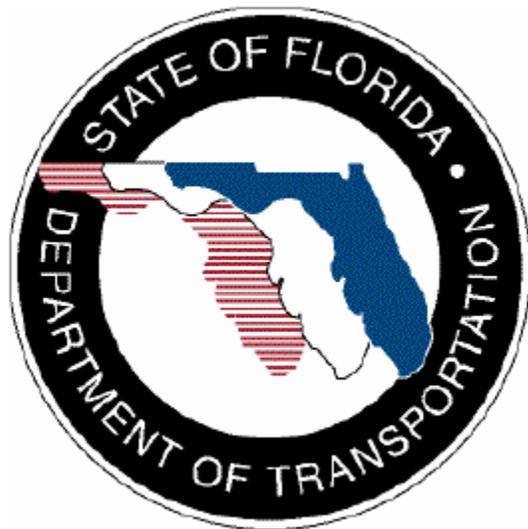


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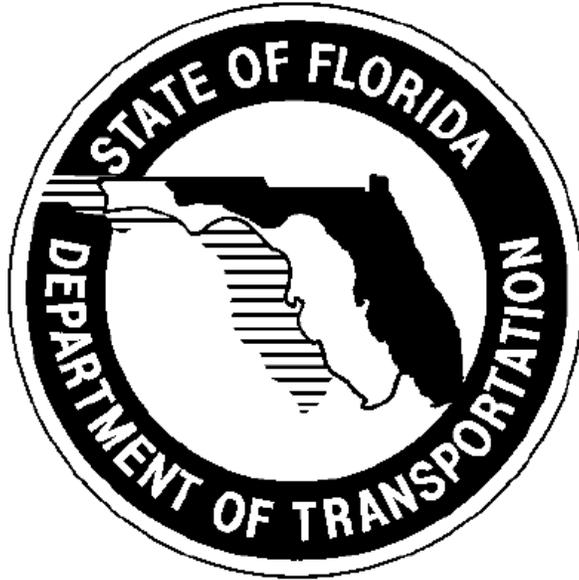
**FDOT Traffic Plans Course – Signing &
Pavement Markings
CE-11-0117**

**Course Guide
January 3, 2011**

**ENGINEERING / CADD SYSTEMS OFFICE
TALLAHASSEE, FLORIDA**

<http://www.dot.state.fl.us/ecso/>

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FDOT Traffic Plans Course – Signing & Pavement Markings

CE-11-1117

Description

This course was developed to teach students fundamental use of GEOPAK, MicroStation, and the FDOT CADD standard resources and applications for Traffic Plans and Signing & Pavement Markings design based on a typical traffic plans design workflow to produce and present Traffic Plans and Signing & Pavement Markings design required for Electronic Delivery.

Topics Covered

- General topics on Signing & Pavement Markings Plans and File Creation
- Exploring the FDOT desktop folder
- Create File/Project tool for creating base files for a project
- FDOT20XX Traffic Plans Menu bar
- Levels and Level Filters
- Text Styles
- Annotation Scale
- Models
- Creating a Signing & Pavement Markings Key Sheet
- Creating a Summary of Pay Items
- Signing & Pavement Markings Tools
- Quantities and Reports
- Sheet Navigator/Sheet Labeling Tools
- Plotting Tools

Prerequisites

The following courses and some manual drafting or related CADD product experience is recommended:

- FDOT MicroStation Essentials - Part I (CE-11-0114)
- FDOT MicroStation Essentials - Part II (CE-11-0115)
- FDOT Basic GEOPAK Road (CE-11-0099)

Duration: 24 Hours

Professional Credit Hours: 18 PDHs

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1 SIGNING AND PAVEMENT PLANS

OBJECTIVE

This chapter is divided into three sections:

1. CADD Standards & File Creation

This section contains:

- General discussion on Signing & Pavement Markings Plans and File Creation.
- Exploring the FDOT2010 folder on the desktop.
- Using the FDOT Create File/Project tool to create the base files for a project.

2. Traffic Plans Menu

This section discusses setting up the FDOT Menu to add the Traffic Plans menu.

3. Levels, Text and Models

This Section discusses some new features/concepts used in MicroStation V8i.

- Levels
- Level Filters
- Text Styles
- Annotation Scale
- Models

INTRODUCTION

This chapter reviews the FDOT2010 working environment including how to properly create design files that meet Florida Department of Transportation (FDOT) standards. New concepts and new tools are introduced that make producing plans much more efficient.

GENERAL CADD STANDARDS & FILE CREATION

GENERAL DISCUSSION ON TRAFFIC PLANS AND FILE CREATION

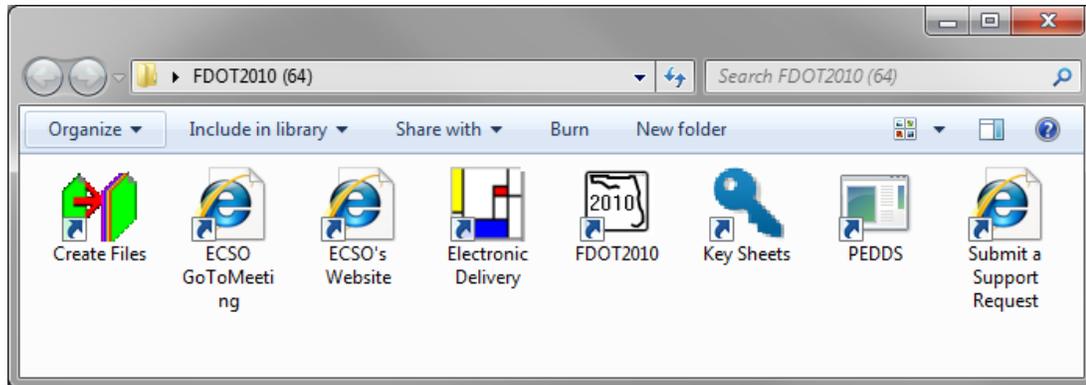
Traffic Plan projects are normally a component of a Roadway plans package. Therefore, the project directory structure usually exists prior to beginning work on a Traffic Plans component. If this is not the case, the same directory structure and file standards that apply to Roadway apply to any other lead component. The *FDOT CADD Production Criteria Handbook* (CPCH) defines the naming convention used to create the different types of design files required in a project.

FDOT uses TIMS Document Management software to manage project files and to create the local directory structure. The FDOT Electronic Delivery (EDelivery) software is used to document all project files and track project information. Geopak's Project Manager creates a set of binary files to keep track of all the files used by GEOPAK and their purpose. The information tracked by GEOPAK is different from that maintained in EDelivery and TIMS.

EXPLORING THE FDOT2010 FOLDER ON THE DESKTOP

When the FDOT software was installed a folder named FDOT2010 was placed on the desktop. This folder contains shortcuts to applications used when working on FDOT projects. Some of the shortcuts are for starting MicroStation and others are for working with Electronic Delivery.

The figure below shows the contents of the FDOT2010 folder.



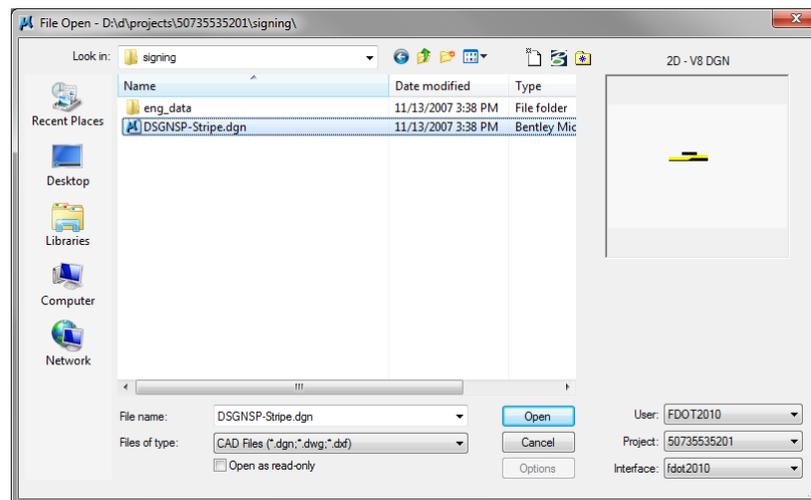
It is recommended to use these shortcuts to start MicroStation. Using these shortcuts will start the workspace environment properly which can alleviate, among other things, issues with using the wrong CADD standards.

FDOT now delivers only one (1) shortcut for starting MicroStation:

4. **FDOT2010** – Uses the V8 file format and FDOT2010 CADD standards. This option requires existing MicroStation V7 formatted files to be converted for both file format and CADD standards. All new support files and programs are accessible.

Note FDOT2010 does not include a metric workspace. Resource files that are required to view and print existing metric files are supplied for this purpose only.

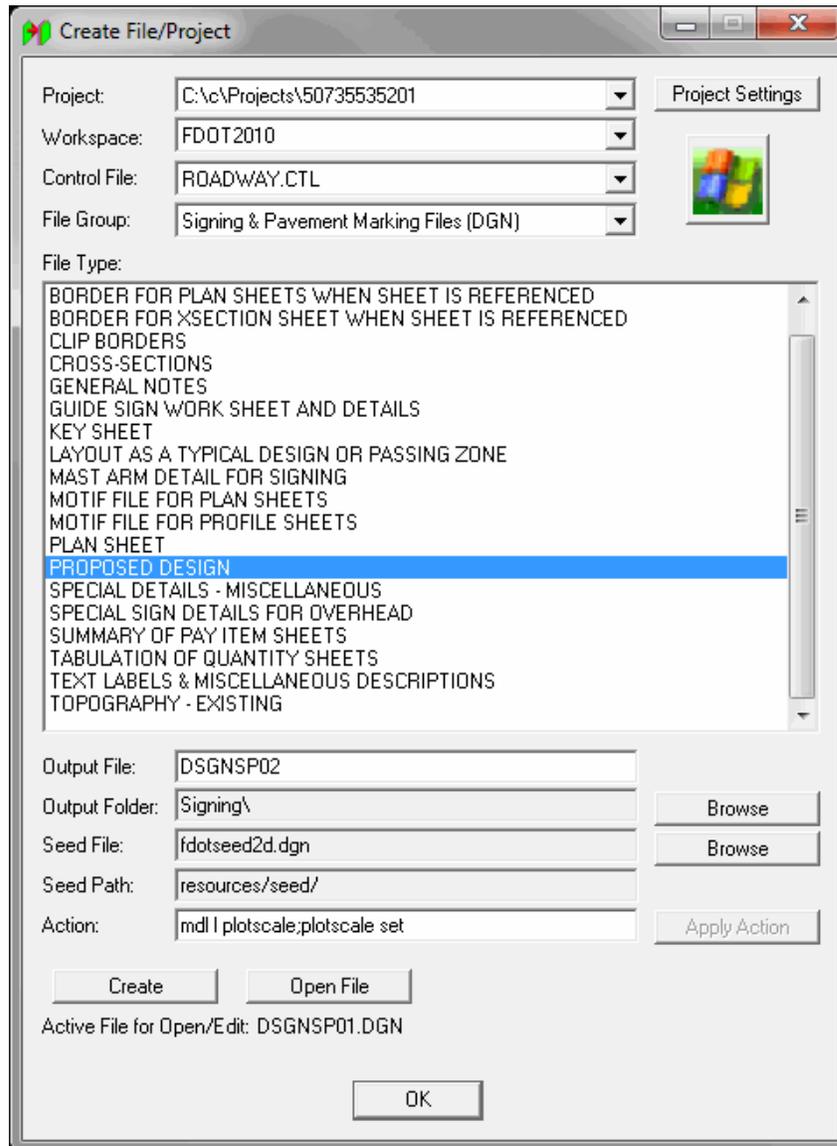
Using this shortcut to start MicroStation, as mentioned previously, opens MicroStation Manager and sets the workspace but does not set the Project. The Project is set by selecting the drop down arrow and selecting the correct project configuration file or (.pcf) file. The workspace remembers the last project worked in and will use the .pcf file the next time MicroStation is started with that workspace. This is important to watch as most designers probably work on more than one project at a time. It is recommended to always use the pcf file. This supplements other tools used to produce electronic delivery submittal. Discussion provided later in the course.



USING FDOT CREATE FILE/PROJECT - CREATE BASE FILES FOR A PROJECT

The Create File/Project application is used to create MicroStation design files, Compbook Excel files and other files in accordance with FDOT standard file naming conventions. Create File/Project uses an ASCII text file, called a Control File (*.ctl) to perform these task(s). This application can also create projects, although Electronic Delivery is the recommended method for creating new projects. Create File/Project can be accessed from both inside and outside of MicroStation. The advantage to using this tool to create files is that the file will always be named according to FDOT standards.

The Figure below shows the Create File/Project tool.



Note The designer has the option to open the file after it is created or create all the design files and open them later.

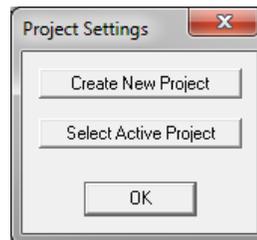
Exercise 1.1 *Creating the Base Files for a Project*➤ **Creating signing and pavement marking files**

1. Open the FDOT2010 folder  on the desktop.

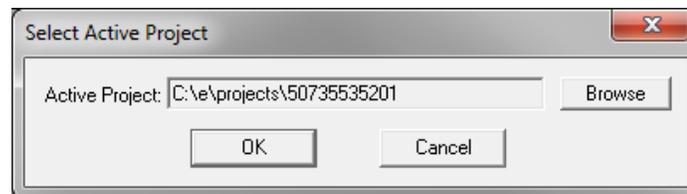
2. Double click on the **Create Files** icon . This will open the Create File/Project tool.

Note When training in FDOT offices, the user must click the Project Navigator button to allow the Create File/Project tool to work locally.

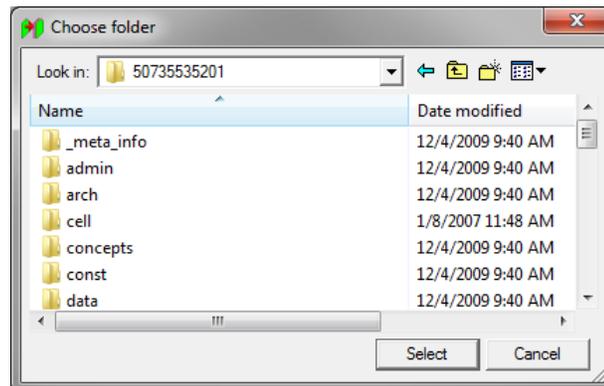
3. On the top right hand side of the Create File/Project tool, select the **Project Settings** button. This will open Project Settings.



4. Select **Active Project**. This will open the Select Active Project dialog.



5. Browse to the *Projects* folder and select **50735535201**. Stop at the root folder.



6. Click on the **Select** button. This selects the project and dismisses the Choose Folder dialog and goes back to the Select Active Project dialog.

7. Click **OK** on the Select Active Project dialog.

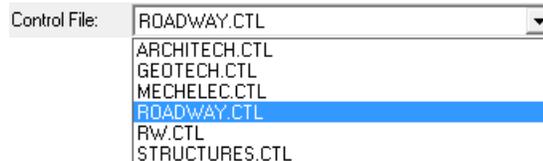
8. Click **OK** on the Project Settings dialog. This sets the active project.

➤ **Next, load the appropriate control file.**

Note Remember the control file sets, for lack of a better term, the discipline to work in. Signing and Pavement Marking files are part of the Roadway control file. It is important to know how to do this in case it is required to use a different control file in the future or if the standards ever change.

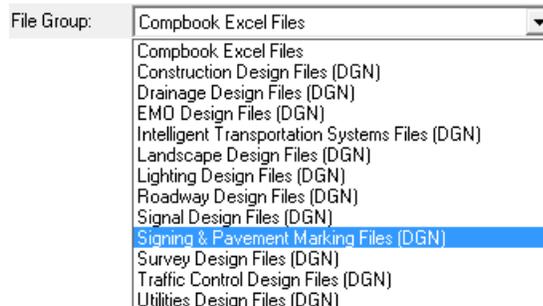
9. Click the down arrow on the **Control File** combo box.

Note Depending on how the software is installed, the FDOT2010\RESOURCES\Control_Files folder could be on the server or the local hard drive.



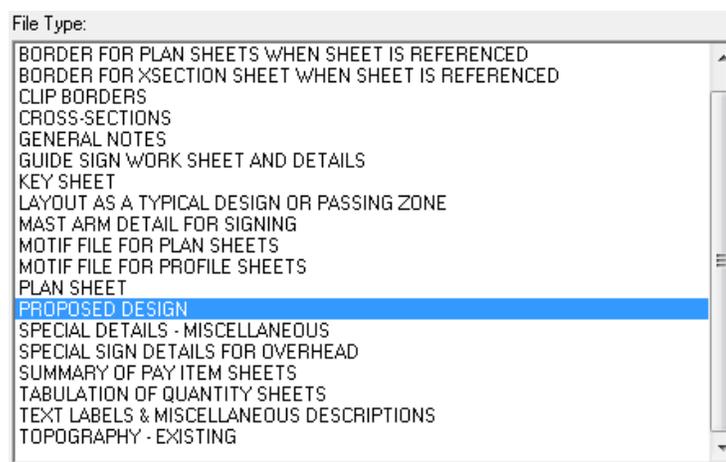
10. Click on **Roadway.ctl**. This loads the control file and the Create/Edit application now has enough information to begin creating design files in the specified Output folder.

11. In the *File Group* category, use the drop down arrow to select **Signing & Pavement Marking Files (DGN)**. This sets the file types to Signing & Pavement Marking files and sets the output folder to Signing.



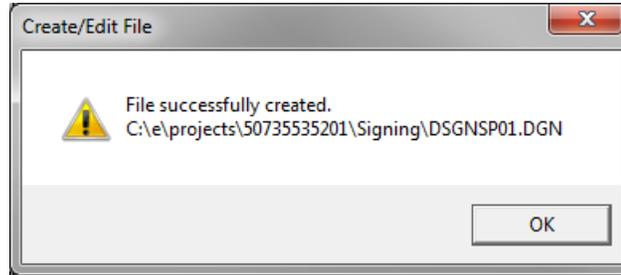
12. In the *File Type* category select the file **Proposed Design**. This selection populates the *Output File and Seed File* with the correct information.

Note This version of Create File/Project allows the designer to browse to a different **Output Folder** if needed. Also, the Workspace field is set to FDOT2010 by default.

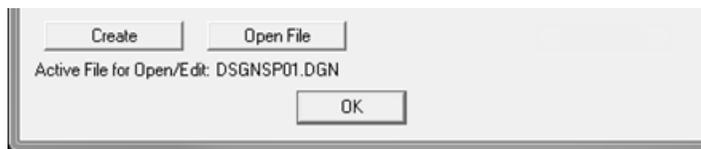


13. Click the **Create** button at the bottom of the dialog.

14. Click the **OK** button to acknowledge the file creation.



Note Clicking the Open File button next to the Create button at the bottom of the dialog can be used to open the file with this tool, which also registers and checks the file out in Project Navigator when the Create Edit Application is in TIMS mode. Also, notice below the Create and Open File buttons that the file name is shown. If the file Dsgnsp01 already exists in this project, the application will increment the file name to Dsgnsp02 and will not overwrite the file.



15. Go on to the Optional Exercise or click **OK** to close the Create File/Project tool.

Exercise 1.2 (Optional) Create Additional Files

➤ **Use same File Group to create additional design files**

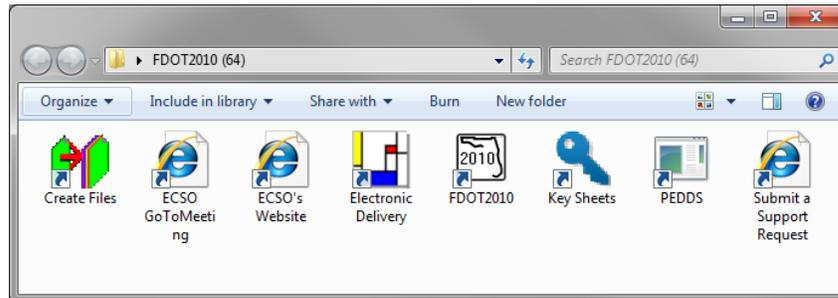
1. Using the Create File/Project tool select the **Tabulation of Quantity Sheets** file.
2. Select the **Create** button.
3. Click **OK** to acknowledge the file creation.
4. Repeat steps 1 thru 4 to create the Border for Plan Sheets When Sheet is Referenced file.
5. Repeat steps 1 thru 4 to create the **Summary of Pay Item Sheets** file.
6. Click **OK** on the Create File/Project tool. This will close the tool.

Exercise 1.3 Starting MicroStation through the FDOT2010 Folder

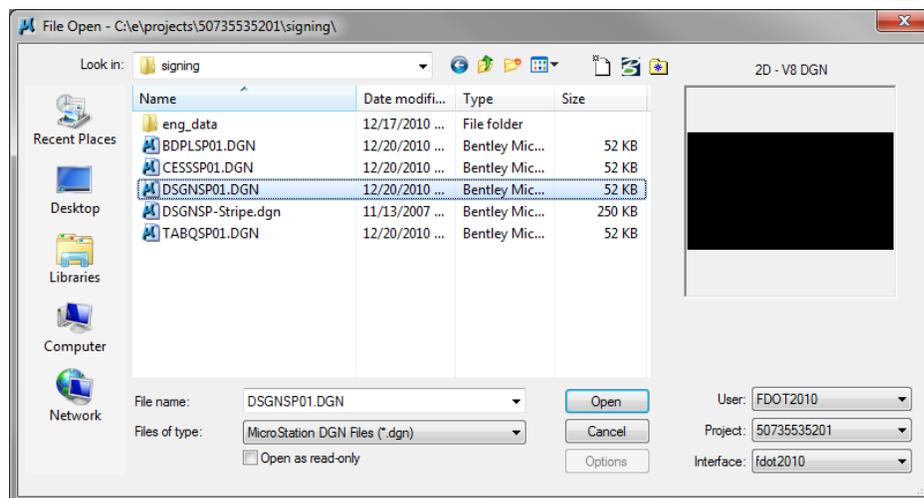
➤ Opening MicroStation using shortcuts in FDOT2010 folder

In this exercise, use the **FDOT2010** folder located on the desktop similar to the previous exercise. This folder contains several shortcut icons. It is important to review and understand what each icon is used for.

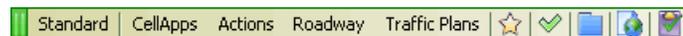
1. From the FDOT2010 folder  double click on the icon labeled **FDOT2010**. This opens the MicroStation Manager dialog and sets the *Workspace* environment.



2. In MicroStation File Open, select the project **50735535201**. This selection opens the project in the correct root directory.



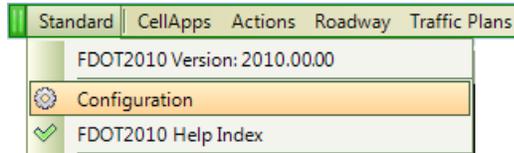
3. Navigate to the *Signing* folder.
4. Select the **Dsgnsp01.dgn** file and click **Open** or double click on the file to open it.
5. Once in MicroStation notice that the FDOT Menu appears. Take a moment to become familiar with this workspace configuration.



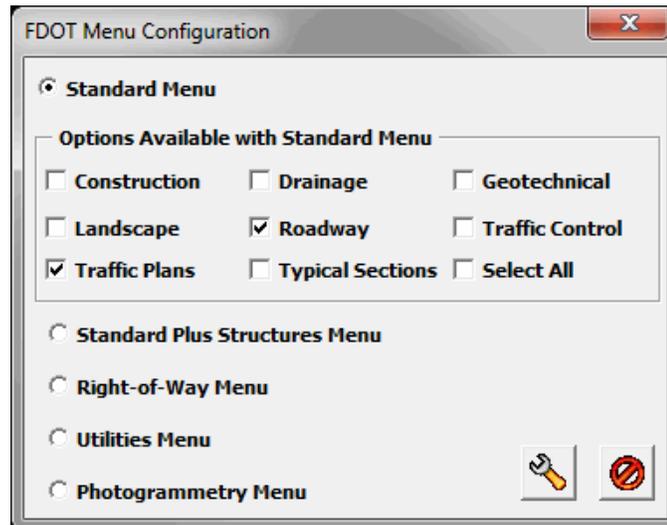
TRAFFIC PLANS MENU

ACTIVATING THE TRAFFIC PLANS MENU

As seen in the last exercise, FDOT Menu loads when MicroStation is loaded through the FDOT delivered workspaces. FDOT Menu, by default, opens in the Standard menu; FDOT has provided the option to configure FDOT Menu to load additional discipline menus as needed.



The figure below shows the possible FDOT Menu configurations.



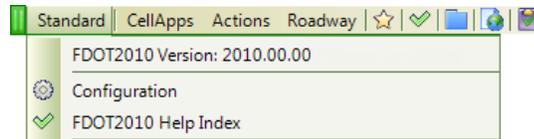
In the top portion of the FDOT Menu Configuration dialog provides the option to load one or all of the Roadway Menu Options. For example, Traffic Plans can be loaded along with Roadway and Typical Sections or it can be loaded by itself.

The Bottom portion of the dialog provides options to load the Structures, Right of Way, Utilities or Photogrammetry menus. These menu cannot be loaded at the same time as the Roadway menus. Once the options have been selected click the Update (wrench icon) button to load the additional menus, Exit (slashed circle icon) closes this dialog without making any changes.

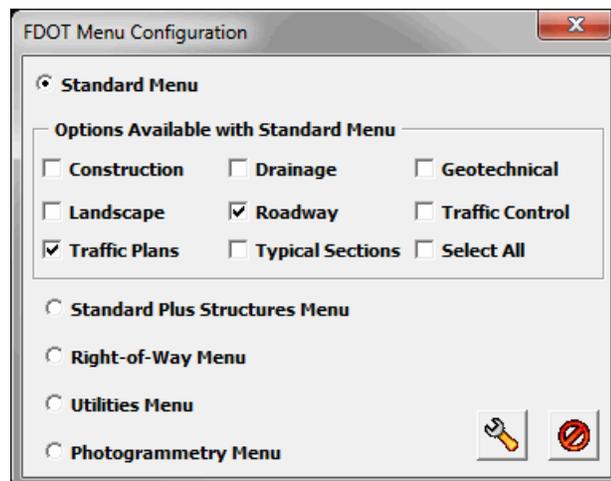
Exercise 1.4 *Setting up FDOT Menu to Load the Traffic Plans Menu*

➤ **Load Traffic Plans menu**

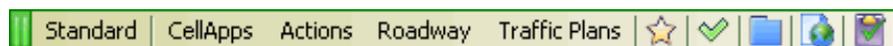
1. Continuing in *Dsgnsp01.dgn*, select the Standard pull down from the far left of FDOT Menu.
2. Select **Configuration** to open the Configuration dialog.



3. Click the option to load the **Traffic Plans** menu. (It's a good idea to activate the **Roadway** menu as well.)



4. Click the Update (wrench icon) button.
5. Click and hold the **green box** at the front of the FDOT Menu to drag it to a convenient location.
6. Right click on the **green box** at the front of the FDOT Menu to access the **context menu**.
7. Select **Save Settings** to save the FDOT Menu location.
- 8.
9. When the standard FDOT Menu is reloaded the **Traffic Plans Menu** is added.



10. Take a moment to become familiar with this workspace configuration and the FDOT Menu.

LEVELS, TEXT AND MODELS

LEVELS

FDOT has created 6 level libraries: Common, Survey, Right of Way, Roadway, Photogrammetry and Structures. There are approximately 1400 levels. The appropriate level library is loaded when a MicroStation file is created or opened using the FDOT workspaces. The level name is a maximum of 18 characters and is divided into three components.

The three components of a level name are:

1. Level Name
2. State
3. View

An example of a plan view level is (**PavtMessage_ep**).

1. Level Name – **PavtMessage**
2. State - **e**
3. View - **p**

The level name is obvious, as it describes the element about to be drawn.

The State options are:

- **e** = Existing
- **p** = Proposed
- **d** = Drafting

The View options are:

- **p** = Plan
- **r** = Profile
- **x** = Cross Section

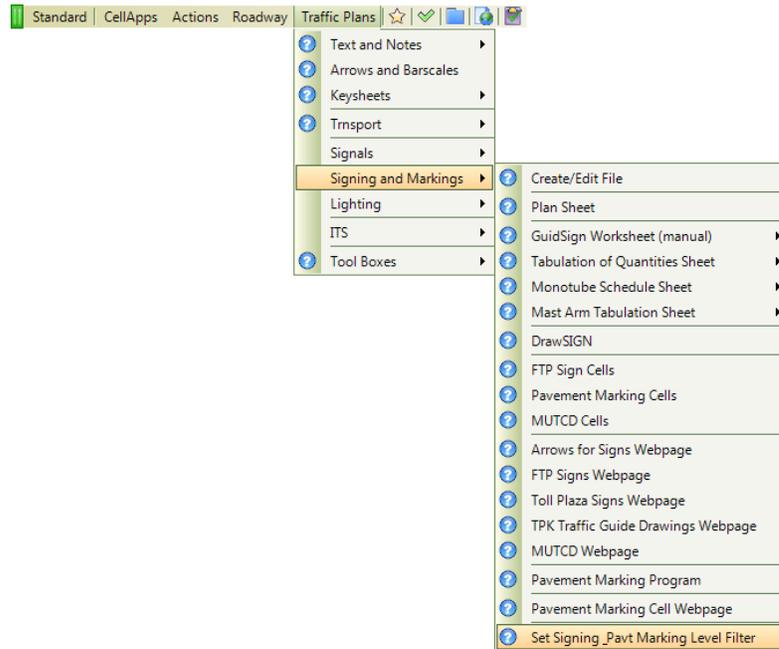
Note Some levels do not show a State or View in their name. These levels are set by default to be a proposed plan view element. An example is the level (**RPM1**) this level is created for proposed RPM's in the plan view.

The levels symbology or color, weight and style are set to ByLevel. What this means is that each level already has a color, weight and style associated to it. Designers cannot create additional levels.

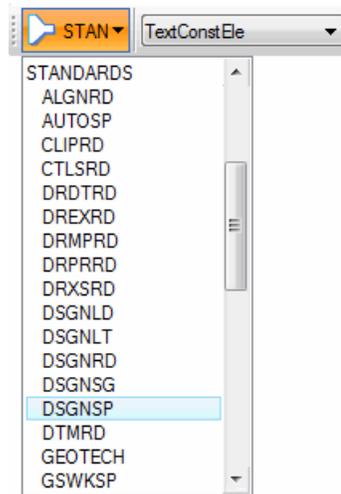
LEVEL FILTERS

Level filters are used to group levels together. This makes searching through the level menu much easier. FDOT delivers level filters for each level library. These filters are discussed later in this section. Level Filters do not turn levels on or off but they reduce the number of levels visible in the dialog box.

Activating a level filter is very easy and can be done from several locations. Level filters can be loaded from the FDOT Menu option: **Traffic Plans Submenu > Signing and Markings > Set Signing Pavt Marking Level Filter.**



Next to the level name menu on the MicroStation Attributes tool palette, there is a drop down menu as seen in the figure below where level filters can be loaded. This option is only available if “Active Level Filter” is selected.

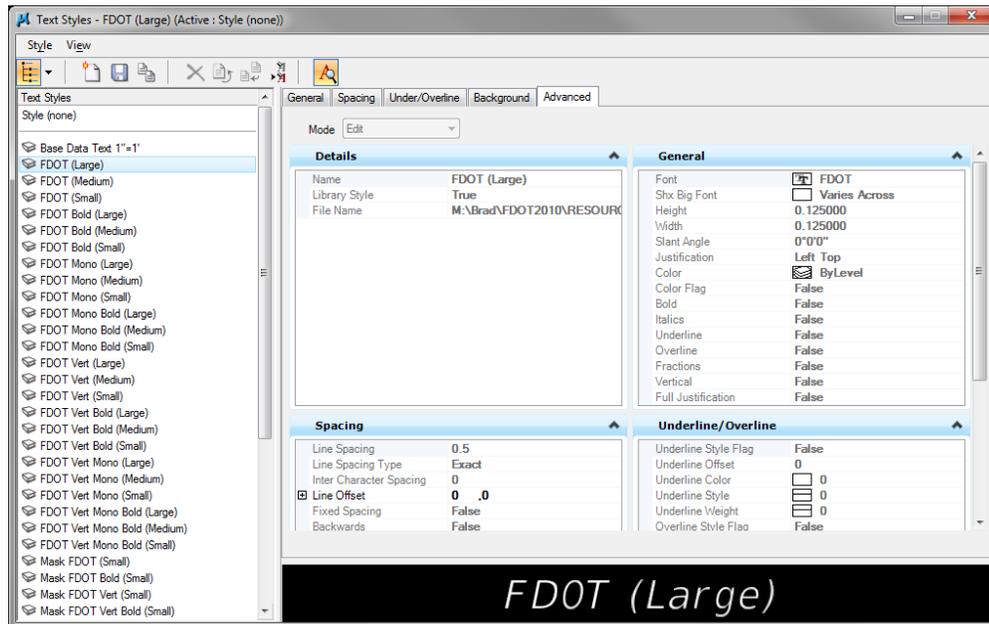


Note By default the Level Filter is already set by the filename.

TEXT STYLES

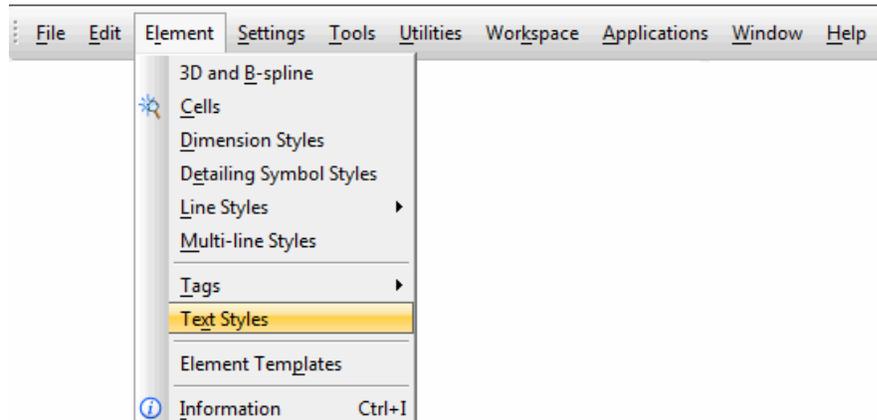
A text style is comprised of a group of text attributes, such as font, width, height, spacing and so on. Text styles take away the burden of having to set all of the individual text parameters as required in previous versions of MicroStation. FDOT delivers predefined text styles, which should be used whenever possible. The text styles delivered by FDOT are created at a scale of 1 to 1. This is important to remember when placing text using Annotation Scale. Annotation Scale is discussed in more detail later in this section.

TEXT STYLES DIALOG BOX



The Text Styles dialog box shows all of the text styles that exist in the design file, and all of the parameter settings for each style. When a new file is created or opened an existing file based on the **fdot_levels_v8.dgnlib** all of the appropriate text styles are loaded. No changes should be made to the delivered text styles.

The Text Styles dialog can be accessed by selecting **Element > Text Styles** from the MicroStation menu bar.



TRUE TYPE FONTS

FDOT has integrated the use of True Type Fonts and restructured the Text Styles. True Type Fonts have been implemented for the following:

- Cell Libraries
- DDB (Geopak Database)
- VBAs
- MDLs
- Spreadsheets

True Type Fonts will ignore MicroStation weights. The best method to show thicker text is to use the Bold font. The True Type Fonts delivered by FDOT will be installed by the installation and are located in the FDOT2010\RESOURCES\Fonts\ folder on the server and in the Windows\Fonts folder on the client. The True Type Font files that will be delivered are as follows:

- FDOT.ttf
- FDOTBold.ttf
- FDOTImprint.ttf
- FDOTImprintBold.ttf
- FDOTMono.ttf
- FDOTMonoBold.ttf

Note Old fonts will be delivered, but the menus and tools will not be configured to use them.

STYLE ORGANIZATION

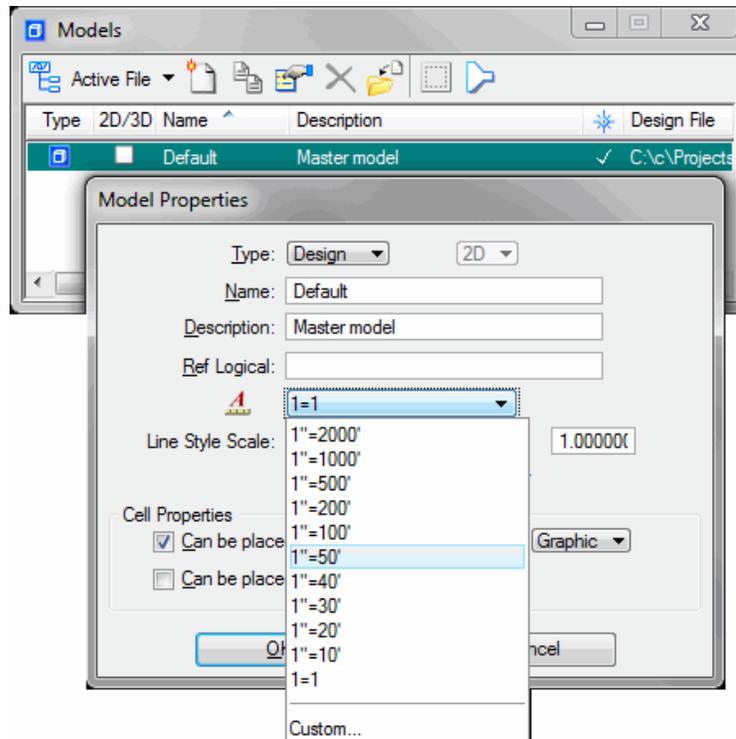
Fonts at Common Sizes	40 Scale	50 Scale
Large = .125 x Scale	5.0	6.25
Medium = .1 x Scale	4.0	5.0
Small = .07 x Scale	2.8	3.5

ANNOTATION SCALE

Annotation Scale associates all of the text placed in a model to a specific scale so if the scale of that model is changed the text dynamically changes with it. The Annotation Scale lock must be checked on before placing the first piece of text and continue to use Annotation Scale on all of the remaining text for this to function properly.

