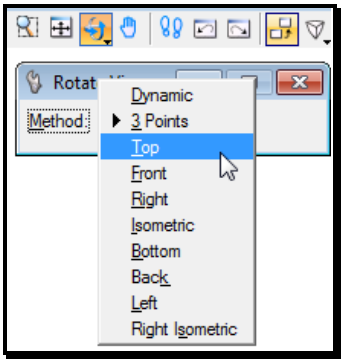


Figure 1-3: View Rotation Methods

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 by using the **File > Export > 2D** command from the *Main Menus*. You have to use the **File > Open** command to open the 2D file that was just exported.

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

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 Tasks** can be opened from the **Menus** by choosing **Tools > Main**.

The **Main Task Tasks** can be opened from the **Menus** by choosing **Tools > Task**.

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**.

With our in-house customization we have specific *Tasks Menus* docked on the left and more can be opened using the **Maine DOT WorkGroups** drop-down. Log in credentials should open your primary Task Menu (i.e. HighwayGroup) automatically upon start up.

AccuDraw can be opened by pressing the **Toggle AccuDraw** button on the **Primary Tools** bar (Figure 1-4).

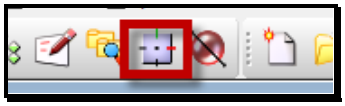


Figure 1-4: AccuDraw Button

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 V8i 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**, and then click **Remap Buttons** to get the **Button Mappings** dialog (Figure 1-5).

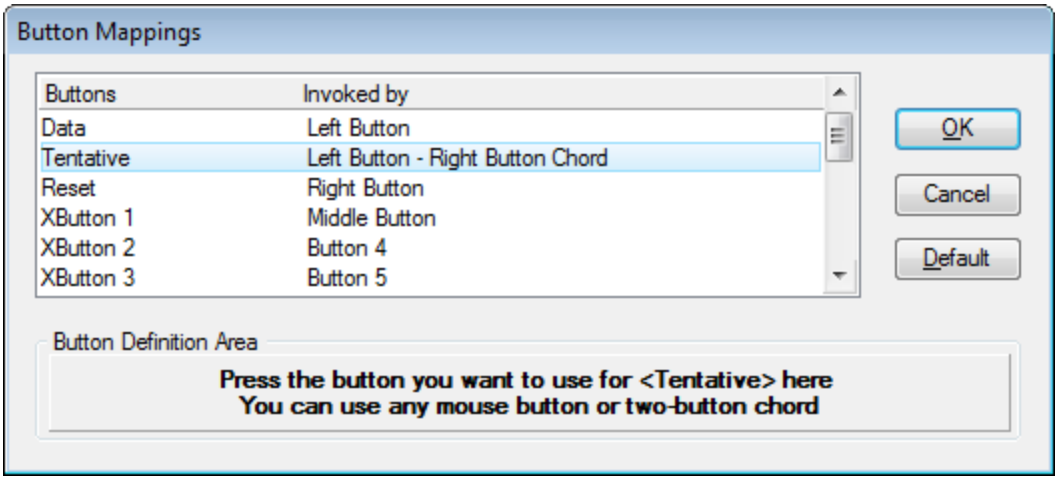


Figure 1-5: No Middle Button Assigned

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 1-6)

- 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**.

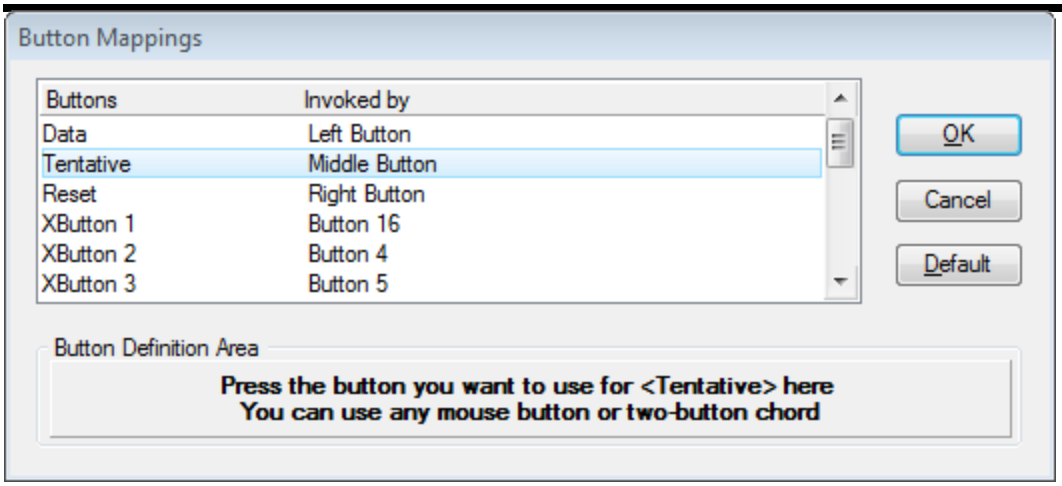


Figure 1-6: Middle Button Correctly Assigned

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 > 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 1-7)

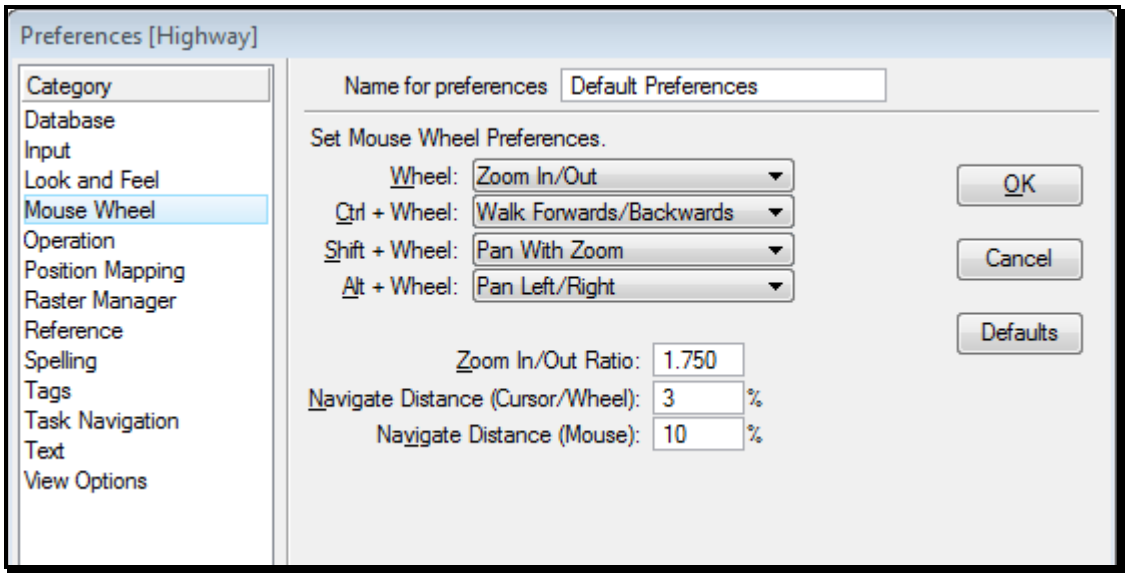


Figure 1-7: User Preferences

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 **Macros** menu is used to launch custom applications and enhancements.

The **Measure** menu measures distances, angles, areas and volumes.

The **Qualities** menu matches and changes color line style and other attributes.

The **Settings** menu has been modified to give you access to a wide range of MaineDOT, 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

MICROSTATION/INROADS CONFIGURATION

Configuration Files and Drawing Files

The master MicroStation customization files are on the network 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 of:

\\oit-teaqasdtiis.mdot.w2k.state.me.us\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 V8i** from your desktop icon.

- If you intend on using the InRoads tools, select Applications > InRoads Group > Activate InRoad.

✓ ***Please refer to page 13-22 for more information on launching InRoads.***

The first dialog to open is the **File Open**. At the bottom of this dialog you will notice the **Workspace** area. **User** should be set to **InRoads_network_V8i**. If working on your project locally, this can be switched to **InRoads_local_V8i. 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 **File Open** 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 Make Sheetz macro

Select **File > Make Sheetz**. This will open the **File Prefix Dialog** (Figure 1-8).

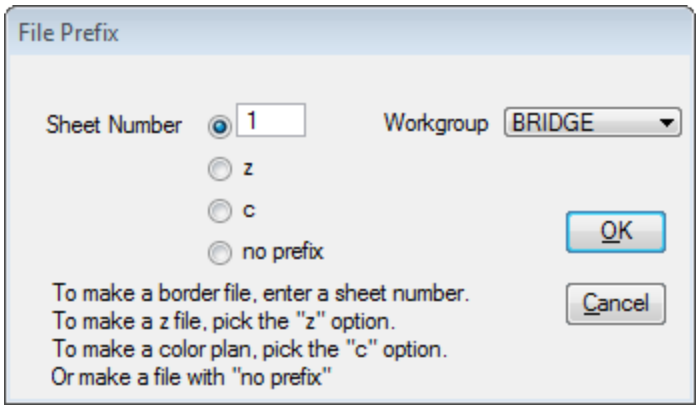


Figure 1-8: File Prefix

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 1-9).

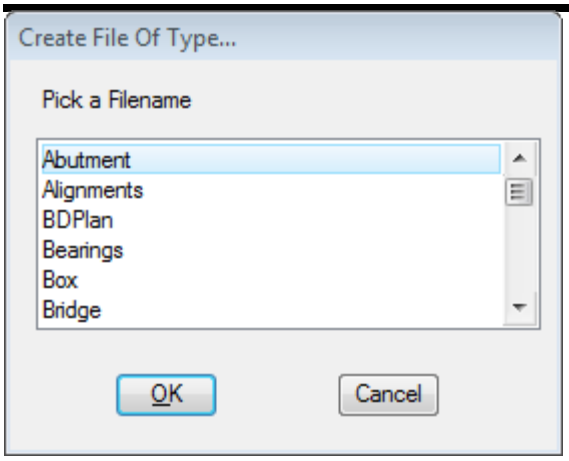


Figure 1-9: Create File of Type

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 1-10).

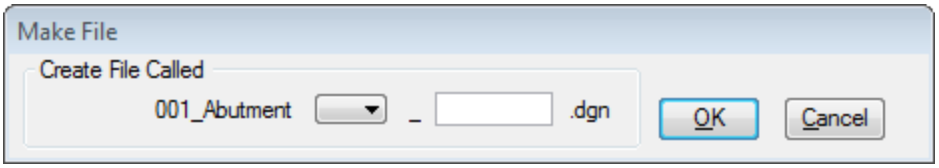


Figure 1-10: Make File

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 1-11) or type a suffix into the text entry box (Figure 1-12).

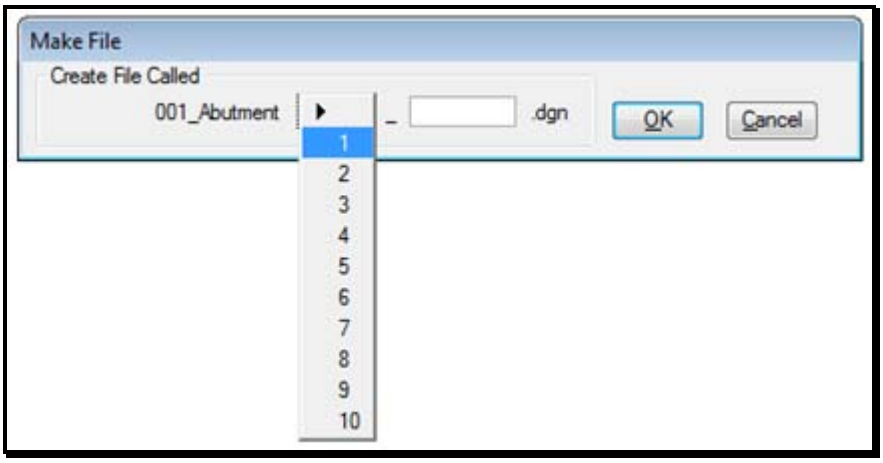


Figure 1-11: Index Picker

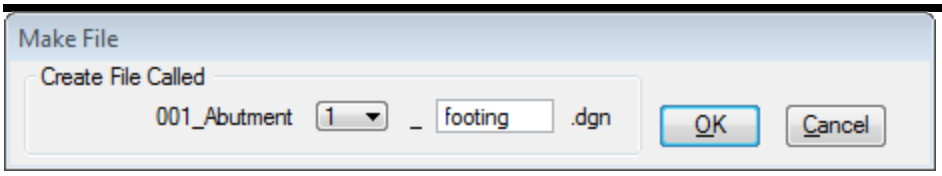


Figure 1-12: Suffix

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 1-13)

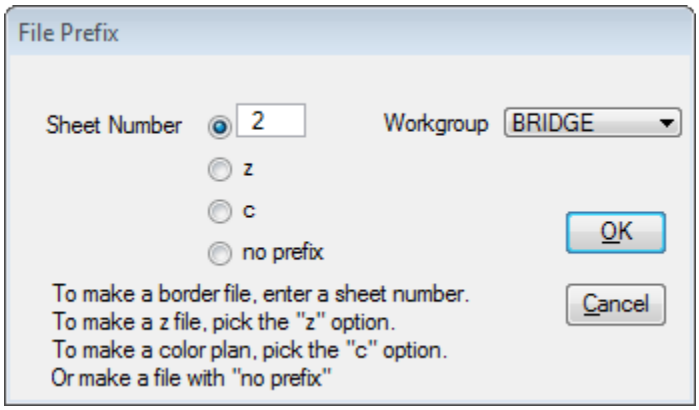


Figure 1-13: File Prefix Again

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 1-14).

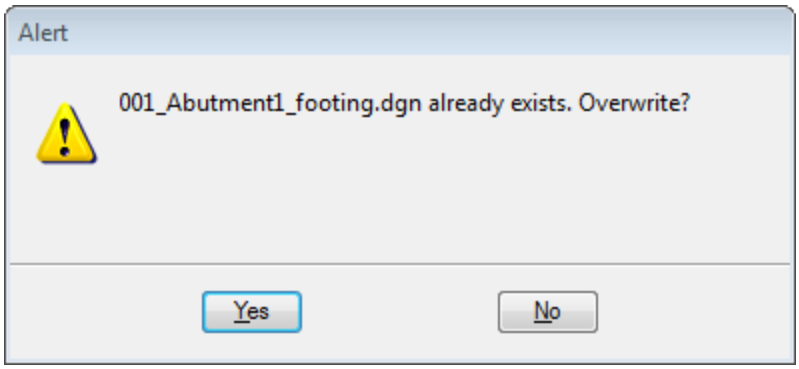


Figure 1-14: File Overwrite Alert

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 *Tasks Menus* that should be used based on the user log in credentials.

ⓘ ***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.

Step One: Start the Utility

To use this utility click on the icon on your desktop (Figure 1-15) or by selecting **Start > Programs > MDOT Utilities > MDOT MicroStation Sheet Numbering Utility.**

Figure 1-15: The Tao of Renumbering

Step Two: Browse to Project

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:\\oit-teaqasdtiis.mdot.w2k.state.me.us\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 1-16.

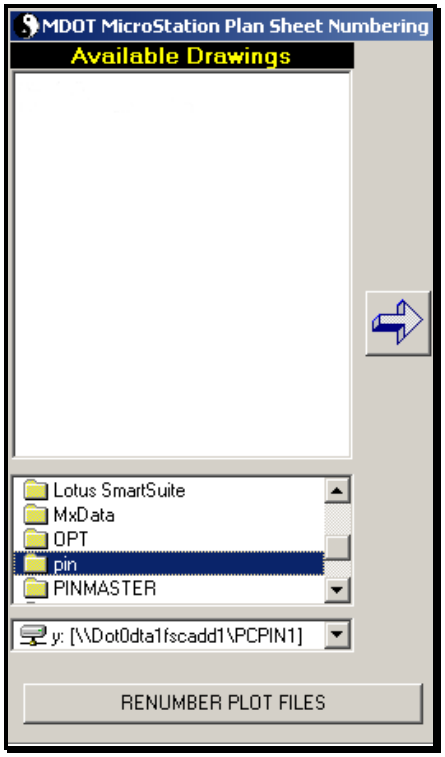


Figure 1-16: Browsing for Files.

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 1-17).

- 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.

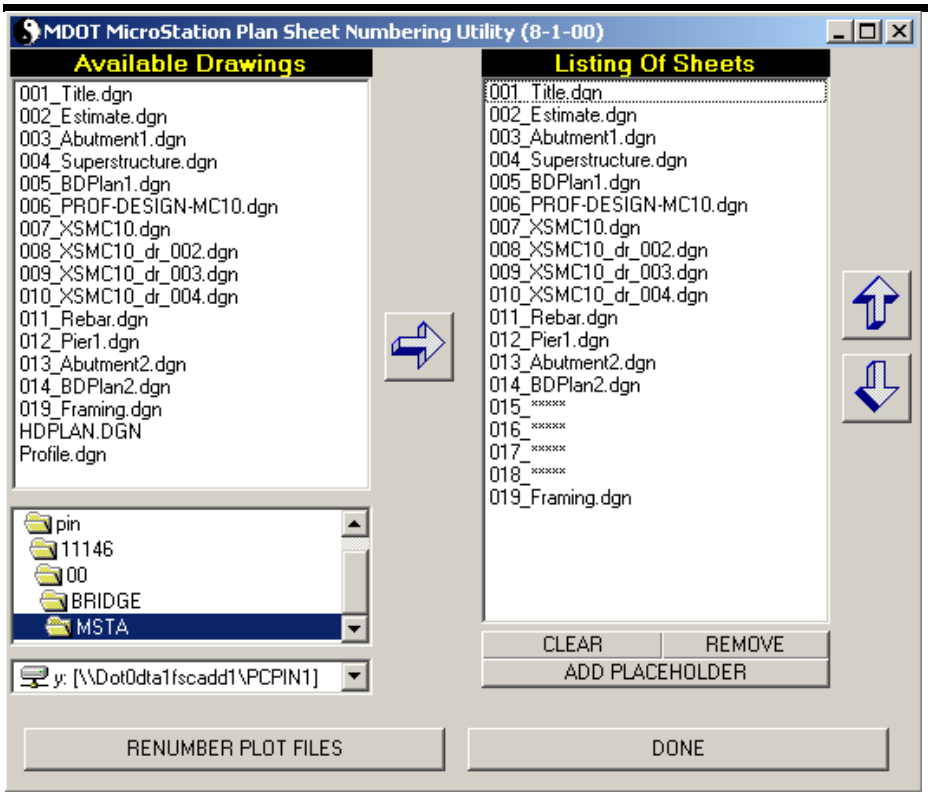


Figure 1-17: Renumbering Interface

Step Three: Prioritize 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 1-18.

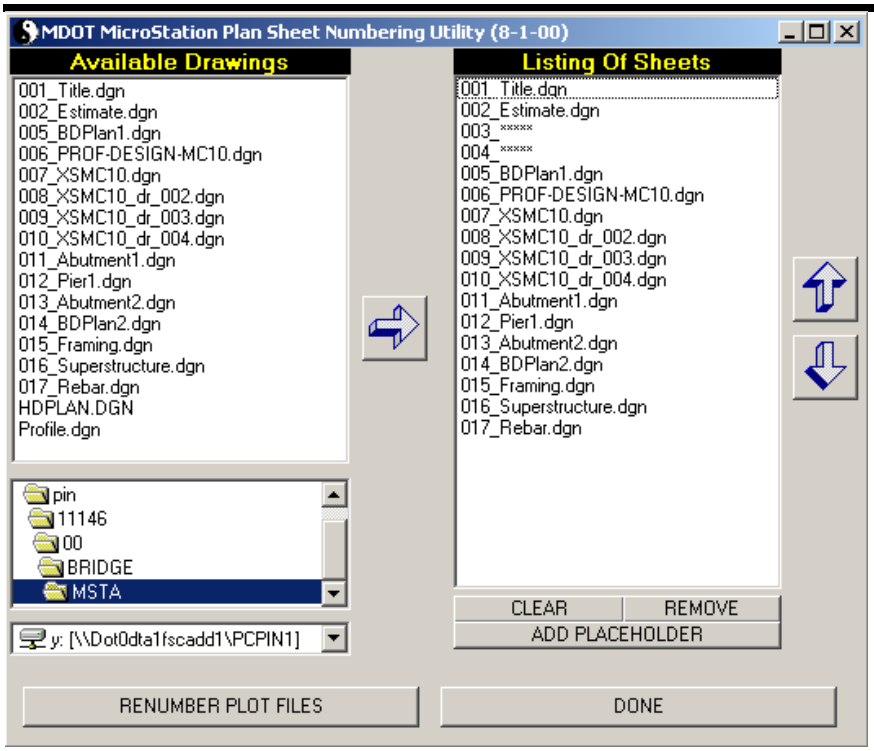


Figure 1-18: Renumbered Files

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 1-19)***

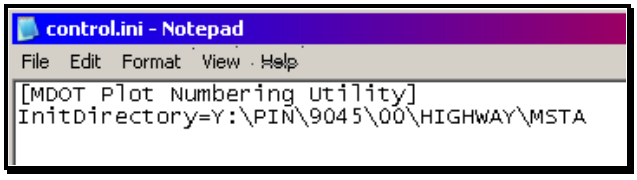


Figure 1-19: Control file

Adding Place Holders

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.

PCF EDITING

Overview

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 1-20***)

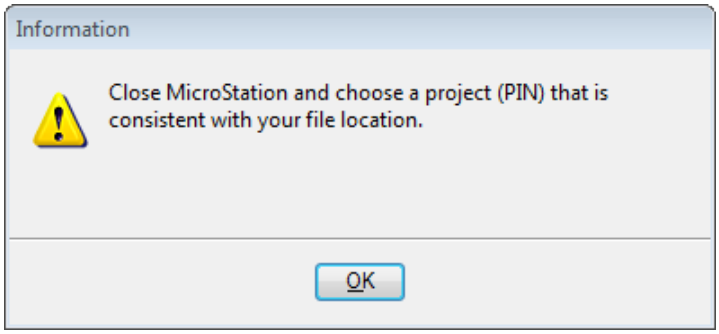


Figure 1-20: Information Dialog

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 *File Open* 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 1-21).

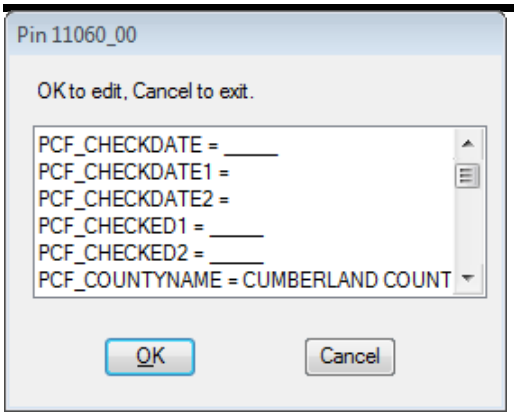


Figure 1-21: PCF Selections

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 1-22

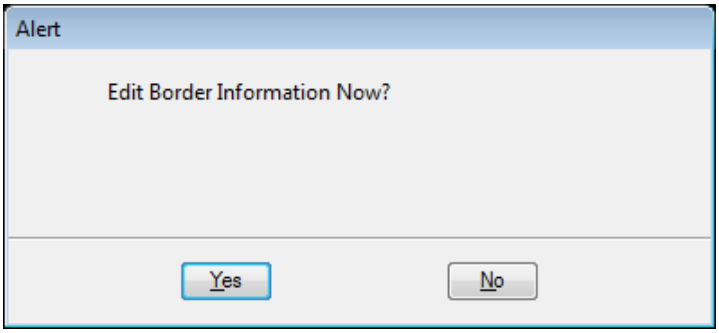


Figure 1-22: PCF Edit Alert

✓ ***Refer to the Border Information Macro on page 1-69.***

BORDER INFORMATION MACRO

Overview

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 1-72 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 1-62 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 1-23) that offers you two options.

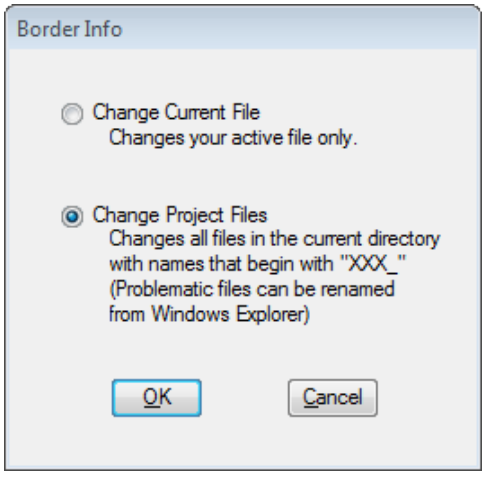


Figure 1-23: Border Info

Option One: Change Current File

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

Option Two: Change 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 1-24).

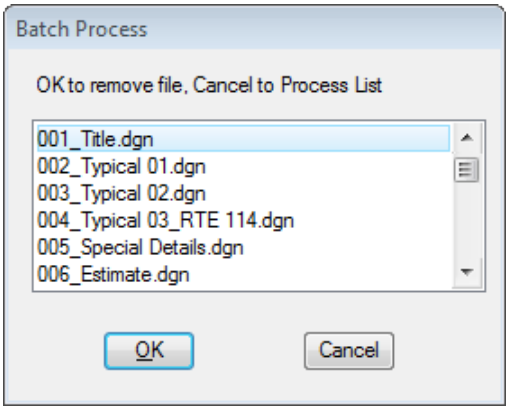


Figure 1-24: Batch Process

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 1-67 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 (**Macros > 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 Element Selection 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 **Macros > 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 drivers below are located in the /!msV8iconf/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 recommended printing solution is *Printing to PDF* by creating single sheet or a multi-page PDF and then print from Adobe directly to a plotter.
- ✓ ***Refer to page 28-10 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_ XEROX6279b-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.

US_ XEROX6279b-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.

US_ XEROX6279b-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 primarily 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.

US_ XEROX6204-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.**

US_ XEROX6204-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.

US_ XEROX6204-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_CANONColor-full-rm126 – Full Size Color Plotter

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

US_CANONColor-half-rm126 – Half Size Color Plotter

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

US_CANONColor-long-rm126 – Half Size Color Plotter

This option sends color plots longer than our normal plan sheet is tall (24"+/-) to 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.

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.

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.

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 /!msV8iconf/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 using the *Print Organizer*, 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 using the *Print Organizer*, 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 pen table 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 pen table 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 pen table 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

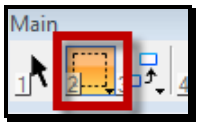
This option adjusts the processing order and forces all color to black except for color 46.

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 1-25).

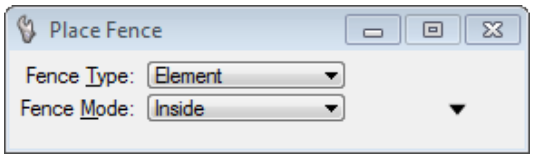


Figure 1-25: Place Fence Options

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 1-26**)**.

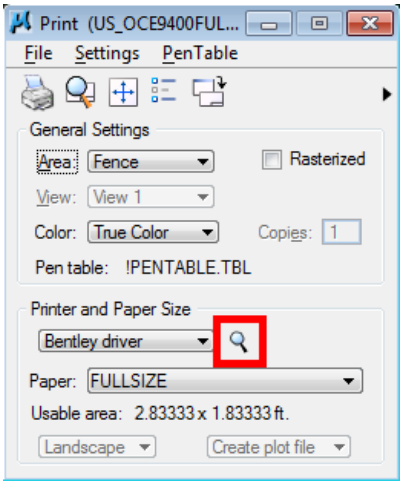


Figure 1-26: Plotter Driver on the Print Dialog

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:\!msV8iconf\standards\plotdrv.** Select the plot driver that you want to plot to.

✓ ***For a complete list of drivers, refer to page 1-74.***

Step Three: Select Pentable (If Necessary)

Select the pen table if necessary. The default table (!pentable.tbl) 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:\!msV8iconf\standards\tables\pen**.

✓ ***Refer to page 1-81 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 1-27) 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 1-27).

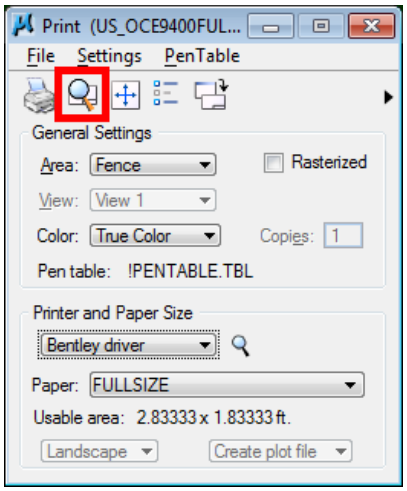


Figure 1-27: Preview Icon

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 1-28).

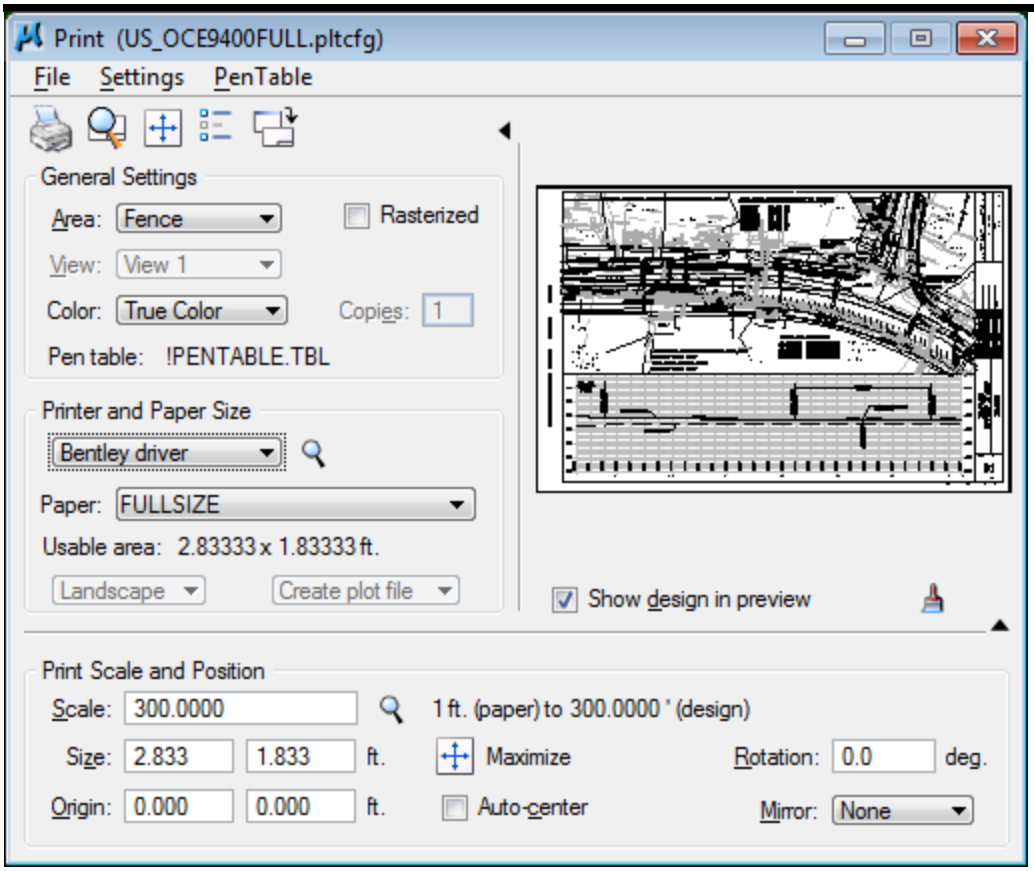


Figure 1-28: Show Details

Step Seven: Check Scale

When you expand the dialog you will see information about your **Print Size/Scale** and **Print Position** (Figure 1-29).

ⓘ ***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.***

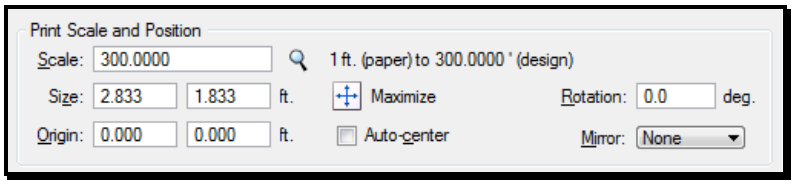


Figure 1-29: Print Scale and Position

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 (PRINT ORGANIZER)

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 *Print Organizer* utility **(File > Print Organizer)** 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 > Print Organizer**. This brings up the *Print Organizer* dialog (Figure 1-30).

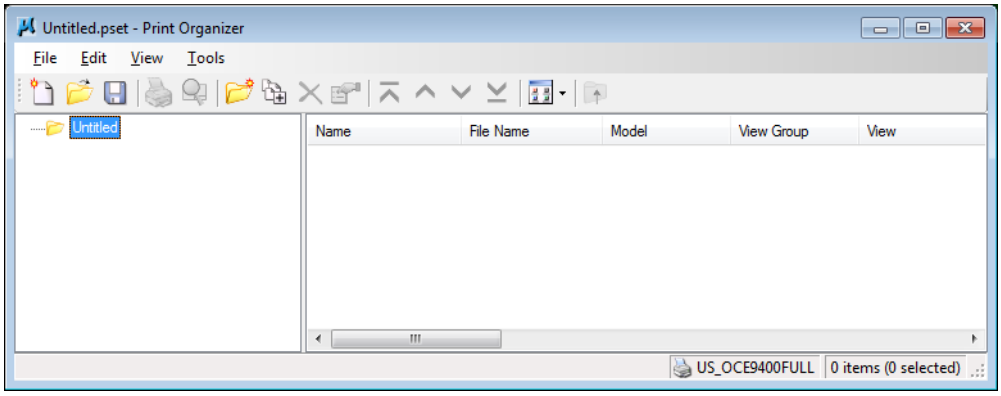


Figure 1-30: Print Organizer Dialog

This dialog allows you to create a *Print Set.* A *Print Set* has two parts: a list of files and a list of specifications. The files are simply the .dgn files that *Print Organizer* is going to plot for you, and they'll be listed at the right side of the dialog.

The Specifications control *how* these files are going to be plotted, the extents to be plotted, Paper Size, etc.

Step Two: Add Design Files

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

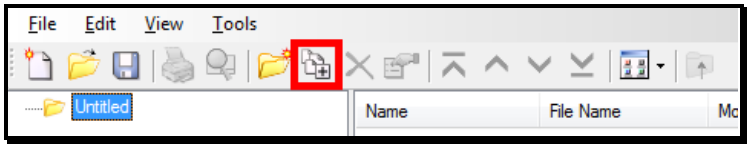


Figure 1-31: Add Files to Set Button

This brings up the Create Print Definitions dialog (Figure 1-32).

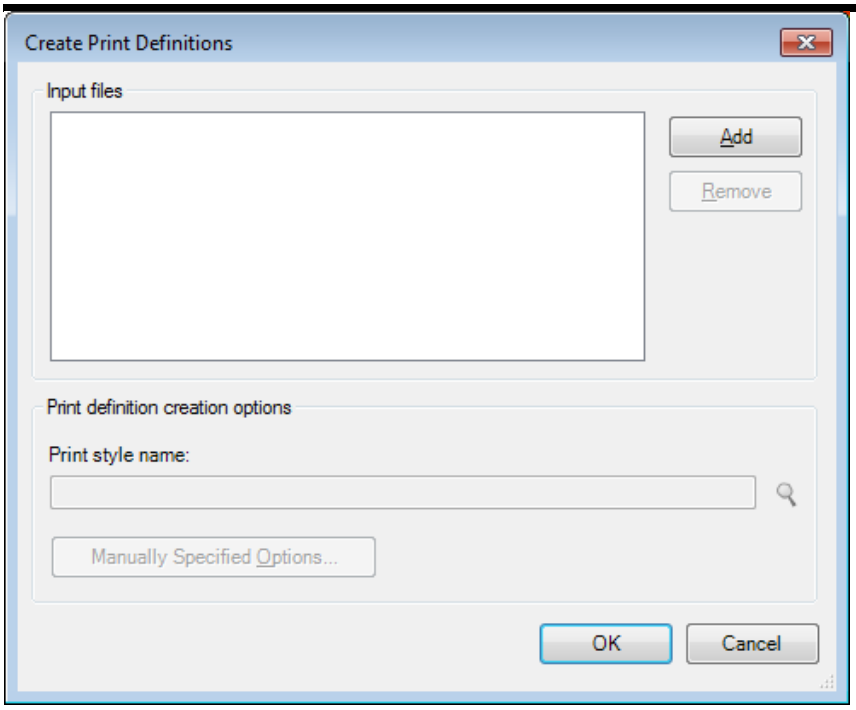


Figure 1-32: Create Print Definitions Dialog

Click the **Add** button on the Create Print Definitions dialog. This will bring up the Select Files dialog (Figure 1-33).

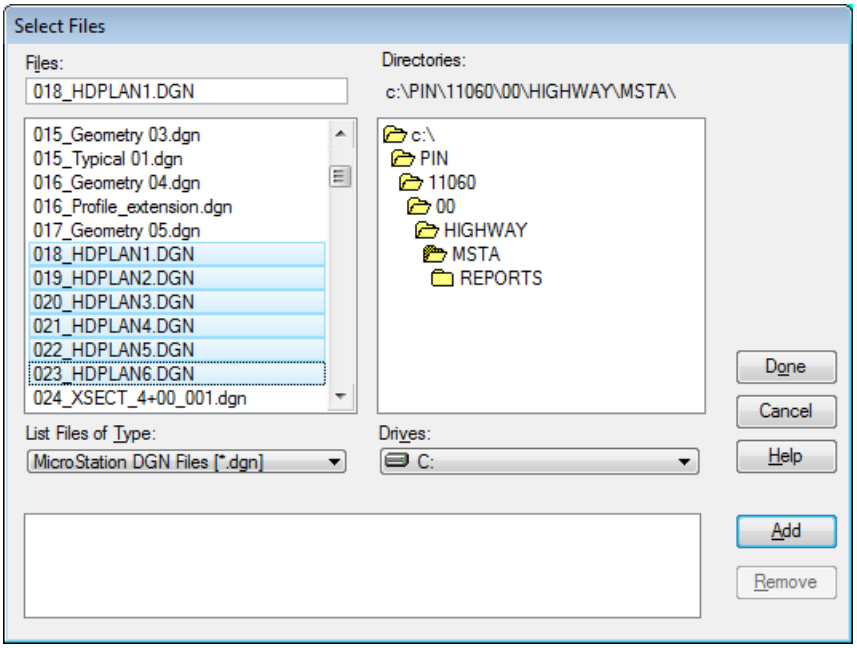


Figure 1-32: Select Files Dialog

Navigate to the appropriate folder and select the files you want to add to the Plot Set from the Select Files dialog. Click the **Add** button on the Create Print Definitions dialog. This will bring up the Select Files dialog (Figure 1-34).

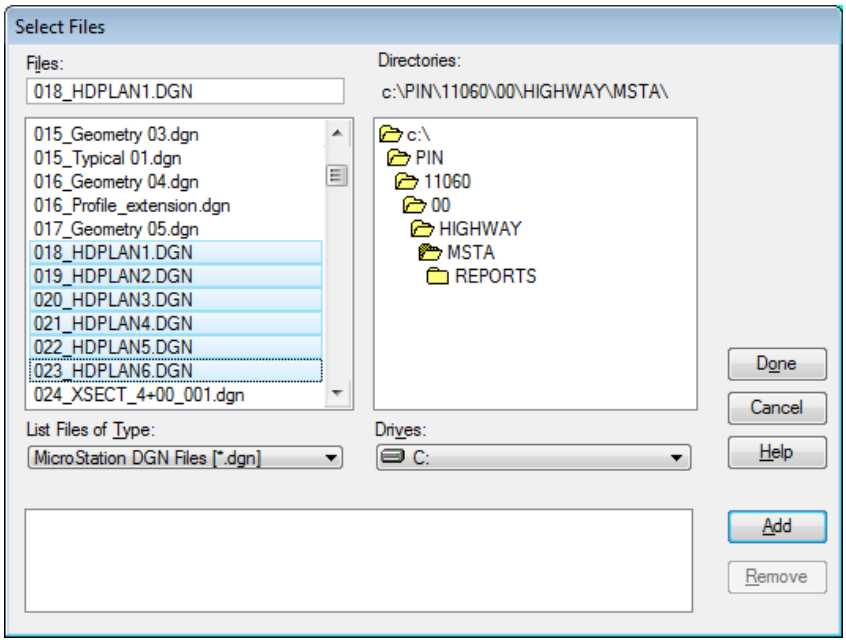
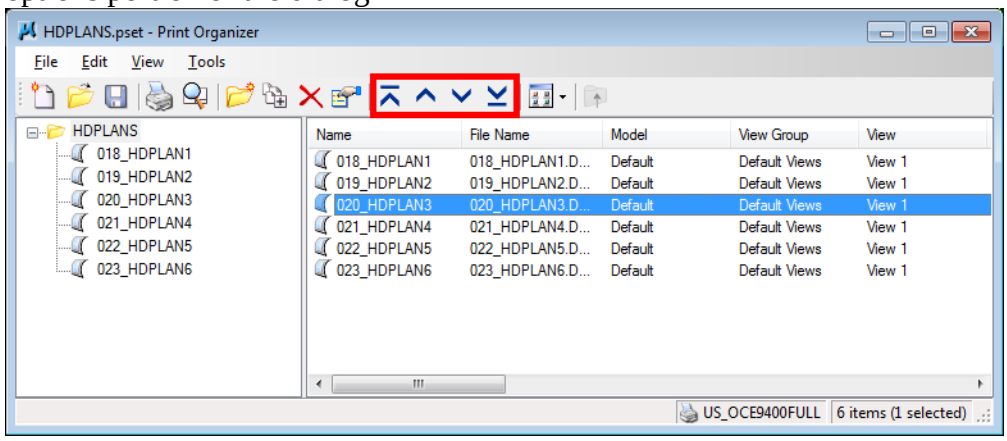


Figure 1-33: Use the Shift and/or Ctrl buttons on your keyboard to select multiple files.

Click the **Add** button on the Select Files dialog to populate the list of files at the bottom of the dialog. Click the **Done** button when you are finished.

Step Three: Set Specifications

From the Create Print Definitions dialog, select the Browse from the Print definition creation options portion of the dialog



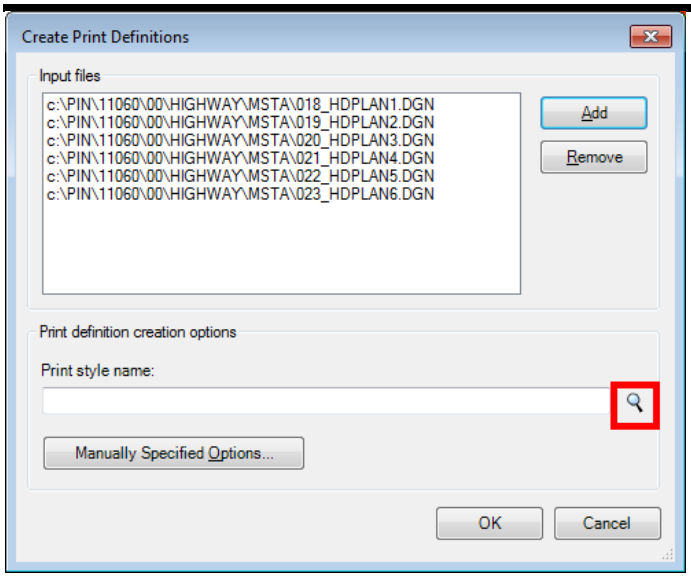


Figure 1-34: Browse for Print Styles

This will bring up the Apply Print Style dialog (Figure 1-37). The Print Style defines the settings for the plot, e.g., plot shape, scale, etc. Select the appropriate Print Style from the Apply Print Style dialog and click the **OK** button.

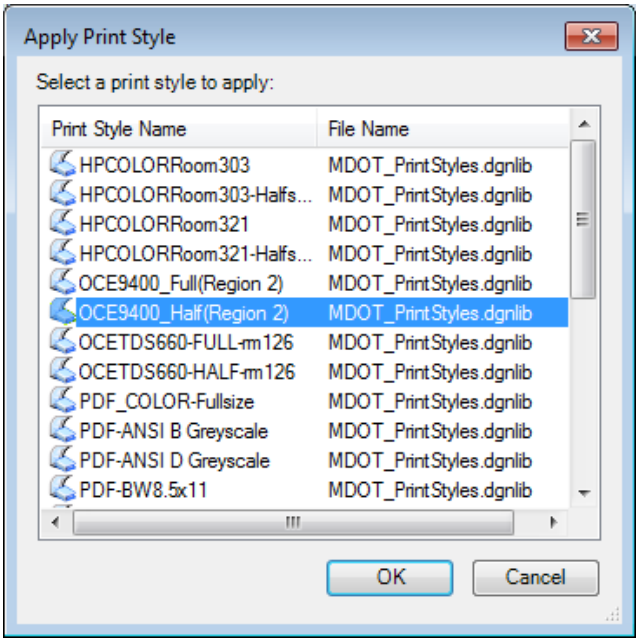
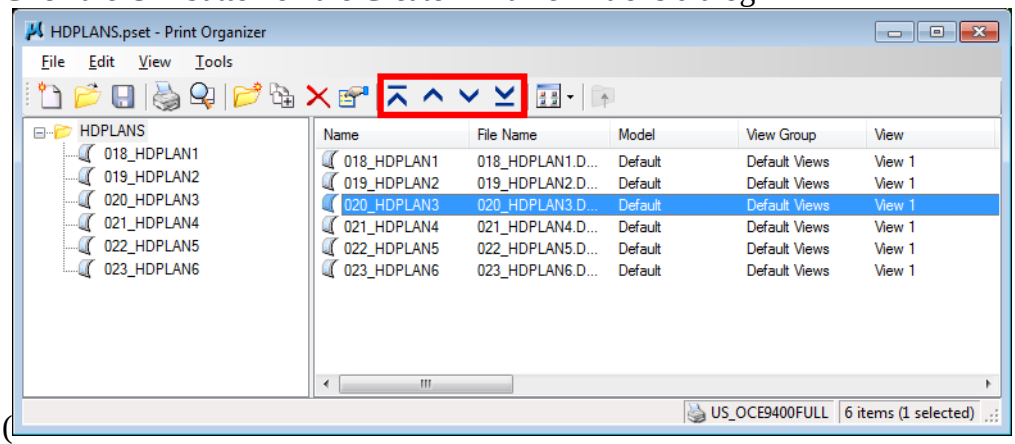


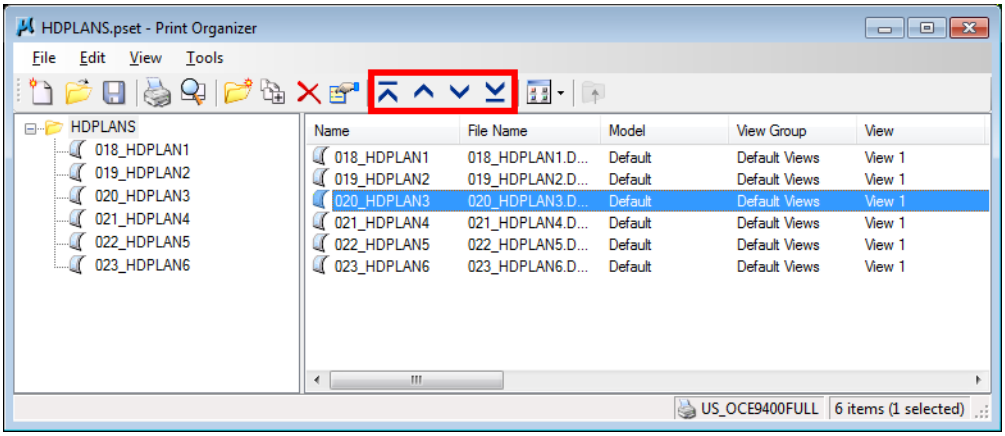
Figure 1-35: Apply Print Style Dialog

Click the **OK** button on the Create Print Definitions dialog



(

). This will bring back the Print Organizer dialog populated with the MicroStation Design files you selected to Print. You can reorder the plots by using the Move Up and Move Down icons.



To save the Plot Set, select the **File > Save** command from the Print Organizer drop-down menus. This will bring up the Save Print Set dialog (Figure 1-37).

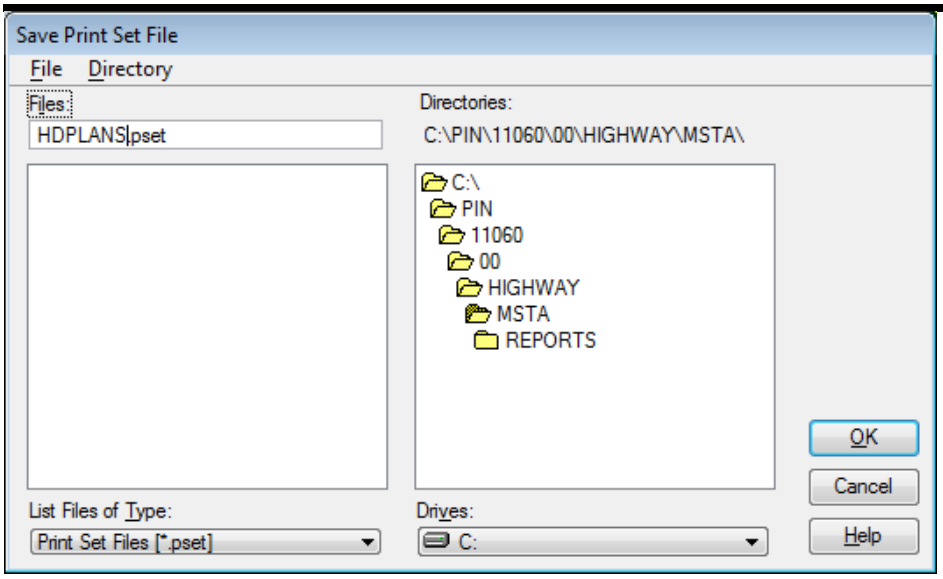


Figure 1-36: Save Job Set File Dialog

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

Step Four: Printing with Batch Print

- MicroStation 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 1-74 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* dialog will open (Figure 1-38). If the Printer Name is not correct, click the Printer Setup button and select a different Printer Name. 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**.

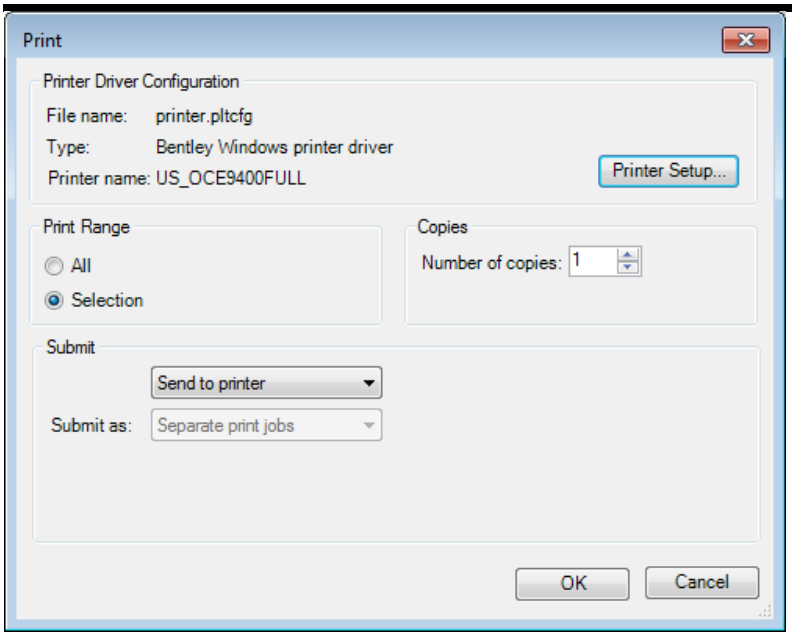


Figure 1-37: Print Dialog

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.

Print Set Troubleshooting

Print Organizer also generates information in the MicroStation Message Center that can be used for troubleshooting purposes when plotting.

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PRINTING FROM AN EXISTING PRINT SET

Once a *Print Set* 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 *Print Set*, first open the **Print Organizer** dialog from **File > Print Organizer**.

Choose the existing .pset or legacy .job file (Figure 1-39) you want to print from and press **OK**.

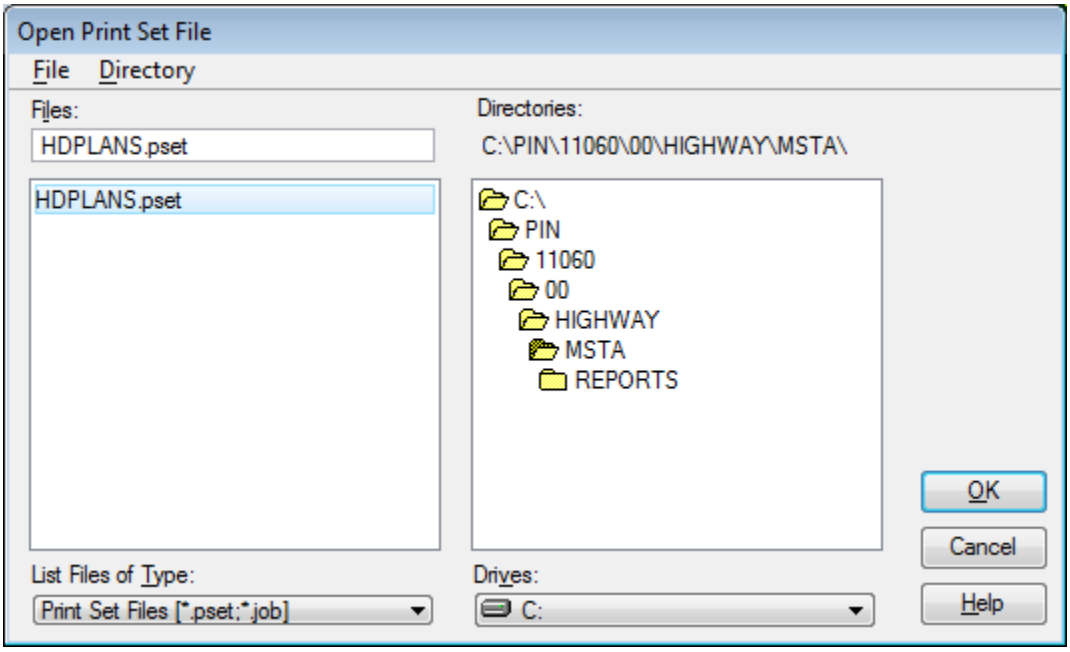


Figure 1-38: Open Print Set Dialog

On the **Print Organizer** dialog, select the file or files you want to plot (Figure 1-40).

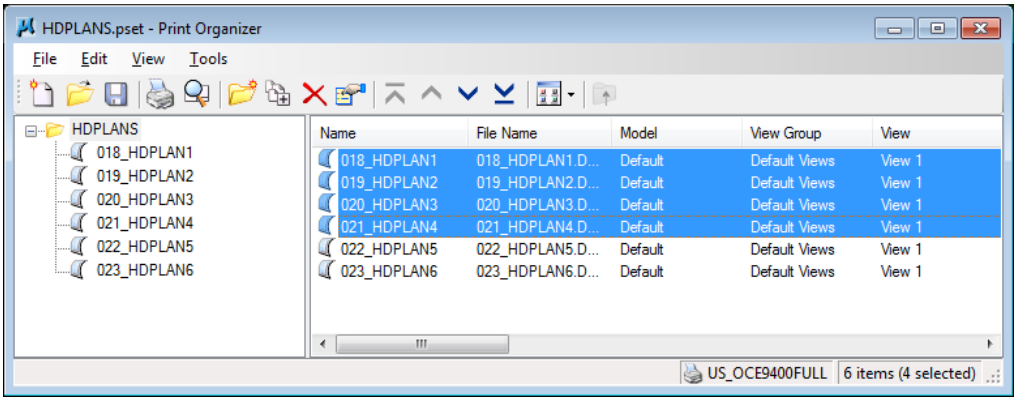


Figure 1-39: Pick Files to Print

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 1-41).

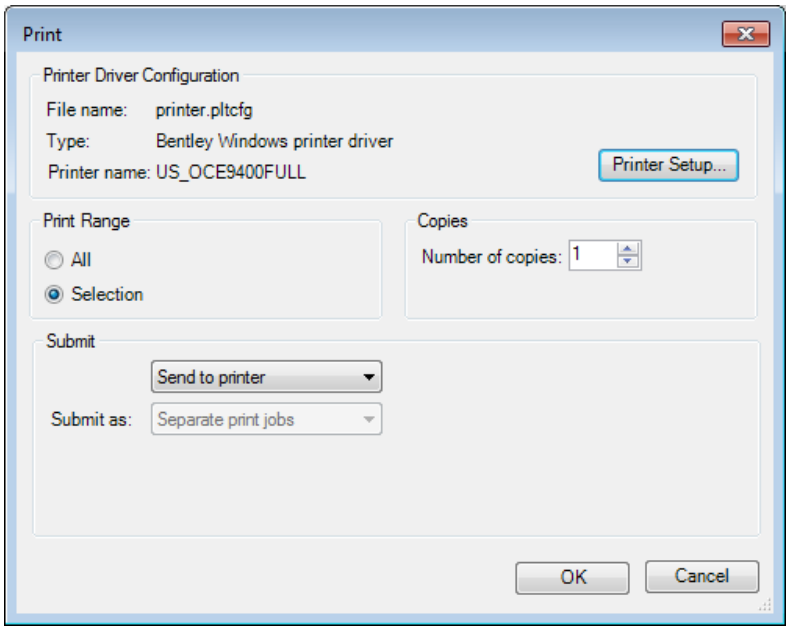


Figure 1-40: Plot Selection

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

Select the **Settings > Drawing Scale** and pick the scale you want to plot to (i.e., 1 in.=25 ft. or 1 in.=50 ft.). From Task Menus, select your **Workgroup > Plan > 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 1-42).

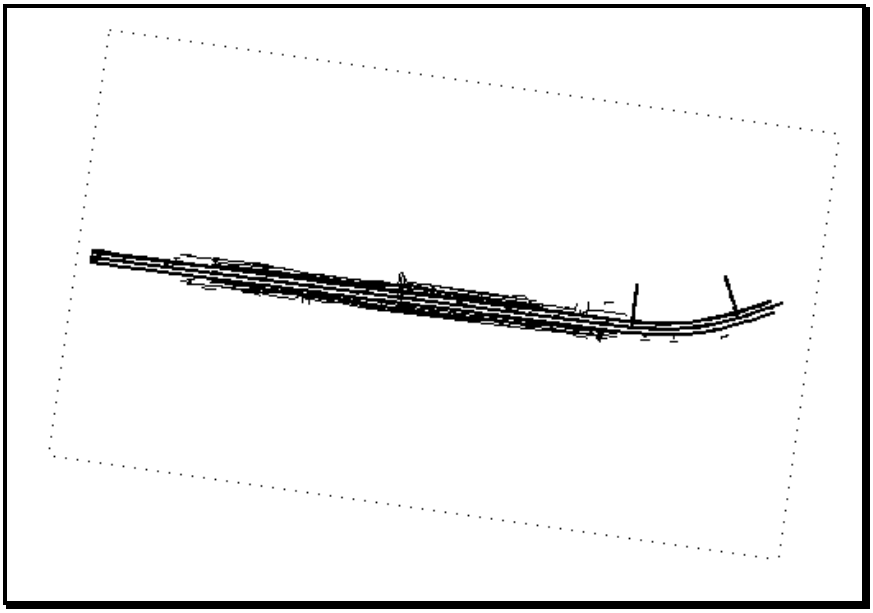


Figure 1-41: Long Plot Boundary

Step Three: Rotate View

Before we can print, we have to rotate our view. Select the **Rotate View** button in the corner of window 1 (Figure 1-43).

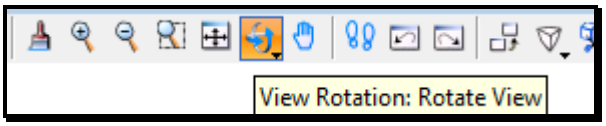


Figure 1-42: Rotate View Button

Select the **3 Points** method from the *Rotate View Window* (Figure 1-44).

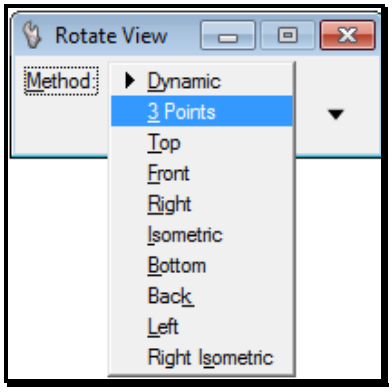


Figure 1-43: 3 Points Method

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 1-42).**

It is recommended to rotate your view horizontally as shown in (Figure 1-45).

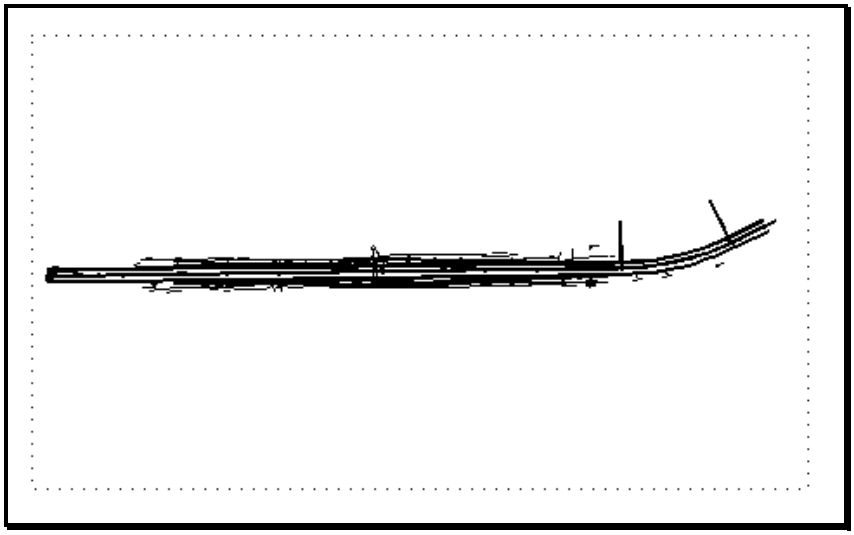


Figure 1-44: Vertical Long Plot View

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 1-46).

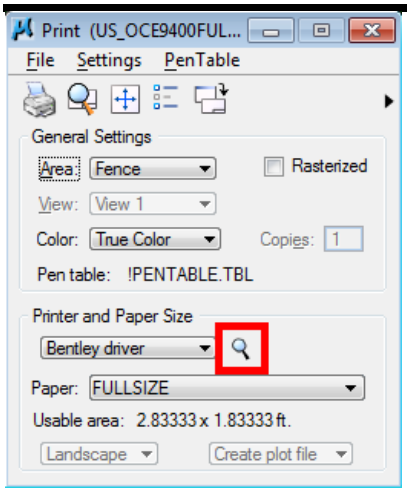


Figure 1-45: Plot Driver on the Print Dialog

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 1-47). Leave it set to the defaulted **20FTPLOT** for any size.

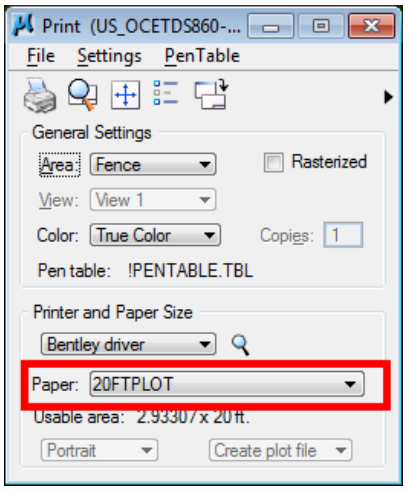


Figure 1-46: Page Setup on the Print Dialog

- 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 1-48).

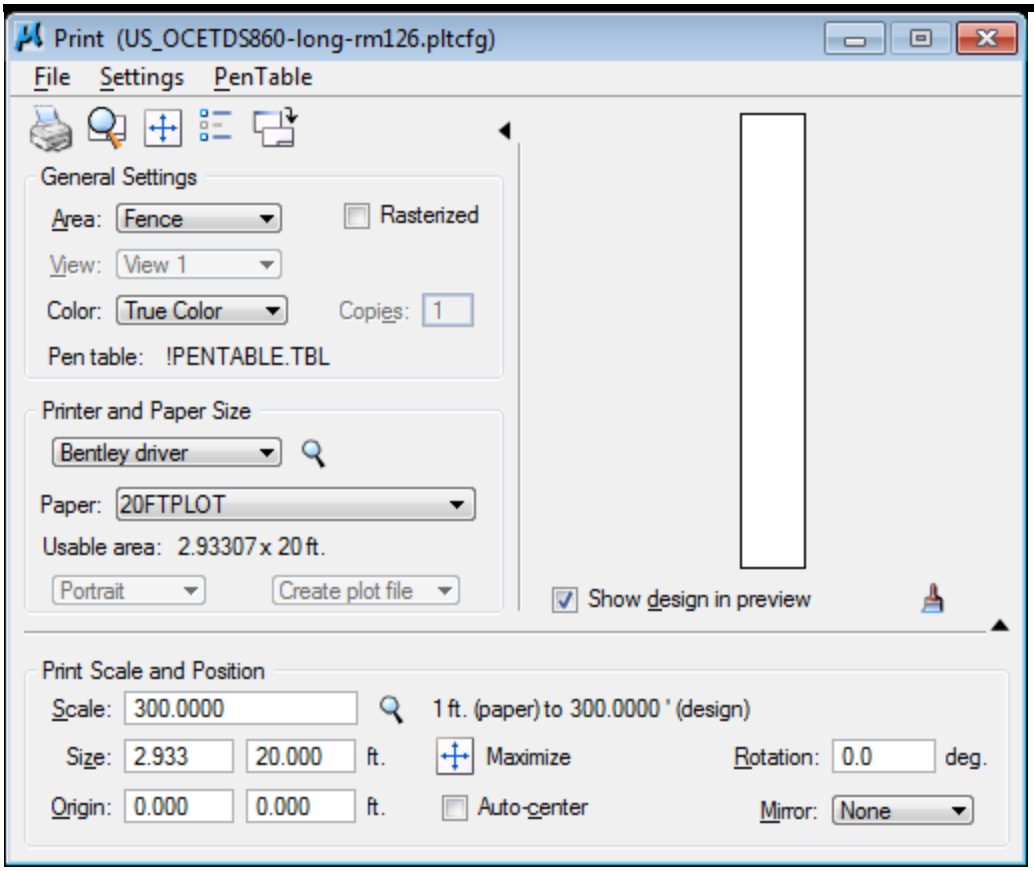


Figure 1-47: Print Rotate 90

ⓘ ***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 1-49).

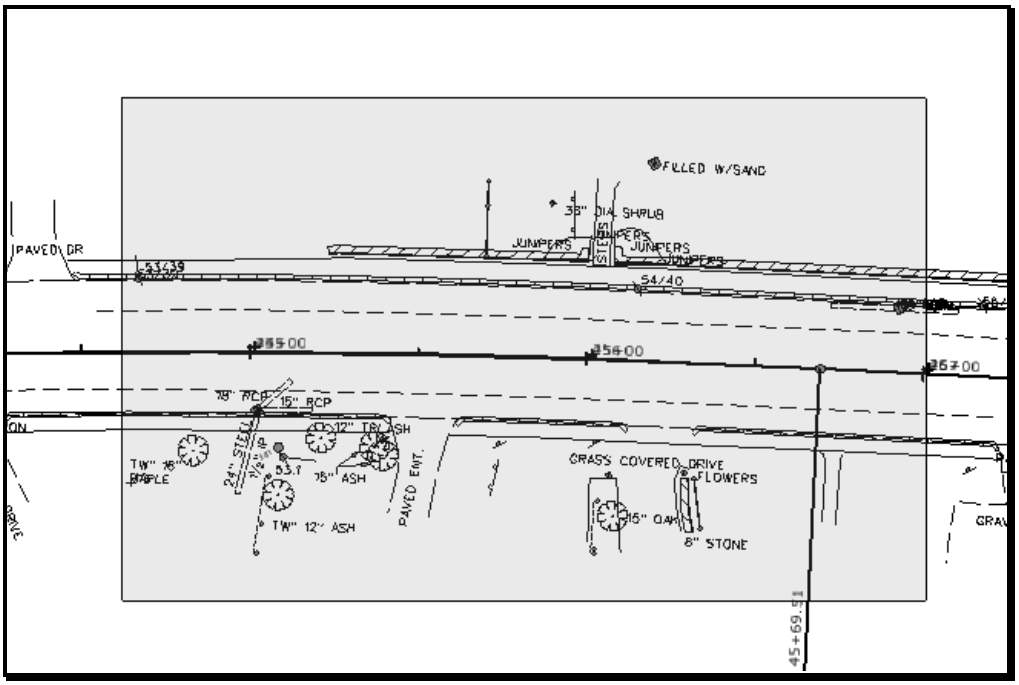


Figure 1-48: Place Fence

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 1-50) 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 1-51). You could change this option to "**':" to 1 IN.**" by selecting **Settings > Units> inches** from the **Print** menu. This would allow you to set the **Scale:** to "**25**" (Figure 1-52).

- You are only allowed to change the scale option to a larger number than what is displayed when opening the *Print Dialog.* If you cannot 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.

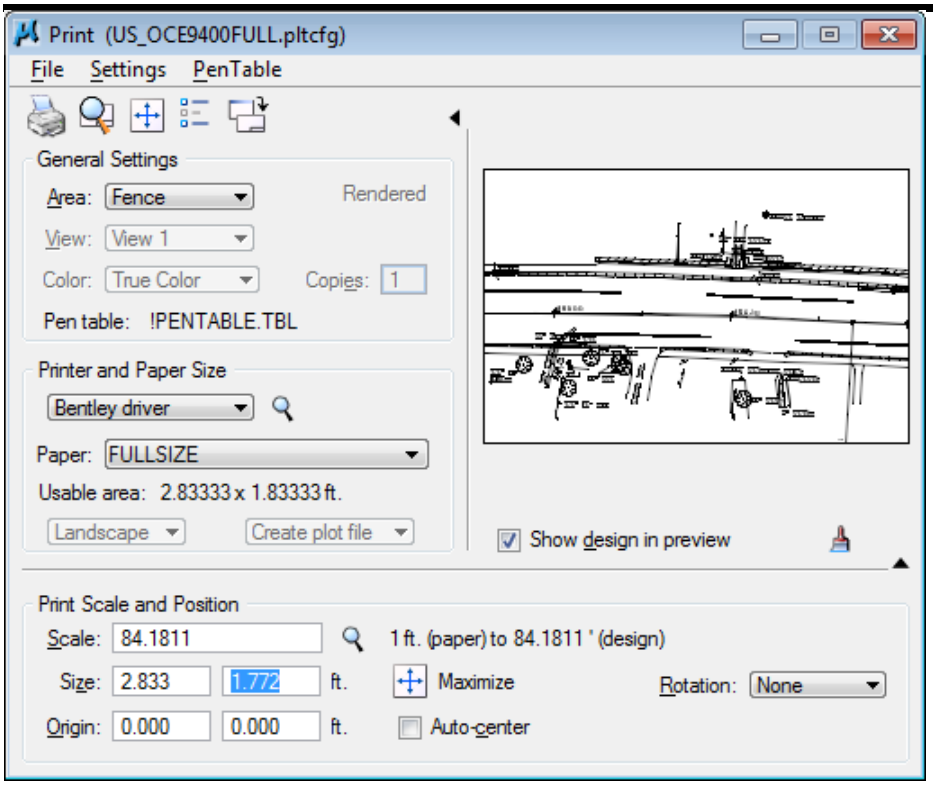


Figure 1-49: Scaled Printing by Fence

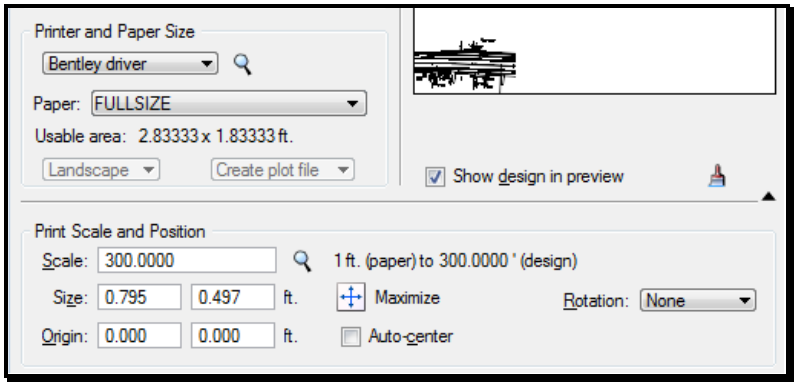


Figure 1-50: Scale Change Master Units

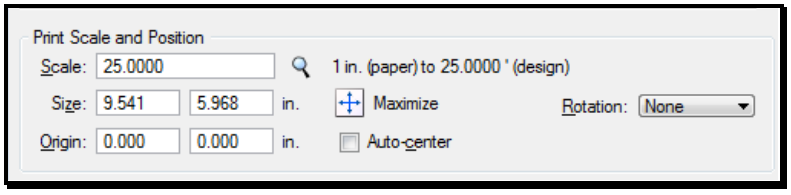


Figure 1-51: Scale Change Sub Units

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. 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: Print Organizer to a Multi-page PDF

When using the Print Organizer, select the **pdf-fullsize** printer configuration file (.pltcfg) from by clicking the **Printer Setup** button. Add the files you want to print, select **pdf_bw-Fullsize** from the available printers and select print. When the *Print* dialog opens (Figure 1-53), add a **file name** and **.pdf** extension (i.e. FinalPlans.pdf) in the *filename* portion of the dialog.

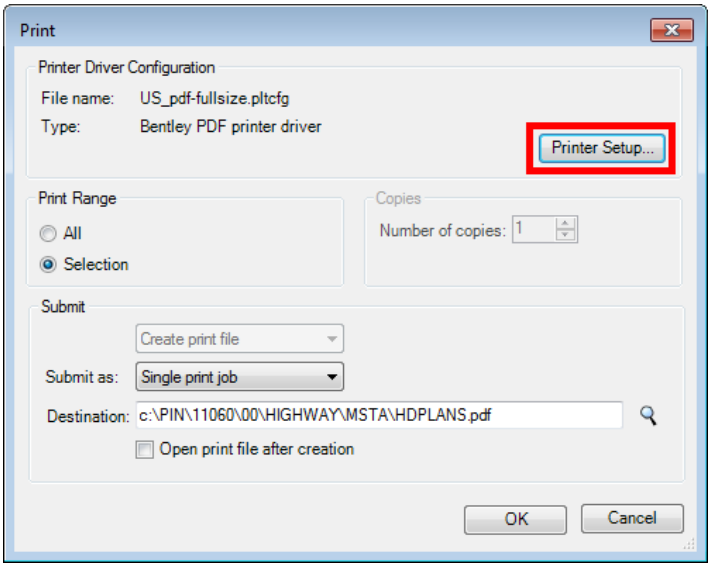


Figure 1-52: Print Batch dialog. Add the filename with the .pdf extension.

The file will be created in your active MSTA folder.

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).

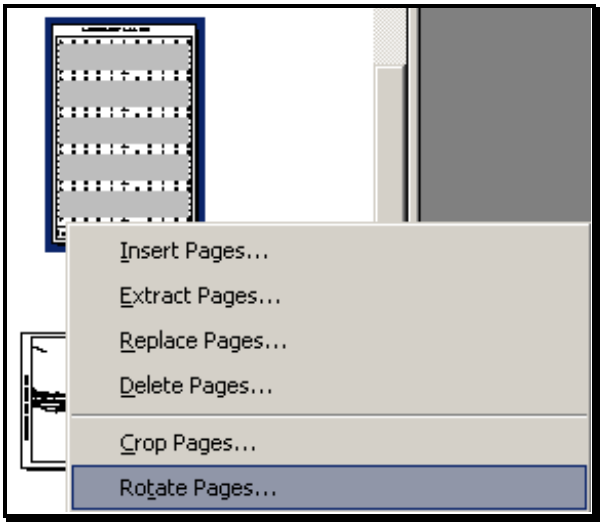


Figure 1-53: Right-click and select Rotate Pages

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.**

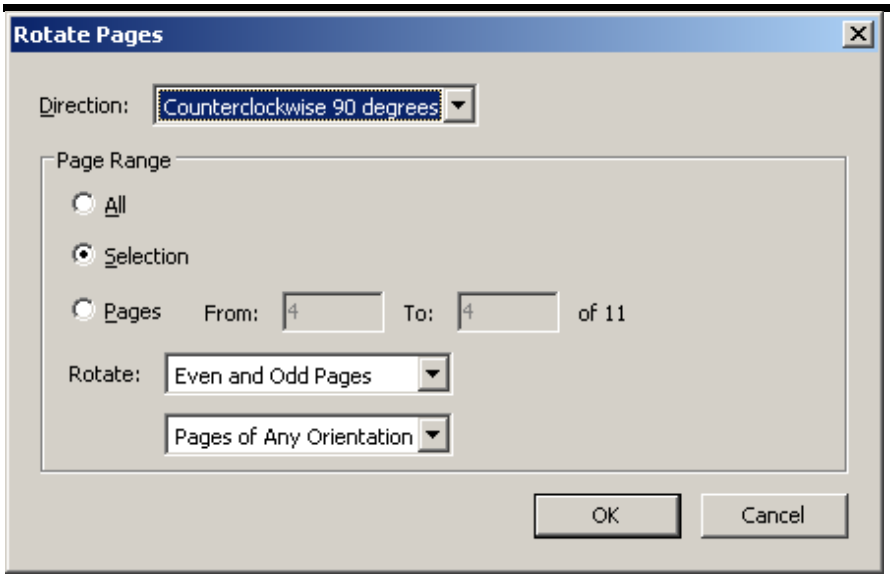


Figure 1-54: Rotate Pages dialog

Save the PDF Document

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

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).

Option Two: Print Organizer to .plt

When using the Print Organizer, select the **PLOT2FILE** printer from available printers. The files will be created in your active MSTA folder.

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 or match an Element's Attributes, you can see these *Active Attributes*, along with other settings for your *Active Class and Template* (Figure 2-2).

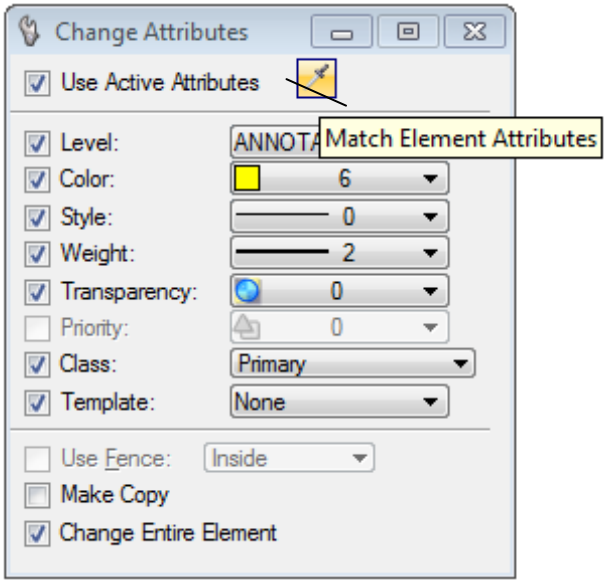


Figure 2-2: Change Element Attributes Setting

- Element Attributes can be matched by using the icon for *Match Element Attributes.* Making elements a *Class* of *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**).

Tasks Menus

You can let the *Tasks Menus* take care of all these *Element Attributes* for you.

For example, choose your **Workgroup > Plan > Roadway > Edge Shoulder** from Tasks Menus.

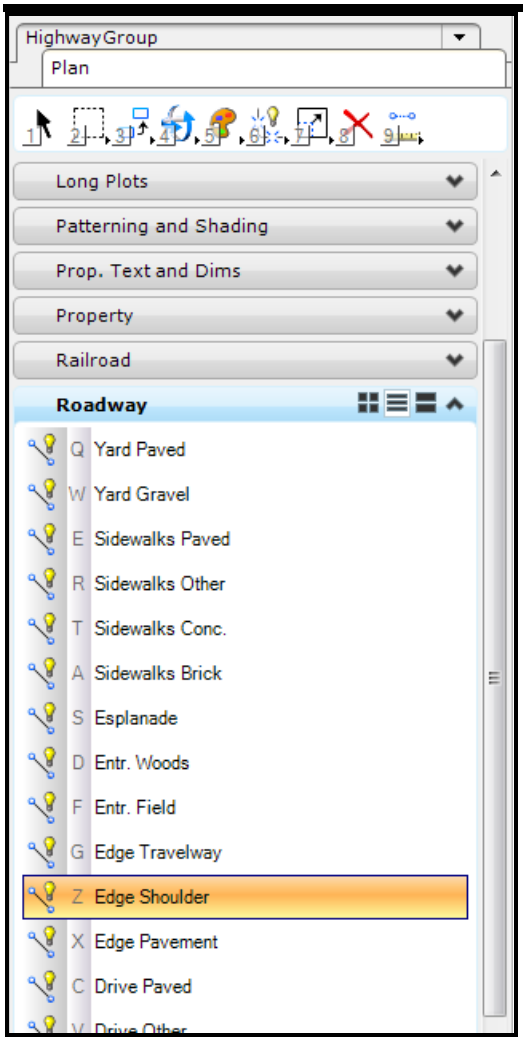


Figure 2-3: Pick a Task

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

Figure 2-4: Edge Shoulder Setting

Level Display

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

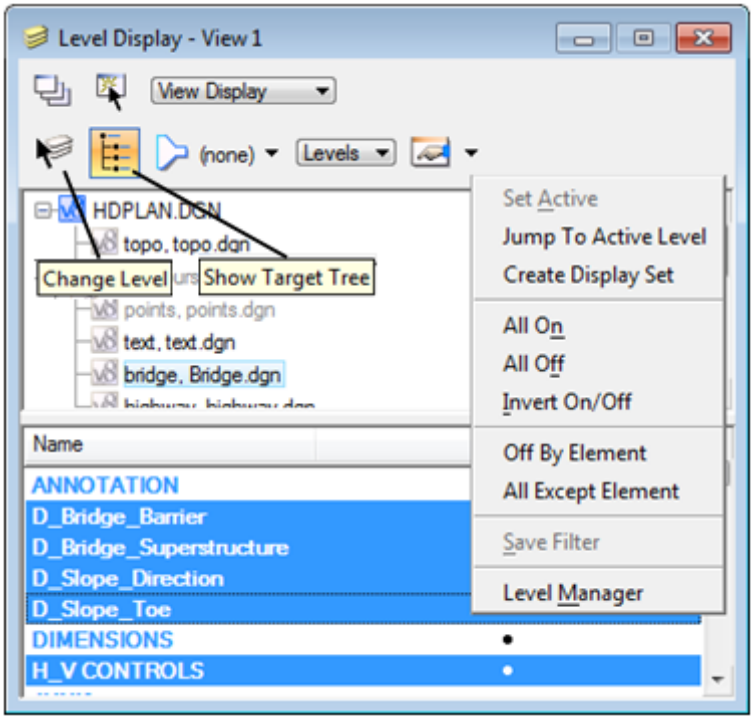


Figure 2-5: Level Display Dialog

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, or the **Show Target Tree** icon to expand the file tree.

To toggle the display of levels in a file, **Click** a level if being used (blue highlight with a dot in the *Used* column) it will turn the level off and changes the blue to white. If the level is off when clicked the change will be from white to blue 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 *Off by element* tool. In the *Level Display* dialog, select the *Change Level* (Figure 2-5) icon, then choose **Level: Display Off** from the *Change Level Dialog* (Figure 2-6) and Data Hit the Element on the screen.

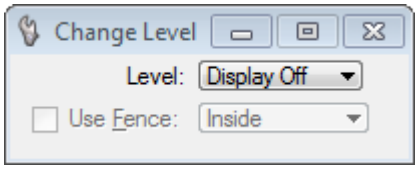


Figure 2-6: Change Level Dialog

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.*

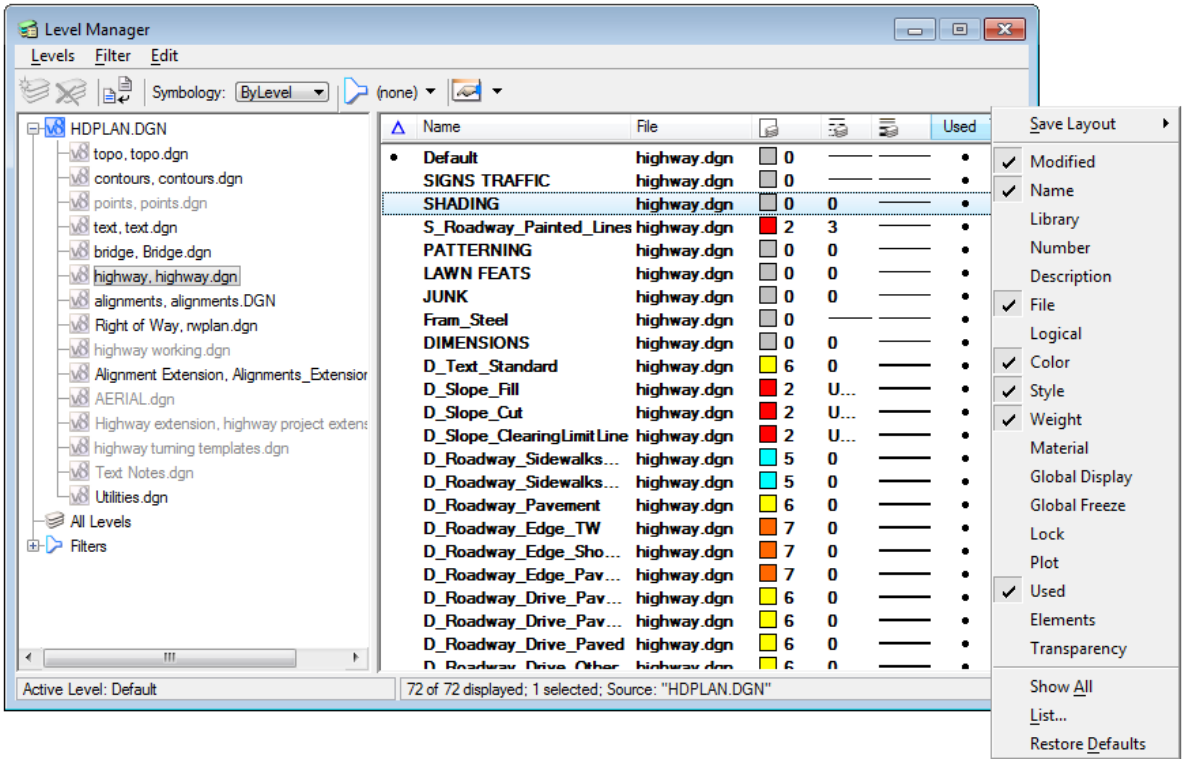


Figure 2-7: Level Manager Dialog

Most of our element symbology is set using the *Task Menus*. 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 level 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 (right-click on the *Used* column header to enable this column, if it is not already displayed) 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** option to **Override**. **Right Click** on a level will bring up a menu with other options.

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

SNAPS

Enable Snapping (on by default)

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**.

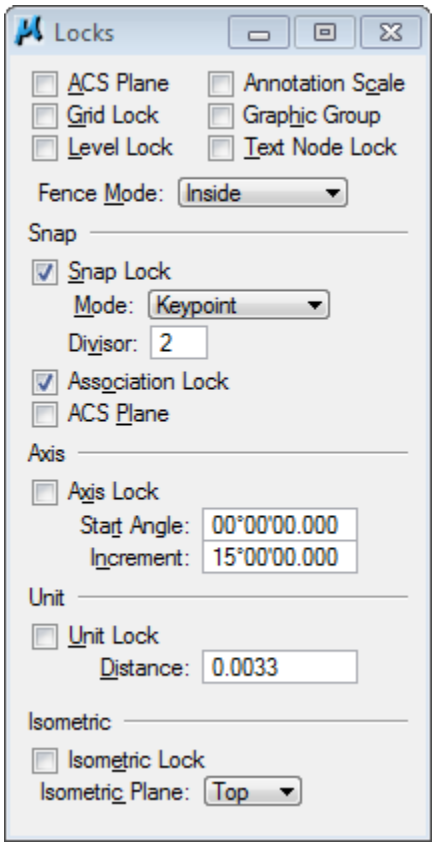


Figure 2-8: Locks Dialog

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+?).**

Snapping Modes Defined

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).

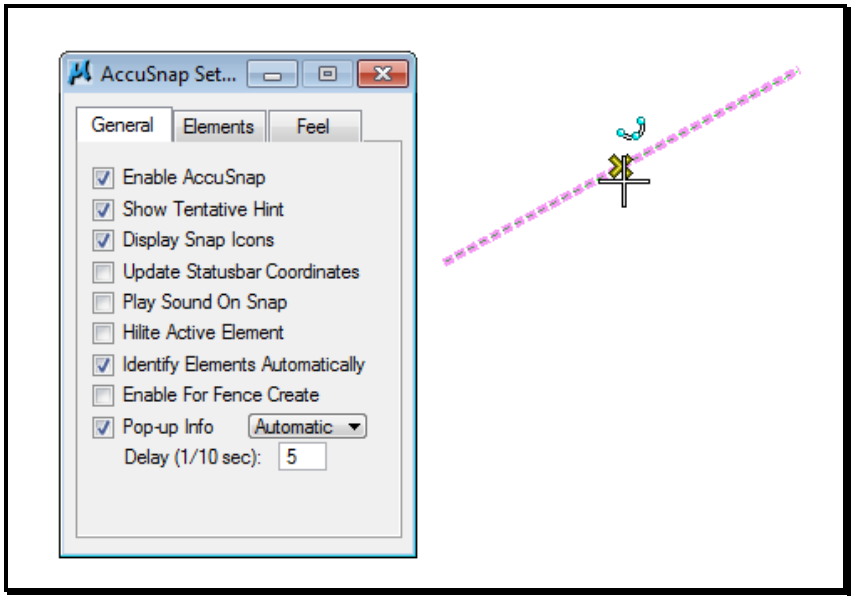


Figure 2-10: AccuSnap

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**.

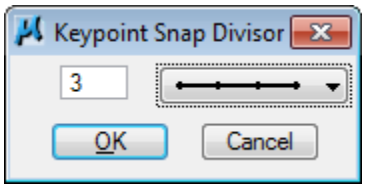


Figure 2-11: Keypoint Snap Divisor 3

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.

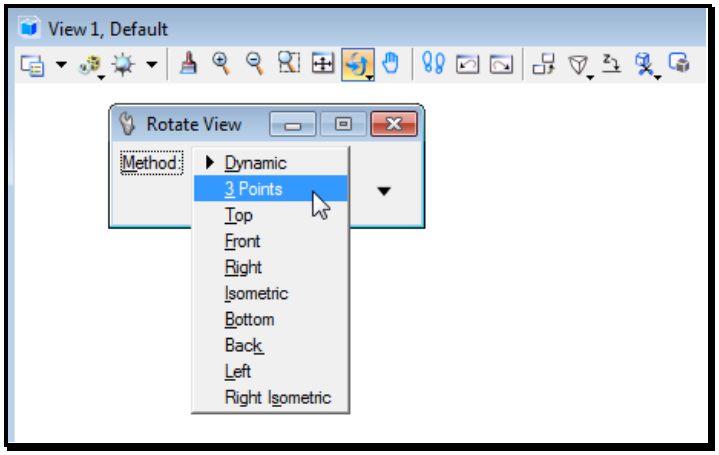


Figure 2-12: View Rotation Methods

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 ACS Plane 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 by using the **File > Export > 2D** command from the *Main Menus*. You have to use the **File > Open** command to open the 2D file that was just exported.

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 **Task Menu** (Figure 2-13) or from your main menu by selecting **Group > Groupings > Create Chain**.

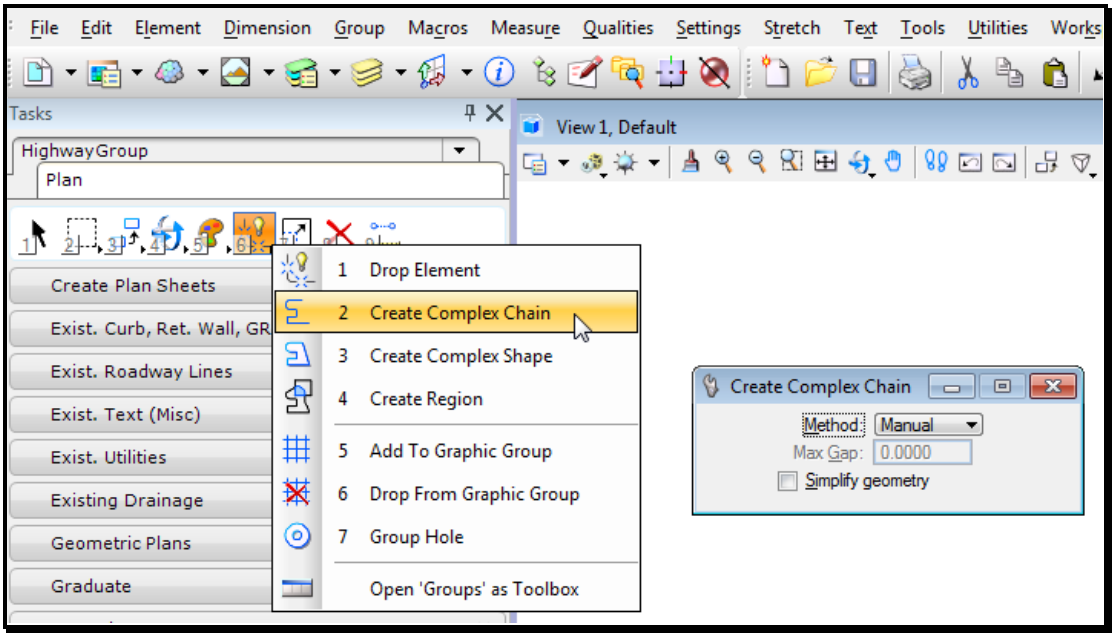


Figure 2-13: Create Complex Chain

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 **Task Menu** (Figure 2-14) or choose **Group > Groupings > Create Shape** from your main menu.

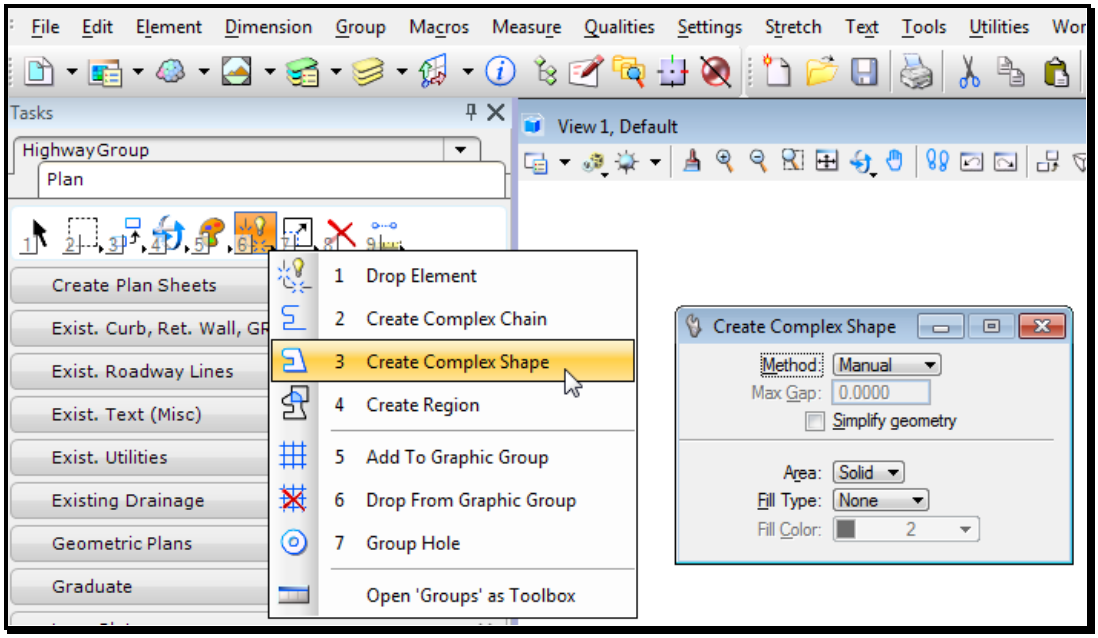


Figure 2-14: Create Complex Shape

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 **Task Menus** (Figure 2-15) or from your menu by choosing **Group > Groupings > Create Region**.

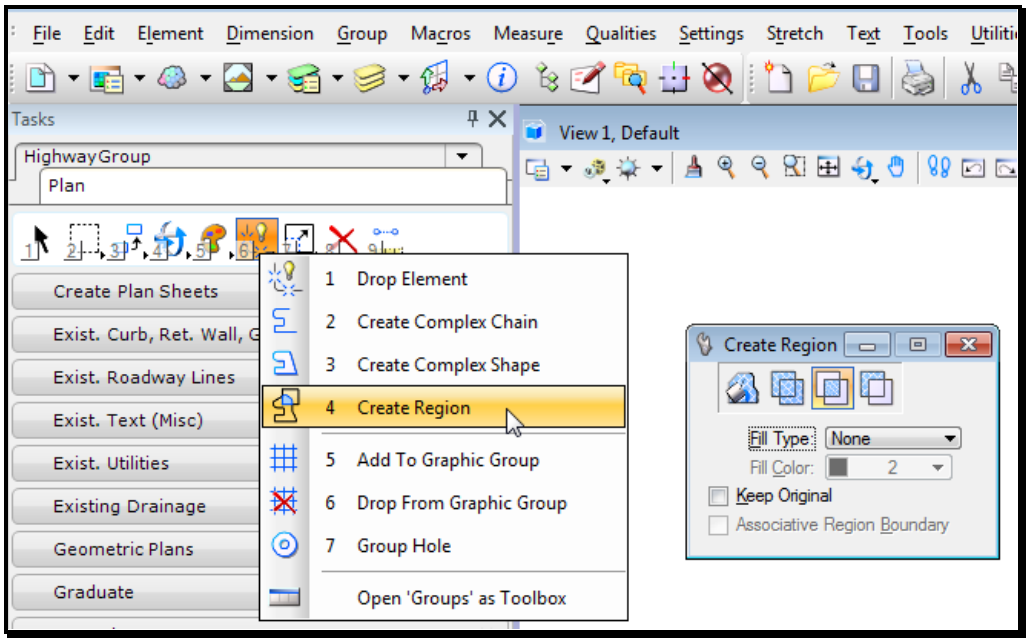


Figure 2-15: Create Complex Region

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:

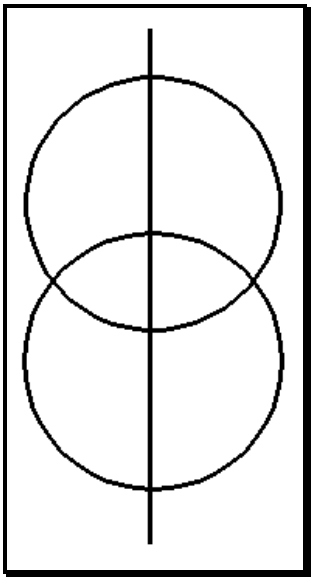


Figure 2-16: Starting Point

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.

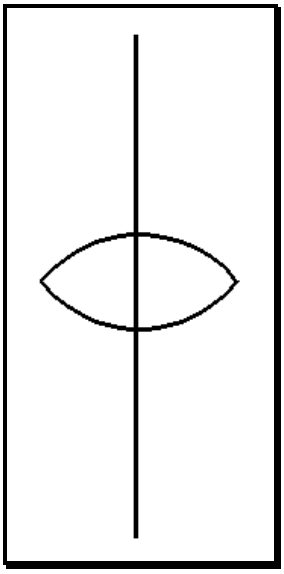


Figure 2-17: Intersection

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.

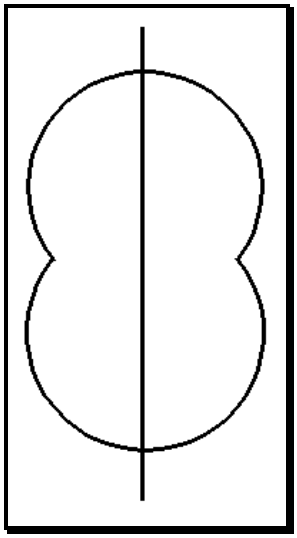


Figure 2-18: Union

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.

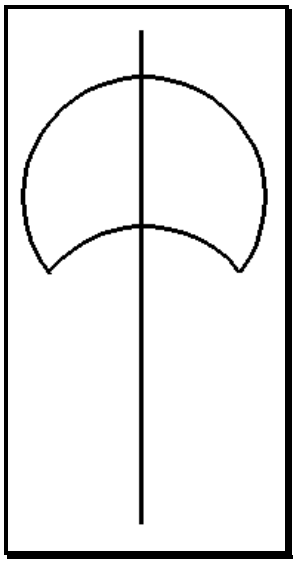


Figure 2-19: Difference

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.

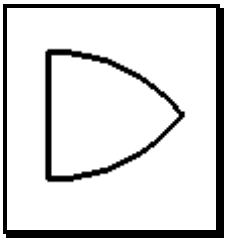


Figure 2-20: Flood

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).

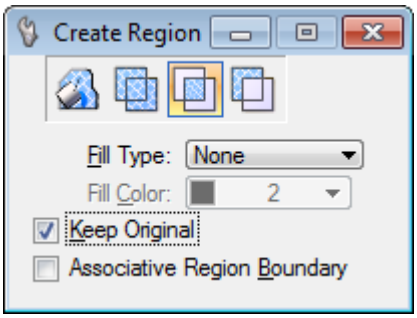


Figure 2-21: Keep Original

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*.

Element Selection

To simplify matters, start by using *Element Selection* to pick only the elements that make up the outline you want to create a region from. 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.

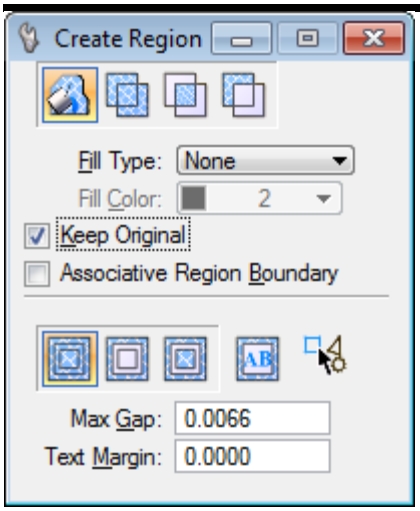


Figure 2-22: Create Region dialog – Max Gap

✓ ***Check Flattening your Active File on page 2-90.***

Elevation to Zero

Prior to V8i, the available MicroStation macro of "Set/Lock Z" will help make sure that you are measuring on the same plane and get the correct area measurement. This macro is located at *Macros > Set/Lock Z* in the older workspace. In the newer version of MicroStation, the Depth Lock has been removed and the ACS Plane Snap lock was added. When using 3D MicroStation design files, you can draw at elevation zero by keying az=0 into the Key-in dialog, pressing Enter, and click in the CAD View. This changes the Auxillary Coordinate System (ACS) Z value to 0. To further hold the elevation, enable the ACS Plane Snap lock by selecting Settings > Locks > ACS Plane Snap from the MicroStation menus. This will help make sure that you are measuring on the same plane and get the correct area measurement. You can also draw at different elevation by using the same technique, except key-in az= and specify the elevation you want after the "=".

INTRODUCTION TO THE TASK MENUS

The *Task Menus* are 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 TASK MENUS

The *Task Menus* works kind of like a menu structure: it contains hierarchy of tasks sorted by groups of tasks. A Task can be a single standard tool, a custom tool, or mixture of both types. Tasks are grouped into categories that make it easier to find the Tasks you are looking for. For example, if you want to dimension something on a plan, you would select the task group named Plan and the sub-group named Prop. Text and Dims. When you select a tool from the Prop. Text and Dims group, it will automatically select the appropriate tool and set the correct color, weight, level and other setting associated with placing proposed text and dimensioning.

The Many Faces of the Tasks Menus

When you start MicroStation, the Tasks Menus will appear on the left side of the MicroStation interface. It will look like what is shown below (Figure 2-23). Your WorkGroup will be automatically listed as one of the tasks groups. In this example, **BridgeGroup** is listed as the WorkGroup.

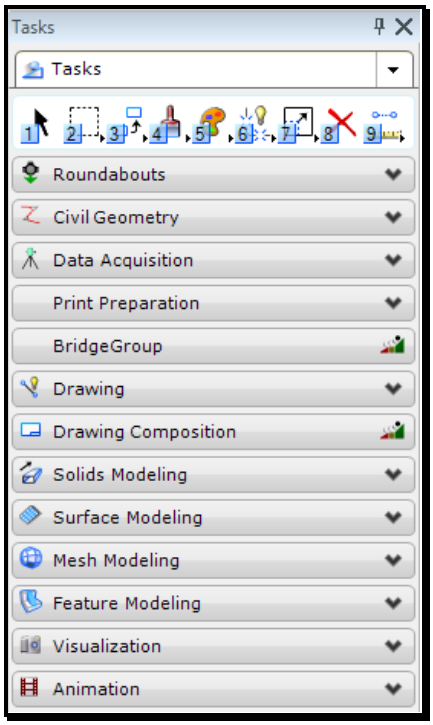


Figure 2-23: Tasks Menus

The Tasks Menus can be pinned to the side of the MicroStation. To access the Tasks sub-groups, simple single left click on the appropriate Task group, e.g., BridgeGroup, etc. This will open another set of Tasks groups. Two examples of selecting the Task sub-groups are shown in red below. The first example is shows selecting the Task sub-group named BridgeGroup. The adjacent example is shows selecting a BridgeGroup task sub-group named Structural Detail (Figure 2-24).

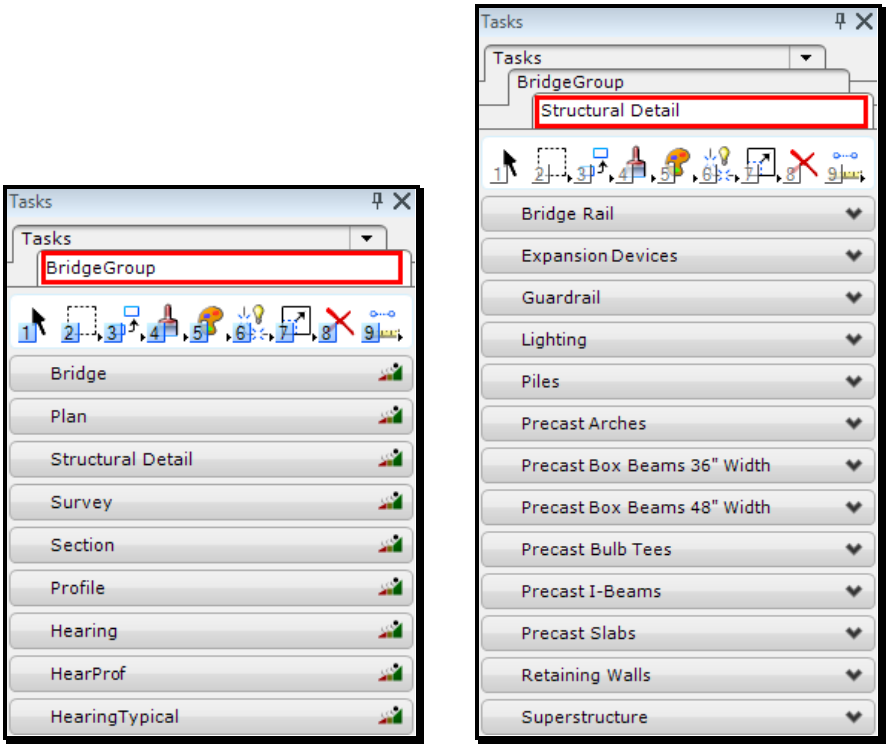


Figure 2-24: Navigating Down Sub-group Tasks - Examples

You can single left click the Task sub-group name to return to that level of the Tasks groups hierarchy (Figure 2-25). When you hold your cursor over the Task sub-group, it will turn a white color.

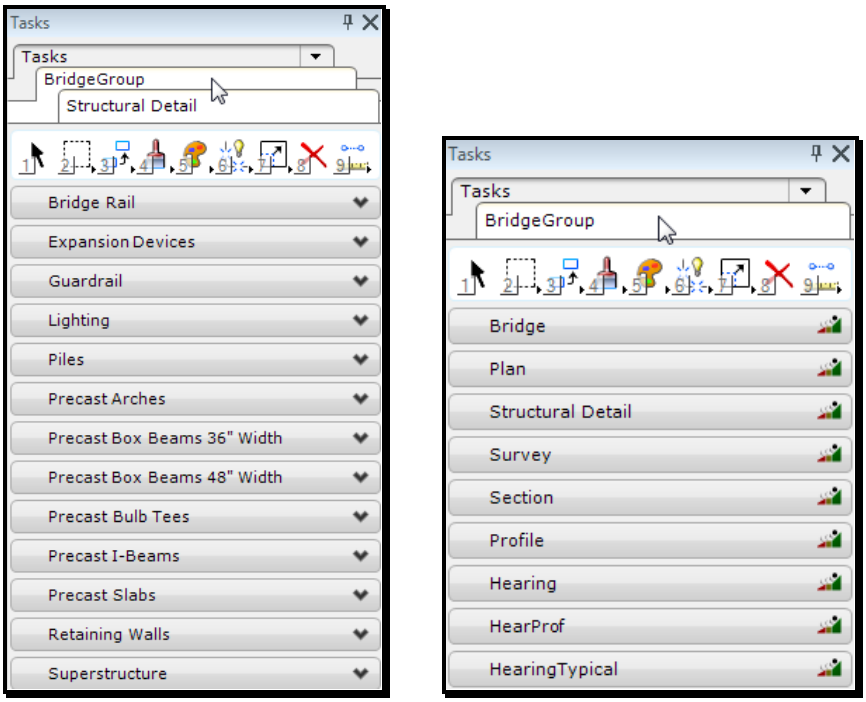


Figure 2-25: Navigating Up Sub-group Tasks - Examples

When you have selected the bottom of the Tasks sub-group hierarchy, the individual Tool groups will be shown and can be selected with a single left click (Figure 2-26). To close the view of the tools, click another Task sub-group or Tool group.

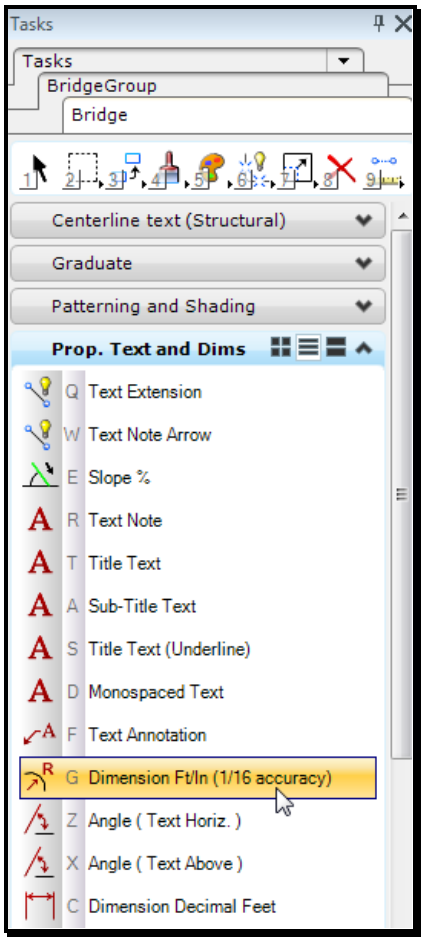


Figure 2-26: Tasks Menus - Tools

Tool groups can be opened as a Toolbox by right-clicking on any tool and selecting **Open "Tool group name" as Toolbox** (Figure 2-27). The Toolbox can be docked into the MicroStation interface.

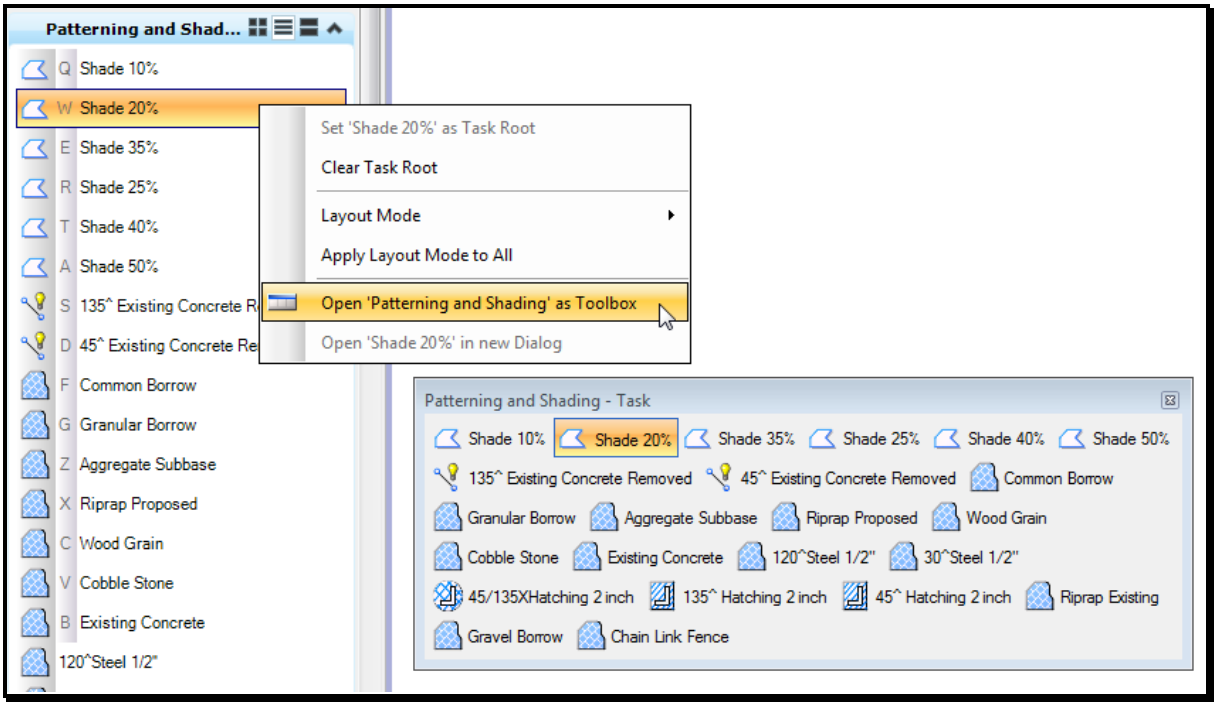


Figure 2-27: Tasks Menus – Tool Group Shown as Toolbox

Opening the Tasks Menus

The *Tasks Menus* are autoloaded depending on the work group and the working units of the file, if the file is opened using the *File Open* and a *PIN* is selected. Other work group task menus can be opened at anytime by selecting **Maine DOT WorkGroups > <Pick Work Group>**. Multiple menu's can be opened at the same time if needed, also dock them over top of each other and then click from tab to tab to quickly access a work groups tools. If finished with a work group toolset, close and continue using your standard menus.

DRAWING SCALE

One of the primary functions of the *Scaling* tool 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 Drawing > 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 3 foot wing measures 3 foot 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 0.5 inches high. But what does that 0.5 inches high mean to your 3-foot wing? Nothing -- because those 0.5 inches are in "Paper Space" instead of "Model Space."

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

Selecting a Scale

Navigate to **Settings > Drawing Scale** (Figure 2-28).

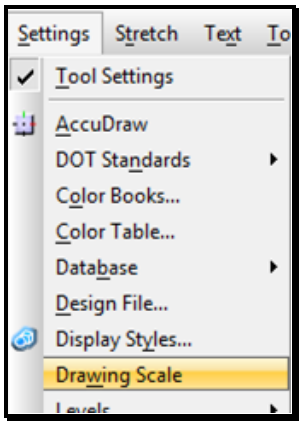


Figure 2-28: Drawing Scale

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

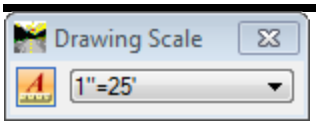


Figure 2-29: Select Drawing Scale Dialog

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 change the scale of the items created using the Tasks Menus. From here on out, anything tool we use from the Tasks Menus is going to know that it needs to be at the selected scale. We'll see the impact of this when we use the *Tasks Menus* to place text and dimensions, as well as certain cells, line styles and borders. Changing the Drawing Scale can change the size of text, cells, and dimensions in your drawing. Normally, all elements in the drawing are placed using a single Drawing Scale. If you need to place elements in another scale, create a new Design file and reference that file to the Design file using different Drawing Scale.

- Note again that this may have an impact on items already placed in the drawing.

This is not at all like changing our *Working Units*. *Drawing Scale* uses its internal scale settings only to help you place new text and cells at the right size. Once your text and cells has been placed, changing the *Drawing Scale* will change the size of the text and cell that have already been placed.

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.

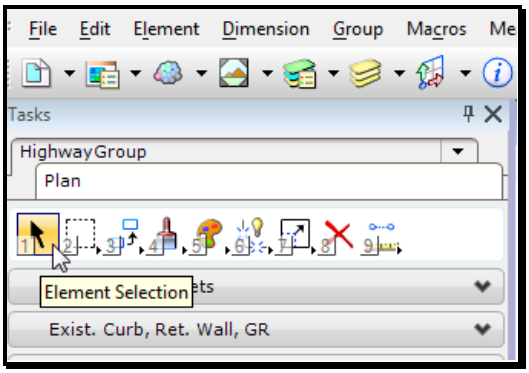


Figure 2-30: Element Selection

- 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.

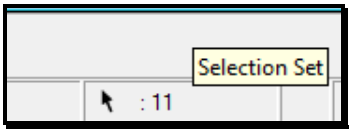


Figure 2-31: Count of Elements

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*.

Element Selection

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

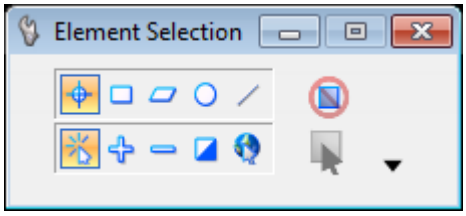


Figure 2-32: Element Selection

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: elements inside the block are selected

Shape: elements inside a shape are selected

Circle: elements inside the circle are selected

Line: selects elements that intersect a line

Modes

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

Add: adds elements to a selection set

Subtract: subtracts elements from a selection set

Invert: toggles the selection status of an element

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 ELEMENT SELECTION

Setup

There is a little arrow in the lower right-hand corner of the *Element Selection Dialog* (Figure 2-33).

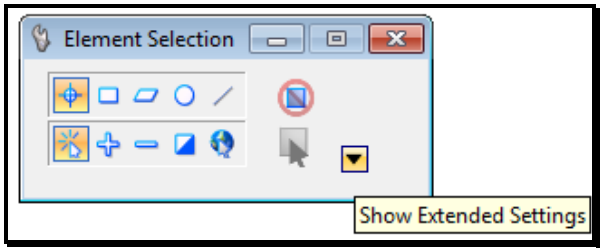


Figure 2-33: Show Extended Settings

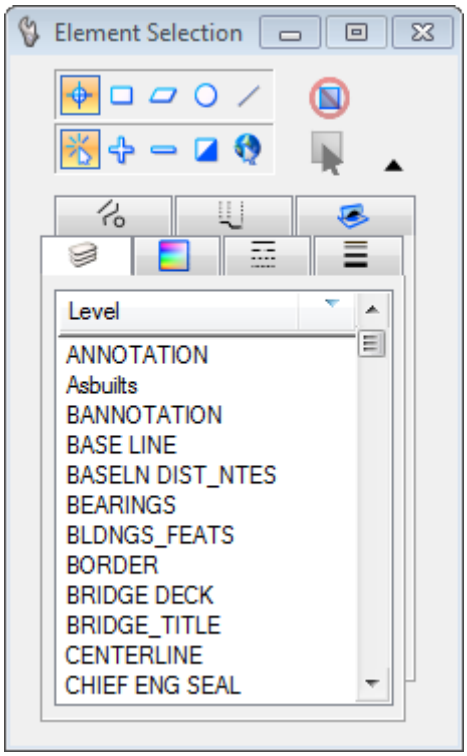


Figure 2-34: Expanded Element Selection

To expand the *Element Selection* click on the **Show Extended Settings** arrow to reveal the Attribute tabs (Figure 2-34).

Tabs

Level: select levels from a list

Color: select the required colors from a list (plus ByLevel).

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

Line Weight: select the required line weights from a list (0–31 plus ByLevel).

Element Type: select the required element types from a list.

Element Class: select the required element classes from a list.

Element Template: select the required element template from a list.

Adding Elements

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

Start by choosing **Level** 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 *Level* list (Figure 2-35).

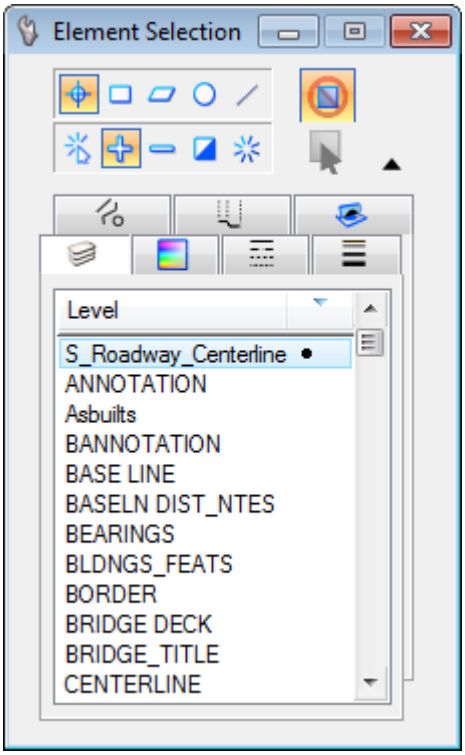


Figure 2-35: Level Dialog

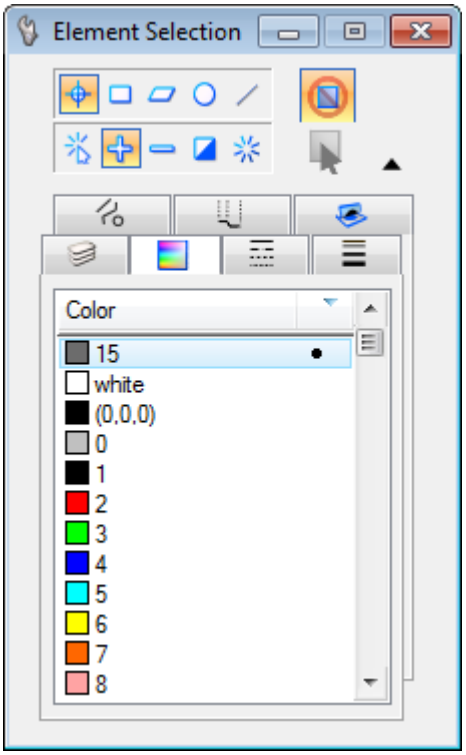


Figure 2-36: Color Dialog

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

Now add all elements of color 2 to the set by choosing **Color tab** from the *Element Selection*. Notice that *Color 15* is at the top of the list (Figure 2-36).

The *Color 15* is the color of elements already selected (elements on the **S_Roadway_Centerline** level that was selected above from the *Level* tab). To add color 2 to this list, **Click** the cursor in the "color **2**". Notice in (Figure 2-37) number *2* moved to the top with *15*. All the elements with the color *2* have been added to the *Selection Set*.

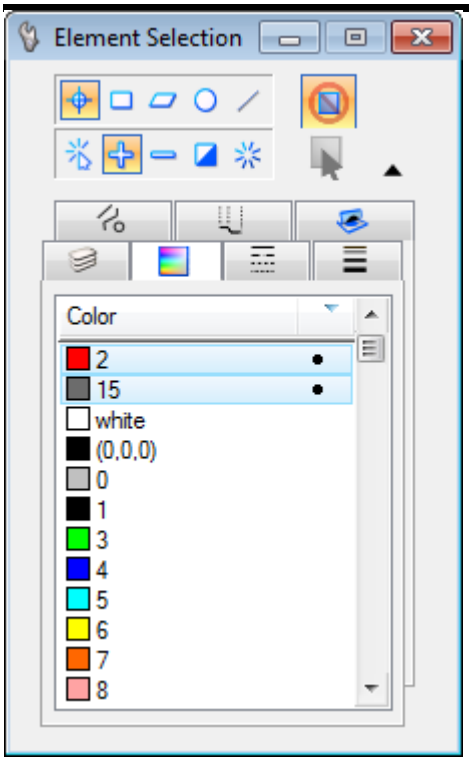


Figure 2-37: Colors 2 and 15 Selected

ⓘ ***This does not mean that all elements of color 2 and 15 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 highlighted and dragging to display all of the levels and release. Now check out the **Level** tab, all the levels that are present in the *Selection Set* (Figure 2-38) have elements.

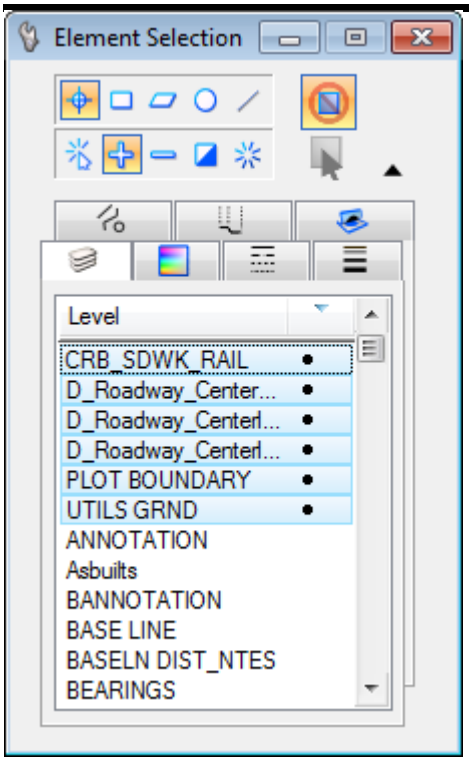


Figure 2-38: All Levels Picked

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 2-39) can be opened from the main menu by selecting **Edit > Select By Attributes.**

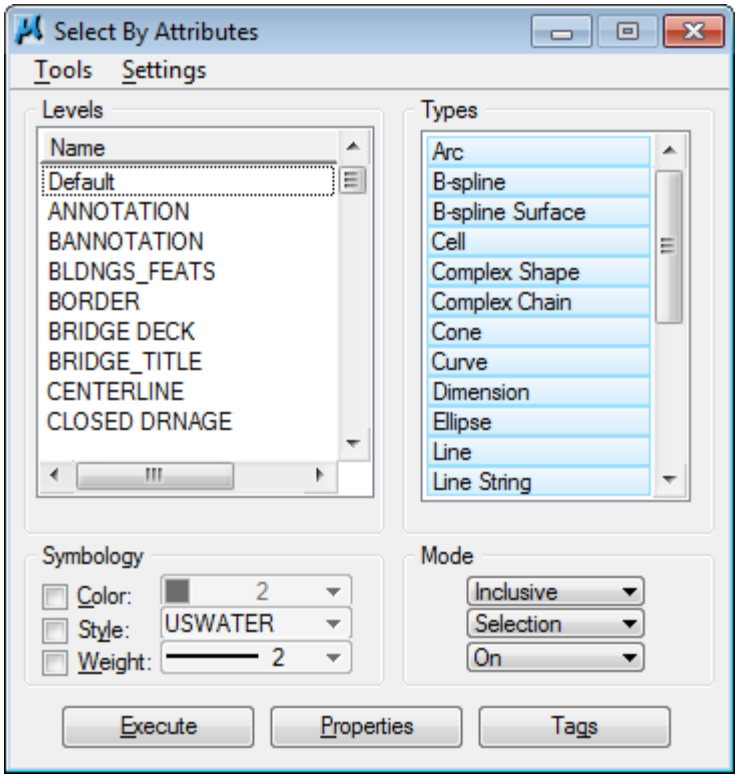


Figure 2-39: Select By Attributes Dialog

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 2-40) 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**.

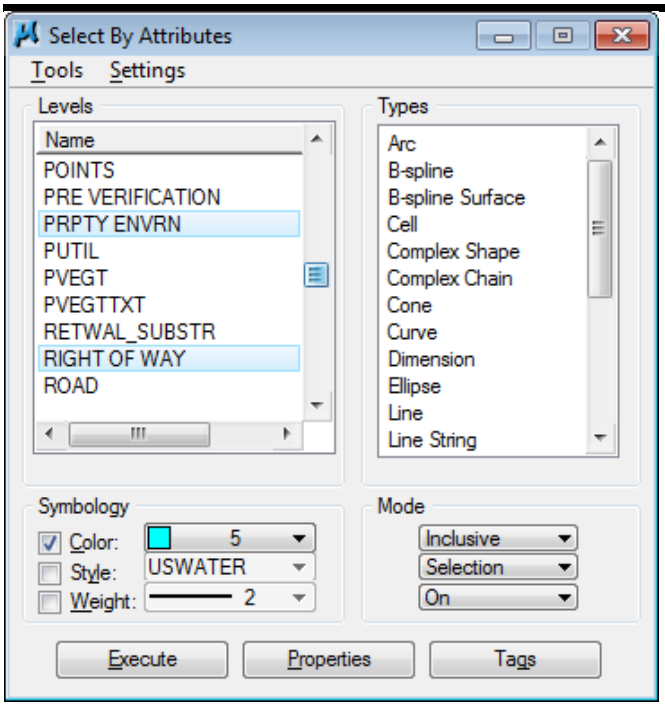


Figure 2-40: Select By Attributes Dialog

- 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 2-41).

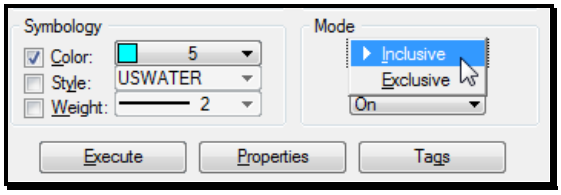


Figure 2-41: Inclusive/Exclusive

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 2-42).

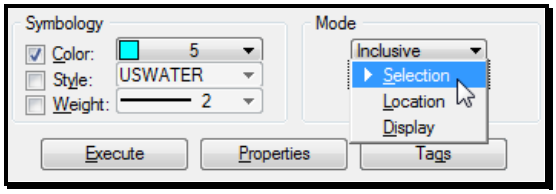


Figure 2-42: Selection/Location/Display

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 2-43).

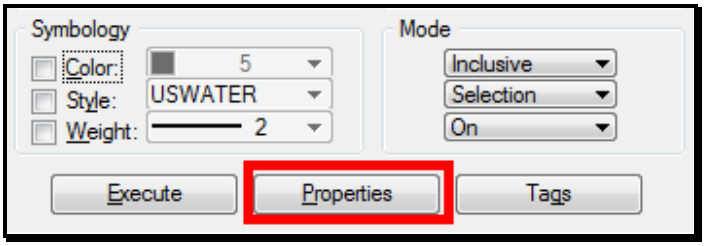


Figure 2-43: Properties

Pushing this button gives you access to more element selection criteria via the **Select By Properties Dialog** (Figure 2-44).

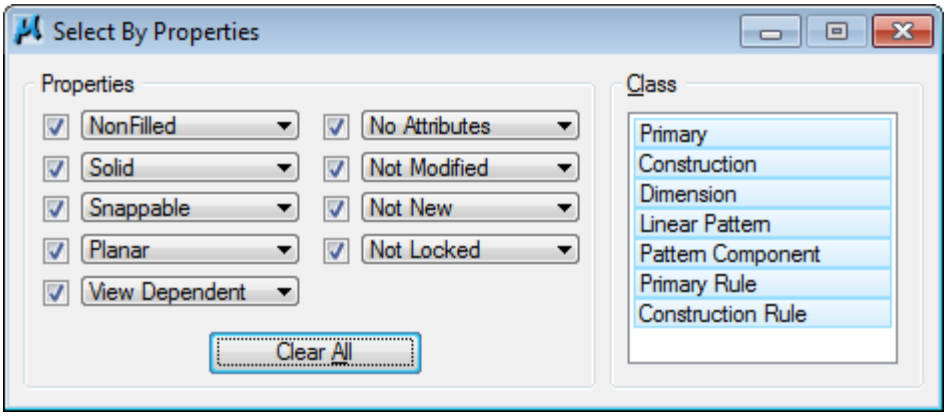


Figure 2-44: Select by Properties Dialog

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 2-45).

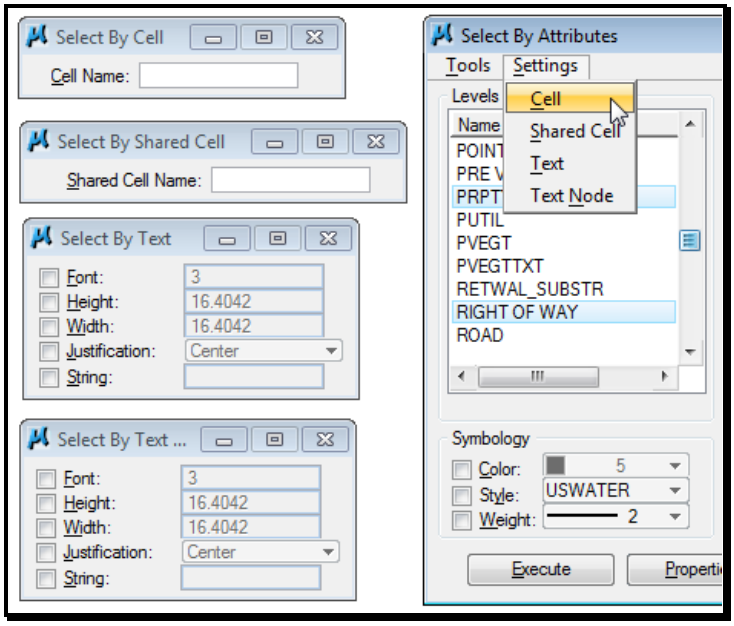


Figure 2-45: Settings Menu Properties

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 2-46).

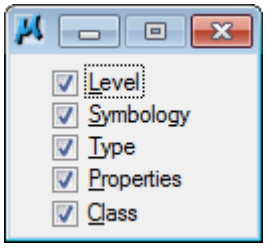


Figure 2-46: Set Select By

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.

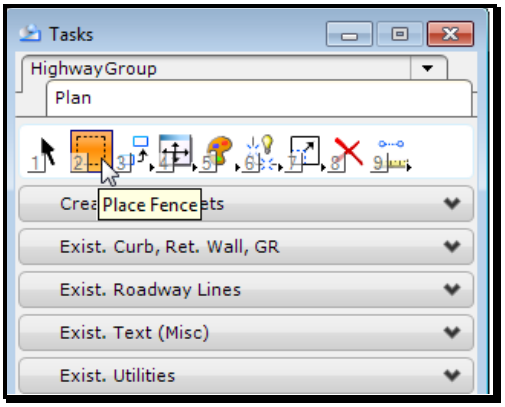
One is processing time. If you have to move a lot of elements, it is usually quicker to fence them than to select them. This is because the selection tools require more redrawing of the elements to the views.

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 2-47) you have a number of options of what kind of *Fence* you would like to place (Figure 2-48).



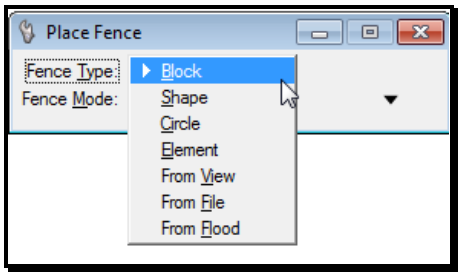


Figure 2-47: Place Fence *Figure 2-48: Fence Types*

- **Block** allows you to define two corner of a rectangle.
- **Shape** allows you to define up to an unlimited number of 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.
- **From Flood** sets a fence to include the (minimum) area enclosed by a set of elements.

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 2-49).

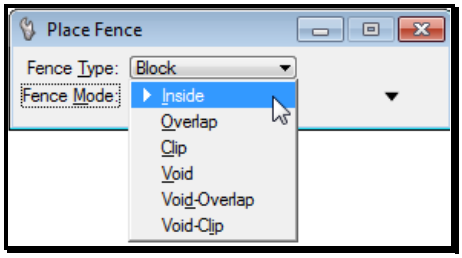


Figure 2-49: Fence Modes

- **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.

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 2-50).

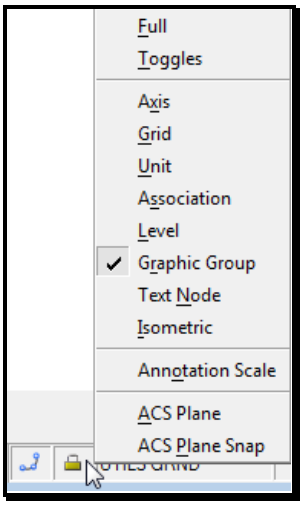


Figure 2-50: Locks in the Status Bar

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 **Task Menus** (Figure 2-51).

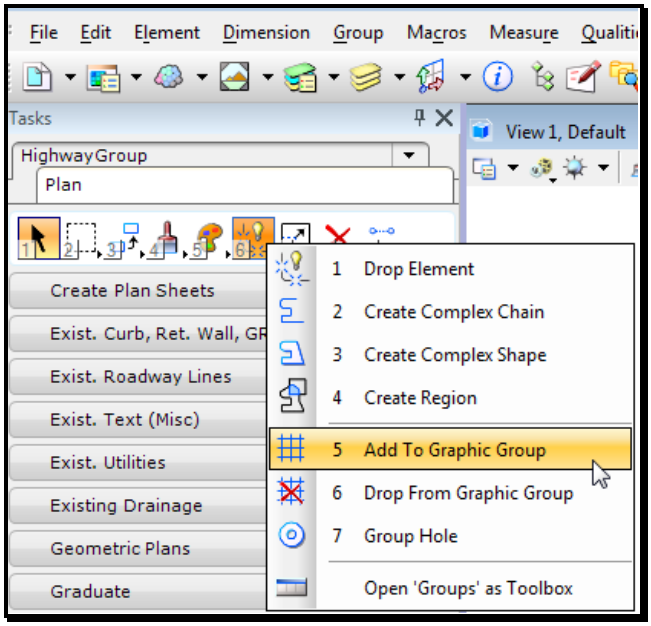


Figure 2-51: Add to Graphic Group

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 *Element Selection*, 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 **Task Menus** (Figure 2-52) or select **Group > Groupings > Drop from Graphic Group** from your menu.

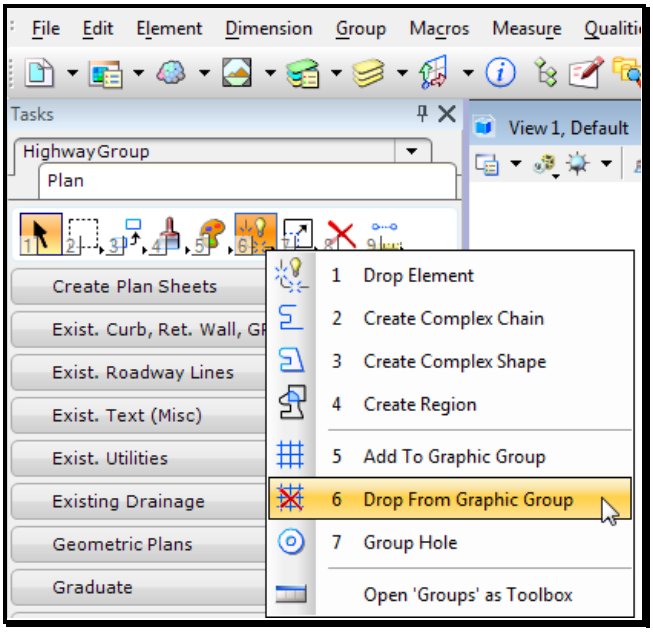


Figure 2-52: Drop from Graphic Group

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 2-53 for a detailed example of using AccuDraw.***

Introduction

Launch **AccuDraw** from the **Primary Tools** toolbox by pressing the **Start AccuDraw Button** (Figure 2-53).

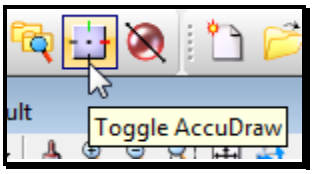


Figure 2-53: AccuDraw Start

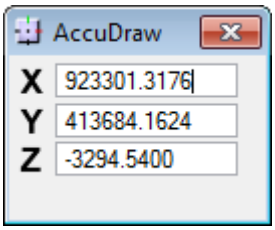


Figure 2-54: Rectangular AccuDraw Window

Somewhere on your screen you'll see the AccuDraw window (Figure 2-54).

The window may be in its *Distance/Angle* format as well (Figure 2-55).

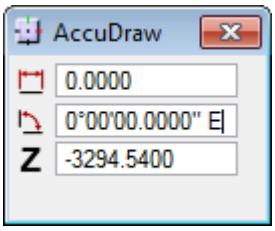


Figure 2-55: Polar AccuDraw Window

It's also possible that the AccuDraw window will be docked (Figure 2-56).

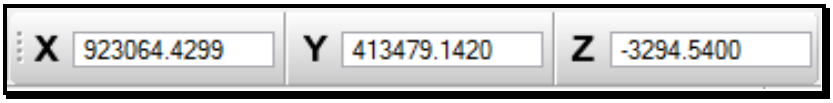


Figure 2-56: Docked AccuDraw Window

When you place a data point in the drawing, it will bring up the *AccuDraw Compass*. In Figure 2-57, you can see *AccuDraw* in *Rectangular* mode.

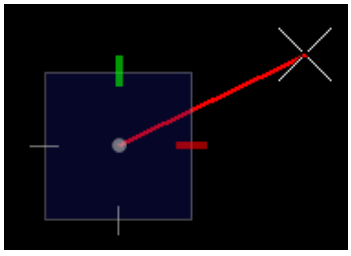


Figure 2-57: AccuDraw's Rectangular Compass

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

In Figure 2-58 you can see *AccuDraw* in its *Polar* mode.

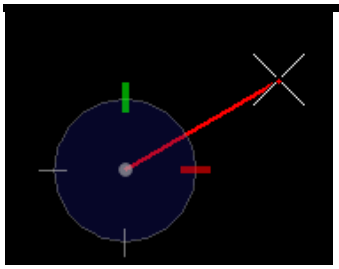


Figure 2-58: AccuDraw's Polar Compass

- 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 2-59).

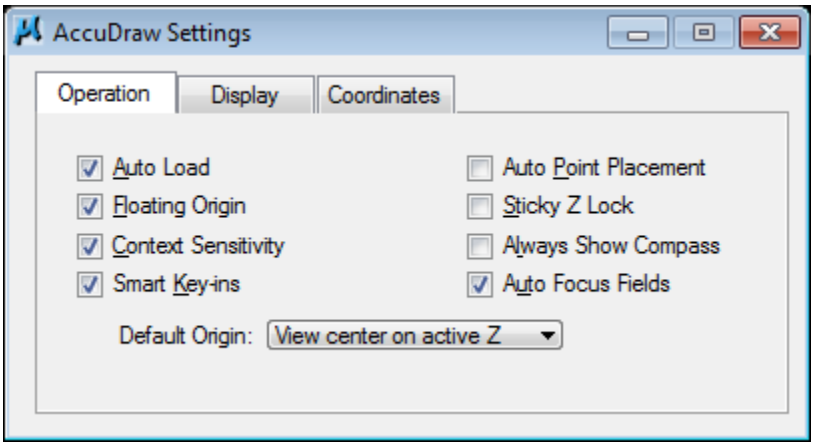


Figure 2-59: AccuDraw Settings Dialog

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.

Auto Focus Fields: If on (the default), the <A> and <D> AccuDraw shortcuts set focus to the selected field and lock the current value. If off, the <A> and <D> AccuDraw shortcuts lock the current value without affecting the focus.

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 origin is centered in the view, at the Active Z depth

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

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

Display Tab

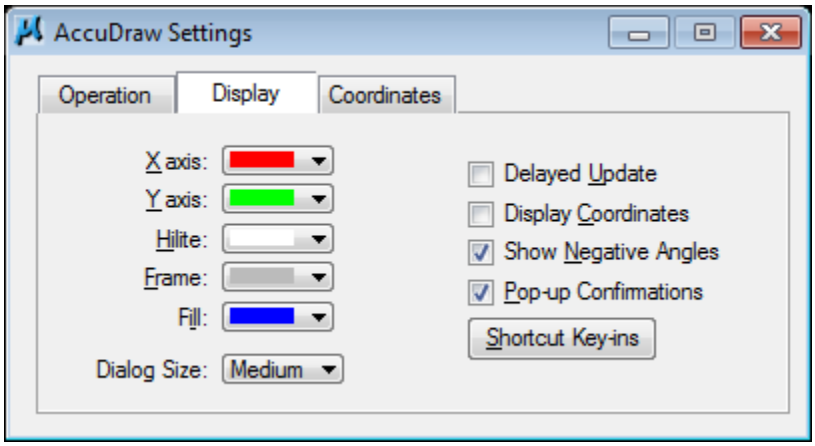


Figure 2-60: AccuDraw Settings Display Tab Dialog

X axis, Y axis, Hilite, Frame, & Fill: 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.

Display Coordinates: If on (default is off), a coordinate display at the pointer shows the increments in the x, y, and z (for 3D) directions from the previous data point.

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

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

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

Coordinates Tab

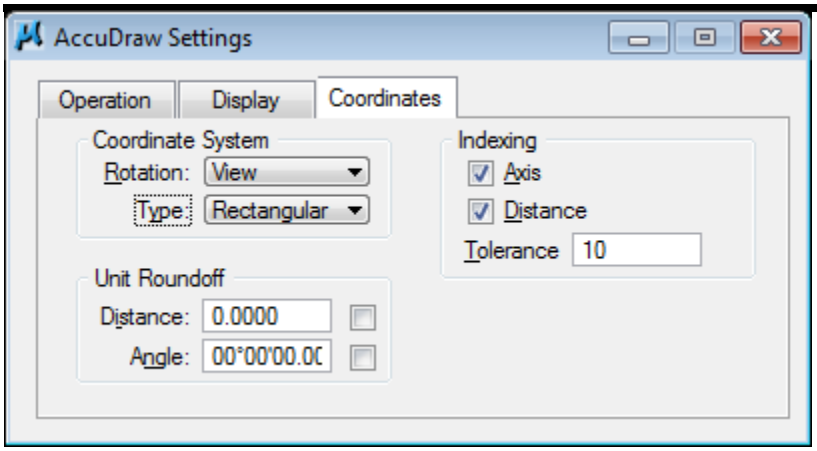


Figure 2-61: AccuDraw Settings Coordinates Dialog

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 2-62).

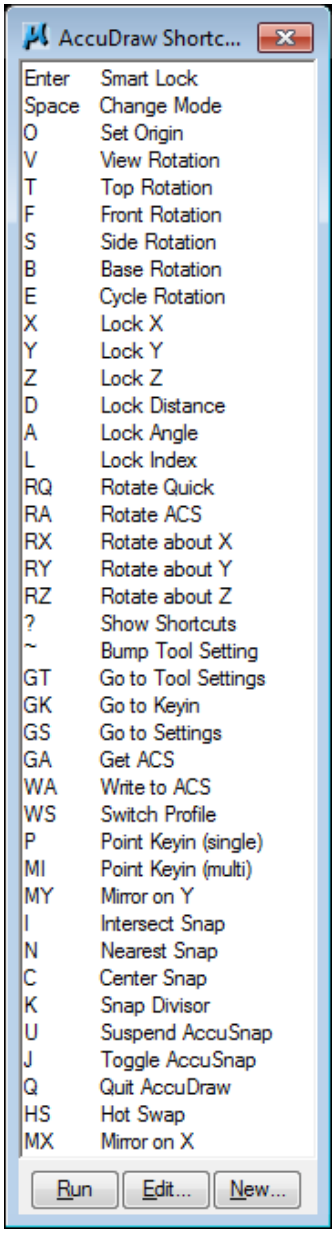


Figure 2-62: AccuDraw Shortcuts Dialog

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

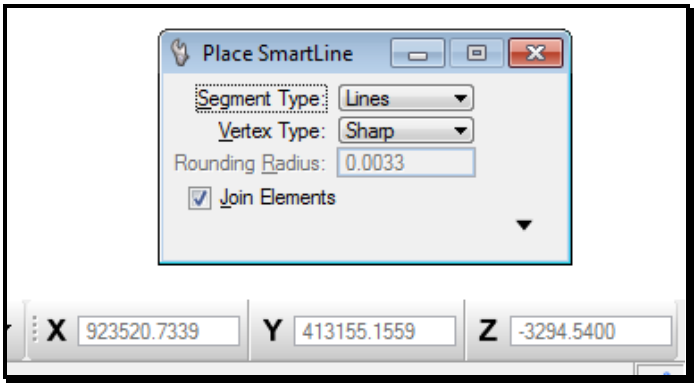


*Figure 2-63: AccuDraw Docked - Focus **OFF***

Note also that the *Tool Settings Window* has *Focus* (like the **Place SmartLine** window in Figure 2-63) 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 2-64) and the Place SmartLine window is grayed.

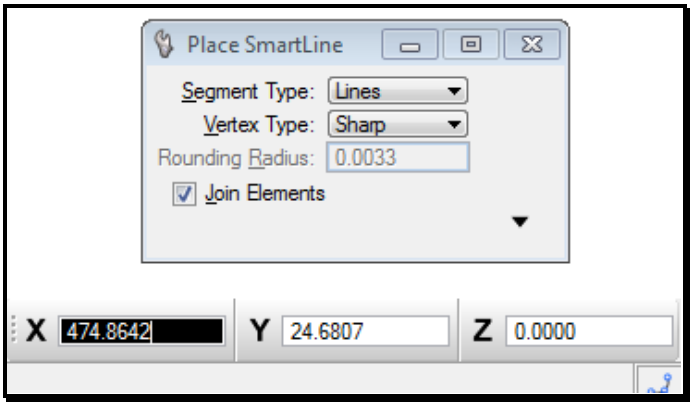


*Figure 2-64: AccuDraw Docked - Focus **ON***

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 2-65).

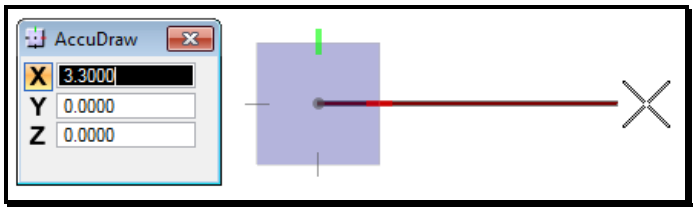


Figure 2-65: Enter Width in AccuDraw

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 2-66).

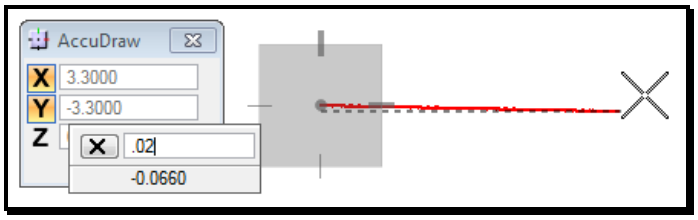


Figure 2-66: Calculate Vertical Drop Based on Slope

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 2-67).

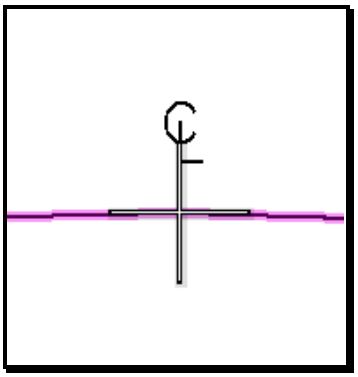


Figure 2-67: Tentative on the Centerline

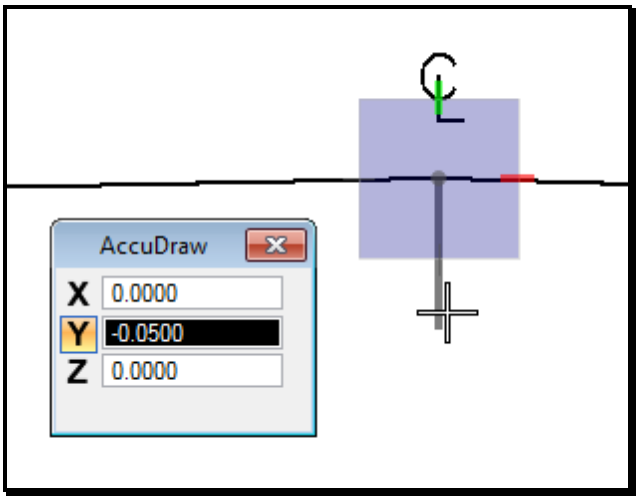


Figure 2-68: AccuDraw Origin

Without accepting that position, hit the "O" on your keyboard to invoke the **Set Origin** function of *AccuDraw* (Figure 2-68).

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 -0.05. By accepting that position with a *data point* you can begin to draw again (Figure 2-69).

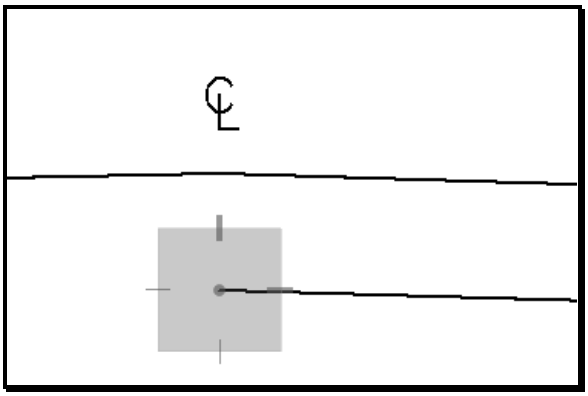


Figure 2-69: Free to Draw

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 2-70).

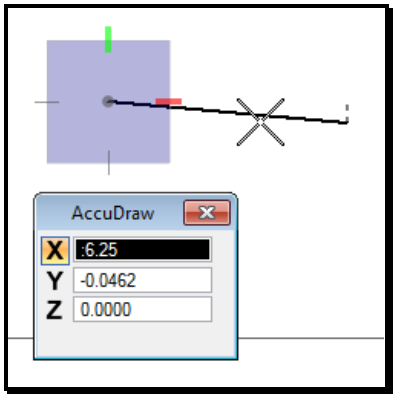


Figure 2-70: Subunits in AccuDraw

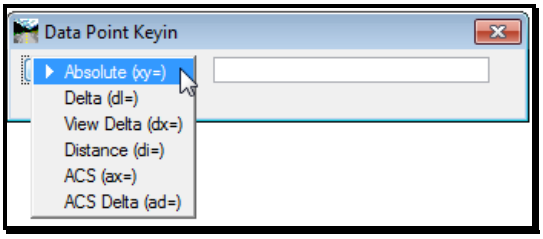
This tells *AccuDraw* that you will be using the sub-units. For instance, if you were working in an U. S. Custom job (ft, in) and wanted to draw a line that is 6.25 inches long; all you would have to do is input that distance in your *AccuDraw* window with **:6.25** (Using the proper X,Y, Z depending 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 AccuDraw's 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 > Key-in** 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 AccuDraw's 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** > **Working Units** (Figure 2-71).

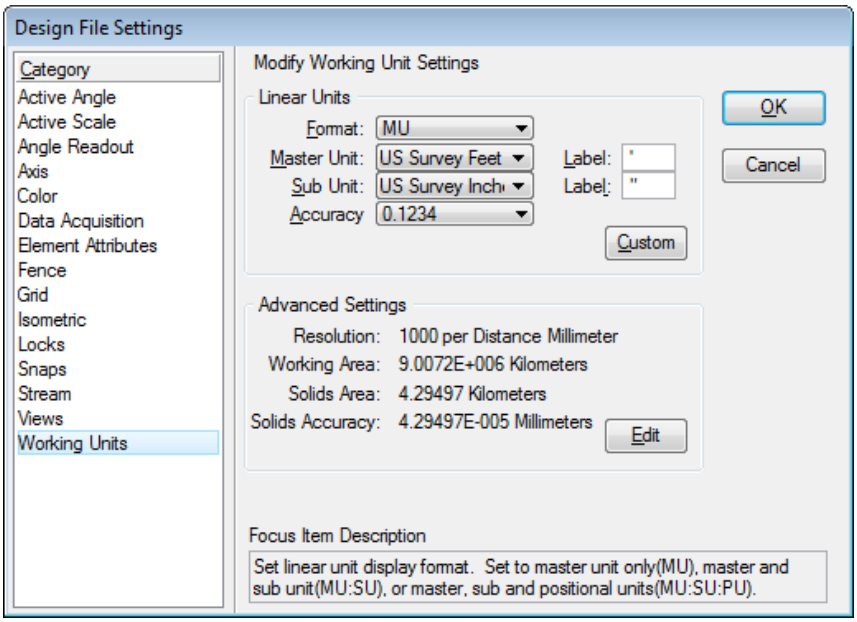


Figure 2-71: Design File Working Units

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

Linear Units, Accuracy

In the **Linear Units** area of this dialog, choose **Format** (Figure 2-72) and **Accuracy** (Figure 2-73).

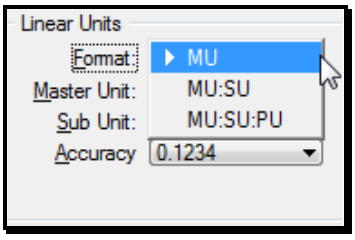


Figure 2-72: Coordinate Format

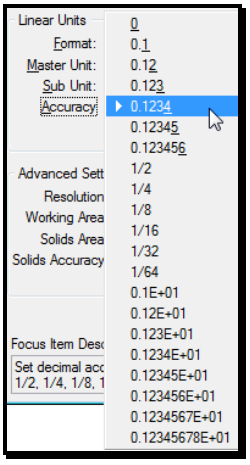


Figure 2-73: Coordinate Accuracy

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 Readout** category of the **Design File Settings Dialog** you can control the **Format** (Figure 2-74), **Mode** and **Accuracy** (Figure 2-76) of MicroStation's angular display. Choose whether you want the **Format** of your angular display to be in decimal degrees or in degrees, minutes and seconds.

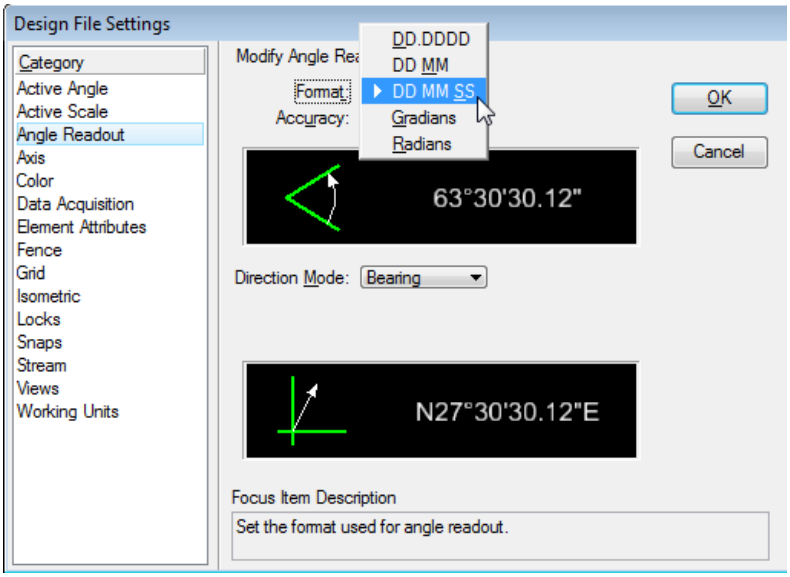


Figure 2-74: Angle Format

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

Choose whether you want your **Mode** to be **Azimuth,** or **Bearing**. **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 2-75).

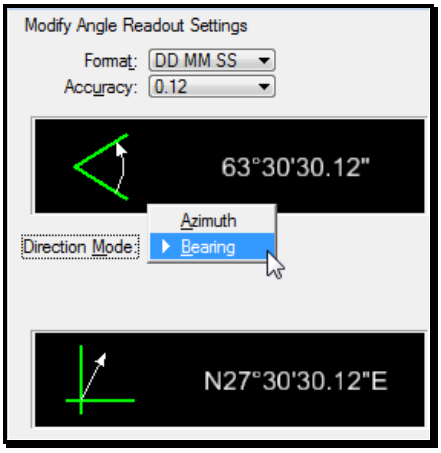


Figure 2-75: Angle Mode

Set your angular accuracy to as many decimal places as you want (Figure 2-76).

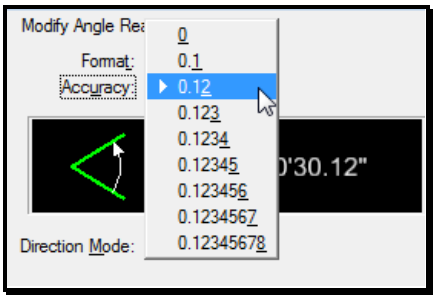


Figure 2-76: Angle Accuracy

MEASURING PART 1

You can access all measuring commands from your *Main Menu* by selecting **Measure** (Figure 2-77).

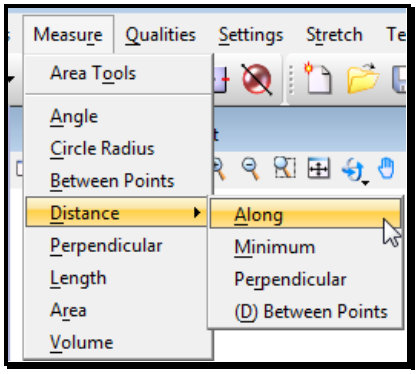


Figure 2-77: Measure Menu

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 **Task Menus**, select **Measure Area** (Figure 2-78) or choose **Measure > Area** from the *Main Menu*.

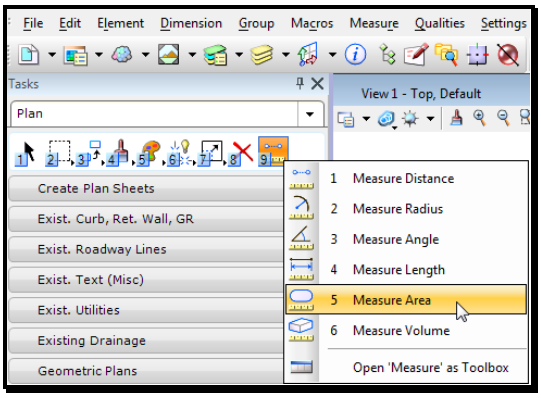


Figure 2-78: Measure Area

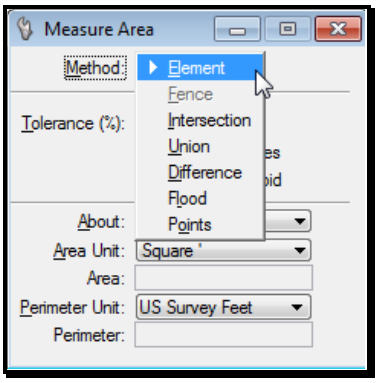


Figure 2-79: Measure Area Methods

A brief look in the **Tool Settings Window** should reveal some familiar **Methods** (Figure 2-79).

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 **Settings > Locks > ACS Plane Snap.** Key-in az=0 in the Key-in dialog and press Enter. Click in the CAD View.

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

Step Two: Set the Drawing Scale

From the *Main Menu,* select **Settings > Drawing Scale.** From the list of available scales, select the scale that you intend on plotting your sheets.

Step Three: Set the Text Attributes

From the *Tasks Menus,* select your **Workgroup > Plan > 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 2-80), set some *Parameter Settings*.

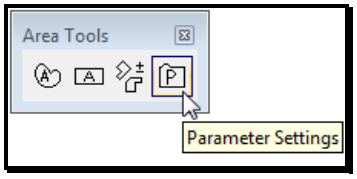


Figure 2-80: Area Parameter Settings

Part One: Set the Default Text Font

While in the **Text** tab, set the **Font** to **123 dotitalics** (Figure 2-81). This is the only setting necessary on the tab.

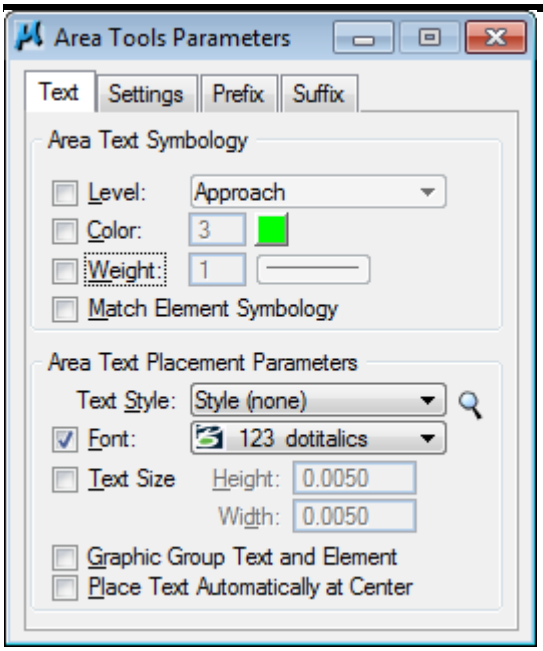


Figure 2-81: Adjust Text Font to 123 dotitalics

Part Two: Set the Default Prefix

Click on the *Prefix* tab (Figure 2-82). Add a prefix that you would like to use. (i.e., Wetlands =). You're limited to ten characters.

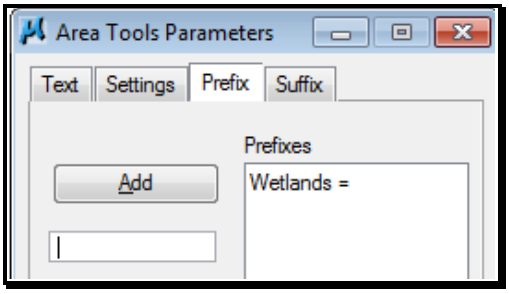


Figure 2-82: Add a prefix

Part Three: Set the Default Suffix

Click on the *Suffix* tab (Figure 2-83). Add a suffix that you would like to use. (i.e., s.f.). You're limited to ten characters.

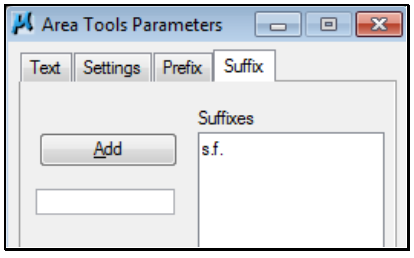


Figure 2-83: Add Suffixes

Step Five: Select Measure Area Tool

From the *Area Tools* toolbox (Figure 2-84), select *Measure Area.*

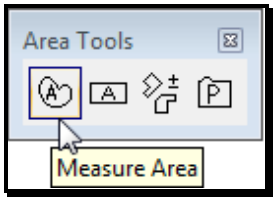


Figure 2-84: Measure Area Tool

Configure area tool for the method, prefix and suffix. Select one of the methods available. If using the *Flood* method, use the Element Selection 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.

TIPS AND TRICKS

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

Measuring with Flood Method

Element Selection

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 *Element Selection* 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*.

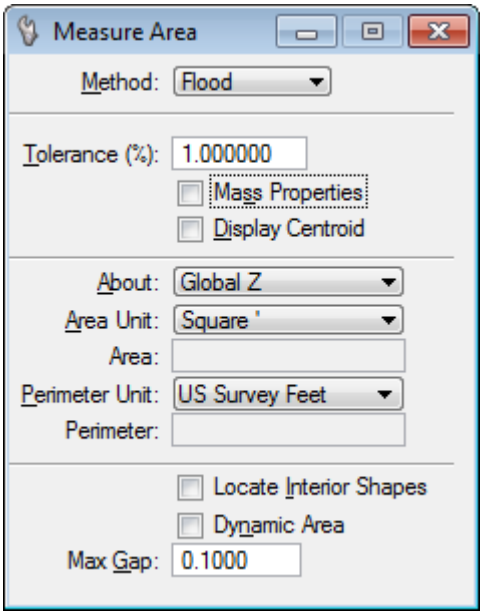


Figure 2-85: Measure Area by Flood Options

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 2-85). 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 2-90.***

Lock Z to Zero

From the *Main Menu*, select **Settings > Locks > ACS Plane Snap.** Key-in az=0 in the Key-in dialog and press Enter. Click in the CAD View.

REFERENCE FILES

REFERENCES DIALOG

From the *Main Menus*, select **File > Reference (DOT) > Dialog**. This will open the **Reference Dialog** (Figure 2-86).

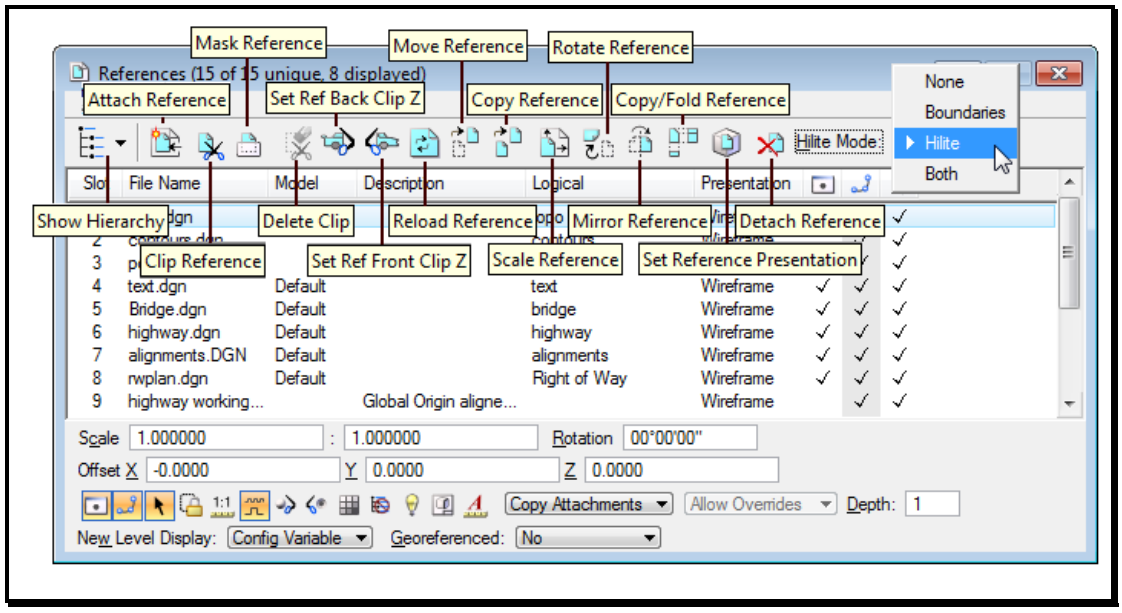


Figure 2-86: Reference Dialog

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

Show Hierarchy: Opens up an additional pane to show the references files in a tree schematic

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

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

Mask Reference: Used to display only graphic outside a fence boundary

Delete Clip: Deletes the clip boundary of a reference

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

Set Ref Back Clip Z: Sets the back 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

Copy/Fold Reference: Copies the selected reference, then attaches a view of the reference by folding it about an orthogonal axis or a line defined

Set Reference Presentation: Changes the display: Wireframe, Smooth, 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

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

Exchange: Toggles from the master file to an attached reference

Open in New Session: Starts a new session of MicroStation and opens the selected reference file

Activate: Activates the selected reference for in-place editing. A black dot indicates it is activated column. Only references that are not open for editing in another session can be activated.

Deactivate: Deactivates a Reference file that was previously Activated

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.

Create Drawing Title: Opens the Create Drawing Title window. Click **OK** to create a drawing title with the default drawing title name.

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)

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

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

Adjust Colors: Opens the Adjust Reference Colors dialog, which modifies or adjusts the color table for references

Reprojection: Opens the Reference Reprojection Settings dialog, which defines the

reprojection settings for the selected reference(s). This menu item is disabled if the Georeferenced mode is not set to Reprojected.

Hilite > Boundaries: Places a dashed border around the reference

Hilite > Hilite: Highlights the reference

Auto Arrange Icons: If on, icons in the dialog's tool bar wrap when the dialog is resized

Level Manager: Opens the Level Manager dialog, which is used to manage levels for the active model and its references.

Level Display: Opens the Level Display dialog, which is used to turn on and off levels in the active model and its references.

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

REFERENCES ATTACH

Most of the files 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 2-87). This is an automated routine to look at where you entered MicroStation thru the projects list and place you into the proper directory tree.

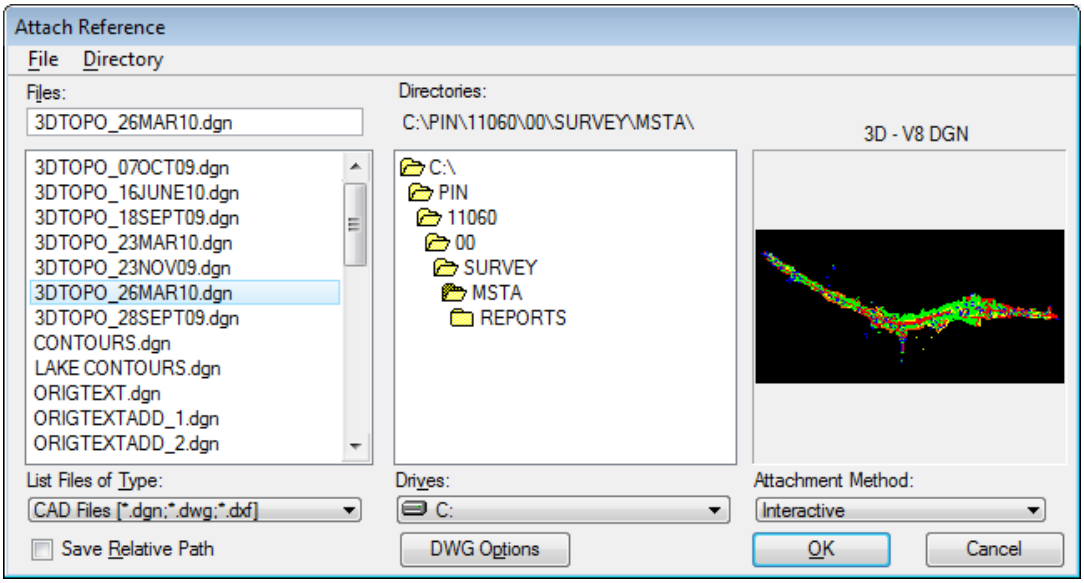


Figure 2-87: Attach Reference

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 2-88).

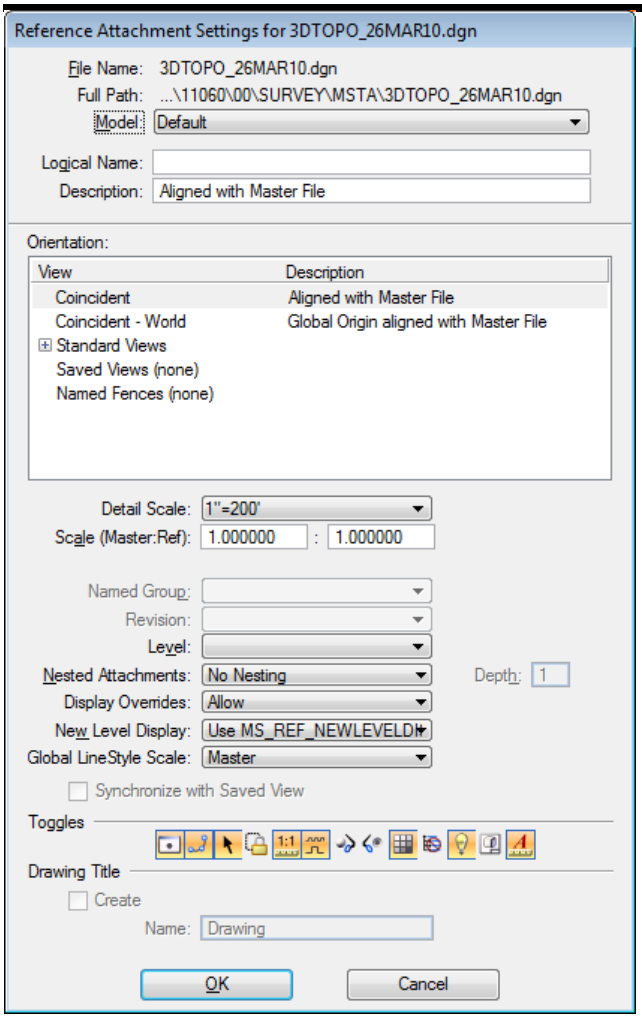


Figure 2-88: Attach Reference Settings Dialog

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 2-89) will be grayed if no files are attached to the file being referenced.