Using Annotation Scale also removes the burden of having to calculate what text height should be used at a particular scale when placing text. Annotation Scale is model specific.

It is recommended that this be set at the time the model is created and that the Annotation Scale lock is selected. This can also be set in the *Model Properties* as seen in the figure below.



Important items to remember regarding Annotation Scale

- Model Specific
- Annotation Lock must be on from the start
- Can be synced up to the plot scale using FDOT Menu
- Can be set in the model properties
- Don't switch between Annotation Scale on and off

MODELS

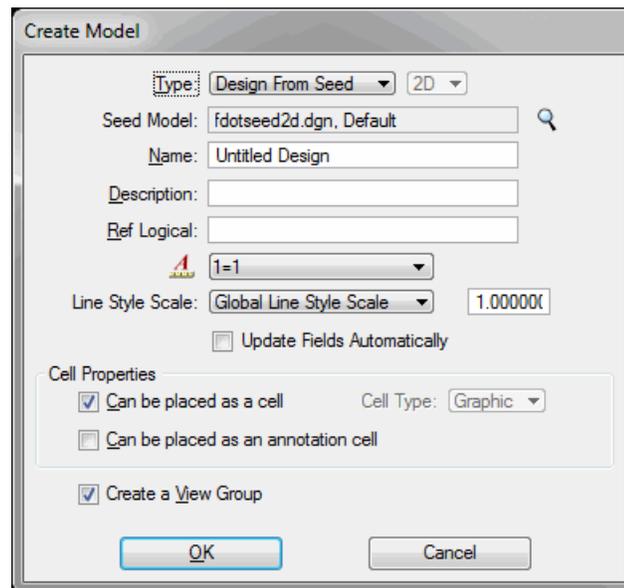
Models are independent sets of design data within the same file. Every MicroStation design file has at least one model named Default. Models are used to consolidate files that contain data that is used collectively. An example is the cross section file, this one file (Rdxsrd*.dgn) has four models in it.

1. Pattrd – Pattern lines for cross sections
2. Rdxsrd – Cross Sections
3. Xsshrd – Cross Section Shapes
4. Rdxsrd_shg – Cross Section Sheets

This one file with four models replaces four MicroStation design files.

Another example of how to use a model is with the alignment file or (Algnrd*.dgn). This file is for displaying the Baseline of Construction. Typically, there could be multiple alignment files to cover all of the different scales. Using the model concept only one MicroStation (Algnrd*.dgn) file with several models in it (i.e. a model for each scale) has to be created.

When a new model is created there are several options to define in the model properties, these properties are unique to the model. The figure below shows the Create Model dialog box.



There are two types of models, Design and Sheet. The Design model is the actual geometry or line work and the Sheet model is the sheet file or border. Models can be either 2D or 3D and a 3D model can be referenced to a 2D design file.

Note If multiple models are used in the DGN files, it is important that their names and uses are documented in the project Journals. This will give downstream users an idea as to what is in the file and whether it is important or not. The same goes for CADD managers who are reviewing QC reports, if temp models are created to work in and the model fails compliancy it may be covered if documented in the project Journal, as long as this Model **IS NOT** referenced to any other design file.

Exercise 1.5 Using the Tools

➤ Reference Files, Models and Plot Scale (Part 1)

This exercise will cover attaching reference files that have multiple models in them. This reinforces what was discussed earlier regarding models inside of a MicroStation file. There is more than one way to load the References dialog. Use the method most familiar.

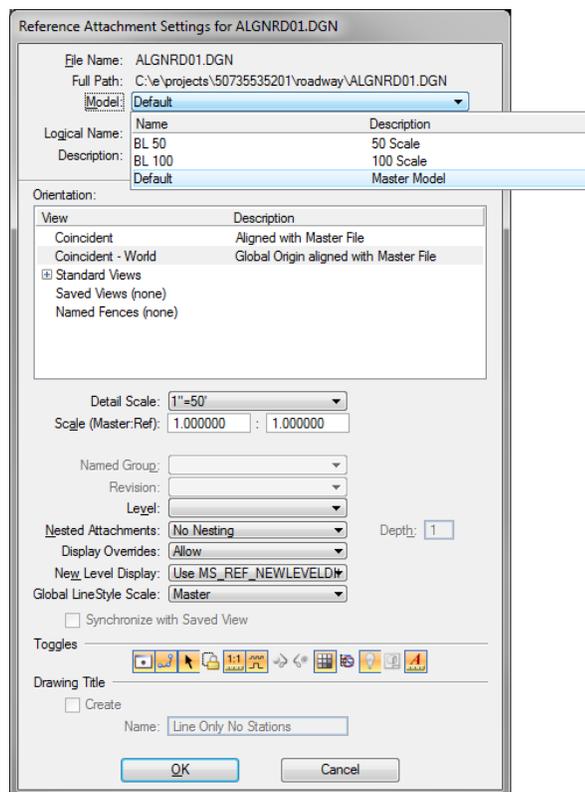
1. Continuing with *Dsgnsp01.dgn* open the References dialog box. This dialog is loaded by clicking on the **References** icon on the Primary Tool Bar.



2. In the References dialog, select **Tools > Attach**. This opens the Attach Reference dialog.
3. Navigate to the *Roadway* folder.
4. Select the **Algnrd01.dgn** file in the *roadway* folder. This is the alignment file that contains the Baseline of Construction.

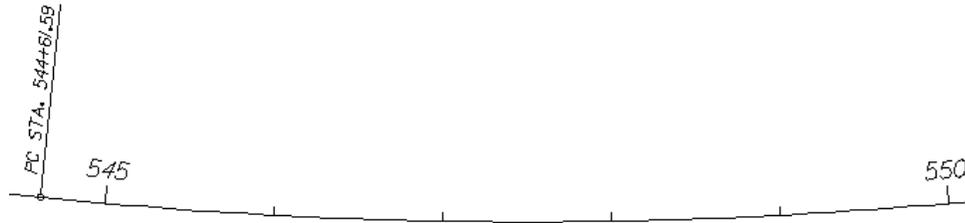
Note The attachment method should be set to Interactive by default. All files created in this training course are true V8 files so it is not required to use Coincident World as the attachment method.

5. Click on **Open**. This opens the Reference Attachment Settings dialog box.

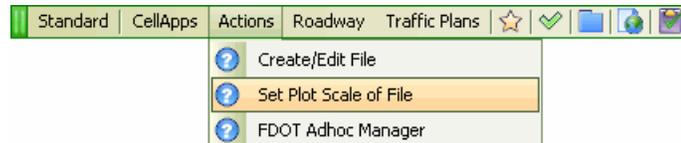


6. Notice the Model name defaults to the *Default* model. As discussed earlier in this section every MicroStation file has at least one model named *Default*, except **Rdxsrd*.dgn** where the default model has been renamed to **Rdxsrd**. This reference file has additional models in it to accommodate multiple scales. Take a moment to look at this on the dialog.
7. In the Reference Attachment Settings dialog set the Model to **Default**.
8. Click the **OK** button. This attaches the reference file.
9. In MicroStation do a **Fit View**. This fits the reference file to the active view window.

10. Take a moment and zoom in close to the baseline, notice that there are no tick marks or stations. The default model in the (*Algnrd01.dgn*) file does not have ticks or stations in it. The stations and ticks are in another model in the same file. The reason for doing it this way is that on Signing and Marking Plans sometimes it's more advantageous to only display the stations and ticks and not the baseline to avoid confusion if close to another pavement marking line. This set up makes it easier to turn off the display of the reference file (*Algnrd01*, model *Default*).
11. Using the same process as above, attach the **Model BL 100** in the **Algnrd01.dgn** file.
12. Zoom in close to the baseline again; notice now that there are tick marks and stations.



13. Attach the reference file **Dsgnrd01.dgn** in the *roadway* folder, use the **default** model. This will display the proposed roadway features.
14. It may be necessary to attach the **Topord*.dgn**, **Utexrd*.dgn** and **Drexrd*.dgn** files depending on the type of project being worked. If there are conflicts with any of the existing features than that reference file should be displayed. Refer to the *Plans Preparation Manual Volume II - Chapter 23* for further guidance.
15. From the FDOT Menu select **Actions > Set Plot Scale of File** or click the **Star** icon. This opens the Set/Update Plot Scale.



16. Change the *Scale* to **100** and click **OK**. This changes the active *plot scale* of the file from 50 to 100.

Note In previous versions of FDOT Menu -.9999 was the default scale. This causes problems with other applications like Sheet Navigator, so FDOT set the default scale to 50.

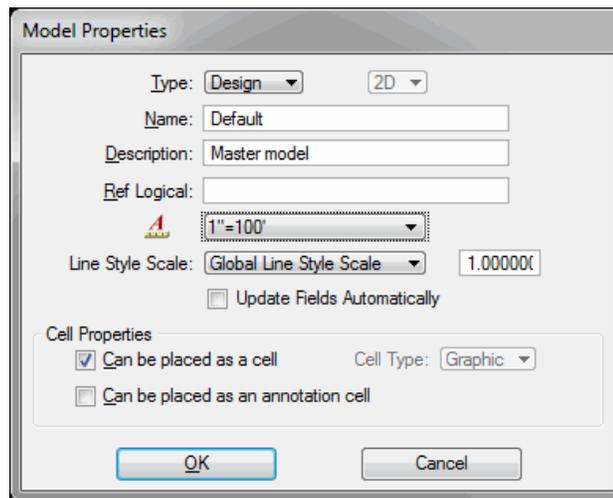
➤ **Models (Part 2)**

This exercise will cover setting the Annotation Scale for the default model and create a new model in this exercise. This model is a place where to experiment with some tools without adding junk to the default model.

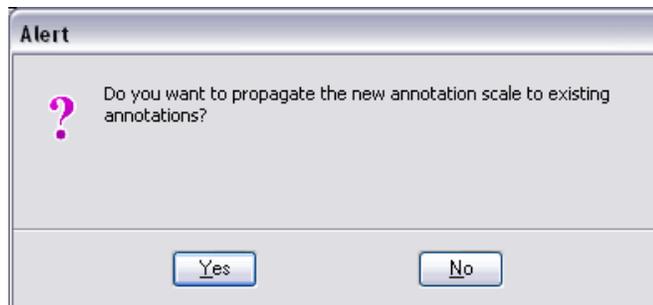
1. Continuing in *Dsgnsp01.dgn* open the Model Properties dialog. This can be opened from the *Primary Tool*.



2. In the Model dialog, highlight the **Default** model.
3. Right mouse click on the **Default** model and select **Properties**. This opens the Model Properties dialog.

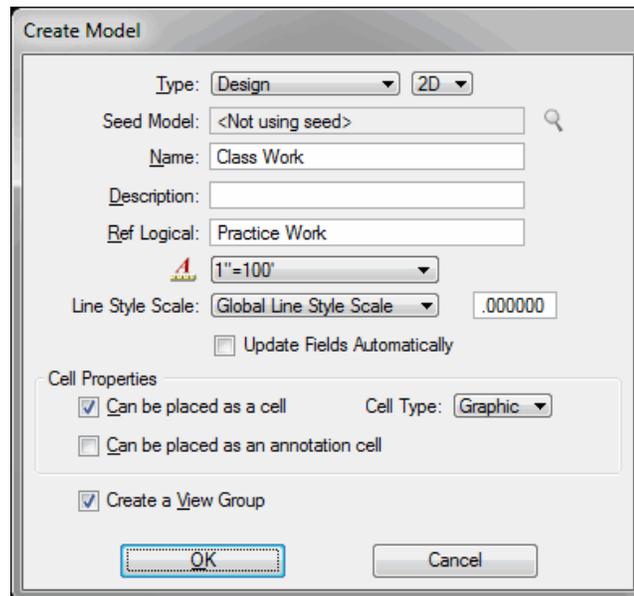


4. For *Annotation Scale* set this to **1"=100'**.
5. Click **OK**. This closes the Model Properties dialog.

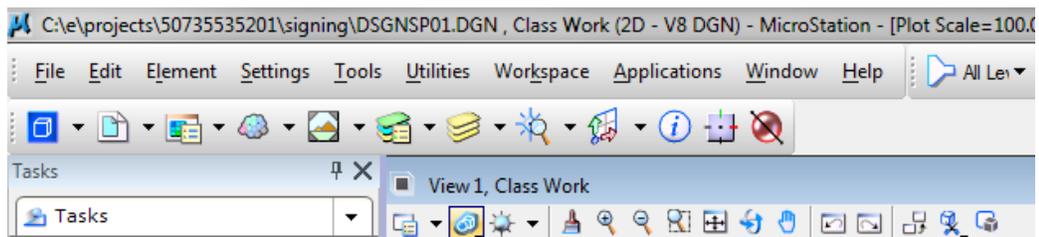


6. Click **Yes** on the Alert dialog (if one appears.). Up to this point nothing is in the design file to change.

7. In the Models dialog select **Create a new model** . This opens the Create Model dialog.



8. Set the *Type* to **Design 2D**. These are the default settings.
9. In the *Name*, enter **Class Work**. This is the **Model** name.
10. *Description* can be left **blank**.
11. For *Ref Logical* enter **Practice Work**. This field, if populated, will fill in the logical name in the reference palette if this file is attached. This is very helpful.
12. For *Annotation Scale* set this to **1"=100'**.
13. Click **OK**. This creates the new model and makes it the active model.
14. Set the *Plot Scale* to **100**.
15. Set the *Units* to **English**.
16. Notice now that the new Model shows up in the Model dialog. To switch between models, double click on the model name. The active model name will be next to the **View 1** name.



17. In MicroStation, turn the **Annotation Scale Lock** on.

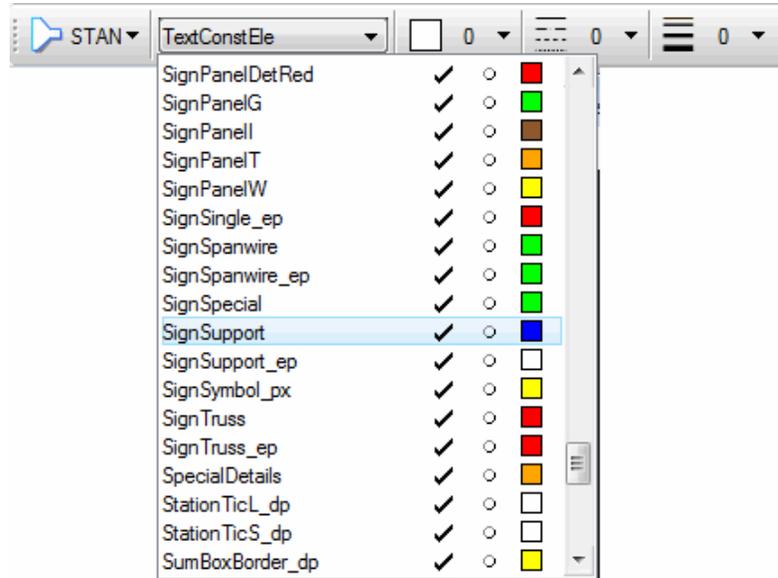
➤ **Levels and Filters (Part 3)**

This exercise will cover investigating Levels and Level Filters delivered by FDOT. The elements placed in this exercise are not part of the final design; they are for experimenting and practicing only.

1. Continuing with *Dsgnsp01.dgn* in the Class Work model, select the FDOT Menu option: **Traffic Plans > Signing and Markings > Set Signing Pavt Marking Level Filter**. This sets the active level filter.

Note As a refresher, a level filter isolates the levels seen in the level dialog so it is easier to navigate. The level filters are grouped by discipline and are now set by the filename.

2. In the *Attributes* tool palette, select the drop down arrow next to the level names.

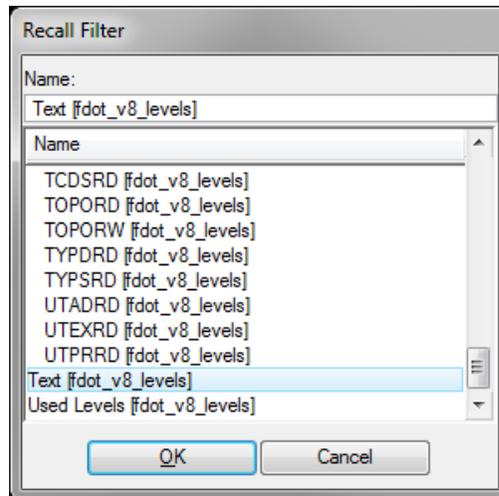


3. Scroll down and select the level **SignSupport**. This sets the active level to SignSupport and sets the color, Weight and Style because all levels are set up ByLevel.
4. In the *Attributes* tool palette, select the drop down arrow next to the level name.
5. Scroll all the way to the top and select **Filter: STANDARDS:DSGNSP**. This opens the Recall Filter dialog.



Note This is another way to load level filters.

6. Scroll down and select **Text (fdot_v8_levels)**.

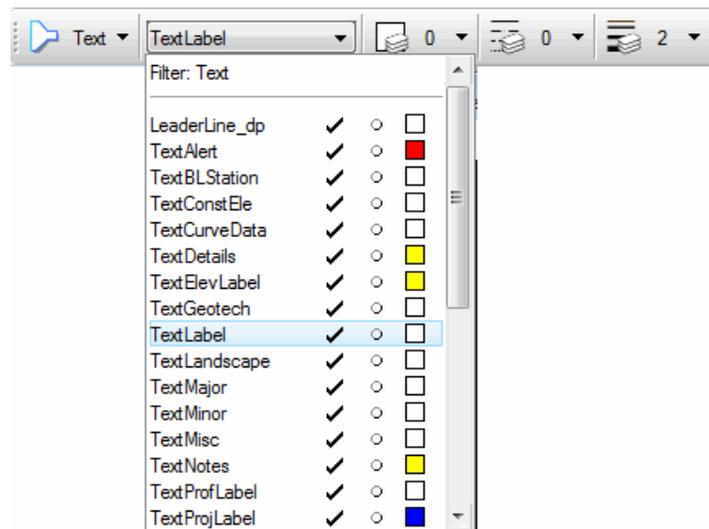


7. Click **OK**. This loads *Text Levels* filter.
8. Take a moment to review the levels in this filter. Notice that all levels visible are associated to text.
9. Now that the *Filter* is loaded, navigate the level drop down menu and select the level that is appropriate to the item being placed. It is important to understand how useful the level filters are, they will save time when going from Line work to Text and so on.

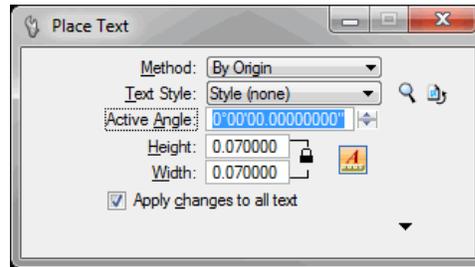
Annotation Scale and Text Styles (Part 4)

This is a brief introduction to placing text using the FDOT delivered Text Styles. This is discussed in more detail later in this course.

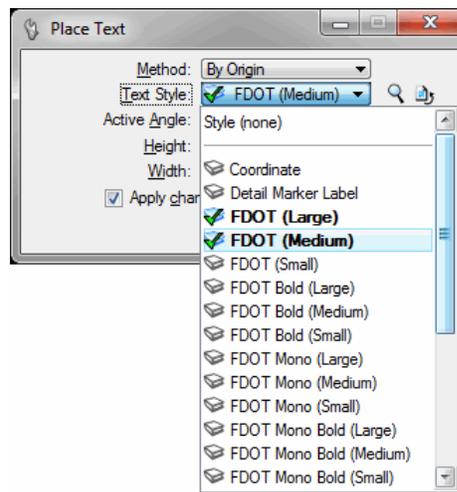
10. Continuing with *Dsgnsp01.dgn* in the **Class Work** model, set the active level to **TextLabel**.



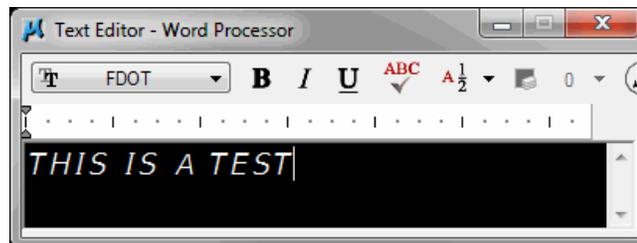
- From the MicroStation Task Navigator's Main Classic Task, select the **Place Text** tool. This opens the Place Text dialog.



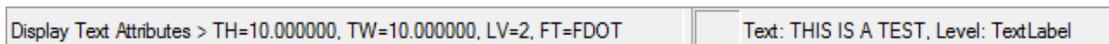
- Notice that the *Annotation Scale* option is **active**. This was part of our Model Properties set in a previous exercise. Remember with *Annotation Scale* set there is no need to calculate what text height and width to use; this tool automates the calculation.
- From the *Text Styles* drop down menu, select the **FDOT (Medium)** style.



- In the Text Editor dialog, enter a sample text string and place it in the design file.



- From the MicroStation Task Navigator's Main Classic Task, select the **Display Text Attributes** tool .
- Select the text just placed and notice the text attributes, the *Height* and *Width* are set to the correct size based on the Annotation Scale. No manual calculation required.



- Take a moment to become familiar with the Place Text dialog and the other delivered Text Styles.
- Change the Model back to **Default** and select **File > Save Settings**.

2 CREATING A KEY SHEET

OBJECTIVE

The objective of this chapter is to teach the student how to create a Signing and Pavement Marking Key Sheet that meets FDOT CADD standards.

INTRODUCTION

Once the student has completed this chapter they will be able to create a Key Sheet and all of its components that follow FDOT standards. The FDOT CADD standards and the Plans Preparation manual will be adhered to for the creation of this sheet.

GENERAL INFORMATION

The key sheet is the first sheet in the set of construction plans. The information shown on the Signing and Pavement Marking plans key sheet varies depending if the Signing and Pavement Marking plans are a component of the Roadway plans or the lead component. For example, if the Signing and Pavement Marking plans are a component of the Roadway plans, you do not need a location map or length of project box because this information is on the lead key sheet. This also applies to the Signalization and Lighting plans key sheets. Refer to Chapter 3 Volume II of the Plans Preparation Manual for more information.

During the creation of a Key Sheet, the designer is required to take the actions listed below.

Produce the graphical portion of the sheet with these elements:

- Place the standard border cell for a key sheet.
- Place the project location map (only on a lead Key Sheet).
- Place the Florida map cell for a key sheet (only on a lead Key Sheet).
- Place the Section, Township and Range lines (only on a lead Key Sheet).
- Begin Milepost (correct to three decimal places).
- Place the North arrow cell for a key sheet (only on a lead Key Sheet).
- Identify all Railroad Crossings (only on a lead Key Sheet).
- Fill in component Plans (Only on a lead Key Sheet).
- Index of Sheets
- Revision Box

Fill in the project data, including the following:

- Financial Project ID, Number
- Federal Funds (if applicable)
- County Section Number, County Name and State Road Number
- Fiscal Year

PROJECT LOCATION MAP

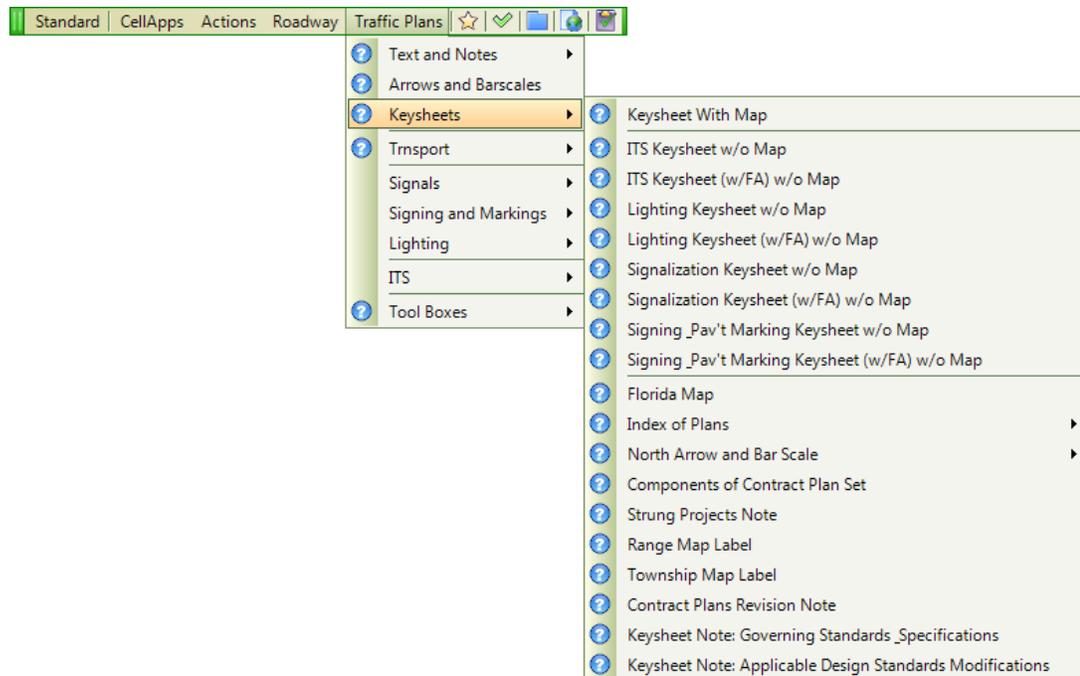
Florida county maps are available for download from FDOT's Surveying & Mapping web page. <http://www.dot.state.fl.us/surveyingandmapping/countymap.shtm>

These maps are available in DGN or PDF file format. Download the DGN file into the appropriate project directory. This file is used by another FDOT Menu tool to attach, scale and clip the map to the key sheet. Currently the county map DGN files are available in MicroStation version 7 format only. The key map sheet clipping process will cover how to use the version 7 maps with a Version 8 design file.

The Project Location Map is placed in the center of the sheet and sized so as not to interfere with other elements on the Key Sheet. Its purpose is to provide enough information so that the project location is easily understood. Township, Range, and County lines and numbers are shown to make the location clear.

USING FDOT MENU TO CREATE A TRAFFIC DESIGN KEY SHEET

FDOT Menu includes tools to aid in the creation of key sheets with location maps or without. The figure below shows all of the possible scenarios for creating a traffic plans key sheet.

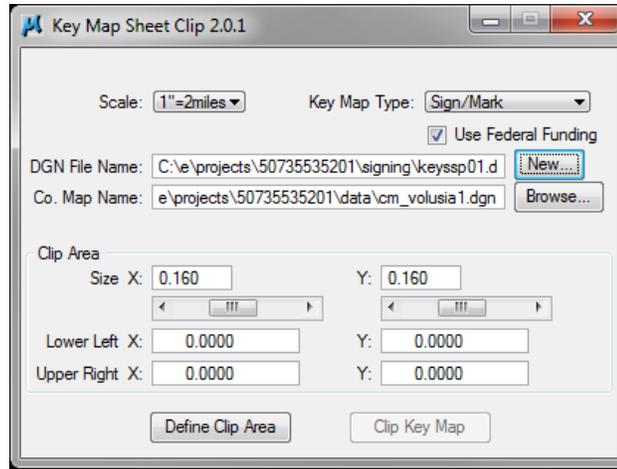


KEY SHEET WITHOUT MAP

In the figure on the above, there is the option to create a Key Sheet with or without a map. If the option without a map example (*Signing & Pav't Marking Keysheet w/o MAP*) is selected, a Key Sheet design file will have to be created first using the Create File/Project tool or some other acceptable method to create the design file using the correct seed file and design file name. An example of when to create a Key Sheet without a map is if the Signing and Pavement Marking plans are a component of the Roadway plans.

KEY SHEET WITH A MAP

If the project is the lead component, a Key Sheet with a map will need to be created. This option from FDOT Menu opens the Key Map Sheet Clip tool. This tool does not require a Key Sheet design file already created; this tool creates it.



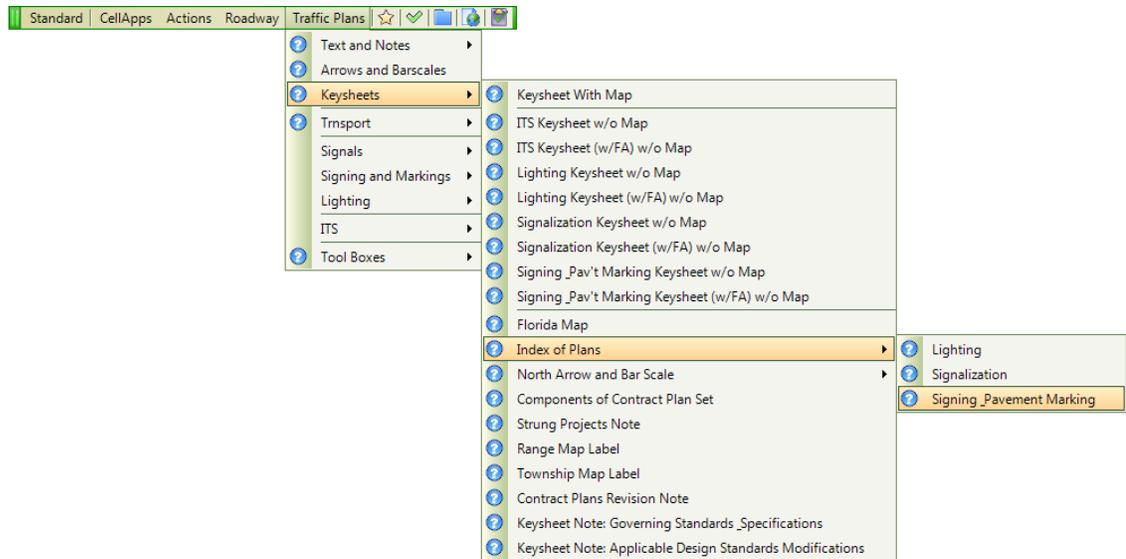
Note This tool by default is set to create the Roadway Key Sheet even if the tool is started in the Signing folder. It is important to set the Key Map Type first.

- **Scale** - 1"=2miles (10,560), 1"=4miles (21120) or 1"=8miles (42240)
- **Key Map Type** – The list of disciplines for creating key sheets. As the component is selected, the DGN File Name will dynamically change accordingly.
- **Use Federal Funds** – If selected this places the (**FEDERAL funds**) text on the Key Sheet.
- **DGN File Name** – Displays the working directory path and the design file name of the Key Sheet being created. This dynamically changes based on the Key Map Type setting. The **New** button creates a new file for the sheet cell to be placed in. The file name will default to the next available file number in the standard naming convention for the key map type chosen.
- **Co. Map Name** – This is the county map file downloaded from FDOT's Surveying and Mapping web site. Browse to the file in either in the Roadway discipline folder or the data folder in the project directory. The web site to download the files is www.dot.state.fl.us/surveyingandmapping/countymap.shtm.
- **Clip Area** – This portion of the dialog is for setting the clip limits of the map. Either key-in the coordinates, or dynamically select them with the Define Clip Area button.
- **Define Clip Area** - This opens the selected county map so the area to be clipped can be graphically selected. A square will be attached to the cursor. The size of the square is defined by the Scale or Size. Place the square around the area to be clipped and enter a Data Point. The **Clip Key Map** button will become active.
- **Clip Key Map** – This will clip the map, place the sheet cell, open the file, set the plot scale according to the scale selected, and then launch Sheet Navigator.

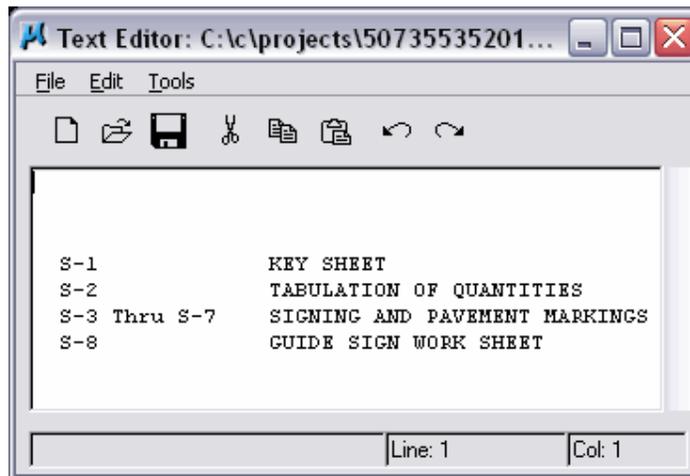
Note If a Key Sheet is created in the roadway directory by error, make sure to delete it to avoid problems with electronic delivery.

INDEX OF PLANS

The *Index of Plans* is used to describe what sheets and corresponding sheet numbers are in the set of plans. This option on the FDOT Menu opens a text editor with a pre-defined index. This text file is editable and can be placed using the text editor.



The figure below shows the Signing and Pavement Marking index text file opened in the text editor.



The text height and width of the index text, when placed on the Key Sheet, is generally set to 369.6 which is the default text size for a Key Sheet that is at a scale of 1" = 1 Mile. Though the Key Map Clipping tool sets the text height and width values you may desire to check the program for accuracy or modify these values based on the scale of your Key Sheet.

For Example, if your Key Sheet is a scale of 1" = 2 Miles you would multiply 369.6 x 2 to get 739.2. Another way to look at this is to take the text size of 369.6 and divide it by 5280 you would get 369.6 / 5280 = 0.07. This, 0.07, is the desired text height for a 1 to 1 scale. Take 0.07 x 10560 = 739.2 where 10560 is 2 miles.

On the Tools menu is an option to Import text. This is how to place this text in the design file. The text size in this file is set up to read the plot scale of the active design file and will place correctly as long as the plot scale is set correctly in the active file.

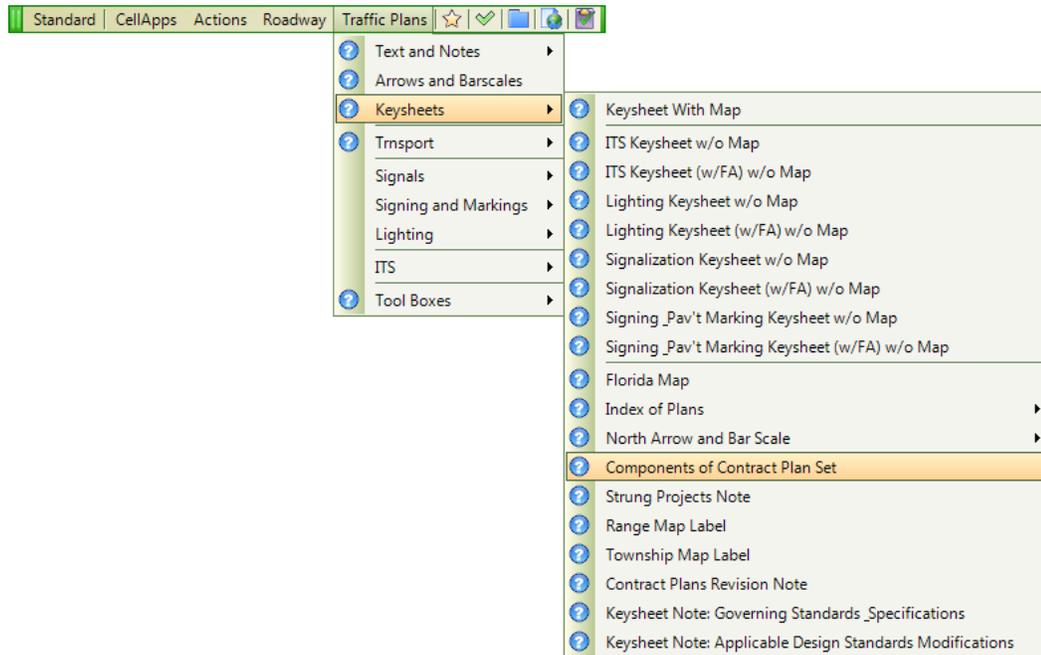
COMPONENTS OF CONTRACT PLAN SET

The *Components of Contract Plan Set* is a list of all disciplines that are a component to the lead project. The order of the component plans is:

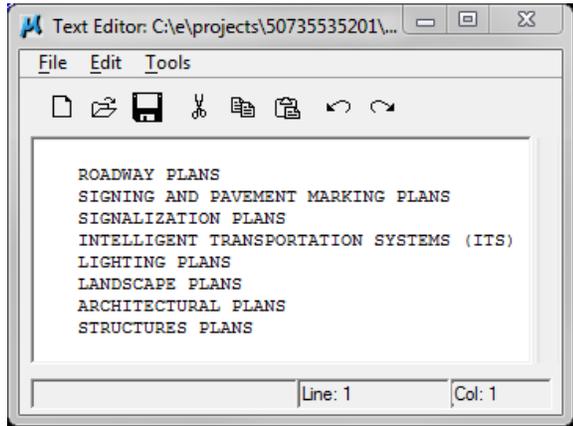
1. Roadway
2. Signing and Pavement Marking
3. Signalization
4. Intelligent Transportation Systems (ITS)
5. Lighting
6. Landscape
7. Architectural
8. Structures

Note If your project includes Signing and Pavement Markings, Signalization or other component sheets as part of the Roadway Plans and those sheets are numbered consecutively within the Roadway Plans then these are not to be shown as components of the contract plans set.

The figure below shows the FDOT Menu tool to aid in the production of the Components of Contract Plan Set.