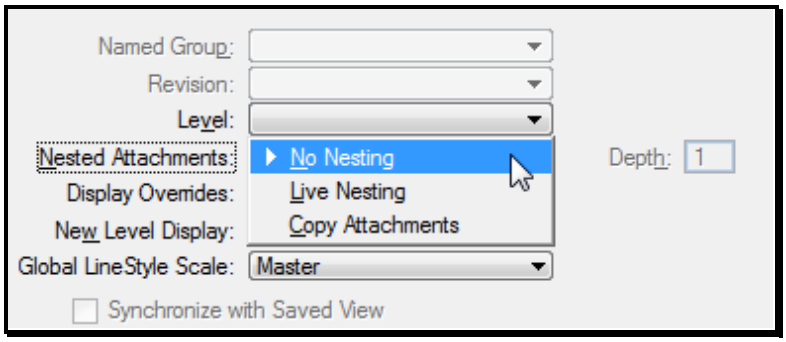


Figure 2-89: Nested Attachments

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 the Display Raster References icon can be disabled to not display the image.

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 2-90).

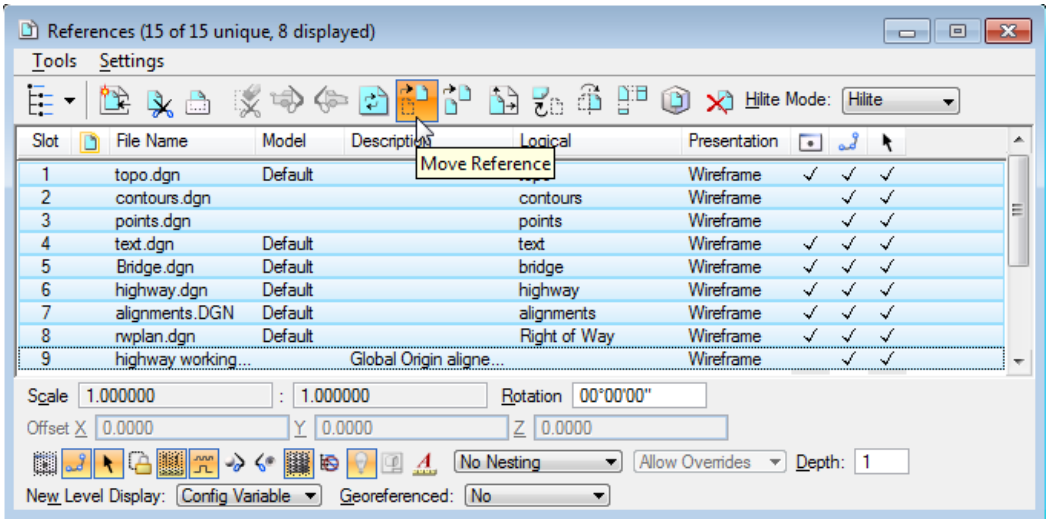


Figure 2-90: Reference Dialog

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 2-91).

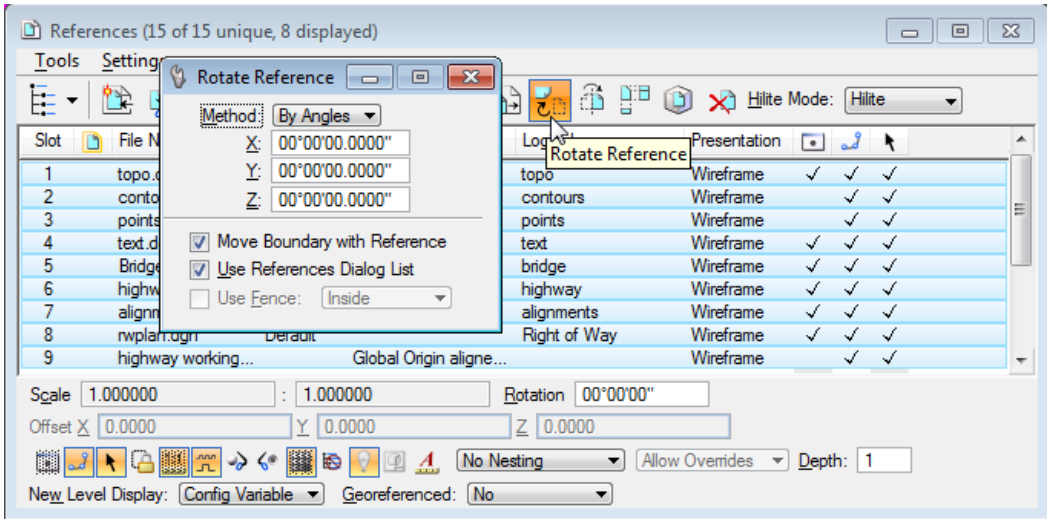


Figure 2-91: Reference Dialog

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 2-75.***

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 2-92).

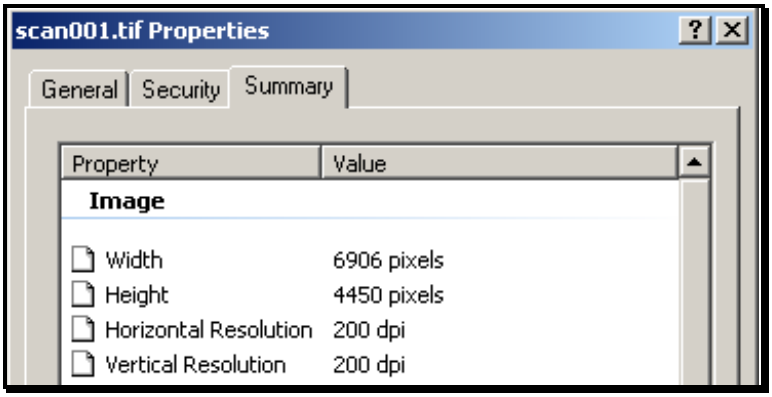


Figure 2-92: Windows Explorer

Divide the dimensions by the resolution to get the image size in inches. Using the numbers in the example above (Figure 2-92), 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 = 10,359' & 22.25 x 300 = 6,675').

- If the image will open with *Paint*, check **Image > Attributes** for size in inches.
- The Reproduction Room 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 2-93).

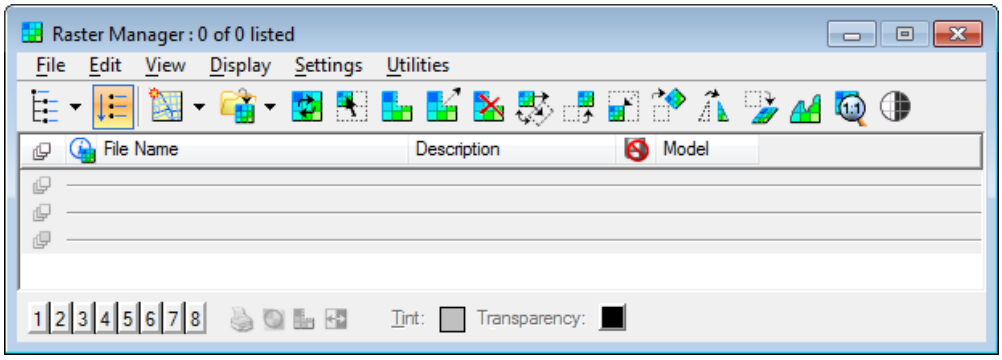


Figure 2-93: Raster Manager Dialog

From the main menu of the *Raster Manager Dialog* select **File > Attach**. When the **Attach Raster Reference Dialog** (Figure 2-92) opens, browse to select the Image File. Enable the *Place Interactively* and *Open Settings Dialog* options and click **OK**. The *Raster Attachment Options dialog* (Figure 2-95) will appear. Adjust the settings accordingly and click **Attach**.

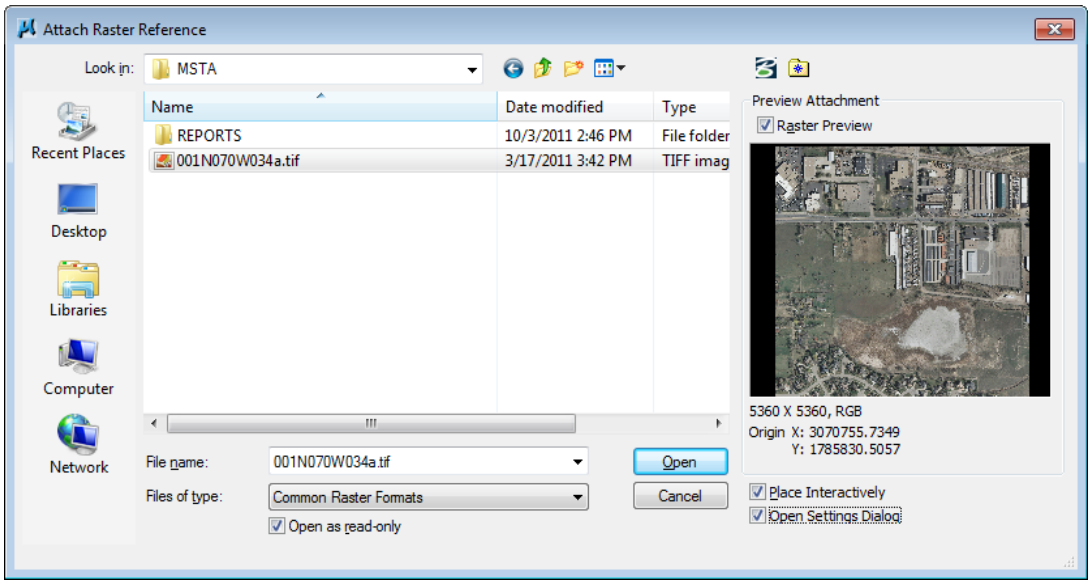


Figure 2-94: Attach Raster Reference

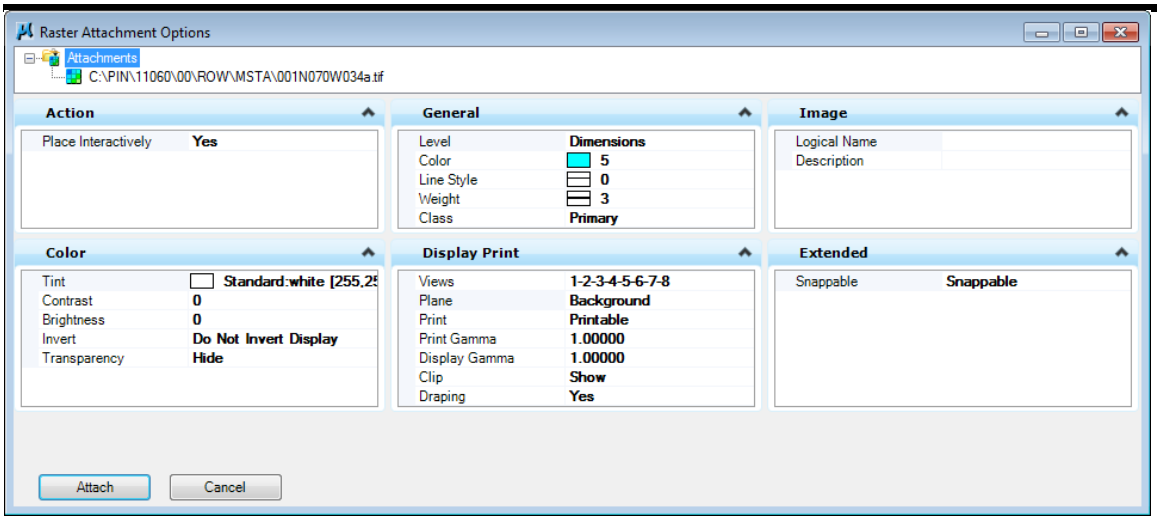


Figure 2-95: Raster Attachment Options Dialog

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**.

To change the *Raster Attachment Options* after the Raster file is attached, select the **Element Information** icon and click the border of the attached Raster file. This will open the Element Information dialog (Figure 2-96). The *Raster Attachment Options* can be changed using this dialog.

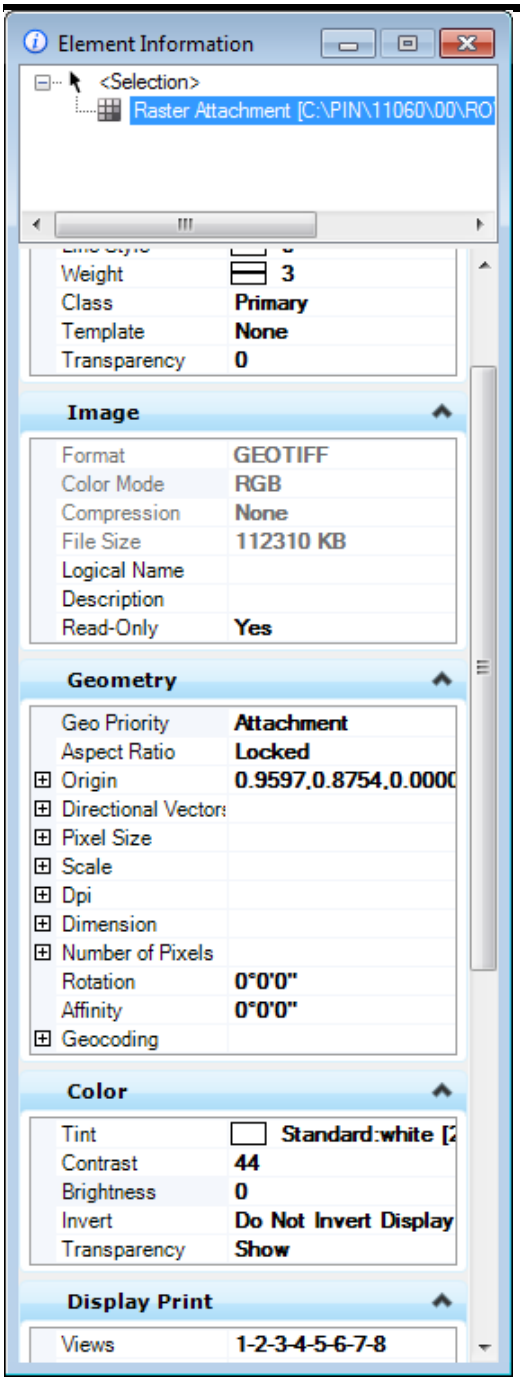


Figure 2-96: Element Information

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 (\\oit-teaqasdtiis.mdot.w2k.state.me.us\pcpin1). Your project's Survey\MSTA 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 2-97). 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.

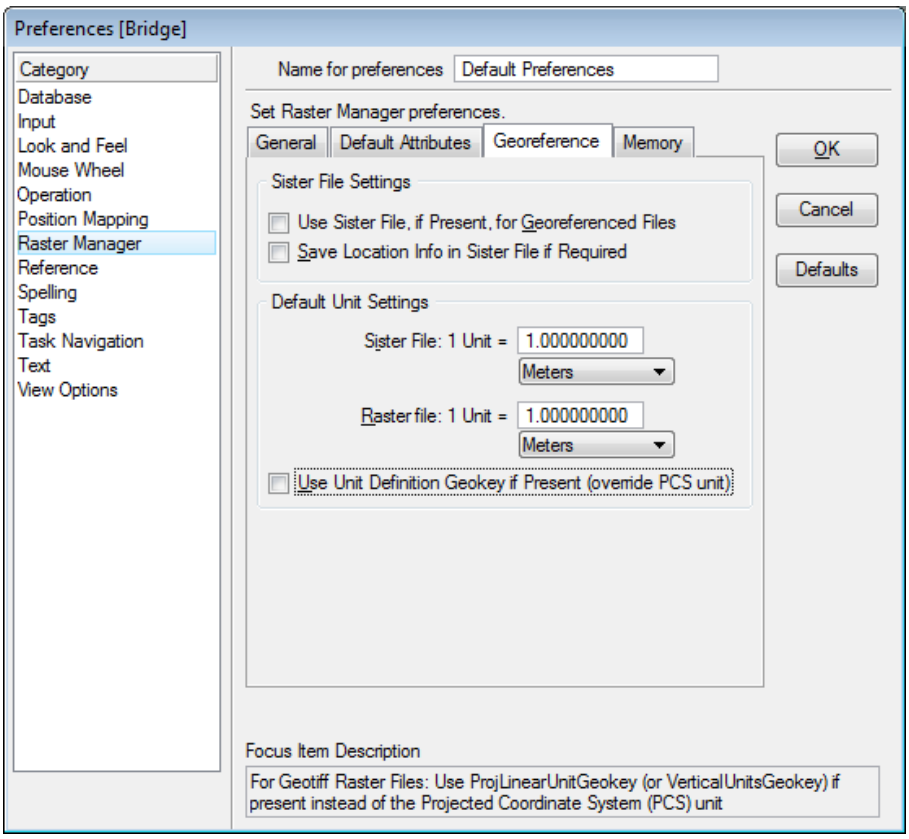


Figure 2-97 User Preference dialog – Raster Manager Preferences

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 your **Workgroup > Plan Graduate > Distance and Offset** from the *Tasks Menus* (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 2-98)

Figure 2-98: 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 2-99)

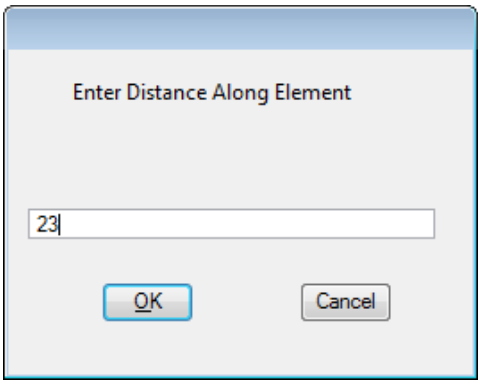


Figure 2-99: Input Distance

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 2-100)

Figure 2-100: 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 2-101) and enter in a data point (left button). There is no need to snap to enter this point.

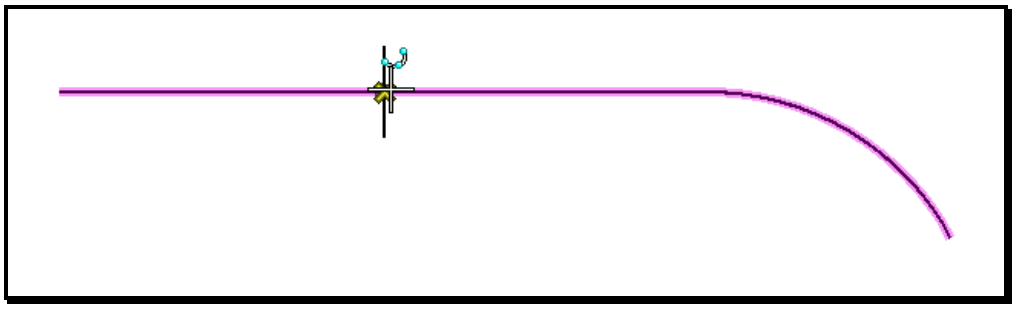


Figure 2-101: Identify Direction for Construction

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 2-102).

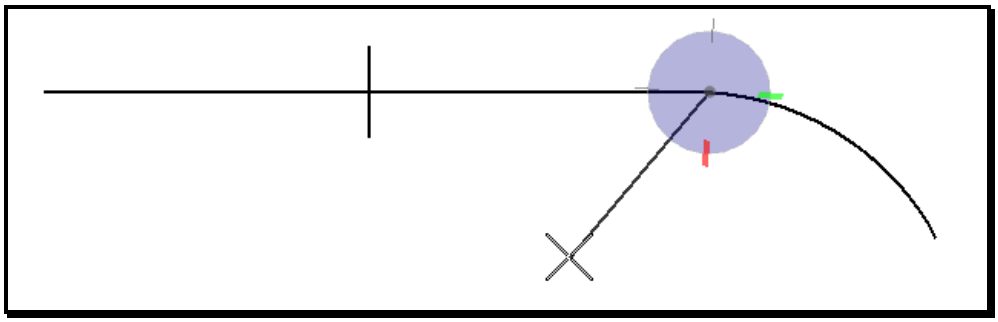


Figure 2-102: Point Constructed

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 2-103).

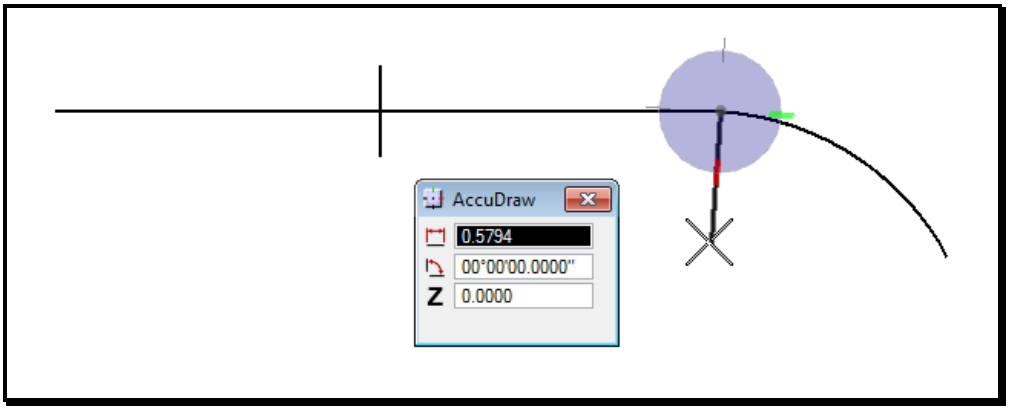


Figure 2-103: Constructing a Distance off the Baseline

Notice that the angle is 0°. Enter a *Data Point* to complete the command. *Reset* to stop drawing lines.

Troubleshooting

There is a **Warning Dialog** (Figure 2-104) that you will get from time to time when you construct distances using this macro.

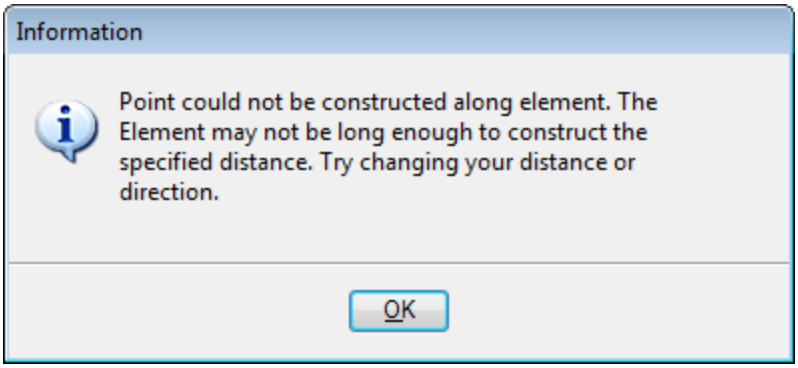


Figure 2-104: Pointalong Warning Dialog

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***

HOTSWAP

Overview

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

Launch the HotSwap Macro

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

Identify the Element

MicroStation will prompt "HotSwap > Identify Element." Click 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 2-105).

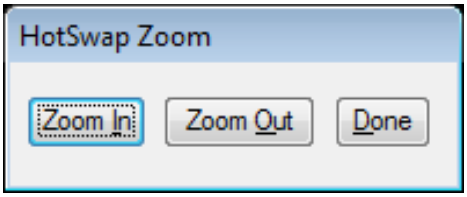


Figure 2-105: HotSwap Zoom Dialog

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 *Drawing Scale dialog*.

Run the Macro

From the *Tasks Menus*, select your **Workgroup > Plan > 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

The Export 2D command is used to create a 2D file from a 3D file. 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 Export 2D

From the Main Menu, select **File > Export > 2D**. This will open the **Export 3D to 2D** dialog (Figure 2-106). Select the appropropriate folder and key-in a new filename. You cannot use the same filename as the 3D file. Click the **OK** button. All the reference files that were attached to the 3D file will be automatically attached to the 2D file after the export. The reference files will not be converted to 2D during the export. You have to use the **File > Open** command to open the 2D file that was just exported.

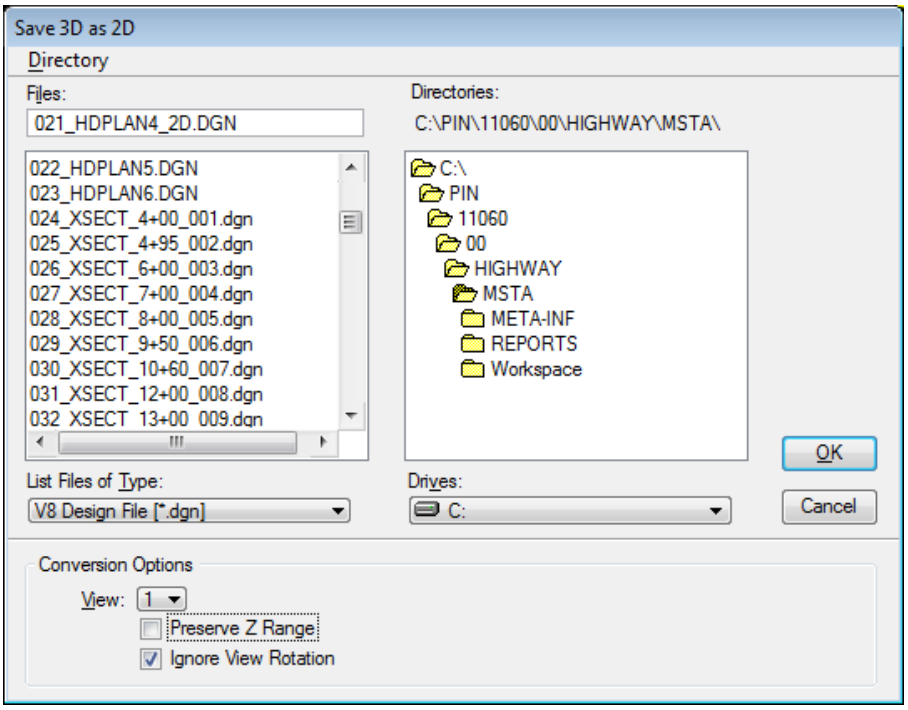


Figure 2-106: Export 3D to 2D dialog

The Preserve Z Range option may be enabled to be able to retrieve the original elevations of the file at a later time. The Ignore View Rotation should be enabled if the View has been

Rotated. The Ignore View Rotation setting preserves the X-Y geometry coordinates and discards the Z information.

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 *Tasks Menus* and pick the most appropriate setting (i.e., **BridgeGroup > Bridge > 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 Toolbar** (Figure 2-107).

Figure 2-107: Steel Toolbar

Step Two: Set Steel Section Parameters

On the right side of the **Steel Toolbar** is the **Steel Section Parameters** icon.  The **Steel Section Parameters** dialog (Figure 2-108) can be used to change the display of the steel sections and hatching. If you want to use the Attributes set by the Tasks (Color, Weight, and Level), disable the options for each Attribute. If the Attributes options are enabled, the setting you define will be used to display the Steel Section.

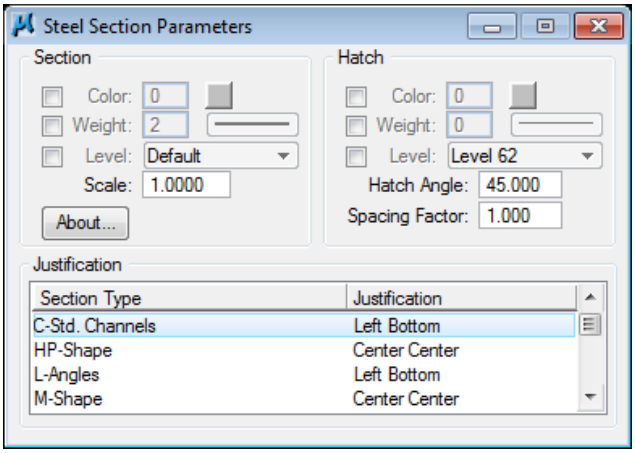


Figure 2-108: Steel Section Parameters Dialog

Step Three: Choose an Origin

Now you need to make a decision about how you want to place this shape. You can change the Justification of the different Section Types by selecting the appropriate *Section Type* and clicking on the *Justification* field (Figure 2-109).

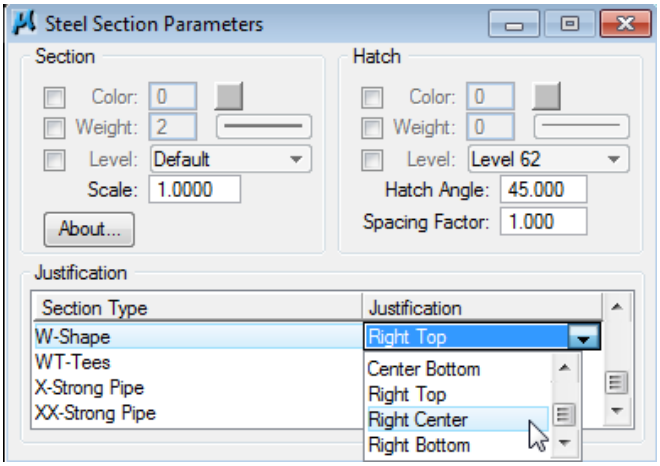


Figure 2-109: Steel Section Parameters Dialog – Setting the Justification

In the **Justification** section of this dialog, there are nine options that you can press to set the justification. Your choice will depend on the detail you are working on.

Changing the settings in the **Steel Section Parameters** dialog will be applied to the Steel Section that will be placed.

You can keep the **Steel Section Parameters** dialog open and change the settings while you are placing Steel Sections.

Step Four: Place the Shape

On the right side of the **Steel Toolbar** is the **Place Steel Section** icon.  The Place **Steel Section** command is used to place the Steel Sections based on the Settings in the **Steel Section Parameters** dialog. Clicking the **Place Steel Section** icon will bring up Place Section in the **Tool Settings Window** (Figure 2-110).

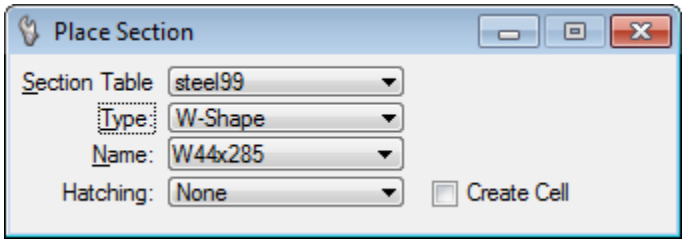


Figure 2-110: Place Section Dialog

Start by selecting the appropriate *Type* from the list (Figure 2-111).

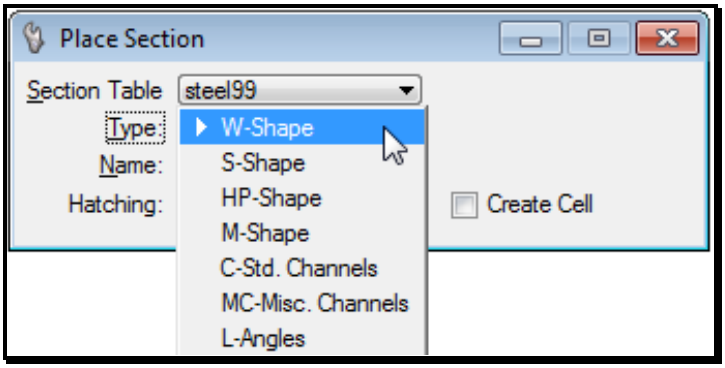


Figure 2-111: Place Section Dialog – Select Type

Continue by then selecting the appropriate *Name* from the list (Figure 2-112).

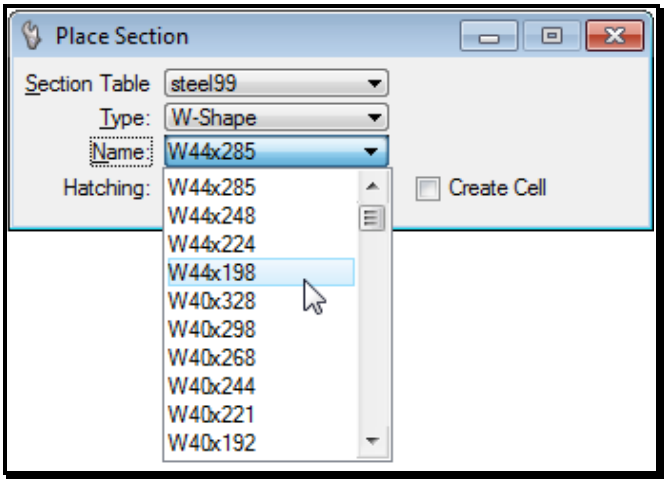


Figure 2-112: Place Section Dialog – Select Name

Finally, select the needed Hatching from the list (Figure 2-113)

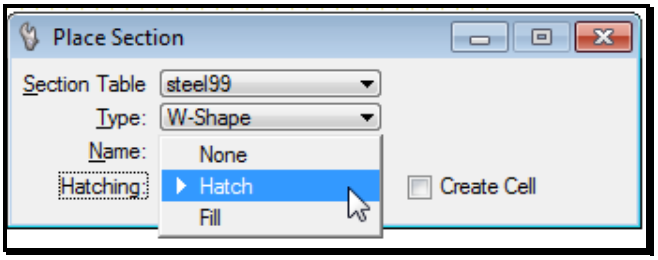


Figure 2-113: Place Section Dialog – Select Hatching

You can make the Steel Section a cell by enabling the *Create Cell* option. If the *Create Cell* option is disabled, the Steel Section will be a complex shape.

The Steel Section should appear at the location of your cursor and will be placed where ever you click in the MicroStation View (Figure 2-114).

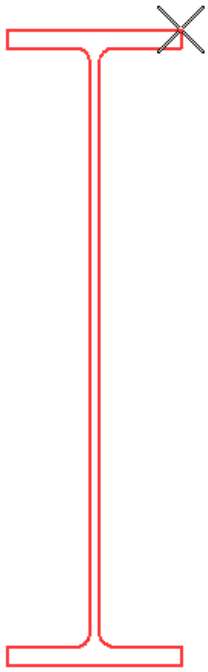


Figure 2-114: Placed Steel Section

- Notice the cursor at the right of the top flange in Figure 2-114. This is the **Origin** point that was assigned .

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**.

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 Weld Macro

Run the **Weld** macro from your main menu by choosing **Macros > Weld**. This will bring up **Machining Toolbar** (Figure 2-115).

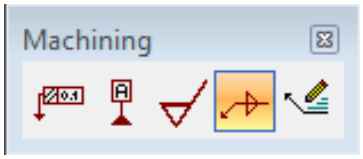


Figure 2-115: Machining Toolbar

Step Two: Start the Place Welding Symbol Tool

Select the **Place Welding Symbol** tool.  It is the fourth icon in the **Machining Toolbar**. This will bring up the **Place Welding Symbol** dialog (Figure 2-116).

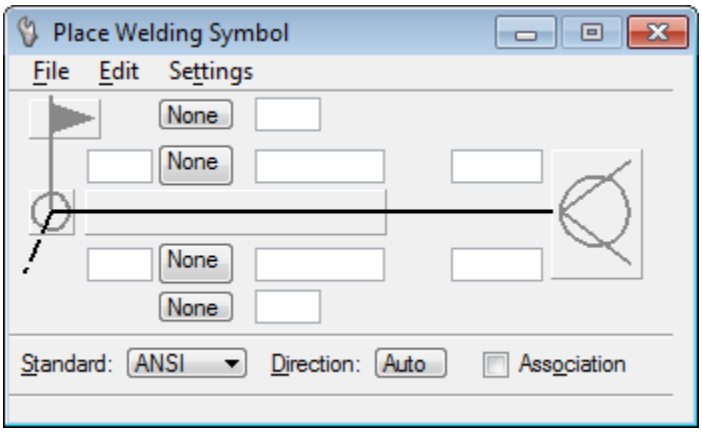


Figure 2-116: Place Welding Symbol Dialog

Step Three: Fill out the Dialog

The Place Welding Symbol dialog consists of three “push” buttons, numerous text entry fields, and several pull-down list boxes.

The three “push” buttons are marked below in red outlines (Figure 2-117). The default settings for these buttons are “grayed out” and are shown below. This means that the symbols they represent will not be shown when the Welding Symbol is placed.

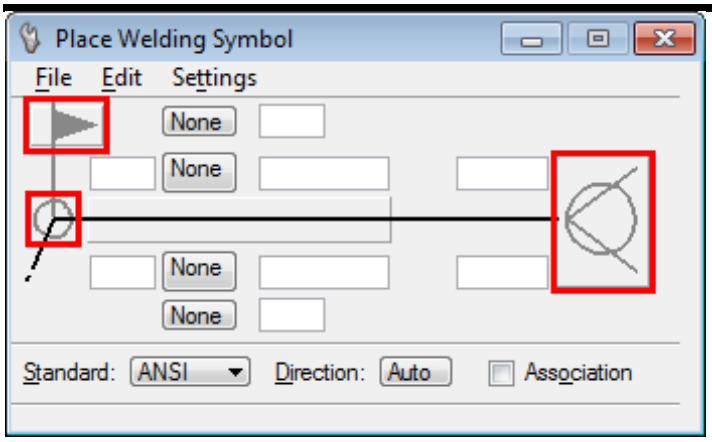


Figure 2-117: Place Welding Symbol Dialog – Three Push Buttons

There are three modes for the push button that looks like a flag. They modes are no flag displayed, flag displayed with fill, or flag displayed with no fill. The modes are displayed below respectively (Figure 2-118).

Figure 2-118: Place Welding Symbol Dialog – Flag Push Button Modes

There are two modes for the push button that looks like a circle on the left. They modes are no circle displayed, or circle displayed. The modes are displayed below respectively (Figure 2-119)

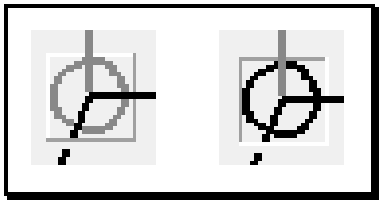


Figure 2-119: Place Welding Symbol Dialog – Circle Push Button Modes

There are three modes for the push button that looks like a circle/tail on the right. They modes are no circle/tail displayed, tail displayed, or circle displayed. The modes are displayed below respectively (Figure 2-120).

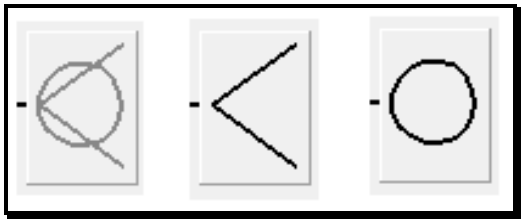


Figure 2-120: Place Welding Symbol Dialog – Circle/Tail Push Button Modes

The Place Welding Symbol dialog has two drop-down lists to select the appropriate welding symbol. This is outlined in red below (Figure 2-121).

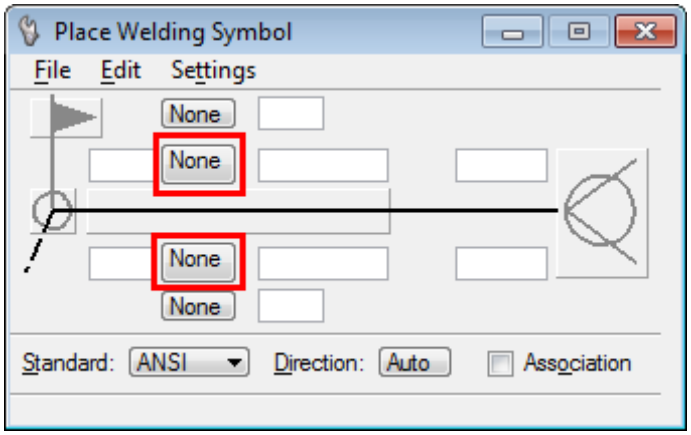


Figure 2-121: Place Welding Symbol Dialog – Welding Symbol Drop-down Lists

Selecting the appropriate welding symbol on the top will display that symbol on the top. Selecting the appropriate welding symbol on the bottom will display that symbol on the bottom. The welding symbol choices are shown below (Figure 2-122).

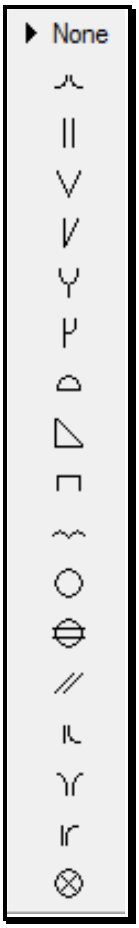


Figure 2-122: Place Welding Symbol Dialog –Welding Symbols

There are two drop-down lists for welding contours of the weld as shown outlined in red below (Figure 2-123)

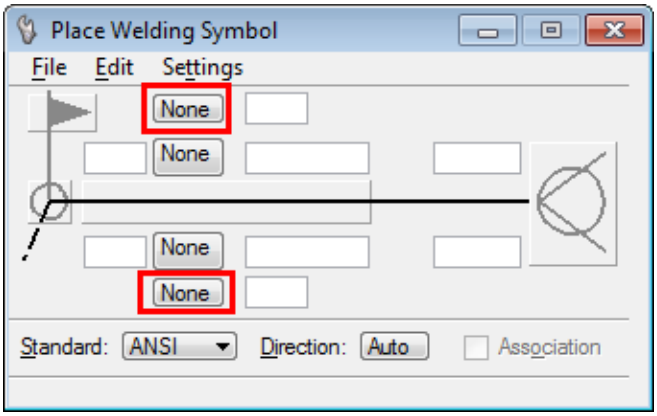


Figure 2-123: Place Welding Symbol Dialog – Welding Contours Pull-down Menus

There are three weld contours as shown below (Figure 2-124).

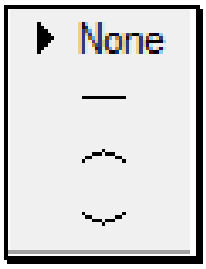


Figure 2-124: Place Welding Symbol Dialog – Welding Contours Symbols

There are numerous text boxes on the **Place Welding Symbol** dialog. Key in the desired text. If you select the circle/tail push button, an addition text box will be revealed at the bottom of the dialog. The tail note can be keyed in inside that text box as shown below (Figure 2-125). If additional room is needed, you can insert spaces in the text boxes to spread out the orientation of the welding symbol.

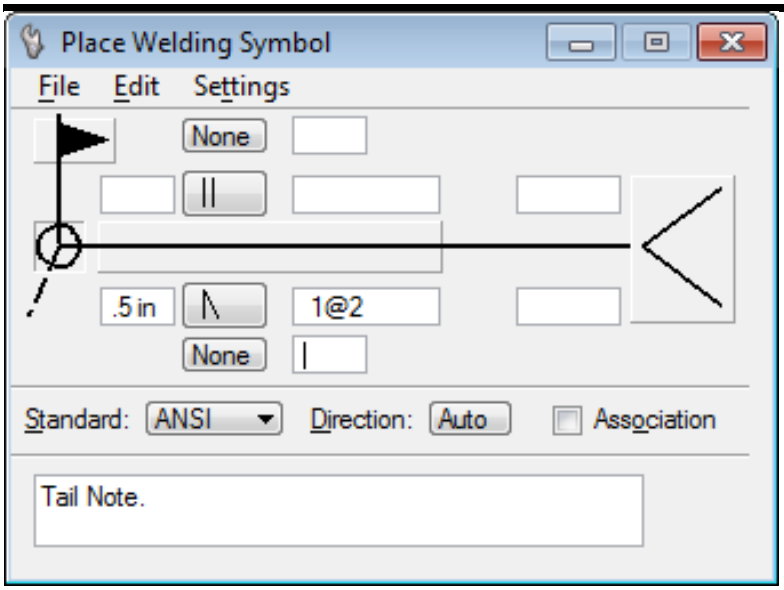


Figure 2-125: Place Welding Symbol Dialog – Text Boxes

This example (Figure 2-125) will produce a welding symbol as shown below (Figure 2-126).

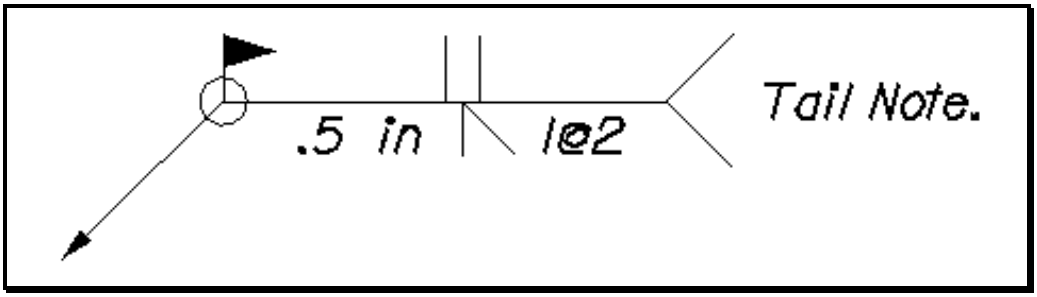


Figure 2-126: Place Welding Symbol Example

Step Four: Set the Scale and Place the Welding Symbol

Use the **Settings > Drawing Scale** to select the appropriate scale before you place the Welding Symbols. The scale controls all of the welding symbol display.

To place a welding symbol, snap to the location of arrow head to be placed. Then, you can select as many leader segments as needed by clicking at the desired vertex of the leader segment.

Step Five: Saving the Weld Symbols

You can save up to five welding symbol configurations for future use. Simply configure the welding symbol as described in this section and select **File > Save > Weld 1-5** from the Place Welding Symbol dialog. The configuration you are currently using will stay set until you exit MicroStation. To bring back a saved Welding Symbol configuration, select **File > Load > Weld 1-5**. See Figure 2-127.

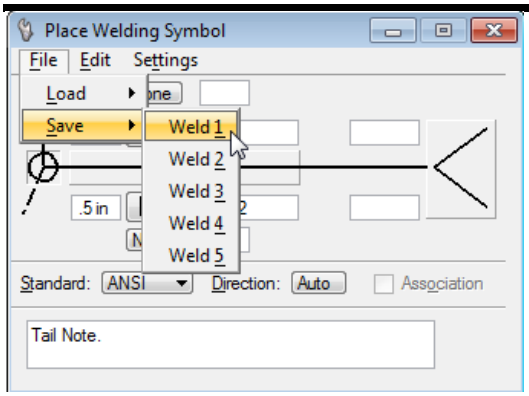


Figure 2-127: Place Welding Symbol Dialog – Save Weld

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.

Chapter 3 InRoads Configuration

MAINEDOT INROADS CONFIGURATION

!MSINROADSCONF VS. !MSV8ICONF

Overview

The migration to InRoads design software was an opportunity to take advantage of some of the new capabilities of MicroStation. The initial upgrade had various configuration files located on the users hard drive at **!msInRoadsconf** folder. The latest upgrade will have the newest files located at **!msV8iconf** folder. As you transition to newer projects and older ones are completed, you will see increased use of your **!msV8iconf** folder. Many changes have been made to the newer workspace so ensure you are using then newer files for the newer projects. If unsure of which version you should be using, contact CADD support. In order to take advantage of the new enhancements and continue working with projects developed to date, users need to keep older projects separate from new projects developed for use with InRoads V8i.

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, then 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 V8i 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. After upgrading to the V8i software, users should have a local copy of the customization on their C: or D: drive called **!msV8iconf**. Updates to the configuration are handled with a newer version of the Update Utility tool. 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 worked previously on 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 Upgraded to the new file format. Master files like RWPlan, EnvPlan, UTPlan, Geoplan, etc. will all need to be upgraded. In most cases the recommended workflow will be to upgrade the master files themselves and then re-cut the individual sheets (i.e., 001_RWPlan01) from the upgraded master files.

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\11060\XX\ROW\MSTA) (Figure 3-1).

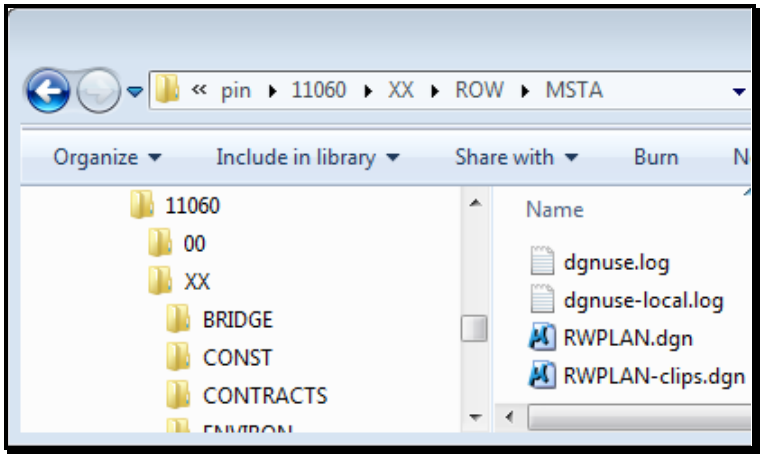


Figure 3-1: Browse to "XX" folder within Windows Explorer.

Step Three: Copy files to Clipboard

Select the files you wish to preserve and migrate to the new directory structure setup for InRoads and **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 V8i* 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 **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 MicroStation V8i

Launch the *MicroStation V8i* 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).

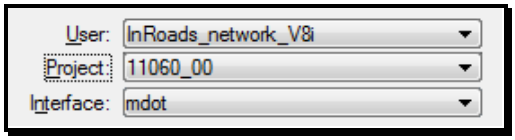


Figure 3-2: Select project from Project pull down.

- This will direct the *File Open* dialog to the new InRoads project directory on the network (i.e., Y:\pin\11060\00\ROW\MSTA\) (Figure 3-3).

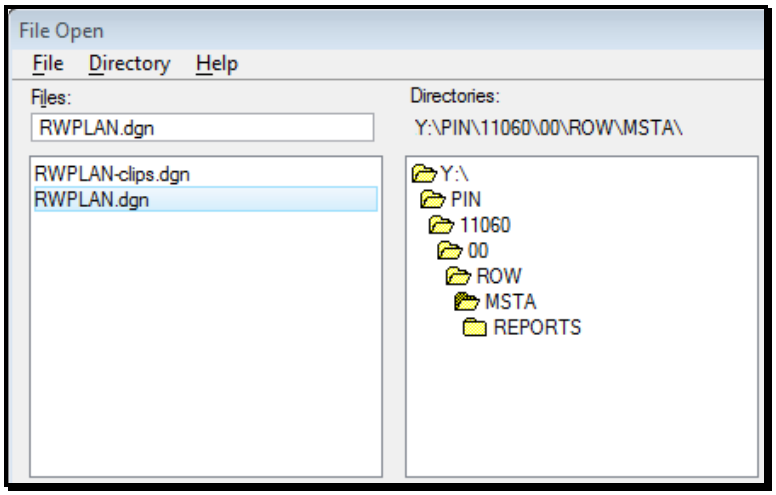


Figure 3-3: Project directory set by project pick.

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.**

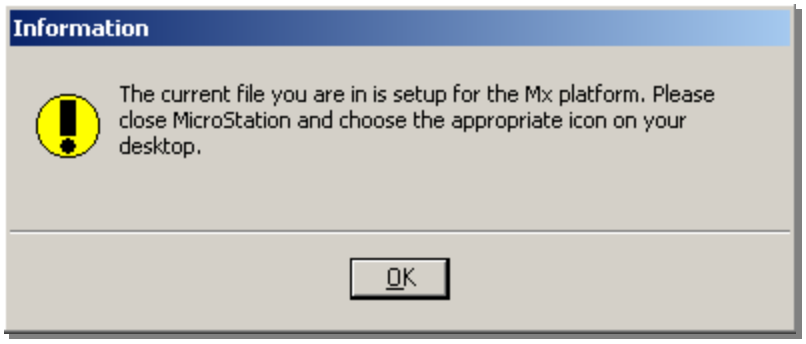


Figure 3-4: Warning message saying that file is setup for MX platform.

Step Eight: Run UOR Fix

Part One: Launch Update UOR and Units Macro

Select **Macros > Update UOR and Units** from the MicroStation menu (Figure 3-5).

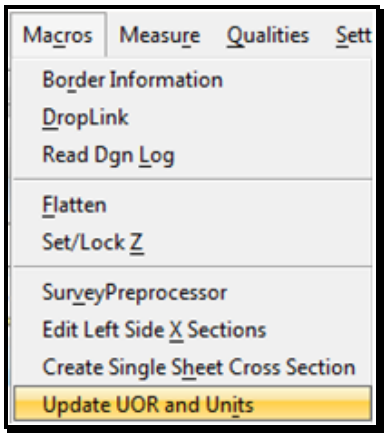


Figure 3-5: Launch UOR fix from MicroStation menu.

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.**

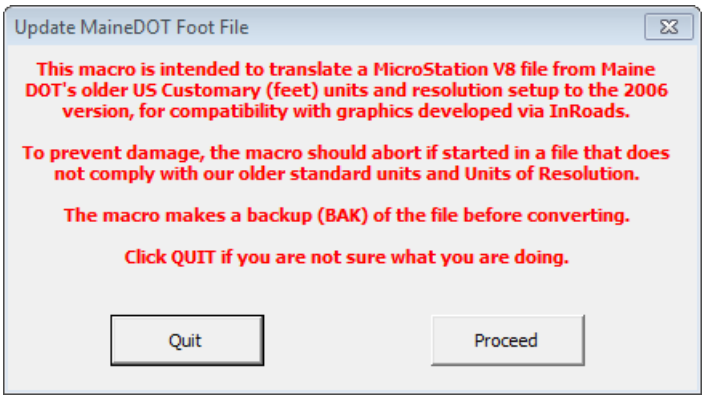


Figure 3-6: Warning message when updating UOR fix.

- 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.**

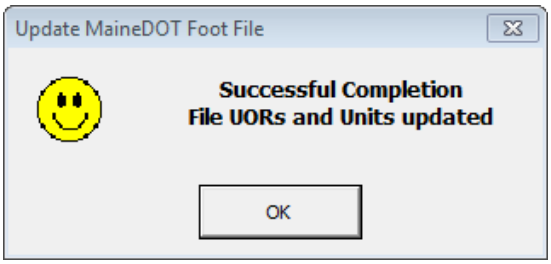


Figure 3-7: Update successful dialog.

- 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. Type **GO=$** into the MicroStation Key-in to get the results of the current global origin location offset from the design center plane in the status bar (Figure 3-8).

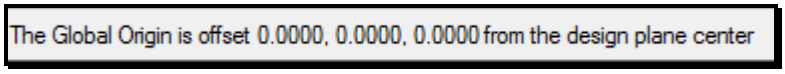


Figure 3-8: Check results of Global Origin.

If it is desired to set the global origin, Type **GO=** to get the Global Origin dialog. Select **Center** mode and enter a data point.

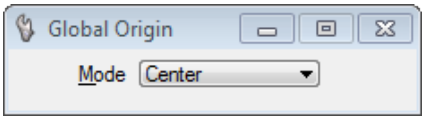


Figure 3-9: Global Origin Center Mode dialog.

Part Four: Fit View

Fit the view using the MicroStation view controls.

Troubleshooting

If you receive an error message, 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 V8i*), a new InRoads icon (*InRoads Suite V8i*) and a new Update Utility (*MDOT Update InRoads MicroStation V8i*) will be copied to a user's *Desktop* to help keep the two configurations and projects separate. Older desktop shortcuts can remain during this time of transition.

- 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 V8i for New InRoads Projects

A **MicroStation V8i** 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_V8i*. Once in the MicroStation session, an *Application* menu item is available to *Activate* InRoads products manually.

Step One: Launch the MDOT Update InRoads MicroStation V8i Utility

Part One:

Locate the **MDOT Update InRoads MicroStation V8i** on your *Desktop*. This will update user's local copy of the configuration from the network. Note, the older workspace would use the original Update Utility icon as it compares to the !msInRoadsconf folder.

ⓘ ***Your project directory contains some of the same files. This utility <u>does not</u> update files within your project***

Part Two:

Let's review the *Options* and decide which are necessary to select at this time (Figure 3-10).

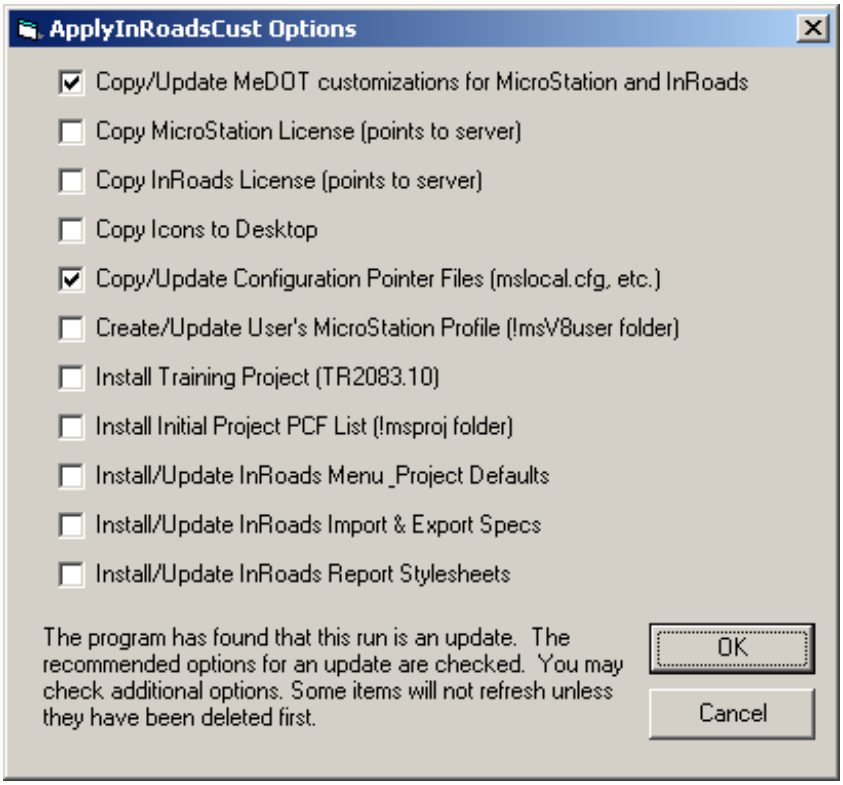


Figure 3-10: MDOT Update InRoads MicroStation V8i Dialog- Options.

Option 1: 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 !msV8iconf folder *(older projects will remain looking to the !msInRoadsconf folder)* for all its customization.

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.

Part Three:

Click **OK** and then click **Next** to begin the process.

Step Two: Refresh Copies in Project Directory

Part One:

Using *Windows Explorer*, browse to the **C:\!msInRoadsconf\standards\InRoadsSTD** folder (Figure 3-11).

Select the **mdot_US_V8i.xin** and the **template_V8i.itl** files. Select **Copy** from *Windows Explorer*.

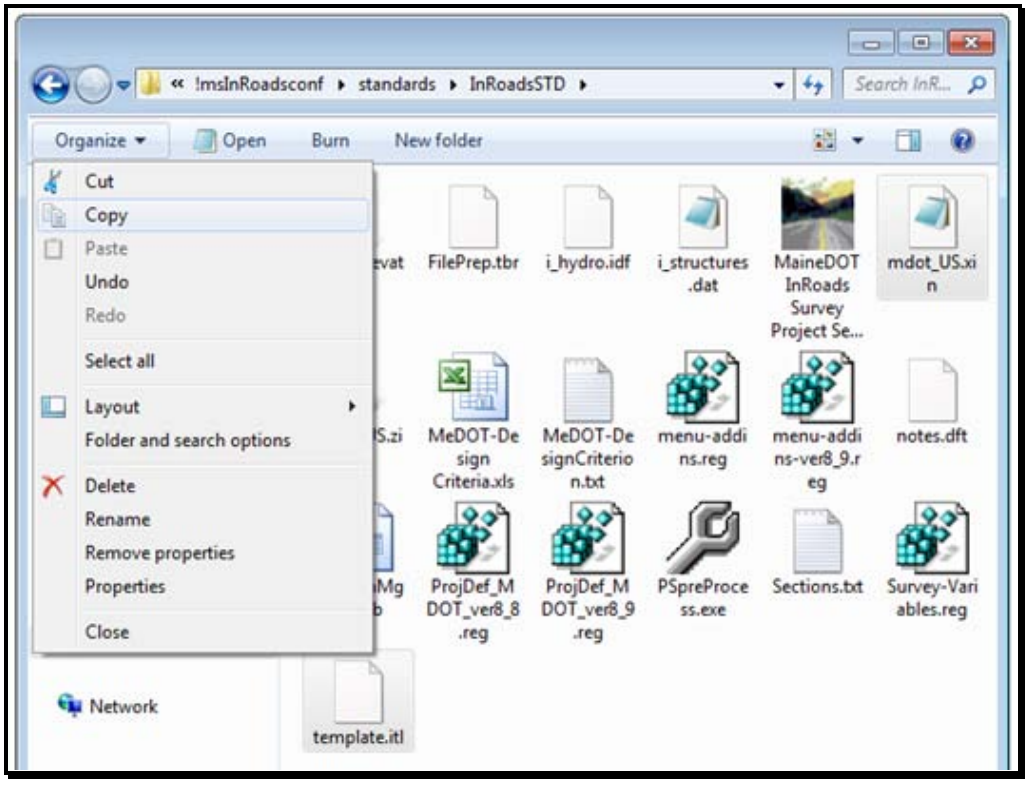


Figure 3-11: C:\!msInRoadsconf\standards\InRoadsSTD Folder.

Part Two:

Using *Windows Explorer*, browse to your **C:\PIN\#####\00\InRoadsSTD** folder (or Y:\PIN\#### for network projects). Select **Paste** from the menu (Figure 3-12). When prompted to overwrite, select yes.

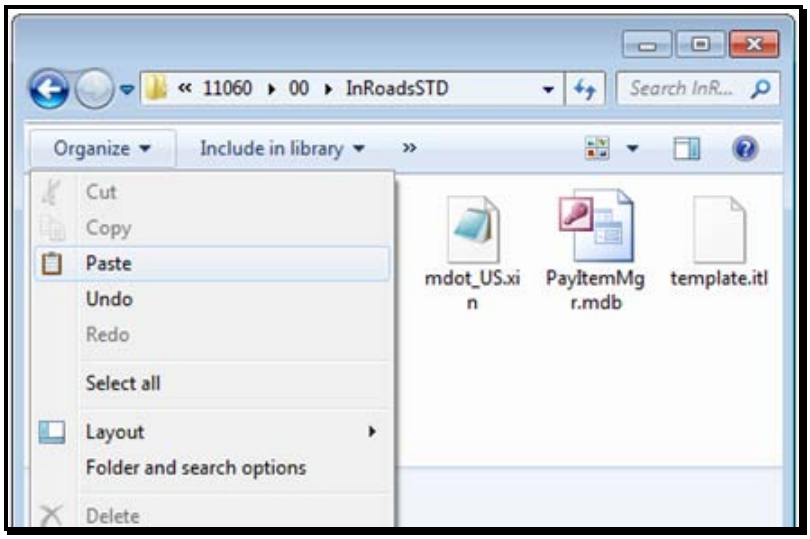


Figure 3-12: Paste InRoads Files into PIN Folder.

Part Three:

Close Windows Explorer.

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 *File Open* 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. Also, this is needed to remain in use and available for the older InRoads projects using InRoads version 8.9. Newer projects will use InRoads version 8.11 software and also take advantage of a newer Update Utility V8i tool, mentioned earlier in this chapter.

STANDARD INROADS PIN STRUCTURE

STANDARD INROADS FOLDER STRUCTURE

Overview

Project PIN creation should be requested through your CADD support staff. This will assure 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.

Step One: Open Windows Explorer

Open *Windows Explorer* (Windows +E) and browse to the **C: or Y:\PIN\#####\00** folder (Figure 3-13). Multiple workgroups may be working on a project. The folders and the files within these folders are the deliverables given to the design staff at the start of an InRoads project.

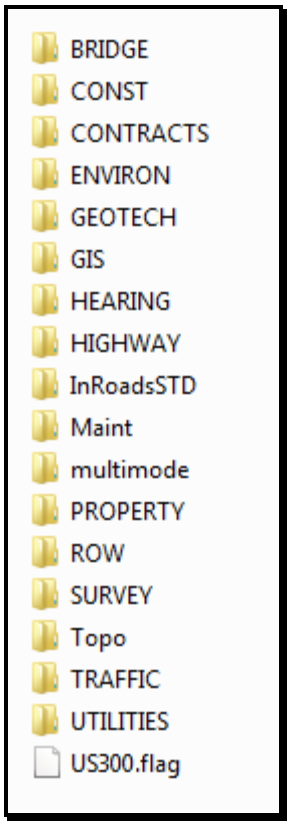


Figure 3-13: Pin Workgroup Folders.

Review the Contents of the Highway, Survey, and Topo Folder

Step Two: Review the InRoadsSTD Folder

Open the **InRoadsSTD** folder (Figure 3-14).

Figure 3-14: InRoadsSTD Folder Contents.

A set of default InRoads files are copied to the InRoadsSTD folder for every InRoads PIN on the Y: drive. These files have been modified in accordance with MaineDOT standards. As CADD Support develops additional functionality, some of these files may become "out-of-date". Two files specifically (template_V8i.itl and mdot_US_V8i.xin) live in a state of constant development, and will be updated periodically.

A local copy of the InRoads V8i standards files are copied to a folder (C:\!msV8iconf\standards\InRoadsSTD) on your hard drive that contains both the MicroStation V8i and the InRoads V8i configuration files. The user can manually refresh these files by running the *MDOT Update InRoads MicroStation V8i* desktop icon. This does not update the files within your project directory! 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 lose 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 *File Open* dialog (Figure 3-15).

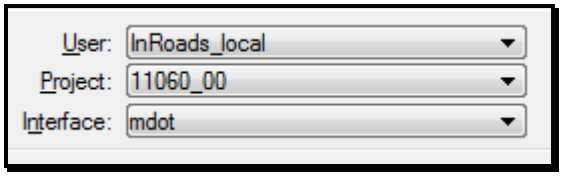


Figure 3-15: The Project pull down lists the available PCF files.

- 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_V8i)* is for network projects and the other *(InRoads_local_V8i)* 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_V8i.ucf* file to open it. If the ".ucf" file is not opened directly, Windows may not recognize this file extension and ask you to Select a program to open the file with. If prompted, use **Notepad** (Figure 3-16) Place a checkmark in the box to **Always use the selected program to open this kind of file.** Click **OK.**

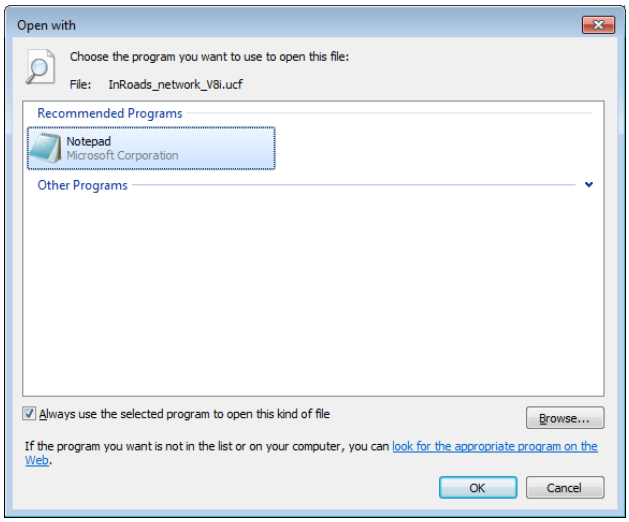


Figure 3-16: Select Notepad as the preferred program to open this file.

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 **CAPITAL** letters and there may be a space between the "=" and the value as in the examples provided in the file (Figure 3-17). 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 3-17: User Configuration File - WKGROUP

If you need to work locally in the new workgroup, then you should open the **InRoads_local_V8i.ucf** and change that WKGROUP variable also.

Step Three: Assign User's Menu Availability (If necessary)

The Assign Users Menu Availability can be adjusted to make menus available from different work groups. The valid groups are shown in (Figure 3-18). The groups must be all CAPTAL letters and there may be a space before or after the "=".

```
#-------------- Assign user's Menu Availability --------------------#
#-- Valid Groups are BRIDGE,BRMAINT,CONST,ENVIRON,GEOTECH, --#
#-- HEARING,HIGHWAY,ROW,SURVEY,TRAFFIC,UTILITIES ------------#

HIGHWAY=Menu On
```

Figure 3-18: User Configuration File – Menu On

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_V8i.ucf* and *InRoads_local_V8i.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_V8i.ucf* and *InRoads_local_V8i.ucf*. Select **Copy** from the Windows Explorer menu. Select **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_V8i.ucf* and *InRoads_ROWlocal_V8i.ucf*.)

Step Two: Adjust Workgroup

Adjust the workgroup to provide quick access to that workgroup folder on the network or locally.

- ✓ ***Refer to page 3-19 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.**

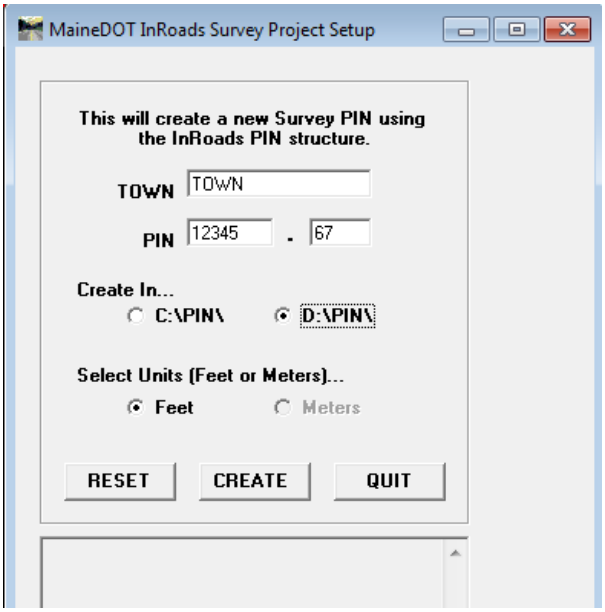


Figure 4-2: Survey Project Setup dialog.

- 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.**

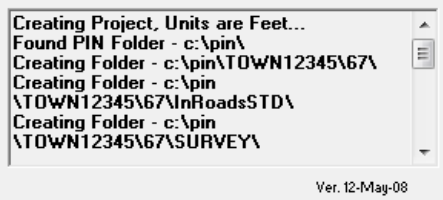


Figure 4-3: Survey Project Setup dialog's Output Window

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).

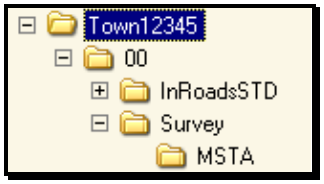


Figure 4-4: Folder Structure in Windows Explorer

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 MicroStation

Launch **MicroStation V8i** from your desktop icon. The first dialog to open is the *File Open.*

Step Four: Change User

In the *Workspace* area of the dialog, select the pull down next to the *User* field and select **InRoads_local_V8i.** This will direct MicroStation/InRoads to a local copy of the project directory (Figure 4-5).

- ✓ ***Refer to page 3-19 for more information on User Configuration files.***

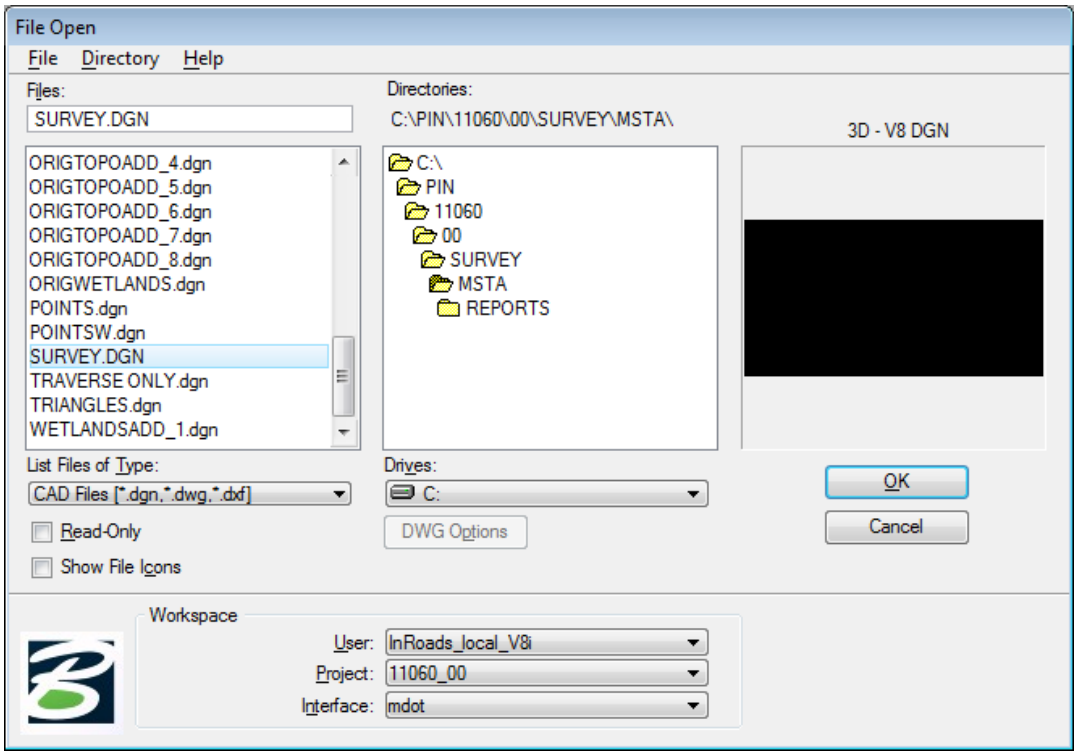


Figure 4-5: File Open dialog when working locally.

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.**

Step Seven: Launch InRoads

Select **Applications > InRoads Group > Activate InRoads Survey** from the *Main Menus*.

- 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 Your 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_V8i.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 3-19 for more information on User Configuration files.***

Step One: Launch MicroStation

Launch **MicroStation V8i** from your desktop icon. The first dialog to open is the *File Open.*. The *File Open* dialog will open (Figure 4-6). In the *Workspace* portion of the dialog, the *User* is defaulted to *InRoads_network_V8i* and the directories will be pointing to the network (y: drive) for project PINs.

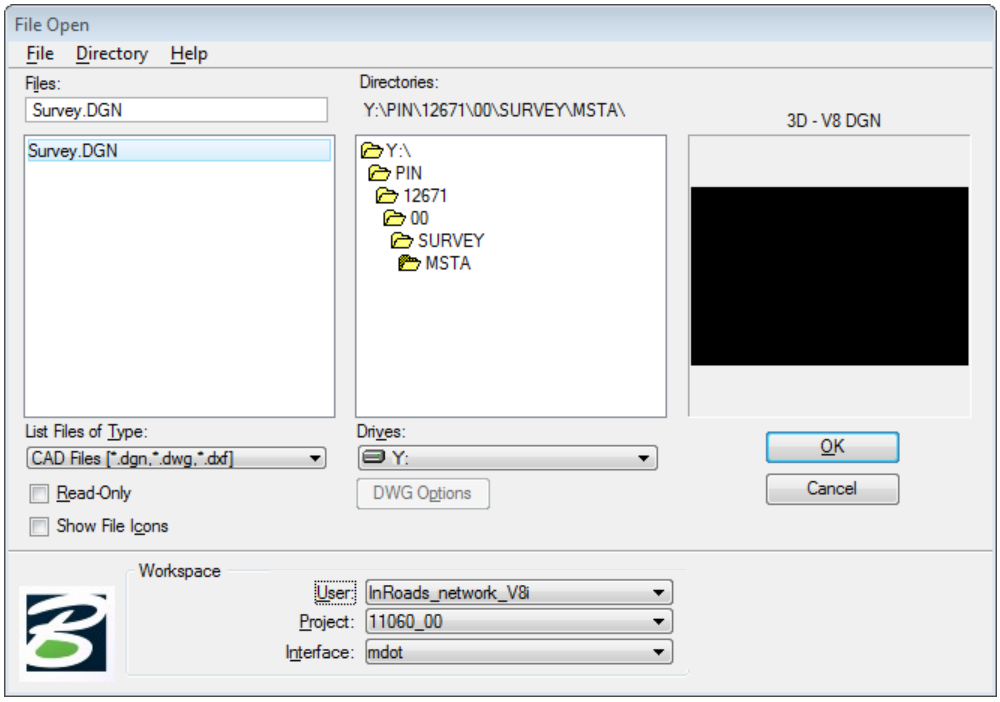


Figure 4-6: File Open dialog when working on the network.

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.**

Step Four: Launch InRoads

Select **Applications > InRoads Group > Activate InRoads Survey** from the *Main Menus*.

- ♫ 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 Your RWK.***

Chapter 5 Survey Editing Procedures

OVERVIEW

See the MaineDOT Survey group for “InRoads Survey Editing Procedures” documentation.

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 the MDOT Standard File Naming Convention at:

www.maine.gov/mdot/caddsupport/msinroads/inroadsnaming.htm

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 13-6 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.

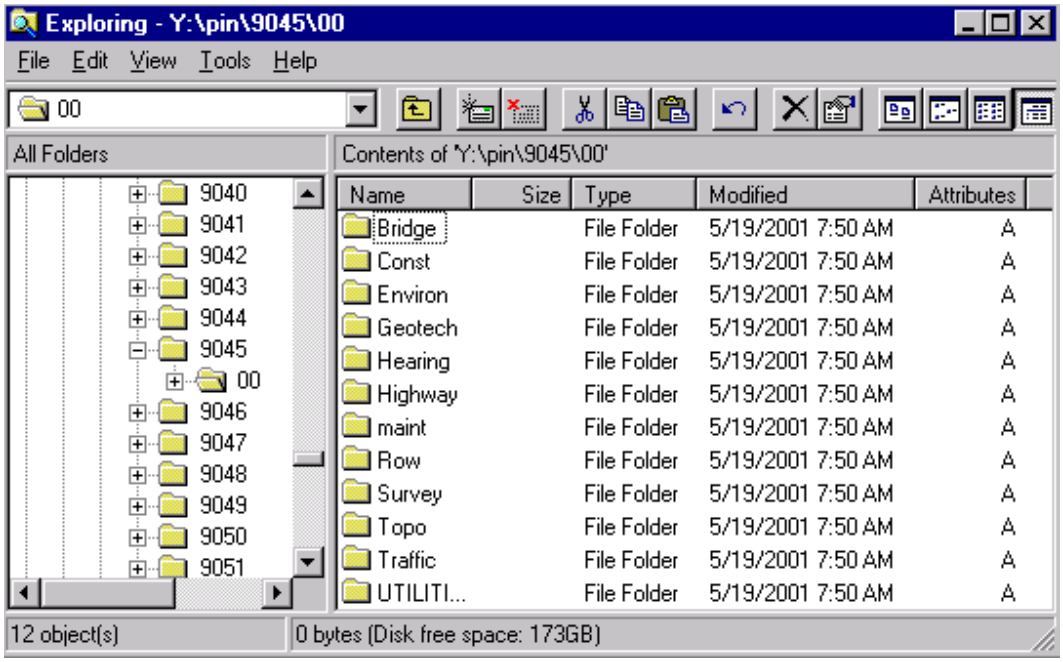


Figure 6-1: Browse with Windows Explorer

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.

Part Three: Copy

From the Main Menu, select **Edit > Copy** (Figure 6-2)**.**

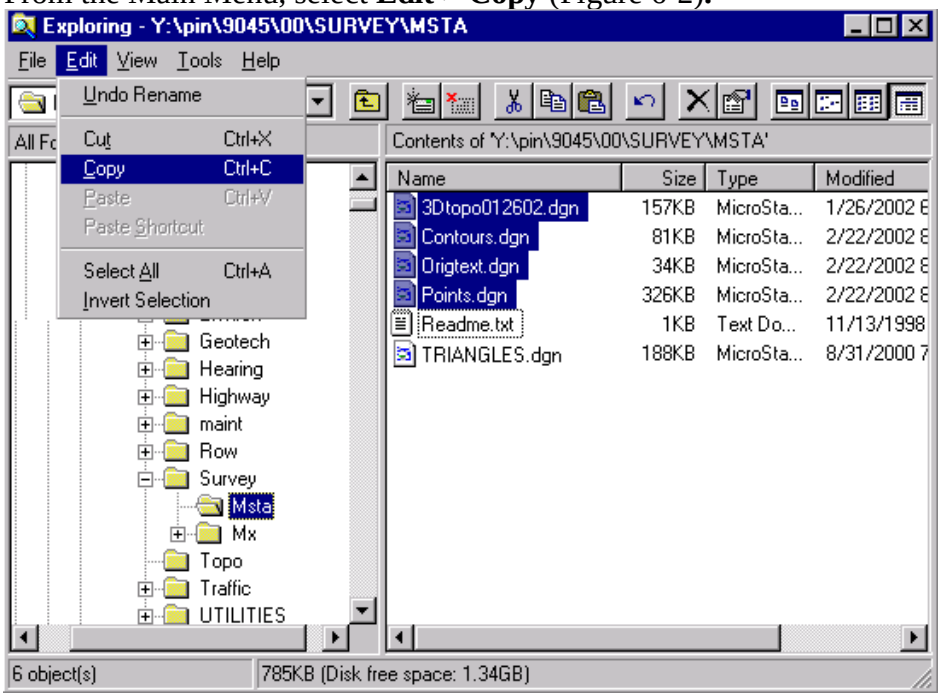


Figure 6-2: Select and Copy files from Survey\MSTA folder

Part Four: Paste

Click on the **Topo** folder. From the Main Menu select **Edit > Paste** (Figure 6-3)**.**

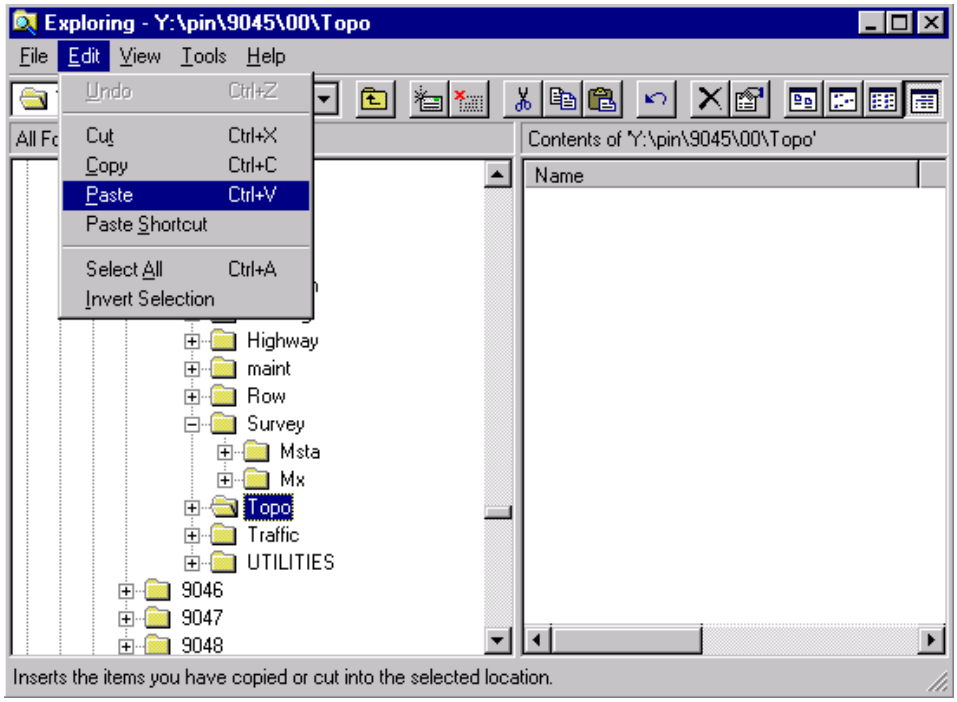


Figure 6-3: Paste files from Survey\MSTA folder to Topo folder

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 **File > Rename.** Begin typing the new name, which is **Text.dgn.** Hit Enter to accept this name.

Select **3DmappingMMDDYY.dgn.** From the Main Menu select **File > 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 V8i" icon on your desktop. When the *File Open* 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.

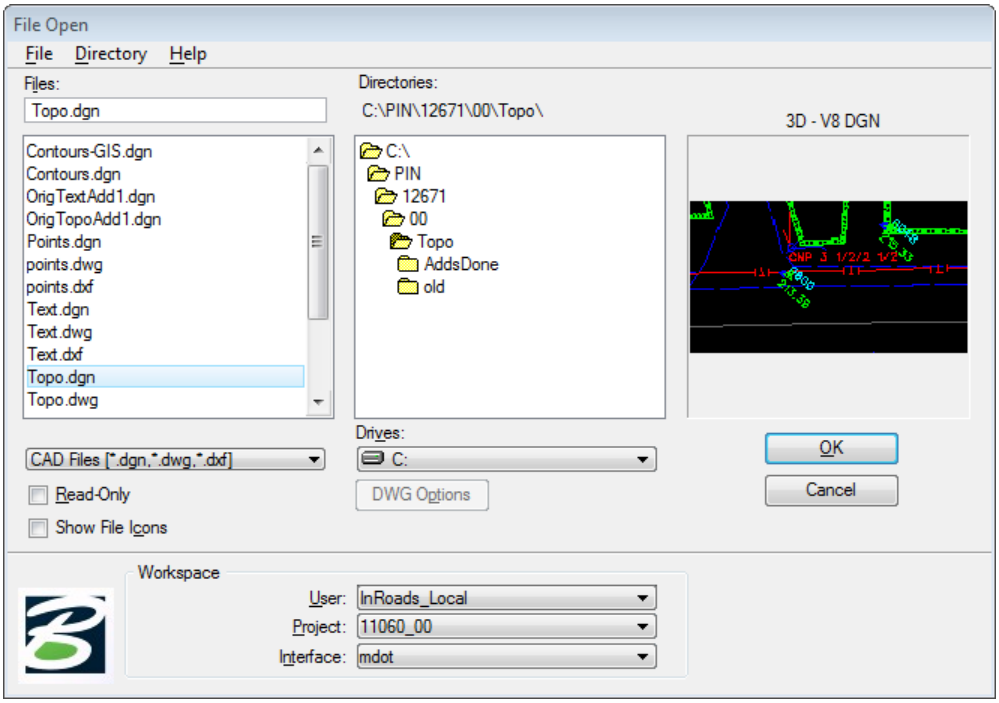


Figure 6-4: Select the topo.dgn and click OK

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. Disable the Line Weights options. 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…**

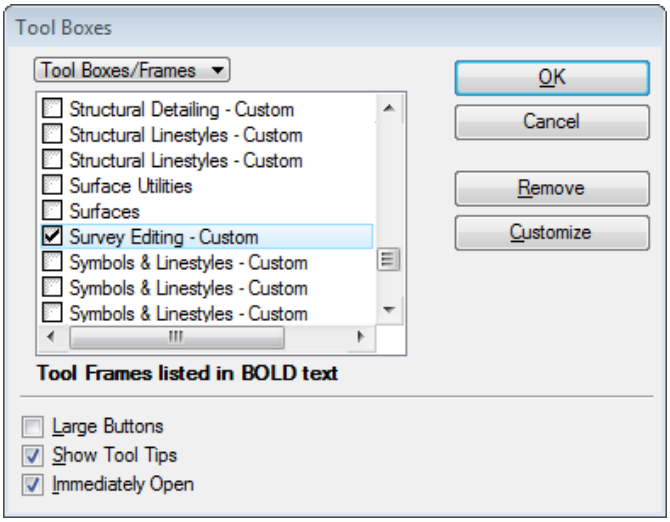


Figure 6-5: Tool Boxes dialog

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.

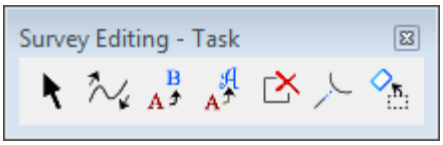


Figure 6-6: Survey Editing Toolbox

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 Tasks.)

 **Change Curve Direction Tool:** Use this to reverse a custom line style direction. (i.e., Trees and Bushes). (Also located in the *Modify* Tool Tasks.)

 **Edit Text:** Says it all. (Also located in the *Text* Tool Tasks.)

 **Change Text Attributes:** Used to change the text to the MAINEDOT standard height and width. (Also located in the *Text* Tool Tasks.)

 **Partial Delete:** Used to delete part of an element. (Also located in the *Modify* Tool Tasks.)

 **Extend Element to Intersection:** Used to extend an element. (Also located in the *Modify* Tool Tasks.)

 **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 Tasks)

ⓘ ***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).

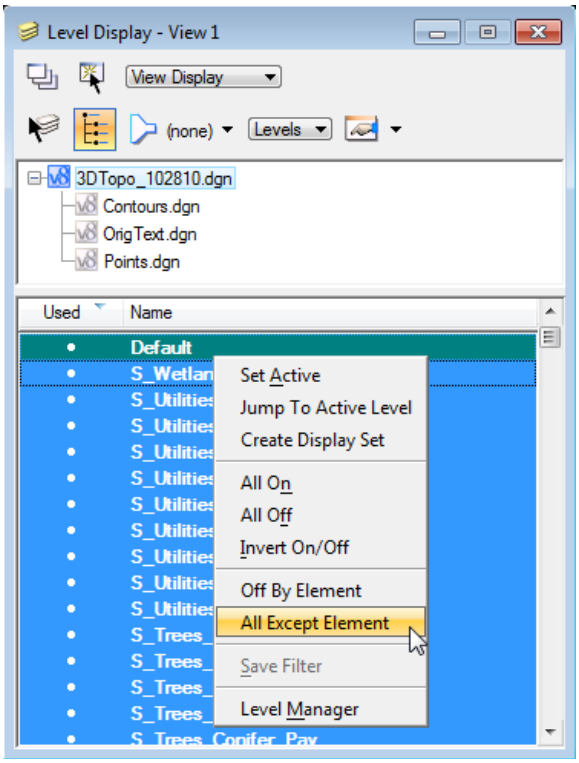


Figure 6-7: Right Click and Select All Except Element

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 > ACS Plane** 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.

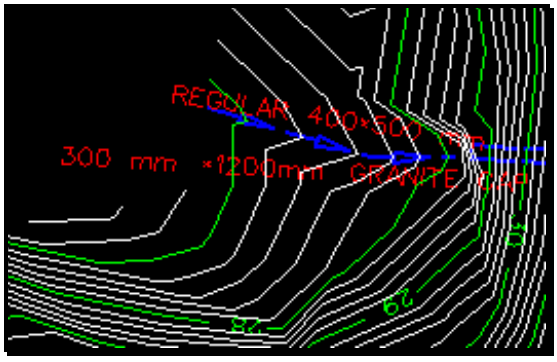


Figure 6-9: Example of ditch arrow in wrong direction

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 Change Curve 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.

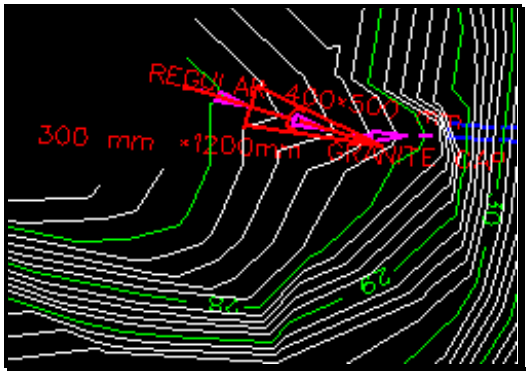


Figure 6-10: Reverse Direction tool in action

Part Five: Accept or Reject

Click the arrowhead to change the direction of the arrowhead. Then, click again anywhere in the view window with a left mouse button to *Accept* or a right mouse button to *Reject*.

(Figure 6-11).

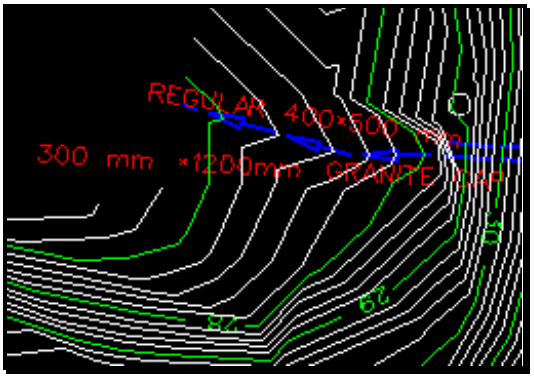


Figure 6-11: Change Curve Direction results

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).

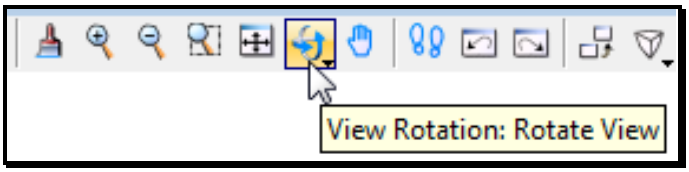


Figure 6-12: Rotate View Tool

- 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. To lock your "Z", from the Main Menu, select Settings > Locks > ACS Plane Snap. Key-in az=0 in the Key-in dialog and press Enter. Click in the CAD View. 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).

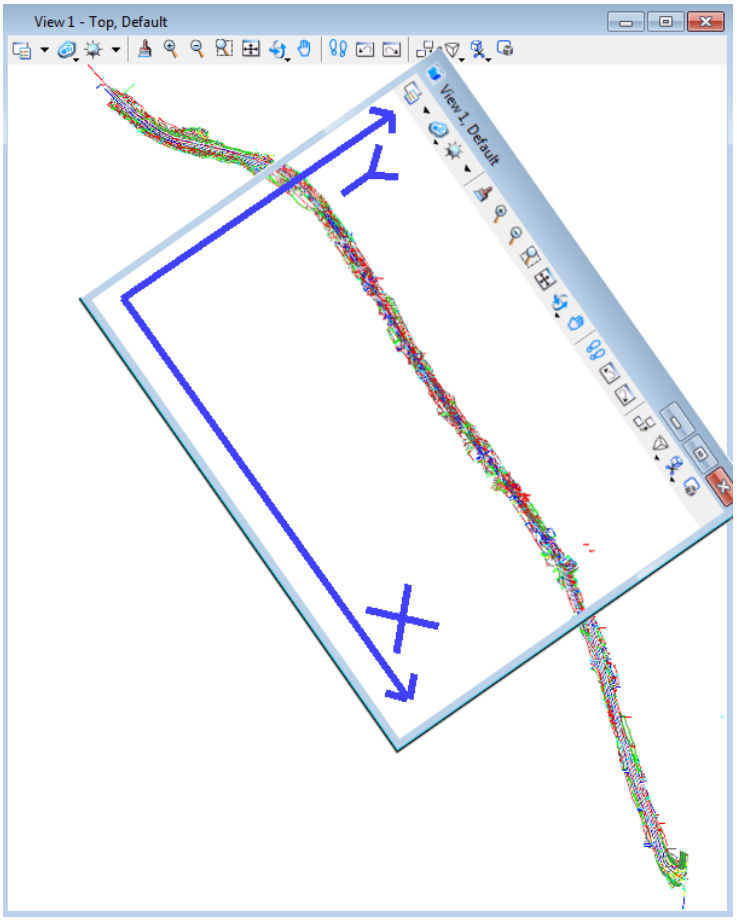


Figure 6-13: Rotating Your View

Graphic Group Unlock

Disable Graphic Groups by selecting **Settings > Locks > Graphic Group** 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: Change Curve Direction

There are many other directional elements (like ditches) that may require reversing in the **Topo.dgn.** Use the **Change Curve Direction 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 Curve Direction Tool and reverse the string(s) (may have more than one segment to reverse).

Part One: Click the Change Curve 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 the arrowhead to change the direction of the arrowhead. Then, click again 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 line style. This line style 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.**

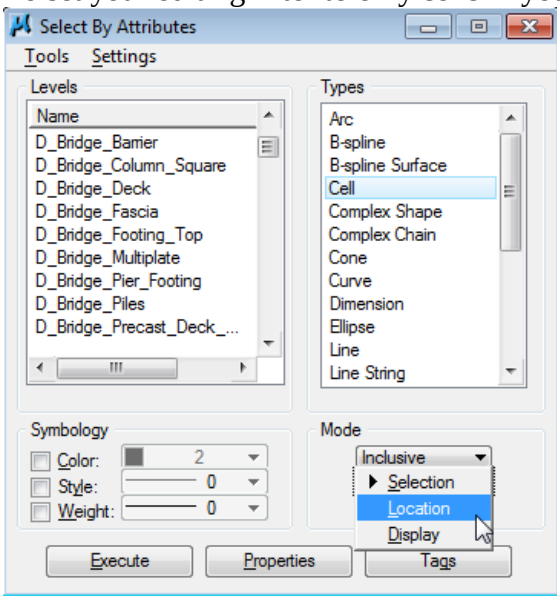


Figure 6-14: Select By Attributes set to locate cells only

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 only 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.

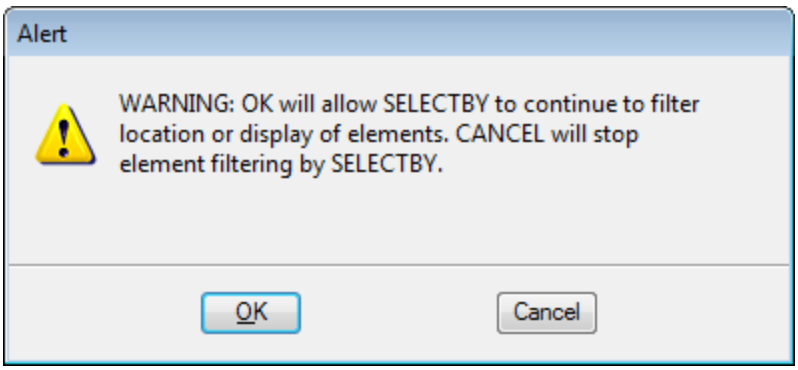


Figure 6-15: Select By Attributes Alert Message

Using the Element Selection - The Element Selection command 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).

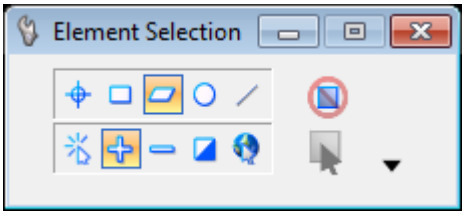


Figure 6-16: Element Selector set to shape

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 *Element Selection* dialog) and place a shape around the new set of cells.

✓ ***Refer to page 2-29 for more information on the Element Selection tool.***

Click the **Rotate** tool from the Survey Editing tool box or the Main tool tasks (Figure 6-17). Place a checkmark in the *About Element Center* box (Figure 6-18) of the dialog box.

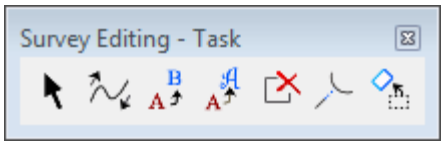


Figure 6-17: Rotate Element Button

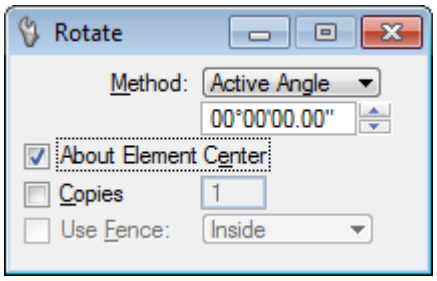


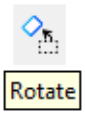
Figure 6-18: Rotate Element's About Element Center box

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 Editing tool box or *Task Menus*. In the Tools Setting box, 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 only 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 Cleanlog.txt 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.

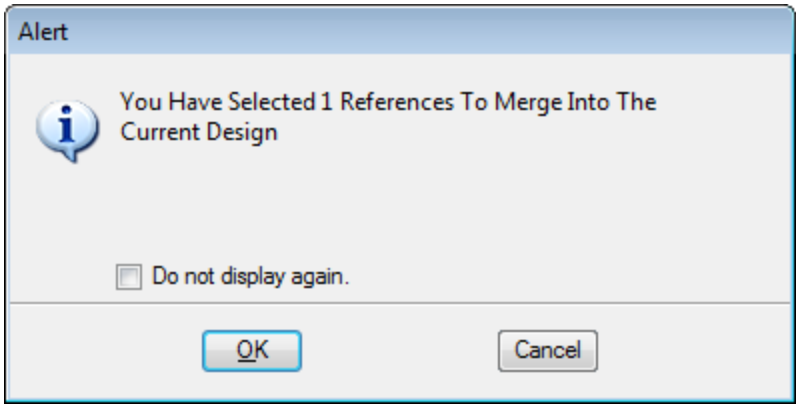


Figure 6-19: Merging Reference File Alert

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 V8i" icon on your desktop. When the *File Open* 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.

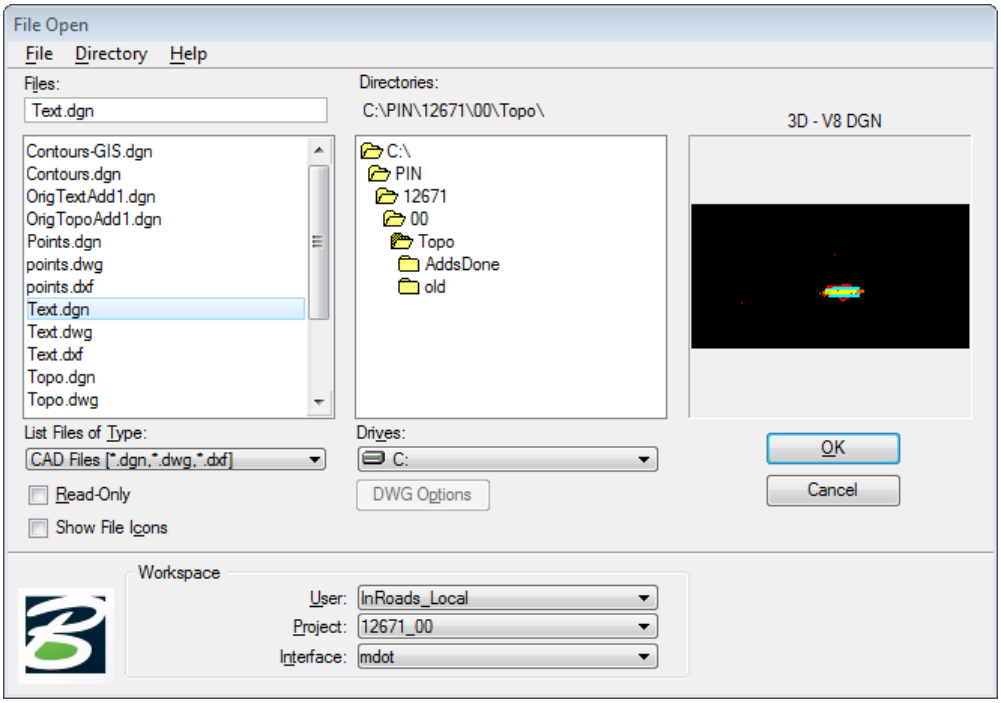


Figure 6-20: Select Text in the File Open Dialog

You should see multiple drawings on the left. Select **Text.dgn** and click **OK** (Figure 6-20).

Once the file is open, click *Fit View*  from *Window 1's* view control toolbar. Close *Window 2, Window 3 and Window 4* 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 Element Section Tool - The Element Selection tool 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).

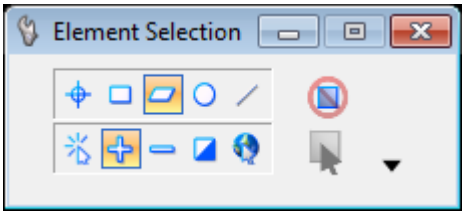


Figure 6-21: Element Selection set to shape

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 Editing tool box or the *Task Menus* (Figure 6-22). In the Tools Setting dialog, place a checkmark in the *About Element Center* box of the dialog box (Figure 6-23).

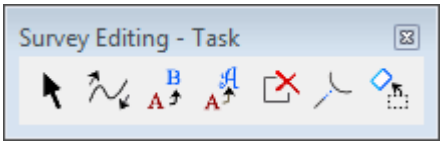


Figure 6-22: Rotate Element tool

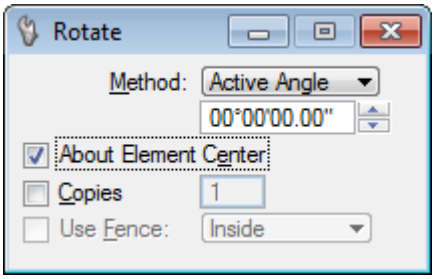


Figure 6-23: Rotate Element's About Element Center box

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.)

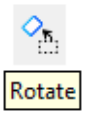
2 Points method: Click on the screen and you are dynamically rotating the text blocks around their origins. Move your cursor around the *AccuDraw's* compass until the majority is rotated correctly. Click to *Accept* this rotation. Right Click to stop rotating.

- To create new selection sets, hit your "spacebar" to clear the current selection set (while focus is in *Element Selection* dialog) and place a shape around the new set of text blocks.

✓ ***Refer to page 2-29 for more information on the Element Selection 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 Editing tool box or *Tasks Menus*. In the Tools Setting dialog, 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

From the *Tasks Menus*, select your **Workgroup > Plan > Prop. Text and Dims > Arrow Lines** command.

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.

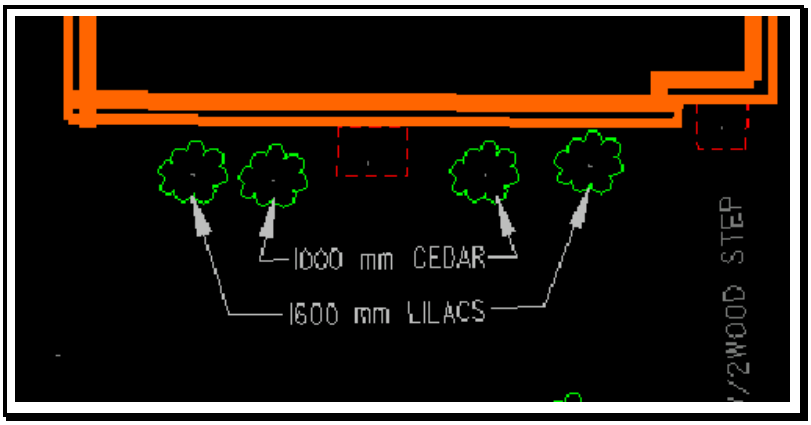


Figure 6-24: Example of annotating with arrows

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 Cleanlog.txt 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., **topoadd_1.dgn** and **textadd_1.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 not 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 Overrides (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 Overrides

From the Main Menu, select **Settings > View Attributes (Ctrl + B).**

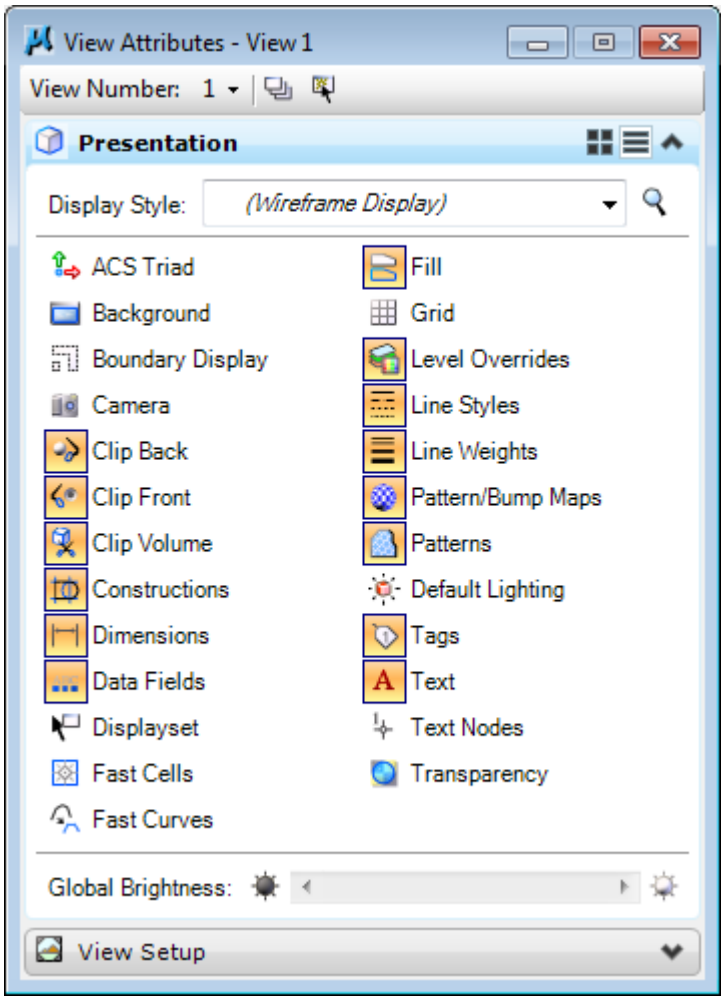


Figure 6-25: View Attributes using Level Overrides

Enable the *Level Overrides option* (Figure 6-25).

Part Three: Assign Colors to the Active Design File (i.e., Topo)

Open the **Settings > Level > Manager** dialog from the *Main Menu*.

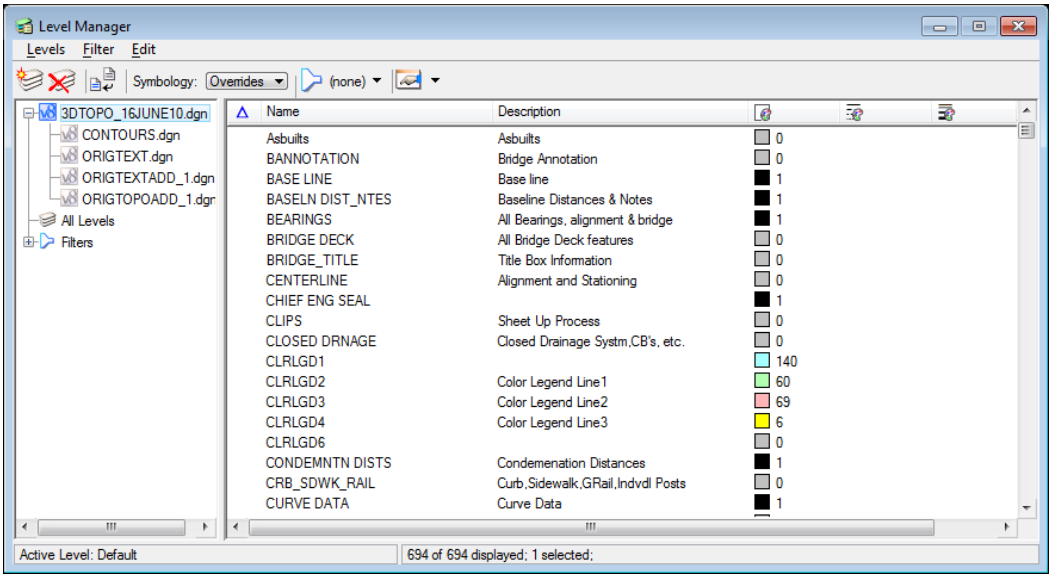


Figure 6-26: Level Manager Dialog

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).

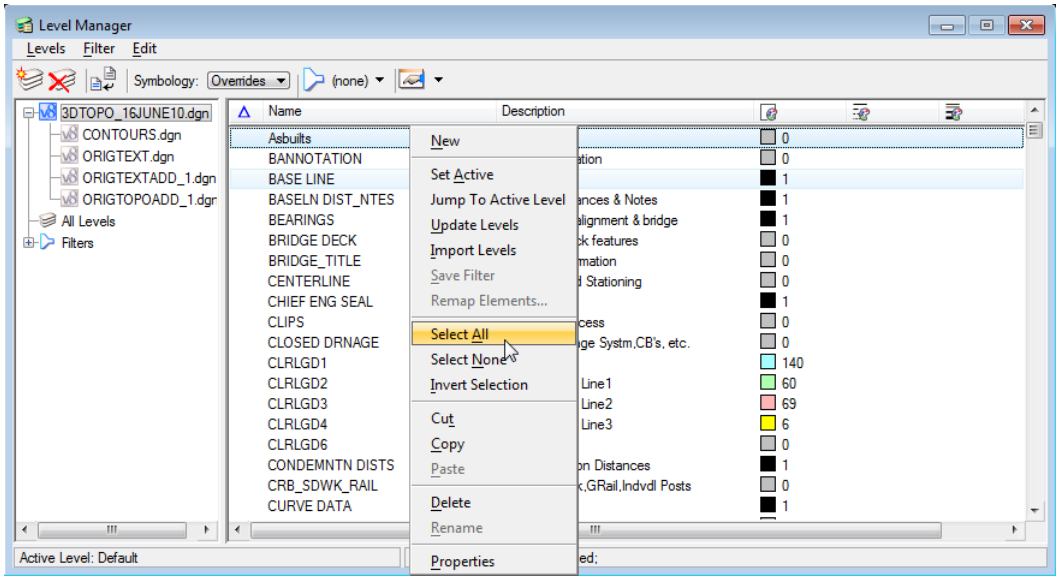


Figure 6-27: Right Click and select Select All

Right-Click again and select *Properties (*Figure 6-28*).*

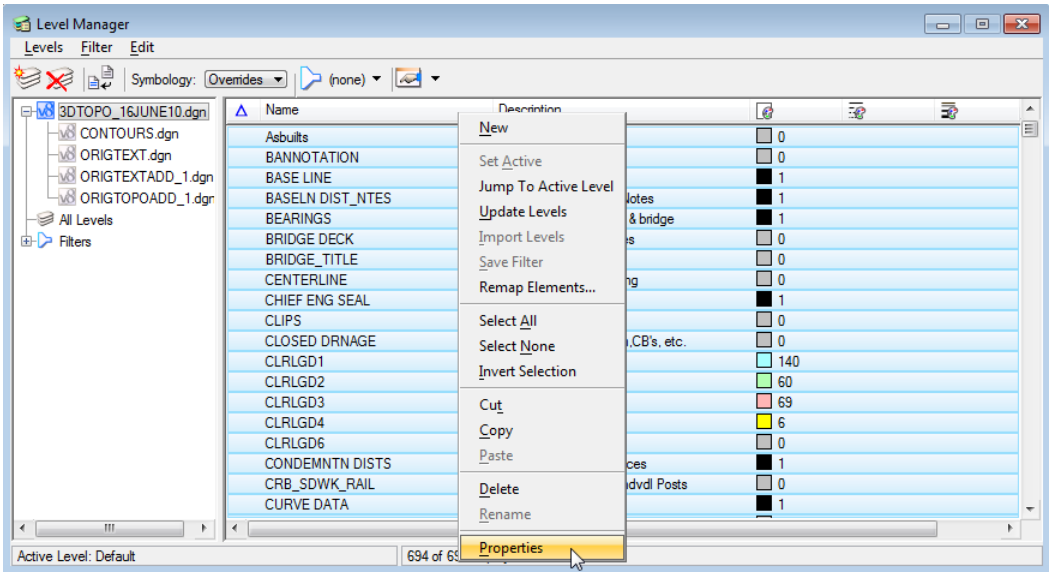


Figure 6-28: Right Click and select Properties

In the *Level Properties* dialog, adjust the *Symbology Overrides* to look like the dialog in Figure 6-29. (Ignore the *Symbology: ByLevel* area.) Hit *OK*.

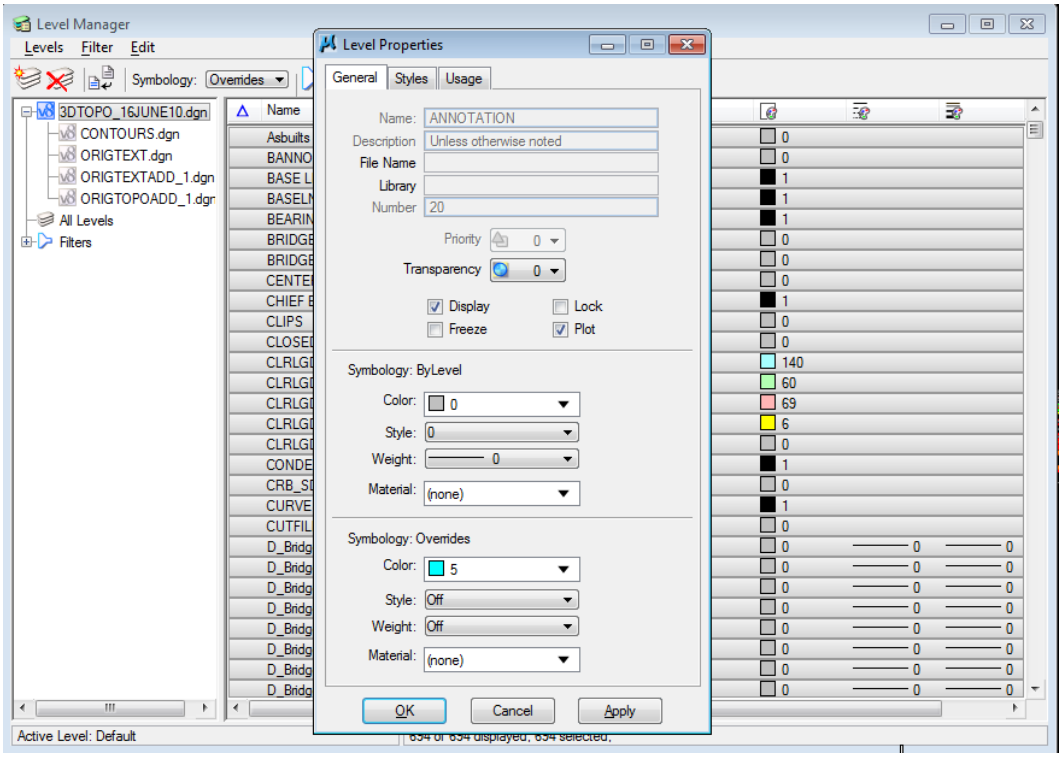


Figure 6-29: Symbology Overrides section of Level Properties

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#

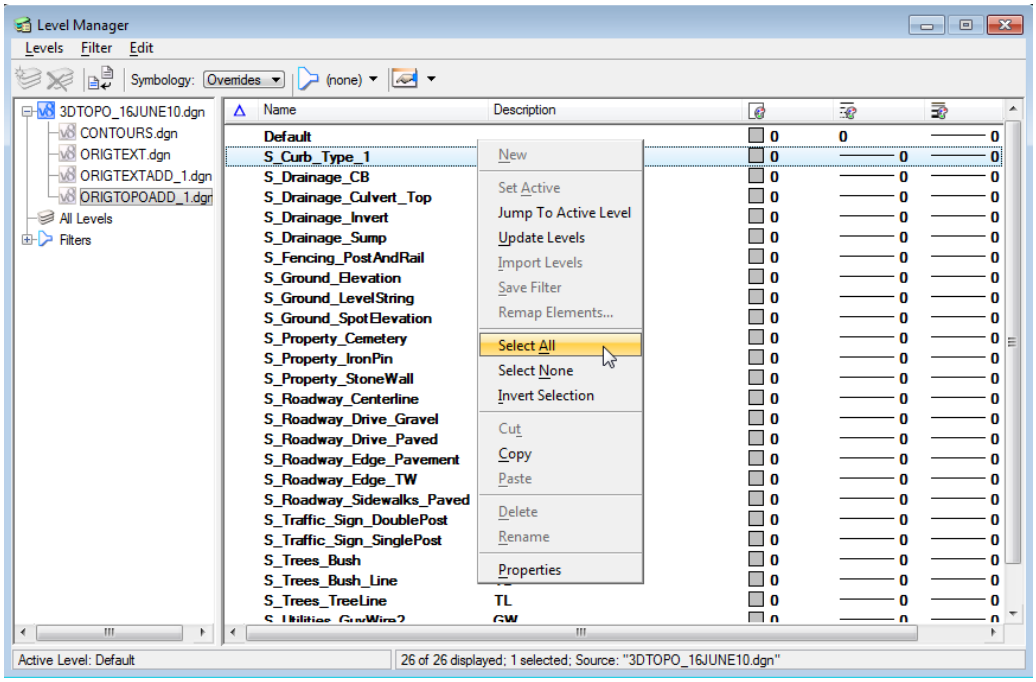


Figure 6-30: Right Click and pick Select All

In the leftmost window, click to highlight *Topoadd_1.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: ByLevel* area.) Hit *OK.*

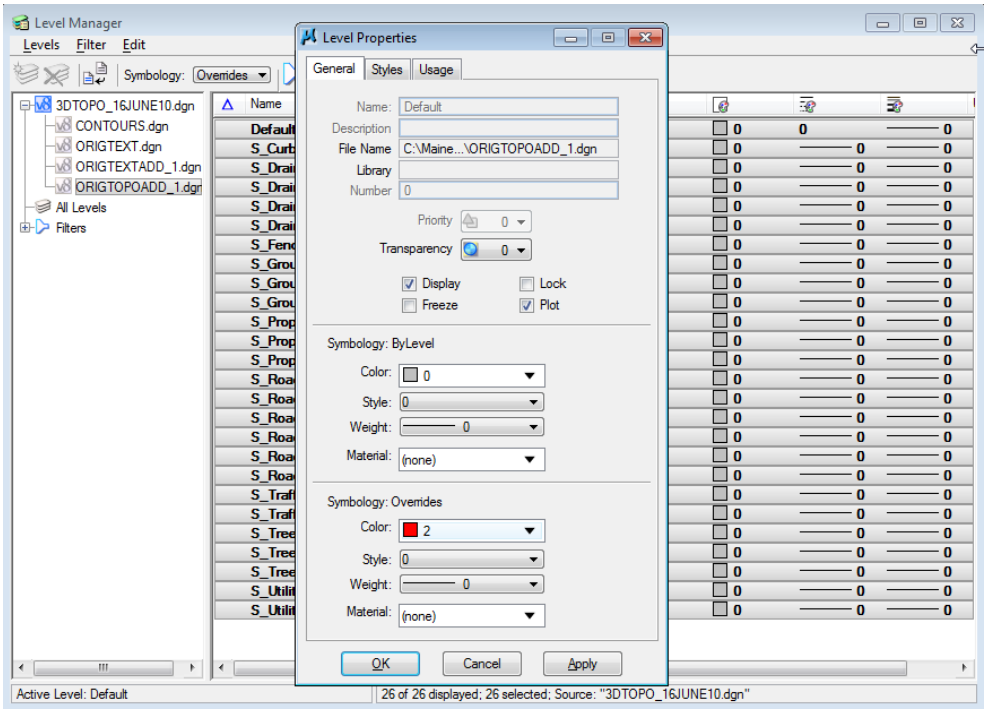


Figure 6-31: Symbology Overrides section of Level Properties

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 **Topoadd_1.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.

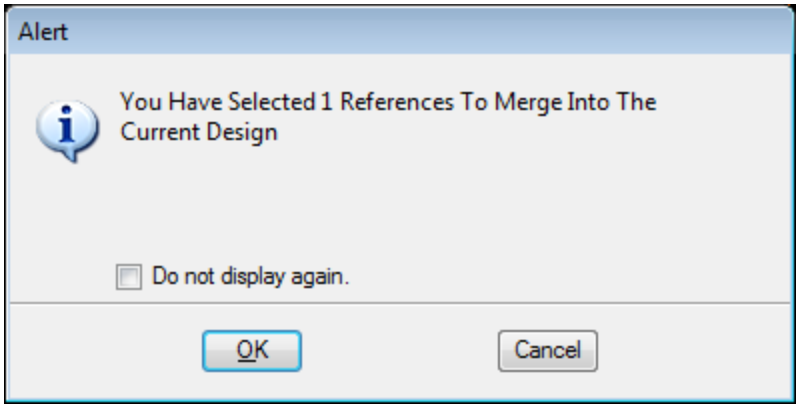


Figure 6-32: Merging Reference File Alert

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 disable the *Level Symbology* option. Close the View Attributes dialog.

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.

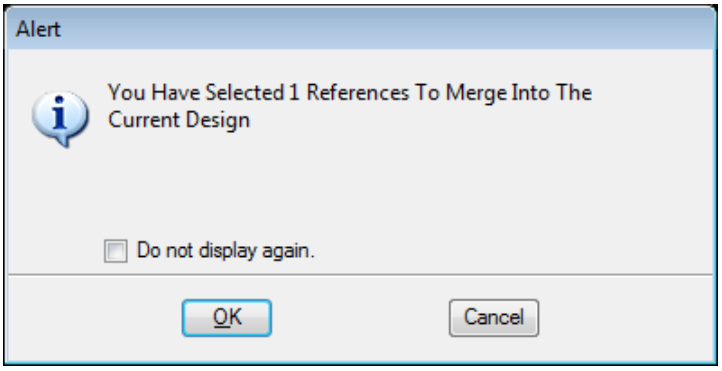


Figure 6-33: Merging Reference File Alert

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 disable the *Level Symbology* option. Close the View Attributes dialog.

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 the MDOT Standard File Naming Convention at:

www.maine.gov/mdot/caddsupport/msinroads/inroadsnaming.htm

.

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.

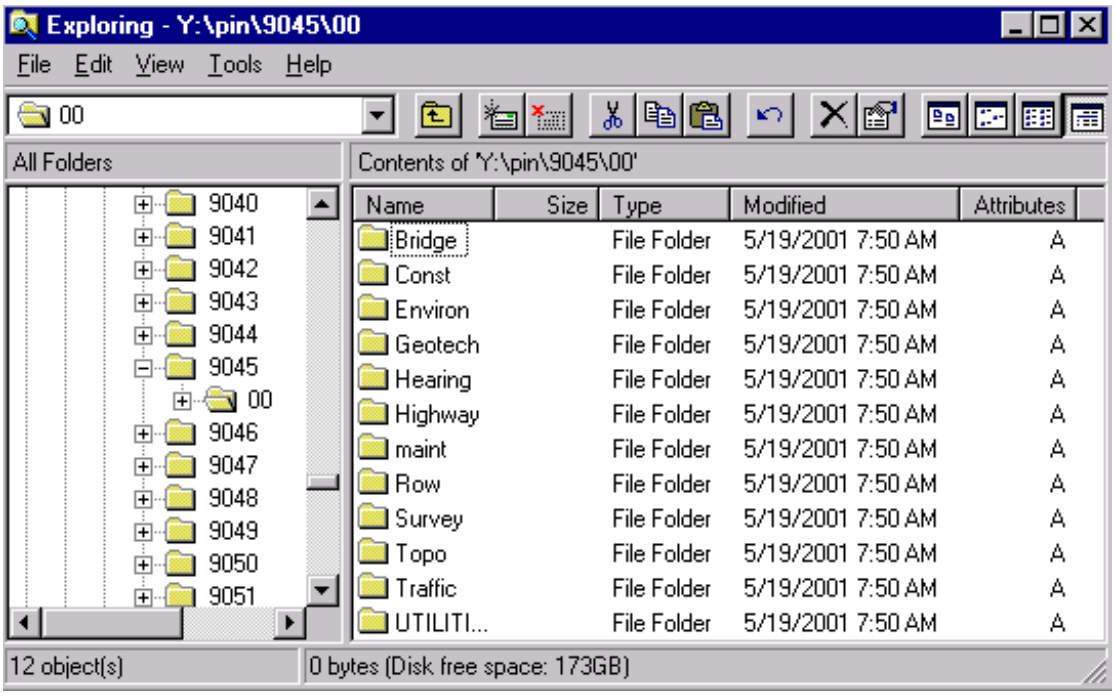


Figure 6-34: Browse to your PIN's topo folder

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., wetlandsadd_1.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)**.**

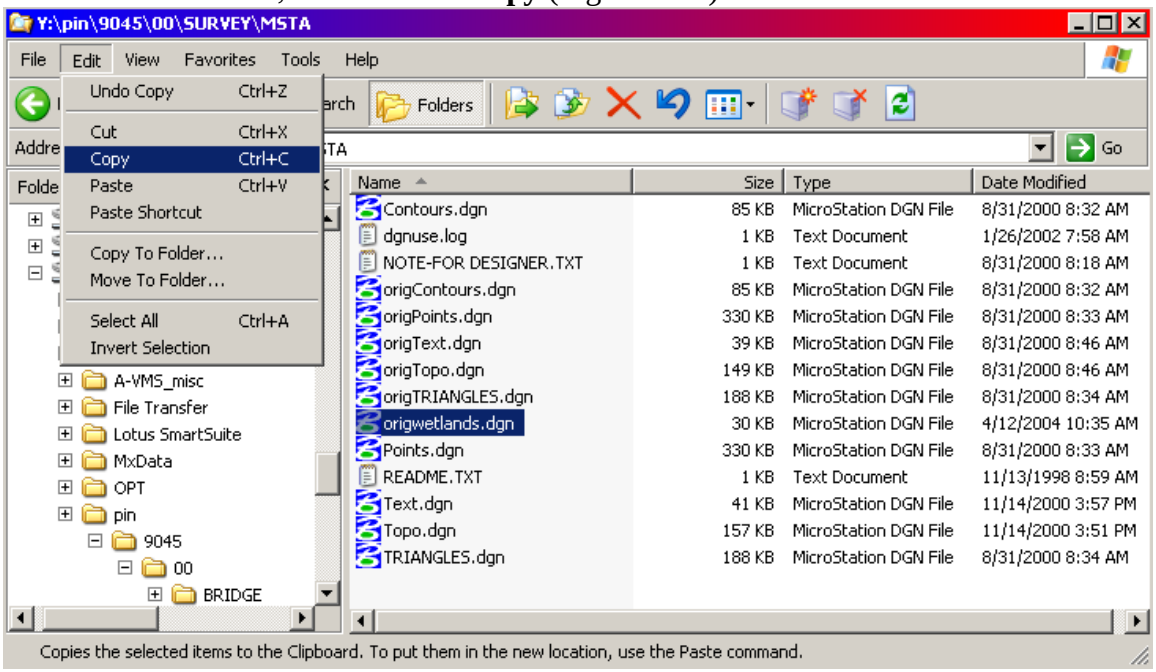


Figure 6-35: Copy OrigWetlands.dgn from the Survey\MSTA folder

Part Four: Paste

Click on the **Topo** folder. From the Main Menu select **Edit > Paste** (Figure 6-36)**.**

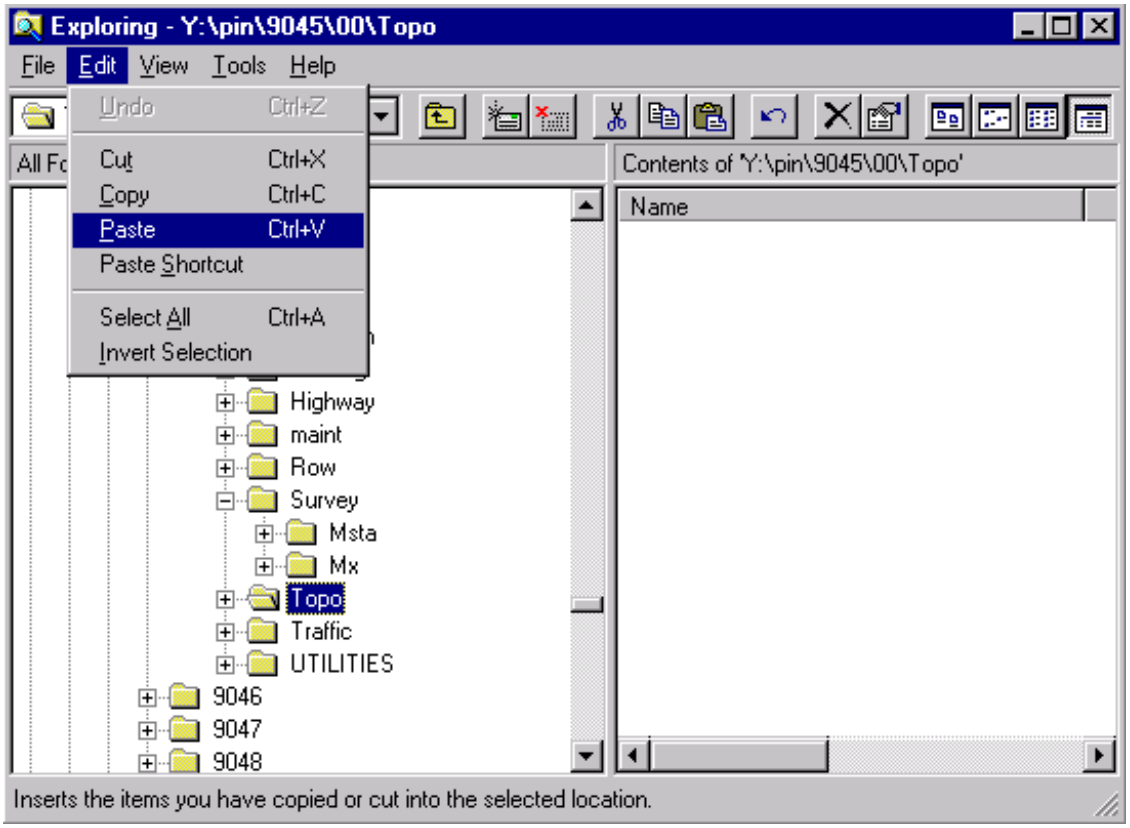


Figure 6-36: Paste OrigWetlands.dgn into the Topo folder

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 V8i" Icon on your desktop. When the *File Open* 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\11060**"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_V8i.** 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.

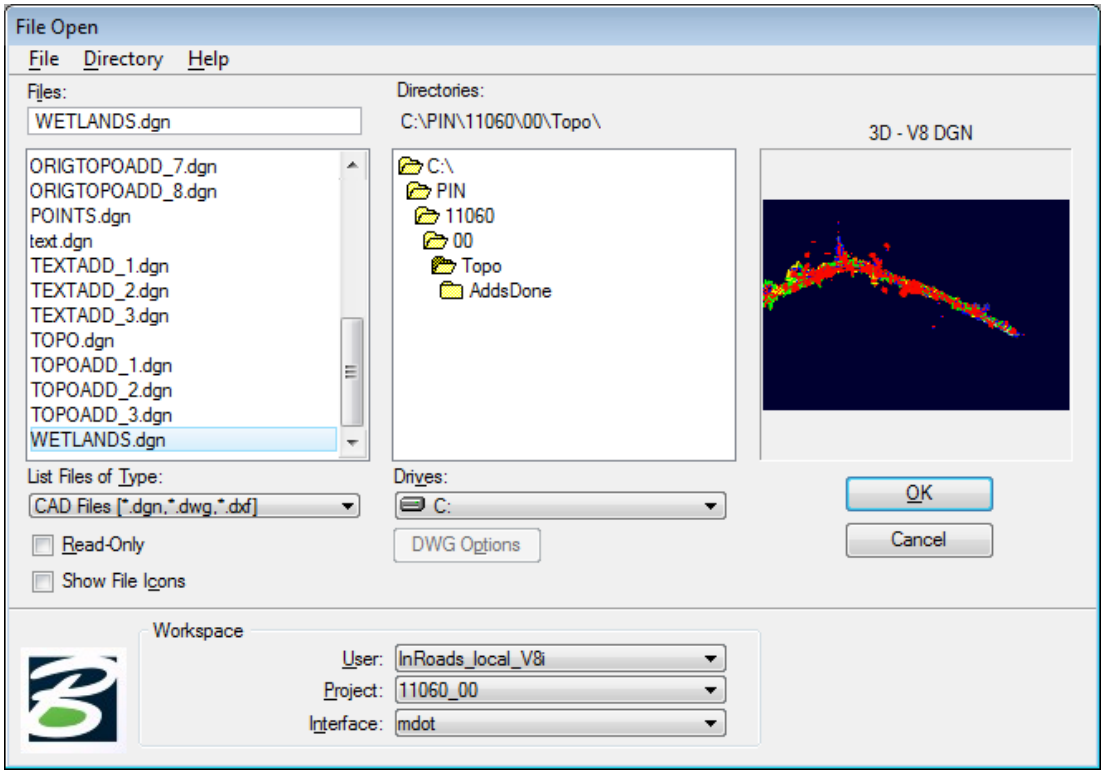


Figure 6-37: Select wetlands.dgn from your list of available files

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 *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 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 line styles 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).

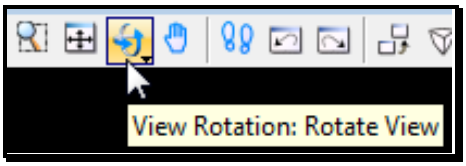


Figure 6-38: Rotate View tool

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).

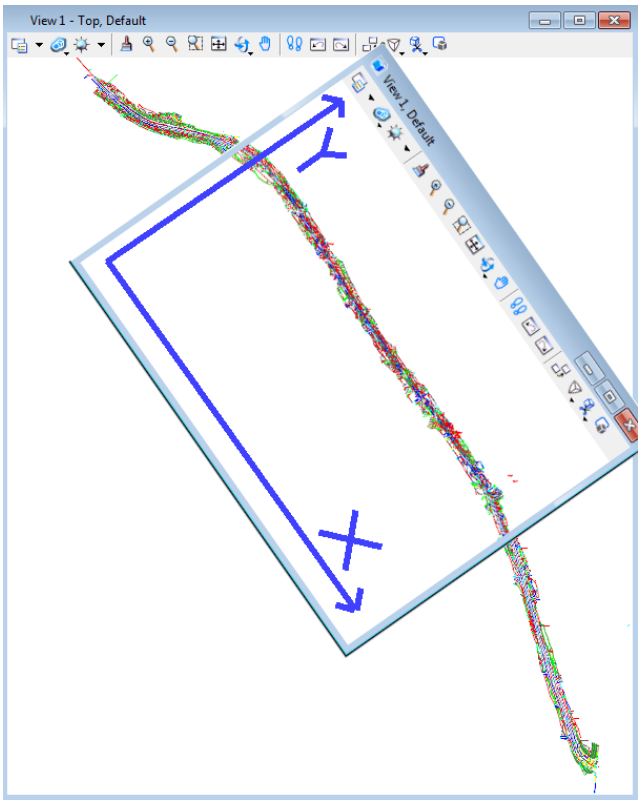


Figure 6-39: Rotating View with 3 point method

- 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, To lock your "Z", from the Main Menu, select Settings > Locks > ACS Plane Snap. Key-in az=0 in the Key-in dialog and press Enter. Click in the CAD View. 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 Line style Direction

Objective

Wetland lines have text imbedded in the line style. 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 Change Curve Direction Tool 

The *Change Curve Directions* tool is located in the *Modify Curves* 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. Click the arrowhead again to change the direction of the line. Click again to Accept the change.

Here is an example of a wetland line before clean up (Figure 6-40). Notice only part of the line reads correctly.

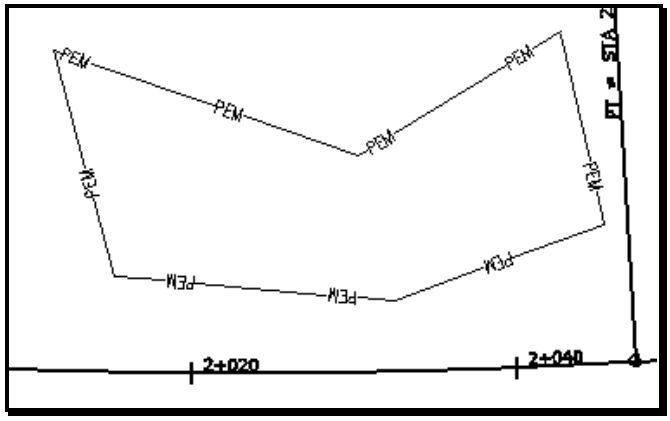


Figure 6-40: Example before reversing elements

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.

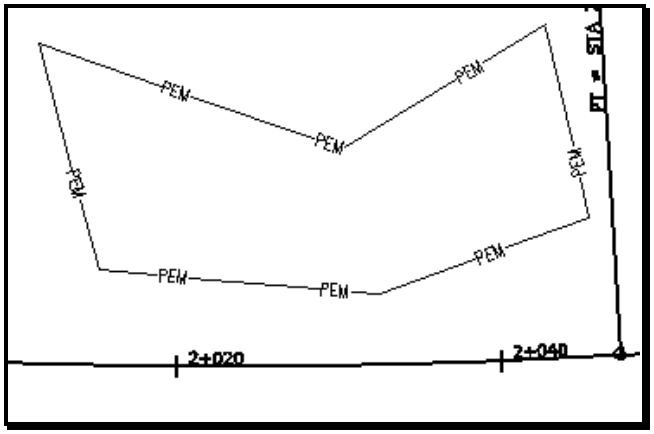


Figure 6-41: Example of a cleaned up wetland line

- 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 Line style (if necessary)

If the wetland *Line style* is incorrect, select the line and select your **WorkGroup > Survey > Wetland/Rare Vegetation > ?Type?** from the *Tasks Menus.* Select **Quality > Change > Symbology** from the Main Menu and click in the view window.

Step Ten: Add Wetland Lines (if necessary)

Use the *Tasks Menus* to place new wetland lines if necessary. Select your **WorkGroup > Survey > Wetland/Rare Vegetation > ?Type?** from the *Tasks Menus.* Draw the line using *AccuDraw's* abilities. If there are Station and offsets available, consider using the *Point Along* macro.

- ✓ ***Refer to page 2-84 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 Element Selection tool - The *Element Section tool* 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).

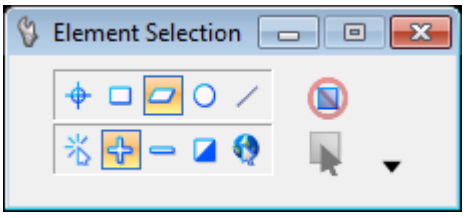


Figure 6-42: Element Selection set to shape

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 Editing tool box or the Task Menus (Figure 6-43). In the Tools Setting box, place a checkmark in the *About Element Center* box of the dialog box (Figure 6-44).

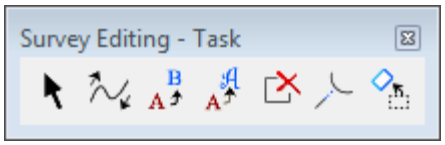


Figure 6-43: Rotate Element tool

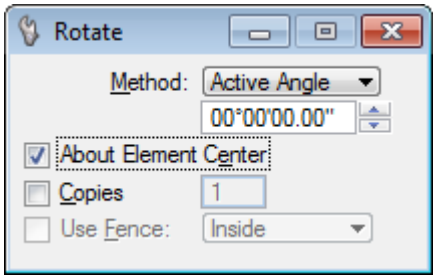


Figure 6-44: Rotate Element's About Element Center box

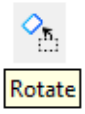
Set *Method* to **2 Points.** Click on the screen and you are dynamically rotating the text blocks around their origins. Move your cursor around the *AccuDraw's* compass until the majority is rotated correctly. Click to *Accept* this rotation. Right Click to stop rotating.

- To create new selection sets, hit your "spacebar" to clear the current selection set (while focus is in *Element Selection* dialog) and place a shape around the new set of text blocks.

✓ ***Refer to page 2-29 for more information on the Element Selection 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 Editing toolbox or Task Menus. In the Tools Setting dialog, 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 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 6-43 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 V8i" 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 not 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.

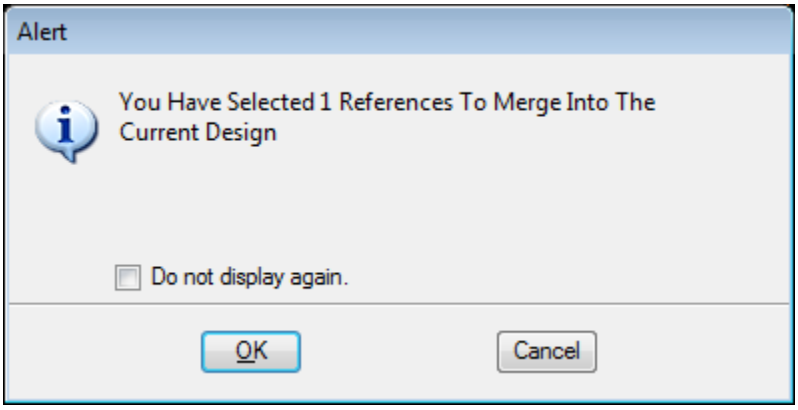


Figure 6-45: Merging Reference File Alert

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 TITLE SHEET

Step One: Open MicroStation V8i

To begin, double click on your *MicroStation V8i* 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 1-57 for help making sheets.***

Step Three: Editing Text Headings

Do not 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 1-67.***

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 1-57 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. From the *Tasks Menus,* select your **Workgroup** > **Plan** > **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 7-1)

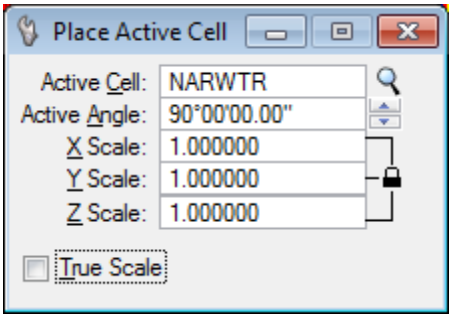


Figure 7-1: Adjust Active Angle, Padlock locked

Type **300** 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 7-2)

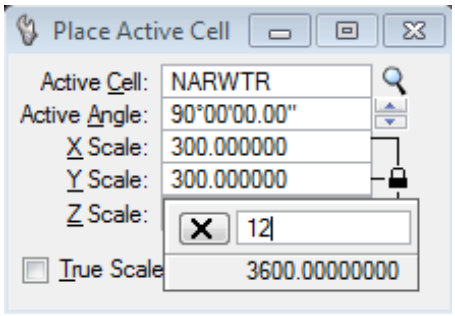


Figure 7-2: Using AccuDraw's Calculator

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

From the *Tasks Menus*, select your **Workgroup** > **Plan > 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 7-3)

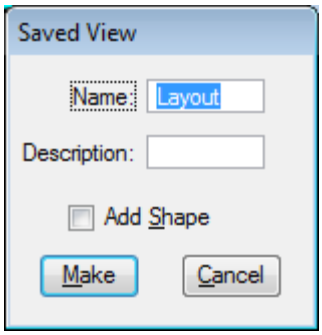


Figure 7-3: Saved View Dialog Settings

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**). 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 7-4).

- 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)

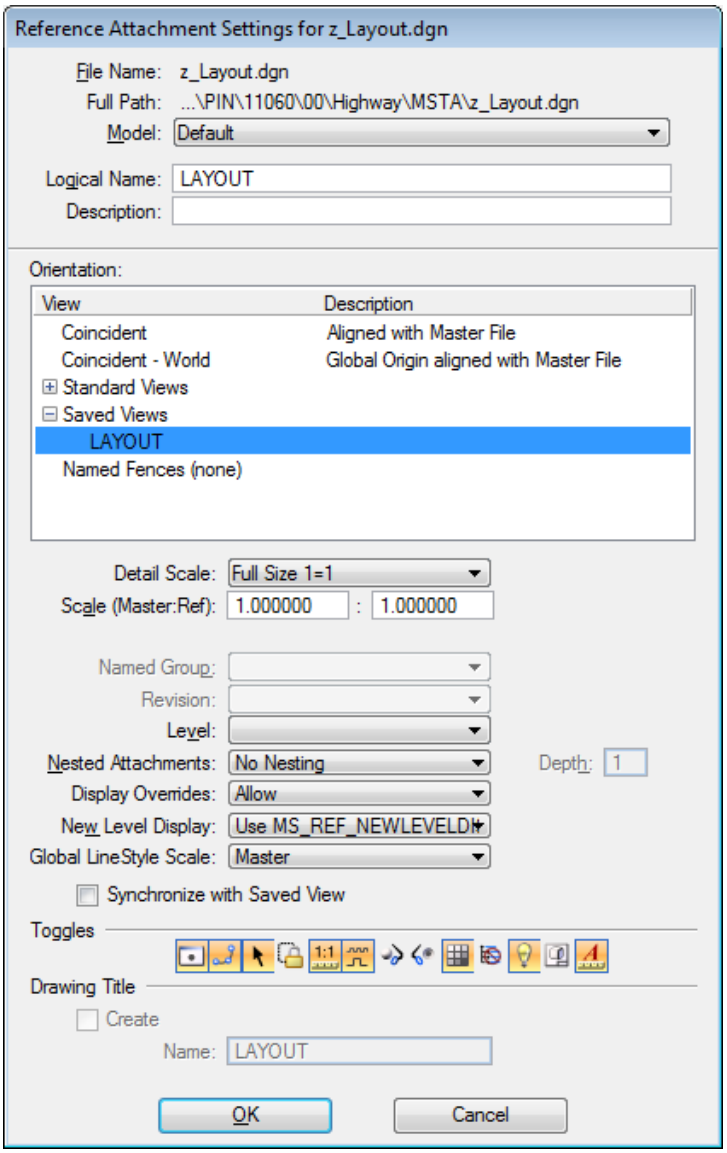


Figure 7-4: Sample Setting for Attaching Layout

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 2-74 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 **Active Fence,** place a *check* in the *Use References Dialog List* and click in the view window (Figure 7-5).

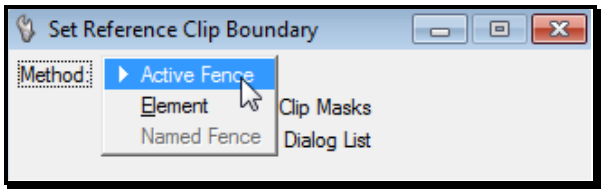


Figure 7-5: Set the Clip Boundary Tool Settings dialog

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 2-42 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.

From the *Tasks Menus*, select your **Workgroup** > **Plan > Graduate** 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 commands are 20', 25', 40' 50' and 60' for US Customary projects.

A new toolbox should be on your screen. (Figure 7-6) Click on the **Place cell along** tool.

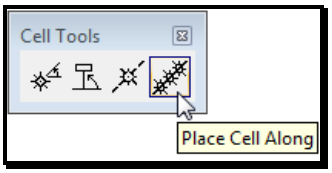


Figure 7-6: Pace Cell Along Tool

When the dialog opens, enter the desired spacing for the tick marks. Defaults are 100'. (Figure 7-7)

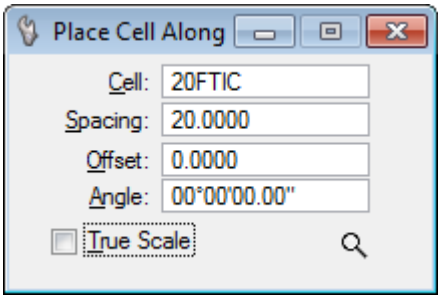


Figure 7-7: Place Cell Along Dialog

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, but if you have a really long job, maybe you might want to space them at 1000 feet or another even increment. Be sure that the *Offset* and *Angle* are both set to "0". **(**Figure 7-7**)**

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.

From the **Drawing Scale** dialog, set the *Scale* to Full Size 1 = 1 (Figure 7-8).

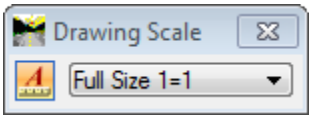


Figure 7-8: Set Scale

From the *Tasks Menus*, select your **Workgroup** > **Plan > Prop. 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.

- 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 **File > Export > 2D** from the *Main Menu.* You have to use the **File > Open** command to open the 2D file that was just exported.

Part Four: Select Boundary Lines of Area to be Shaded

Using your *Element Selection* 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 7-9.

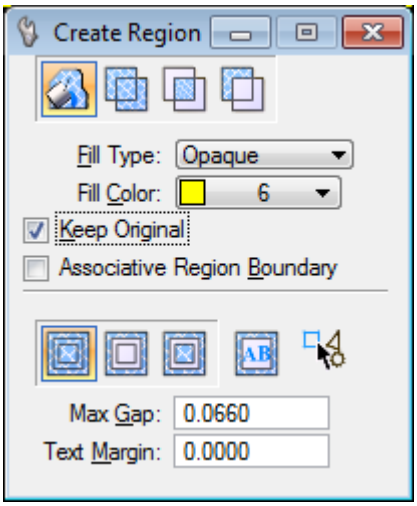


Figure 7-9: Create Region Settings

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 *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 7-10.

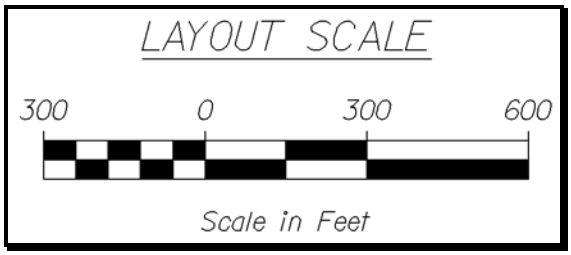


Figure 7-10: U.S. Customary Layout Scale Example

Step Ten: Place Text on the Title Sheet

From the *Tasks Menus*, select your **Workgroup** > **Plan > 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 Section Task Menu 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 2-53 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 V8i

To begin, double click on your *MicroStation V8i* 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).

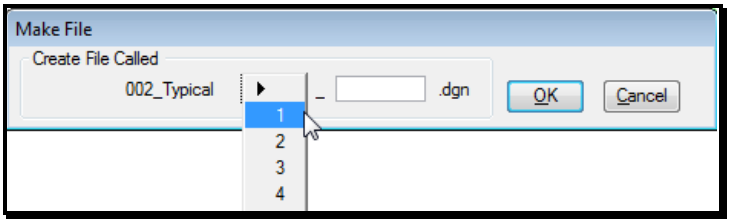


Figure 8-1: Selecting a Suffix for Multiple Drawings of the Same Type

✓ ***Refer to page 1-57 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).

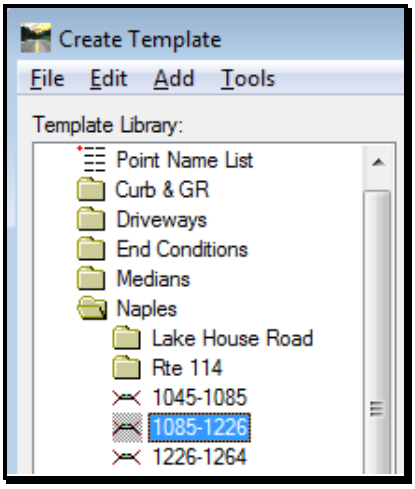


Figure 8-3: Expand folder that contains your project's templates.

Step Three: Right Click and Display

Right click on a specific template in the library and select **Display…** (Figure 8-4).

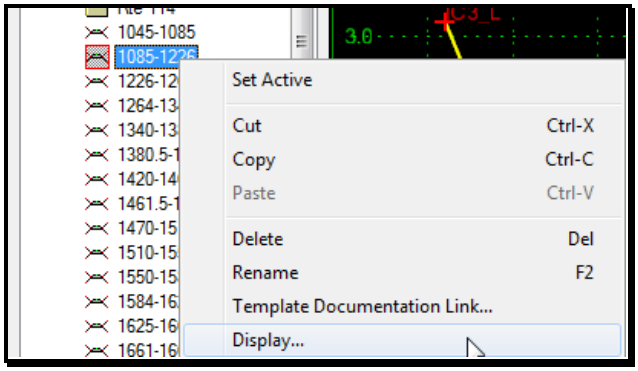


Figure 8-4: Right click the template and select display.

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.

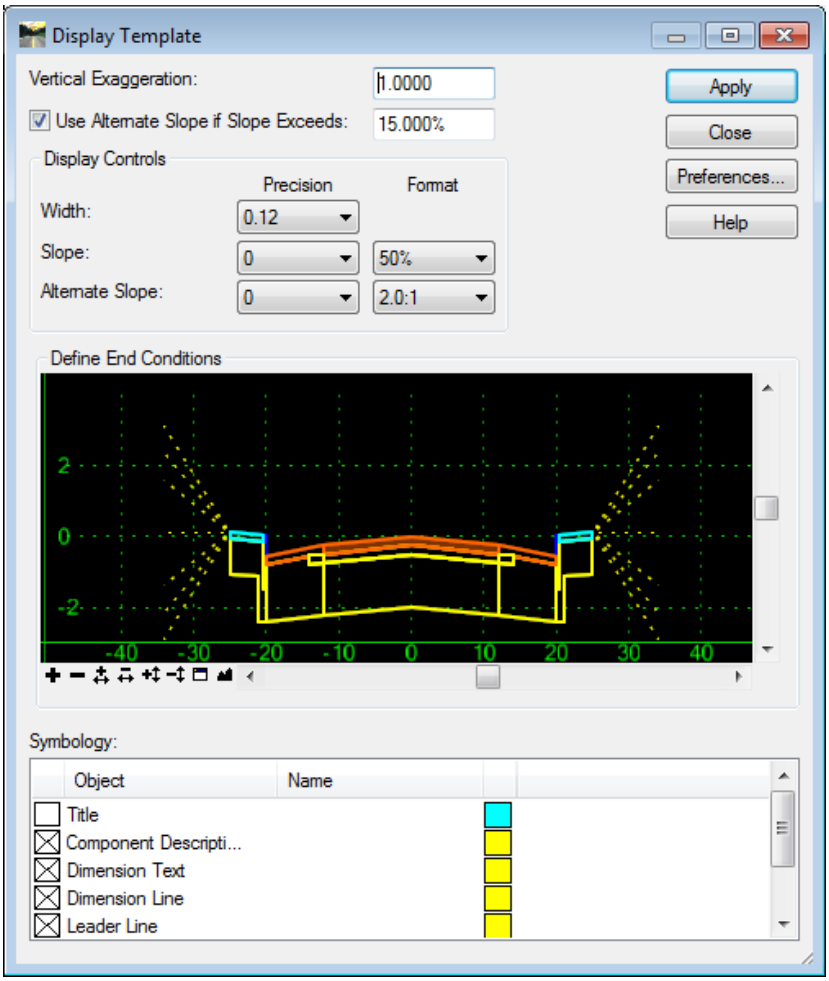


Figure 8-5: Display Template dialog with defaults preset.

Repeat for the other typicals for the project. The results are shown in Figure 8-6.

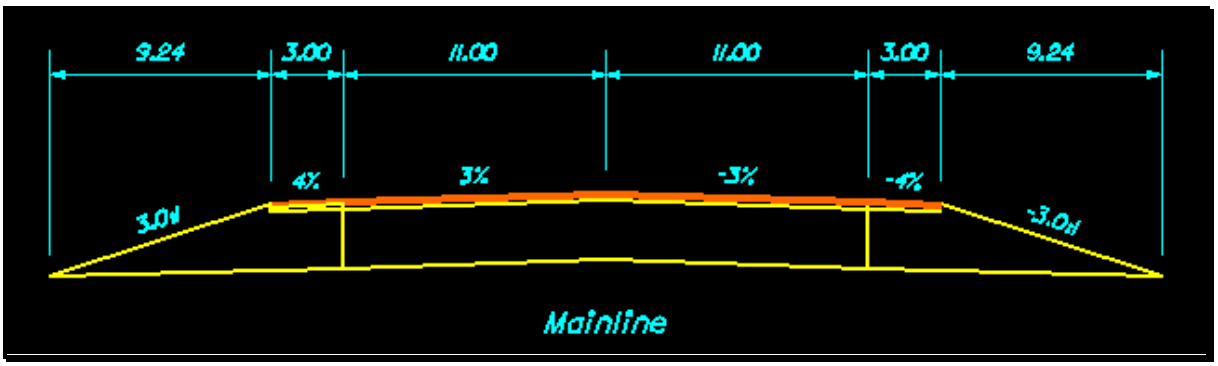


Figure 8-6: Example of a Template placed as a Typical Section.

- 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 *Tasks Menus* tools.

DIMENSIONS, TEXT, AND NOTES

ⓘ ***Always use the Tasks Menu when placing dimensions and text. This is especially helpful in keeping your elements on the correct levels.***

Step One: Set the Drawing Scale

Use the **Drawing Scale** dialog to select the proposed scale of the drawing (i.e., 1 in = 4 ft.).

Step Two: Place Text and Dimensions

From the *Tasks Menus*, select your **Workgroup > Plan** > **Prop. Text and Dims** and pick the desired option from the right side.

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).

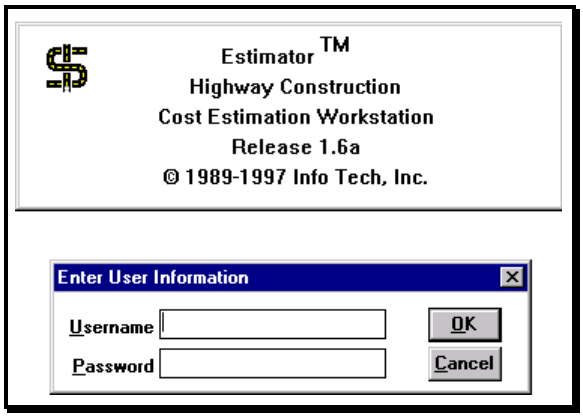


Figure 9-1: Log In to Estimator

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).

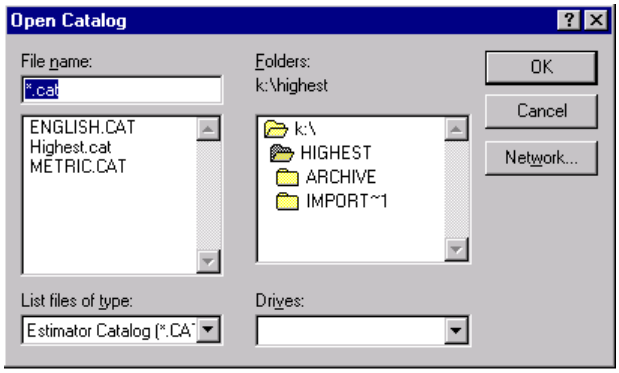


Figure 9-2: Select your Catalog

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.

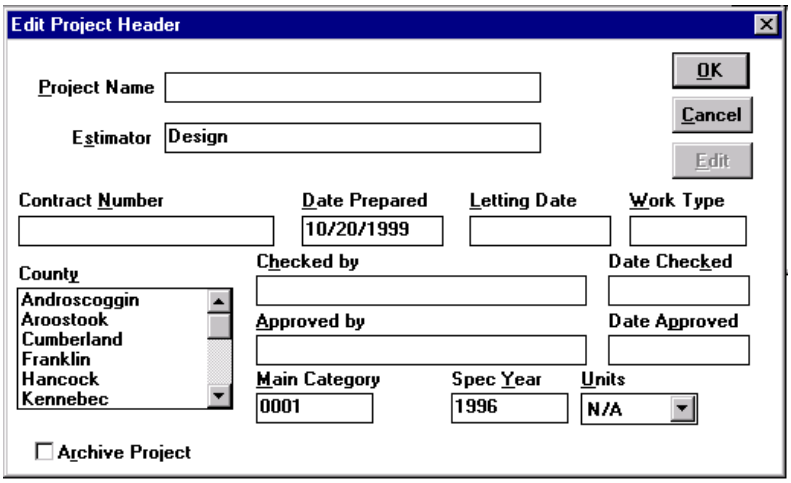


Figure 9-3: Edit Project Header

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.

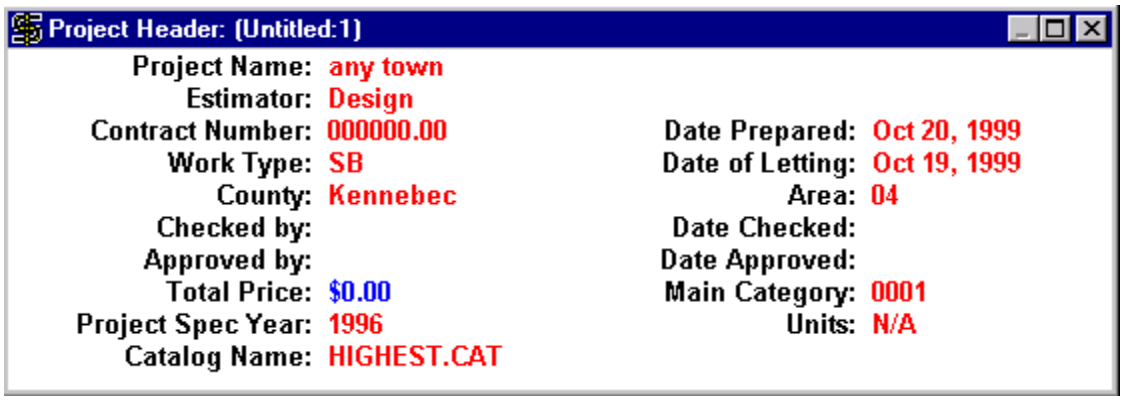


Figure 9-4: Project Header

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).

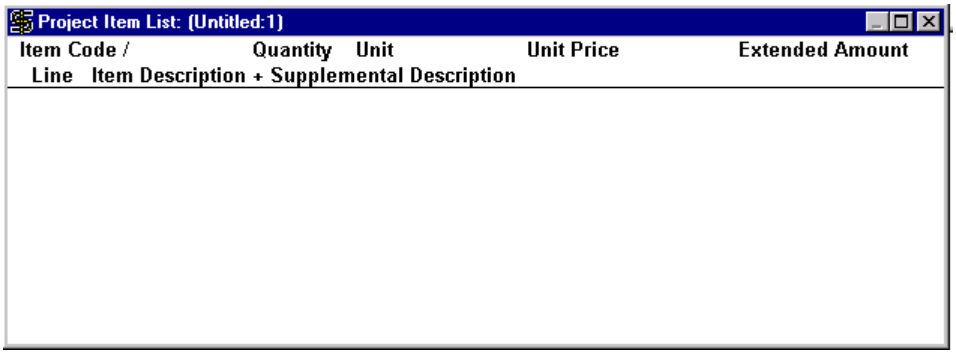


Figure 9-5: Empty Project Item List

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.

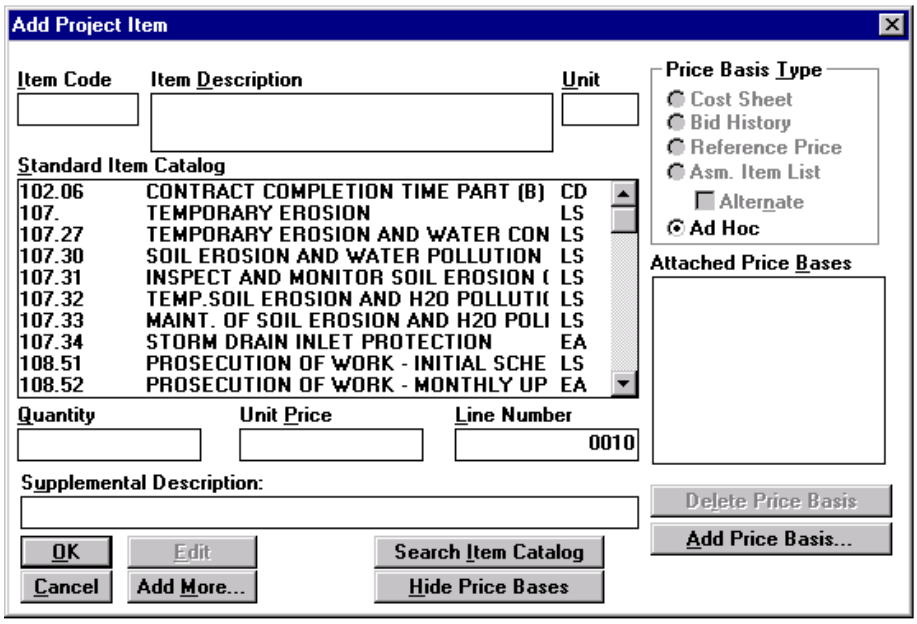


Figure 9-6: Add Project Item

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.

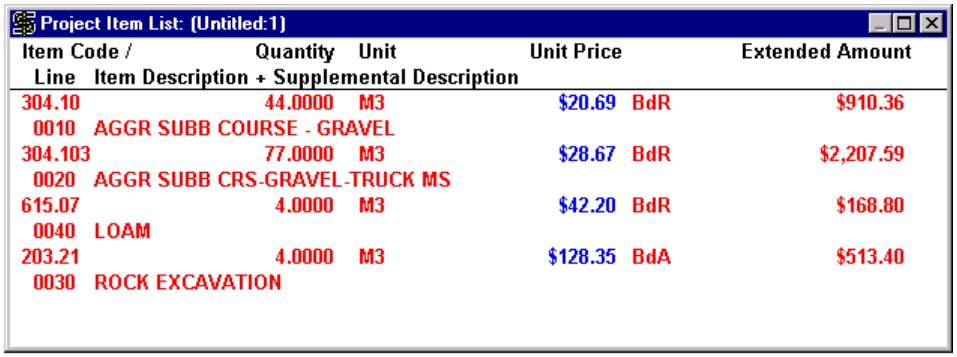


Figure 9-7: Project Item List

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.

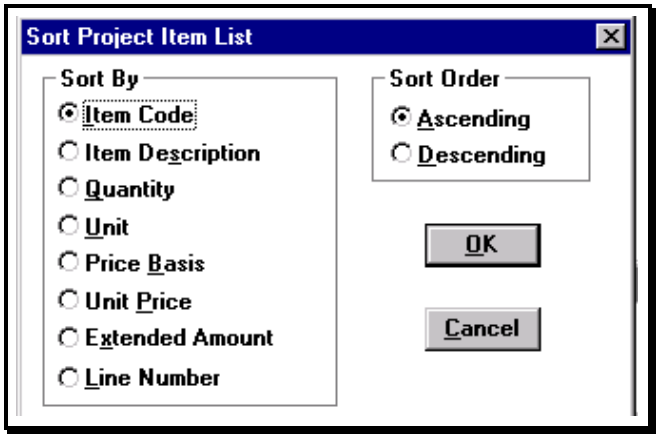


Figure 9-8: Sort Item List

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.

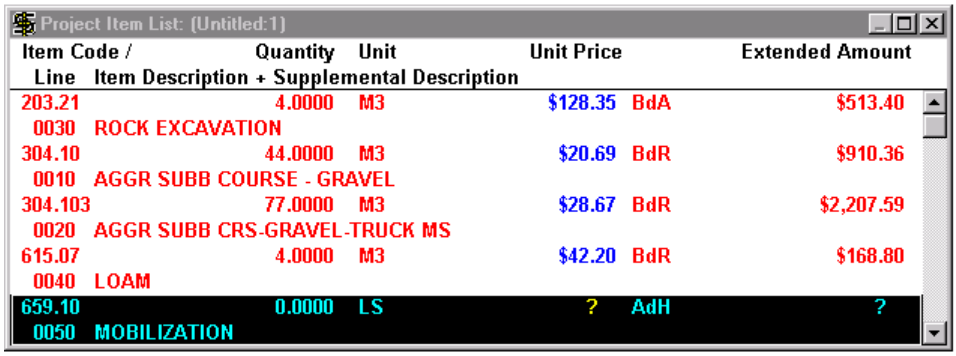


Figure 9-9: Project Item List

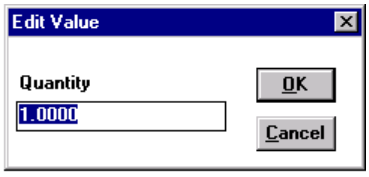


Figure 9-10: Edit Project Item Quantity

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.

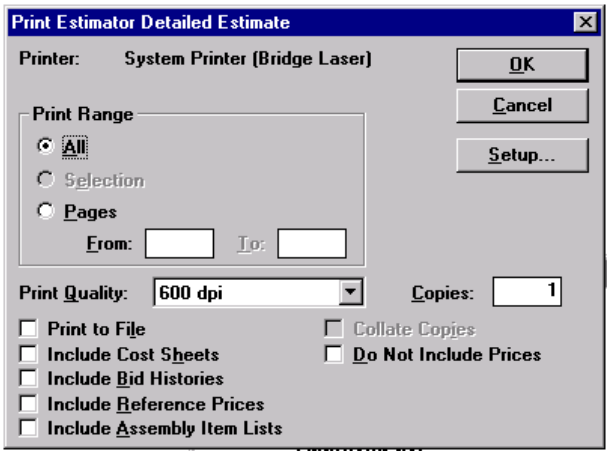


Figure 9-11: Print Estimator Detailed Estimate

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 they have an item that does not appear in the catalog selection

set that they should notify the Estimator System Manager 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)

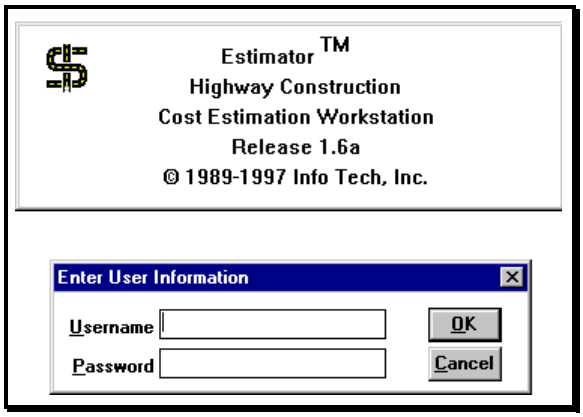


Figure 9-12: Log In to Estimator

"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).

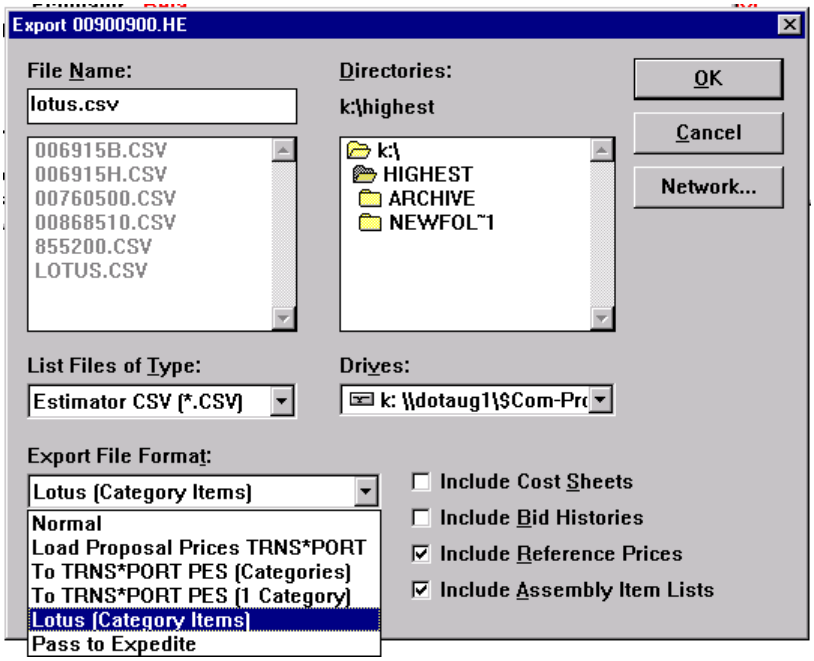


Figure 9-13: Export Dialog

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 V8i" 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 1-57 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.

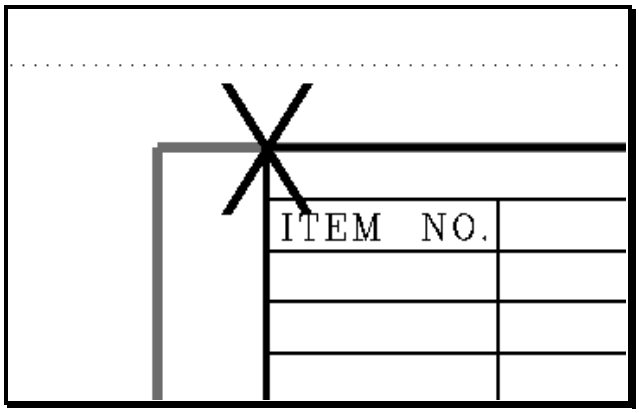


Figure 9-14: Example of Snap Point "Upper Left Corner of First Table"

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).