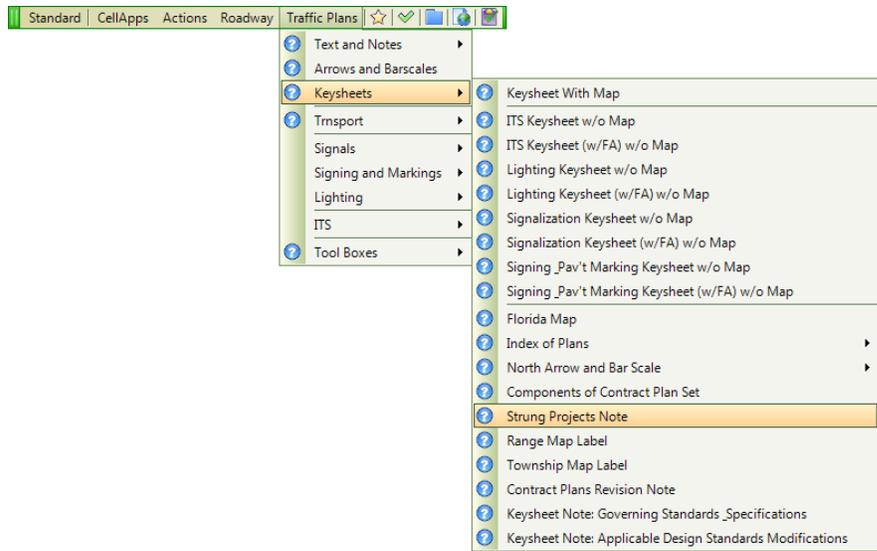
This tool functions similar to the Index of Plans. A text file is opened for editing to meet the project requirements. The text size for this file is set up to read the plot scale of the active design file and will place correctly as long as the plot scale is set correctly in the active file.



This file is set up for the lead key sheet in the set of plans. If a Signing and Pavement Marking Key Sheet without a map is created, this file will not be used because there are no components; hence, there is no *COMPONENTS OF CONTRACT PLANS SET* option on the key sheet.

STRUNG PROJECTS NOTE

Projects that are independently prepared but are let in the same construction contract shall have the additional Financial Project IDs noted on the right side of the key sheet below the Plans Prepared By block. This cell can be placed from FDOT Menu. This tool reads the plot scale for text size.

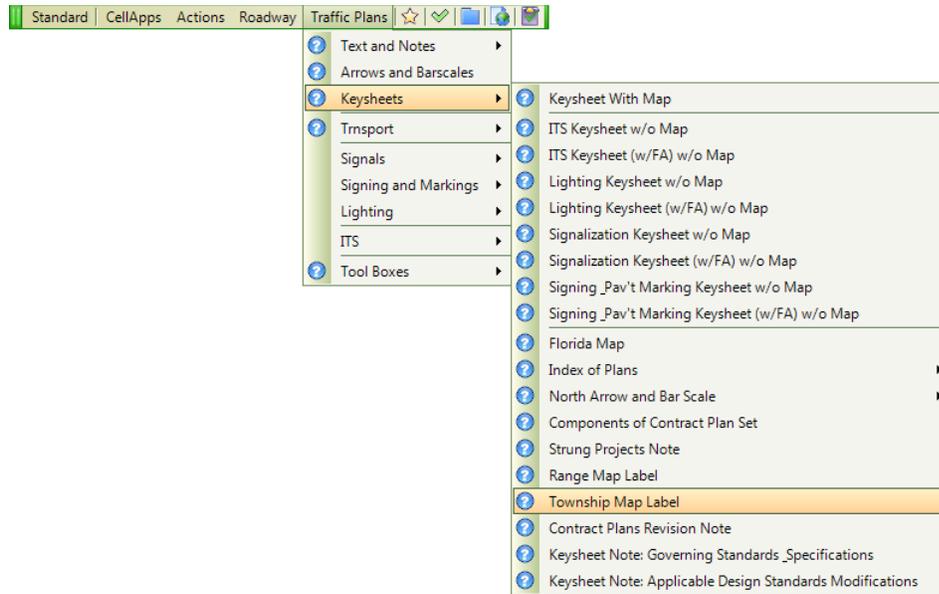


NOTE: THIS PROJECT TO BE LET TO CONTRACT WITH FINANCIAL PROJECT ID 000001-1-52-04

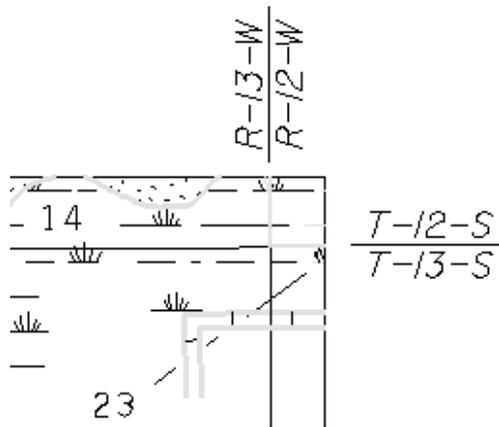
Note The FPID numbers in this note are part of a data field; do not drop the cell to edit the text.

TOWNSHIP AND RANGE MAP LABEL

The **Township and Range** are used to better describe the area of the project. On FDOT Menu there is a tool to help place these labels.

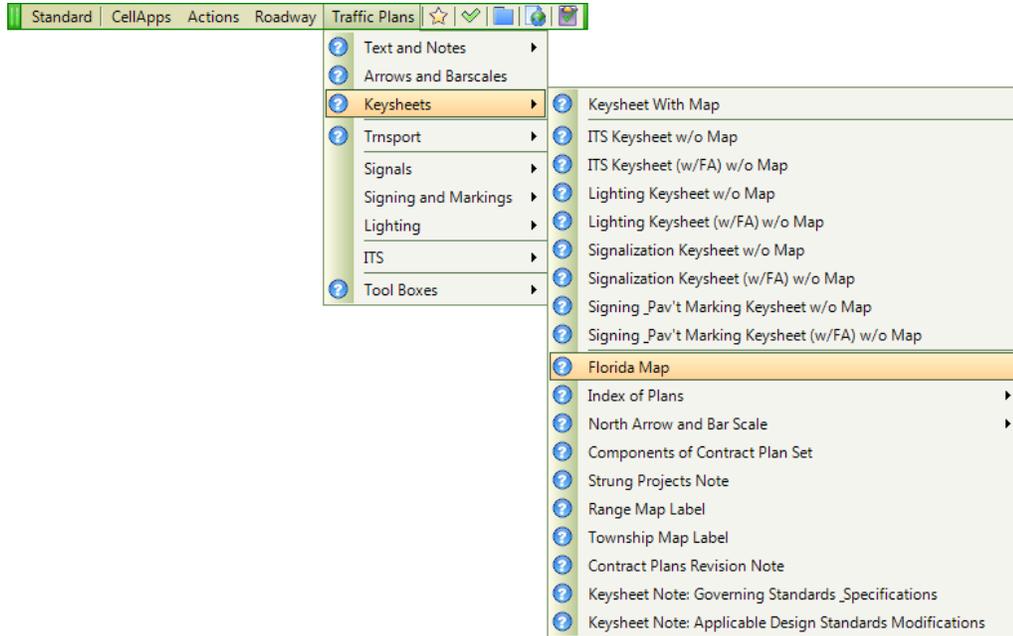


The Township and Range labels are cells with data fields in them, again do not drop the cell to edit the text. The cells are placed based on the plot scale. The figure below shows the Township and Range cells placed from FDOT Menu.

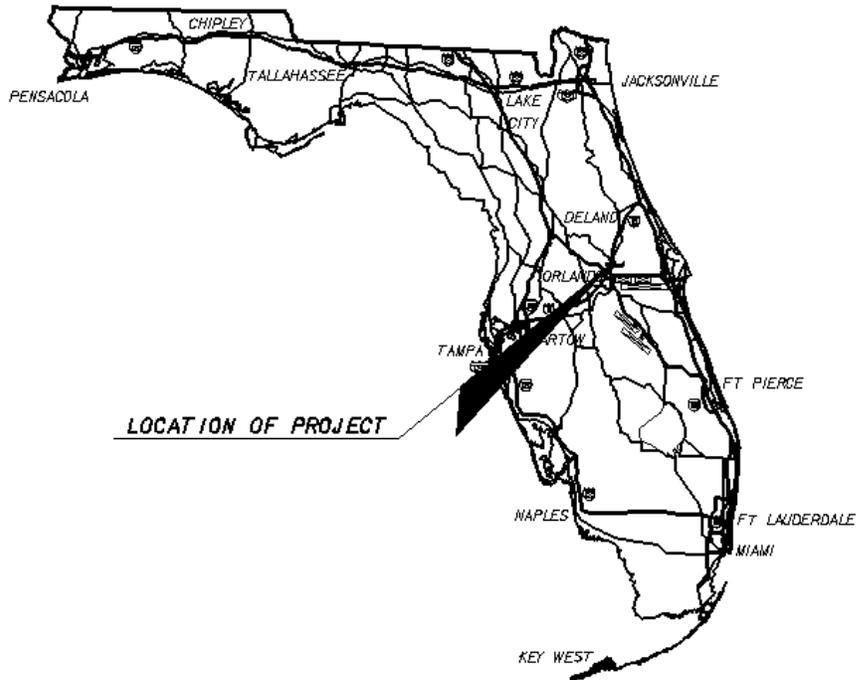


FLORIDA MAP

The Florida map is a cell that can be placed from FDOT Menu. The Florida Map cell is to be located in the upper right hand corner of the key sheet. This map is only needed on the key sheets without a location map. Refer to the *Plans Preparation Manual Volume II - Chapter 23.2* for more detail.

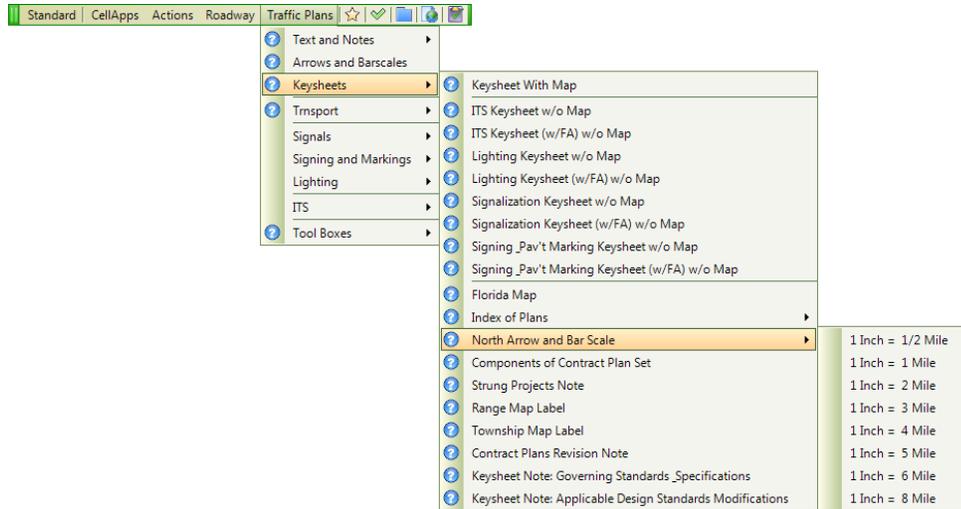


The insertion point is the upper right hand corner of the border and the cell scale is based on the plot scale. A leader line and text label pointing at the general location of the project are also required.



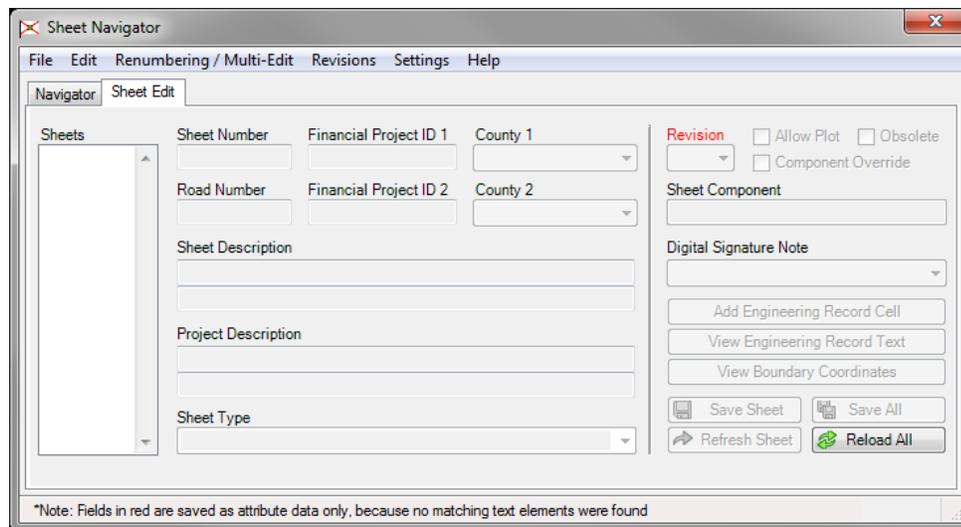
NORTH ARROW AND SCALE

The North Arrow and Bar Scale are automatically placed on key sheets with a location map using the Key Map Sheet Clip tool covered earlier in this section. If a key sheet is created by some other means or the North Arrow from the key sheet deleted, than this is the tool to use to place the scale and place the arrow.



SHEET NAVIGATOR

Sheet Navigator is a tool developed for FDOT to aid in the proper identification of plan sheets in a construction set of plans. Sheet Navigator will tag each sheet with information pertinent to the electronic delivery process. Sheet Navigator can also number and renumber sheets in a set of plans.

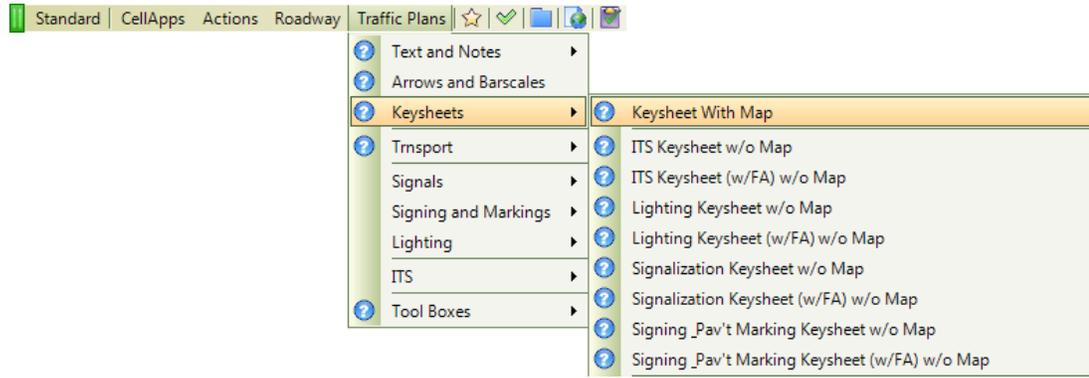


It is important to remember not to put sheet borders in design files that are not going to be part of the plan set. Sheet Navigator along with the electronic delivery indexer will look for all files that have sheet borders in them and will tag them as sheets. If the designer absolutely has to put a sheet border in a file that is not part of the plan set, then check the **Obsolete** option in this dialog so that indexer will not select the file as a sheet file. This tool will be covered in great detail later in this course guide when clipping plan sheets.

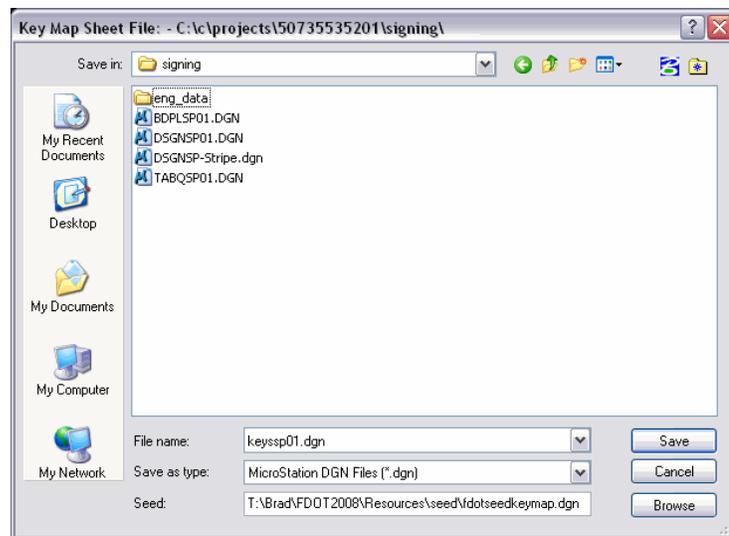
Exercise 2.1 Creating a Key Sheet with a Location Map

➤ Create the Key Sheet (Part 1)

1. Open **Dsgnsp01.dgn** in the *signing* folder.
2. From FDOT Menu, select **Traffic Plans > Keysheets > Keysheet With Map**. This opens the Key Map Sheet Clip dialog.

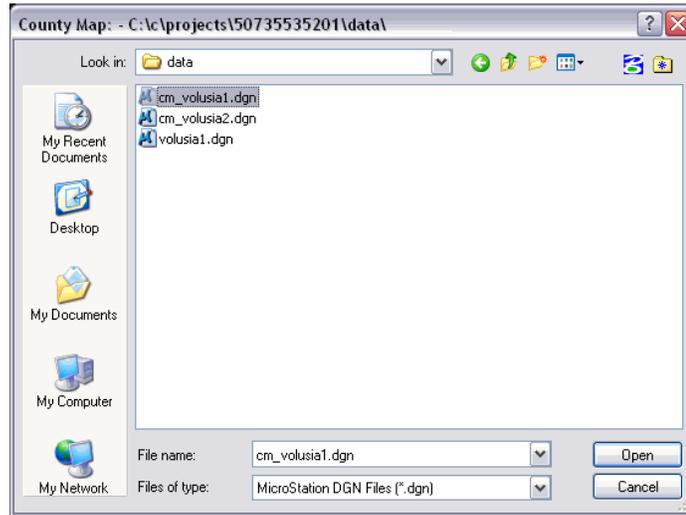


3. Set the top portion of the dialog as follows:
 - Scale – 1”=2miles
 - Key Map Type – Sign/Mark
 - Check to Use Federal Funding
4. Click the **New** button next to the *DGN File Name*. This will open the Key Map Sheet File dialog. This dialog allows the designer to enter a different file name and select a different folder.

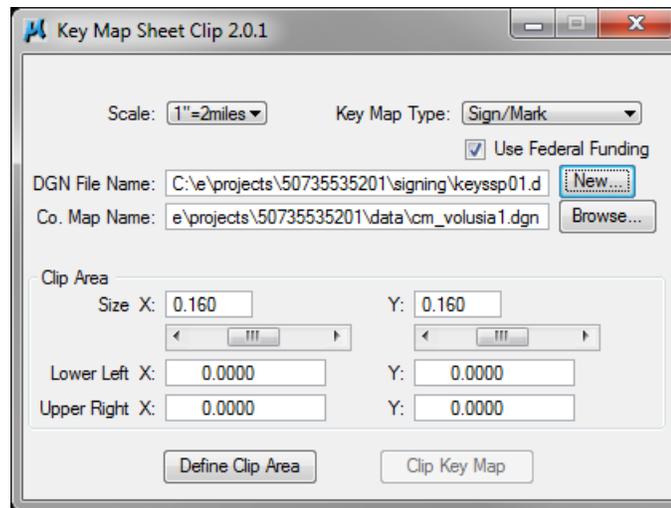


5. Click the **Save** button. This will create the Key Sheet File; however, it is an empty file.
6. Click the **Browse** button next to *Co. Map Name*. This is where the designer can select the full county map MicroStation file downloaded from the Survey and Mapping web site.
7. Navigate to the **data** folder in the project. The location that the county map is located in will vary from location to location. The data folder is not necessarily the folder the file will be found in at each individual's office.

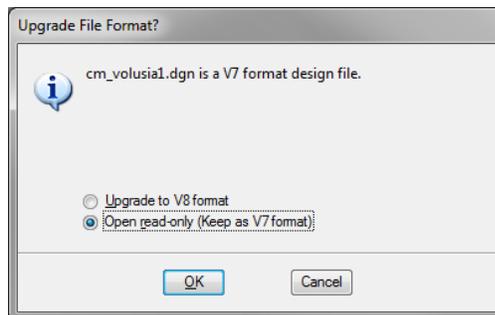
8. Select the **cm_volusia1.dgn** file and click **OK**. This will populate the *Co Map Name* field in the Key Map Sheet Clip dialog.



9. The figure below shows how the dialog should look up to this point. Notice all of the fields are populated.



10. Click the **Define Clip Area** button. This opens an Upgrade File Format dialog asking you to upgrade the file to V8 format or open read only and keep as V7. This happens because the county maps are still in V7 format. For this exercise, open the file as Read Only. In the future, these county maps will be converted to V8 format and will not receive this warning. (MicroStation v8, MicroStation V8 XM Edition and MicroStation V8i Edition use the same file format.)



11. Select **Open read-only (Keep as V7 format)** and click **OK**. This opens the county map design file to allow the *Defined Clip Area* to be positioned around the area to be clipped.
12. In MicroStation, **pan** to an area where the clip border will have maximum coverage. This area is not important for this exercise; it is a general location.

Note Use any of the MicroStation zoom or pan tools to move around the file.

13. Issue a **Data Point** to place the clip border.
14. If you don't like the clip area, you can click the **Define Clip Area** button to place a different clip boundary.
15. Click the **Clip Key Map** button. This will process for a moment and open the key sheet. Sheet Navigator will also open requiring user input.

Sheet Navigator (Part 2)

16. Continuing in *keyssp01.dgn*, the *plot scale* should be set automatically to **10560**. This is equal to a 1"=2mile scale.

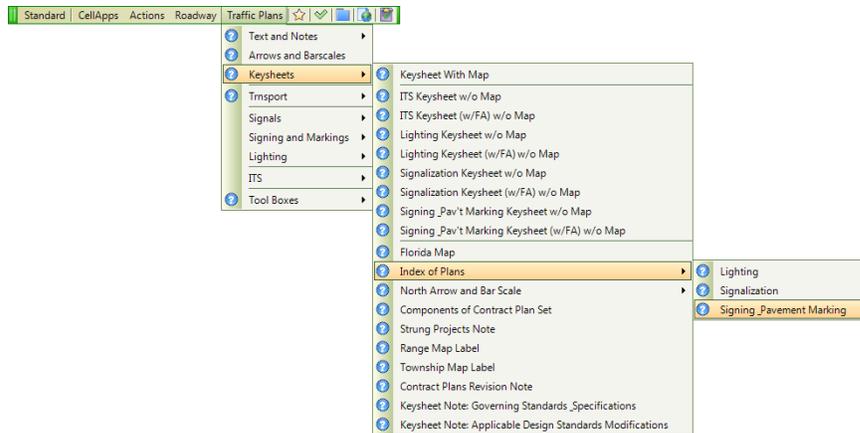
Note It is very important to set the plot scale before completing Sheet Navigator; the Digital Signature Note is dependent on the scale.

17. In Sheet Navigator, fill in the *Sheet Number* with **S-1**.
18. For the *Financial Project ID 1*, click inside the blank field. This will populate the field with the correct **Financial Project ID**.
19. For the *County* select the drop down arrow and navigate to **Volusia** County.
20. For the *Road Number* type in **415**. Do not include **SR** in the field; it is part of the sheet file.
21. For the *Digital Signature Note* select the drop down then select **Standard**.
22. Click the **Save Sheet** button. This will tag the file with all of the pertinent information for creating the electronic delivery index and populates the fields in the key sheet.

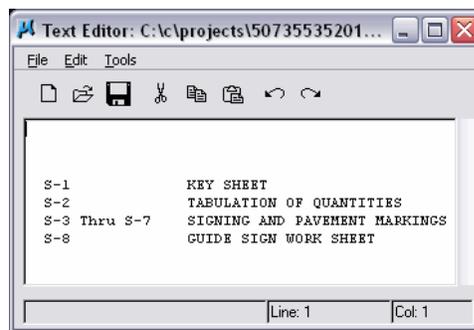
23. Click the **X** in the upper right hand corner to close Sheet Navigator.
24. Take a moment to review the key sheet.

➤ **Add Index of Sheets (Part 3)**

1. Continuing in *Keyssp01.dgn*, zoom in around the text “INDEX OF SIGNING AND PAVEMENT MARKING PLANS”. This is on the left hand side of the sheet.
2. From FDOT Menu select Traffic Plans > Keysheets > Index of Plans > Signing & Pavement Marking.



3. On the Alert dialog, click **OK**. This is a warning for organizations that use a document management system such as TIMS or ProjectWise.
4. The Signing & Pavement Markings Index of Plans (kspindex.txt) opens ready for placement.



5. If any modifications are made to the text, click the **Save File** icon or **File > Save**.
6. In the Text Editor, click **Tools > Import Text**.
7. Read the **Status Bar** in MicroStation, this provides information for the next step required.



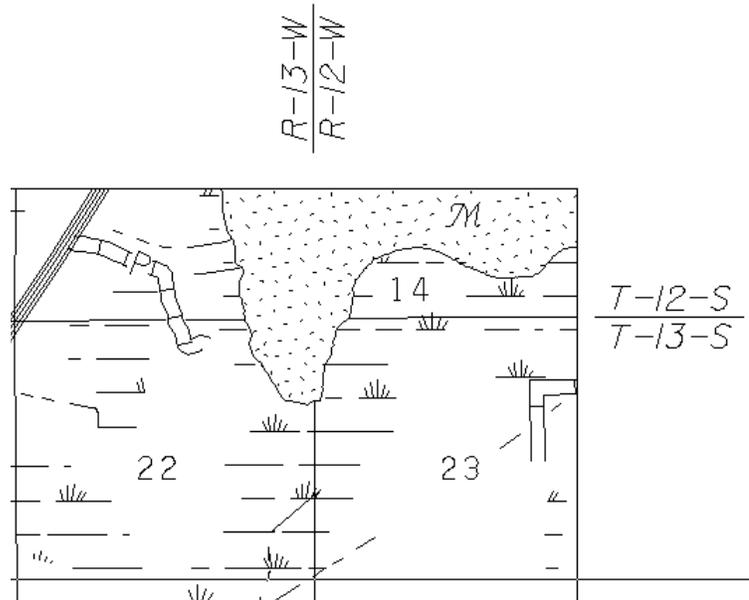
8. Snap to the origin of the text label **SHEET**. This will line up the text properly.



9. Issue a **Data Point** to place the text.
10. Close the Text Editor.

➤ **Add the Township and Range Labels (Part 4)**

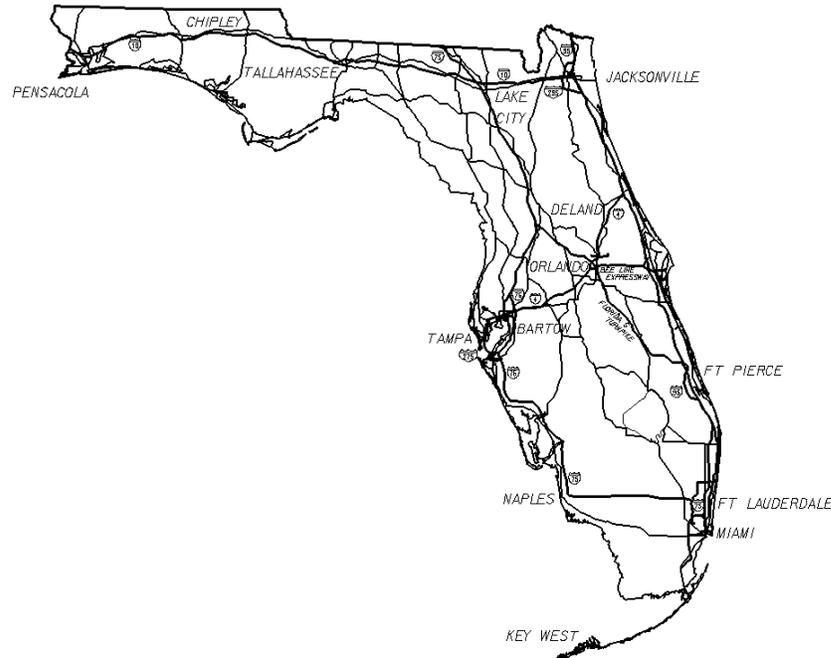
1. Continuing in *Keyssp01.dgn*, zoom in around location map in the center of the sheet.
2. From FDOT Menu, select **Traffic Plans > Keysheets > Range Map Label**. This attaches the Range cell at the active plot scale.
3. Locate where to place the label and issue a **Data Point** to place the Range cell. This cell contains data fields so it is not necessary to drop it, use the edit data filed tool to edit the label.
4. From FDOT Menu, select **Traffic Plans > Keysheets > Township Map Label**.
5. Locate where to place the label and issue a **Data Point** to place the Township label.
6. The figure below shows what the map with labels looks like. These labels come with the default text built into them and they will have to be changed based on the project.



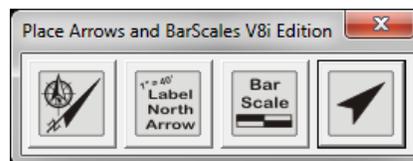
➤ **Placing Project Location Label (Part 5)**

In this exercise the student will draw a leader line with arrow pointing at the general location of the project on the Florida Map then the note “LOCATION OF PROJECT” will be added. This exercise requires the student to use some concepts covered earlier in the course.

1. Continuing in *Keyssp01.dgn*, zoom to the Florida Map area of the key sheet.



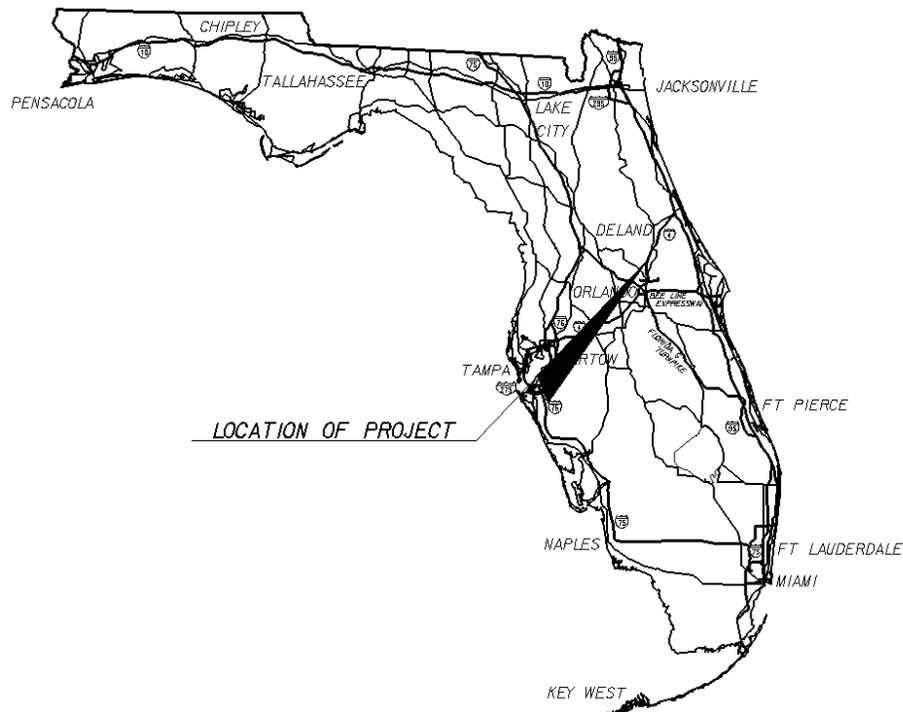
2. Set the MicroStation level to **LeaderLine_dp**. Use the drafting filter to make this easier.
3. Place a line starting from a point near the label DELAND on the map. The leader line will be a two-piece line or smart line.
4. Draw the second part of the leader line horizontal. The length needs to be long enough to hold the text “LOCATION OF PROJECT”. The length can be adjusted after the text is placed.
5. From FDOT Menu, select Traffic Plans > Arrows and Barscales.
6. Select the **Place Terminator Arrows** tool on the Place Arrows and BarScales V8i Edition toolbox. (Terminator icon.)



7. Set the *Terminator* to **ArrTermPrEnd** located in the *roadway.cel* library. This terminator is a personal preference, use whichever arrow meets the projects needs.



8. Select the **leader line** and accept the line to place the arrow. Select near the end of the line.
9. Set the MicroStation level to **TextLabel**.
10. On the MicroStation Task Navigator's Main Classic tool palette, select **Place Text**.
11. Set the *Text Style* to **General Text Label**.
12. Check on the *Height* and *Width* and set them to **739.20. (0.07 x 10560)**.
13. In the Text Editor, key-in **LOCATION OF PROJECT**.
14. Place the text above the leader line.
15. Adjust the length of the leader line if need be.
16. The figure below shows the label and leader line pointing at the project location.



➤ **Place County Number Next to County Name (Part 6)**

In this exercise, the student will use the **Fill in Single Enter_Data Field** tool to place the county number next to the county name. The county number is made up of five numbers, the first two numbers are the county and the next three numbers represent the section of the road being worked on. This county number can be found on the straight line diagrams.

1. Continuing in *Keysp01.dgn*, zoom to the top center of the key sheet next to the text “VOLUSIA COUNTY”.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

CONTRACT PLANS

FINANCIAL PROJECT ID 507355-3-52-01
(FEDERAL FUNDS)
VOLUSIA COUNTY ()
STATE ROAD NO. 415

2. From the MicroStation Task Navigator’s Main Classic tool palette, select the **Fill in Single Enter_Data Field** tool.
3. Issue a **Data Point** in between the parenthesis. A box will appear inside of the parenthesis; this indicates you got the data field.

VOLUSIA COUNTY ()

4. In the Text dialog type in the *County Number 79120*.
5. Issue a **Data Point** in the view. This will fill in the data field with the county number.
6. Right mouse click to **reset/cancel** the command.

VOLUSIA COUNTY (79120)

3 SUMMARY OF PAY ITEMS

OBJECTIVE

The objective of this chapter is to teach the designer how to create the Summary of Pay Items sheet.

INTRODUCTION

The summary of pay items sheet is generated from data outputted from TRNS*PORT PES. In TRNS*PORT, there are two different outputs produced for pay item summaries, the Project Summary of Pay Items and the Proposal Summary of Pay Items. Use the appropriate report, based on the project's phase.

For early phase reviews (up to Phase III, or until the proposal has been created), the designer must use the Project Summary of Pay Items Report (the proposal report is not available during this phase of a project). If a designer anticipates the simultaneous release of multiple projects, he/she should print each project's Summary of Pay Items for review. These reports are printed on standard 8.5" by 11" paper. A Project's Summary of Pay Items sheet does not have to be in CADD sheet format for phase review submittals.

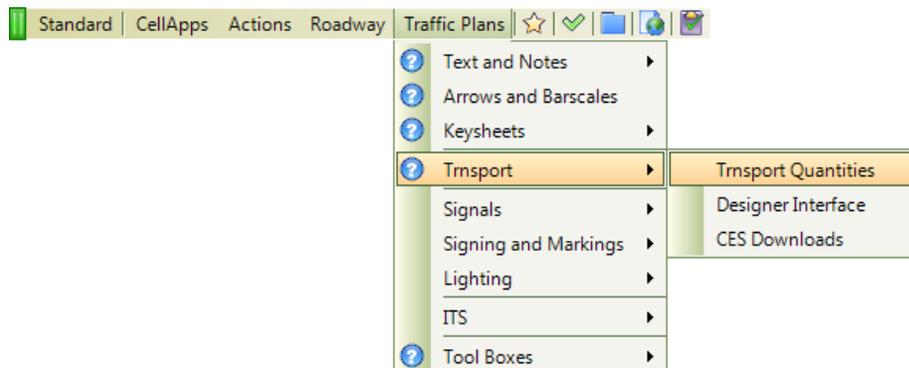
For later phase reviews (Phase III or after the proposal has been created), the designer uses the Proposal Summary of Pay Items Report. After the designer submits the report from the designer interface menu, the output is sent to the CADD FTP site, ftp.dot.state.fl.us/outgoing/ces/, normally within 5-10 minutes. The output is transferred to a MicroStation graphics design file and placed on a standard formatted plan sheet via a program available in the FDOT Engineering/CADD Systems Software. The quantities listed in the plans must be kept current with the quantities in TRNS*PORT. Any revisions to the quantities in TRNS*PORT must be transferred and updated in the graphics design file. The TRNS*PORT quantities are used to prepare the bid documents therefore the quantities listed in the plans must match.

When the Signing and Marking Plans are a component of the Roadway plans, the Summary of Pay Items Sheet is part of the Roadway plan set and is not included as part of the Signing and Marking Plans.

The CADD version of the Summary of Pay Items Sheet is created by a program, Trns*Port Quantities option that is available on the FDOT Menu Roadway Submenu or the Traffic Plans Submenu. This tool transfers the PES Output file, imports it into a design file, and places it on a plan sheet.

GENERAL INFORMATION

The Trns*Port Quantities tool gives the designer the option to place a sheet border into the design file or to only import the PES text file. Do not override the border and settings when updating quantities. The figure below shows how to access the tool.



The figure below shows the Trns*Port Quantities tool loaded from FDOT Menu. The dialog is broken into two parts; the top portion of the dialog defines the sheet information and search paths. The bottom part of the dialog defines the label for the title block on the sheet border.

Input File Name - The name of the PES data input file, for example: p723423.dat. It doesn't matter where the PES data file is located as long as it is accessible by the file list box. This file may also be an XML file, for example: 50735535201.XML. Click Browse to navigate to the location of the file in your project directory.

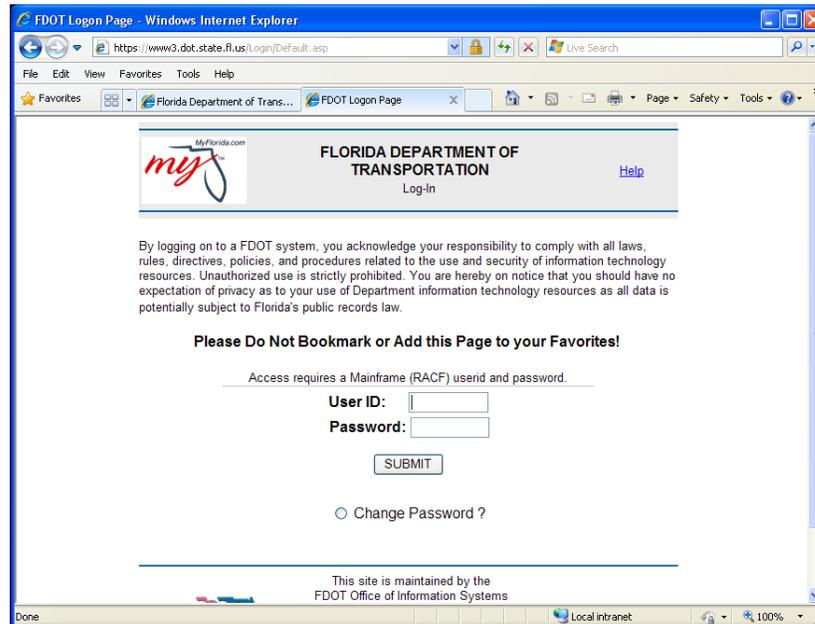
- **Label Sheet** - If these fields are filled in, the program places the *sheet number*, the *title*, and the *project number* in the appropriate fields on the sheet cell when it is placed.
- **Label Sheet Toggle** – will disable the Label Sheet portion of the FDOT TRNS*port tool. The labeling then can be completed by the Sheet Navigator application.

Exercise 3.1 Transferring PES Data to Plan Sheet

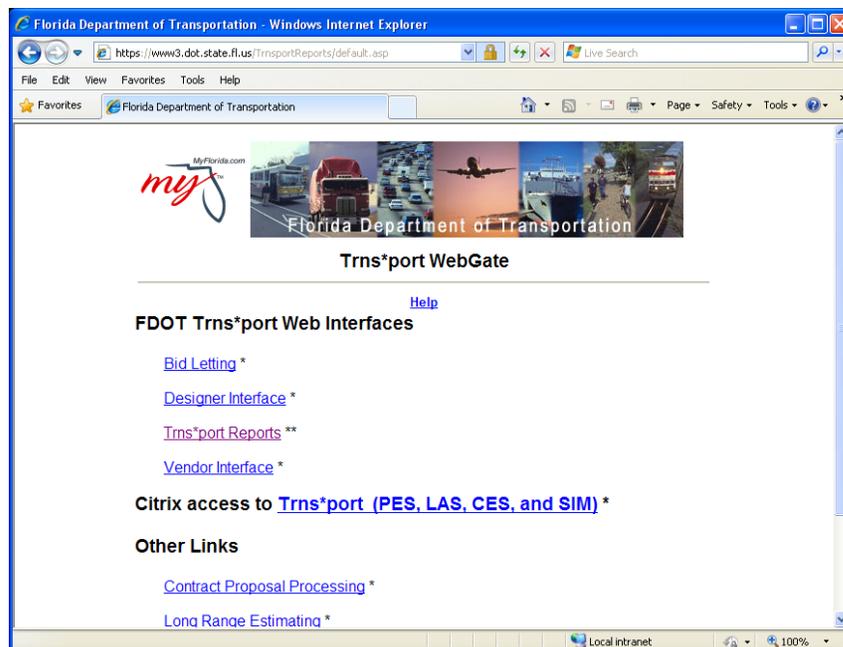
➤ Create Summary Of Pay Items Sheet (Part 1)

In this exercise, the instructor will cover the steps that would normally take place after the designer submits the report from the designer interface menu. These steps will take the designer through accessing the output data and setup for the use of the automated process called FDOT TRNS*port.

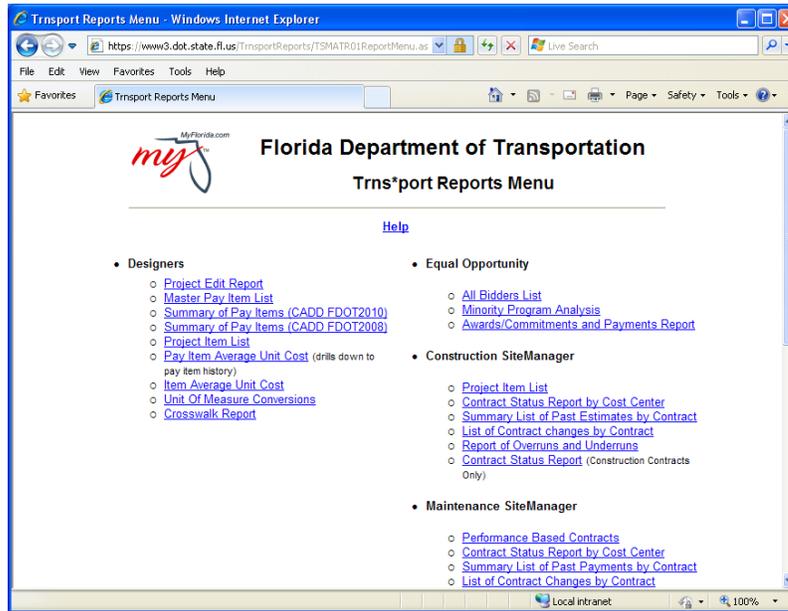
1. The designer would access the *Designer Interface* from the FDOT Menu option: **Traffic Plans > Trnsport > Designer Interface.**



2. The designer would *Login* by typing their **User ID** in the *User Id* field and typing in their **password** in the *Password* field and clicking the **Submit** button.
3. This will take them to the Trnsport WebGate page.

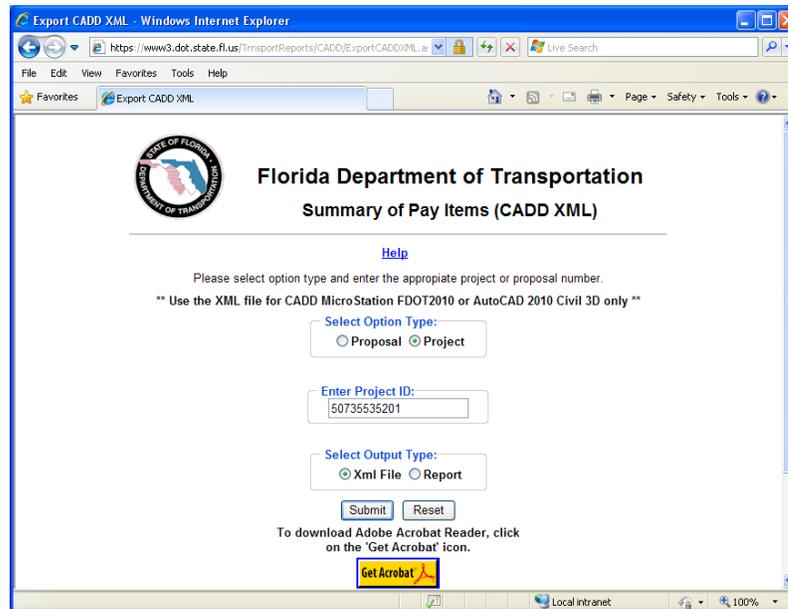


- Clicking on the **Trns*port Reports** link will take the designer to the Trns*port Report Menu.



Note Selecting the Summary of Pay Item (CADD FDOT2008) link will allow the designer to access the previously accepted file format for the Summary of Pay Item report.

- Clicking the **Summary of Pay Items (CADD FDOT2010)** link takes the designer to the Summary of Pay Items (CADD XML) page.

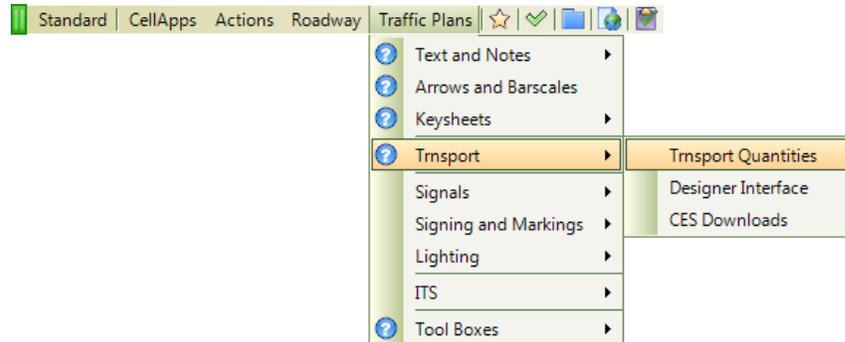


- The designer will select the radio button for either **Proposal** or **Project** from the *Select Option Type* section. For this project, the **Project** radio was selected.
- The designer will type in the project **Financial (Project ID)** number in the *Enter Project ID* section field. The *Project ID* is **50735535201**.
- The designer will select the radio button for either **XML File** or **Report** from the *Select Output Type* section. For this project, the **XML File** radio button was selected.
- The designer will then click the **Submit** button to submit the request for the output data.

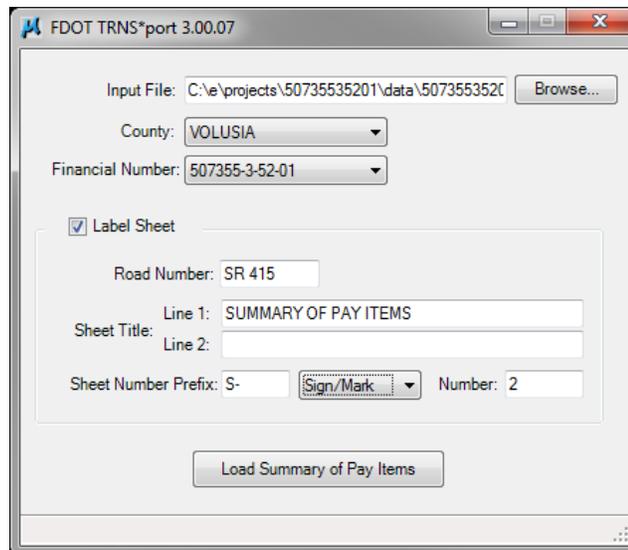
➤ **Create Summary of Pay Items Sheet (Part 2)**

In this exercise, the designer will create a new design file and import the Trns*port XML data at one time. FDOT delivers a tool to automate this process called FDOT TRNS*port. This tool can be started from any open MicroStation file.

1. From the Microstation Menu, select **File > Open** and select the **Cesssp01.dgn** file. This file was created earlier using the Create Edit application.
2. From FDOT Menu, select **Traffic Plans > Transport > Transport Quantities**. This opens the FDOT TRNS*port tool.



3. For the *Input File*, select **Browse**.



4. Browse to the *data* folder in the project and select the **50735535201_SP.xml** file.
5. Click **Open**. This fills in the *Input File name*, *County Name* and the *Financial Number* in the FDOT TRNS*port dialog.
6. Toggle on the **Label Sheet** check box.
7. Fill in the *Road Number* with **SR 415**.
8. For the *Sheet Title*, leave the **default** text.
9. Set the *Discipline* to **Sign/Mark**. This will set the *Sheet Number Prefix* to **S-**.
10. Set the **Number** to **2**. This will number the sheet **S-2**.
11. Click **Load Summary of Pay Items**. This will load the CES text file and place a border in our file.
12. Close the FDOT TRNS*port dialog.

Exercise 3.2 Update Sheet with Sheet Navigator

➤ **Add Digital Signature Note and update labels**

1. Continuing in *Cesssp01.dgn*, from the FDOT Menu, select **Actions > Label Sheets (Sheet Navigator)** launch Sheet Navigator.

2. Notice the fields that are populated, also notice that all of the fields are upper case. Sheet Navigator by default places all text as upper case that is why you left the text in the FDOT TRNS*PORT tool lower case (if the sheet title was lower case) this tool will fix it.
3. If the field for the *Financial Project ID 1* is **blank**, click inside the blank field. This will populate the *Project ID* with the correct number. (This field should already be filled out from the FDOT TRNS*port tool.)
4. Set the Digital Signature Note to **Standard**.
5. Click the **Save Sheet** button. This updates the sheet border.
6. Close Sheet Navigator.

4 PAVEMENT MARKING TOOLS

OBJECTIVE

The objectives of this chapter are as follows:

- How to Clip Sheets with GEOPAK
- How to use D&C Manager, the FDOT Menu and other GEOPAK tools to create proposed pavement marking features.

INTRODUCTION

In the Sheet Clipping section, the student will learn how to layout clip sheet borders and then clip sheets using GEOPAK. FDOT delivers a number of standard sheet clip standards to make the clipping process much easier. As with any process, it is important to communicate with the FDOT project manager to make sure that all district specific requirements are addressed i.e. Match Lines or no Match Lines, Grey Scaling existing features and so on.

The Pavement Marking Tools section introduces several applications that help to create a Pavement Marking set of plans.

As explained in Chapter One of this course material, the student will create a new file, *dsgnsp01.dgn*, in which the Signing & Pavement Marking proposed design will be drawn. In addition, the student must reference the proposed roadway design files, *Algnrd01.dgn*, *dsgnrd01.dgn*, existing topographic file *topord01.dgn*, existing utilities *utexrd01.dgn*, existing drainage *drexrd01.dgn*, existing and proposed right-of-way files, and any additional file containing the existing inventory of Signs along the project.

The next step is to draw/place the Pavement Markings in accordance with FDOT CADD Standards. The Traffic Plans Menu provides tools with the active settings (Level and Symbology) used to create the markings. There are additional tools available to help in the efficient placement of directional arrows and message cells: the Pavement Marking Toolboxes, GEOPAK's Pavement Marking program and the GEOPAK Draw Cell group by Feature tool.

Refer to chapter 23 in the *Plans Preparation Manual*, Volume II, for more detail on developing the Signing and Marking set of plans. Refer to the Design Standards indexes for design criteria.

The Labeling of the plan sheet items has been made easier with the use of GEOPAK's Plan Labeler, which allows the designer to create styles for the placement of repetitive labels.

To assure designers are adhering to the *Traffic Plans CADD Standards*, the FDOT Menu provides an easy way to check and fix symbology to match the CADD standards.

After the proposed Pavement Markings have been drawn, designers are ready to clip the sheets. To aid in this task, there are two options available, the FDOT Menu Clipping program, commonly known as the FDOT Sheet Clipping (RFCLIP), and the GEOPAK's Sheet Clipping program.

Finally, designers must compute the pay items used and populate the Tabulation of Quantities Sheet. GEOPAK's Design and Computation Manager (D&C Manager) can count and report every "each" and "linear" item. D&C Manager generates a report that can be polished in Microsoft Excel, which can then be imported into the MicroStation Tabulation of Quantities design file.

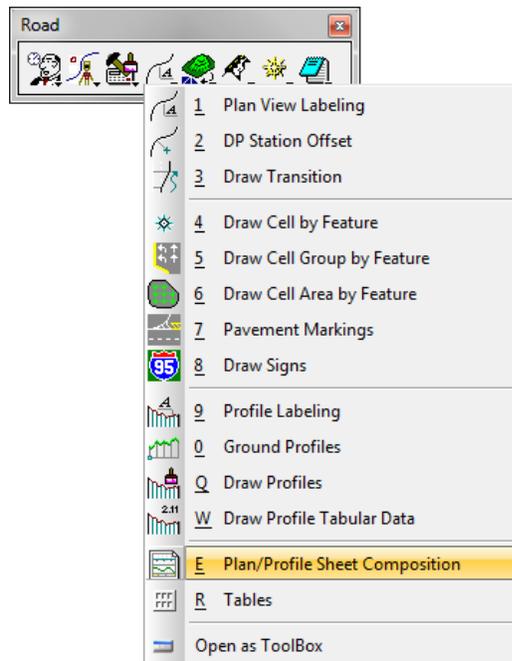
SHEET LAYOUT AND CLIPPING WITH GEOPAK

In this section, the student will learn how to layout clip sheet borders and then clip sheets using GEOPAK. FDOT delivers a number of standard sheet clip standards to make the clipping process much easier. As with any process, it is important to communicate with the FDOT Project Manager to make sure that all district specific requirements are addressed i.e. Match Lines or no Match Lines, Grey Scaling existing features and so on.

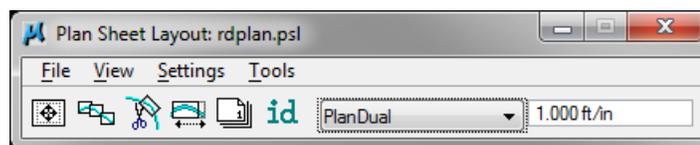
The most basic description on what sheet clipping is, to get the information that is in the design file onto a plan sheet. There are several ways to accomplish this with GEOAPK being the most automated. There are advantages to using GEOPAK to clip sheets, consistency, all of the sheets will look the same with the same reference files and level structure of those reference files will be consistent. Re-clipping, if the alignment were to change and the sheets needed to be re-clipped it is very easy to do this with GEOPAK.

TO START THE SHEET LAYOUT TOOL

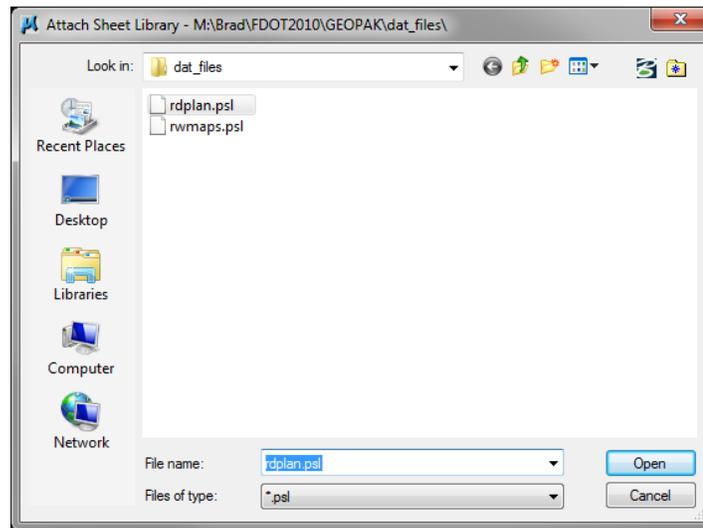
From the MicroStation menu, select **Applications > GEOPAK Road > Plans Preparation > Plan/Profile Sheet Composition** or from the Road tools palette click the **Plan/Profile Sheet Composition** button.



Once activated the Plan Sheet Layout dialog opens as shown below.



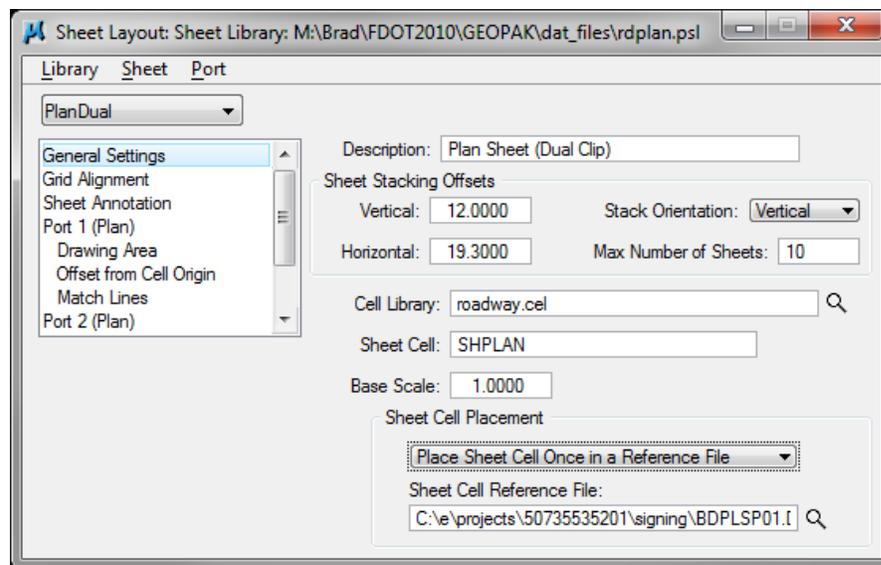
The Plan Sheet Layout tool uses an attached library that controls what sheet types are available. The Plan Sheet Library or “*ps*” file is located in the *FDOT2010\geopak\dat_files* folder.



FDOT delivers a group of these files, ready to use, that cover the most common of the sheet configurations used. By default, the **rdplan.psl** library is attached. This is shown in the header of the dialog box to see which library is currently attached.

SHEET LIBRARY

The sheet library is accessed from the Plan Sheet Layout dialog from the **File** pull down **Sheet Library**. Selecting **Edit** opens the Sheet Layout dialog as shown below.

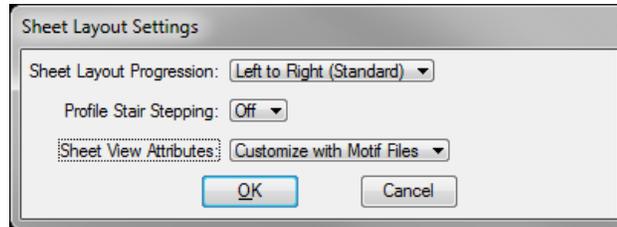


The most important parameters in Sheet Layout: Sheet Library are the following:

- **Cell Library** – Make sure the correct cell library is attached.
- **Sheet Cell** – This is the name of the cell representing the border.
- **Sheet Cell Placement** – Select how the Sheet Cell, Border, is to be placed. Either Place the sheet cell in each file or place it once in a border reference file.

SHEET LAYOUT SETTINGS

The Sheet Layout Settings dialog can be accessed from the settings pull down on the Plan Sheet Layout dialog. This dialog instructs the sheet clipping to cut sheets a certain way. For example: is the clipping to go from Left to Right, is there a lot of elevation relief on the project, if so than set the stair stepping ON and how do is the sheet view attributes set up, use the current design file or a Motif file.

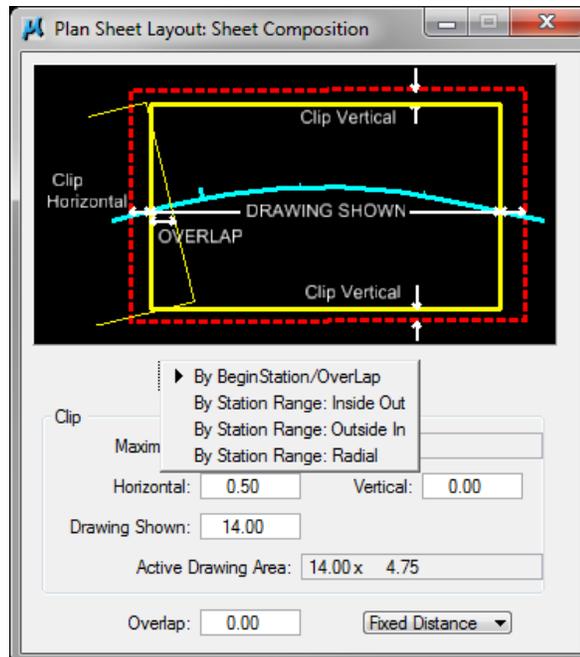


A Motif file is nothing more than a MicroStation design file with reference files attached and level symbology set up the way the plan sheets are to look when clipped. FDOT has established a standard design file name *MTPLSP01.dgn*. Once the Motif file is created, attach the appropriate reference files and turn on or off the levels to make the file look the way the plan sheets are to look for the project. This is, also, where the designer can set up any level symbology that is required.

SHEET COMPOSITION

Sheet Composition controls how the limits of the sheets are handled. The options are:

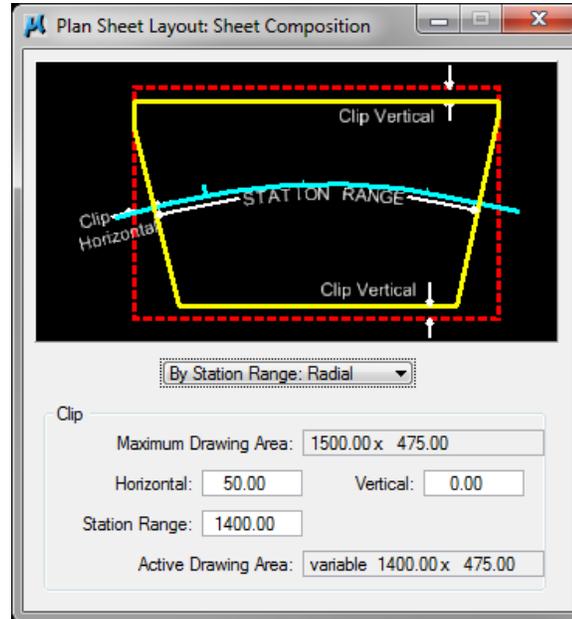
1. By Begin Station/Overlap
2. By Station Range: Inside Out
3. By Station Range: Outside In
4. By Station Range: Radial



The *Station Range* is a factor of the Clipping Scale. Look in the *PPM, Volume 2, chapter 10*, for the values to be used in the *Station Range*. These values are filled in based on the scale entered, but may need to be adjusted to fix areas in sharp curves where portions of the design files are missed.

These four options are covered in great detail in the *Basic GEOPAK for Roadway Designers* training guide. In this training course, the class will use the option *By Station Range Radial*.

By Station Range Radial – With this option the **Horizontal** distance is used to trim the Station Range. The Maximum Drawing Area, Horizontal and Station Range are inter-related. The resultant clipping shapes are not rectangular; instead, the Vertical edges are oriented perpendicular to the alignment, which results in rectangular shapes along tangent sections and more of a trapezoidal shape along curved sections. Adjusting the Station Range will alleviate the pie shaped wedges along curves.



The critical value in this option is the *Station Range*. This should be set based on the standards delivered in the PPM. For example, for 100 scale sheets the Station Range should be set to 1400. This is the maximum value and may be decreased to handle alignments with unique conditions like sharp curves or intersections.

Horizontal is used for the clipping limits at the ends of the sheet. If you adjust the *Horizontal* distance the *Station Range* will dynamically change by the Horizontal distance times 2.

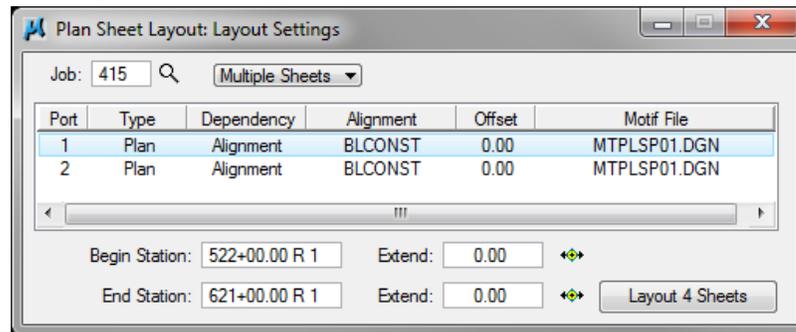
Vertical sets an additional clip limit from the defined sheet width. In the figure above, the red dashed rectangle represents the *Maximum Drawing Area*. Entering a value other than zero will reduce the clip limit by this amount.

The sheet layout process is a multiple step process because of the items mentioned earlier, curves and intersections. There are three ways to approach this:

1. Layout all clip sheets from begin project to end project then adjust the sheets at the intersections and around curves to clean up the pie shaped wedges.
2. Layout single sheets at all of the intersections then run the remaining clip sheets up to the intersections and after the intersections. It is good practice to try to center intersections on the plan sheets if possible.
3. Get the clipped sheets from the Roadway group and rename them to signing and pavement marking sheets. As long as the scales are the same this option works fine.

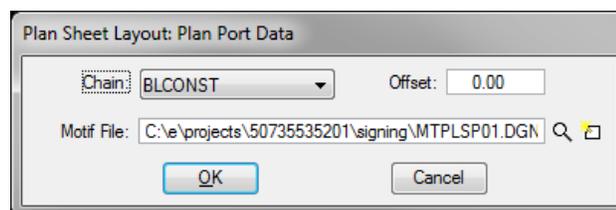
SHEET LAYOUT

The Sheet Layout dialog is used to define the Ports and alignments and station range to run the layout along.



- **Job** – This is the gpk. If Project Manager is used, this will be filled in automatically. If Project Manager is not used the job will have to be selected using the magnifying glass icon.
- **Multiple Sheets** – Used for clipping more than one sheet.
- **Single Sheet** – Used for clipping only one sheet.
- **Port** – In a Plan/Profile scenario Port 1 is the Plan view and Port 2 is the Profile. For Plans that are Double Stacked with two plan views, both Port 1 and 2 are Plan.
- **Type** – This is either the Plan or Profile area. In a scenario like Signing and Pavement Markings there will only be a Plan port.
- **Dependency** – This instructs the Port to either be dependent on an Alignment or another port.
- **Alignment** – This is a GEOPAK chain that the sheets are clipped along.
- **Offset** – This allows the designer to set the clip borders at an offset from the Alignment.
- **Motif File** – This shows whether a motif file is used and if so what the name is.

Double Clicking on one of the **Plan** ports in the **Layout Settings** tool opens the **Plan Port Data** dialog as seen below. This is where modifications are made to set up the **Layout Settings** dialog.

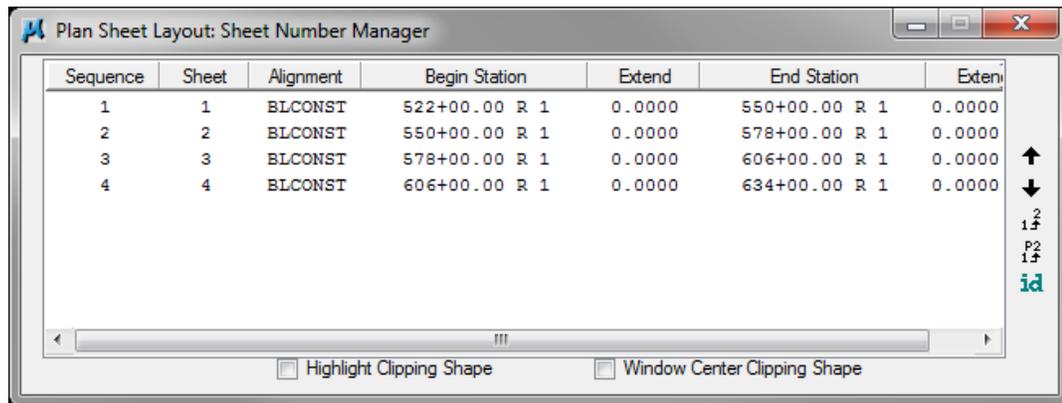


- **Begin and End Station** – This defines where the first sheet starts and the last sheet ends. Either key-in the values or use the Select icons to dynamically select the stations. It is highly recommended to select an even station or snap to an even tick mark for the begin station so that the sheets will all fall on even stations.
- **Extend** – To start the first sheet at a defined distance prior to the Begin Station. This is good for leaving space for General Notes or additional design before the Begin Station. The same applies for the End Station.
- **Layout Sheets** – This button will show the number of sheets needed based on the Begin and End Stations. Clicking this button will draw the clip borders into the active design file.

SHEET NUMBER MANAGER

Sheet Number Manager provides a method for applying sheet and sequence numbers to the clip borders. The main window contains a list of the sheet borders contained in the file. In the case of dual clip borders for a single sheet, i.e. Plan/Profile sheets, the borders are grouped together and only listed once in this window. Select a line in the window, click the up and down arrow buttons to move the Sheet in the sequence order. The next two buttons allow for the manual editing of sequence and sheet numbers. The *ID* button is used to graphically select a sheet to modify. Select the *Highlight Clipping Shape* check box or *Window Center Clipping Shape* if applicable.

Keep in mind that this is the MicroStation design file name for the sheet not the actual sheet number that is placed in the title block. Knowing this, you should always run Sheet Number Manager and add a Prefix of '0' to the sheets so when the sheets are clipped the file names will be, as an example: *Plansp01.dgn* not *Plansp1.dgn*. This will make organizing and managing the files in explorer much easier.



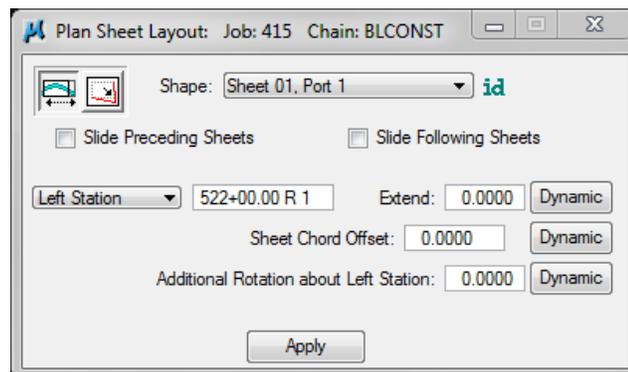
MODIFY SHEETS

This allows the clip sheet borders to be adjusted prior to actually clipping the sheets. The Sheet Modify command opens Plan Sheet Layout: Modify, which operates in two modes, *Slide Sheets* or *Modify Drawing Area*, represented by the two buttons in the upper left corner. The following figure shows the *Slide Sheets* mode.

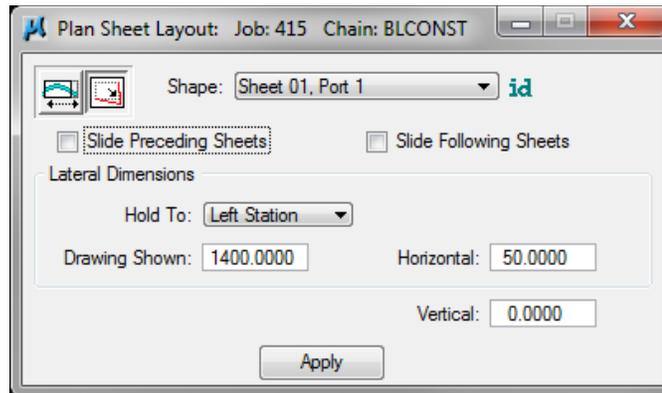
Slide Sheets is used to move the clip borders along the alignment. Type a specific station in the box and select the *Left Station*, *Center Station*, or *Right Station* to apply the new station. *Left Station*, *Center Station*, or *Right Station* refers to the portion of the clip border that is located at that station.

Another option is to change the *Sheet Chord Offset* of the border to allow the movement of the sheet parallel to the alignment in either direction for a given distance. *Additional Rotation* can also be applied. This angle is measured from the left station and is in reference to the alignment.

Perform any of these three actions dynamically with the *Dynamic* buttons to the right of the respective function.



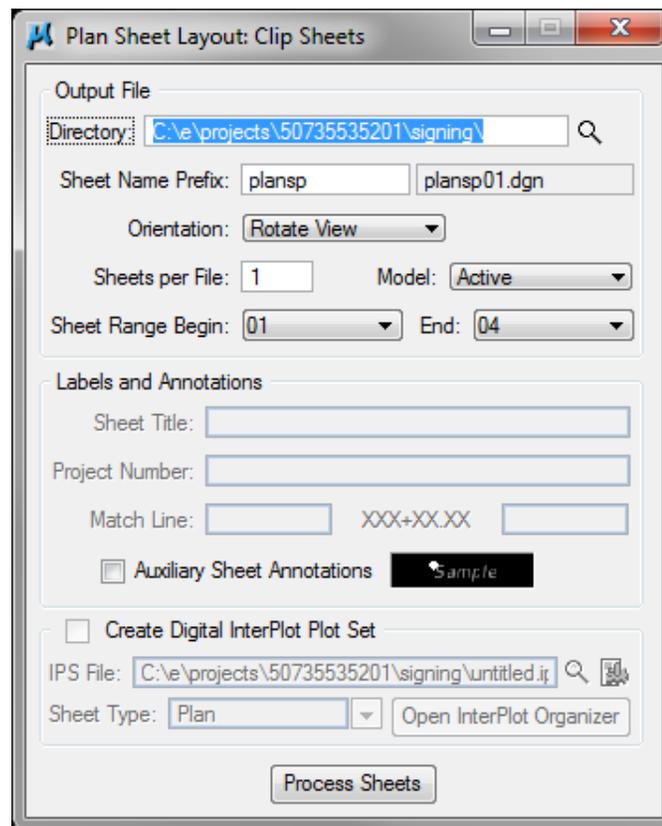
Modify Drawing Area changes the composition of the borders. Type the appropriate dimensions in the *Drawing Shown*, *Horizontal*, and *Vertical* boxes, and then select *Left Station*, *Center Station*, or *Right Station* from the *Hold To* list.



In either mode, select which sheet is being modified from the *Shape* list, or click the *Identify* button to do so graphically. Select the *Slide Preceding Sheets* check box and/or the *Slide Following Sheets* check box to indicate if the sheets preceding and following the modified sheet are to slide to compensate for the changes made to the current sheet border. To make any changes effective, click the *Apply* button.

CLIP SHEETS

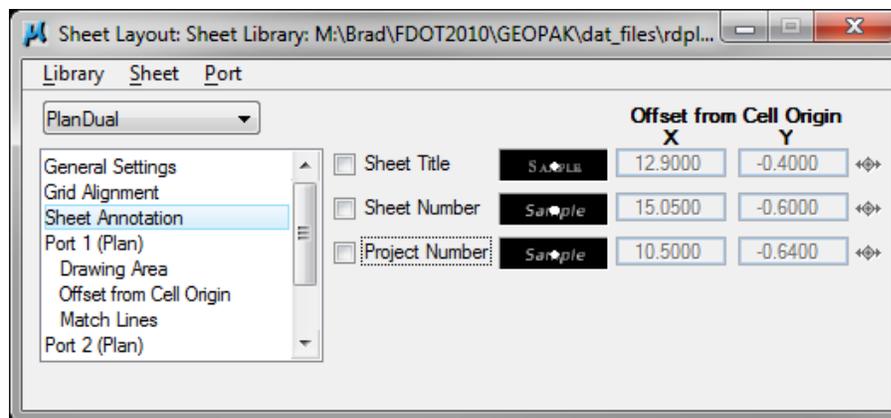
This actually clips the plan sheets based on all of the previous settings.



- The **Output File** section allows the designer to specify where sheet files are created and what to name them.
- **Directory** – Select the path where the new sheet files are to be placed.