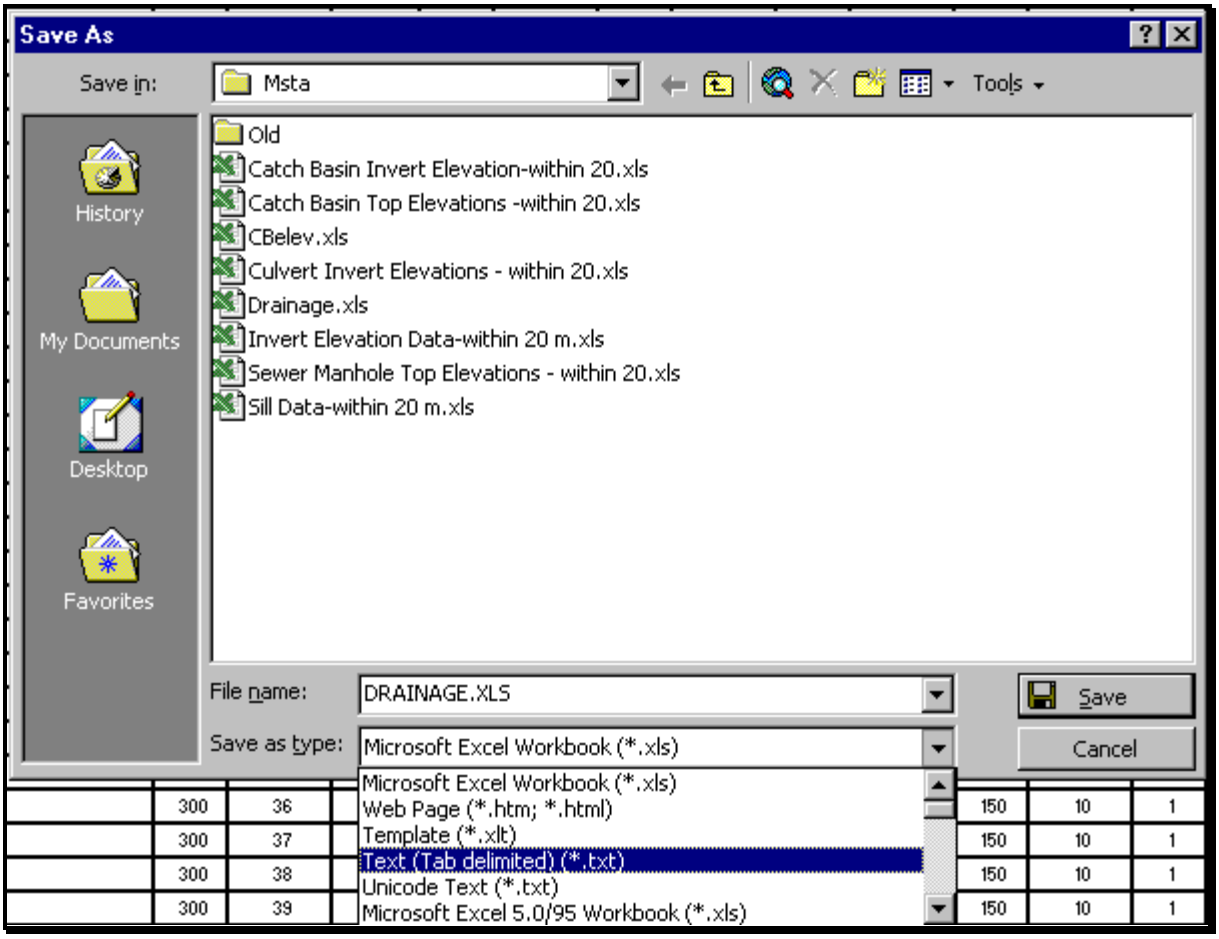


Figure 10-1: Save As Txt

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).

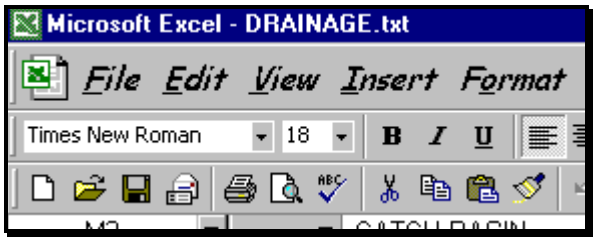


Figure 10-3: New File Name

You are now finished with **Excel**. Choose **File > Exit**. You will get a warning dialog like Figure 10-4.

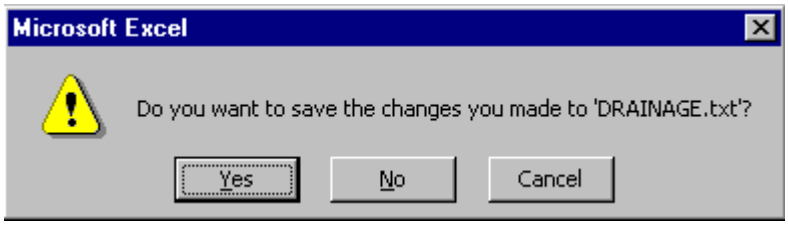


Figure 10-4: Save Changes?

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 V8i" icon and select your project from the project pull down. Open any file.

Step Two: Make a 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 1-57 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*.

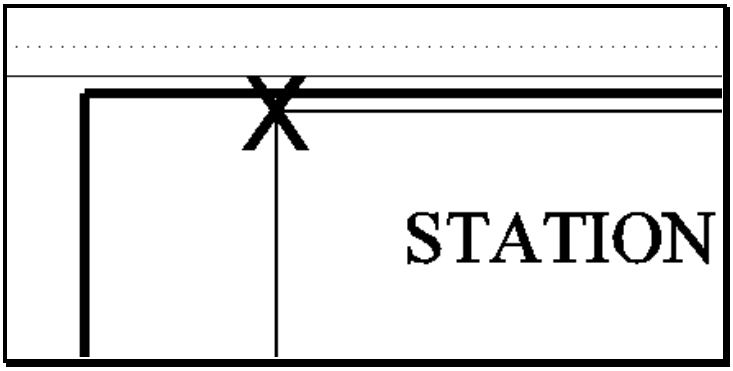


Figure 10-5: Upper Left Corner

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) without the prices.

- ♫ InRoads can easily produce End Area Volume reports for the project.
- ✓ ***Refer to page 20-32 for information on End Area Volume reports.***

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.

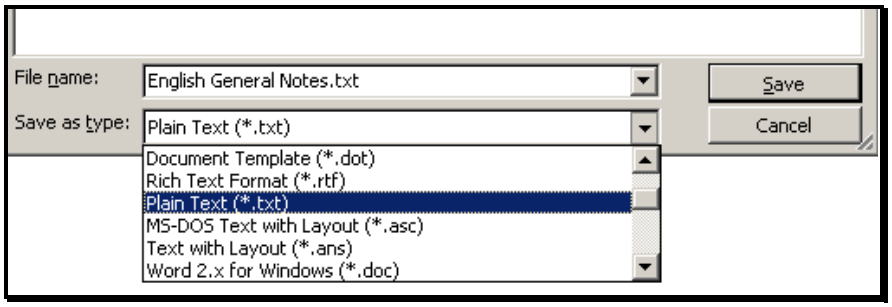


Figure 11-1: Save as type- Plain Text (.txt)*

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.

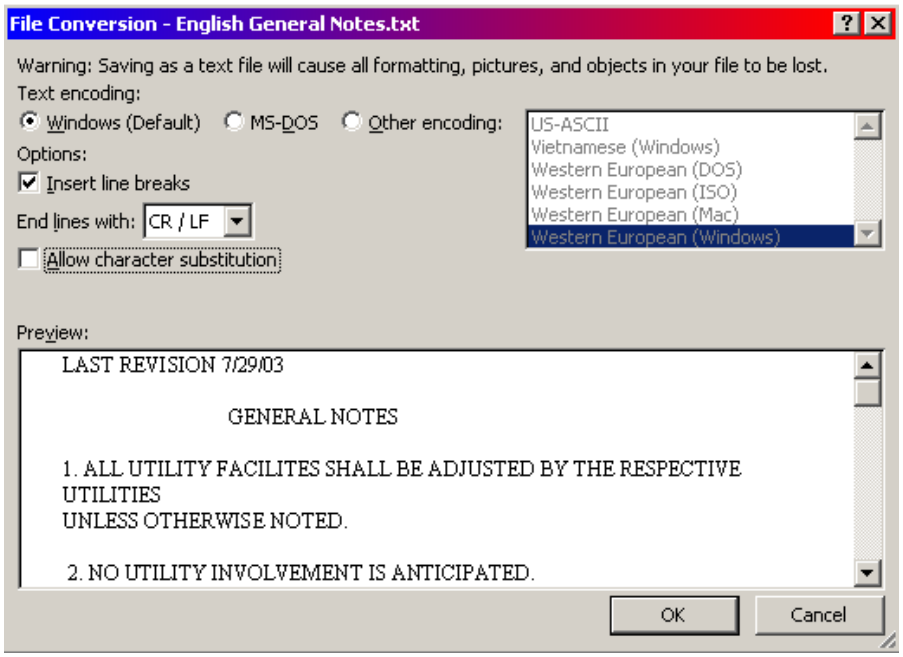


Figure 11-2: Select Insert Line Breaks

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 V8i" 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 > Make Sheetz.** 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 1-57.***

Step Six: Set Your Text Size and Font

Use the Drawing Scale dialog to select appropriate scale**.** Normally, General Notes are placed on a border that hasn't been scaled. Select Full Size 1=1 for U.S. Customary projects. From the *Tasks Menus*, select your **Workgroup > Plan > 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).

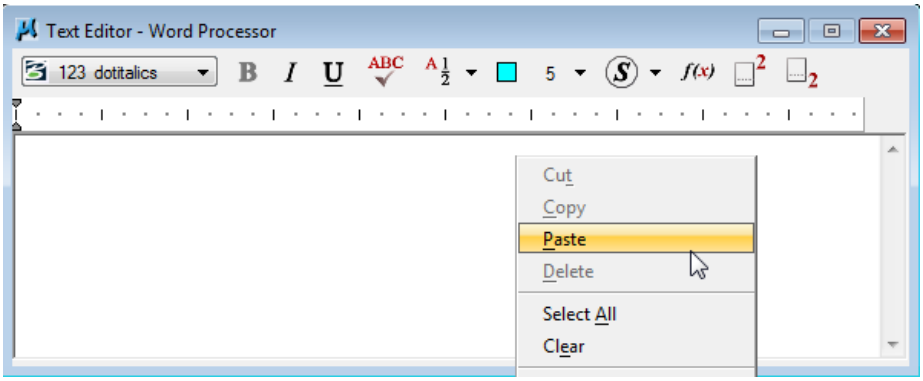


Figure 11-3: Right Click with mouse - Paste Option

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.

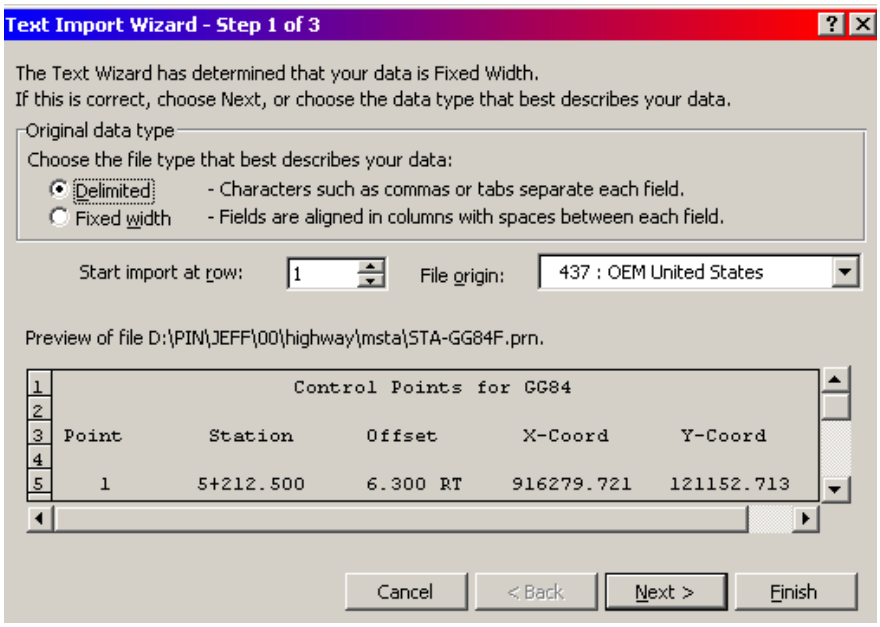


Figure 11-4: Text Import Wizard

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.**

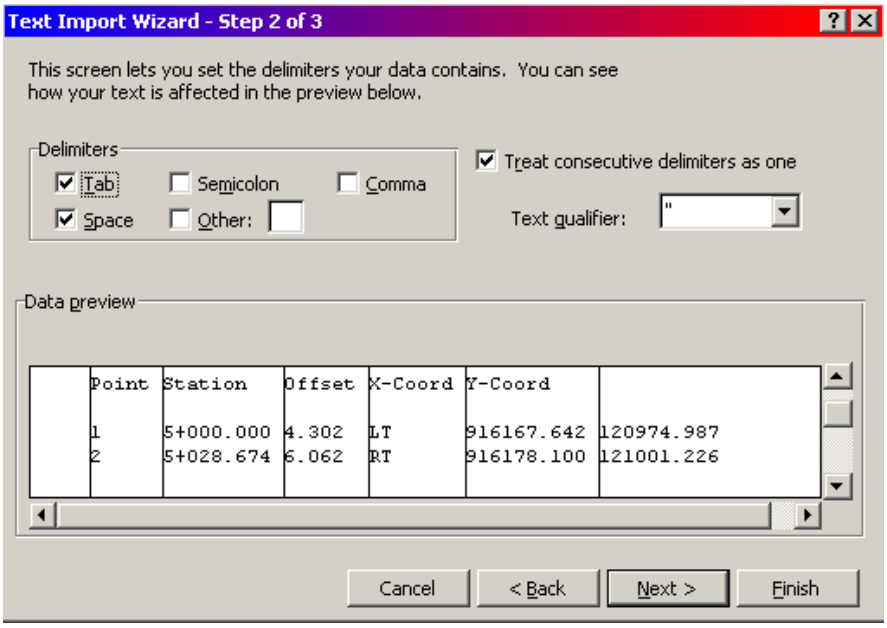


Figure 11-5: Select "space" as your delimiter

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)**.**

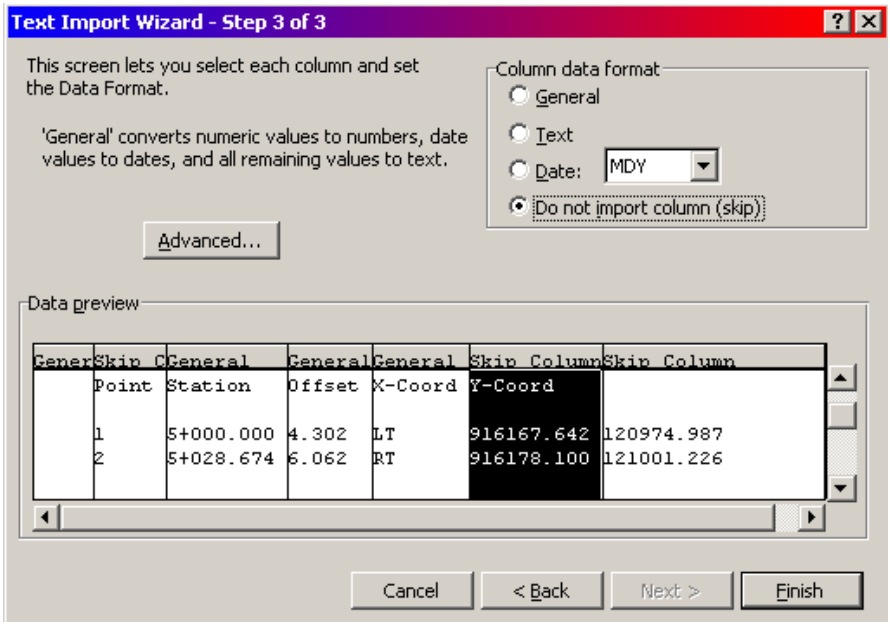


Figure 11-6: Import Wizard column formatting

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.**

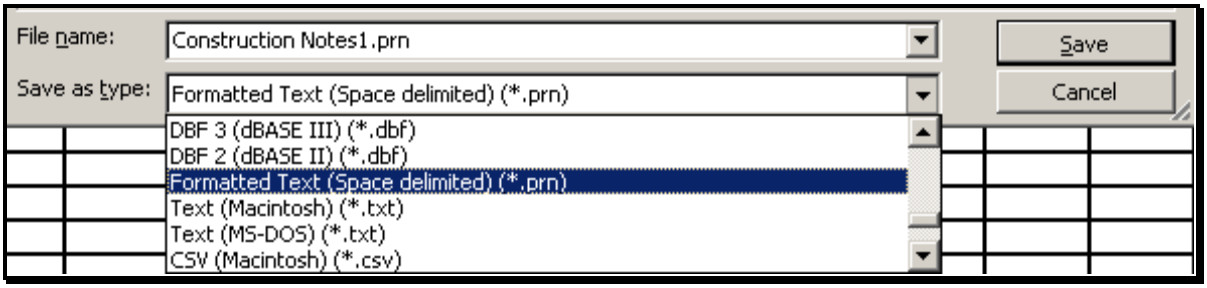


Figure 11-7: Save as Type Text (Tab delimited) (.txt)*

- 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)

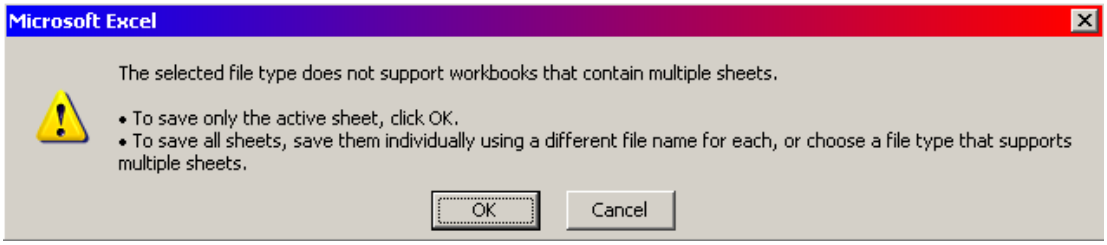


Figure 11-8: Warning One – Click OK

At the next warning click **Yes.** (Figure 11-9)

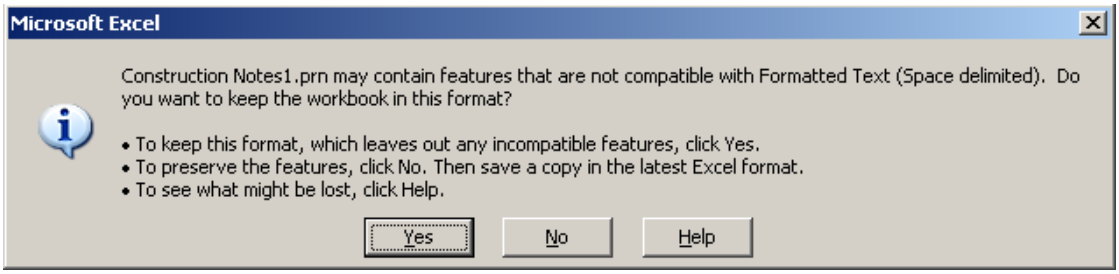


Figure 11-9: Warning Two – Click Yes

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***

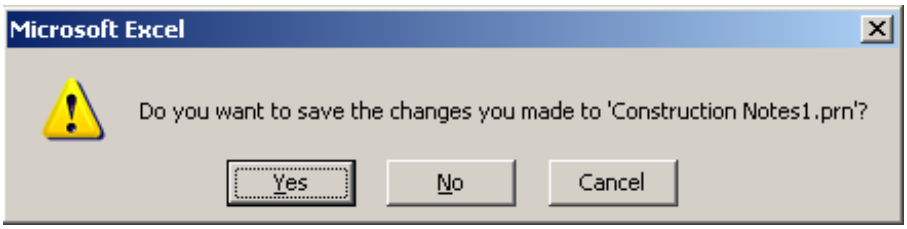


Figure 11-10: Warning when closing the file – Click NO!

Step Four: Open MicroStation

Open MicroStation by double clicking the "MicroStation V8i" 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 > Make Sheetz.** 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

Use the Drawing Scale dialog to select appropriate scale**.** Normally, Construction Notes are placed on a border that hasn't been scaled. Select Full Size 1=1 for U.S. Customary projects. From the *Tasks Menus*, select your **Workgroup > Plan > 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 *Tasks Menus* 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 1-56 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 not 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).

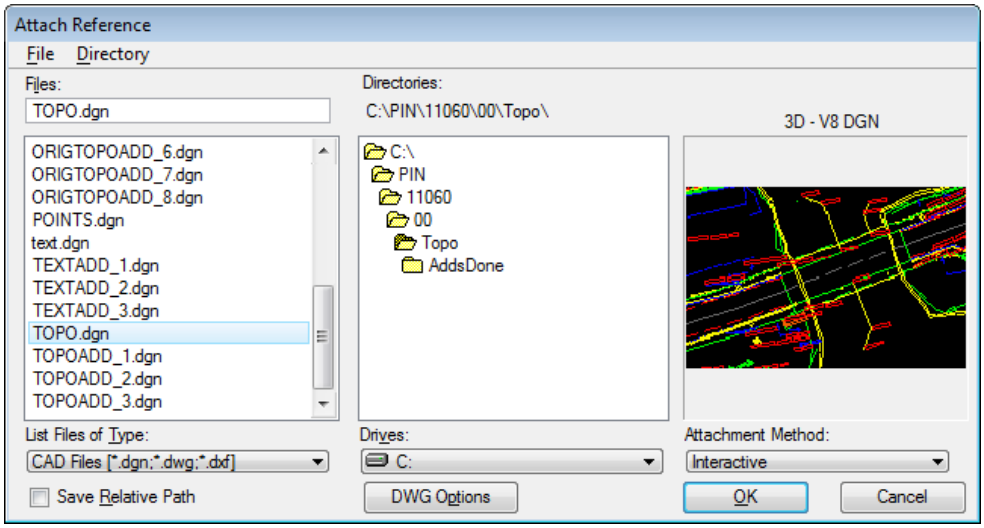


Figure 12-1: The Topo Directory

ⓘ ***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** is enabled.

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).

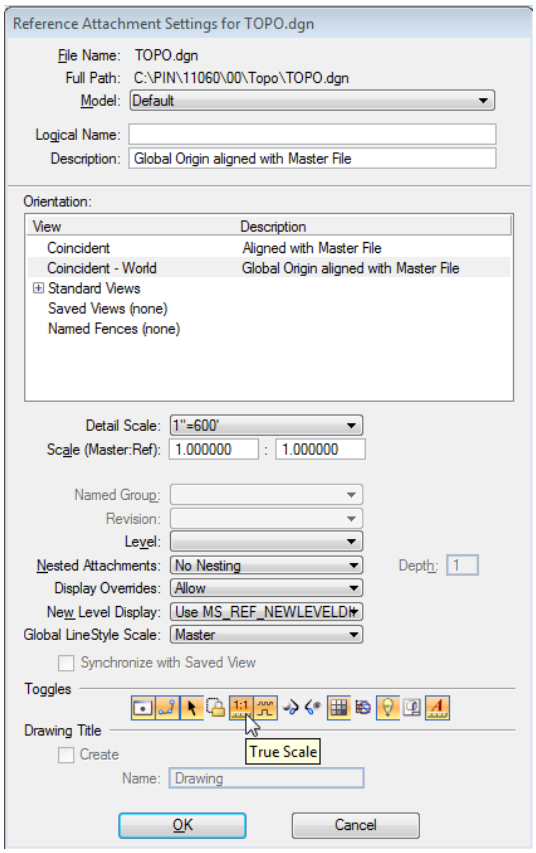


Figure 12-2: Reference Settings

- ✓ ***Check page 2-72 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.

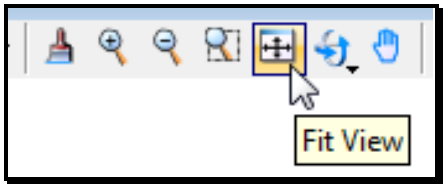


Figure 12-3: The Fit View Button

ⓘ ***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 *Tasks Menus* to accomplish this.

Part One: Set the Drawing Scale

Use the **Drawing Scale** dialog to set your scale (i.e., 1 in.=25 ft. or 1 in.=50 ft. for U.S. Customary projects or 1:250.

Part Two: Place the Cells

From the *Tasks Menus,* select your **Workgroup > Plan > 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 *Tasks Menus*, select your **Workgroup > Plan > 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 *Tasks Menus*, select your **Workgroup > Plan > 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).

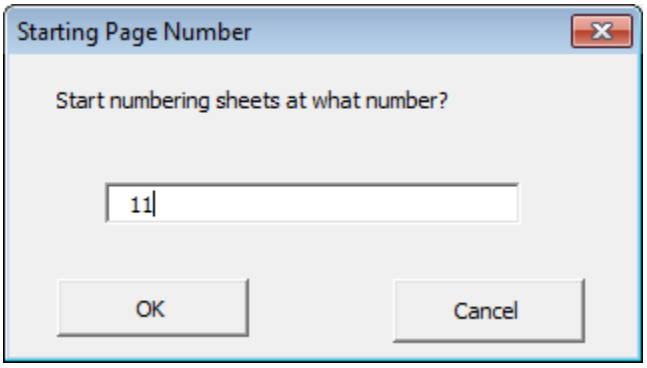


Figure 12-4: Start Numbering At?

- 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 V8i 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 (from the *Tasks Menus*, select your **Workgroup > Plan > 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_V8i.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 3-19 for more information on User Configuration files.***

Step One: Launch MicroStation

Launch MicroStation from the *MicroStation V8i* icon. The *File Open* dialog will open (Figure 13-1). In the *Workspace* portion of the dialog, the *User* is defaulted to *InRoads_network_V8i* and the directories will be pointing to the network (y: drive) for project PINs.

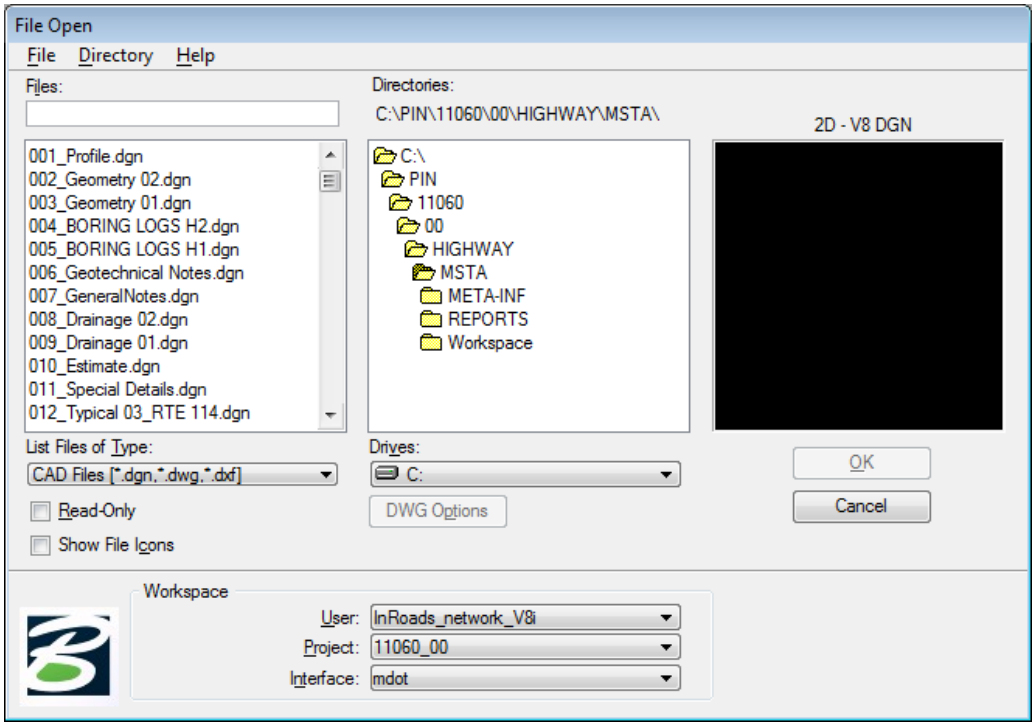


Figure 13-1: File Open dialog when working on the network.

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: Launch InRoads

Select **Applications > InRoads Group > Activate InRoads** from the *Main Menus*.

Step Five: 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 1-57 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*.

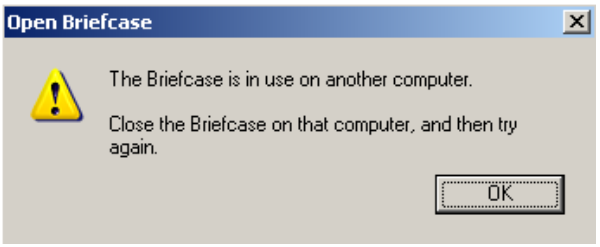


Figure 13-2: Open Briefcase

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).

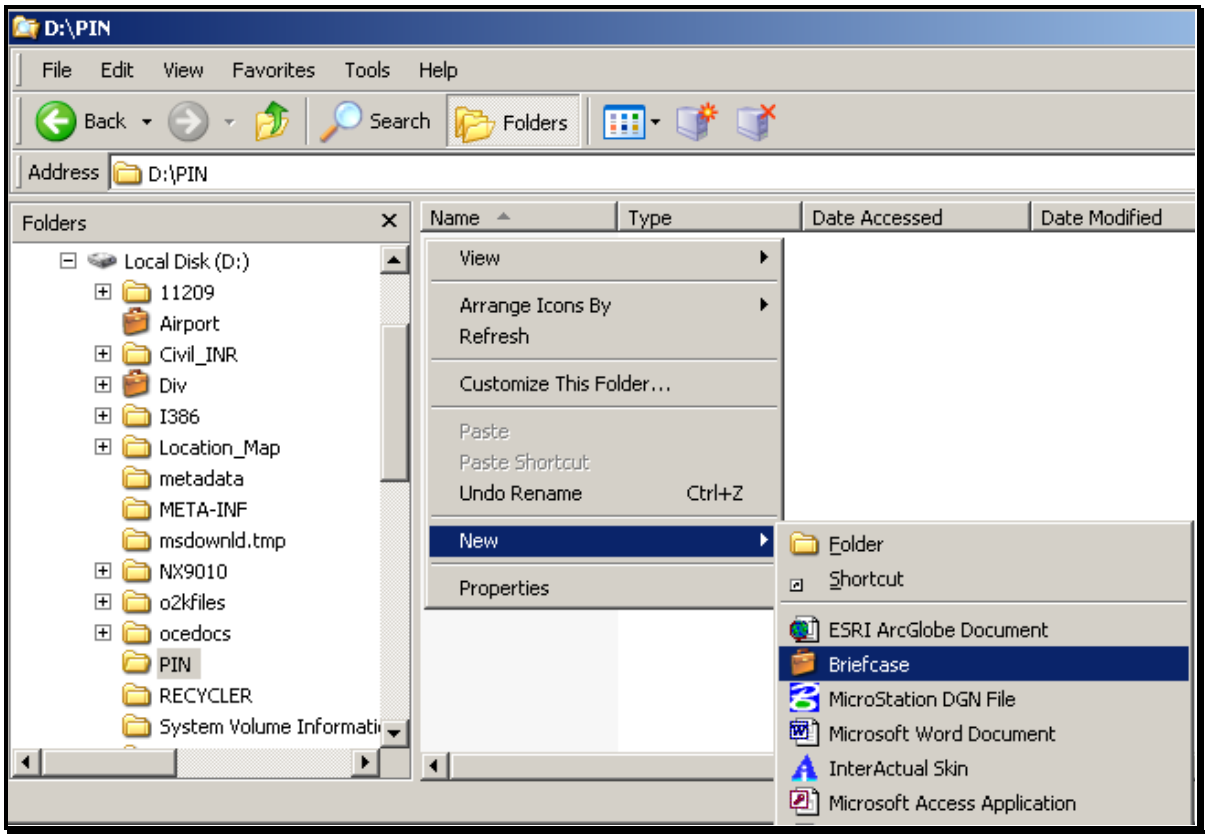


Figure 13-3: Creating New Briefcase

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).

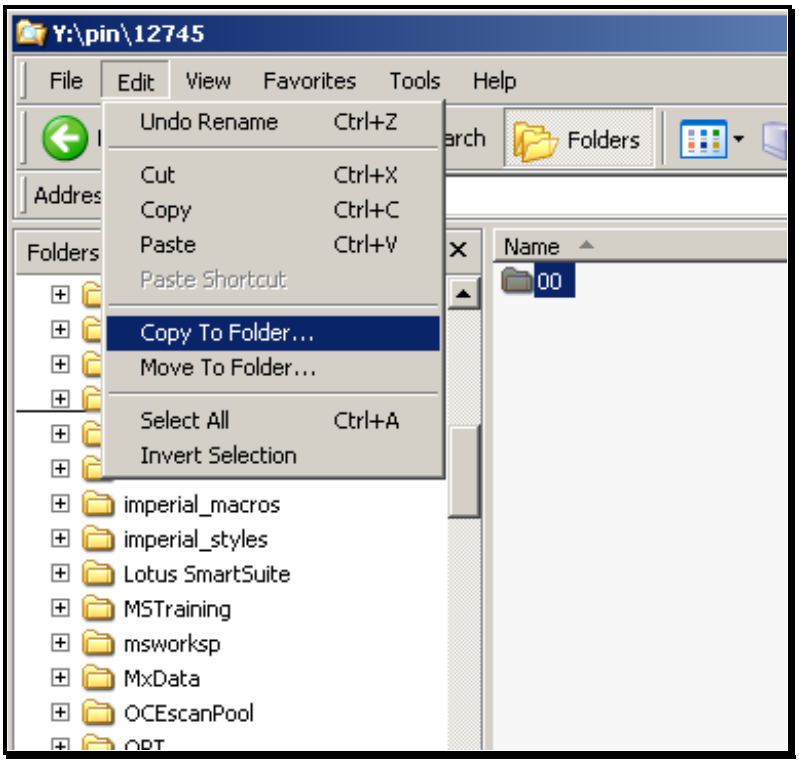


Figure 13-4: Select Copy To Folder…

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.**

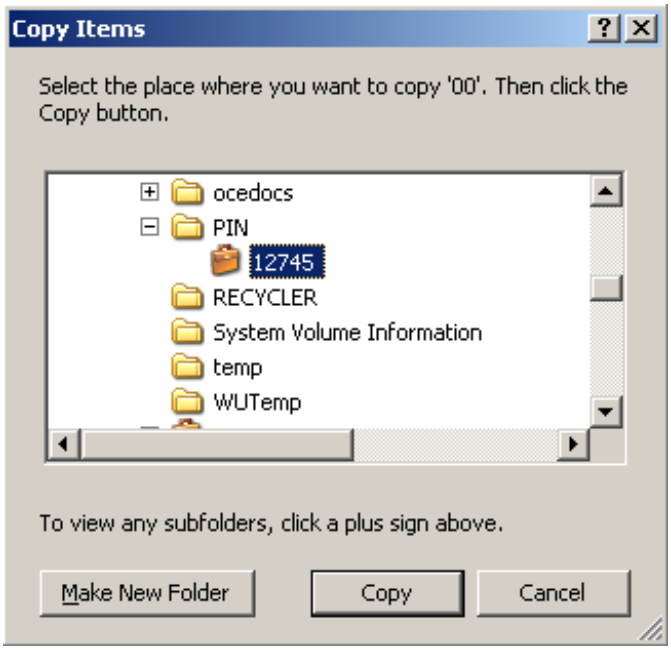


Figure 13-5: Navigate to your PINs briefcase on your D: drive.

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.

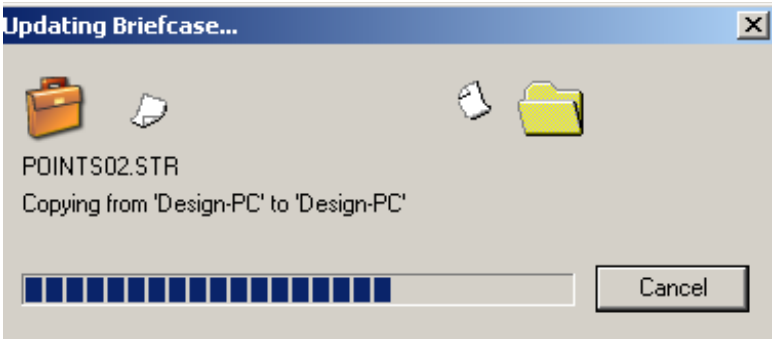


Figure 13-6: Updating Briefcase dialog while processing.

- 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.

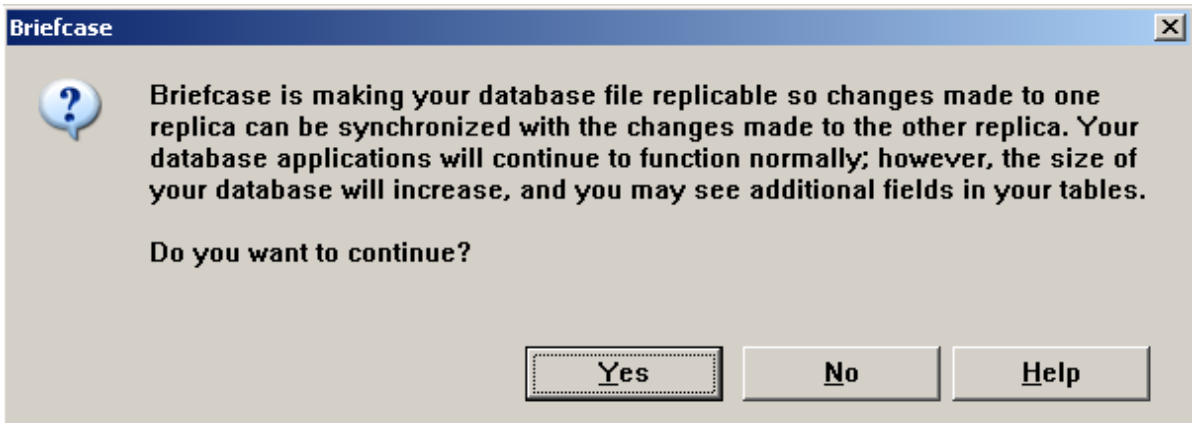


Figure 13-7: Creating a replica of the database locally.

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.

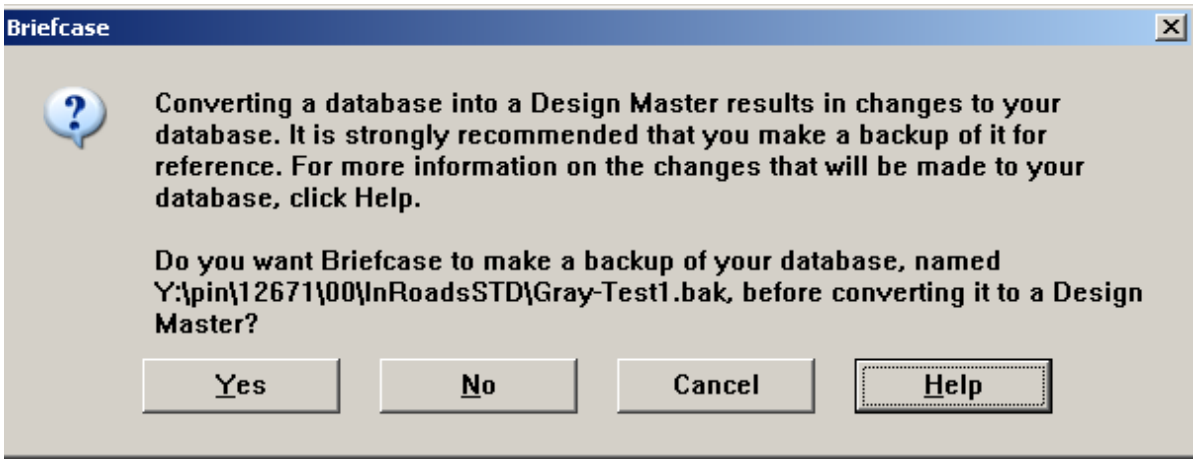


Figure 13-8: Creating a backup of the database.

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*.

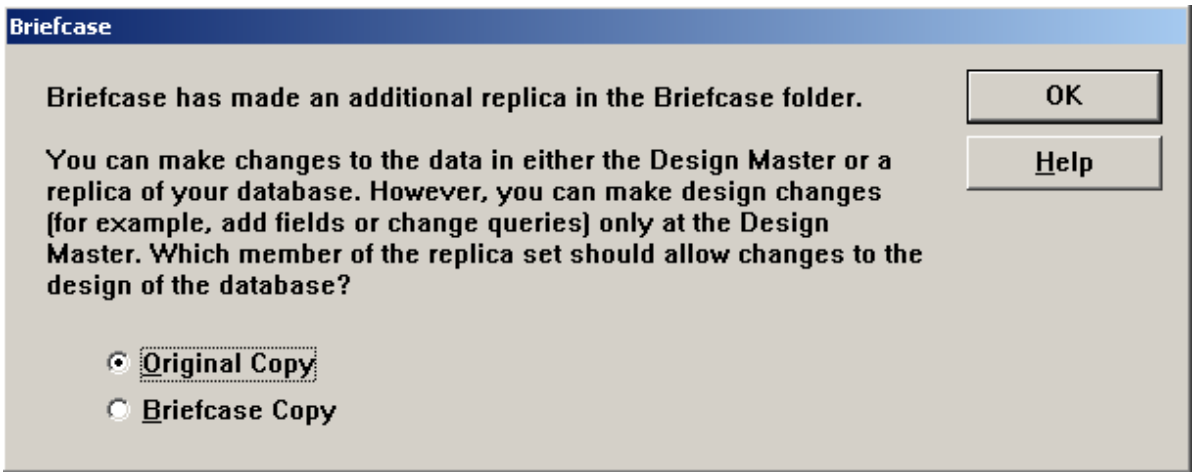


Figure 13-9: Select which database has the ability to make design changes.

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.

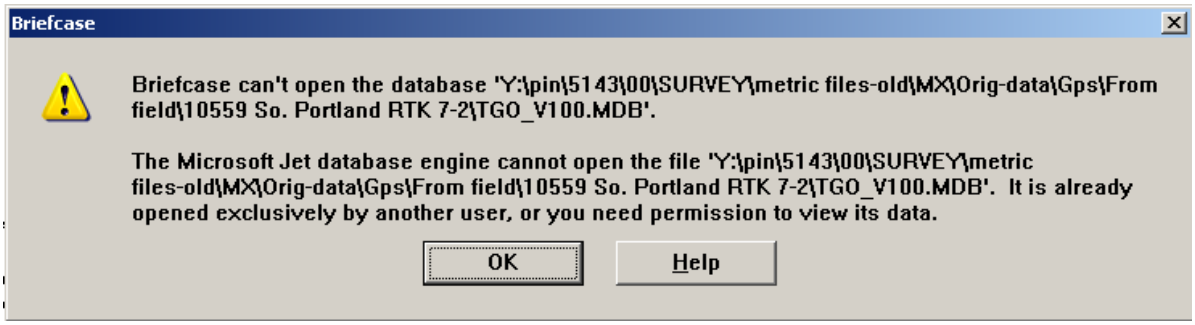


Figure 13-10: Briefcase can't open the database - No permissions.

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).

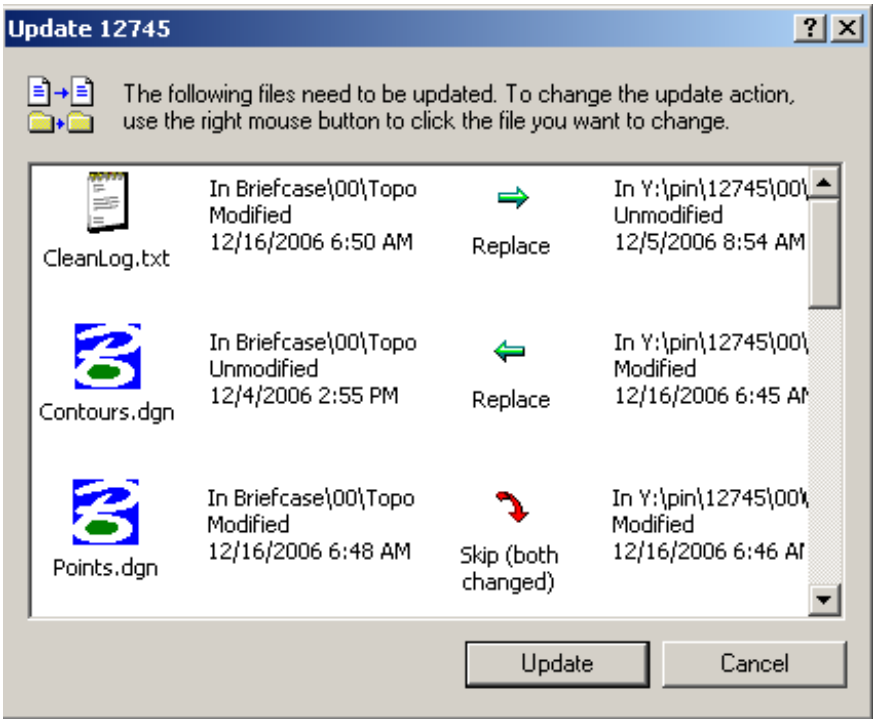


Figure 13-12: Update dialog with default action.

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.

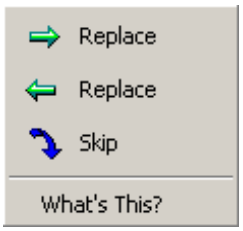


Figure 13-13: Update Options

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).

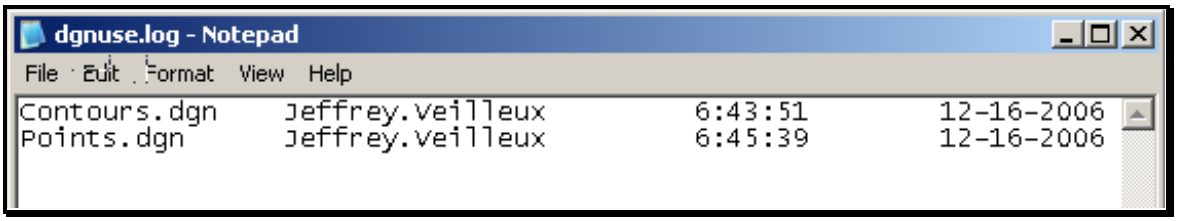


Figure 13-14: The dgnuse.log file provides valuable information.

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).

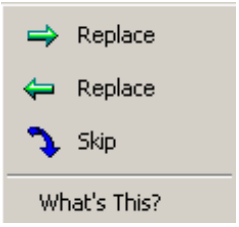


Figure 13-15: Options when both files have been modified.

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).

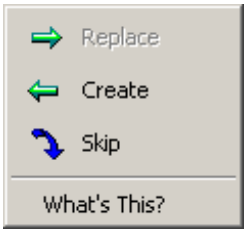


Figure 13-17: Create options.

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.**

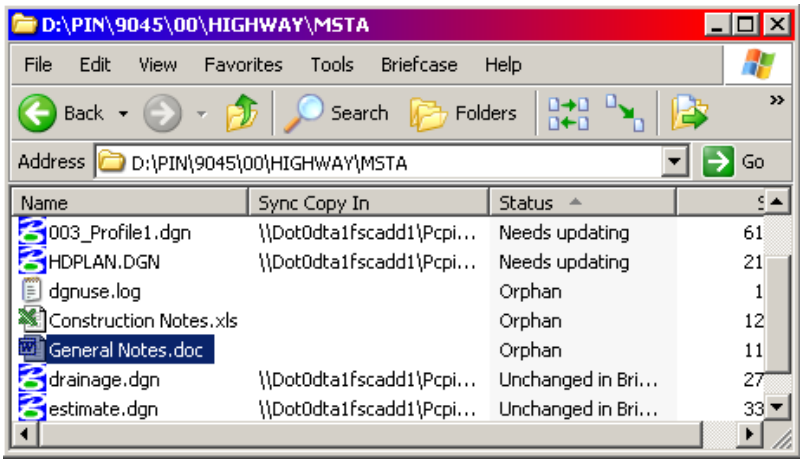


Figure 13-18: Adding Orphan Files

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

The default *User Configuration File (UCF)* file that MicroStation uses when a user launches MicroStation from the desktop icon is the *InRoads_network_V8i.ucf*. This directs MicroStation and 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.

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.

Step One: Launch MicroStation

Part One:

Launch MicroStation from the *MicroStation V8i* icon. The *File Open* dialog will open. (This could also be done from within your current session of MicroStation by using the Applications menu)

Part Two:

Pick the *User* to your desired preference (network vs. local) using the pull down.

Part Three:

Pick your ##### from the "Project" pull down.

Part Four:

Select your **HDPlan.dgn** from the list of files in the directory.

Part Five:

Select **Applications > InRoads Group > Activate InRoads** from the *Main Menus*.

- At this point, the InRoads splash screen should open momentarily and then the InRoads menu dialog will open and wait for input.

Step Two: Verify Project Defaults

From the InRoads menu select **File > Project Defaults**.

The *Configuration Name* text box (Figure 13-18) should reflect **MDOT**.

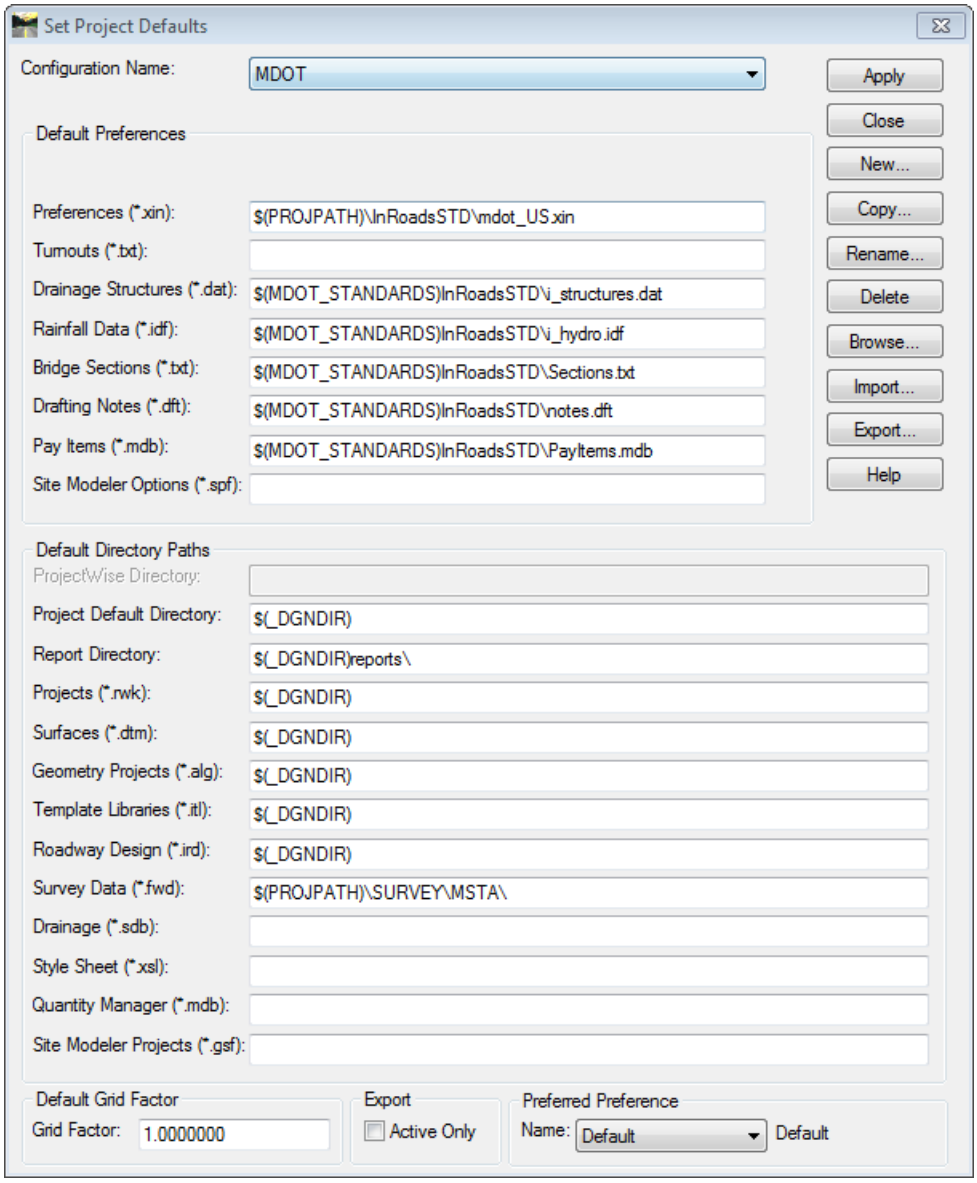


Figure 13-18: Set Project Defaults dialog to MDOT

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**.

Step Three: Activate Locks Tool Bar

Adding Locks Toolbar

Select **Tools > Locks > Toolbar** from the InRoads main menu (Figure 13-19).

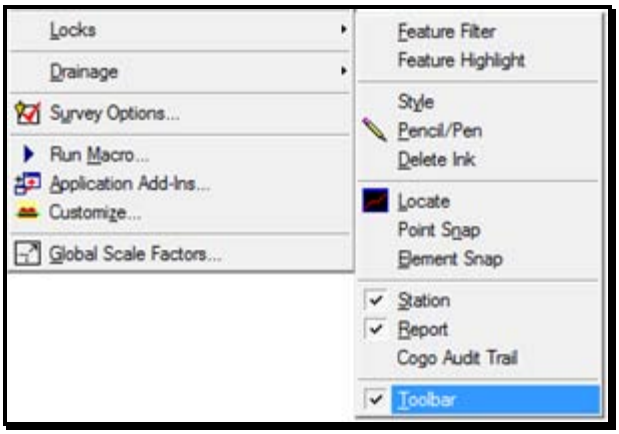


Figure 13-19: Adding the Locks toolbar to the InRoads dialog

LOCKS

- 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)
- Cogo Audit Trail Lock (On/Off)

✓ ***For more information on these tools and their functions, please refer to the InRoads internal Help (Help > Contents).***

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 are broken down in more detail in subsequent Chapters. These Chapters are referenced with page numbers.

Starting an InRoads Project

Launching InRoads

- ✓ ***Refer to page 13-3 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 15-13 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 14-4 for instructions on creating a Horizontal Alignment.***

Create a Vertical Alignment

- ✓ ***Refer to page 14-24 for instructions on creating a Vertical Alignment.***

Design Your Horizontal and Vertical Alignment

- ✓ ***Refer to page 14-8 for instructions on designing your horizontal and vertical alignments.***

Create Alignment Deliverables

- ✓ ***Refer to page 14-19 for instructions on creating the alignment drawing.***

Creating a Template

Attach MaineDOT's Standard Template Library

- ✓ ***Refer to page 15-13 for instructions on attaching MaineDOT's Standard Template Library.***

Create Project Specific Template Folder

- ✓ ***Refer to page 15-29 for instructions on creating a project specific template folder.***

Create Project Specific Templates

- ✓ ***Refer to page 15-29 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 16-6 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 16-17 and the InRoads HELP for instructions on adding and adjusting Superelevations.***

Design Drives and 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 16-36 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 16-37 for instructions on creating a design drawing.***

Drainage Development

This area still needs development. We will eventually be taking advantage of the InRoads Drainage product and toolset, 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 (Use **File > Import Geometry**), 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 (save) these same files before you close InRoads. Anything newly created will need saved first, and then you can append the .RWK for future use in your next InRoads session.

Creating and Saving an .RWK

Overview

The **Template_V8i.itl** and the **mdot_us_V8i.xin** should be in the project directory by default. The **mdot_us_V8i.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 **Applications > InRoads Group > Activate InRoads**. 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 *Files of 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 *Surfaces* and select **Open…** (Figure 13-19) Browse to the Survey\MSTA folder, and select **Ground.** Click **Open** and then **Cancel** to close the dialog.

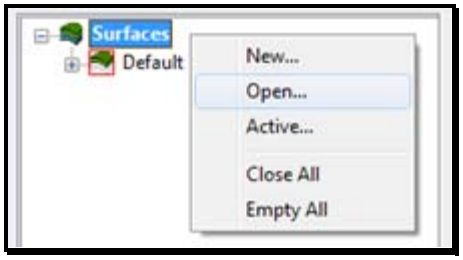


Figure 13-19: Sub menu for opening a surface.

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 13-20) to **Projects (*.rwk).** Supply a name for the .RWK (i.e., Design or Survey depending on the user).

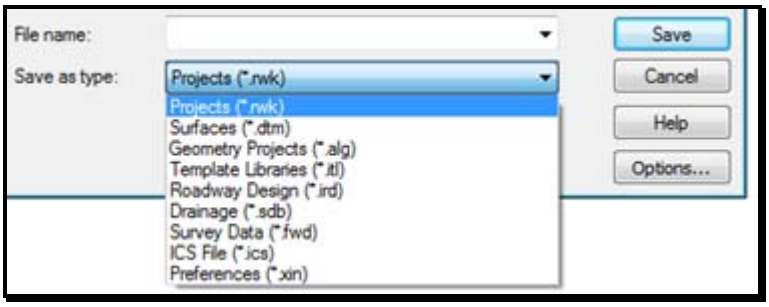


Figure 13-20: Adjust the Save as Type pull down to Projects (.rwk)*

Step Five: Select Options Button

Select the **Options** button (shown in Figure 13-20). Select the *Surfaces* tab. Place an "X" in the *Add* box (Figure 13-21). *Add* means this file will "Open" if the RWK is opened.

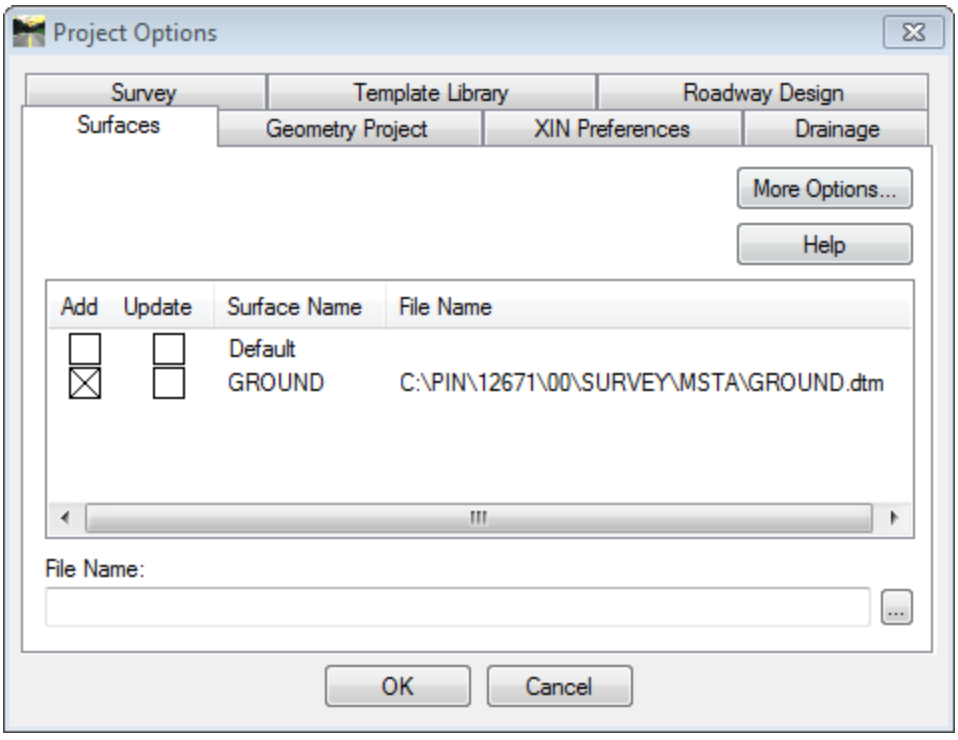


Figure 13-21: Project Options when saving an .RWK as Add only

- Depending on permissions, you may not be able to write to the Survey\MSTA folder.

Select the *Template Library* tab. Place an "X" in the *Add* and *Update* boxes (Figure 13-22). *Update* means this file will "Save Down" if the RWK is saved. In summary, Add means Open, Update means Save, but only if the RWK is utilized.

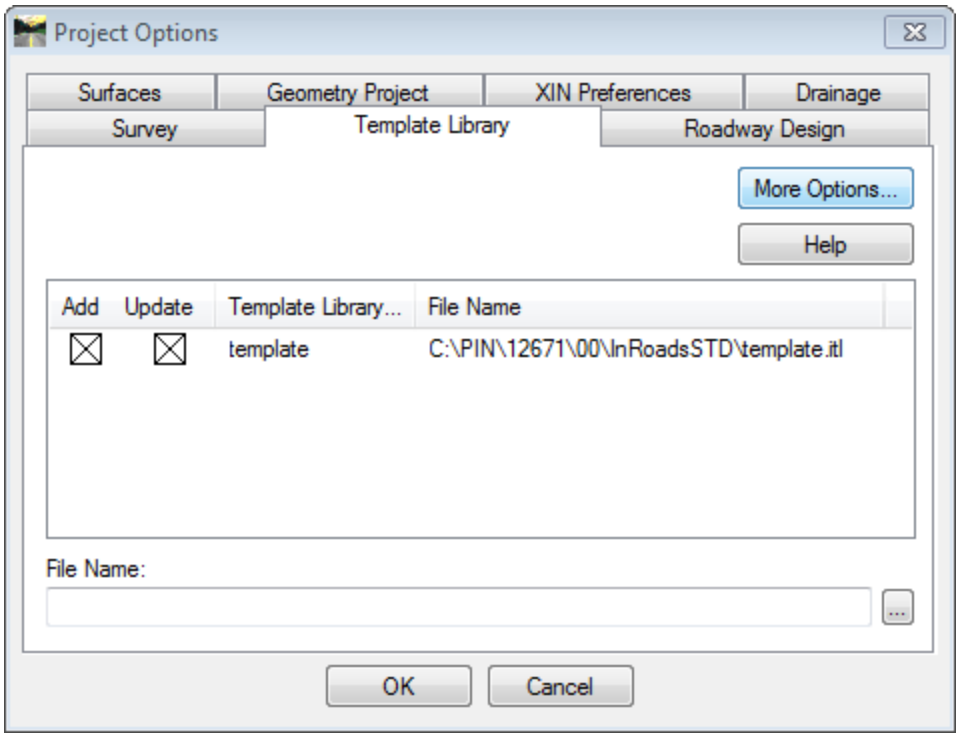


Figure 13-22: Project Options when saving an .RWK as Update and Add

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 As > 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 to Open the file for editing. If Windows can't open the file but will give you an option to *Open With,* pick this option (Figure 13-23) and select *Notepad* to open this file type.

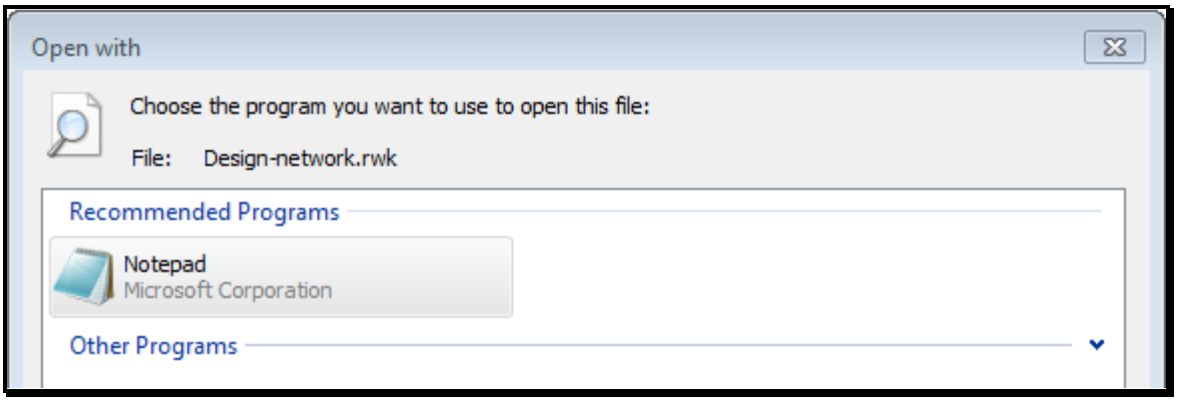


Figure 13-23: Select a program to open the .rwk extension (Notepad)

Once the file is open, you will notice that the paths are pointing to the D: drive (Figure 13-24).

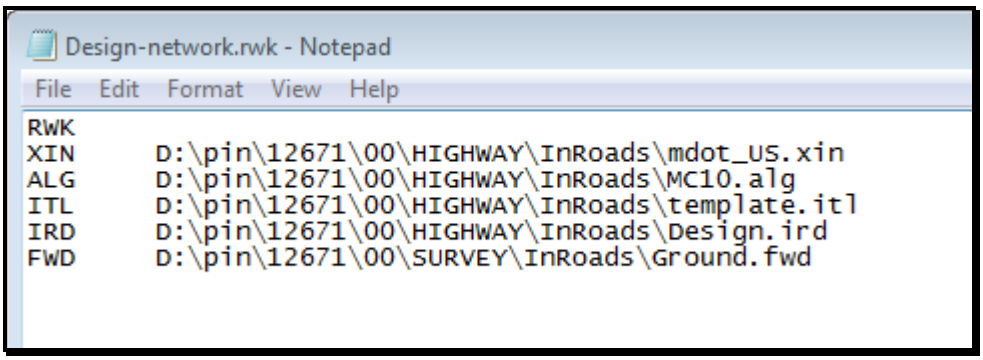


Figure 13-24: RWK file pointing files the D: drive

Replace the D: with a Y: so that the paths to the files are directed to the network (Figure 13-25). Save the file.

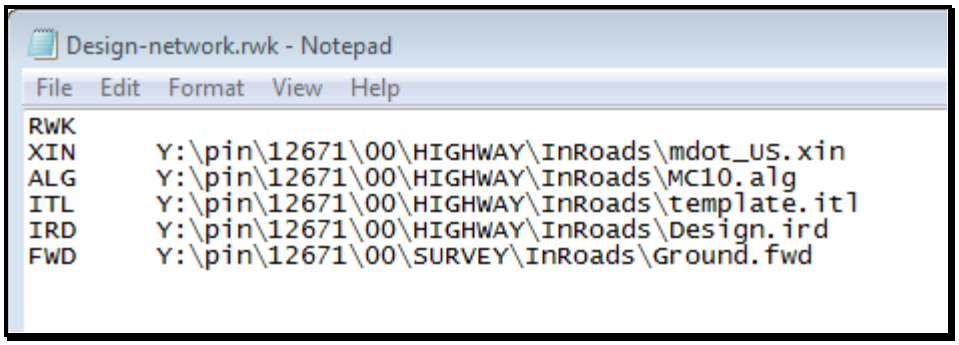


Figure 13-25: RWK file adjusted so that it points for files on the Y: drive

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 stores an alignment as an **.ALG** file. You can have multiple *Geometry Projects* open, but only one active.

Create Highway_working.dgn

Create a Highway_working or Bridge_working file to work in and Start *InRoads Suite V8i*.

Step One: Create a Geometry Project

Part One:

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).

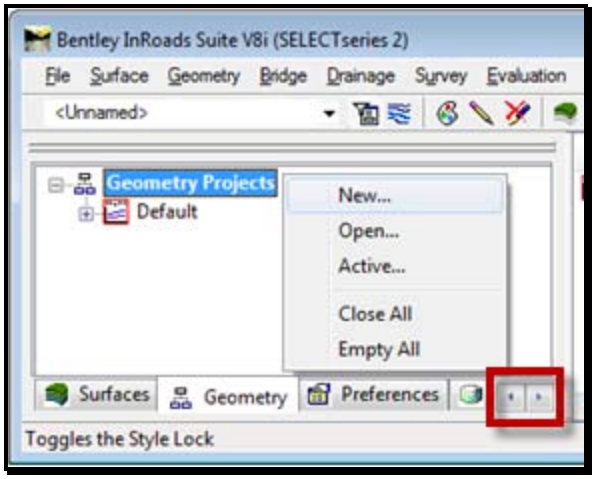


Figure 14-1: Create a new Geometry Project

Part Two:

Supply the name **MainLine** for your *Geometry Project* 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.

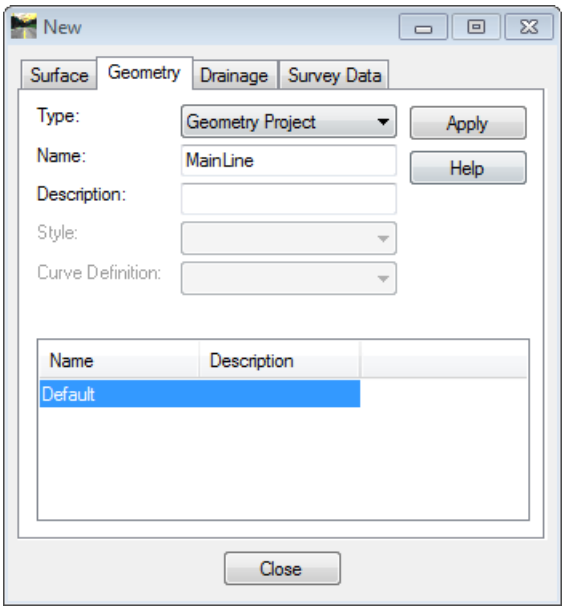


Figure 14-2: Name the Geometry Project

Step Two: Create a Horizontal Alignment (Container)

Part One:

With the *New* dialog still open, change the pull down to *Horizontal Alignment* (Figure 14-3).

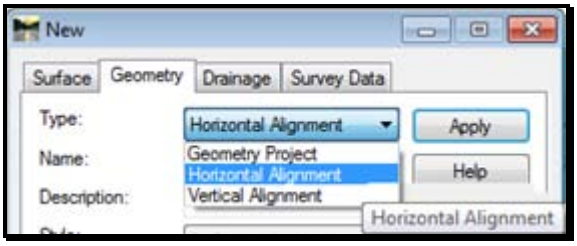


Figure 14-3: Create a new Horizontal Alignment

- 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.

Part Two:

Supply **MainLine_Horiz** for the name of your *Horizontal Alignment* as seen in Figure 14-4. Add a description that you would want to use for the road name. Later on we can extract it with *Drafting Notes.*

Change the *Style* to **D_Roadway_Centerline.** Click **Apply.** Don't close the dialog yet.

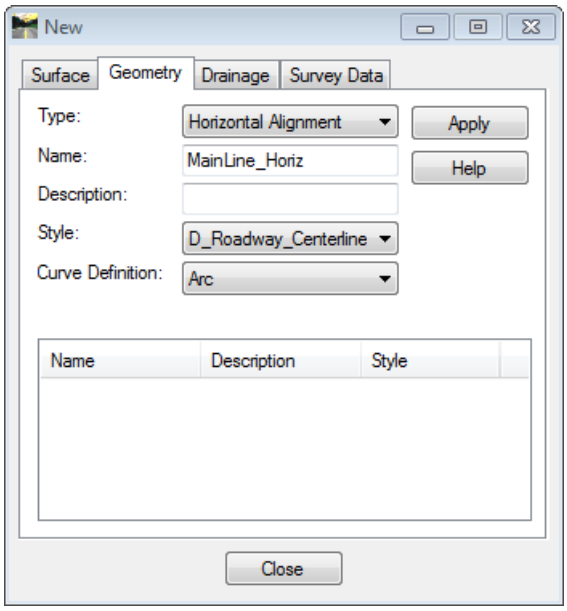


Figure 14-4: Name the Horizontal Alignment

Step Three: Create a Vertical Alignment (Container)

Part One:

With the *New* dialog still open, change the pull down to *Vertical Alignment* (Figure 14-5).

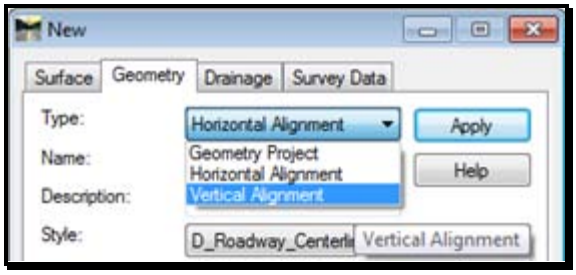


Figure 14-5: Create a new Vertical Alignment

- 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.

Part Two:

Supply **MainLine_Vert** as the name of your *Vertical Alignment* as seen in Figure 14-6. Add a description if you think it would be helpful, but it's not necessary.

Change the *Style* to **D_Roadway_Centerline.** Click **Apply** and then click **Close.**

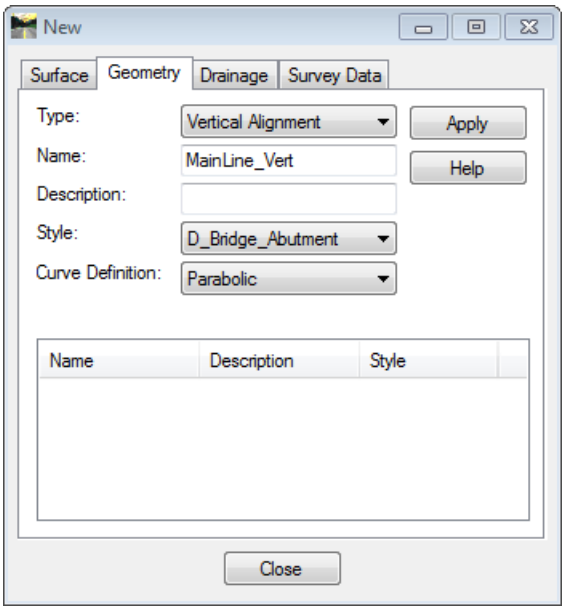


Figure 14-6: Name the Vertical Alignment

Step Four: Save Geometry 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.

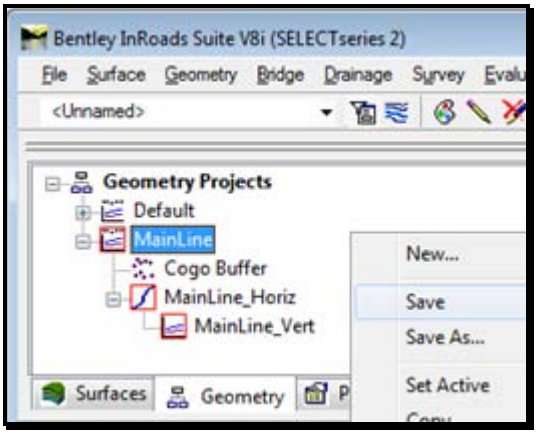


Figure 14-7: Save the Geometry Project at the InRoads Explorer dialog

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.

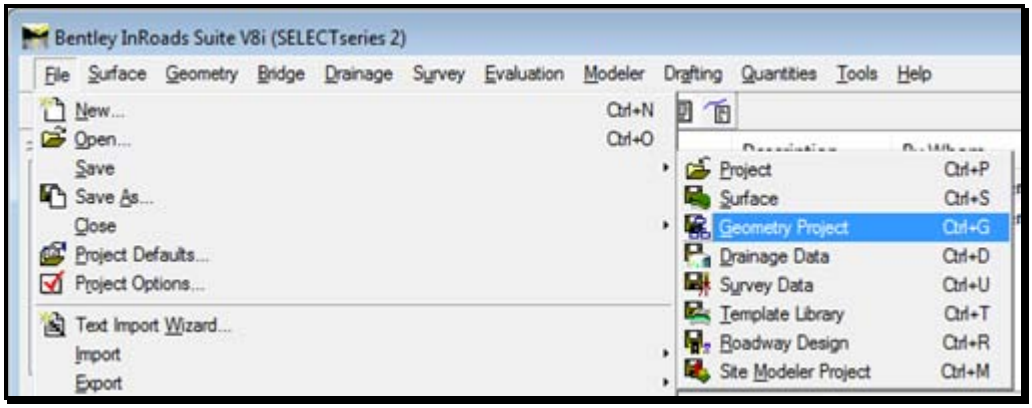


Figure 14-8: Saving the project via the main menu

Step Five: 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 **Projects (*.rwk)** and adjust the *Options* button to *Add* and *Update* the new *Geometry Project.*

DESIGN HORIZONTAL ALIGNMENT

Overview

Anyone who has done alignments in the past (with MX or any other software) will find the tools very familiar in name and operation. InRoads **HELP** menu will provide a good definition of the types of tools available.

- The section below highlights the Element toolset to create horizontal geometry. The other toolset is the PI toolset and the main difference is the alignment has to be continuous from start to stop for those tools to be used. A designer might need to rely on both methods to fully define the needed geometry, so it is advantageous to know what both can do.

InRoads Help

Overview

InRoads provides tool specific help on each tool. The help is also available on specific topics in the *Table of Contents.*

Before using the tools reviewed below, let's review the three types of elements and then you'll better understand how they are to be placed:

- **Fixed** Horizontal Elements are fully defined in shape and position, enough information is available to lock the piece of geometry in place. It could be considered independent of other existing elements. Lines will be defined by information such as Start points and End points or a Start point with a direction and distance. Curves will be defined by Two Points and Radius or Three Points.
- **Floating** Horizontal Elements are linked and attached on one end to an existing element. That existing element will serve as a base for the proposed element. Once placed, it will become a fixed element. When connecting to an existing curve or line, the element will adjust to the best fit solution. Lines will be defined by a Point or Direction and the resulting floating line will be a best fit. Curves follow the same workflow and the existing element responds by adjusting itself to meet the new solution. Curves will be defined by Point and Radius or Point and Direction.
- **Free** Horizontal Elements are linked to two existing elements and they must fit in between them. Free Elements cannot be at start or end of alignment. They simply connect to other elements at both ends. The Free Curve needs the user to enter a Radius. The Free Line connects to the adjacent curve elements.

When defining Vertical Geometry using the Element tools, the same general constraints apply, but with vertical geometry parameters. Vertical Element tools are covered later in this chapter.

Part One:

Select **Help > Contents** from the InRoads main menu.

Part Two:

Select **Reference Information** on the left of the directory tree. Select the **Geometry** link on the right (Figure 14-9).

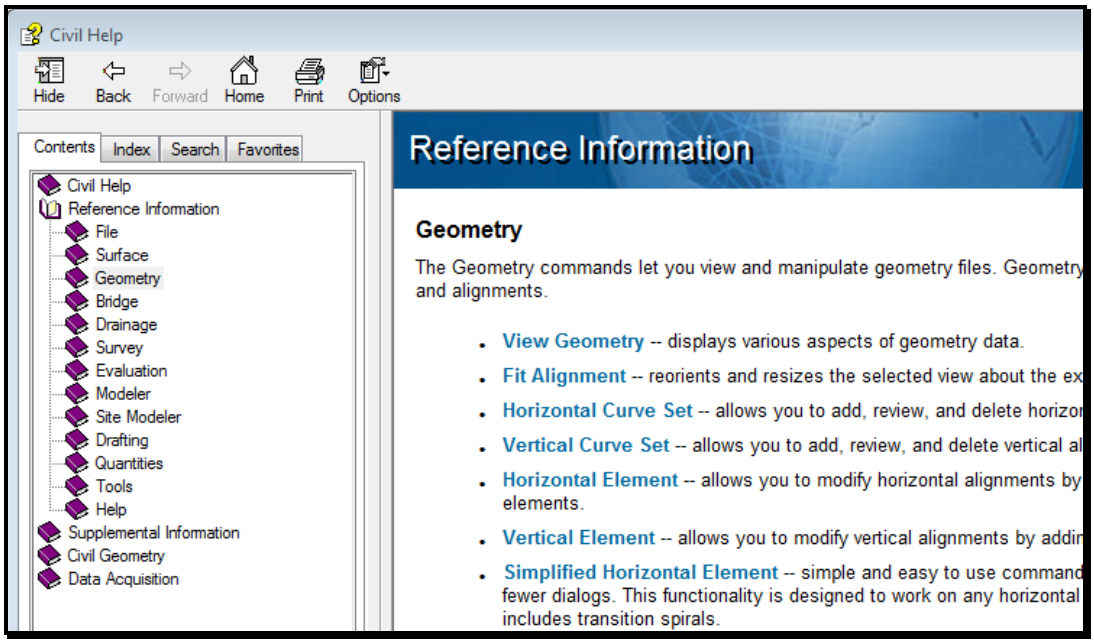


Figure 14-9: Civil Help – Reference Information

HORIZONTAL ELEMENT METHOD

Method One: Add Fixed Line…

Select **Geometry > Horizontal Element > Add Fixed Line…** from the InRoads menu. This will bring up the Add Fixed Horizontal Line dialog Figure 14-10.

Part One: Add Fixed Horizontal Line – By Two Points

To create a Fixed Horizontal Element by two points, enable *Point 1* and *Point 2*. Key in the appropriate *Northing* and *Easting* values (Figure 14-10) or you could click the Target Button and snap to a MicroStation graphic to set the location. Click **Apply** and **Left Mouse Button** to accept. Remember to follow the prompts in the bottom left of the MicroStation window.

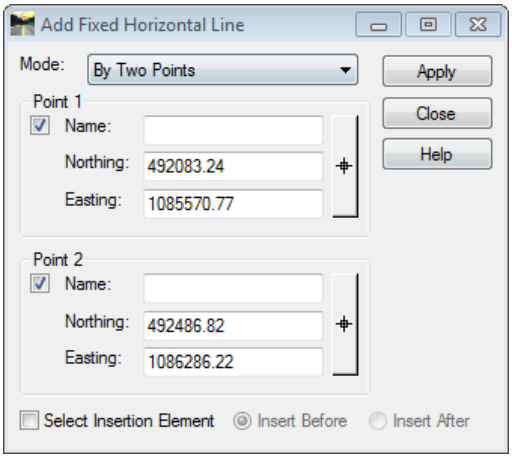


Figure 14-10: Add Fixed Horizontal Line Dialog – Mode: By Two Points

Part Two: Add Fixed Horizontal Line – By Point, Direction and Distance

To create a horizontal element by point, direction and distance, change the *Mode to By Point, Direction and Distance*. Key in the appropriate *Northing* and *Easting* values (this is where the line will start). Key in the appropriate *Direction* and *Distance* (Figure 14-11). Click **Apply** and **Left Mouse Button** to accept.

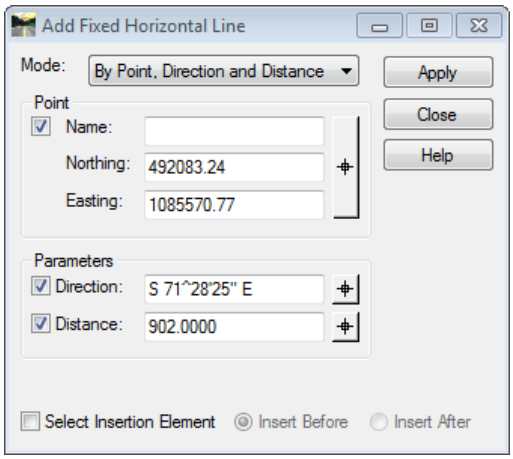


Figure 14-11: Add Fixed Horizontal Line Dialog – Mode: By Point, Direction and Distance

Informational Example

You can layout alignments with the fixed horizontal line graphically as well. Just disable all options within the dialog (Figure 14-12). Click **Apply** and follow the prompts as provided in the lower left corner of the MicroStation graphic window.

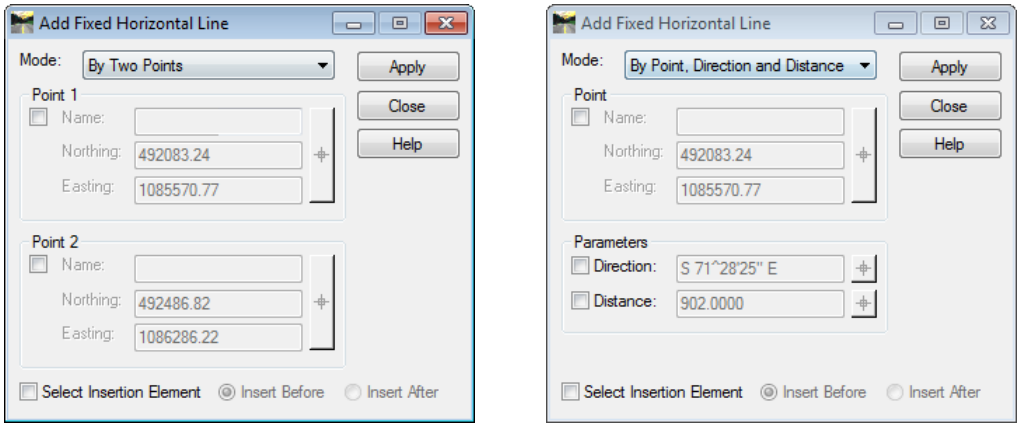


Figure 14-12: Add Fixed Horizontal Line Dialogs – All Options Disabled

Method Two: Add Free Horizontal Curve…

Select **Geometry > Horizontal Element > Add Free Curve…** from the InRoads menu. This will bring up the Add Free Horizontal Curve dialog (Figure 14-13).

Part One: Add Free Horizontal Curve…

Enter values for the *Radius* and click **Apply** to begin the command. A negative value will create a circular curve in a counter clockwise direction and a positive value will produce a clockwise circular curve. Remember to follow the prompts in the bottom left of the MicroStation window.

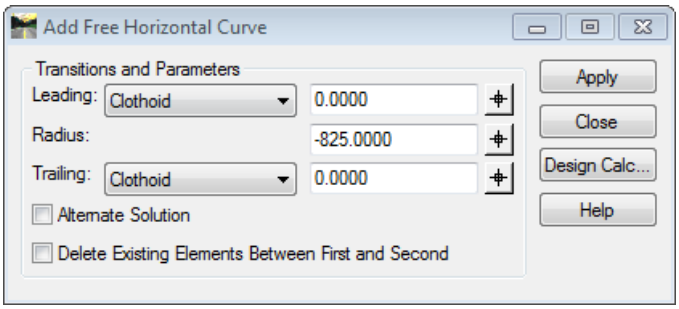


Figure 14-13: Add Free Horizontal Curve Dialog

Identify first element; identify second element and **Left Mouse Button** to accept the circular curve between the two fixed elements. **Right Mouse Button** to end this process.

Method Three: Add Floating Horizontal Curve…

Select **Geometry > Horizontal Element > Add Floating Curve…** from the InRoads menu. This will bring up the Add Floating Horizontal Curve dialog (Figure 14-14).

Part One: By Point and Radius

To create a floating horizontal curved element by point and radius, change the *Mode* to *By Point and Radius*. Key in the appropriate *Northing* and *Easting* values (this is the location where the curve will end) or you could click the Target Button and snap to a MicroStation graphic to set the location. . Key in the appropriate *Radius* (Figure 14-14). Click **Apply;** identify element with a **Left Mouse Button** and **Left Mouse Button** to accept the floating circular curve off the beginning element. **Right Mouse Button** to end this process.

- This tool, like many others, allows for the use of Spirals in the Leading and Trailing Clothoid fields. However, MaineDOT does not regularly use Spirals.

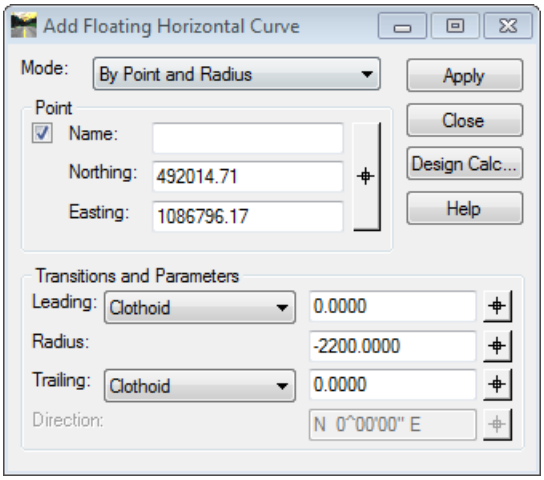


Figure 14-14: Add Floating Horizontal Curve Dialog – By Point and Radius

Part Two: By Point and Direction

To create a floating horizontal curved element by point and direction, change the *Mode* to *By Point and Direction*. Key in the appropriate *Northing* and *Easting* values (this is the

location where the curve will end). Key in the appropriate *Radius.* Key in the appropriate *Direction* (this is an imaginary line where the curve will be tangent). See Figure 14-15.

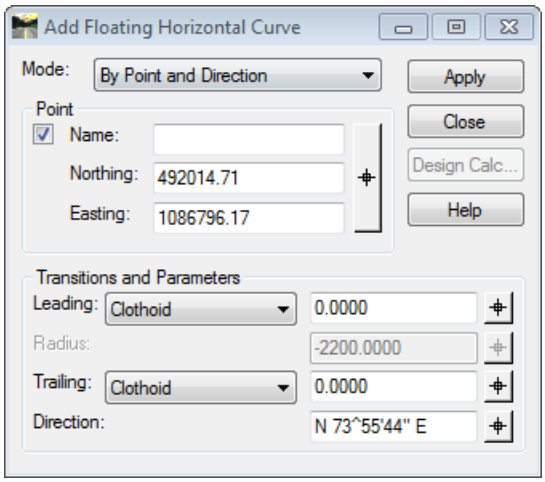


Figure 14-15: Add Floating Horizontal Curve Dialog – By Point and Direction

Click **Apply;** Identify preceding element with a **Left Mouse Button** and **Left Mouse Button** to accept the floating circular curve element. **Right Mouse Button** to end this process.

Method Four: Add Fixed Horizontal Curve…

Select **Geometry > Horizontal Element > Add Fixed Curve…** from the InRoads menu. This will bring up the Add Fixed Horizontal Curve dialog.

Part One: By Two Points and Radius

To create a fixed horizontal curved element by two points and radius, change the *Mode* to *By Two Points and Radius*. Key in the appropriate *Northing* and *Easting* values (this is the location where the curve will begin and end) or you could click the Target Button and snap to a MicroStation graphic to set the location. Key in the appropriate *Radius.* See Figure 14-16. Click **Apply** and **Left Mouse Button** to accept.

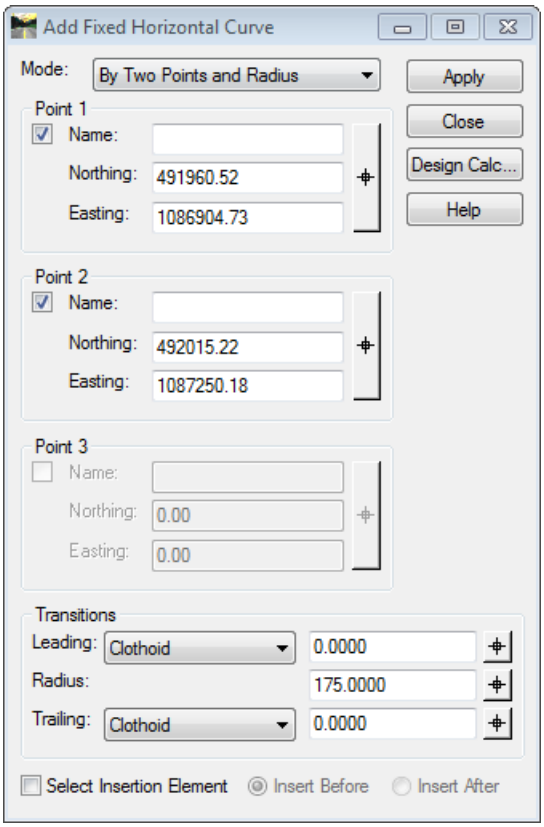


Figure 14-16: Add Fixed Horizontal Curve – By Two Points and Radius

Part Two: By Three Points

To create a fixed horizontal curved element by three points, change the *Mode* to *By Three Points*. Key in the appropriate *Northing* and *Easting* values (this is the location where the curve will begin and end; Point 2 is a pass-through point). See Figure 14-17. Click **Apply** and **Left Mouse Button** to accept.

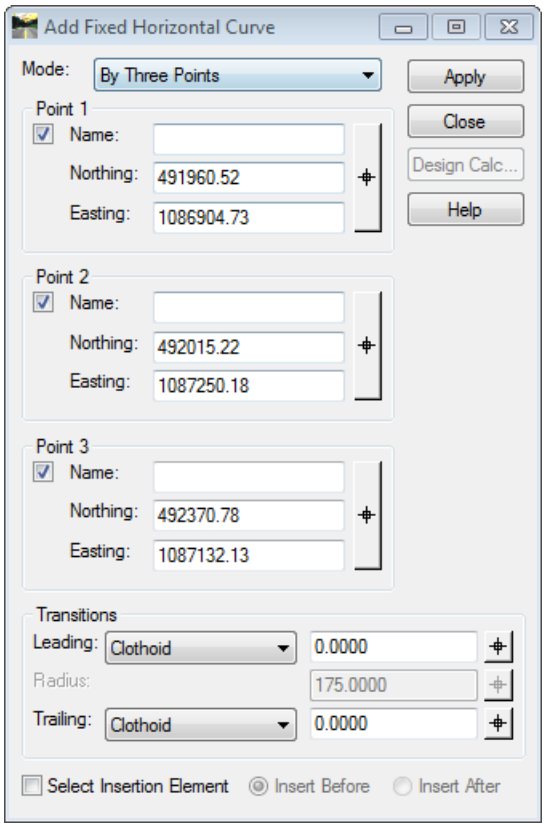


Figure 14-17: Add Fixed Horizontal Curve – By Three Points

Method Five: Add Floating Horizontal Line…

Select **Geometry > Horizontal Element > Add Floating Line…** from the InRoads menu. This will bring up the Add Floating Horizontal Line dialog.

Part One: By Point

To create a floating horizontal line by point, change the Mode to By Point. Key in the appropriate *Northing* and *Easting* values (this is the location where the line will end) or you could click the Target Button and snap to a MicroStation graphic to set the location. See Figure 14-18.

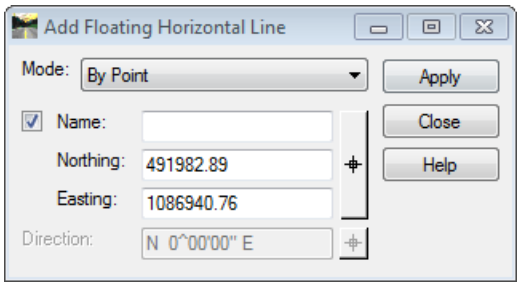


Figure 14-18: Add Floating Horizontal Line – By Point

Click **Apply**. Identify the curve element with a **Left Mouse Button** and **Left Mouse Button** to accept the floating horizontal line. **Right Mouse Button** to end this process.

Part Two: By Direction

To create a floating horizontal line by direction, change the *Mode* to *By Direction*. Key in the appropriate *Direction* (this is the direction of the line). See Figure 14-19.

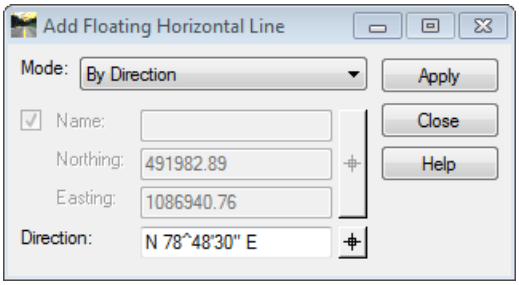


Figure 14-19: Add Floating Horizontal Line – By Direction

Click **Apply;** Identify the curve element with a **Left Mouse Button**; Move your mouse to the side of Mainline you just identified, which will show the floating line alignment and **Left Mouse Button** to accept the point; **Left Mouse Button** again to accept the floating line.

Method Six: Add Free Horizontal Line…

Select **Geometry > Horizontal Element > Add Free Line…** from the InRoads menu. This will bring up the Add Free Line dialog.

Part One: Add Free Line

This tool has no dialog just simply follow the prompts; it does require that you select the preceding and following element to make the appropriate connection. Select the first element with a **Left Mouse Button**; select the second element with a **Left Mouse Button** and **Left Mouse Button** to accept the free horizontal line.

ADJUSTING START STATION

After completing the horizontal alignment it is recommended to adjust the start station of your alignment. To do this select **Geometry > Horizontal Curve Set > Stationing…** from the InRoads main menu. See Figure 14-20.

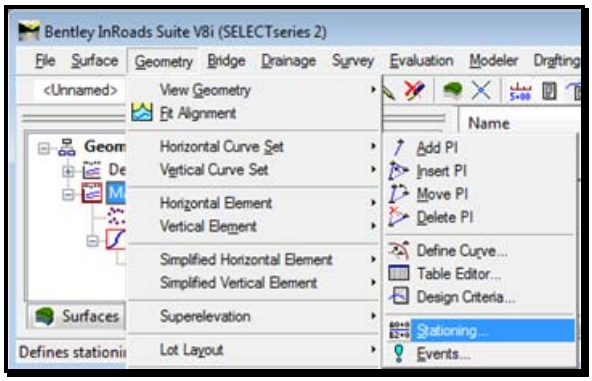


Figure 14-20: Geometry > View Geometry > Stationing Command

Select the *Horizontal Alignment* name; pick the *Northing* and *Easting* point by using the target button and graphically selecting the start location and then type the desired **Starting Station**. Click **Apply**. See Figure 14-21.

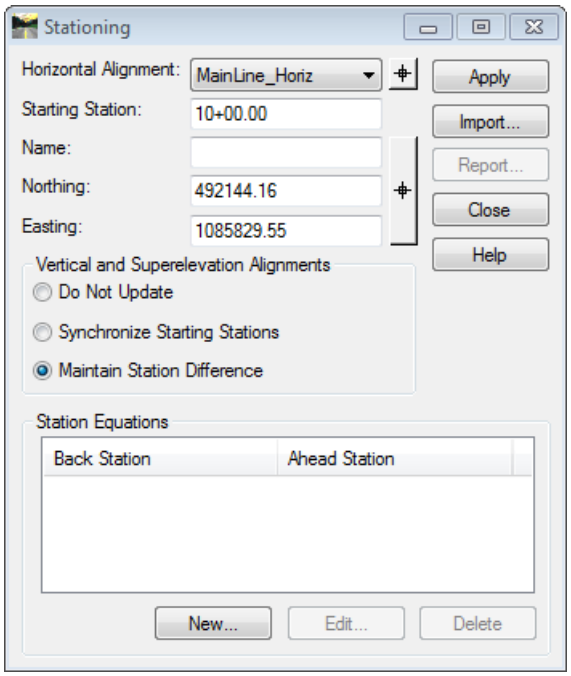


Figure 14-21: Stationing Dialog

EDITING HORIZONTAL ALIGNMENT

Overview

There are a few different ways to manipulate your horizontal alignment. The list below is how you can manipulate your horizontal alignment short of deleting and recreating portions of it. The following does require you have integrity within your alignment.

- **Geometry > Horizontal Curve Set > (Add PI, Insert PI, Move PI or Delete PI)**
- **Geometry > Horizontal Curve Set > Define Curve…**
- **Geometry > Horizontal Curve Set > Table Editor…**

If there are discontinuities then you may choose to fix the problem by checking the integrity of the alignment and deleting the problem element or by using:

- **Geometry > Horizontal Element > Check Integrity…**
- **Geometry > Horizontal Element > Edit Element…**
- **Geometry > Horizontal Element > Delete Element…**

ANNOTATING HORIZONTAL ALIGNMENTS

Overview

With MaineDOT's setup standards for InRoads we have made it really simple to annotate your alignment. The final deliverable requires that you create an **Alignments.dgn** file for your final alignments.

When creating a horizontal (or vertical) geometry from scratch, the **Geometry > View Geometry > Options** tool allows for annotation to show automatically while creating the geometry itself. See Figure 14-22. The **Default** preference turns on 3 horizontal tools and 1 vertical tool. When you define the geometry, if the Style matches one of the tools available preference set names (case-sensitive), then the link is defined and the annotation will show automatically which saves multiple steps and improves workflow efficiency.

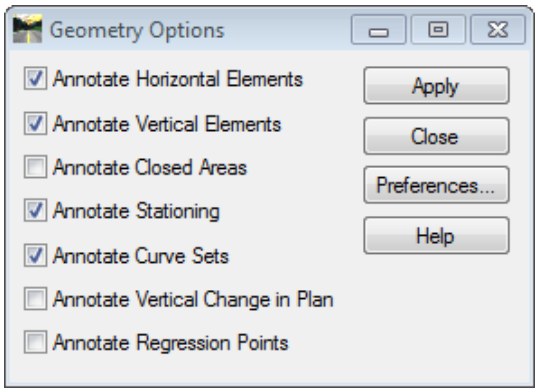


Figure 14-22: Geometry Options

Other preferences are available and allow user to see only horizontal annotation, only vertical, or turn off all toggles. In review, just because the toggles are turned on, doesn't mean it will work. The Horizontal Alignment Style needs to match an available preference set name within the tool toggled on (i.e. *D_Roadway_Centerline*). See Figure 14-23.

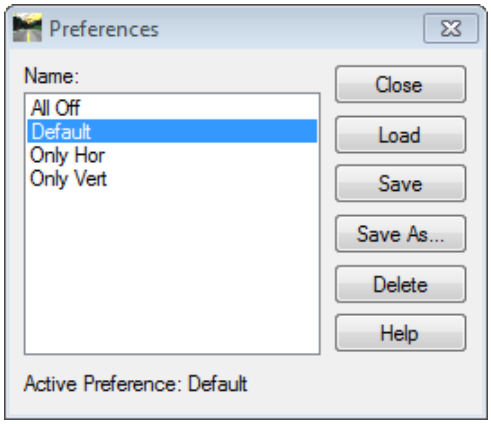


Figure 14-23: Preferences Dialog

Step One: View Alignment

Part One: Create File

Select **File** > **Make Sheetz** from the MicroStation main menu and create a no prefix drawing called **Alignments.dgn**. **Cancel** the dialog once the file is created. You will notice you are in the new drawing by looking at the top left of the MicroStation window.

- 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.

Part Two: View Alignment

Verify you have the new alignment active that you just created by checking within your Geometry Project to see if there is a red square (means it is "active") around it. See Figure 14-24.

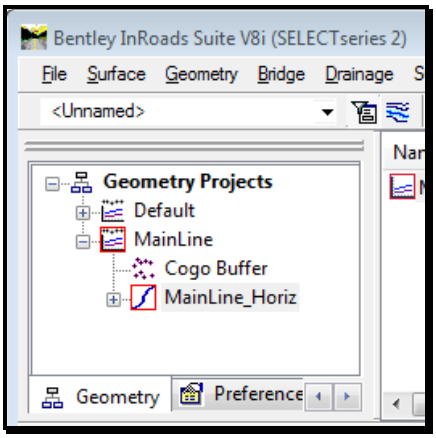


Figure 14-24: InRoads Explorer – Active Geometry

Also check to see if you have the **Station Lock** on so that you get 100 foot stationing based on the even stationing value. This is important only when you may have started the stationing with an odd value; however this lock is almost always on. See Figure 14-25.

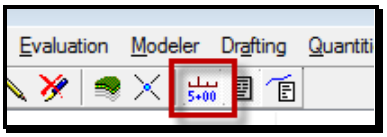


Figure 14-25: Station Lock

Step Two: Annotate Stationing

Select **Geometry** > **View Geometry** > **Stationing…** from the InRoads main menu. Select your **Horizontal Alignment:** by using the pull down arrow or using the **Target** button to pick it graphically. Click **Apply**. See Figure 14-26.

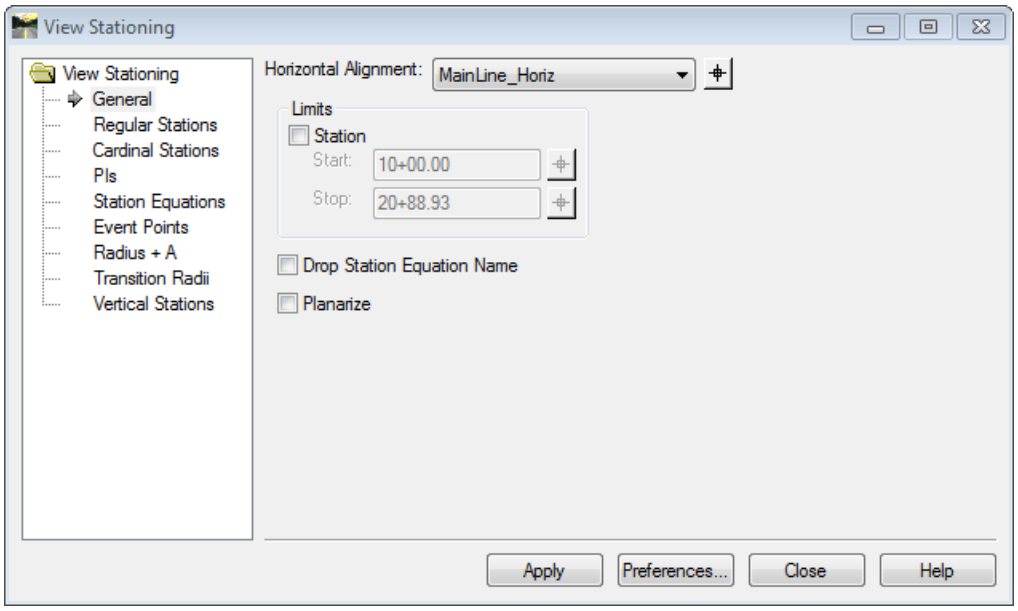


Figure 14-26: View Stationing Dialog

Step Three: Annotate Bearings

Select **Geometry > View Geometry > Horizontal Annotation…** from the InRoads main menu. On the **Main** tab there is a location for **Horizontal Alignments-Include:** you can place the cursor in this area and select **Filter…** in the upper right area of the dialog to select the alignment, use the **Target** button to pick your alignment graphically, type the name and hit the Tab key on your keyboard, or even use a wild card like * and hit the Tab key on your keyboard. In any case you want to have the dialog look like below (Figure 14-27). Click **Apply**.

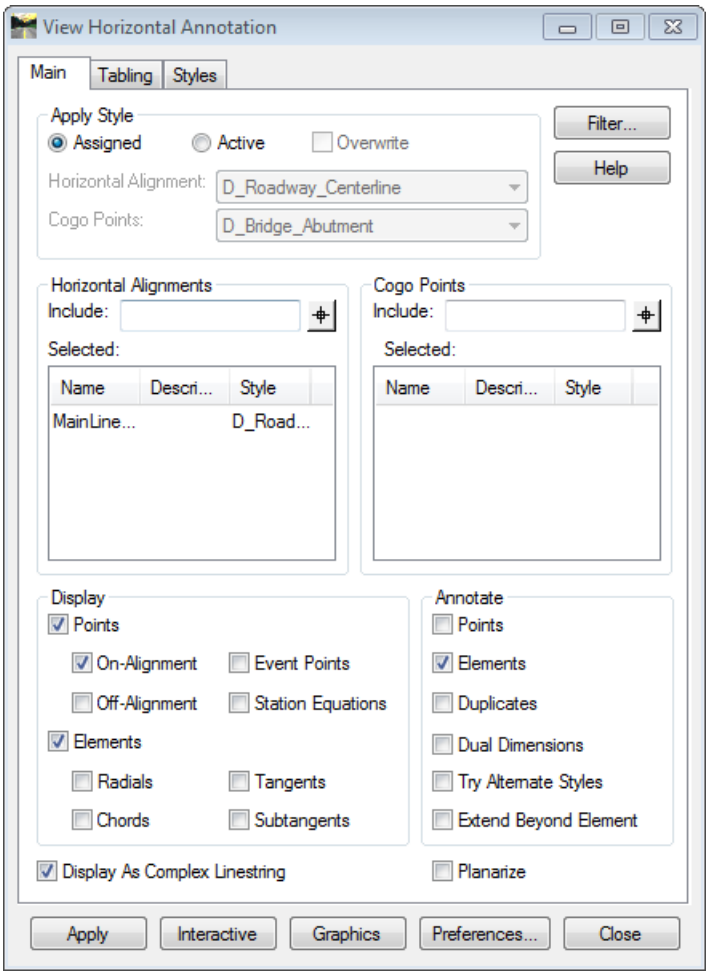


Figure 14-27: Horizontal Annotation Dialog

There will be some cleanup required as far as rotation of the bearings for the alignment. Simply use the rotate tool within MicroStation to adjust this.

Step Four: Annotate Curve Data

Select **Geometry > View Geometry > Curve Set Annotation…** from the InRoads main menu. Select your **Horizontal Alignment:** by using the pull down arrow or using the **Target** button to pick it graphically. See Figure 14-28. Click **Apply**.

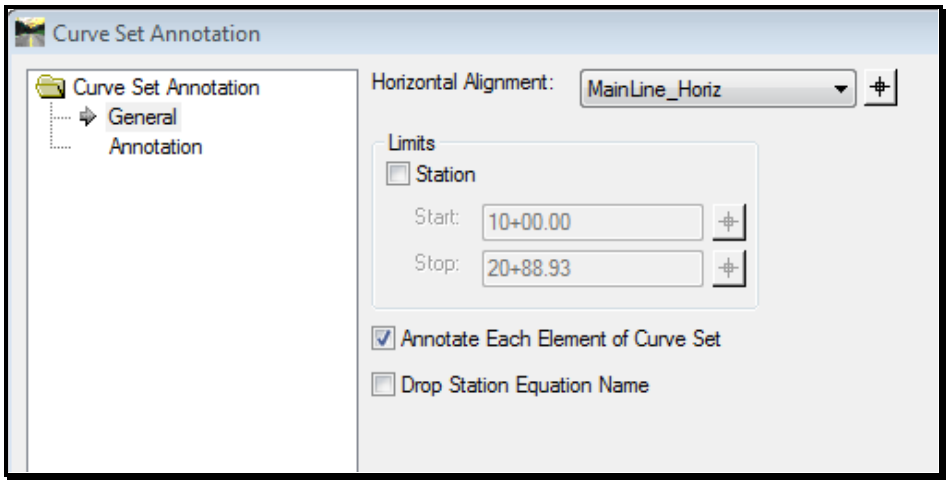


Figure 14-28: Curve Set Annotation Dialog

There will be some cleanup required as far as rotation of the curve data for the right side of the alignment. Simply use the rotate tool within MicroStation to adjust this.

Step Five: Flatten the Alignment

Select **File > Export > 2D** from the MicroStation menu. Key-in a new filename and click **OK** to flatten all elements in your **Alignments.dgn**. You have to use the **File > Open** command to open the 2D file that was just exported.

- By default InRoads 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.

DESIGN VERTICAL ALIGNMENT

Overview

Anyone who has done alignments in the past (with MX or any other software) will find the tools very familiar in name and operation. InRoads **HELP** menu will provide a good definition of the types of tools available.

- Before Vertical geometry can be defined, it needs to be a child of its horizontal alignment & a working profile needs to be created to work within. Profile creation is covered in the next section.
- The section below highlights the Element toolset to create vertical geometry. The other toolset is the PI toolset and the main difference is the alignment has to be continuous from start to stop for those tools to be used. A designer might need to rely on both methods to fully define the needed geometry, so it is advantageous to know what both can do.

InRoads Help

Overview

InRoads provides tool specific help on each tool. The help is also available on specific topics in the *Table of Contents.*

Part One:

Select **Help > Contents** from the InRoads main menu.

Part Two:

Select **Reference Information** on the left of the directory tree. Select the **Geometry** link on the right.

VERTICAL ELEMENT METHOD

Method One: Add Fixed Line…

Select **Geometry > Vertical Element > Add Fixed Line…** from the InRoads menu. This will bring up the Add Fixed Vertical Line dialog.

Part One: By Two Points

To create a fixed vertical line by two points, key in the *Station* and *Elevation* of the beginning and end of the line. See Figure 14-29.

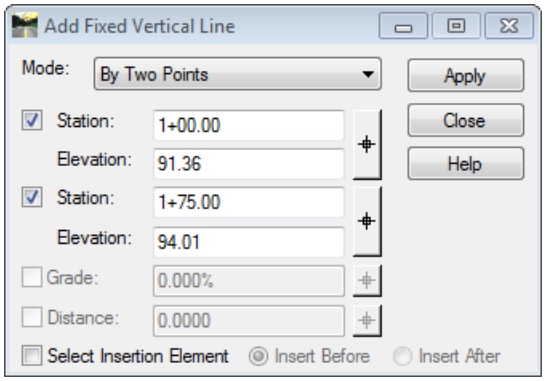


Figure 14-29: Add Fixed Vertical Line Dialog – By Two Points

Click **Apply** and **Left Mouse Button** to accept.

Part Two: By Point, Grade and Distance

To create a fixed vertical line by point, grade and distance, key in the *Station* and *Elevation* of the beginning of the line. Then, key in the *Grade* and *Distance* to the end of the line. See Figure 14-30.

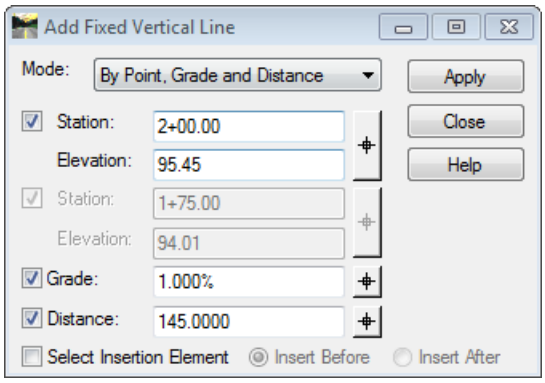


Figure 14-30: Add Fixed Vertical Line Dialog – By Point, Grade and Distance

Click **Apply** and **Left Mouse Button** to accept.

Method Two: Add Fixed Vertical Curve…

Select **Geometry > Vertical Element > Add Fixed Curve…** from the InRoads menu.

Part One: By Two Points and Parameter

To create a fixed vertical curve by two points and parameter, key in the *Station* and *Elevation* of the first and last points of the curve. Key in the appropriate Parameters. See Figure 14-31.

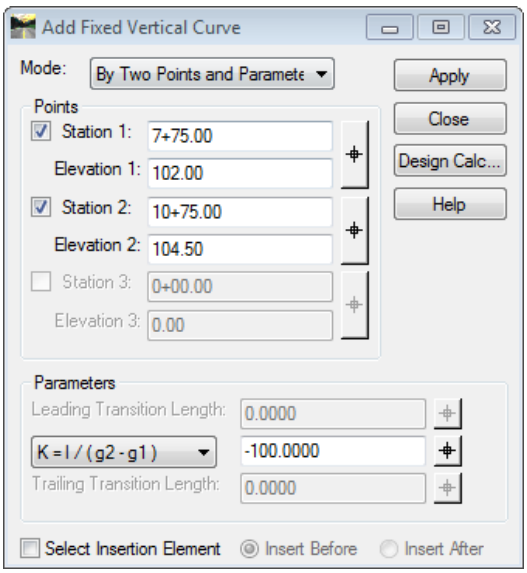


Figure 14-31: Add Fixed Vertical Curve Dialog – By Two Points and Parameter

Click **Apply** and **Left Mouse Button** to accept.

Part Two: By Three Points

To create a fixed vertical curve by three points, key in the *Station* and *Elevation* of the first and last points of the curve. Key in the *Station* and *Elevation* of any point on the curve (*Station 2* and *Elevation 2*). See Figure 14-32. Click **Apply** and **Left Mouse Button** to accept.

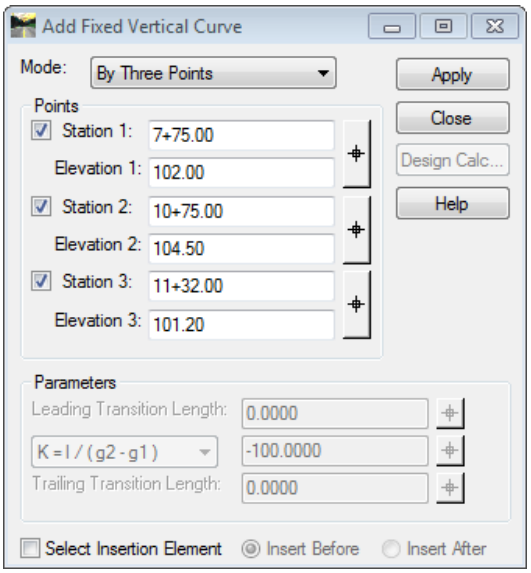


Figure 14-32: Add Fixed Vertical Curve Dialog – By Three Points

Method Three: Add Floating Vertical Curve…

Select **Geometry > Vertical Element > Add Floating Curve…** from the InRoads menu. This will bring up the Add Floating Vertical Curve dialog.

Part One: By Point and Parameter

To create a fixed vertical curve by point and parameter, key in the *Station* and *Elevation* of where the curve ends. Key in the appropriate *Parameters*. See Figure 14-33.

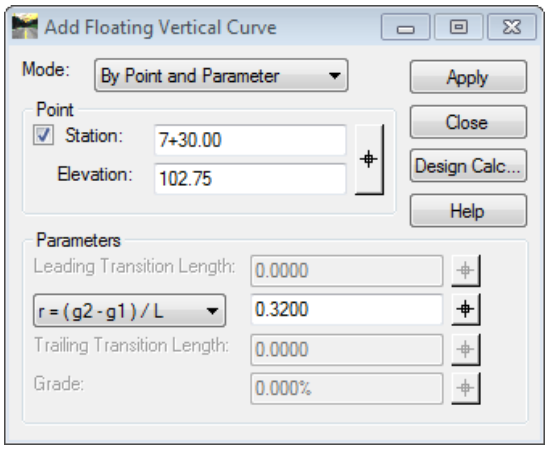


Figure 14-33: Add Floating Vertical Curve Dialog – By Point and Parameter

Click **Apply;** identify the preceding element with a **Left Mouse Button** and **Left Mouse Button** to accept the floating vertical curve off the beginning element. **Right Mouse Button** to end this process.

Method Four: Add Free Vertical Curve…

Select **Geometry > Vertical Element > Add Free Curve…** from the InRoads menu. This will bring up the Add Free Vertical Curve dialog.

Part One: Length

To create a free vertical curve by length, key in the appropriate *Length* of the curve. See Figure 14-34.

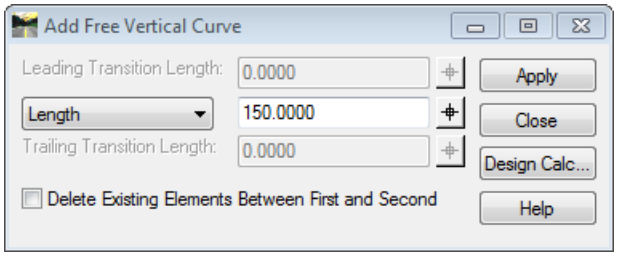


Figure 14-34: Add Free Vertical Curve Dialog

Click **Apply;** identify the first element with a **Left Mouse Button** and the second element

with a **Left Mouse Button; Left Mouse Button** to accept the free vertical curve between the two elements. **Right Mouse Button** to end this process.

Method Five: Add Floating Vertical Line…

Select **Geometry > Vertical Element > Add Floating Line…** from the InRoads menu. This will bring up the Add Floating Vertical Line dialog.

Part One: By Point

To create a floating vertical curve by point, change the *Mode* to *By Point*. Key in the *Station* and *Elevation* of the end of the line. See Figure 14-35.

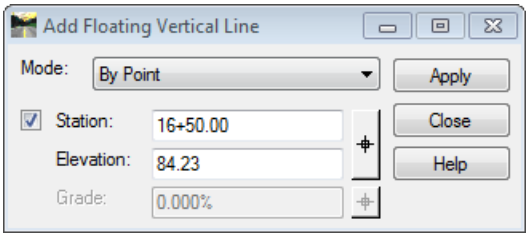


Figure 14-35: Add Floating Vertical Line Dialog

Click **Apply;** identify the preceding element with a **Left Mouse Button** and **Left Mouse Button** to accept placement. **Right Mouse Button** to end this process.

The **Add Floating Vertical Line** also has the option to place the line **By Grade**. For this option you would want to verify the exiting grade of the parabola and place this in the **Grade** location of the dialog box and follow the prompts for placement.

Method Six: Add Free Vertical Line…

Select **Geometry > Vertical Element > Add Free Line…** from the InRoads menu.

Part One: Add Free Line

This tool has no dialog just simply follow the prompts; it does require that you select the preceding and following element to make the appropriate connection. Select the first element with a **Left Mouse Button**; select the second element with a **Left Mouse Button** and **Left Mouse Button** to accept the free vertical line.

Use this tool to fill in the gaps between parabolas previously placed. There should be two locations within the vertical alignment that will need this to finalize the vertical alignment.

EDITING VERTICAL ALIGNMENT

Overview

There are a few ways to edit the vertical geometry that was just placed through the exercise. Below is a list of possible ways to edit the vertical alignment.

- **Geometry > Vertical Curve Set > (Add PI, Insert PI, Move PI or Delete PI)**
- **Geometry > Vertical Curve Set > Define Curve…**
- **Geometry > Vertical Curve Set > Table Editor…**

If there are discontinuities then you may choose to fix the problem by checking the integrity of the vertical alignment and deleting the problem element or by using:

- **Geometry > Vertical Element > Check Integrity…**
- **Geometry > Vertical Element > Edit Element…**
- **Geometry > Vertical Element > Delete Element…**

ANNOTATING VERTICAL ALIGNMENT

Overview

With MaineDOT's setup standards for InRoads we have made it really simple to annotate your vertical alignment. If you want to create a long profile and annotate it for printing the following will need to be done.

Step One: Create File

Select **File > Make Sheetz** from the MicroStation main menu and create a no prefix drawing called **Profile.dgn**. **Cancel** the dialog once the file is created. You will notice you are in the new drawing by looking at the top left of the MicroStation window.

- After entering your project file you may want to verify your *Global Scale Factors* are set to the desired scale before displaying your Annotation.
- 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 Two: Create Long Profile

Select **Evaluation > Profile > Create Profile…** from the InRoads main menu. Verify you have the active vertical alignment; select the **Source** location in the InRoads explorer tree and look to the right. See Figure 14-36.

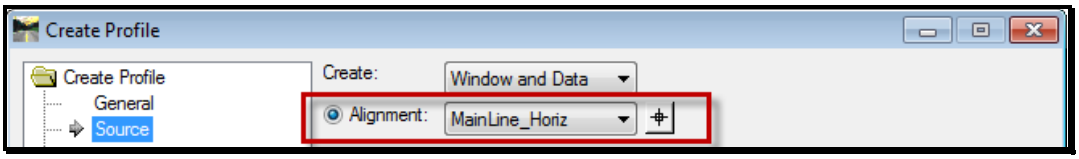


Figure 14-36: Create Profile Dialog – Horizontal Alignment Selection

Return to the **General** location and select the **Ground** surface only. See Figure 14-37.

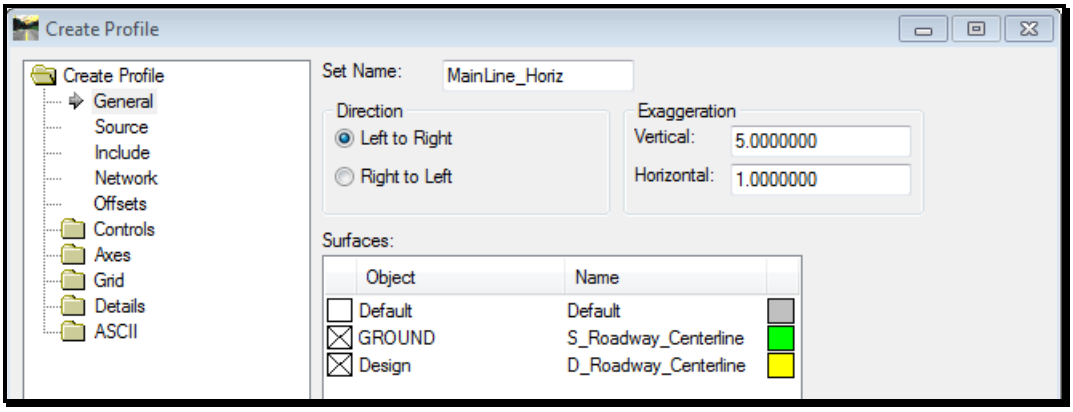


Figure 14-37: Create Profile Dialog – Surface Selection

You can limit the length of the profile if your design is only a portion of the overall

horizontal alignment. Select the **Controls** folder and limit the profile from the start to stop. See Figure 14-38.

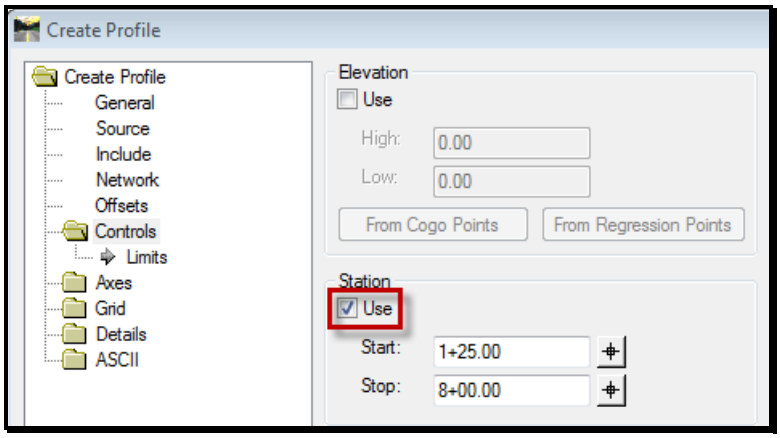


Figure 14-38: Create Profile Dialog – Station Limits

Click **Apply** and **Identify Location** of profile within the view window of MicroStation with a **Left Mouse Button**.

Step Three: View Alignment

Verify you have the new alignment active that you just created the profile along by checking within your geometry project to see if there is a red square around it (signifies it is 'active'). Select **Geometry > View Geometry > Active Vertical**.

Step Four: Annotate Elevations

Select **Evaluation > Profile > Annotate Profile** from the InRoads main menu. Verify you have the correct **Profile Set:** picked if there is more than one profile drawing created within this file. See Figure 14-39.

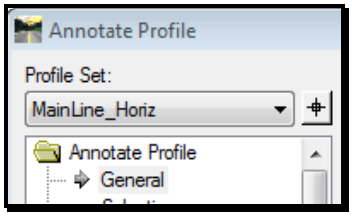


Figure 14-39: Annotation Profile – Profile Set Selection

Select the **Preferences…** button at the bottom of the **Annotate Profile** dialog and load the **Proposed and Existing Elevation** preference. See Figure 14-40.

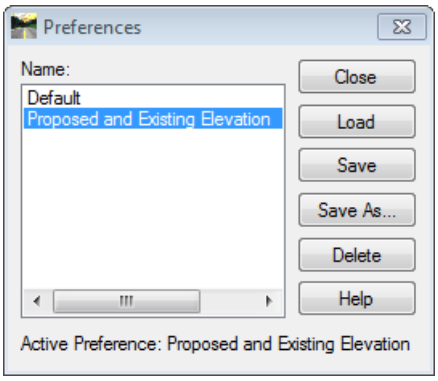


Figure 14-40: Preferences for Annotate Profile Dialog

Close the dialog.

Verify your **Vertical Alignment:** and set the **Surface:** to **Ground**. See Figure 14-41.

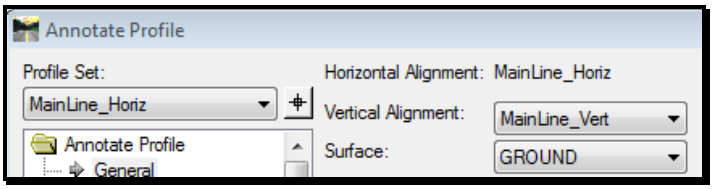


Figure 14-41: Annotation Profile – Vertical Alignment and Ground Selection

Click **Apply**.

Step Five: Annotate Vertical Curve Information

Select **Geometry > View Geometry > Vertical Annotation** from the InRoads main menu. On the **Main** tab verify you have the correct **Horizontal Alignment, Vertical Alignment** and **Profile Set** picked. See Figure 14-42. Click **Apply**.

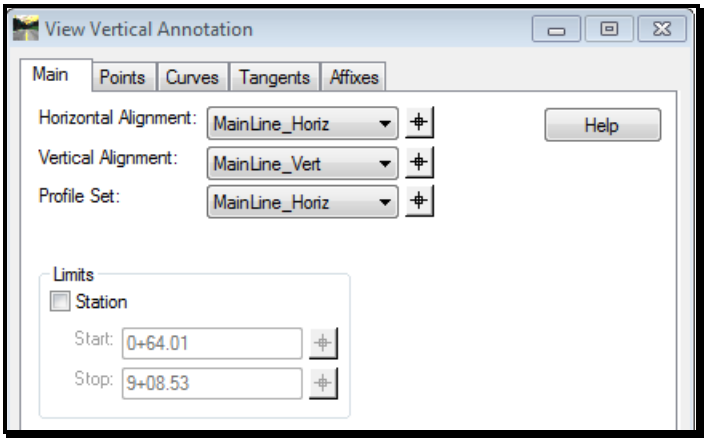


Figure 14-42: View Vertical Annotation Dialog

DRAFTING NOTES

USING INROADS DRAFTING NOTES

Overview

InRoads Drafting Notes are extremely useful as an analysis tool as well as an annotation tool. Use this command to place an annotation note in a Plan, Profile or Cross Section design file. Notes can annotate existing or proposed InRoads features too.

As a drawing production tool, InRoads allows you to place computed or manual text as an intelligent note, meaning it does not have to be deleted when changes occur; it can be automatically updated, moved, or edited throughout the design process.

Notes are composed by directly keying text into the text field; selecting keywords for computed values; by selecting text from the User Text field; or by a combination of these methods. The entire note can be composed directly on the main dialog box.

MaineDOT Standard Notes.dft file

InRoads was shipped with a default **notes.dft** file that contains some basic examples of drafting notes. This file is separate from the .XIN (InRoads Preference file). We have defined the location of the *Drafting Notes* file through the *Project Defaults.* This location is within MaineDOT's InRoads configuration on users C: drive as opposed to within the project's folder structure. In this case, running the *Update Utility* will update the **notes.dft** making it available for any project.

As users develop more specific notes for standard MaineDOT notation, we can add them to the master **notes.dft** file and make them available for everyone.

Step One: Select Alignment and Surface

Part One: Open Drafting Notes Dialog

Select **Drafting > Place Plan Note** from the InRoads main menu. The *Place Plan Note* dialog opens with the active *Horizontal Alignment* selected along with the last active *Surface*. See Figure 14-43.

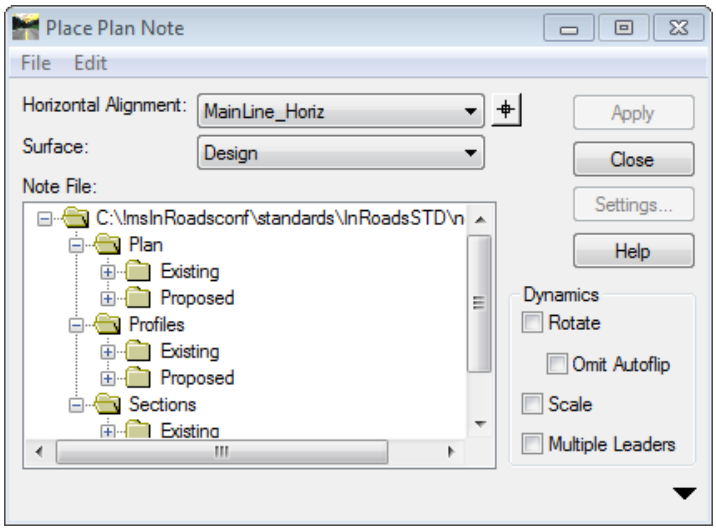


Figure 14-43: Place Plan Note Dialog

Part Two: Select Alignment and Surface

Select the centerline that you want to reference from the *Horizontal Alignment* pull down. For training purposes, select the **MainLine_Horiz.**

Set your active surface to **Design** by selecting it from the *Surface* pull down.

Part Three: Global Scale Factor

♫ The *Global Scale Factor* does come into play when using the *Drafting Notes.*

Select **Tools > Global Scale Factor** from the InRoads main menu. Enter the scale factors manually based on the type of drawing you are annotating. See Figure 14-44.

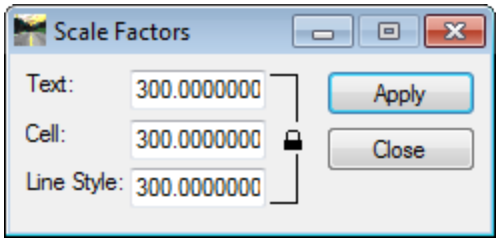


Figure 14-44: Scale Factors Dialog

OR

Select **File > Project Options** from the InRoads main menu. Load the Preference that corresponds to the type of drawing you are annotating and the scale it needs to make use of. See Figure 14-45.

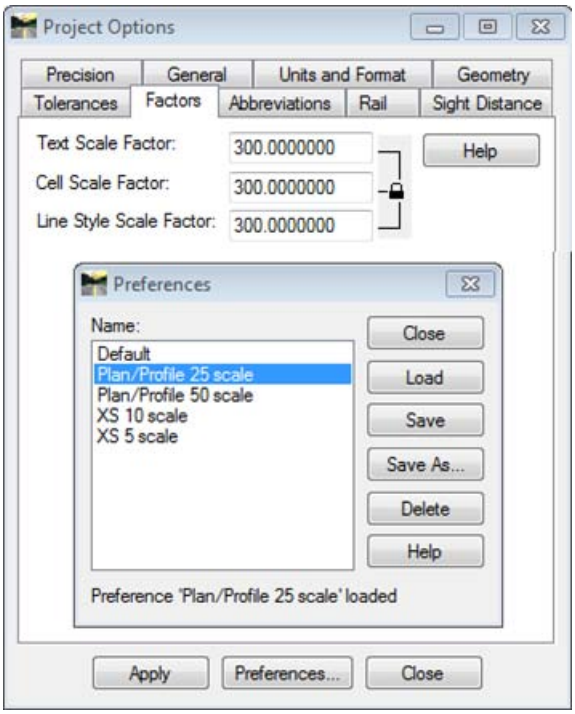


Figure 14-45: Project Options - Preferences

Plan or Profile Notes = 300, 300, 300 (standard 25 scale)

Cross Section Notes = 60, 1, 60 (standard 5 scale)

- Factors are based on absolute scale which gives users the flexibility to design/print/work at any scale (i.e. 12 x scale/in. = absolute scale or 12 x 25'/in = 300).

Step Two: Place Plan Note Folders

The **Plan** folder is broken up into two subfolders for ease of locating the type of note being placed. Additional folders can be added to further separate the types of notes being placed.

Existing Folder

The **Existing** folder contains predefined drafting notes intended to be used to annotate existing features or items in the existing surface (Ground) in a plan view. The font has been set to *dot_eng*, which is the standard MaineDOT font for labeling existing items.

Proposed Folder

The **Proposed** folder contains predefined drafting notes intended to be used to annotate proposed features or items in the proposed surface (Design) in a plan view. The font has been set to *dotitalics*, which is the standard for MaineDOT font for labeling proposed items.

Step Three: Existing "Feature Name" Note

Review the Settings

Expand the folder tree to view the *Existing* Plan Notes. Select the **Feature Name** note. See Figure 14-46.

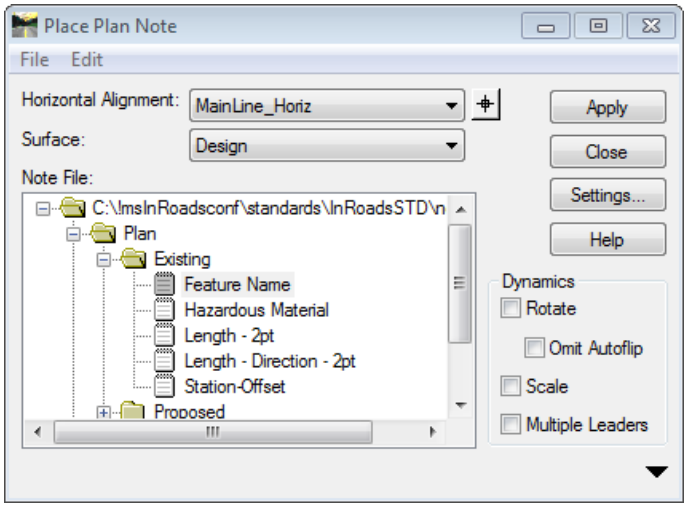


Figure 14-46: Place Plan Note – Feature Name Note

Select the **Settings** button to reveal the settings for the note. See Figure 14-47. Review the options by clicking the **Help** button.

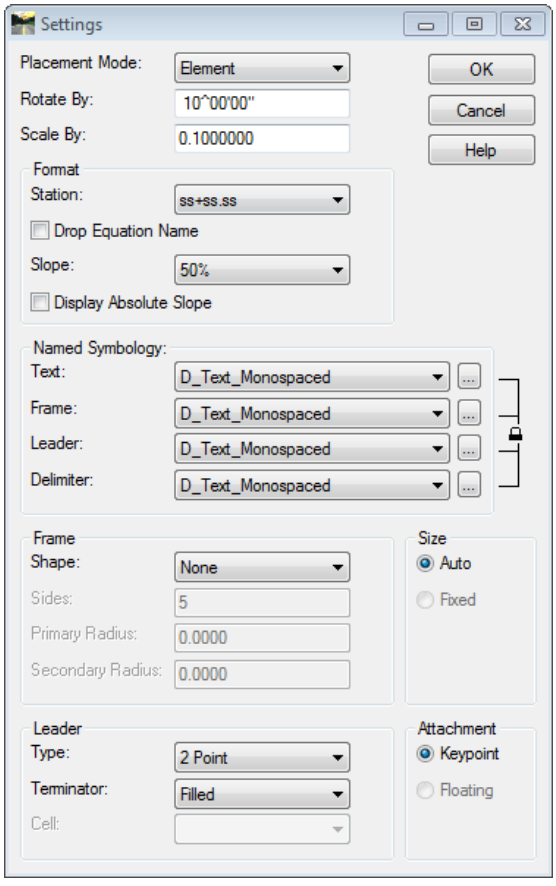


Figure 14-47: Drafting Notes Dialog - Settings

Close the *Help* window. Close the *Settings* dialog.

- The *Settings* for a note will control how the note is placed and the symbology of the text. Named Symbology controls its appearance.

Building the Note

Select the down arrow to the right of the *Place Plan Note* dialog. This is where you actually build the note. See Figure 14-48.

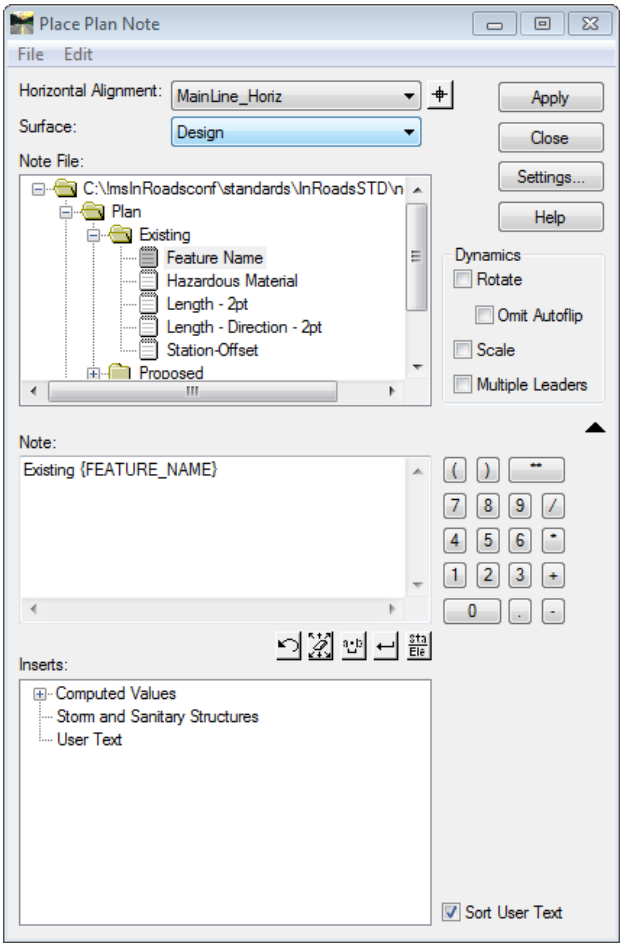


Figure 14-48: Place Plan Note Dialog – Building a Note

The *Feature Name* note was created by typing the word **Existing,** followed by a space, then locating the InRoads coding for the **FEATURE_NAME** in the *Computed Values* tree in the *Inserts* portion of the dialog.

Drafting Note Inserts and Computed Values

Expand the *Computed Values* leaf. Expand *General*, *Geometry* and *Surface* leaves. Computed values are keywords which will be interpreted by InRoads and replaced with correct values within the note. See Figure 14-49. InRoads provides derived values from points in the design file for the following keywords:

General	Geometry	Surface	Storm & Sanitary Structures	Text
Area	Alignment Description (Primary)	Depth to Surface	Areas*	User Text
Direction	Alignment Name (Primary)	Elevation	Channels*	
Easting	Offset	Elevation of Active Surface	ChannelDesign*	
Length	Offset (Second Data Point)	Feature Description	Culverts*	
Level Name	Offset Absolute	Feature Name	CulvertDesign*	
Master Unit Label	Offset Absolute (Second Data Point)	Feature Parent	Inlets*	
Northing	Start Station	Feature Style	InletDesign*	
Slope	Station	Feature Style Description	Manholes*	
Slope Length	Stop Station	Surface Description	ManholeDesign*	
Sub Unit Label	Vertical Elevation	Surface Name	Pipes*	
Total Length		Surface Type	PipeDesign*	
Vertical Depth			Pumps*	
			Utilities*	
			Zones*	

*contains additional sub-keywords

Figure 14-49: Computed Values

In the **Existing Plan Note > Feature Name,** the value “FEATURE_NAME” can be found in the *Surface* leaf.

ⓘ ***This existing note (FEATURE_NAME) would require the GROUND features to be displayed in a design file.***

Placing Existing FEATURE_NAME Note

Highlight the **FEATURE_NAME** note under the **Plan > Existing** folder. Click **Apply** and then left click on an existing feature graphic in the plan view. Left click again to **Accept** the feature. Place the note with another left click. Notice that InRoads cannot replace the coding with the actual value from the topo.dgn file. See Figure 14-50.

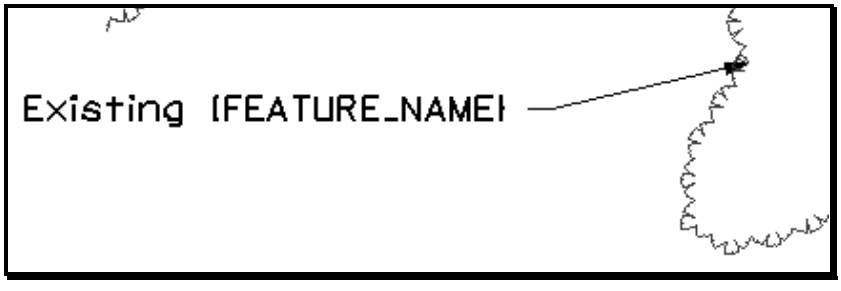


Figure 14-50: Placing Note – Missing Computed Value

Click on one of the features displayed from the design surface. Notice that InRoads could

replace the coding with the actual feature name. Though, it's not an existing feature and it uses the wrong font. See Figure 14-51.

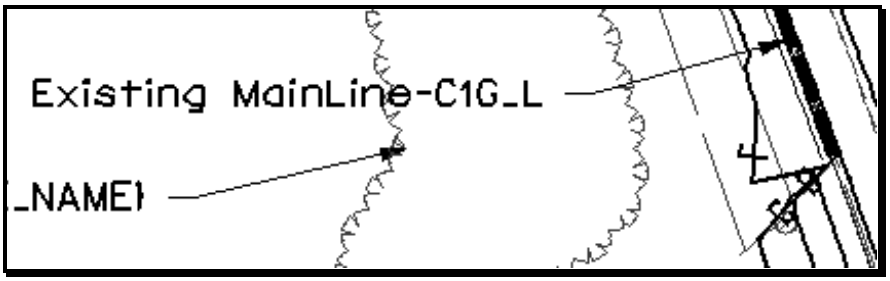


Figure 14-51: Placing Note – Not an Existing Feature

Browse to the **Plan > Proposed > Feature_Name** note. Click on the same proposed feature. The text is the correct font. The note does not contain the words ***Proposed*** prior to the FEATURE_NAME coding. Figure 14-52.

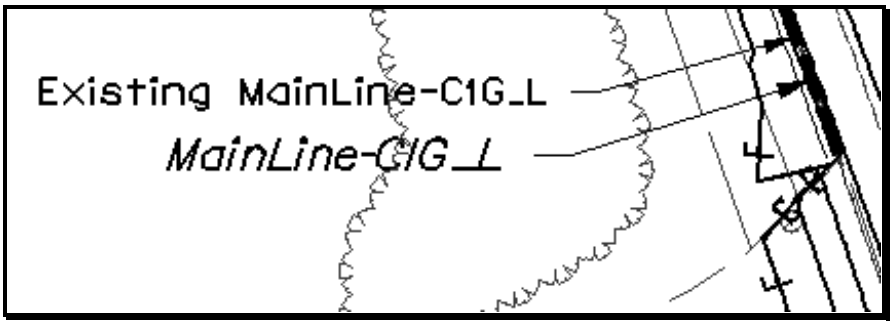


Figure 14-52: Placing Note – Proposed Feature Name

Add Proposed to the FEATURE_NAME Note

Edit the **Plan > Proposed > Feature Name** note to include **Proposed** prior to the FEATURE_NAME. See Figure 14-53.

♫ Remember to add a space between Proposed and Feature_Name.

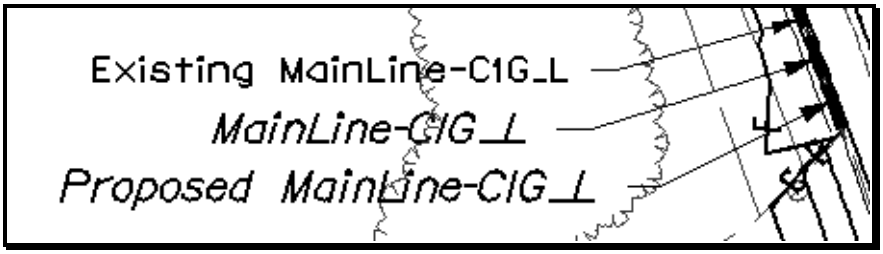


Figure 14-53: Placing Note – Proposed Feature Name with Correct Spacing

Adding Numerous Existing Notes

Before using the drafting notes for annotating various existing surface features, use **File > Make Sheetz** to create the **GROUND.dgn**. Then, view the existing surface features in the design file so that the drafting notes can obtain the intelligent information. For this

example, the user is snapping to the graphic of the surface feature to display feature name and elevation. Use the **GROUND**. **dgn** file as a Reference File. When using the Drafting Note tool to add the existing notes, ensure the surface name is Ground.

Creating Custom Notes

Overview

Custom notes can be created by you at anytime. This example creates two Proposed Plan notes, one for the Begin project note and one for the End project note with the stationing being captured with the InRoads coding.

Part One: Copy a Note

Copy the **Proposed > Feature Name** note and paste it into the same directory.

♫ This saves the step of having to setup the Settings.

Part Two: Rename Note

Rename the note that you copied to **Begin Project.**

Part Three: Clear and Rebuild the Note

Select all the text in the *Note* section of the dialog and hit delete on the keyboard or use the "clear" icon.

Enter **Sta.** followed by a space bar or the "space" icon.

Now expand the *Inserts* to **Computed Values > Geometry** and select the **Station** insert. Enter another "space" (or use the space icon). Now add the **Alignment Description (Primary)** *Insert* followed by the **"="** sign.

Select the *Delimiter* icon. This will place a line between two rows of text. Enter the text **"Begin Proj. No. STP-1308('700)X".** The results are shown below (Figure 14-54).

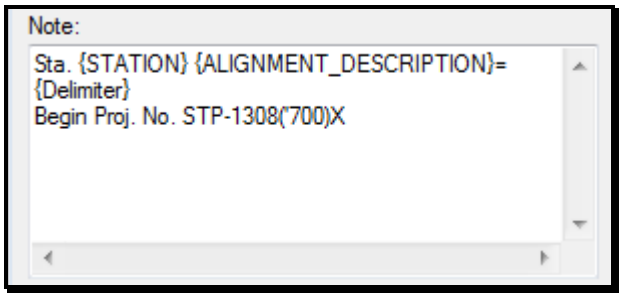


Figure 14-54: Revising a Note

ⓘ ***Notice that there is a single quote after the first parenthesis. This will have to be entered in order to trick InRoads into thinking that the contents between the parentheses is text. This will have to be manually edited afterwards.***

Part Four: Create End of Project Note

Repeat the steps above to create an End of Project note. Since the settings were copied, both notes should be ready to **Apply** at the project start and stop.

IMPORTING ALIGNMENT FROM GRAPHICS

This portion of the manual needs further development however is documented in the Bentley InRoads documentation.

Chapter 15 Templates

TEMPLATE DETAILS

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 strings to automatically connect from typical to typical (template drop to template drop), these points have to be named the exact 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 possible.

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 *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 and Labels

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. Some points are set to create *Alternate Surfaces* by default and others have a *Label* that can be used to control widths, depths and slopes through a station range through *Point Controls* or *Parametric Constraints.*

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 whatever 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 16-30 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 (algebraically measured). To the right and down is negative, but to the left and down is positive.

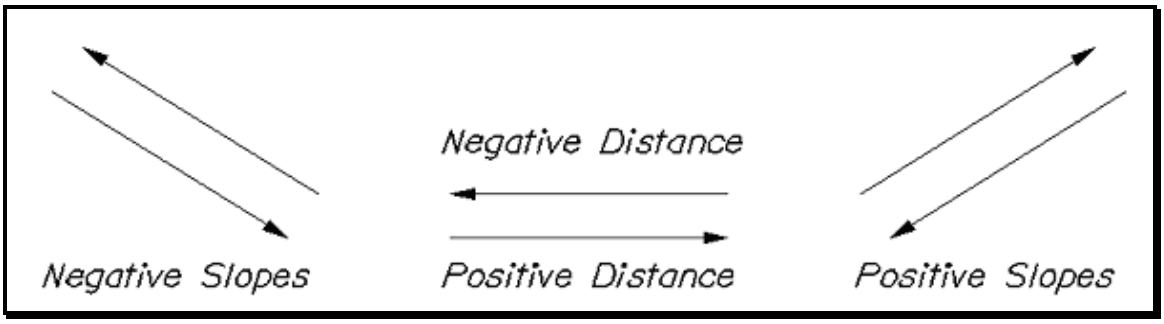


Figure 15-1: Positive and Negative slopes explained

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.

TEMPLATE POINTS, PARTS AND PIECES

Open the Template Library

Select **Modeler > Create Template** from the InRoads main menu. The **Create Template** dialog opens with a directory of folders on the left. See Figure 15-2.

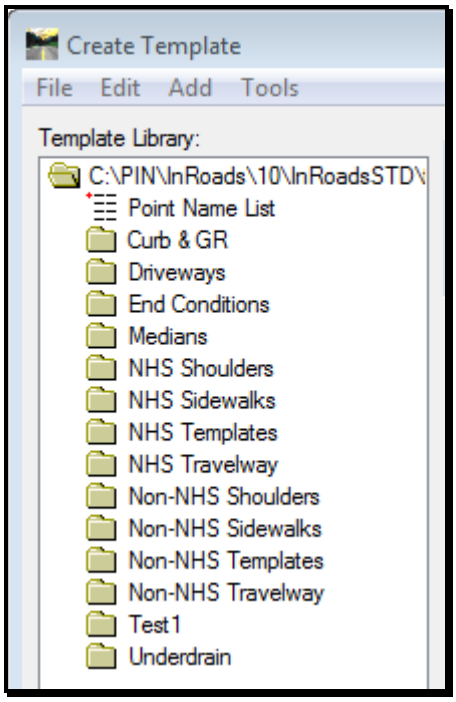


Figure 15-2: Create Template Dialog - Folders

Overview

The Templates generate the transverse geometry that is the backbone to roadway design. A template is comprised of a series of **points** and **components.** The connected points will turn into *breakline* features that are stored in the design surface generated by the *Roadway Designer* command.

When templates are paired with horizontal and vertical alignments and superelevation, they define the surface of a corridor.

Points

Overview

The points of a template represent *breakline* features that will be created when the template is processed using the *Roadway Designer* command. Points have a *name* and *feature style*. In order to get connectivity from template drop to template drop, the points representing the same feature have to be named the exactly same. Once processed in Roadway Designer, they are saved to the design surface as features.

Review Common Point Names

Select the **Point Name List** icon on the top left of the *Create Template* dialog's directory tree (Figure 15-3). The list opens displaying all of the seed points and the styles assigned to them.

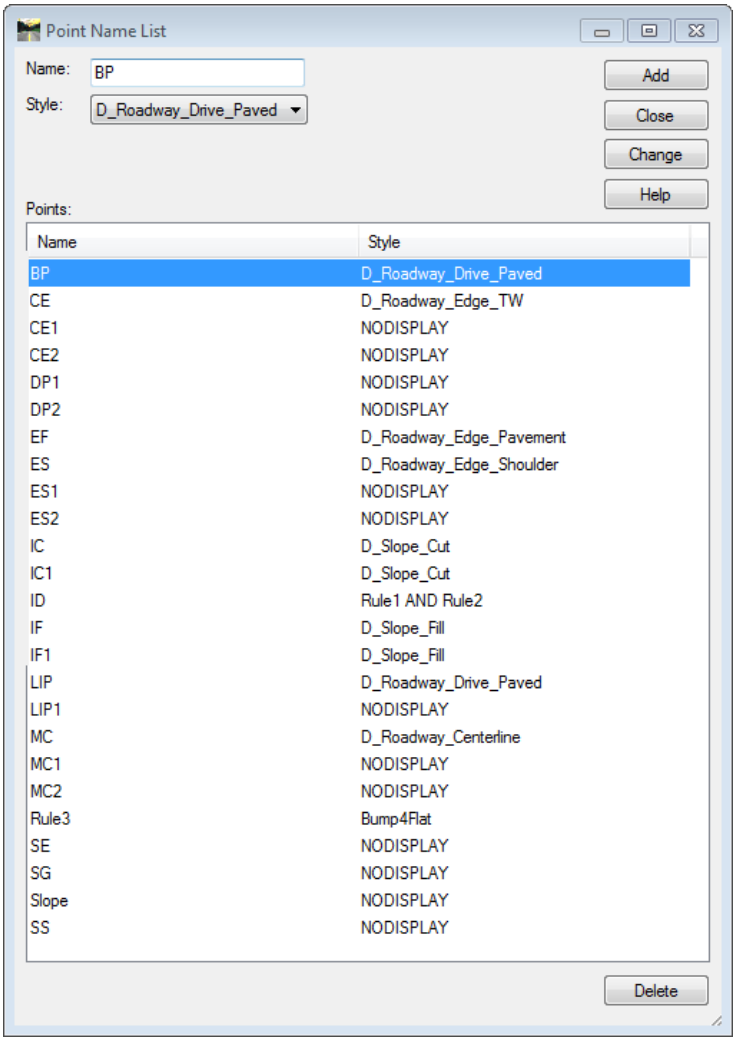
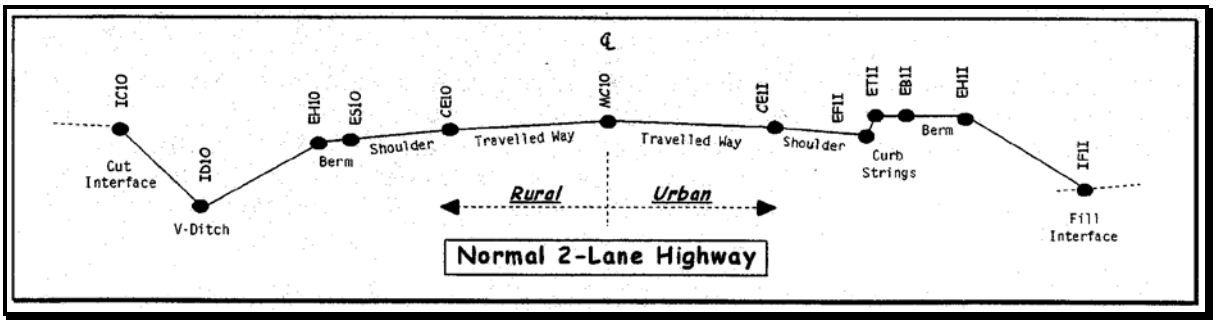
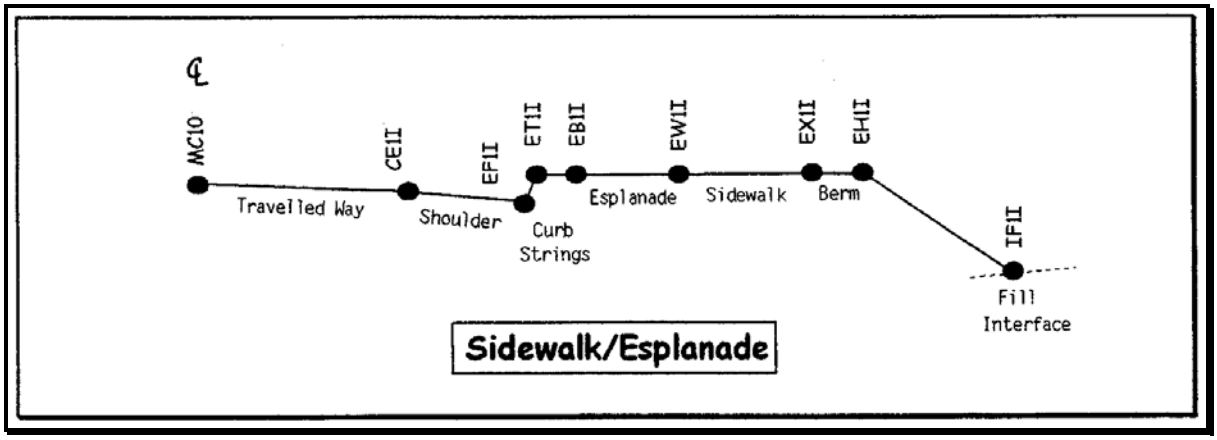


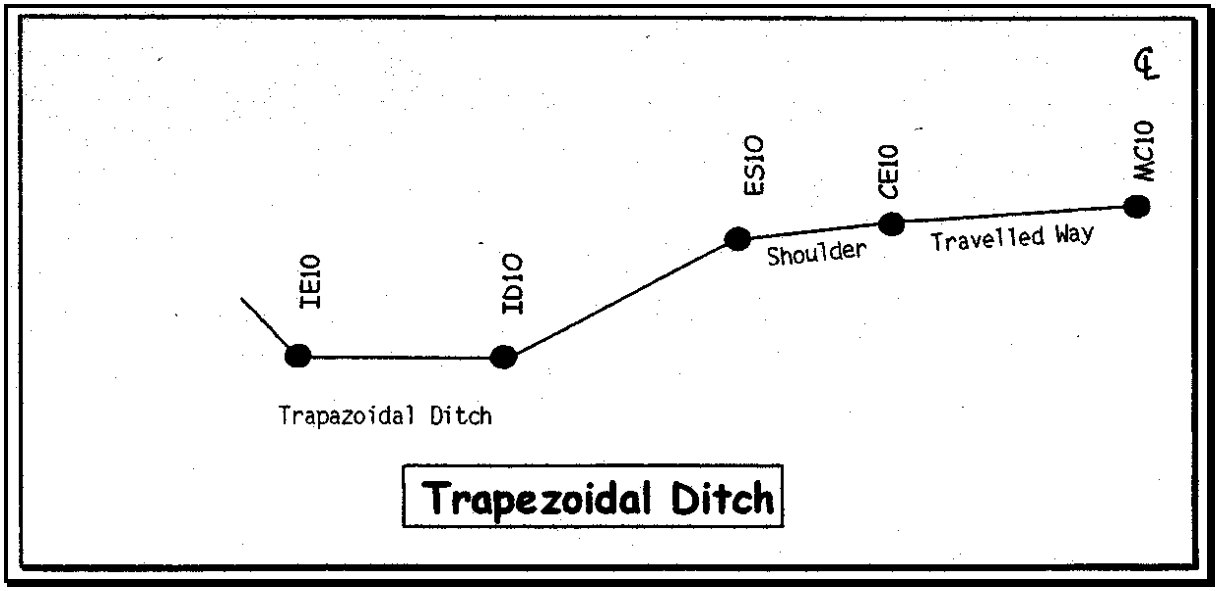
Figure 15-3: Point Name List Dialog

These point names were modeled after the MX (previous design software) naming convention. The screen captures below are directly from the MX manual (Figure 15-4).

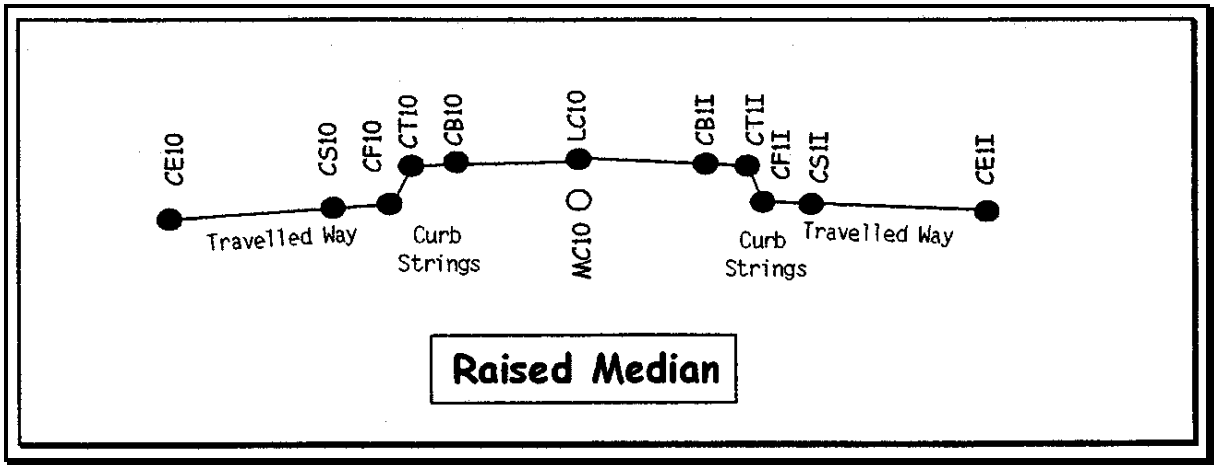




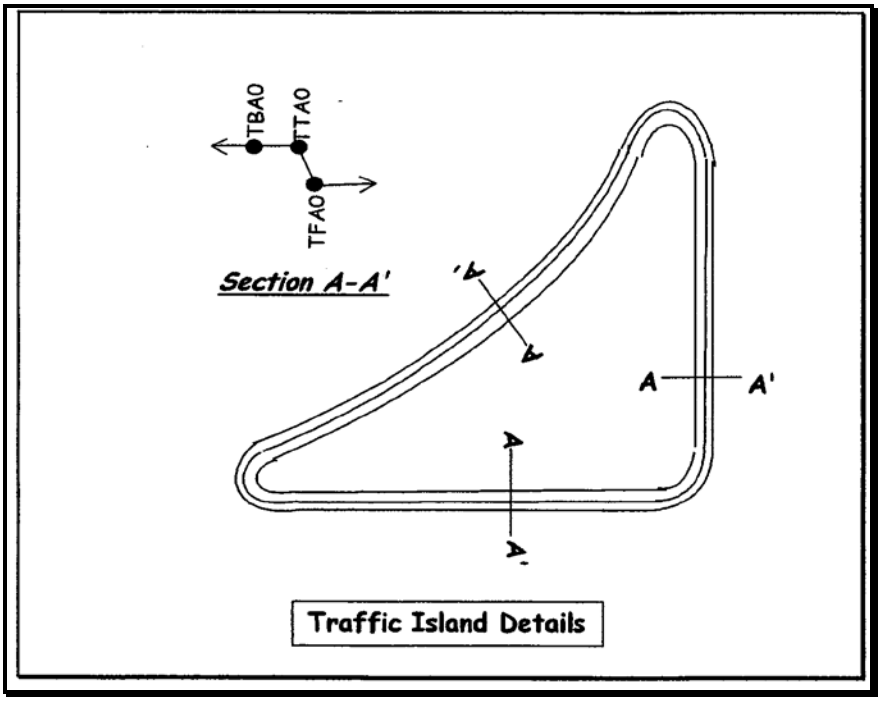
Sidewalk/Esplanade



Trapezoidal Ditch



Raised Median



C0 Roadway (Other - 0)	E6 Shoulders (Other - 6)	IB Earthworks (Cut Berm)
C1 Roadway (Other - 1)	E7 Shoulders (Other - 7)	IC Earthworks (Intermediate)
C2 Roadway (Other - 2)	E8 Shoulders (Other - 8)	ID Earthworks (Front of Ditch)
C3 Roadway (Other - 3)	E9 Shoulders (Other - 9)	IE Earthworks (Back of Ditch)
C4 Roadway (Other - 4)	EB Shoulders (Back of Curb)	IN Earthworks (Noise Bund)
C5 Roadway (Other - 5)	EF Shoulders (Flowline)	IS Earthworks (Fill Berm)
C6 Roadway (Other - 6)	EH Shoulders (Earthworks Datum)	IZ Earthworks (Broken Hinge)
C7 Roadway (Other - 7)	ER Shoulders (Shoulder Roll-over)	R Earthworks (Rounding)
C8 Roadway (Other - 8)	ES Shoulders (Edge)	J Junk
C9 Roadway (Other - 9)	ET Shoulders (Top of Curb)	LC Road Centerlines (Levels)
CB Roadway (Back of Curb)	EV Shoulders (Unpaved Shoulder)	MC Road Centerlines
CE Roadway (Edge)	EW Shoulders (Front of Sidewalk)	MR Curb Return
CF Roadway (Flowline)	EX Shoulders (Back of Sidewalk)	TB Traffic Islands (Back of Curb)
CH Roadway (Hinge)	GC Road Centerlines (Geometry)	TF Traffic Islands (Flowline)
CM Roadway (Material Edge)	I0 Earthworks (Other - 0)	TI Traffic Islands (Reserved)
CR Roadway (Curb Return)	I1 Earthworks (Other - 1)	TJ Traffic Islands (Edge of through lane)
CS Roadway (Median Shoulder)	I2 Earthworks (Other - 2)	TK Traffic Islands (Edge of intersect lane)
CT Roadway (Top of Curb)	I3 Earthworks (Other - 3)	TL Traffic Islands (Edge of turn lane)
D Driveway Bump	I4 Earthworks (Other - 4)	TT Traffic Islands (Top of Curb)
E0 Shoulders (Other - 0)	I5 Earthworks (Other - 5)	
E1 Shoulders (Other - 1)	I6 Earthworks (Other - 6)	
E2 Shoulders (Other - 2)	I7 Earthworks (Other - 7)	
E3 Shoulders (Other - 3)	I8 Earthworks (Other - 8)	
E4 Shoulders (Other - 4)	I9 Earthworks (Other - 9)	
E5 Shoulders (Other - 5)	IA Earthworks (General)	

Figure 15-4: Example Point Names

- This MX naming convention was followed as much as possible. In some cases, we continued the naming convention from the top layers through to the bottom by adding a number increment with the exception of the Subgrade layer. In order to make connectivity with multiple like points, we also use *Feature Name Overrides* that will be discussed later.

Components

A component is a set of points that define an open or closed shape. Each component, whether open or closed, can represent a different material or area of interest. Components are named and have an assigned *feature style*. There are 6 *types* of components created in InRoads: *Simple, Constrained, Unconstrained, Null Point, End Condition, and Overlay/Stripping.*

Some components are used to quantify volume of a material and others are used to compare an area between the component and the existing ground.

Activate Non-NHS Template

Expand the **Non-NHS Templates** folder and the **Minor Collectors <1000** subfolder. Select the 12' Daylight template. Right click the template and select **Set Active** (double clicking the template sets it active as well). See Figure 15-5.

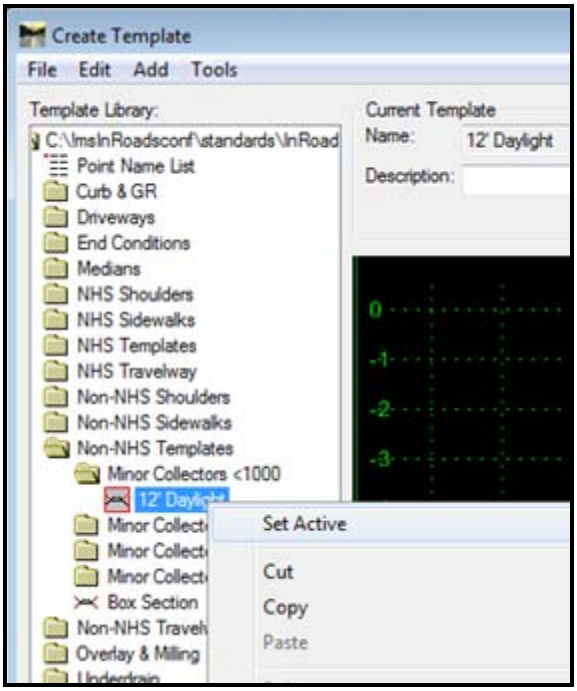


Figure 15-5: Setting Templates Active

View Components and Points in Non-NHS Template

Click the *Active Template* tab at the bottom of the *Create Template* explorer dialog. This displays *Components*, *Points* and *Rules* used in the active template (Figure 15-6).

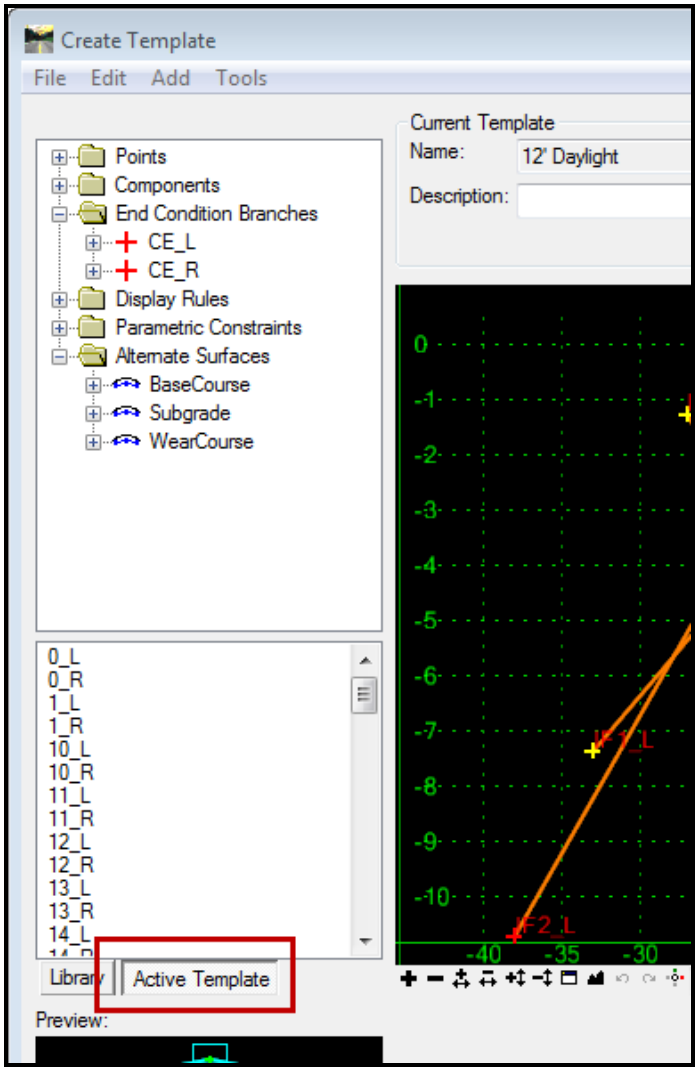


Figure 15-6: Active Template View of the Create Template Dialog

Expand and explore each folder. Select a *Point* or *Component* to view its settings. Notice that it's highlighted in the cross section view of the template. Double click it to make an edit.

Feature Styles

The style assigned to a **Point** or **Component** controls how the feature behaves in *Plan*, *Profile* and *Cross Section.* Styles and their settings have been pre-established and can be adjusted to suit your needs if necessary.

Open Style Manager

Select **Tools > Style Manager** from the InRoads main menu. Select the **D_Curb_Type_1_Lt** and click the **Edit** button (Figure 15-7).

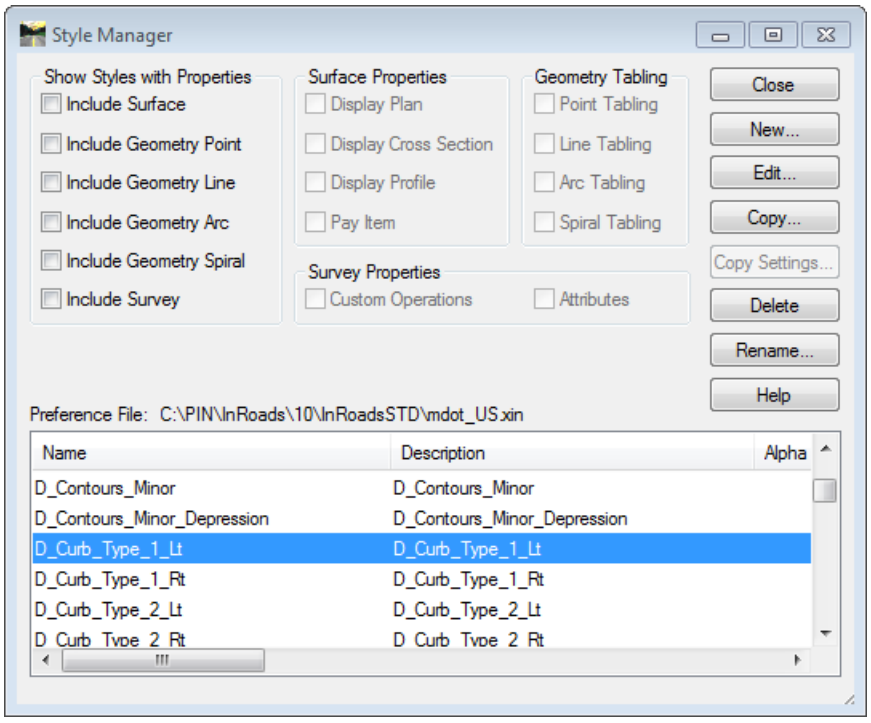


Figure 15-7: Style Manager Dialog

View the Symbology

Select the *Symbology* leaf (Figure 15-8). Click the **Edit** button.

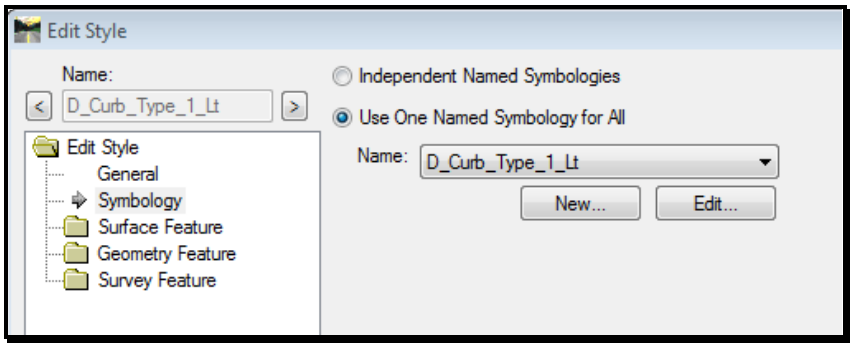


Figure 15-8: Style Manager Dialog – Symbology Leaf

This is where the *Style* selects a *Symbology*. The symbology controls the *Level*, *Color*, *Style*, *Weight*, *Text*, and whether a *cell* or *line* is placed in Plan, Profile or Cross Section. Review the settings. Close the dialog.

Surface Feature

Expand the *Surface* leaf of the dialog (Figure 15-9). This is where InRoads will determine how the style behaves in Plan, Cross Section and Profile and also where you adjust the *Pay Item Name* for the style in the future.

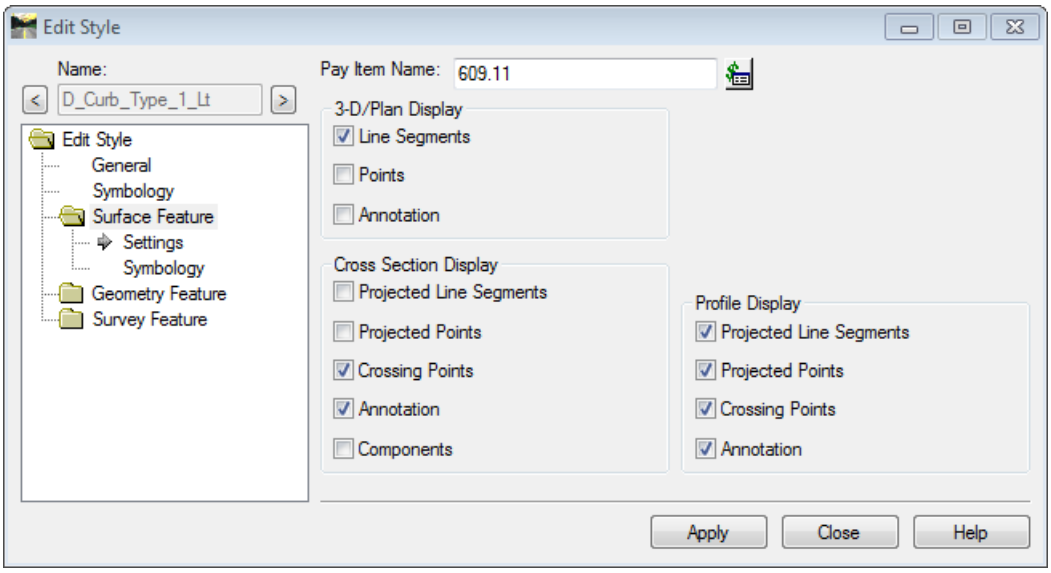


Figure 15-9: Style Manager Dialog – Surface Feature Leaf

Close the *Edit Style* dialog. Close the *Style Manager* dialog.

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, styles and surfaces, you should try and use the ones provided. You can modify them for your specific needs. Sub Assemblies will be discussed in more detail later in the chapter.

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 15-45 for guidance on the Template Library Organizer.***

If you wish to overwrite your library within your project, First run the appropriate Update Utility (older or newer version). Next, manually copy the template library from your local copy. Using InRoads version 8.11 in the C:\!msV8iconf\standards\InRoadsSTD folder to your PINs InRoadsSTD folder.

Attaching the Default Template Library

After launching InRoads, select **File > Open** from the InRoads main menu (Figure 15-10). Change the *File Types* pull down to ***.itl.** and browse to your projects InRoadsSTD folder.

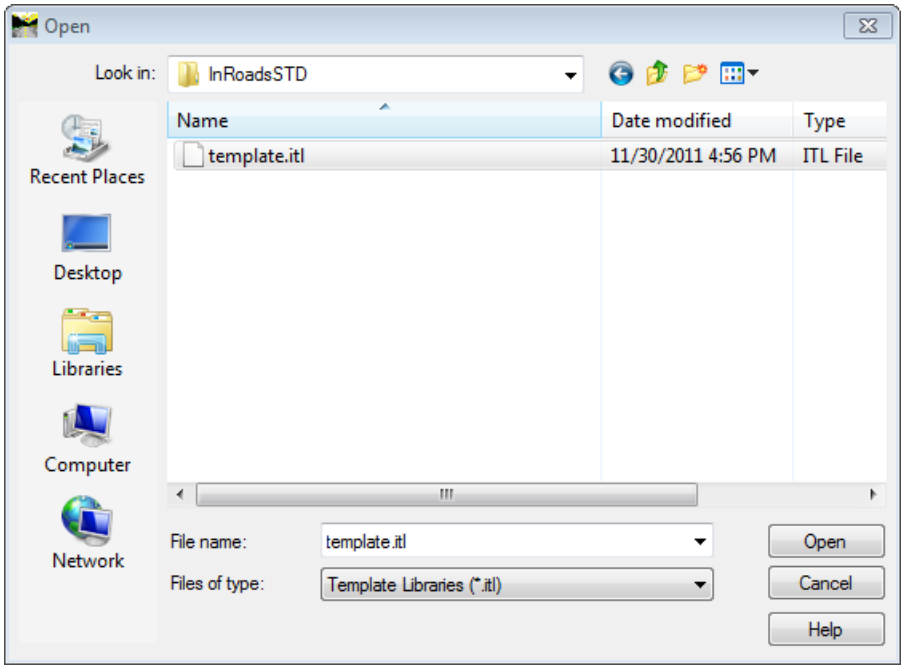


Figure 15-10: Open Dialog

Select the **.itl** and select **Open.** Click **Cancel** to close the dialog.

BUILDING TEMPLATES FROM SCRATCH

Overview

Building templates from scratch will require manual work and familiarity with the standard point names and styles. The example below shows the basic workflow to create a road template from scratch.

Step One: Create Project Specific Folder

Part One:

Right click the top-most folder (root of the template library tree) and select **New > Folder** (Figure 15-11). For example, Supply **RoadA** as a folder name.

- This should be named your Town_Road name for real project work.

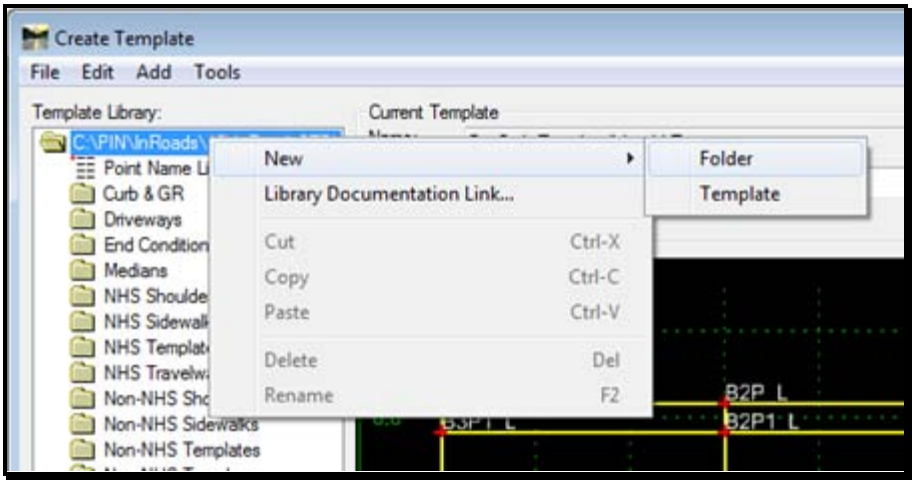


Figure 15-11: Create New Folder

Part Two:

Right click the **RoadA** folder and select **New > Template.** Enter **DaylightLT-DaylightRT** as the name of the template.

Step Two: Template Options

Overview

The *Template Options* dialog allows some control over building the components and point labeling.

Open Template Options

Select **Tools > Options** from the *Template Library* main menu (Figure 15-12).

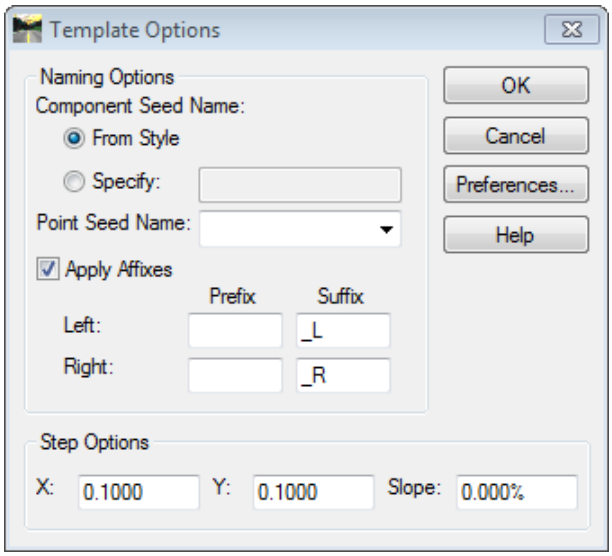


Figure 15-12: Template Options Dialog

Set the *Components-Seed Name* to **From Style.**

Place a check mark in the *Apply Affixes* box.

Set the *Step Options* to **X = 0.1000, Y = 0.1000** and **Slope = 1.000%.**

Click Help Button

Review the Help on this topic and minimize the help screen.

♫ The *Step Options* keep the accuracy to the degree applied. This can be adjusted on an individual basis per component.

Step Three: Dynamic Settings

Overview

The *Dynamic Settings* is similar to *AccuDraw* in MicroStation and also gives you control over the point names as a component is being placed. The *Dynamic Origin* can be moved around similar to the *AccuDraw Origin.*

Open Dynamic Settings Dialog

The *Dynamic Settings* dialog (Figure 15-14) can be open by selecting **Tools > Dynamic Settings** from the *Template Library* main menu or by selecting the right-most tool in the view tools area of the dialog (Figure 15-13).

Figure 15-13: Dynamic Setting Icon

The dialog is similar to the *Template Options* dialog and can be adjusted as necessary.

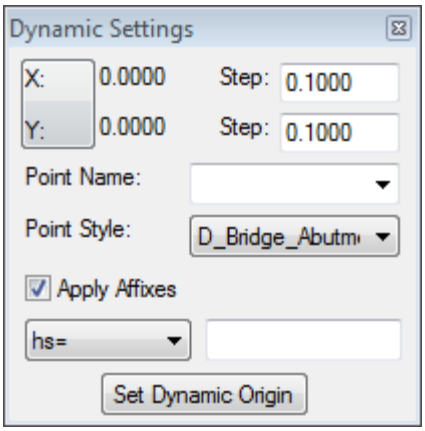


Figure 15-14: Dynamic Setting Dialog

Explore Help on Dynamic Settings

Maximize the Help screen and select *Dynamic Settings* from the directory tree on the left. Review and close.

Step Four: Place Travelway Component

Part One:

Right click in the gridded screen and select **Add New Component > Simple** (Figure 15-15).

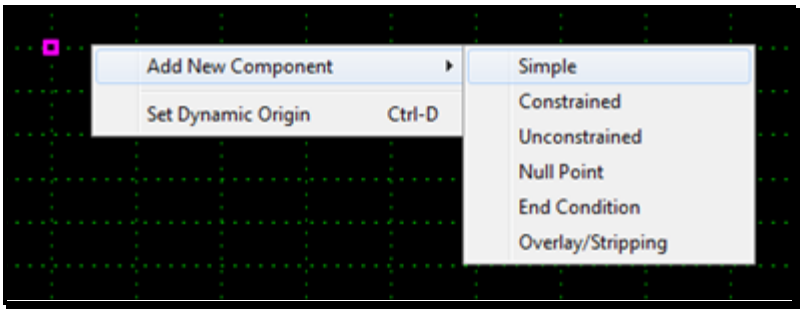


Figure 15-15: Add New Component > Simple Command

- At this point, we are going to let the point names be created as their default values. We will edit the values afterwards.

Part Two:

Now let's add some values to the component prior to placing it. At the bottom of the *Create Template* dialog (Figure 15-16), enter the following example values:

Figure 15-16: Current Component Parameters.

Name: Leave blank (will use Style as the Name)

Style: D_Roadway_Edge_TW

Slope: -2%

Thickness: .25

Width: 12

Right click the gridded screen and place a check in the **Mirror** option.

Place the *Component(s)* in the center of the magenta circle (which should be coordinate 0,0). You should see it lock in on this point. Fit the *Components* into the view.

- Zoom in if necessary with the wheel of your mouse.
- To close the context menu, hit escape.

Step Five: Add the Shoulder and Base Pavement

Shoulder Criteria

Name: Leave blank (will use Style as the Name)

Style: D_Roadway_Edge_Shoulder

Slope: -4%

Thickness: .25

Width: 4

Base Pavement Criteria (TW)

Name: Leave blank (will use Style as the Name)

Style: D_Roadway_Pavement

Slope: -2%

Thickness: .25

Width: 12

Base Pavement Criteria (Shoulders)

Name: Leave blank (will use Style as the Name)

Style: D_Roadway_Pavement

Slope: -4%

Thickness: .25

Width: 4

The result should resemble the capture below (Figure 15-17).

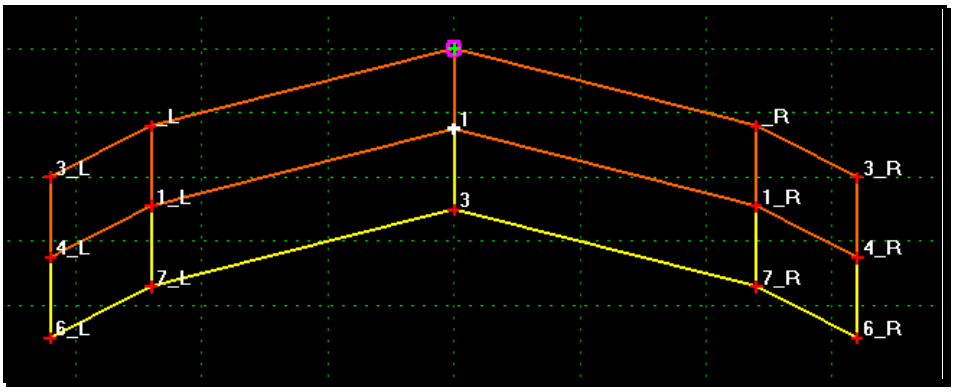


Figure 15-17: Example Results

Step Six: Merge Components

Right click the vertical lines between the travelway and shoulders. Select **Merge Components.** Repeat for the vertical lines at the centerline of the template. The results are displayed in the capture below (Figure 15-18).

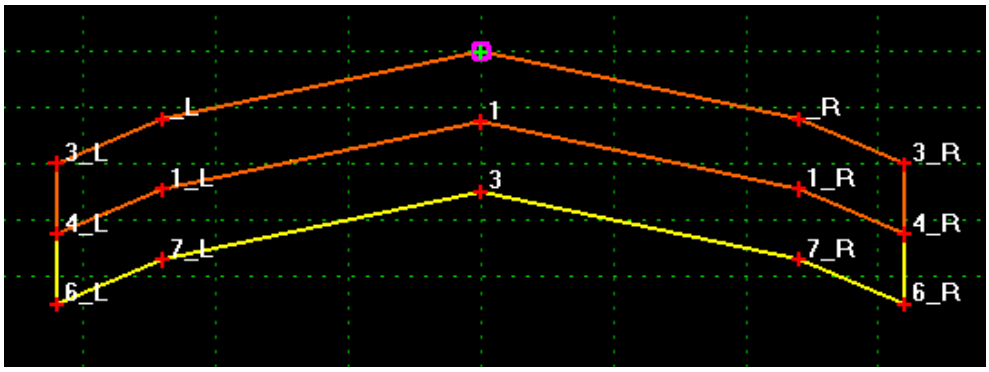


Figure 15-18: Merge Component Results

Step Seven: Add Subgrade

Part One:

Right click in the gridded screen and select **Add New Component > Constrained.** Supply the **D_Roadway_Subgrade** style.

Part Two:

Right click and uncheck *Mirror.* Starting from left to right, click the bottom three points of the travelway to begin placing the subgrade component. The point will highlight "white" when you are on the point in question.

Part Three:

For the bottom of subgrade points, we'll use *Dynamic Settings* to accurately place these points.

While still in the placement mode, right click the edge of travel way point in the base pavement and select **Set Dynamic Origin** and place the origin on the point as seen below (Figure 15-19).

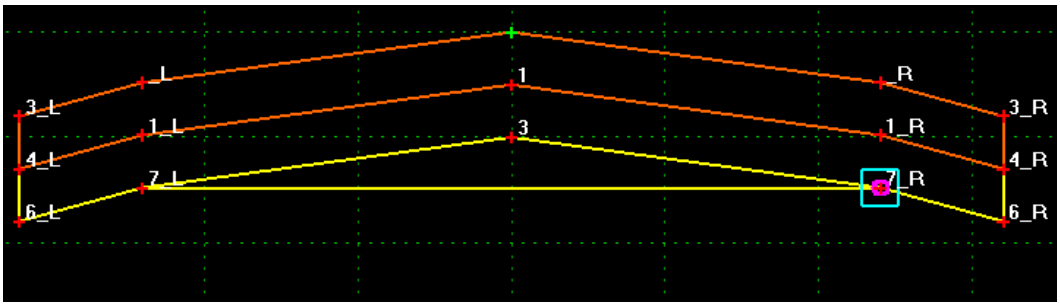


Figure 15-19: Set Dynamic Origin

With the *Dynamic Settings* dialog open, enter 1.5 for X and Y. Pick SE for the point name. Ensure **NODISPLAY** is the *Style* (Figure 15-20).

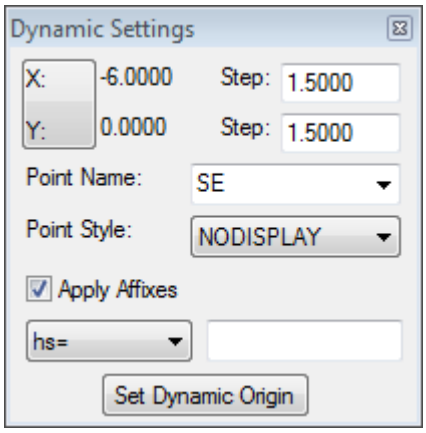


Figure 15-20: Dynamic Settings Example

♫ You may have to zoom out in order to make the 1.5' depth below pavement layer.

Move the cursor down below the point and it will try to lock in on the depth you specified.

Make sure it is directly below the point by verifying the X value to the left in the *Dynamic Settings* dialog is 0.000.

Right click the centerline point at the base pavement layer and select **Set Dynamic Origin.** Place the origin at this point. Pick the *Point Name* to **SG.** Drag the cursor down below the point and click when the X = 0.000 and the Y = -1.5.

Lastly, set the **Dynamic Origin** at the left travelway point at the base pavement layer and set the *Point Name* to **SE.** Right click and select **Finish.**

The results are shown below (Figure 15-21).

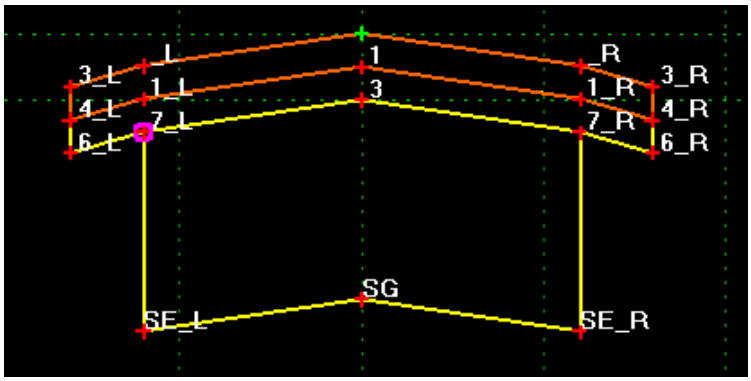


Figure 15-21: Subgrade Example Results

Step Eight: Add Daylight Subgrade (LT and RT)

Daylight Subgrade Criteria

Add Constrained Component

Style: D_Roadway_Subgrade

Point Name: SS

Step Nine: Edit SS Points

Double click the SS_L points and change *Constraint 1* of the constraints to a **Slope** constraint from the edge of shoulder point and enter **1:3** in the *Value* field. Hit **Tab** key (Figure 15-22).

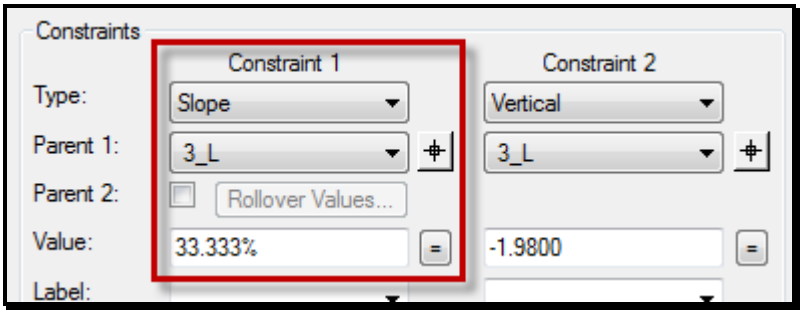


Figure 15-22: Constraint 1 Values

Change the *Constraint 2* to a **Vector Offset** from points **SE_L** to **SG** with a **0.00** *Offset.* Hit the **Tab** key and click **Apply** (Figure 15-23).

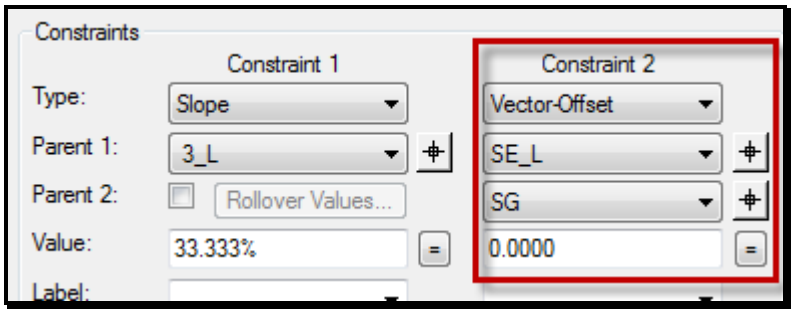


Figure 15-23: Constraint 2 Values

♫ This will keep the subgrade the same slope as the travelway.

Step Ten: Edit SS_R Point

Change the Constraints for point **SS_R.**

Slope Value: -1:3

Vector Offset Points: SE_R and **SG.**

Step Eleven: Edit Points/Styles of Wearing Course

Part One:

Double click the Centerline Point (Figure 15-24). This is the only point in the template that should be "green" in color. Pick **MC** from the drop down arrow as the point *Name* and change the *Style* to **D_Roadway_Centerline.** Click **Apply.**

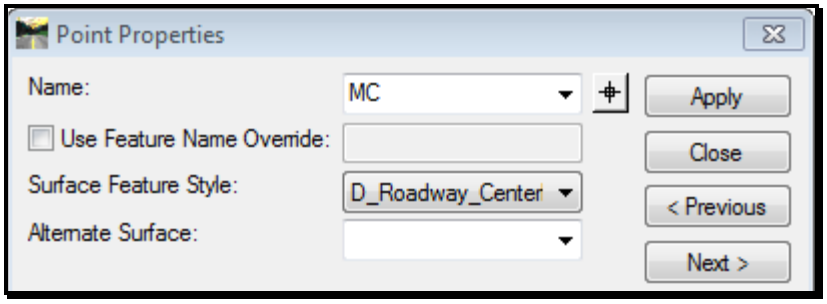


Figure 15-24: Point Properties Dialog – Changing Point Names of Wearing Course Example

Part Two:

Using the *Target* icon next to the *Name* pull down, pick the left travelway point (Figure 15-25). Change the *Name* to **CE_L.** Verify the *Style* is set to **D_Roadway_Edge_TW.** Click **Apply.**

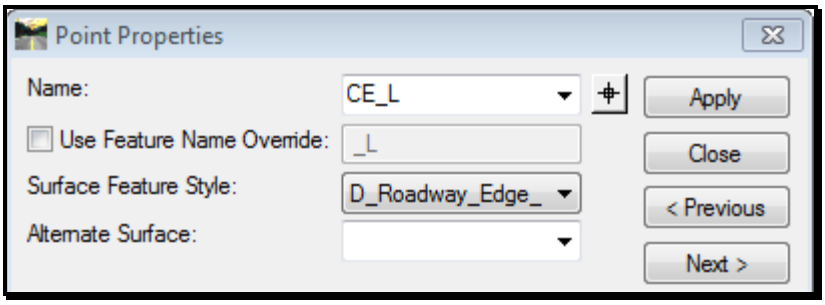


Figure 15-25: Point Properties Dialog – Changing More Point Names of Wearing Course Example

Repeat for right side supplying CE_R.

Part Three:

Edit the left edge of shoulder. Change the point *Name* to **ES_L** and the *Style* to **D_Roadway_Edge_Shoulder**. Click **Apply.**

Repeat for right side supplying ES_R. See Figure 15-26.

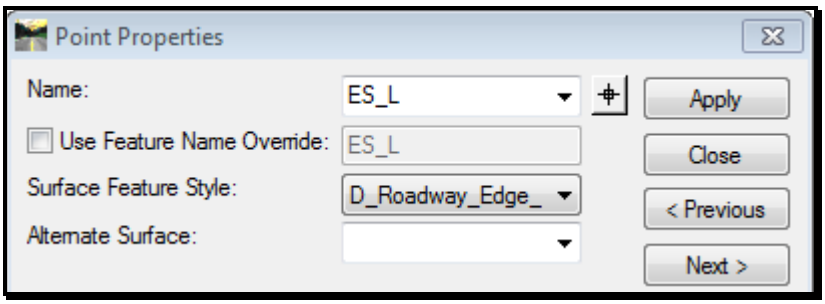


Figure 15-26: Point Properties Dialog – Changing More Point Names of Wearing Course Example

Step Twelve: Edit Remaining Points

Bottom of Wearing Course

Point Name: Increment naming from above point (i.e., ES1_L, MC1, etc.)

Style: NODISPLAY

Alternate Surface: WearCourse

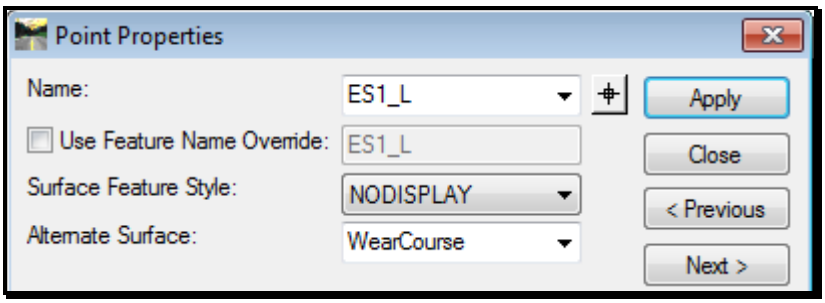


Figure 15-27: Point Properties Dialog – Changing More Point Names of Wearing Course Example

Bottom of Base Pavement

Point Name: Increment naming from above point (i.e., ES2_L, MC2, etc.)

Style: NODISPLAY

Alternate Surface: BaseCourse

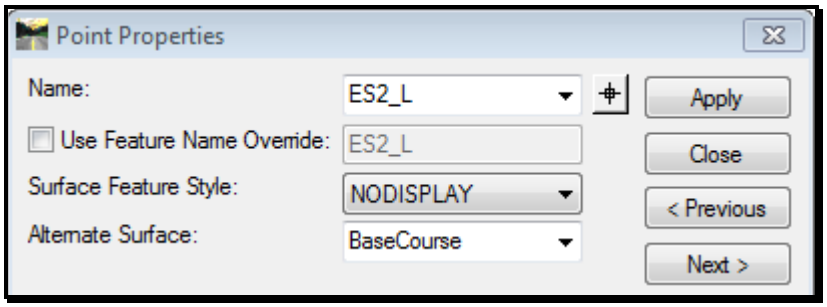


Figure 15-28: Point Properties Dialog – Changing More Point Names of Wearing Course Example

Bottom of Subgrade

Point Names: SS_L, SE_L, SG, SE_R, SS_R

Style: NODISPLAY

Alternate Surface: Subgrade

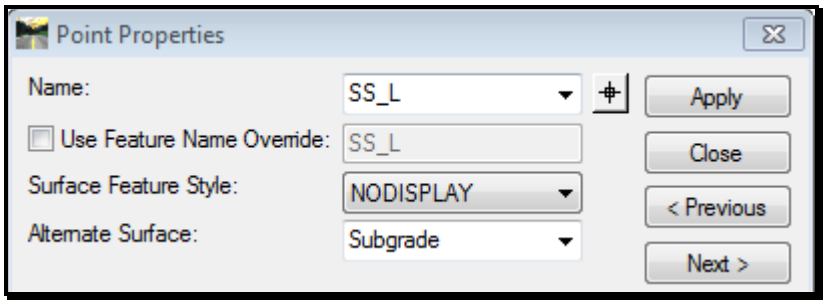


Figure 15-29: Point Properties Dialog – Changing More Point Names of Subgrade Course Example

Step Thirteen: Add Labels

Overview

Labels can be applied to certain points so that they can easily adjusted by altering the values globally using *Parametric Constraints.* They re-define the constraints on these points.

Part One:

Edit point **CE_L.** Add a *Label* to the *Slope* constraint called **TWSlopeLT.** Add a *Label* to the *Horizontal* constraint called **TWWidthLT.** See Figure 15-30. Click **Apply.**

Repeat for **CE_R** but supply **RT** in the values.

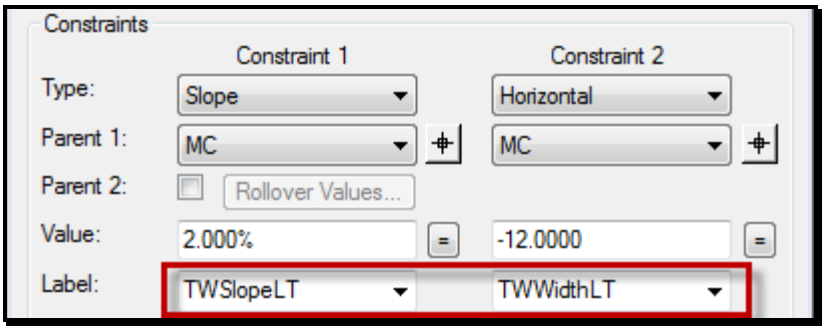


Figure 15-30: Constraint Labels

Part Two:

Edit point **ES_L.** Add a *Label* to the *Slope* constraint called **SHSlopeLT.** Add a *Label* to the *Horizontal* constraint called **SHWidthLT.** Click **Apply.**

Repeat for **ES_R** but supply **RT** in the values.

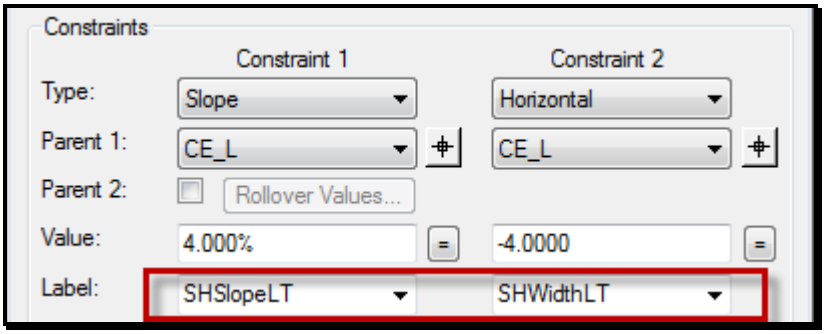


Figure 15-31: Constraint Labels

Step Fourteen: Add Vertical Labels

Add Vertical Label to Bottom of Wearing Course

Edit points **ES1_L, CE1_L, MC1, CE1_R, ES1_R.** Add a *Label* called **TWwcDepth** to the vertical *Constraint.*

Add Vertical Label to Bottom of Base Pavement

Edit points **ES2_L, CE2_L, MC2, CE2_R, ES2_R.** Add a *Label* called **TWbcDepth** to the vertical *Constraint.*

Step Fifteen: Add End Conditions

Part One:

Right click the gridded screen and select **Add New Component > End Condition.** See Figure 15-32. Set the *Style* to **D_Roadway_SlopeLines.**

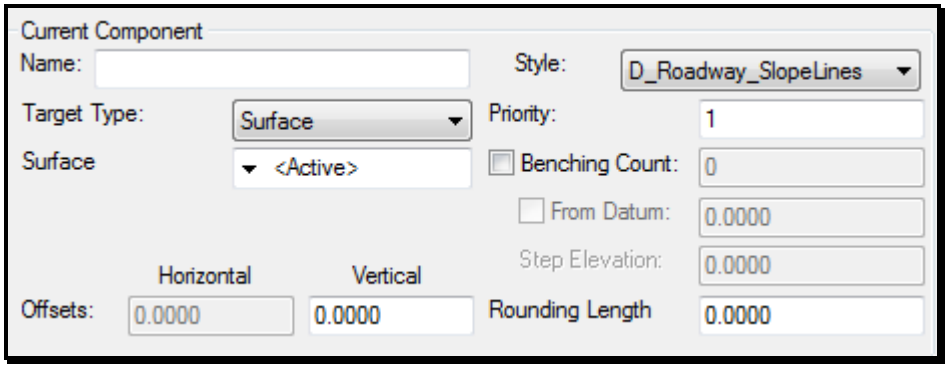


Figure 15-32: End Conditions Component Parameters

Part Two:

Utilize the *Dynamic Setting* dialog to help draw this *End Condition.* Click the **Set Dynamic Origin** button and place the "origin" on the **ES_R** point. Left click on the **ES_R** point to begin the placement of the component.

- The *Dynamic Settings* dialog adapts to *End Conditions* giving a few more options on the fly.

Part Three:

Adjust the *Dynamic Settings* dialog by toggling the X, Y to **X, Slope.** See Figure 15-33. Enter a distance of **8** in the *X Step* and enter **1:3** in the *Slope Step.*

Enter **ID** in the *Point Name* field. Set the *Point Style* to **D_Drainage_Ditch_Line_High.** Place a check in the *Apply Affixes* box. Your dialog should resemble the one below.

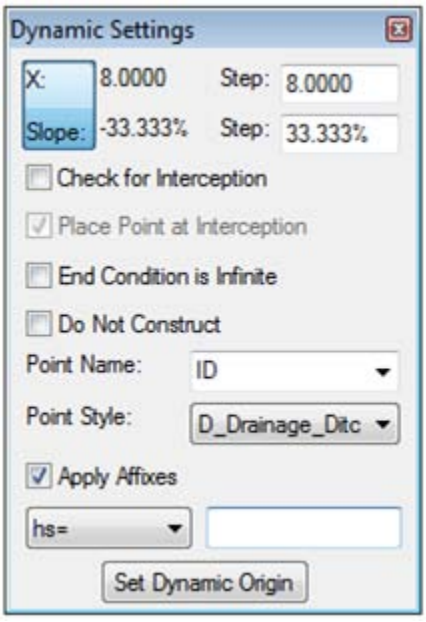


Figure 15-33: Dynamic Setting for End Conditions

- You may have to zoom out to place the second point.

Left click to place the second point.

Part Four:

Right click the gridded screen and select *Set Dynamic Origin* and place the origin at the second point (ID_R). Adjust the *Dynamic Settings* so that the *X Step Value* is set to **5** and the *Slope Step* is set to **1:2.** Move cursor to the right to define the back slope point. Left click to place the final point then right click and select **Finish** to end the command. See Figure 15-34.

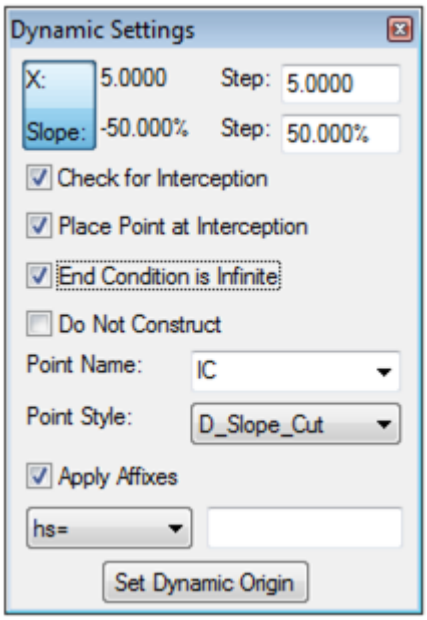


Figure 15-34: Dynamic Setting for End Conditions - Example

Part Five:

Edit the *End Condition* component by double clicking the line. Adjust the *Rounding Length* to **4.** Click **Apply** and then **Close.**

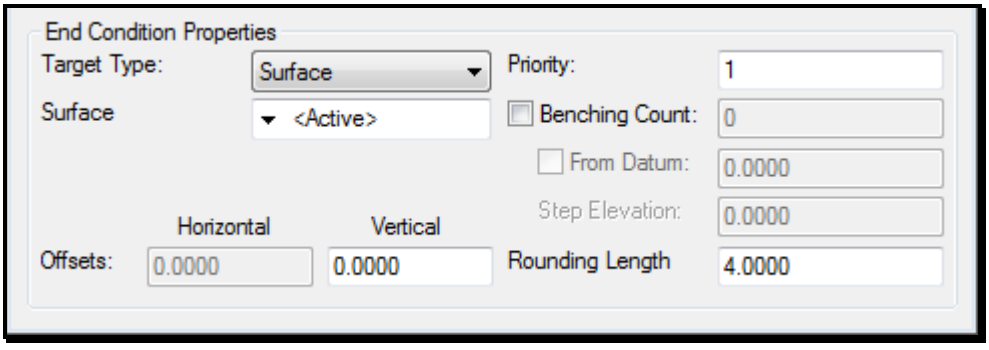


Figure 15-35: End Conditions Property Parameters

Part Six:

Change the *Slope Constraint* on point **SS_R** to be a **Vector Offset** using points **ES_R** and **ID_R.** Make this value **0.00.**

Step Sixteen: Repeat for Left End Condition

Left End Condition Criteria

ES_L to ID_L Slope: 1:3

ES_L to ID_L Horiz: 8.0000

ID_L Style: D_Drainage_Ditch_Line_Low

ID_L to IC_L Slope: 1:2

ID_L to IC_L Horiz: 5.0000

Rounding Length: 4.0000

Step Seventeen: Test End Condition

Part One:

Select the **Test** button on the right, just below the view window. A new dialog will open.

Part Two:

Click the **Draw** button and move the cursor into the view window. Use the **Shift + Wheel** on the mouse to adjust the exaggeration. Left click to place the line representing the existing ground in the view.

Change the slope percentage to **5%.** Click **Draw** again. Try it at **10%.**

Step Eighteen: Save Template Library

Part One:

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

BUILDING TEMPLATES FROM SUB ASSEMBLIES

Overview

After reviewing the points, components and styles used in the making of templates, it may be evident that a lot goes into building one from scratch. In the event you need to create one, there is a sub folder called *components* beneath each sub assembly groupings with the raw pieces and part used to build the sub assemblies.

Raw Components

Some of the Template Library folders have *Component* subfolders.

NHS Templates

NHS Travelway and **NHS shoulder** folders contain *Sub Assemblies* that have been designed to the "default" NHS standards. Travelway width is 12' with a 2% slope. Shoulders are designed at 8' with a 4% slope. Widths and Slopes can be adjusted easily to your project needs.

NON-NHS Templates

These types of 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. Review the folder to see if 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 is 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 made 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: Example Template One

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 15-36)**.** Enter **RoadB**.

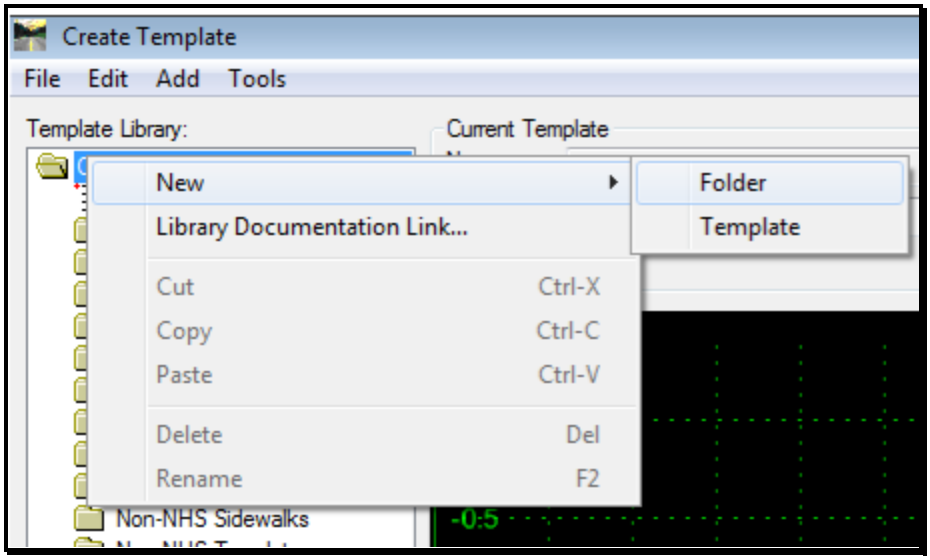


Figure 15-36: Create Template Dialog - Create New Folder

- 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 and select **New > Template** (Figure 15-37). Supply a name that describes the template (i.e. 4:1 Daylight LT SW RT).

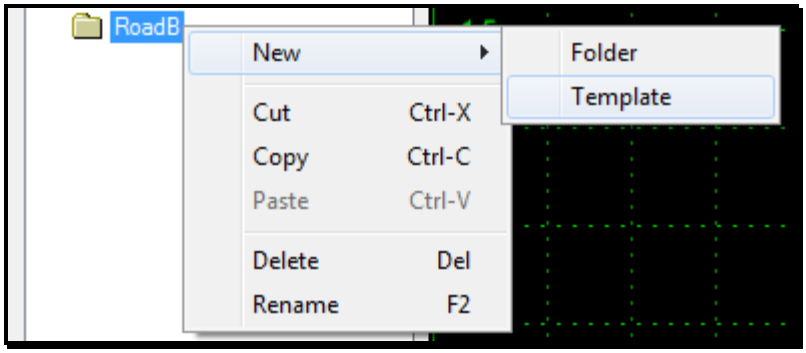


Figure 15-37: Create New Project Specific Template

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 15-38). 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. Check to make sure the Dynamic Origin is at 0,0 before proceeding.

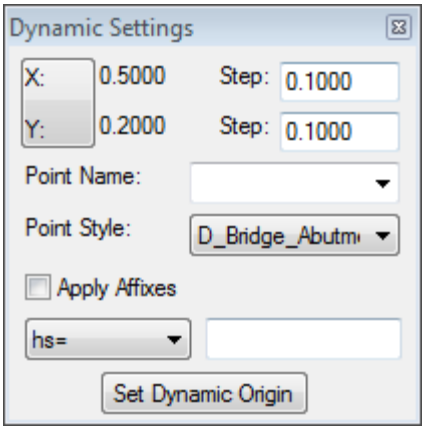


Figure 15-38: Dynamic Settings Dialog

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 15-39).

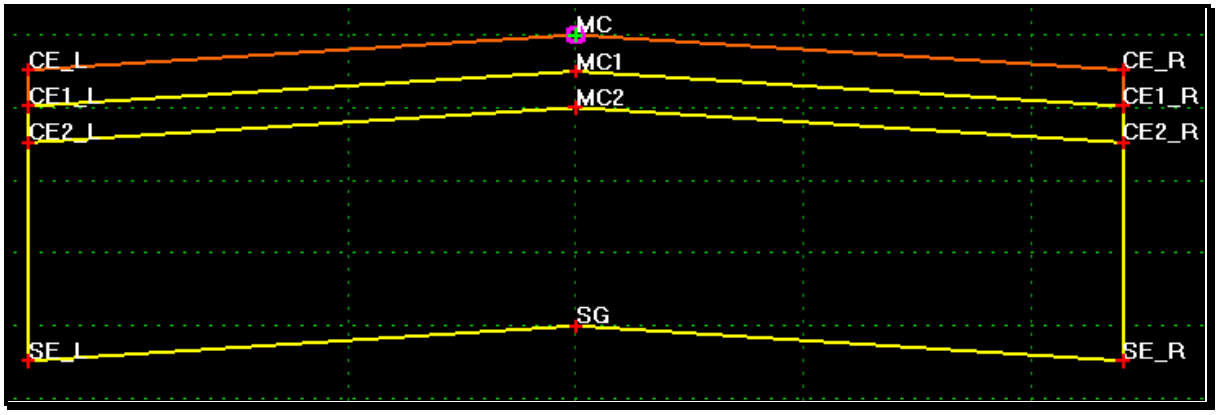


Figure 15-39: Travelway Sub Assembly placed at the Dynamic Origin

- 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 15-40). Click **OK.**

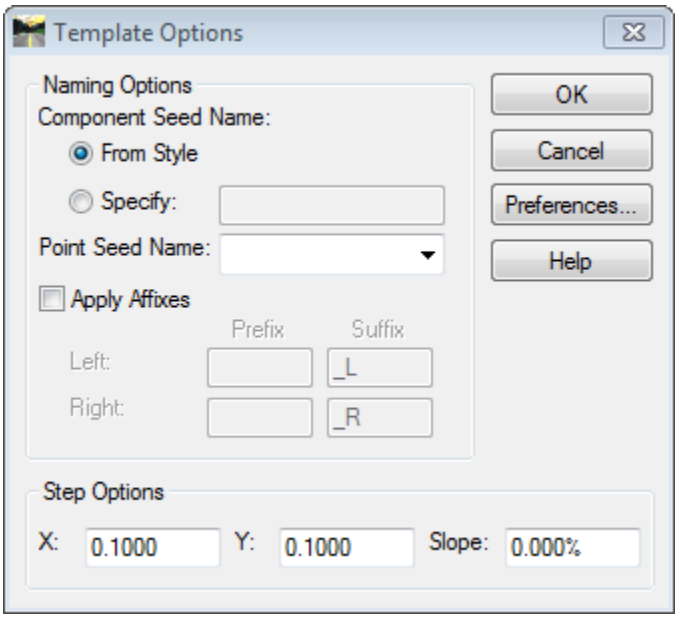


Figure 15-40: Template Options – Uncheck Apply Affixes

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 (_L or _R) 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 (_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 15-41). This will set the slope of the base pavement layer to follow the slope of the Travelway. Click **Apply.** Repeat for the opposite shoulder.

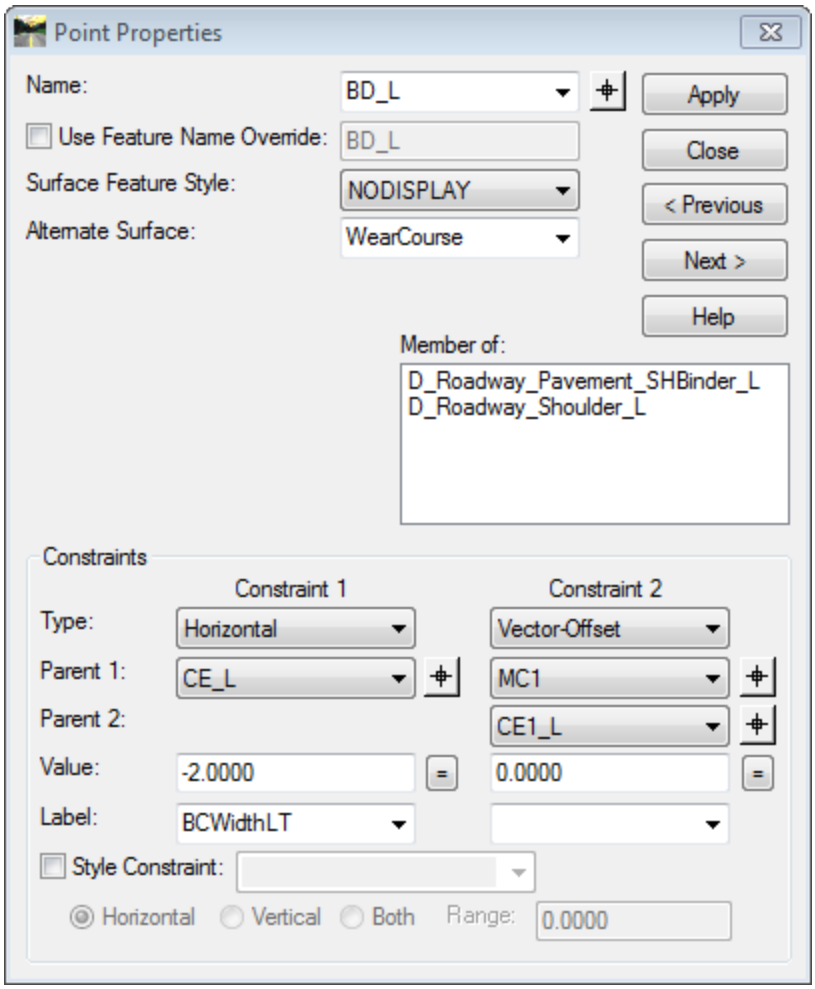


Figure 15-41: Constrain point BD with a Horizontal and Vector-Offset

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 15-42). 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.

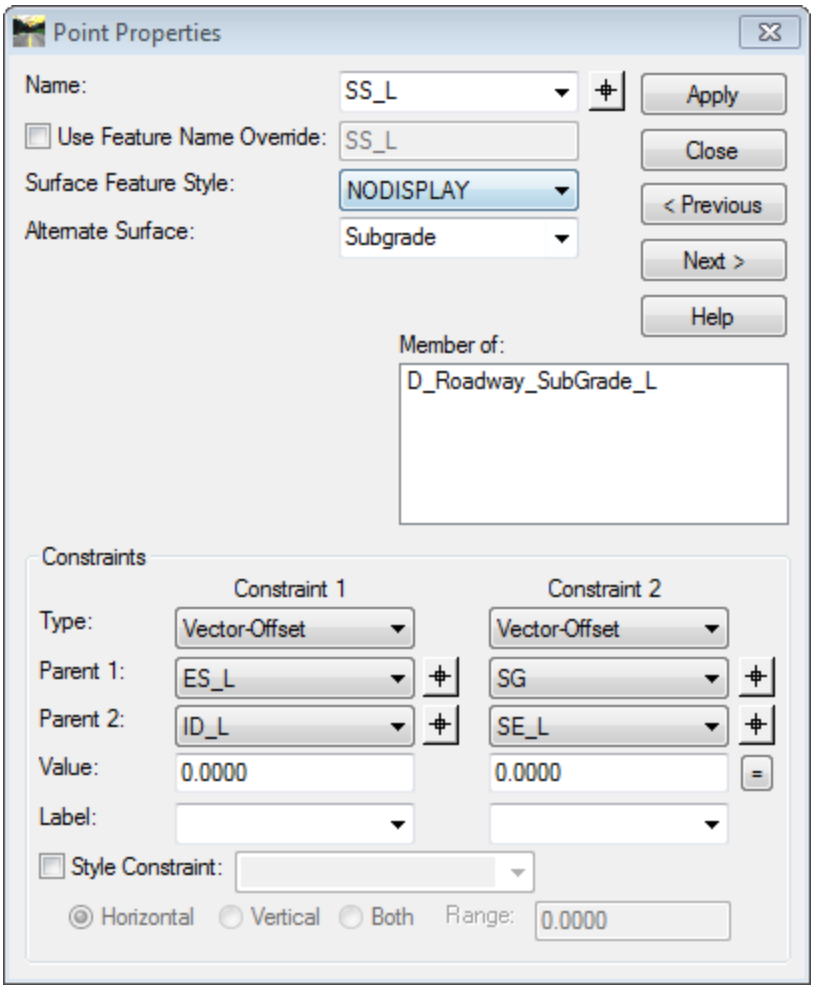


Figure 15-42: Constrain point SS with two Vector-Offsets for Daylight sections.

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 16-30 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. They 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 LT**) drag and hold the *Sub Assembly* into the "gridded" template window. Release the *Sub Assembly* on point SS which is the edge of subgrade. Repeat for the opposite side if desired. Note, the 12UD3_L point might need some editing with a vector offset constraint to follow a vector offset which follows the subgrade line, repeat for the right if desired.

Step Six: Save Template Library

Part One:

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

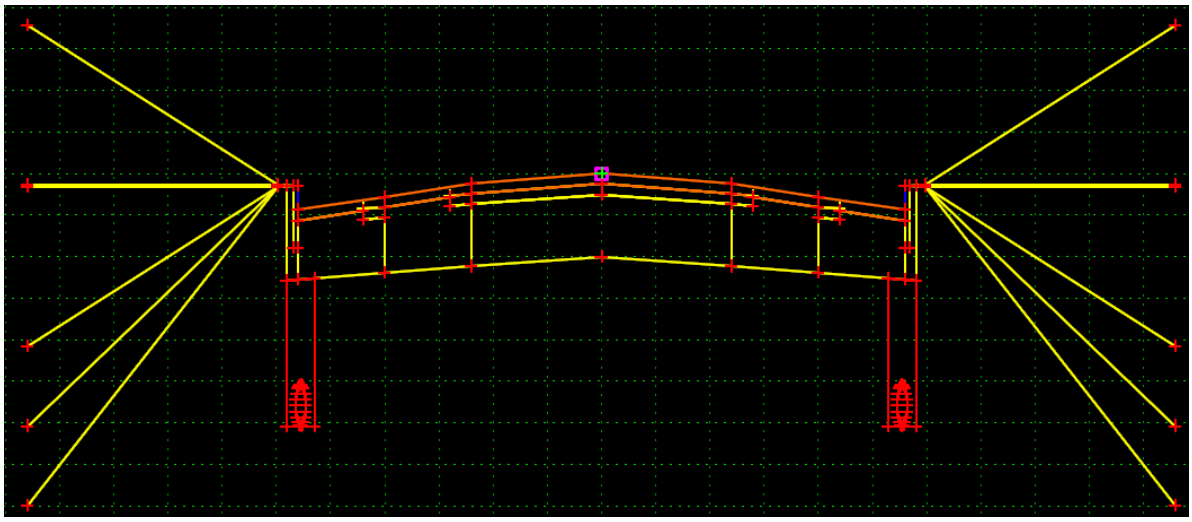


Figure 15-43: Underdrain Example

Template Creation

This example continues to address typical workflows needed to create and adjust a template built from sub assemblies.

Step One: Example Template Two

Part One:

Create a **New Template** in the **RoadB** folder by right clicking the folder and selecting **New > Template.** Enter **Curb LT-Sidewalk RT** and hit enter on your keyboard.

Part Two:

Open *Dynamic Settings* dialog if not already open (Figure 15-44). Toggle the **X, Slope** to **X, Y.** Set the *X Step* and the *Y Step* to 0.1000. Remove the *Point Name* and ignore the *Point Style*. Uncheck **Apply Affixes.**

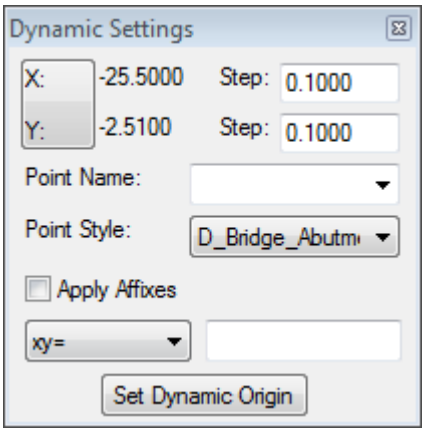


Figure 15-44: Dynamic Settings Dialog

- All Sub Assemblies already have affixes applied so this must be unchecked so multiple affixes are not applied.

Part Three:

Expand the NHS Travelway folder. Drag the **Travelway** into the gridded display and drop onto the *Dynamic Display Origin* which is signified by the magenta box.

Important: If the template centerline point is not at 0, 0 within the gridded display, but you used the magenta box, the Dynamic Origin is the issue. You can reset the **Dynamic Origin** to 0,0 and/or set the **Template Origin** (Figure 15-45) by right clicking the centerline point **(MC)** and selecting **Change Template Origin.**

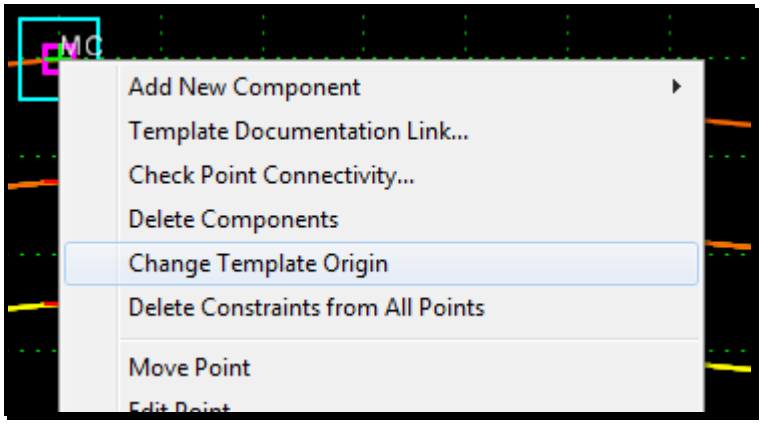


Figure 15-45: Change Template Origin

- This will move the template to **0, 0.** The *Dynamic Origin* is back where you left it and you can move it again if desired.

Part Four:

Place an **Auxiliary Lane RT** travelway onto point **CE_R.** This point will become "white" when you have hit the point exactly.

Part Five:

Expand the **NHS Sidewalks** folder and place the **BoxCurb Type1 w/SW RT** *Sub Assembly* onto point **CA_R.** See Figure 15-46.

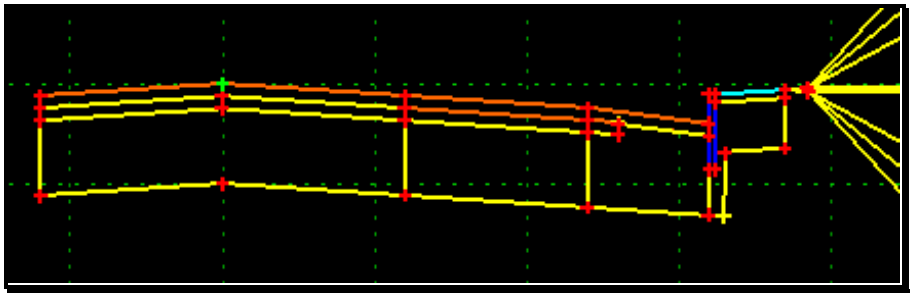


Figure 15-46: Place BoxCurb Type1 w/SW RT

Part Six:

Expand the **NHS Shoulders** folder and drag and drop the **BoxCurb Type1LT** *Sub Assembly* and place it on to **CE_L.** See Figure 15-47.

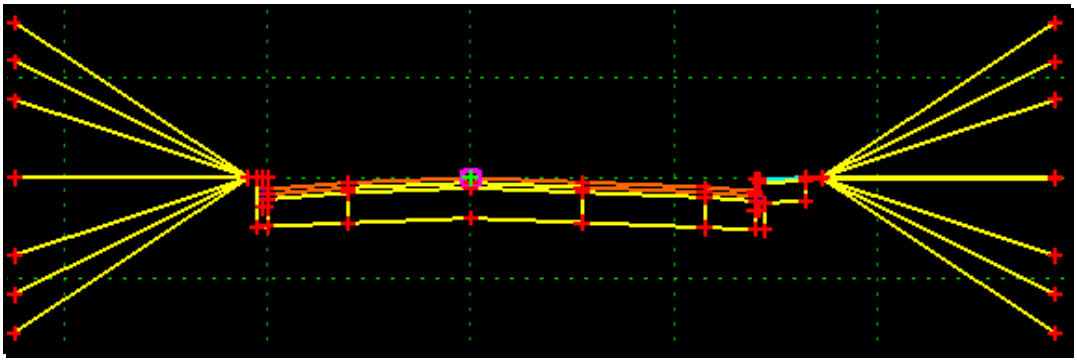


Figure 15-47: Place BoxCurb Type1 w/SW LT

Step Two: Edit Points/Constraints

Adjust Base Pavement (Full Width)

Zoom in on the right shoulder where the base pavement extends into the shoulder. Right click the top point on point **BD_R** and select **Delete Horizontal Constraint** (Figure 15-48).

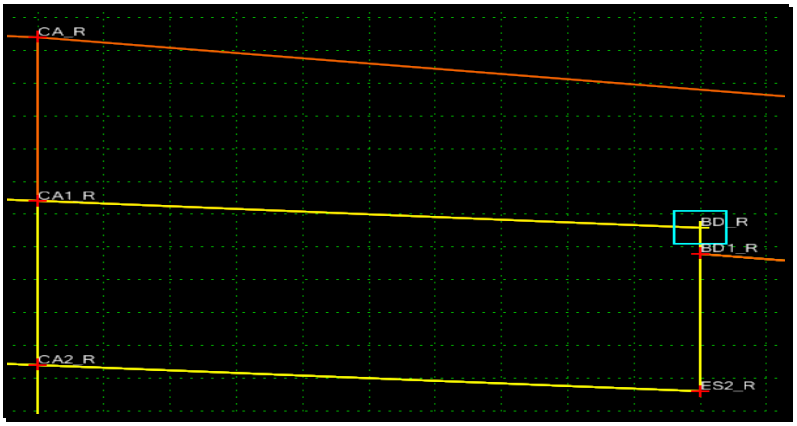


Figure 15-48: Delete Horizontal Constraint

Right click **BD_R** and select **Move Point.** Move this point to **ES1_R** which is the bottom of the wearing course of pavement where it meets the curb.

Now right click the **BD_R/BD1_R/ES1_R** point and select **Merge Points.** The *Delete Point* dialog opens prompting for which point you want to delete (Figure 15-49). Select the BD1_R point.

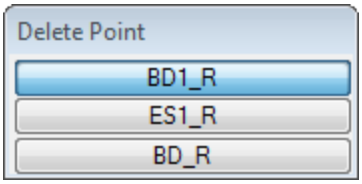


Figure 15-49: Delete Point Dialog

- When there is more than 2 points on top of each other, you will be prompted to select one of the remaining two points.

Then select the **BD_R** point from the **Merge BD1_R With Point** dialog. The result is two points still exist at the same location. See Figure 15-50.

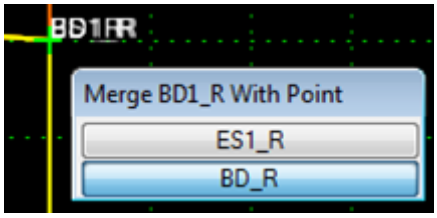


Figure 15-50: Merge Point Dialog

Right click the **BD_R/ES1_R** point and select **Merge Points.** The *Delete Point* dialog opens prompting for which point you want to delete (Figure 15-51). Select the other **BD_R** point.

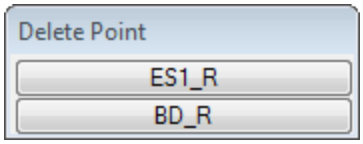


Figure 15-51: Delete Point Dialog

Step Three: Final Adjustments

Part One: Base Pavement Layer LT

BD_L: Release Horiz Constraint

Move BD_L to ES1_L

Merge BD1_L into BD_L

Merge BD_L into ES1_L

Part Two: Adjust SS_L and SS_R

Add Vector Offset to SE_L and SG, 0.00 Offset

Add Vector Offset to SG and SA_R, 0.00 Offset

Part Three: Adjust Widths

Adjust Left and Right Shoulder Widths to 5’

Adjust Left and Right Travelway Widths to 11’

Adjust Auxiliary Lane Width to 11’

Step Four: Save Template Library

Part One:

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

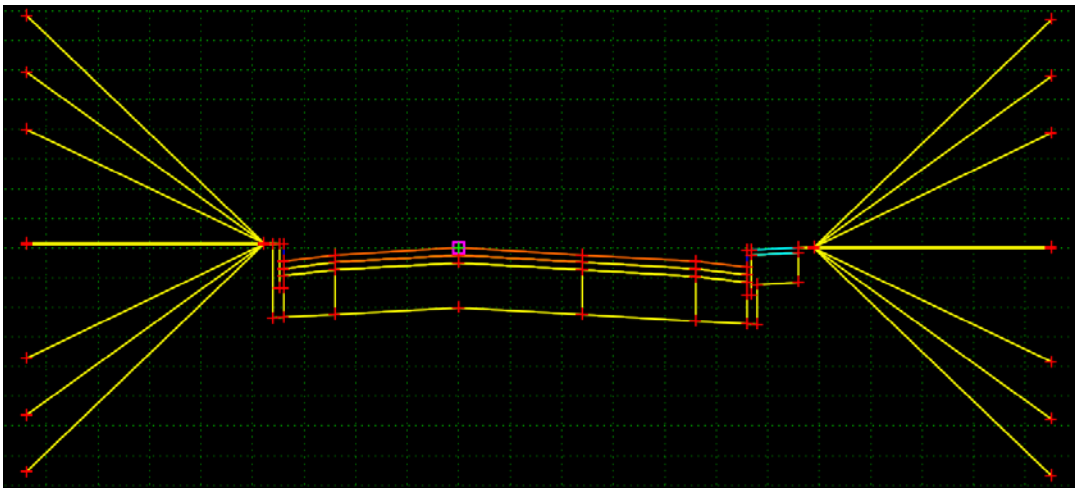


Figure 15-52: Completed Example Template

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 **RoadB** folder called **MedianTest**. 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 15-30 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 15-30 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 15-31 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 15-53), 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.

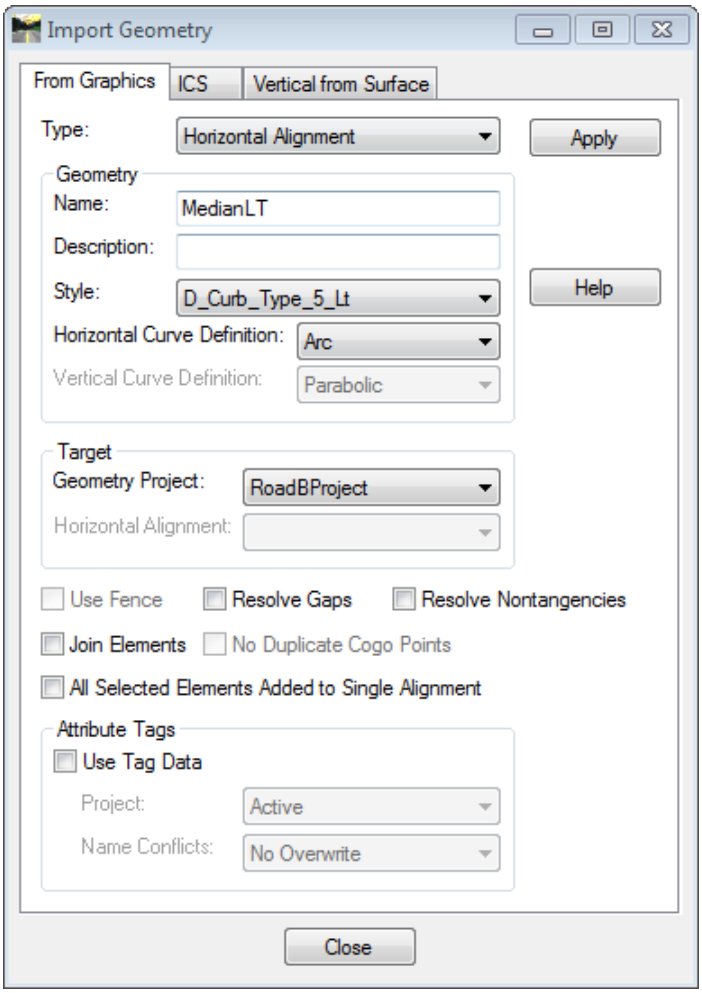


Figure 15-53: Import the LT and RT portions of the medians From Graphics.

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 (Figure 15-54).

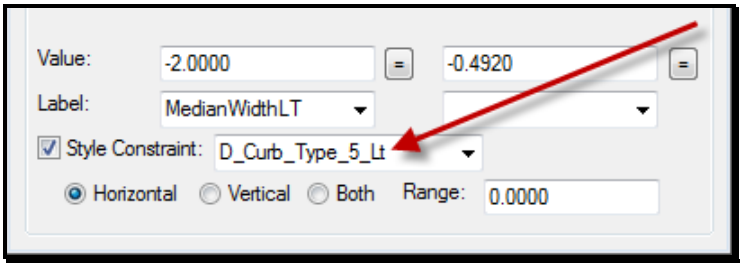


Figure 15-54: Style Constraint field in Template Point Properties.

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 **RoadB** folder called **ParametricTest**. Place the Travelway without *Affixes* on the center point of the template.

- ✓ ***Refer to 15-30 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.

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

Save template and close Template Library. Set up the Roadway Designer to use just one template drop. Adjust the transition in and out of the auxiliary lane using *Parametric Constraints* found at **Tools > 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 *Element Selector* or other selection method.

Step Three: Import the Template/End Condition

Select **File > Import Template** from the *Create Template* dialog in InRoads. Typically the *Style* can be left alone and addressed after the template is created inside the Template Library. Select the appropriate *Type* as it will help setup component properties and constraints during the import. If the graphics are vertically stretched, that can be addressed now too.

Step Four: Define the Template Origin

Define the origin with data click. This will locate the 0,0 value in the template.

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. Since the points are in the correct location, it is a matter of setting constraints and defining components as needed.

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 15-55).

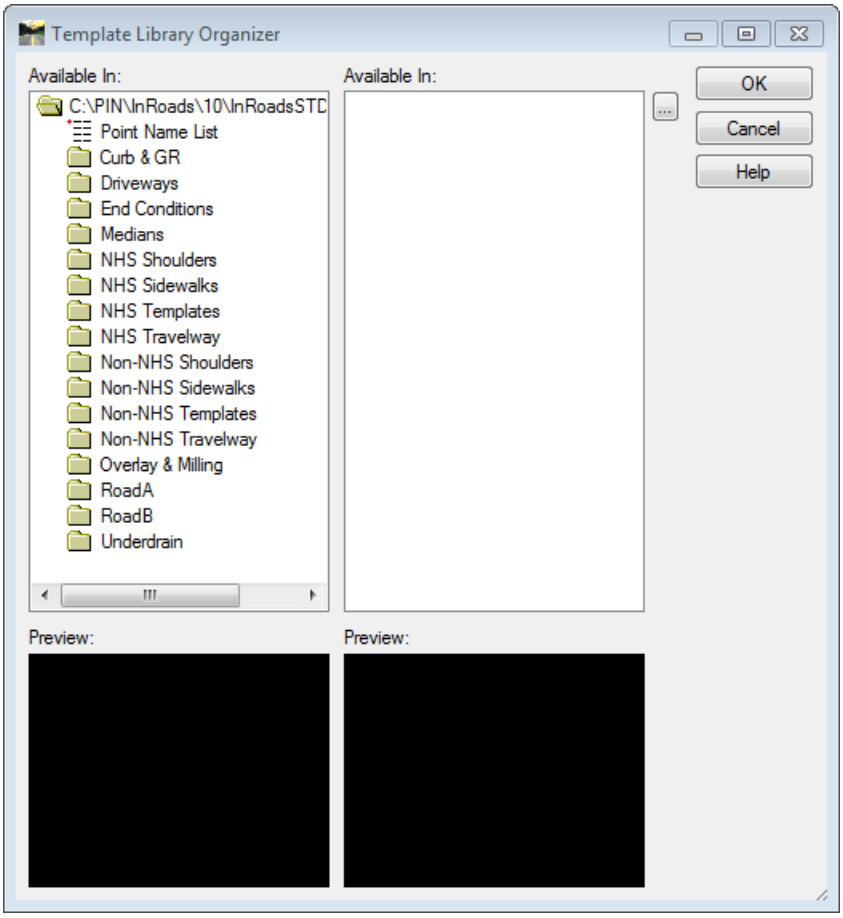


Figure 15-55: Template Library Organizer Dialog

Step Three: Browse to Library Copying From

On the right side of the dialog, click the browse button (button with 3 dots) and browse to the source library you are copying from. Typically you will copy from another Template Library file, however you could browse to an InRoads *Roadway Designer (*.ird)* file instead.

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, click OK and you will be prompted to save changes to the library(s). See Figure 15-56.

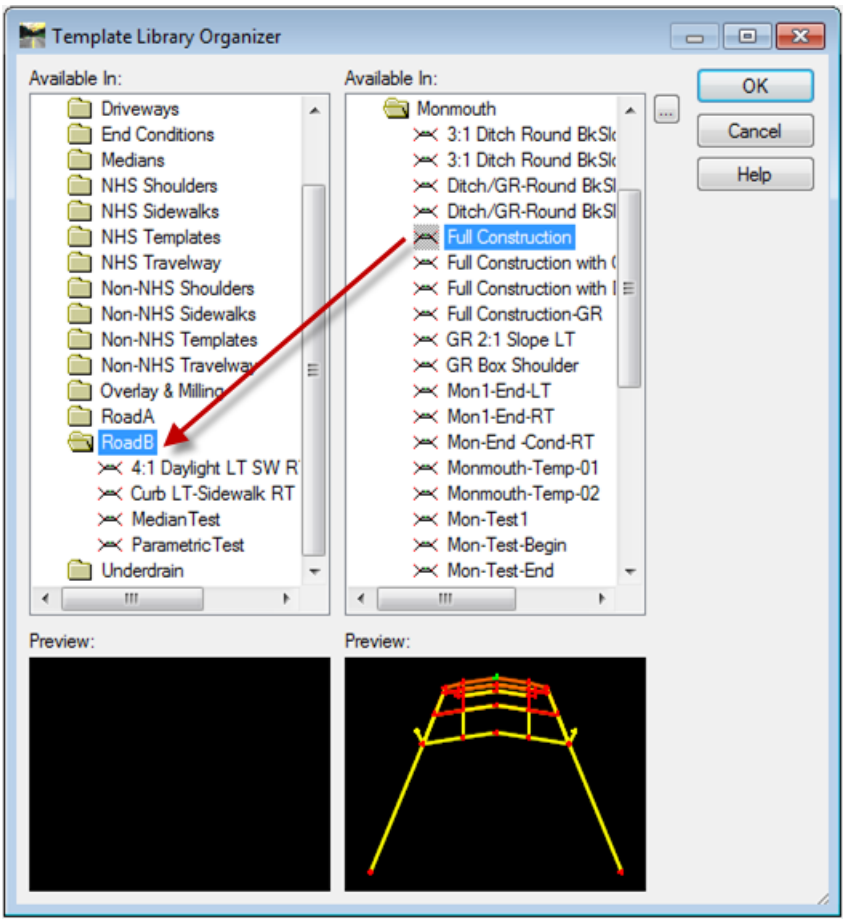


Figure 15-56: Template Library Organizer Dialog – Drag and Drop

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 15-29 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, superelevation, etc. The following section walks you through an example of using the Roadway Designer.

Step One: Open Roadway Designer

Select **Modeler > Roadway Designer** from the InRoads main menu. This opens a **New File.** Select **File > Save** from the *Roadway Designer* menu. Enter **Design** as your file name. Select **Save.** See Figure 16-1**.**

This will be the "container" for all of your *Corridors* (MainLine with its alignment and template drops & Side Roads with their alignments and template drops).

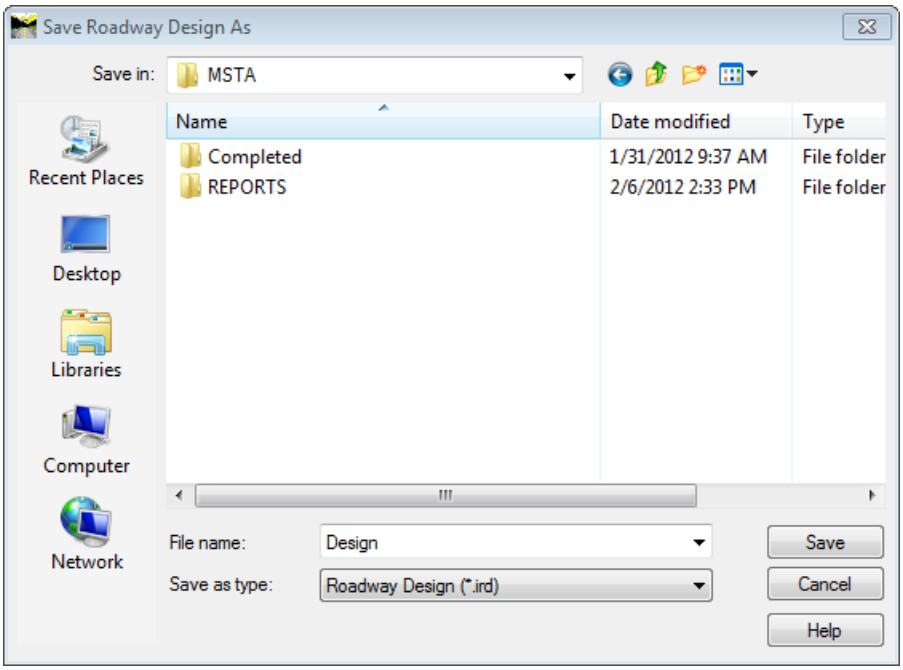


Figure 16-1: Save Roadway Design As Dialog

Once saved, you can update your Project File (*.rwk).

Step Two: Create a MainLine Corridor

Select **Corridor > Corridor Management** from the *Roadway Designer* menu. Enter **MainLine** as the *Name* of the corridor. Set the *Surface Symbology* to **D_Roadway_Centerline.** Set the *Type* to **Alignment.** Set the *Horizontal Alignment* to the **MainLine_Horiz** and set the *Vertical Alignment* to the **MainLine_Vertical.** Enable the **Station** lock use 1+00 and 16+50 as the limits and click **Add**. See Figure 16-2.

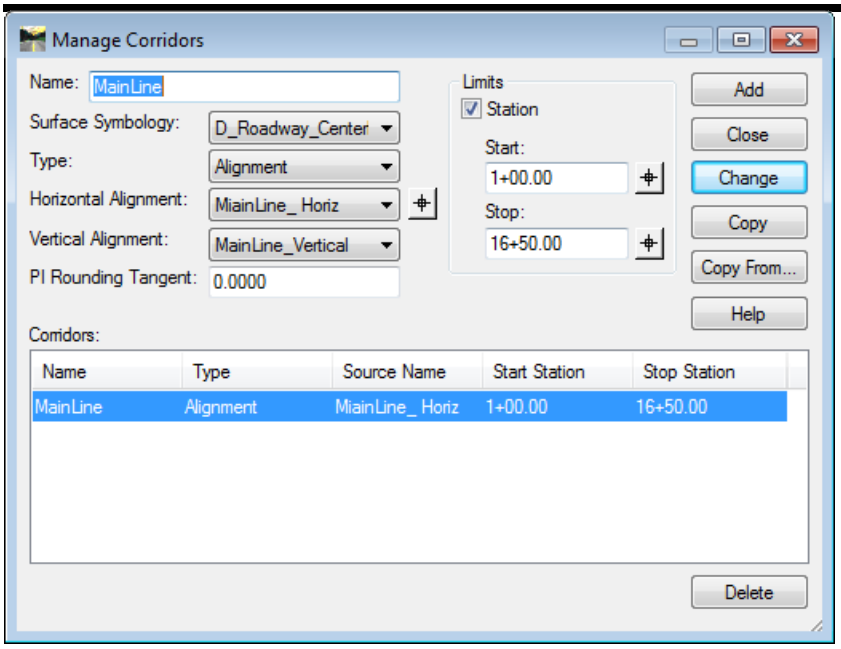


Figure 16-2: Manage Corridors Dialog

ADD A TEMPLATE DROP

Open Template Drop Dialog

Part One:

Select **Corridor > Template Drops…** from the *Roadway Designer* main menu. Expand the folder structure for the *Library Template* that is loaded. This **RoadB** folder has two saved templates. See Figure 16-3.

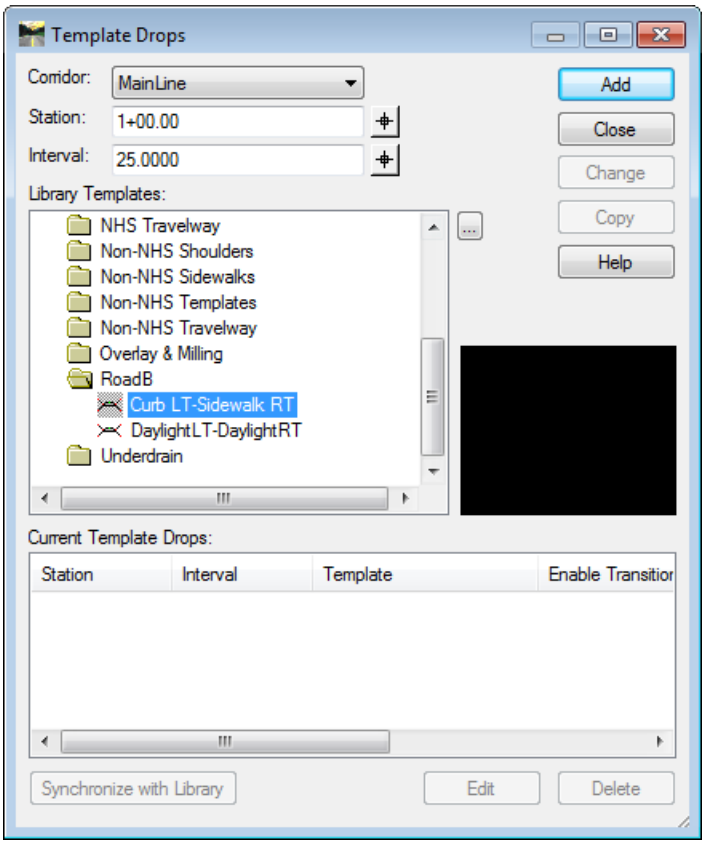


Figure 16-3: Template Drops Dialog

Part Two:

Select the **Curb LT-Sidewalk RT** template from the **RoadB** folder. Change the *Interval* to **50.0000.** Click the **Add** button and then **Close.**

Part Three:

In the *Roadway Designer* window, select **Process All.** Now look at the cross section view by clicking the forward arrows. Before continuing, lock the Active Surface as **GROUND** so that all processed models in this session are run against the existing surface (Figure 16-3).

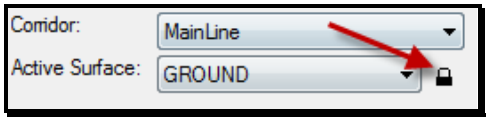


Figure 16-4: Lock the Active Surface

ADJUST PARAMETRIC CONSTRAINTS

Overview

We applied a template that contains the right side auxiliary lane throughout the project. Now we want to adjust the start and stop of the additional lane. Adjusting the *Parametric Constraints* will minimize the number of template drops needed to do this.

Step One: Open Parametric Constraints Dialog

Select **Tools > Parametric Constraints** from the *Roadway Designer* menu. Let's look at the possible adjustments that can be made in the *Constraint Label* pull down (Figure 16-5).

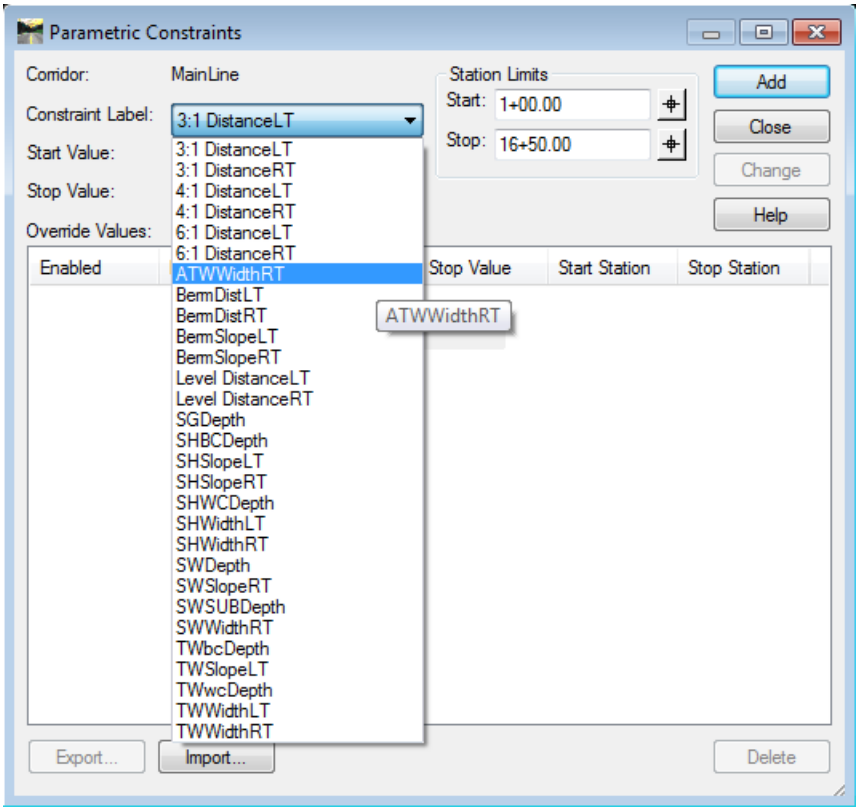


Figure 16-5: Parametric Constraints Dialog – Select Label

Step Two: Adjust Auxiliary Travel Lane Width

Overview

For this example, it was decided that the Auxiliary Lane is necessary from **Sta. 4+25** through **Sta. 14+00.** There will be a **175'** transition into the lane and a **125'** transition back to a single lane.

Part One:

Change the *Constrain Label* to the **ATWWidthRT** (Auxiliary Travelway Width Right). By default, the width of the Auxiliary Lane is 11' as a *Start* and *Stop* value (Figure 16-6).

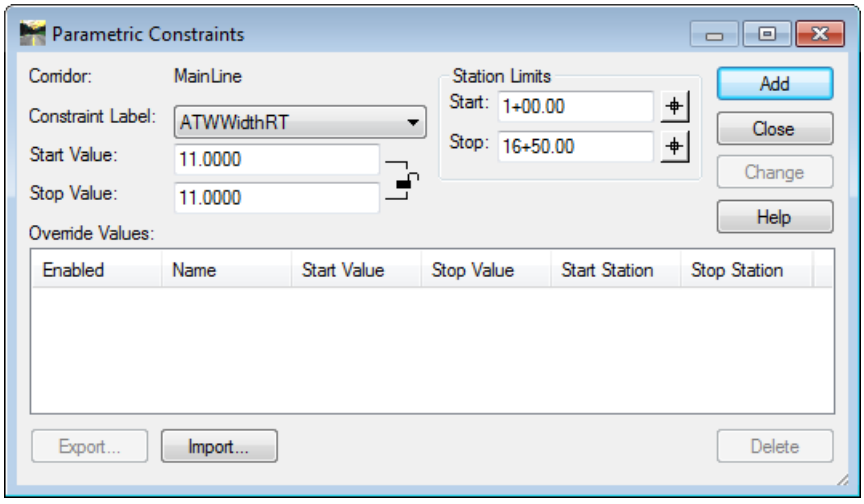


Figure 16-6: Parametric Constraints Dialog – Default Start and Stop Values

Part Two: Single Lane Limits (Beginning)

Adjust the *Start Value* and *Stop Value* to **0.0000.**

Adjust the *Station Limits Start* value to **1+00.00.**

Adjust the *Station Limits Stop* value to **2+50.00.**

Click the **Add** button. See Figure 16-7.

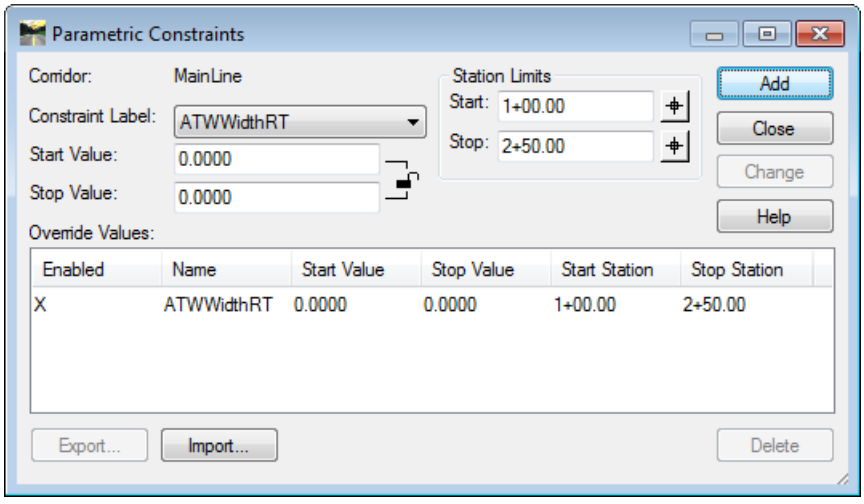


Figure 16-7: Parametric Constraints Dialog – Setting Start and Stop Values

Part Three: Transition to 2 Lanes

Adjust the *Start Value* to **0.0000.**

Adjust the *Stop Value* to **11.0000.**

Adjust the *Station Limits Start* value to **2+50.00.**

Adjust the *Station Limits Stop* value to **4+25.00.**

Click the **Add** button. See Figure 16-8.

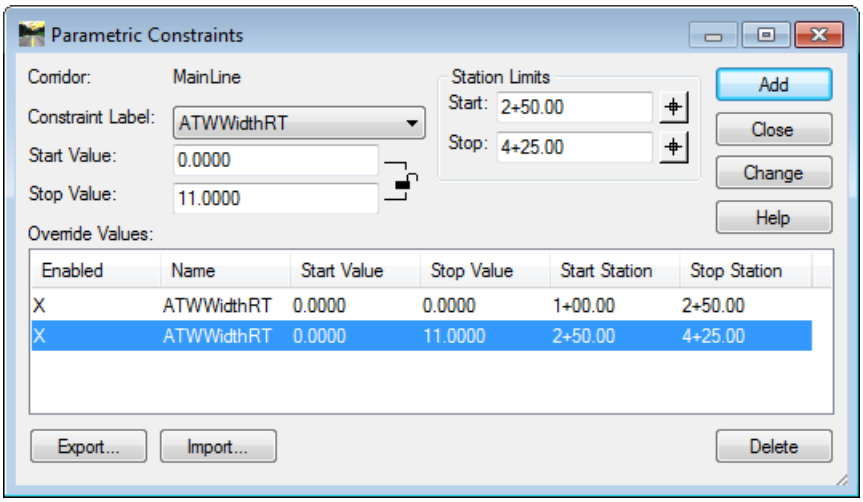


Figure 16-8: Parametric Constraints Dialog – Setting Start and Stop Values for Transition

Part Four: Transition to One Lane

Adjust the *Start Value* to **11.0000.**

Adjust the *Stop Value* to **0.0000.**

Adjust the *Station Limits Start* value to **14+00.00.**

Adjust the *Station Limits Stop* value to **15+25.00.**

Click the **Add** button. See Figure 16-9.

Note, no entry from 4+25 to 14+00 is needed, it is already 11' by default.

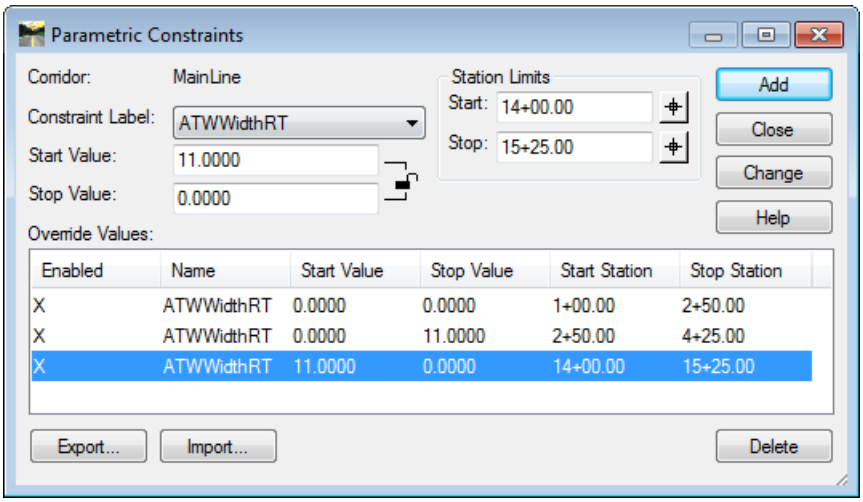


Figure 16-9: Parametric Constraints Dialog – Setting Start and Stop Values for Transition

Part Five: Single Lane Limits (Ending)

Adjust the *Start Value* and *Stop Value* to **0.0000.**

Adjust the *Station Limits Start* value to **15+25.00.**

Adjust the *Station Limits Stop* value to **16+50.00.**

Click the **Add** button. See Figure 16-10.

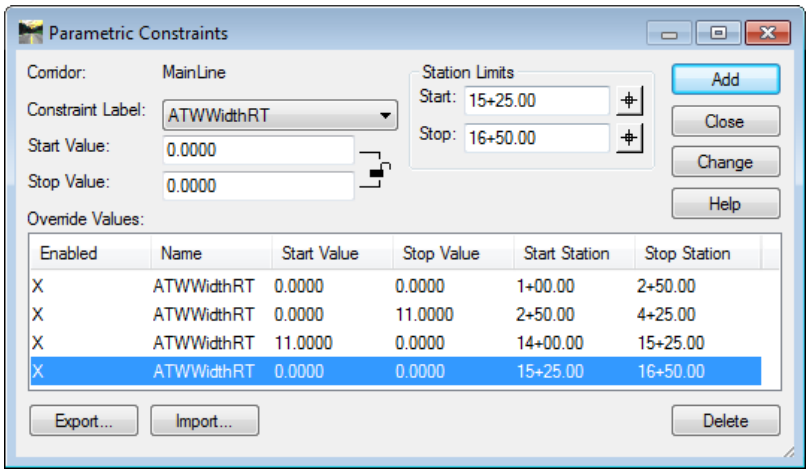


Figure 16-10: Parametric Constraints Dialog – Setting Start and Stop Values

Part Six: Export as Parametrics.txt

Select the **Export** button at the bottom of the *Parametric Constraints* dialog and save this as **Parametrics.txt** in your MSTA location. Select **Close** to close the *Parametric Constraints* dialog.

Saving the Parametric Constraints in a text file will allow you to recover these settings in the future if need be. The can also be edited and then imported back in, but make sure to delete the previous list to avoid getting duplicate lines.

Step Three: Review with Roadway Designer

Process All

Select the **Process All** button at the bottom right of the *Roadway Designer* dialog (Figure 16-11). Step through the stations in the cross section view using the forward arrow. Notice the auxiliary lane expand and contract in the station range due to the *Parametric Constraints* you applied.

Figure 16-11: Roadway Designer – Process All

Enter Stations

Select the station text and type in the station **2+50** (250 can be entered without the "+" sign) followed by the "tab" key on your keyboard. This is where the auxiliary lane will start.

Enter **2+51** and hit the "tab" key on your keyboard. Zoom in on the edge of travelway. The auxiliary lane begins to appear.

Enter **3+00.** Notice the green box (parametrically controlled point) continues adjusting outward (Figure 16-12).

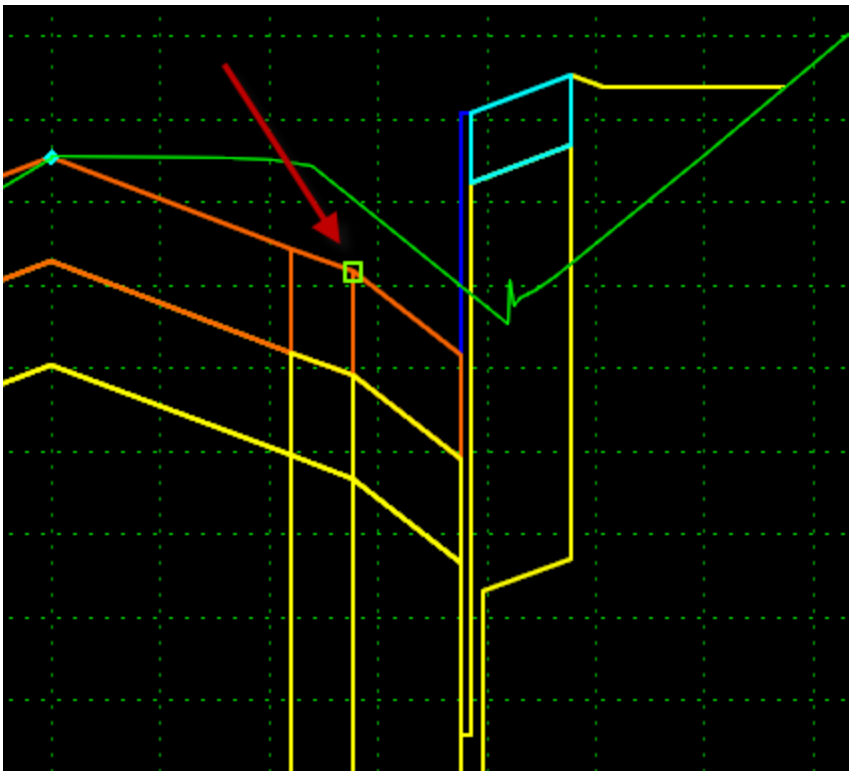


Figure 16-12: Parametric Constraint Marker

Enter station **4+25.** Hover over the component that defines the auxiliary lane. It says it has an 11' width with a slope of -2%.

Enter station **14+00.** Hover over the component that defines the auxiliary lane. It says it has an 11' width with a slope of -2%.

Enter station **15+25.** This is where the auxiliary lane should be back to zero width.

DISPLAY REFERENCES

Display ROW in Roadway Designer

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.

- When existing Right of Way is done completely in InRoads the design staff won't have to create the surface.

Part One:

Minimize the *Roadway Designer* dialog. Open the HDPlan.dgn from your list of files in your PIN MSTA directory or attach RWPLAN.dgn as a reference file to the current file you have open.

Part Two:

Select **File > Import > Surface Advanced…** from the InRoads main menu (Figure 16-13). In the Import Surface Advanced dialog, 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.**

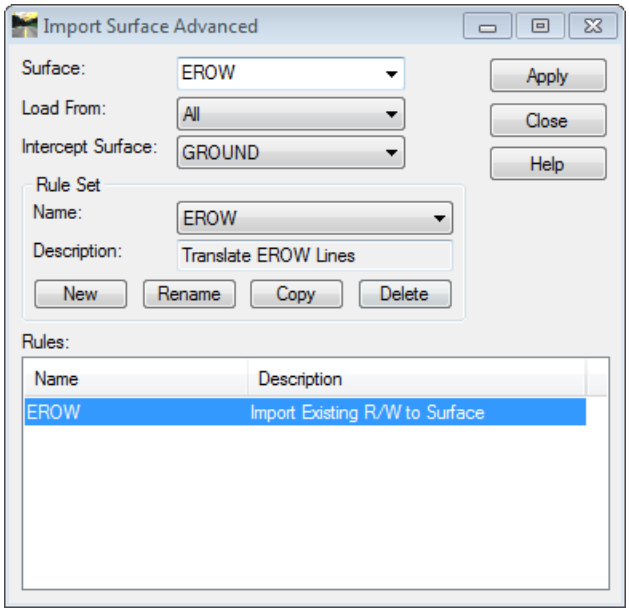


Figure 16-13: Import Surface Advanced Dialog

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.**

Part Three:

Verify that there are features in the EROW surface by returning to the InRoads main menu and browsing to the **Surfaces** tab. Select the **EROW** surface in the InRoads Explorer portion of the dialog. The right pane should show the total number of *Breakline Features* of the surface (Figure 16-14).

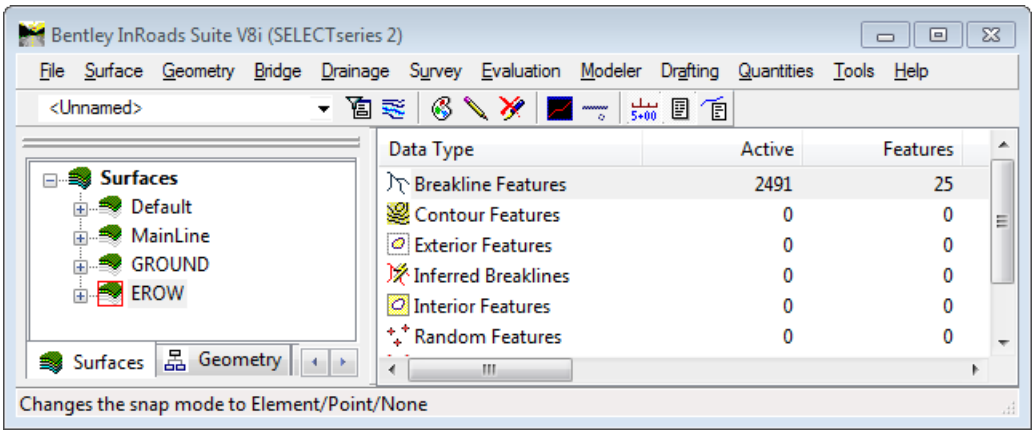


Figure 16-14: Breakline Features Totals

- If this doesn't work the first time, make sure the levels are turned on (i.e. make sure "E_ROW_Line" is on so it can be found). If still having failure, double click the EROW LINE rule and browse to the *General* portion of the *Selection Criteria* leaf. Click on the **Highlight Matching Elements** button. The Existing Right of Way elements should highlight. If not, it means that they were placed on the wrong level. Use the **Match Element Properties** button and click on an Existing Right of Way line.

Part Four:

Maximize the *Roadway Designer*. Select **Corridor > Display References…** from the *Roadway Designer* menu. Select the Filter radio button and then the **EROW** surface from the *Surface* pull down above. 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 (Figure 16-15). Click **Close** to exit the dialog.

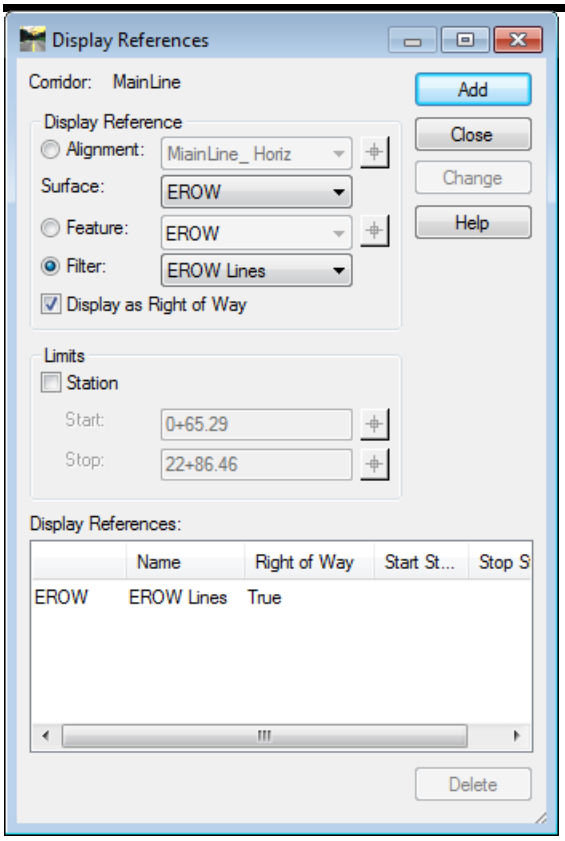


Figure 16-15: Display References Dialog

The plan view portion of the dialog should now contain the ROW lines (Figure 16-16).

Figure 16-16: Roadway Designer Plan View with ROW Lines Displayed

The cross section view of the *Roadway Designer* should now display the ROW lines as dashed vertical lines (Figure 16-17).

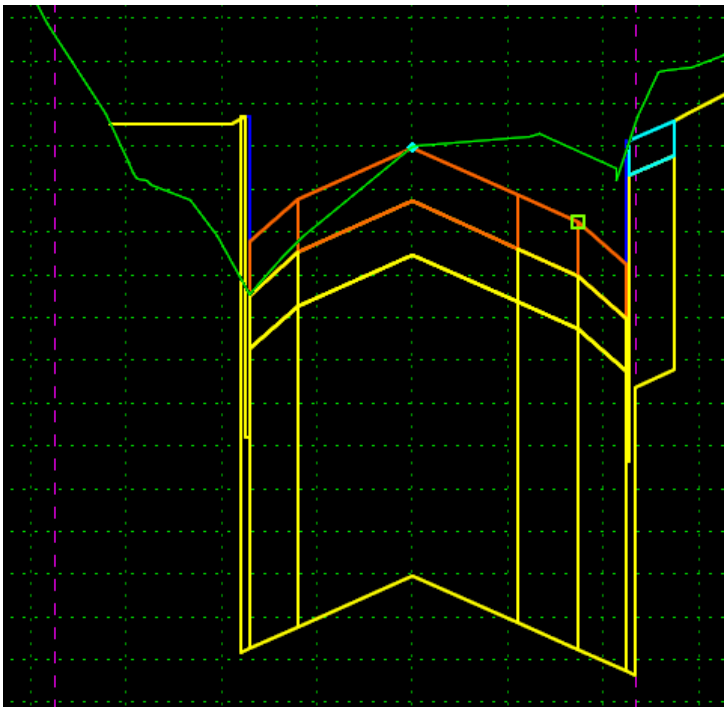


Figure 16-17: Roadway Designer - ROW Lines in Cross Section View

DISPLAY SUPERELEVATIONS

Step One: Add Superelevation

Overview

There are a lot of options and adjustments that can be performed in the *Superelevation* dialog. The dialog seems intimidating at first, but you will eventually see that it's not so difficult. Use InRoads *Help* on the more intricate details.

Part One:

Verify that your *Corridor* is set to your **MainLine** and *Active Surface* is set to **Ground.**

Part Two:

Select the **Display Mode** of **Superelevation** (Figure 16-18). Select **Process All.** The view window inside of the *Roadway Designer* changes to display different aspects of the Superelevation.

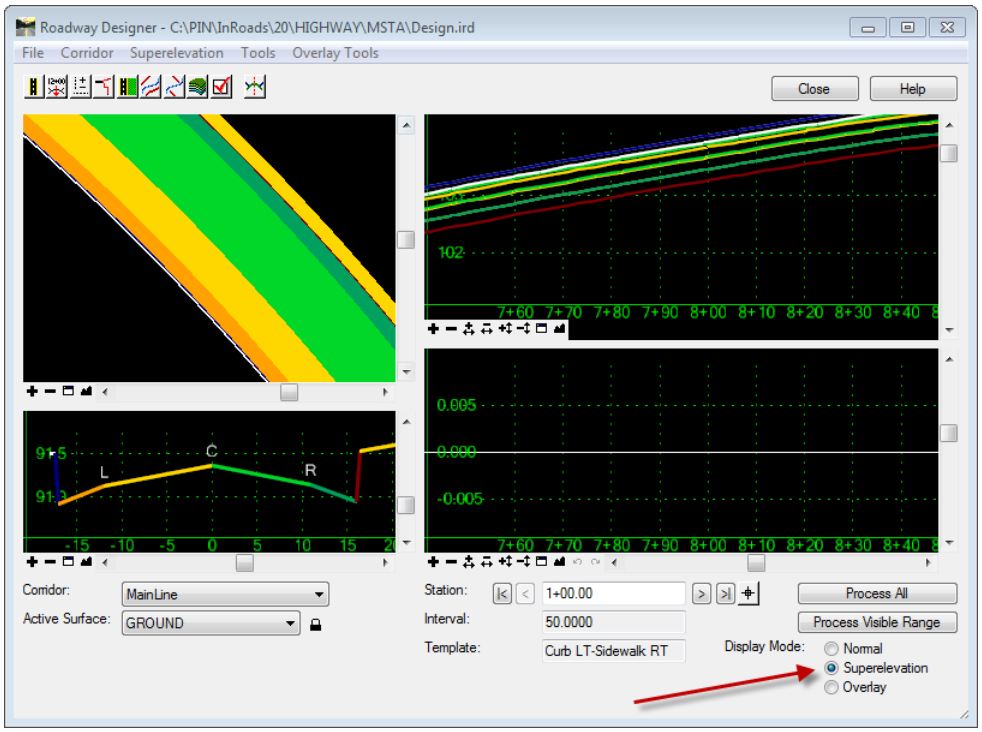


Figure 16-18: Roadway Designer - Superelevation Display Mode

Part Three:

Select **Superelevation > Create Superelevation Wizard > Table….** MaineDOT has the Superelevation in the format of a *Table* (Figure 16-19).

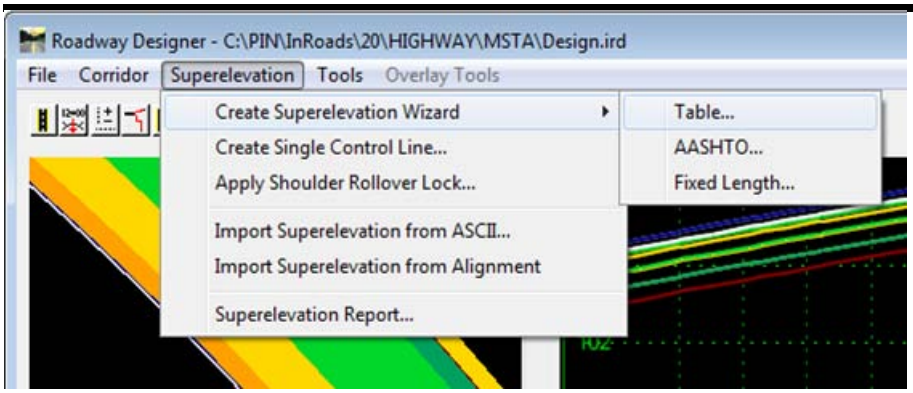


Figure 16-19: Create Superelevation Wizard - Table

Part Four:

Select the **Browse** button and browse to the **C:\!msV8iconf\standards\InRoadsSTD\Superelevation** folder. Select the Superelevation table that suits your needs. In this case, we will be using the **MeDOT_06_35.sup** table.

- The tables are listed by maximum Superelevation percentage and posted speed (i.e., MeDOT_06_35.sup would be a 6% max super with a design speed of 35 mph).

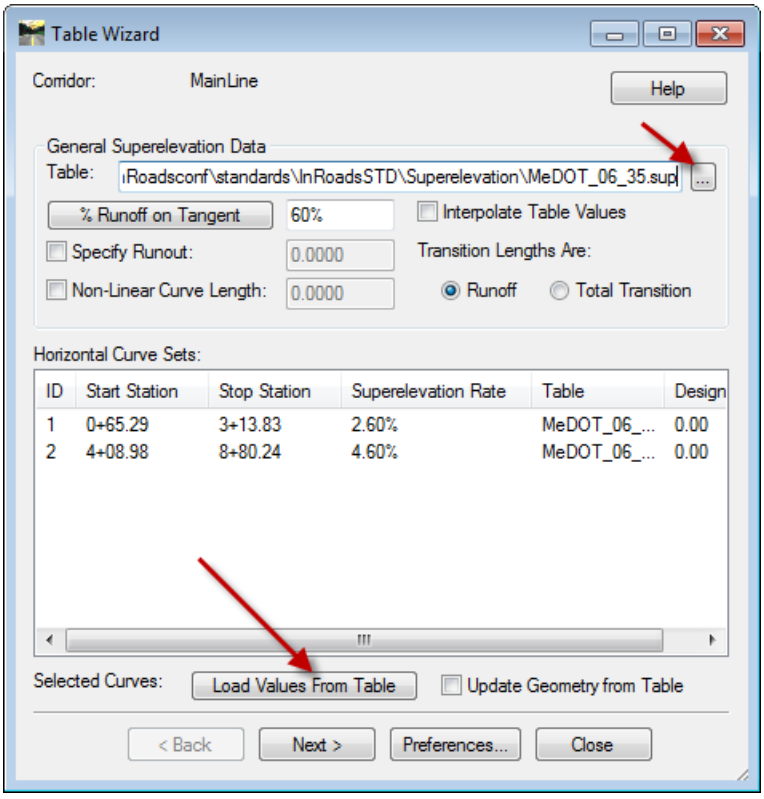


Figure 16-20: Table Wizard – Load Values

Select **Load Values From Table** then select **Next** (Figure 16-20).

Part Five:

Select the **Add** button (Figure 16-21).

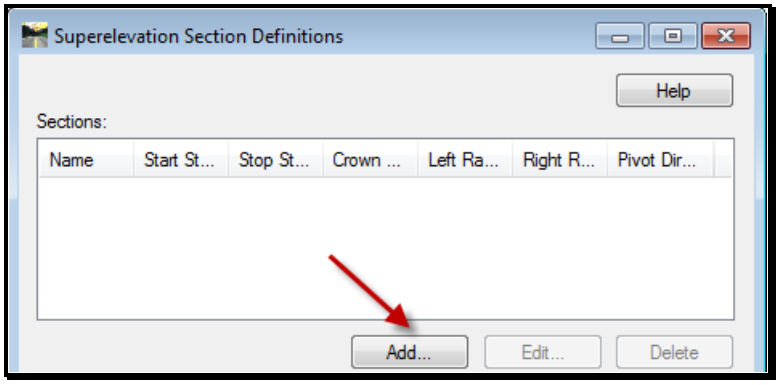


Figure 16-21: Superelevation Section Definitions Dialog

Part Six:

Enter **MC** as the *Crown Point.* Set the *Left Range Point* to **CE_L** and *Right Range Point* to **CA_R**. See Figure 16-22.

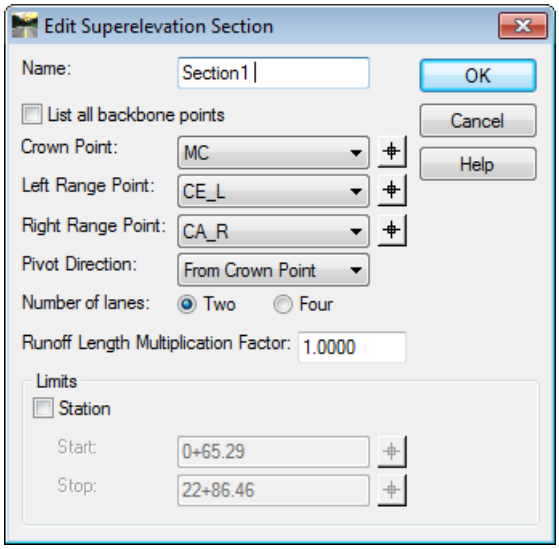


Figure 16-22: Edit Superelevation Section Dialog

Click **OK.** Select **Next** to proceed in the wizard.

Part Seven:

The *Superelevation Section Definitions* dialog allows for some adjustments. Additional *Sections* can be added or the *Sections* can be edited for max super, runoff distance and runoff length or station. Click **Next.** See Figure 16-23.

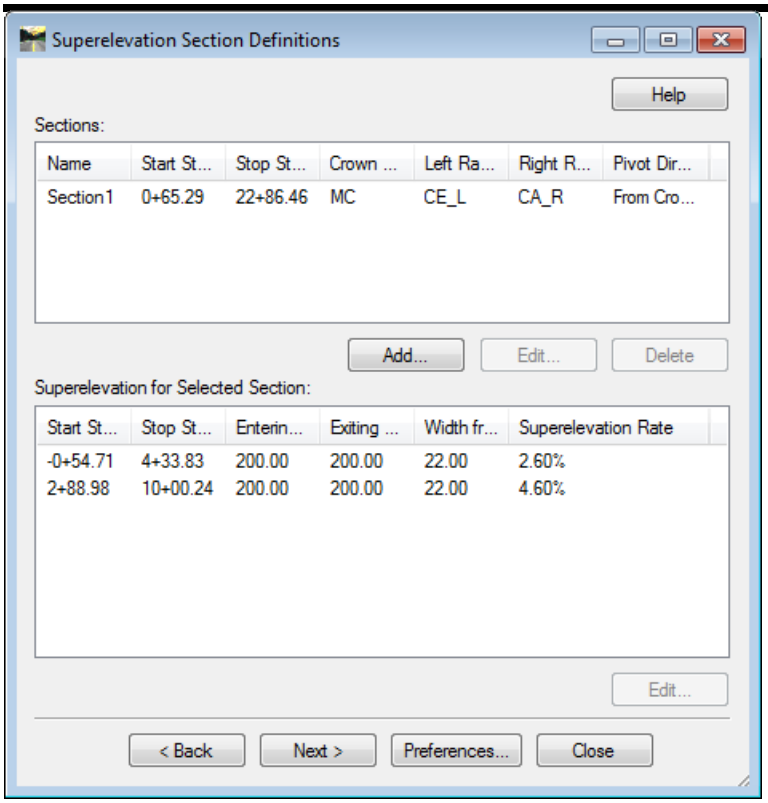


Figure 16-23: Superelevation Section Definitions Dialog

Part Eight:

Notice that the results are displayed in the wizard. 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. This dialog will allow you to round the stations to the nearest 1' or 10'. Click **Finish.** See Figure 16-24.

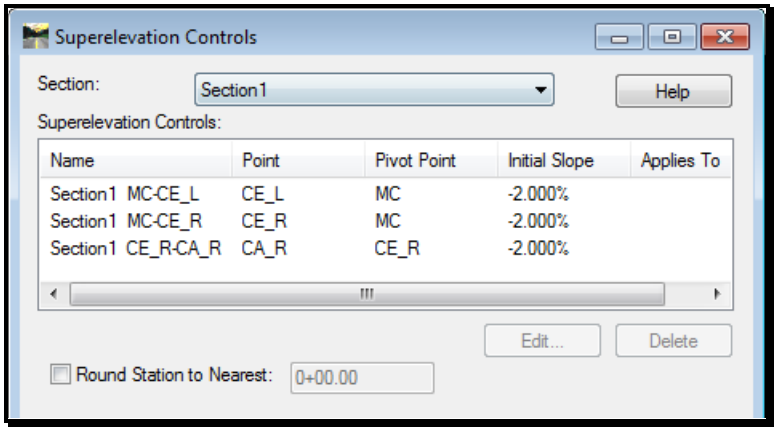


Figure 16-24: Superelevation Controls Dialog

Part Nine:

The *Fix Superelevation Overlap* dialog will appear if there are issues with overlap. Notice that the Curve 1 superelevation starts before beginning of alignment. Click **Next.** See Figure 16-25.

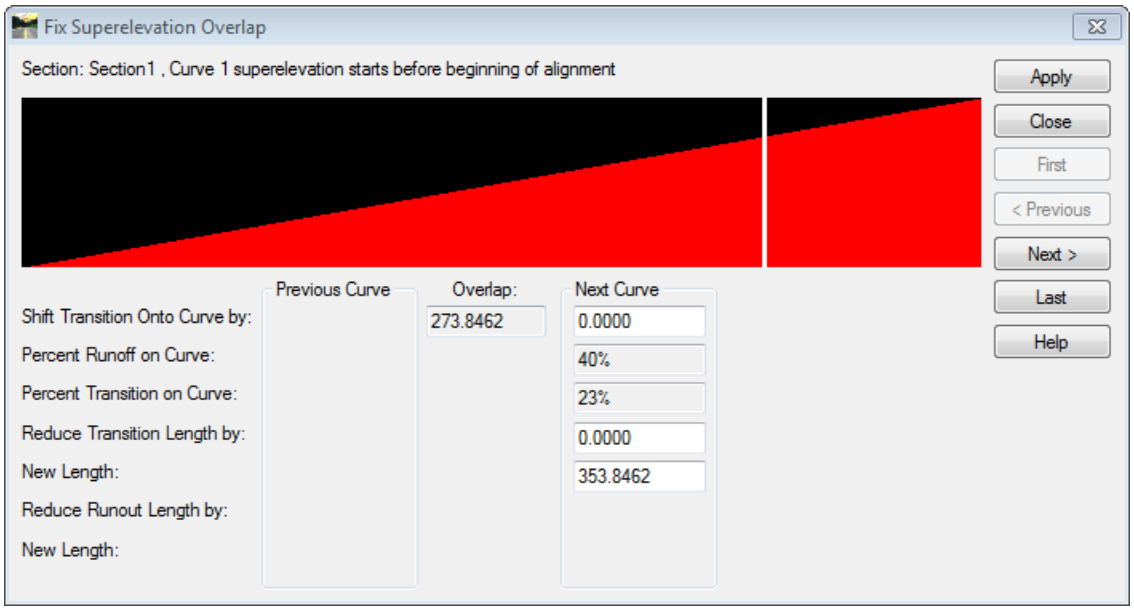


Figure 16-25: Fix Superelevation Overlap Dialog

The next curve shows that there is overlapping based on the standard transitions when applied. Edits can be made to this dialog (like shortening the transition or shifting the transition to avoid overlap) but it may be easier to edit the wire diagram based on standards from the Highway Design Guide (Figure 16-26). Select **Close.**

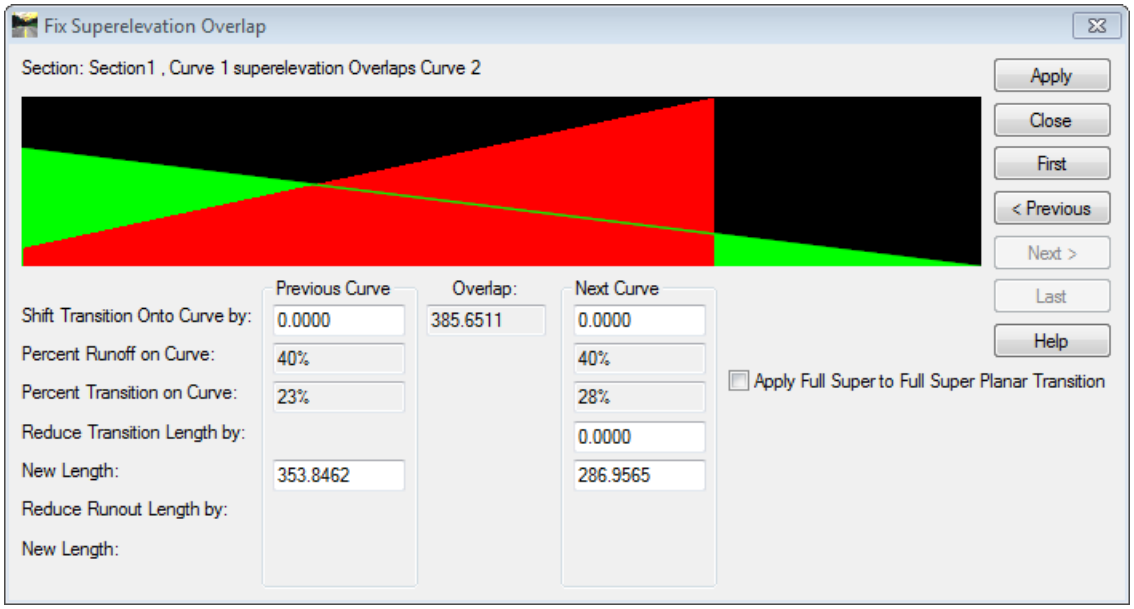


Figure 16-26: Fix Superelevation Overlap Dialog - Adjustments

Step Two: Adjust Superelevation

Overview

We will adjust the superelevation so that there are no overlaps and so that the transitions are smooth. It is very similar to Template editing.

Adjust Display List

The wire diagram is simple once you get the gist of it. The screen capture below shows the wire diagram with a lot of lines (Figure 16-27). Let's clean it up to display only the left side travelway CE_L.

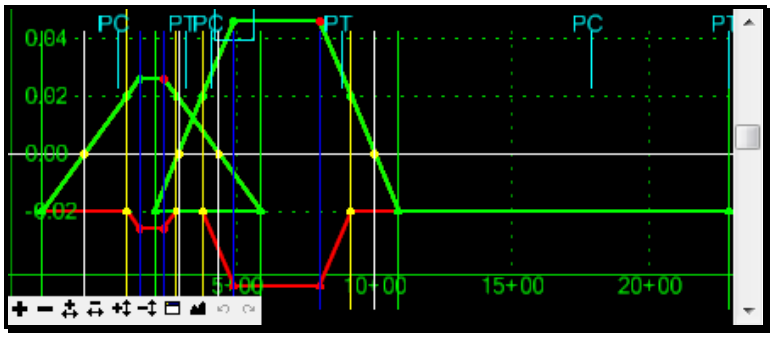


Figure 16-27: Superelevation Diagram

Right click the gridded background and select **Superelevation Display List** (Figure 16-28).

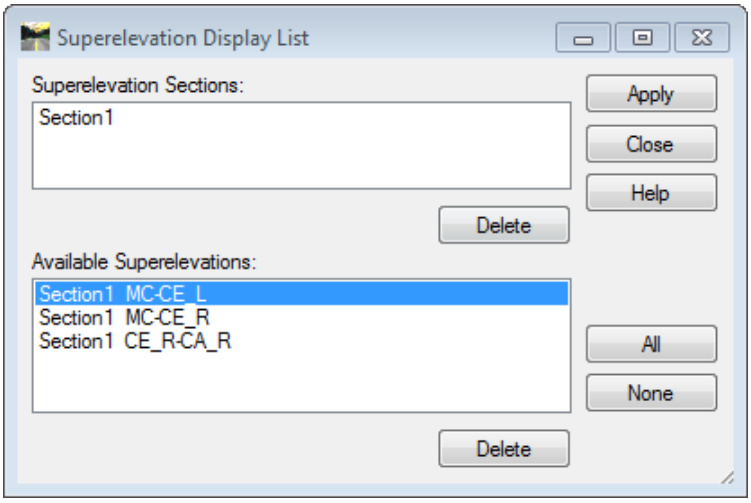


Figure 16-28: Superelevation Display List

Highlight **Section1 MC-CE_L** and select the **Apply** button. This will just display the left travelway line.

Analyze the Diagram

Notice the thin white line at **0.00.** This is the centerline point in your template. The red line (Edge Travelway Left) starts at -.02 (-2%) until it reaches the point where it will begin transition to superelevation (Figure 16-29).

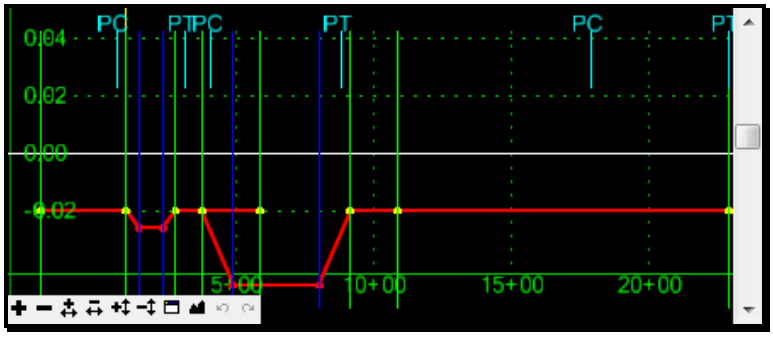


Figure 16-29: Superelevation Diagram - Analysis

Hover over the yellow point on the vertices on the red line (Figure 16-30). Yellow indicates that this point has one constraint. Red points indicate that there are two constraints to the point. The information box will give you all sorts of information about the point. Double click the point if you want to adjust it. If the *Station* is grayed out and you want to adjust the station, you will have to release the constraints of the point.

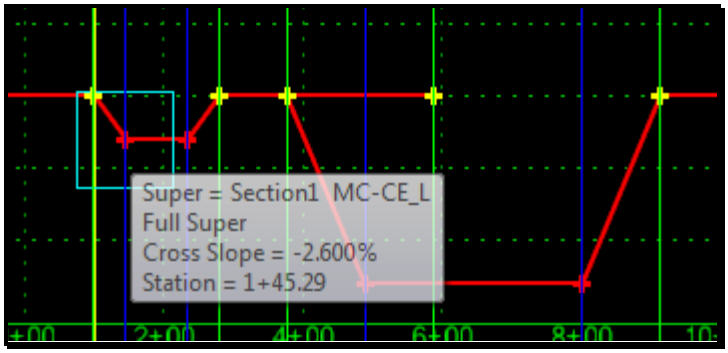


Figure 16-30: Superelevation Diagram – Tool Tips

Move Point Graphically

Let's move the first point to 1+00 with a -2% slope. Right click the first vertex (point) on the red CE_L line and select **Delete Horizontal Constraint.** The point turns green which means unconstrained.

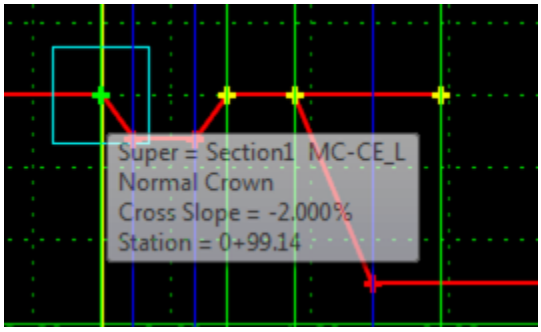


Figure 16-31: Superelevation Diagram – Move Point

Right click the point again and select **Move Point** (Figure 16-31). The *Dynamic Settings* dialog opens (Figure 16-32).

Adjust the *Station: Step* to the nearest foot by entering **0+01.00.** Adjust the *Cross Slope: Step* to **1.000%** (Figure 16-32).

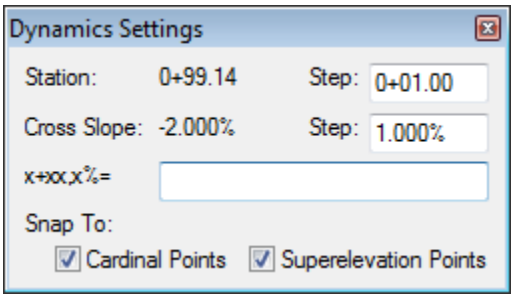


Figure 16-32: Superelevation Dynamic Settings – Adjust Step Values

Now move the point until the *Station* readout says 1+00.00 while staying at the -2.000% *Cross Slope* (Figure 16-33). This may require that you zoom way in near station 1+00.00 in order to hit it. Once there left click to place the point.

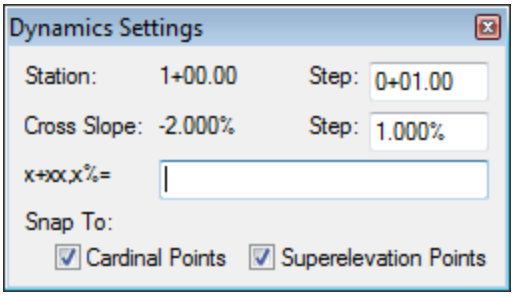


Figure 16-33: Superelevation Dynamic Settings – Move Cursor to Corrected Station and Cross Slope

Now undo last edit. This is accomplished by typing **Ctr+Z** on your keyboard or by selecting the **Undo last edit** tool on the view control area of the dialog (Figure 16-34).

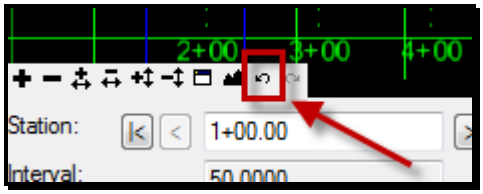


Figure 16-34: Undo Button

Move by Entering Station and Slope

Right click the point again and select **Move Point.** This time, enter **1+00,-2%** in the **x+xx,x%=** field. Great flexibility if you have figured out your superelevation according to standards.

Undo this edit also.

Move by Editing Point

Right click the point again and select **Edit Point.** Enter **1+00** in the *Station* field and **-2%** in the *Cross Slope* field. Click **Apply** and then **Close**. See Figure 16-35**.**

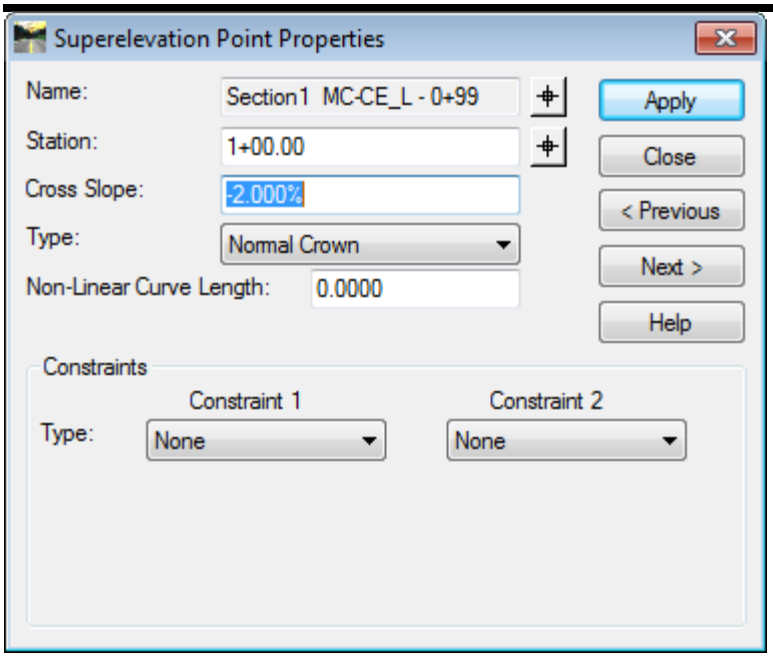


Figure 16-35: Superelevation Point Properties

Delete Points

Rather than let the low side of the shoulder return to normal cross slope from the first curve, we'll hold the full super as it transitions into the next superelevated curve.

Part One:

Right click in the gridded window and select **Delete Points.** This will require two opposite corner clicks similar to a fence command. Place the box so it encompasses the 3 yellow points along the red line that are still at the -2% cross slope as in the capture below (Figure 16-36).

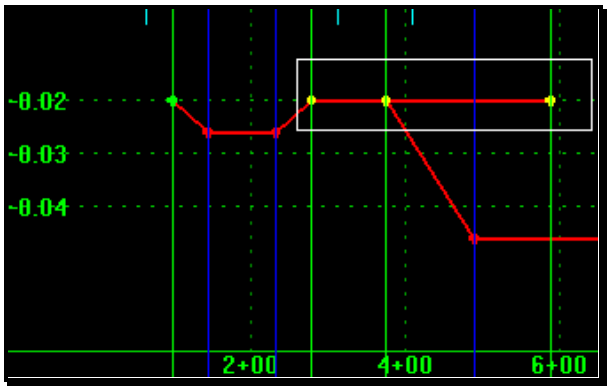


Figure 16-36: Delete Multiple Points

This will delete the points and create the transition from the low side full super to transition directly to the low side full super of the next curve (Figure 16-37).

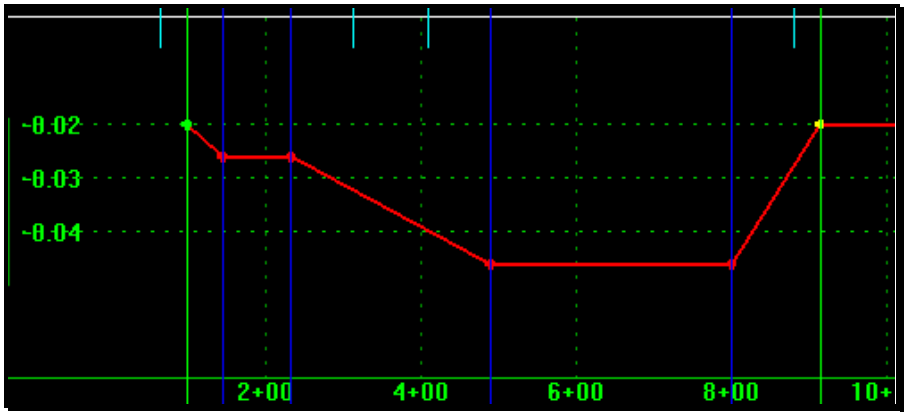


Figure 16-37: Delete Points Results

Step Three: Adjust High Side Superelevation

Adjust the Display List

Display both right side section1 lines (use Control key to help select from list)

Move Start Station to 1+00 with -2% Cross Slope

Delete Points to transition from Full Super (Curve 1) to Full Super (Curve 2).

Review sections and plan view to verify latest edits.

Step Four: Process All

Select the **Process All** button. Select the **Display Mode** of **Normal** radio button to change back to section view. Check out the progress in the section view, notice the purple boxes on the points being superelevated (point controls being used). Save your design at this point.

Step Five: 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 ES_L and ES_R for Daylight Sections (ESH for Box Sections and EF for Guardrail Sections). Click **Apply** and close to dismiss the dialog (Figure 16-38).

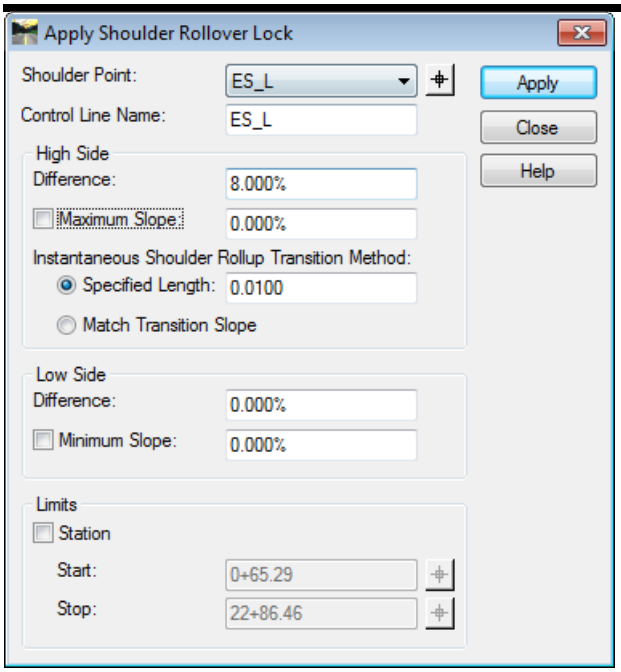


Figure 16-38: Apply Shoulder Rollever Lock Dialog

Hint: Once you click **Apply** to the first point, ES_R will appear as the shoulder point, but the *Control Line Name* remains ES_L. You should click the *Shoulder Point* down arrow and select ES_R from the list to correctly populate the *Control Line Name* field.

Step Six: Check out Results

Select **Process All.** View the results using the Cross Sectional View of the *Roadway Designer* (Figure 16-39). Navigate through the Sections in areas of Superelevations. Review in **Superelevation** mode too. Navigate through the Sections in areas of Superelevations. One handy view will display the slopes of shoulders and travelways. High side shoulder will change so as not to be greater than an 8% grade change (between lane and shoulder).

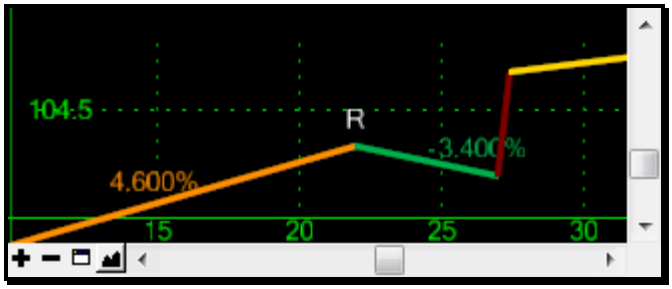


Figure 16-39: Shoulder Rollover Lock – Cross Section View

Step Seven: Save Roadway Designer

Select **File > Save** from the *Roadway Designer* menu.

CREATE/VIEW A PRELIMINARY SURFACE

Step One: Create a MainLine Surface

Select **Corridor > Create Surface** from the *Roadway Designer* menu. Enter **MainLine** as the *Name* of the surface (Figure 16-40). The remainder of the dialog is good by default. Click **Apply** and then **Close.**

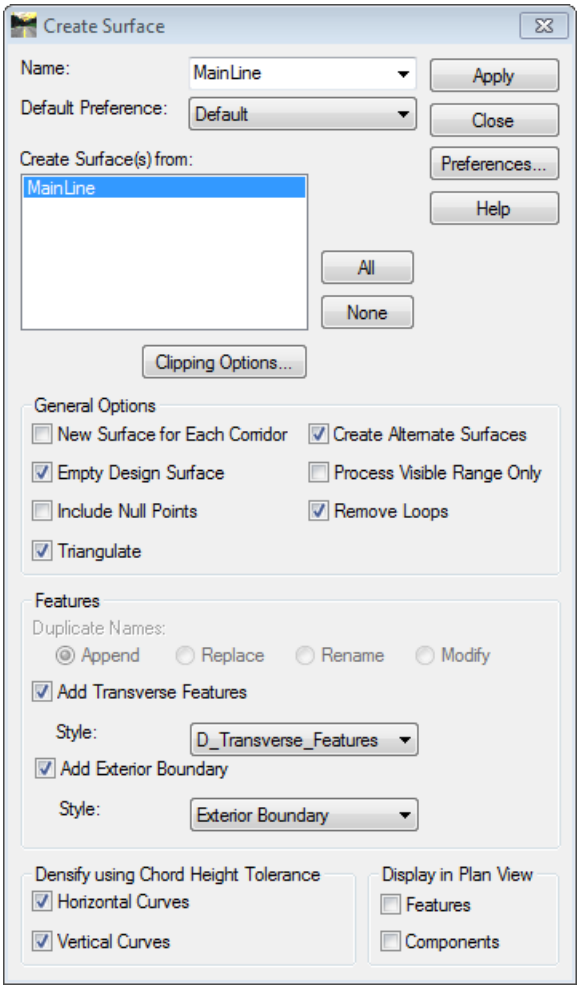


Figure 16-40: Create Surface Dialog

Step Two: Close the Roadway Designer

Close the *Roadway Designer* dialog (**File > Close).** If prompted to save, select **Yes.**

Step Three: View Surface Features

Apply Plan Display Filter

Apply the **PLAN DISPLAY** *Filter* by selecting the pull down that currently has *Unnamed*

as the selection. Next to the pull down, make sure that the filter button is active (pressed). See Figure 16-41.

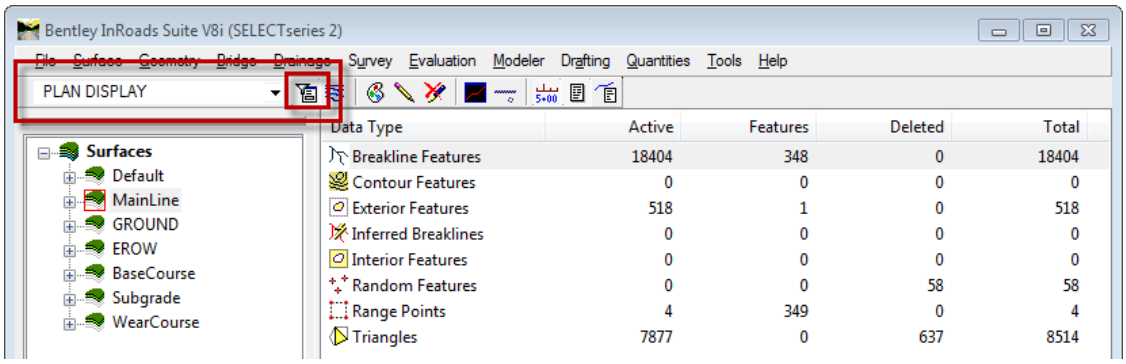


Figure 16-41: Feature Filter List – Select PLAN DISPLAY

♫ If the *Filter* toolbox is missing, right click on the menu bar and select **Locks.**

View Features

Select **Surface > View Surface > Features** from the InRoads main menu (could also use **Surface > Update 3-D/Plan Surface Display..**). Select **MainLine** as the *Surface.* Click **Apply** and then **Close.** See Figure 16-42.

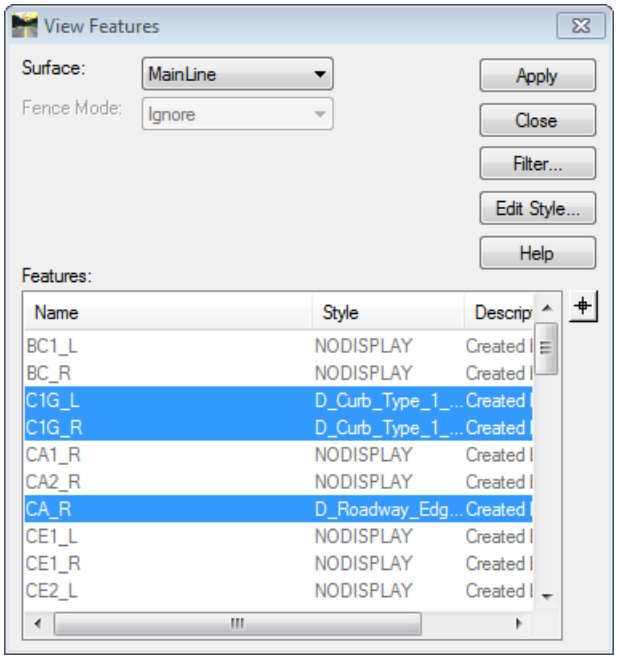


Figure 16-42: View Features Dialog

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 16-43).

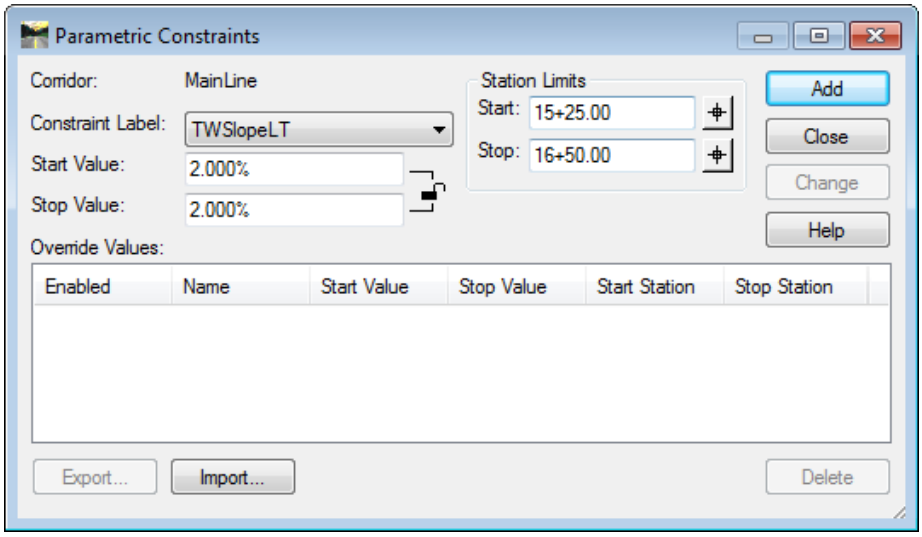


Figure 16-43 Parametric Constraints dialog

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 16-44).

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.

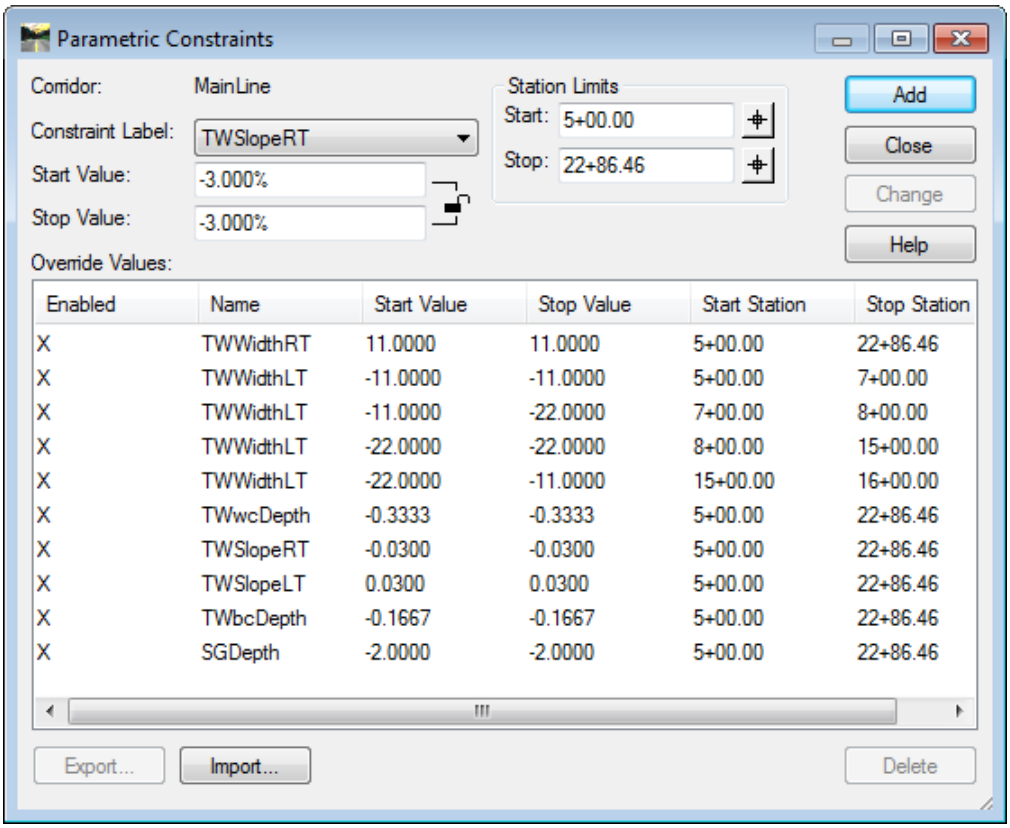


Figure 16-44: Parametric Constraints dialog with examples of adjustments.

- 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* to 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 16-45). Click **OK.**

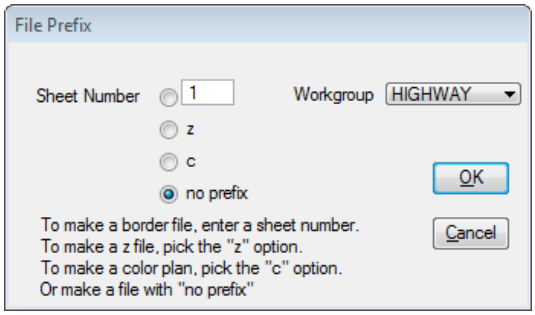


Figure 16-45: Select No Prefix in the Make Sheetz dialog

Part Three: Select the File Name

Select **Highway** (or **Bridge** for Bridge users) (Figure 16-46). Click **OK.**

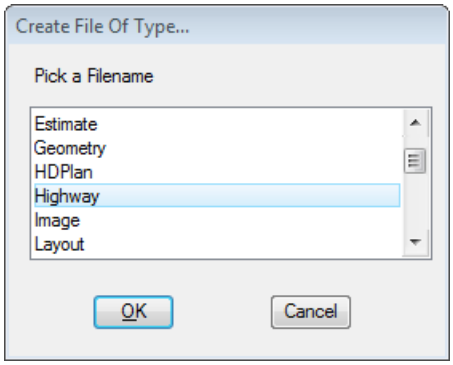


Figure 16-46: Select your drawing name

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 16-47).

- 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.

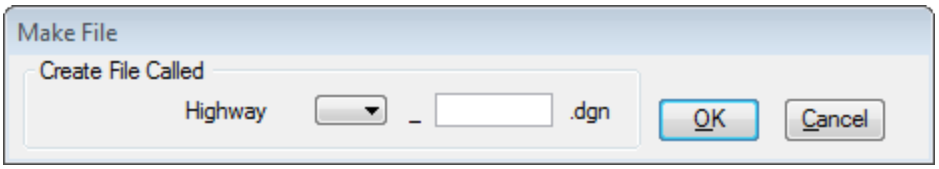


Figure 16-47: Do not add a suffix for standard drawing names

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). You can also navigate to **File > Project Options** and review the **Factors** tab, possibly loading a desired preference if need be to change these numbers (quick and avoids typing).

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 16-48). Click **Apply.**

Minimize or close the *Roadway Designer* window.

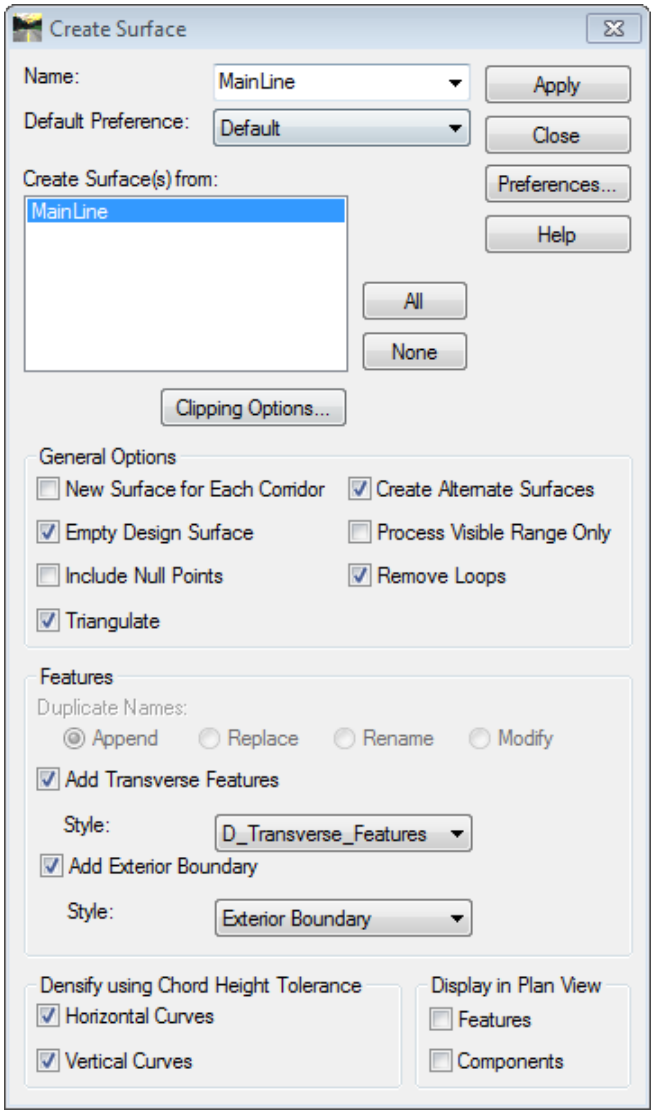


Figure 16-48: Create Surface dialog with default settings

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 16-49).

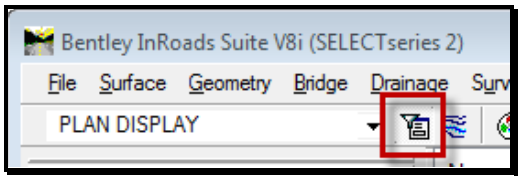


Figure 16-49: Set the active filter to PLAN DISPLAY

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 16-50). Click **Apply.**

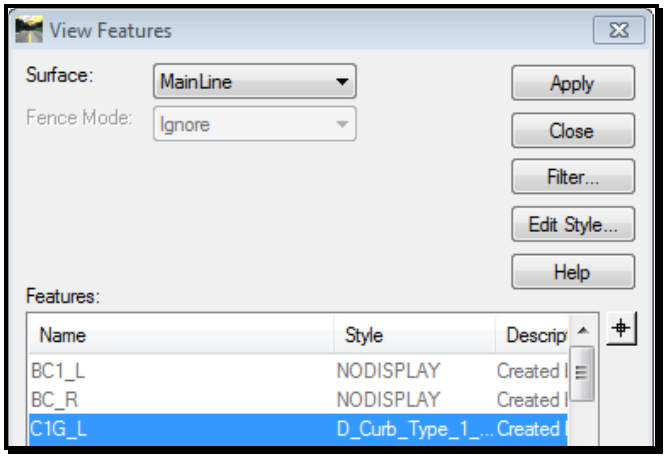


Figure 16-50: View Features dialog with the design surface selected

- 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 then select all the features you want to update (can also right click over names to get more options) and then plan display updates automatically**.**

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 MicroStation and inRoads

Double click your **MicroStation V8i** icon and select and select your project from the project pull down list. Open any file. Select **Applications > InRoads Group > Activate InRoads** from the Main Menus.

Step Two: Create Utilities drawing

Part One: Create File

Select **File > Make Sheetz** from the *MicroStation Main Menu*. Create **Utilities.dgn** drawing using the no prefix option.

- ✓ ***Refer to 1-57 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** Attachment Method (Figure 16-51).

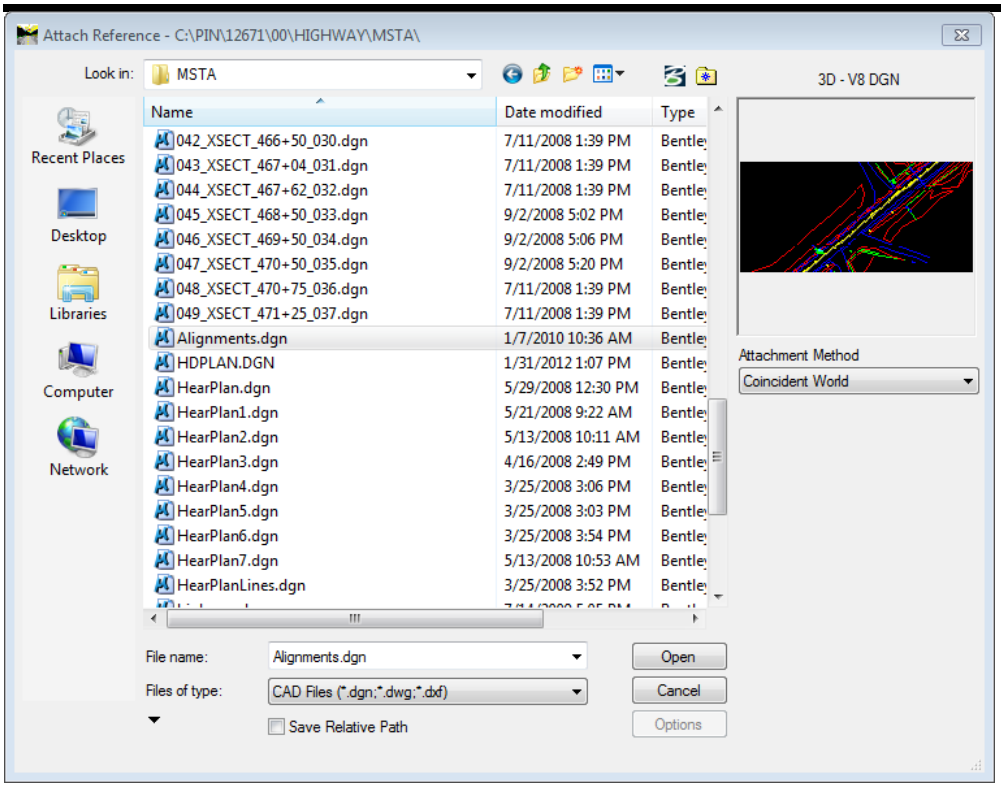


Figure 16-51: Reference Attachment Settings

Repeat this for the design file (i.e., **Highway.dgn** or **Bridge.dgn**) and **Topo.dgn** file in the topo folder.

✓ ***Refer to 2-67 for more on Reference File attachments.***

Part Three: Prepare File

From the *Main Menu*, select **Settings > Locks > ACS Plane Snap.** Key-in az=0 in the Key-in dialog and press Enter. (Figure 16-52) Click in the CAD View. .

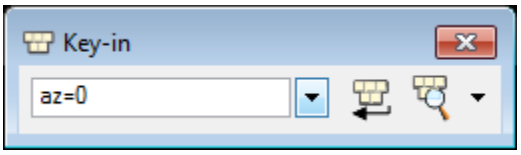


Figure 16-52: az=0

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 16-53). Highlight the geometry project and click **Open**.

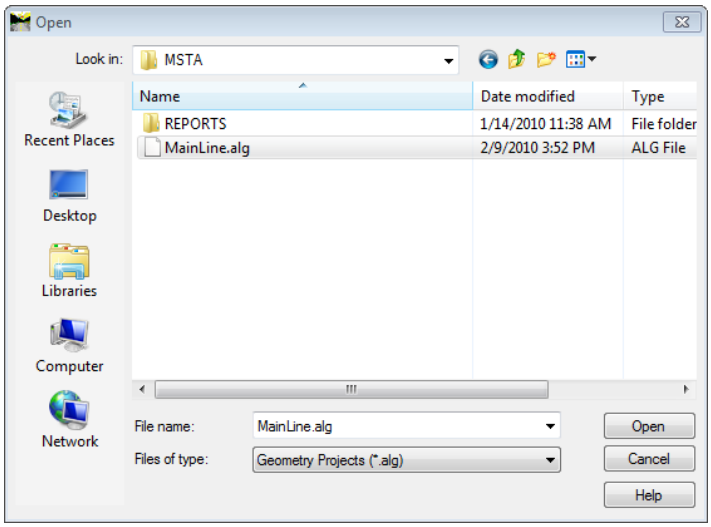


Figure 16-53: Open Geometry Projects

Part Two: Load Surfaces

Switch the *Files of type:* to **Surfaces (*.dtm)**, select the **Design** surface (*.dtm) and click **Open** (Figure 16-54).

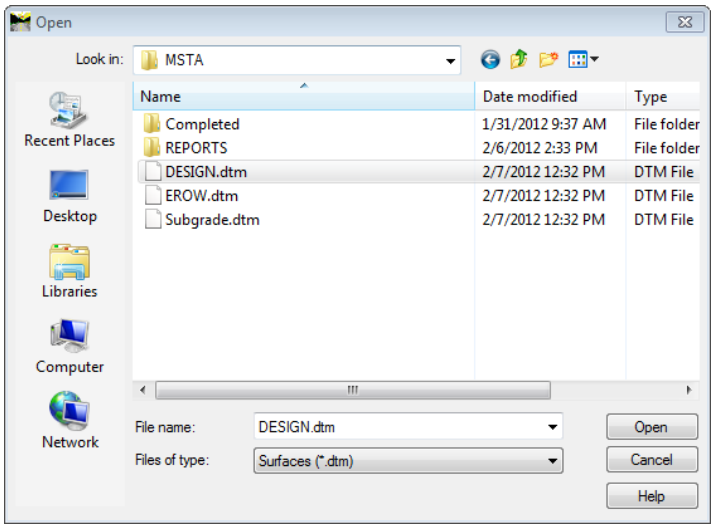


Figure 16-54: Open Design Surface

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 16-55).

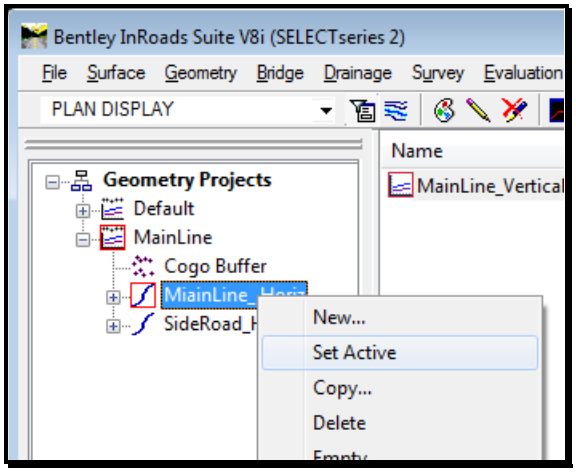


Figure 16-55: Set Active

Step Five: Open Key-in Dialog in MicroStation

Select **Utilities > Key-in** from the *MicroStation Main Menu* to launch the Key-in dialog (Figure 16-56).

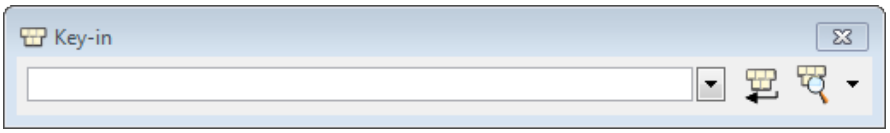


Figure 16-56: Key-in

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 the Utility Coordinator. In the following example we will place a couple of poles randomly to the left and then to the right.

From the *Main Menu,* select **Settings > Drawing Scale.** From the list of available scales, select **1"=25'.** (Figure 16-57).

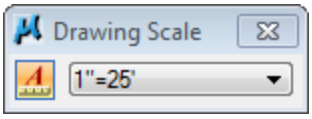


Figure 16-57: Select Scale

From the *Tasks Menus,* select your **Workgroup > Plan > Utilities > Pole Left.** This will set your text to the correct height, width, color, level, style and weight (Figure 16-58). 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 16-58: 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 16-59), 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.

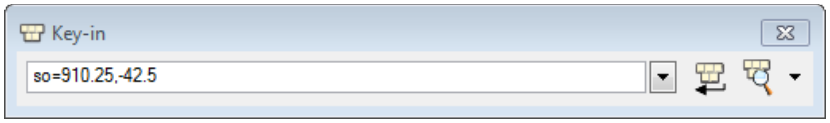


Figure 16-59: Key-in Value

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 16-60). With the **Surface** tab selected change the following to:

- *Type:* Design
- *Name:* Utilities

- *Description:* Proposed Utilities

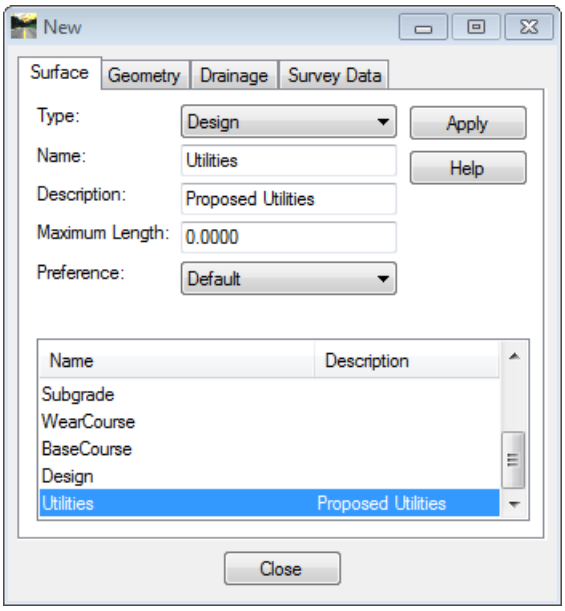


Figure 16-60: New Surface

Click **Apply** and then **Close** the dialog.

Part Two: Import Data to InRoads

Select **File > Import > Surface Advanced…** from the *InRoads Main Menu* (Figure 16-61).

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_V8i.XIN** file for the project pin you are working with.)

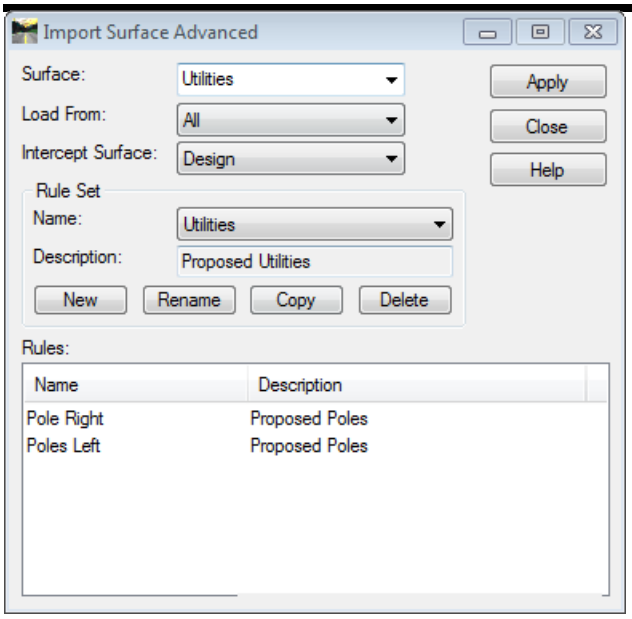


Figure 16-61: Import Surface Advanced

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 As… > 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 or load the desired **File > Project Options** preference, which also specifies the necessary factors.

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 > Cross Sections..** and click the **Update Cross Section** folder from the *InRoads Main Menu*.

Within the **Update Cross Section** dialog (Figure 16-62) set your *Cross Section Set:* if there is more than one in the existing **Xsect.dgn** file and toggle the *Mode:* to **Display On**.

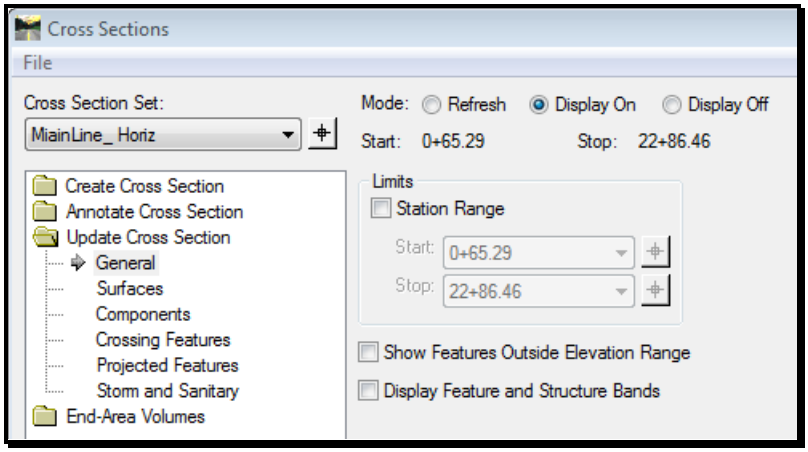


Figure 16-62: Update Cross Section – General

Select the *Projected Features* leaf 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 16-63).

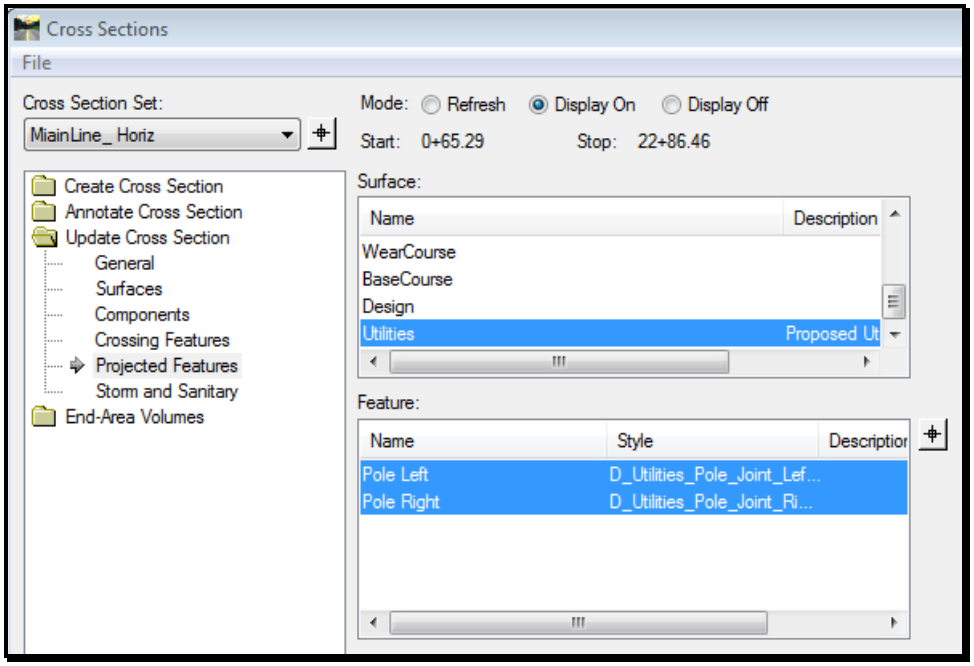


Figure 16-63: Update Cross Section - Projected Features

Click **Apply** and then **Close** the dialog.

Step Two: Annotate Proposed Poles

Select **Evaluation > Cross Section > Cross Sections..** and click the **Annotate Cross Section** folder from the *InRoads Main Menu*.

Select the **Preferences…** button at the bottom of the dialog and load the **UTILITIES** preference (Figure 16-64).

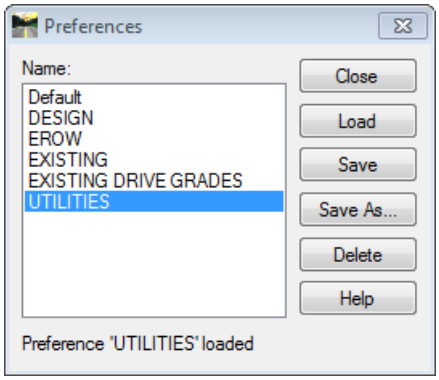


Figure 16-64: Annotate Preferences

Close the dialog.

Within the **Annotate Cross Section** dialog set to 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 16-65).

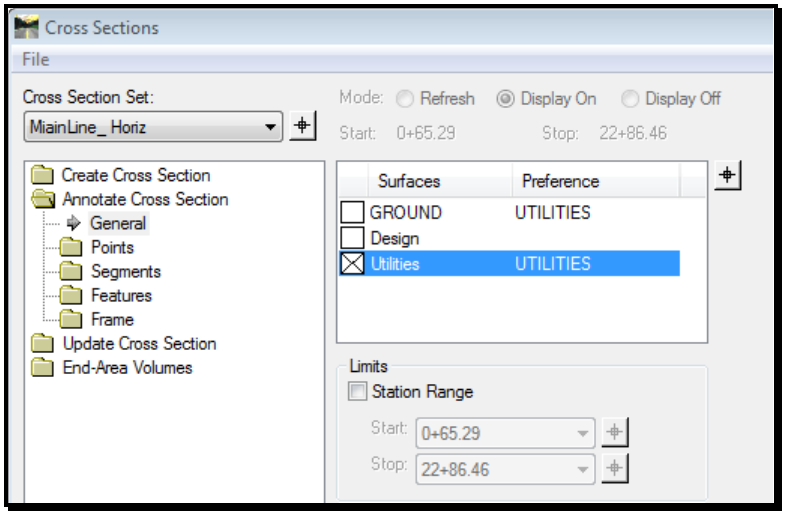


Figure 16-65: Annotate Cross Section – General

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 16-66).

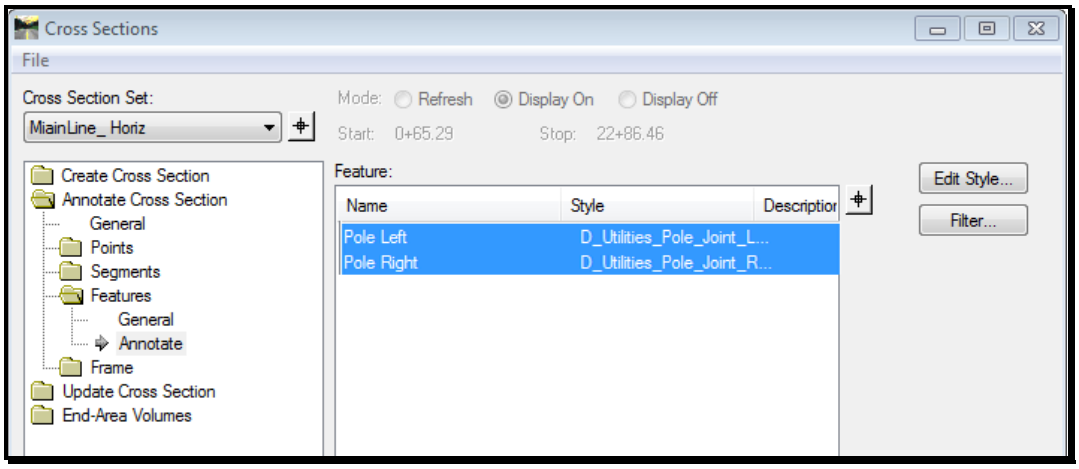


Figure 16-66: Annotate Cross Section – Features

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

OVERVIEW

This section will be developed in the future.

INTERSECTION DESIGN

INTERSECTION DESIGN

Prerequisites

Final Horizontal and Vertical Alignments Designed for Maineline(s) and Side Road(s)

- Depending on if the intersection being designed is a signalized section or a non-signalized section determines how the vertical alignment should be designed and what edges will need to be intercepted. This workflow is a design example for a signalized intersection so we will be designing to the travelway edge instead of the shoulder edge of MainLine.

Superelevation Applied

MainLine Surface and SideRoad 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 workflow was from viewing a video supplied by Bentley for designing intersections using the Roadway Designer. To view the video follow the link provided. \\Oit-teaqasdtiis.mdot.w2k.state.me.us\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 1-57 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 SideRoad 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 SideRoad Surface Features

Overview

This step assumes you have created a Main Line and SideRoad corridor in the Roadway Designer, passed a template along each, assigned superelevation and applied shoulder rollover locks. For this example the two corridors have been supplied for you.

Part One: Creating Surfaces

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 SideRoad corridors in the *Create Surface(s) from*, turn on **Add Transverse Features** and pick the **Style: D_Transverse_Features** if it is not already provided and leave off **Create Alternate Surfaces** (Figure 17-1).