- **Sheet Name Prefix** – Type the name of the sheet file. Type only the first part of the file name; the software supplies a numerical suffix that corresponds with the sheet number. For example, if PLANSP is entered as the prefix, as the sheets are clipped the files are named PLANSP01.DGN, PLANSP02.DGN, PLANSP03.DGN, etc.
- **Rotate Reference** or **Rotate View** – Rotate Reference is used when stacking more than one sheet per file and Rotate View is used when only one sheet per file is used.
- **Sheets per File** – Type the number of sheets to be created in each design file.
- **Sheet Range Begin and End** - Select the range of sheets to be created from the clip borders.
- **Labels and Annotations** allows the designer to enter a **Sheet Title** and **Project Number**, as well as **Match Line** text when applicable. This information cannot be entered if the annotation information is not set up in the Sheet Library. Typically, this section is not used to label the sheets.

Note If this section is grayed out that is because the Sheet Annotation settings in the attached library are clear as seen in the figure below.

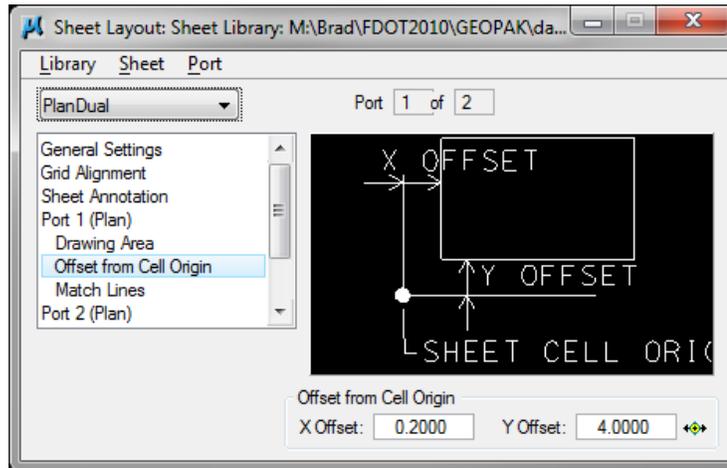


- **Process Sheets** – This button when pressed starts the sheet clipping process.

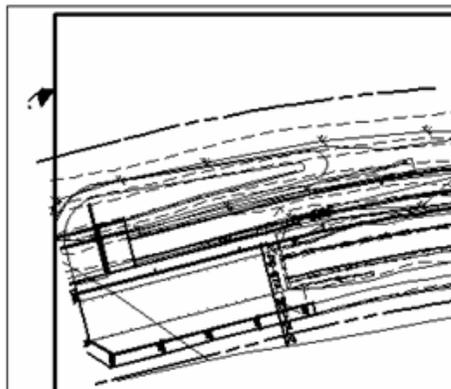
SHEET LIBRARY ITEMS

There are some settings in the sheet library that may need to be adjusted to make the plan sheets look correct. For example, if after the sheets are clipped and the offset for the left edge of the border to the clip limit is too small this can be adjusted in the library and the sheets re-cut.

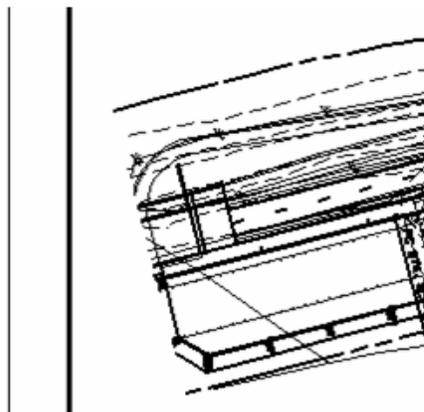
The figure below shows the Offset from Cell Origin as 0.200. This is the default as delivered from FDOT. When the sheets are clipped, the space from the left edge of the border to where the clip sheet starts is too small.



The image below shows the top panel with the Offset from cell origin set at 0.200. Changing this value to 0.800 will shift the clip area over to a much better looking condition.



The figure below shows the results after changing the Offset from Cell Origin.



Exercise 4.1 Sheet Clipping

➤ Sheet Clipping (Part 1)

In this exercise, the student will create the Clip Sheet file and Plan Sheet Border.

✓ Set up Sheet Clip design file

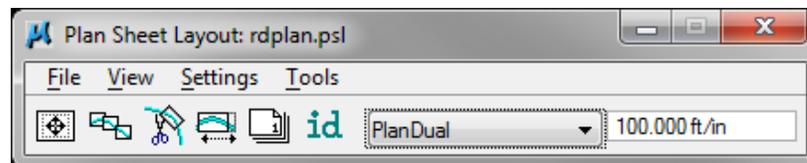
1. From the FDOT Menu, select Traffic Plans > Signing and Markings > Create/Edit File to load the Create Edit Application.
2. Using what you have learned in this course guide create the *Clip Borders* file. Create the file in the *Signing* folder using the *Signing & Pavement Marking Files* Group. Refer to chapter 1 in this training guide for assistance if needed.

➤ Open Border Sheet design file

3. Open the *Border Sheet*, **Bdplsp01.dgn** created in chapter 1.
4. Set the *Plot Scale* to **1.00**. No need to place a sheet border at this time, the sheet clipping process will place the border sheet cell.
5. Open the new file **Clipsp01.dgn**. Plot Scale in this file is not critical because it is only for laying out clip borders, no text or line work goes in this file; however, you may set it.
6. Reference in the **Algnrd01.dgn** and **Dsgnrd01.dgn** from the *Roadway* folder. This is so you can see the project limits as the sheets are being laid out.
7. Zoom to a **Fit View**.

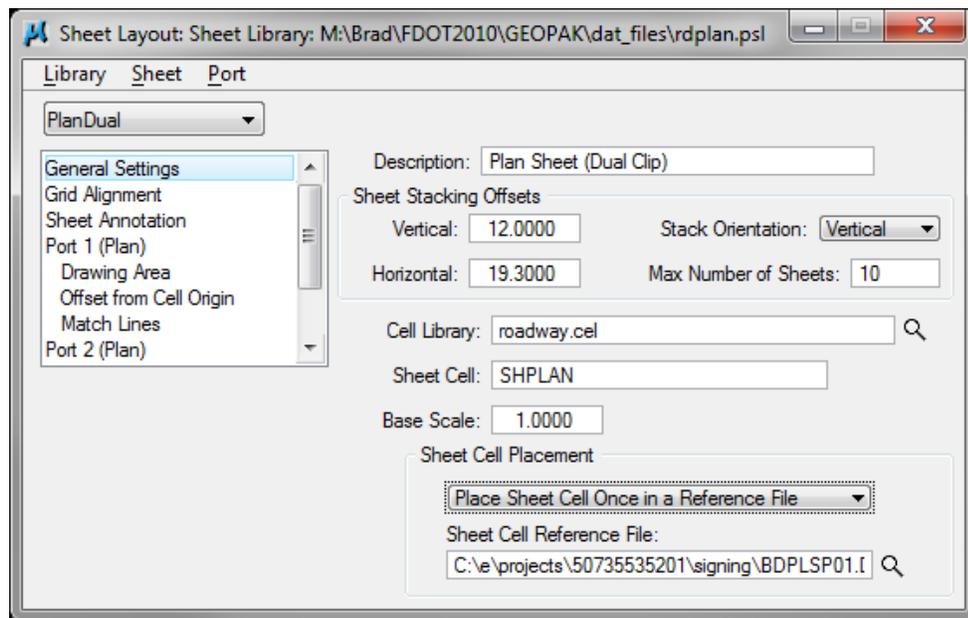
✓ Start Plan Sheet Layout Tool

8. Continuing in *Clipsp01.dgn*, select Plan/Profile Sheet Composition from the GEOPAK Road tools palette or from the Applications > GEOPAK Road > Plans Preparation > Plan/Profile Sheet Composition pull down.
9. Select the **SR415.prj** file located in the *Roadway* folder. This opens Plan Sheet Layout Tool.
10. In Plan Sheet Layout, select the *Sheet Ttype*: **PlanDual**. This is the drop down menu on the right hand side of the dialog.
11. Set the *Scale* to **100.00**. This is next to the sheet type.

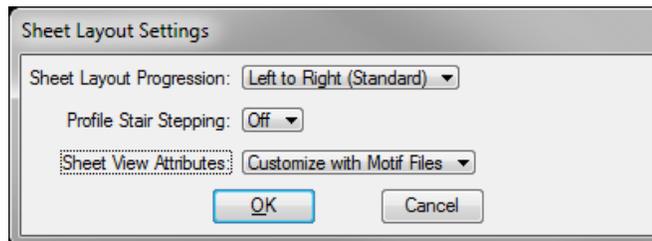


➤ **Sheet Clipping (Part 2)**✓ Sheet settings

1. In Plan Sheet Layout select **File > Sheet Library > Edit**. This opens Sheet Library.



2. In the *Sheet Cell Placement* portion of the dialog, select **Place Sheet Cell Once in a Reference File**. Use the magnifying glass icon to browse to the border sheet created earlier.
3. Close Sheet Library by clicking on the **X** in the upper right hand corner.
4. Click **Yes** to save the changes to the Sheet Library.
5. In Plan Sheet Layout, select **Settings > Sheet Layout**. This opens Sheet Layout Settings.

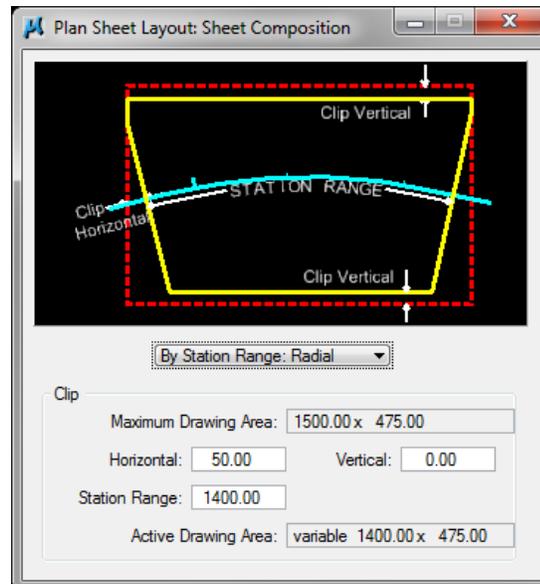


6. Set *Sheet Layout Progression* to **Left to Right (Standard)**.
7. Set Profile Stair Stepping to **Off**.
8. Set *Sheet View Attributes* to **Customize with Motif Files**.
9. Click **OK**.

➤ **Sheet Clipping (Part 3)**

✓ Sheet Composition

1. Open Sheet Composition . This can also be loaded from the **Tools** menu.



2. Set the *Method* to By Station Range: Radial.
3. Set the *Station Range* to **1400.00**. This is the maximum length allowed for a 100 scale sheet as per PPM Vol. II Chapter 10. This will automatically set the Horizontal clipping to 50.00.
4. Close Sheet Composition.

✓ Set up Sheet Clip Motif file

1. From the FDOT Menu, select **Traffic Plans > Signing and Markings > Create/Edit File** to load the Create Edit application.
2. Using what has been learned in this course guide, create the **Motif File for Plan Sheets** file. Create the file in the *Signing* folder using the *Signing & Pavement Marking Files* Group. Refer to chapter 1 in this training guide for assistance if needed.
3. Open the **Mtplsp01.dgn** by clicking the **Open** button on the bottom of the Create Edit dialog.
4. Open the **References** dialog box. This dialog is loaded by clicking on the **References** icon on the Primary Tool Bar.



5. In the **References** dialog, select **Tools > Attach**. This opens the Attach Reference dialog.

Note The attachment method should be set to Interactive by default. All files created in this training course are true V8 files so it is not required to use Coincident World as the attachment method.

6. Select the **Clisp01.dgn** file and the **Dsgnsp01.dgn** by selecting both files and clicking **Open**.

Note The Reference Attachment Settings dialog will attach both files 1 at a time. Setup the first files settings and click OK. The next file is now available for any settings changed necessary.

7. In the Reference Attachment Settings dialog set the *Model* to **Default**.
8. Click the **OK** button. This attaches the reference file.

9. Repeat Steps 12 and 13 for the second reference file.
10. In the References dialog, select **Tools > Attach**. This opens the Attach Reference dialog.
11. Navigate to the *Roadway* folder.
12. Select the **Algnrd01.dgn** file in the *roadway* folder. This is the alignment file that contains the Baseline of Construction.

Note The attachment method should be set to Interactive by default. All files created in this training course are true V8 files so it is not required to use Coincident World as the attachment method.

13. Click **Open**. This opens the Reference Attachment Settings dialog box.
14. In the Reference Attachment Settings dialog set the *Model* to **Default**.
15. Click the **OK** button. This attaches the reference file.
16. In the References dialog, select **Tools > Attach**. This opens the Attach Reference dialog.

Note The attachment method should be set to Interactive by default. All files created in this training course are true V8 files so it is not required to use Coincident World as the attachment method.

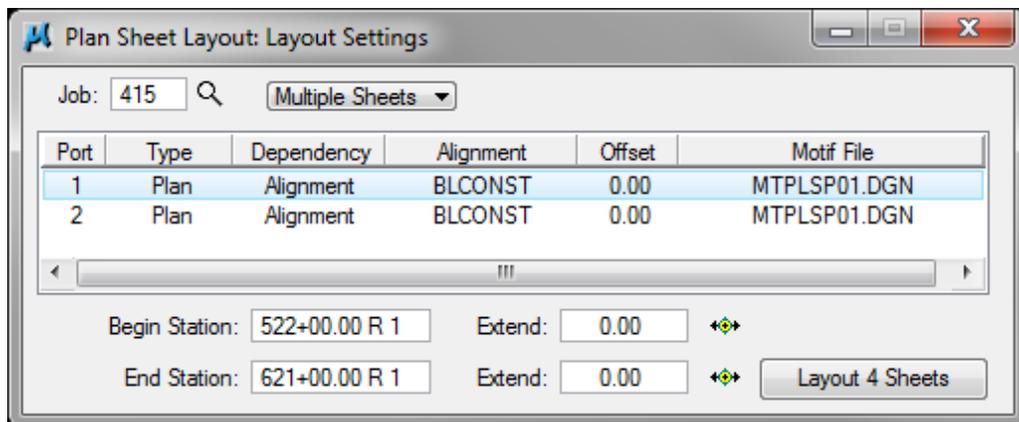
17. Navigate to the *Roadway* folder.
18. Select the **Algnrd01.dgn** file and the **Dsgnrd01.dgn** by selecting both files and clicking **Open**.

Note The Reference Attachment Settings dialog will attach both files 1 at a time. Setup the first files settings and click OK. The next file is now available for any settings changed necessary.

19. In the Reference Attachment Settings dialog set the *Model* to **BL 100** for the **Algnrd01.dgn** file and set the *Model* to **Default** for the **Dsgnrd01.dgn** file.
20. Click the **OK** button. This attaches the reference file.
21. Repeat Steps 23 and 24 for the second reference file.
22. Next, lay out the clip borders.

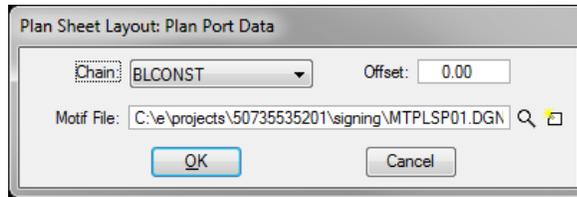
✓ Layout Sheets

1. Click the **Sheets Layout** icon  or select from the **Tools** menu.

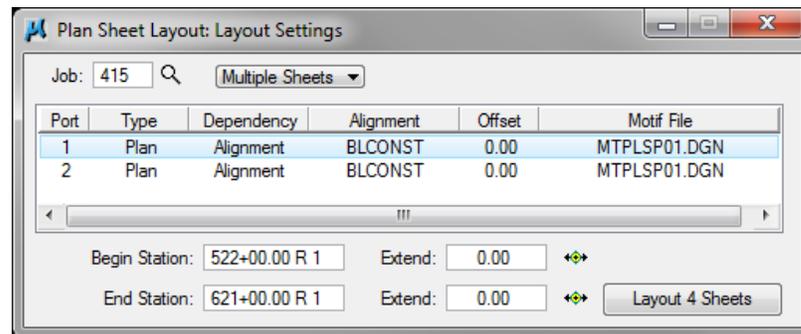


2. The *Job Number* should be set to **415**. If not, you will have to browse and select the **415** gpk file.
3. Set the *Method* to **Multiple Sheets**. The options are Single or Multiple.

- Double click on **Port 1**. This opens Plan Port Data.



- Set the *Chain* to **BLCONST**.
- Set the *Offset* to **0.00**.
- For *Motif File* browse to the **MTPLSP01.dgn** in the *Signing* folder.
- Click **OK**.
- Double click on **Port 2**.
- Populate **Port 2** with the same settings as port 1.
- Click **OK**.
- Set the *Begin Station* to **522+00**.
- Set the *End Station* to **621+00**.



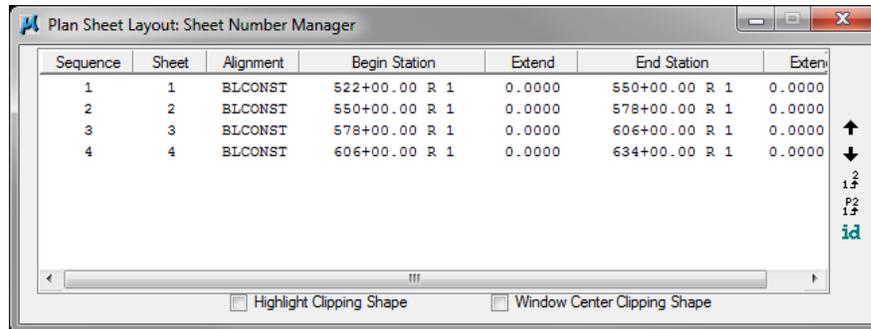
Note Notice the sheet count is calculated in the Layout button.

- Click the **Layout 4 Sheets** button. This will draw the clip shapes into the design file.
- Close Layout Settings.

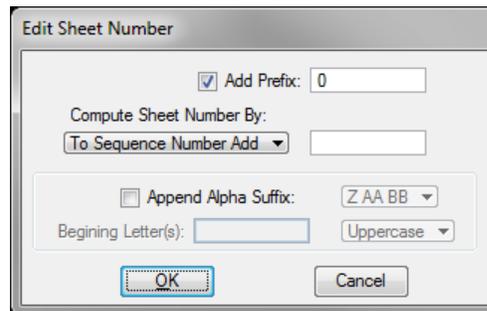
➤ **Sheet Clipping (Part 4)**

✓ Sheet Number Manager

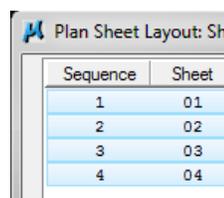
1. Click the **Sheet Number Manager** button . This opens Sheet Number Manager.



2. Select the four sheets by clicking and dragging across them.
3. On the right hand side of the dialog, click the **Edit Sheet Number** button . This opens Edit Sheet Number.



4. Toggle on **Add Prefix**.
5. Enter a **0** for the *Prefix*.
6. Click **OK**. This will change the *Sheet Numbers* to 01, 02, 03, and 04.

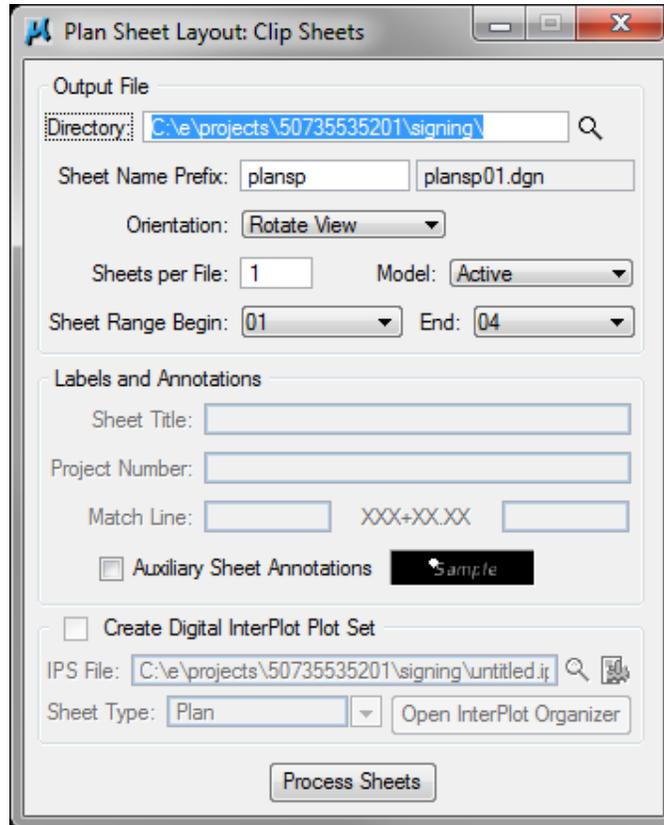


7. At the bottom of the Sheet Number Manager dialog, toggle on **Window Center Clipping Shape**.
8. Select **Sheet 01**. This will zoom and center on sheet 1.
9. Next, select **Sheet 02**.
10. Take a moment to familiarize yourself with this function.
11. Close Sheet Number Manager.
12. Click Yes to Save Sheet Number Changes.

➤ **Sheet Clipping (Part 5)**

✓ Clip Sheets

1. Click the **Clip Sheets** button  to open Clip Sheets.



Plan Sheet Layout: Clip Sheets

Output File

Directory: C:\e\projects\50735535201\signing

Sheet Name Prefix: plansp plansp01.dgn

Orientation: Rotate View

Sheets per File: 1 Model: Active

Sheet Range Begin: 01 End: 04

Labels and Annotations

Sheet Title:

Project Number:

Match Line: XXX+XX.XX

Auxiliary Sheet Annotations

Create Digital InterPlot Plot Set

IPS File: C:\e\projects\50735535201\signing\untitled.jp

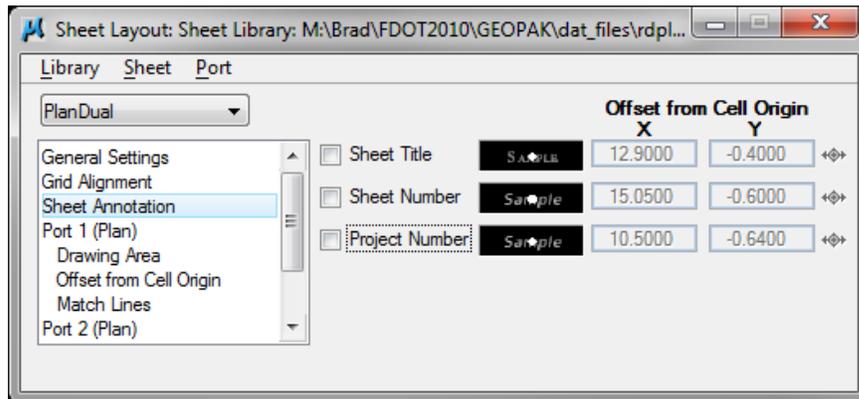
Sheet Type: Plan

2. For the *Directory*, use the magnifying glass to browse to the project *Signing* folder.
3. *Sheet Number Prefix* enter **Plansp**. The full file name will appear to the right of the prefix space.
4. For *Orientation*, select **Rotate View**. The options are Rotate View or Rotate Reference. This is a personal preference.
5. Set the Sheets per File to **1**.
6. Set the *Model* to **Active**.
7. Sheet Range Begin set to **01**.
8. *End* set to **04**.

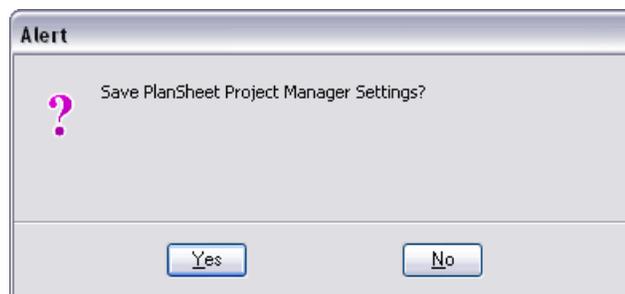
Note The sheet range settings allow you to select a range of sheets to clip in case you do not want to clip all of the sheets at this time. This is useful as a check to make sure all of the settings are the way you want them before clipping a mass number of sheets.

Labels and Annotations will be grayed out, as seen in the figure above, if the options are cleared in the sheet library. If they are active, it is not necessary to fill them in as you will use **Sheet Navigator** to populate the title block.

The figure below shows the Sheet Library and the Sheet Annotation options cleared.



9. Click **Process Sheets**. This will start the sheet clipping process.
10. Close Clip Sheets.
11. Open **Plansp01.dgn** in the *Signing* folder.
12. Take a moment to review the sheet and reference files and level settings. If the settings are not the way you want them, go into the Motif file and fix them then go back into the **Clipsp01.dgn** file and re-clip the sheets.
13. Close Plan Sheet Layout.
14. If **Project Manager** was used for the proceeding exercises you will receive the following Alert message. Click **Yes** to save settings to **Project Manager**.



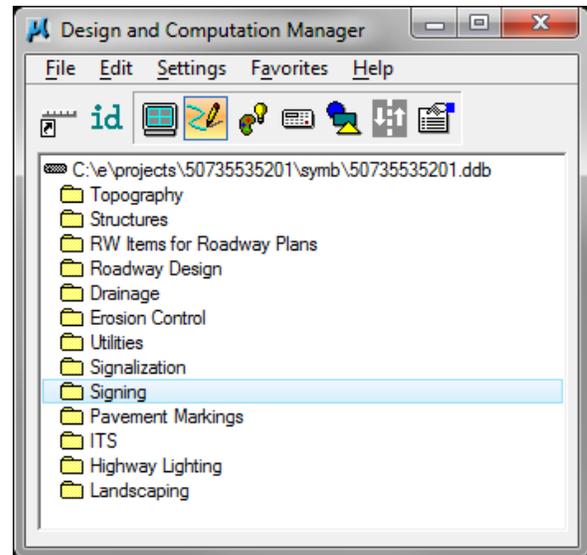
EXPLORING D&C MANAGER

The Design and Computation Manager or D&C Manager uses a proprietary database that is provided by FDOT. When the FDOT software is installed, the latest D&C Manager database (DDB) is placed either on the server or on the local hard drive. For new projects, it is recommended to copy the latest DDB file from the FDOT installation folder into the project SYMB folder and rename it to the eleven digit FIN number. For the 50735535201 project used as the example in this manual, the **FDOT2010.ddb** is renamed to **50735535201.ddb**. This allows the designer to modify the database for specific parameters, and protect it from being overwritten by any future maintenance updates. The latest FDOT .ddb file is located in the **\FDOT2010\geopak\databases** folder. The naming format is **fdot####.ddb** where **####** is the year of the .ddb file.

When D&C Manager is opened during a design session it should not be closed, minimize the dialog. This tool loads slowly because of the number of items in the database.

It is highly recommended that every user that works on projects becomes very familiar with D&C Manager. D&C Manager should be the standard tool used by everyone whether they are drawing simple lines or designing major interchanges. Many other applications and processes rely on the features that D&C Manager places on elements, if these features are not found then drawing cross sections, for example, would be nearly impossible.

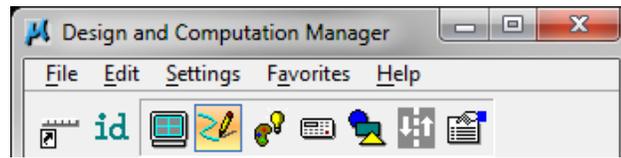
This database has been set up specifically by FDOT to create elements with the correct level symbology according to FDOT CADD Standards. The .ddb file is set up with discipline folders called categories. Inside of each category are items.



- **Categories** - The basic component of the hierarchical tree is the Category, which is represented by a folder icon. The FDOT2010.ddb database categories are divided by discipline. The figure above shows the Categories with a description relative to their discipline. Inside these Categories, you have either subcategories or items. Items are represented by one of three icons as described below.
- **Items** - The other database component is the item. An item could be a drafting item, a compute item or a default item. Items contain specific functions related to defined element symbology or quantity calculations. Items are represented by one of three icons:
 -  **Default Icon** - These items are used to set drafting standards for MicroStation commands or to draw COGO elements without annotation. In many cases, this is a 3PC routine.
 -  **Drafting Standards Icon** - These items are used to set drafting standards for MicroStation commands or to draw COGO elements with annotation.
 -  **Calculator Icon** - These items are used to set drafting standards for MicroStation commands or to draw COGO elements. The graphics can be tagged with a pay item attribute for additional stratification of features when running computations. Computation parameters are defined for these items.

D&C MANAGER MENU BUTTONS

D&C Manager has a toolbar to quickly access different modes. The function of each button is summarized below. The tools used to create pavement marking plans will be covered in more detail later in this chapter.



- **Switch To Toolbox Mode.** D&C Manager is set up to work in two different modes, as a dialog box or a toolbox. This button activates the toolbox mode. This toolbox can be resized and docked. To change the display back to the whole dialog box, click the **Switch to Dialog Mode** button. The Place Influence check box is at the left end of the toolbox.



- **Identify Item.** The **Identify Item** button is used to set the D&C Manager item to match a selected MicroStation element previously drawn by the D&C Manager or elements drawn with Graphical COGO and the SMD file. If the item you ID does not match an item in the active database, a message appears in the status bar saying: **No matching database item**. This is a very useful tool for new users learning the hierarchy of the database.



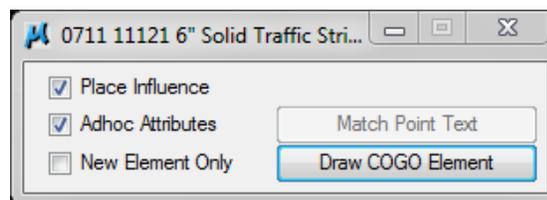
- **Display.** The **Display** button filters the display of MicroStation elements in the design file so only the selected features are displayed, highlighted or hidden. This button expands D&C Manager to show a collection bin. This collection bin is for controlling the display of multiple items at one time. To add items to the collection bin, double-click the item. This tool also opens a second tool box with four buttons as seen in the figure below.



From left to right the buttons are Normal Display, Highlight Selection, Hide Selection and Display Only Selection. You will cover all of these in the exercises.



- **Design.** The **Design** button is used to plot COGO and MicroStation elements into MicroStation with the defined symbology by use of Draw Plan and Profile dialog or in conjunction with MicroStation commands when **Place Influence** is selected.

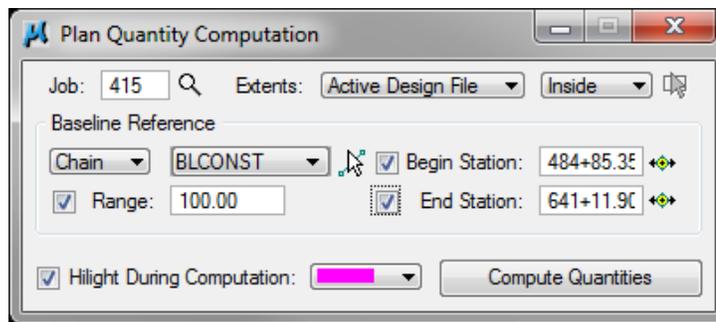




- **Set.** The Set button is used to set the symbology of previously drawn MicroStation graphic elements in accordance with the parameters of a selected item in the database. This is the tool you use if an element needs to be fixed to meet CADD standards.



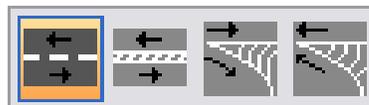
- **Compute.** The Compute button is used for tabulating quantities of items that have been placed as a Pay Item by use of the Design or Set mode or have been drawn in MicroStation and they match the search criteria of the ddb file. This tool also expands D&C Manager to show the collection bin; this allows you to process multiple pay items at one time. A second toolbox containing the computation results is also opened. Computing is covered later in this course.



- **Shapes.** The Shapes button uses plan view MicroStation graphics that defines an enclosed area to create a filled shape for computing area quantities. This tool will not be used in the creation of Pavement Marking Plans. However, this tool could be used to calculate Island Nose paint.



- **Pavement Marking.** This mode provides additional options for placing pavement striping and markings. This tool adds four additional tools to D&C Manager as shown in the figure below.



The four tools from left to right are:

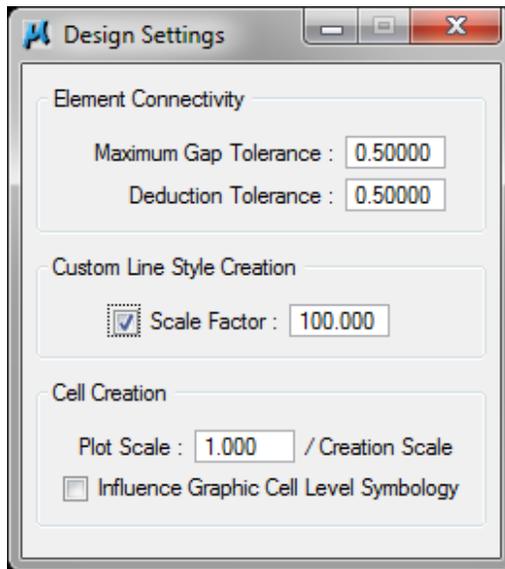
- Striping
- Separation
- Chevron Diverge
- Chevron Merge



- **Preference.** This expands the toolbar to include four additional buttons to configure D&C Manager. These tools are also accessible from the **Edit** menu.

DESIGN SETTINGS

Some settings need to be addressed before using D&C Manager to draw or compute items. These are the Design Settings loaded from the **Settings > Design** menu in D&C Manager.



- **Maximum GAP Tolerance** – If the distance between two specified elements in a MicroStation file is smaller than the **Max Gap Tolerance**, the software assumes the two elements intersect and act accordingly. If the distance is larger than the **Max Gap Tolerance**, GEOPAK assumes the two elements do not connect.
- **Deduction Tolerance** – The **Deduction Tolerance** is utilized in the Compute mode. For example, if the pay item is specified for a curb line, and for each manhole (drawn in as a cell), there is a deduction of six feet. The origin of the cell does not have to be on the curb line, but must be within the deduction tolerance in order for the cell to be recognized and the deduction to be made.
- **Custom Line Style Creation** – The Custom Line Style **Scale Factor** utilized during the Draw Plan & Profile dialog. Note this scale is only for custom line styles. Text and other labeling are controlled by the Label Scale on the Draw Plan & Profile dialog.
- **Cell Creation** – **Plot Scale** is utilized as a ratio with the Creation Scale within the setup of D&C Manager. If the Cell Creation Scale is 10 and the designer wants the cell twice as large as a cell placed with D&C Manager, utilize 20 as the Drawing Scale.

If a drawing scale is entered, all subsequent cells that are placed from the D&C Manager are scaled accordingly if the item is set to use creation scale. When a cell is placed with place influence on, GEOPAK utilizes the drawing scale setting to compute an X & Y scale for use in the MicroStation Place Cell dialog. Why do this? Otherwise, the designer would have to type the X & Y scale in the Place Cell dialog whenever another item is placed from D&C Manager. This also allows use of a metric ddb with English cells by using a different creation scale.

- **Influence Graphic Cell Level Symbology** – When active, GEOPAK utilizes the symbology within the D&C Manager, ignoring the element symbology defined in the cell.

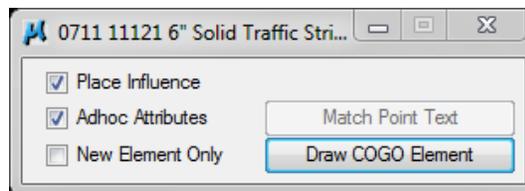
DESIGN MODE

Design Mode is the default mode when the D&C Manager is opened. **Design Mode** is used for the following functions:

- Set Drafting Standards by use of the **Place Influence** command for the placement of MicroStation elements using MicroStation commands.
- Plot COGO elements into the design file according to the drafting standards set by the item's defined parameters.
- Place Adhoc Attributes on an element.

Whether an item is placed in the file by generic MicroStation commands or plotted from the COGO database, the items can be placed as pay items for future tabulation. The following sections will detail the procedure to set drafting standards for MicroStation commands and for the plotting of COGO elements.

By selecting **Place Influence**, the designer can use MicroStation commands to place elements utilizing the element attributes established for the currently selected item in the GEOPAK D&C Manager database. With some items, a GEOPAK attribute is placed with the element for calculating quantities.



When **Place influence** is selected, the MicroStation level symbology is set. Any MicroStation command to draw a line, copy a line or place a cell is set to this symbology.



When finished placing the elements for a selected item it is important to remember to turn off **Place Influence**.

It cannot be stressed enough how important it is that all users working on projects become familiar with D&C Manager and use this tool for everything they do. D&C Manager should be the first tool opened when MicroStation is started and the last tool closed when the work day is done.