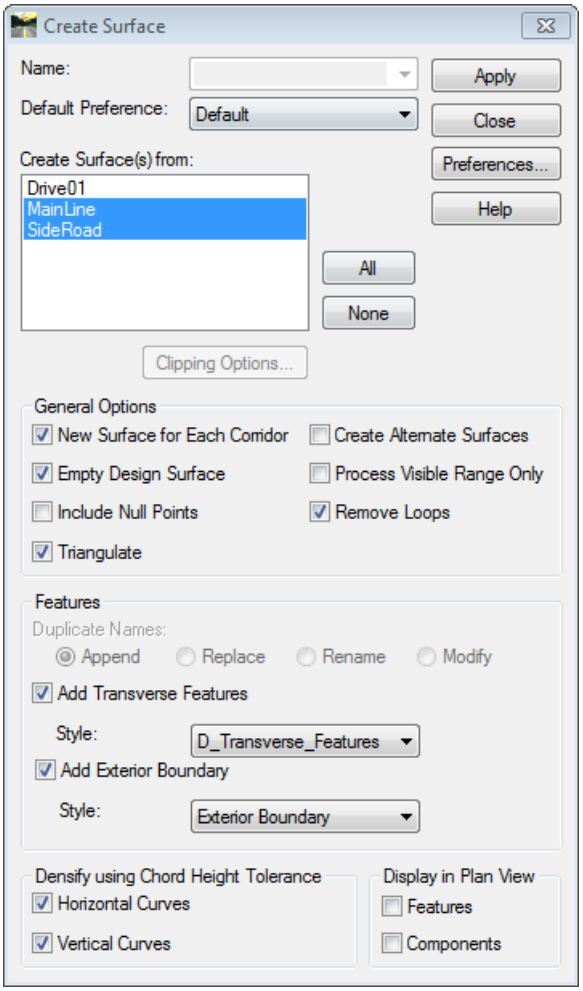


Figure 17-1: Create Surface Dialog

Click **Apply** and after it is done processing **Close** the *Results* and *Create Surface* dialogs and minimize the *Roadway Designer*.

Part Two: Displaying Features

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 in the pull down and click **Apply**. Select the **SideRoad** surface in the pull down and click **Apply**. Fit the view to see your graphics (Figure 17-2).

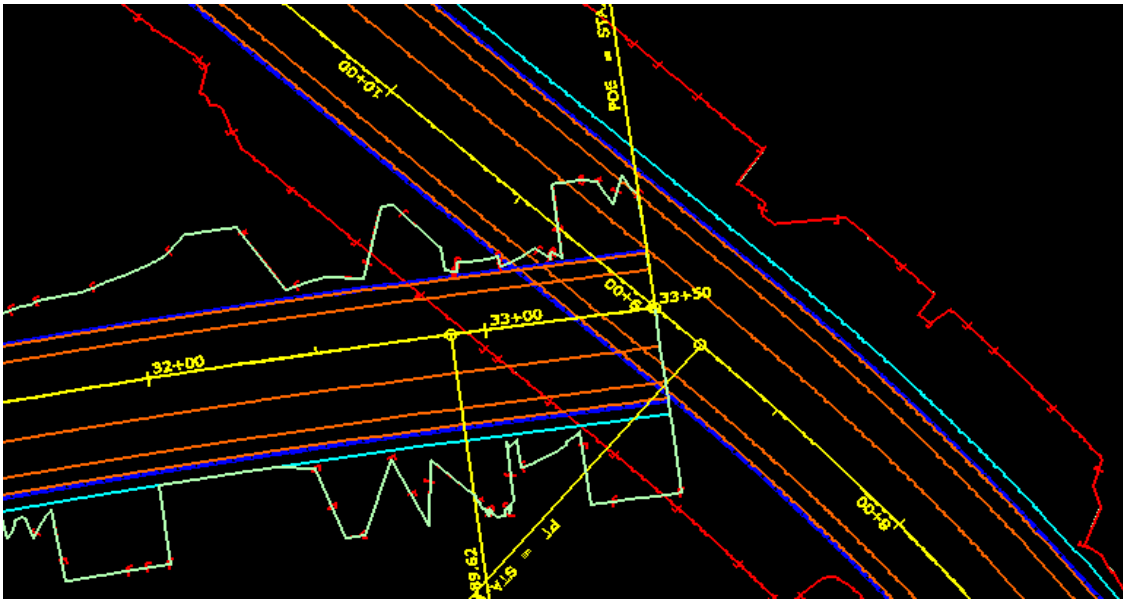


Figure 17-2: Display Features

Close the View Features dialog.

Step Three: Using the Multicenter Curve tool and Review

Overview

To determine what radii are needed, use AutoTrack. Once turning movements are determined the designer will decide what radii are needed when using the Multicenter Curve tool.

- For more information about Multicenter Curve tool refer to the InRoads Help button within the dialog.

Part One: Creating Multicenter Curve for Quad1 Travelway Edge

Select **Geometry > Utilities > Multicenter Curve** from the InRoads main menu. Use of this tool will allow for generating a horizontal and vertical alignment from the MainLine and SideRoad surfaces (Figure 17-3).

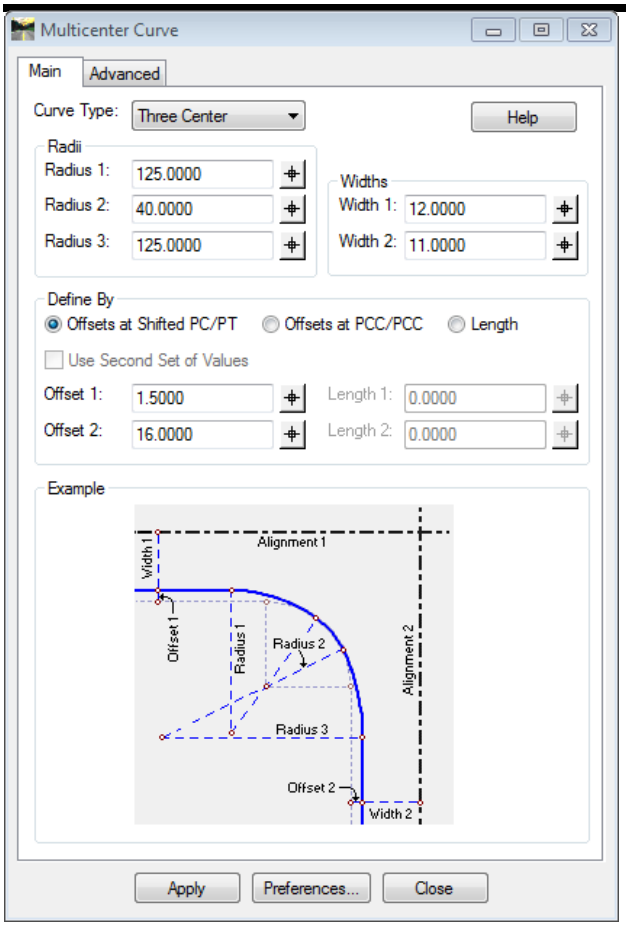


Figure 17-3: Multicenter Curve Dialog

In this example we will use *Curve Type:* **Three Center** for one side of the intersection (Figure 17-4).

On the *Main* tab set your desired **Radii** in the three radius boxes as shown below, for the **Widths** you will want to set the travelway width for the MainLine in **Width 1** and your SideRoad travelway width in **Width 2**.

♫ Refer to the **Example** illustration at the bottom of the dialog for a better understanding of the width relationship to centerline.

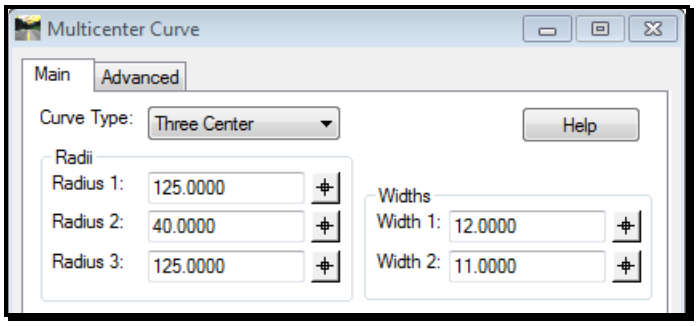


Figure 17-4: Multicenter Curve Dialog – Radii and Widths - Quad1 Travelway Edge

In the **Define By** area leave the radio button set to **Offsets at Shifted PC/PT** and set the **Offset 1** and **2** as shown below (Figure 17-5).

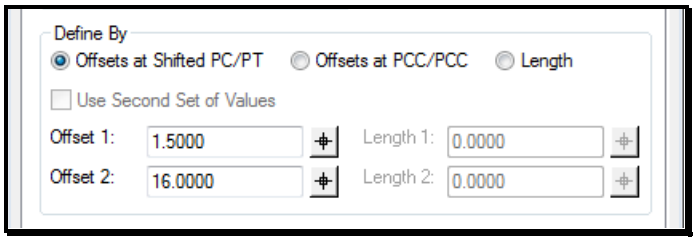


Figure 17-5: Multicenter Curve Dialog – Define By - Quad1 Travelway Edge

Select the *Advanced* tab and assign an **Alignment Name**: **Quad1_Edge_TW** and pick the **Style: D_Roadway_Edge_TW** (Figure 17-6).

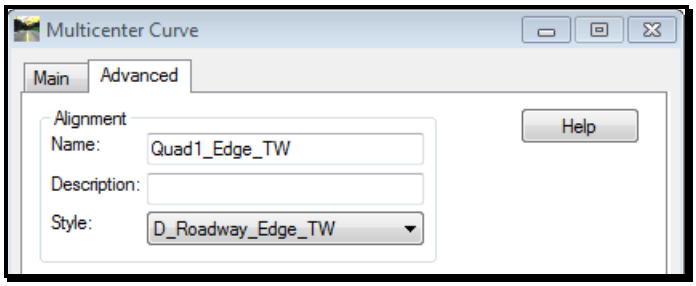


Figure 17-6: Multicenter Curve Dialog – Advanced Tab - Quad1 Travelway Edge

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 SideRoad surface as shown below (Figure 17-7).

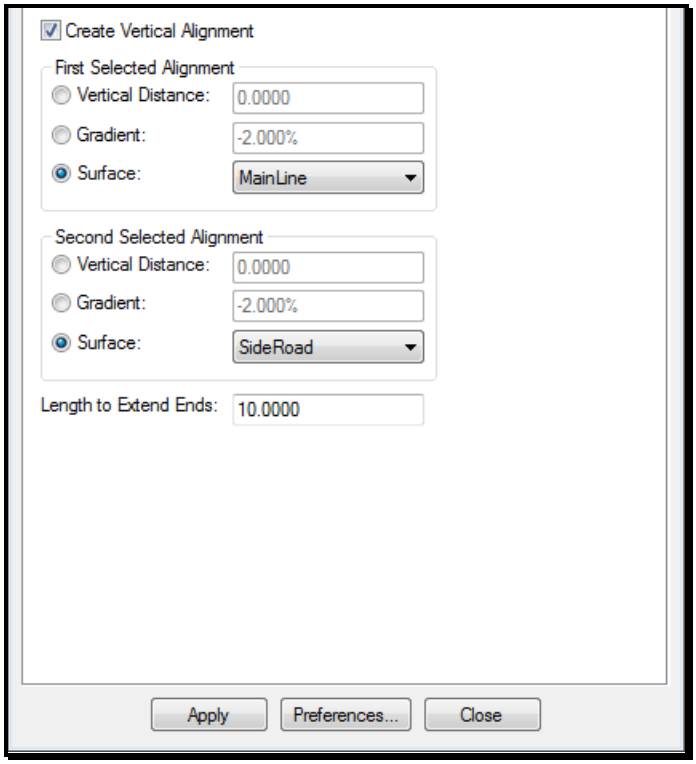


Figure 17-7: Multicenter Curve Dialog – Advanced Tab – Vertical Alignments - Quad1 Travelway Edge

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 SideRoad 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. See Figure 17-8.

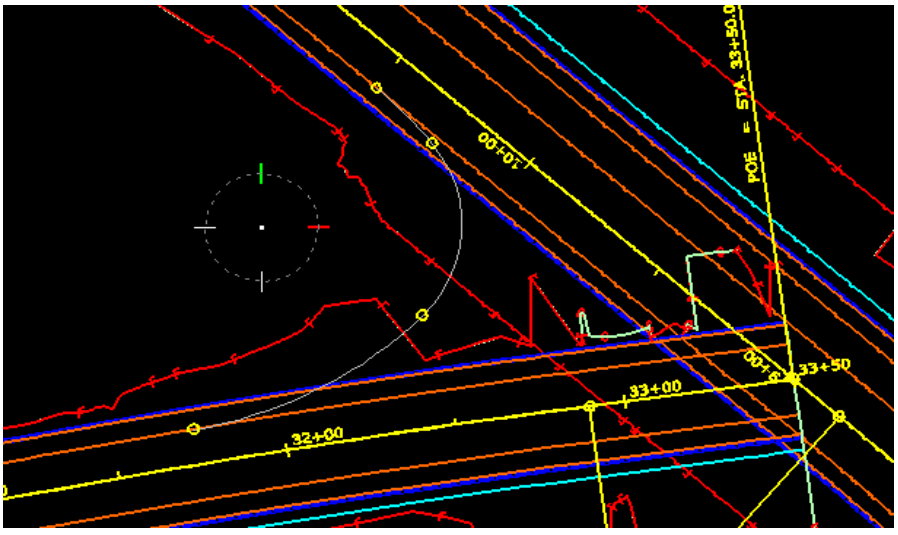


Figure 17-8: Multicenter Curve – Quadrant and Alignment Selection - Quad1 Travelway Edge

If you like the alignment then left mouse button in the view to accept the alignment. You can choose to save the results if you want or just close the dialog. To view the alignment; right click on the alignment in the InRoads explorer tree and select **View** (Figure 17-9).

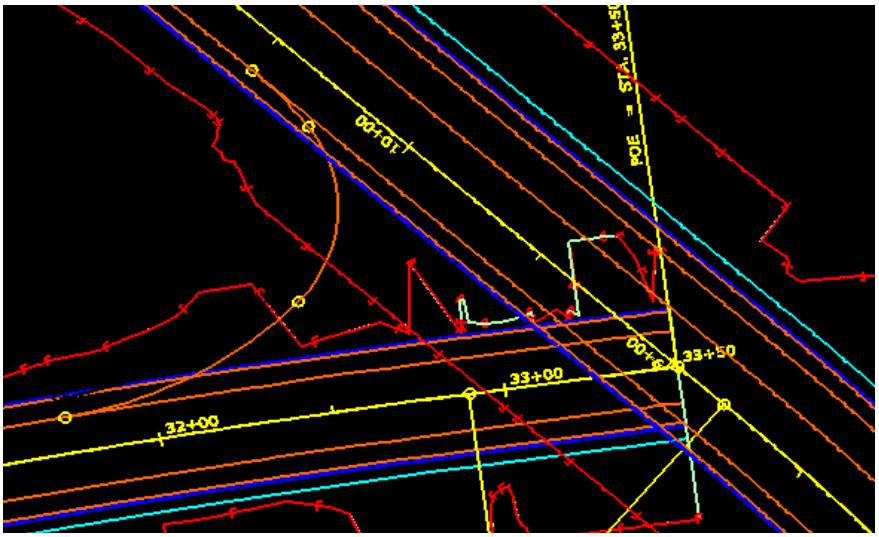


Figure 17-9: Multicenter Curve – Quadrant and Alignment Acceptance - Quad1 Travelway Edge

The new alignment ties into the edges of travelway for each roadway surface.

Part Two: Creating Multicenter Alignment for Quad1 Shoulder

Follow the same routine as the Quad1 edge of travelway and develop the radii for the shoulder in the same quadrant using the following information in the **Main** tab:

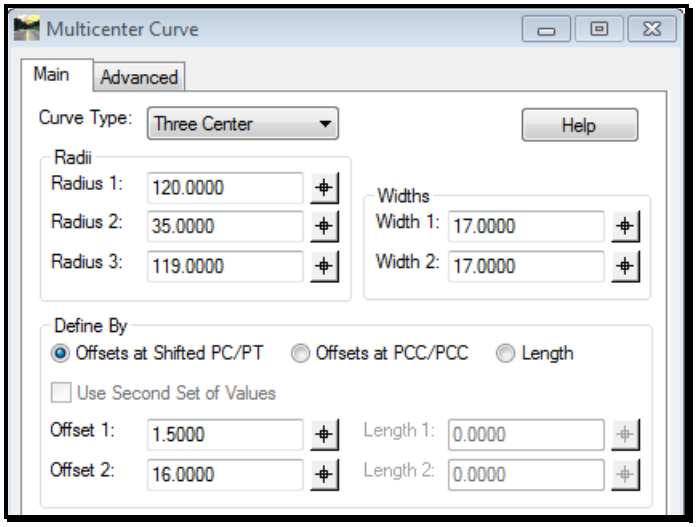


Figure 17-10: Multicenter Curve Dialog – Radii and Widths - Quad1 Shoulder

In the **Advanced** tab set the options to the following (Figure 17-10):

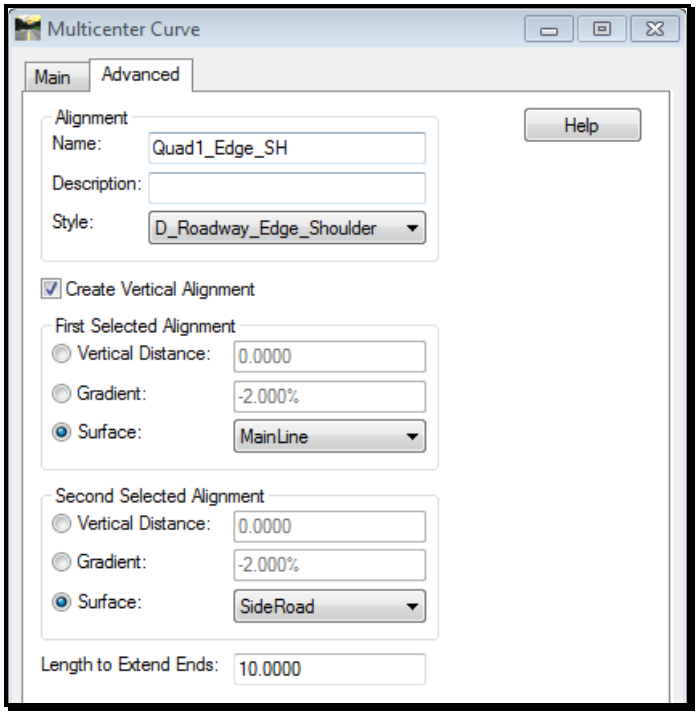


Figure 17-11: Multicenter Curve Dialog – Advanced Tab – Vertical Alignments - Quad1 Shoulder

Click **Apply**; identify your MainLine and SideRoad alignments and select the quadrant area as you did with the travelway edge.

Part Three: Creating Multicenter Curve for Quad4 Travelway Edge

In this example we will use *Curve Type:* **One Center** for the other side of the intersection.

On the *Main* tab set your desired **Radius** in the radius box as shown below, for the **Widths** you will want to set the travelway width for the MainLine in **Width 1** and your SideRoad travelway width in **Width 2**. See Figure 17-12.

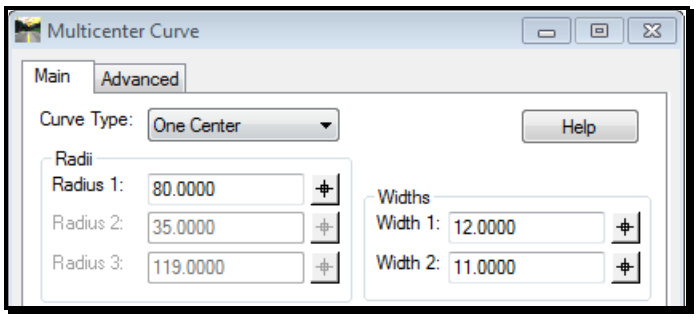


Figure 17-12: Multicenter Curve Dialog – Radii and Widths - Quad4 Travelway Edge

Select the *Advanced* tab and assign an **Alignment Name**: **Quad4_Edge_TW** and pick the **Style: D_Roadway_Edge_TW** (Figure 17-13).

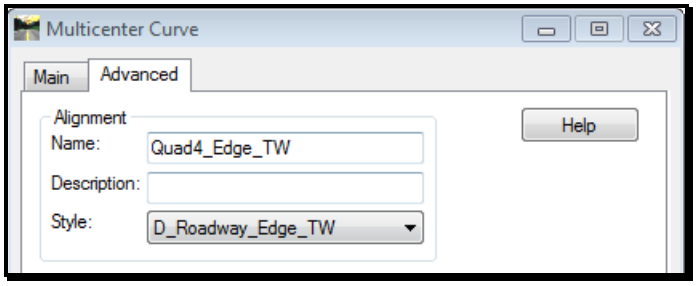


Figure 17-13: Multicenter Curve Dialog – Advanced Tab – Quad4 Travelway Edge

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 SideRoad surface as shown below (Figure 17-14).

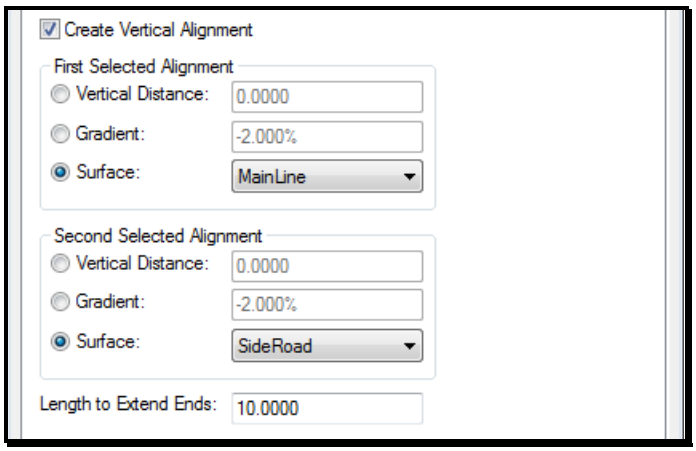


Figure 17-14: Multicenter Curve Dialog – Advanced Tab –Vertical Alignments - Quad4 Travelway Edge

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 SideRoad 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. See Figure 17-15.

Figure 17-15: Multicenter Curve – Quadrant and Alignment Selection – Quad4 Travelway Edge

If you like the alignment then left mouse button in the view to accept the alignment. You can choose to save the results if you want or just close the dialog. To view the alignment; right click on the alignment in the InRoads explorer tree and select **View**. See Figure 17-16.

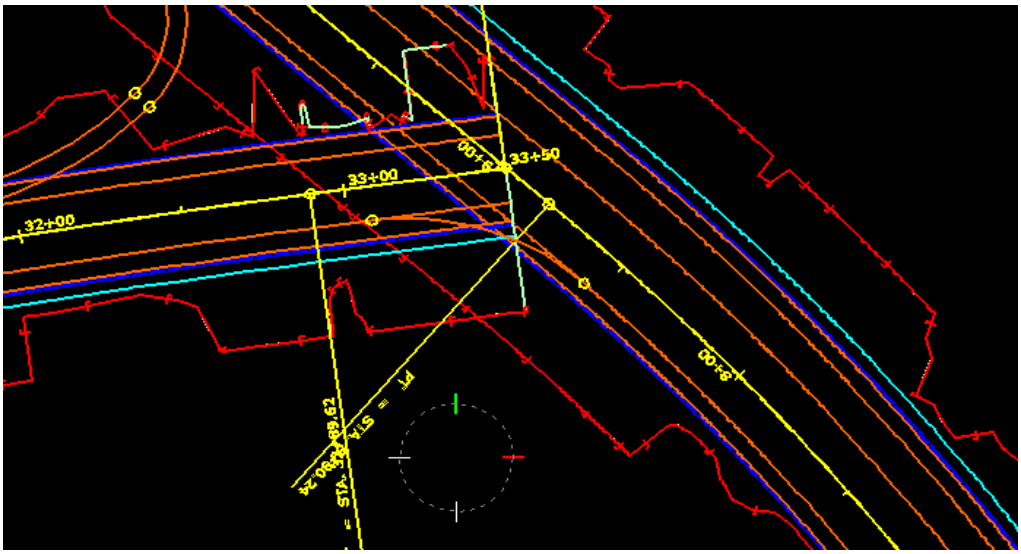


Figure 17-16: Multicenter Curve – Quadrant and Alignment Acceptance – Quad4 Travelway Edge

The new alignment ties into the edges of travelway for each roadway surface.

Part Four: Creating Multicenter Curve for Quad4 Shoulder Edge

Follow the same routine as the Quad4 edge of travelway and develop the radius for the shoulder in the same quadrant using the following information in the **Main** tab (Figure 17-17):

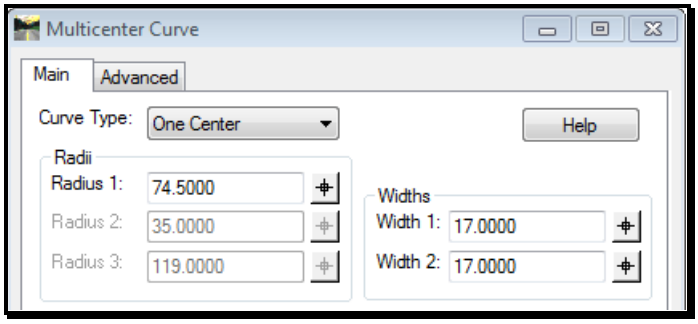


Figure 17-17: Multicenter Curve Dialog – Radii and Widths - Quad4 Shoulder

In the **Advanced** tab set the options to the following (Figure 17-18):

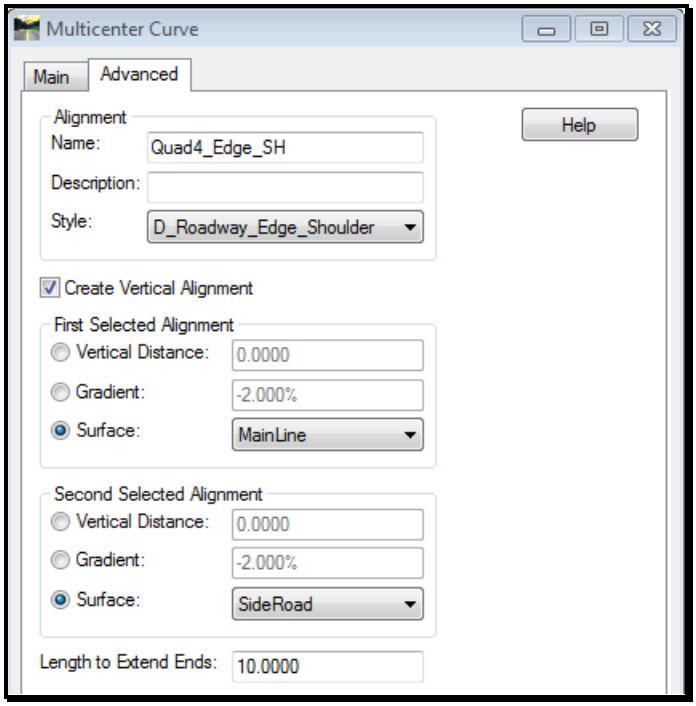


Figure 17-18: Multicenter Curve Dialog – Advanced Tab - Quad4 Shoulder

Click **Apply**; identify your MainLine and SideRoad alignments and select the quadrant area as you did with the travelway edge.

Step Four: Review Vertical Alignments

Select **Evaluation > Profile > Create Profile** from the InRoads main menu. In the *Source* area set the alignment to one of the Quad alignments generated using the Multicenter tool (Figure 17-19).

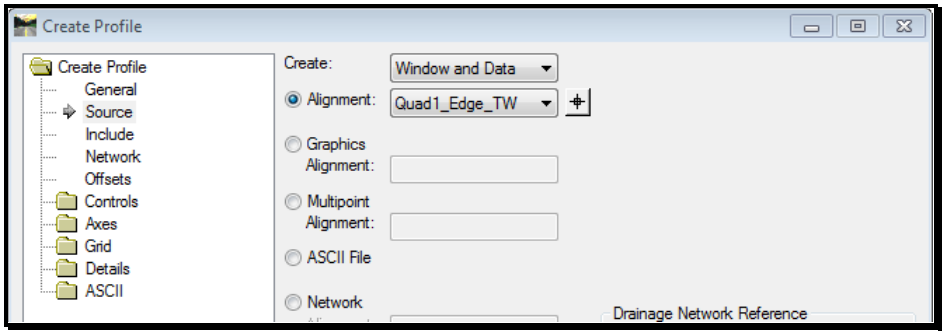


Figure 17-19: Create Profile Dialog

In the *General* area set a style name for the MainLine and SideRoad surfaces listed in the *Surface:* section by highlighting the surface and selecting *Properties*. Set the Cross Sections and Profiles Symbology to **D_Roadway_Centerline** for each surface clicking **Apply** for each of them and **Close** the dialog (Figure 17-20).

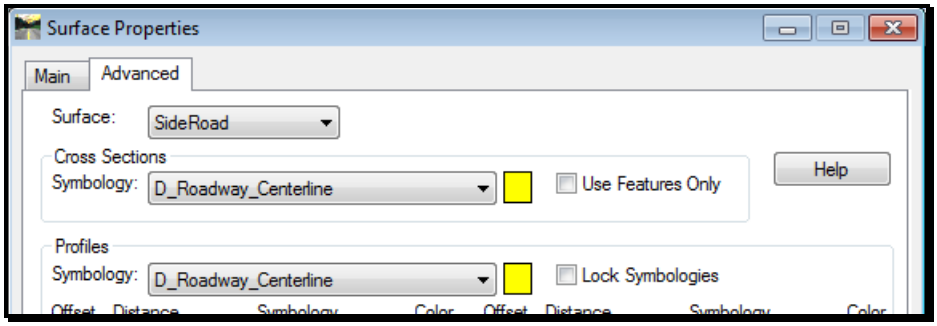


Figure 17-20: Surface Properties – Advanced Tab

Make sure all surfaces are selected with an **X** next to them in the *Surfaces:* area of the dialog (Figure 17-21).

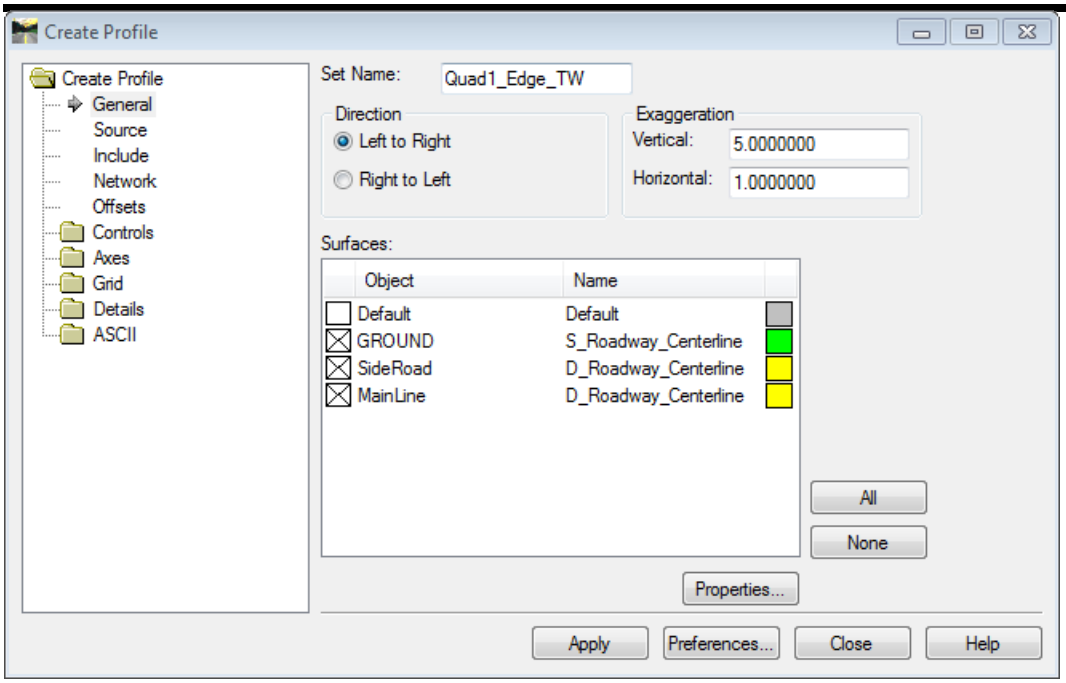


Figure 17-21: Create Profile Dialog – Surface Selection

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 17-22).

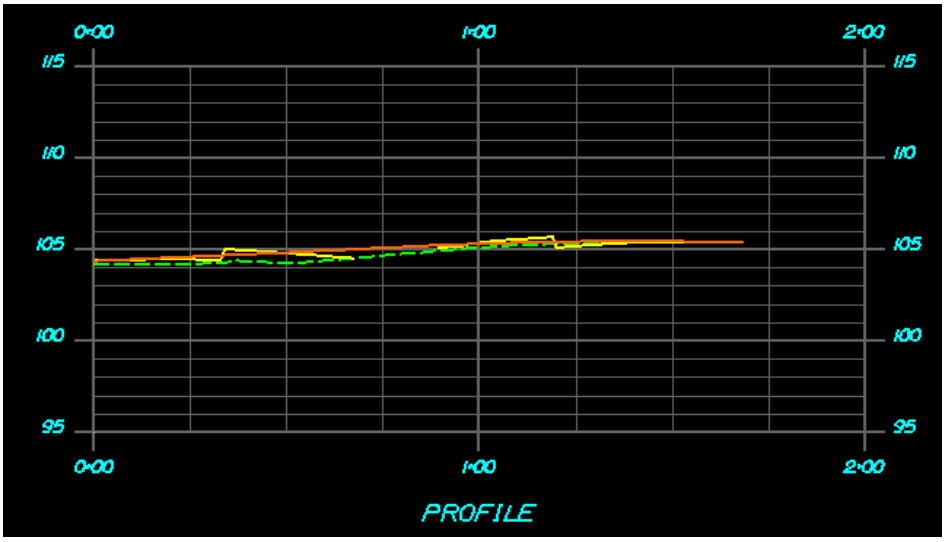


Figure 17-22: Profile of Side Road and Main Line

If you want to adjust the vertical alignment then refer to the geometry tools to edit or recreate the vertical alignment.

Repeat the following to view the other 3 vertical alignments created through the use of the Multicenter Curve tool. You will only need to change the **Source** alignment; all other settings will still be preset for you.

Step Five: Point Control for Edge of Travelways and Shoulders

Overview

Now that we have alignments for each edge of travelway and shoulder of the SideRoad the widths of travelway and shoulders can be controlled with point controls within the Roadway Designer.

Part One: Travelway Edge Control

Select **Modeler > Roadway Designer** from the InRoads main menu. Pick your SideRoad *Corridor:* and set the *Active Surface:* to **Ground**. Also, enable the Lock to keep your active surface set to GROUND for this session of InRoads (Figure 17-23).

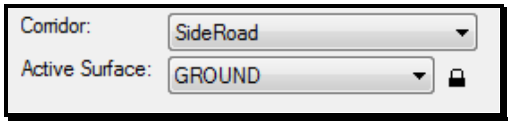


Figure 17-23: Active Corridor and Surface

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 SideRoad travelway (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 17-24). Note, entering text in the Control Description field is optional.

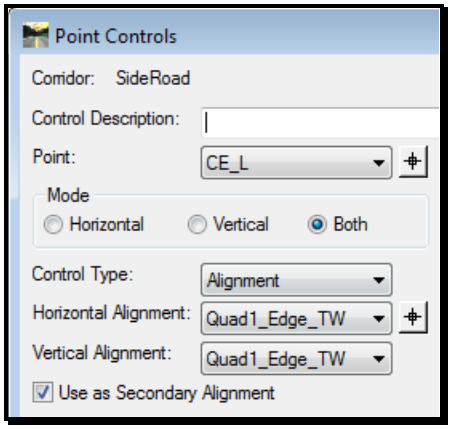


Figure 17-24: Point Controls Dialog – Travelway Edge Control

For the *Station Limits* the **Start:** station should be the first point of the Quad1_Edge_TW alignment intersecting the travelway edge of the SideRoad and the **Stop:** should be approximately the last point along the Quad1_Edge_TW alignment that can be seen perpendicular to the SideRoad alignment (Figure 17-25).

♫ If you want an exact Stop station then use MicroStation to draw a line with a tangent

snap to the Quad1_Edge_TW alignment and perpendicular snap to the SideRoad alignment.

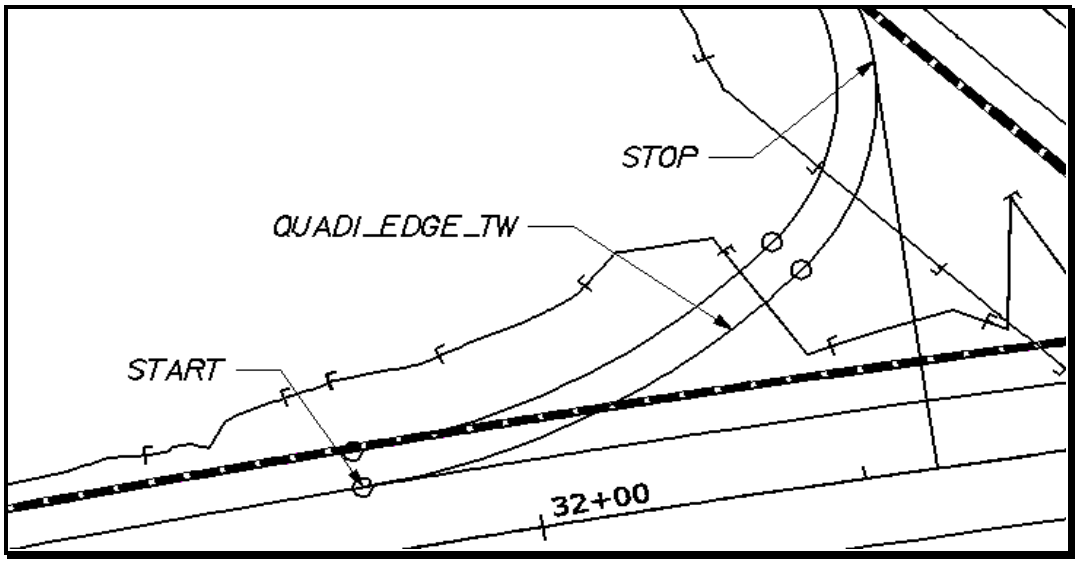


Figure 17-25: Point Controls Dialog – Travelway Edge Example Diagram

To set the *Station Limits* hold down the **Ctrl** key and use the selection button to the right of the start and stop station to pick the limits graphically (Figure 17-26).

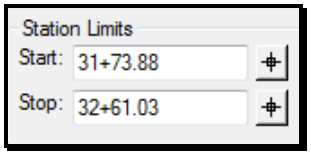


Figure 17-26: Point Controls Dialog – Travelway Edge Station Limits Example

Deduct **.10'** from the stop station to help eliminate any spiking (Figure 17-27).

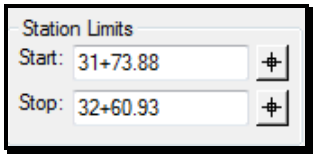


Figure 17-27: Point Controls Dialog – Travelway Edge Station Limits Example – Adjusted for Spiking

Click the **Add** button to populate the **Horizontal and Vertical Controls** area of the dialog (Figure 17-28).

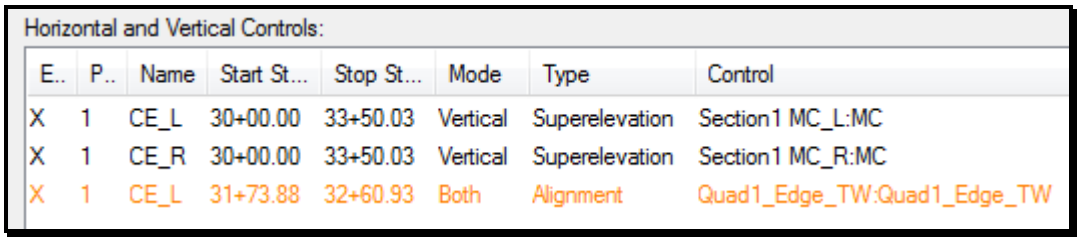


Figure 17-28: Point Controls Dialog – Populated Example with Conflict

You may have noticed the current point control turned orange. This tells you that there is a conflict in station range of a point. This can be corrected by adjusting the priority of one of the points OR change the station range of the point control. In this case change the stop station of the Vertical mode point control for **CE_L** to end at the start station of the point control of **CE_L** being controlled by Alignment type. Once clicking Change, the orange text will turn to black text (Figure 17-29).

Horizontal and Vertical Controls:

E...	P...	Name	Start St...	Stop St...	Mode	Type	Control
X	1	CE_R	30+00.00	33+50.03	Vertical	Superelev...	Section1 MC_R:MC
X	1	CE_L	31+73.88	32+60.93	Both	Alignment	Quad1_Edge_TW:Quad1_Edge_TW
X	1	CE_L	30+00.00	31+73.88	Vertical	Superelev...	Section1 MC_L:MC

Figure 17-29: Point Controls Dialog – Populated Example with Conflict Corrected

Repeat this process for the right travelway edge (**CE_R**) taking it as far as the alignment will allow, click **Add** and adjust any conflicting stationing as necessary (Figure 17-30).

Horizontal and Vertical Controls:

E...	P...	Name	Start St...	Stop St...	Mode	Type	Control
X	1	CE_L	31+73.88	32+60.93	Both	Alignment	Quad1_Edge_TW:Quad1_Edge_TW
X	1	CE_L	30+00.00	31+73.88	Vertical	Superelev...	Section1 MC_L:MC
X	1	CE_R	30+00.00	33+07.14	Vertical	Superelev...	Section1 MC_R:MC
X	1	CE_R	33+07.14	33+50.03	Both	Alignment	Quad4_Edge_TW:Quad4_Edge_TW

Figure 17-30: Point Controls Dialog – Example Continued

Close the dialog.

After setting the right side you should see the secondary alignments displayed within the Roadway Designer. 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 17-31).

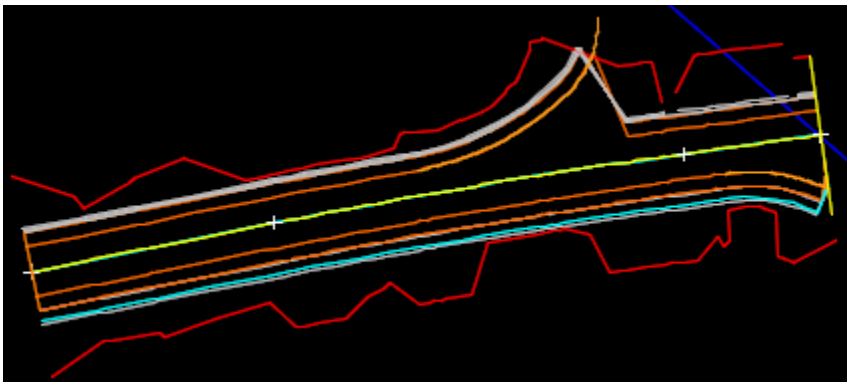


Figure 17-31: Plan View Graphic Results

Part Two: Shoulder Edge Control

Select **Corridor > Point Controls** from the Roadway Designer main menu. Set *Point:* to **ES_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 SideRoad at the shoulder edge (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 17-32).

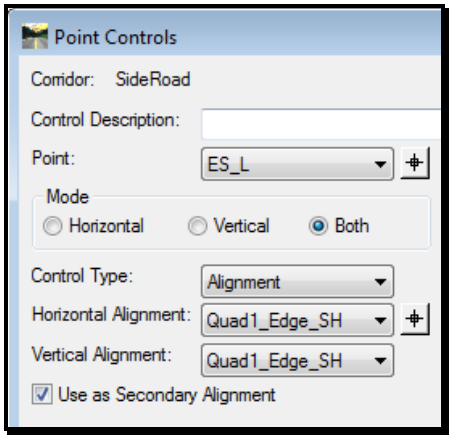


Figure 17-32: Point Controls Dialog- Shoulder Edge Control

For the *Station Limits* the **Start:** station should be the first point of the Quad1_Edge_SH alignment intersecting the shoulder of the SideRoad and the **Stop:** should be approximately the last point along the Quad1_Edge_SH alignment that can be seen perpendicular to the SideRoad alignment (Figure 17-33).

- If you want an exact Stop station then use MicroStation to draw a line with a tangent snap to the Quad1_Edge_SH alignment and perpendicular snap to the SideRoad alignment.

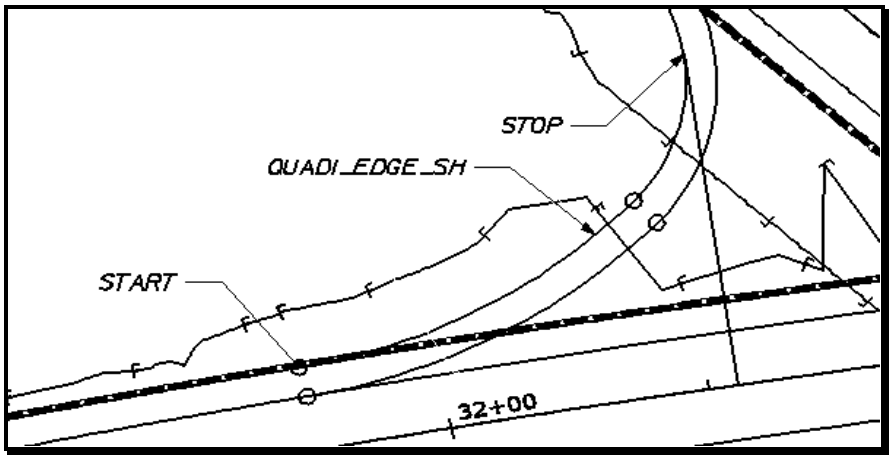


Figure 17-33: Point Controls Dialog – Shoulder Edge Example Diagram

To set the *Station Limits* hold down the **Ctrl** key and use the selection button to the right of the start and stop station to pick the limits graphically (Figure 17-34).

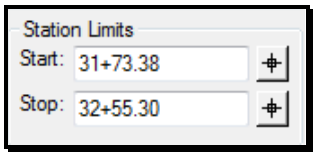


Figure 17-34: Point Controls Dialog – Shoulder Edge Station Limits Example

Deduct **.10'** from the stop station to help eliminate any spiking (Figure 17-35).

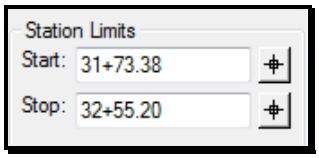


Figure 17-35: Point Controls Dialog – Shoulder Edge Station Limits Example – Adjusted for Spiking

Click the **Add** button to populate the **Horizontal and Vertical Controls** area of the dialog.

Repeat this process for the right shoulder edge (**ES_R**) taking it as far as the alignment will allow, click **Add** and **Close** the dialog.

After setting the right side you should see the additional secondary alignments displayed within the Roadway Designer (Figure 17-36).

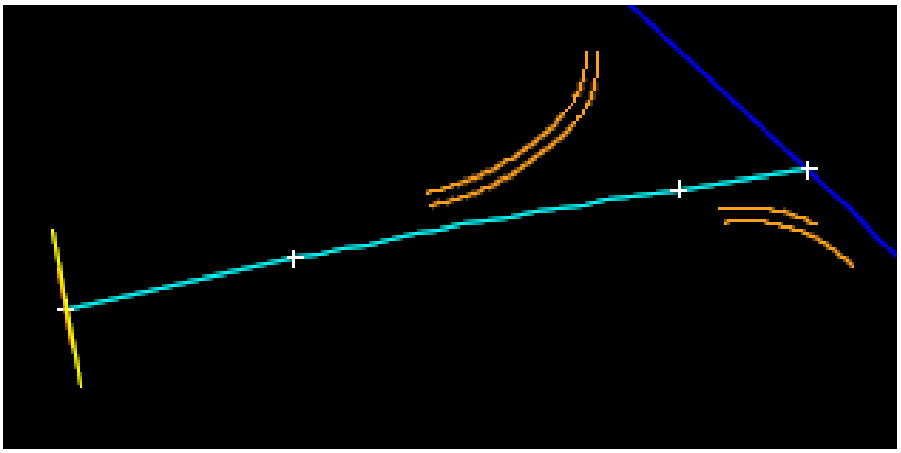


Figure 17-36: Plan View Graphic Results

Step Six: Adjust Template drops for SideRoad

Part One: Template Drops and Edits

At this point additional template drops will be needed at key stations along the SideRoad corridor and will need to intercept the edge of travelway 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 only template drop, set the station to the first alignment to be encountered along the corridor (i.e., 31+73.38), set the interval to 2 feet and click **Copy** (Figure 17-37).

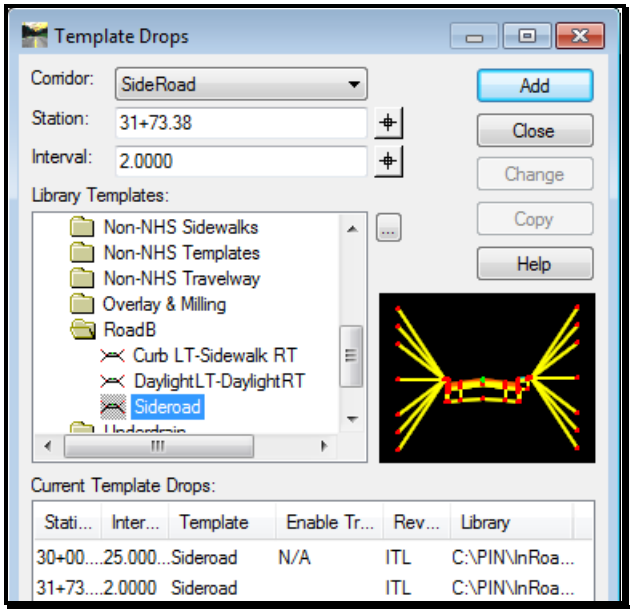


Figure 17-37: Template Drops Dialog – Set Interval and Copy – First Alignment Encountered

Next, set the *Station:* to the closest station intercepting the edge of travelway 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 32+60.93). Set the *Interval:* to 2 feet and click the **Copy** button (Figure 17-38).

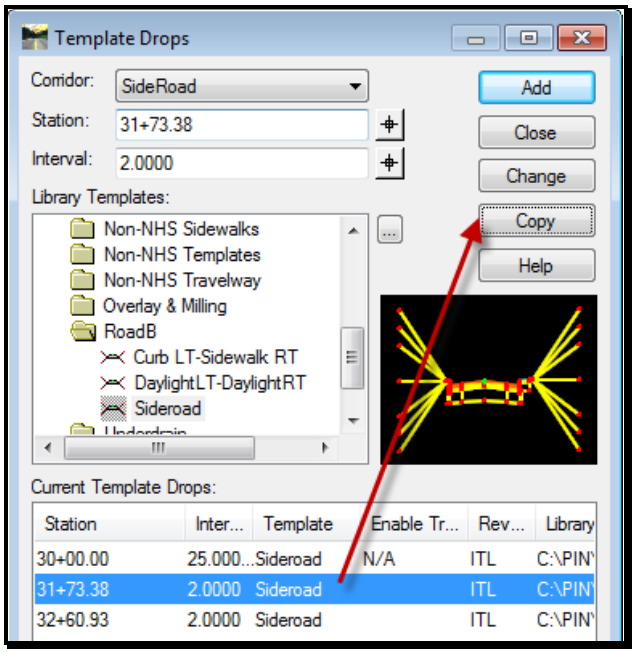


Figure 17-38: Template Drops Dialog – Set Interval and Copy – Edge of Travelway Intercept

Highlight the new template drop and select **Edit** (Figure 17-39).

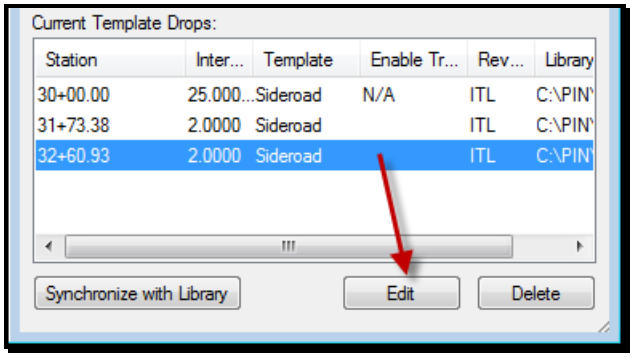


Figure 17-39: Template Drops Dialog – Edit Template Drop

Delete left end conditions, curbing, and shoulder from the template drop (leaving just the lane). See Figure 17-40.

Figure 17-40: Edit Template Drop – Delete Left End Conditions, Curbing and Shoulder

Click **OK.**

Next, highlight the last template drop, set the *Station:* to the intersecting point of the SideRoad alignment and the edge of travelway 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 17-41).

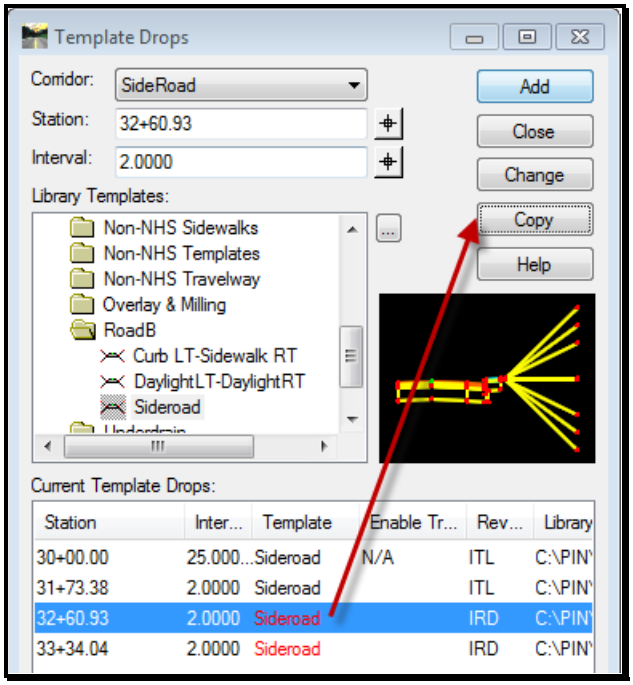


Figure 17-41: Template Drops Dialog – Set Interval and Copy – Edge of Sideroad Intercept

Highlight the new template drop and select **Edit** (Figure 17-42).

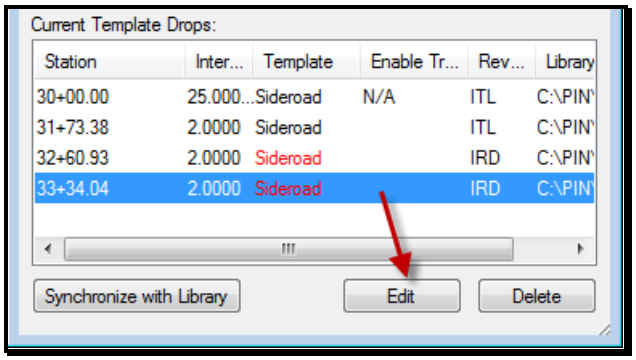


Figure 17-42: Template Drops Dialog – Edit Template Drop

Delete the left travelway edge and sub points from the template drop by right clicking on each point and selecting **Delete Point**. When more than one point display in a separate dialog select **All** and click **OK** (Figure 17-43).

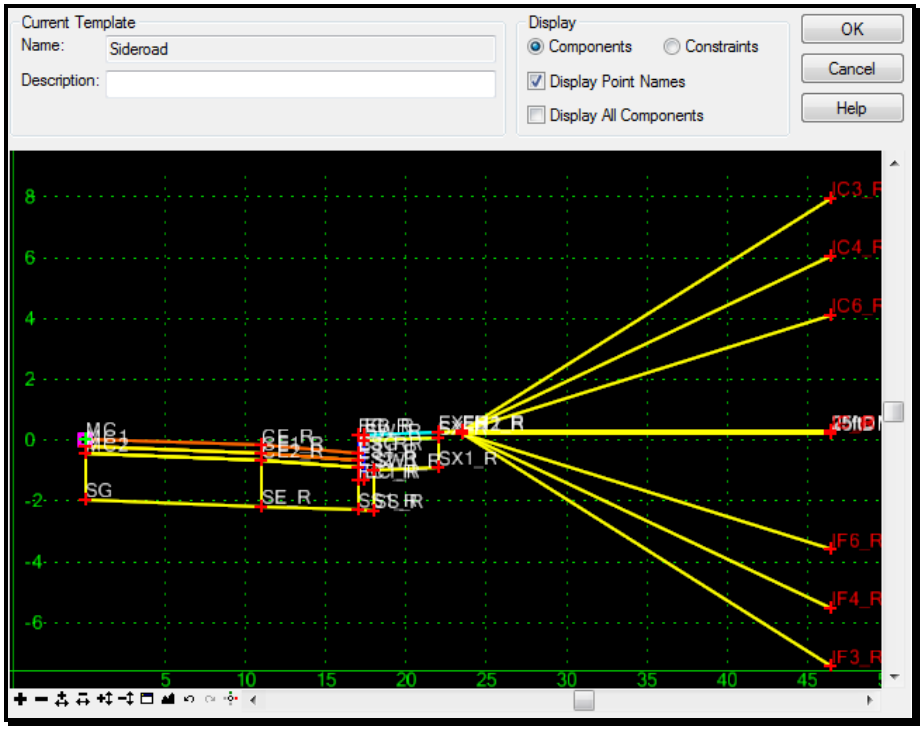


Figure 17-43: Edit Template Drop – Delete Travel Edge and Sub Points

Select **OK** when finished editing and **Close** the Template Drops dialog.

Part Three: 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 travelway point name from the MainLine (**CE_L**). See Figure 17-44.

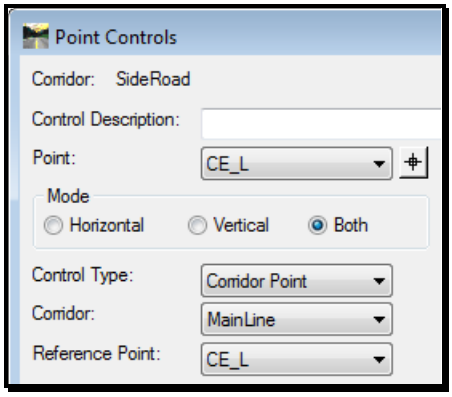


Figure 17-44: Point Controls Dialog- Edited Template Drops

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 17-45).

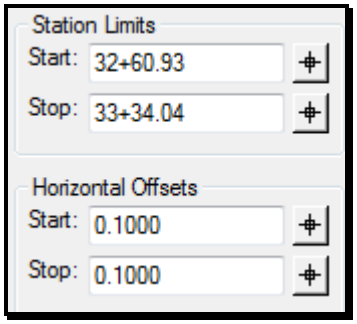


Figure 17-45: Point Controls Dialog- Station Limits – Horizontal Offsets

Click the **Add** button (Figure 17-46).

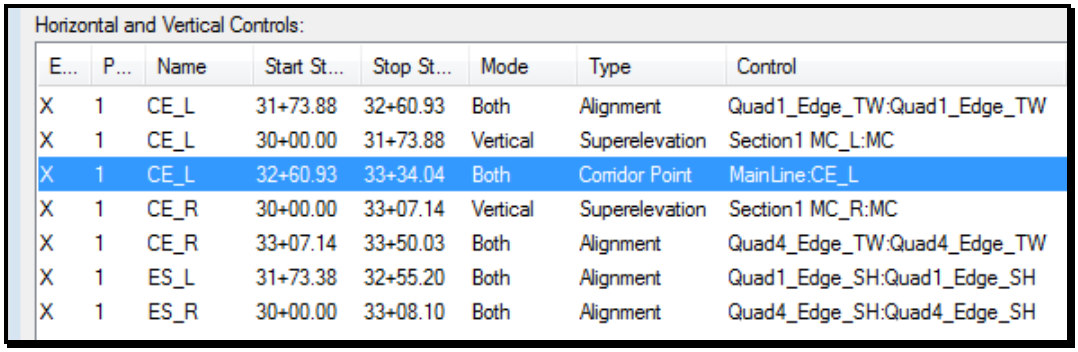
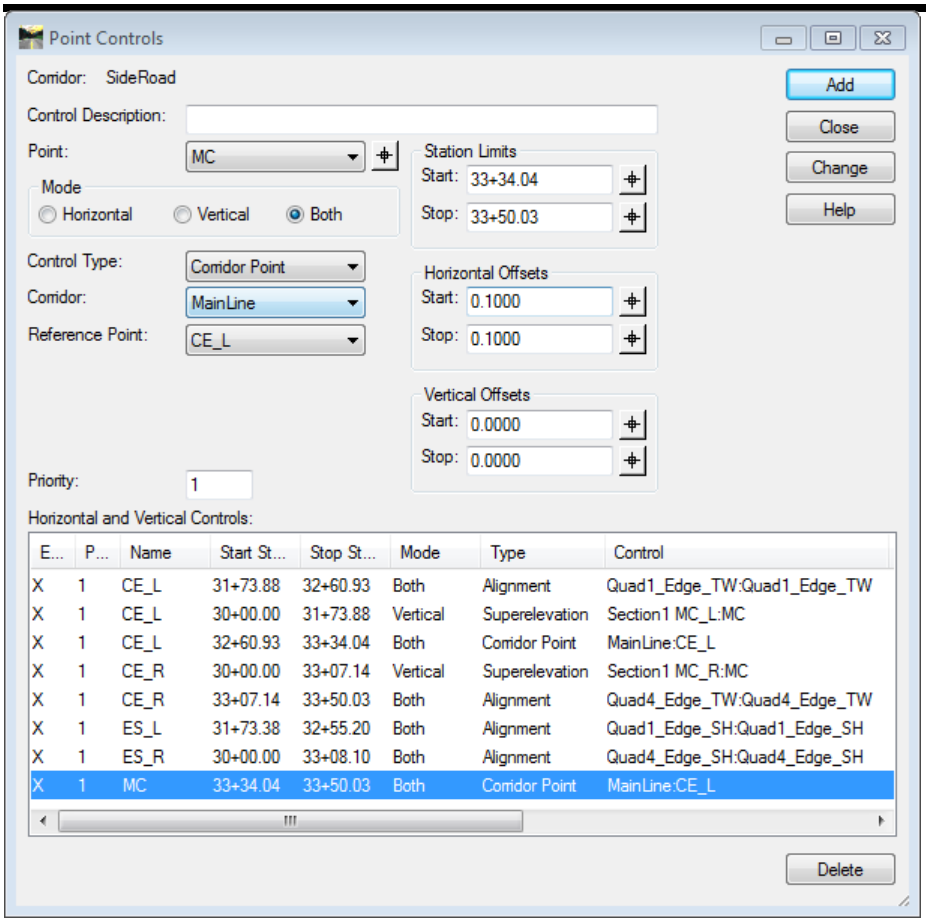


Figure 17-46: Point Controls Dialog – Adding Point Controls for Edited Templates

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 SideRoad, stop station at the farthest point of intersection for the travelway edge and edge of travelway on the MainLine and supply a **0.100 Horizontal Offsets** for both the start and stop (Figure 17-47).



E...	P...	Name	Start St...	Stop St...	Mode	Type	Control
X	1	CE_L	31+73.88	32+60.93	Both	Alignment	Quad1_Edge_TW:Quad1_Edge_TW
X	1	CE_L	30+00.00	31+73.88	Vertical	Superelevation	Section1 MC_L:MC
X	1	CE_L	32+60.93	33+34.04	Both	Corridor Point	MainLine:CE_L
X	1	CE_R	30+00.00	33+07.14	Vertical	Superelevation	Section1 MC_R:MC
X	1	CE_R	33+07.14	33+50.03	Both	Alignment	Quad4_Edge_TW:Quad4_Edge_TW
X	1	ES_L	31+73.38	32+55.20	Both	Alignment	Quad1_Edge_SH:Quad1_Edge_SH
X	1	ES_R	30+00.00	33+08.10	Both	Alignment	Quad4_Edge_SH:Quad4_Edge_SH
X	1	MC	33+34.04	33+50.03	Both	Corridor Point	MainLine:CE_L

Figure 17-47: Point Controls Dialog – Adding MC Point

Click **Add** to populate the **Horizontal and Vertical Controls** and **Close** the dialog.

In the Roadway Designer click the **Process All** and view the plan view of the Roadway Designer to see how the interfacing looks (Figure 17-48).

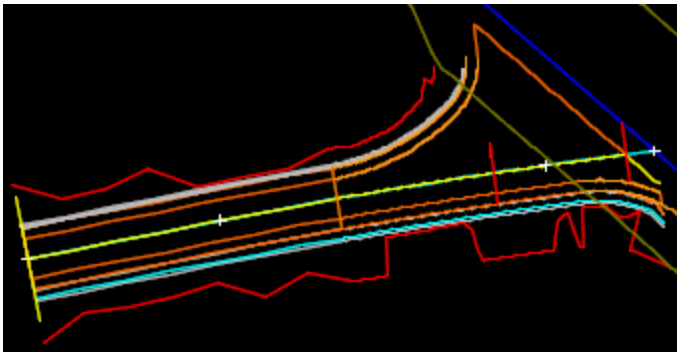


Figure 17-48: Plan View Graphic Results

As you can see there is a line following the mainline corridor.

Step Six: Target Alias

Select **Tools > Target Aliasing** 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 17-49).

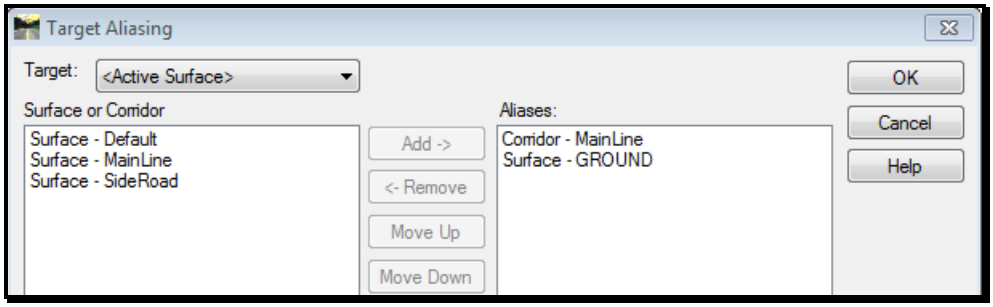


Figure 17-49: Target Aliasing Dialog

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**.

In The **Create Surface(s) from:** area of the dialog, highlight both the MainLine and SideRoad surfaces.

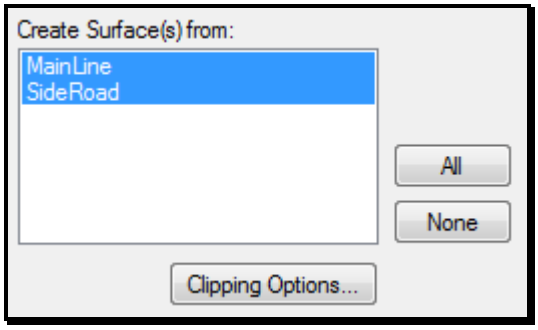


Figure 17-50: Create Surface Dialog – Selecting Surfaces

Click on the **Clipping Options** button to review the settings (Figure 17-50).

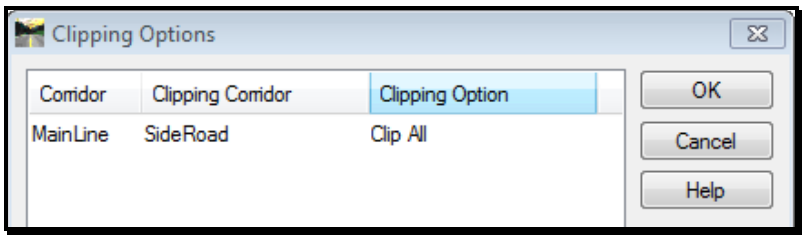


Figure 17-51: Create Surface Dialog – Clipping Options

This should be set to **Clip All** for the SideRoad clipping corridor. To change it left click the desired row of the **Clipping Options** column. Click **OK** to close the dialog box.

You may or may not want to **Create Alternate Surfaces** at this time. In this exercise we will not be creating the alternate surfaces so uncheck this option. The overall look of the Create Surface dialog should look like this (Figure 17-52).

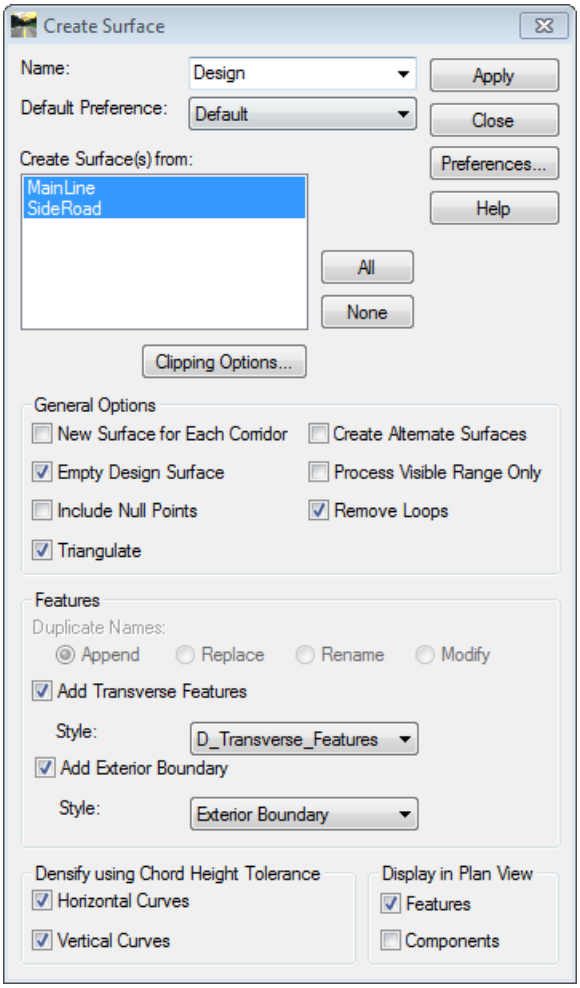


Figure 17-52: Create Surface Dialog

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

If you have features already displayed in your drawing select **Edit > Select All** from the MicroStation main menu and use the delete tool to remove all feature graphics.

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 17-53).

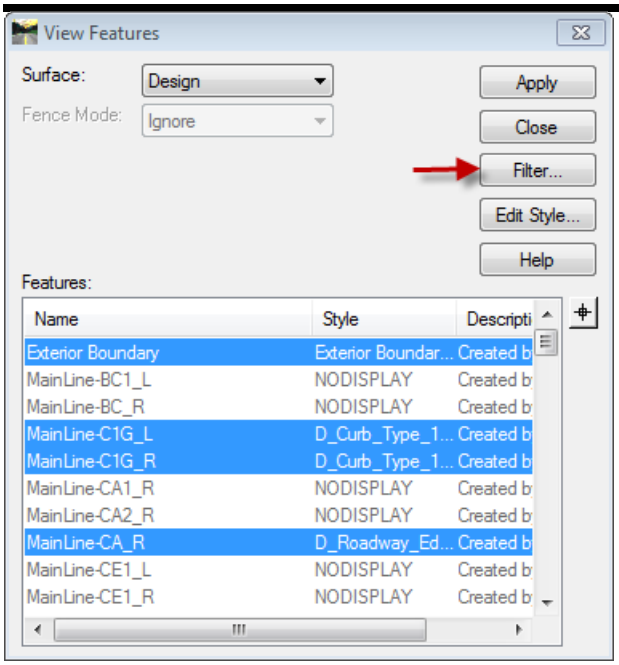


Figure 17-53: View Features Dialog – Change Filter to PLAN DISPLAY - Verify Feature Lock is On

Verify that the **Feature Filter Lock** is ON in the Locks toolbar and click **Apply** to display the features of the combined surface (Figure 17-54). Close the dialog.

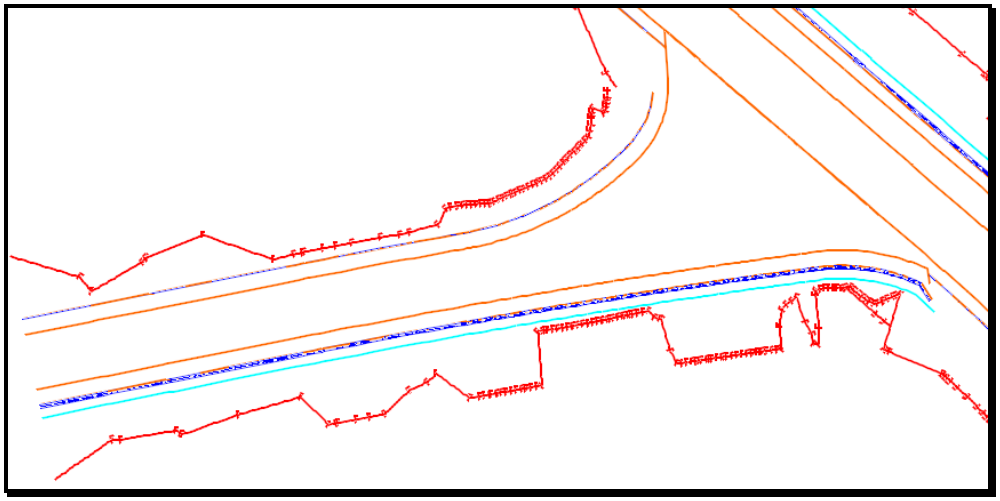


Figure 17-54: Feature Display

As you can see there will still need to be some clean up of the features coming into the edges of the MainLine. Also, the Cut and Fill might need to use end condition exceptions to continuously follow the toe of slope along the corridors. Surface editing tools within InRoads and alignments that were created to control the edge of travelways for the SideRoad by importing them to the **Design** surface will help improve the 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 17-55).

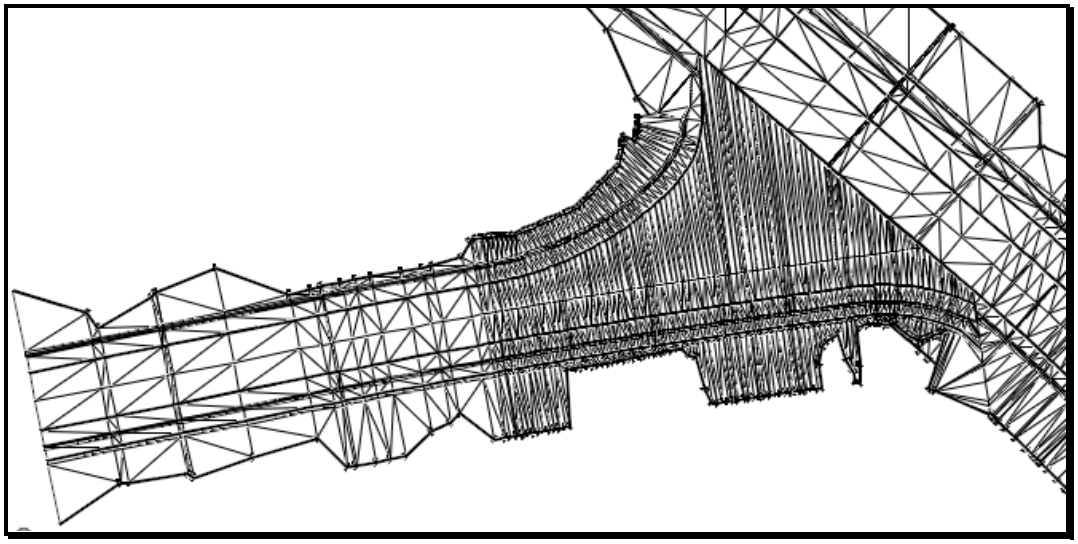


Figure 17-55: Triangle Display

The display of the triangles shows how the SideRoad interfaces to the edge of travelway 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 MicroStation **Settings > View Attributes** (or Control+B). Change the *Display Style* to **Smooth** for View 1 (Figure 17-56).

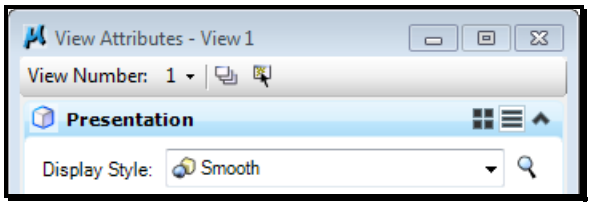


Figure 17-56: View Attributes - Smooth

This will render the view.

- You will want to turn the level off for the Exterior. Turn off the level named (**Exterior Boundary**) in the level display of MicroStation.

Use the Rotate View tool, set *Method:* to **Dynamic** and place a tentative snap near the intersection and accept (left button) to rotate the triangles around viewing the interfacing into the MainLine (Figure 17-57).

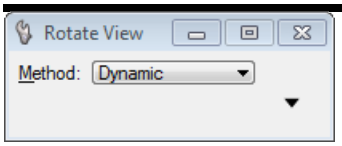


Figure 17-57: Rotate View - Dynamic

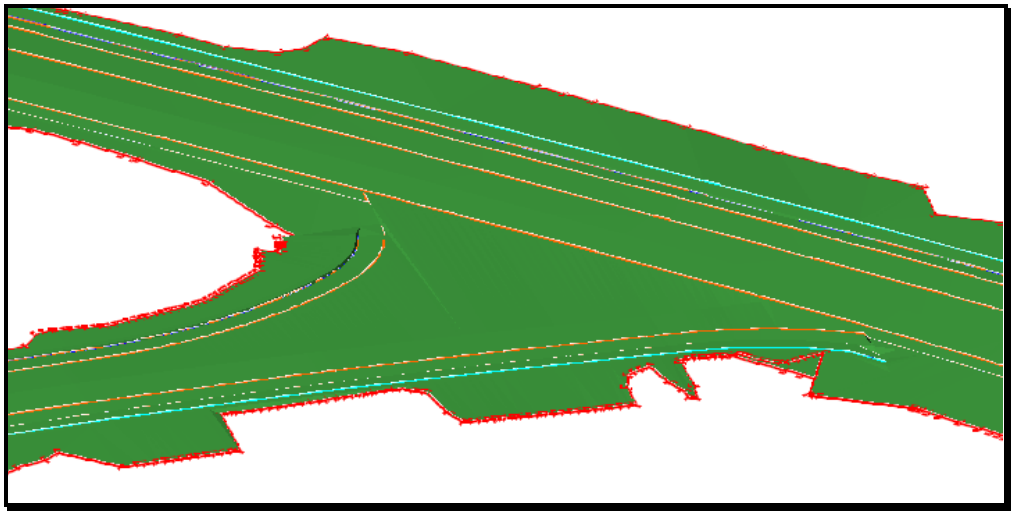


Figure 0-58: Rendered View

Select the Rotate View tool again and change *Method:* to **Top** to set the view back to normal. Open the **View Attributes** icon and set the *Display Style:* to **Wireframe** to remove the rendering (Figure 17-59).

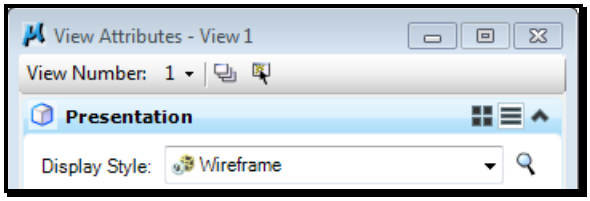


Figure 17-59: View Attributes - Wireframe

Step Eleven: Delete Triangle Display

Select **Surface > Update 3-D/Plan Surface Display** from the InRoads main menu. Ensure the *Surface* is **Design**, then uncheck the **Triangles** option to remove the triangle graphics that were displayed earlier (Figure 17-60).

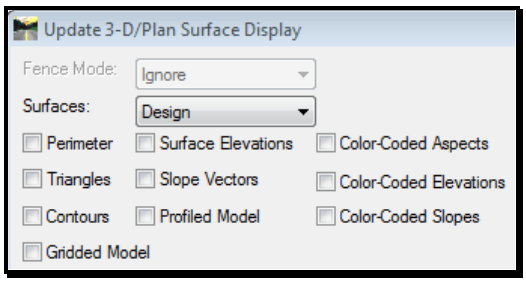


Figure 17-60: Update 3-D/Plan Surface Display

SURFACE EDITING

SURFACE EDITING

Overview

Final surface editing is required to mesh the areas that could not be completely modeled due to skew conditions etc. Final editing should only be done after all driveway and intersections have been designed, any boring for drainage situations have been received and drainage conditions designed and template depths design have been adjusted for final computation. Basically you want to make sure you are done using the Roadway Designer.

Display Alignment Edges

In the Geometry tab of the InRoads explorer tree right click on each of the horizontal alignments created earlier and select **View** (Figure 17-61).

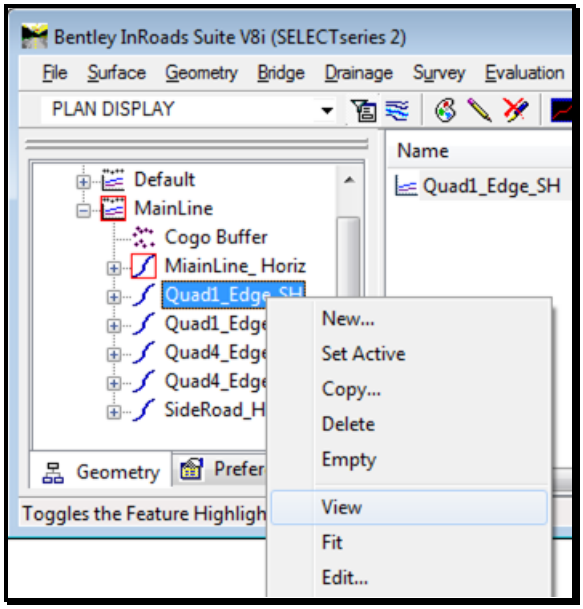


Figure 17-61: View Horizontal Alignment

They will be displayed in your MicroStation view window.

Partial Delete Features

Select **Surface > Edit Surface > Partial Delete** from the InRoads main menu. You will be prompted to 'Identify Feature' at the bottom left of the MicroStation window (Figure 17-62).

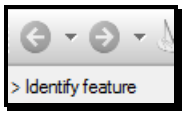


Figure 17-62: Identify Feature Prompt

Part One: Locate Feature

Left click on the **CE_L** feature of the SideRoad. You will be prompted to **Accept/Reject** the feature (Figure 17-63).

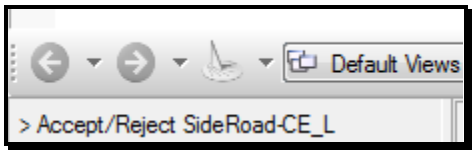


Figure 17-63: Accept/Reject Prompt

Left click to accept the **SideRoad-CE_L** feature for editing.

Part Two: Identify Starting Point

Identify the starting point of the feature to be deleted. This feature starts along the MainLine corridor, drag your mouse to the end of the feature and left click to accept the starting point (Figure 17-64).

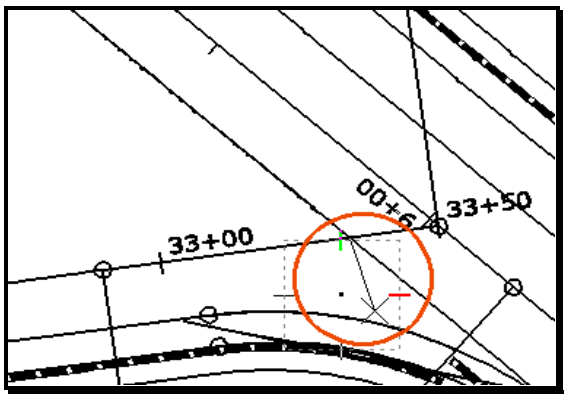


Figure 17-64: Locate Start of Partial Delete

Part Three: Identify Ending Point

Identify the ending point of the feature to be deleted. This will be the starting circle of the alignment that was created for the control of the **CE_L** feature. Use a center snap to get the exact station and accept this point (Figure 17-65).

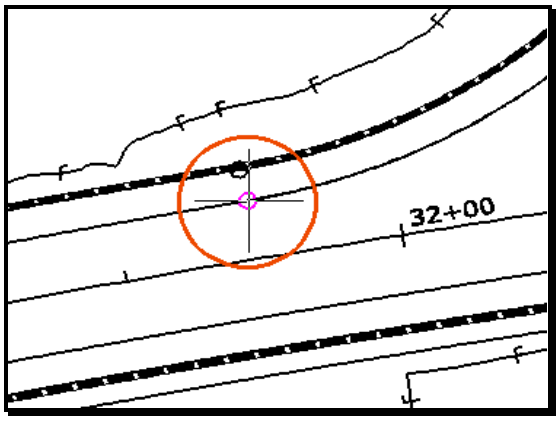


Figure 17-65: Locate End of Partial Delete

Repeat this process for the Curb, Shoulder and Travelway edges remaining for the SideRoad and Curb and Shoulder edge for MainLine.

What you should see in the end is all the features trimmed to the ends of the alignments that were created (Figure 17-66).

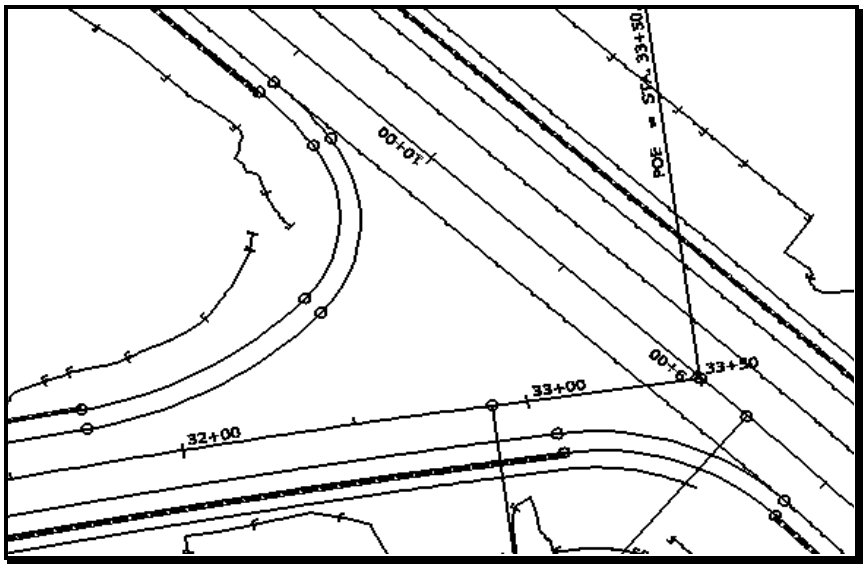


Figure 17-66: Partial Delete Complete

We will address the back of sidewalk later.

Import Geometry to Surface

Overview

By applying the correct styles for the travelway edges and shoulders when creating the multicenter alignments the import process can be done all at once.

Part One: Import to Surface

Select **File > Import > Surface** from the InRoads main menu. Select the **From Geometry** tab within the Import Surface dialog (Figure 17-67).

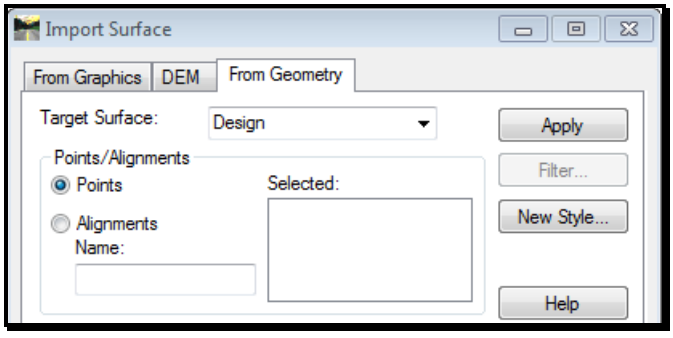


Figure 17-67: Import Surface – From Geometry

Set the **Target Surface** to your **Design** surface. In the **Points/Alignments** area of the dialog select the radio button for **Alignments**. Place your cursor in the **Name:** field and select the **Filter…** button to the right of the dialog (Figure 17-68).

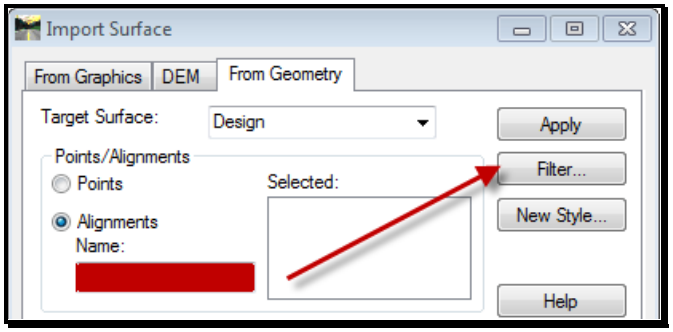


Figure 17-68: Import Surface – Filter

A second dialog will appear called the **Geometry Selection Filter**, select the entire Quad* alignments that were created for this intersection and **Add** them to the **Selected:** side of the dialog (Figure 17-69).

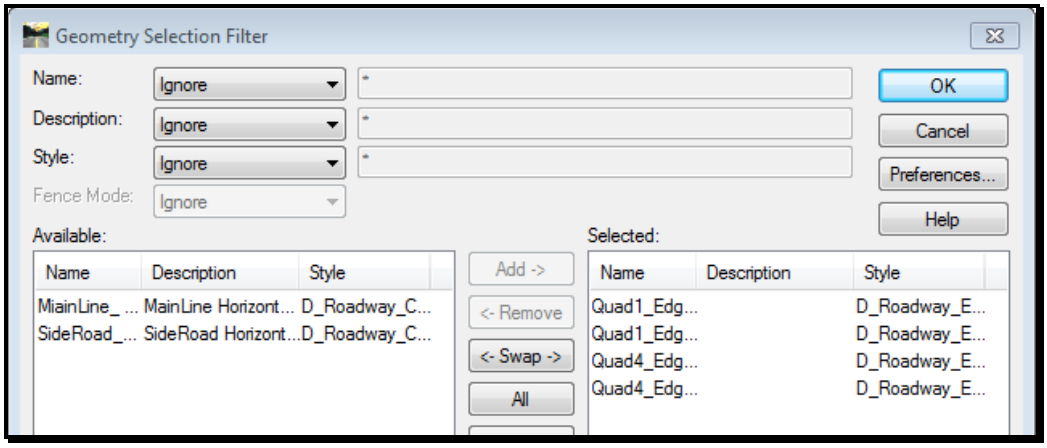


Figure 17-69: Geometry Selection Filter

Press **OK** when done and this will populate the **Selected:** area of the **Import Surface** dialog. In the **Features:** area of the dialog you will leave the **Name:** set to **From Geometry**, **Type:** set to **Breakline** and the **Duplicate Names:** set to **Rename** (Figure 17-70).

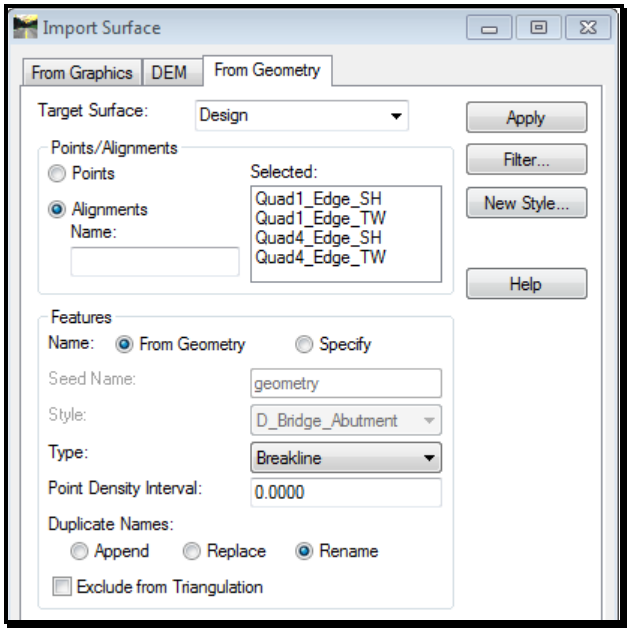


Figure 17-70: Populated Import Surface Dialog

In the **Elevation** area of the dialog change the **Source:** to **Vertical Alignment** (Figure 17-71).

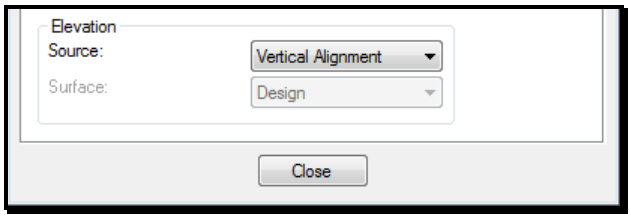


Figure 17-71: Import Surface – Elevation

Select **Apply** and **Close** the dialog. This places the new features into the Design surface.

Part Two: Display New features

With the graphic group lock on delete the alignments displayed in the MicroStation view window. Select **Surface > View Surface > Features…** from the InRoads main menu. Set your **Surface:** to **Design** and select all the features in the **Feature:** list (Figure 17-72).

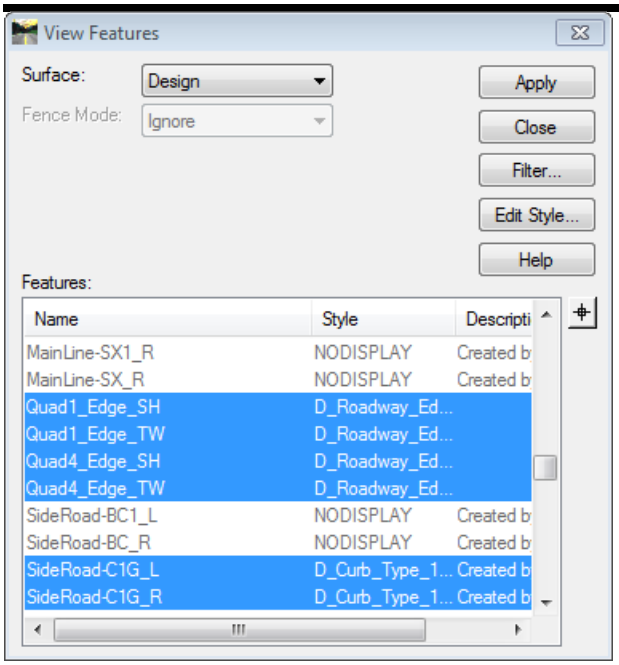


Figure 17-72: View Design Features

Click **Apply** to update the features in the view window. You should now see new features tying in the SideRoad and MainLine (Figure 17-73).

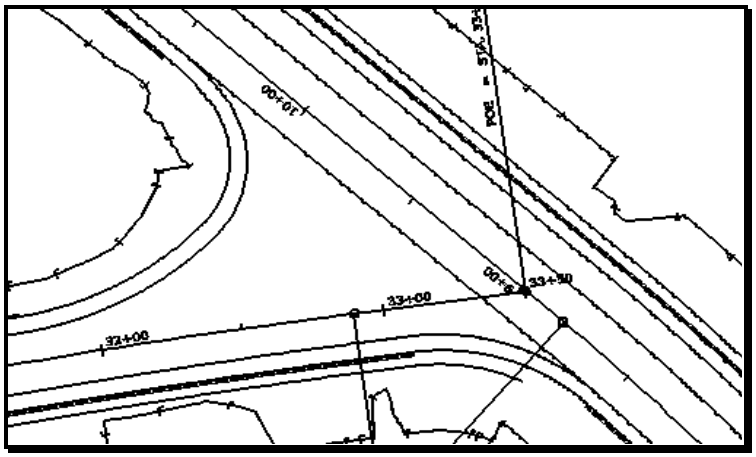


Figure 17-73: Design Feature Display

This took care of the edge of travelway and edge of shoulder.

Part Three: Copy Features for Curb Features

Select **Surface > Edit Surface > Copy Single Feature…** from the InRoads main menu.

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** (or use **File > Project Options** and select the correct preference).

CREATE PLAN OVER PROFILE PAGES

Step One: Open MicroStation

To begin, double click your **MicroStation V8i** icon and select your project from the project pull down. Open any file.

Step Two: Create or Open a Profile Drawing

Select **File > Make Sheetz** from the *MicroStation Main Menu.* Create a **Profile.dgn** drawing (if one doesn't already exist) using the no prefix option.

✓ ***Refer to 1-57 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 click the **Preference** button open the 50 Scale preference sets.

♫ **Disable** 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. Enable the *Plan Only* option. Disable the *Generate Sheets* option.

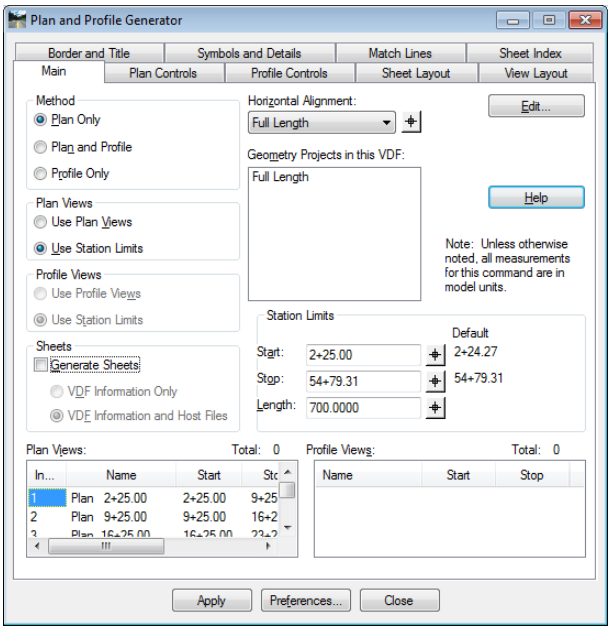


Figure 18-1: Plan and Profile Generator-Main

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.).

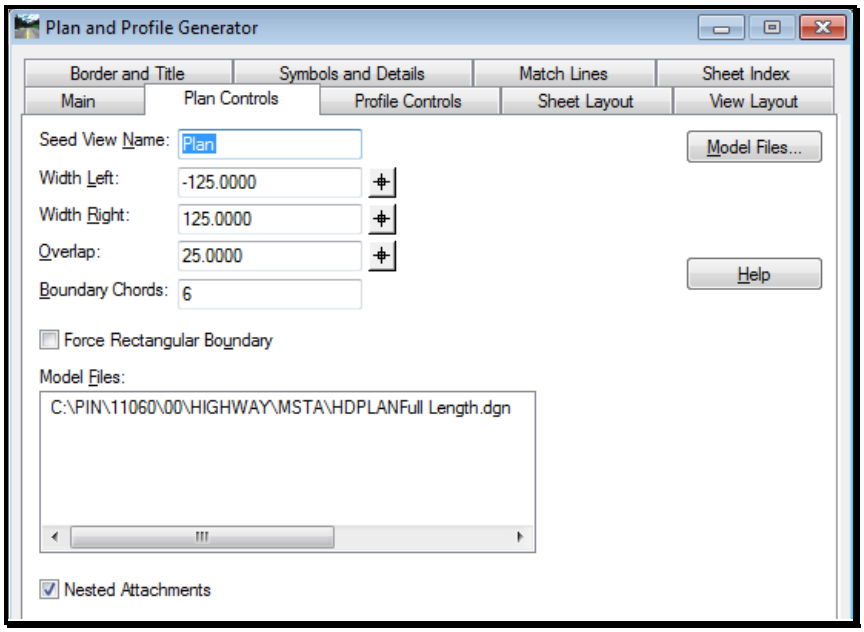


Figure 18-2: Plan and Profile Generator-Plan Controls

Click **Apply**. This will result in creating Plan Views.

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**.

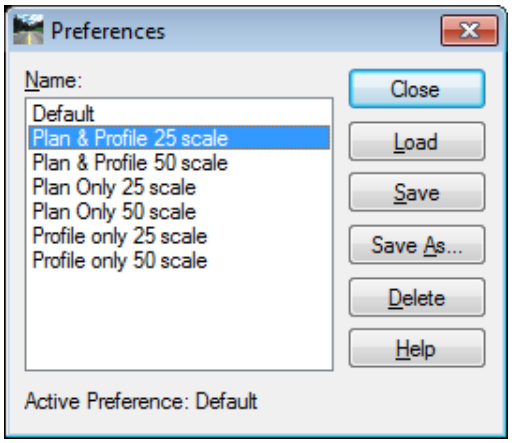


Figure 18-3: Preferences

Press **Close** to return to the Plan and Profile Generator dialog. Enable the **Use Plan Views** option on the **Main** tab of 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.***

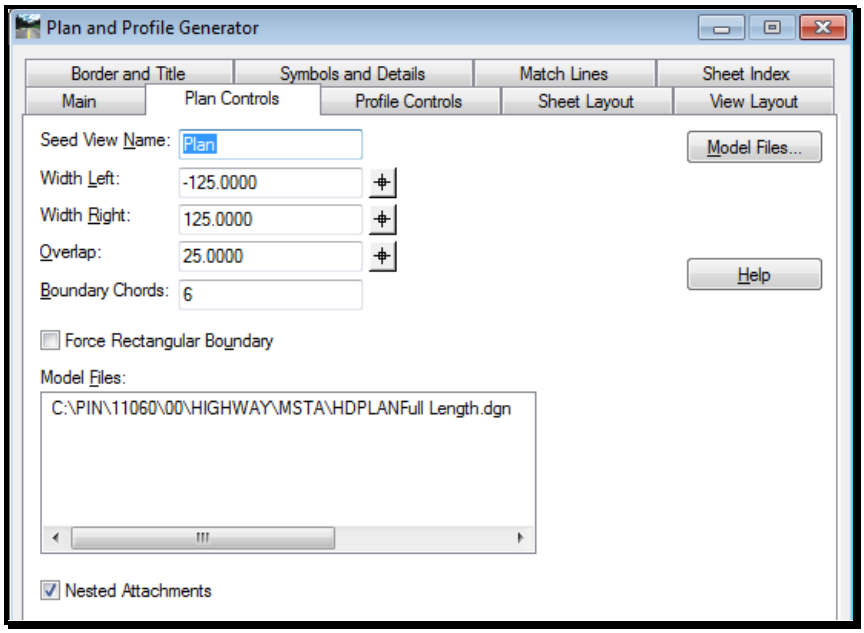


Figure 18-4: Plan and Profile Generator-Plan Controls

♫ 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 2-72 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.***

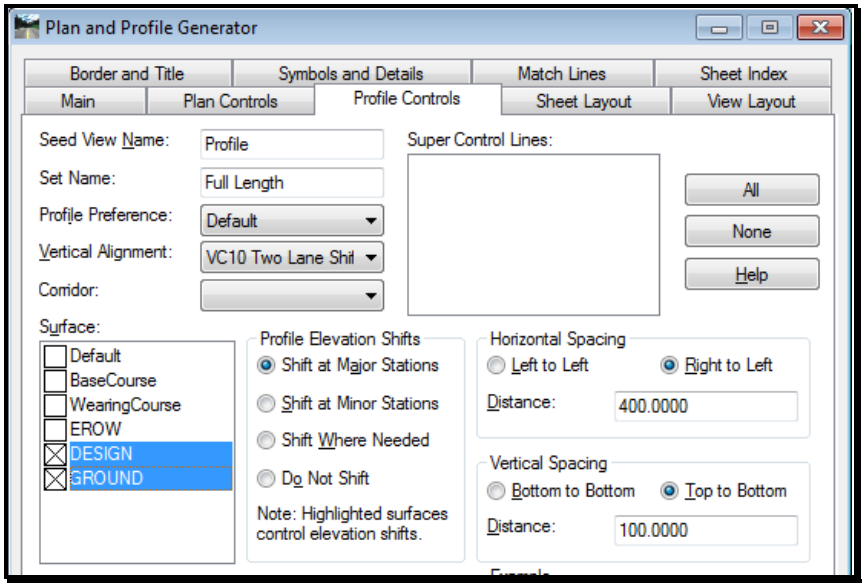


Figure 18-5: Plan and Profile Generator-Profile Controls

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.).

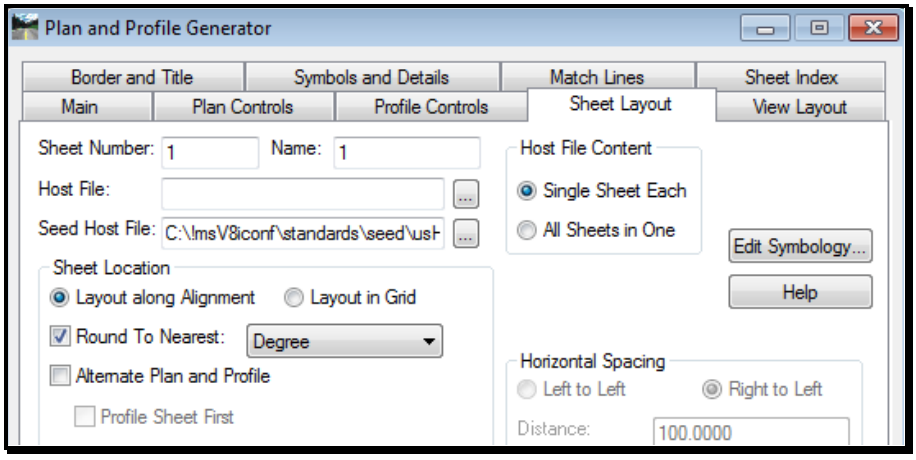


Figure 18-6: Plan and Profile Generator-Sheet Layout

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 1-62.***
- ✓ ***For detailed instructions on using the Border Information macro, please refer to 1-69.***

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.***

Part Five: Adjusting Plan Area

Overview

The viewable area of the plan can easily be adjusted with MicroStation tools and the *Reference File* dialog. There is an element that surrounds the plan view area within the border drawings.

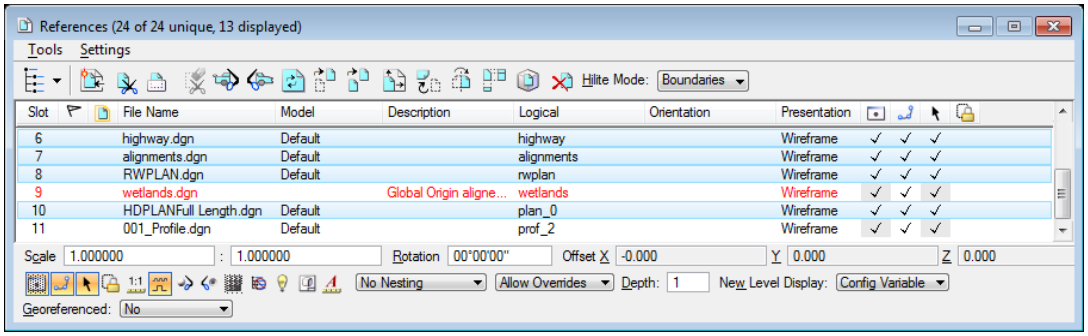
- The element is color 160 (which plots white) and is a *Construction* element, therefore it will never plot.

Part One: Export the DGN to 2d

From the *Main Menu,* select **File > Export > 2d.** Use the current name of the DGN, but add a suffix of "_2d". The resulting DGN will be flat and ready for use. Open the new 2d file.

Part Two: Open Reference Dialog

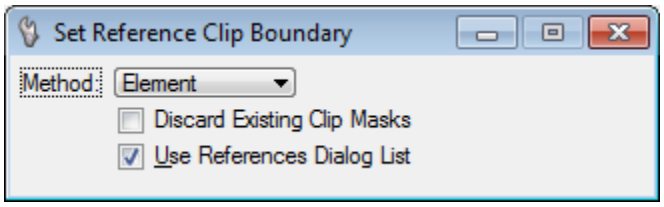
Select **File > Reference (DOT) > Dialog** from the MicroStation main menu. This opens the *Reference* dialog.



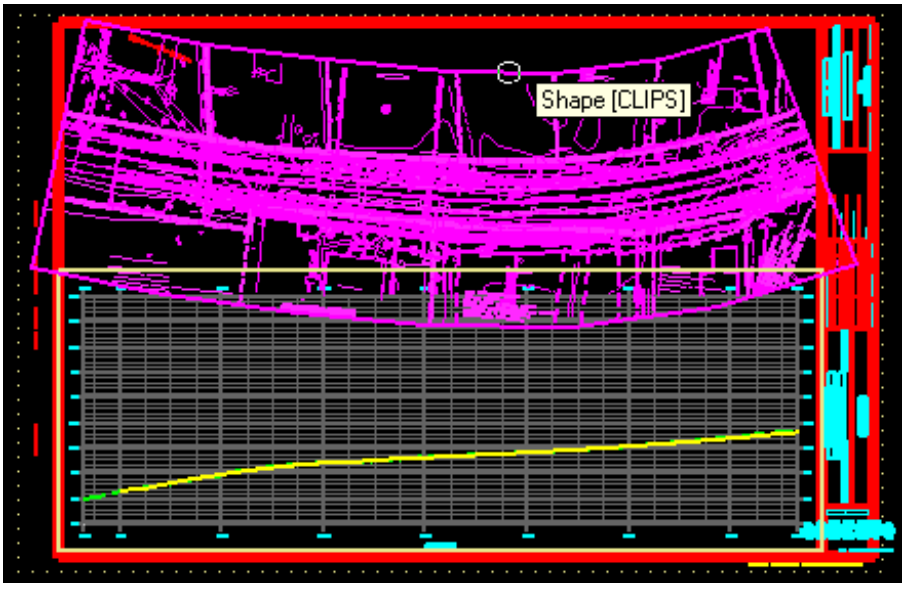
The dialog lists multiple reference files. Select all of the reference files you want to clip, except xxx_Profile.dgn which contains the profile and its extents.

Part Three: Set Element as Clip Boundary

Select **HDPLAN.DGN** with a left click. Now select **Tools > Clip Boundary** from the *Reference* file menu. Set the *Method* to **Element** and place a check in the *Use Reference Dialog List* box.



MicroStation prompts you to **Identify Clipping Element.** Click on the light yellow shape surrounding the plan area.



Part Four: Modify with MicroStation Tools

Now that the *Clip Boundary* element has been established, the element can be modified by moving a vertex with the *Modify Element* tool or by adding or deleting a vertex with the appropriate tool.

Rotate or Move References (Optional)

To move or rotate the area within the view extents, highlight HDPLAN.DGN in the *Reference* dialog and use the **Tools > Move** or **Tools > Rotate** to reposition the area. This may require that you adjust the *Clip Boundary* afterwards.

Step Six: Adjust the Clip Boundaries

Adjust the *Clip Boundaries* of each plan sheet that was created.

Step Seven: 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.

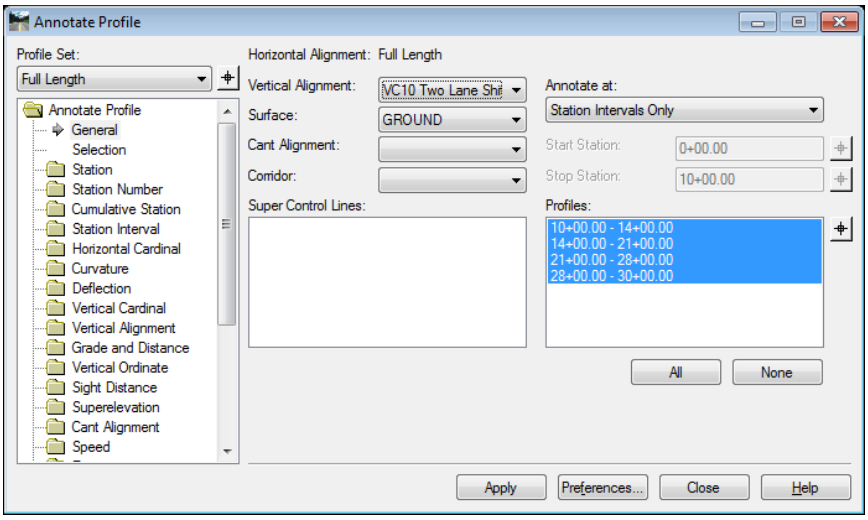


Figure 18-7: Annotate Profile

Click **Apply** and **Close** to exit this dialog.

Part Two: Label Vertical Annotation

Normally, the Vertical alignment will already be automatically annotated based on the **Geometry > View Geometry > Options** command. If it is not annotated, 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.

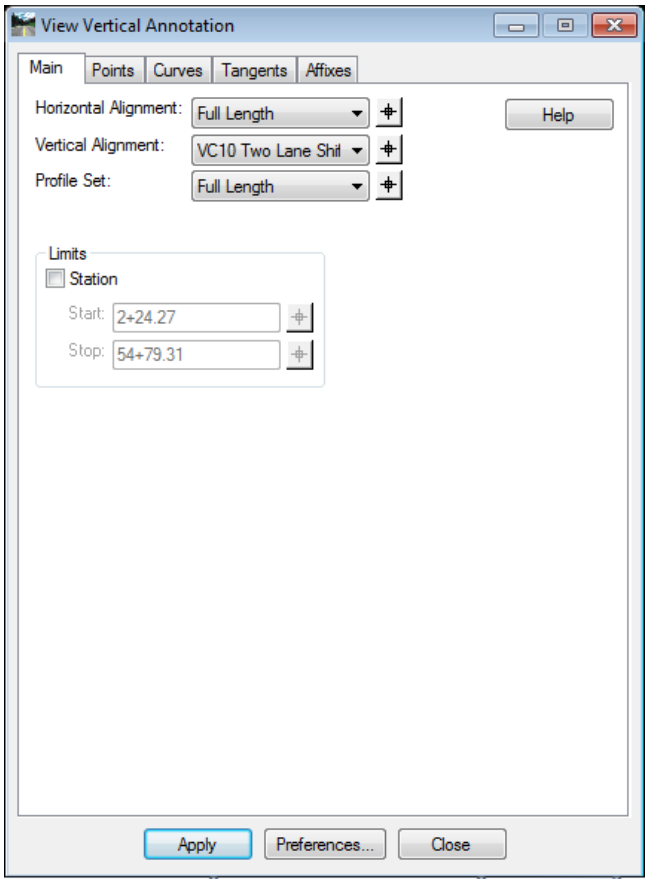


Figure 18-8: View Vertical Annotation

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 **MicroStation V8i** 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.).

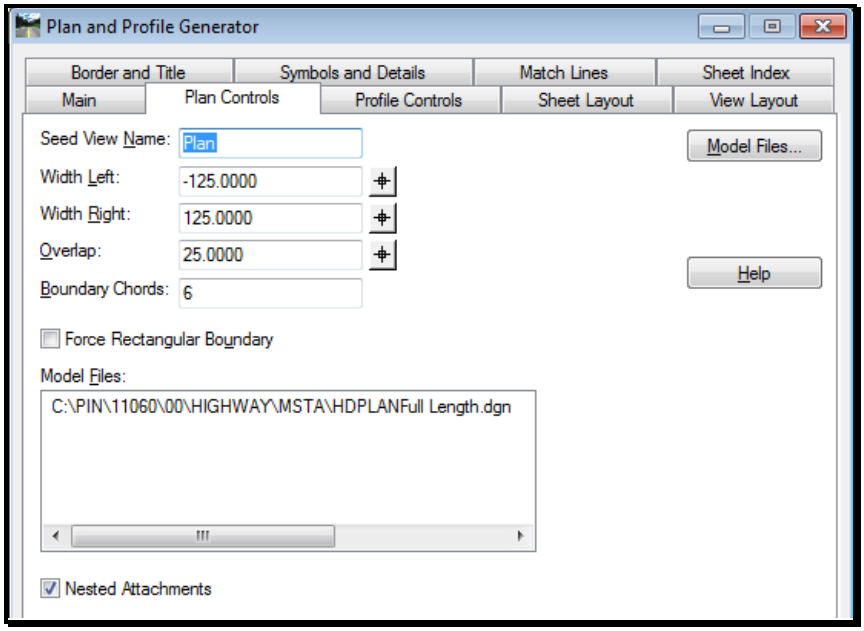


Figure 18-9: Plan and Profile Generator-Plan Controls

- 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 2-72 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.).

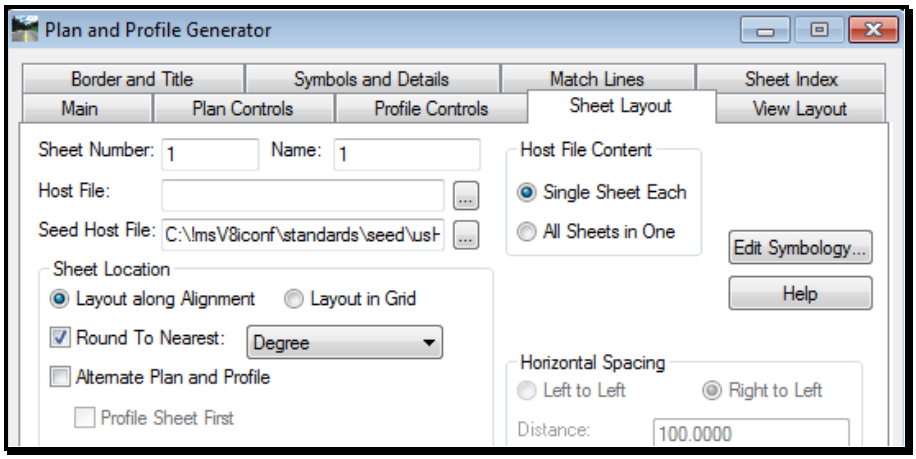


Figure 18-10: Plan and Profile Generator-Sheet Layout

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 1-62.***
- ✓ ***For detailed instructions on using the Border Information macro, please refer to 1-69.***

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 **MicroStation V8i** 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 **Make Sheetz** 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).

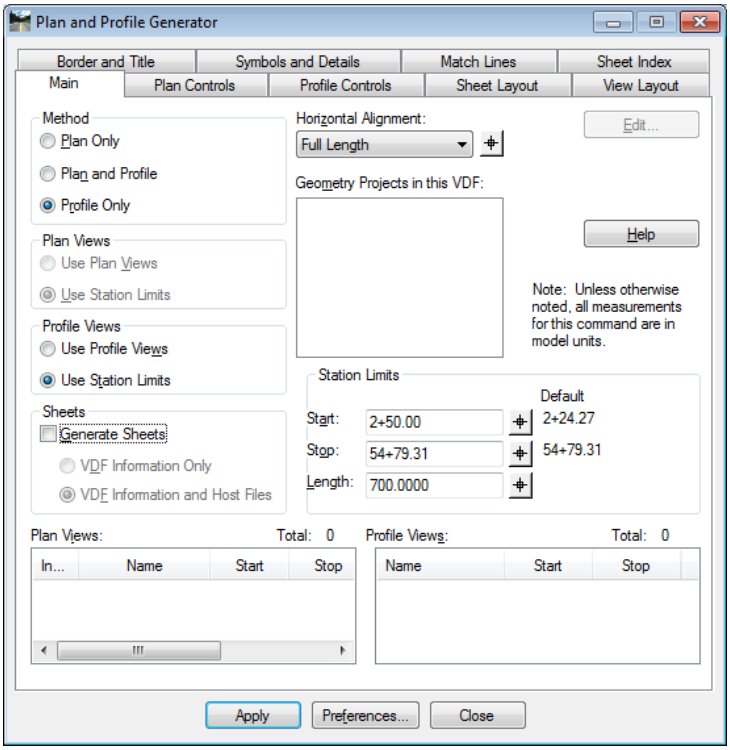


Figure 18-11: Main tab

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.***

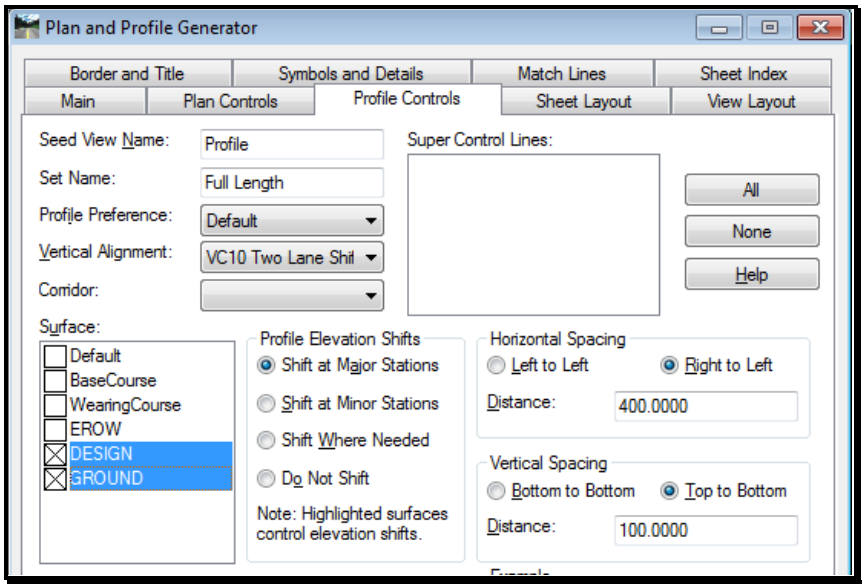


Figure 18-12: Plan and Profile Generator-Profile Controls

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.

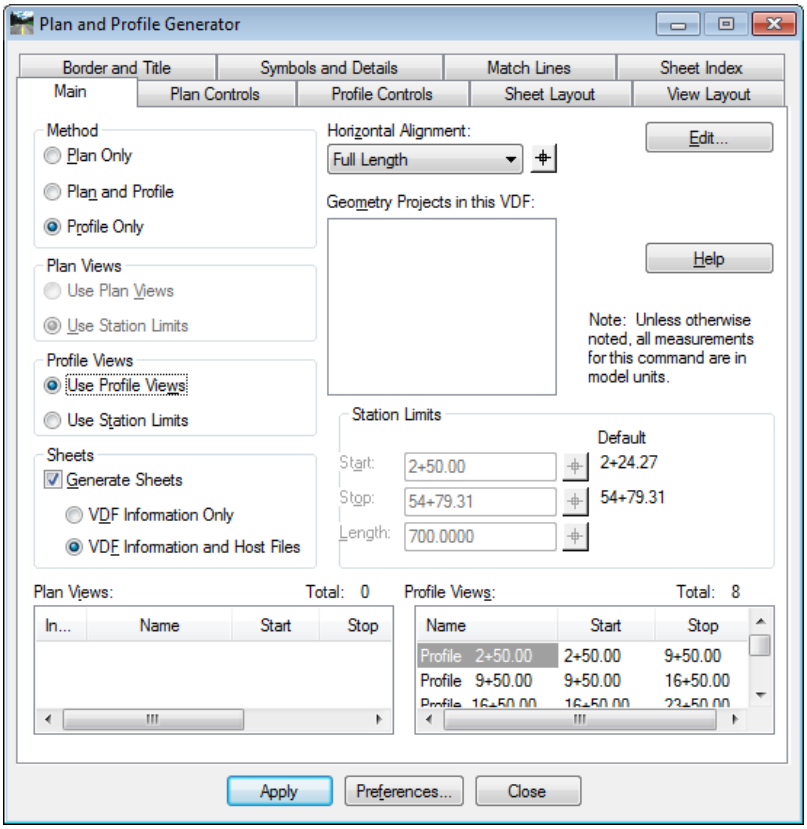


Figure 18-13: Main tab Profile Controls

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.

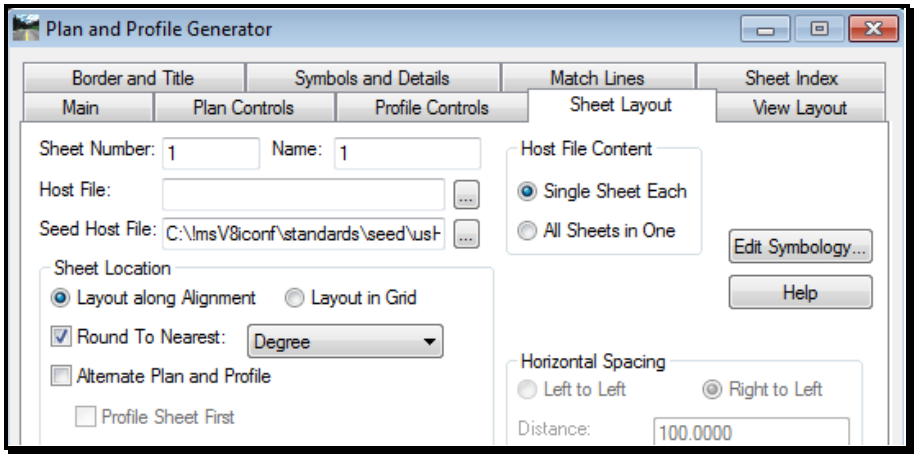


Figure 18-14: Plan and Profile Generator-Sheet Layout

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 1-62.***
- ✓ ***For detailed instructions on using the Border Information macro, please refer to 1-69.***

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.

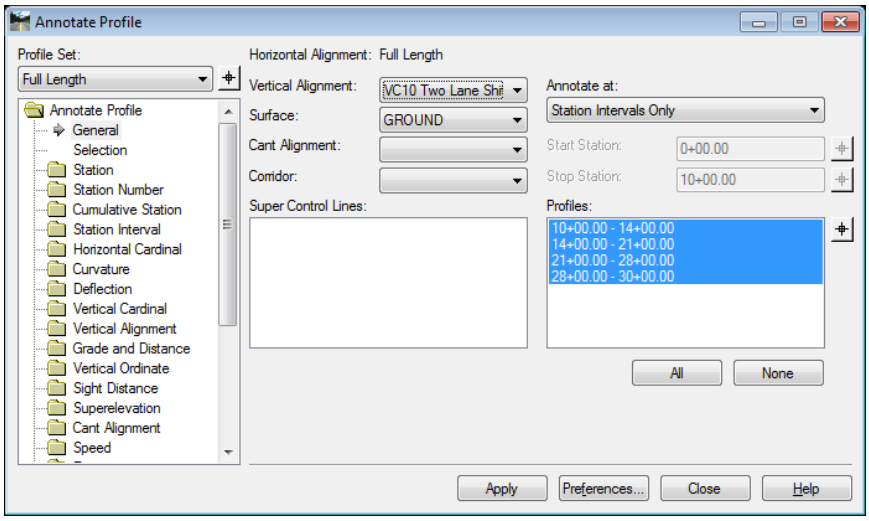


Figure 18-15: Annotate Profile

Click **Apply** and **Close** to exit this dialog.

Part Two: Label Vertical Annotation

Normally, the Vertical alignment will already be automatically annotated based on the **Geometry > View Geometry > Options** command. If it is not annotated, select **Geometry > View Geometry > Vertical Annotation**. (Figure 18-16). 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.

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.

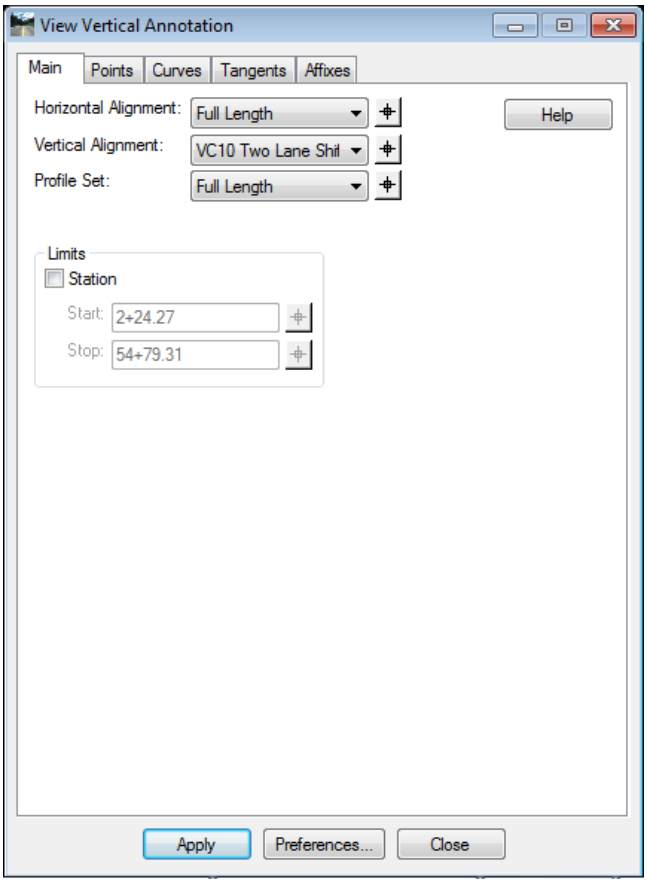


Figure 18-16: View Vertical Annotation

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_V8i.xin** file. You can verify what your scales are set to by selecting from the *InRoads Main Menu* **File > Project 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.

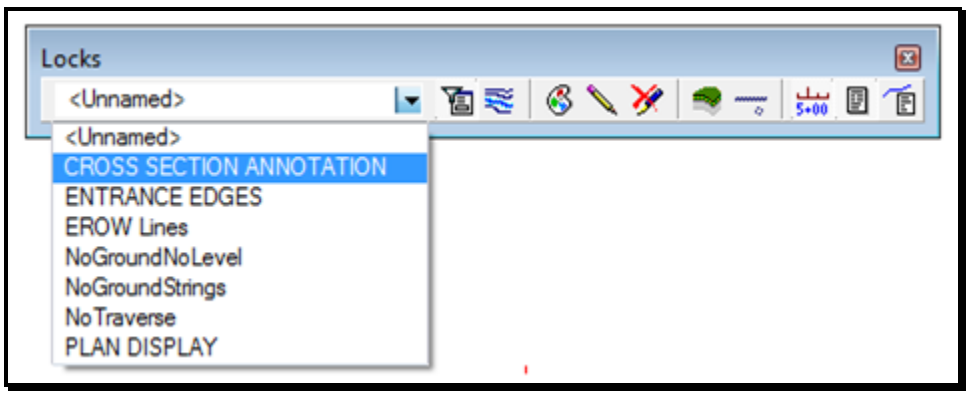


Figure 20-1: Feature Filter lock with various predefined filters

Station Lock

The Station lock, which is the next to last lock located in the **Locks** toolbar plays an important role 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).

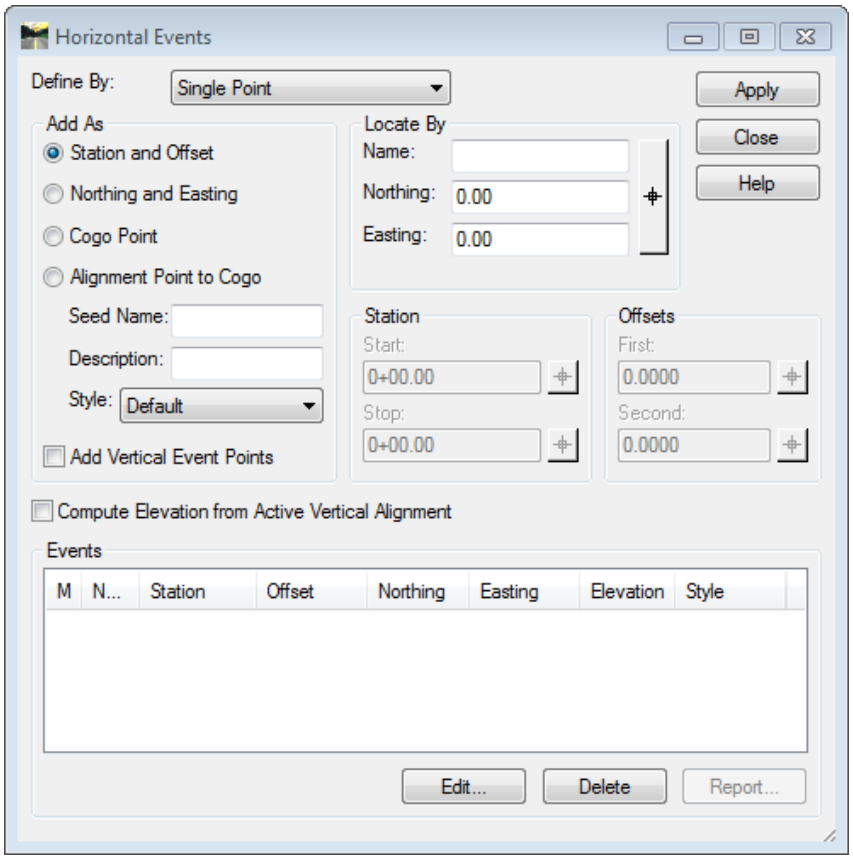


Figure 20-2: Horizontal Events

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).

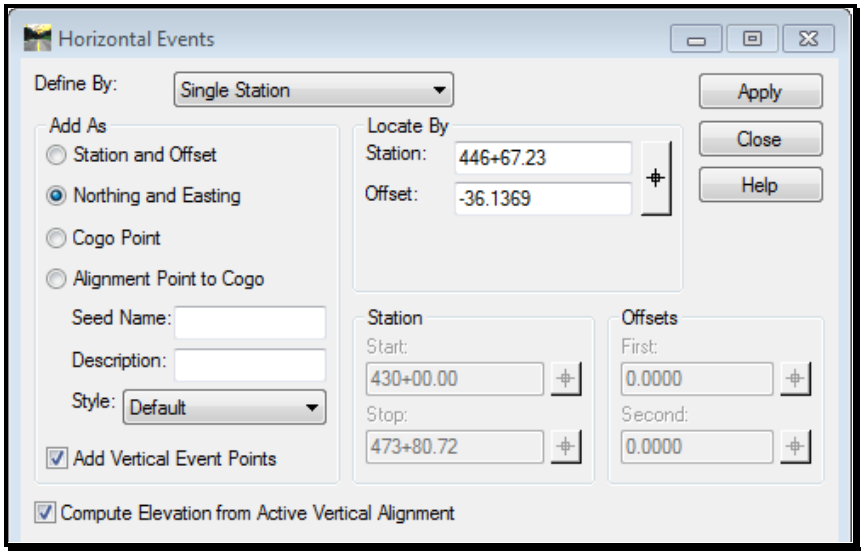


Figure 20-3: Horizontal Events – Settings

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).

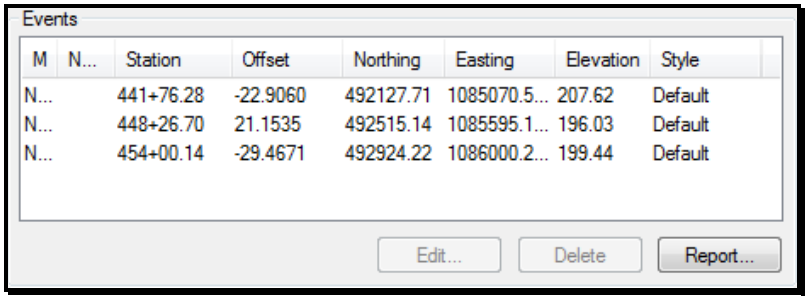


Figure 20-4: Horizontal Events - Events

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 be 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.

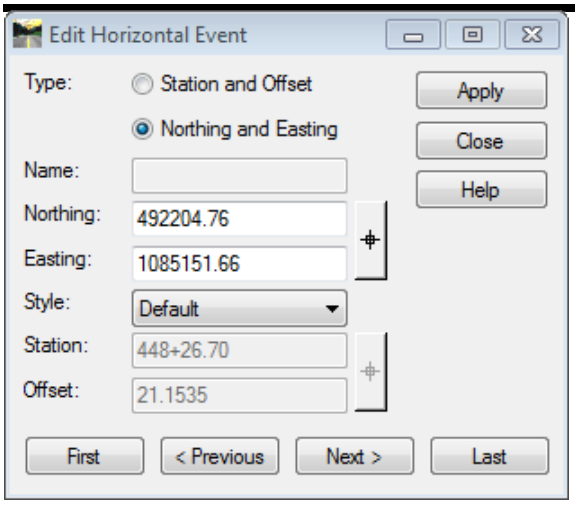


Figure 20-5: Edit Horizontal Event

When done **Close** the dialogs.

CREATING PRELIMINARY CROSS SECTION DRAWINGS

CREATE PRELIMINARY CROSS SECTION DRAWINGS

Overview

This set uses a constant interval between cross sections and is used 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** folder in the **Create Cross Section** dialog as explained further into this document.

Step One: Open Microstation and InRoads

To begin, double click your **MicroStation V8i** icon. By default the user is set to **InRoads_network_V8i**, if you are working in a local pin setup then you will want to change the user to **InRoads_local_V8i**. Select your project from the project pull down and open your workgroups **??plan.dgn** (i.e., HDPlan.dgn or BDPlan.dgn.). Select **Applications > InRoads Group > Activate InRoads** from the *Main Menus*. Pick your projects ***.rwk** or load the necessary InRoads files for you project.

Step Two: Create Cross Section Drawing File

Select **File > Make Sheetz** 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 1-57 for help making drawing files.***

Step Three: Create Cross Sections

Select **Evaluation > Cross Section > Cross Sections..** and click the **Create Cross Section** folder from the *InRoads Main Menu* (Figure 20-6).

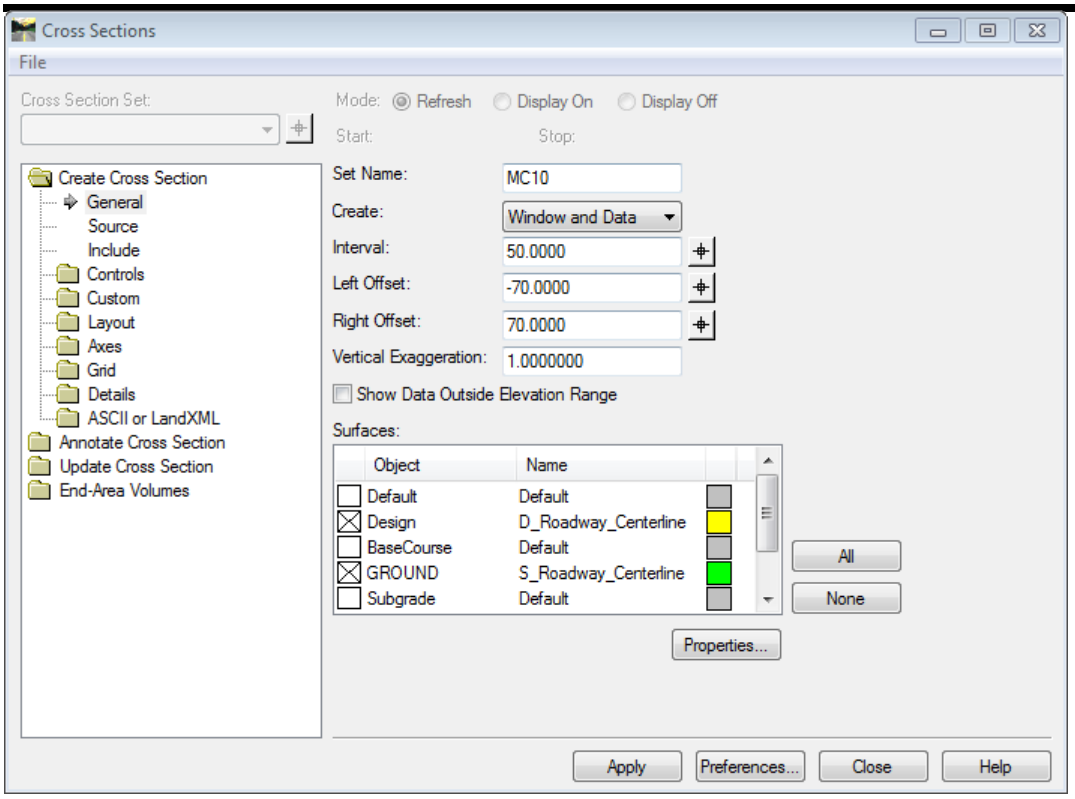


Figure 20-6: Create Cross Section

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).

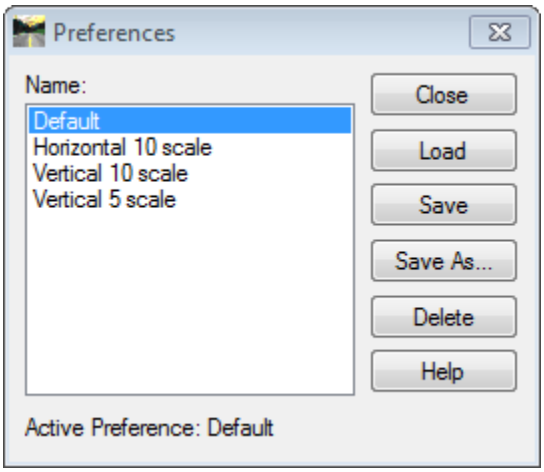


Figure 20-7: Preferences

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 **Tools > Global Scale Factor** before beginning (Figure 20-8) or go to **File > Project Options** and load the correct preference set (The example below would have used the **XS 5 scale** preference. 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.

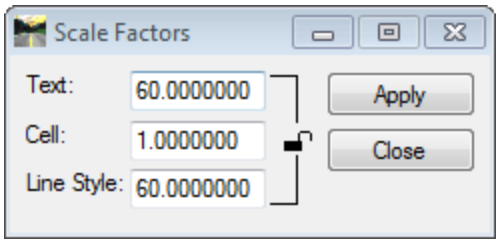


Figure 20-8: Scale Factors

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.

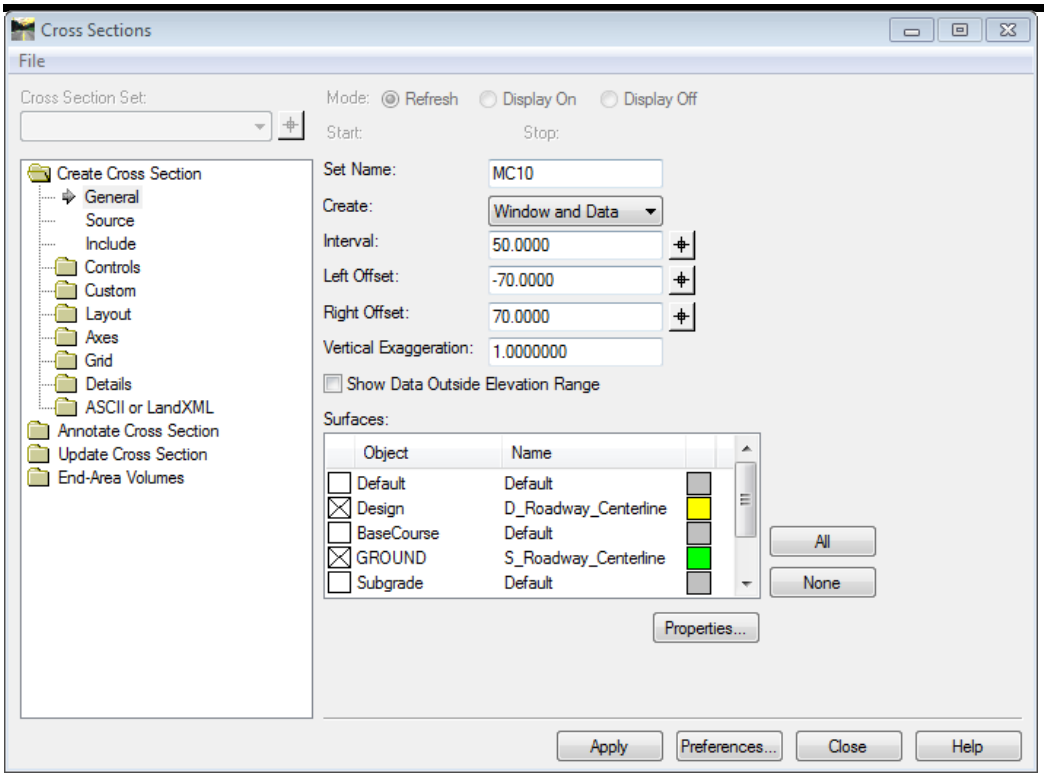


Figure 20-9: Create Cross Section General

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).

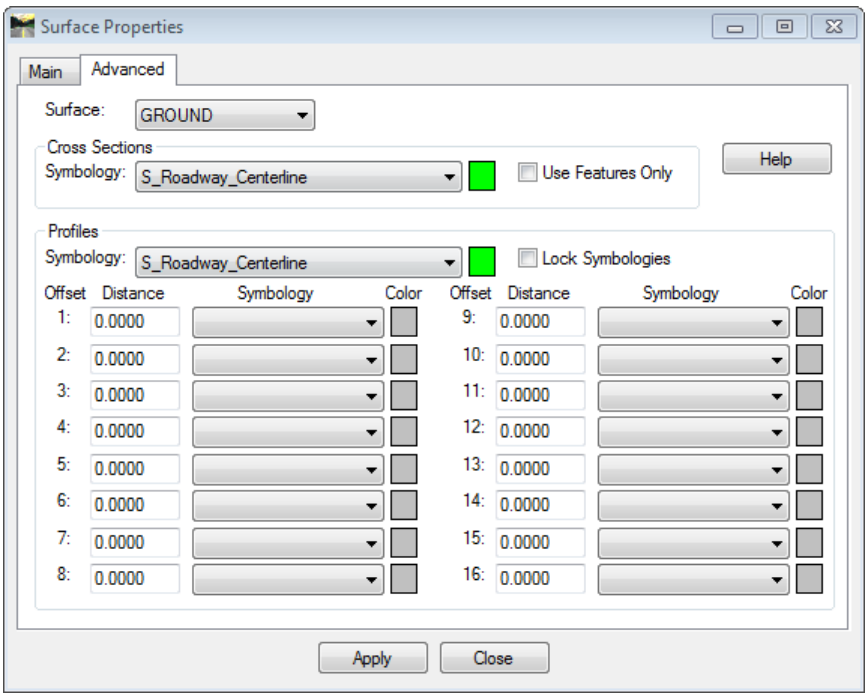


Figure 20-10: Surface Properties

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 an EROW surface. Include this surface to display it on your cross sections.

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).

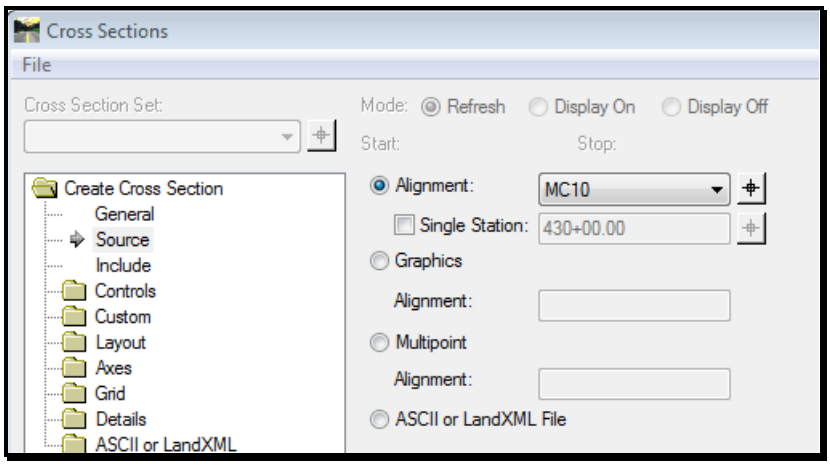


Figure 20-11: Create Cross Section Source

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** leaf there isn't anything that needs to be set at this time. This is where we control how random point features get placed into the cross section drawings.

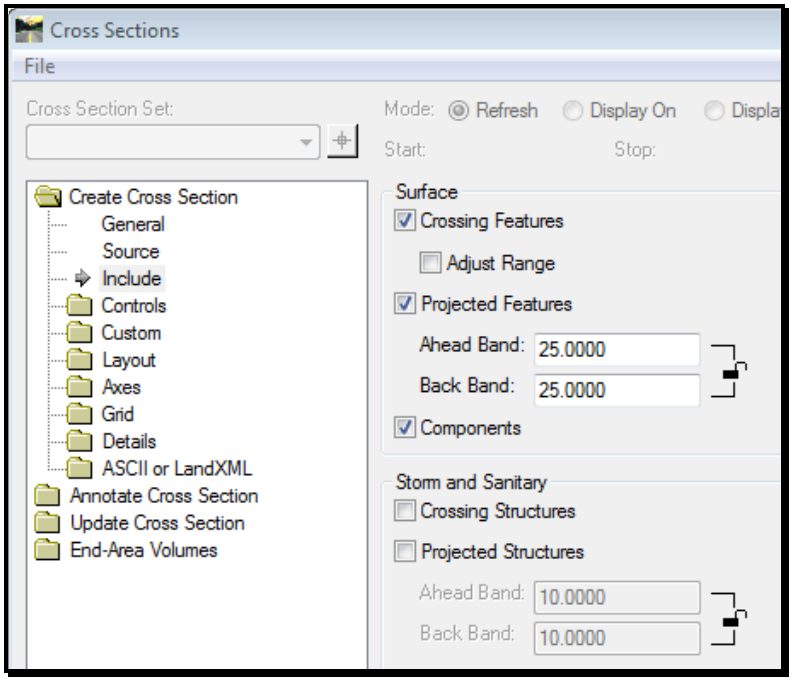


Figure 20-12: Create Cross Section Include

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).

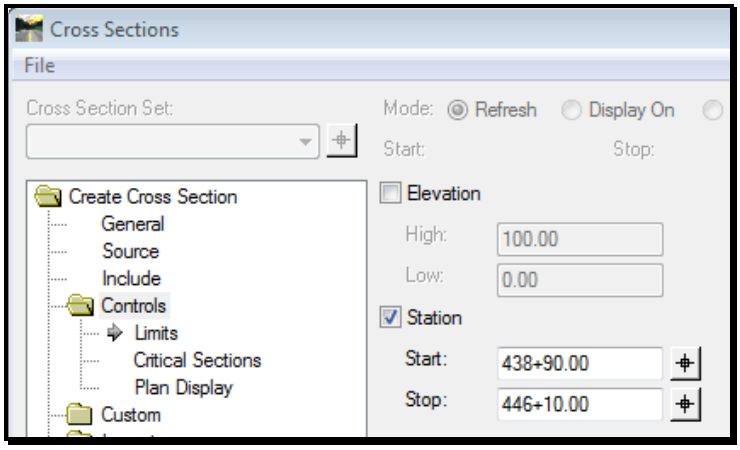


Figure 20-13: Create Cross Section Controls - Limits

Part Six: Controls – Critical Sections

The **Critical Sections** leaf is 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.***

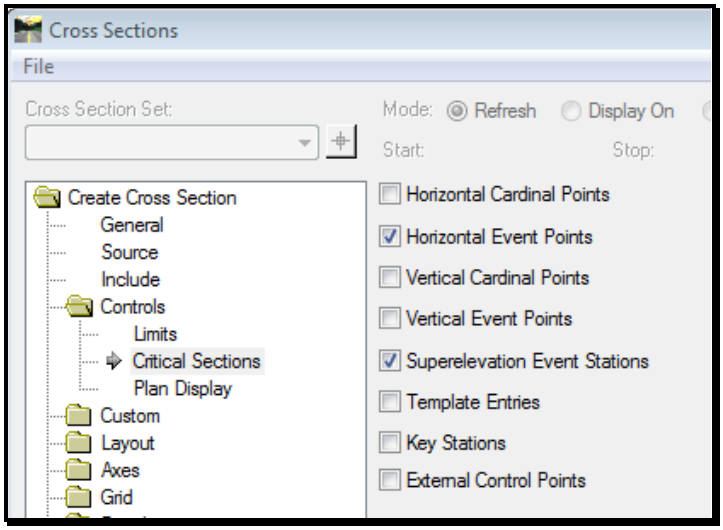


Figure 20-14: Create Cross Section Controls - Critical Sections

Part Seven: Controls – Plan Display

The **Plan Display** leaf 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).

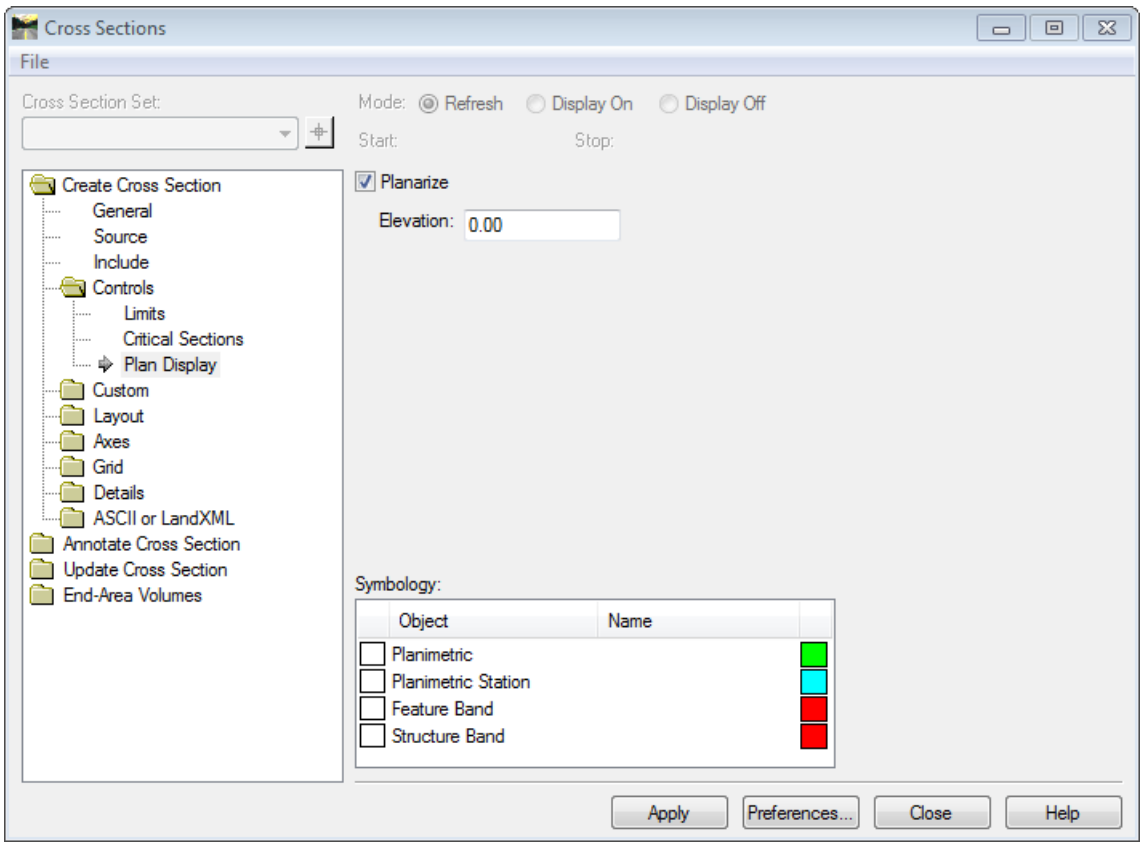


Figure 20-15: Create Cross Section Controls - Plan Display

- 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 and Project Options in the overview to ensure correct annotation scale.***

Select **Evaluation > Cross Section > Cross Sections…** and click the **Annotate Cross Section** folder 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).

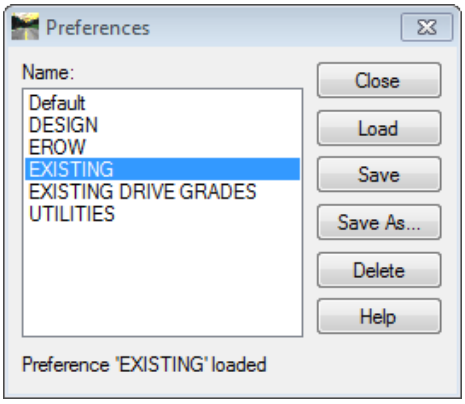


Figure 20-16: Preferences - Annotate Cross Section

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**.

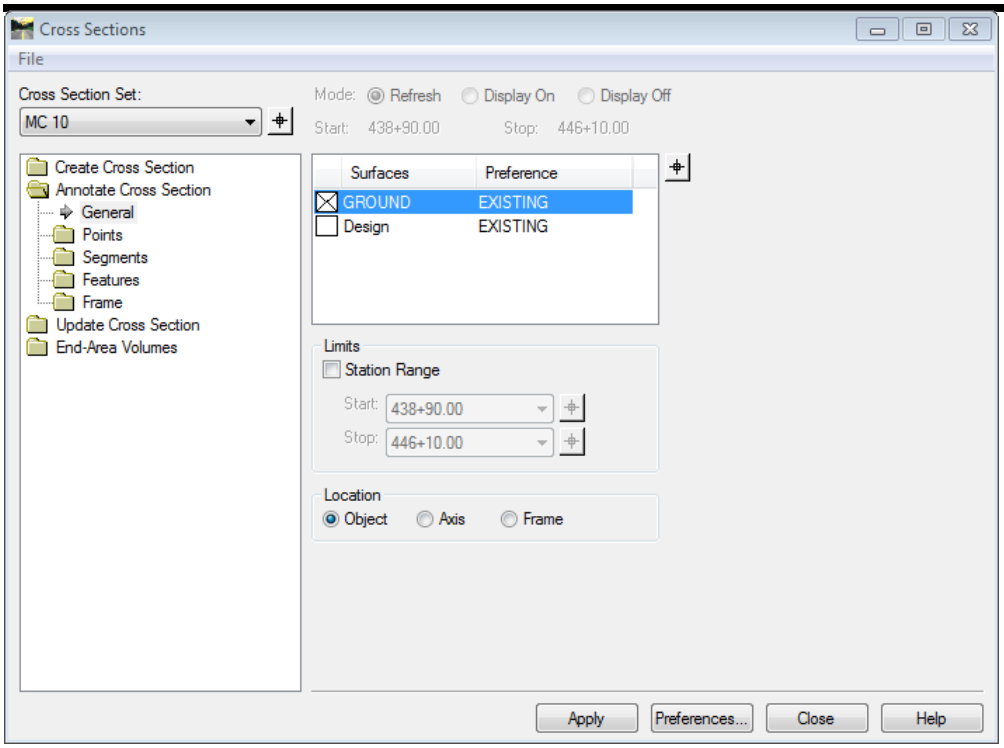


Figure 20-18: Annotate Cross Section - General

Part Two: Features

Select the **Features** folder in the explorer tree and highlight the **Annotate** leaf (Figure 20-19). Right click on any Feature in the **Feature:** list area and pick **Select All**.

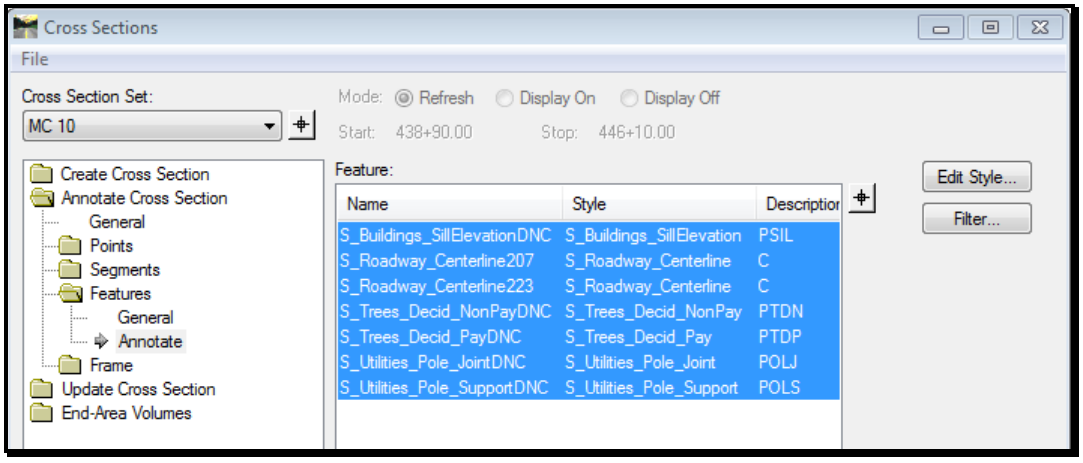


Figure 20-19: Annotate Cross Section – Features

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).

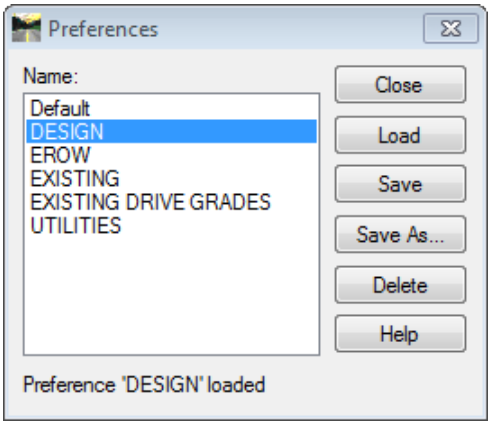


Figure 20-20: Preferences – Design

Part One: General

Select your **Design** surface with an **X**.

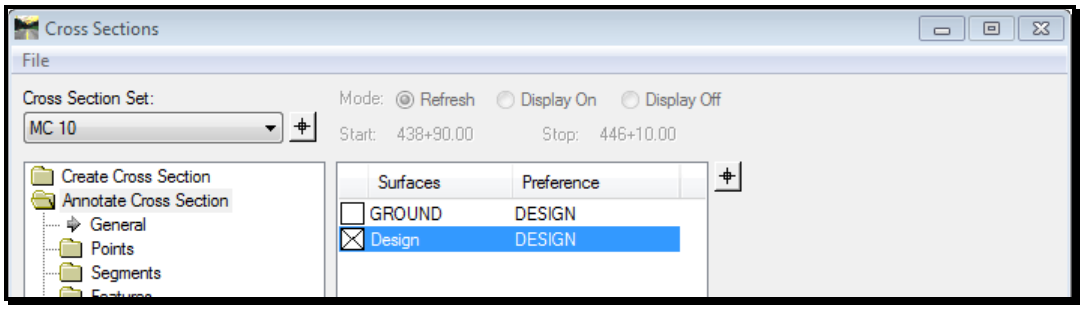


Figure 20-21: Annotate Cross Section - General Design

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).

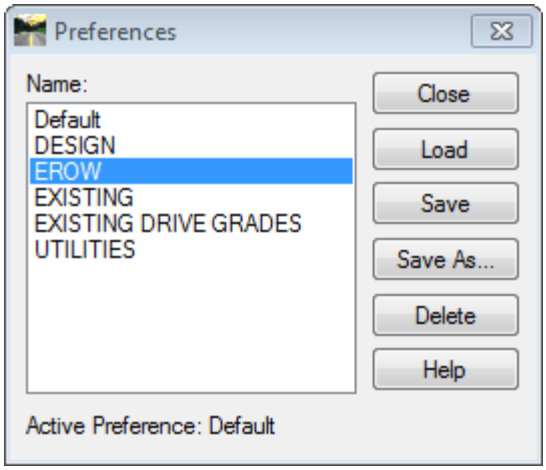
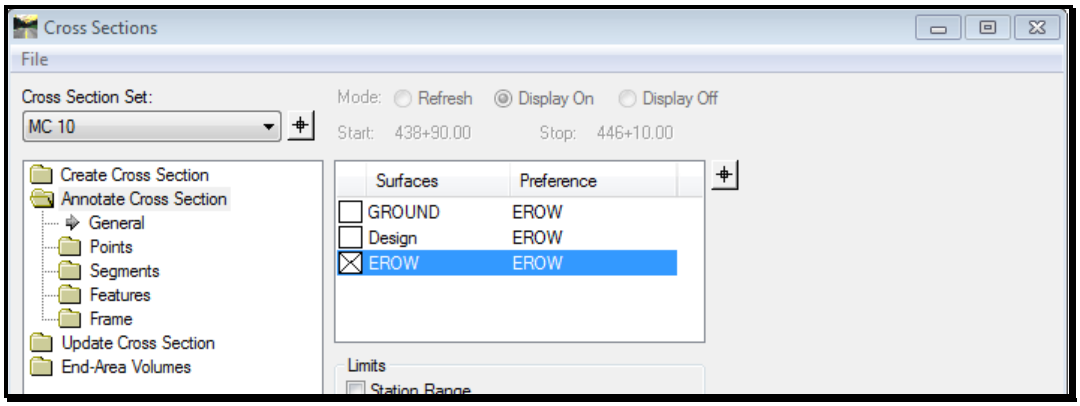


Figure 20-22: Preferences - EROW

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).

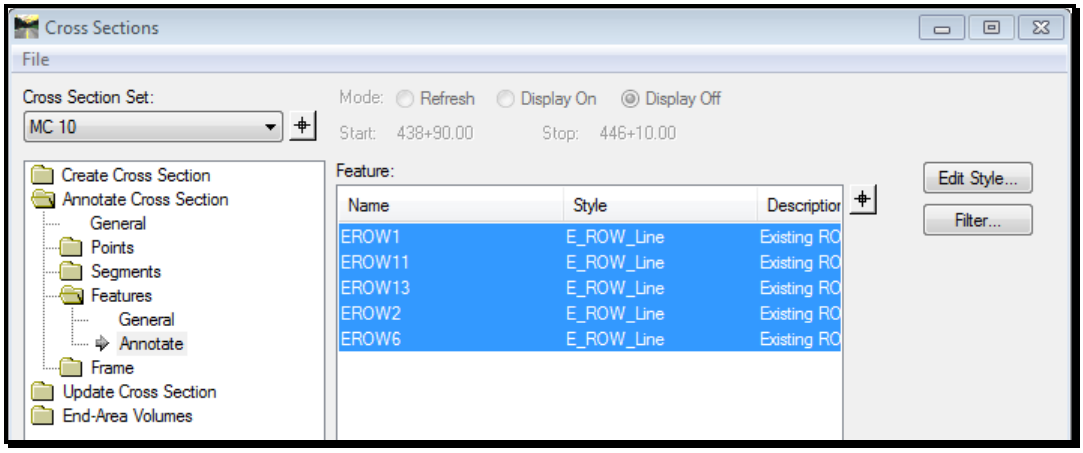


Figure 20-23: Select all of the Features for EROW

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 **Macros > Edit Left Side X 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 FINAL CROSS SECTION DRAWINGS

OVERVIEW

Custom sections will probably be the way a designer will want to manage the cross section set of drawings in the long run. 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* tool (**Evaluation > Cross Section > Cross Sections…** and click the **Create Cross Section** folder**).** Make sure you select the **Custom** folder. 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.

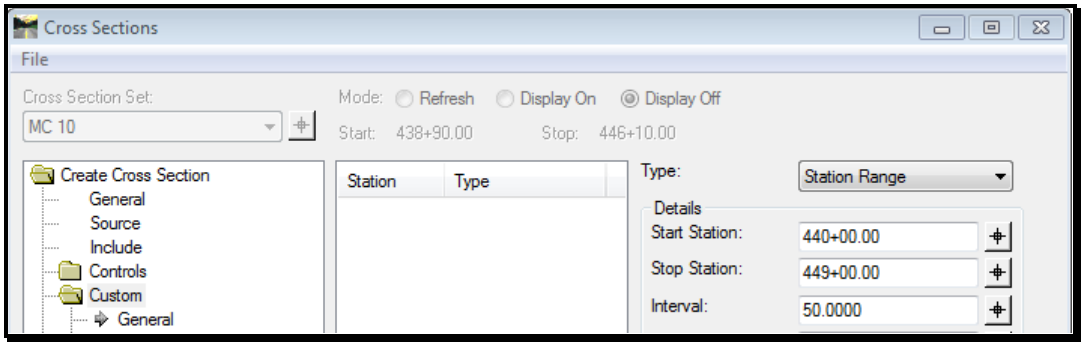


Figure 20-24: Create Cross Section - Custom – General

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.

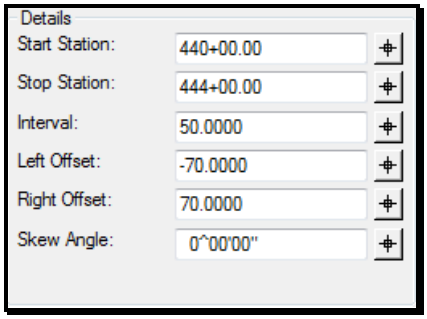


Figure 20-25: Create Cross Section - Custom – Station Range and Offsets

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.

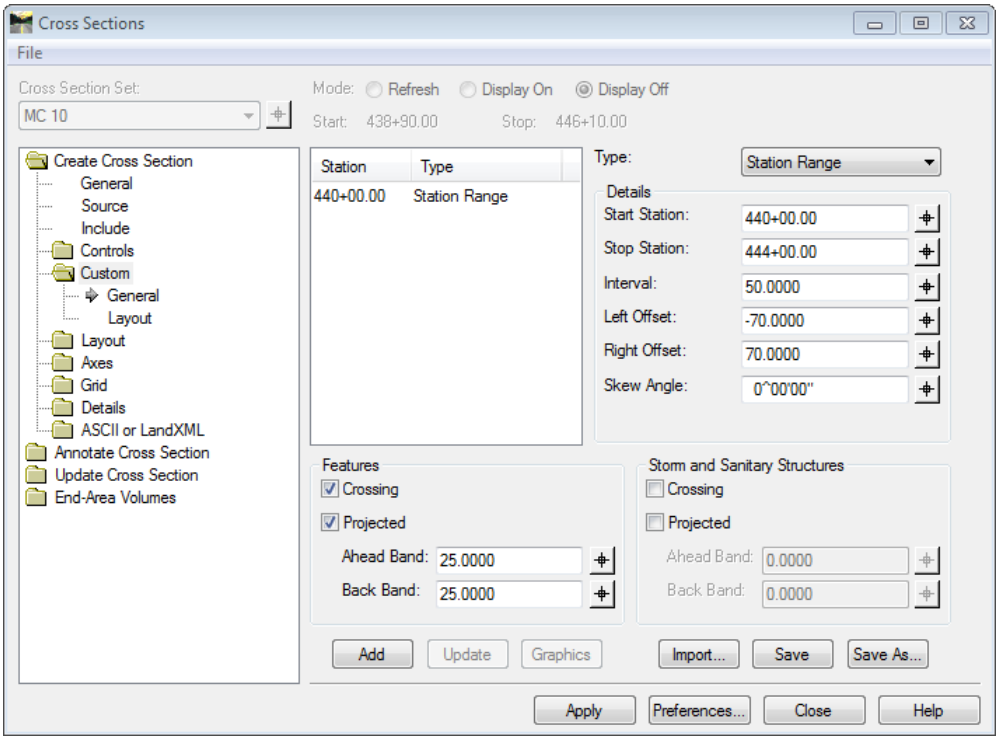


Figure 20-26: Create Cross Section - Custom – Features

- 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 could be used to cut special sections perpendicular to the alignment but it 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 does allow 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**. Also, enable the **Crossing** and **Projected** Features and use the bandwidth if necessary.

Part Three: Add

Click the **Add** button to populate the **Station/Type** area.

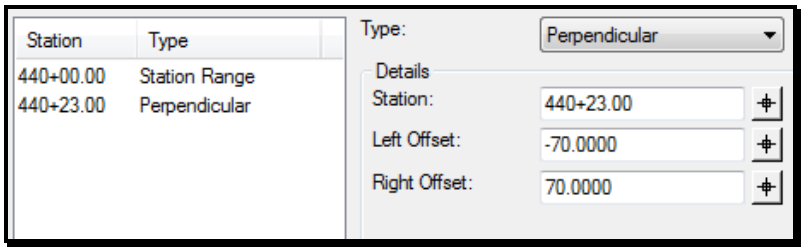


Figure 20-27: Create Cross Section - Custom - Perpendicular

- 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

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* intersection snap to get the exact station.

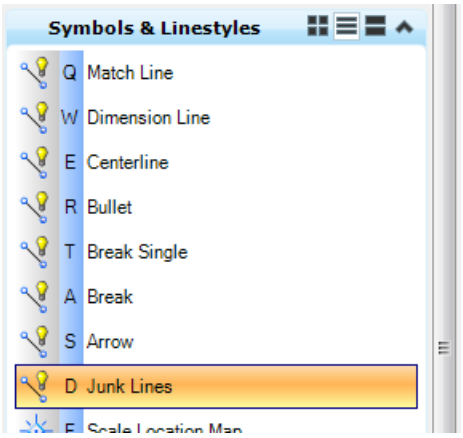
Part Two: Left and Right Offset

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**. Also, enable the **Crossing** and **Projected** Features and use the bandwidth if necessary.

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 *Tasks Menus*, select your **Workgroup > Plan > Symbols & Linestyles > Junk Lines** tool.



Place a line along the crossing feature (Figure 20-28) you would want sectioned at a skew (i.e., crossing pipe).

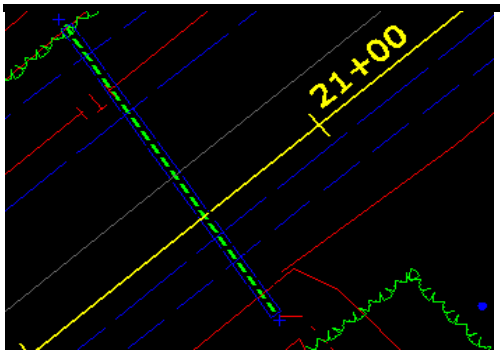


Figure 20-28: Junk Line along Crossing Feature

On Alignment Tangent (Option 1)

Using the *Place 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.

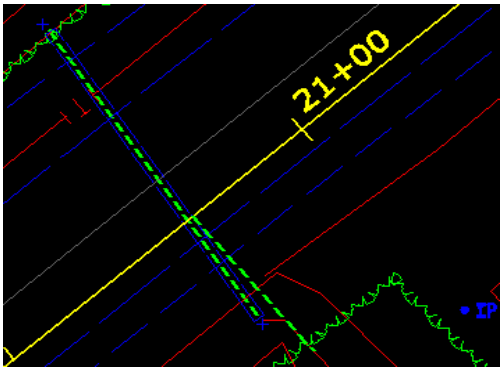


Figure 20-29: Perpendicular Junk Line

From the *Tasks Menus*, select **Drawing > Measure Angle** and follow the prompts in the lower left corner of MicroStation to measure the angle.

On Alignment Tangent (Option 2):

Using the *Place 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 AccuDraw's origin, "**RQ**" to rotate AccuDraw's compass, "**N**" for a nearest point on alignment and "**Enter**" to lock the compass. Place the line.

Measure the angle and highlight the resulting angle (Figure 20-30) to **Copy** and **Paste** it into the **Skew Angle:** area of the Custom **Details** area.

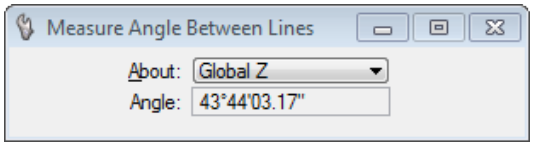


Figure 20-30: Measure Angle between Lines

On a Radius:

Using the **Junk Lines** tool, 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.
- ✓ ***For more on using AccuDraw refer to page 2-45.***

Highlight the resulting angle (Figure 20-30) to **Copy** and **Paste** it into the **Skew Angle:** area of the Custom **Details** area.

Click the **Add** button to populate the **Station/Type** area.

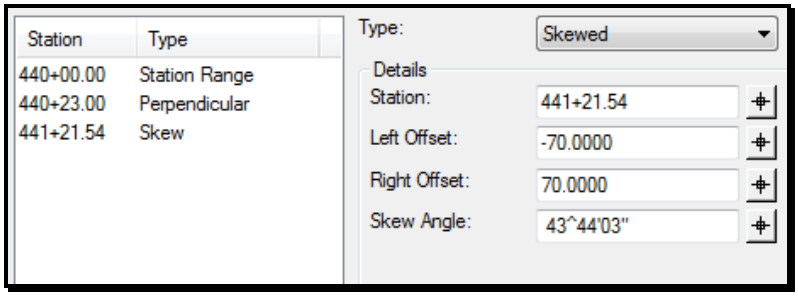


Figure 20-31: Create Cross Section – Custom – Skewed

LINE STRING STATIONS

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. 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 MicroStation *Element Selection* tool, pick the line strings (Figure 20-32) drawn perpendicular from centerline out to the apron and through the driveway.

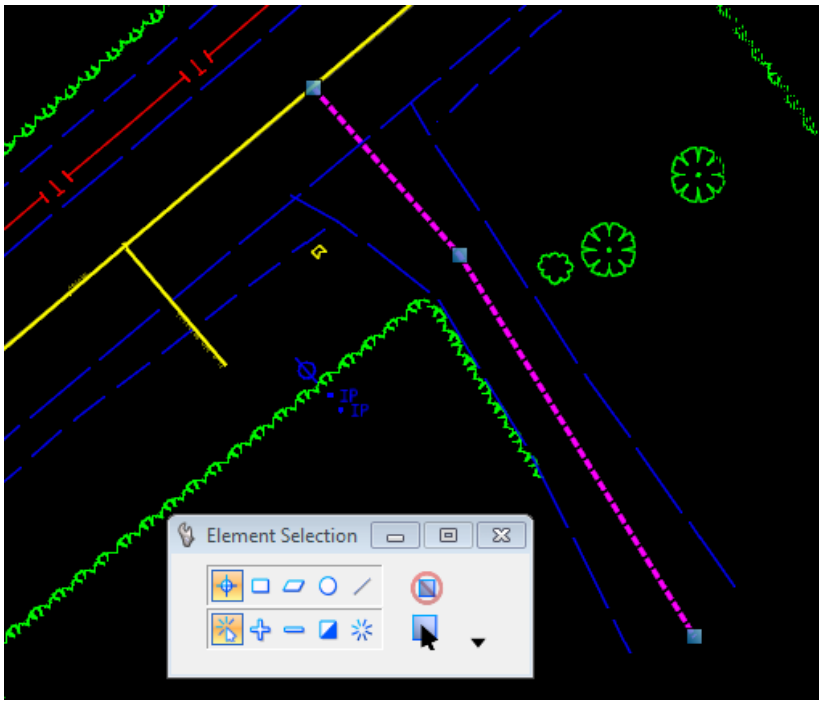


Figure 20-32: Driveway Centerline Line Strings

Having a selection set picked within MicroStation will allow the **Graphics** button in the **Custom** folder of the **Create Cross Section** dialog box to be used. Select the **Graphics** button (Figure 20-33) to populate the **Station/Type** area of the dialog.

If the **Graphics** button is still grayed out, select **Linestring** one more time (basically the Element Selection tool needs used first).

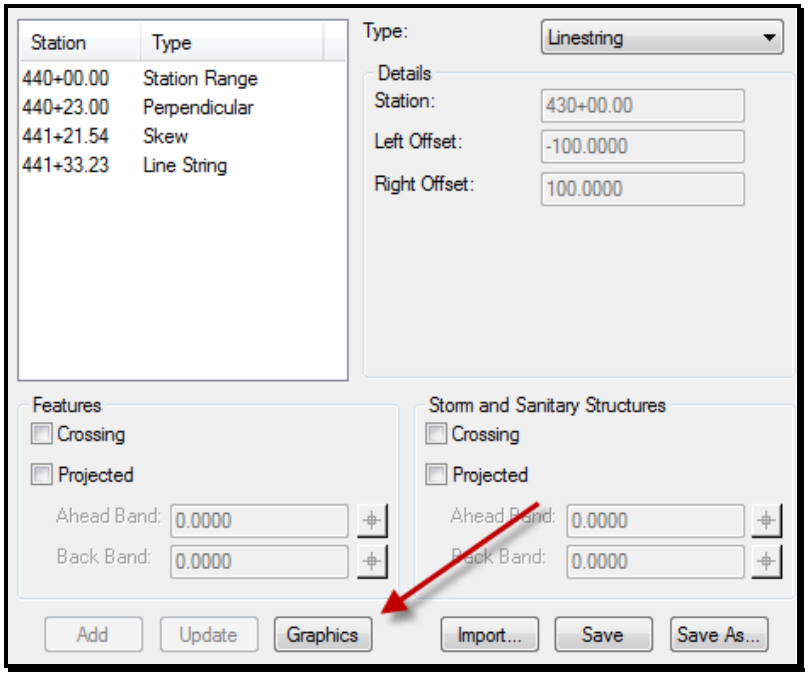


Figure 20-33: Create Cross Section – Custom – Line String

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.

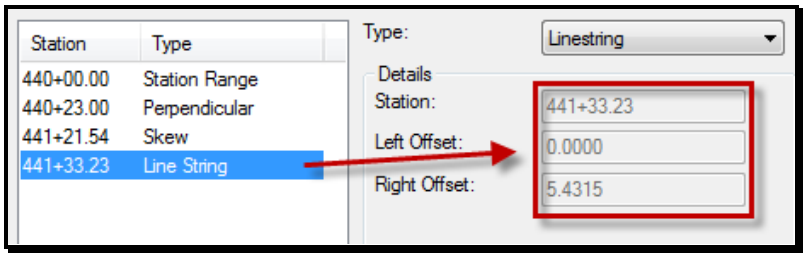


Figure 20-34: Line String Details

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. Name the *.xsc for future retrieval by using the **Import** button on the Custom tool in a future session of InRoads.

Step Three: Annotation

- Refer back to Annotation portion of this chapter to apply annotation and running the **Macro** 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 **Macros > Create Single Sheet Cross Section** from the *MicroStation Main Menu*. This will launch a tool that will prompt you for a Starting Page Number (Figure 20-35).

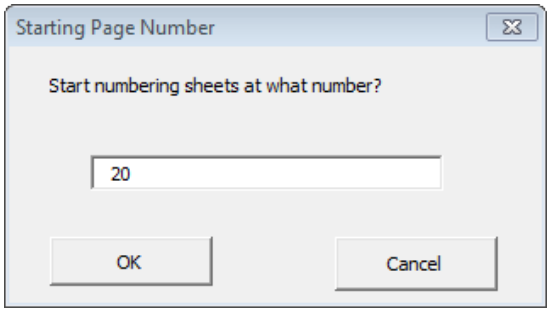


Figure 20-35: Starting Page Number

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 1-69.***

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 > Cross Section > Cross Sections…** and click the **End-Area Volumes** folder to get the following menu (Figure 20-36).

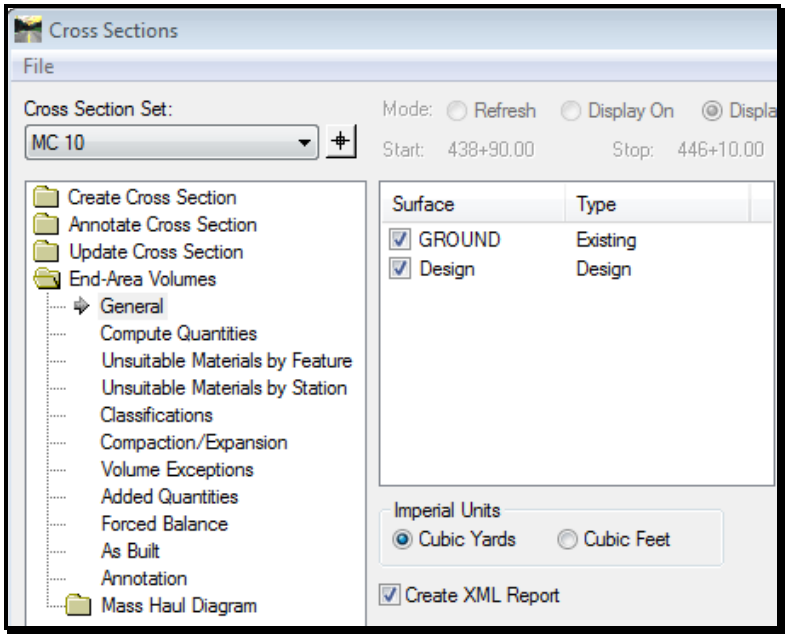


Figure 20-36: End Area Volume menu.

Step Two: Setup the Dialog's General Tab

Verify that the active *Cross Section Set* is set to the Cross Sections you 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).

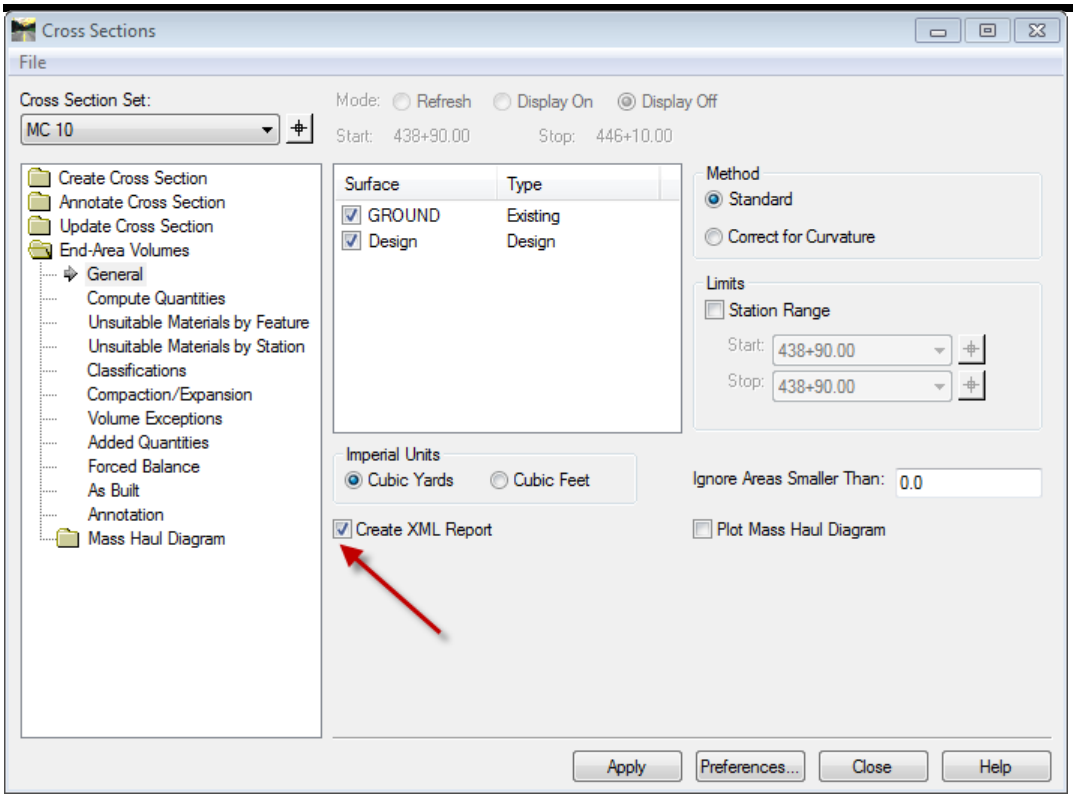


Figure 20-37: End-Area Volumes General tab dialog.

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 want (i.e., EndAreaVolumePageTotals.xsl). One 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. The preferred option is to select **File > Save As**, then save the report directly to an **Excel or Word** file because the formatting will also be part of the new document.

Other Volumes

Switch the *Style Sheet* to **Volumes.xsl** (or RoadwayDesignerComponentQuantities Summary Report.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, create the Excel (or Word) document and manipulate the report 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 adding 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 V8i

To begin, double click your **MicroStation V8i** icon. By default the user is set to **InRoads_network_V8i**, if you are working in a local pin setup then you will want to change the user to **InRoads_local_V8i**. Select **Applications > InRoads Group > Activate InRoads** from the *Main Menus*. 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).

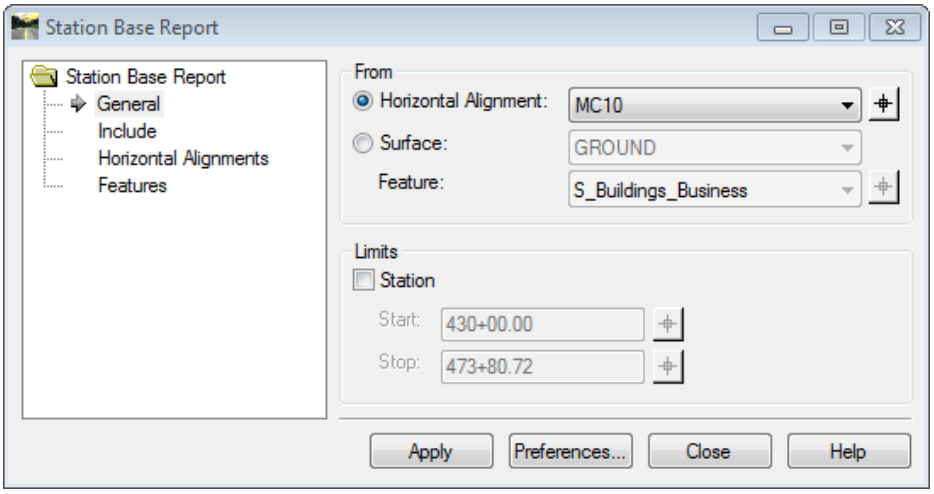


Figure 21-1: Station Base Report General

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).

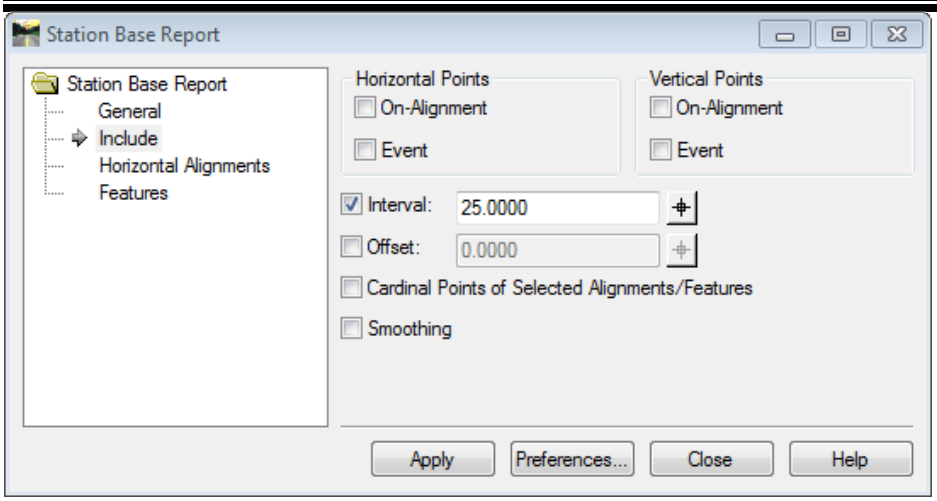


Figure 21-2: Station Base Report Include

On the top 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).

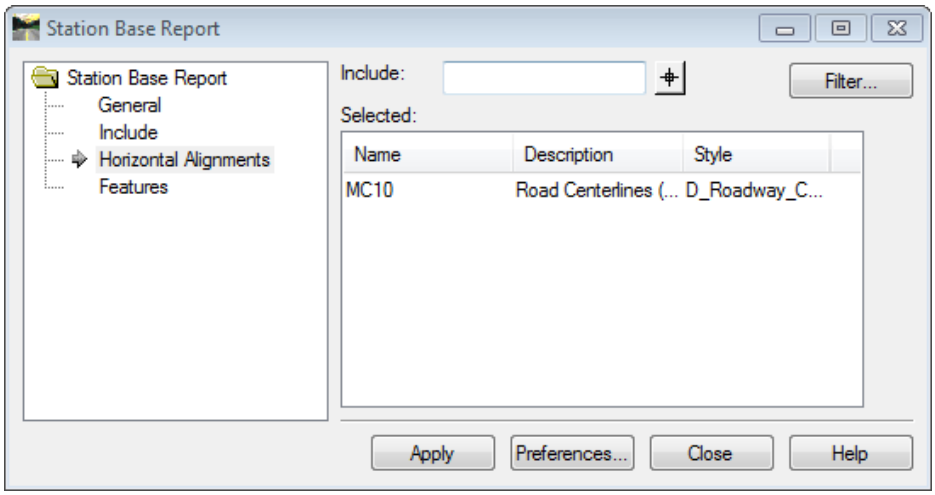


Figure 21-3: Station Base Horizontal Alignments

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 **OK** 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).

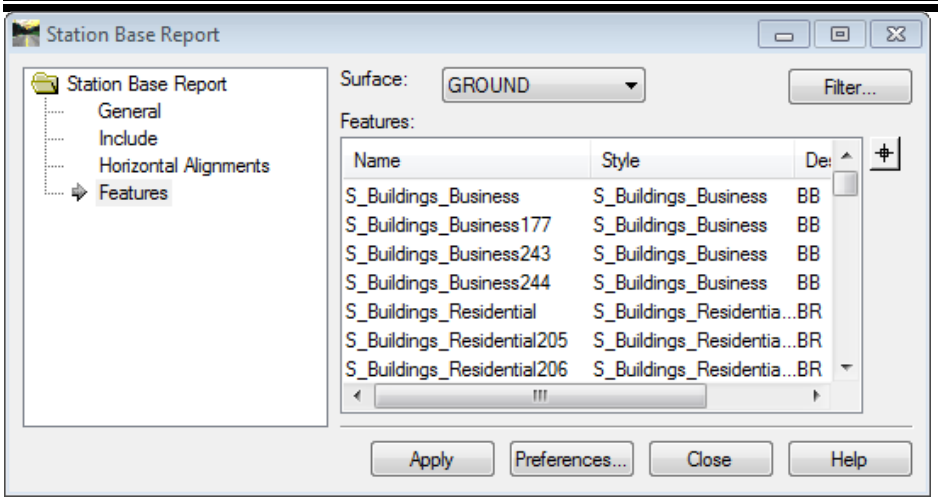


Figure 21-4: Station Base Features

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 Civil Report Browser** will display for you a default report of **StationOffset.xsl**. Select the **ProfileExistingProposedElevation.xsl** to see your elevations and cut/fill depths along centerline.

Select **File > Save As..** from the **Bentley Civil Report Browser** menu and save your reports (Excel or Word) 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 V8i* 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 V8i

To begin, double click your **MicroSttaion V8i** icon. By default the user is set to **InRoads_network_V8i**, if you are working in a local pin setup then you will want to change the user to **InRoads_local_V8i**. Select **Applications > InRoads Group > Activate InRoads** from the *Main Menus*. 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 Clearance Report

From the *InRoads Main Menu* select **Tools > XML Reports > Clearance...**

- This step uses the Clearance tool at first, but the final report is in essence a Station and Offset arrangement. The customized MaineDOT style sheet (.xsl) is needed in the step below as the default report can't be used since the description column won't be available.

Part One: General Settings

Select **General** on the left side of the dialog box (Figure 21-5).

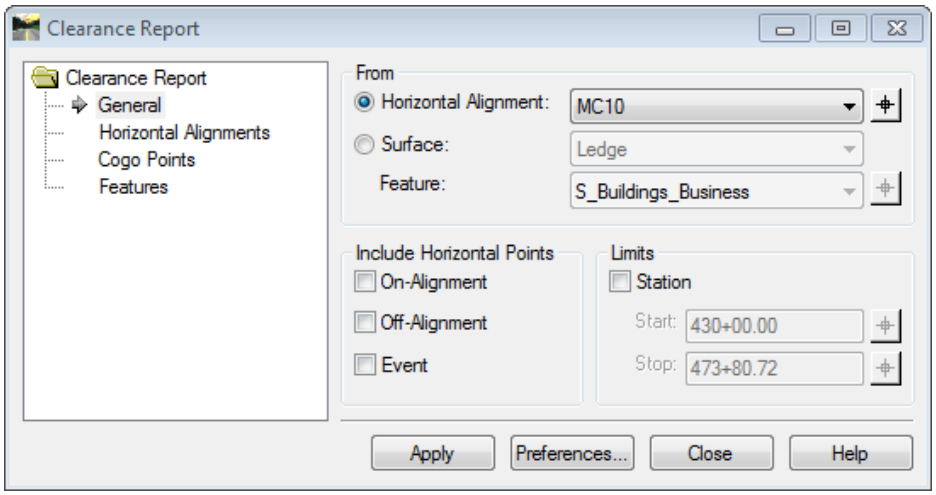


Figure 21-5: Clearance Report General

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).

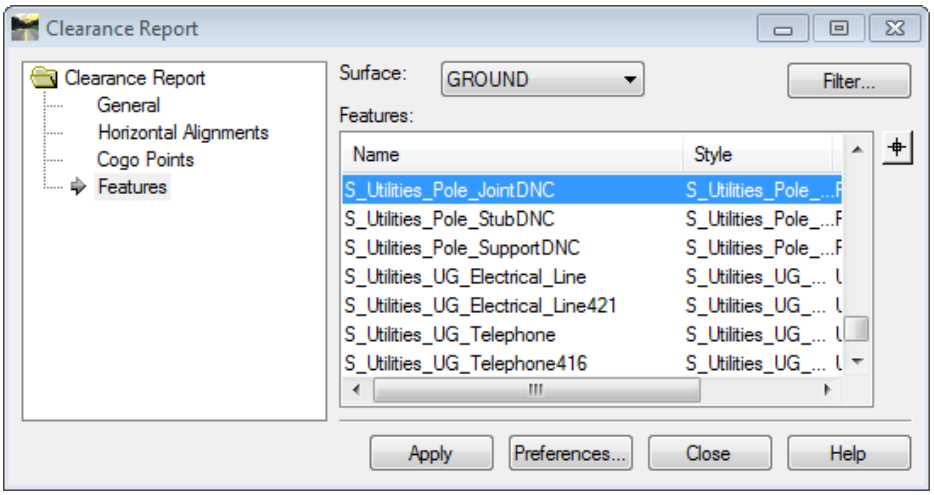


Figure 21-6: Clearance Report Features

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_JointDNC).

- 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 Civil Report Browser** will display the default *Clearance Report* for you. On the left side, in the Clearance folder, select **MaineDOT StationOffset.xsl.**

Select **File > Save As…** from the **Bentley Civil 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 Volume…** 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.

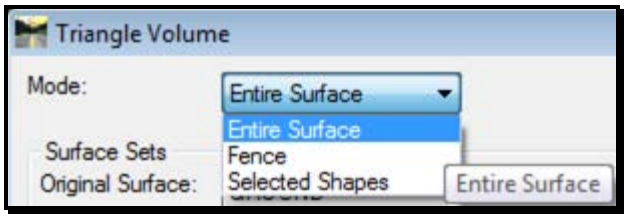


Figure 21-7: Set Mode to desired method

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.**

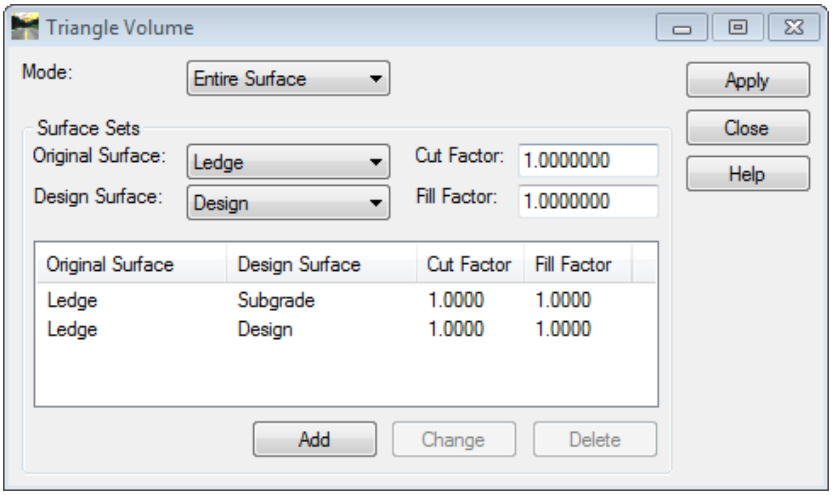


Figure 21-8: Ledge and Subgrade surfaces as well as Ledge and Design

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 > TriangleVolumes.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 > Cross Section > Cross Sections…** and click the **End-Area Volumes** folder from the *InRoads Main 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.**

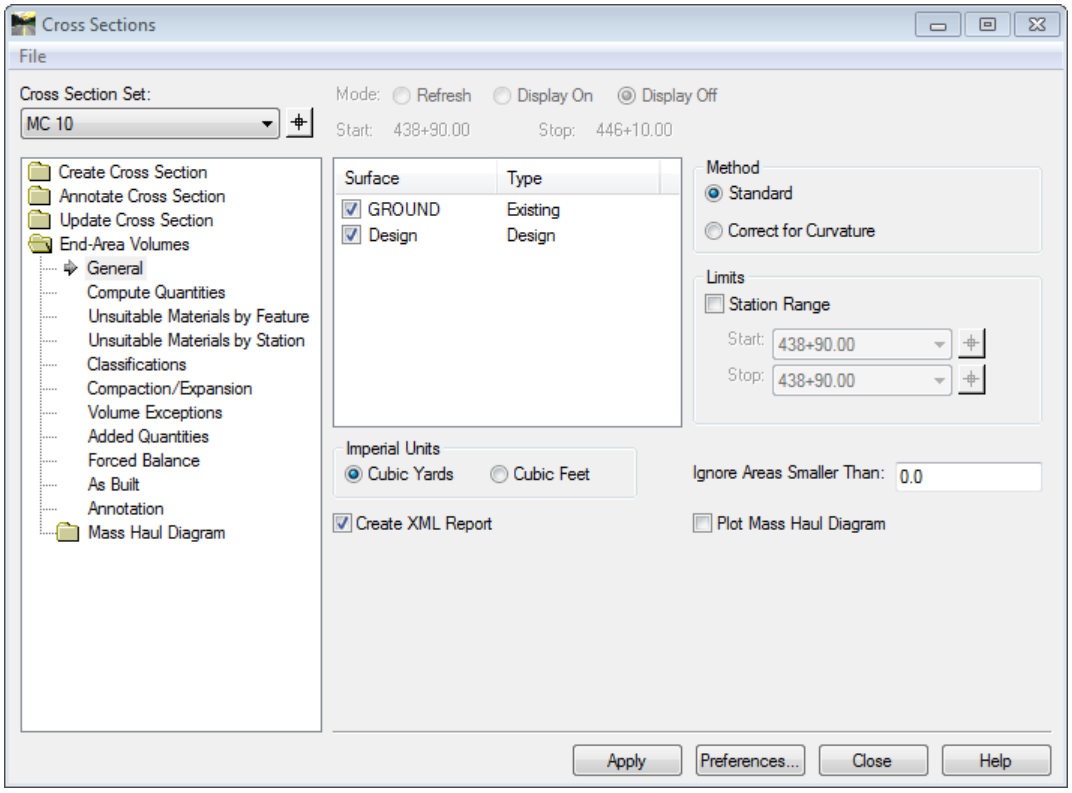


Figure 21-9: End Area Volumes dialog.

✓ ***Refer to page 20-32 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)

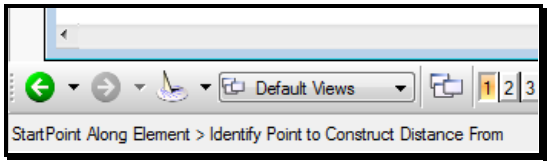


Figure 22-1: Start Point Along Status Prompts

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)

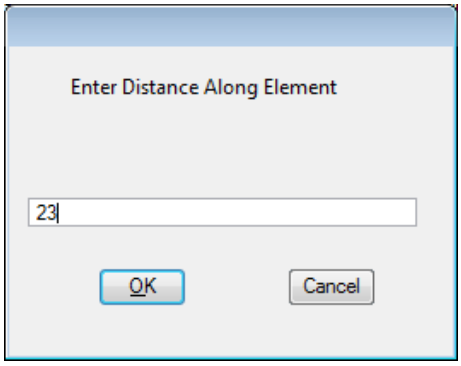


Figure 22-2: Input Distance

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)

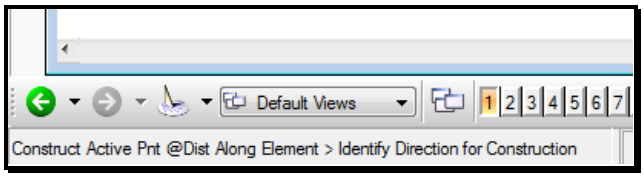


Figure 22-3: Status Bar Message

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.

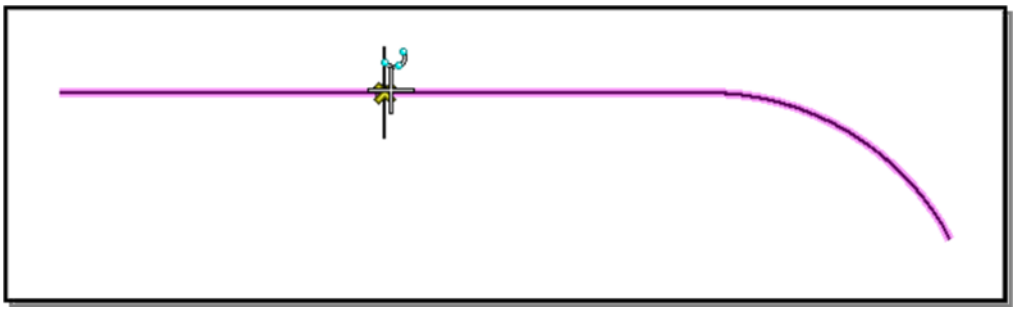


Figure 22-4: Identify Direction for Construction

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).

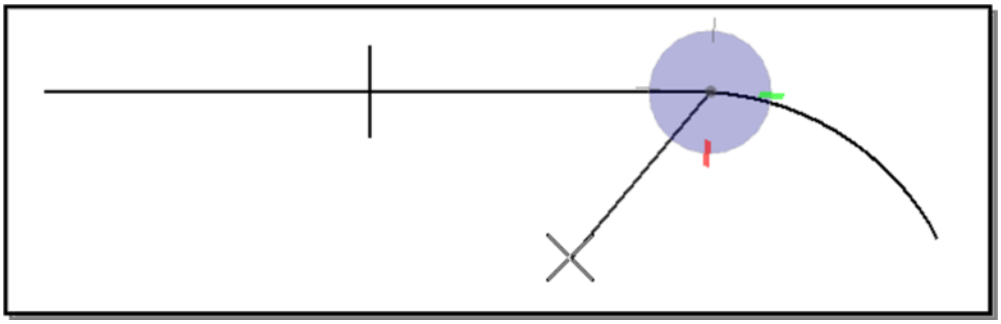


Figure 22-5: Point Constructed

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).

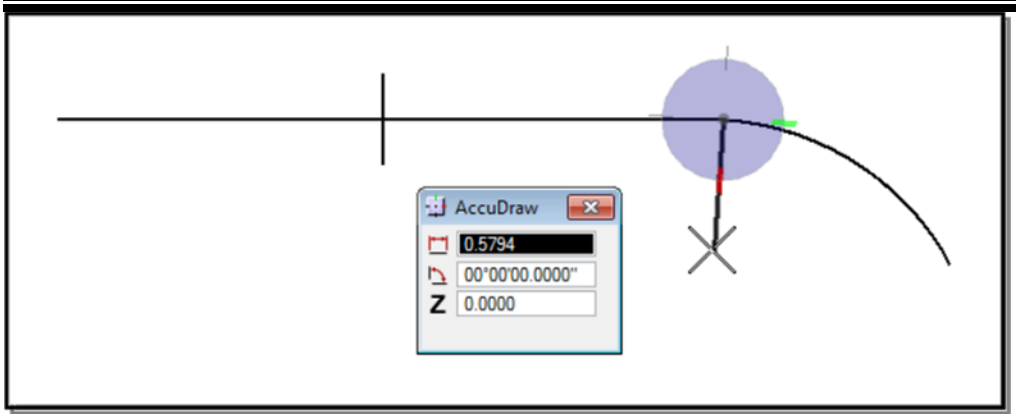


Figure 22-6: Constructing a Distance off the Baseline

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.

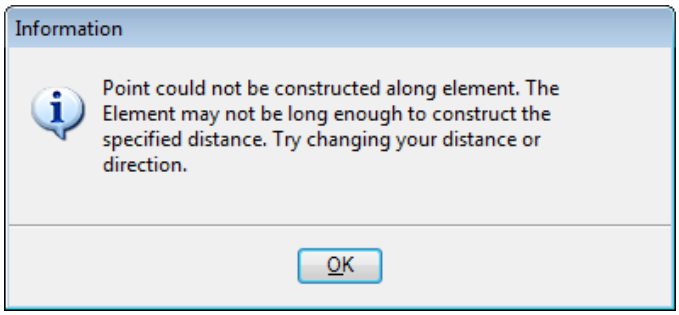


Figure 22-7: Pointalong Warning Dialog

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 *File Open*.

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.**

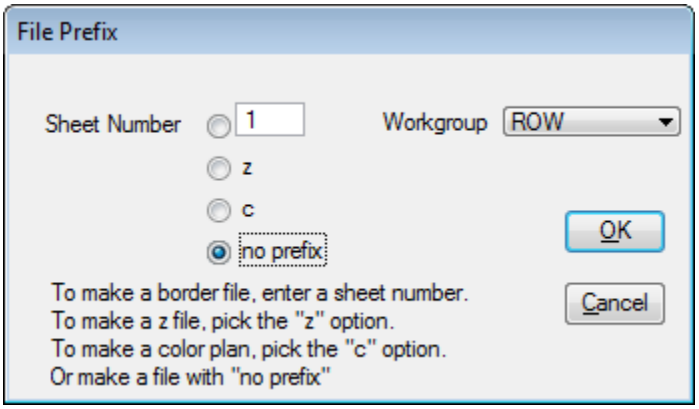


Figure 22-8: File Prefix Dialog

Choose **RWPlan-Clips** (Figure 22-9) and click **OK** in the **Create File Of Type…** Dialog.

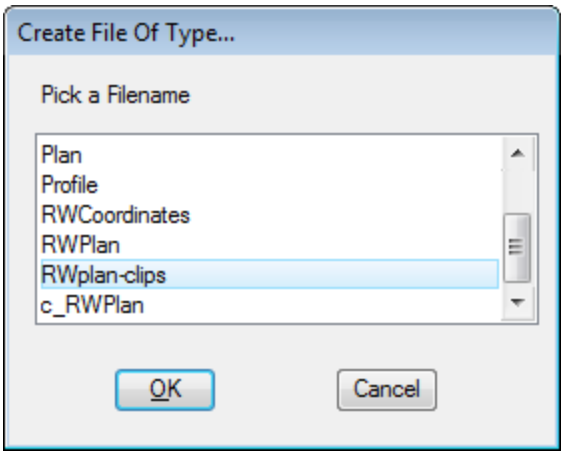


Figure 22-9: Create File Of Type Dialog

Click **OK** in the **Make File** Dialog (Figure 22-10).

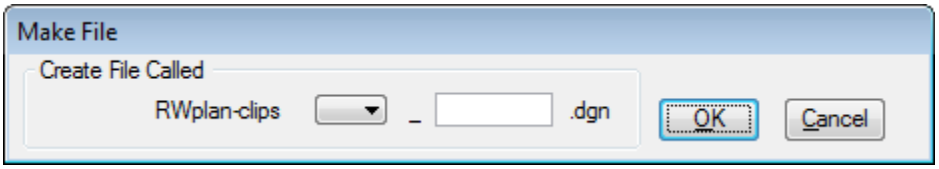


Figure 22-10: Make File Dialog

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**

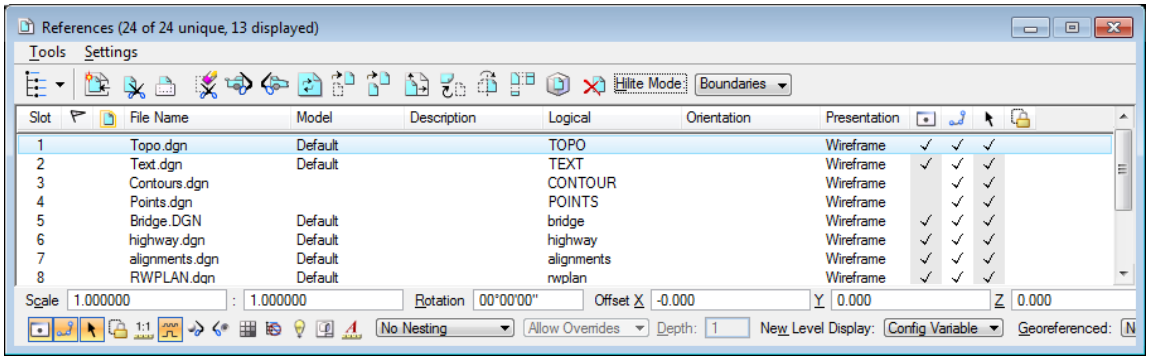


Figure 22-11: Reference File Dialog

- 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 2-72 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 *Tasks Menus* to accomplish this. If the desired *Task Menu* is not available on the left side of your MicroStation file, select the correct workgroup from the Maine DOT WorkGroups drop-down (i.e., **Maine DOT WorkGroups > Right of Way**).

Part One: Set Category Scale

From the *Main Menu*, select **Settings > Drawing 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 *Tasks Menus*, select your **Workgroup > Right of Way > 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 *Tasks Menus,* select your **Workgroup > Right of Way > 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 1-62 about the Sheet Renumbering Utility.***
- ✓ ***Refer to page 1-67 about PCF editing.***
- ✓ ***Refer to page 1-69 about the Border information macro.***
- ✓ ***Refer to page 1-72 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 > Make Sheetz**. Leave the dialog toggled to **Sheet Number** and select **OK** (Figure 22-12).

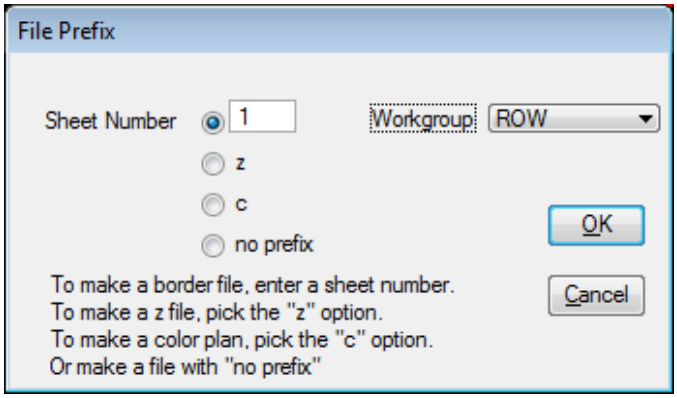


Figure 22-12: File Prefix Dialog

Choose **RWCoordinates** (Figure 22-13) and click **OK**.

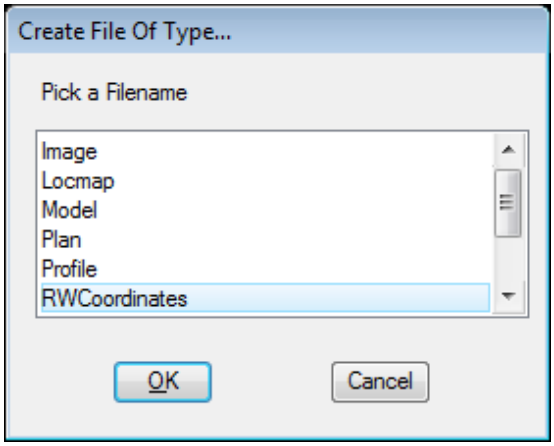


Figure 22-13: Create File of Type… Dialog

Click **OK** in the **Make File** Dialog (Figure 22-14).

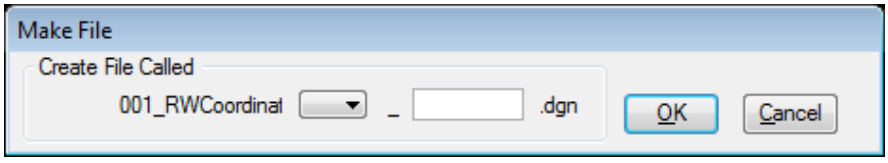


Figure 22-14: Make File Dialog

Now that the file is created select **Cancel** to end the process of creating files.

Step Two: Placing Coordinate Information

From the *Tasks Menus,* select your **Workgroup > Right of Way > Tools > Create ROW Coordinate Info.** (Figure 22-15).

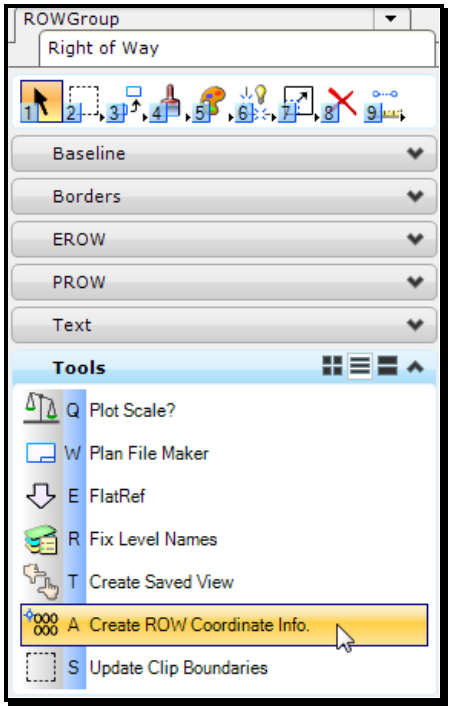


Figure 22-15: Right-of-Way Tasks

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 cannot 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 1-62 about the Sheet Renumbering Utility.***

✓ ***Refer to page 1-67 about PCF editing.***

✓ ***Refer to page 1-69 about the Border information macro.***

✓ ***Refer to page 1-72 about disabling the Borderinfo Substitution.***

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, below are the primary things you 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 top of your View 1 - Top Window (Figure 22-16).

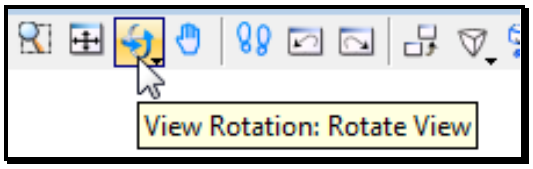


Figure 22-16: Rotate View Dialog

Look at your **Tool Settings Dialog** and make sure you have *Top* selected as your rotation **Method** (Figure 22-17).

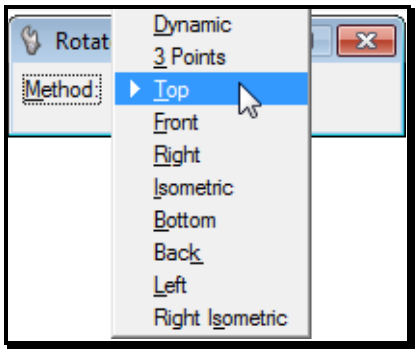


Figure 22-17: View Rotation Top Dialog

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).

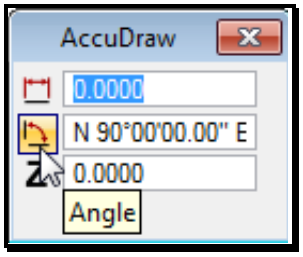


Figure 22-18: Toggle AccuDraw Mode Dialog

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).

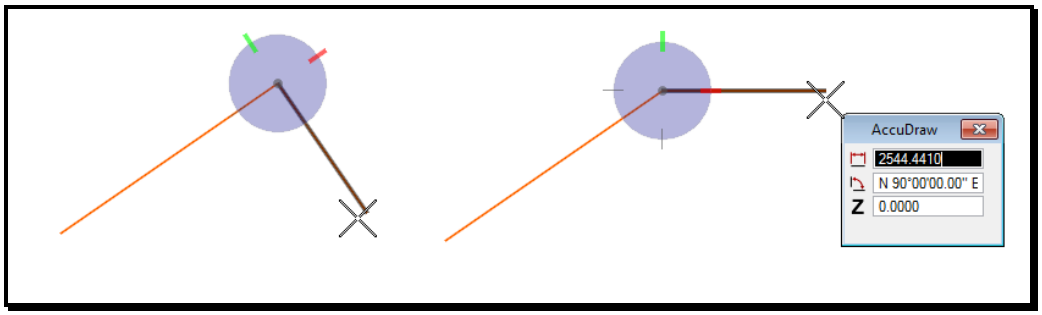


Figure 22-19: Rotate AccuDraw to the View

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** Tasks (Figure 22-20).

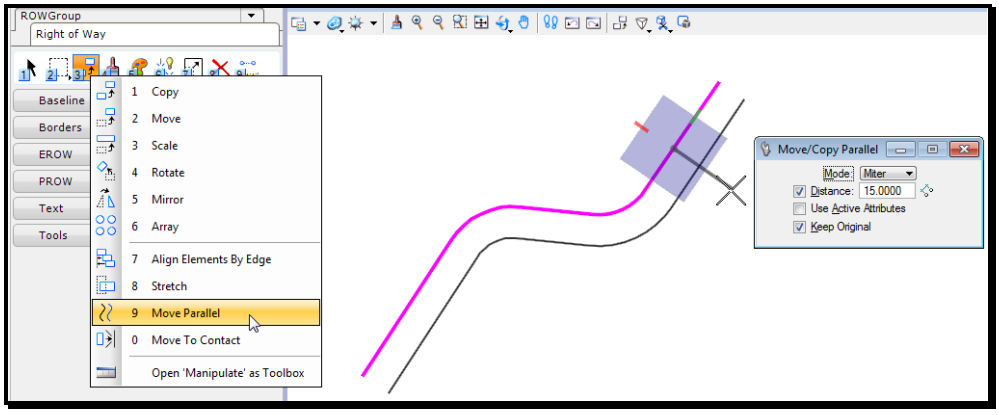


Figure 22-20: Move/Copy Parallel Dialog

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 to pick all the elements in your layout (Figure 22-21).

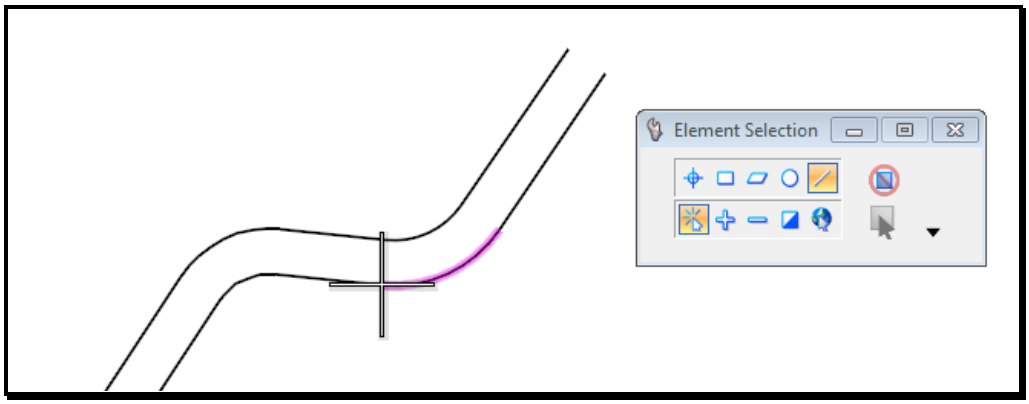


Figure 22-21: Pick the Elements in your Layout

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).

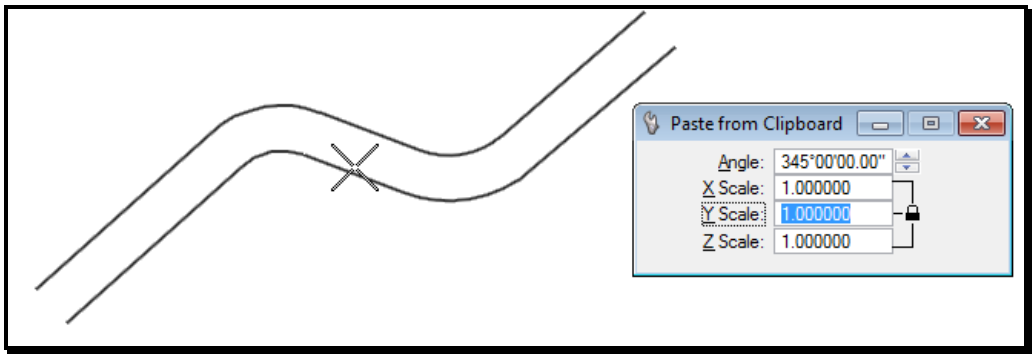


Figure 22-22: Paste your Layout Down

Look at your **Tool Settings Window**, 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 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 Element** command from the **Manipulate** Tasks (Figure 22-23).

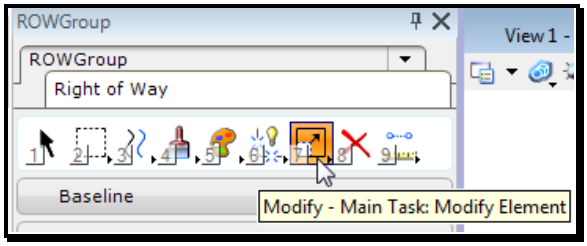


Figure 22-23: The Modify Element Command

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 *Tasks Menus*.

- ✓ ***Check page 2-20 for an overview of the Tasks Menus.***

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.

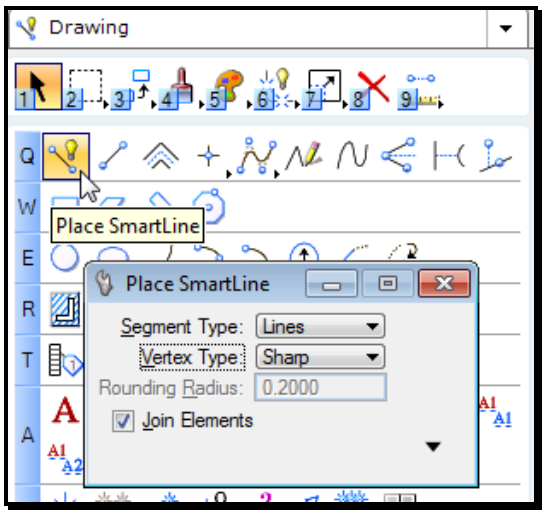


Figure 22-24: SmartLine Segment Type Options

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 can enter either the **Bearing** (N 23° W) or **Angle** (113°). The format of the Bearing is as follows:

N23°45’33.44”E. You can use the semicolon to separate the digress-minutes-seconds fields, e.g., N23:45:33.44E.

- 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 *Tasks Menus*, select your **Workgroup > Right of Way > Baseline > Baseline** (Figure 22-25).

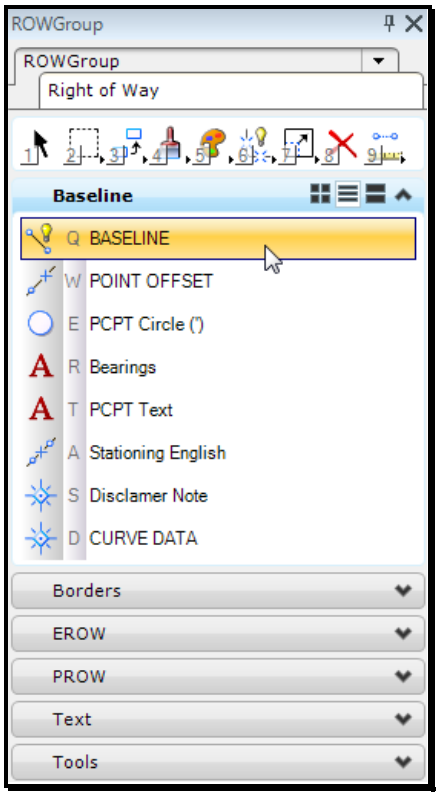


Figure 22-25: ROW Tasks

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.) 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.

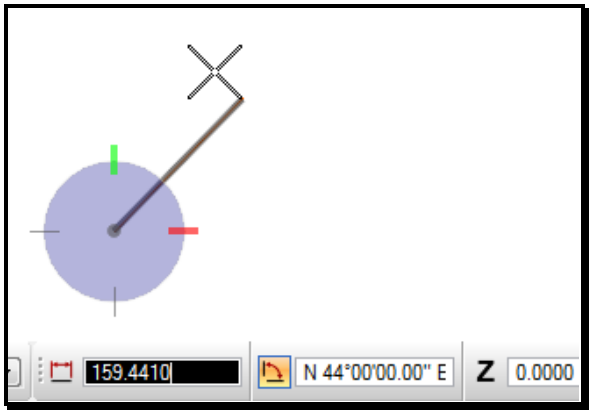


Figure 22-26: Drawing to the Right at a Fixed Angle

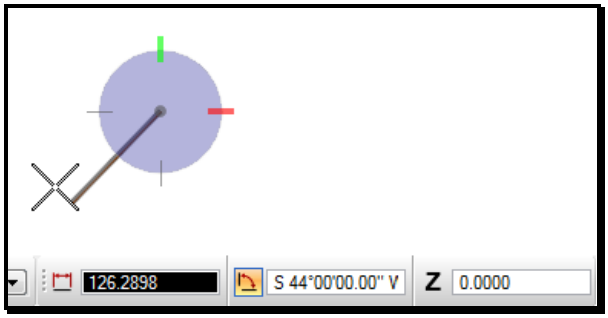


Figure 22-27: Drawing to the Left at the Same Angle

ⓘ ***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."

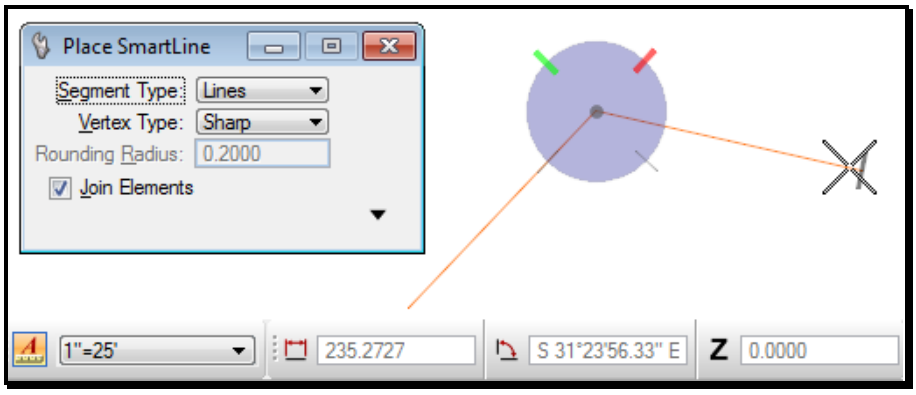


Figure 22-28: First Line Complete

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).

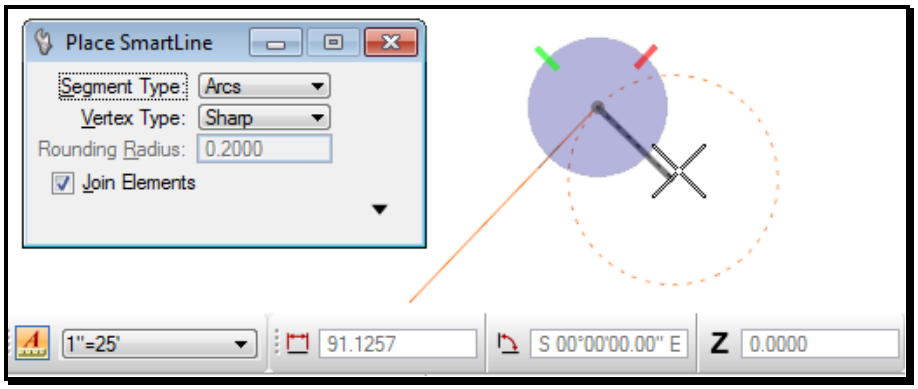


Figure 22-29: Swap to SmartLine Arcs

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.

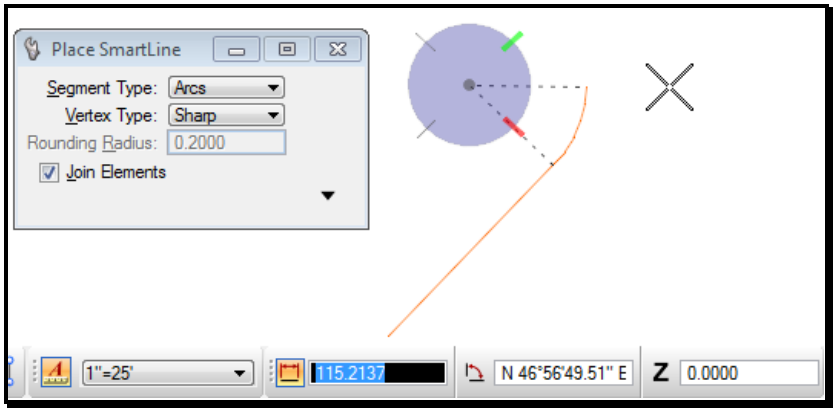


Figure 22-30: Sweep an Arc

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**.

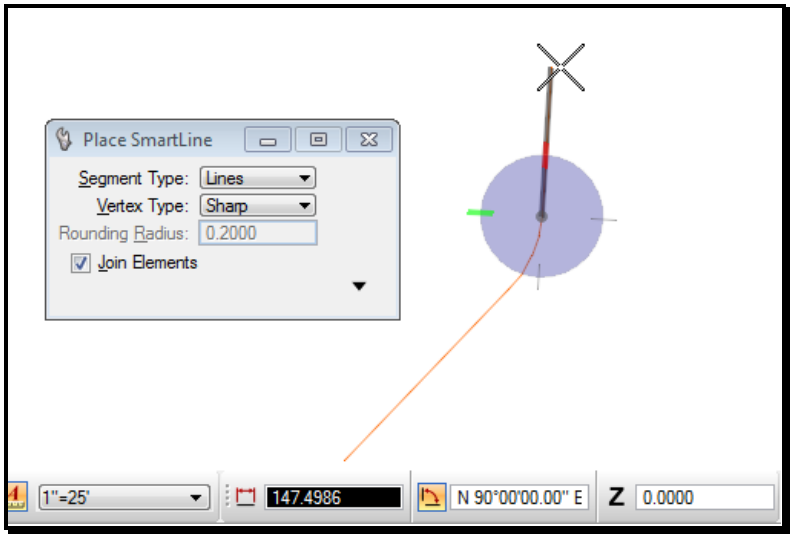


Figure 22-31: Construct Tangent Direction

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 Tasks**. 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.

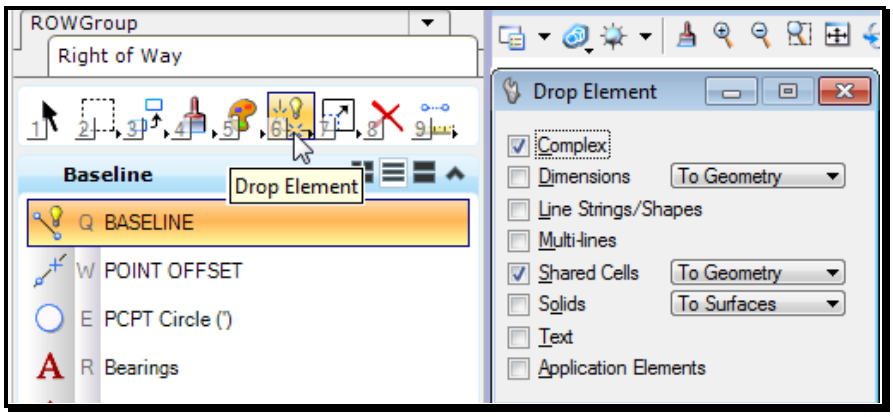


Figure 22-32: Drop Elements Complex

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* Tasks, 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.

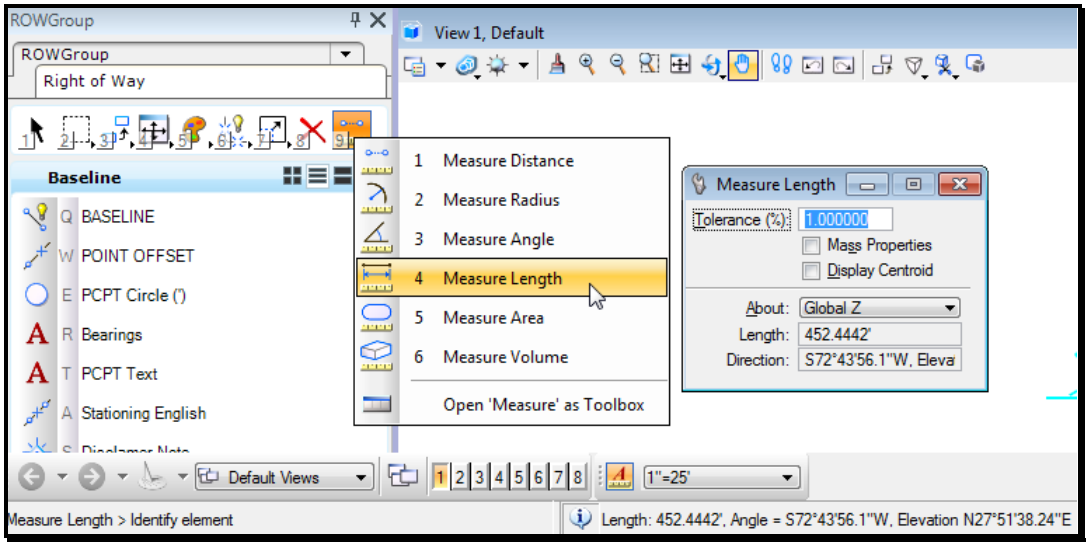


Figure 22-33: Measure Distance

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. 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** Tasks, choose **Measure Radius**. The *Status Bar* will prompt you to "Identify Element."

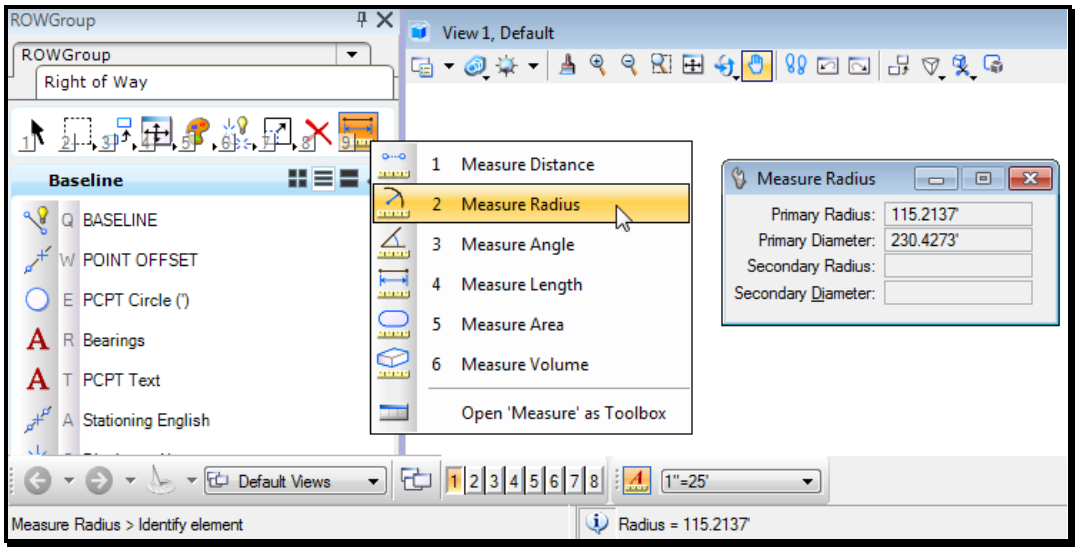


Figure 22-34: Measure Radius

Data Point on an arc and it will highlight. You 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** Tasks on the **Tasks Menus**, choose the **Modify** tool (Figure 22-35).

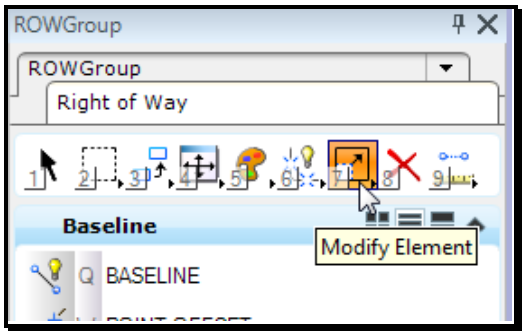


Figure 22-35: Modify Element

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 Tasks**, choose the **Rotate** tool (Figure 22-36). From the **Tool Settings Window** make sure to set the **Method** to **3 Points**.

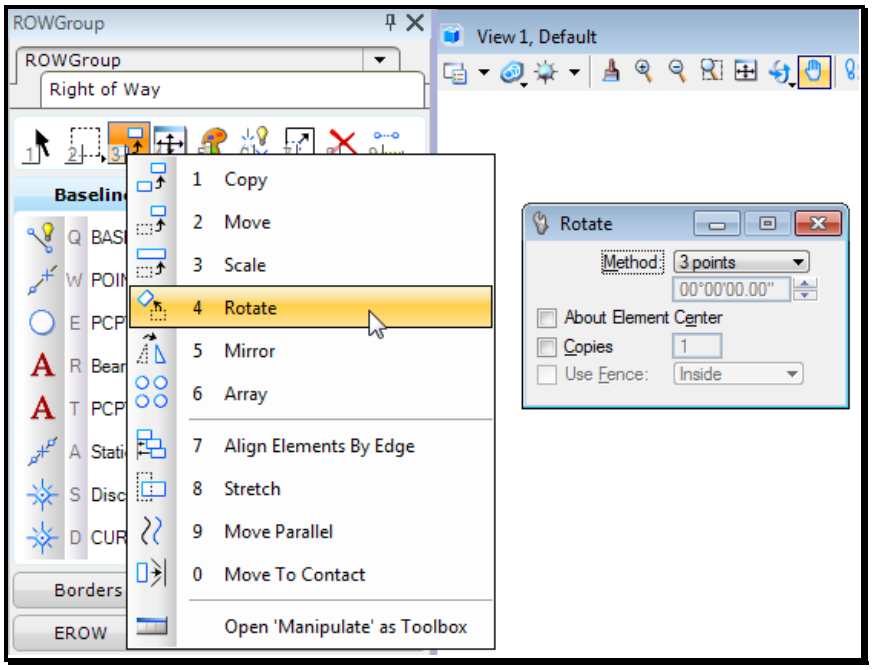


Figure 22-36: Rotate Element

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 *Element Selection* 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.

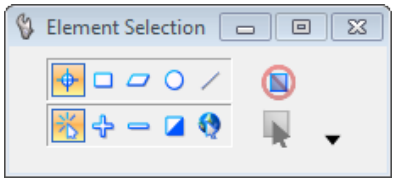


Figure 22-37: Element Selection

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** tasks, 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*.

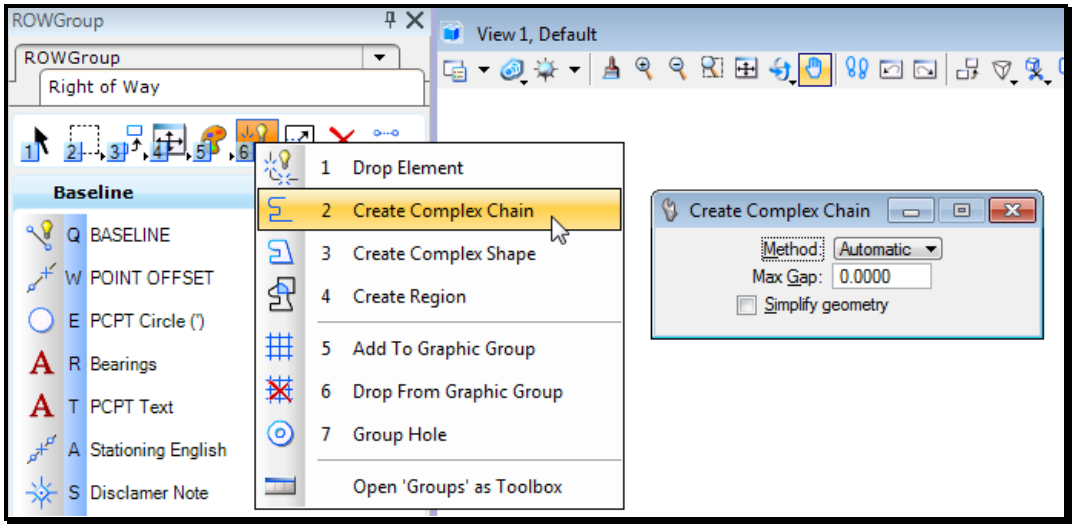


Figure 22-38: Create Complex Chain

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 use *Element Selection* 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 (**File > Export > 2D)**. Then go back and recreate the *Complex Chain* from the first element again. You have to use the **File > Open** command to open the 2D file that was just exported.

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 *Tasks Menus* to place our stations.

Construct the PCs and PTs

From the *Tasks Menus*, select your **Workgroup > Right of Way > Baseline > Baseline** 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.

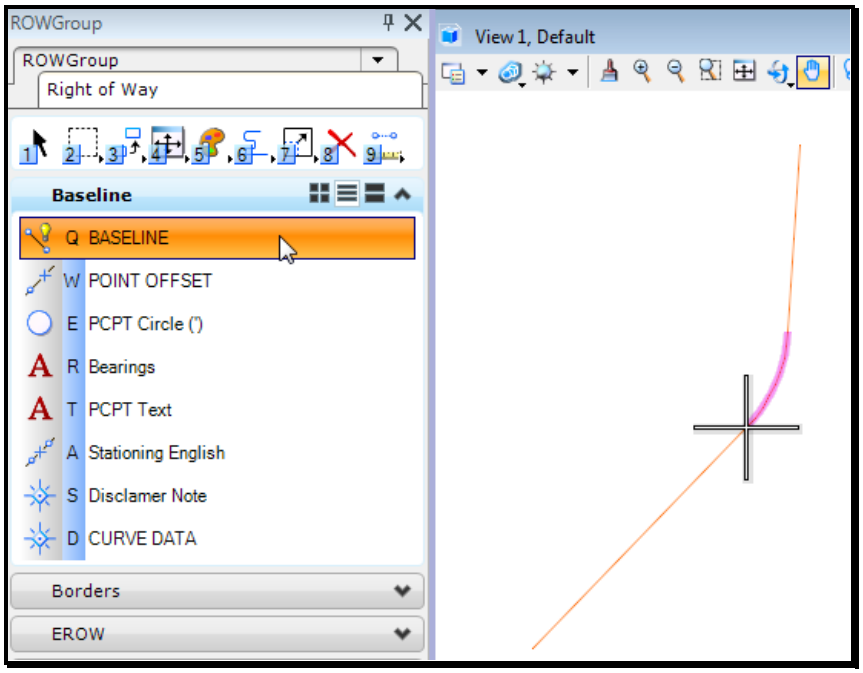


Figure 22-39: Snap to the End of a Curve

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 to add to set." Pick on your Baseline with a *Data Point.* 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 “Complex Chain”. 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’ Station on the Baseline. Press the **F12** key to run the *Pointalong* macro.

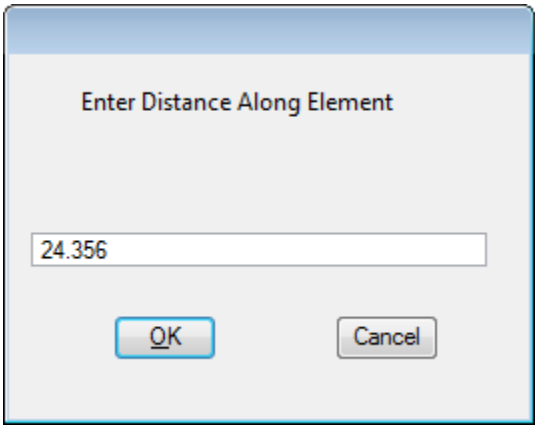


Figure 22-40: Point Along Distance

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’ station. 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 *Tasks Menus* to begin to annotate. From the *Tasks Menus,* select your **Workgroup > Right of Way > Baseline > Stationing English.**

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. 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 **Tasks > Drawing > Text** tasks (Figure 22-41).

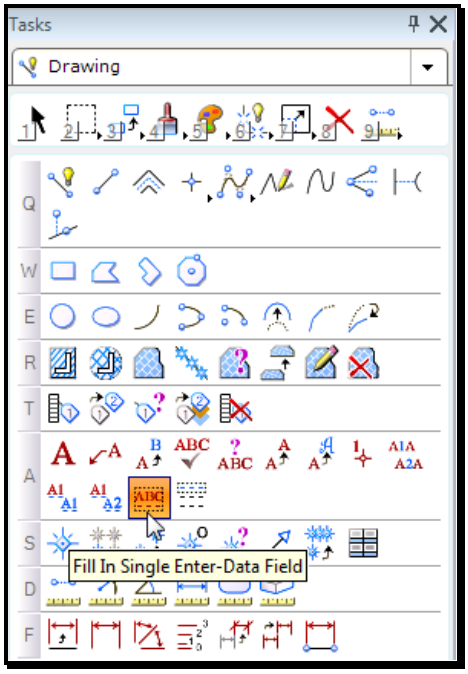


Figure 22-41: Fill in Single Enter Data Field

We're going to start by changing the value of the first Station on our Baseline. From the **Tasks > Drawing > Text** tasks, 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).

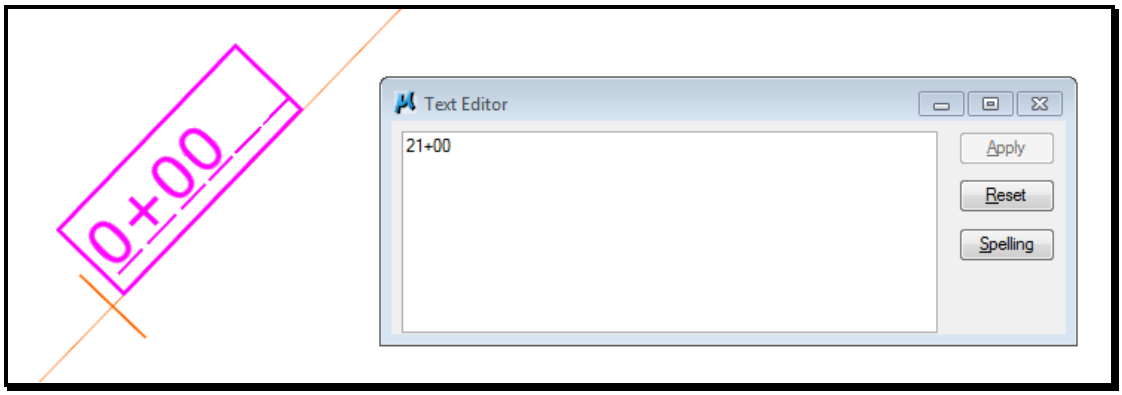


Figure 22-42: Pick an Enter Data Field

MicroStation will put the text you typed into the **Text Editor** into the **Enter-Data Field** (Figure 22-43).

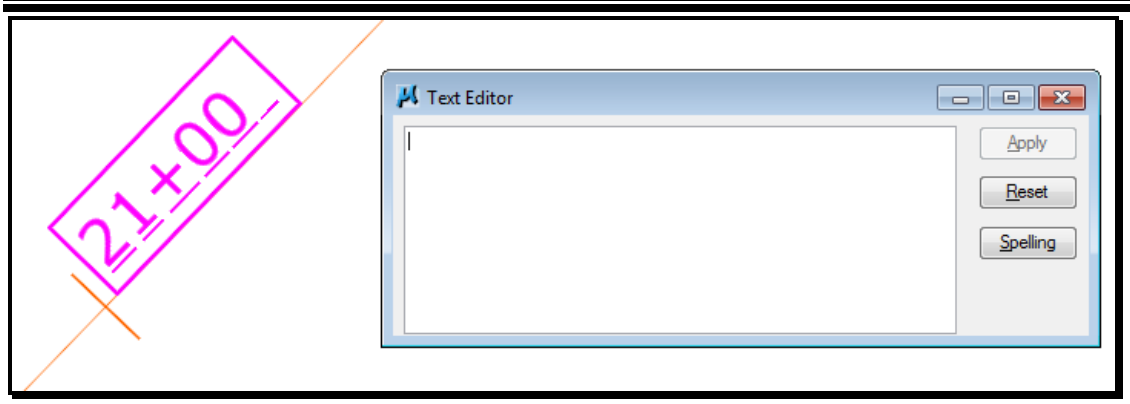


Figure 22-43: Data Point to Change the Field

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.

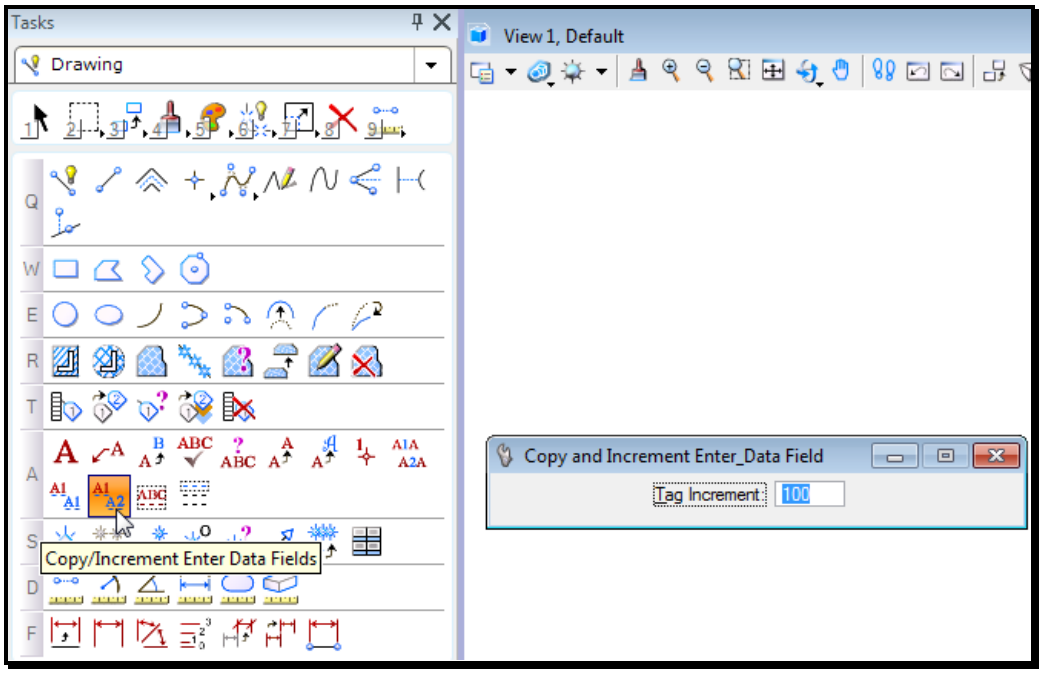


Figure 22-44: Copy/Increment Enter Data Fields

From the **Text** tasks, pick the **Copy/Increment Enter-Data Fields** tool (Figure 22-44). On your **Tool Settings Window**, set your **Tag Increment** to 100. 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+500. 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 25+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.

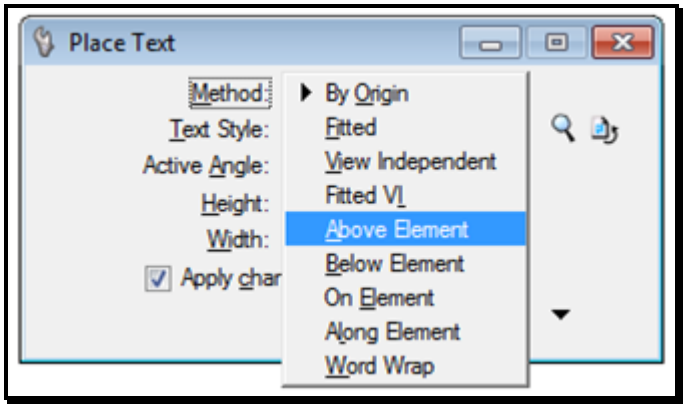


Figure 22-45: Text Placement Methods

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 *Tasks Menus,* select your **Workgroup > Right of Way > 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 Element** from the **Method** section of the **Place Text Tool Settings Window**. Select a **Justification** from the same **Tool Settings Window** (Figure 22-46).

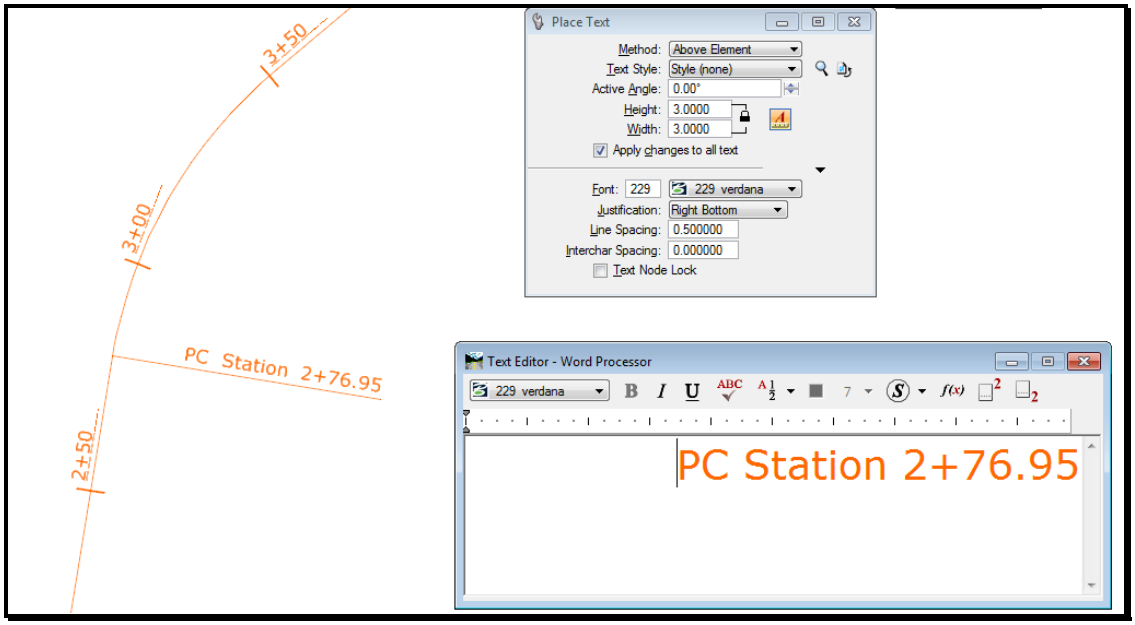


Figure 22-46: Labeling a PC

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' at the PC and PT point on the Baseline. From the *Tasks Menus*, select your **Workgroup > Right of Way > Baseline** > **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 *Tasks Menus*, select your **Workgroup > Right of Way > 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.

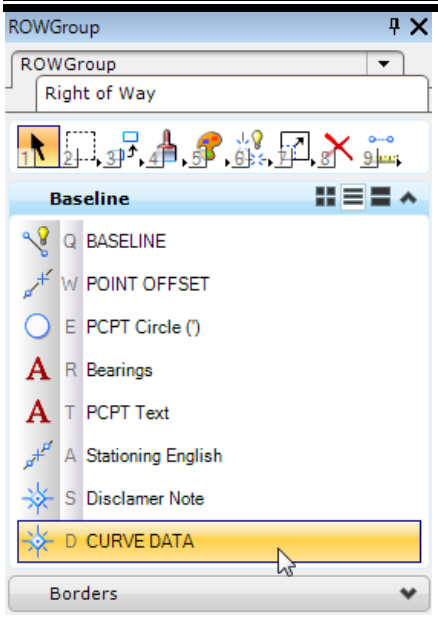


Figure 22-47: Choose Baseline>Curve Data

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*.

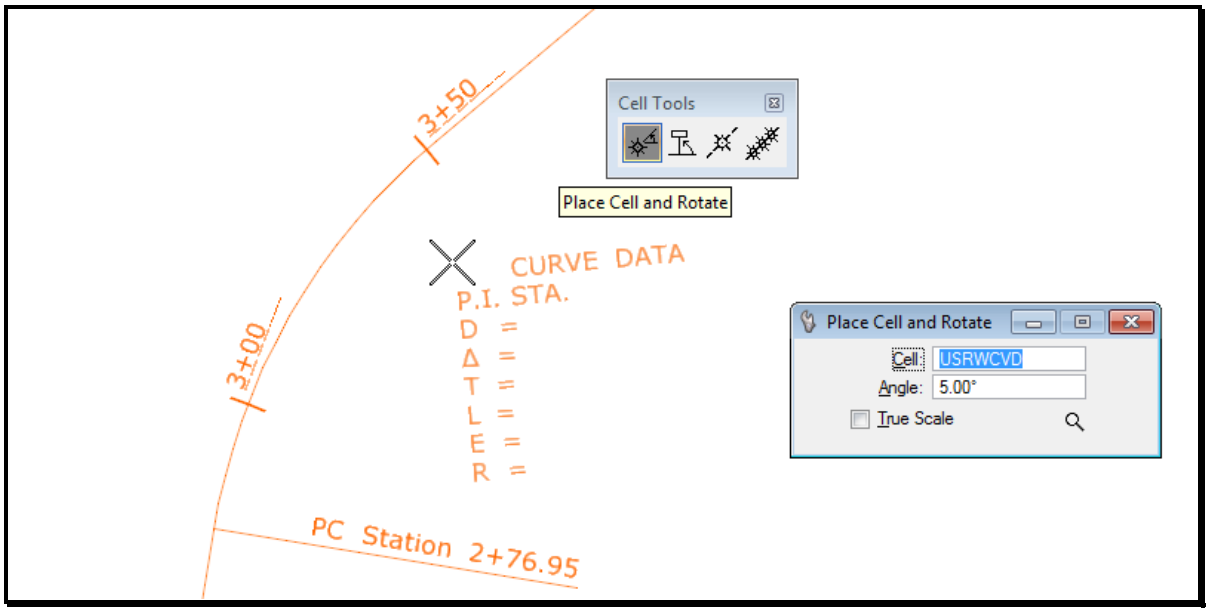


Figure 22-48: Placing Curve Data

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*.

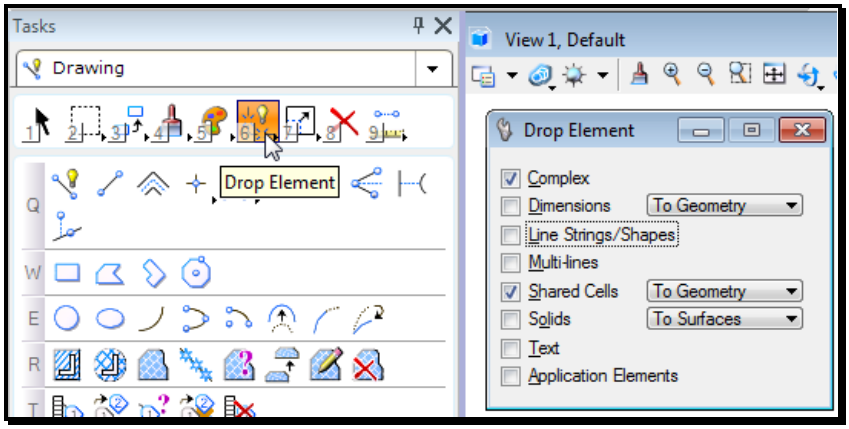


Figure 22-49: Drop Element Tool Settings

From the **Main Tool Tasks**, 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	
F2	Window in
F3	Zoom Out
F4	Update View
F5	Element Selection
F6	Fence
F7	*AccuDraw* On/Off
F8	Set Angle Mode to Azimuth East
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	
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

- All instructions are based upon the project folder being created using the InRoads Survey Project setup icon.

✓ ***Refer to page 4-3 for information about the InRoads Survey Project setup program.***

Step One: Launch InRoads

Start InRoads Suite V8i using the desktop icon (Figure 22-51).

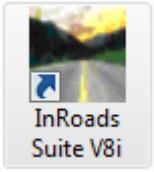


Figure 22-51: InRoads Suite Desktop icon

Step Two: Adjust User

In the *Workspace* portion of the *File Open* dialog (Figure 22-52), adjust the *User* pull down to **InRoads_local_V8i.**

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.**

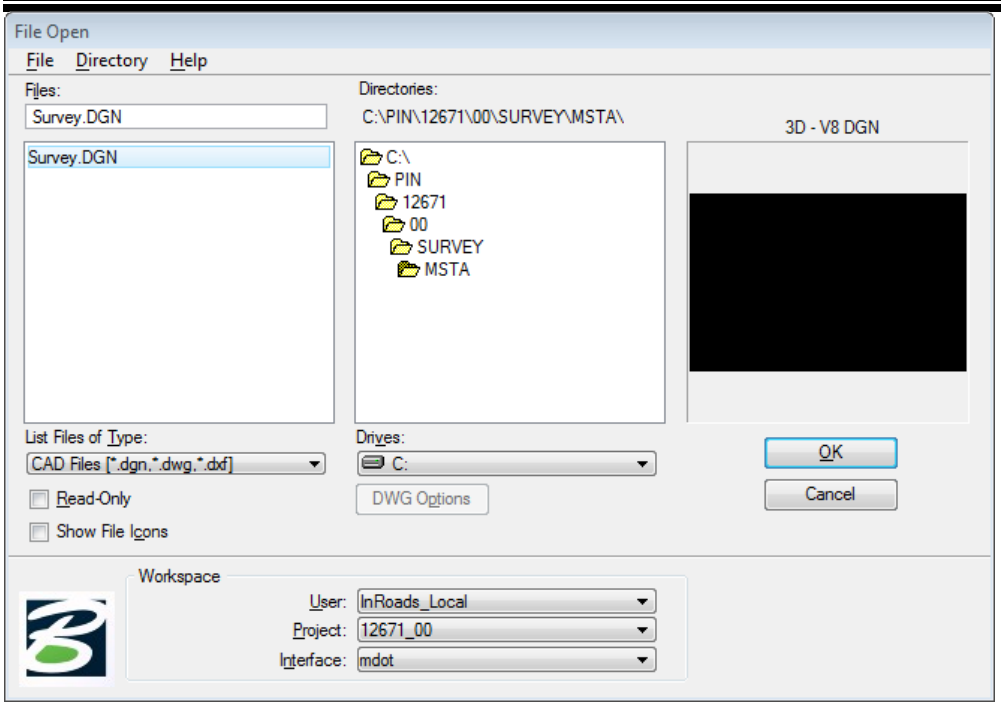


Figure 22-52: Workspace area of the File Open dialog

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.

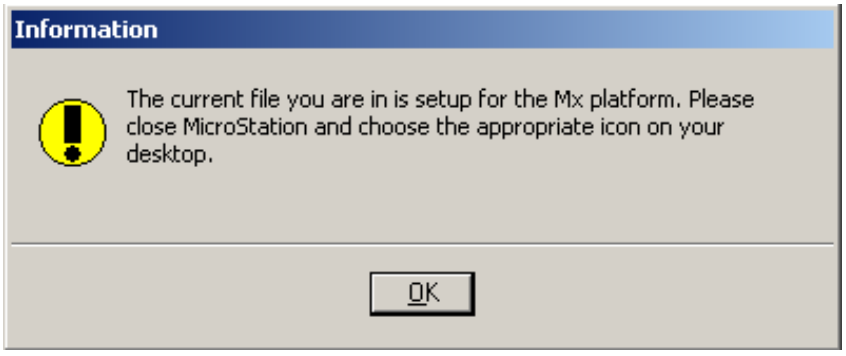


Figure 22-53: Information dialog stating that the file was created for the MX platform

Click **OK.**

After the file opens, select **Macros > Update UOR and Units** from *MicroStation's* main menu (Figure 22-54).

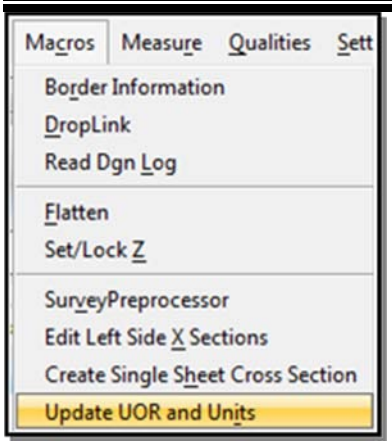


Figure 22-54: Run the Update UOR and Units from the MicroStation menu

The *Update MaineDOT Foot File* dialog will open displaying information about the program (Figure 22-55). Select **Proceed.**

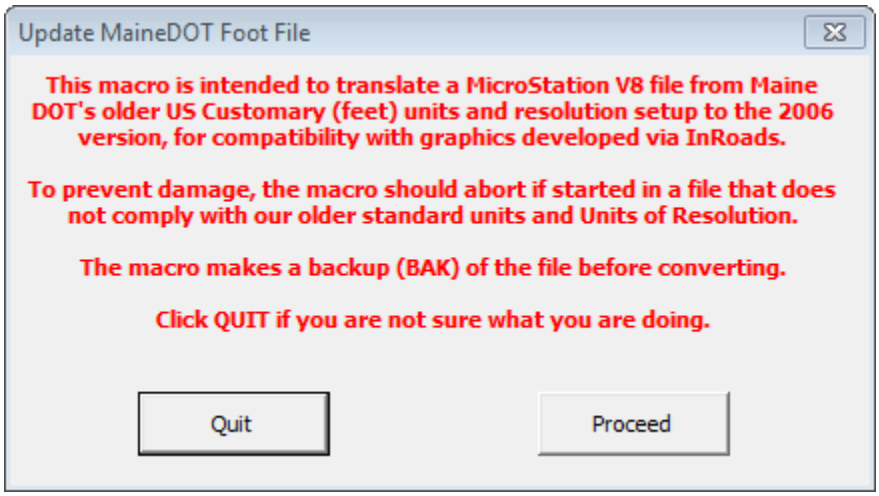


Figure 22-55: Update MaineDOT Foot File program dialog

Once the program is done processing, a message will appear (Figure 22-56). Click **OK.**

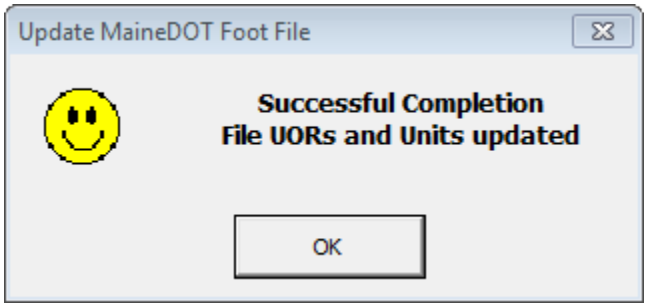


Figure 22-56: Successful Completion message

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).

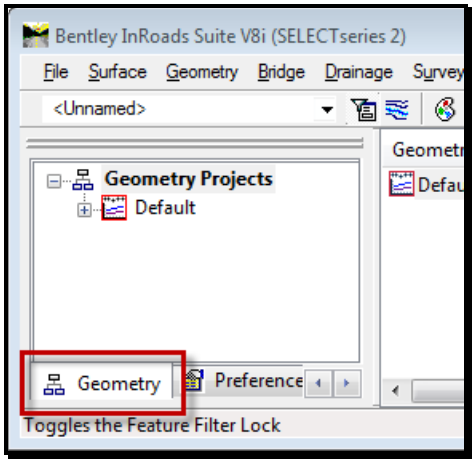


Figure 22-57: Select the Geometry tab

Right-click on the **Geometry Projects** name and Select **New…** (Figure 22-58).

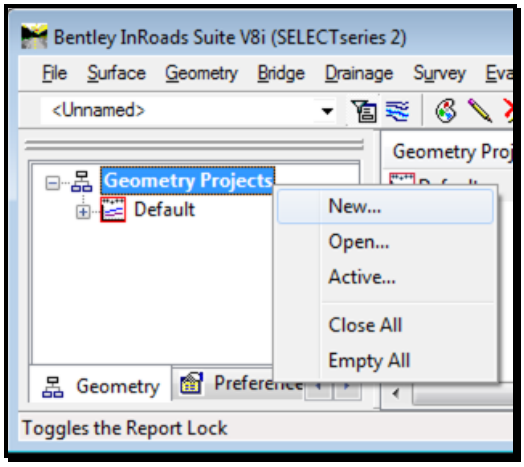


Figure 22-58: Right Click and select New

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.**

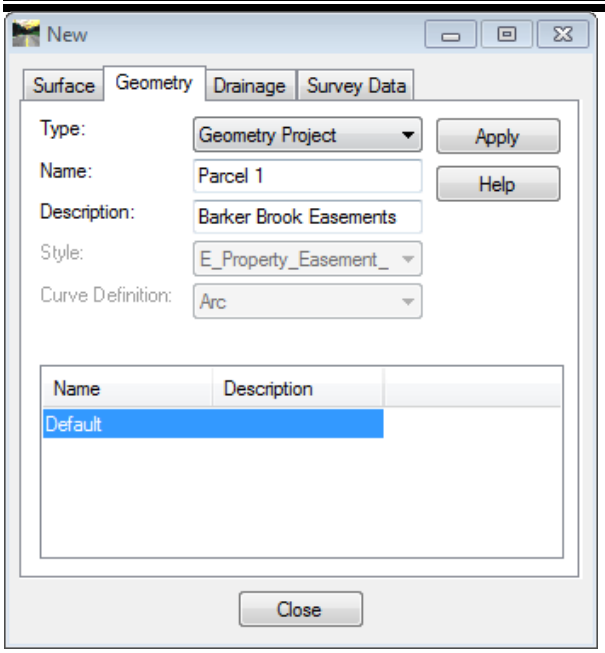


Figure 22-59: Create the Geometry Project called Parcel 1

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.**

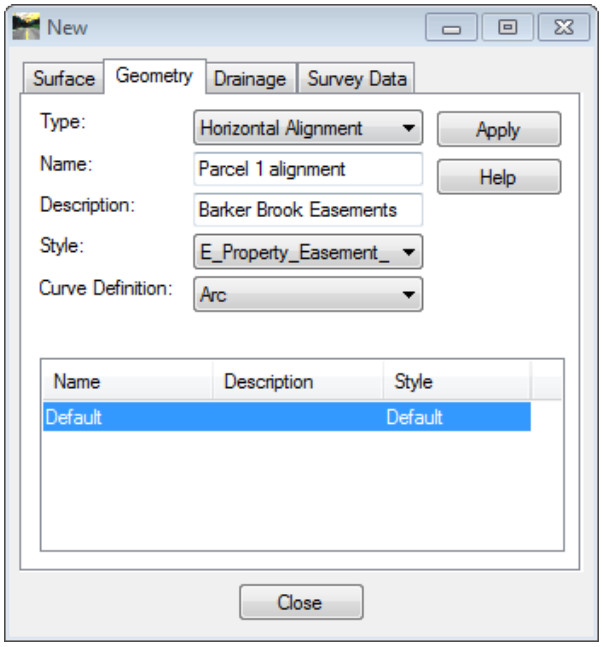


Figure 22-60: Create a Horizontal Alignment

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).

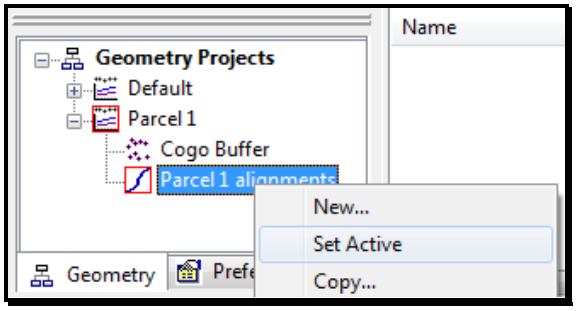


Figure 22-61: Right Click Alignment and Set Active

Step Four: Create a Traverse

Select **Geometry** > **Traverse** from InRoads main menu (Figure 22-62).

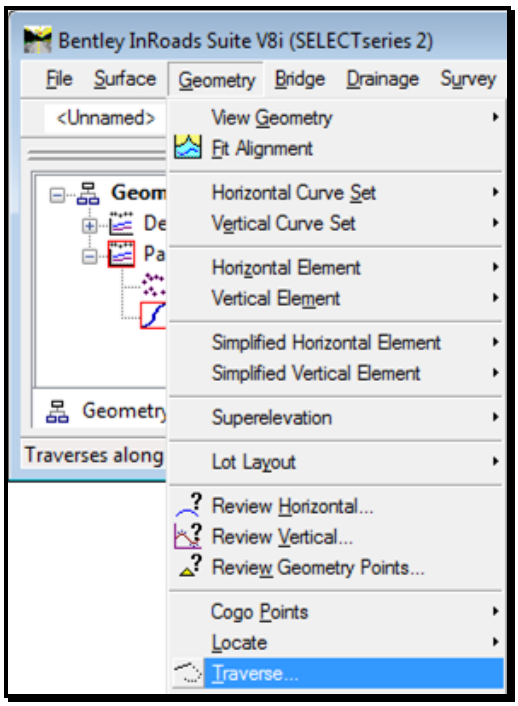


Figure 22-62: Select Traverse from the InRoads main menu

In the *Traverse* dialog (Figure 22-63), set the *Method* to **Direction.** Set the *Insert Point Mode* to **After Alignment.**

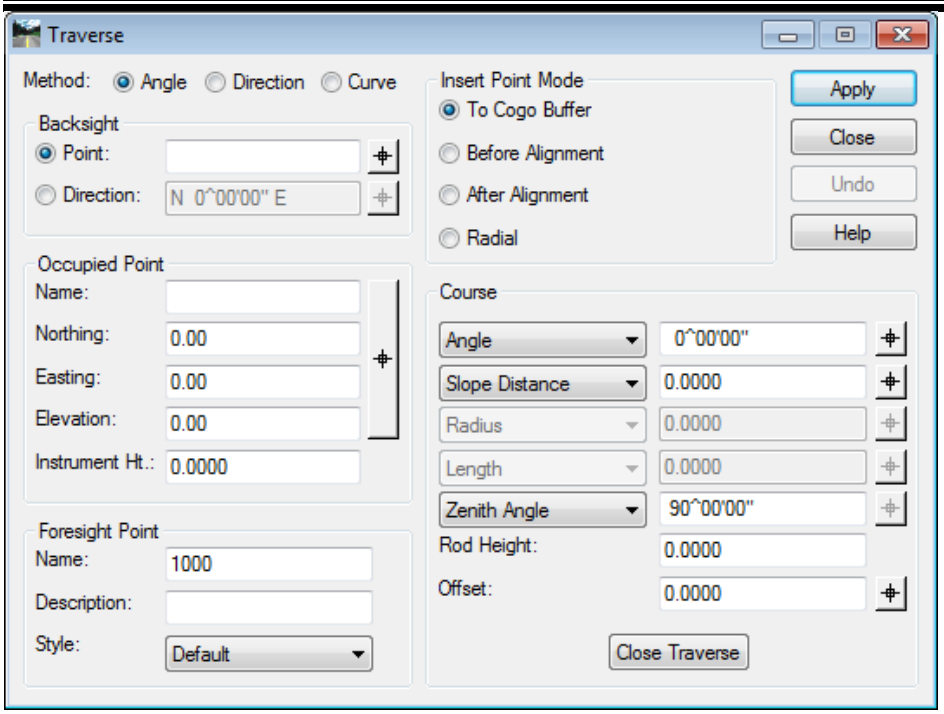


Figure 22-63: Adjust the Traverse dialog

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).

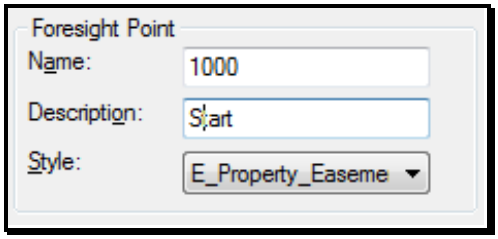


Figure 22-64: Enter Point Name, Description and Style

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.**

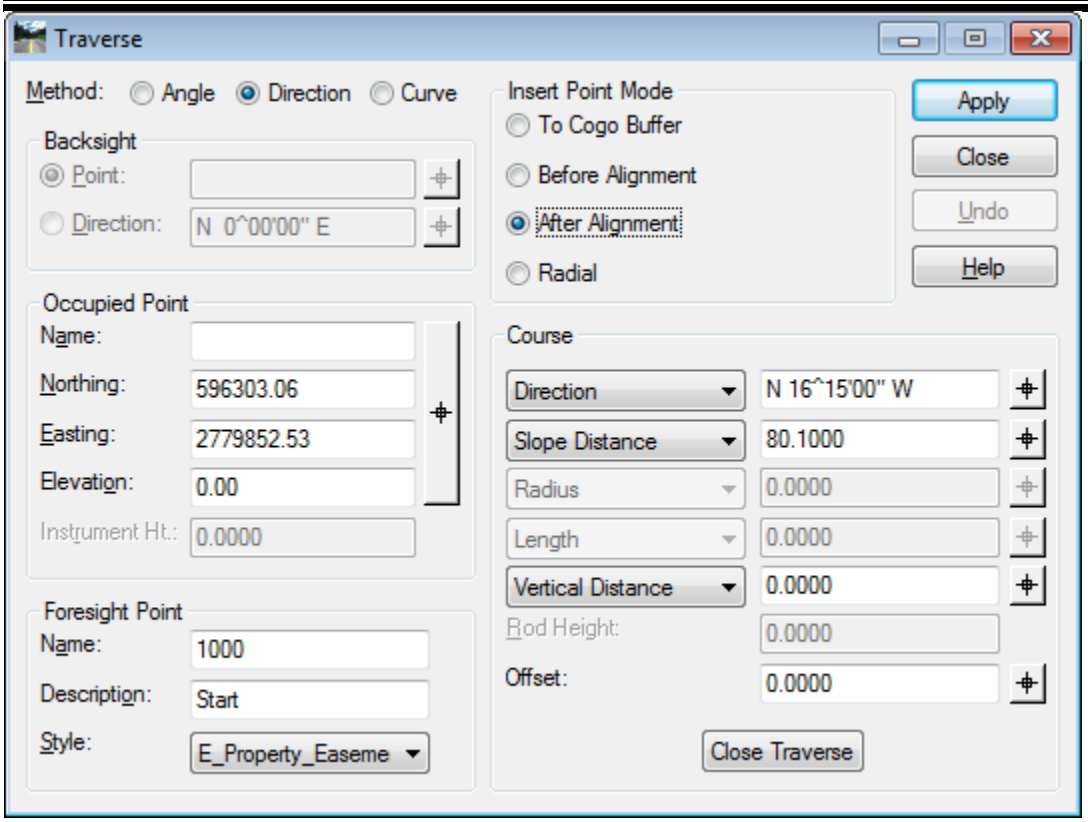


Figure 22-65: Enter the deed description's bearing and distance

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.

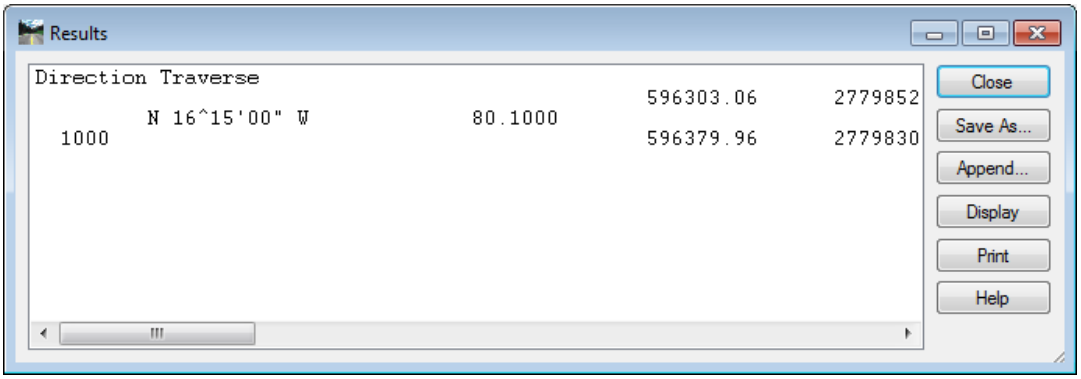


Figure 22-66: The Results dialog displaying the current traverse

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.**

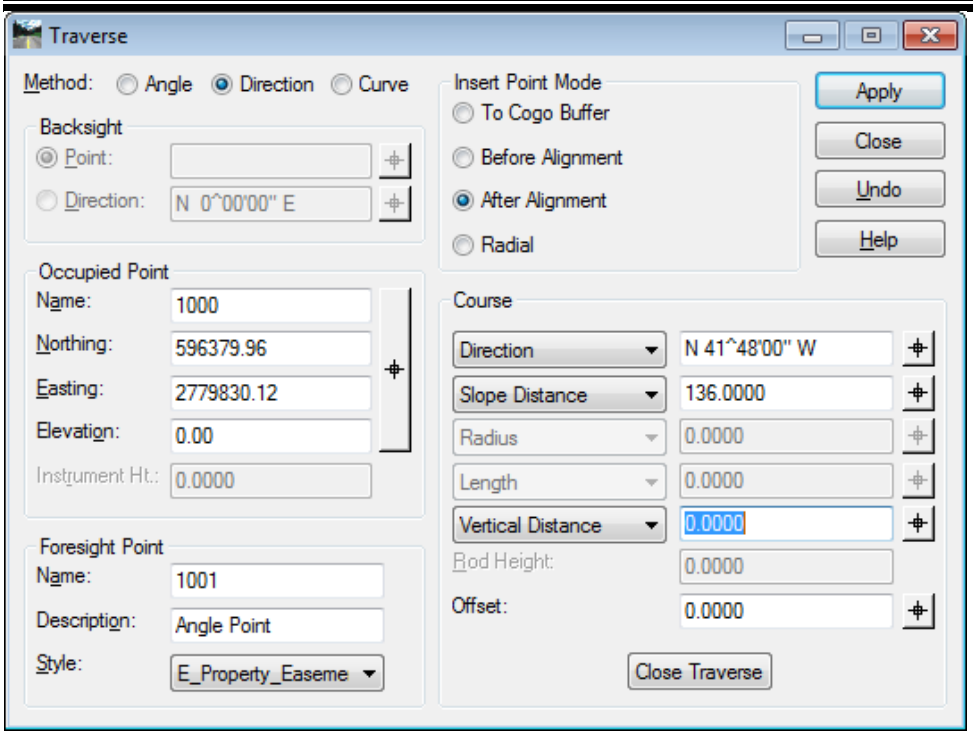


Figure 22-67: Traverse dialog auto incremented and ready for next description

- 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).

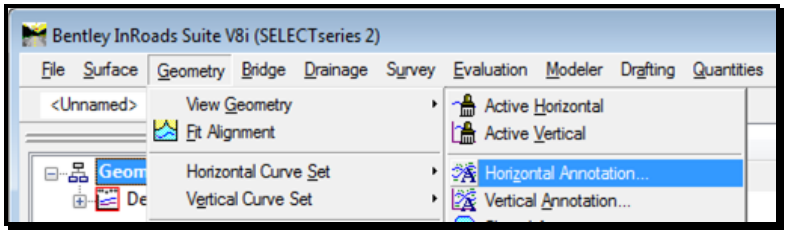


Figure 22-68: View Horizontal Annotation to graphically view annotation

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).

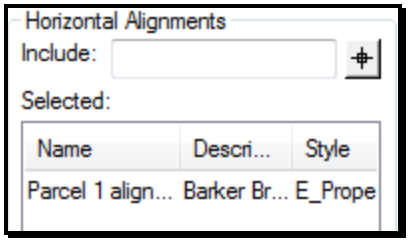


Figure 22-69: The list of alignments selected to be annotated

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).

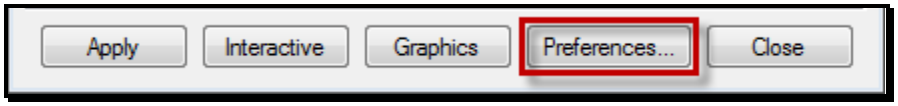


Figure 22-70: Select a custom preference

Select the preference for **Property** (Figure 22-71). Click **Load.** Select **Close** to dismiss the dialog.

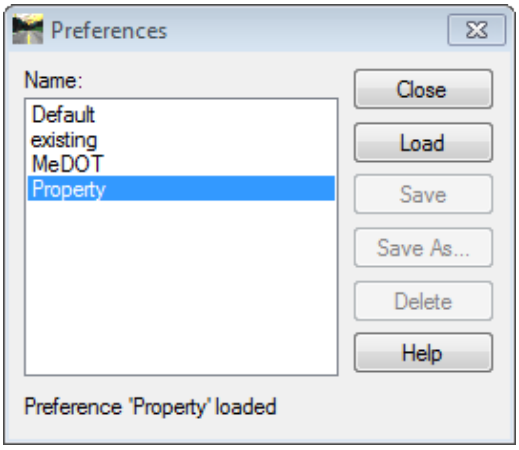


Figure 22-71: Select and Load the Property preference

The *View Horizontal Annotation* dialog is now adjusted to match the Property preference (Figure 22-72). Click **Apply.** Select **Close.**

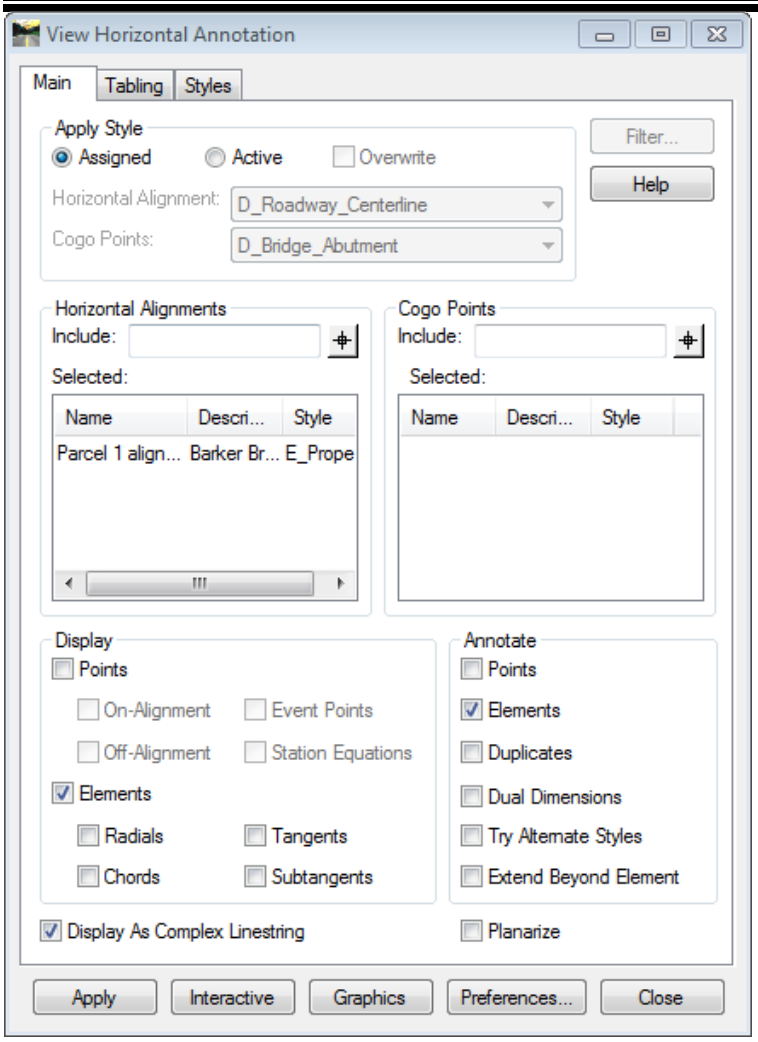


Figure 22-72: View Horizontal Annotation adjusted by the Property Preference

The annotation is displayed with the bearing and distance (Figure 22-73).

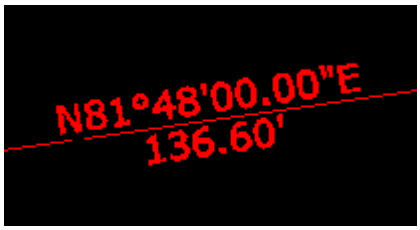


Figure 22-73: Bearings and Distances annotation are displayed

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).

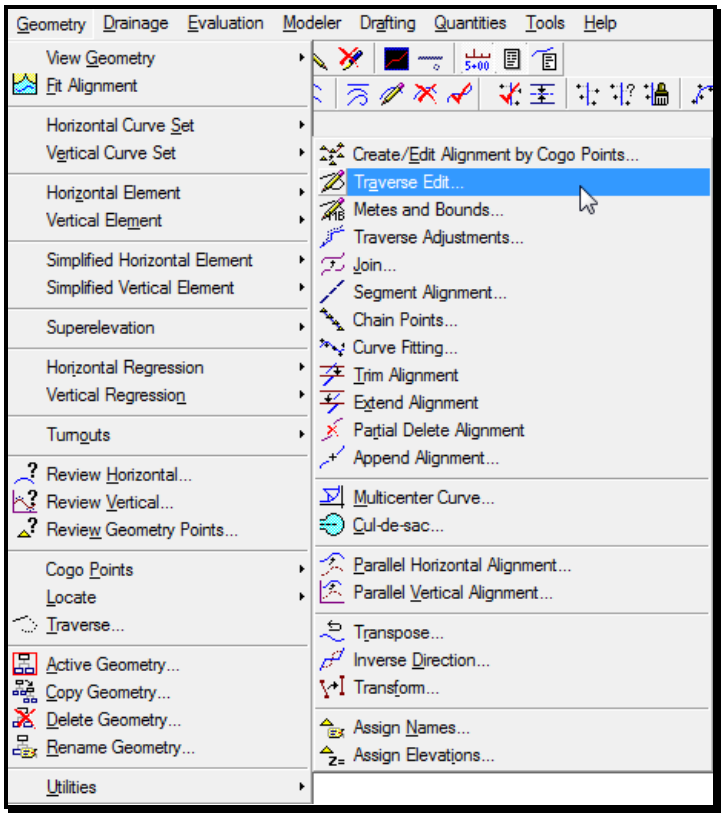


Figure 22-74: Open the Traverse Edit dialog

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.

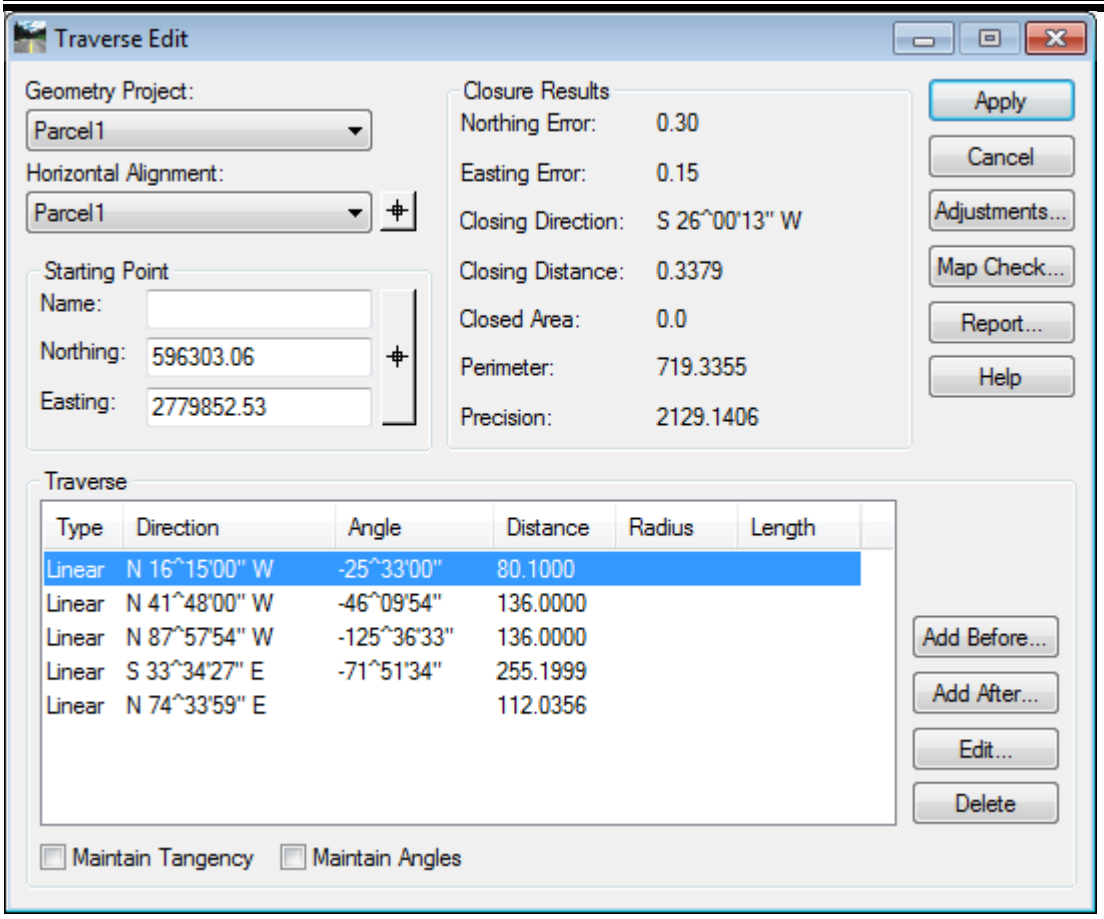


Figure 22-75: Traverse Edit dialog

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.**

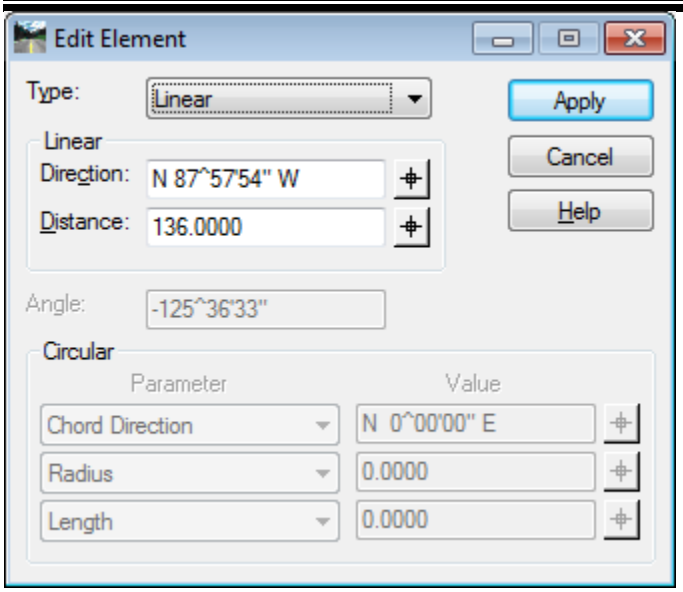


Figure 22-76: Edit Element dialog allows adjustment to existing boundary lines

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.**

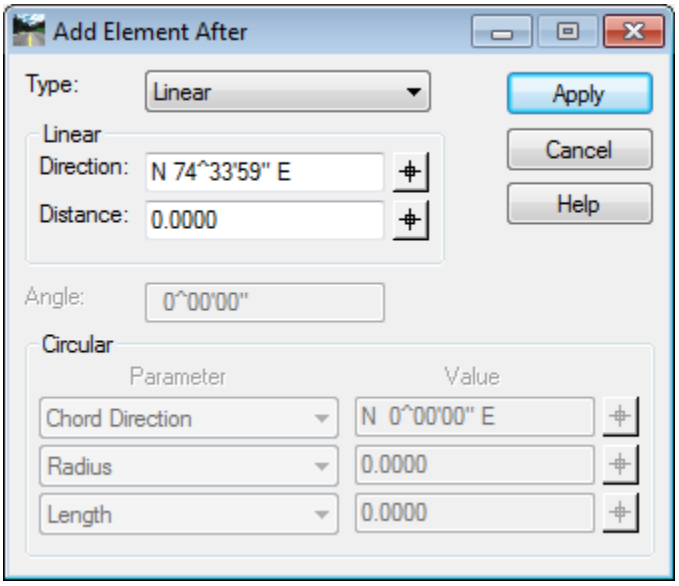


Figure 22-77: Add Element Before or After dialog

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 *Bentley Civil Report Browser* dialog (Figure 22-78). This is an example of a report that is generated. Different reports can be selected on the left pane of the Bentley Civil Report Browser.

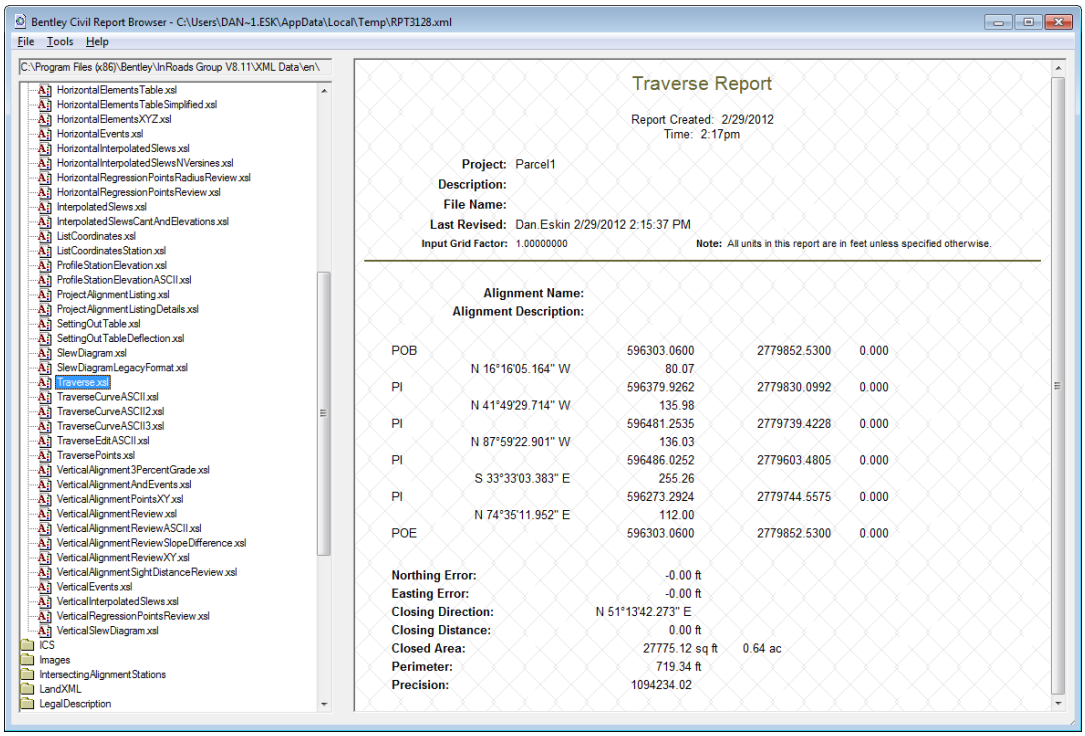


Figure 22-78: The Bentley Civil Report Browser dialog displays a report of the boundary

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 the InRoads main menu (Figure 22-79).

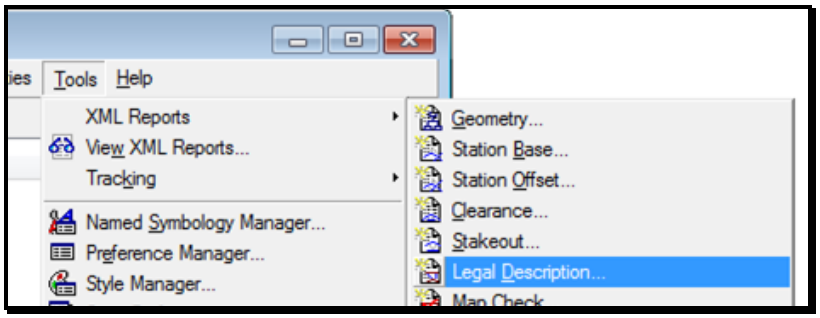


Figure 22-79: Opening the Legal Descriptions dialog

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).

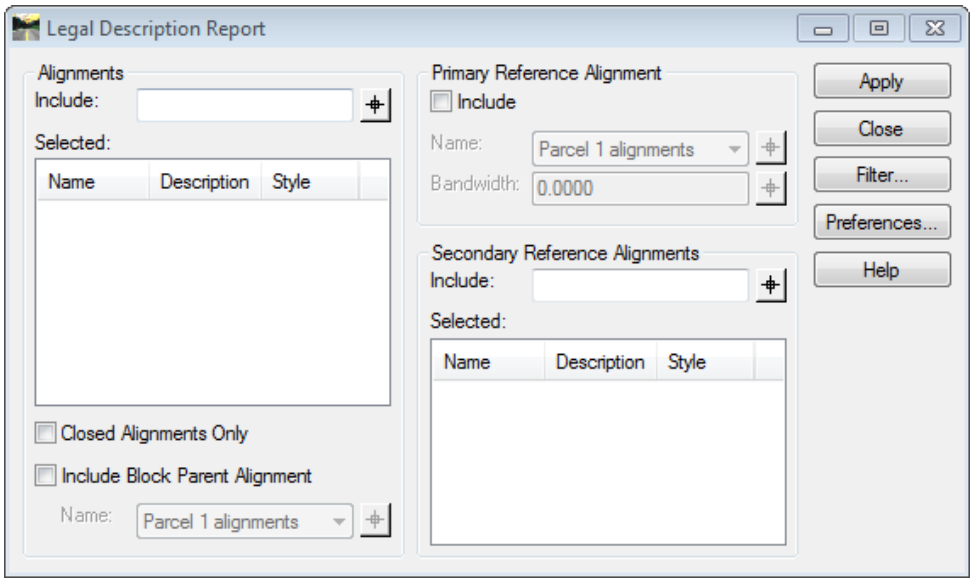


Figure 22-80: Example of Legal Description Reports panel

ⓘ ***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).

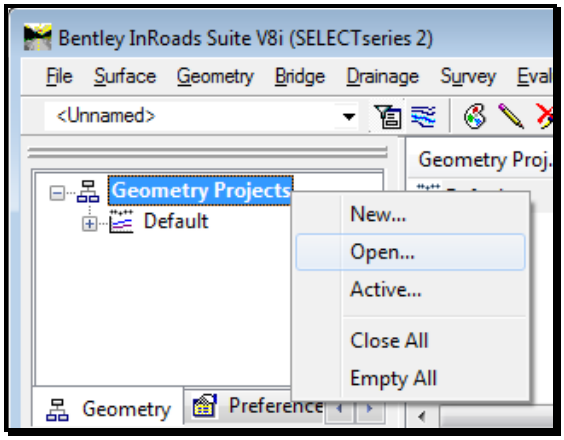


Figure 22-81: Opening a Geometry Project

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., Parcel 1.alg), click **Open** and then **Cancel.**

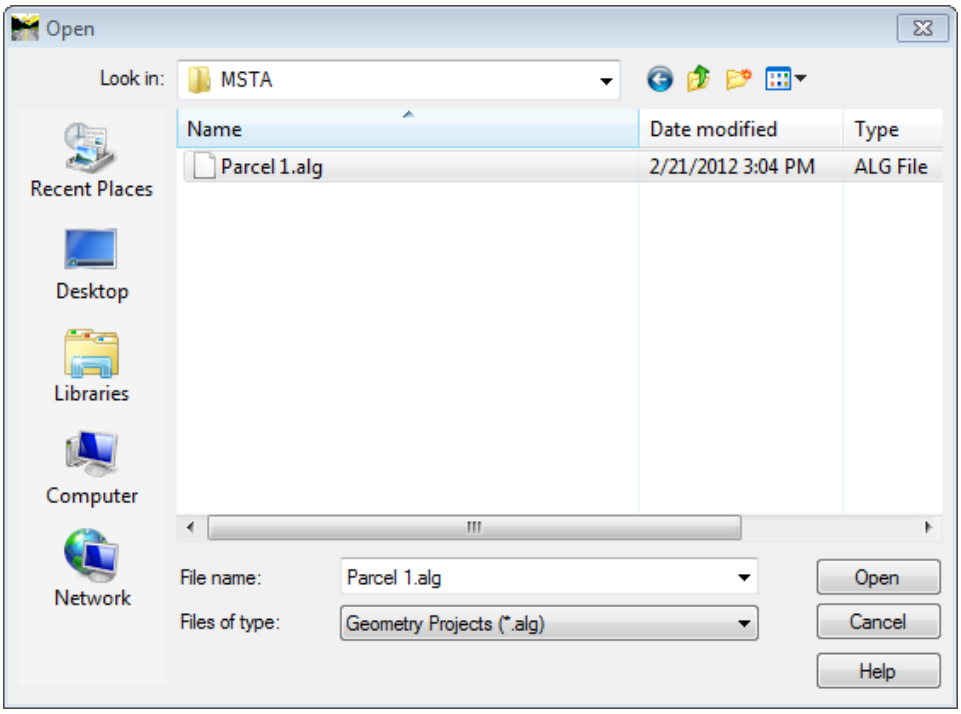


Figure 22-82: Open Geometry Project dialog

Step Three: Select Apply

With the boundary alignment highlighted in the *Selected* portion of the dialog (Figure 22-83), click **Apply.**

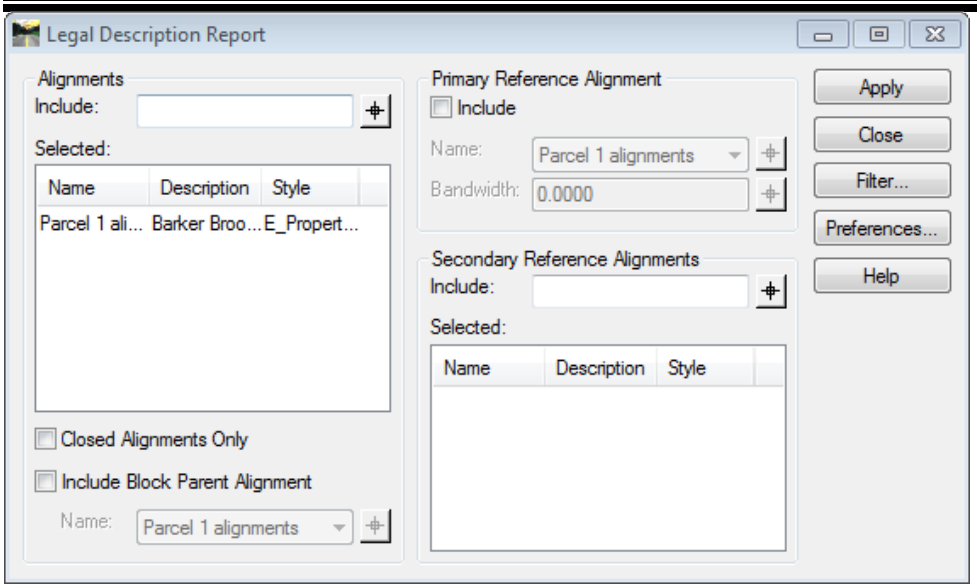


Figure 22-83: Select your alignment and click Apply

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).

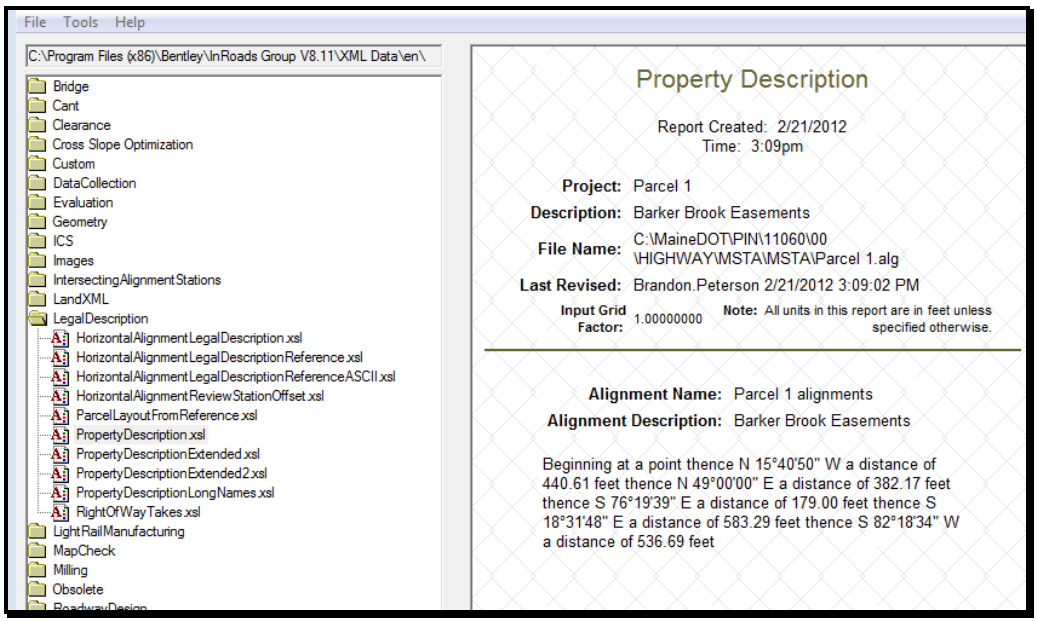


Figure 22-84: XML Report is displayed with current style sheet

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).

You can save the file directly as an .html file, but notice the drop-down allows for saving to a Microsoft Word (*.doc) or even Microsoft Excel (*.xls) file. Pick the desired **Save as type**, enter a name for your report, and then click **Save**. Select the **Close** button to dismiss the dialog.

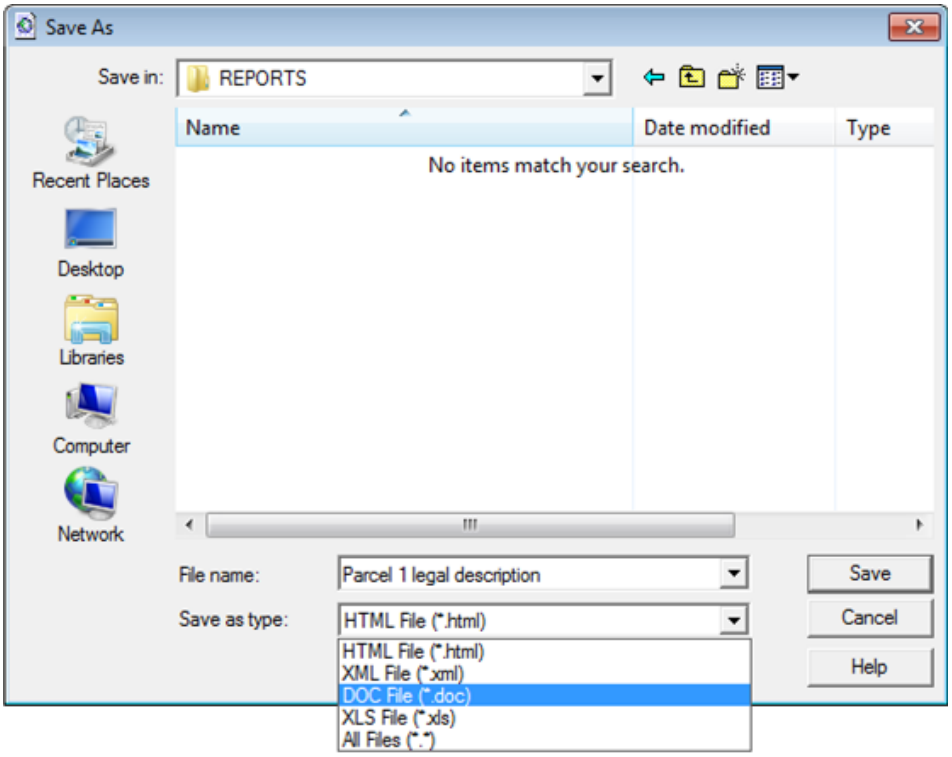


Figure 22-85: Save As dialog waiting for file name and type

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 *Tasks Menus*.

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 1-57 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 *Tasks* to control our level, color, style and weight. From the *Tasks Menus*, select your **Workgroup > Substructures > Abutment** 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 Drawing Scale dialog is not open, navigate to **Settings > Drawing Scale** (Figure 23-1).

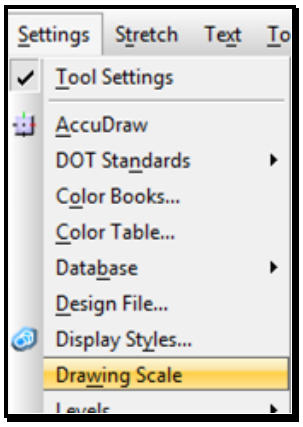


Figure 23-1: Accessing the Drawing Scale dialog

From the *Main Menu*, select **Settings > Drawing Scale.** Select the desired scale from the drop down (Figure 23-2).

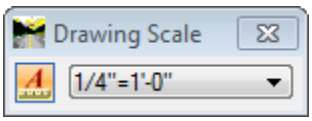


Figure 23-2: Select Scale

Let's select a scale of ¼ in. = 1 ft.

- ✓ ***Check page 2-25 for more information on the Drawing Scale.***

Once you have selected your scale, it is time to annotate your detail. From the *Tasks Menus*, select your **Workgroup > Bridge > 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.

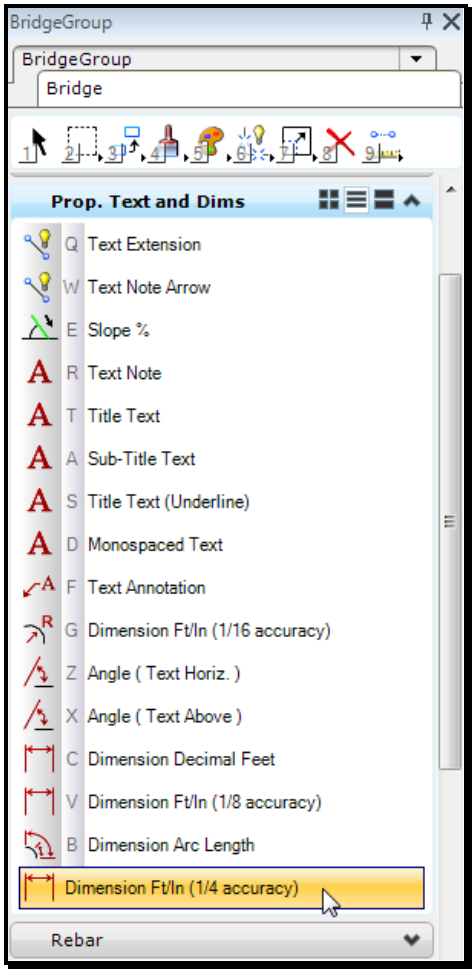


Figure 23-3: The Prop. Text and Dims Group

Once you have finished your annotation, we are going to set up a *Saved View* that contains our detail. From the *Tasks Menus*, select your **Workgroup > Bridge > 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).

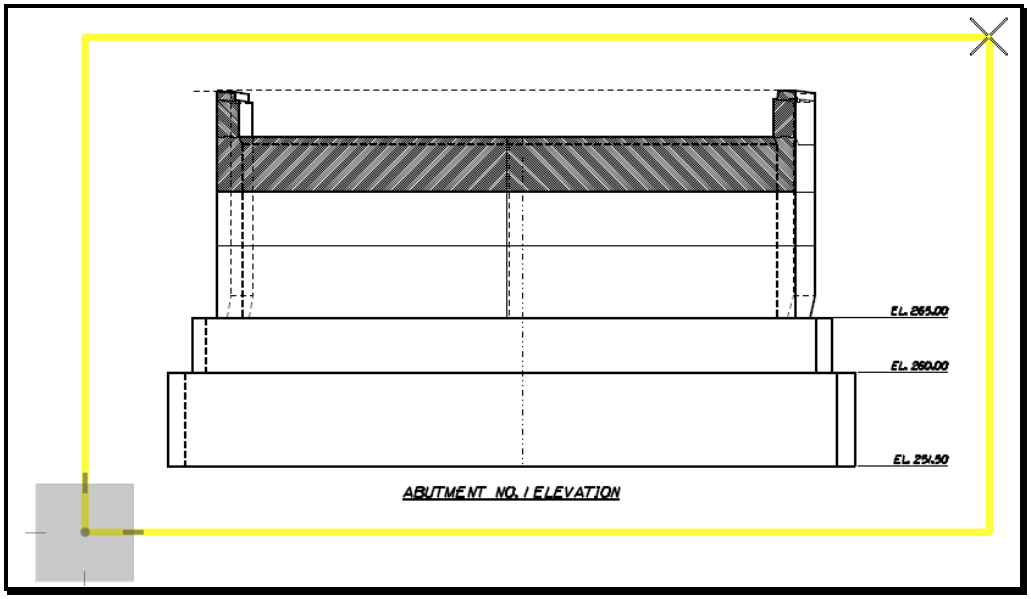


Figure 23-4: Define the Extents of your Saved View

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).

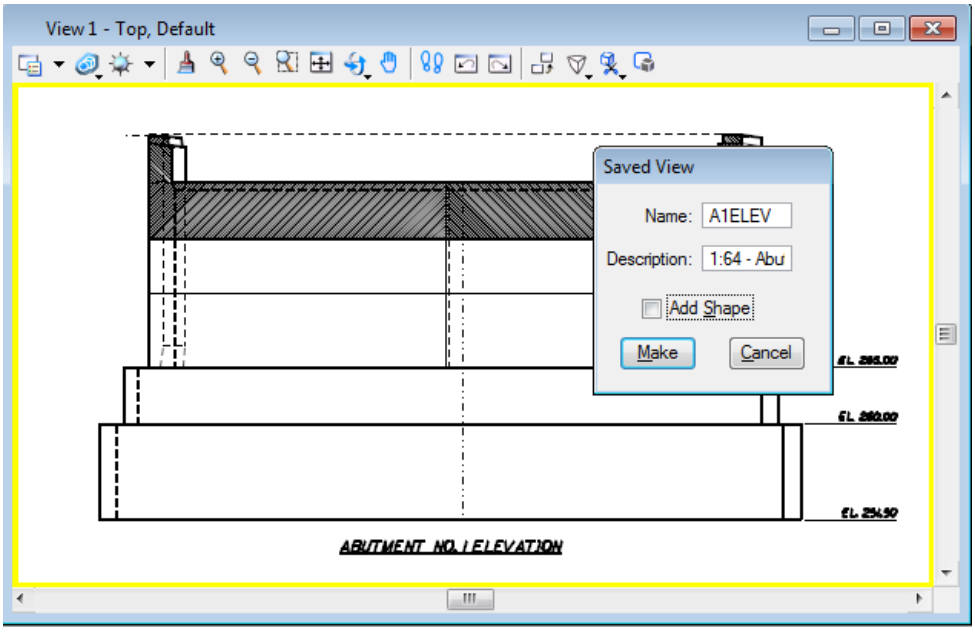


Figure 23-5: Naming a Saved View

- 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 1-57 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 1-67 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.

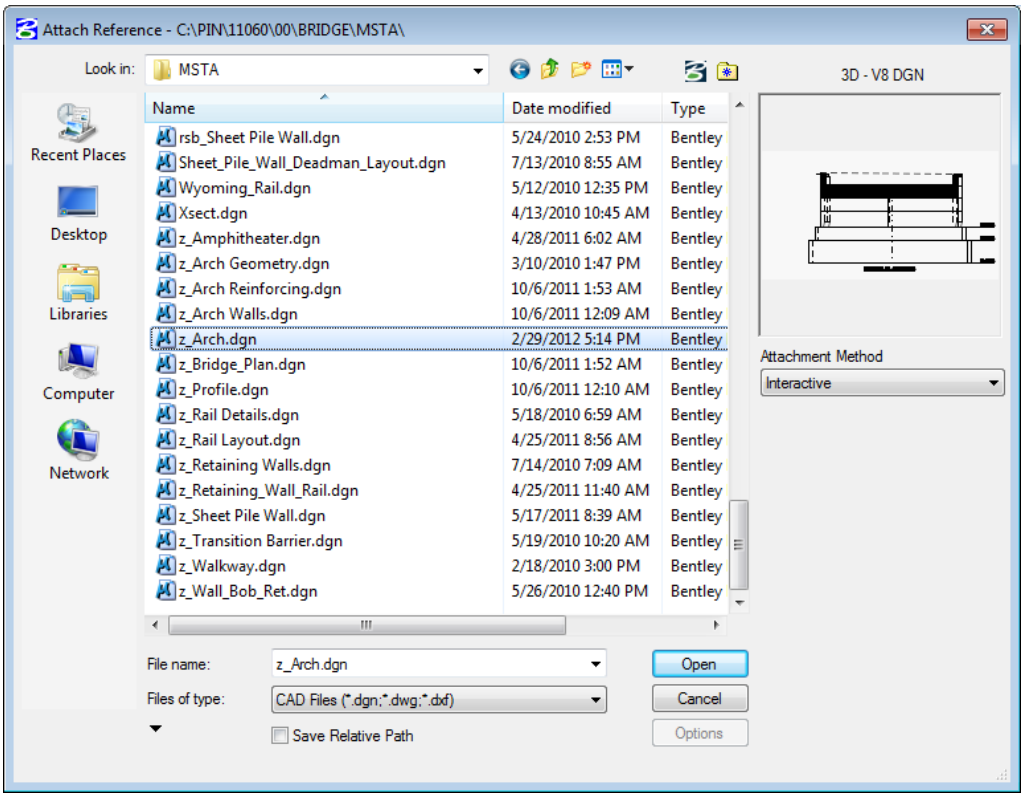


Figure 23-6: The Preview Reference Dialog

This will bring up the **Attach Reference File** dialog (Figure 23-7).

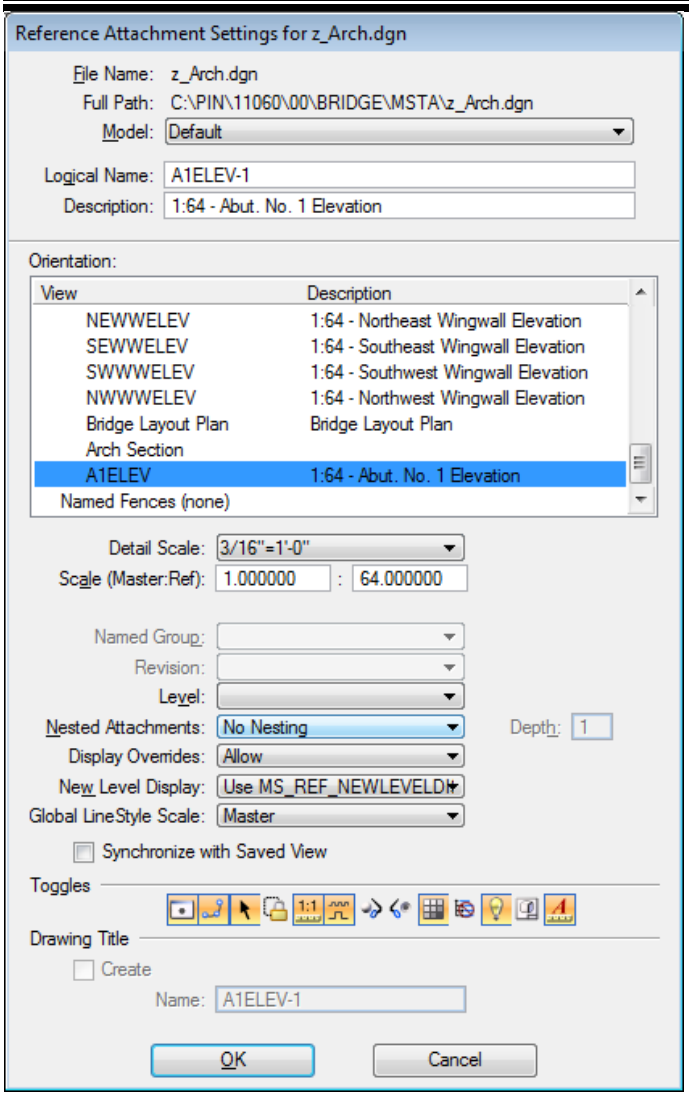


Figure 23-7: The Attach Reference File Dialog

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 *Drawing Scale* that you used when annotating your detail. (In this case, our 3/16 in.=1 ft. scale translates to a 1:64 Master:Ref scale.) Push **OK**.

- ✓ ***Refer to page 31-2 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).

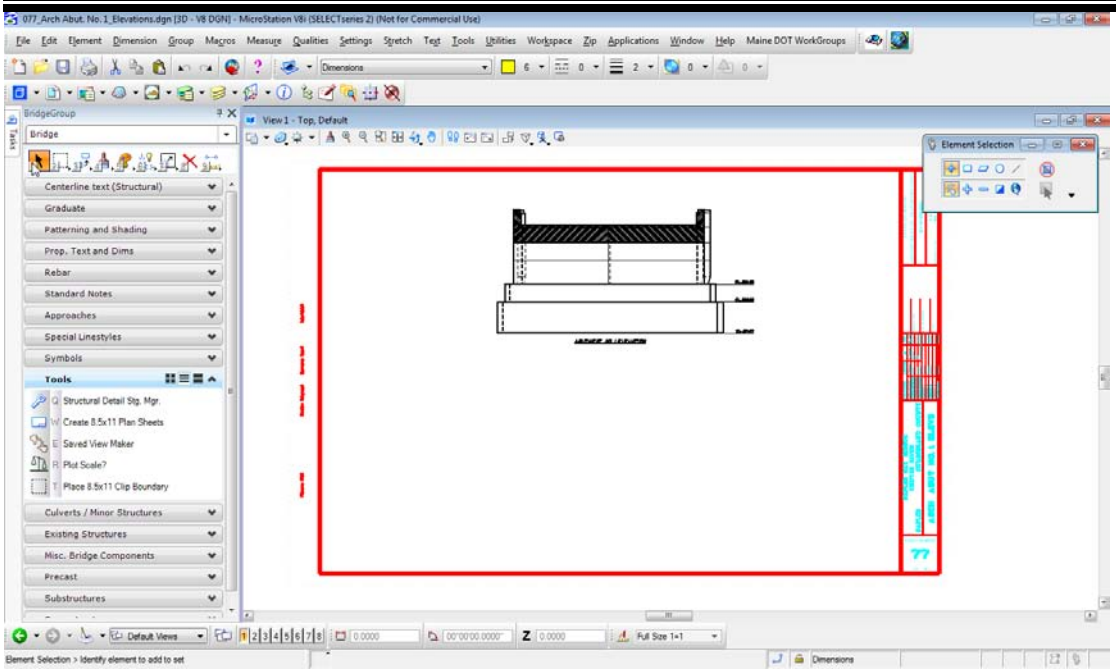


Figure 23-8: Reference Placement by Saved View

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_arch.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_arch.dgn drawing file.

However, the abutment section is often at a different scale than the plan and elevation. To create a abutment section using a different scale, create a new design file ("z_arch_sect.dgn") and choose something like "1/2 in.=1 ft." for the scale. Then draw and annotate as we just explained, creating a saved view and attaching that file to 017_arch_plan.dgn.

You **MUST** select the proper *Drawing Scale* before using the *Tasks* to place additional text, dimensions, custom line styles, or cells. This means that each drawing can only have one scale and you must separate each scale into different drawings.

To check your current *Drawing Scale*, select your **Workgroup > Bridge > Tools > Plot Scale?** from the *Tasks Menus.* (Figure 23-9)

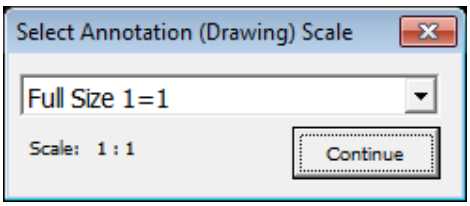


Figure 23-9: Drawing Scale Information

TOOLS IN THE TASKS MENUS

The **Tools** section of the **Bridge** tasks (Figure 23-10) has a couple useful automation routines.

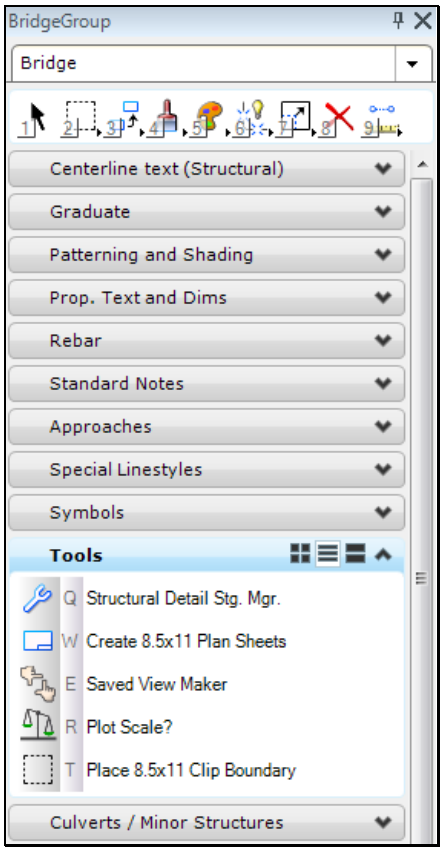


Figure 23-10: Bridge > *Tools*

The File Making Macros

File creation has been removed from the Structural Tasks. Cut sheets will be created from the **Workgroup > Plan > Create Plan Sheets** tasks and all other file creation will be handled through the **makesheetz.bas** macro (**File > Make Sheetz**).

- ✓ ***Check page 1-57 for a description of the Make Sheetz 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?** task reminds you of your current **Drawing Scale** (Figure 23-11).

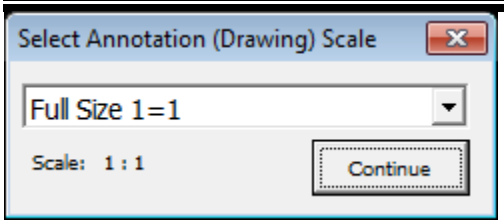


Figure 23-11: Drawing Scale Information

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).

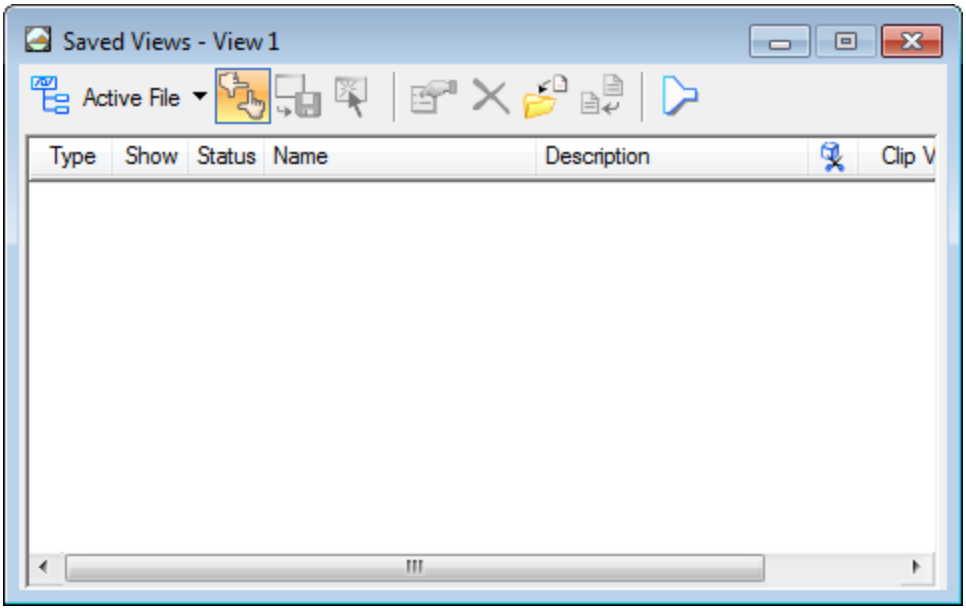


Figure 23-12: Saved View Dialog

Structural Detail Tasks

Selecting **Bridge Tasks** 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 TASKS

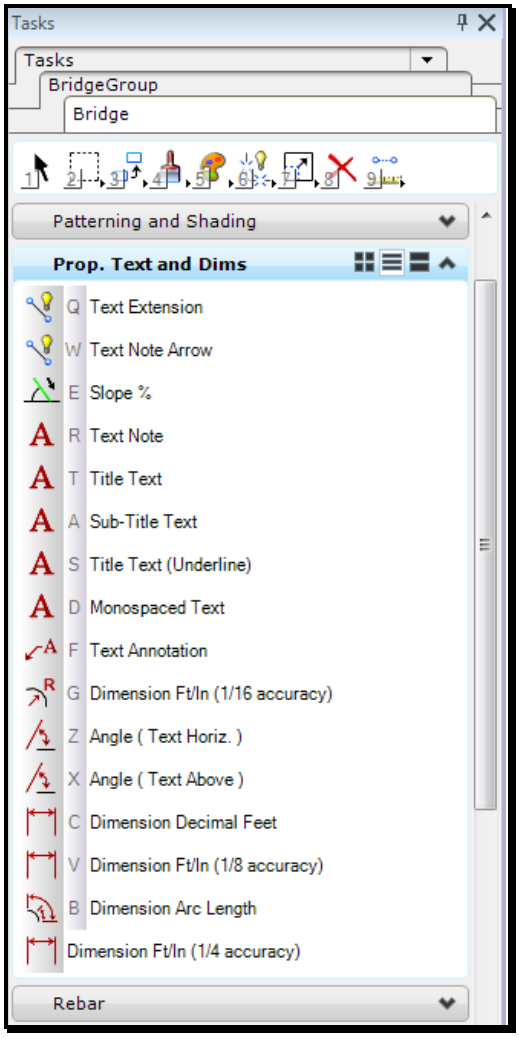


Figure 23-13: Dimensions

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 **Drawing Scale**. It will also launch the appropriate tool for dimensioning (in this case, the *Dimension Size Arrow* tool (Figure 23-14).)

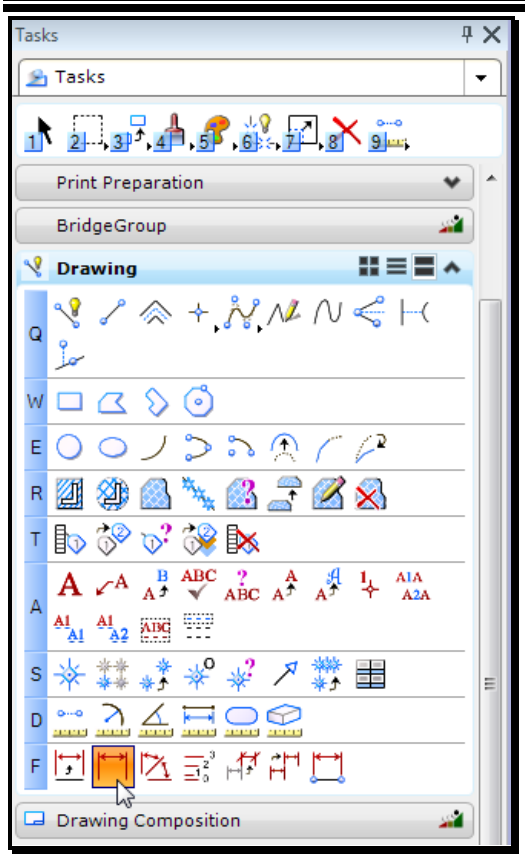


Figure 23-14: Dimension Size Arrows Command

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).

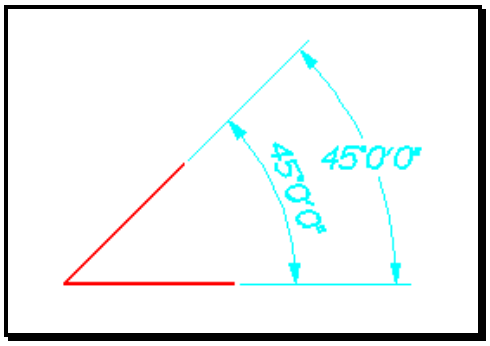


Figure 23-15: Angular Dimension Examples

- 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).

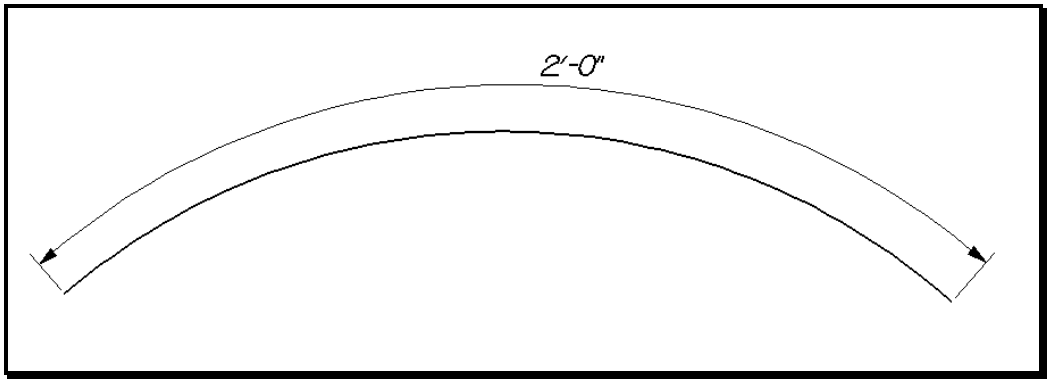


Figure 23-16: Dimension Arc Length

STRUCTURAL DETAILING TASKS

The **Structural Detailing** component of the **Tasks** (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. Select **Maine DOT WorkGroups > Construction** from the *Main Menu* to access the Structural Detailing tasks. From the *Tasks Menus*, select **ConstructionGroup > BridgeAS > Structural Detailing.**

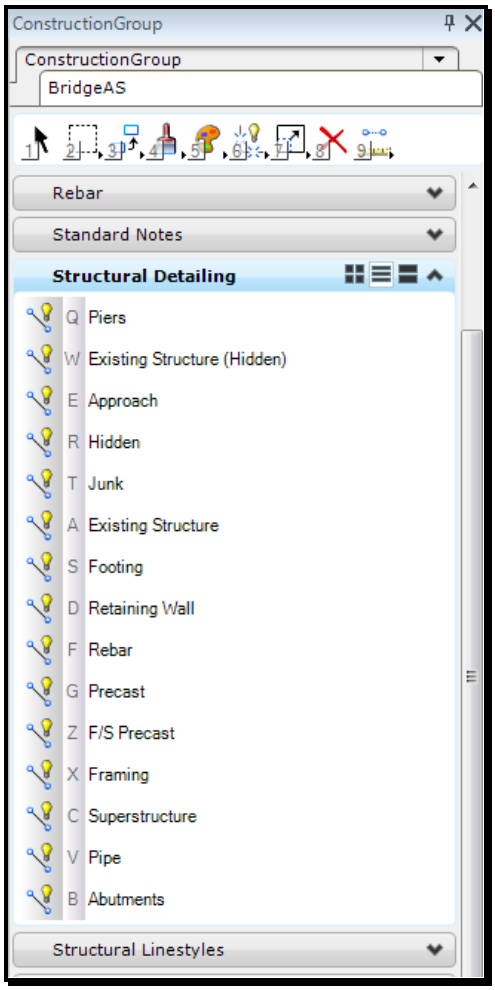


Figure 23-17: Structural Detailing Tasks

Nuts and Bolts

Selecting any component from the **Structural Detailing** portion of the *Tasks* 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 *Tasks* best corresponds to the work you're going to be doing, and pick that item from the **Tasks Menus**. 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 *Tasks Menus*, select **ConstructionGroup > BridgeAS > Structural Detailing > Abutments** to set the appropriate level, color, style and weight.

Then, choose the *Change Attributes* tool either from the **Main Tool Tasks** 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 line styles 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 **Drawing Scale** dialog, pick your new scale (Figure 23-19).

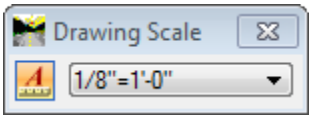


Figure 23-19: Pick a Drawing Scale

- ✓ ***Check page 2-25 for more information on the Drawing 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 **Tasks Menus** and choosing your **Workgroup > Plan > Prop. Text and Dims > Text Note** (Figure 23-20).

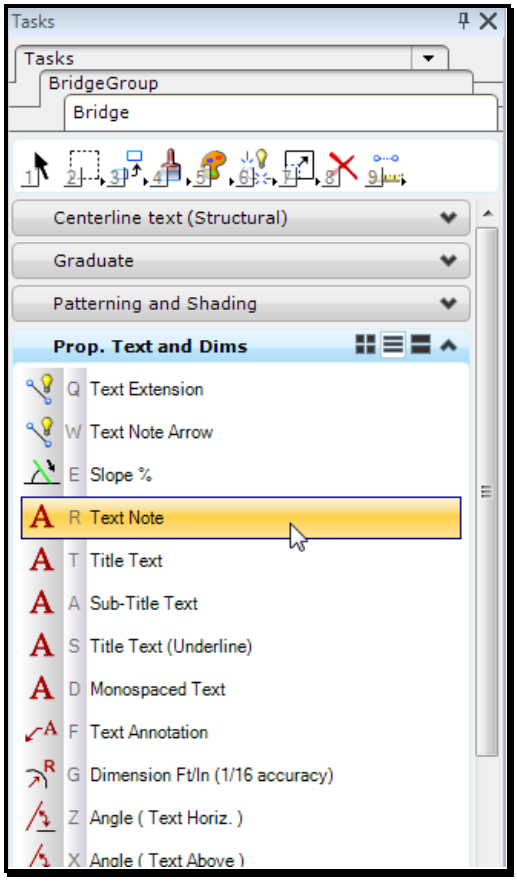


Figure 23-20: Proposed Text and Dimension Tasks

This will open up the **Text Editor** (Figure 23-21).

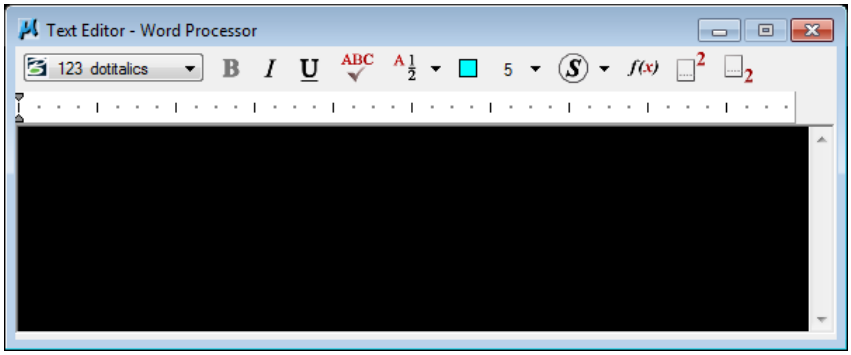


Figure 23-21: The Text Editor

It opens up because that *Task* 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.).

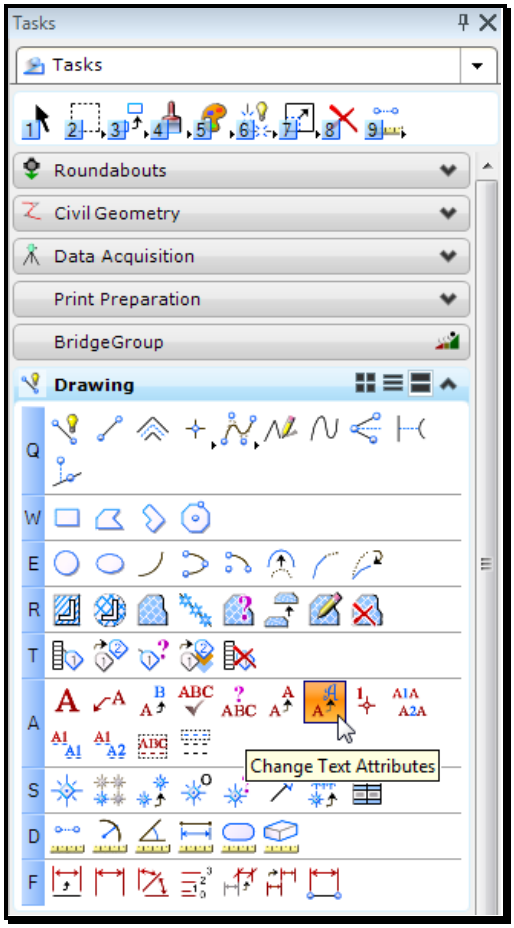


Figure 23-22: Change Text Attributes

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 **Tasks Menus** and choose the dimension *Task* that corresponds to the dimension that you need to change.

Once you have selected a *Task*, 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** Tasks (Figure 23-23) or from the Main Menu **Dimension > Update**.

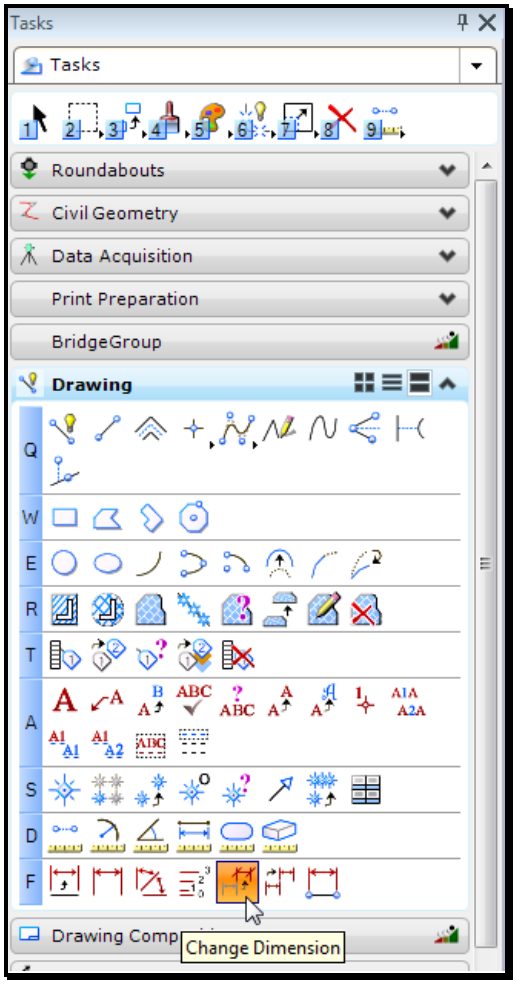


Figure 23-23: The Dimension Tasks

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 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 line styles as well.

Do this by going to the *Tasks Menus*, select your **Workgroup** > **Plan > Symbols & Linestyles > Bullet** (Figure 23-24).

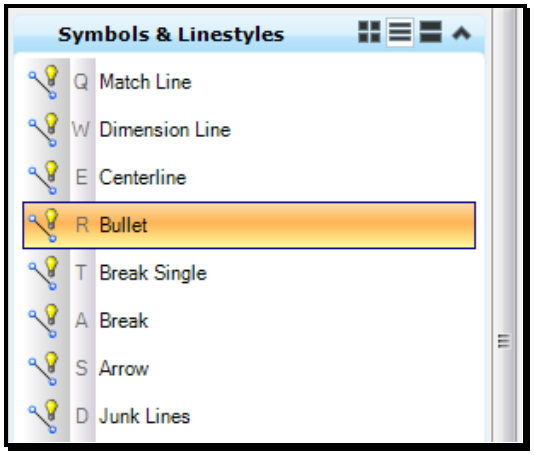


Figure 23-24: Structural Line Styles

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 *Tasks Menus* and go on to select *Change Element Attributes*.

This can be selected from the **Main Tool Tasks** 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.

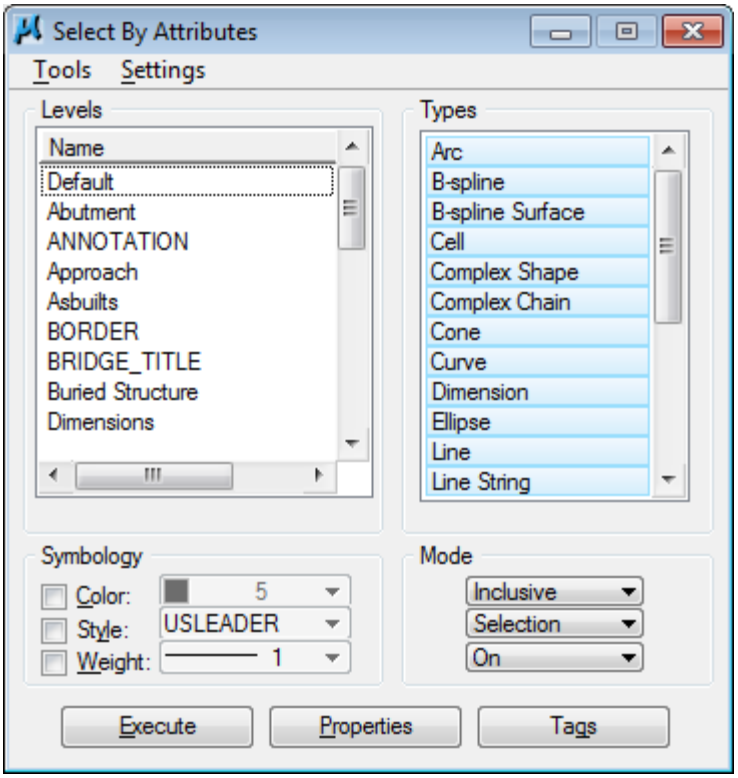


Figure 23-25:Select By Attributes

This utility allows you to select elements by Level, Symbology, and Type (Line, Arc, etc.)

- ✓ ***Refer to page 2-35 for a thorough discussion of Selecting by Attributes.***

TEXT TASKS

One of the primary functions of the *Tasks Menus* is to help us control text size on details of various scale. We have programmed a number of text settings into the *Tasks Menus*. 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 used the *Main Menu,* select **Settings > Drawing Scale.**

- ✓ ***Check page 2-25 for more information on the Drawing 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** *Task* 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 *Tasks* 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 *Tasks*, open up the **Text Dialog** by choosing **Element > Textstyles** from the Main Menu (Figure 23-26).