ADHOC ATTRIBUTES

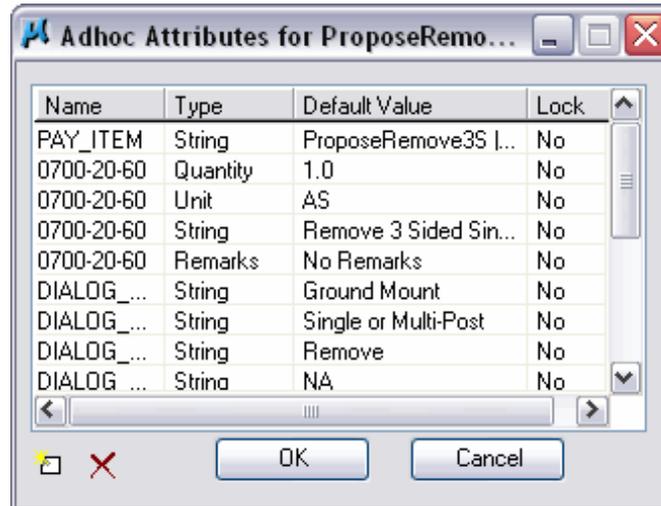
An Adhoc Attribute is additional information about a particular element. Look at it as another property for the MicroStation element. Example, a line has this fundamental data associated to it:

- Level
- Color
- Weight
- Style

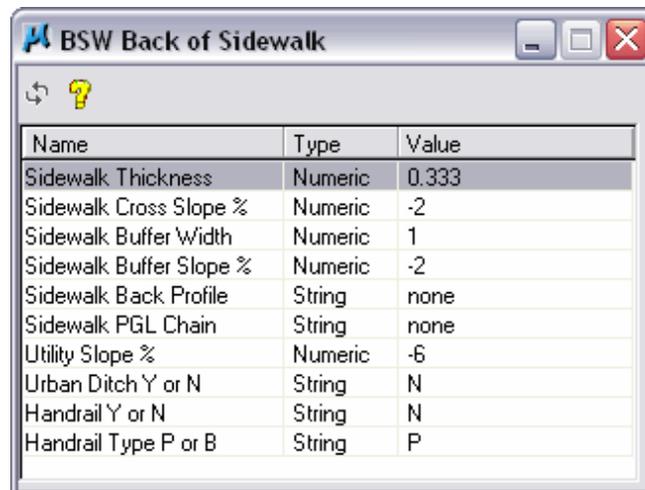
By placing an Adhoc on the line, the designer is giving that line additional information. That information could be a chain name, cross slope, profile name, thickness, etc. It is almost limitless as to what can be associated to an element with Adhocs. These Adhocs can be used by other down-stream applications to generate quantities, draw cross sections or many other tasks.

Some Adhocs are placed in the background and the designer has no interaction with them. For example, when a proposed & remove sign post is placed with the Draw Sign Program, a 3pc file is utilized to access the D&C Manager (.ddb) to place Adhocs on the post symbol for computing quantities.

The figure below shows the Adhocs that are associated to an item from D&C Manager. These Adhocs are part of the item and are set by default. Nothing indicated this information was set.



Other Adhocs are interactive meaning the designer must fill in the parameters. An example is when placing the back of sidewalk. There are several pieces of additional information that can be added to the sidewalk line. This information is then used to draw the sidewalk in the cross sections.



Adhoc Attributes are comprised of three types of information that must be defined:

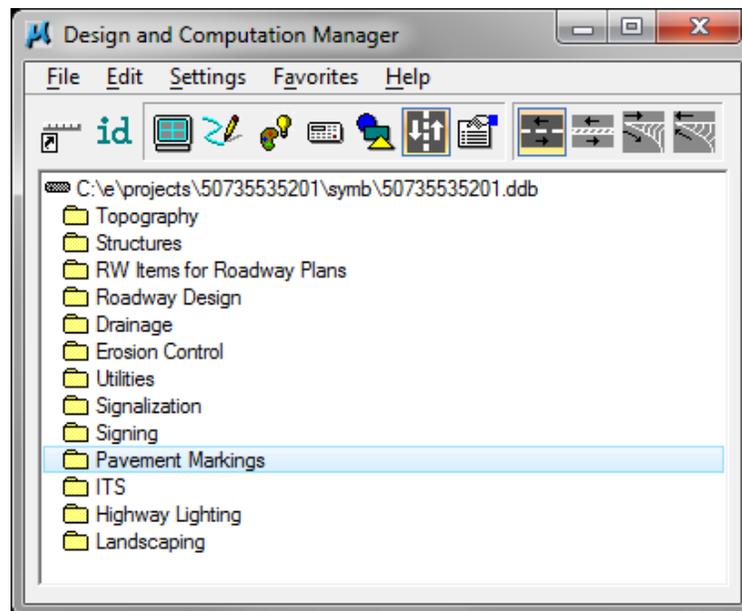
- **Name** - The *Name* is an identifying term used when GEOPAK is searching for a specific Adhoc Attribute.
- **Type** - The *Type* identifies the nature of the information, and can be set to various options: Numeric, String, Unit, Quantity, and Remarks.
- **Value** - The *Value* is the actual information to be used by GEOPAK, and is determined by the Type. For example, if the Type is set to Numeric then the Value must be a number.

DRAWING PAVEMENT MARKINGS



Many of the Traffic Plan items are simple cells or line styles that can be drawn and quantified using the D&C Manager. The Pavement Striping component of the D&C Manager facilitates the production of pavement striping plans as well as automates the quantities process. To draw pavement markings with the GEOPAK's Pavement Marking program, select the pay item then click on the *Pavement Marking* button from the D&C Manager dialog box. After selecting the *Pavement Marking* button, D&C Manager displays additional *Pavement Marking* options.

Note As a best practice, start the pavement marking design by placing one of the solid edge lines and build from that. This will give the designer a solid starting point to create the entire remaining pavement marking lines parallel to.

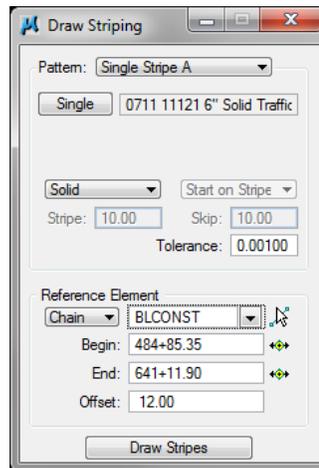


As mentioned earlier in this chapter, there are four additional tools in D&C Manager to aid in the design and layout of pavement marking.

DRAW STRIPING



The Striping tool is the heart of this section in this training manual and will be the single most important tool used in the production of pavement marking plans. This is the tool used to draw all solid or skip pavement markings. The striping tool can reference a GEOPAK chain or an existing MicroStation linear element for length and offsets. The MicroStation elements can be in the active file or in a reference file.

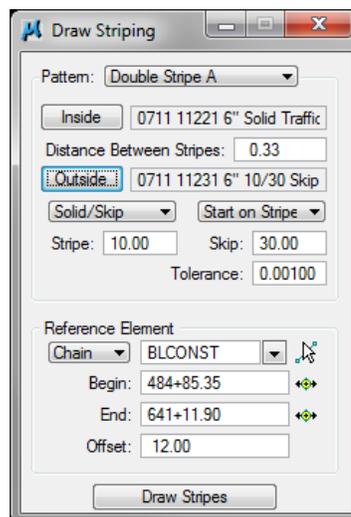


The Draw Striping tool is divided into two parts, Pattern and Reference Element, with several preferences for you to set in each of the two parts. The following pages detail the **Draw Striping** tool.

PATTERN – SINGLE STRIPE OR DOUBLE STRIPE

Single Stripe A or *Single Stripe B* options allow two different configurations to be stored in a resource file so the type of stripe being placed can be changed very easily. It is basically a way to set favorites, example; set *Single Stripe A* to 6” solid white and set *Single Stripe B* to 6” solid yellow. To draw a 6” solid white line set the pattern to *Single Stripe A* or to draw a 6” solid yellow line set the pattern to *Single Stripe B*.

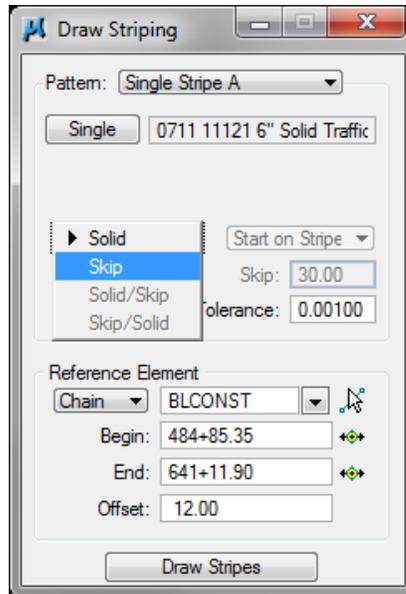
In the case of *Double Stripe*, there are four possible configurations. *Double Stripe A, B, C and D*. The figure below shows the *Double Stripe A* Pattern, the example here is set up to draw a 6” solid yellow line on the Inside and a 6” 10/30 Skip line on the Outside with a 0.33’ or 4” Distance Between Stripes.



This is a typical set up for a two lane roadway with a passing zone on one side, as depicted in the figure below.

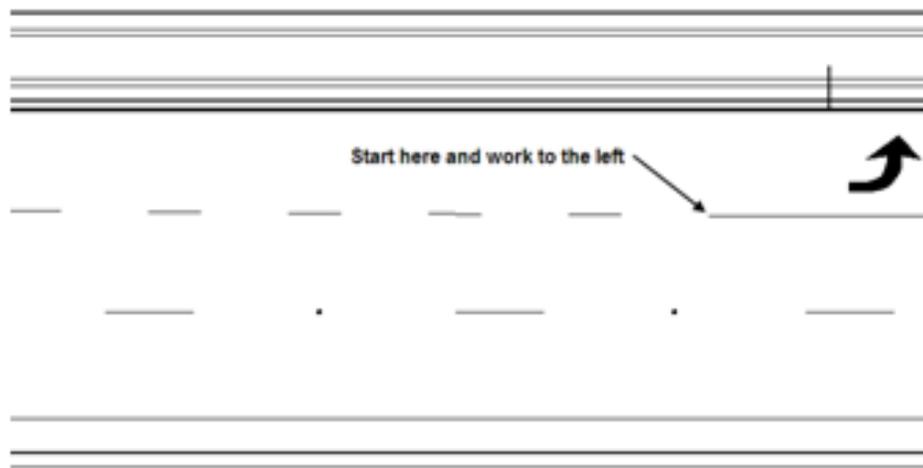


Below the displayed item selection is the *Skip/Solid* option. This defines whether to start on a stripe or a skip and the length parameters for both.



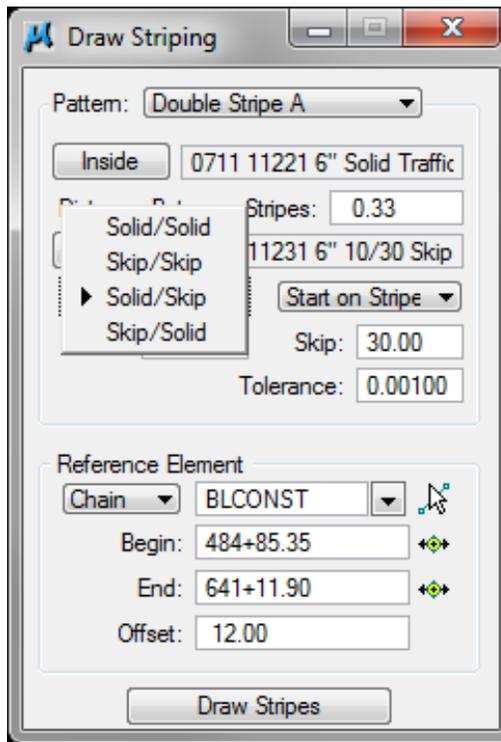
If *Single Stripe A* is selected, there are two options for drawing the line, *Solid* or *Skip* as shown in the figure above. If the **Solid** option is selected the Stripe Length and Skip Length are not utilized. If *Skip* is selected then the Stripe Length and Skip Length must be defined.

Note When drawing skip lines, it is easier to get the spacing correct by using the end point of the solid line that approaches the stop bar, starting on skip and placing the strip in reverse of the driving direction. The figure below shows this scenario.



If *Double Stripe A* is selected there are four options for drawing the lines, *Solid/Solid*, *Skip/Skip*, *Solid/Skip* and *Skip/Solid* as shown in the figure below. These four options work in conjunction with the *Inside* and

Outside pay item options. If either of the Pay Item Specifications has one of the key words, "solid" or "skip", as part of the D&C Item the *Skip/Solid* option will be set to the appropriate option.



Distance Between Stripes – It is the space between two striping lines. This distance is expressed in terms of master units. There will be times when the designer will need to use a larger distance between lines than what the design standards call for. Example, if the signing and marking plans are at 100 scale a 4” separation between two 6” lines is not enough, the two lines appear like one thick line.

Tolerance – If the length of a segment of pavement marking is less than the **Tolerance**, the line will not be placed. It will only be utilized at the ending point, to determine where the final piece of marking is placed.

REFERENCE ELEMENT – DGN OR CHAIN

A Reference Element is an element used for creating parallel lines and arcs. The options are, **DGN** or **Chain**.

DGN – This can be any MicroStation element like the edge of pavement line or another striping line. When you select **DGN**, there are three options when selecting a MicroStation element:

Single Element – When selected, use the Identify DGN Element button to select the element. The stationing begins at 0.00 and the end is based on the length of the element selected.

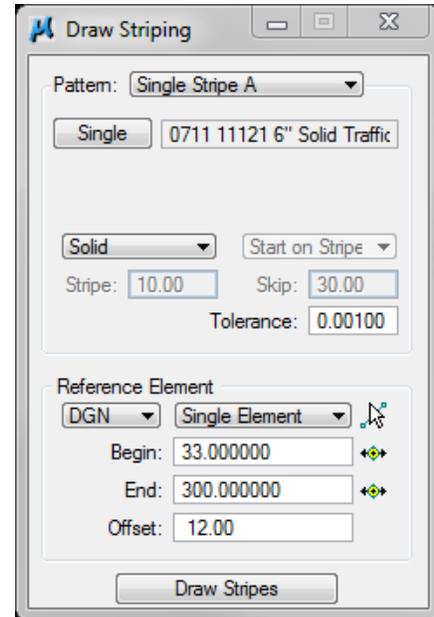
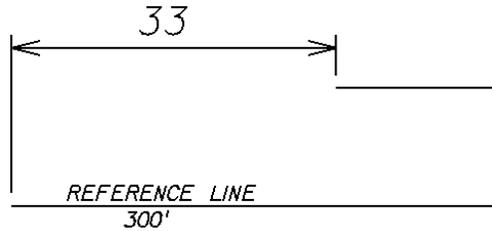
Complex Chain – Select the option, which invokes the MicroStation Create Automatic Complex chain tool to define the elements. Stationing begins at 0.00 and is based on the length of the selected element. This option does not work with elements in a reference file.

Selection Set – This option works with elements in the active file or in a reference file. Create the selection set, and then set the toggle to **Selection Set**. Click **Accept Selection Set**, which computes the stationing for the selection set. MicroStation’s **PowerSelector** works very well for creating the selection set.

Chain – This is a GEOPAK chain stored in the GPK. Select the chain from the list or graphically with Identify Chain. Stationing fields are automatically populated. The values may be changed manually or graphically using the Beg and End buttons.

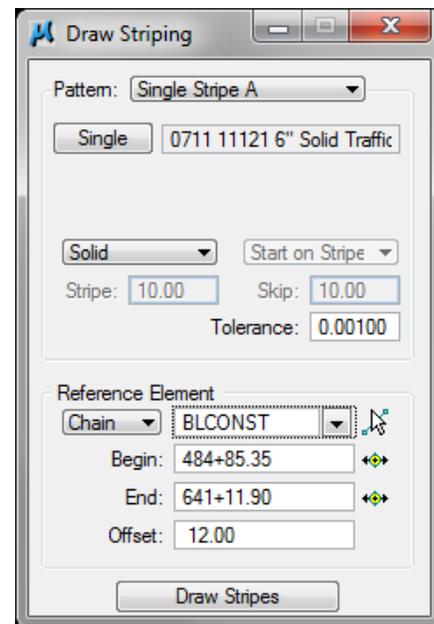
Begin – Identifies the beginning of the striping. If using **DGN** element, this field will start at a value of 0.00 or the value of the length of the line selected depending on how the element was created. Enter a value in the field to start the striping at a point other than the beginning of the line. If **Station** is used the begin station of the chain will be the value.

The figure below shows the reference line used which is 300' long and also the new line created 33' to the right of the beginning point. The reference line is, a reference, it does not have to control the length of the new striping line created.



End – Identifies the end of the striping. If using **DGN** element, this field will start at a value equal to the length of the line or 0.00 depending on how the element was created. Enter a value in the field to end the striping at a point other than the end of the line. If **Station** is used the end station of the chain will be the value.

The figure below shows the Chain option. Notice the Begin and End values are populated with the beginning and ending station values of the selected chain.



Offset – This is the offset from the selected element, either the **Chain** or **DGN** element, to the new striping line. It is not necessary to use plus or minus values, simply graphically indicate the side by moving the cursor to the left or right.

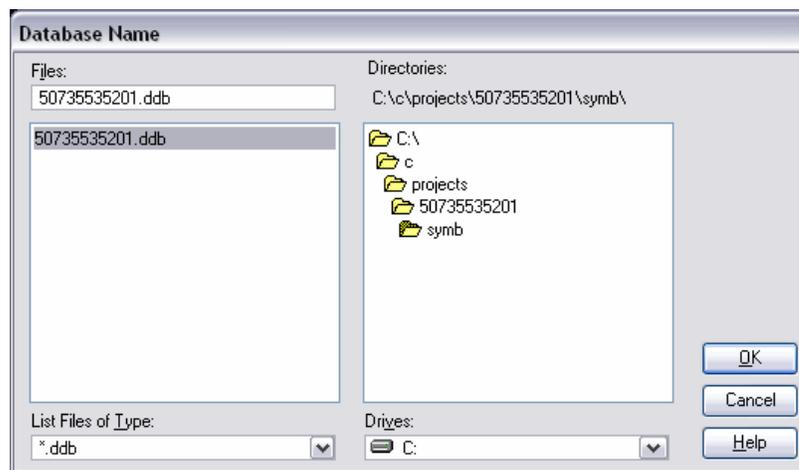
Draw Stripes – This attaches the new striping to the cursor at the defined offset. Just move the striping to the desired side of the **DGN** or **Chain**. Issuing a Data Point places the new striping in the design file. The new striping elements are placed in a graphic group for easy deletion.

Exercise 4.2 Drawing Pavement Markings

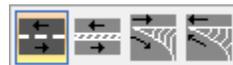
➤ Placing Solid White Striping (Part 1)

In this exercise, D&C Manager will be used to draw the solid pavement markings. The process will start by placing the outside edge lines using the Baseline of Construction as the reference element then the inside edge lines. Thermoplastic items will be used in this exercise.

1. Open **Dsgnsp01.dgn**. This is the main design file for all signing and pavement marking elements.
2. If necessary, click the GEOPAK Project Manager and choose the correct project.
3. From the Road toolbox, open D&C Manger. Next, open the project ddb file.
4. From D&C Manager select **File > Open**.
5. Navigate to the *symp* folder. This is where you should copy and rename the **FDOT2010.ddb**.
6. Select **50735535201.ddb** and click **OK**. It takes several seconds to load, be patient.



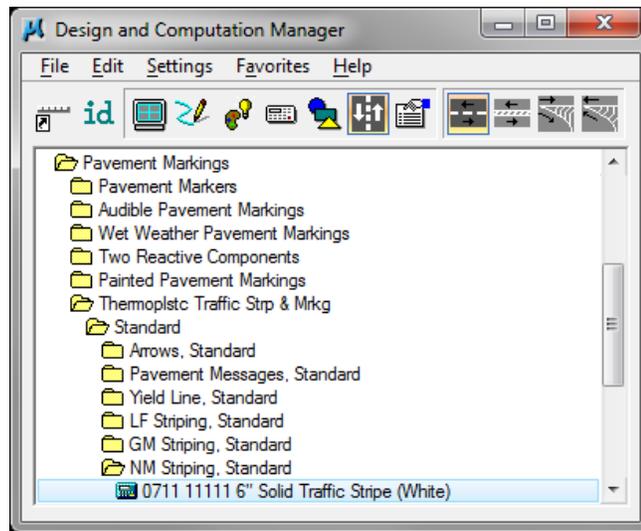
7. Zoom to near **STA. 525+00**. This is where the edge lines will start.
8. From D&C Manager click the **Pavement Marking** button . This activates four additional pavement marking tools.



9. From D&C Manager navigate to the Pavement Markings > Thermoplastic Traffic Strp & Mrkg > NM Striping, Standard category.

Hint From the Edit menu in D&C Manager there is a search tool to aid in finding a category or item within D&C Manager. To launch the search tool select Edit > Find.

10. Select the Item 0711 11111 6" Solid Traffic Stripe (White).

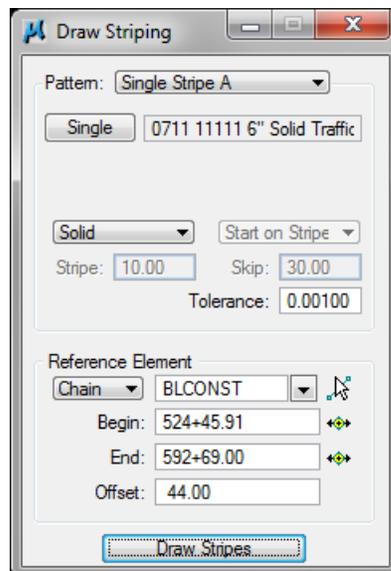


11. From D&C Manager, click on the **Stripping** button . This opens the Draw Stripping tool.

12. Set the **Pattern** to **Single Stripe A**. Because the item was selected before starting this tool, the Single field is populated with the correct item.

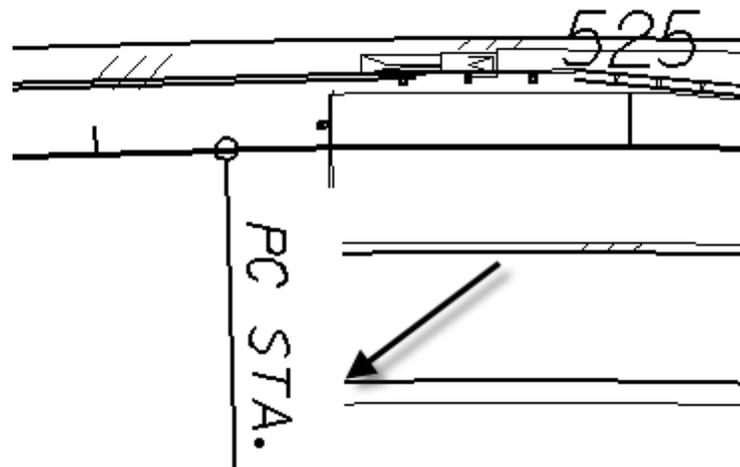
Note It is not necessary to close the Draw Stripping tool to select a different item, go back to D&C Manager and select a new item then click the Single button to make it active or double click on the new item in D&C Manager.

13. The type of line should be set to **Solid**. This is automatically set to solid because the item In D&C Manager was created with the key word **Solid** in the description.
14. Set the Reference Element to **Chain**.
15. From the drop down list, select **BLCONST**. Selecting the chain will populate the Begin and End station values.



16. For the *Begin* station, click on the **VCR** button **Begin Station** to the right of the station field.

17. Snap to the end of the edge of pavement line as shown in the figure below. This will populate the station with the value calculated from the chain.

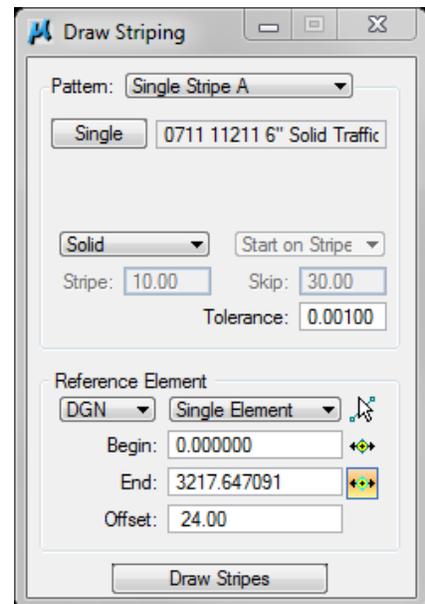


18. For the *End* station, key-in **592+69**.
19. Set the *Offset* to **44.00**. It is not necessary to use a plus or minus with this tool.
20. Click the **Draw Stripes** button.
21. Move your cursor to the right side of the Baseline and issue a **Data Point**.
22. Right mouse click to stop the command. Do not close the Draw Striping dialog.

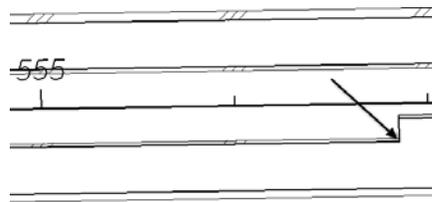
➤ **Placing Solid Yellow Striping (Part 2)**

In this part of the exercise, you will draw the solid yellow edge line using the previously drawn white edge line as the reference element.

1. Continuing in *Dsgnsp01.dgn* select the D&C Manger item to **0711 11211 6" Solid Traffic Stripe (Yellow)**.
2. Leave the *Pattern* on **Single Stripe A**.
3. On the **Draw Striping** dialog box, click the **Single** button. This will change the item to the 6" solid Yellow item.
4. For the *Reference Element* change the option to **DGN**.
5. Set the *type of element* to **Single Element**. The options are Single Element, Complex Chain or Selection Set.
6. Click the Identify DGN Element button.
7. Select the previously drawn 6" White Edge Line and issue a Data Point to accept it.
8. The *Begin* field will be populated with **0.00** and the *End* will be the length of the element selected, this may need to be adjusted based on turn lanes and median openings. In this example, there is a left turn lane that needs to be accounted for.



9. Zoom to near station **556+85**. There is a left turn lane that you need to use for the end point, the figure below shows the location



10. Click on the **End Distance** button and snap to the beginning of the turn lane as seen in the figure above. This will adjust the *End Distance*.
11. Set the *Offset* to **24**. This is the roadway width based on the typical section.
12. Click the **Draw Stripes** button.
13. Move your cursor to the left side of the previously selected edge line and issue a **Data Point**.
14. Right mouse click to stop the command.
15. Open the Reference palette and turn off **Dsgnrd01**. This will better show the lines.

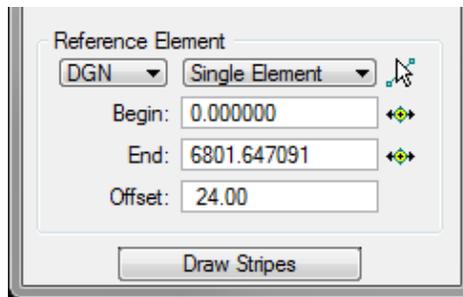
➤ **Placing Solid Yellow Striping (Part 3)**

In this exercise, you will draw a 50' taper using a 6" solid yellow line. This taper occurs at a median opening where there is a left turn lane. Later in this chapter you will place turn arrows in this left turn lane.

1. Continuing in *Dsgnsp01.dgn* zoom to near **Sta. 557+00**. This is approximately where the turn lane starts.
2. Turn the **Dsgnrd01** reference file on.
3. Make sure item 0711 11211 6" Solid Traffic Stripe (Yellow) is still selected.

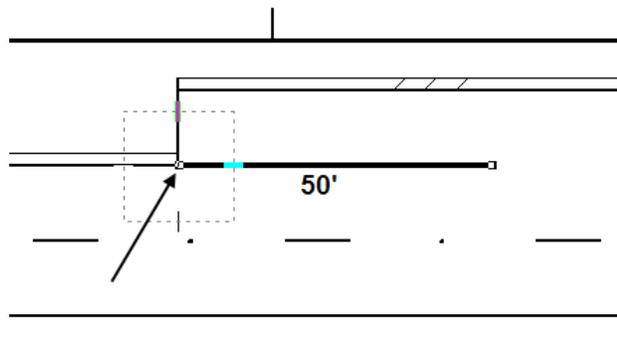
Next, you will draw the yellow edge line starting 50' from the beginning of the turn lane up to the PC of the median nose. You will use the white edge line as the reference element and adjust the begin and end lengths using the Begin and End distance buttons on the Draw Striping tool along with AccuDraw. The alternative is that you have to draw construction lines that you later have to delete.

4. On the Draw Striping tool, click the **Identify DGN Element** button.
5. Select the previously drawn **6" White Edge Line** and issue a **Data Point** to accept it.
6. The *Begin* distance will set to **0.0** and the *End* will be set to the **length of the element selected**.



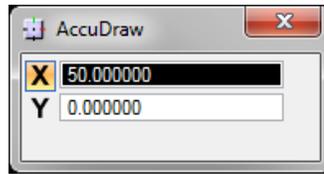
Next, you will use AccuDraw and the Draw Striping tool to set the *Begin* distance **50'** to the right of the beginning of the turn lane.

7. Activate AccuDraw.
8. Click the **Begin Distance** button and snap to the end point of the line at the beginning of the turn lane.



9. Click the letter **O** on the keyboard. This will move the AccuDraw compass to the location you snapped to as shown in the figure above.
10. Move the cursor to the right and click the **Tab** key. This locks the AccuDraw origin.
11. Key-in **50**. This will set the *X value* to **50** in the AccuDraw dialog.

12. As soon as you start entering a value the X origin will lock in as seen in the figure below.

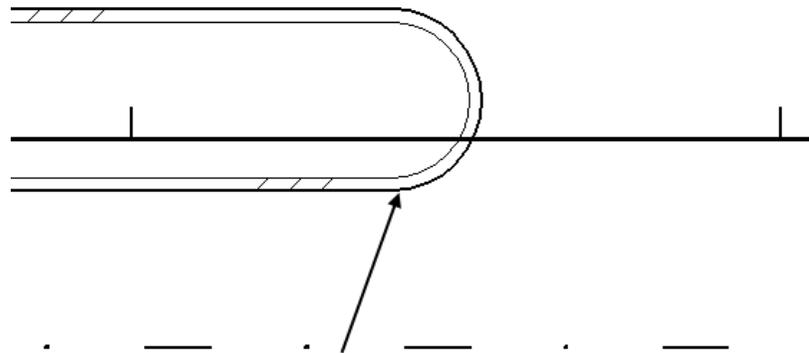


Note In v8i the toggle boxes have been removed. However, you can lock the X or Y value by typing either X or Y while the appropriate field is the active field and pressing the Tab button on the keyboard..

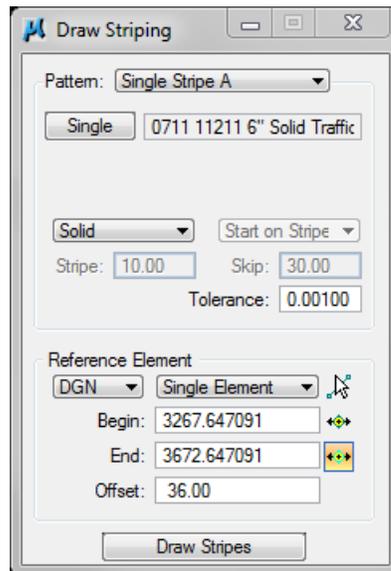
13. Issue a **Data Point** on the screen. This will move the AccuDraw compass over 50' and change the *Begin Distance* by 50' in the Draw Striping tool.

14. Zoom to the end of the turn lane.

15. Click the **End Distance** button and snap to the PC of the median nose.



16. Set the *Offset* to 36.0. This is the distance from the white edge line to the new inside yellow edge line.



17. Click Draw Stripes.

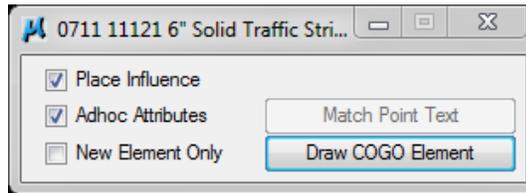
18. Move your cursor to the left side of the previously selected edge line and issue a **Data Point**.

19. Reset to **cancel** the command.

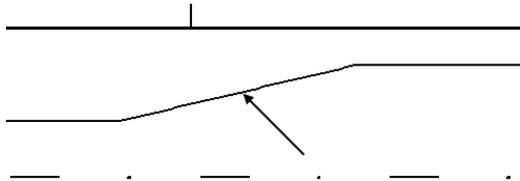
➤ **Placing Solid Yellow Striping (Part 4)**

In this exercise you will draw the 6" yellow edge line representing the 50' taper from the begin turn lane to the end of the line placed in the previous exercise.

1. Continuing in *Dsgnsp01.dgn* turn off the reference file **Dsgnrd01**. You need to be able to see the endpoints of the yellow edge lines.
2. Zoom to the beginning of the turn lane.
3. In D&C Manager, click the **Design** button. 
4. Make sure item **0711 11211 6" Solid Traffic Stripe (Yellow)** is still selected. It should be the current item as it was used in the previous exercise.
5. Check on Place Influence and Adhoc Attributes.



6. Using MicroStation's *Place Line*, draw a line from end point to end point to finish the taper.

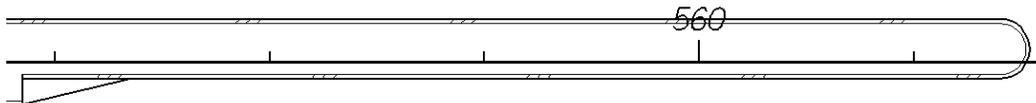


7. Reset to **cancel** the *Place Line* command.
8. Turn off Place Influence.
9. Turn on the reference file **Dsgnrd01**.

➤ **Placing Solid White Turn Lane Stripe (Part 5)**

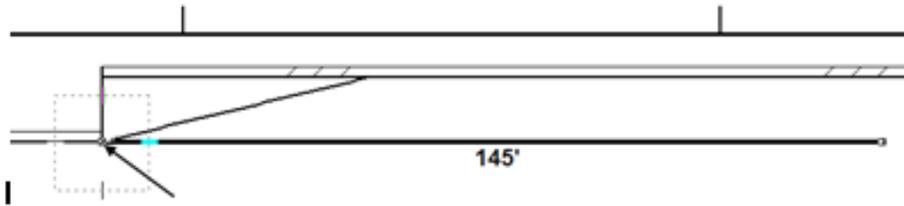
In this exercise, you will draw the 6" solid white line in the left turn lane. You will use the yellow edge line placed in the previous exercise as the reference element. Refer to index 301 for turn lane design criteria and index 17346 for special markings in turn lanes.

1. Continuing in *Dsgnsp01.dgn* zoom so you can see the entire turn lane.



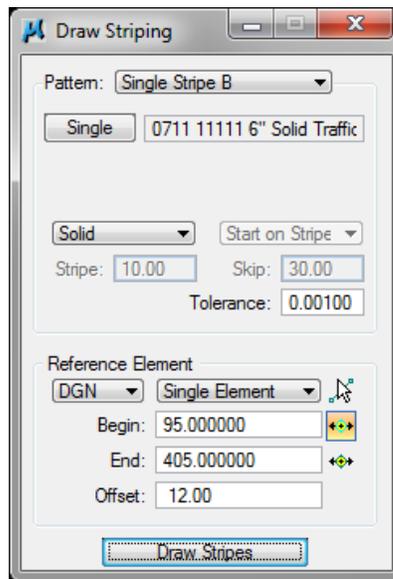
2. In D&C Manager select Item 0711 11111 6" Solid Traffic Stripe (White).
3. If you closed the Draw Striping tool, open it again.
4. Set the *Pattern* to **Single Stripe B**.
5. Click the **Single** button. This will set the item from D&C Manager.
6. Set the *Reference Element* to **DGN** and **Single Element**.
7. Click the Identify DGN Element button.

8. Identify the 6" yellow edge line drawn to the median nose PC earlier.
9. Click the **Begin Distance** button. Next, you will use **AccuDraw** to set the **Begin** distance.
10. Snap to the end point of the line at the beginning of the turn lane. This is where the 50' taper begins.

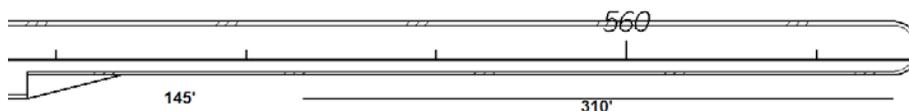


11. Click the letter **O** on the keyboard. This will move the **AccuDraw** compass to the location you snapped to as shown in the figure above.
12. Key-in **145** and click the **Tab** key. This will set the *X value* to **145** in the **AccuDraw** dialog.
13. Issue a **Data Point** on the screen. This will move the **AccuDraw** compass over 145'.

Note 145' is distance L1 from the table on index 17346 based on a 60 (mph) design speed. This gives you a 310' lane line. The length 310' is derived from L2, which is 260' plus the Queue length. The Queue length is based on the number of vehicles making the turning movement, this exercise uses a Queue length of 50'.



14. *End* distance, leave as is.
15. Set the *Offset* to **12.0**. This is the lane width.
16. Click **Draw Stripes**. Move your cursor to the right side of the previously selected edge line and issue a **Data Point**.
17. **Reset** to cancel the command.
18. Take a moment to review the pavement markings. The figure below shows the finished product, 145' Clearance Distance and 310' lane line.



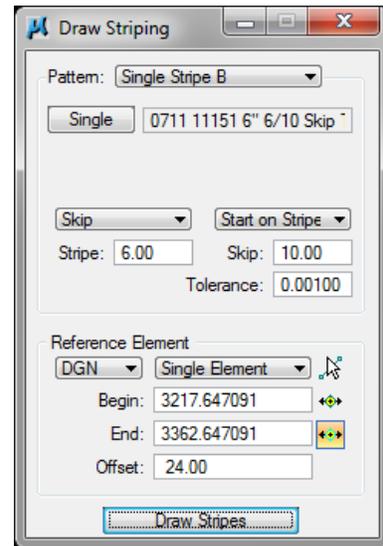
➤ **Placing 6/10 White Skip Stripe (Part 6)**

In this exercise, you will complete the turn lane striping by placing a 6” white 6/10 skip line from the beginning of the turn lane to the 6” solid lane line. You will use the 6” yellow edge line as the reference element.

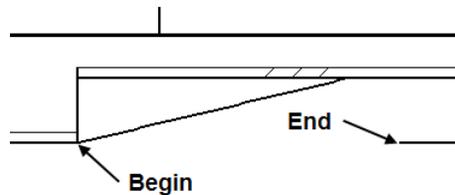
1. Continuing in *Dsgnsp01.dgn* zoom to the beginning of the turn lane.
2. In D&C Manager select Item 0711 11151 6” 6/10 Skip Traffic Stripe (White). This is located in the category Pavement Markings > Thermoplastic > LF Striping, Thermo STD > Guide Lines, Thermo.
3. In the Draw Striping dialog set the *Pattern* to **Single Stripe B**.
4. Click the **Single** button. This sets the pay item and sets the line to *Skip*. Set to **Start on Stripe**.