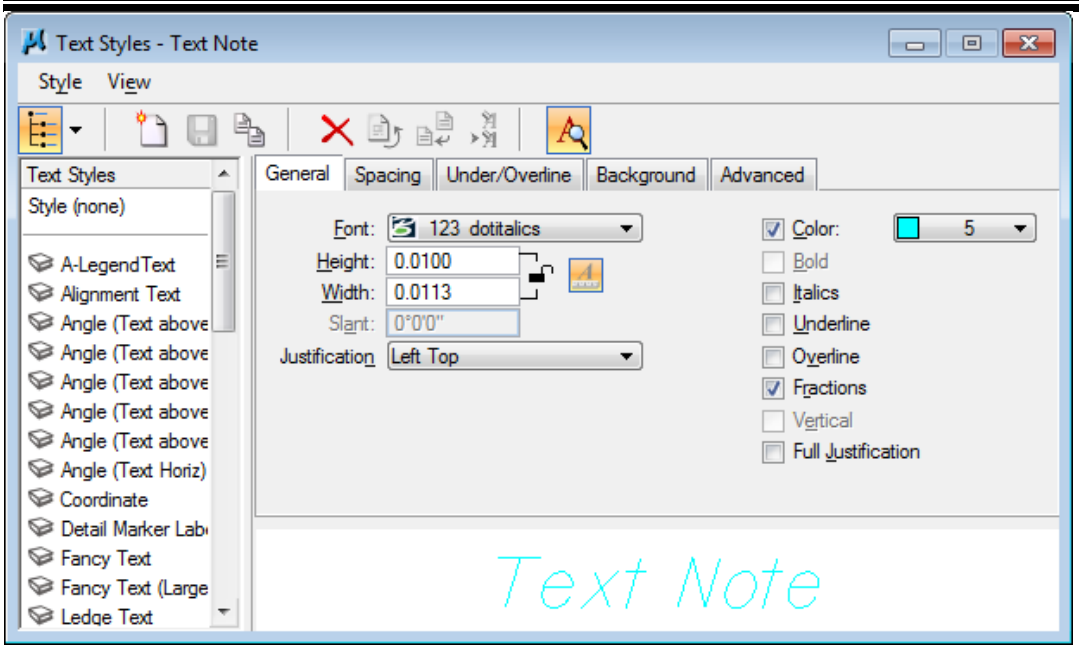


Figure 23-26: The Text Styles Dialog

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 **Tasks Menus**, 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** *Task*. 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).

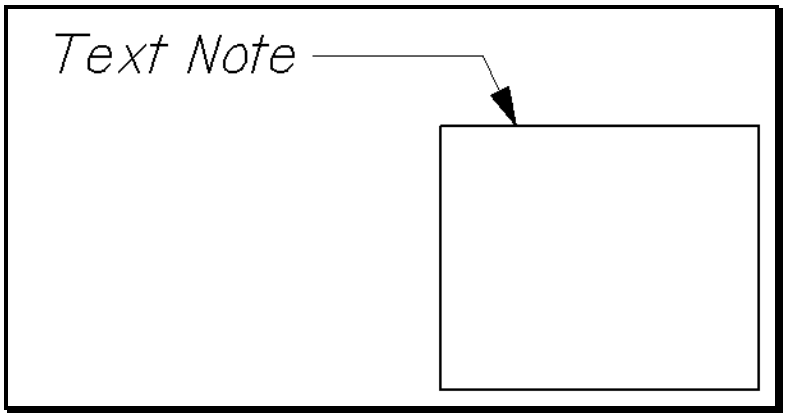


Figure 23-27: Sample Leader Line

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 V8i

Double-click your *MicroStation V8i* 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.

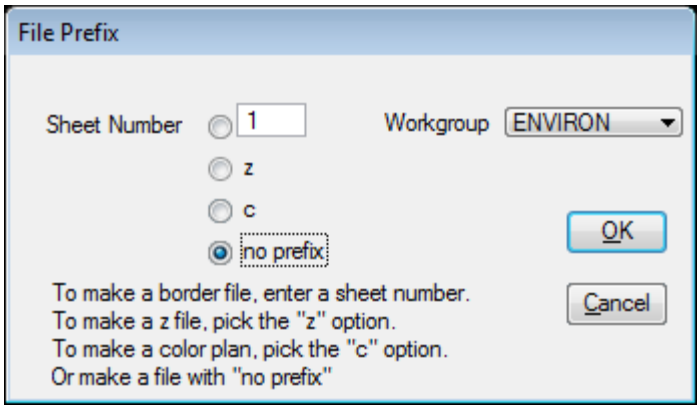


Figure 24-1: File Prefix and Workgroup Selected

From the list of available drawings pick MHPCPlan and click **OK** (Figure 24-2). This creates the new file and opens it.

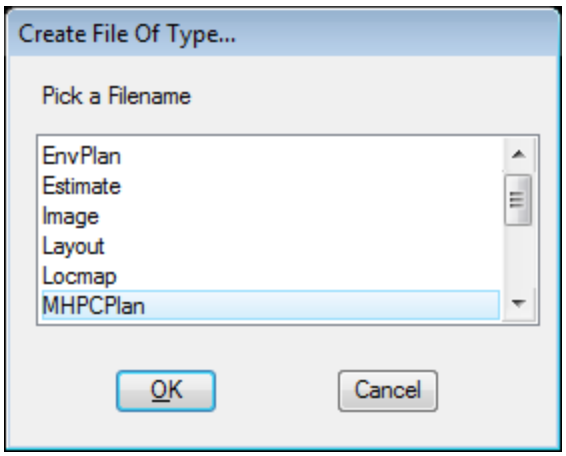


Figure 24-2: Select MHPCPlan

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).

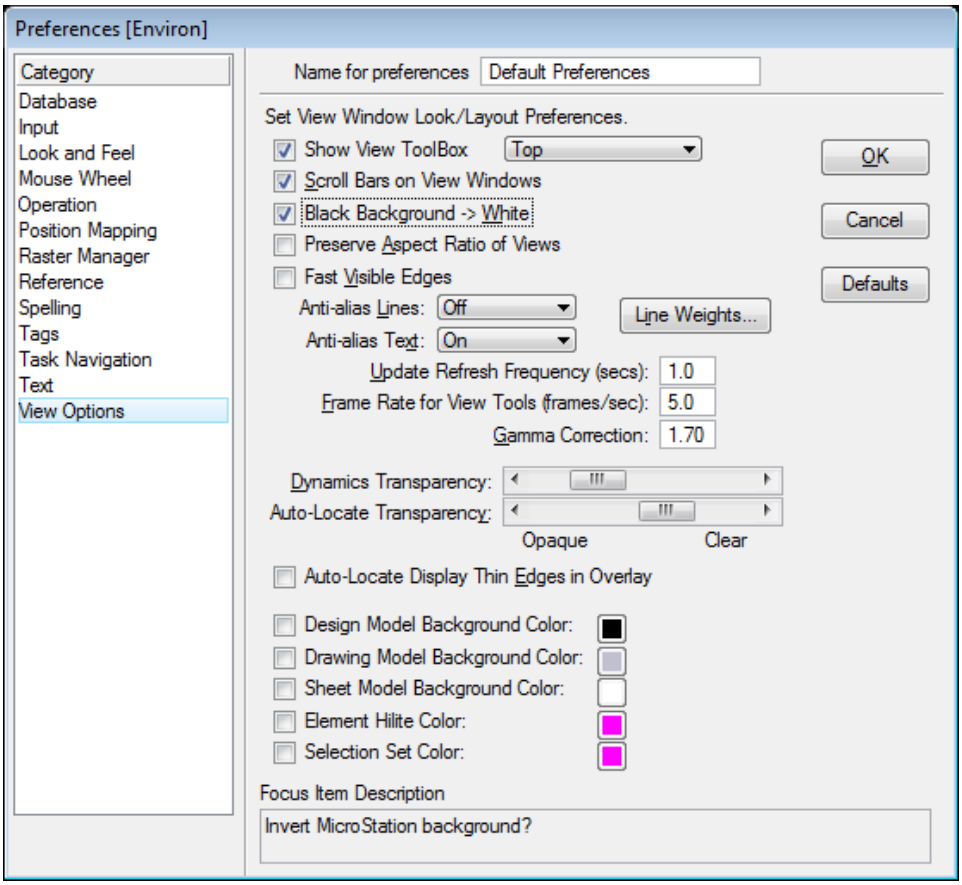


Figure 24-3: Preference set to White Background

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 24-9 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* enabled. It should set correctly by default. Contact CADD Support for more assistance.

ⓘ ***In attempts to stabilize this process, we created a pen table that <u>will not</u> use Symbology. Instead, the pen table 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" pen table. 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 *Tasks Menus*, select your **Workgroup > Plan > 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.

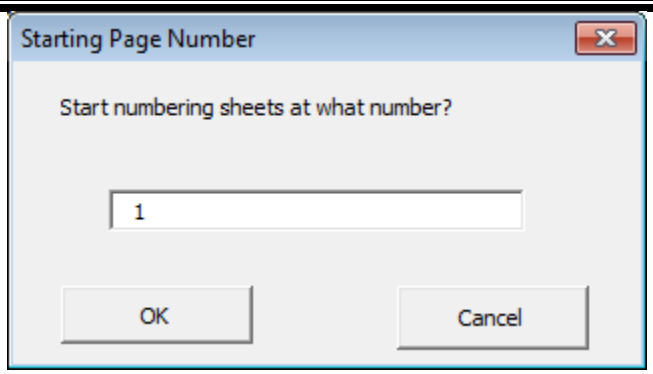


Figure 24-4: Start Numbering At?

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 1-67 if the variables do not get filled in with the proper information.***

Step Two: Place MHPC Legend

Select **Settings > Drawing Scale** from the *Main Menu*. Set the scale to 1 in. = 25 ft. or 1 in. = 50 ft.. From the *Tasks Menus,* select your **Workgroup > Plan > Create Plan Sheets.** (Figure 24-5).

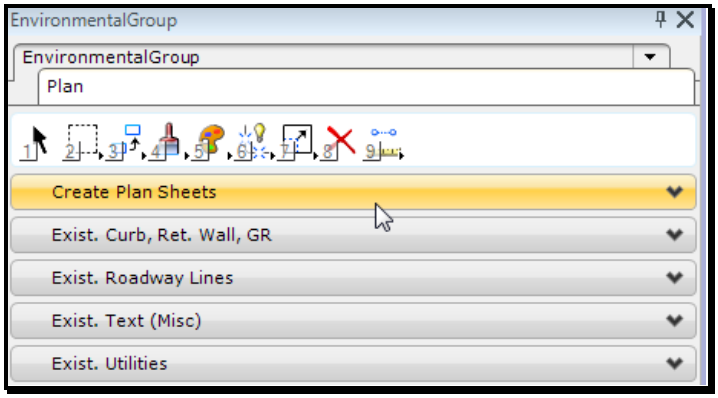


Figure 24-5: Create Plan Sheets

Select **MHPC Legend** from the **Create Plan Sheets** menu (Figure 24-6).

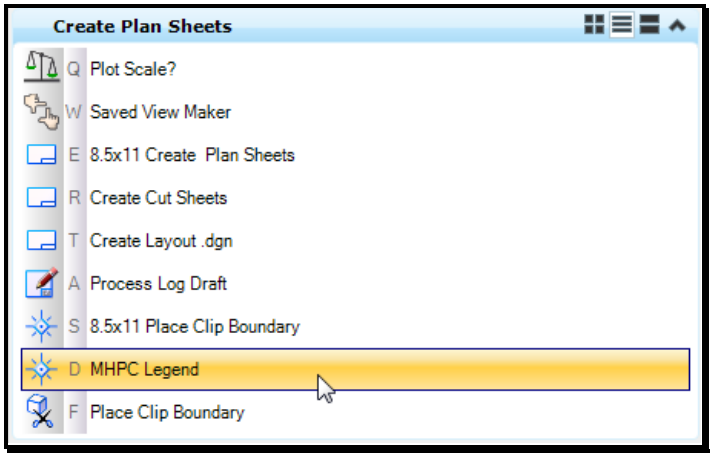


Figure 24-6: Pick MHPC Legend

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 pen table that will not use Symbology. Instead, the pen table 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" pen table. 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 **MHPCPlan.dgn** 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 AERIAL and WTLND_RARE VEG,** 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.

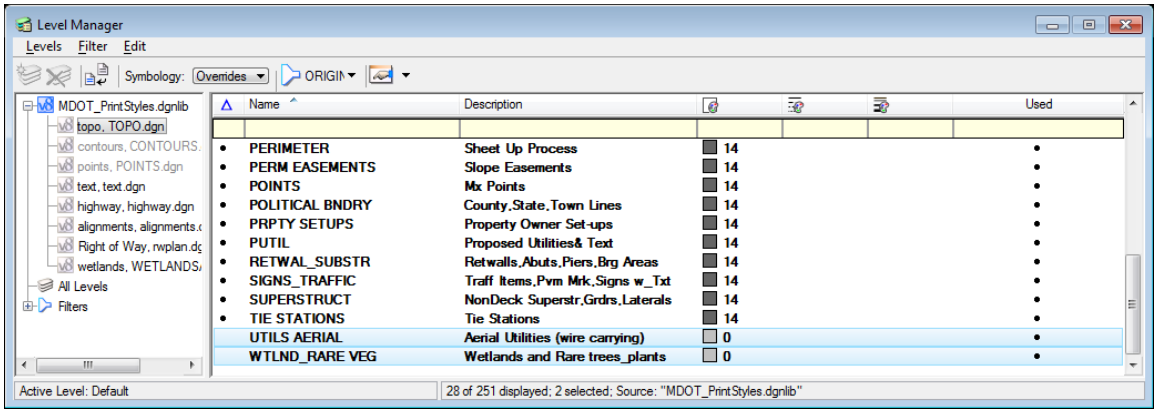


Figure 24-7: Example of selecting two levels within the topo reference file

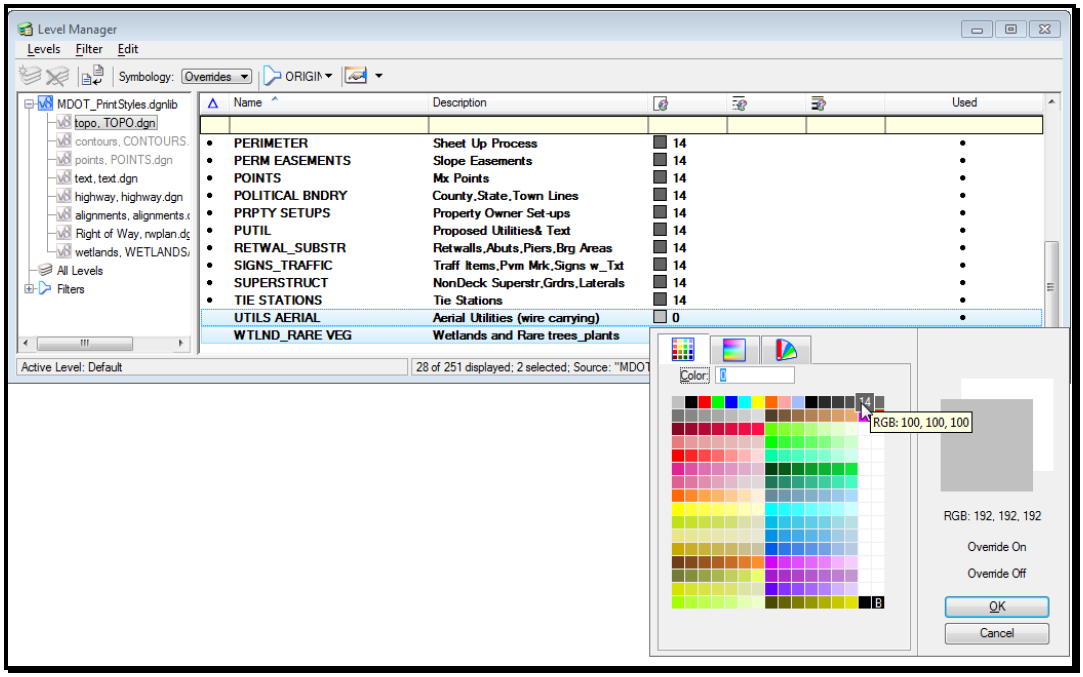


Figure 24-8: Example of selecting a new color for a level(s) within a reference file

Select **File > Save Settings** to save the adjustment.

PRINTING MHPC PLANS SHEETS

Step One: Open Print Organizer Dialog

Select **File > Print Organizer** from the *Main Menu*.

Step Two: Add Design Files

Select **File > Add Files to Set** from the Print Organizer menus. Click the *Add* button. Select all of your numbered MHPCplan drawings. Click Done.

Step Three: Select a Printer Style

Click the magnifying glass (Browse) Print Styles field on the Create Print Definitions dialog. Choose **US_HPCOLORRoom303**.

Step Four: Select a Display (Pentable)

Pentable that uses Level Symbology

Click the **Manually Specified Options** button on the *Create Print Definitions* dialog. This will bring up the *Print Definition Creation Options* dialog. Click the **Main** tab on the *Print Definition Creation Options* dialog. Click the magnifying glass (Browse) next to the *Pen table* field. Choose **Color_MHPCplans** and click **Open**. This pen table utilizes *Level Symbology*.

Pentable without Level Symbology

Click the **Manually Specified Options** button on the *Create Print Definitions* dialog. This will bring up the *Print Definition Creation Options* dialog. Click the **Main** tab on the *Print Definition Creation Options* dialog. Click the magnifying glass (Browse) next to the *Pen table* field. Choose **MHPC-no symbology** and click **Open**. This pen table does not utilize *Level Symbology*. Test this using method below.

ⓘ ***In attempts to stabilize this process, we created a pen table that <u>will not</u> use Symbology. Instead, the pen table 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" pen table. Use your preview in the print dialog to see if the colors are better represented.***

Step Five: Send the Plots

Click the printer icon or select **File > Print** from the *Print Organizer* 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 6 Survey Clean-up and treat an OrigTopoAdd_# and OrigTextAdd_# file as "Additional Topo Clean-up" (6-27).***
- ✓ ***Users should refer to Chapter 6 Survey Clean-up and treat an OrigWetlands as "Initial Wetlands Clean-up" (6-40).***

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 6-40 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 V8i

Double-click your *MicroStation V8i* 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: Printing - Create a New Print Set

Part One: Open Print Organizer Dialog

Select **File > Print Organizer** from the *Main Menu*.

Part Two: Add Design Files

Select **File > Add Files to Set** from the Print Organizer menus. 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 Three: Select a Printer Style

Click the magnifying glass (Browse) Print Styles field on the Create Print Definitions dialog. Choose **US_OCE9800FULL** or **US_OCE9400FULL**. Click OK.

Part Four: Select a Display (Pentable)

Click the **Manually Specified Options** button on the *Create Print Definitions* dialog. This will bring up the *Print Definition Creation Options* dialog. Click the **Main** tab on the *Print Definition Creation Options* dialog. Click the magnifying glass (Browse) next to the *Pen table* field. Choose **graysurvey_wetlands** and click **Open**.

Part Five: Save your Print Set

Select **File > Save As…** and give you Print Set a logical name so you can print it again if the need arises (i.e., Wetland_ck_OCE9800.pset).

Part Six: Send the Plots

Click the printer icon or select **File > Print** from the *Print Organizer* 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 *Tasks Menus,* select your **Workgroup > Plan > 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.

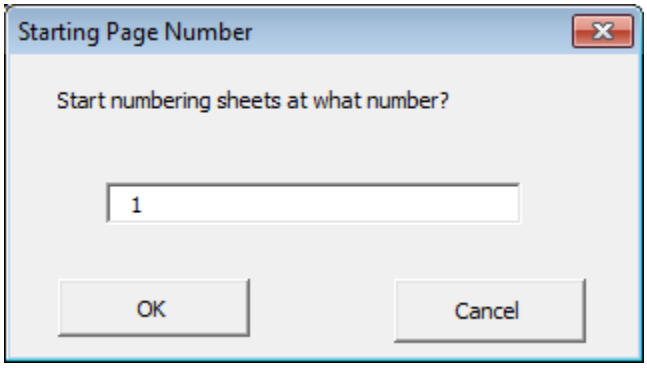


Figure 24-9: Start Numbering At?

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: Printing - Create a New Set

Part One: Open Print Organizer Dialog

Select **File > Print Organizer** from the *Main Menu*.

Part Two: Add Design Files

Select **File > Add Files to Set** from the Print Organizer menus. Select all of the plan sheet drawings you just created (i.e., 001_Wetlands1.dgn). Click the **Add** button. Click **Done**.

Part Three: Select a Printer Style

Click the magnifying glass (Browse) Print Styles field on the Create Print Definitions dialog. Choose **US_XEROX6279BFULL** or **US_XEROX6204FULL**. Click **OK**.

Part Four: Select a Display (Pentable)

Click the **Manually Specified Options** button on the *Create Print Definitions* dialog. This will bring up the *Print Definition Creation Options* dialog. Click the **Main** tab on the *Print Definition Creation Options* dialog. Click the magnifying glass (Browse) next to the *Pen table* field. Choose **graysurvey_wetlands** and click **Open**.

Part Five: Save your Print Set

Select **File > Save As…** and give you Print Set a logical name so you can print it again if the need arises (i.e., Wetland_ck_XEROX6279B.pset).

Part Six: Send the Plots

Click the printer icon or select **File > Print** from the *Print Organizer* 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 V8i

Double-click your *MicroStation V8i* 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 **Settings > Locks > ACS Plane Snap.** Key-in az=0 in the Key-in dialog and press Enter. Click in the CAD View.

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

Step Four: Set the Drawing Scale

Select **Settings > Drawing Scale** from the *Main Menu***.** 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.

Step Five: Cross Hatching Wetlands

Part One: Select Hatching

From the *Tasks Menus*, select your **Workgroup > Plan > 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 *Scale* set in the *Drawing Scale* dialog. 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.

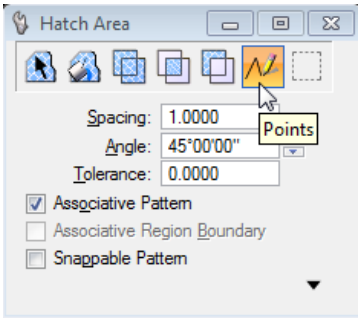


Figure 24-10: Hatch Area/Cross Hatch Area Dialog Settings

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: 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*.

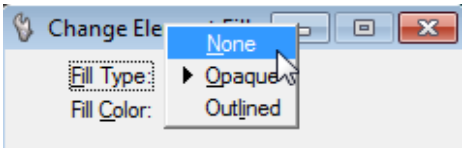


Figure 24-11: Change Fill Type to None

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 **Settings > Locks > ACS Plane Snap.** Key-in az=0 in the Key-in dialog and press Enter. Click in the CAD View.

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

Step Two: Set the Drawing Scale

Select **Settings > Drawing Scale** from the *Main Menu.* 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.

Step Three: Set the Text Attributes

From the *Tasks Menus,* select your **Workgroup > Plan > 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.*

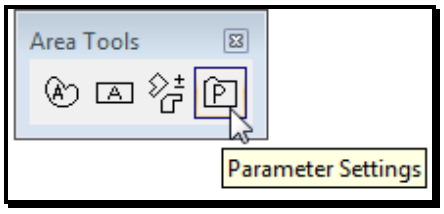


Figure 24-12: Area Parameter Settings

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.

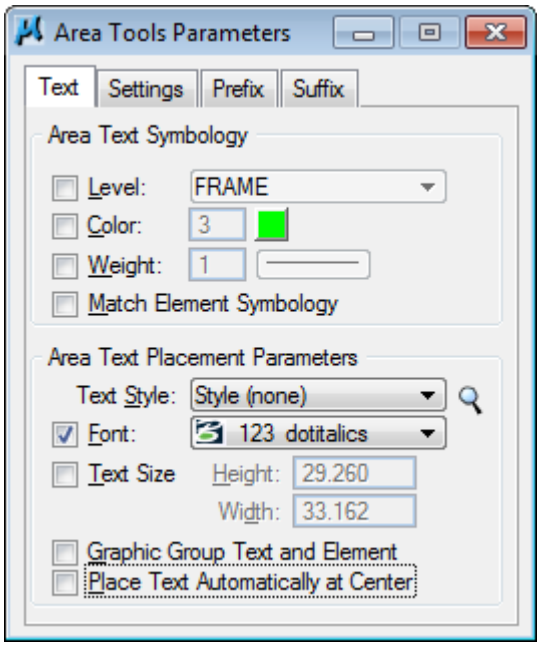


Figure 24-13: Adjust Text Font to 123 dotitalics

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.

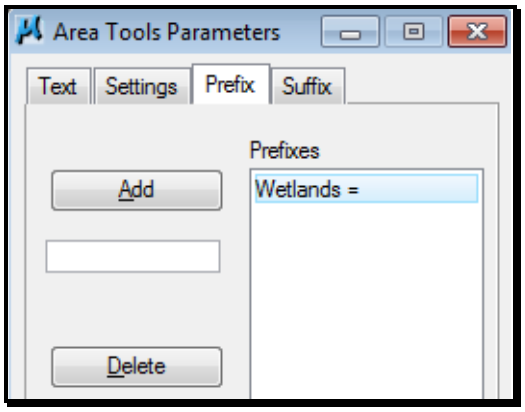


Figure 24-14: Add a prefix

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.). You're limited to ten characters.

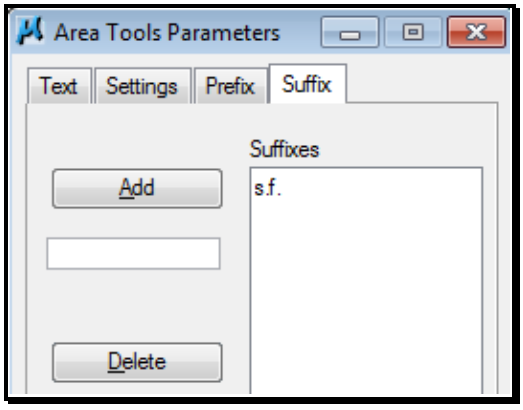


Figure 24-15: Add Suffixes

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.*

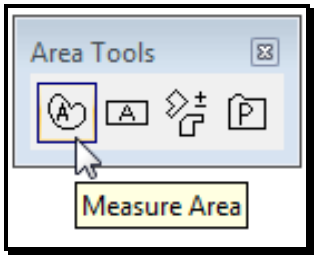


Figure 24-16: Measure Area Tool

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 *Tasks Menus* first in order for the arrowhead to be filled in.

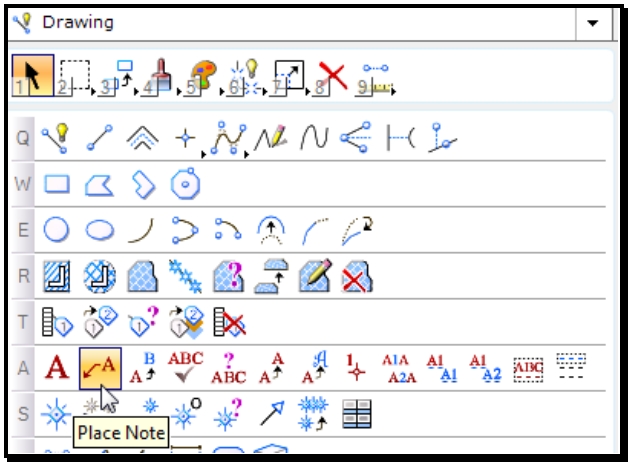


Figure 24-17: Place Note tool

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.

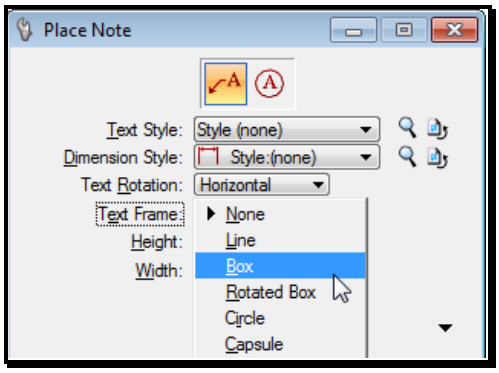


Figure 24-18: Using a Box text Frame

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

Select **Settings > Drawing Scale** from the *Main Menu*. Select the scale you want to use for your cut sheets. 1 in. = 50 ft 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

From the *Tasks Menus*, select your **Workgroup > Plan > Create Plan Sheets > Place Clip Boundary 8.5x11**. 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 *Tasks Menus*, select your **Workgroup > Plan > 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).

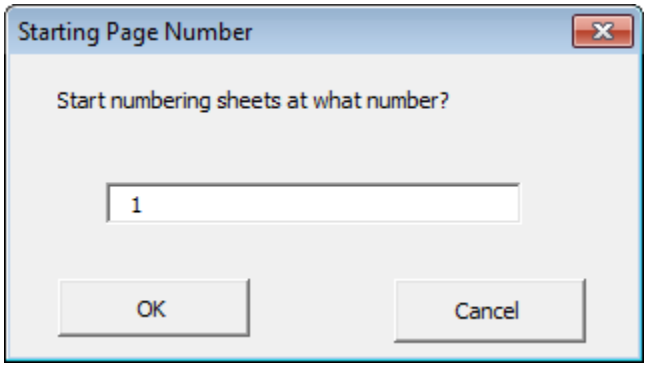


Figure 24-19: Start Numbering At?

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 1-67 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.***

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 7-5 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 1-57 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 2-72 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.

PRINTING 8 ½ X 11 CUT SHEETS

Step One: Open Print Organizer Dialog

Select **File > Print Organizer** from the *Main Menu*.

Step Two: Add Design Files

Select **File > Add Files to Set** from the Print Organizer menus. Select all of the plan sheet drawings you just created (i.e., 001_EnvPlan1.dgn). Click the **Add** button. Click **Done**.

Step Three: Select a Printer Style

Click the magnifying glass (Browse) Print Styles field on the Create Print Definitions dialog. Choose the appropriate Printer Style. Click **OK**.

Step Four: Select a Display (Pentable)

Click the **Manually Specified Options** button on the *Create Print Definitions* dialog. This will bring up the *Print Definition Creation Options* dialog. Click the **Main** tab on the *Print Definition Creation Options* dialog. Click the magnifying glass (Browse) next to the *Pen table* field. Choose the appropriate Pentable and click **Open**.

Step Five: Save your Print Set

Select **File > Save As…** and give you Print Set a logical name so you can print it again if the need arises (i.e. EnvPlan_ArmyCorp_printer.pset).

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 *Print Organizer* 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 Print Style will send your plots to the printer associated with the Print Style.

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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 (line styles) 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, line styles, 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.**

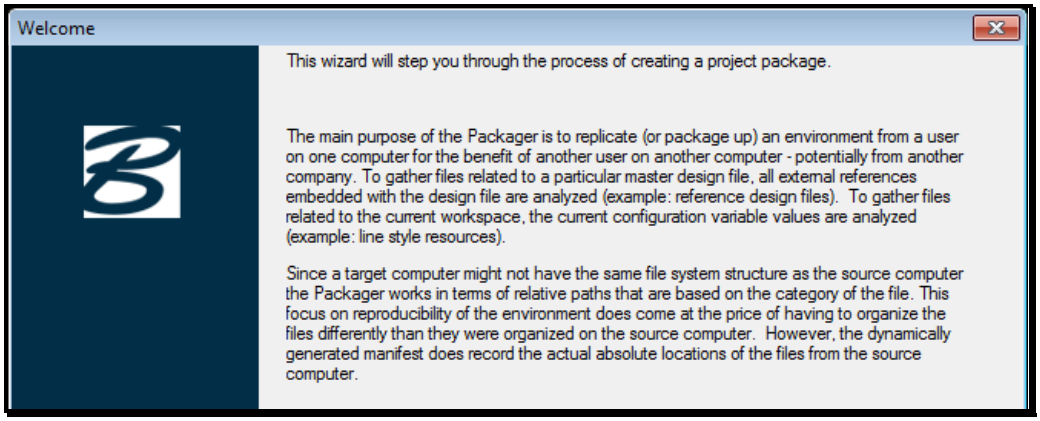


Figure 27-1: Create Package Welcome dialog

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.**

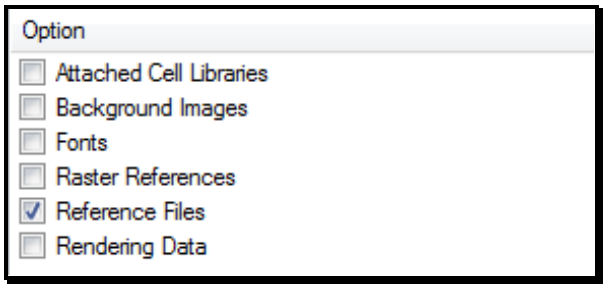


Figure 27-2: Design Options

- 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.**

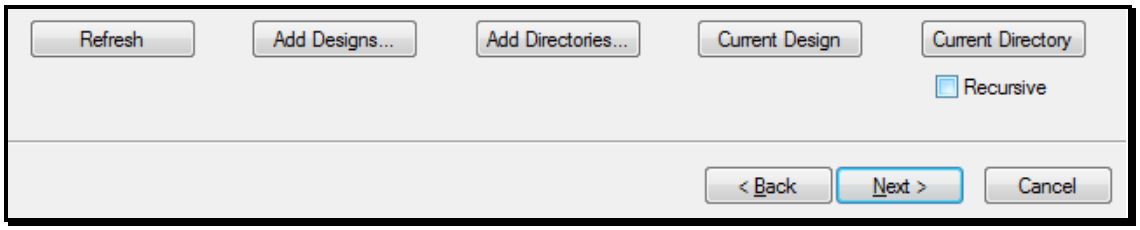


Figure 27-3: Create Package dialog – Recursive un-checked

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.**

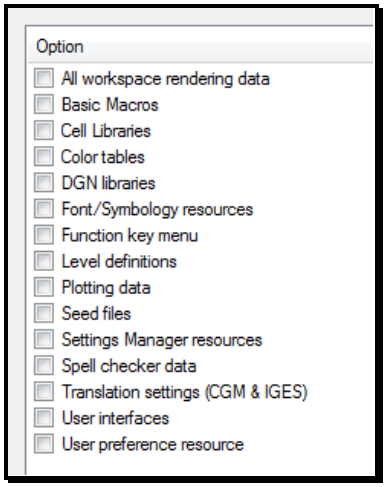


Figure 27-4: Workspace Options

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.**

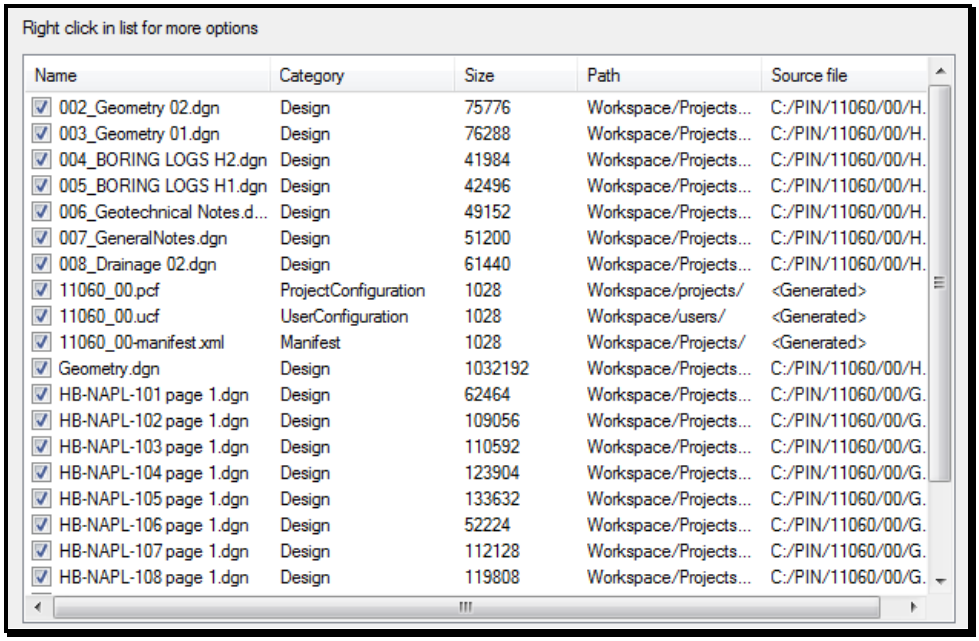


Figure 27-5: Review Selections dialog

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.**

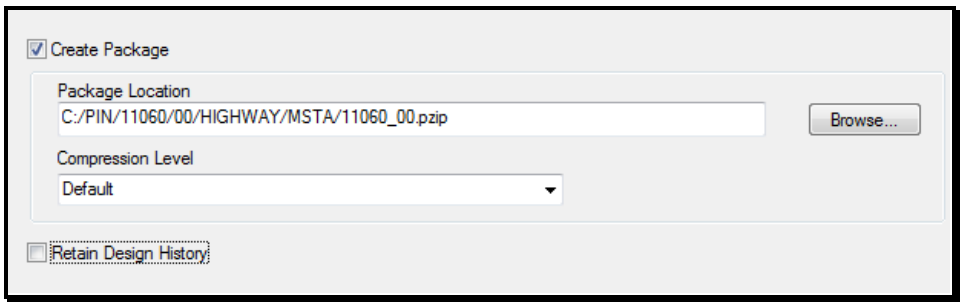


Figure 27-6: Adjust Path Options

- 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.

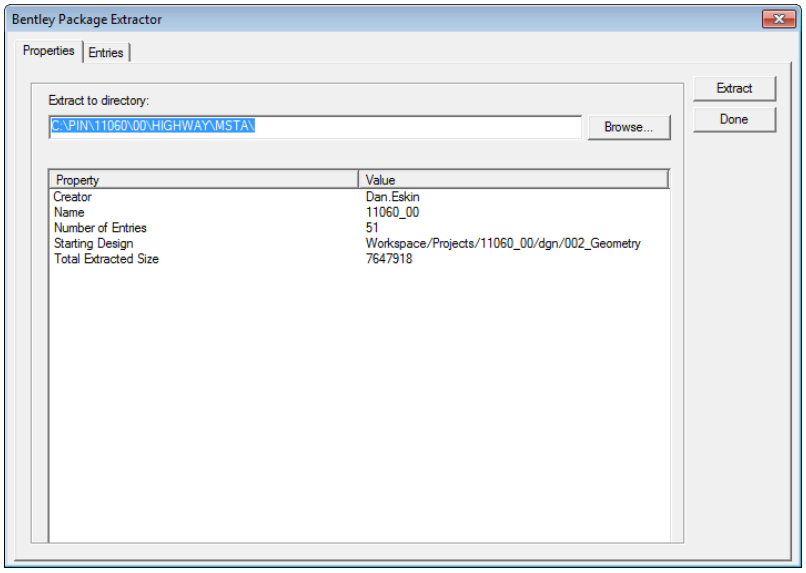


Figure 27-7: properties Tab in the PZIP

The *Entries* tab (Figure 27-8) displays the files that have been packaged.

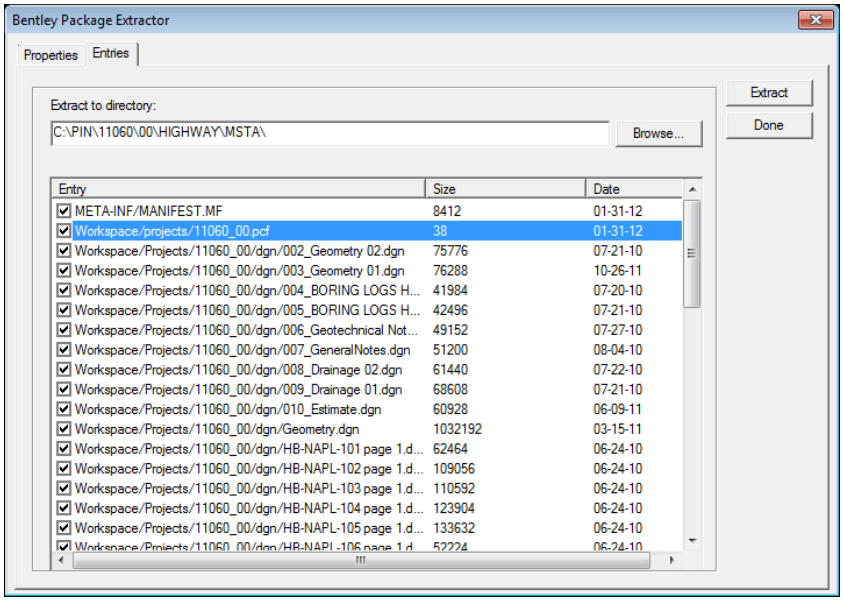


Figure 27-8: Entries Tab

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 its own within the target folder.

Step Four: Extracting the Package File

Click the *Extract* button (Figure 27-8). When Prompted to "Launch MicroStation?", click **No**. (Figure 27-9)

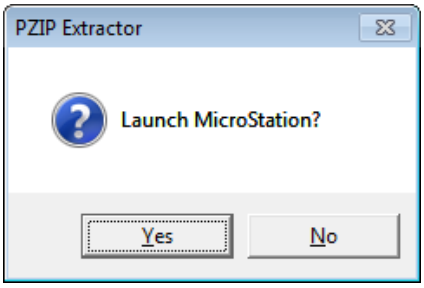


Figure 27-9: Do Not Launce MicroStation – Click No

- 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.

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, *Print Organizer* 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: http://www.maine.gov/mdot/caddsupportmsinroads/inroadsnaming.htm .***

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*.

ⓘ ***Do not 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 1-62 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: Launch Border Information 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.

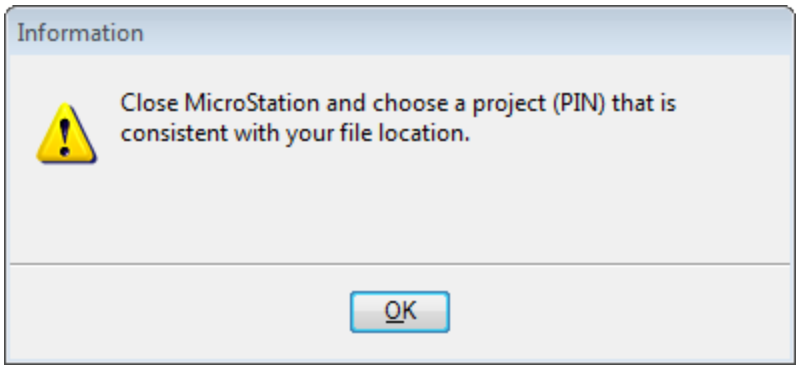


Figure 28-1: Close MicroStation and pick correct PIN.

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 1-69 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 *Print Organizer* 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.

Printing to a Multi-page PDF

Step One: Open Print Organizer

Select **File > Print Organizer** from MicroStation's *Main Menu*. If you have a saved *Batch Print* ".job" file or *Print Set* file (.pset) of your final plans, select that one using **File > Open**.

Step Two: Add Files

Select **File > Add Files to Set** 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). Select **File > Save As…** and save the Print Set file (.pset) as **PIN- FinalPlans.** The name of the PDF file will be the same as Print Set file name.

Step Three: Apply the Printer Style

Select **Tools > Apply Print Style** from the *Print Organizer* dialog. Select the **US_pdf-fullsize** printer from available Print Style Names (Figure 28-2).

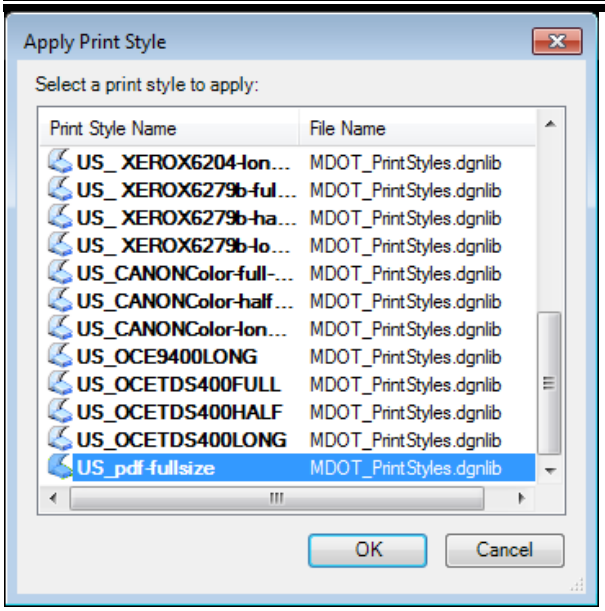


Figure 28-2: Selecting a printer from the Printer Setup.

Step Four: Print to Multi-Page PDF

Select **File > Print…** from the *Print Organizer* dialog (Figure 28-3).

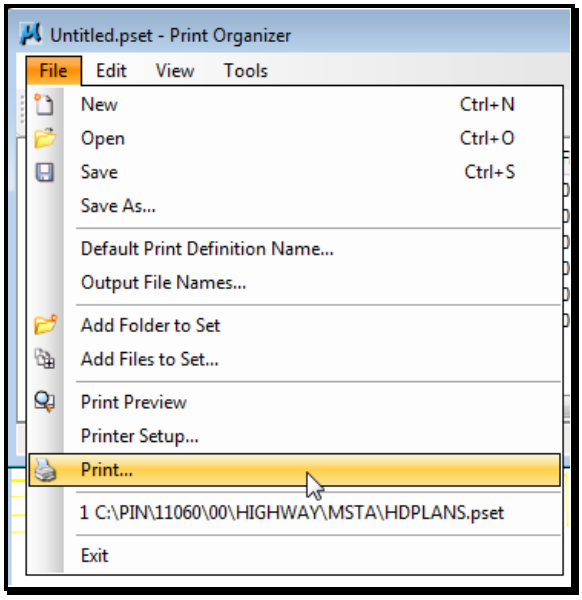


Figure 28-3: Select File > Print from the Print Organizer dialog.

Step Five: Add PDF File Name

When the *Print* dialog opens, enable the *All* option (Figure 28-4). Click the magnifying glass button.

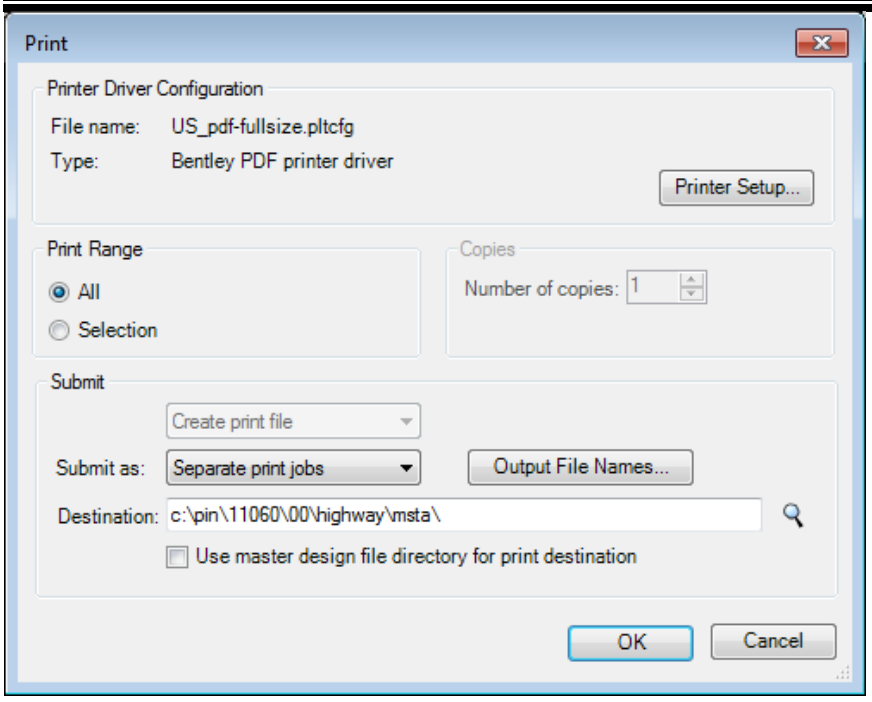


Figure 28-4: Browse to the Contracts folder of your PIN.

Browse to your project's **CONTRACTS** folder (Figure 28-5). Click **OK.**

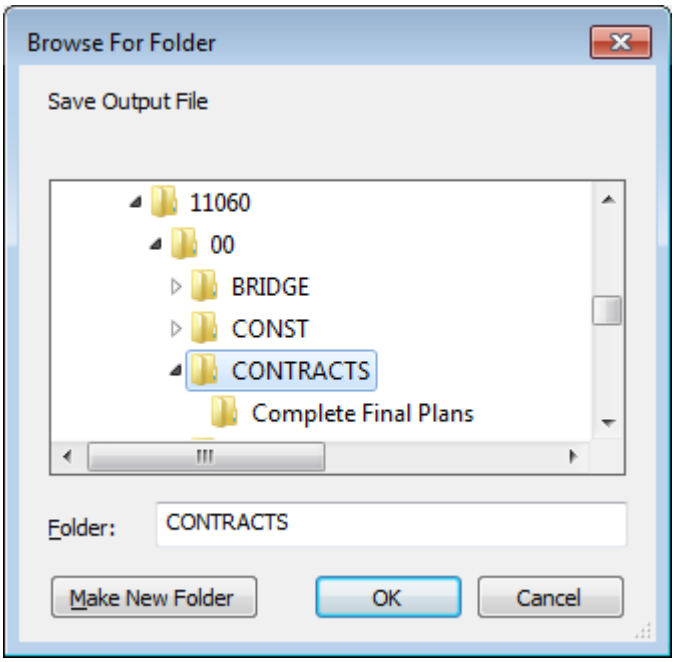


Figure 28-5: Browse For Folder dialog.

Once the path has been set, it will be displayed in the *Print* dialog (Figure 28-6). Select **OK** to start the printing.

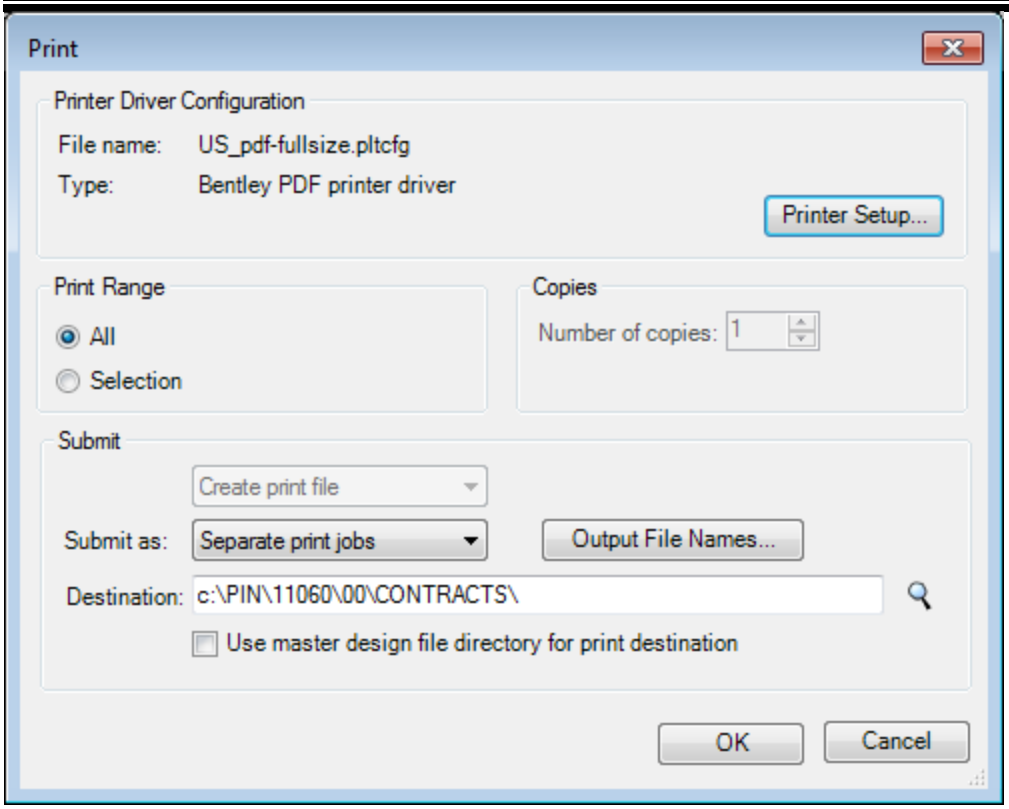


Figure 28-6: Print dialog with the path established.

The multi-page PDF file will be created in the **CONTRACTS** folder.

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 without 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 *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:\!msV8iconf\standards\data folder nod select **Set Design History.txt** *Command File.* Click **OK.**

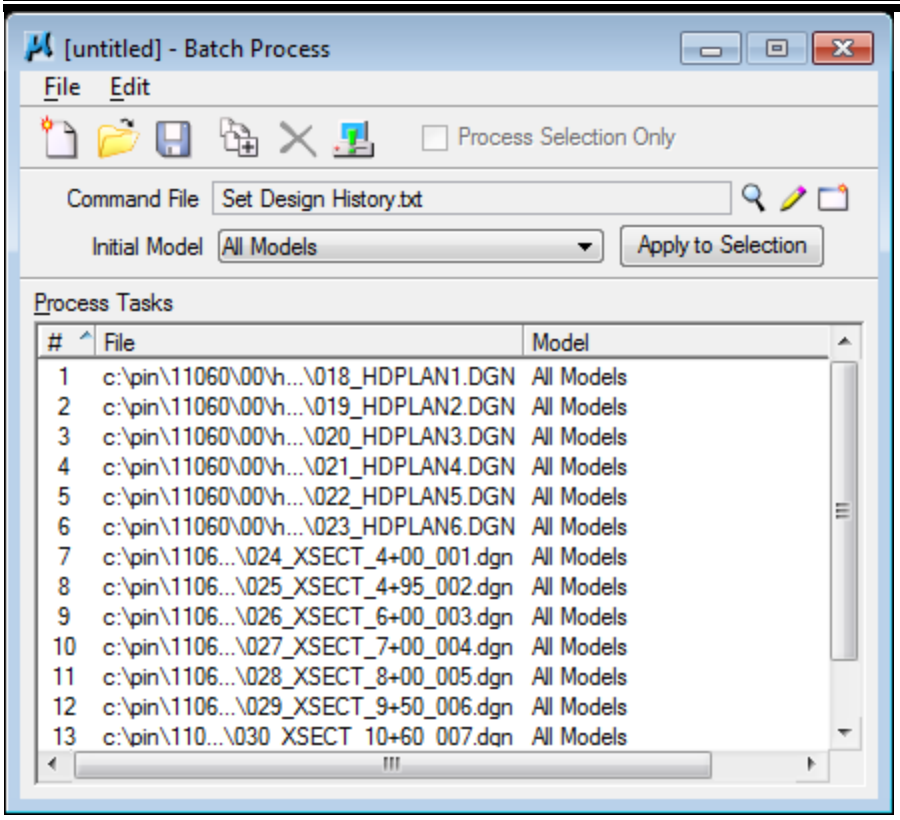


Figure 28-7: Batch Process Dialog.

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).

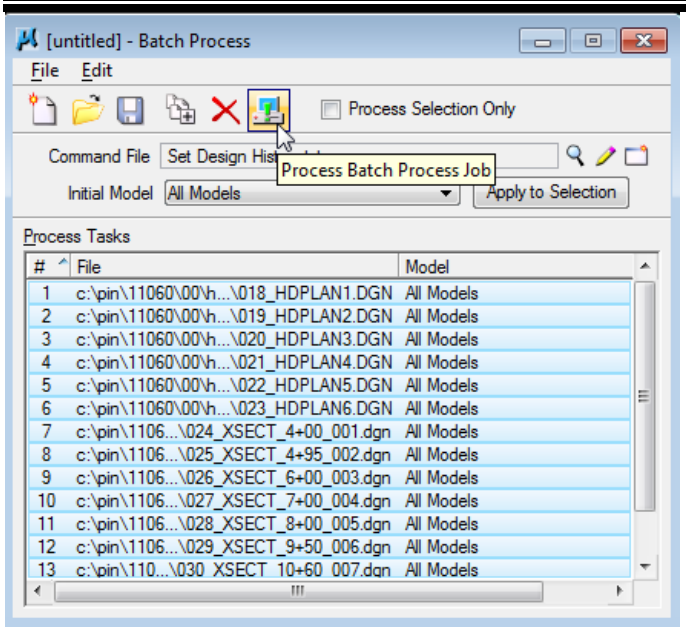


Figure 28-8: Batch Process dialog displaying Process Batch icon.

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.

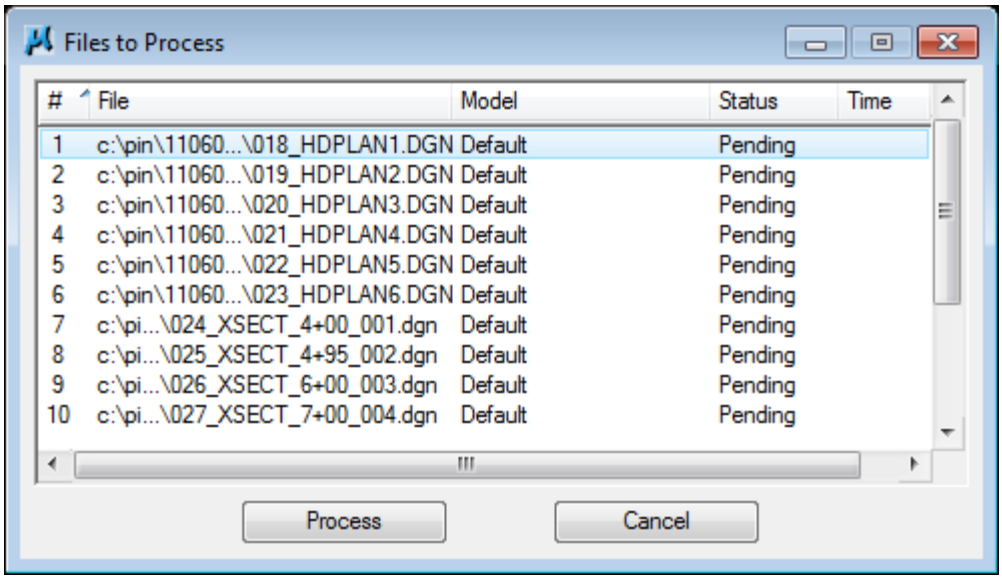


Figure 28-9: Files to process dialog.

- 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 V8i

Launch MicroStation V8i 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
Figure 28-10: 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.**

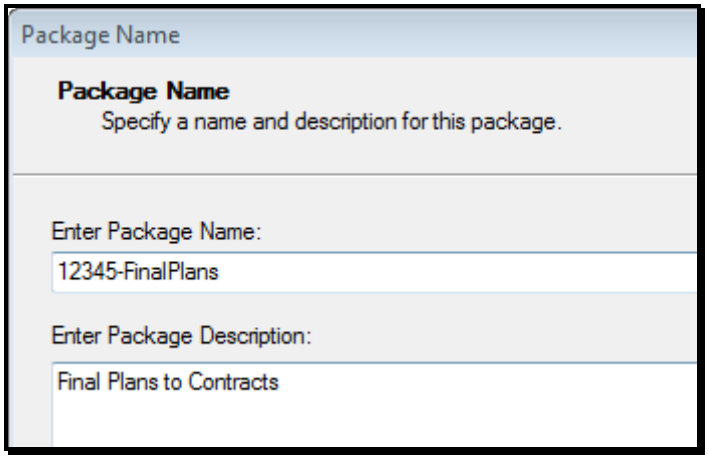


Figure 28-11: Enter the Package Name and Description

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.**

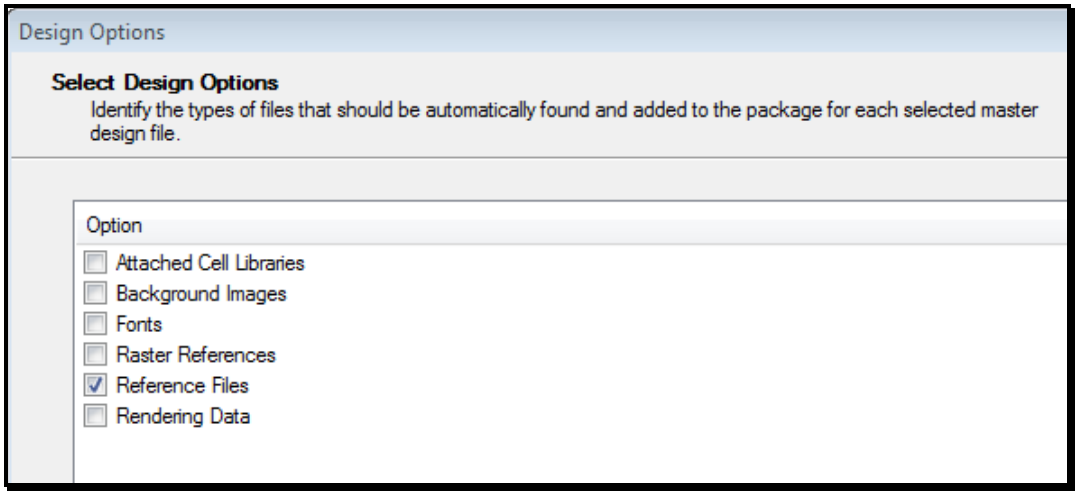


Figure 28-12: Select Reference Files as the only Design Option

Step Five: Select Project Files

The *Add Designs* 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.**

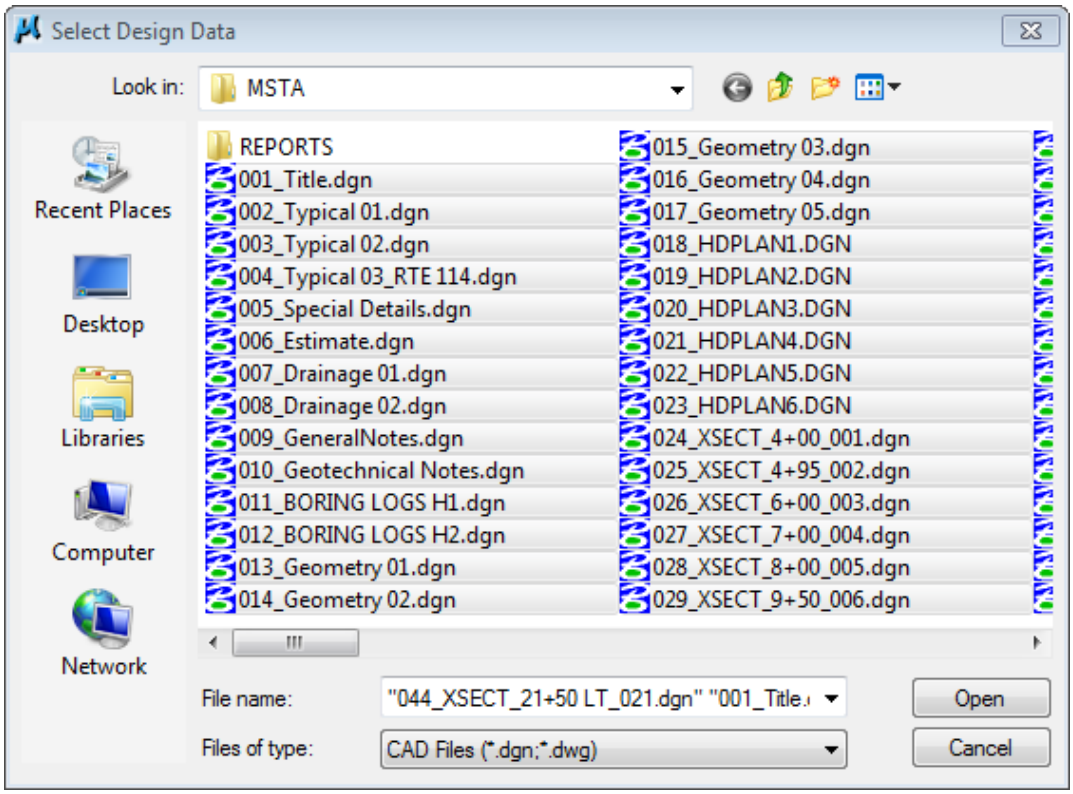


Figure 28-13: Browse and select all 3 digit prefix drawings only

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 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 *Tasks Menus* 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.

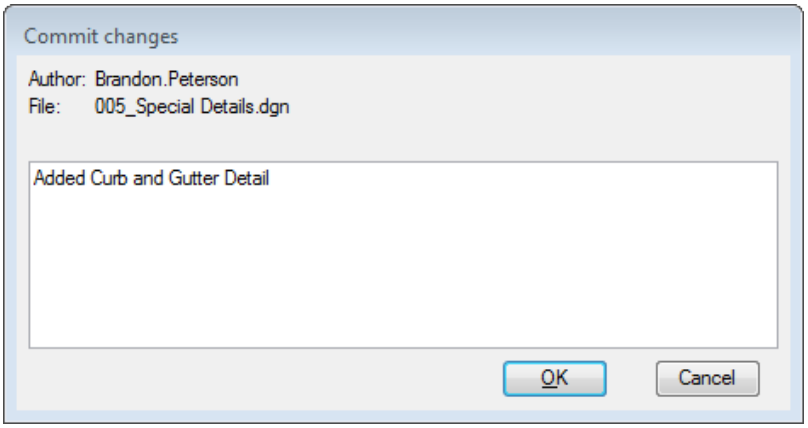


Figure 29-1: Add a brief description to the Commit Changes dialog

- 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 Tasks Menus

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), line styles (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. Select the *Maine DOT WorkGroup* of **ConstructionGroup**, then the correct **sub task (i.e. PlanAS) > Symbols & Linestyles > As-Built Triangle (Large)** and left-click to place. To place a triangle in the Signature Block, select **As-Built Triangle (Title Block)**. Select **Qualities > Drop > Complex (Cell, Chain, etc.)** from the *Main Menu* and left-click on the triangle, and left-click again anywhere 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 by using the *Tasks Menus.* Select the *Maine DOT WorkGroup* of **ConstructionGroup**, then the correct **sub task (i.e., PlanAS) > 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.

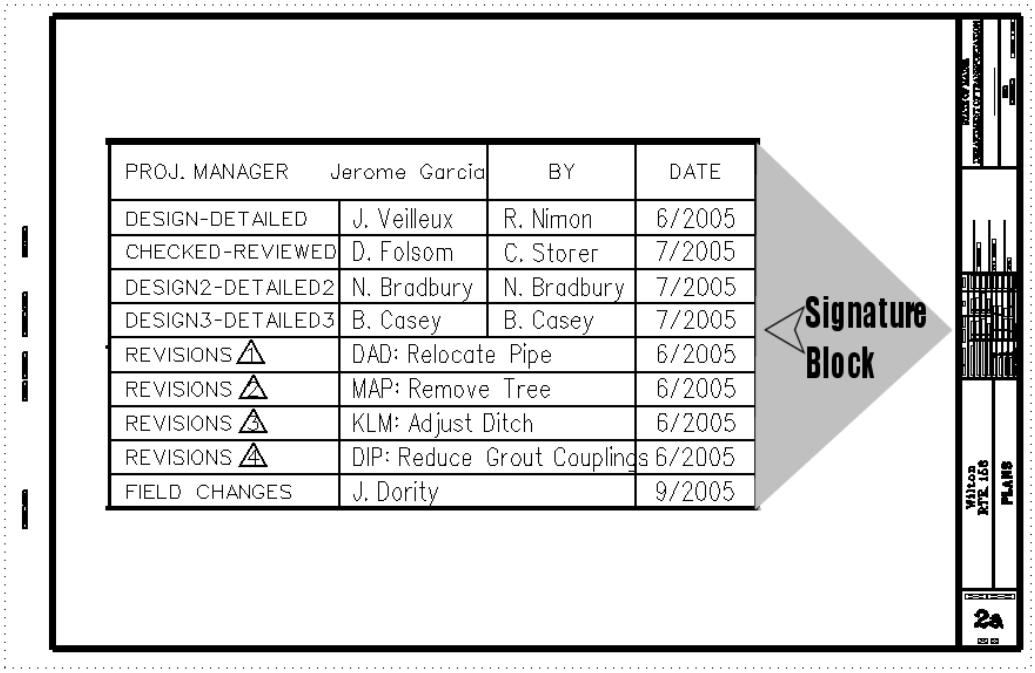


Figure 29-2: US Customary signature block with revision triangles

Metric plan sets may require an expansion to the signature block to cover the revisions (**Error! Reference source not found.**). Use a variety of MicroStation tools to accomplish this.

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.**

Printing 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 *Print Organizer*, 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 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 rotation when 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.

The As-Built tools are under the *Maine DOT WorkGroup* drop-down *Task Menu* of **ConstructionGroup**. The correct sub task needs to be selected next (SectionAS, ProfileAS, PlanAS or BridgesAS), this will help users get the elements on the desired level**.**

Launch MicroStation V8i

Launch the *MicroStation V8i* 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 **Const**. 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.

Construction WorkGroup

We have a *Construction WorkGroup* that will be used when conducting Change Order/As-Built mark-ups. This will automatically load based on the *User* selection being set to **Const**. The As-Built work done on the paper copy of the plan set will be reproduced using the *Tasks Menus* 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.

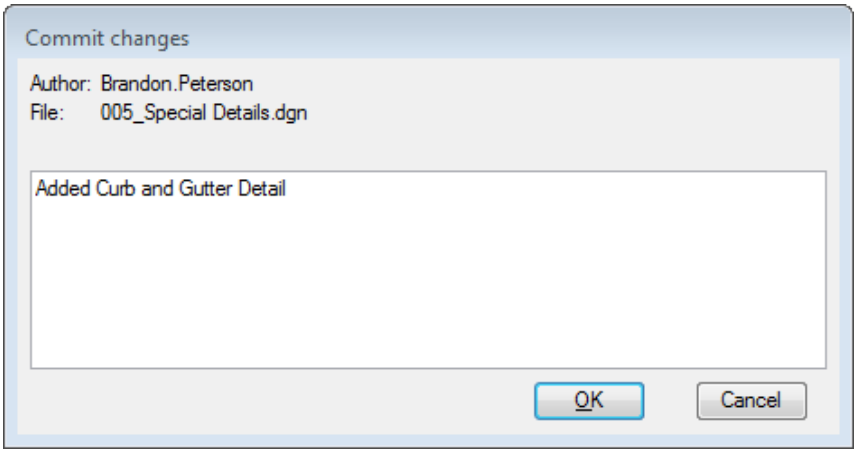


Figure 30-1: Add a brief description to the Commit Changes dialog

- ✓ ***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 **ConstructionGroup** *Tasks Menu* contains the same tools and settings that a detailer or designer used throughout the life cycle of a design with the addition of some *Line Styles and Symbols* to help standardize the look of As-Built drawings. Select the correct **sub task** (**SectionAS, ProfileAS, PlanAS** or **BridgesAS**), then expand **Symbols and Linestyles** from the left side of the *Task Menu* and select one of the tools.

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" pipe culvert was constructed at Station 103+50, whereas the plans called for a 2' x 63'-3" 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 *Tasks Menus* discussed above, 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 **ConstructionGroup** *Tasks Menu* 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 **ConstructionGroup** select the correct **sub task (i.e., PlanAS) > Symbols & Linestyles > Revision Cloud** and left-click to place a shape around a change to help make it apparent to anyone reviewing the plans.

Revision Triangles

Select the *Maine DOT WorkGroup* of **ConstructionGroup**, then the correct **sub task (i.e., PlanAS) > Symbols & 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 use 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. Select the *Maine DOT WorkGroup* of **ConstructionGroup**, then the correct **sub task (i.e., PlanAS) > Symbols & 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.

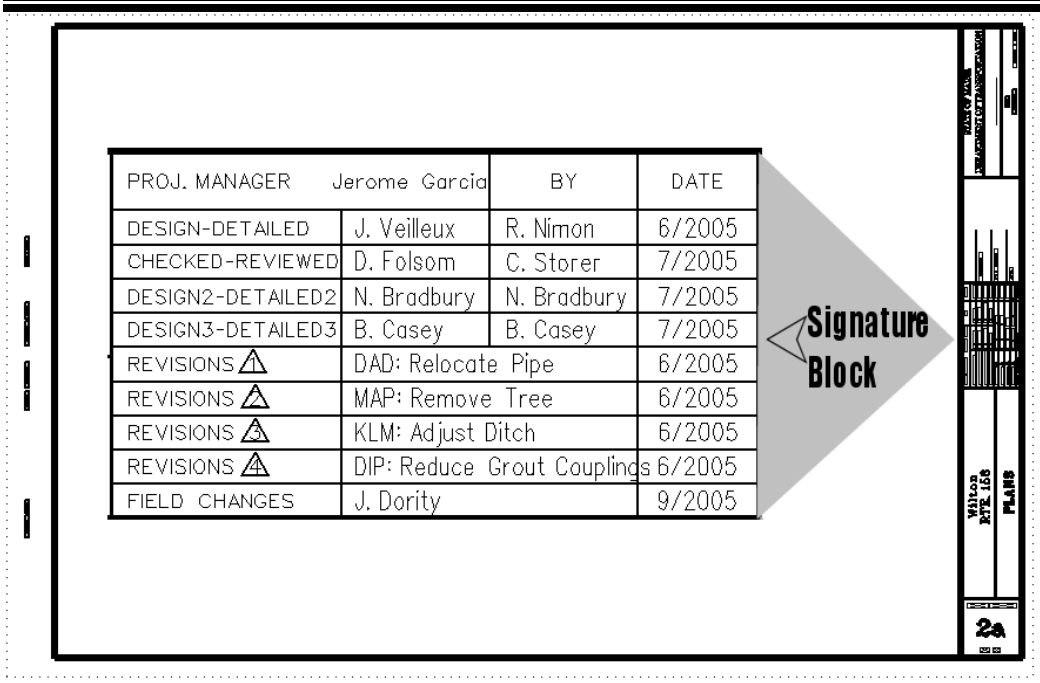


Figure 30-2: US Customary signature block

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 *Print Organizer*, 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** *pen table*. 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 CANONCOLOR 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 **CANONCOLOR** by the Reproduction staff. The CANONCOLOR 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 CANONCOLOR 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 **CANONColor-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 28-18 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

DRAWING SCALES

Overview

The following scales are available through MicroStation's *Drawing Scale* dialog. 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
1" =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. (Full Size 1=1)
Typicals	1" = 4' or 1/4" =1' (48)
Estimate	12"=1ft. (Full Size 1=1)
Drainage	12"=1ft. (Full Size 1=1)
Notes	12"=1ft. (Full Size 1=1)
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

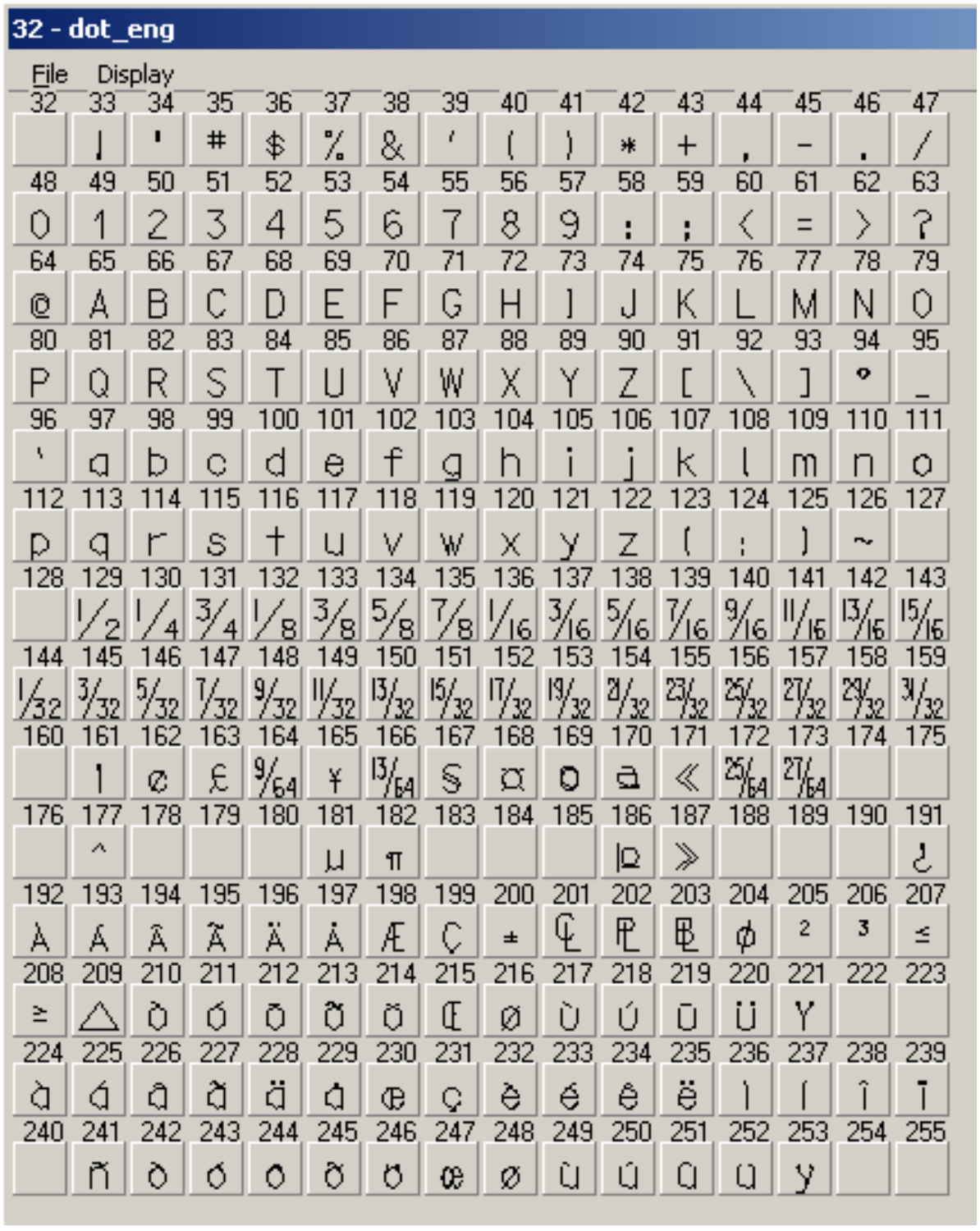


Figure 31-1: Character Map of Font 32, DOT_ENG

FONT 123 DOTITALICS

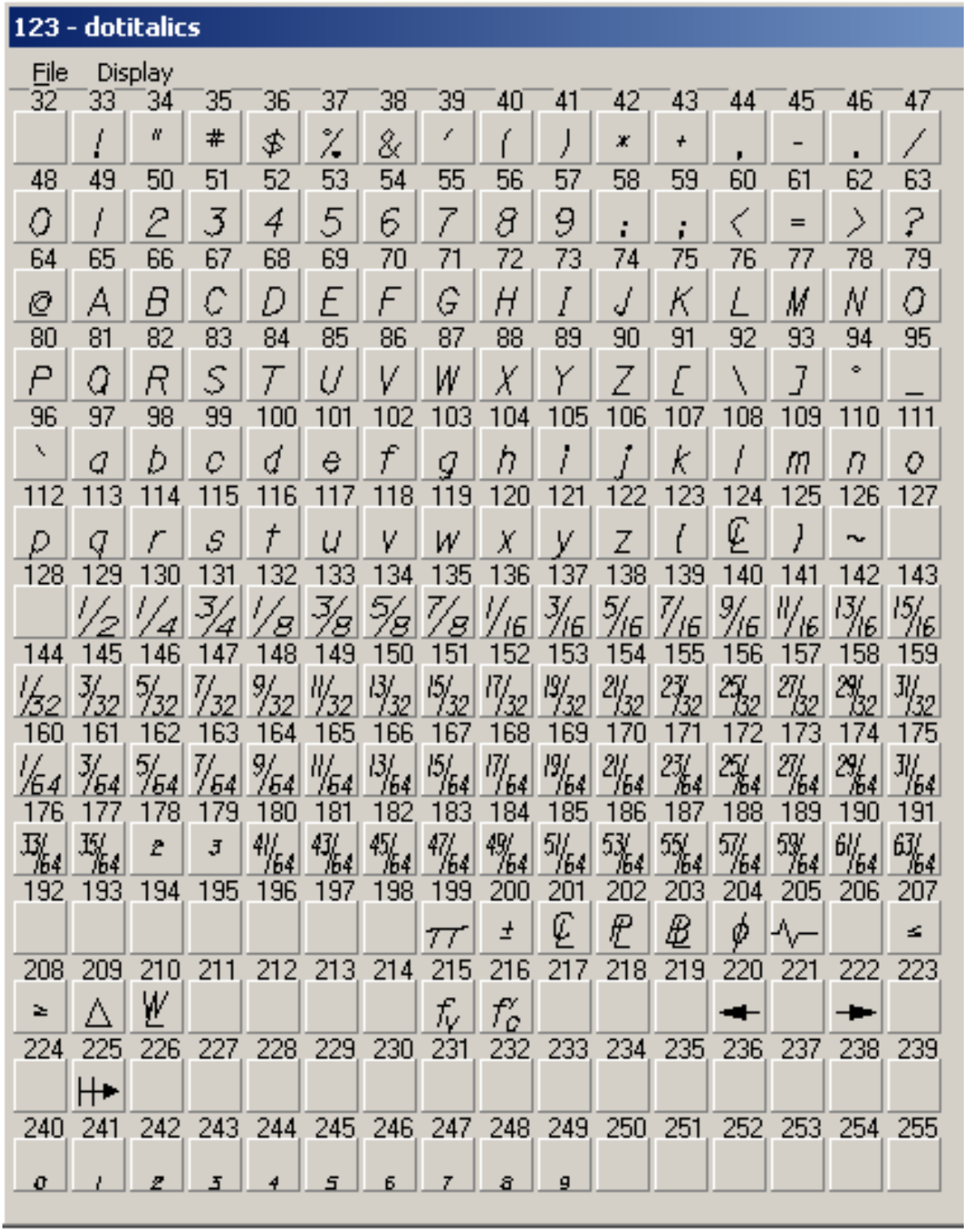


Figure 31-2: Character Map of Font 123, dotitalics

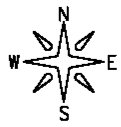
FONT 229 (VERDANA)

Figure 31-3: Character Map of Font 229, Verdana

FONT TABLE

CELL LIBRARIES

Cell Library: Accid2d.cel

ACNARW 	ARDL40 	ARDL80 	ARDR40 
ARDR80 	ARUL40 	ARUL80 	ARUR40 
ARUR80 	BSCARW 	BTARWL 	BTDARW 
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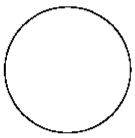
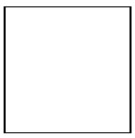
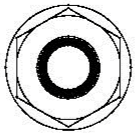
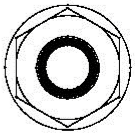
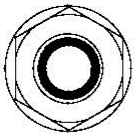
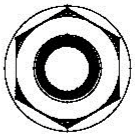
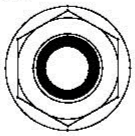
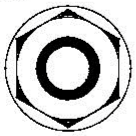
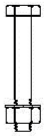
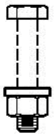
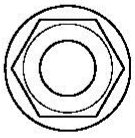
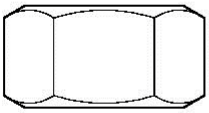
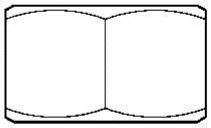
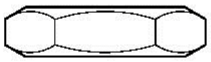
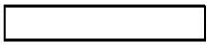
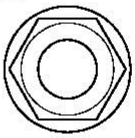
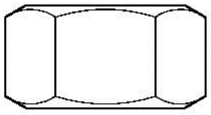
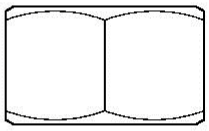
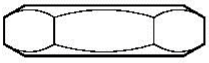
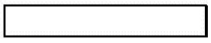
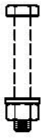
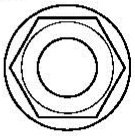
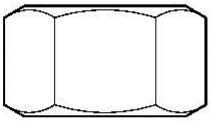
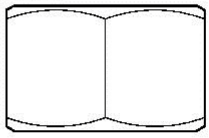
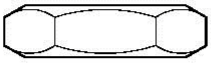
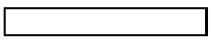
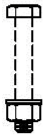
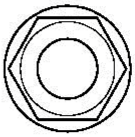
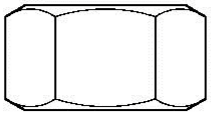
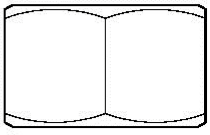
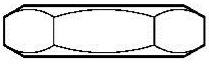
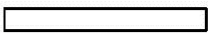
STOPSN 	TLIGHT 	TRMNTR 	TRMOPN 
TXTCRC 	TXTSQR 		

Page 1

Cell Library: US_BOLTS.cel

BWN3d.5I 	BWN3d.625I 	BWN3d.75I 	BWN3d.875I 
BWN3dIJ25I 	BWN3dI.25I 	BWN3dII 	Bolt Section 
MI2BLT 	MI2END 	MI2HNA 	MI2HNB 
MI2JN 	MI2W 	MI4BLT 	MI4END 
MI4HNA 	MI4HNB 	MI4JN 	MI4W 
MI6BLT 	MI6END 	MI6HNA 	MI6HNB 
MI6JN 	MI6W 	M20BLT 	M20END 
M20HNA 	M20HNB 	M20JN 	M20W 

Page 1

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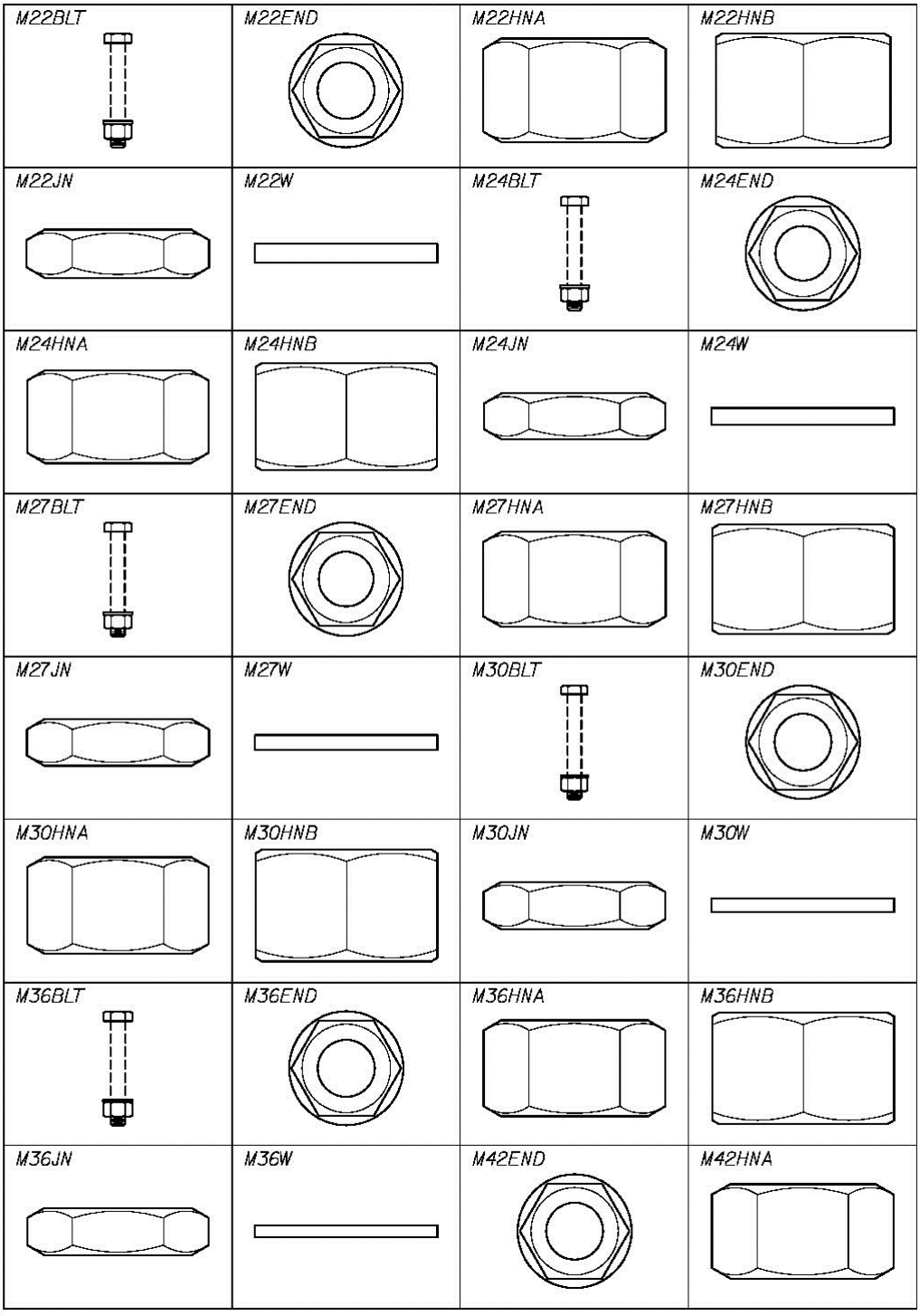
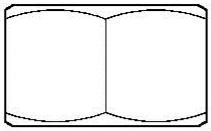
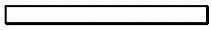
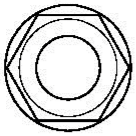
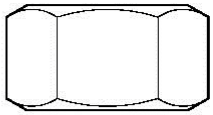
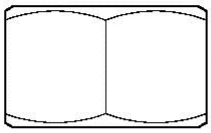
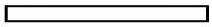
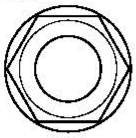
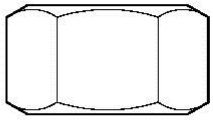
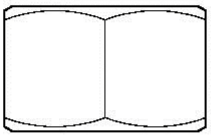
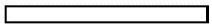


Page 2

Cell Library: US_BOLTS.cel

M42HNB 	M42W 	M48END 	M48HNA 
M48HNB 	M48W 	M56END 	M56HNA 
M56HNB 	M56W 		

Page 3

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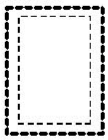
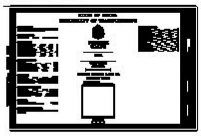
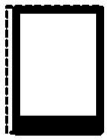
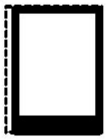
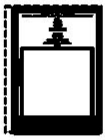
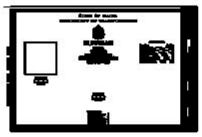
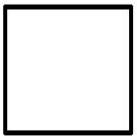
BDGBORDER 	BORDER 	BORDERSC 	BRGTITLE 
CL8X11 	CLP2 	CONOTE 	CSTBRD 
DOTADD 	DRAINAGE 	EN8X11 	ENVLAY 
ENVTITLE 	ESTIMATE 	HWYTITLE 	LMAPBD 
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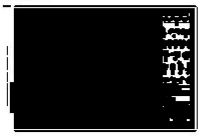
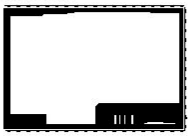
REBAR 	RWBORD 	RWBORDDT 	RWCLP2 

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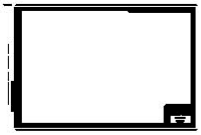
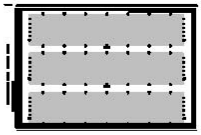
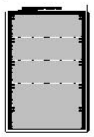
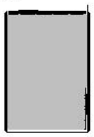
RWCOORD 	STDDTL 	TYPICAL 	XSECTH 
XSECTHF 	XSECTION 	XSECTV 	XSECTVF 

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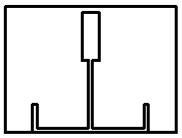
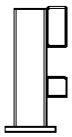
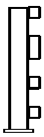
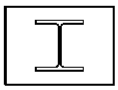
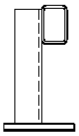
ARP 	BR2T 	BR4TB 	BR4TP 
BRBASE 	BRBMB 	BRBMP 	BRTRI 
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CLCON ℄ Const.	CLCONS ℄ Construction	CLPR1 ℄ Pier No. 1	CLPR2 ℄ Pier No. 2
CLPR3 ℄ Pier No. 3	CLPR4 ℄ Pier No. 4	CLPR5 ℄ Pier No. 5	CLPR6 ℄ Pier No. 6
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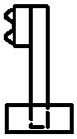
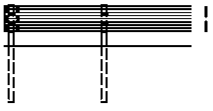
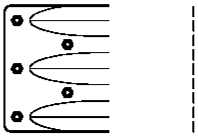
GRCONC 	GRTBPL 	GRTC 	GRTSEC 

Page 1

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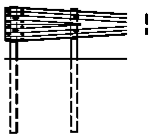
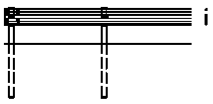
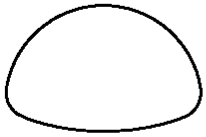
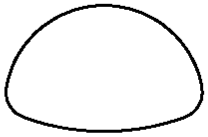
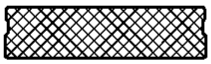
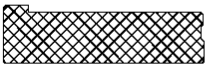
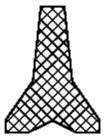
GRTSRT 	GRTWT 	GRWBPL 	GRWSEC 
GRWSRT 	LOCMAP 	PI74 	PI85 
PCI2X3 	PCB3A 	PCEI23 	PCERT 
TCBSEC 	TICK5	TICK50	

Page 2

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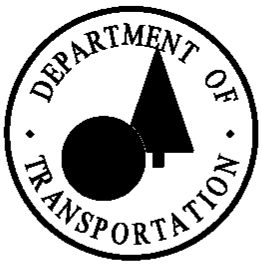
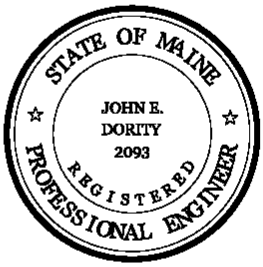
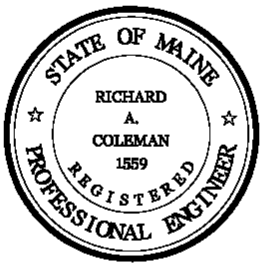
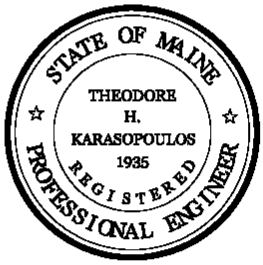
Cell Name: LOGOCA 	Cell Name: LOGODE 
Cell Name: RWSJD 	Cell Name: RWSRC 
Cell Name: RWSTK 	

Page 1

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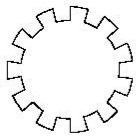
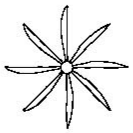
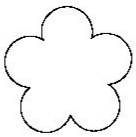
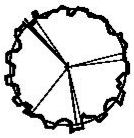
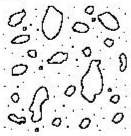
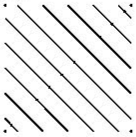
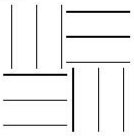
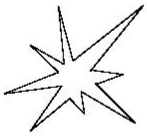
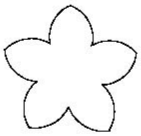
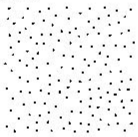
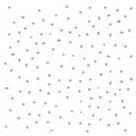
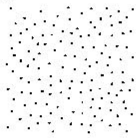
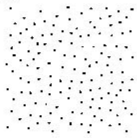
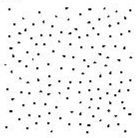
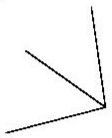
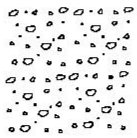
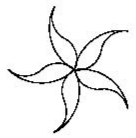
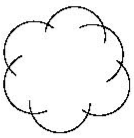
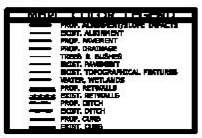
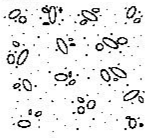
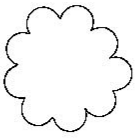
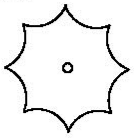
ARBVIT 	ASH 	BEECH 	BIRCH 
COBOLD 	CONCRT 	DTDSHT 	EARTH 
FIR 	FLCRAB 	FORSYT 	FOUNTN 
FPDNSM 	FPSPR2 	FPSPR5 	FPSPR7
FPSPRB 	FZHXPT 	GRI2SP 	GRI4SP 
GRI7SP 	GRI9SP 	GR2ISP 	GRASS 
GRASSP 	GRAVL 	LINDEN 	MAPLE 
MHPC 	MTPBSN 	OAK 	ORNCND 

Page 1

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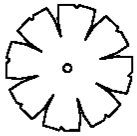
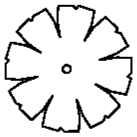
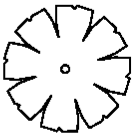
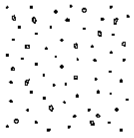
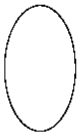
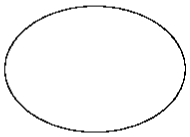
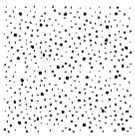
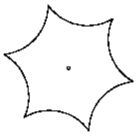
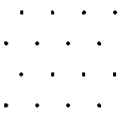
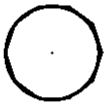
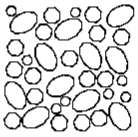
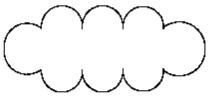
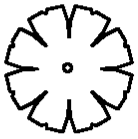
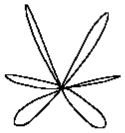
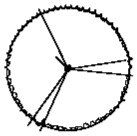
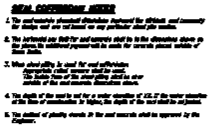
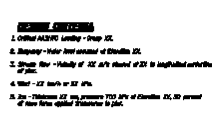
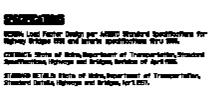
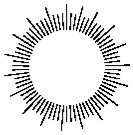
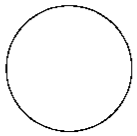
ORNCNL 	ORNCNM 	ORNCNS 	ORNDCL 
ORNDCM 	ORNDCS 	ORNPER 	ORSHRD 
PBEDRP 	PBEDUG 	PBGRVL 	PBLBIG 
PBLMED 	PBLSML 	PBSAND 	PBUSH 
PINE 	PKADFP 	POPLAR 	POROUS 
PRIVET 	PTREE 	RHODOD 	ROSE 
SNCOFF 	SNDESG 	SNDGRC 	SNGENC 
SPECS 	SPRUCE 	STCNPL 	STNCRC 

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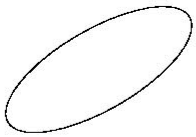
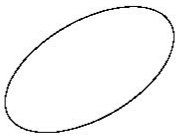
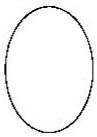
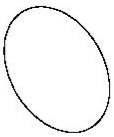
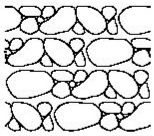
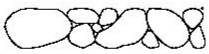
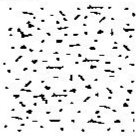
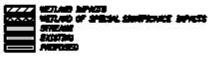
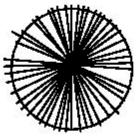
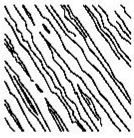
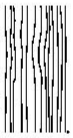
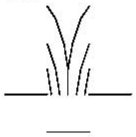
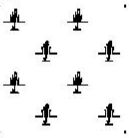
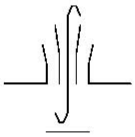
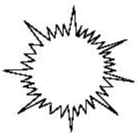
STNLOV 	STNMOV 	STNNCR 	STNOVL 
STNWAL 	STONWL 	STSND2 	WDWST1 
WDWST2 	WETKEY 	WILLOW 	WOODI 
WOOD2 	WTLFRP 	WTLFRS 	WTLSLP 
WTLSLT 	YEW 		

Page 3

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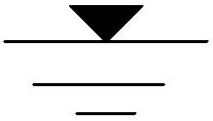
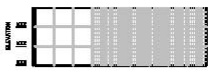
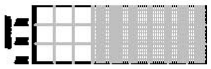
10FTCR 	5FTCR 	ARTPRS 	BDA3IB 
BDA3IT 	BDA3MB 	BDA3MT 	BLCNTA 
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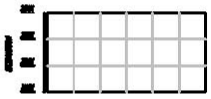
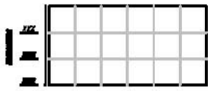
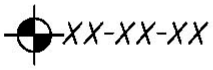
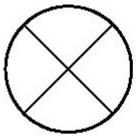
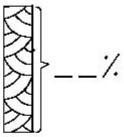
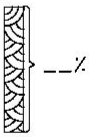
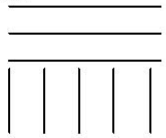
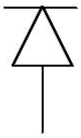
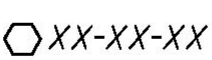
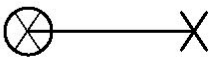
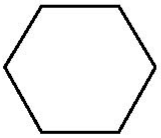
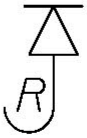
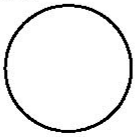
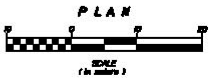
BRNRFL 	DRSIMB 	DRSIMT 	DRSMTB 
DRSMTT 	FSNOTE 	HMBORING 	HNDAGR 
LDGCR1 	LDGCR5 	LEDOC 	NOREF 
PAWT(PLAN) 	PLSLQL 	PWRAGR 	REF 
RODSND 	SCPLM2 	SCPR24 	SCPR48 

Page 1

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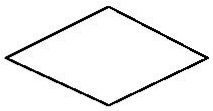
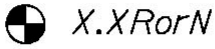
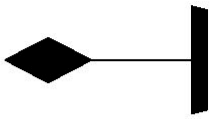
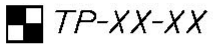
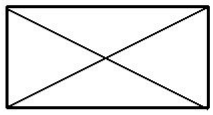
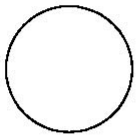
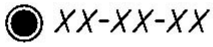
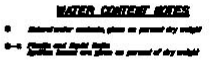
SCPRM2 	SEISHT 	SHRNOT 	SHSTEX 
SSABORING 	SSHOT 	TPBORING 	TSTPIT 
VNFLDT 	VNLBTS 	VNSHFL 	WBTOP 
WSHBRN 	WTCTNT 		

Page 2

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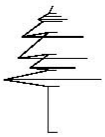
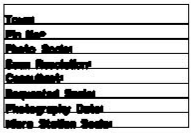
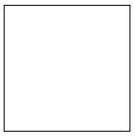
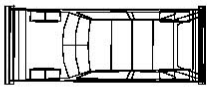
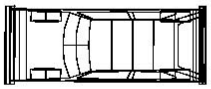
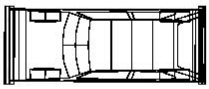
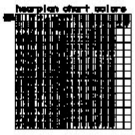
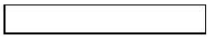
3D 	3DMAN 	3DMAN2 	AERIAL 
AIR 	ALL 	BKEY 	BORDER 
BUSH	CAR1 	CAR2 	CAR3 
CHART 	CHART2 	CHART3 	COLKEY 
DIRIGO 	DOT 	FROAD  FROGGY:/1 1:1	GUIDE1 
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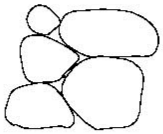
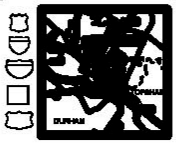
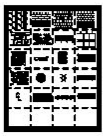
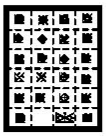
LEDGE3 	LOCMAP 	LODMAP 	LOGO 
MAP 	MAPS 	MAT 	MATF 

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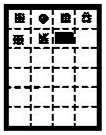
MATF2 	MICRO **Micro Station Presents**	NEW 	NOTE **borders for hearingsize** 1-5875 0-9525 for 250 scale 3-175 1-905 for 500 scale
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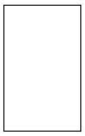
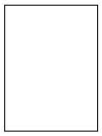
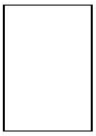
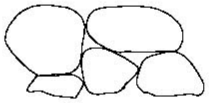
PROF 	PROFI 	REC 	REC2 
REC3 	RIPRAP 	ROCKS 	SCALE
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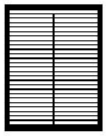
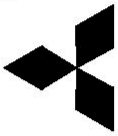
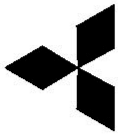
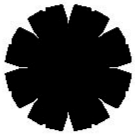
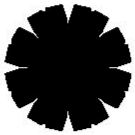
TEST2 	TITLEB 	TRBUC 	TRCCNP 
TRCCP 	TRDCNP 	TRDCP 	TYP 
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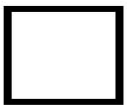
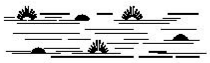
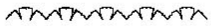
USTATE 	USW 	WETI 	WMILL 
WOODS 	ZALL 	ZPLAN 	ZPROF 
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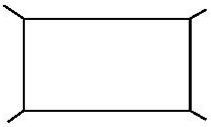
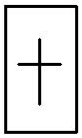
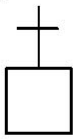
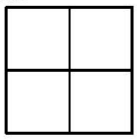
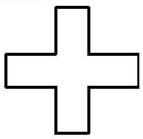
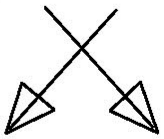
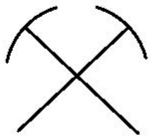
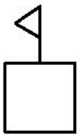
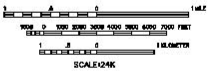
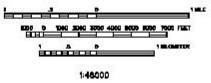
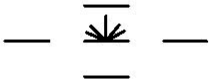
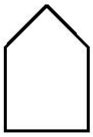
BRSYMB 	BRWPIT 	CEMLRG 	CEMSML 
CHURCH 	FIREST 	HSPTAL 	PIT 
POLICE 	QUARRY 	SCHOOL 	SCL24K 
SCL48K 	SCTL2K 	SCTL2M 	SWAMP 
TWNHAL 			

Page 1

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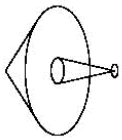
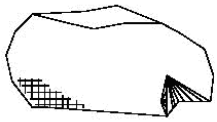
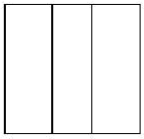
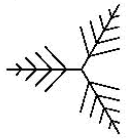
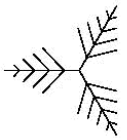
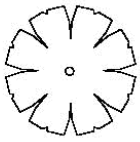
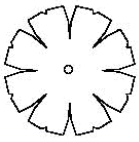
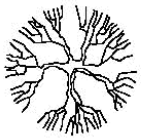
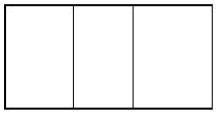
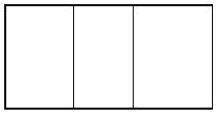
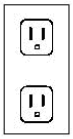
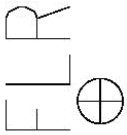
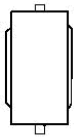
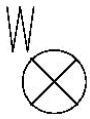
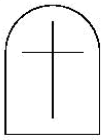
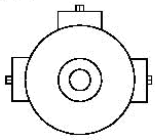
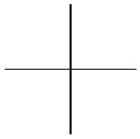
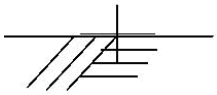
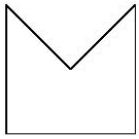
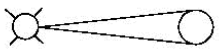
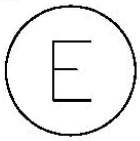
ALARMX 	ANTWDX 	BNCHMK 	BOULDR 
BUSHES 	CB 	CBPROP 	CONNOP 
CONPAY 	DECTNP 	DECTRP 	DEDTNP 
DEDTRP 	DROUTX 	DRPINB 	DRPINX 
ELCTOT 	FILCAP 	GASPMX 	GATEGS 
GATEWT 	GRAVE 	GUYANC	HYDRNT 
INVERT 	IRONPN 	LEDGSH 	MAILBX 
MASTRX 	MHELCP 	MHELCT 	MHGAS 

Page 1

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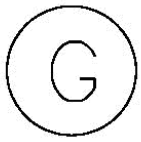
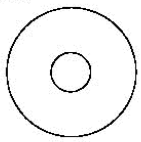
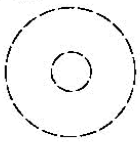
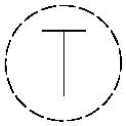
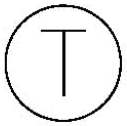
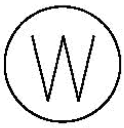
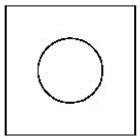
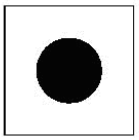
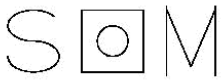
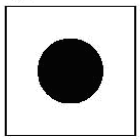
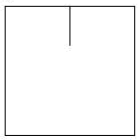
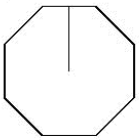
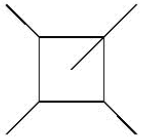
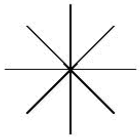
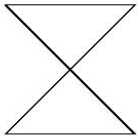
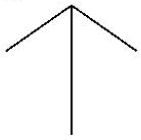
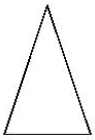
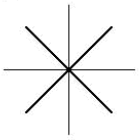
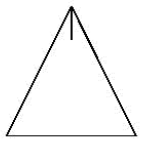
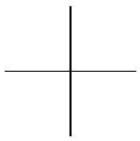
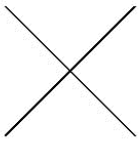
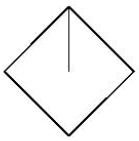
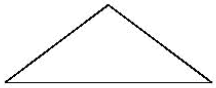
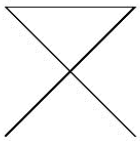
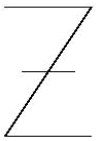
MHGASP 	MHOTHP 	MHOTHR 	MHSANP 
MHSANT 	MHSTRM 	MHTELE 	MHTELP 
MHWATP 	MHWATR 	MNMNTC 	MNMTRW 
MNMTSR 	MNMTST 	MSL_0 	MSL_1 
MSL_10 	MSL_11 	MSL_12 	MSL_13
MSL_14 	MSL_15 	MSL_16 	MSL_17 
MSL_2 	MSL_3 	MSL_4 	MSL_5 
MSL_6 	MSL_7 	MSL_8 	MSL_9 

Page 2

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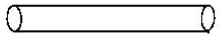
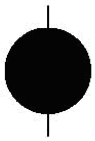
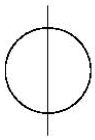
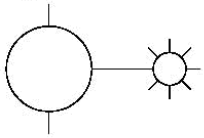
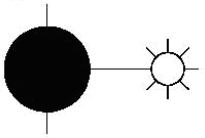
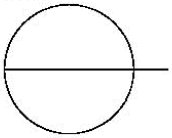
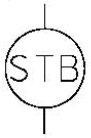
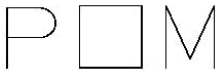
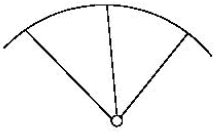
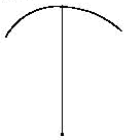
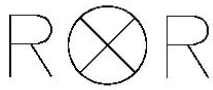
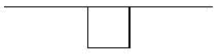
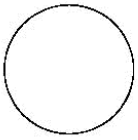
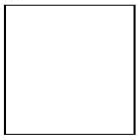
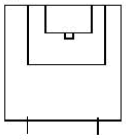
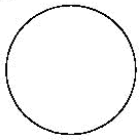
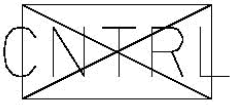
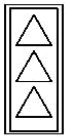
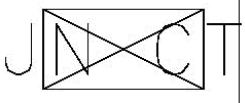
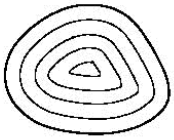
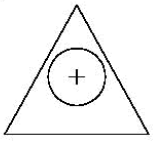
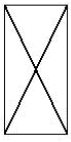
POLBRC 	POLFLG 	POLGNP 	POLGNX 
POLLIT 	POLLTP 	POLSPR 	POLSTB 
POLTRF 	PRJMKR 	RARPLN 	RARSHR 
RARTRE 	RODAGR 	RRSGNL 	RRSWIT 
RRXING 	SGNSGL 	SILLS 	STPOST 
TANKSP 	TELEBT 	TESTPT 	TRCTRL 
TREERT 	TRFSGX 	TRJNCT 	TRSTMP 
TRTP 	UTLTWX 	VENPIP 	WELLSX 

Page 3

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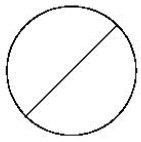
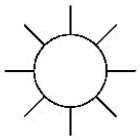
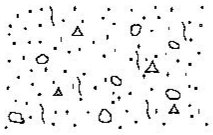
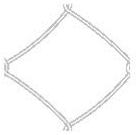
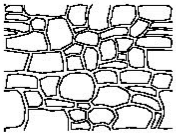
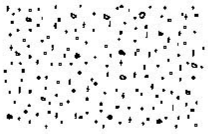
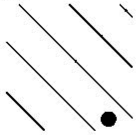
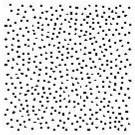
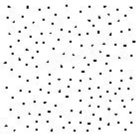
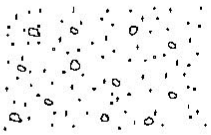
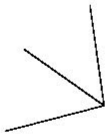
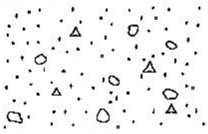
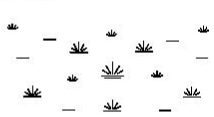
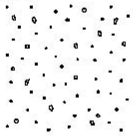
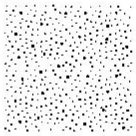
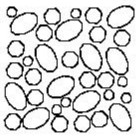
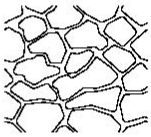
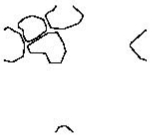
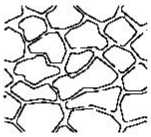
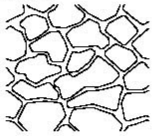
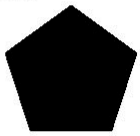
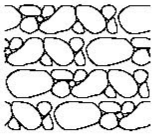
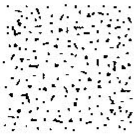
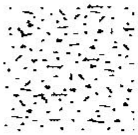
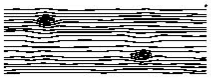
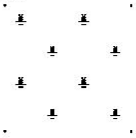
WSHTOX 	YRDLGT 		

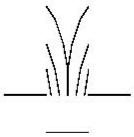
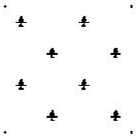
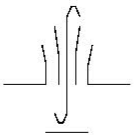
Page 4

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

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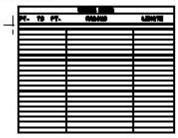
CLUS100	CLUS50	CPTBOX 	CRVBOX 
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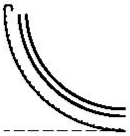
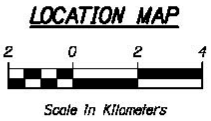
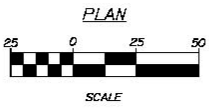
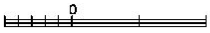
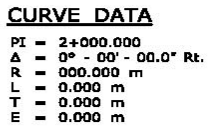
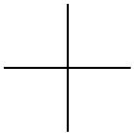
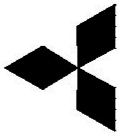
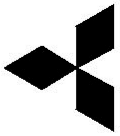
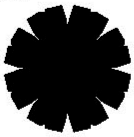
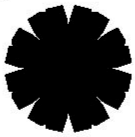
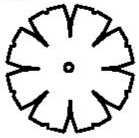
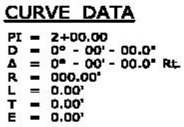
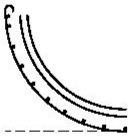
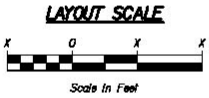
NORGRD 	NORMAG 	RADGR 	SCLCMP 
SCPLFT 	SCPLM4 	SCTLPM 	SNCRVD 

Page 1

Cell Library: PLAN.cel

TICK 	TRBUC 	TRCCNP 	TRCCP 
TRDCNP 	TRDCP 	TREESN 	USLCMP 
USLVGR 	USMELT 	USNCRVD 	USRADGR 
USSCLAY 			

Page 2

Cell Library: PROFILE.cel

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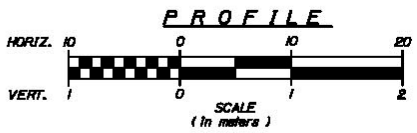

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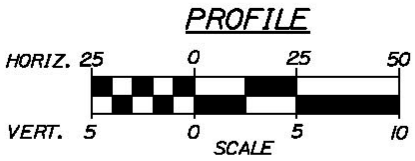

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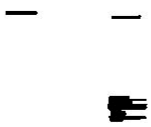
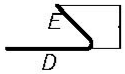
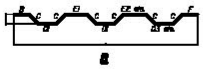
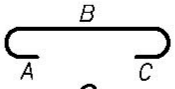
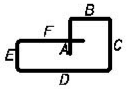
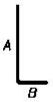
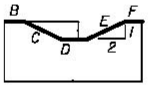
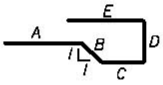
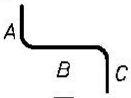
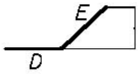
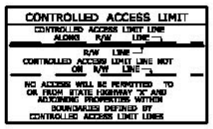
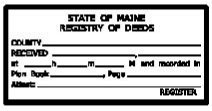
V.C.L. =

Cell Library: REBAR.CEL

BBGRID 	REBNOT 	SBGRID 	TYPEA  A
TYPEB  B	TYPEC  C	TYPECB  CB	TYPEEP  EP
TYPEH  H	TYPEHB  HB	TYPEJ  J	TYPEL  L
TYPEM  M	TYPEPA  PA	TYPEPR  PR	TYPES  S
TYPESB  SB	TYPESC  SC	TYPESJ  SJ	TYPESL  SL
TYPET  T	TYPEV  V	TYPEW  W	

Cell Library: ROW.cel

FINAORD	NOSCALE	NOTE1	ROWCOL
	NOTE: THIS PLAN IS NOT TO SCALE		PERMANENT EASEMENT TEMPORARY EASEMENT TEMPORARY ROAD EASEMENT
ROWCOL2	RWBIRD	RWCVD	RWNAGRID
DRAINAGE EASEMENT PERMANENT EASEMENT TEMPORARY EASEMENT TEMPORARY ROAD EASEMENT		CURVE DATA P.I. STA. Δ = T = L = E = R =	
RWNAMAG	RWNM1	RWNM2	RWNM3
			
RWNRES	RWNRR1	RWNRR2	RWNWP
NOTE: USE OF LAND AND BUILDING WITHIN AREA INDICATED RESERVED TO OWNER UNTIL	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	NOTE: RIGHTS TAKEN TO RAZE OR REMOVE BUILDING AT STA. X	NOTE: PRESCRIPTIVE EASEMENT FOR HIGHWAY PURPOSES WITHIN LIMITS OF WROUGHT PORTION
RWSCOA	RWSREG	RWSU	RWSUIT
		PARCEL NO. ( ) LAND TAKEN = SLOPE EASE. = TEMP. CONST. RIGHTS = TOTAL AREA = REM. AREA =	ITEM NO. ( ) GRADING RIGHTS = TOTAL AREA =
RWSUTC	RWSUWP	RWTICK	
ITEM NO. () TEMP. CONST. RIGHTS = TOTAL AREA =	PARCEL NO. ( ) LAND TAKEN = (PRESC. EASE.) LAND TAKEN = (OTHER) TOTAL LAND TAKEN = SLOPE EASE. = TEMP. CONST. RIGHTS = TOTAL AREA = REM. AREA =	0+000	

Page 1

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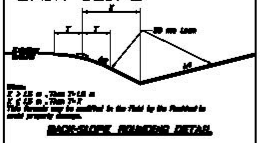
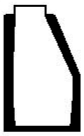
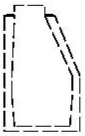
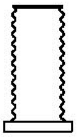
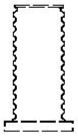
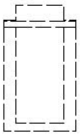
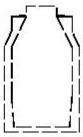
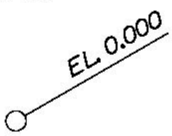
BACK SLOPE 	BLDSCL 	BLDSCR 	CB5LTP 
CB5LTX 	CB5RTP 	CB5RTX 	CBSCEP 
CBSCEX 	CBSCFP 	CBSCFX 	CBSECP 
CBSECX 	CLELFL 	CRBILT 	CRBIRT 
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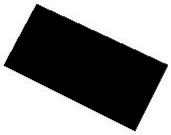
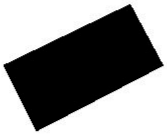
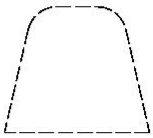
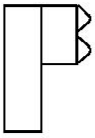
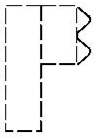
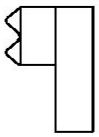
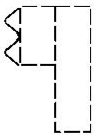
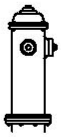
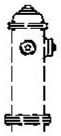
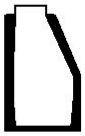
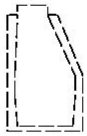
CRB5LT 	CRB5RT 	CRX3IL 	CRX3IR 
CTRLNS 	DITCH 	GRLSCP 	GRLSCX 

Page 1

Cell Library: SECTION.cel

GRRSCP 	GRRSCX 	GRTSCL 	GRTSCR 
GRTSEC 	GRTSRT 	HYDRSC 	HYDRSX 
MHSCPL 	MHSCPR 	MHSCXL 	MHSCXR 
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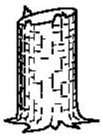
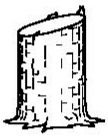
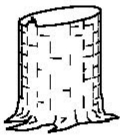
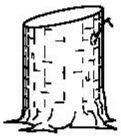
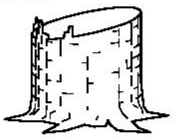
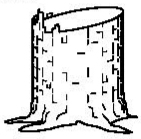
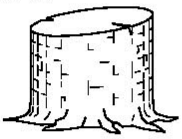
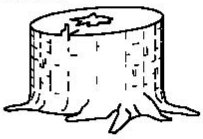
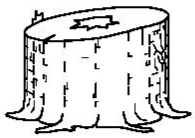
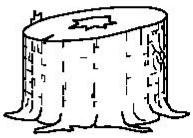
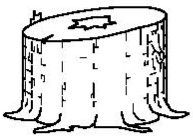
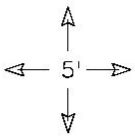
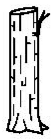
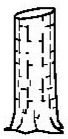
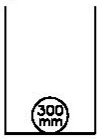
SI0212 	SI3216 	SI7220 	S21224 
S25228 	S29232 	S33236 	S37242 
S43248 	S49254 	S55260 	SCL5FT 
STMI23 	STM426 	STM729 	U300MM 

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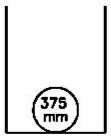
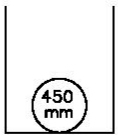
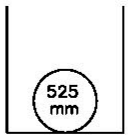
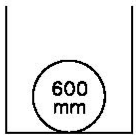
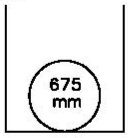
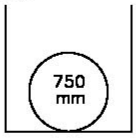
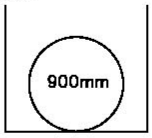
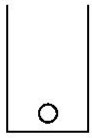
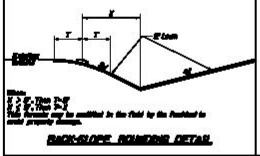
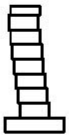
U375MM 	U450MM 	U525MM 	U600MM 
U675MM 	U750MM 	U900MM 	UDRANB 
USBACK SLOPE 	XRETWL 	XRETWR 	

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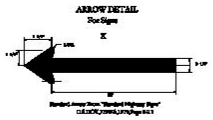
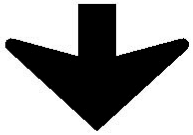
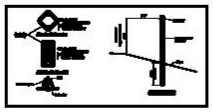
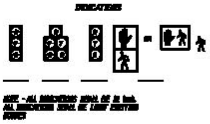
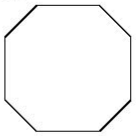
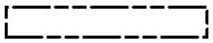
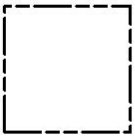
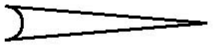
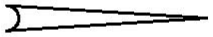
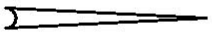
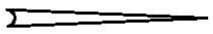
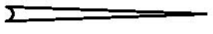
ARWDTL 	ARWDWB 	ARWUPB 	ARWUPL 
DLNDTL 	DLPLTP 	INDCAT 	JUNCBX 
LUP640 	LUP650 	LUP66 	LUP68 
MAST15 	MAST20 	MAST25 	MAST30 
MAST35 	MAST40 	MAST45 	MAST50 
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PMATRT 	PMONLY 	PMRRX 	POLTRF 
S1WAY 	S2LTNL 	S4WAY 	SALLWA 

Page 1

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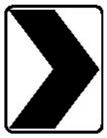
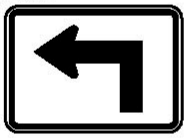
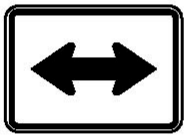
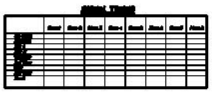
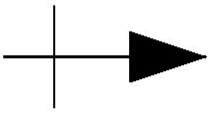
SAVO 	SBIKER 	SBIKWS 	SCANSH 
SCOUNL 	SCRV1R 	SCRV2R 	SCRV3R 
SCRV4R 	SCRV5R 	SCRVMK 	SDNENT 
SDRM5I 	SDRM6I 	SDRM62 	SDRM63 
SDRM64 	SDRM66 	SEAST 	SEMCEL 
SEXINF 	SGHEDP 	SGNLTM 	SIGNOH 
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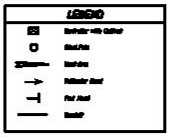
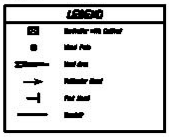
SKPLBR 	SKRETP 	SLGDSP 	SLGDWP 

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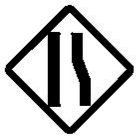
SMOOSE 	SMRG4I 	SMRG42 	SMTA 
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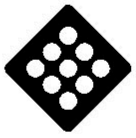
SNRTTR 	SNUTR 	SOM3 	SOMCIR 
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SRTNOS 	SRTNOW 	SRTUSS 	SRTUSW 
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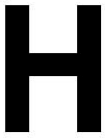
SSHAND 	SSHOSP 	SSINFO 	SSLODG 

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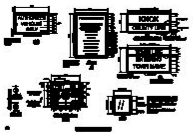
SSMESI 	SSNO 	SSOUT 	SSPED 
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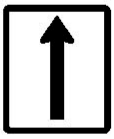
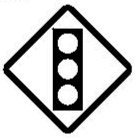
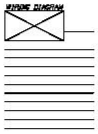
SSTPAH 	SSTPAT 	STHRRT 	STHRU 
STLAHD 	STO 	STONLY 	STR7IA 
STUCLO 	STURLO 	SVCI22 	SWEST 
SWRWAY 	SXNUM 	SYELAS 	SYELAT 
SYIELD 	SYLTOG 	WIRNDI 	

Cell Library: turnradii.cel

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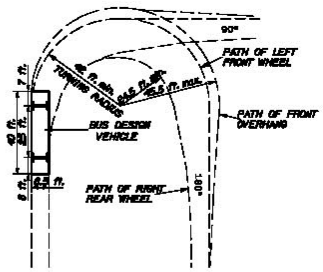

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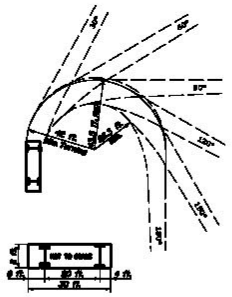

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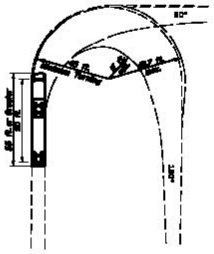

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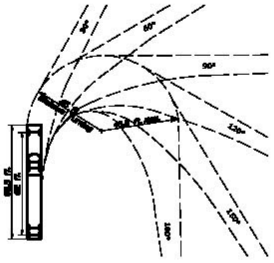

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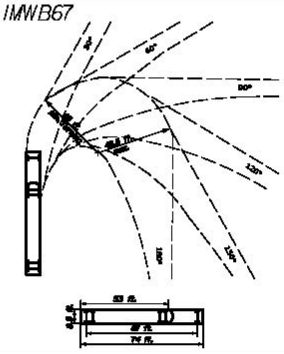

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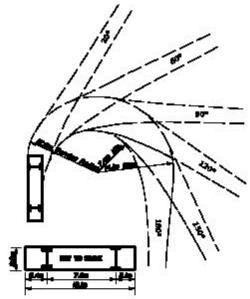

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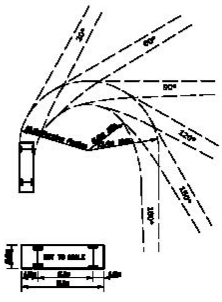

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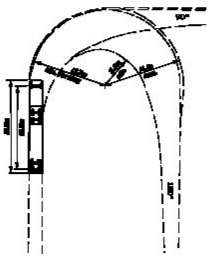

Page 1

Cell Library: turnradii.cel

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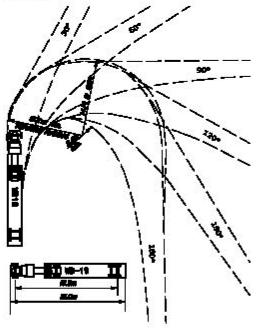	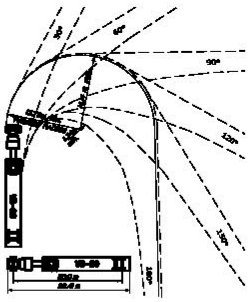

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USNCOFF	USNDESG	USNDESL	USNDRAN
USNELBR	USNGENC	USNHYDF	USNHYDP
USNMATR	USNMOTR	USNPIER	USNPILE
USNPREC	USNSPEC	USNSTL	USNSTPL
USNSUP	USNTRAF	USNTWALL	USNUTIL

Cell Library: US_ROW.CEL

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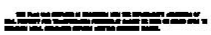
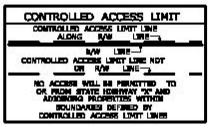
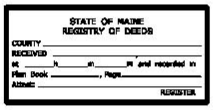
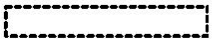
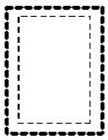
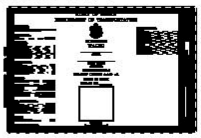
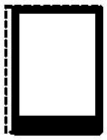
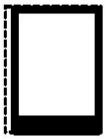
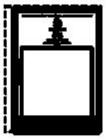
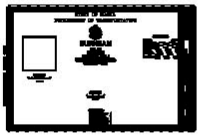
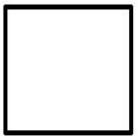
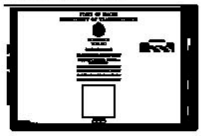
	NOTE: THIS PLAN IS NOT TO SCALE		DRAINAGE EASEMENT PERMANENT EASEMENT TEMPORARY EASEMENT TEMPORARY ROAD EASEMENT
USRWBIRD	USRWCVD	USRWNAGRID	USRWNAMAG
	CURVE DATA P.I. STA. D = A = T = L = E = R =		
USRWNMI	USRWNM2	USRWNM3	USRWNRES
			NOTE: USE OF LAND AND BUILDING WITHIN AREA INDICATED RESERVED TO OWNER UNTIL
USRWNRRI	USRWNRR2	USRWNWP	USRWSCOA
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	NOTE: RIGHTS TAKEN TO RAZE OR REMOVE BUILDING AT STA. X	NOTE: PRESCRIPTIVE EASEMENT FOR HIGHWAY PURPOSES WITHIN LIMITS OF WROUGHT PORTION	
USRWSREG	USRWSU	USRWSUIT	USRWSUTC
	PARCEL NO. ( ) LAND TAKEN = SLOPE EASE. = TEMP. CONST. RIGHTS = TOTAL AREA = REM. AREA =	ITEM NO. ( ) GRADING RIGHTS = TOTAL AREA =	ITEM NO. () TEMP. CONST. RIGHTS = TOTAL AREA =
USRWSUWP	USRWTICK		
PARCEL NO. ( ) LAND TAKEN = (PRESC. EASE.) LAND TAKEN = (OTHER) TOTAL LAND TAKEN = SLOPE EASE. = TEMP. CONST. RIGHTS = TOTAL AREA = REM. AREA =	0+00		

Cell Library: usBorder.cel

USIOFT 	USI5FT 	US20FT 	US5FT 
USBDGBORDER 	USBORDER 	USBORDERSC 	USBRGTITLE 
USCL8XII 	USCLP2 	USCONOTE 	USCSTBRD 
USDOTADD 	USDRAINAGE 	USEN8XII 	USENVLAY 
USENVTITLE 	USESTIMATE 	USHWYTITLE 	USLMAPBD 
USMULTITITLE 	USPLANPROF1 	USPLANPROF2 	USPLNSH2 
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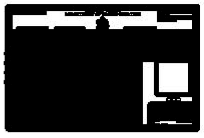
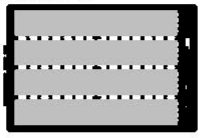
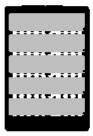
Cell Library: usBorder.cel

USRWCLP2 	USRWCOORD 	USSTDDTL 	USTYPICAL 
USXSECTH 	USXSECTHF 	USXSECTION 	USXSECTV 
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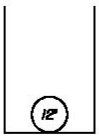
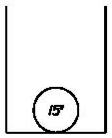
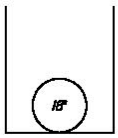
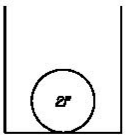
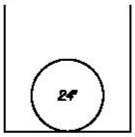
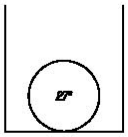
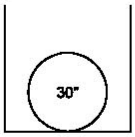
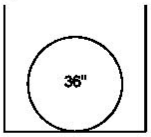
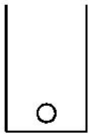
U12IN 	U15IN 	U18IN 	U21IN 
U24IN 	U27IN 	U30IN 	U36IN 
UDRANB 			

Page 1

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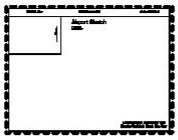
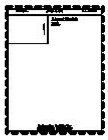
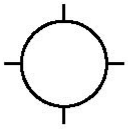
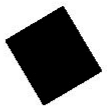
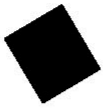
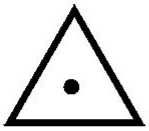
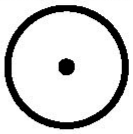
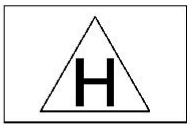
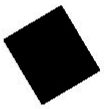
A S BORDER LAND 	A S BORDER PORT 	AIRPORT LOCATION 	ASOS 
AWOS 	BEACON 	CLOSE IN OBSTRUCTION AND TEXT 	CONTROLLING OBSTRUCTION AND TEXT 
GS 	HELIPAD LOCATOR 	LOCALIZER 	LOCATIOM MAP 
MAG VAG 	MM 	NDB 	OPTMAP 
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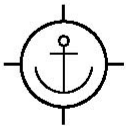
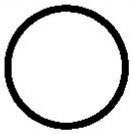
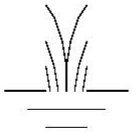
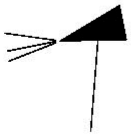
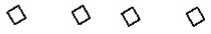
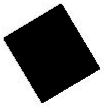
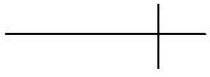
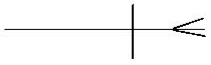
SCALEIIN500FT 	SEAPLANE BASE LOCATOR 	SECUHAZ 	SEGMENTED CIRCLE 
SWAMP 	TETRAHEDRON 	TETRAHEDRON LIGHTED 	THRESHOLD LIGHTS 
VASI 	VOR 	WIND TEE 	WIND TEE LIGHTED 

Page 1

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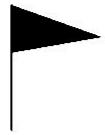
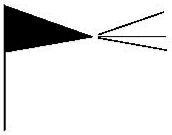
WINSOCK 	WINSOCK LIGHTED 		

Page 2

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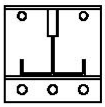
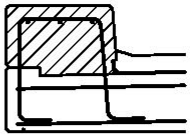
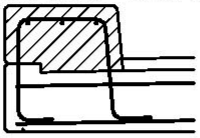
ALUM BR 2 BAR TRAFFIC 	ALUM BR BASE 	BRIDGE TRANS 1 	CONC CURB - BIT WS 
CONC CURB - CONC WS 	CONSPAN 12 	CONSPAN 14 	CONSPAN 16A 
CONSPAN 16B 	CONSPAN 20A 	CONSPAN 20B 	CONSPAN 24A 
CONSPAN 24B 	CONSPAN 28A 	CONSPAN 28B 	CONSPAN 32A 
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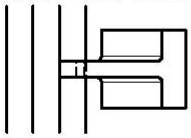
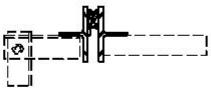
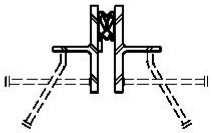
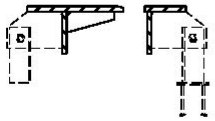
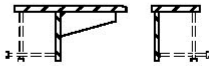
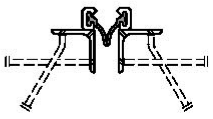
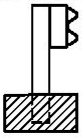
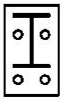
CONSPAN 42MOD 	CONSPAN 48EXT 	CONSPAN WNG PLAN 	CONSPAN WNG SECT 
EXP DEV COMP 1 	EXP DEV COMP 2 	EXP DEV FINGER 1 	EXP DEV FINGER 2 
EXP DEV GLAND 1 	EXP DEV GLAND 2 	GR CONC BLOCK 	GR CURB MTD BASE 

Page 1

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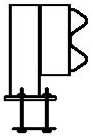
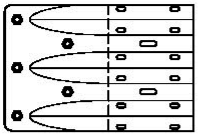
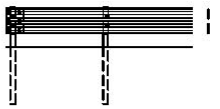
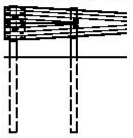
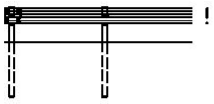
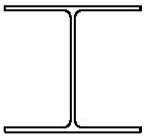
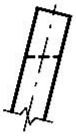
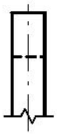
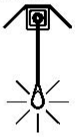
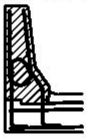
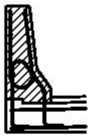
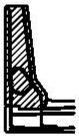
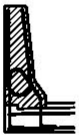
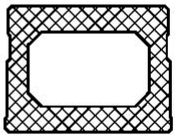
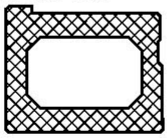
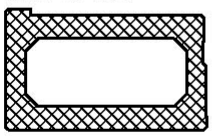
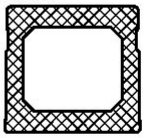
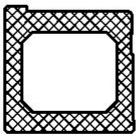
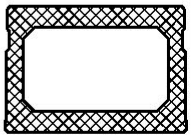
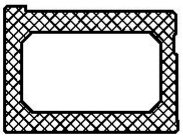
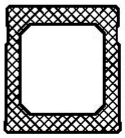
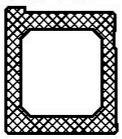
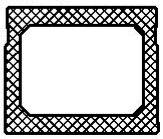
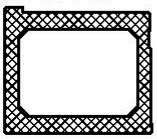
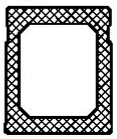
GR CURB MTD ELEV 	GR CURB MTD SECT 	GR THRIE BEAM CON 	GR THRIE BEAM ELEV 
GR THRIE BEAM SECT 	GR THRIE BEAM TRANS 	GR W BEAM ELEV 	GR W BEAM SECT 
H-PILE PLAN BATTERED 	H-PILE PLAN PLUMB 	H-PILE SECT BATTERED 	H-PILE SECT PLUMB 
LIGHT ELEV 	LIGHT PLAN 	LIGHT PLAN FOUND 	PC BARRIER IIIA - BIT WS 
PC BARRIER IIIA - CONC WS 	PC BARRIER IIIB - BIT WS 	PC BARRIER IIIB - CONC WS 	PCI BI-36 
PCI BI-36 EXT 	PCI BI-48 	PCI BI-48 EXT 	PCI BII-36 
PCI BII-36 EXT 	PCI BII-48 	PCI BII-48 EXT 	PCI BIII-36 
PCI BIII-36 EXT 	PCI BIII-48 	PCI BIII-48 EXT 	PCI BIV-36 

Page 2

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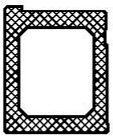
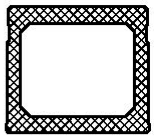
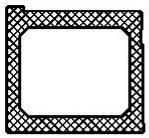
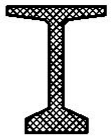
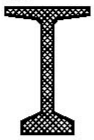
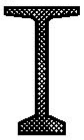
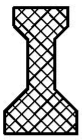
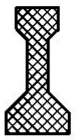
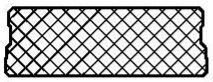
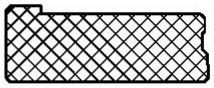
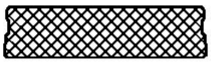
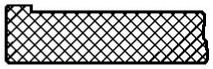
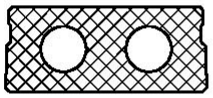
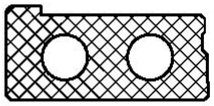
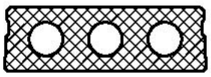
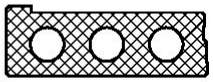
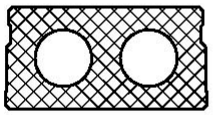
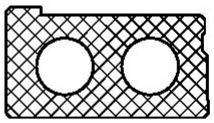
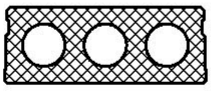
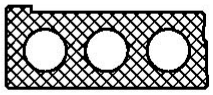
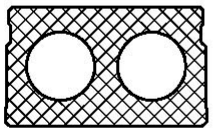
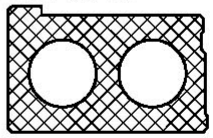
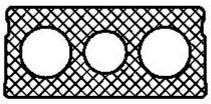
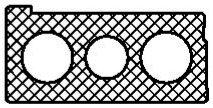
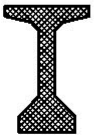
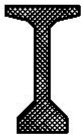
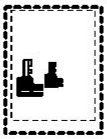
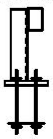
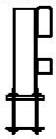
PCI BIV-36 EXT 	PCI BIV-48 	PCI BIV-48 EXT 	PCI BT-54 
PCI BT-63 	PCI BT-72 	PCI I 	PCI II 
PCI III 	PCI IV 	PCI SI-36 	PCI SI-36 EXT 
PCI SI-48 	PCI SI-48 EXT 	PCI SII-36 	PCI SII-36 EXT 
PCI SII-48 	PCI SII-48 EXT 	PCI SIII-36 	PCI SIII-36 EXT 
PCI SIII-48 	PCI SIII-48 EXT 	PCI SIV-36 	PCI SIV-36 EXT 
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

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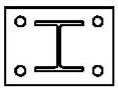
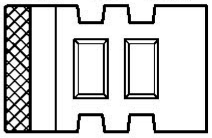
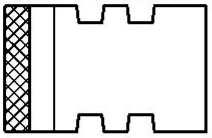
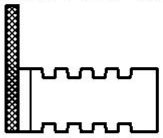
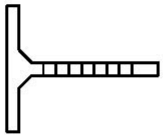
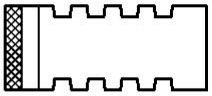
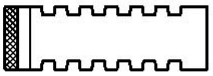
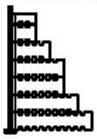
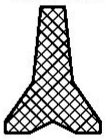
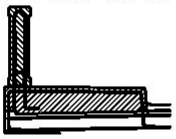
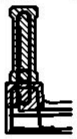
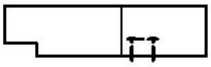
STL BR 4 BAR TRAF BIKE 	STL BR 4 BAR TRAF PED 	STL BR BASE 	T-WALL 10' STD SECT 
T-WALL 12' STD SECT 	T-WALL 4' DET SECT 	T-WALL 4' STD SECT 	T-WALL 6' EXTD SECT 
T-WALL 6' PLAN 	T-WALL 6' STD SECT 	T-WALL 8' STD SECT 	T-WALL BAT SECT 
T-WALL PLUMB SECT 	TEMP CONC BARRIER 	TEX BR PED - BIT WS 	TEX BR TRAF - BIT WS 
TRANS BARRIER PLAN 			

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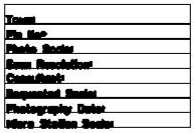
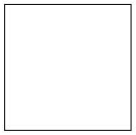
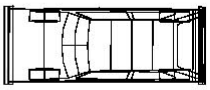
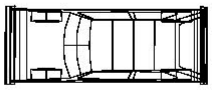
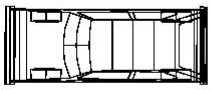
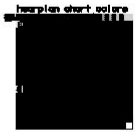
3D MAN 	3D MAN2 	AERIAL 	AIR 
BORDER 	CAR1 	CAR2 	CAR3 
CHART 	CHART2 	CHART3 	COLKEY 
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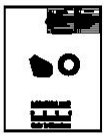
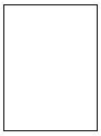
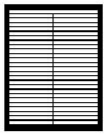
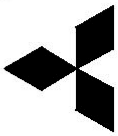
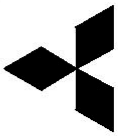
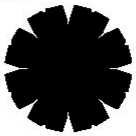
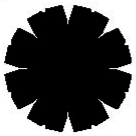
LODMAP 	LOGO 	PC 	PLAN1 
PROF1 	REC 	REC2 	REC3 
SCALE2	SCALE3	TITLEB 	TRBUC 
TRCCNP 	TRCCP 	TRDCNP 	TRDCP 

Page 1

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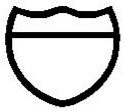
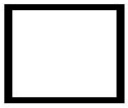
TYPI 	US 	USINT 	USINTW 
USTATE 	USW 		

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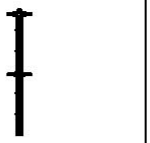
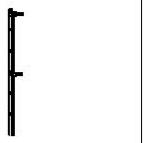
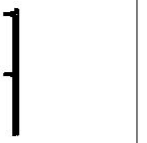
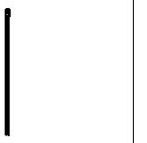
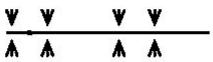
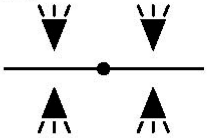
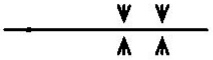
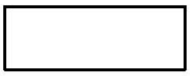
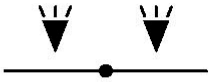
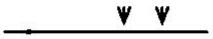
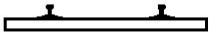
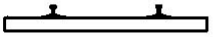
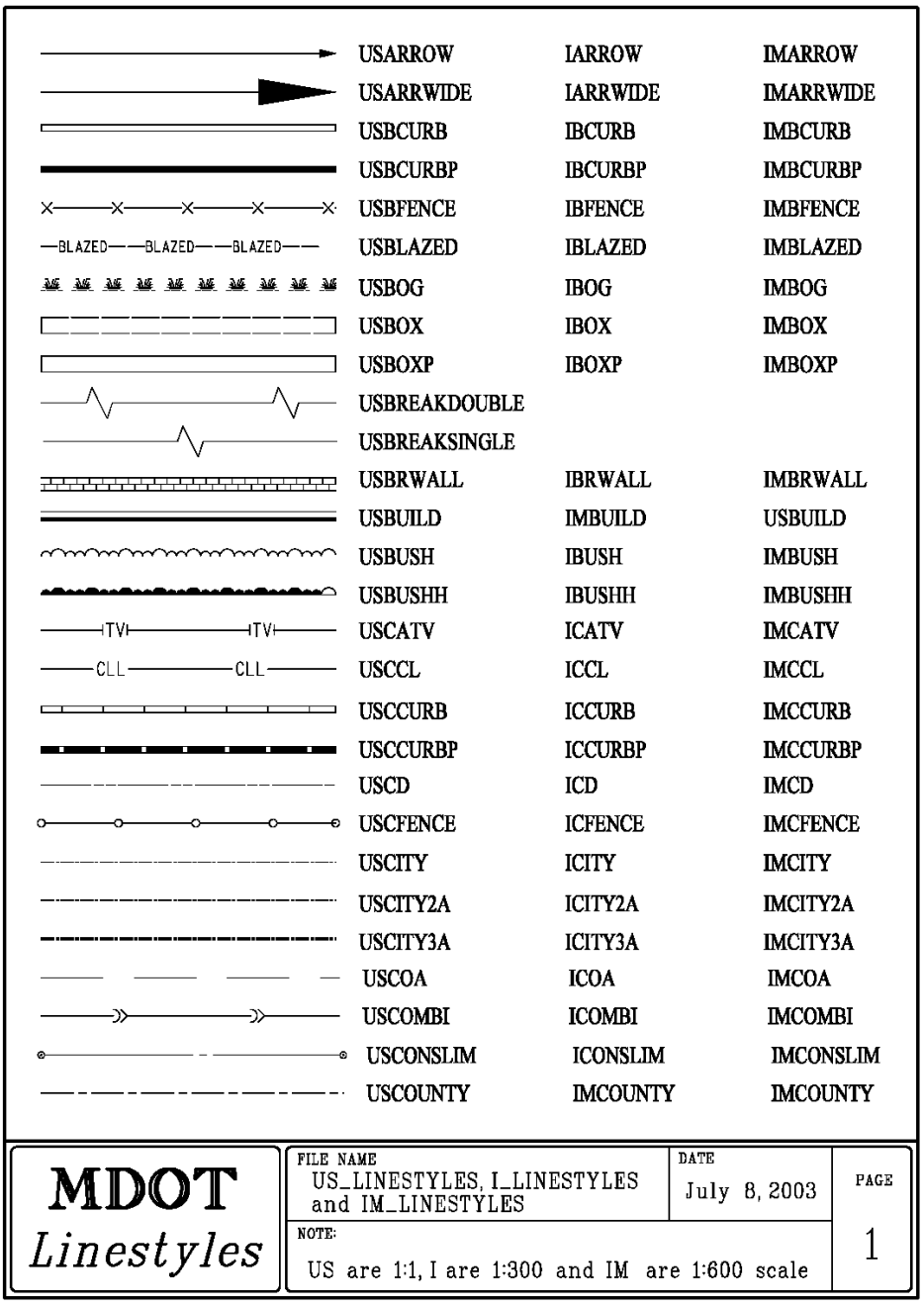
CLFPED 	CLFPLE 	CLFPRE 	CLFSP 
RXDDFC 	RXDF 	RXDFC 	RXDFWG 
RXSB 	RXSF 	RXSFC 	RXSFWG 
RXSWG	TwR6x8x102 	TwR7x9x108 	

Page 1

LINE STYLES

MDOT STANDARD U.S. CUSTOMARY LINE STYLES



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USARRWIDE	IARRWIDE	IMARRWIDE
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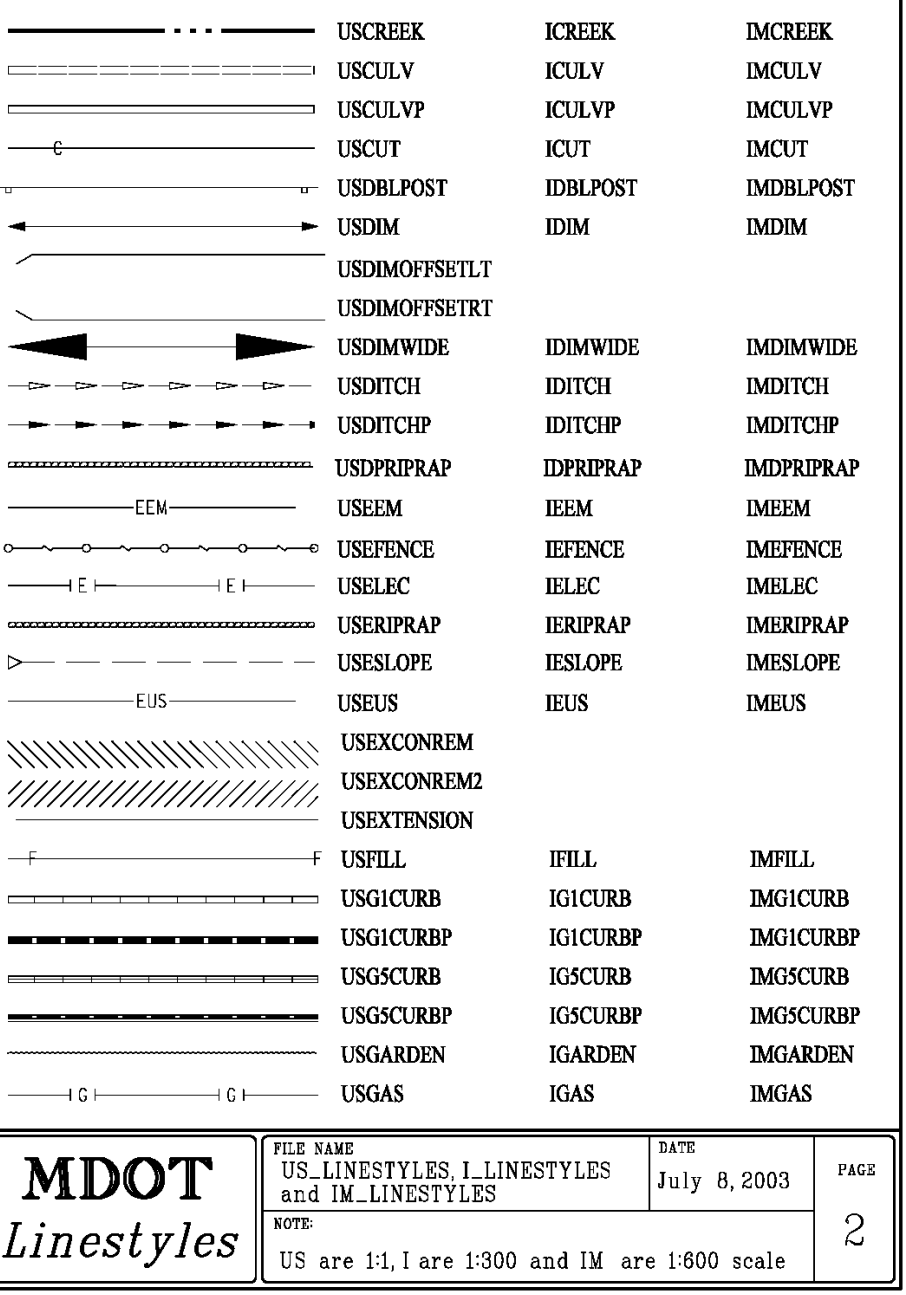
USBCURBP	IBCURBP	IMBCURBP
USBFENCE	IBFENCE	IMBFENCE
USBLAZED	IBLAZED	IMBLAZED
USBOG	IBOG	IMBOG
USBOX	IBOX	IMBOX
USBOXP	IBOXP	IMBOXP
USBREAKDOUBLE		
USBREAKSINGLE		
USBRWALL	IBRWALL	IMBRWALL
USBUILD	IMBUILD	USBUILD
USBUSH	IBUSH	IMBUSH
USBUSHH	IBUSHH	IMBUSHH
USCATV	ICATV	IMCATV
USCCL	ICCL	IMCCL
USCCURB	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

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
C
USCUT ICUT IMCUT
USDBLPOST IDBLPOST IMDBLPOST
USDIM IDIM IMDIM
USDIMOFFSETLT
USDIMOFFSETRT
USDIMWIDE IDIMWIDE IMDIMWIDE
USDITCH IDITCH IMDITCH
USDITCHP IDITCHP IMDITCHP
USDPRIPRAP IDPRIPRAP IMDPRIPRAP
EEM
USEEM IEEM IMEEM
USEFENCE IEFENCE IMEFENCE
E E
USELEC IELEC IMELEC
USERIPRAP IERIPRAP IMERIPRAP
USESLOPE IESLOPE IMESLOPE
EUS
USEUS IEUS IMEUS
USEXCONREM
USEXCONREM2
USEXTENSION
F F
USFILL IFILL IMFILL
USG1CURB IG1CURB IMG1CURB
USG1CURBP IG1CURBP IMG1CURBP
USG5CURB IG5CURB IMG5CURB
USG5CURBP IG5CURBP IMG5CURBP
USGARDEN IGARDEN IMGARDEN
G G
USGAS IGAS IMGAS
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Linestyles
FILE NAME
US_LINESTYLES, I_LINESTYLES and IM_LINESTYLES
DATE
July 8, 2003
PAGE
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NOTE:
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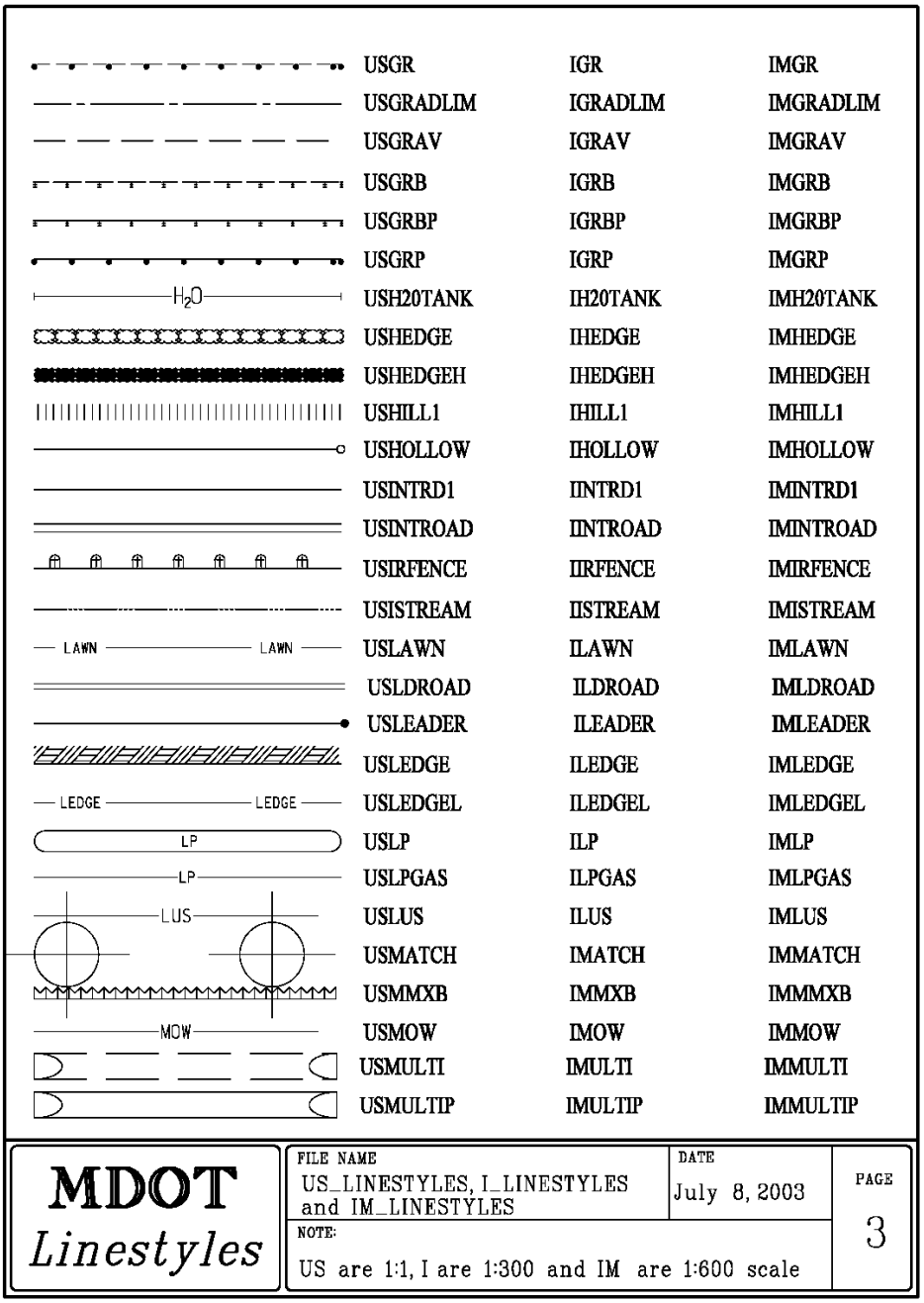


USGR	IGR	IMGR
USGRADLIM	IGRADLIM	IMGRADLIM
USGRAV	IGRAV	IMGRAV
USGRB	IGRB	IMGRB
USGRBP	IGRBP	IMGRBP
USGRP	IGRP	IMGRP
USH20TANK	IH20TANK	IMH20TANK
USHEDGE	IHEDGE	IMHEDGE
USHEDGEH	IHEDGEH	IMHEDGEH
USHILL1	IHILL1	IMHILL1
USHOLLOW	IHOLLOW	IMHOLLOW
USINTRD1	IINTRD1	IMINTRD1
USINTROAD	IINTROAD	IMINTROAD
USIRFENCE	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

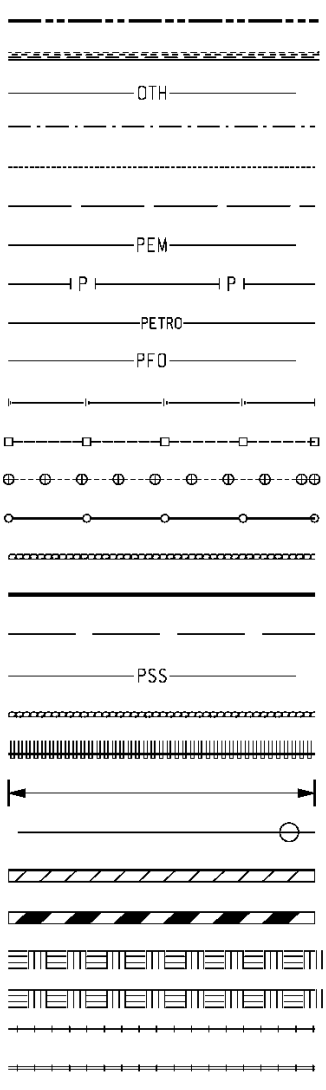
MDOT *Linestyles*

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

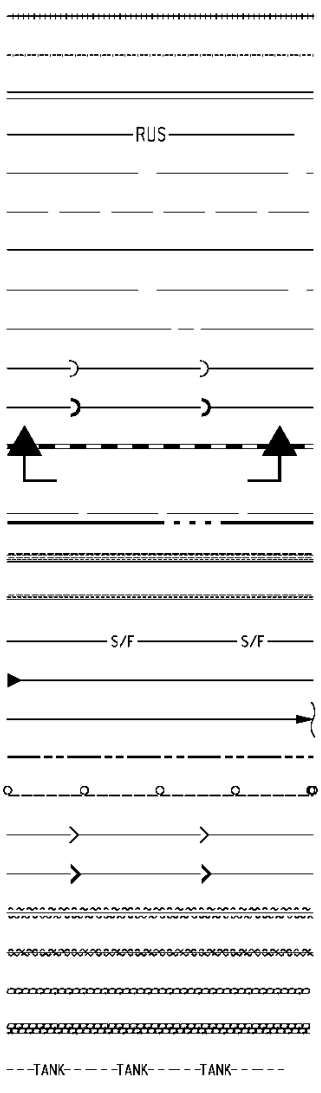


USNATION	INATION	IMNATION
USNATPARK	INATPARK	IMNATPARK
USOTH	IOTH	IMOTH
USPARKL	IPARKL	IMPARKL
USPARKS	IPARKS	IMPARKS
USPAVE	IPAVE	IMPAVE
USPEM	IPEM	IMPEM
USPETRO	IPETRO	IMPETRO
USPETTANK	IPETTANK	IMPETTANK
USPFO	IPFO	IMPFO
USPGFENCE	IPGFENCE	IMPGFENCE
USPICFENC	IPICFENC	IMPICFENC
USPOWER1	IPOWER1	IMPOWER1
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	DATE	PAGE
US_LINESTYLES, I_LINESTYLES and IM_LINESTYLES	July 8, 2003	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 USSECTION	ISECROAD	IMSECROAD
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: 6

NOTE: US are 1:1, I are 1:300 and IM are 1:600 scale

STRUCTURAL LINE STYLES

Samples

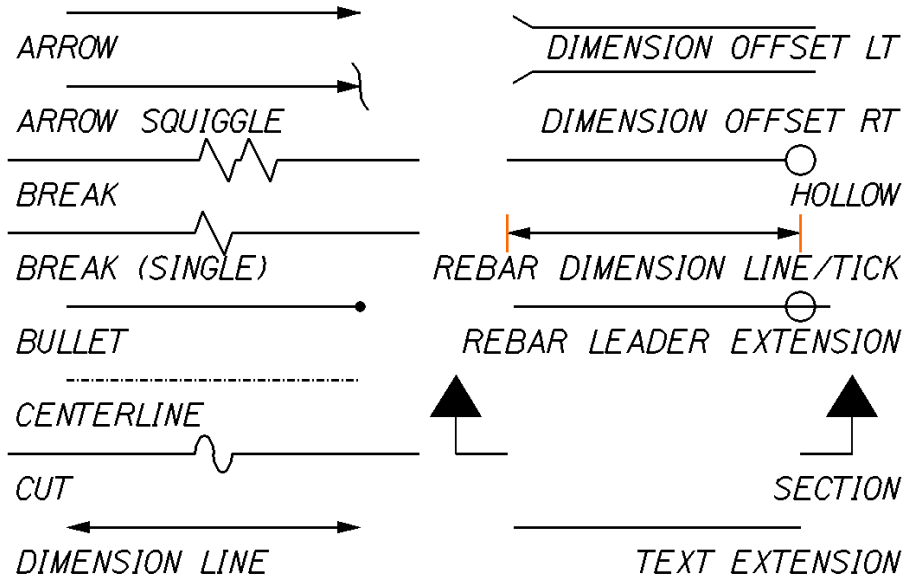


Figure 31-5: Structural Line Styles

Using Custom Line Styles

Line Styles are activated from the **Tasks Menus**. Select **BridgeGroup > Bridge > Special Linestyles** group (Figure 31-6).

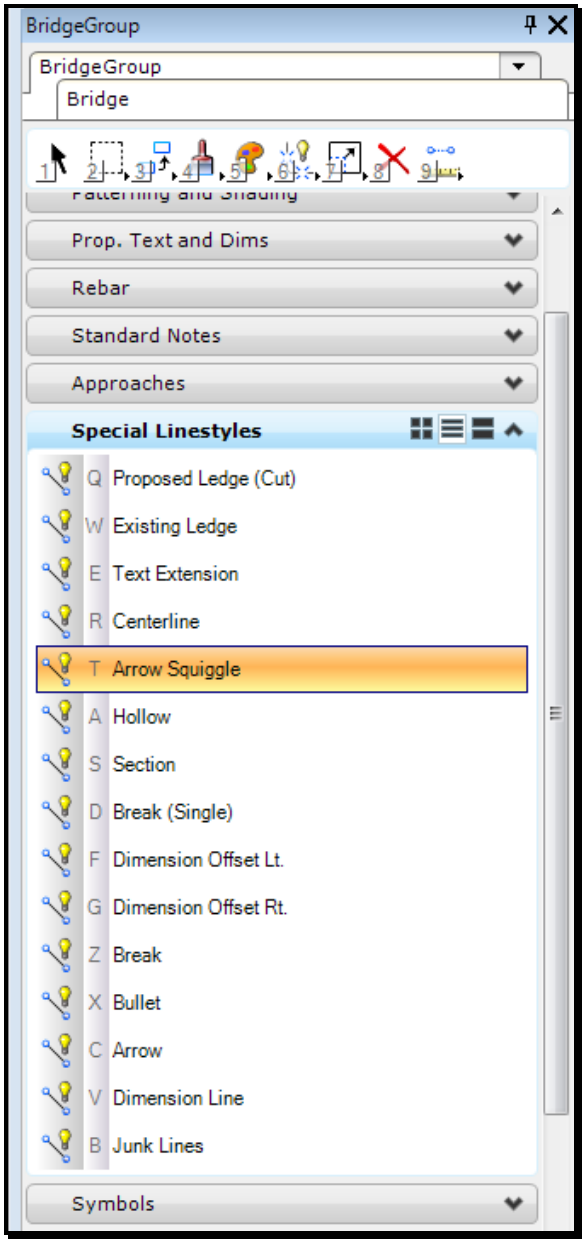


Figure 31-6: Structural Linestyle Options

Line styles are scale-dependent. Make sure you select the appropriate scale from the *Drawing Scale* dialog 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).

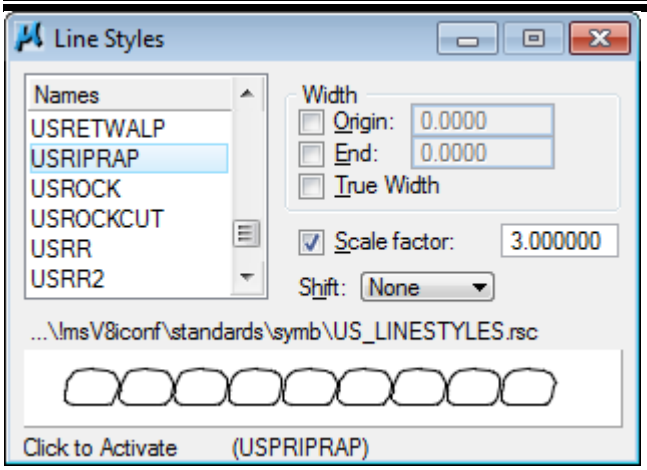


Figure 31-7: Line Styles Dialog

Note that there is an on/off switch labeled **Scale Factor:** followed by a text field. This is the scale, as determined by the **Tasks Menus** and **Drawing Scale** dialog, 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/caddsupport/msinroads/inroadslevelstructure.htm 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 the mapping department manager. They submit their information back to the manager 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, line style resource files, cell libraries and font resources. The web address is as follows: www.maine.gov/mdot/caddsupport/ . We highly encourage them to

use our customization. For more information, have them call MaineDOT'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/caddsupport/msinroads/inroadsdownloads.htm .

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/caddsupport/msinroads/inroadsnaming.htm .

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.

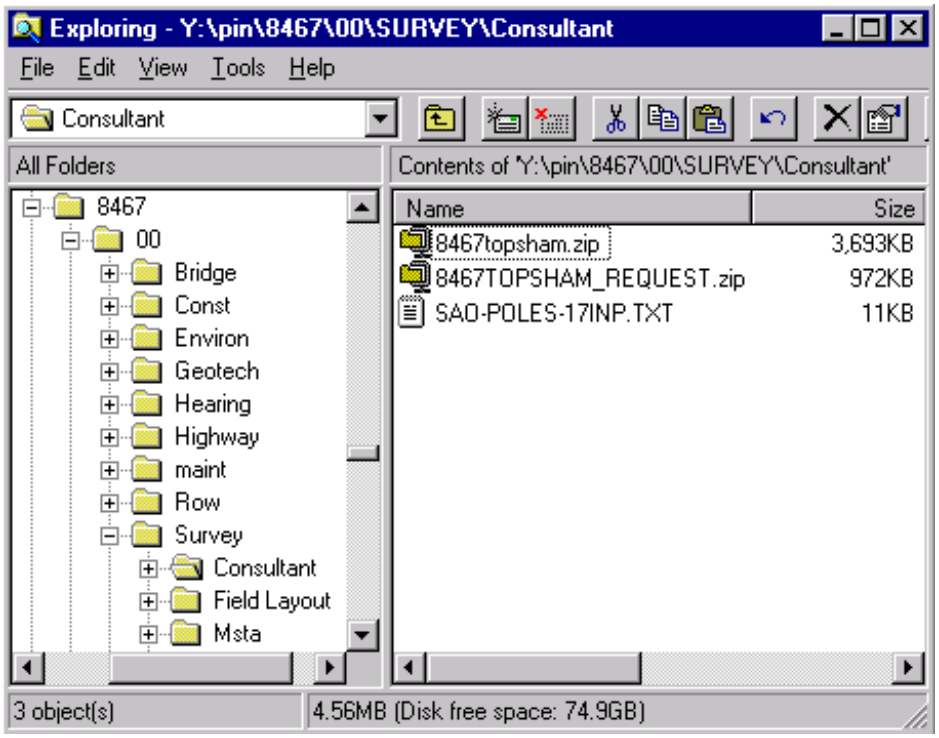


Figure 32-1: Example of zipped Survey Files ready to be sent to a consultant

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.

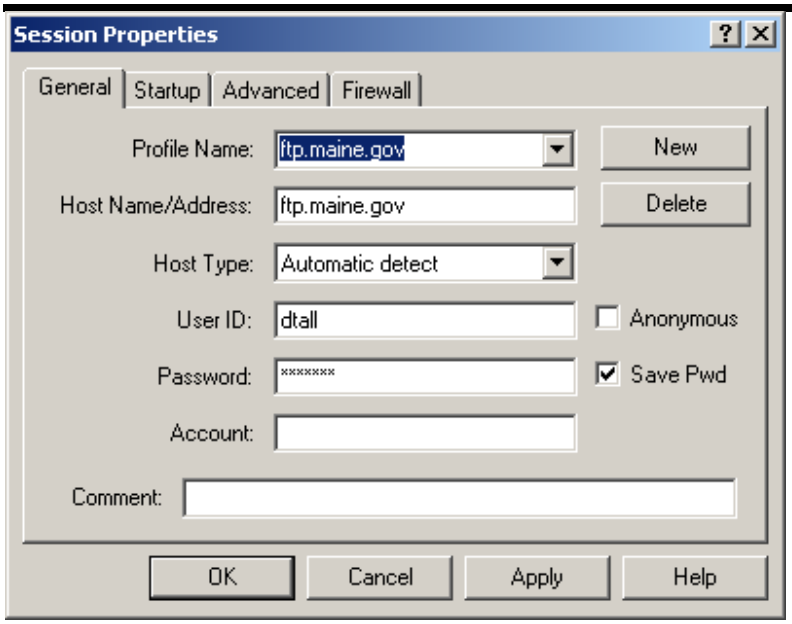


Figure 32-3: Session Properties

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.

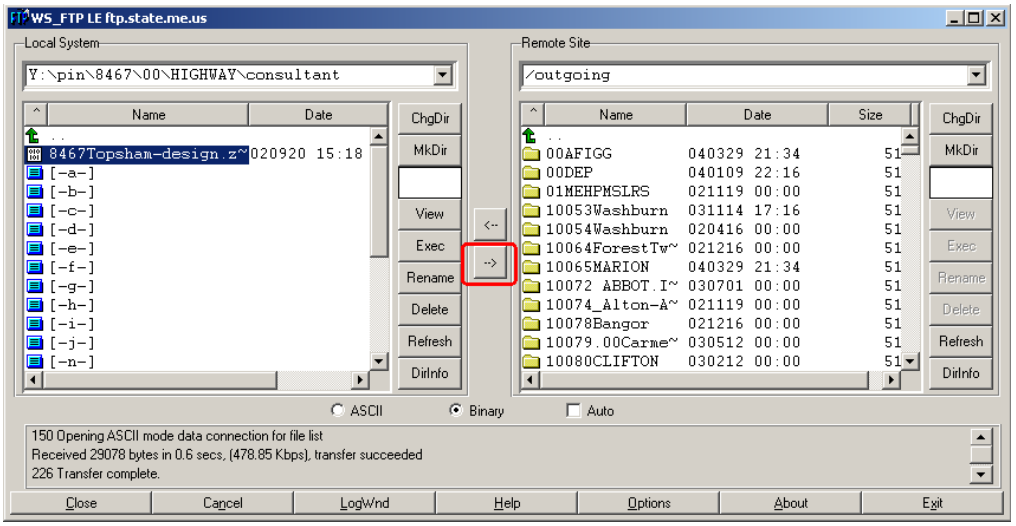


Figure 32-4: WS_FTP LE ftp.maine.gov

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.