Note When starting a skip line from a solid lane line and using a dgn element you set this to start on skip.

5. Set the *Stripe* length to **6.0** and the *Skip* length to **10.0**.



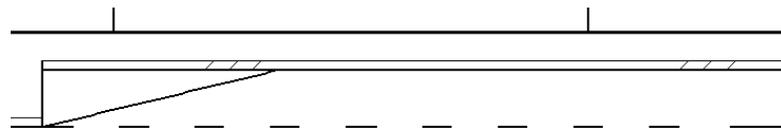
6. Set the *Reference Element* to **DGN** and **Single Element**.
7. Click the **Identify DGN Element** button. Identify the outside 6” white edge line drawn earlier.



8. Click the **Begin Distance** button and snap to beginning of the turn lane as shown in the figure below.
9. Click the **End Distance** button and snap to the beginning of the turn lane as shown in the figure above.
10. Set the *Offset* to 24.0.
11. Click **Draw Stripes**. Move your cursor to the left side of the previously selected edge line and issue a **Data Point**.

Note You can adjust the begin and end points by using the vcr buttons to achieve the desired first stripe line.

12. Reset to **cancel** the command. The figure below shows the finished skip stripes. Later in this chapter you will place left turn arrows in this turn lane.



➤ **Placing 10/30 Skip Striping (Part 7)**

In this exercise, you will add the 10/30 Skip Striping between the two edge lines previously placed.

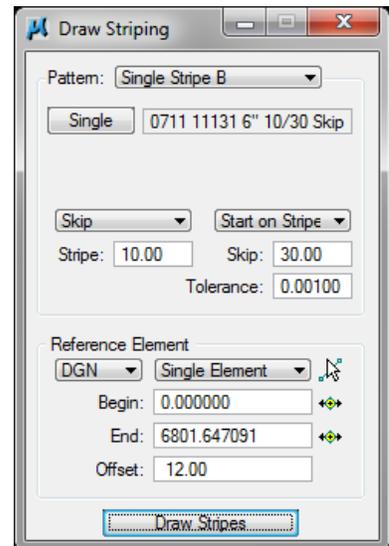
- Continuing in *Dsgnsp01.dgn* in D&C Manger navigate to the *GM Striping* category and select item **0711 11131 6" 10/30 Skip Traffic Stripe (White)**.

Note GROSS MILE ITEMS: The gross mile quantity shall be used to pay for all 3/9 or 10/30 skip traffic stripes, as indicated in the plans. Measurement will be taken as the distance from the beginning of the first painted stripe to the end of the last painted stripe, and shall include the unpainted intervals, refer to the Basis of Estimates manual for more information.

- On the Draw Striping dialog box, set the **Pattern** to **Single Stripe B**.
- On the Draw Striping dialog box, click the **Single** button. This will change the item to the 6" 10/30 Skip Traffic Stripe.
- Notice that the option for the type of line to draw switched to **Skip**; this is because the key word Skip is in the description of the item name in D&C Manager. Set to **Start on Stripe**.
- Set the *Stripe* length to **10.0**.
- Set the *Skip* length to **30.0**.

Next, you will need to set the Reference Element and Begin and End stations.

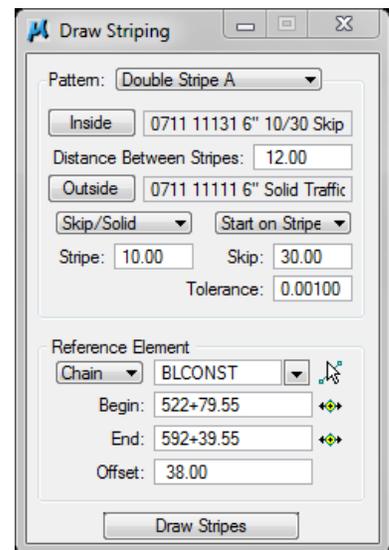
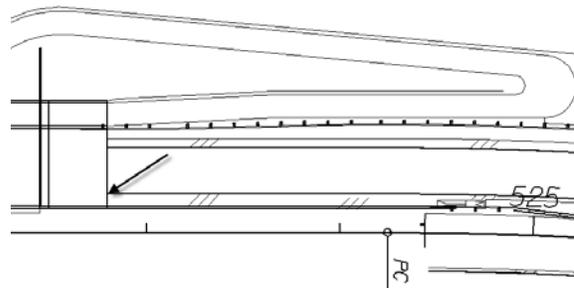
- Set the Reference Element to **DGN**.
- Set to Single Element.
- Click on the **Identify DGN Element** button.
- Select the previously drawn 6" White Edge Line and issue a Data Point to accept it.
- The *Begin* and *End* distances are set based on the length of the DGN element selected. These values can be adjusted with key-ins or by clicking on the Begin Distance or End Distance buttons to the right of the distance fields.
- Leave the *Begin* and *End* distances as they are.
- Set the *Offset* to **12.0**.
- Click the **Draw Stripes** button.
- Move your cursor in between the edge lines and issue a **Data Point**.
- Right mouse click to stop the command.
- Take a moment to review the striping lines, turn the reference files off to better see the line work.



➤ **Placing Solid White/10/30 Skip Stripe Simultaneously (Part 8)**

In this exercise, you will use the **Double Stripe A** option on the Draw Striping tool to place a Solid White edge line and the White 10/30 skip line at the same time. This exercise will work on the left side of the Baseline.

1. Continuing in *Dsgnsp01.dgn* zoom to near **Sta 523+80**. You will be working on the left side of the Baseline.
2. Set the *Pattern* to **Double Stripe A**. This is in the Draw Striping tool.
3. In D&C Manger navigate to the *GM Striping* category and select item **0711 11131 6" 10/30 Skip Traffic Stripe (White)**.
4. On the Draw Striping tool, click the **Inside** button. This will set the Pay Item for the inside line.
5. In D&C Manager navigate to the **NM Striping** category and select the Item **0711 11111 6" Solid Traffic Stripe (White)**.
6. Set the Distance Between Stripes to **12.00**.
7. On the Draw Striping tool, click the **Outside** button. This will set the Pay Item for the outside line.
8. Set the option to **Skip/Solid**. Skip goes with the inside and Solid goes with the outside.
9. Set to **Start on Stripe**. This is a project specific setting not a default.
10. Set the *Reference Element* to **Chain** and select the **BLCONST** chain.
11. Click the **Begin Station** button.
12. **Snap** to the end of the edge of pavement line as shown in the figure below. This will populate the station with the value calculated from the chain



13. For the *End Station*, key-in **592+39.55**.
14. Set the *Offset* to **38.00**.

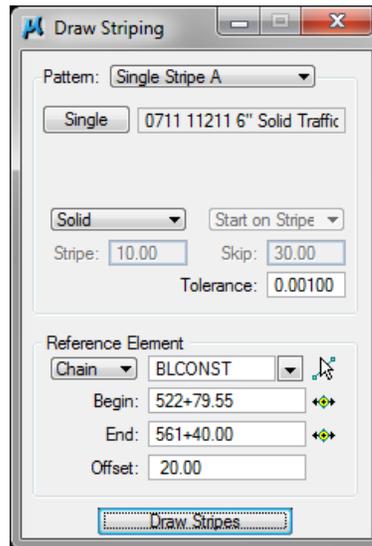
Note The Offset in this example is 44' – 6' = 38' where 44' is the distance from the BLCONST to the outside edge line and 6' is half of the 12' distance between stripes.

15. Click the **Draw Stripes** button.
16. Move your cursor in between the edge lines on the left side of the *Baseline* and issue a **Data Point**.
17. Right-mouse click to stop the command.

➤ **Placing Solid Yellow Striping (Part 9)**

In this exercise, you will finish the left side of the Baseline with a single 6" solid yellow line.

1. Continuing in *Dsgnsp01.dgn* zoom to near **Sta. 523+80**.
2. On the **Draw Striping** tool set the *Pattern* to **Single Stripe A**. The pay item data should be set already. This was set for the first yellow stripe, **0711 11211 6" Solid Traffic Stripe (Yellow)**.
3. Set the *Reference Element* to **Chain**.
4. Select the chain **BLCONST**.
5. Snap to the same end of the edge of pavement line as in the last exercise. Sta. **522+79.55**.
6. For the *End Station* key-in **561+40.00**. This is at a median opening.
7. Set the *Offset* to **20.00**.



8. Click the **Draw Stripes** button.
9. Move your cursor to the left side of the Baseline and issue a **Data Point**.
10. Right mouse click to stop the command.
11. Take a moment to review the striping lines. Turn the reference files off to better see the lines.

DRAW CELL GROUP BY FEATURE

The Draw Cell Group by Feature tool can be used for placing Pavement Messages and Arrows, RPM's or any other cell you want to group together. In this chapter, the student will place RPM's and Turn Arrows. It is not required to use this tool when placing cells, however, this tool will make the task of drawing Arrows and RPMs much easier. This tool can be opened on the Road tools box or on the menu **Applications > GEOPAK ROAD > Plans Preparation > Draw Cell Group by Feature**.

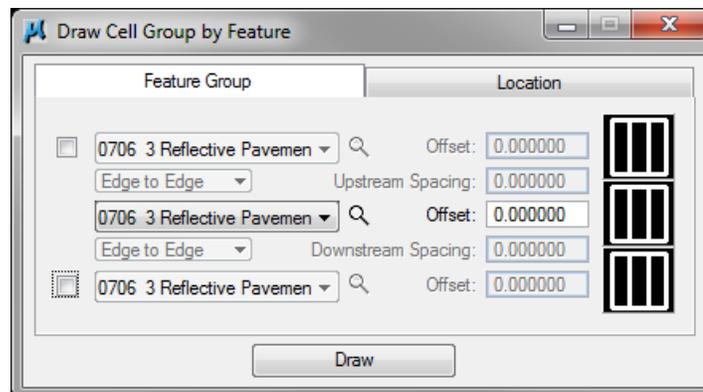
Note When using the Draw Cell Group by Feature and/or Draw Cell by Feature tools, always ensure to load the correct Geopak Database (*.ddb) as the tool will 'reset' the Database to the *.ddb specified in the resource file every time the tool is closed and reopened. This Geopak Database (*.ddb) may not be the database intended for use with your active project.



The dialog consists of two tabs:

FEATURE GROUP TAB

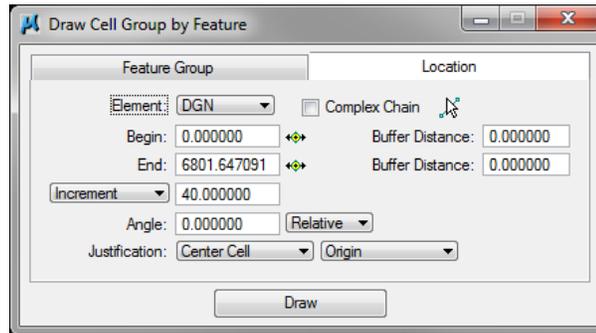
Feature Group defines the D&C Manager item to use which in turn selects the cell to be placed and the Offset from the selected element to place the item.



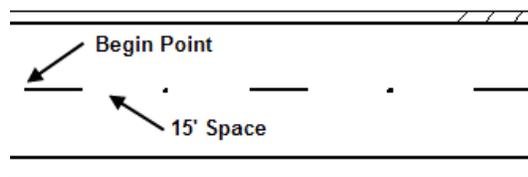
Based on the items that are checked the tool allows the designer to place up to three different cells. The Magnifying glass next to each item allows the designer to browse to D&C Manager and select the appropriate item, which will attach the cell to be drawn. The Offset is the distance off of the selected DGN Element or Chain when drawing the cell.

LOCATION TAB

Location defines whether to use a DGN element or Chain, Begin and End stations and Spacing.



- **Element** – This is either a GEOPAK Chain or DGN element. This function is similar to the Draw Striping tool. The Begin and End fields will be populated with the appropriate data based on the element selected. They can be modified using the buttons or by keying in the value.
- **Buffer Distance** – This is for setting where to start the first cell and end the last cell. Example, when placing RPM's on a 10/30 skip line, if snapping to the beginning of the first painted stripe, set the Begin Buffer Distance to 25.0. This accounts for the 10' (ft) stripe and the 15' (ft) spacing between the first and second stripe, the figure below shows this.



- **Spacing** – There are several options available to set the spacing between the cells, they are:
 - *Increment* – This is a set value between cells.
 - *Even* – Evenly spaces the cells at a user-specified spacing, the buffer distances are ignored.
 - *Max Spacing* – The location of the beginning and ending cell are determined, then a sufficient number of cells are placed in between, so that the distance between them is no more than the specified Max Spacing.
 - *Once* – Only one set or cell is placed. The ending buffer distance is ghosted.
 - *Each Vertex* – The origin of the cell is placed at each vertex of the selected element. The Begin and End and buffer distances are ghosted.
 - *End Points* – The origin of the cell is placed at each end point of the selected element. The Begin and End and buffer distances are ghosted.

Hint When placing RPMs along a curved roadway this tool does not account for the curve geometry at an offset. You will have to copy parallel one of the edge lines on top of the 10/30 skip line and use that line as the DGN element then delete the copied line. Using the Chain option does not work either; it must be an arc on top of the skip line.

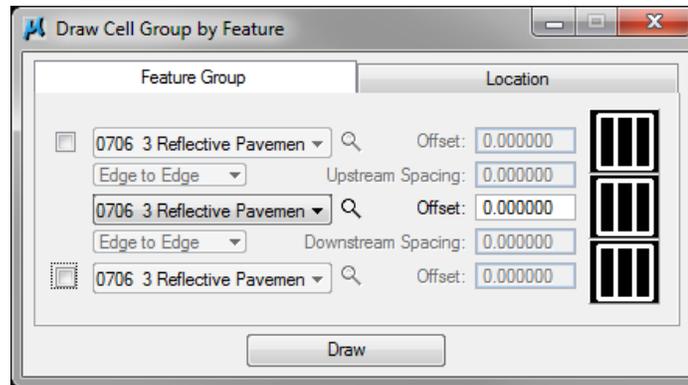
- **Angle** – If set to **Absolute** the angle is based on 0 degrees as horizontal. If set to **Relative** the cell is placed relative to the element selected.
- **Justification** - The justification can be based on the center cell (only option if only one row is placed), the upstream or downstream cell. Only those selected in the **Feature Group** are available for setting Justification.

Exercise 4.3 *Placing RPM's using Draw Cell Group by Feature (Part 1)*

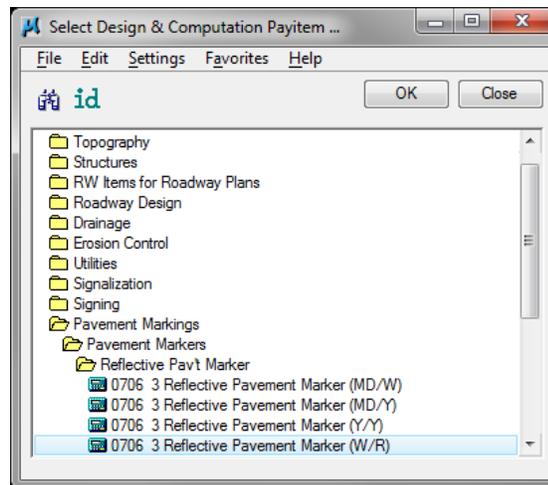
➤ *Placing RPM's using Draw Cell Group by Feature (Part 1)*

In this exercise, the student will place RPMs along the 10/30 skip line drawn in a previous exercise. Remember that a construction line must be drawn on top of the curved section of the skip line in order to get evenly spaced RPM's.

1. Continuing in *Dsgnsp01.dgn* open the Draw Cell Group by Feature tool. This tool can be opened on the Road tools palette or on the menu **Applications > GEOPAK ROAD > Plans Preparation > Draw Cell Group by Feature**.
2. On the *Feature Group* tab, click on the magnifying glass icon to open D&C Manager. Next, you will select one of the RPM items.



3. In D&C Manager navigate to Pavement Markings > Pavement Markers > Reflective Pav't Marker and select the Item 0706 3 Reflective Pavement Marker (W/R).

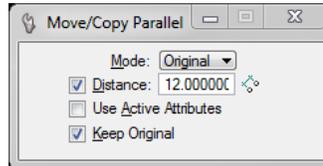


4. Click the **OK** button or **double click** on the item in D&C Manager. This will close D&C Manager and click this item over to the *Feature Group* tab.
5. You should also notice that the picture of the RPM is now visible in the dialog box. The items displayed in this tool are remembered in an .rsc file in the geopak\bin directory. If the .rsc files are deleted this tool will be clear with no items filled in.
6. Set the *Offset* to **0.0**. This is because the first skip line you are placing RPM's on is in a curve and the element you are using in the dgn file is a copy of the edge line on top of the 10/30 skip.
7. Click on the **Location** Tab.

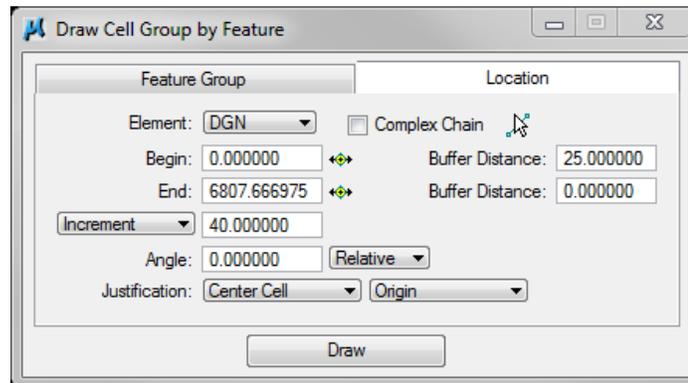
➤ **Placing RPM's using Draw Cell Group by Feature (Part 2)**

In this part of the exercise, you will copy the 6" white edge line over 12' and complete the Location tab of the Draw Cell Group by Feature tool.

1. Continuing in *Dsgnsp01.dgn* open the reference palette and turn the **dsgnr01** file off. This will make selecting the edge line easier.
2. Zoom to near Sta. **525+00**. You will be working on the right roadway first.
3. Using the MicroStation *Move/Copy Parallel* tool copy the **6" white edge line 12' left**. You should now have a solid line on top of the 10/30 skip line.



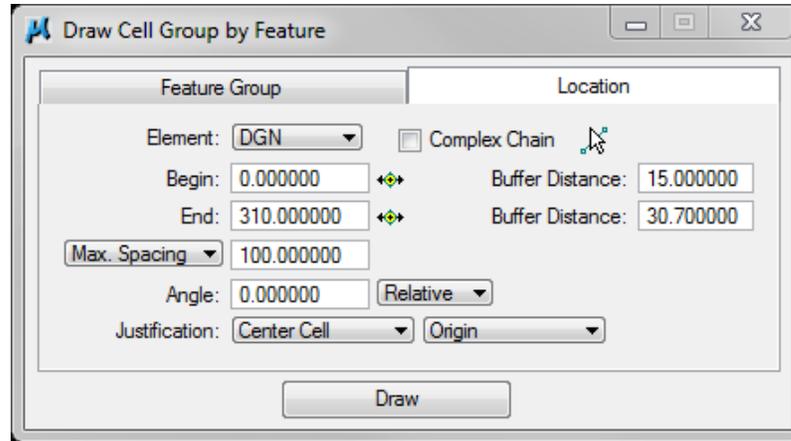
4. Continuing on the *Location* tab of the Draw Cell Group by Feature tool, set the *Element* to **DGN**.
5. Click the **Identify DGN element** button. Next, you will select the line you copied earlier.
6. Select the line you copied on top of the skip line. Make sure you do not select the short skip line.
7. The *Begin* field will be set to **0.00** and the *End* will be the **value of the total length of the element selected**.
8. **Delete** the copied line. Once the line is selected it is no longer needed.
9. Set the Begin Buffer Distance to **25.0**.
10. Set the End Buffer Distance to **0.00**.
11. Set to *Increment* and enter **40.0**. This is the spacing between the RPM's.
12. *Angle* should be **0.00** and **Relative**.
13. Set the *Justification* to **Center Cell** and **Origin**.



14. Click **Draw** and move the pointer over the skip lines and issue a **Data Point**. You should now see RPMs centered between the skips.
15. Take a moment to review the reflective pavement markers. Do not close the Draw Cell Group by Feature dialog; it is needed for the next exercise.

DIRECTIONAL ARROWS

Using the Draw Cell Group by Feature to draw directional arrows is very similar to how the RPM's were drawn. The **Feature Group** tab is the same only select the correct item in D&C Manager for the pavement arrow. In the **Location** tab, there are some settings that need to be set based on the standard indexes and the size of the arrow cell being placed in order to get the required spacing.

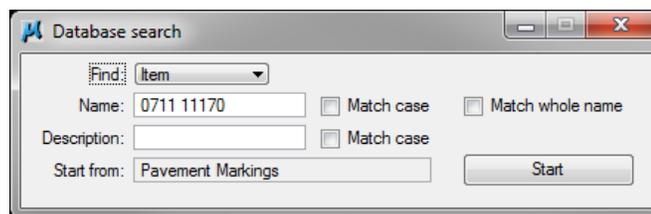


Exercise 4.4 *Placing Turn Arrows using Draw Cell Group by Feature*

In this exercise, the student will use the Draw Cell Group by Feature tool to draw turn arrows in the left turn lane worked on earlier in this chapter. When placing turn arrows and pavement messages refer to index 17346 for placement and spacing details. This exercise uses the 6" white lane line as the reference element to place the turn arrows.

1. Continuing in *Dsgnsp01.dgn* zoom to near **Sta. 558+00**.
2. Switch to the *Feature Group* tab on the Draw Cell Group by Feature tool.
3. Click the **Magnifying Glass** icon in the center field. This opens D&C Manager.
4. In D&C Manager navigate to Pavement Markings > Thermoplastic > Directional Arrows, Thermo STD > 0711 11170 Left Directional Arrow.

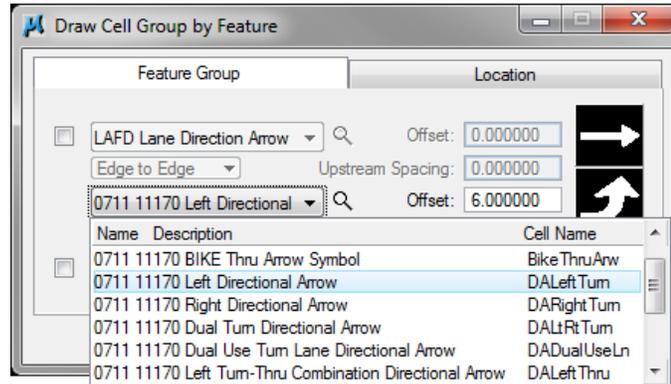
Note You can use the search function to locate items if you know the pat item number or description.



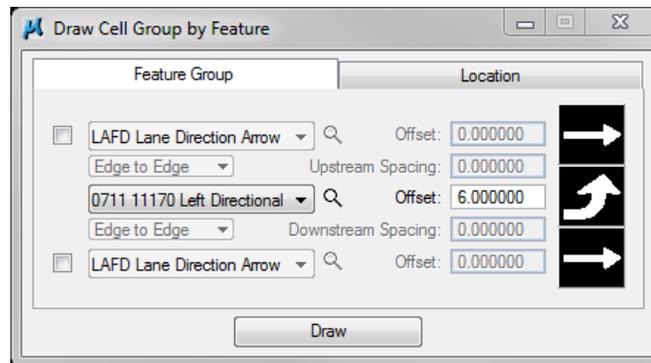
5. Either **Double Click** on the item in D&C Manager or click the **OK** button.

Note This loads all of the items from that category into the drop down menu on the Feature Group tab. Next, you need to select the correct item.

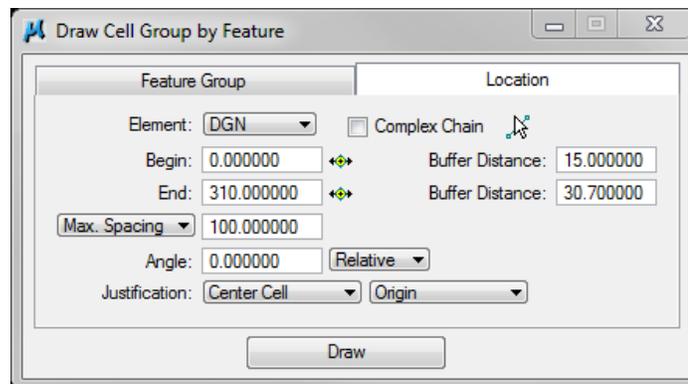
- Next to the **Magnifying Glass**, click the Drop Down menu and select the **Left Directional Arrow**. This will load the appropriate cell.



- Set the *Offset* to **6.0**. This is the distance from the reference element used to place the turn arrows; you must also take into account the cell origin if it is not in the center of the cell.



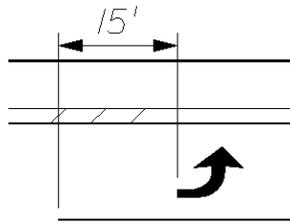
- On the *Location* tab set *Element* to **DGN**. Use the **6" white lane line** as the *reference element*.
- Click the **Identify DGN element** button and pick the **6" white lane line**. Make sure and pick the line near the entrance of the turn lane, the left side.



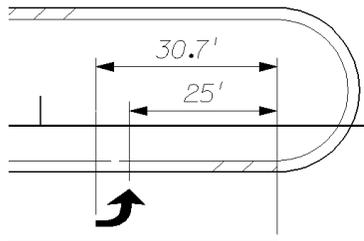
- Notice the *End distance* value is **310'**, based on the details on Index 17346 any turn lane longer than 200' the designer is to add one arrow for each additional 100'. This means the turn lane in this exercise requires four arrows total.

Note In this exercise, the white edge line starts at the right that is the Begin and the end is to the left. This is important to know before filling in the Buffer Distances. If you use Chain as the element then the Begin is on the left and End is to the right.

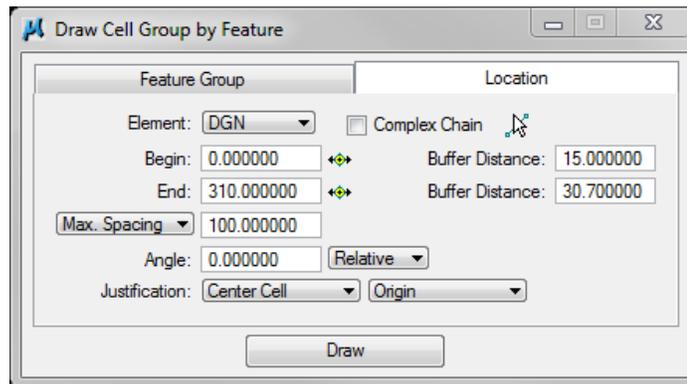
- Set the *Begin Buffer Distance* to **15.00**.



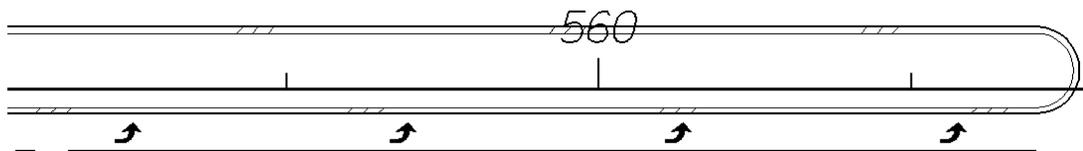
- Set the *End Buffer Distance* to **30.7**. This is the distance from the end of the white edge line or stop bar to the origin of the turn arrow cell to get the required 25' distance from the end of the lane line or stop bar to the point of the arrow.



- Set the *Spacing* to **Max Spacing**. To maximize the cell placement along the selected reference element.
- Set the *Spacing distance* to **100.0**.
- Set the *Angle* to **0.0**.
- Set *Rotation* to **Relative**.
- Set *Justification* to **Center Cell** and **Origin**.



- Click **Draw** and move the pointer into the turn lane and issue a **Data Point**.
- Close the Draw Cell Group by Feature tool. The figure below shows the completed turn lane.



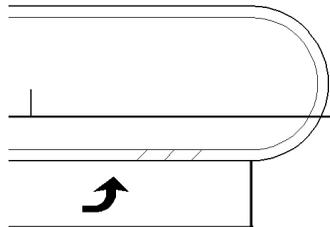
Exercise 4.5 *Placing Stop Bar using D&C Manager*

In this exercise, the student will use D&C Manager to place a stop bar. The Stop Bar item in D&C Manager has the Construct Perpendicular command built into it. When using the D&C Manager, always read the MicroStation status bar for hints.

1. Continuing in *Dsgnsp01.dgn* zoom to near **Sta. 561+00**. This is the end of the turn lane where you placed the turn arrows.
2. Open D&C Manager.
3. Navigate to the category Pavement Markings > Thermoplastic Traffic Strp & Mrkg > LF Striping, Standard > Solid Traf. Stripe (White).
4. Double click on item **0711 11125 24" Solid Traffic Stripe (White)**. Read the message field in MicroStation.



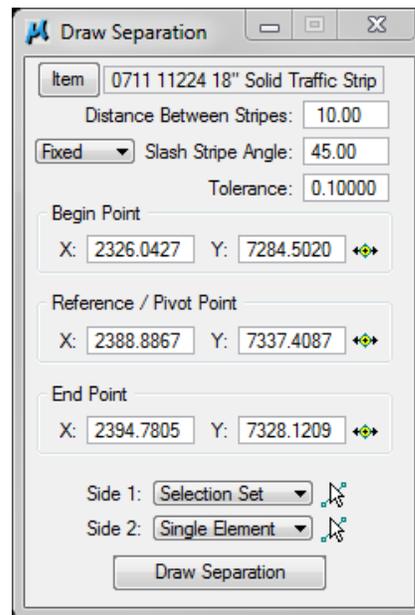
5. Snap to the end of the **Yellow edge line** for the start point.
6. Snap to the **white lane line** for the end point.
7. Turn Off **Place Influence**. The figure below shows the stop bar placed.



CHEVRON SEPARATION



Another pavement marking tool is the Draw Separation tool. This tool allows you to draw stripes at an angle between elements such as a center turn lane where it approaches a left turn condition.



- **Item** – This is the pay item selected in D&C Manager. Clicking the Item button loads the selected item from D&C Manager.
- **Distance Between Stripes** - Refer to the indexes for the correct distance between stripes.
- **Slash Stripe Angle** – This is the angle, in degrees, of the stripe.
- **Fixed** - Stripes are placed parallel to the first stripe (relative to the Reference Point), even in non-tangential areas.
- **Variable** - The angle is maintained between the stripe and the location side, even around curves.
- **Begin Point** - Identifies the beginning of the striping. Note: Begin does not have to be on the element (but inside the striping area) as the software constructs perpendicular to the element and utilizes the projection by utilizing Begin (and End), the length of the striping is determined by the designer, not the length of the chain. Note: If the beginning area is in a gore, DO NOT snap to the gore itself, as the point must be inside the striping area.
- **Reference / Pivot Point** - Point projected onto the Side 1 element and the first marking is placed. The placement of all other markings in this processing are placed relative to this first stripe.
- **End Point** - Serves the same function as Begin, but at the opposite end.

- **Side 1** - In order to place the pavement markings correctly, you must understand the difference between Side 1 and Side 2. Side 1 is the termination side of the stripe or where the marking stops.
- **Side 2** - Side 2 is utilized when turning the Slash Stripe Angle. The software begins on Side 2, and draws the marking at the specified angle until it intersects the Side 1 element, where the marking stops. It is also desirable to have the total length of the Side 2 elements longer than the Side 1 elements; however, it is not mandatory. Three methods are supported to define the elements. It is not necessary to use the same method on both sides.
- **Selection Options** – There are three options for selecting the side elements in MicroStation:
 - *Single Element* – When selected, you are prompted to select the element.
 - *Selection Set* – If the selected elements are in reference files, this method must be utilized, as Complex Chains cannot be selected from reference files. Create the selection set, and then set the toggle to **Selection Set**. Click **Identify DGN Element** to accept the selection set.
 - *Complex Chain* – Select the option, which invokes the MicroStation Create Automatic Complex chain tool to define the elements.
- **Draw Separation** - By moving the cursor on the screen, the designer can move the striping to the desired angle side (90 degrees), and a **Data Point** places the striping into the MicroStation file. The striping is placed (with each **Data Point**) in a graphic group for easy deletion, if desired.

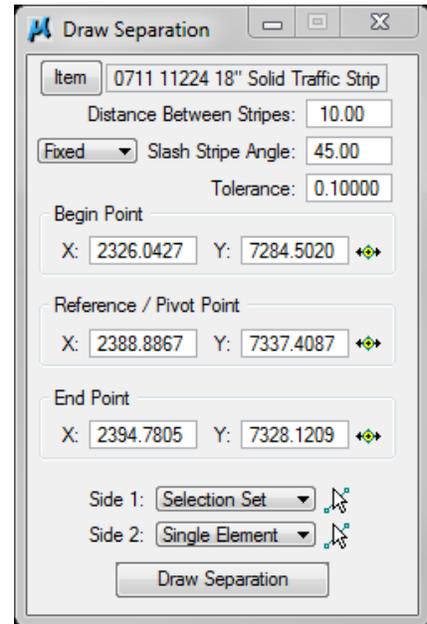
Exercise 4.6 Draw Separation

➤ **Draw Separation (Part 1)**

In this exercise, you will draw 18” Yellow separation lines using the Pavement Marking tool Draw Separation.

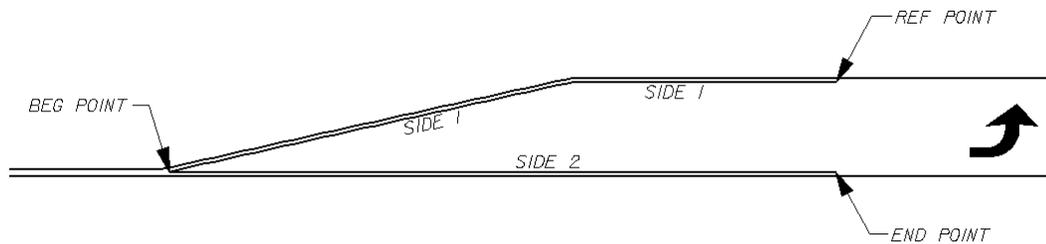
1. Open **Dsgnsp-Stripe.dgn** in the *Signing* folder.
2. Open the *Model Separation*.
3. Open D&C Manager.
4. From the FDOT Menu > Traffic Plans > Signing and Markings, select **Pavement Marking Program**. This will open the D&C Manager with the Pavement Marking Program active.
5. Navigate to Pavement Markings > Thermoplastic Traffic Strp & Mrkg > LF Striping, Standard > Solid Traf. Stripe (Yellow).
6. Select Item 0711 11224 18” Solid Traffic Stripe (Yellow).
7. On D&C Manager, click the **Pavement Markings** button.

8. Click **Separation**. This opens the **Draw Separation** tool as shown below.



9. Set the *Distance Between Stripes* to **10.0**. Refer to Index 17346 for spacing and angle criteria.
10. Select **Fixed** for the *stripe angle*.
11. Set the *Slash Stripe Angle* to **45.0**.
12. Set the *Tolerance* to **0.10**.
13. Set the *Begin Point*, *Reference / Pivot Point*, and *End Point* as shown in the figure. Use the VCR buttons next to each option before snapping to the lines.

14. Use the tentative snap to select the end point of each line.



15. For *Side 1* set the option to **Selection Set**.
16. Using *Power Selector* select both lines representing **Side 1**, see figure above.
17. Once both lines are selected, click the **Accept Select Set** button next to the *Side 1* option.
18. Clear the selection set from *Power Selector*.
19. For *Side 2* set the option to **Single Element**.
20. Click the Identify DGN Element button.
21. Select **Side 2** as seen in figure above. This is a two-click process; select and accept.
22. Click **Draw Separation** and move the cursor onto the screen, adjust the striping by moving the mouse left and right until the desired rotation is present.
23. Issue a **Data Point** to draw the stripes. The figure below shows the finished product. The stripes are placed in a graphic group for easy deletion.

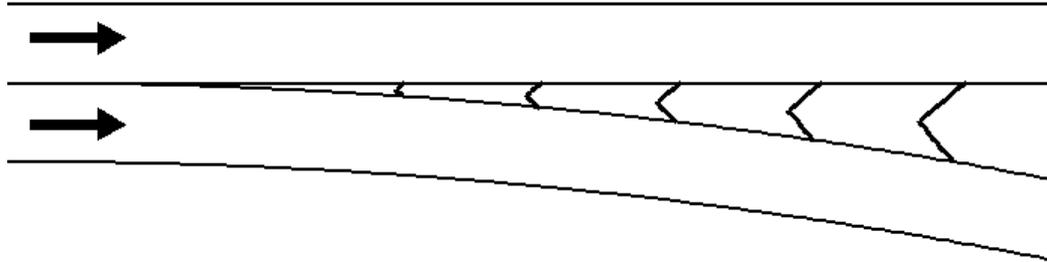


24. Close the **Draw Separation** tool. Do not close **D&C Manager**.

CHEVRON DIVERGE



The *DrawChevron Diverge* tool is used for traffic channelization at a gore when traffic flows in the same direction as seen in the figure below. Refer to Index 17346 for specific design criteria.