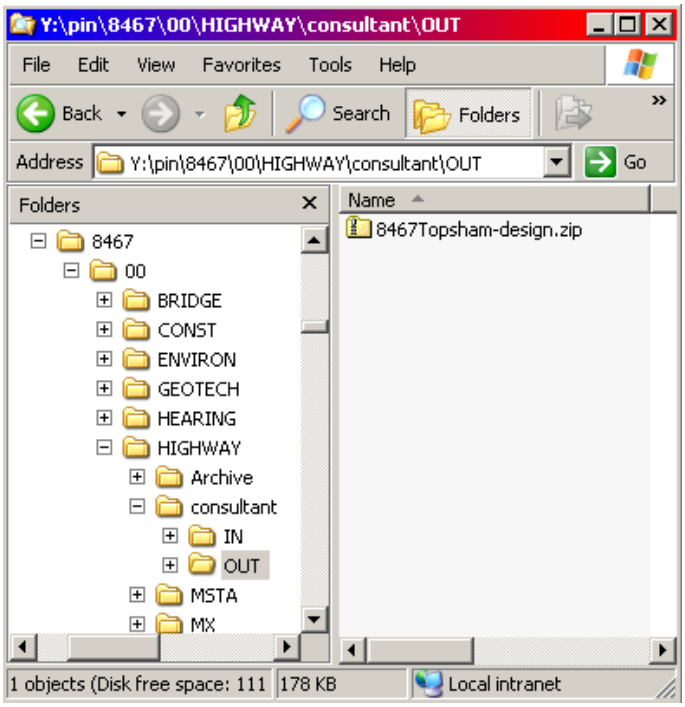


Figure 32-5: An example of a consultant folder structure

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 projects 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/caddsupport/msinroads/inroadsnaming.htm 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.

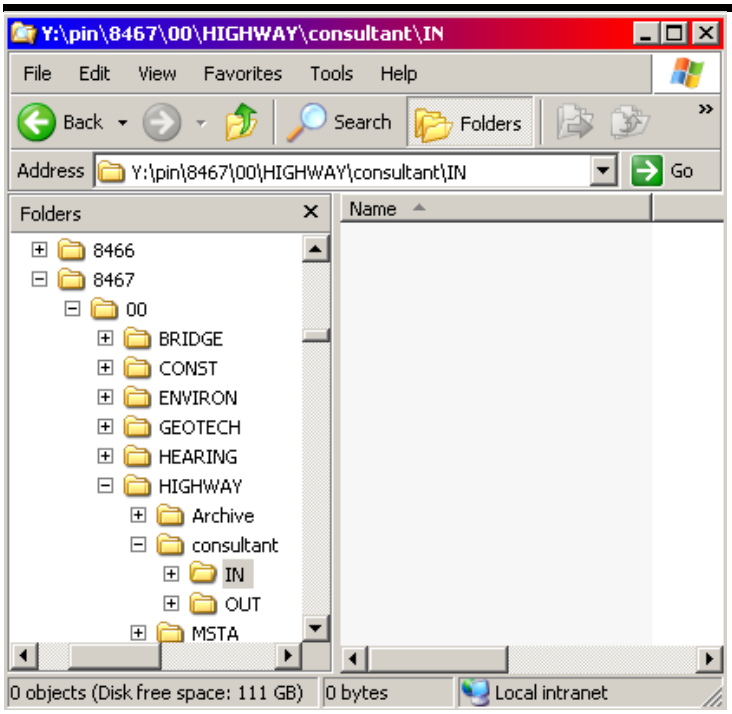


Figure 32-6: Consultant/IN folder in your Workgroup's folder

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.

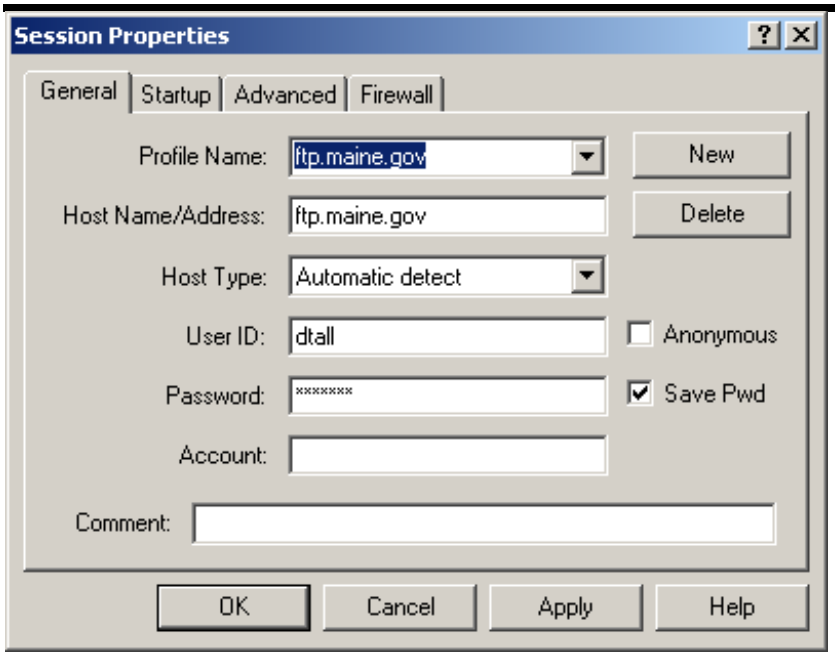


Figure 32-8: Session Properties

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.

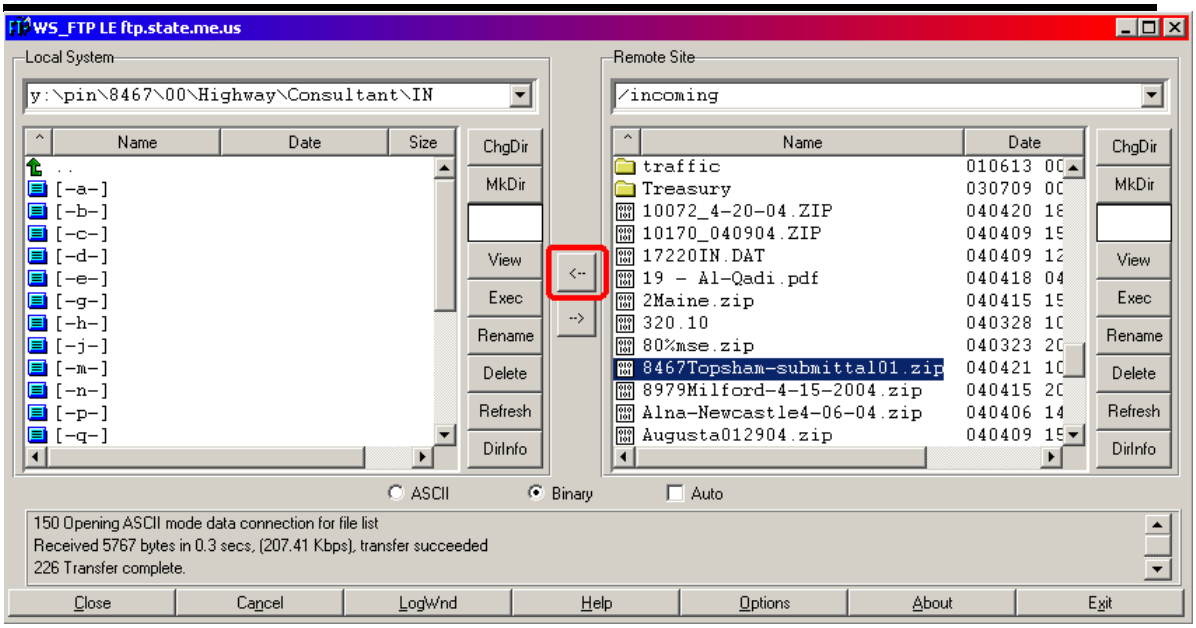


Figure 32-9: Incoming folder using WS_FTP LE ftp.maine.gov

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).

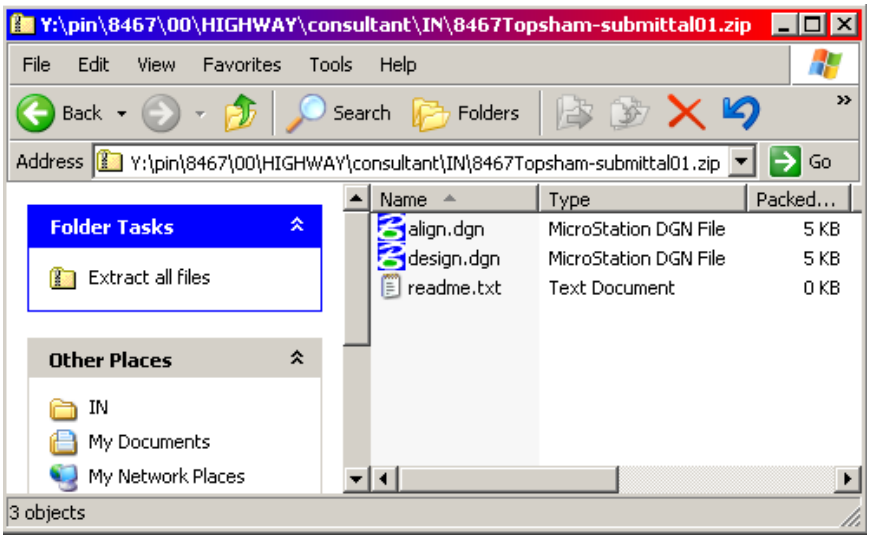


Figure 32-10: Contents of the zipped folder

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).

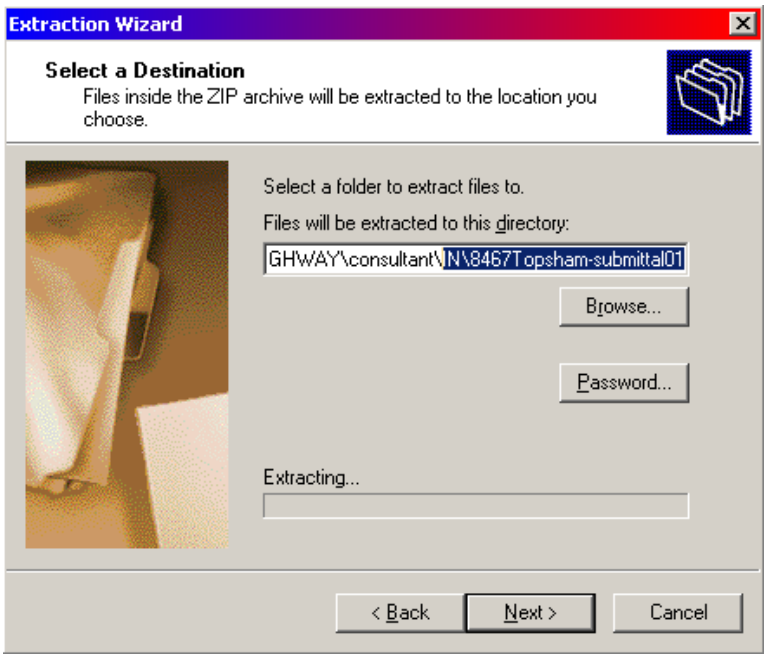


Figure 32-11: Remove part of the path to the desired directory in the Extraction Wizard

- 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/caddsupport/msinroads/inroadsnaming.htm 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 its 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 MaineDOT'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 MaineDOT'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 (R) DWG Files (*.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.***

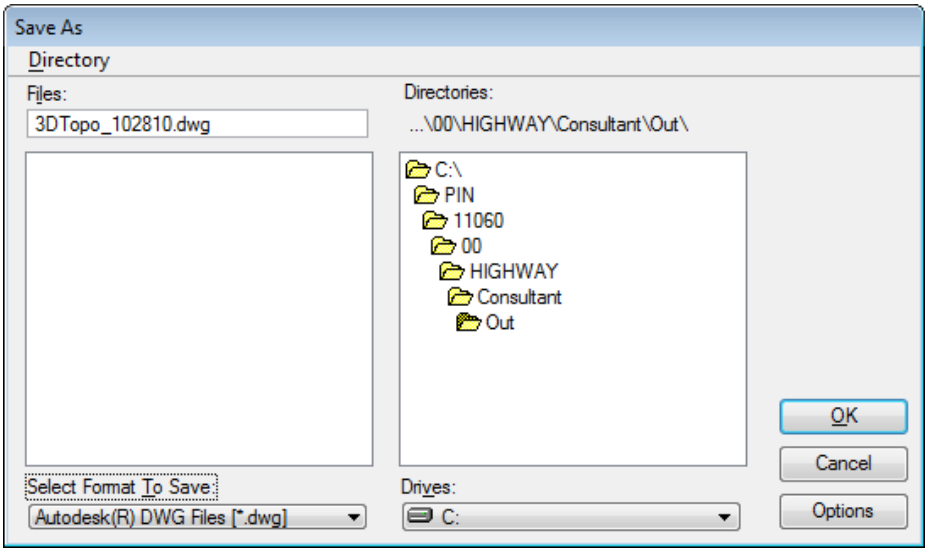


Figure 32-12: Save As dialog (.dwg File Format) pointing to the Workgroups Consultant/OUT directory*

- 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 line styles even though the consultant may not have them configured or mapped appropriately.

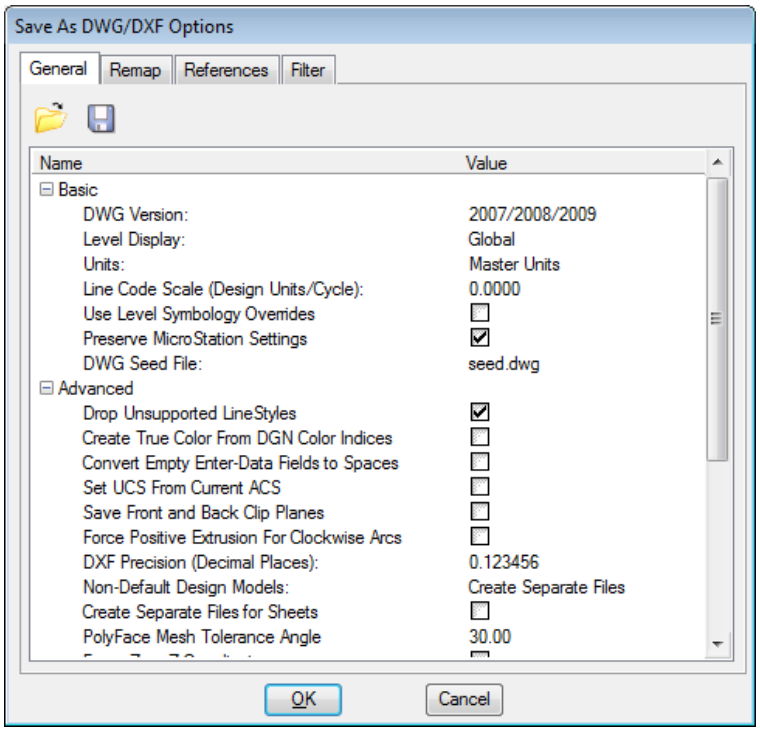


Figure 32-13: General tab with appropriate selections

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.

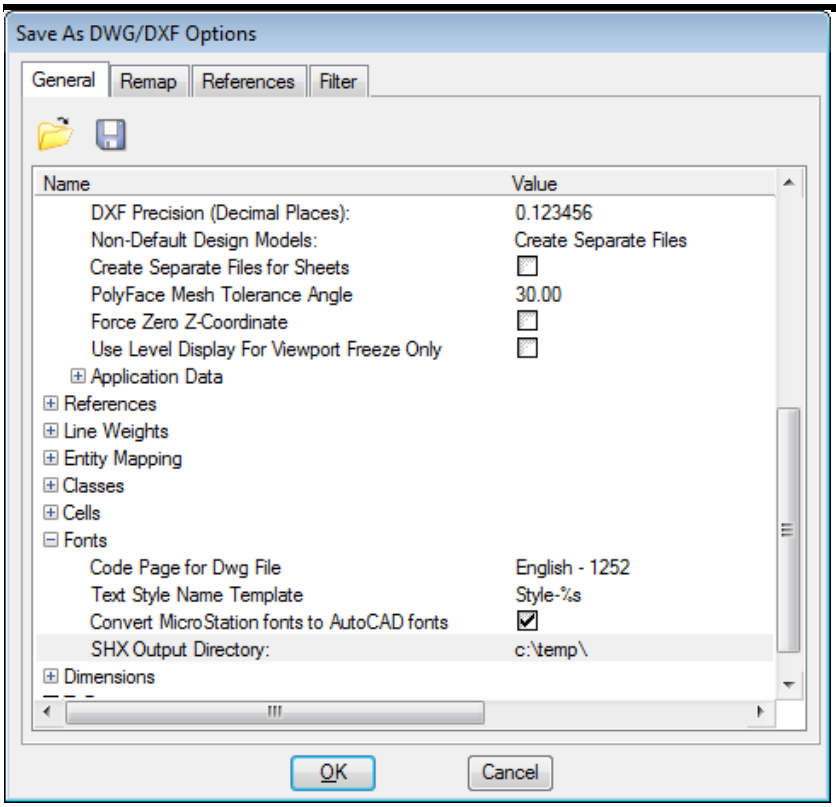


Figure 32-14: Adjust the Fonts portion of the dialog

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.

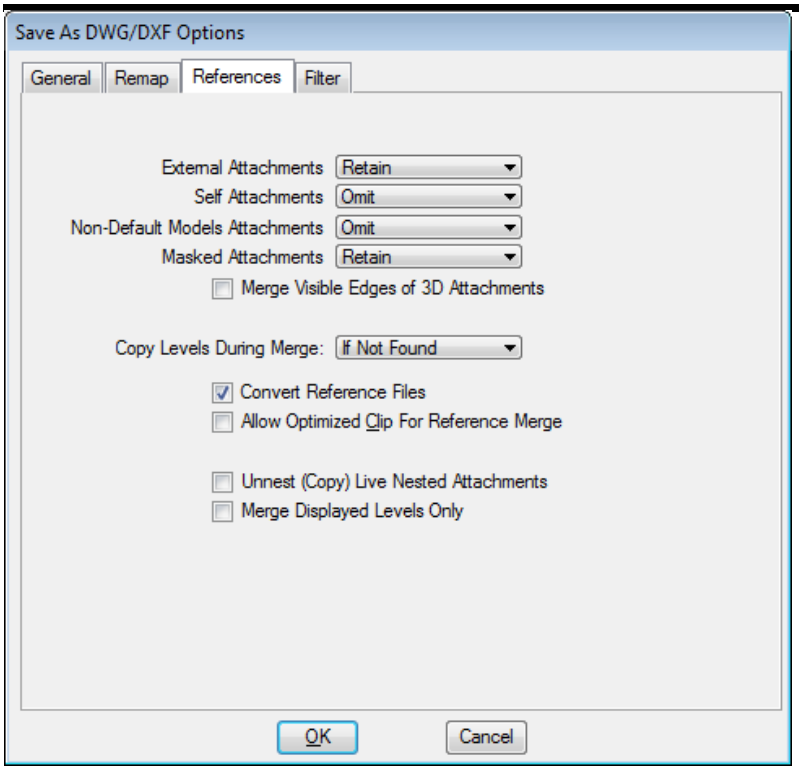


Figure 32-15: Save As Reference Tab options

Select the *Filter* tab and adjust your options to those seen in Figure 32-16.

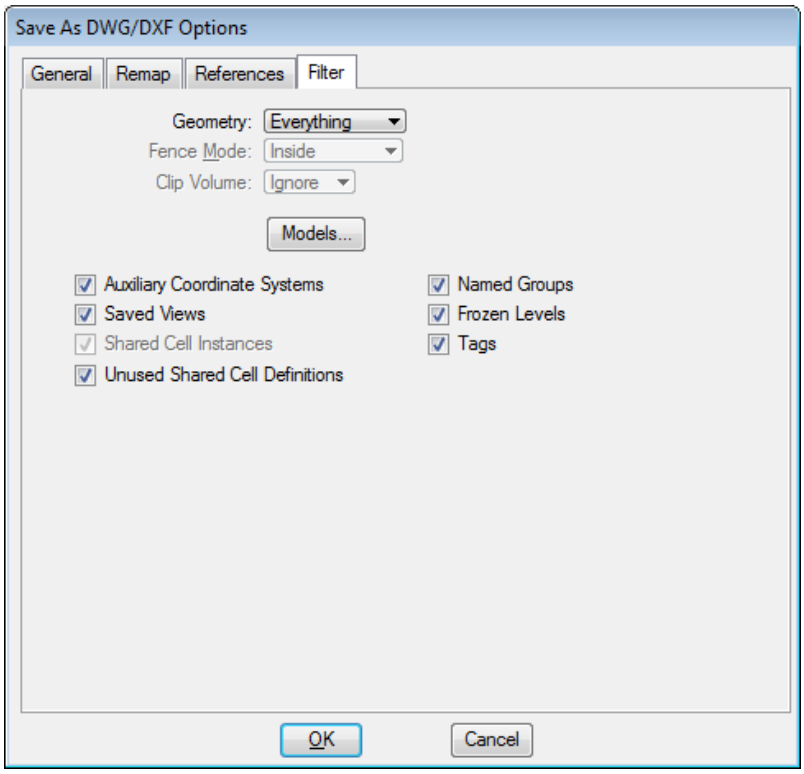


Figure 32-16: Save As Filter Tab options

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 Line Styles 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).

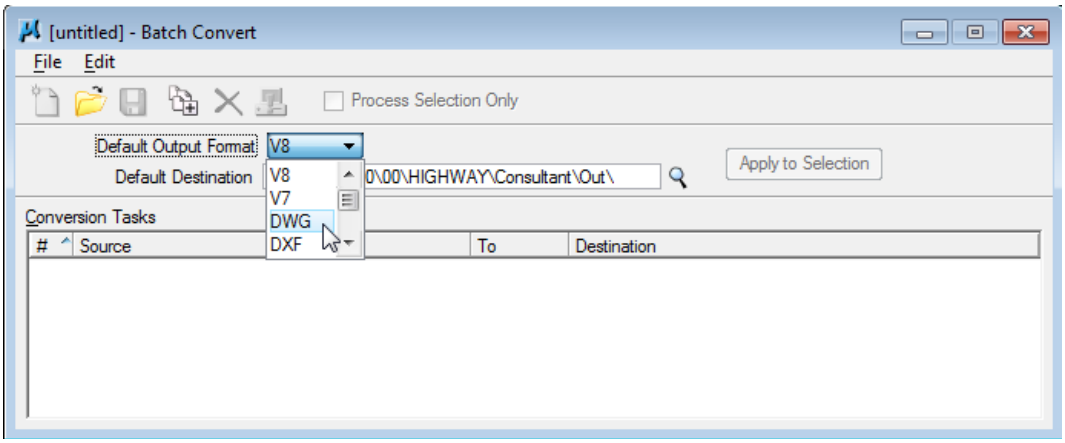


Figure 32-17: Changing the Default Output Format to DWG

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.

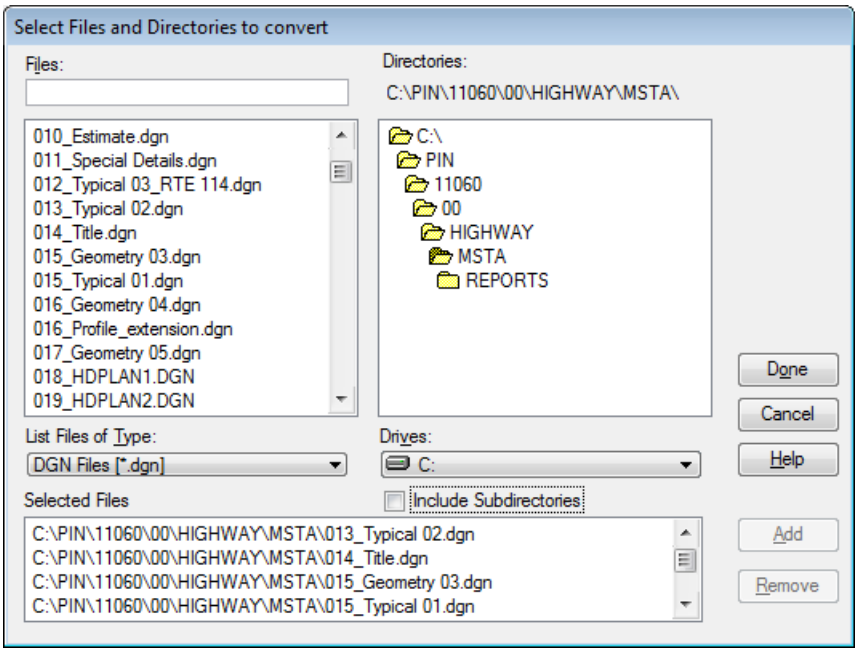


Figure 32-18: Select Files and Directories to Convert dialog

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.

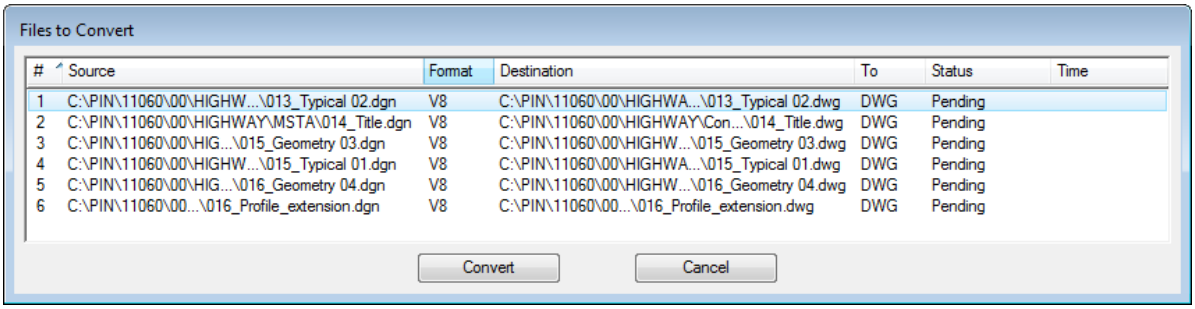


Figure 32-19: Files prepared to convert

ⓘ ***Occasionally you will receive a warning message 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.***

When the files have all been processed, the dialog (Figure 32-20) will display which files that were converted and which ones may have failed. Click Done.

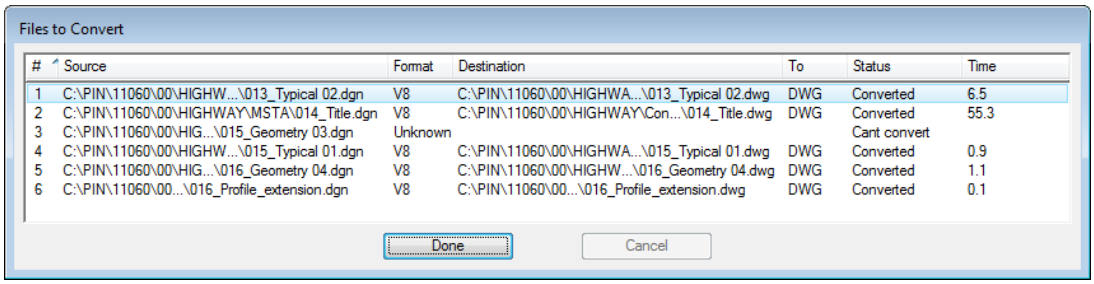


Figure 32-20: Dialog displaying the results

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 32-21). Select **File > Process…** to start the conversion on the individual file(s). Second time usually works fine.

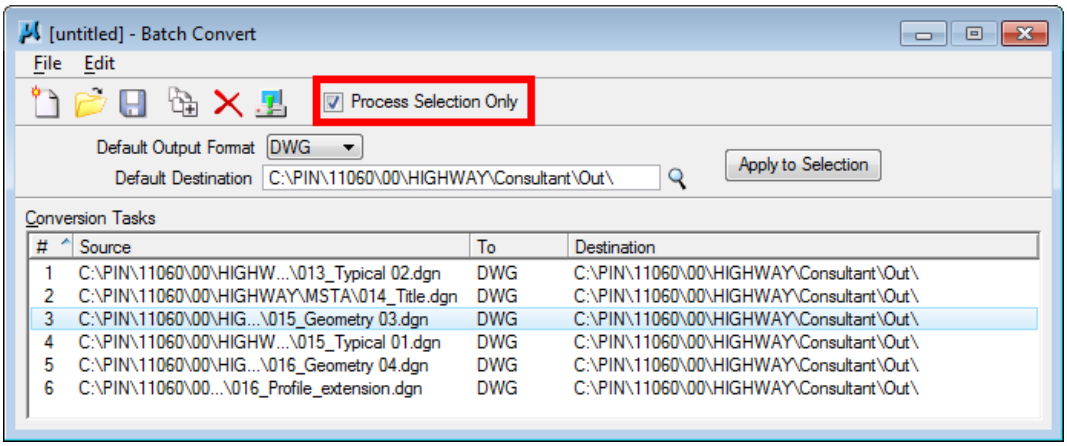


Figure 32-21: Selecting files and using the Process Selection Only box

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 Line Styles 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 your 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.

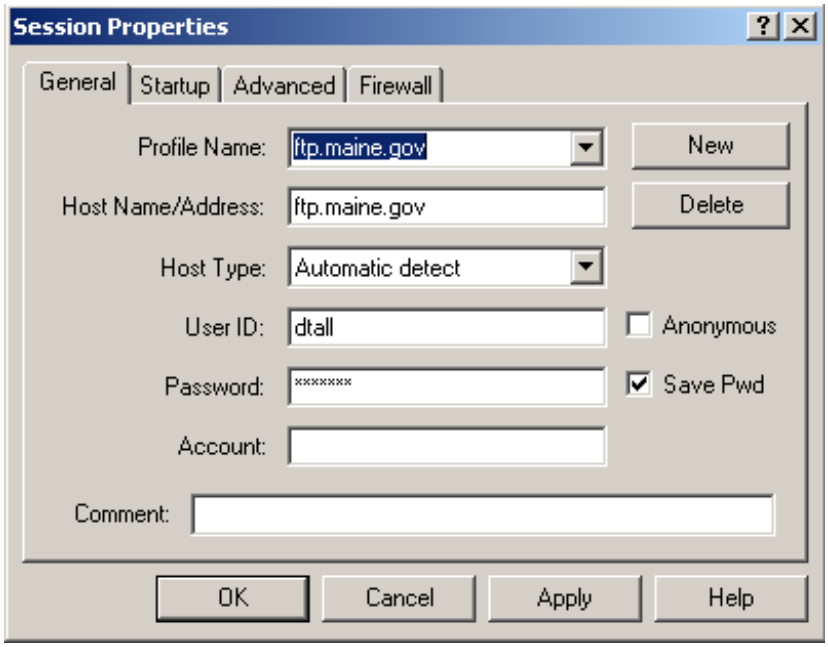


Figure 33-2: Session Properties

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.

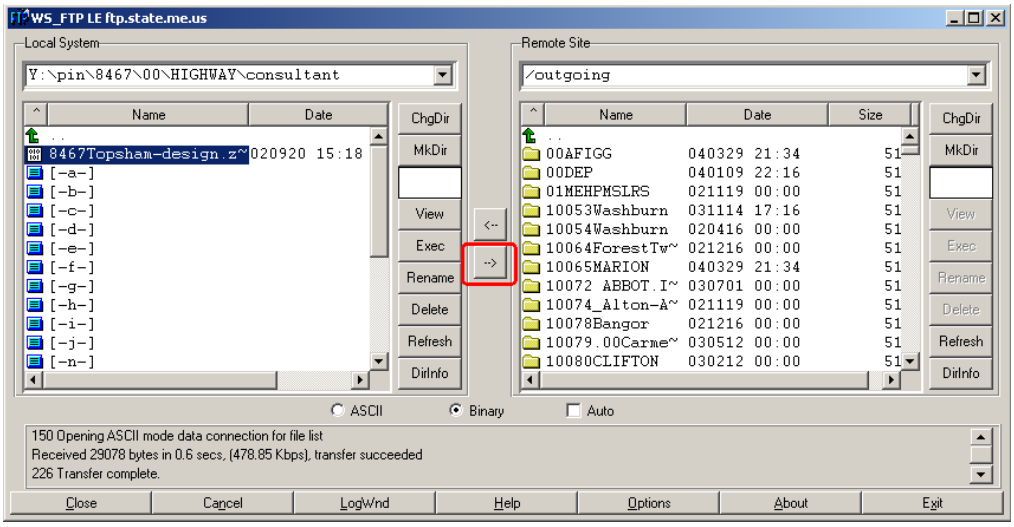


Figure 33-3: WS_FTP LE ftp.maine.gov

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 points to the **oit-teaqasdtiis.mdot.w2k.state.me.us** 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 **oit-teaqasdtiis.mdot.w2k.state.me.us** 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 1-57 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**.

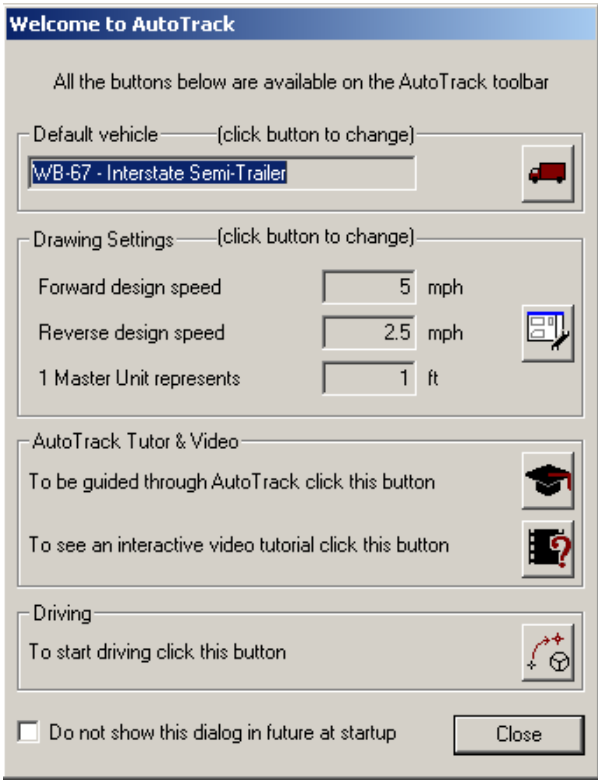


Figure 33-4: AutoTrack Welcome dialog

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 to 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.

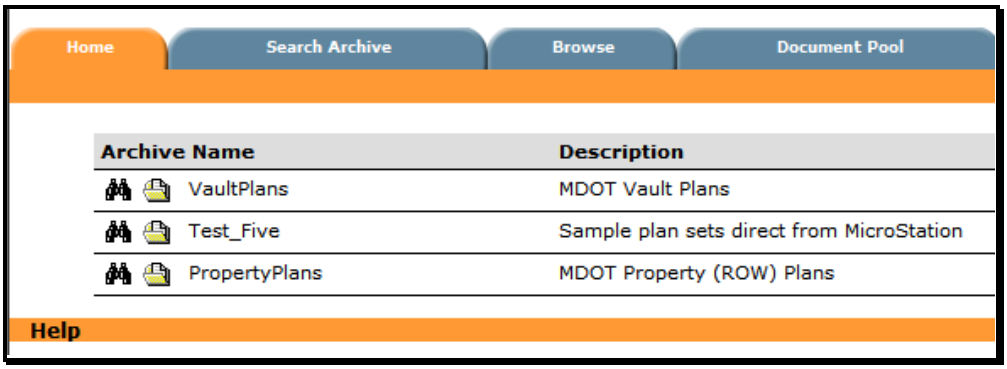


Figure 34-2: Browsing an Archive

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).

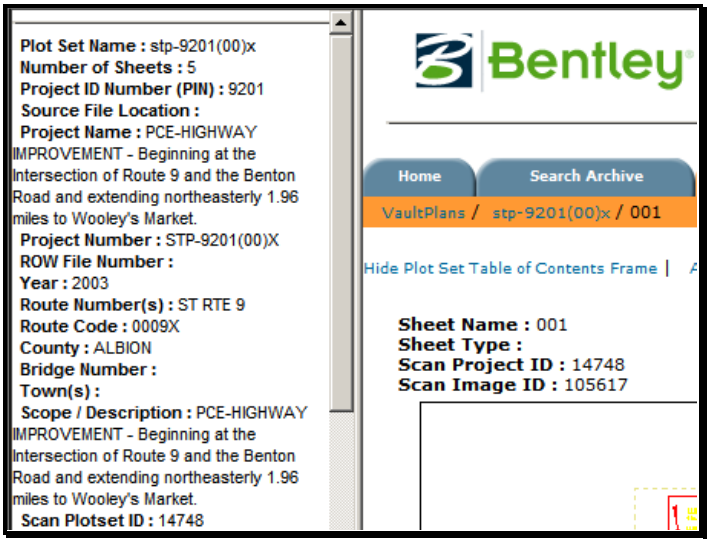


Figure 34-3: Table of Contents Frame

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).

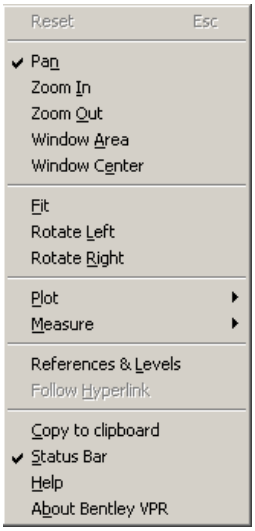


Figure 34-4: Right Click menu items

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.

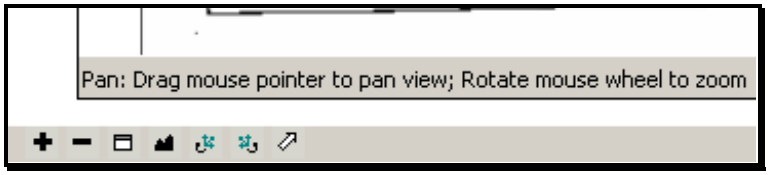


Figure 34-5: View controls

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 proceeding 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).

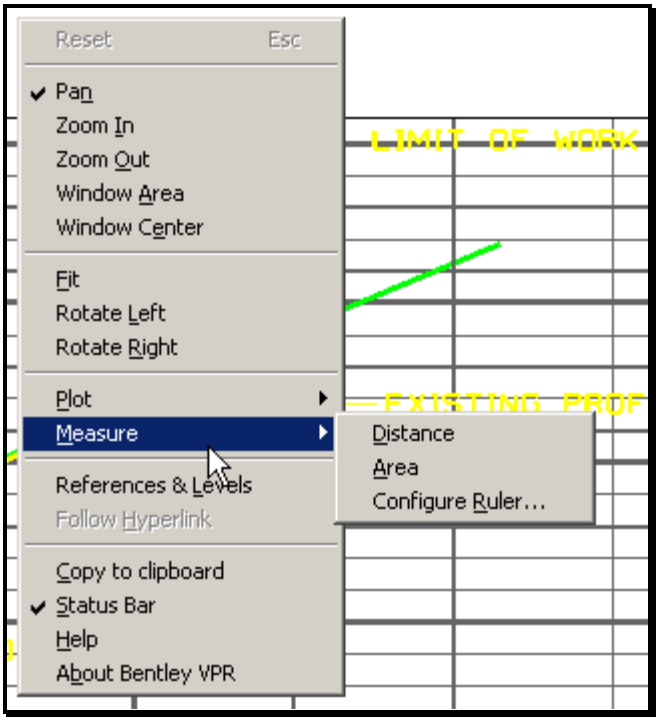


Figure 34-6: Entering the Ruler Configuration

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.

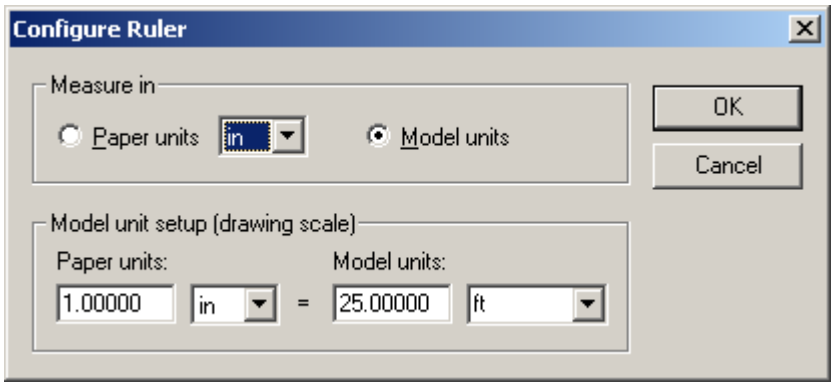


Figure 34-7: Setup for 25 feet per Inch

- 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.

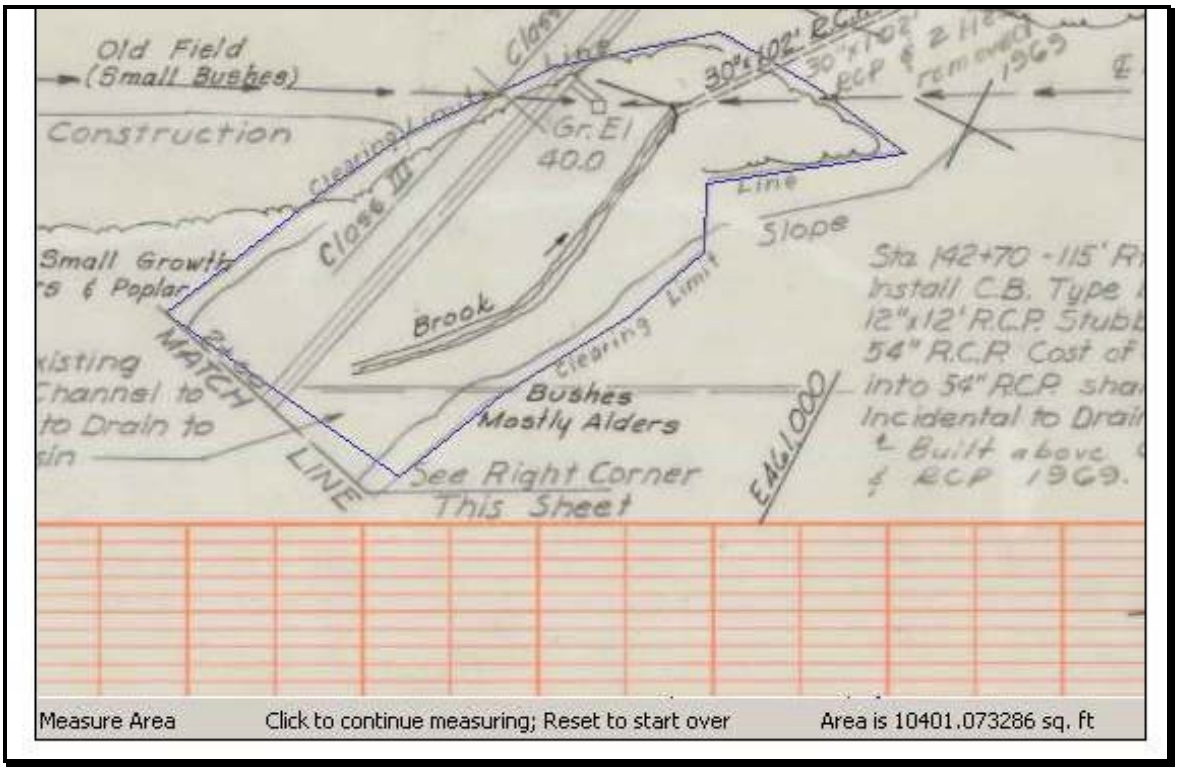


Figure 34-10: Area measurement displayed in lower right hand corner

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.

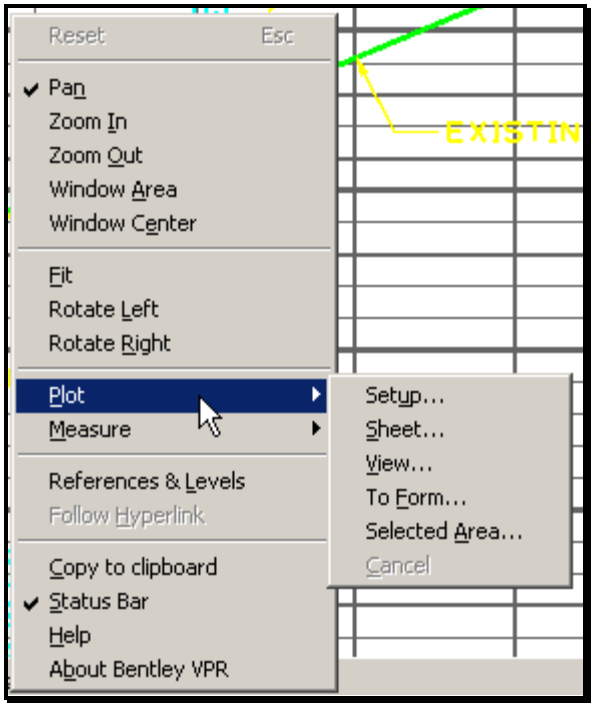


Figure 34-11: Right Click, select Plot to Form

- ✓ ***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).

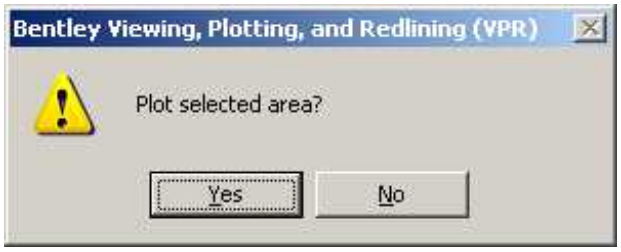


Figure 34-12: Plot selected area?

- 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).

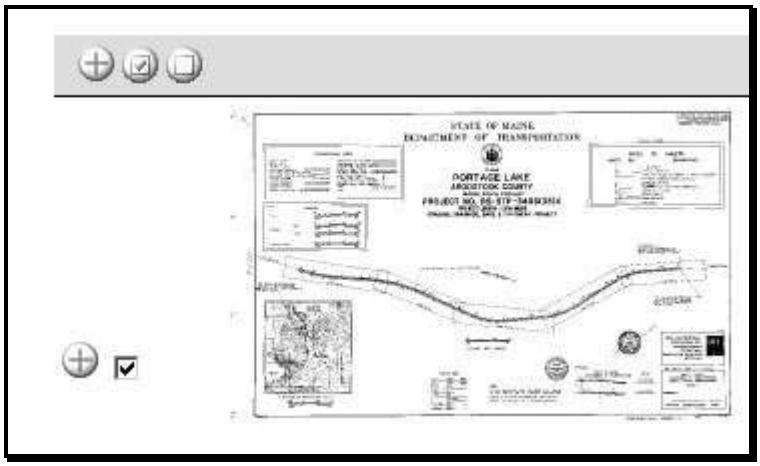


Figure 34-13: Place a check in the box next to the image

Click the "Add to Document Pool" icon (+) next to the check box (Figure 34-14) to add the document(s) to the document pool.

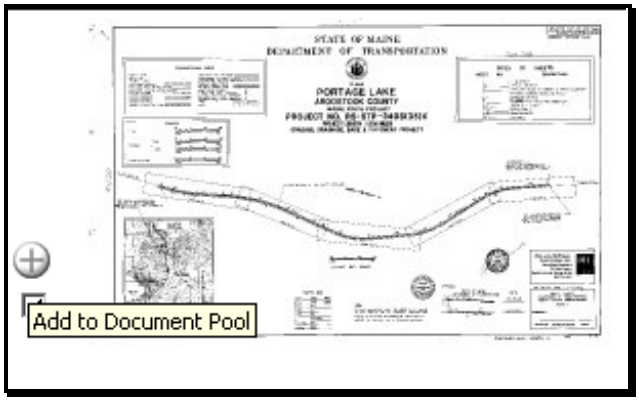


Figure 34-14: Click the Plus sign (+) next to the check box of the image

- 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.

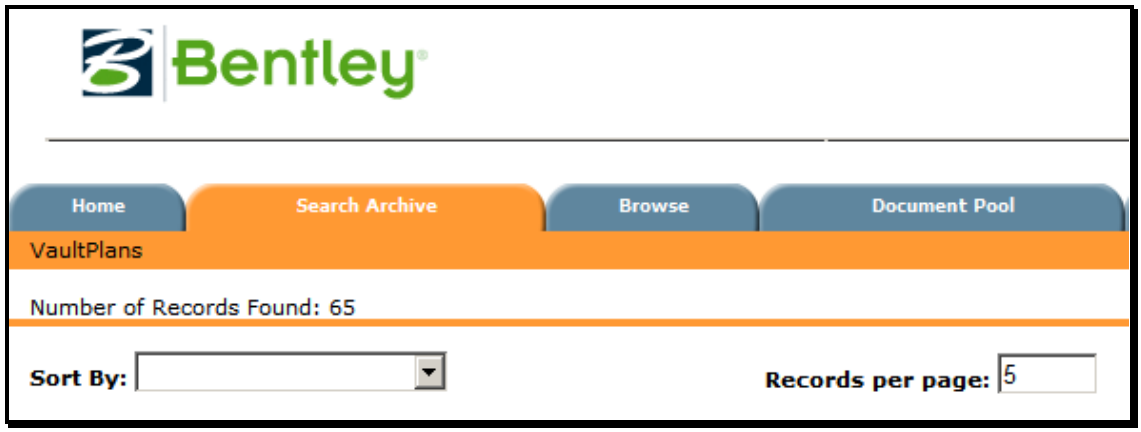


Figure 34-15: Number of Records Found and the Records per Page

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).

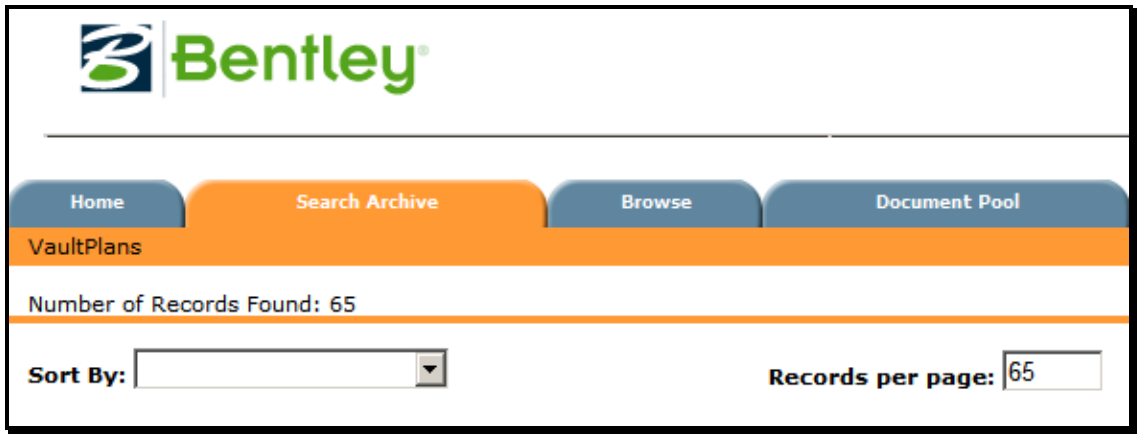


Figure 34-16: Records per page matching the Number of Records

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.

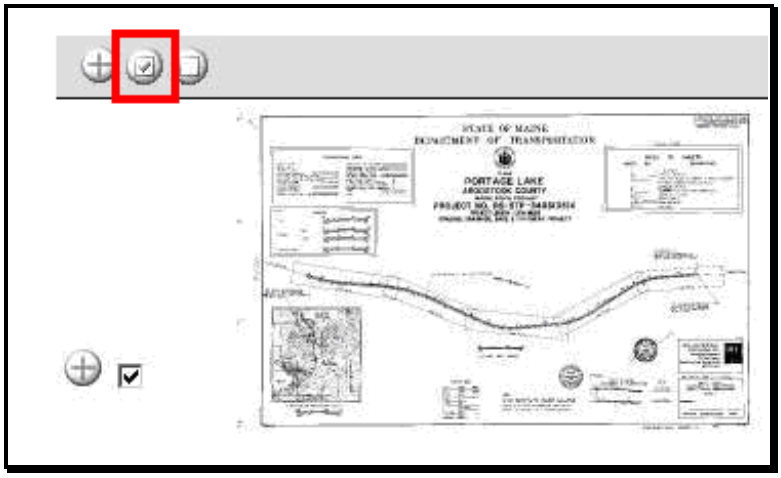


Figure 34-17: Select all the images at once

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.*

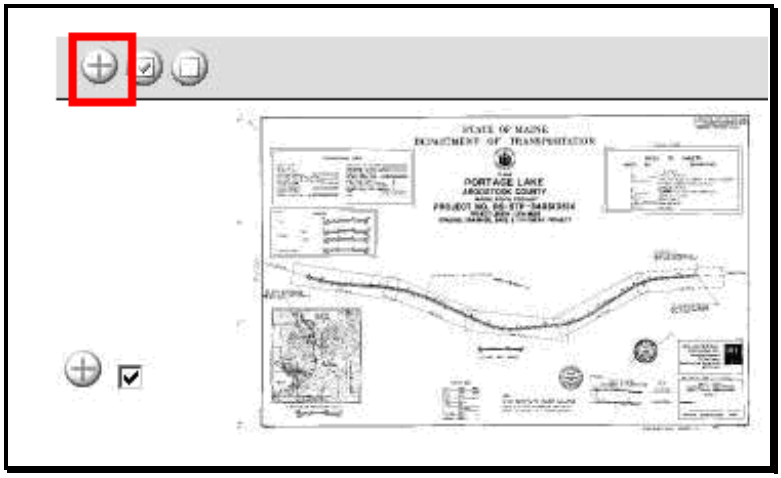


Figure 34-18: Click the Add button to add all images to the Document Pool

- 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.

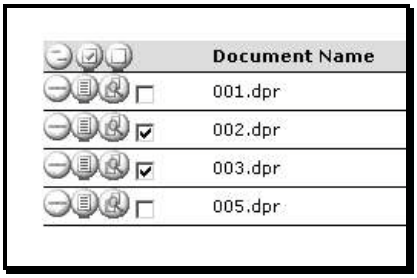


Figure 34-19: Images in the Document Pool

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).

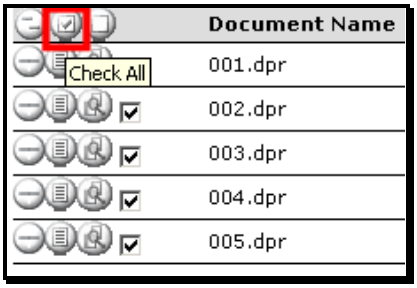


Figure 34-20: Check All button

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.

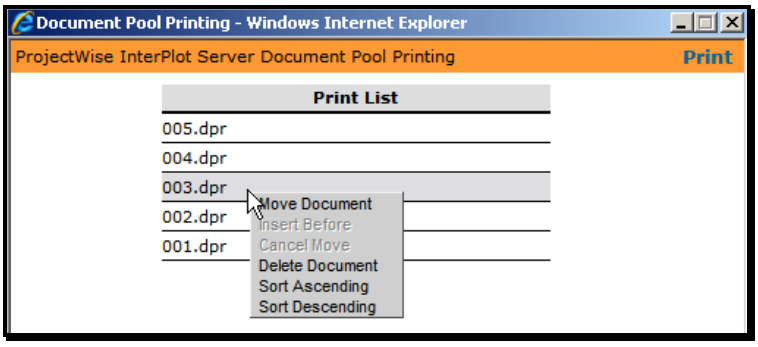


Figure 34-21: Right Click to sort or move a document

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 2-77 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.

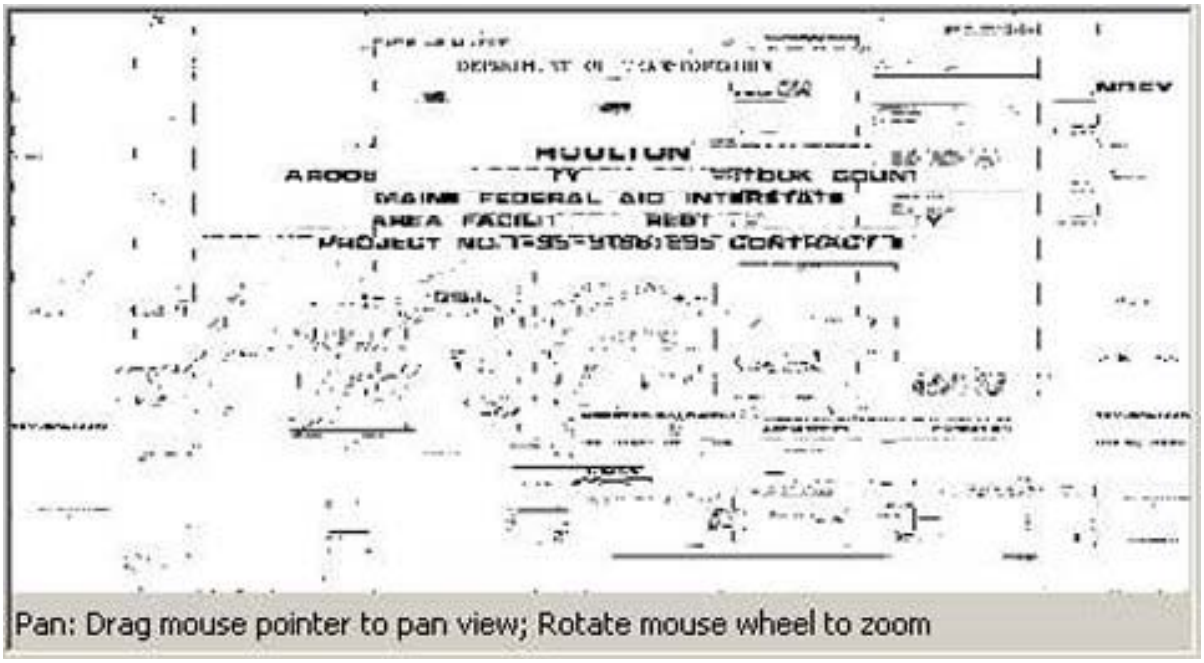


Figure 34-22: Image on a PC that requires the Windows System Variable

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).

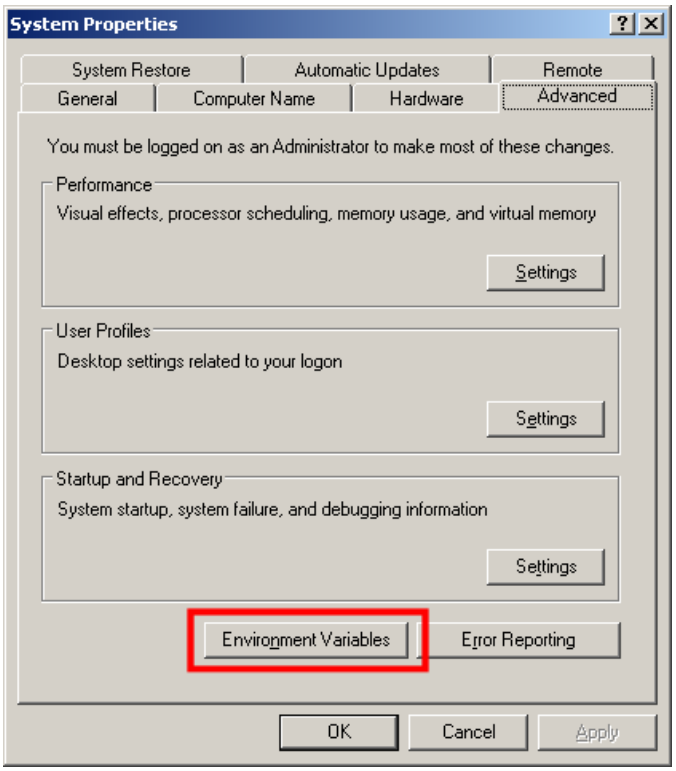


Figure 34-23: select the Environmental Variables button

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.

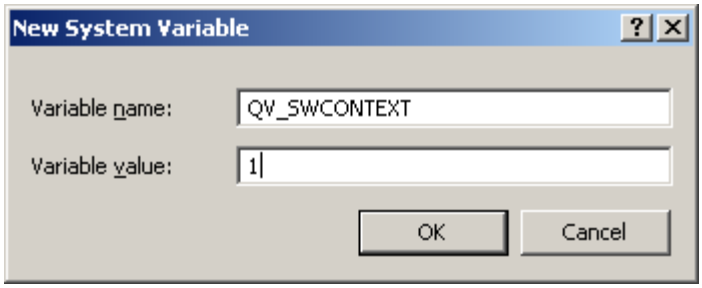


Figure 34-24: Add the variables and their values

Once the variables have been added, you should be able to locate them in the list of System Variables (Figure 34-25). Click **OK.**

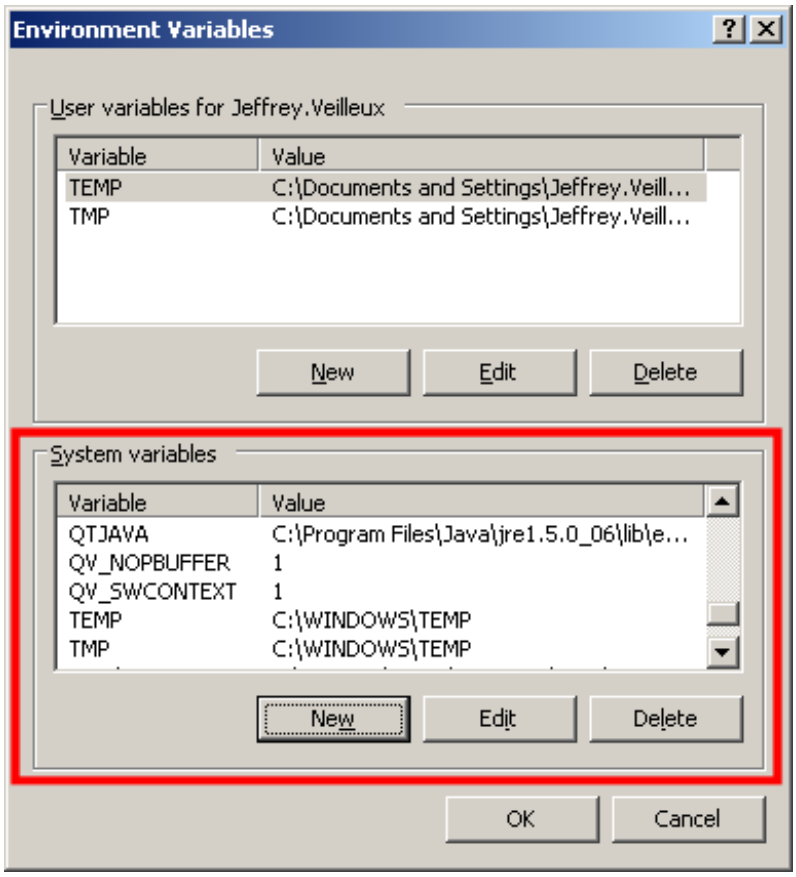


Figure 34-25: New variables added to the System Variables

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 (\\oit-teaqasdtiis.mdot.w2k.state.me.us\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.**

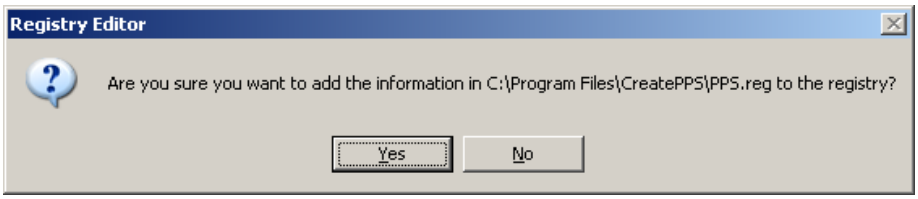


Figure 34-26: Add information to Registry prompt.

Step Four: Confirmation of Registry Addition

Almost immediately you will receive another message stating the information was added successfully (Figure 34-27). Click **OK.**

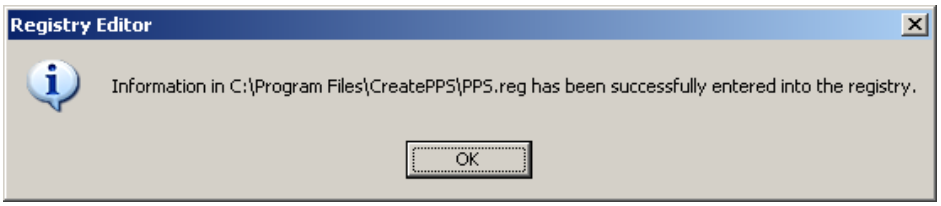


Figure 34-27: Confirmation of Registry information

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).

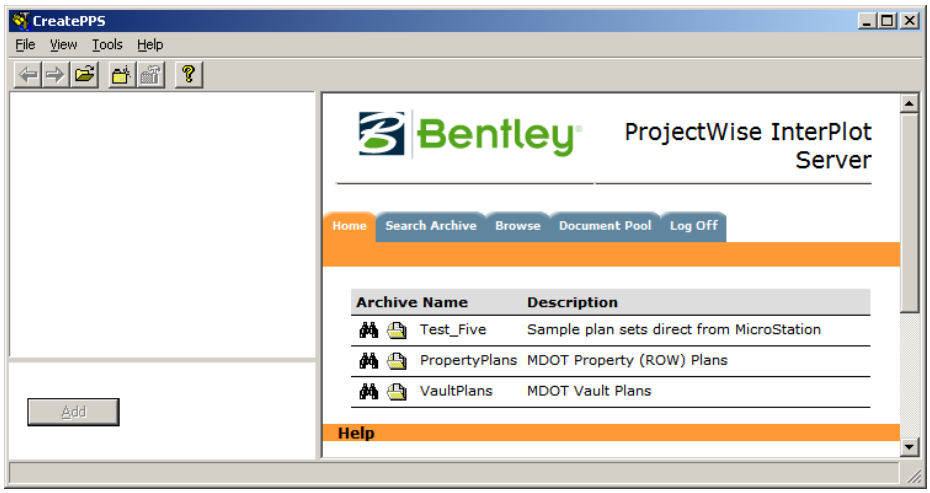


Figure 34-28: CreatePPS dialog

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).

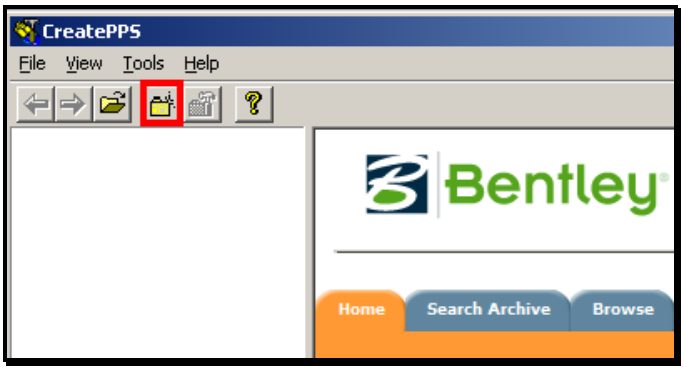


Figure 34-29: Add Folder icon from the CreatePPS tool bar.

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.

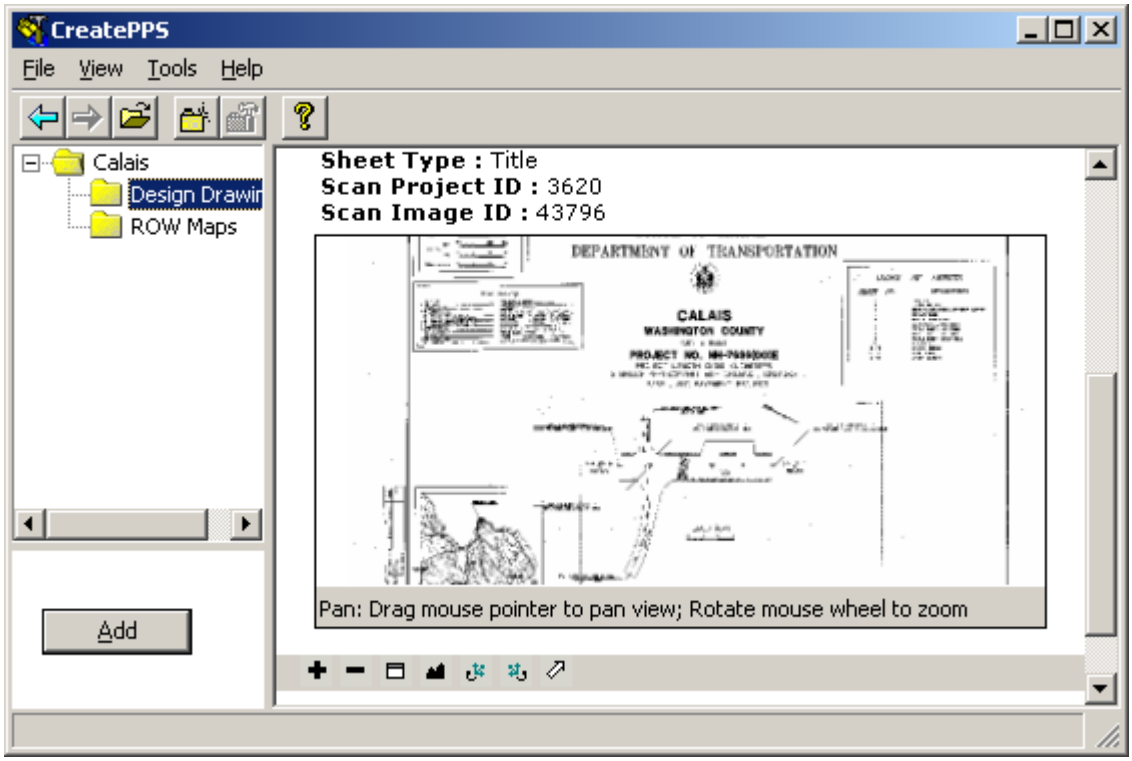


Figure 34-30: Folder structure to organize the images.

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).

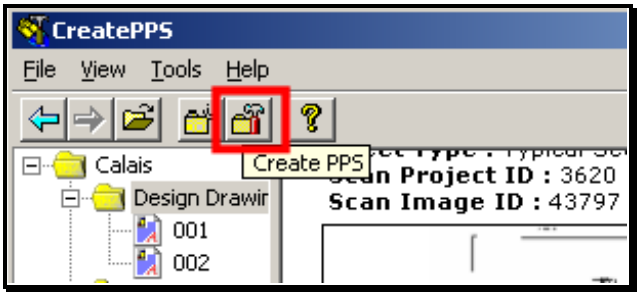


Figure 34-31: Create Plan Set tool on the tool bar.

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

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 08.11.07.420). 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 (\\oit-teaqasdtiis.mdot.w2k.state.me.us\pcpin1\msworksp\DigitalInterPlot\Software Install\pwpor081107420en \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 > ProjectWise InterPlot Utilities > ProjectWise InterPlot Organizer.** Right-click and select **Send to > Desktop (create shortcut).**

Step Four: InterPlot Client Configure

Select **Start > Programs > Bentley > ProjectWise InterPlot Utilities > ProjectWise InterPlot Organizer 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 XEROX 6204** 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 IPXEROX6204 plotter in the list. If it doesn't work, type the address in *Windows Explorer* and double click the IPXEROX6204 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* ***XEROX 6204*** in the name field. Highlight the printer and click **OK.**

- Note that there must be a space between “XEROX” and “6204”.

Step Six: Run Batch File

Browse to the batch file located at the following location (\\oit-teaqasdtiis.mdot.w2k.state.me.us\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.**

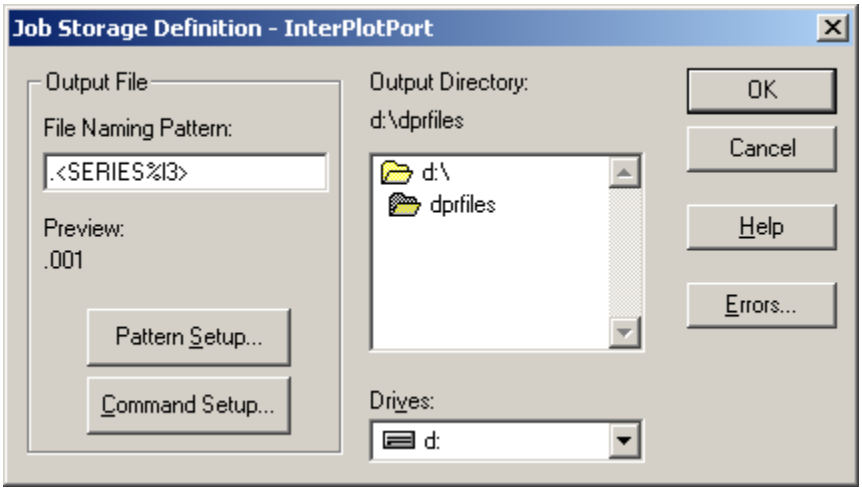


Figure 34-32: Job storage definition dialog.

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 \\oit-teaqasdtiis.mdot.w2k.state.me.us\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). 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.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 XEROX 6204**.

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…**

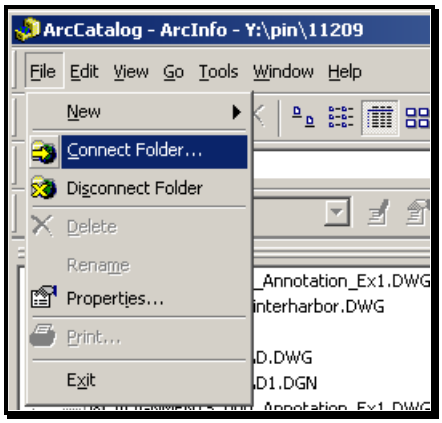


Figure 35-1: Selecting Connect to Folder from the File Menu.

When the *Connect to Folder* dialog opens, browse to the Y: drive (oit-teaqasdtiis.mdot.w2k.state.me.us\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.

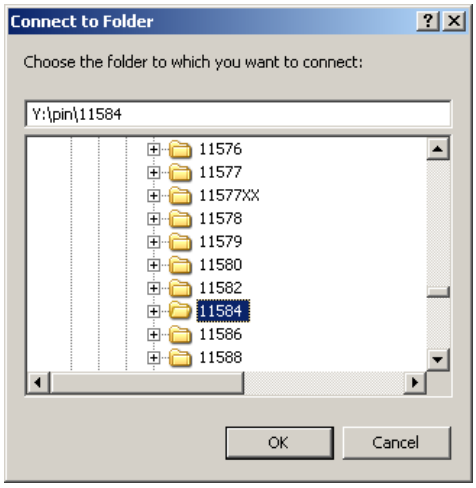


Figure 35-2: Connect to Folder dialog box.

ⓘ ***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…**

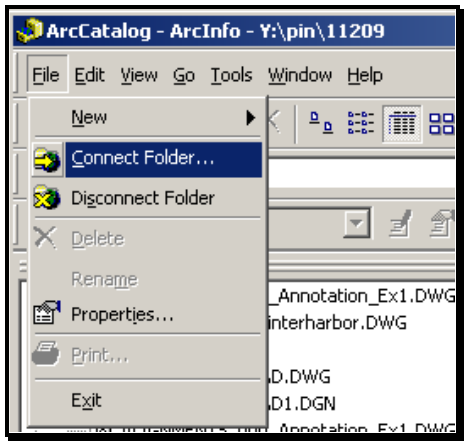


Figure 35-3: Selecting Connect to Folder from the File Menu.

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).

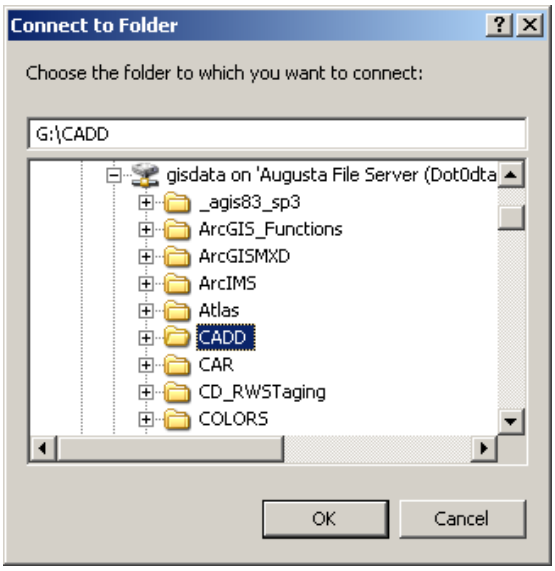


Figure 35-4: Connect to Folder dialog box.

Now you should see the connection alphabetically in your list of files and folders within ArcCatalog (Figure 35-5).

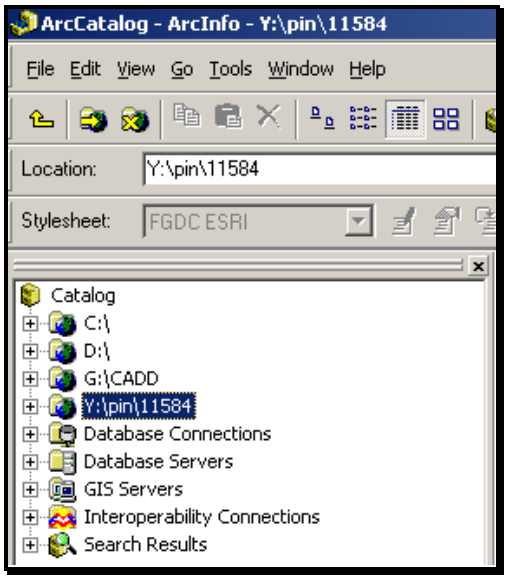


Figure 35-5: Connected folders in ArcCatalog

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.

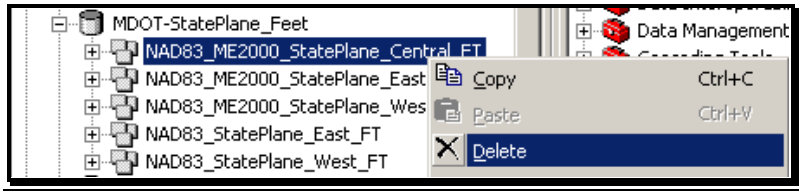


Figure 35-6: Delete unused Feature Datasets.

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).

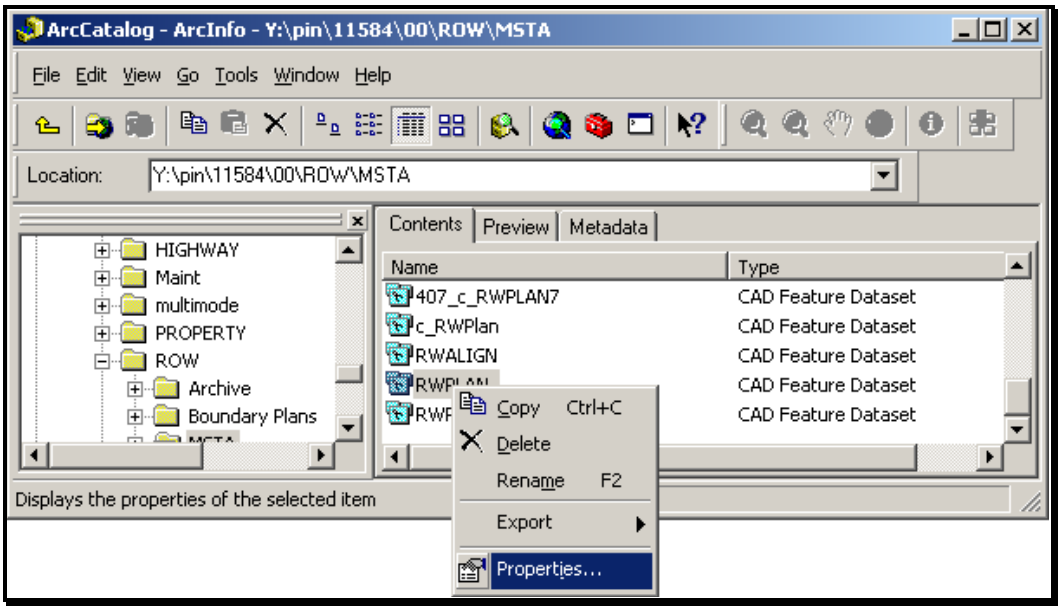


Figure 35-7: Accessing Properties of a CAD Feature Dataset.

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.

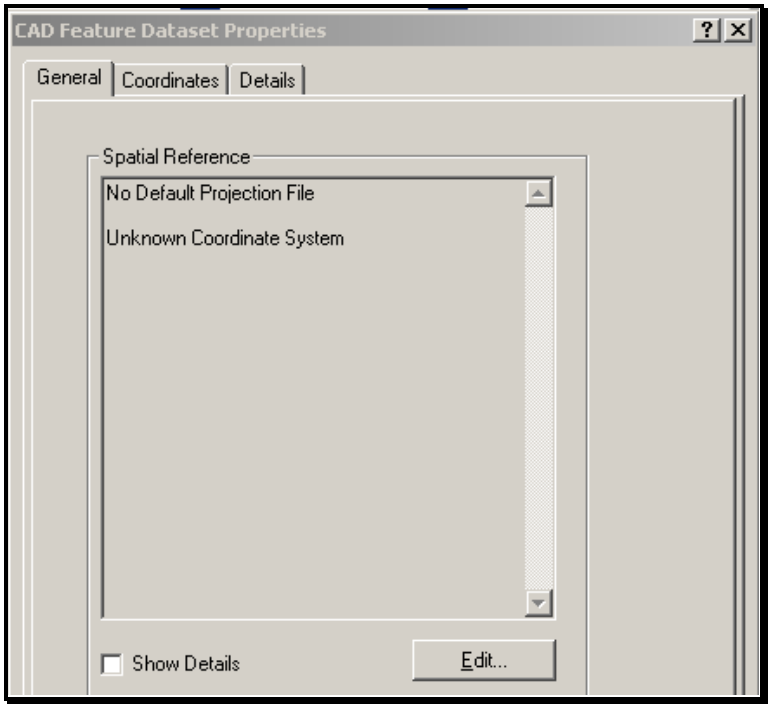


Figure 35-8: CAD Feature Dataset Properties dialog.

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.

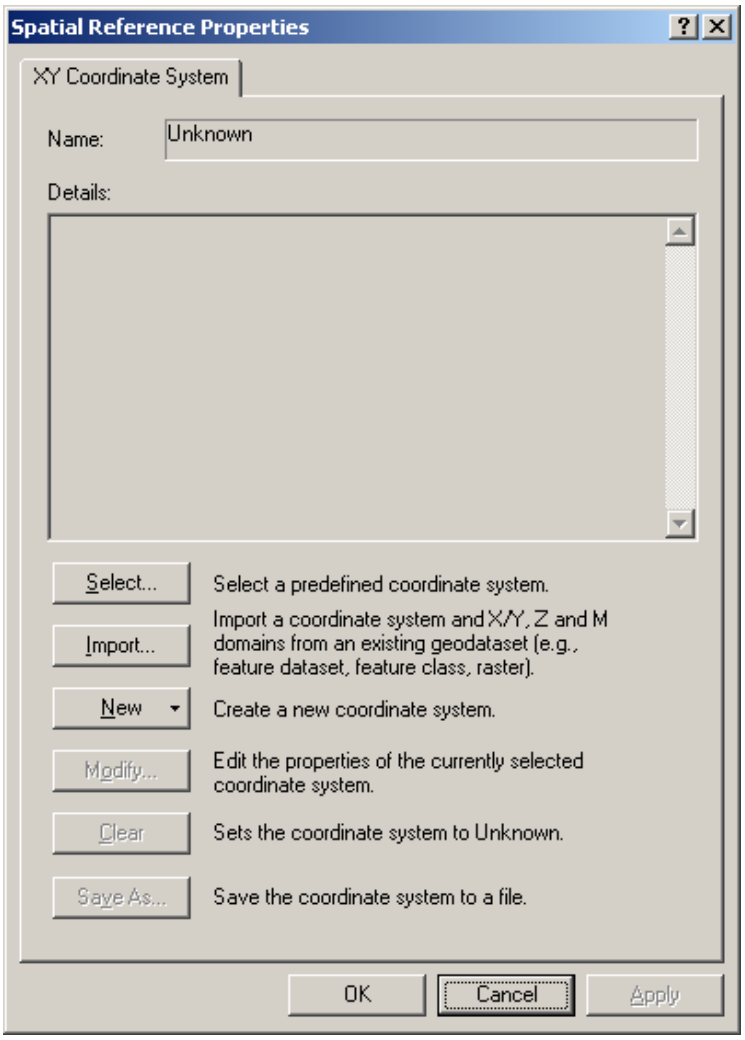


Figure 35-9: The Spatial Reference Properties dialog.

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.***

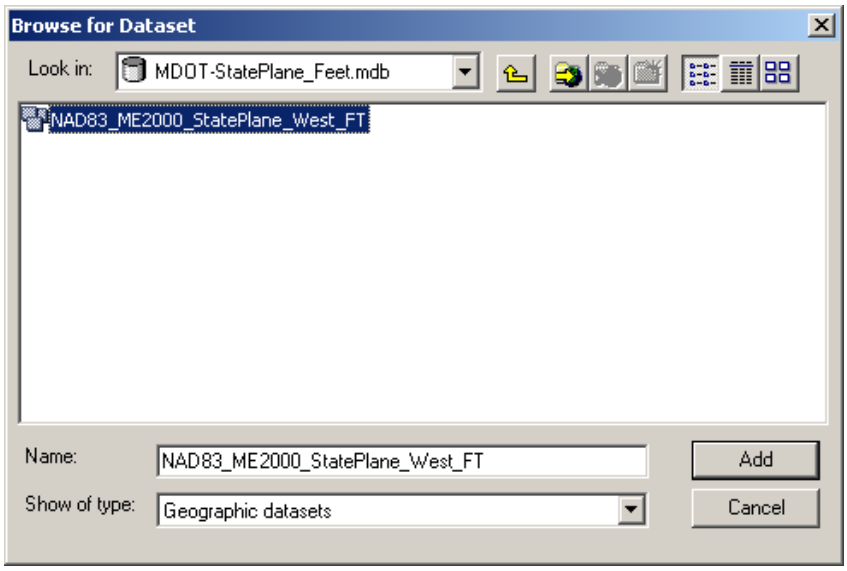


Figure 35-10: Select the Dataset that matches your project's coordinate system.

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.***

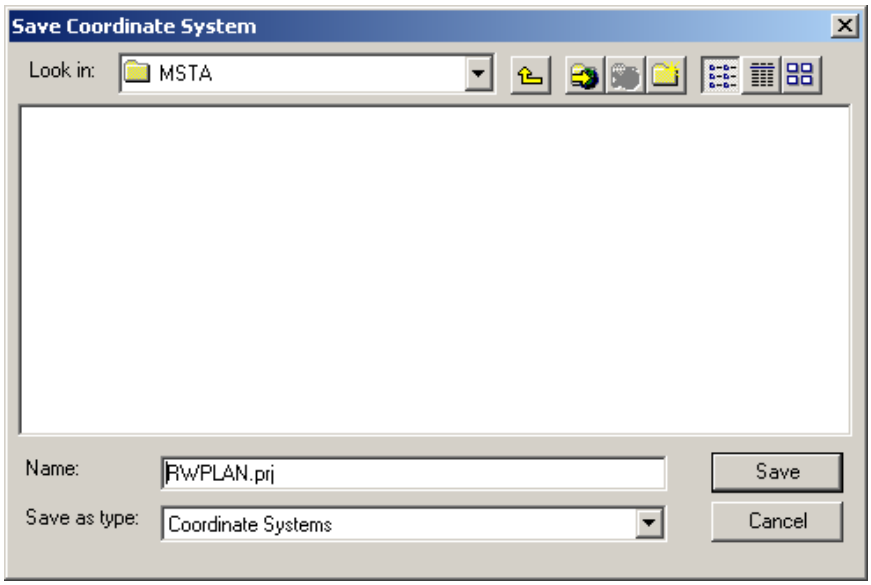


Figure 35-11: Save coordinate system to your files.

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.

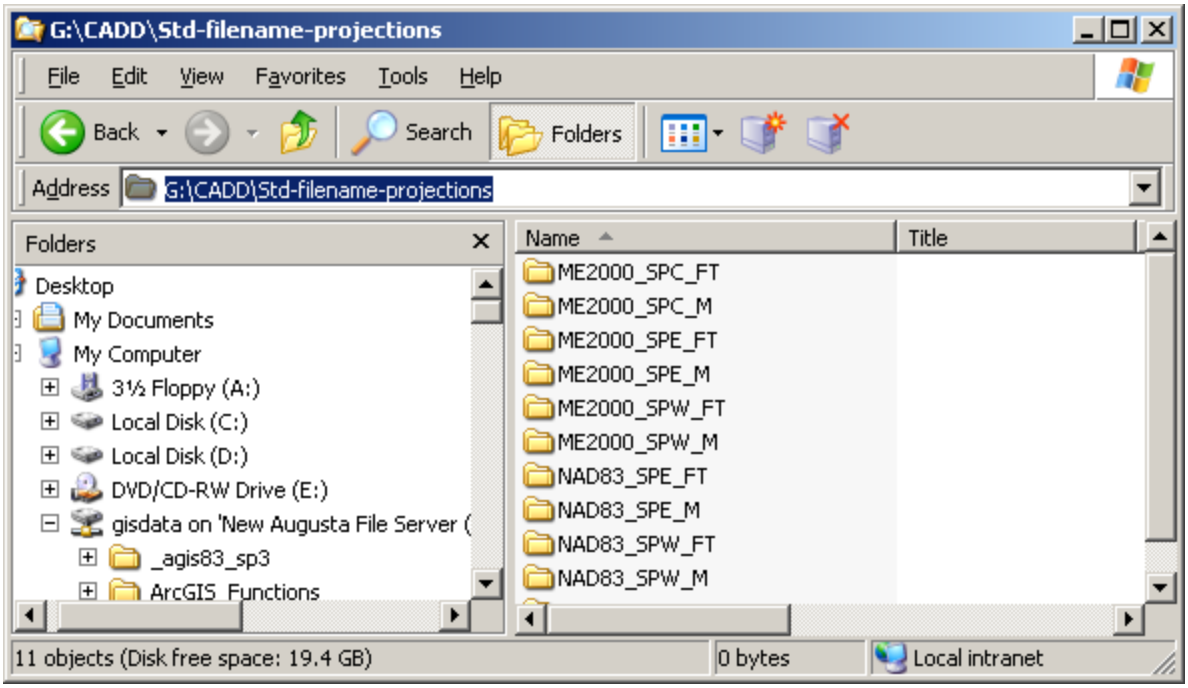
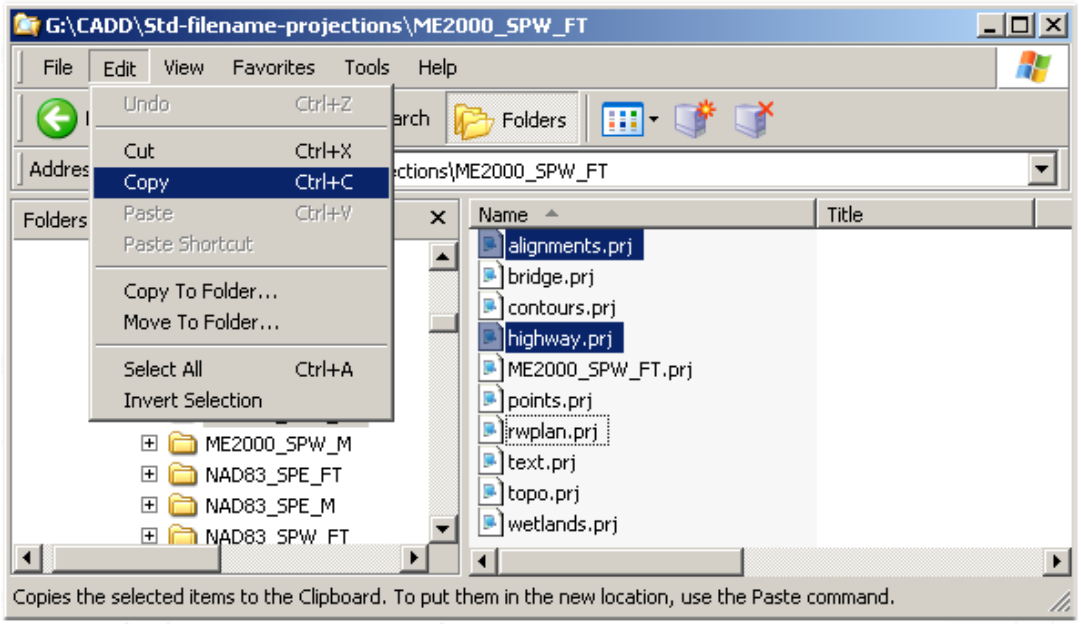


Figure 35-12: The folder containing common file name projections.

- ✓ ***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 oit-teaqasdtiis.mdot.w2k.state.me.us\pcpin1. Select **Edit > Paste.**

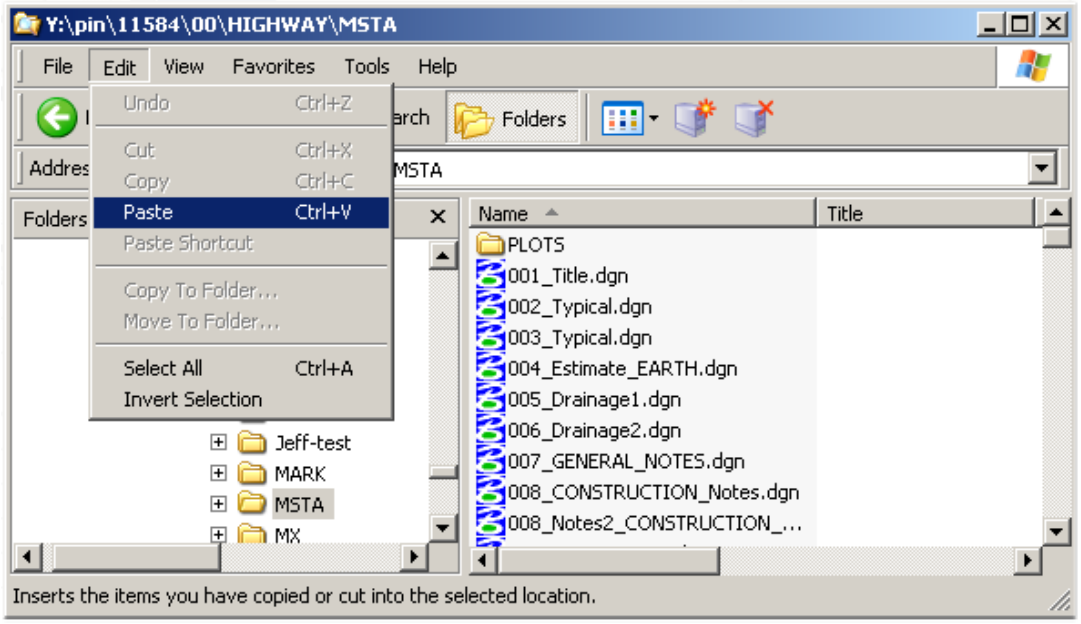


Figure 35-13: Project's folder on the Y: drive.

ⓘ ***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).

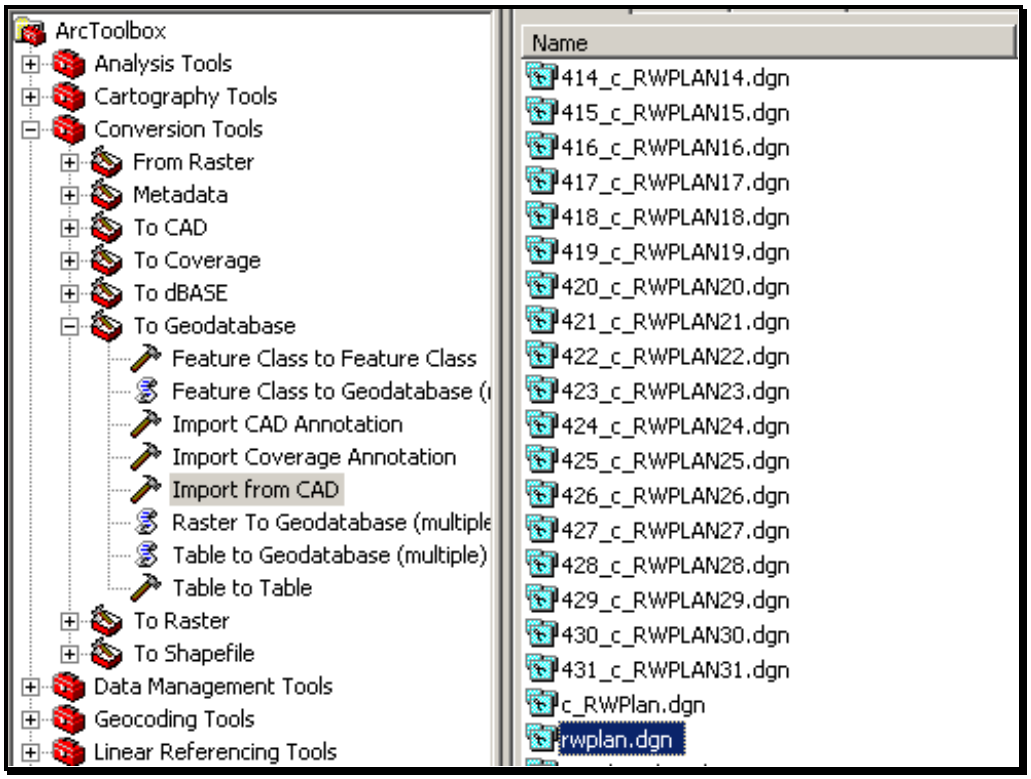


Figure 35-14: Select the ArcToolbox>Conversion Tools>To Geodatabase>Import From CAD tool.

Step Three: Browse to CADD Feature Dataset

Select *Browse* button next to the *Input Files* field (Figure 35-15).

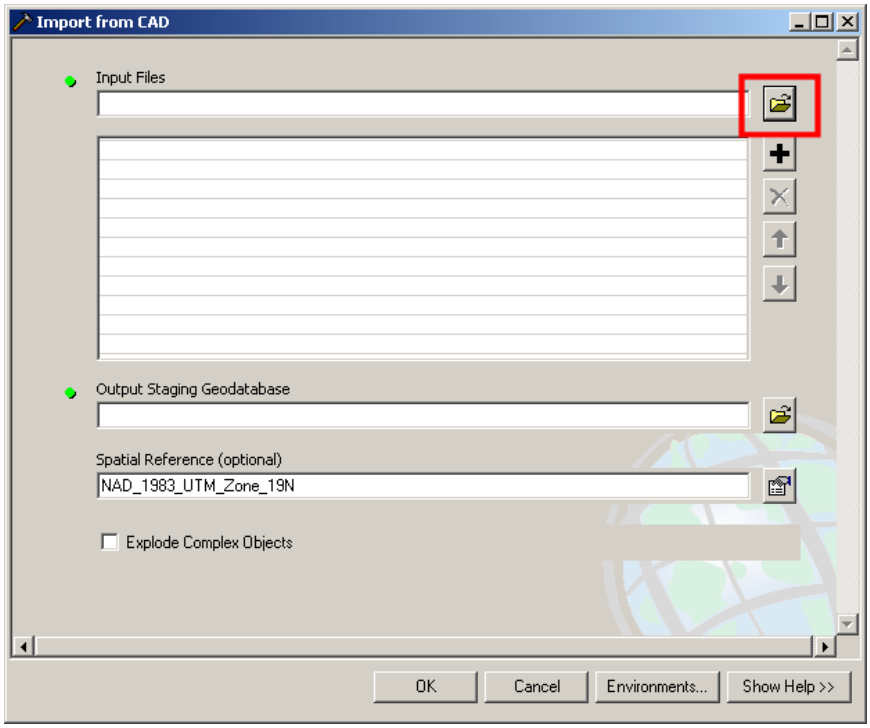


Figure 35-15: Import from CAD dialog.

Locate the CAD Feature Dataset by browsing to your PIN's workgroup/MSTA folder that contains the data needed in GIS (Figure 35-16).

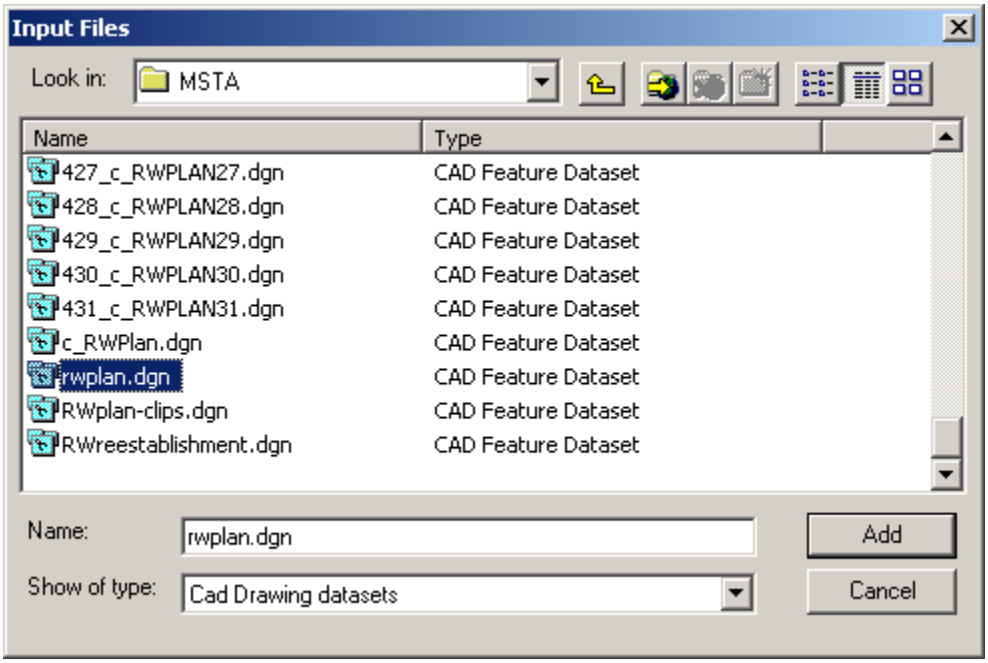


Figure 35-16: Browse to the CAD Feature Dataset needed in GIS.

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.

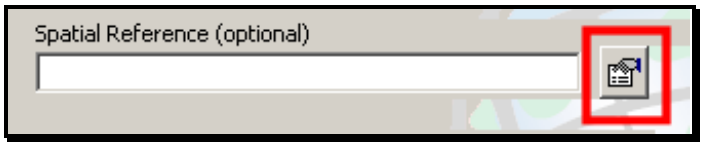


Figure 35-17: Select the Browse button next to the Spatial Reference field.

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.

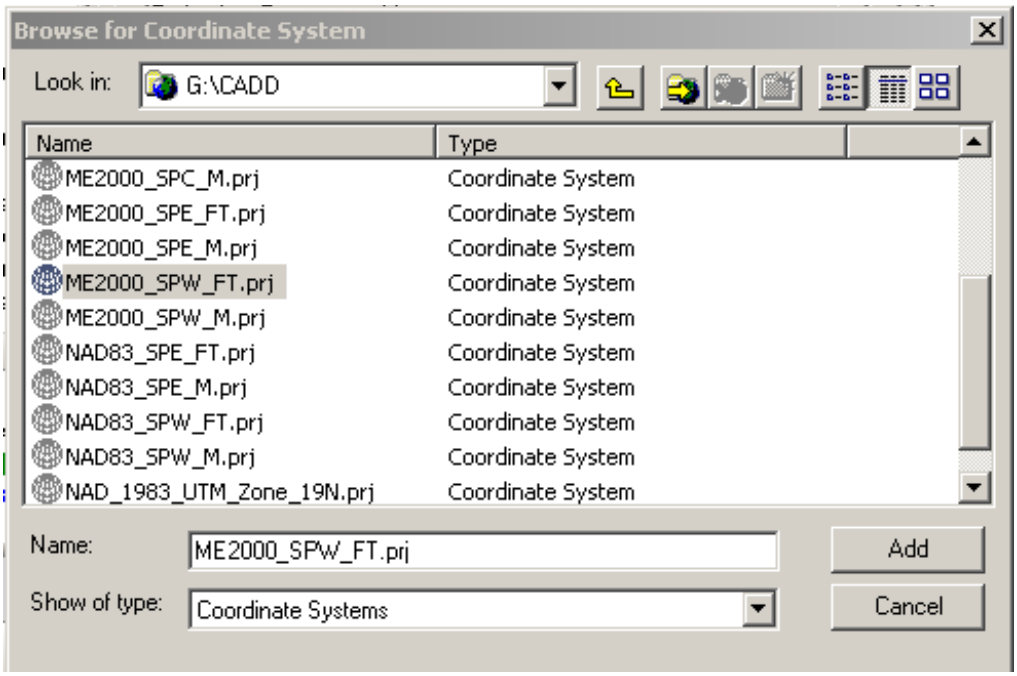


Figure 35-18: Select the coordinate system of the CADD data.

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).

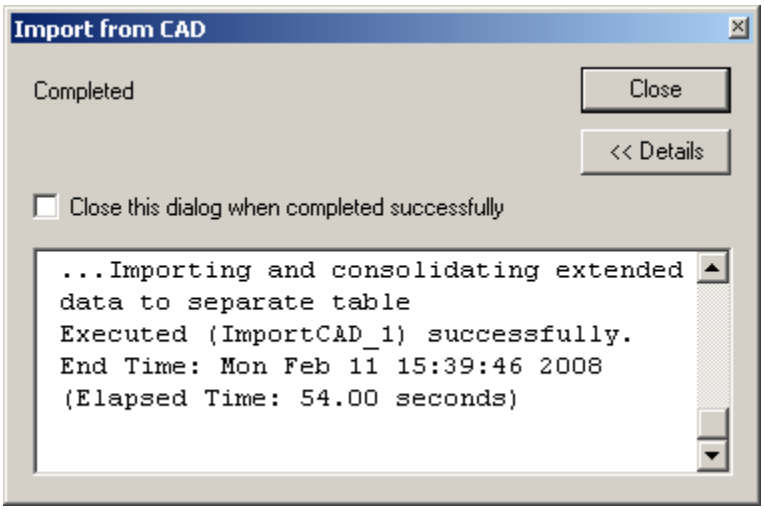


Figure 35-19: Completed dialog once the data has been processed.

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.

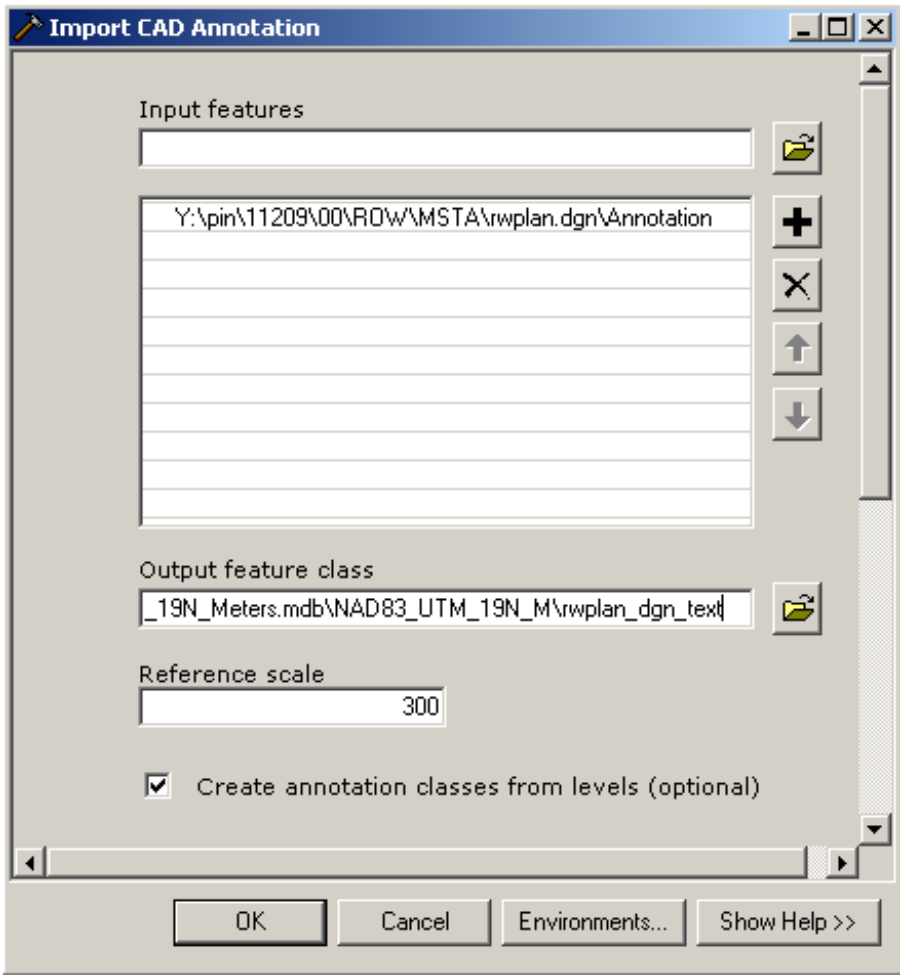


Figure 35-20: Import CAD Annotation dialog.

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).

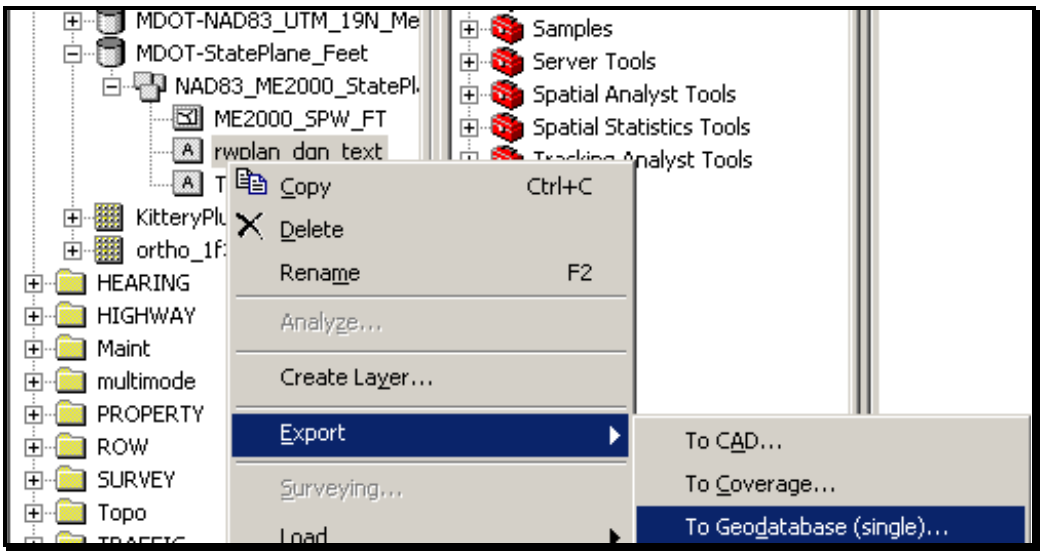


Figure 35-21: Export the Annotation to another Geodatabase.

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.**

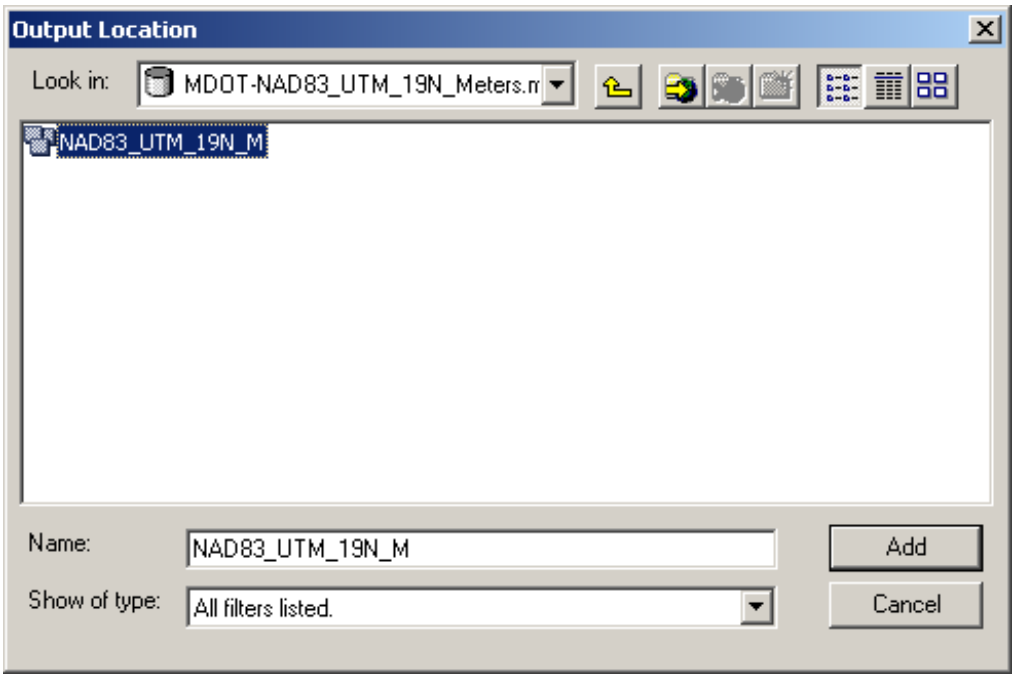


Figure 35-22: Browse to the UTM dataset for an output location.

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).

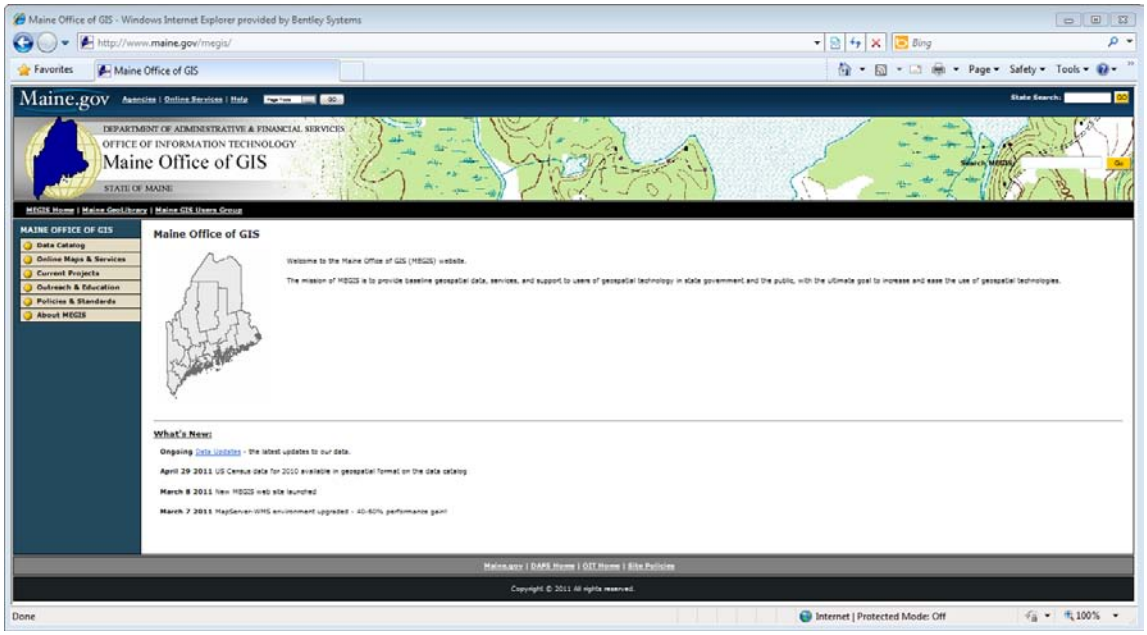


Figure 35-23: MEGIS webpage.

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).

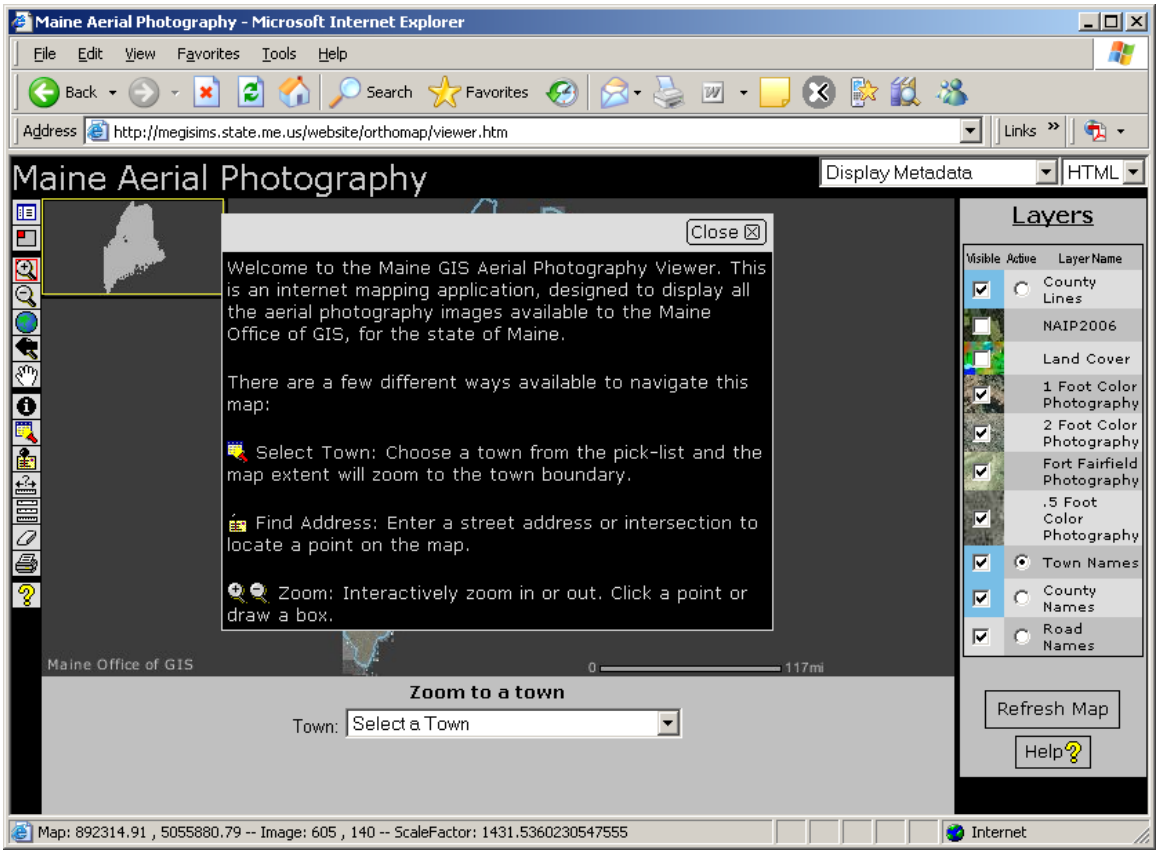


Figure 35-24: Maine Aerial Photography Viewer welcome page.

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).

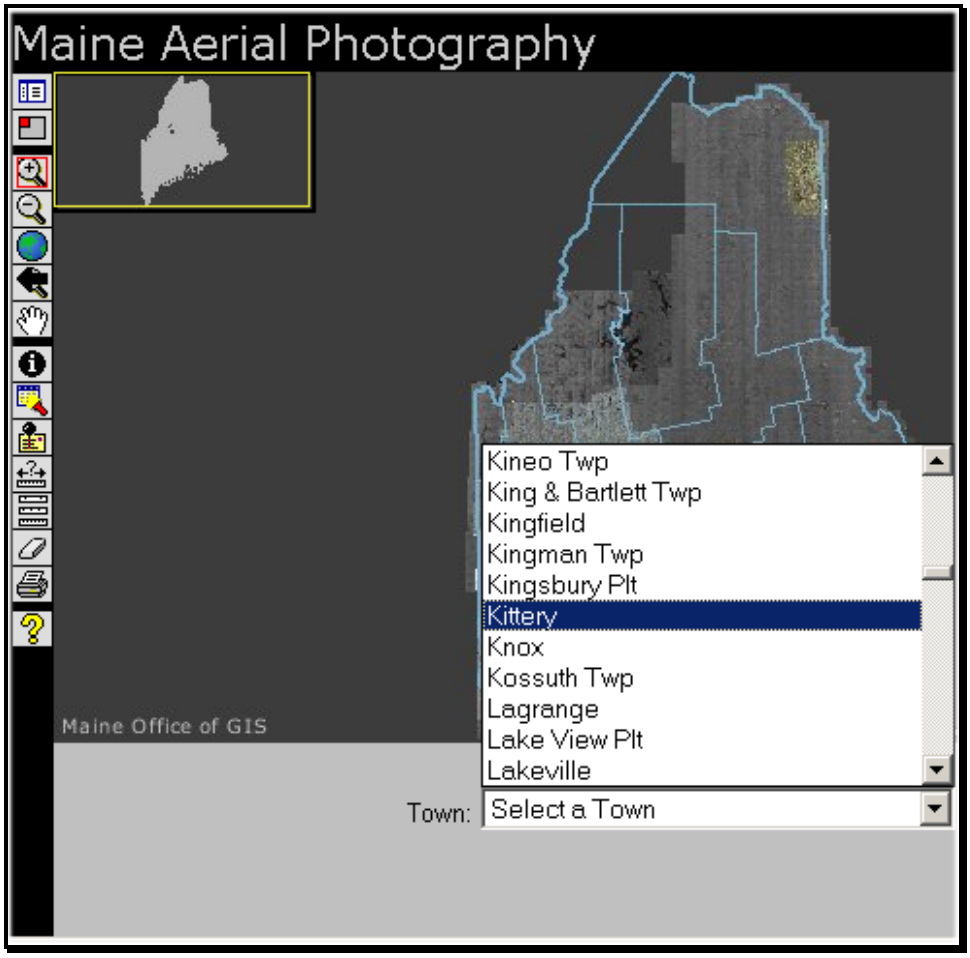


Figure 35-25: Select a town from the Zoom to town pull down.

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”.

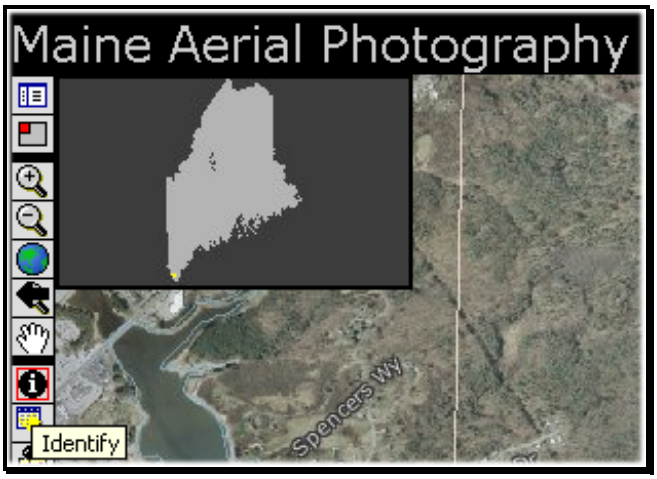


Figure 35-27: Identify tool represented by the letter "i".

This will display some image information at the bottom of the map (Figure 35-28) including the date and a link to the image.

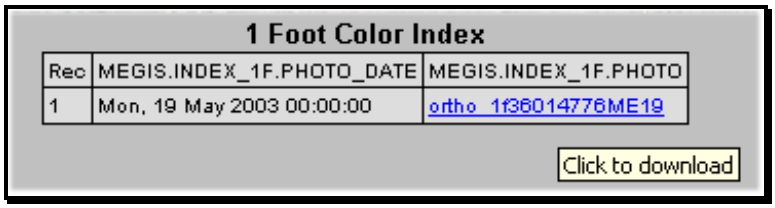


Figure 35-28: Click link to download the zip file.

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.

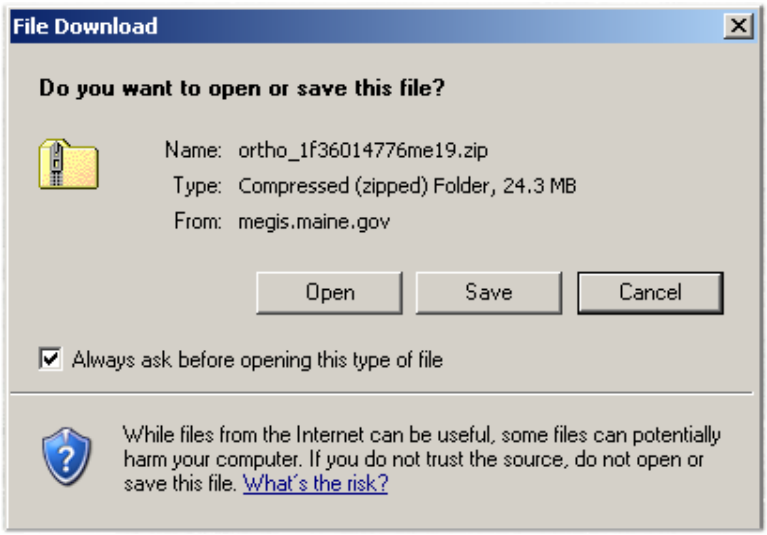


Figure 35-29: Save the zip file to the desired location.

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.**

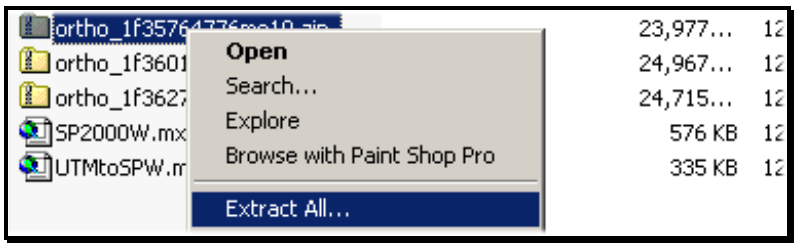


Figure 35-30: Right click and select Extract All.

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.

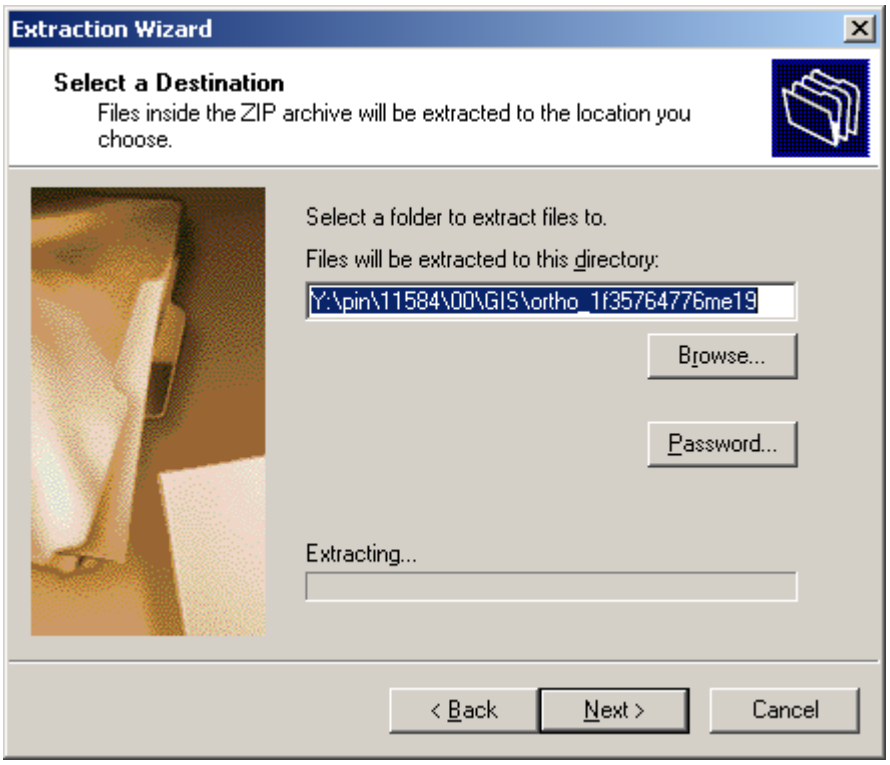


Figure 35-31: Extraction Wizard ready to extract to new folder.

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).

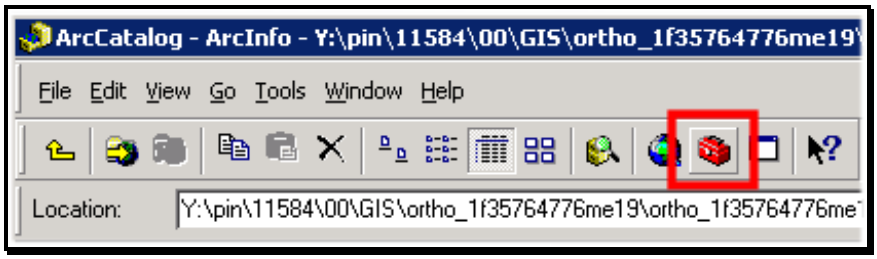


Figure 35-32: Click the ArcToolbox from the Standard toolbar.

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.

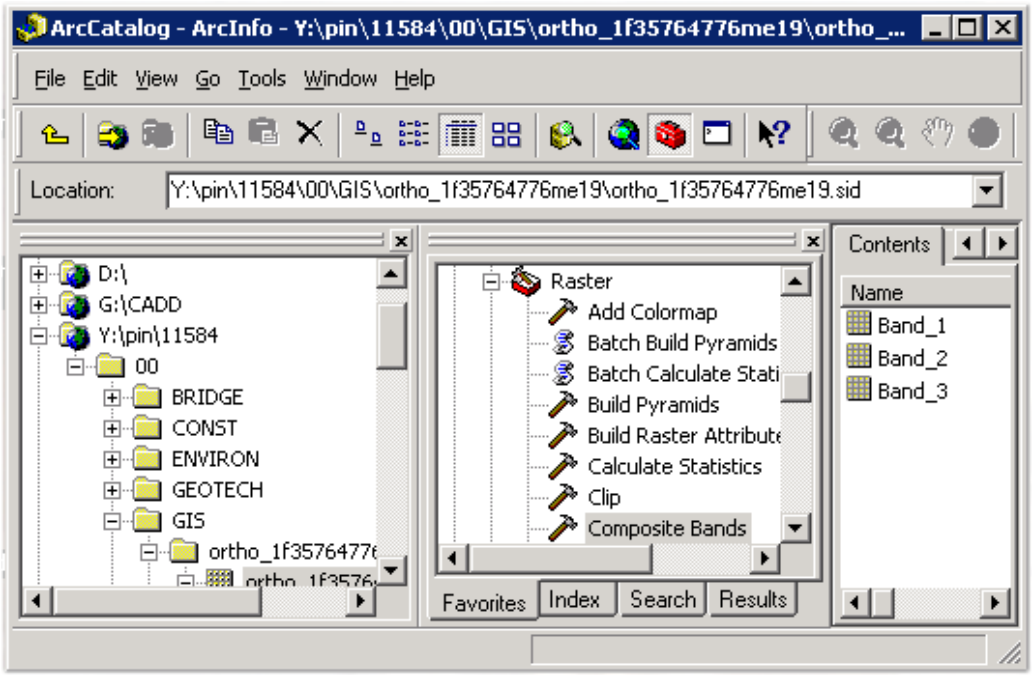


Figure 35-33: Composite Bands tool within ArcToolbox.

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).

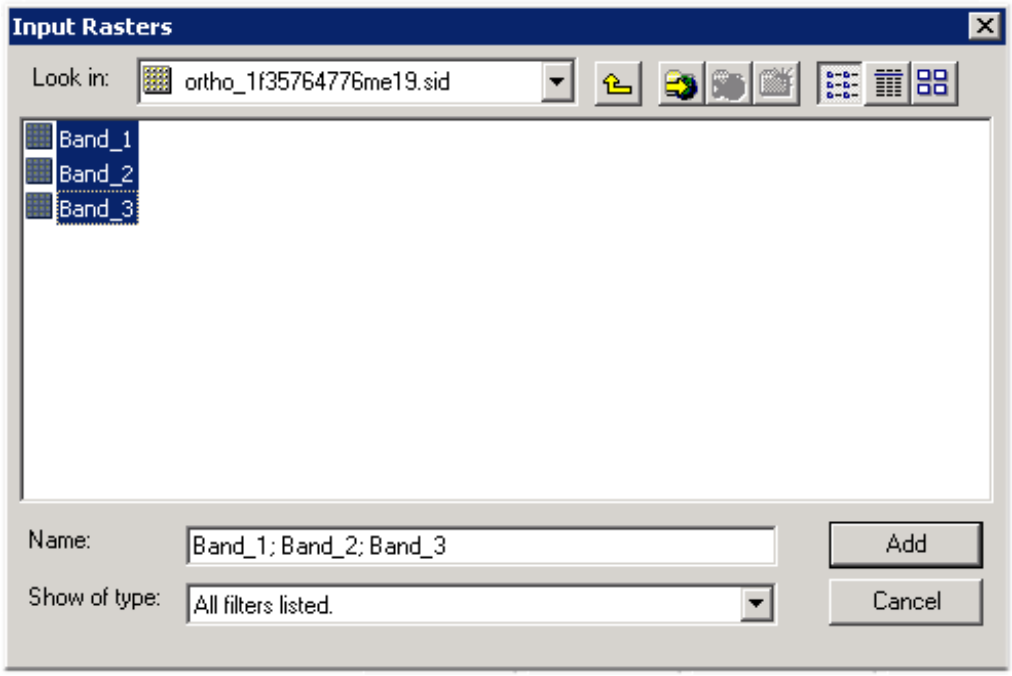


Figure 35-34: Browse to the image.

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).

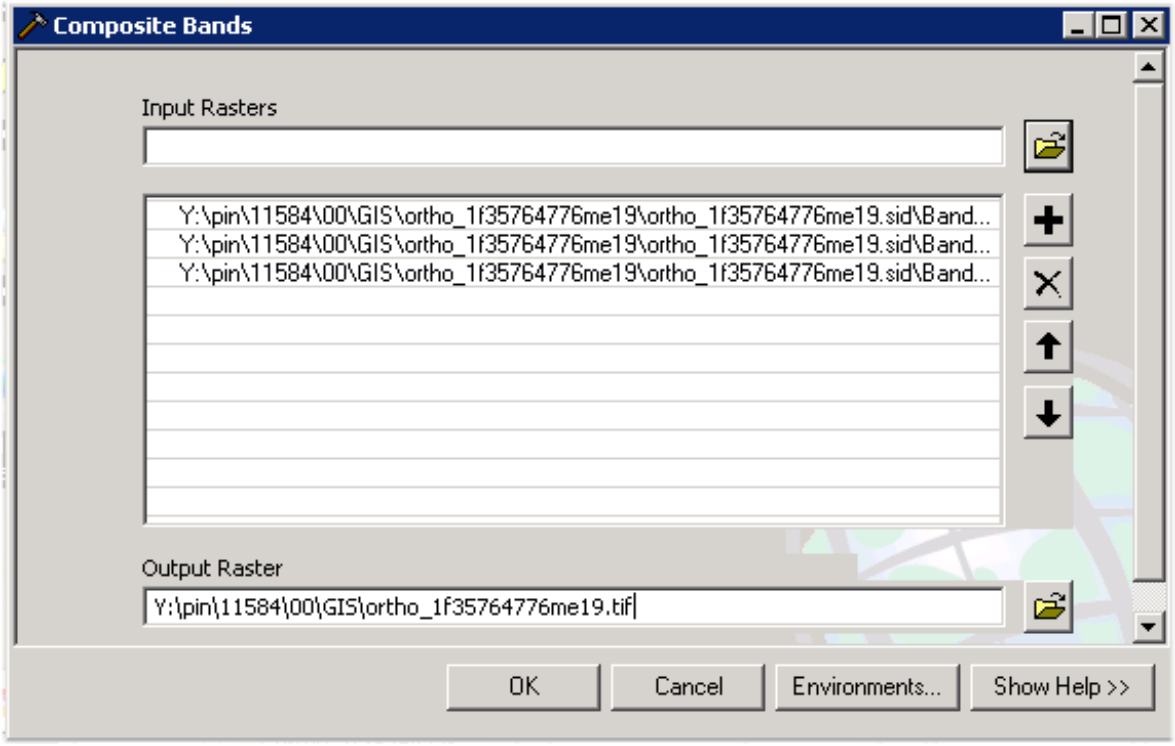


Figure 35-35: Adjust Output Raster name and location.

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).

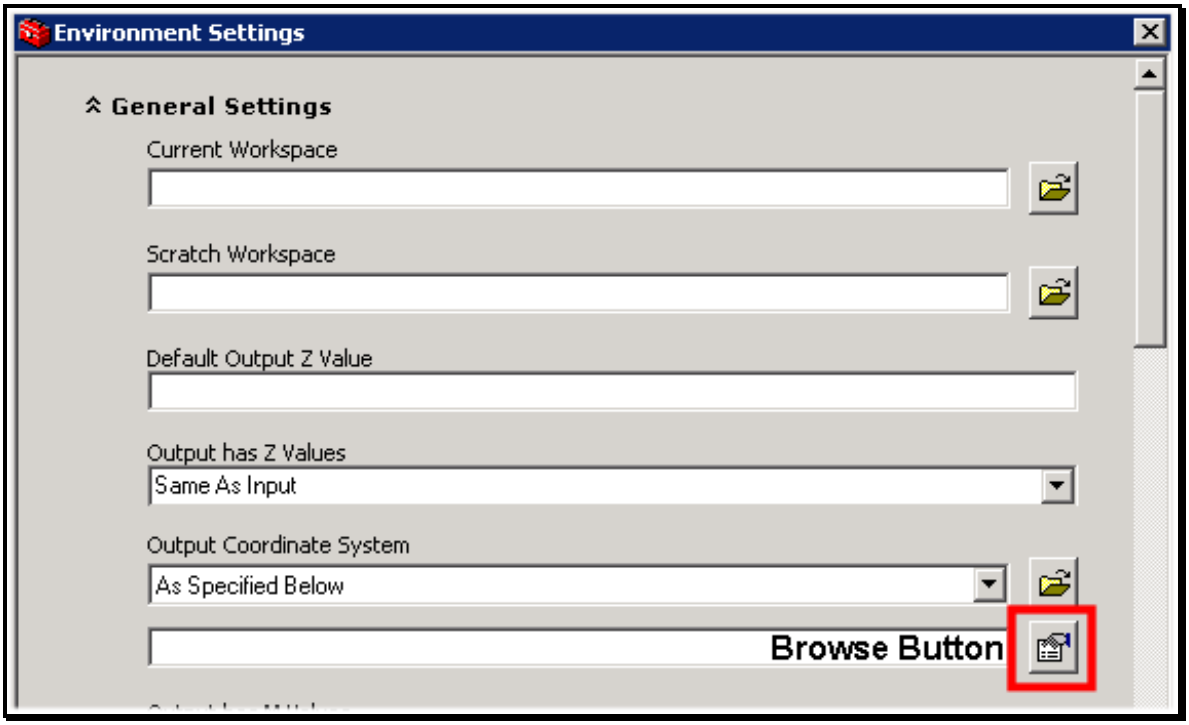


Figure 35-36: Click the Browse button.

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.

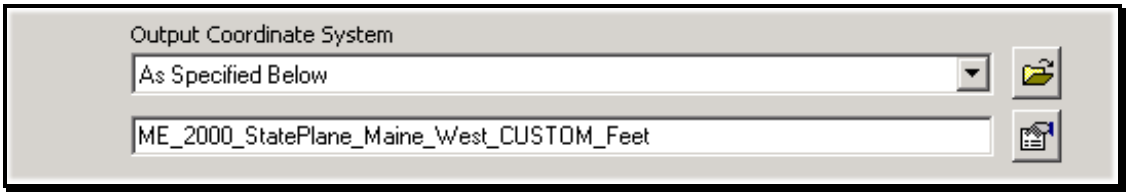


Figure 35-37: The result will be the desired output coordinate system.

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.

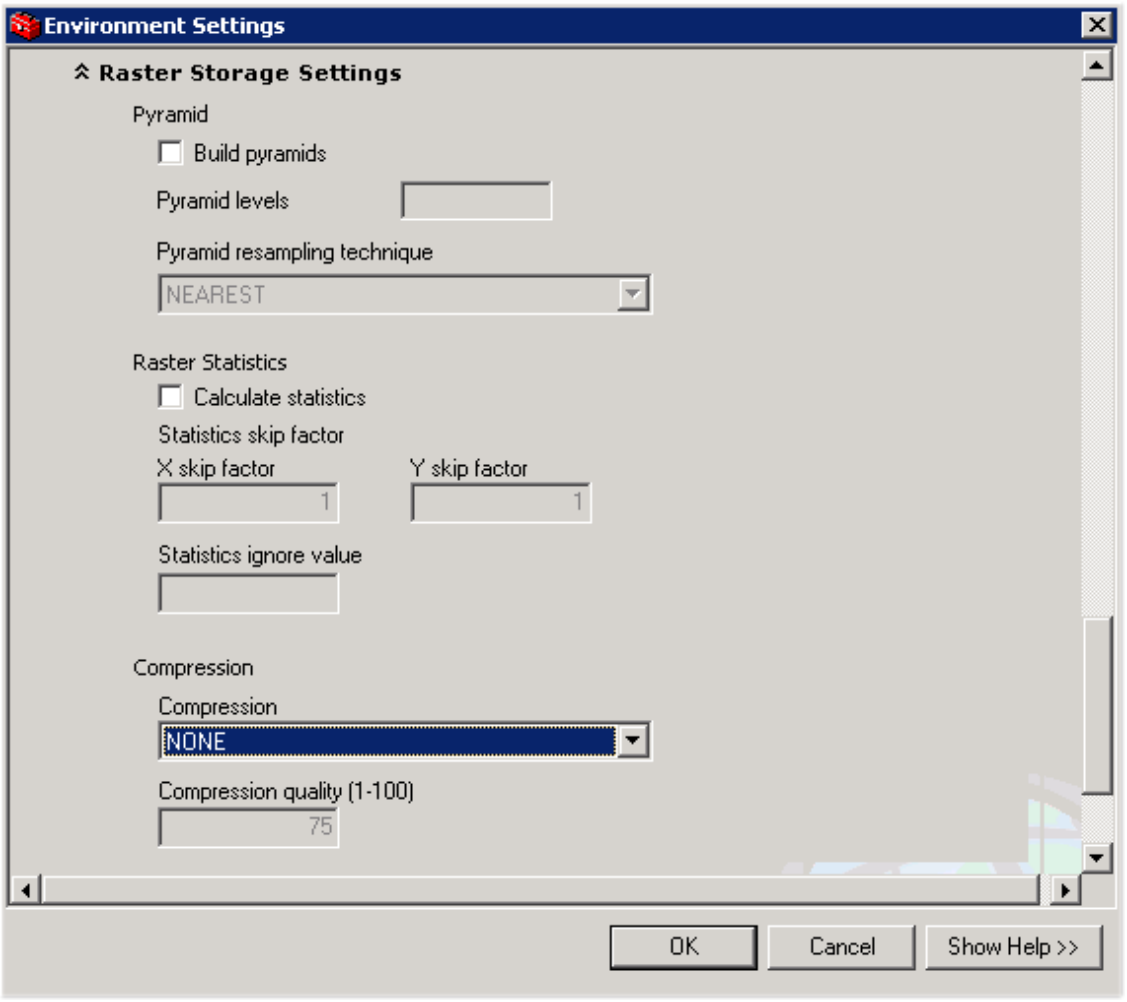


Figure 35-38: Adjust the Raster Storage Settings.

When the process is complete, the dialog will display the *Competed* message (Figure 35-39).

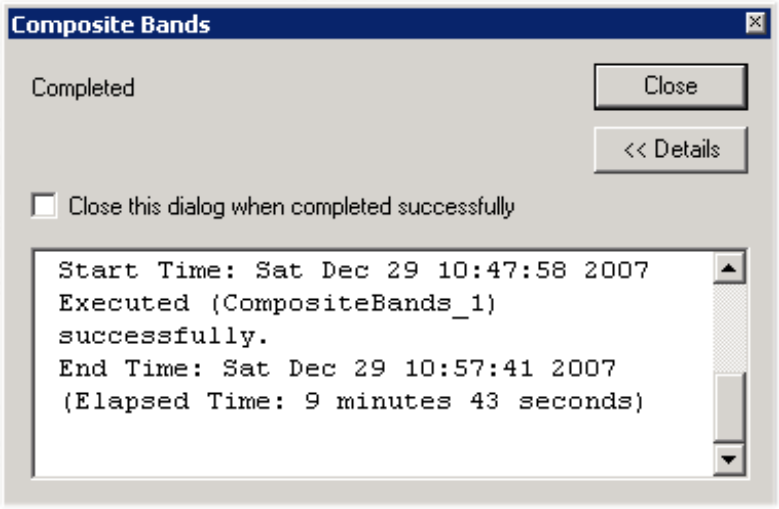


Figure 35-39: Completed message once the process has been completed.

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 dialogs shown in Figure 35-40 and Figure 35-41.

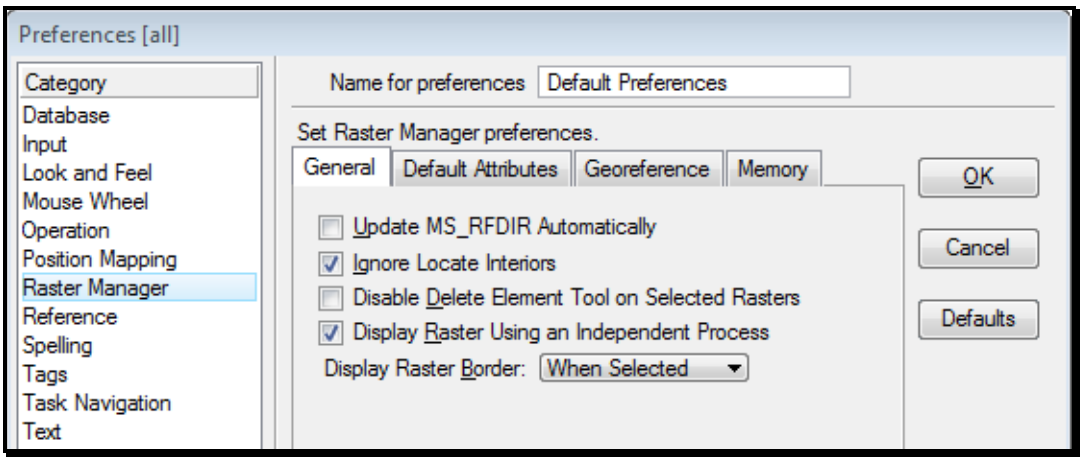


Figure 35-40: Raster Manager General Tab preferences adjusted to handle re-projected raster.

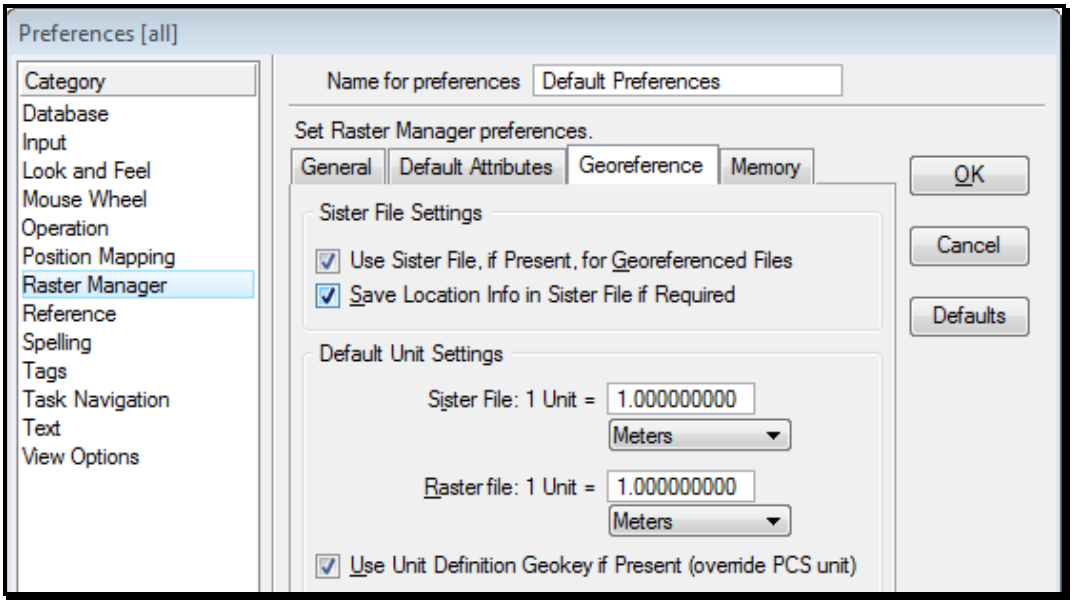


Figure 35-41: Raster Manager Georeference Tab preferences adjusted to handle re-projected raster.

Step Three: Attach Raster

Select **File > Raster Manager.** Select **File > Attach > Raster.** Browse to the image within the GIS folder of your project. Select the image. Uncheck the *Place Interactively* option (Figure 35-42). Click **OK.** This will bring up the *Raster Attachment Options* dialog.

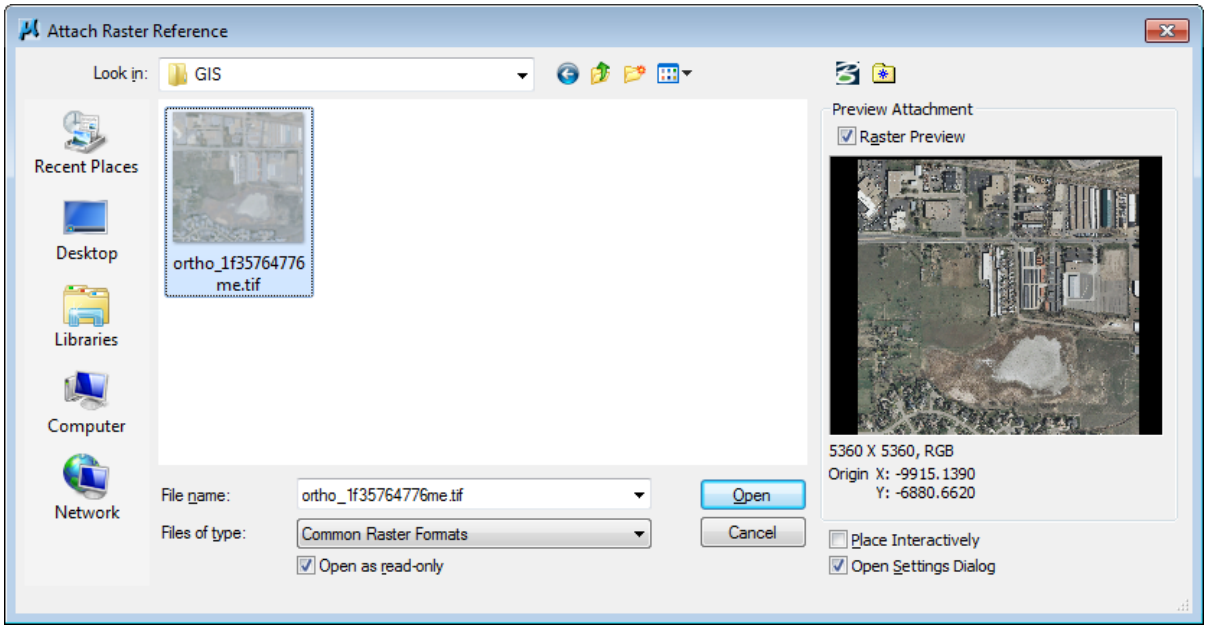


Figure 35-42: Attach Raster Reference dialog.

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 35-43). Click the **Color** tab and ensure the *Transparency* is set to *Hide*.

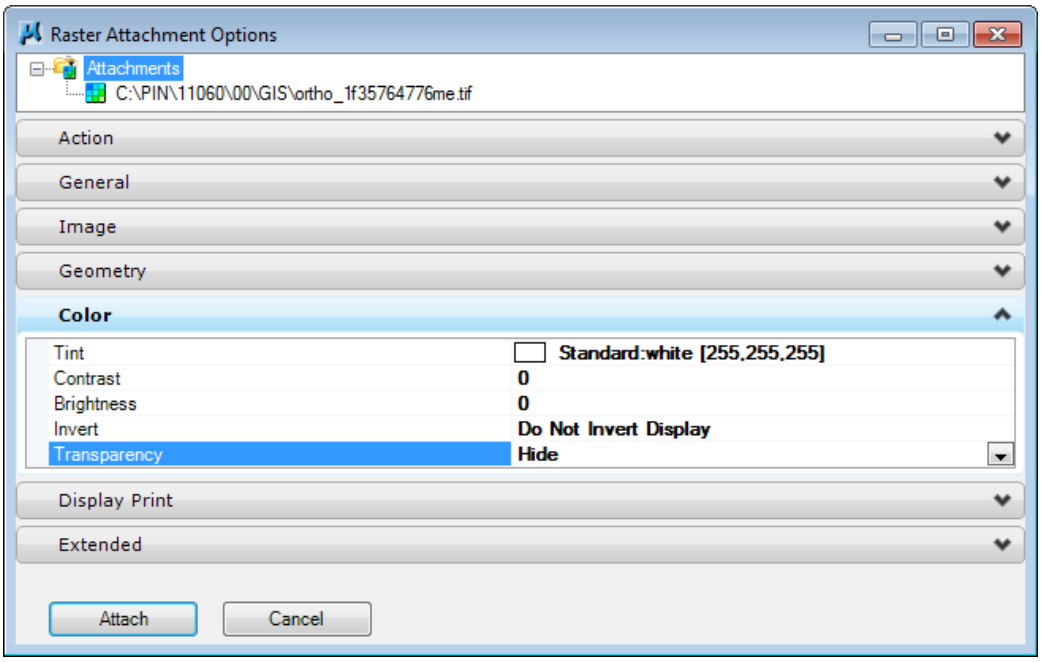


Figure 35-43: Raster Attachment Options. Transparency set to Hide.

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 35-44). Click opposite corners to make a rectangle crossing the data you want to select. The lines will highlight.

Figure 35-44: 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 35-45).

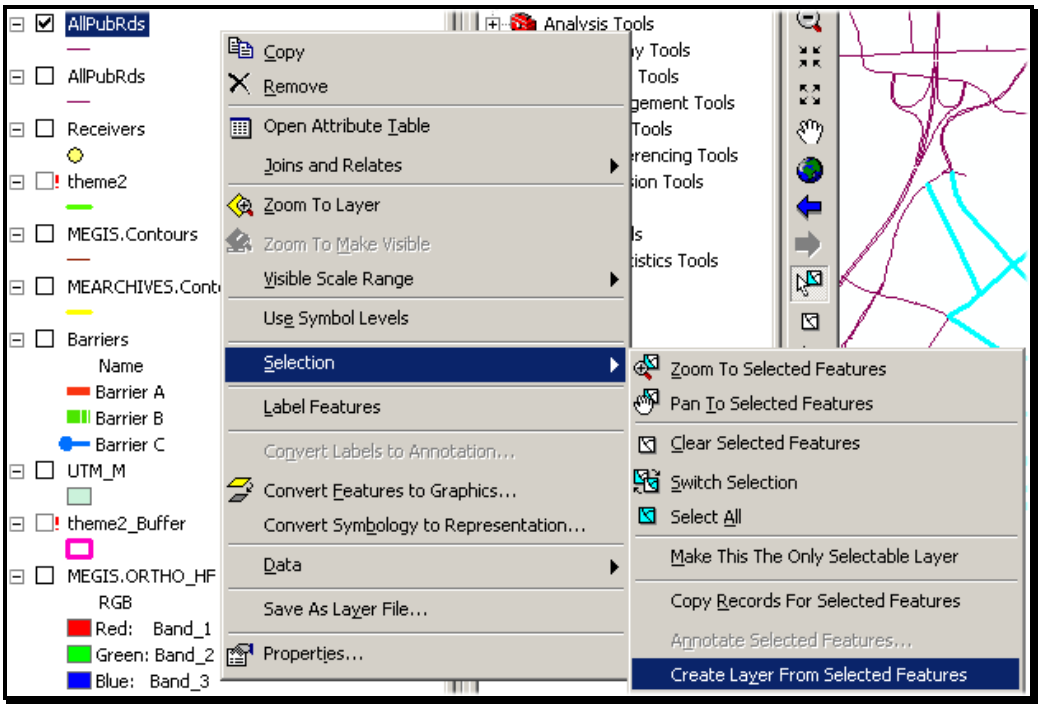


Figure 35-45: Create a new layer from selected features.

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 35-47).

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 35-46).

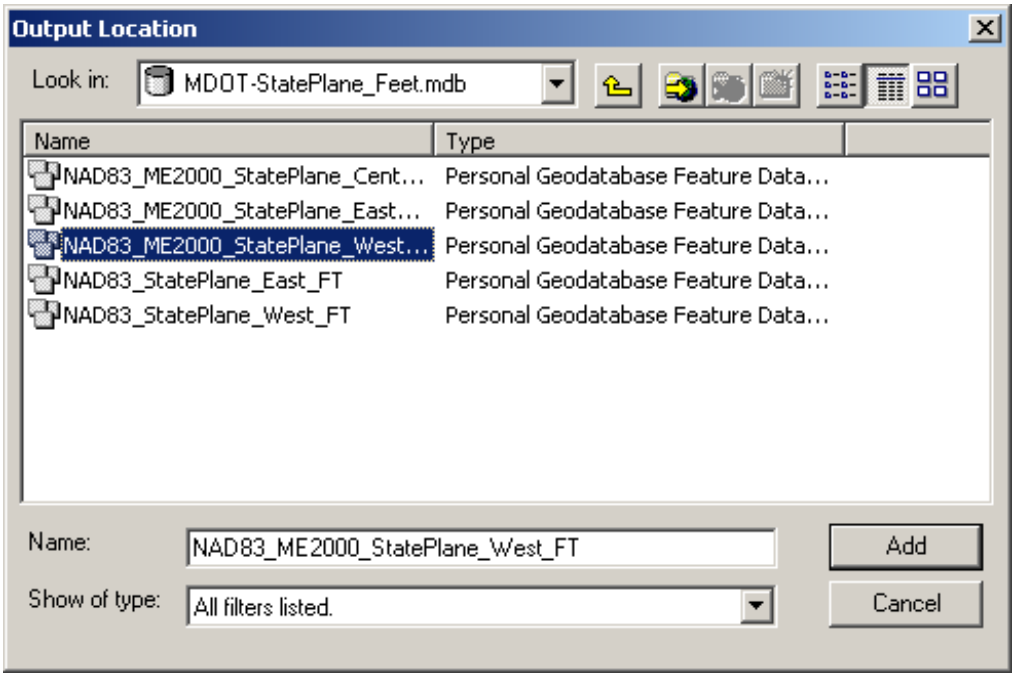


Figure 35-46: Set the Output Location to your Project's Geodatabase Feature Data Set.

Supply a name for the *Output Feature Class.*

The dialog should resemble the one in Figure 35-47. Click **OK.**

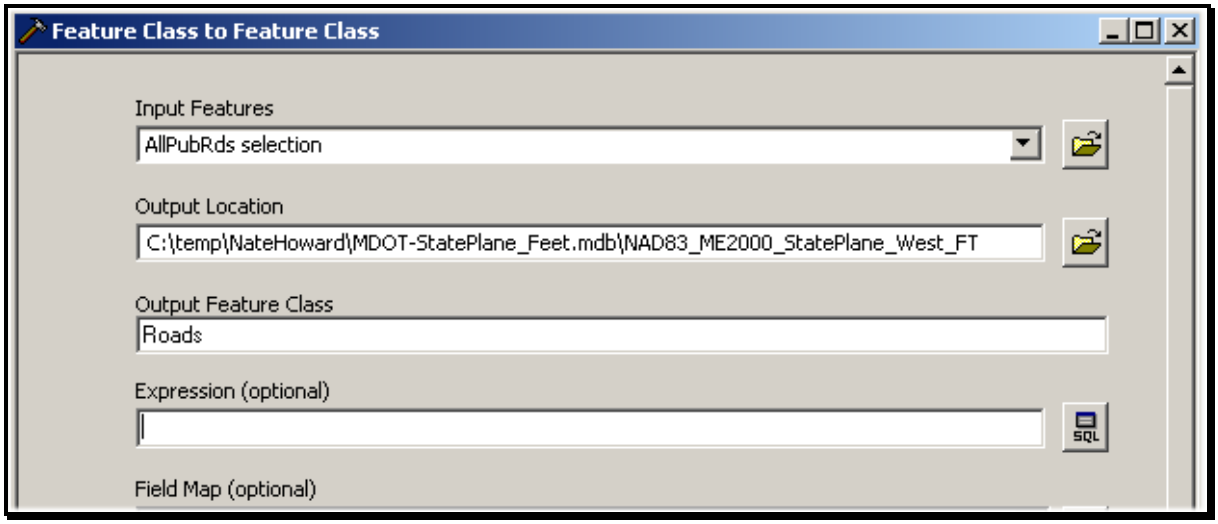


Figure 35-47: Dialog setup with the sample data.

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 35-48).

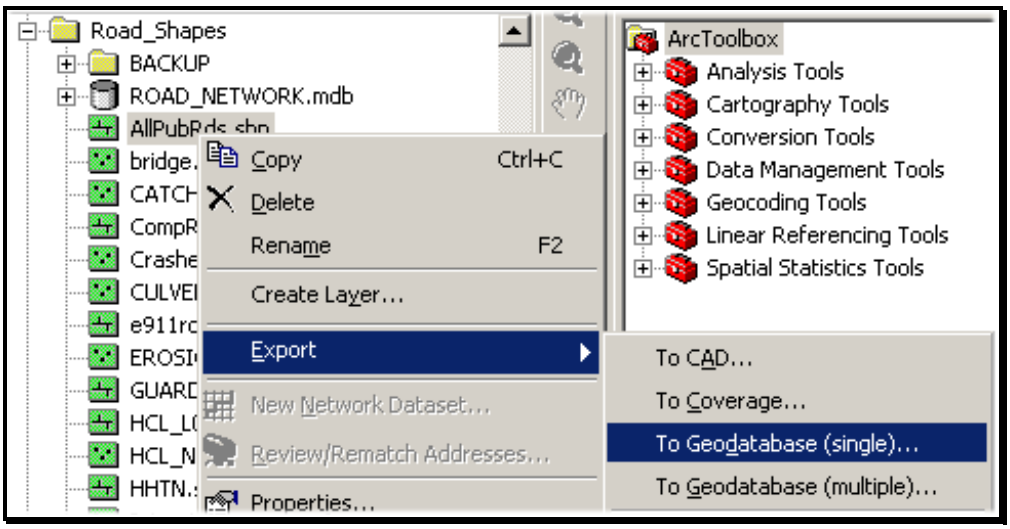


Figure 35-48: Exporting data to Geodatabase.

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 35-49).

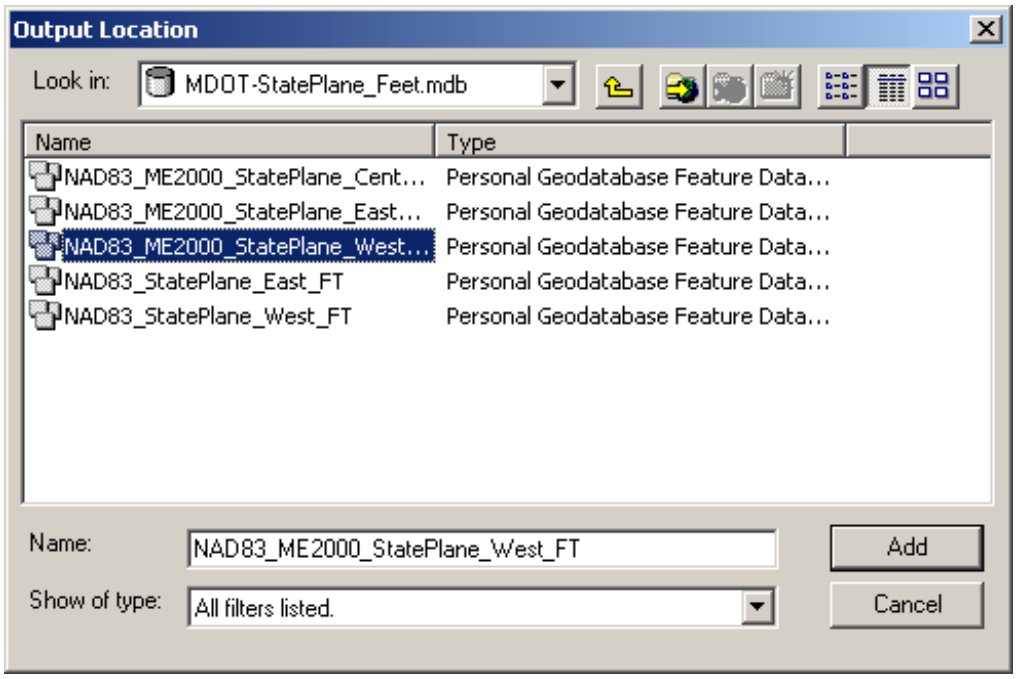


Figure 35-49: Set the Output Location to your Project's Geodatabase Feature Data Set.

Supply a name for the *Output Feature Class.*

The dialog should resemble the one in Figure 35-50. Click **OK.**

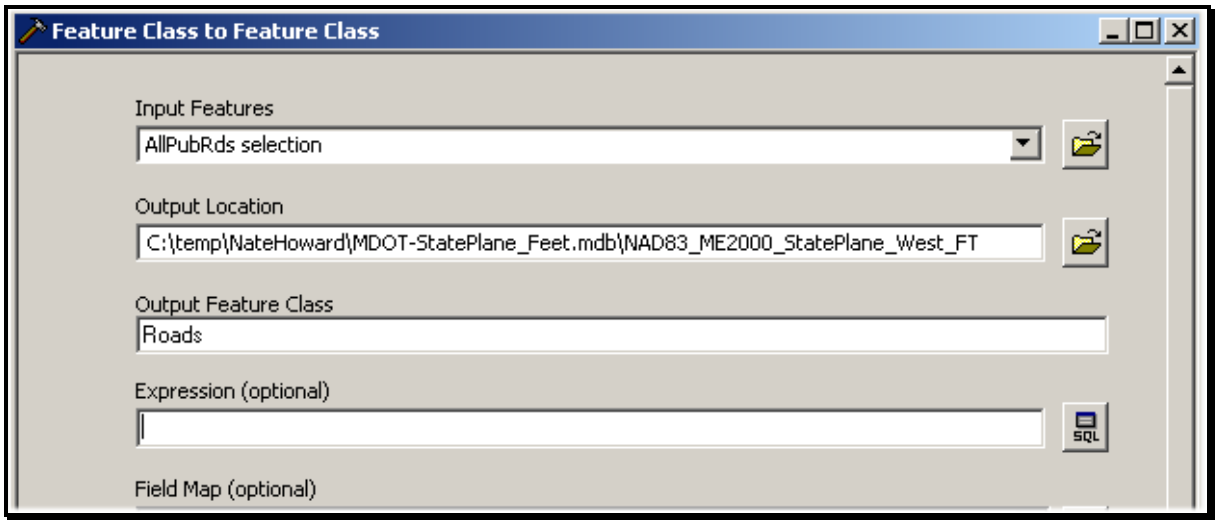


Figure 35-50: Dialog setup with the sample data.

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 35-51).

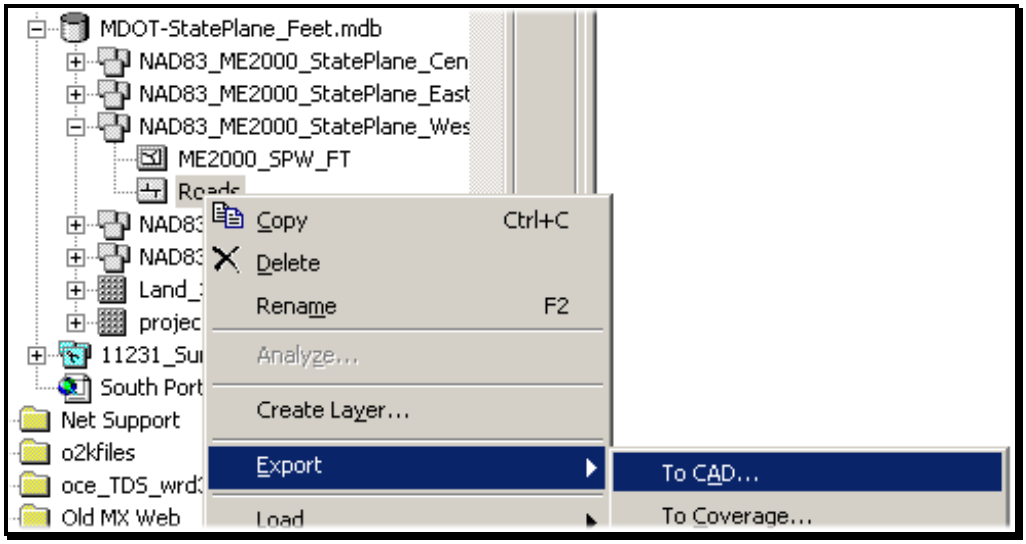


Figure 35-51: Right Click and select Export>To CAD.

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 35-52).

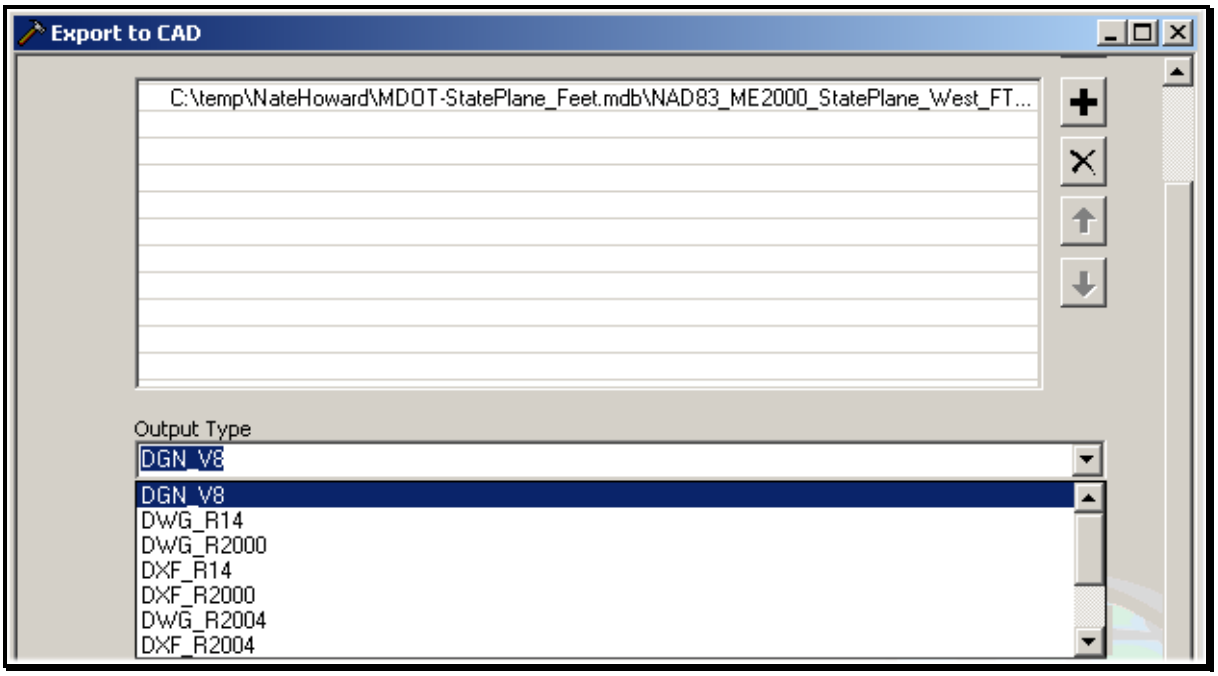


Figure 35-52: Adjust the Output Type to DGN_V8.

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 **including the file extension .dgn** as seen in Figure 35-53.

- 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.

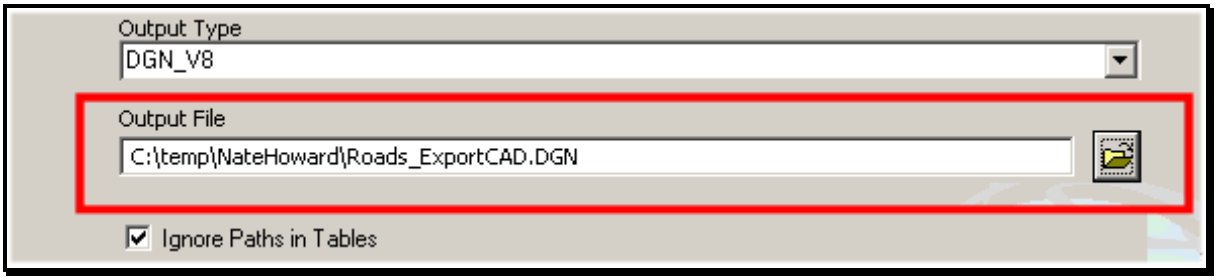


Figure 35-53: Adjust the file location and name. Add the .dgn extension.

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 35-54).

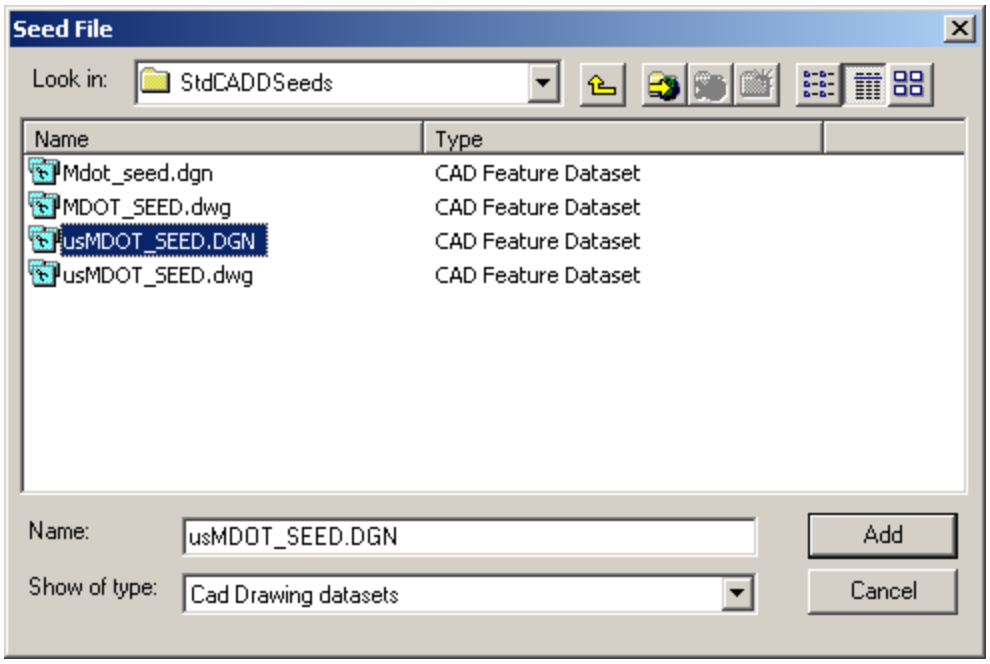


Figure 35-54: Select the appropriate seed file based on units and file type.

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.