DrawChevron Dive...	
Item	0711 11124 18" Solid Traffic Strip
Distance Between Chevrons:	20.00
Tolerance:	0.10000
Gore Point (Wide End of Gore)	
X:	592453.54
Y:	1627369.62
Breaking Line	
X:	592429.63
Y:	1627357.04
Diverge Point (Narrow End of Gore)	
X:	592360.11
Y:	1627317.47
Side 1:	Single Element
Side 2:	Single Element
Draw Chevron Diverge	

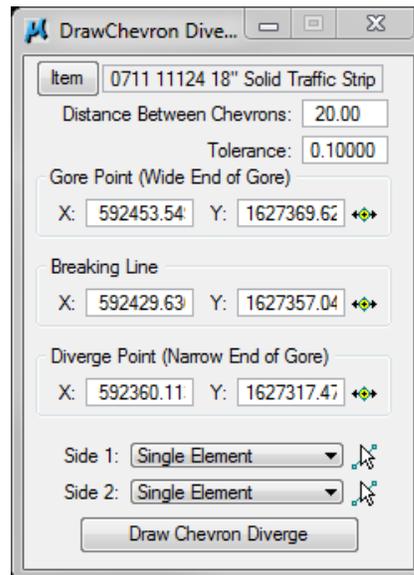
- **Item** – This is the pay item selected in D&C Manager. Clicking the Item button loads the selected item from D&C Manager.
- **Distance Between Chevrons** – Refer to the indexes for the correct distance between stripes.
- **Tolerance** - If the length of a segment of pavement marking is less than the **Tolerance**, the line will not be placed. It will only be utilized at the ending point, to determine where the final piece of marking is placed.
- **Gore Point (Wide End of Gore)** – Identifies the wide end of the gore.
- **Breaking Line** – Placed between the two sides and is used to draw the chevron. This can be adjusted during the drawing process to obtain the best scenario.
- **Diverge Point (Narrow End of Gore)** – Identifies where the chevron stops at the narrow end of the gore.
- **Side 1** – Is the intersecting side where the stripe stops.
- **Side 2** – Is utilized when turning the **Slash Stripe Angle**. The software begins on **Side 2**, and draws the marking at the specified angle until it intersects the **Side 1** element, where the marking stops. It is also desirable to have the total length of the **Side 2** elements longer than the **Side 1** elements; however, it is not mandatory.

- **Selection Options** – There are three options for selecting the side elements in MicroStation:
 - Single Element – When selected, you are prompted to select the element.
 - Selection Set – If the selected elements are in reference files, this method must be utilized, as Complex Chains cannot be selected from reference files. Create the selection set, and then set the toggle to **Selection Set**. Click **Identify DGN Element** to accept the selection set.
 - Complex Chain – Select the option, which invokes the MicroStation Create Automatic Complex chain tool to define the elements.
- **Draw Chevron Diverge** – Displays the striping and the diverging line. A **Data Point** draws the chevron and removes the displayed diverging line. The striping is placed (with each **Data Point**) in a graphic group for easy deletion, if desired.

➤ **Draw Chevron Diverge (Part 2)**

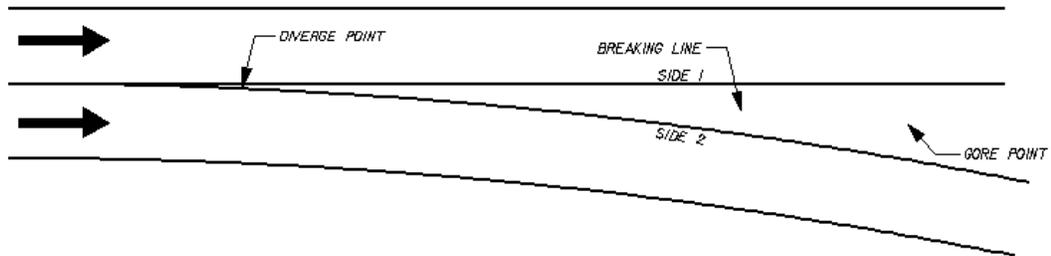
In this exercise you will draw 18” White chevrons in gore area. Refer to Index 17346 for specific design criteria for your specific project requirements. To aid in the selection of the three pick points you will notice labels with leader lines, the end of the leader lines represent the location to snap to when performing this exercise.

1. Continuing in *Dsgnsp-Stripe.dgn* open the model **Diverge**.
2. In **D&C Manager** navigate to Pavement Markings > Thermoplastic Traffic Strp & Mrkg > LF Striping, Standard > Solid Traf. Stripe (White).
3. Select Item 0711 11124 18” Solid Traffic Stripe (White).
4. In **D&C Manager**, click **Chevron Diverge**. This opens the DrawChevron Diverge tool as shown below. The Item should also be set.



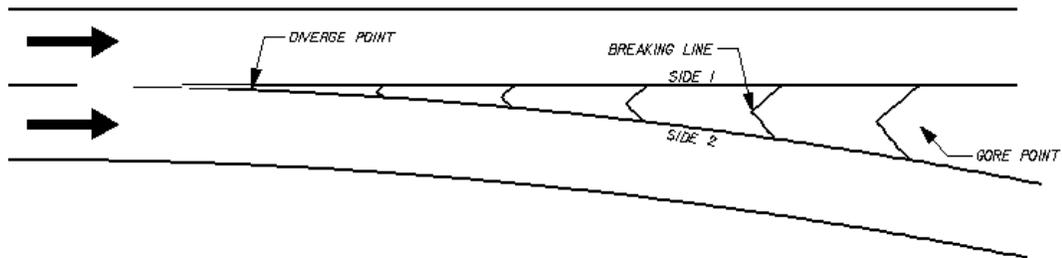
5. Click the **Item** button if the item is not already set. If you select the correct Item in D&C Manager before starting the Chevron Diverge tool the Item is automatically filled in.
6. Set the *Distance Between Chevrons* to **20.0**. Refer to Index 17345 for spacing.
7. Set the *Tolerance* to **0.10**.

8. Set the *Gore Point (Wide End of Gore)*, *Breaking Line*, and *Diverge Point (Narrow End of Gore)* as shown in the figure below. Use the VCR buttons next to each option before snapping to the lines. These locations were pre set to aid in the completion of this exercise, feel free to deviate from these points to view the differences in chevron placements.



9. For *Side 1* set the option to **Single Element**.
10. Click the Identify DGN Element button.
11. Select the **Side 1** element as seen in figure above. This is a two-click process; select and accept.
12. Repeat the above steps for *Side 2* selecting the **Side 2** element.
13. Click Draw Chevron Diverge and move the cursor onto the screen, adjust the striping by moving the mouse left and right until the desired rotation is present.
14. Issue a **Data Point** to draw the stripes.

The figure below shows the finished product. The stripes are placed in a graphic group for easy deletion.

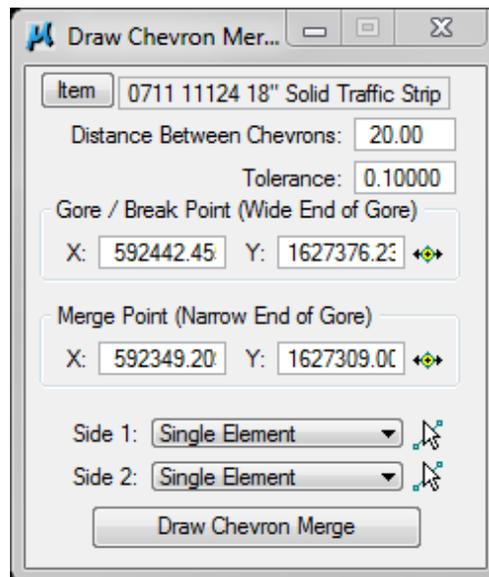
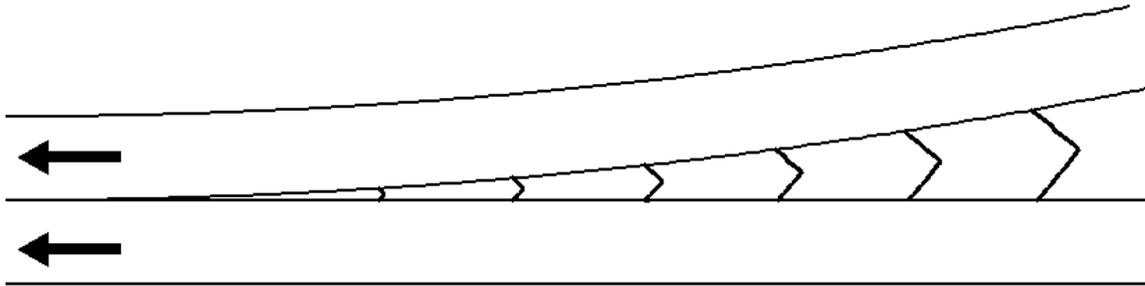


15. Close the DrawChevron Diverge tool.

CHEVRON MERGE



The Draw Chevron Merge tool is used for traffic channelization at a gore when traffic flows in the same direction in a merging situation as seen in the figure below. Refer to Index 17345 for specific design criteria.



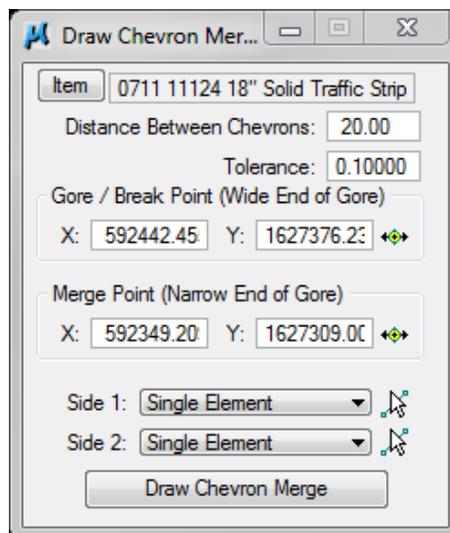
- **Item** – This is the pay item selected in D&C Manager. Clicking the Item button loads the selected item from D&C Manager.
- **Distance Between Chevrons** – Refer to the indexes for the correct distance between stripes.
- **Tolerance** - If the length of a segment of pavement marking is less than the **Tolerance**, the line will not be placed. It will only be utilized at the ending point, to determine where the final piece of marking is placed.
- **Gore / break Point (Wide End of Gore)** – Identifies the breaking line for the chevron and should be located near the wide end of the gore.
- **Merge Point (Narrow End of Gore)** – Identifies the point where the chevron stops at the narrow end of the gore. The software utilizes the **Gore / Break Point**, the **Merge Point** and the intersection of the two sides to construct an arc, which demarcates the breaking in the merging chevron.
- **Side 1** – Is the intersecting side where the stripe stops.

- **Side 2** - Is utilized when turning the **Slash Stripe Angle**. The software begins on **Side 2**, and draws the marking at the specified angle until it intersects the **Side 1** element, where the marking stops. It is also desirable to have the total length of the **Side 2** elements longer than the **Side 1** elements; however, it is not mandatory.
- **Selection Options** – There are three options for selecting the side elements in MicroStation:
 - *Single Element* – When selected, you are prompted to select the element.
 - *Selection Set* – If the selected elements are in reference files, this method must be utilized, as Complex Chains cannot be selected from reference files. Create the selection set, and then set the toggle to **Selection Set**. Click **Identify DGN Element** to accept the selection set.
 - *Complex Chain* – Select the option, which invokes the MicroStation Create Automatic Complex chain tool to define the elements.
- **Draw Chevron Diverge** – Displays the striping and the diverging line. A **Data Point** draws the chevron and removes the displayed diverging line. The striping is placed (with each **Data Point**) in a graphic group for easy deletion, if desired.

➤ Draw Chevron Merge (Part 3)

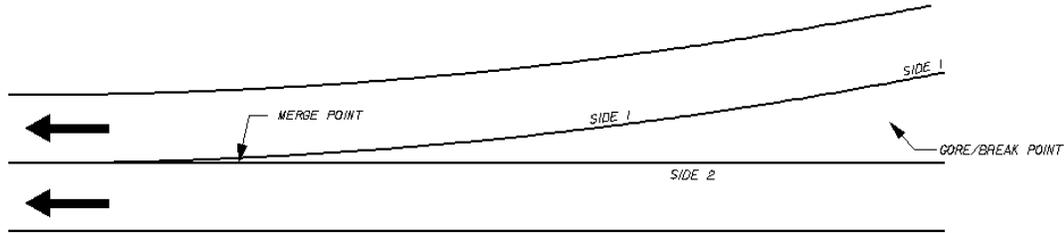
In this exercise the student will draw 18" White chevrons in gore area in a lane merge scenario. Refer to index 17345 for specific design criteria. As mentioned earlier, to aid in the selection of the pick points you will notice labels with leader lines, the end of the leader lines represent the location to snap to when performing this exercise.

1. Continuing in *Dsgnsp-Stripe.dgn* open the model **Merge**.
2. In D&C Manager navigate to Pavement Markings > Thermoplastic Traffic Strp & Mrkg > LF Striping, Standard > Solid Traf. Stripe (White).
3. If you did not close D&C Manger from the last exercise, the item will still be set.
4. Select Item 0711 11124 18" Solid Traffic Stripe (White).
5. In D&C Manager, click **Chevron Merge**. This opens the Draw Chevron Merge tool as shown below. The Item should also be set.

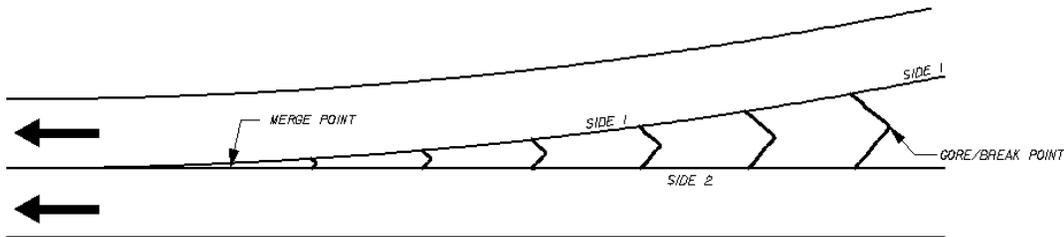


6. Click the **Item** button if the item is not already set. As mentioned previously, if you select the correct Item in D&C Manager before starting the Chevron Merge tool the Item is automatically filled in.
7. Set the *Distance Between Chevrons* to **20.0**. Refer to Index 17345 for spacing.
8. Set the *Tolerance* to **0.10**.

9. Set the *Gore/Break Point (Wide End of Gore)* and *Merge Point (Narrow End of Gore)* as shown in the figure below. Use the buttons next to each option before snapping to the lines. These locations were preset to aid in the completion of this exercise.



10. For **Side 1** set the option to **Selection Set**.
11. Using *Power Selector* select both lines representing **Side 1**, see figure above.
12. Once both lines are selected, click the **Accept Select Set** button next to the *Side 1* option.
13. Clear the selection set from *Power Selector*.
14. For *Side 2* set the option to **Single Element**.
15. Click the Identify DGN Element button.
16. Select the **Side 2** element as seen in figure above. This is a two-click process; select and accept.
17. Click **Draw Chevron Merge** and move the cursor onto the screen, adjust the striping by moving the mouse left and right until the desired rotation is present.
18. Issue a **Data Point** to draw the stripes. The figure below shows the finished product. The stripes are placed in a graphic group for easy deletion.



19. Close the Draw Chevron Merge tool.

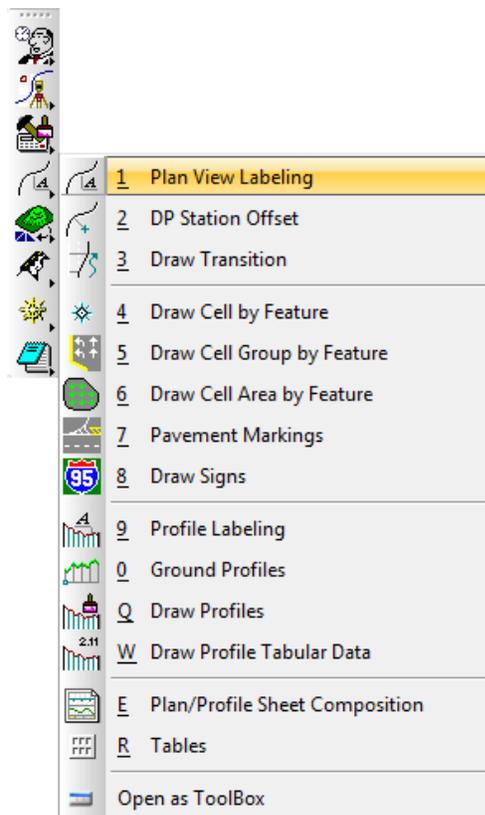
PLAN LABELING

GEOPAK delivers a tool, Plan View Labeler, to aid in the placement of plan labels. These labels can be simple callouts or complex blocks of text with stations and offsets built into them. It is possible to create custom labels for those pieces of text that are placed repeatedly into a style file similar to a library. FDOT delivers style files with custom labels already created.

Labels created with labeler can be synced with D&C Manager for level symbology. This resolves issues with inconsistency between users. Labels can also be created at a scale of 1 to 1 so that they will work on any scale sheet.

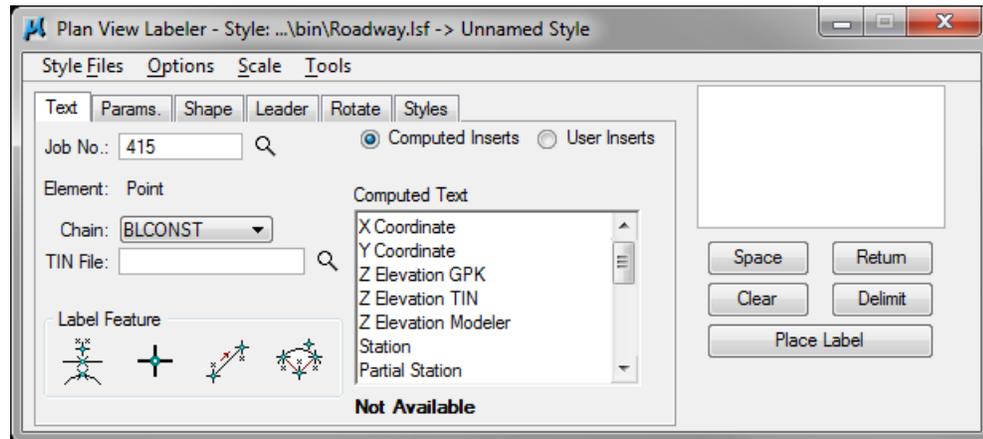
Labels can be created with leader lines and arrow heads as part of the custom label. The arrow heads can be terminators delivered by FDOT or the standard arrows built into the labeler. Again, this makes for very consistent plan labeling if all users use the same labels.

Plan View Labeler can be launched from the Road Tools palette or on the Applications menu **Applications > GEOPAK ROAD > Plans Preparation Plan View Labeling**.

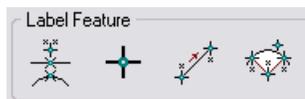


The general work flow of the Labeler is:

- Open Labeler.
- Open a Style File or .lsf.
- Select a custom label.
- Create a custom label.



The Label Feature buttons on the Text tab are discussed below.



Select GEOPAK or MS Element – Prompts the designer to select the GEOPAK or MicroStation element. From this selection, the designer can retrieve the geometry and place that information in MicroStation.



Data Point Location – Prompts the designer to snap to or issue a **Data Point** in the design file. Usually used when placing station and offsets.



2 GPK Point Line - Works with visualized points from COGO. When the points are selected, a display line is drawn between the points and a circle is placed at the midpoint. The bearing of that line is displayed and can be placed in MicroStation.



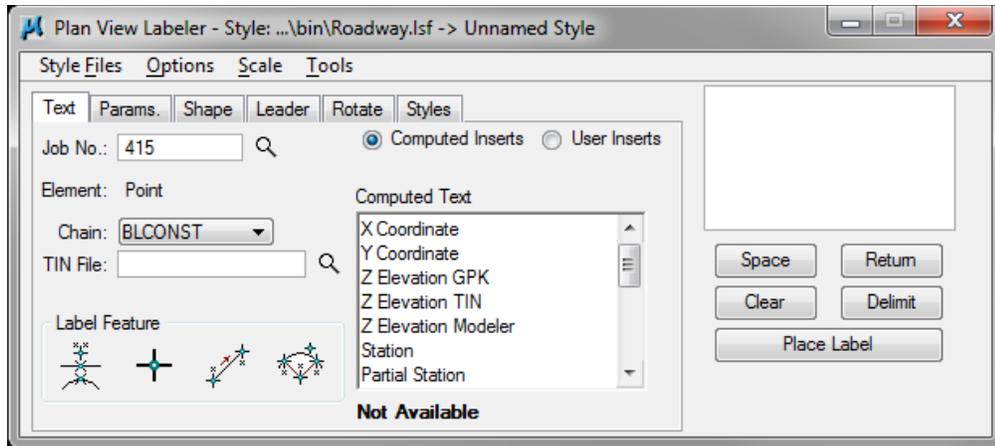
3 GPK Point Arc - Works with visualized points from COGO representing the P.C. and P.T. of the curve. When the points are selected, a display curve is drawn and the designer is prompted to enter the chord direction point, which is identified dynamically. Now any element of the curve's geometry can be displayed or placed in MicroStation.

Exercise 4.7 Text Labels

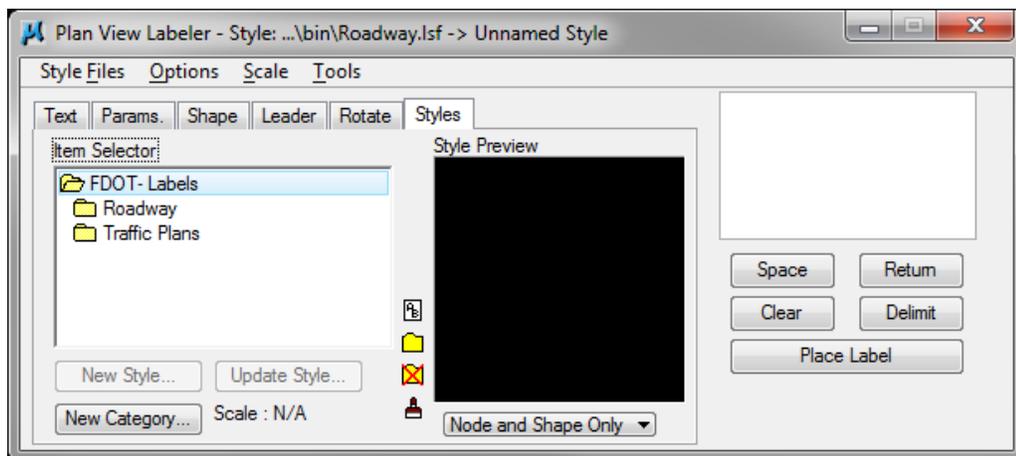
➤ Text Labels (Part 1)

In this exercise, you will place a custom label previously created and delivered with the FDOT Menu software. You will label the lines drawn in previous exercises.

1. Open Dsgnsp01.dgn and zoom to STA. 560+00.
2. Rotate the MicroStation view by 2 points so that the turn lane is horizontal on the screen. Use the tick marks as reference points.
3. Open Plan View labeler. Either from the Road Tools palette or from the Applications menu.

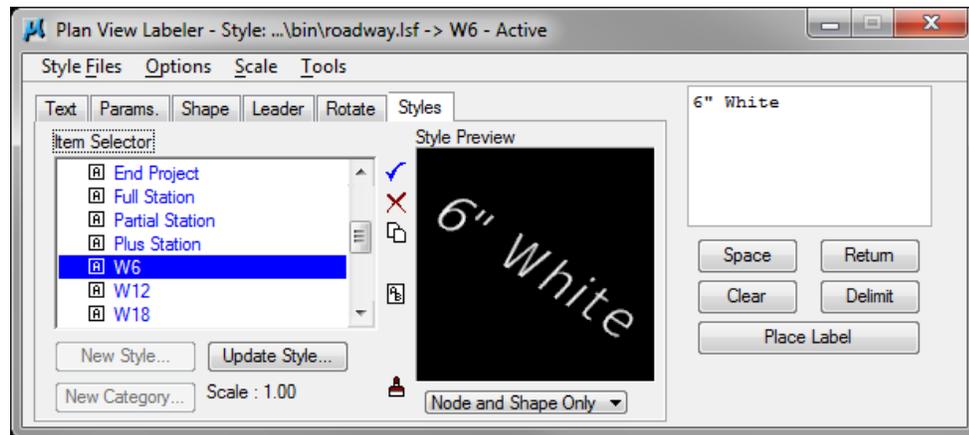


4. Open the **Styles** tab. By default, the labeler opens the **fdotlabels.lsf** style file.
5. The figure below shows the two (2) categories built into the style file. Expanding any of the categories will show custom labels or sub-categories.

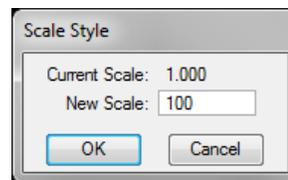


6. Double click on the *Traffic Plans* category. This will show all of the delivered labels.

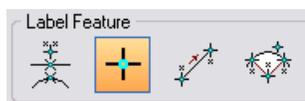
7. Scroll down and select **W6**. This will show up in the preview window as **6" WHITE**.



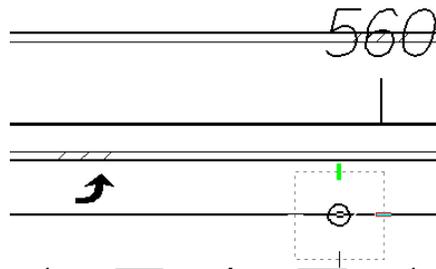
8. Click the **Blue** check mark to set the **W6** style as the active style. You could also double click on the item.
9. Next, you should set the scale of the style. Notice in the figure above that the Scale of the selected style is 1.00. The scale of the plans in this exercise is 100.
10. In Plan View Labeler Menu, select **Scale > Change Scale**. This opens the Scale Style dialog.



11. Change the *scale* to **100** and click **OK**. This sets all of the text parameters for a 100 scale label.
12. Select on the **Text** tab.
13. At the bottom of the *Text* tab, click the **Data Point Location** icon.

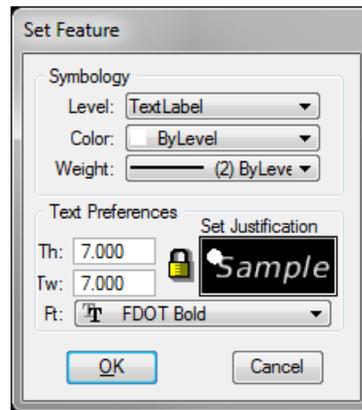
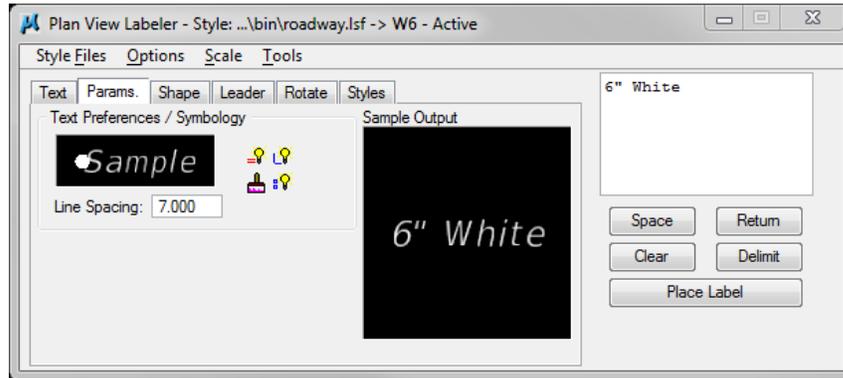


14. Snap using the tentative button to the line you want to label. This point represents where the arrow head of the leader line will end or if no leader line is used then this will be the location of the text label. A circle will appear at the location snapped to; this indicates you selected the line.
15. Using the **Nearest** snap, tentative snap to the **6" White Lane Line** then **Data Point**. A circle will mark the location of Data Point.



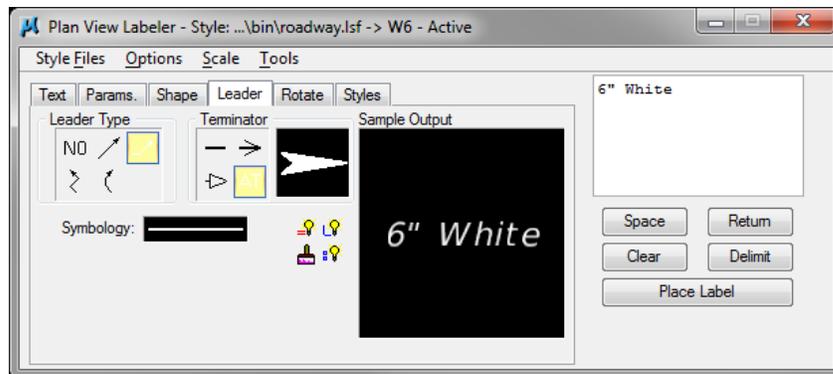
16. Select the **Params.** Tab.

17. Take a moment to review this tab, notice that everything is already set including the text height and width.



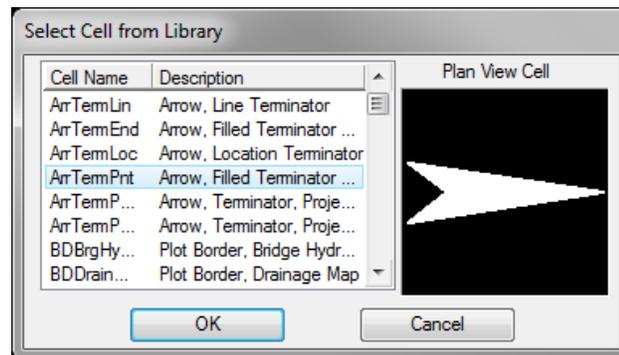
18. The justification and font may need to be set. If so, set the justification to Top Left and the font to FDOT Bold.
19. Select the **Leader** tab. Notice that this label, by default, draws a leader line with an open terminator.

Note The AT button in the Terminator option allows you to place a terminator from a cell library.

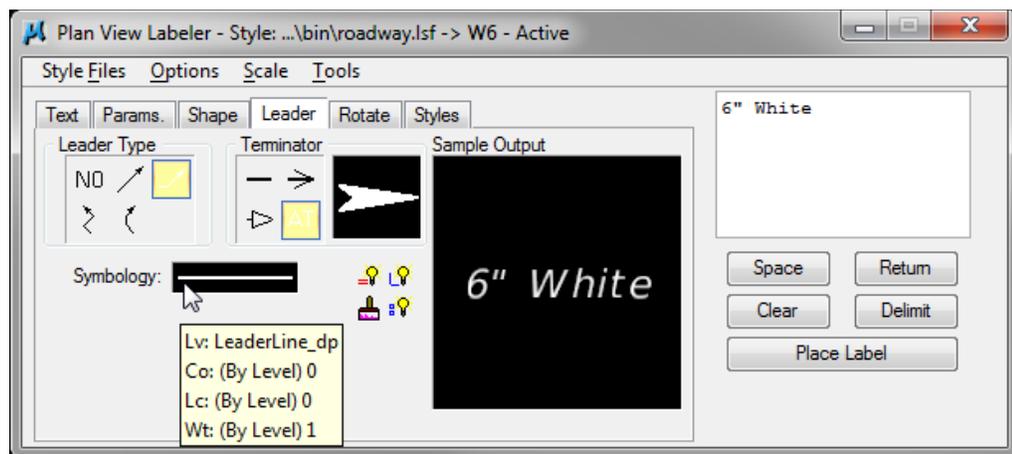


20. Click (if it's not already highlighted) the AT button. This will open a preview window next to the Terminator box.
21. Next, you will need to load the cell library in MicroStation that contains the terminators. Once the cell library is loaded, double click in the preview window to select the appropriate terminator.
22. In FDOT Menu, select **CellApps > Cell Libraries**. This opens the **Cell Library** dialog.
23. In the Cell Library, attach the **rdwyeng** cell library. Use the File menu and select the library from the list.

24. Back on the **Leader** Tab, double click in the Terminator preview window. This opens the **Select Cell from Library** dialog as seen below. (You may have to attach a cell library prior opening the **Select Cell from Library** dialog. You can access the cell library dialog from the **Microstation** Menu under the **Element** and select **Cells**.)

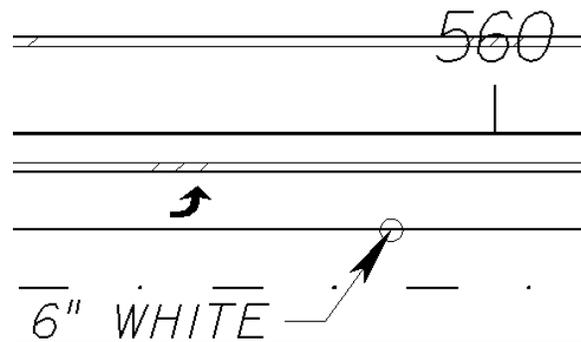


25. Select the **ArTermPnt** cell.
 26. Click **OK**. This loads the terminator into the preview window.



27. Click the **Place Label** button.
 28. The next step is to place the label in the file. This is a three step process:

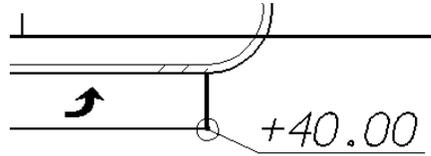
- *First* you place the text graphically where you want it,
- *Next* you select the side of the text to place the leader and
- *Finally* you place a third point to determine how long to make the leader line. The figure below shows what this exercise is looking for.



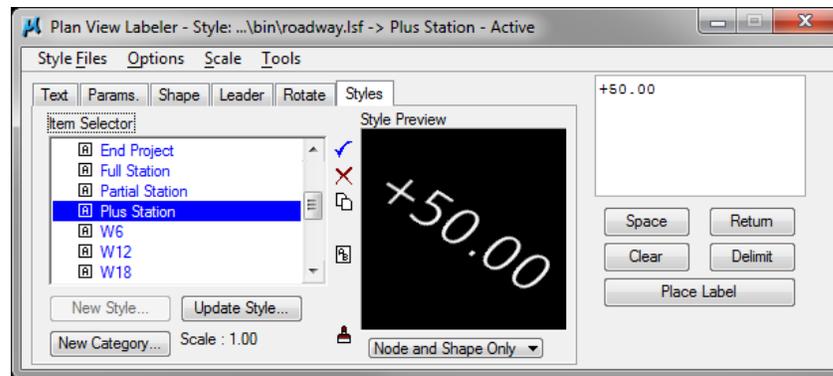
29. Move the cursor near the lane line being labeled and issue a **Data Point**. This places the text label.
 30. Move the cursor to the right or left of the text label and issue a **Data Point**.
 31. Move the cursor to adjust the length of the leader line.
 32. Reset to **Cancel** the command.

➤ Place Offset on Stop Bar (Part 2)

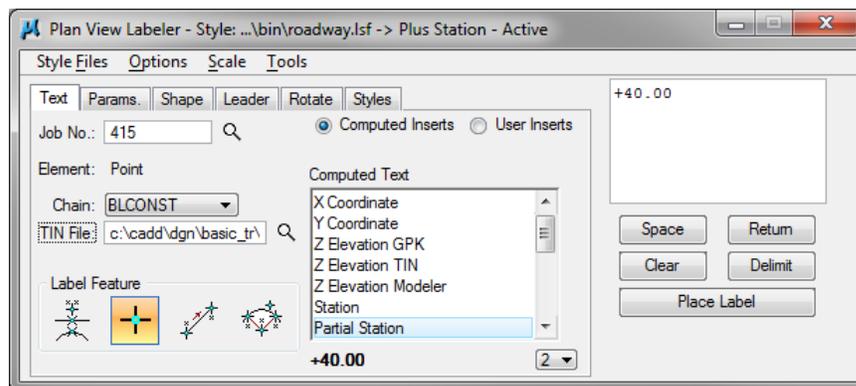
In this exercise, the student will continue with the Plan View Labeler and place a station label at the stop bar in the same turn lane worked in earlier. The figure below shows the objective of this exercise. As with any CADD standard, check with the local district and follow those adopted policies.



1. Continuing in *Dsgnsp01.dgn* zoom to the end of the turn lane near **Sta. 561+50**.
2. Select the **Styles** Tab.
3. Click the **Clear** button. This is above the **Place Label** button.
4. In the **Item Selector**, select the style **Plus Station**. This also is a custom label delivered by FDOT.

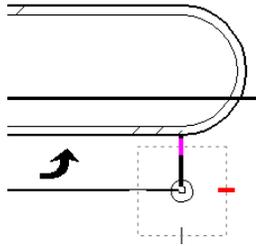


5. Click the **Blue** check icon.
6. Set the **Scale** to **100**. This defaults back to the scale the custom style was created at each time a new style is selected.
7. In the **Text** tab, make sure the **Chain** is set to **BLCONST**. If not, use the drop down menu to select the chain.



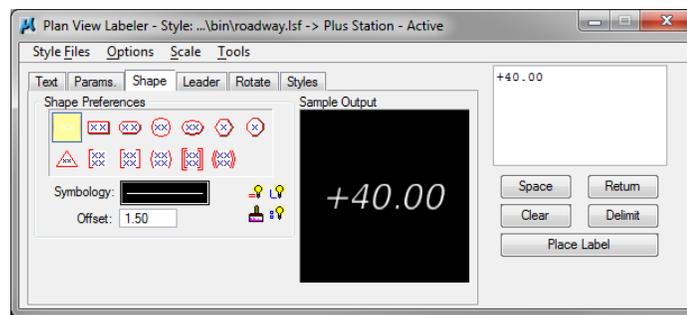
8. In the **Text** tab, click the **Compute Inserts** radio button.
9. Highlight the **+50.00** in the label preview window and delete it.
10. In the **Text** tab, click the **Data Point Location** icon.
11. **Snap** to the end of the stop bar. Notice the circle at the snap point this is where the leader line will end.

12. Double click **Partial Station** from the *Computed Text* list box. Notice that the text label in the preview window has changed to the actual station of the stop bar, +40.00.

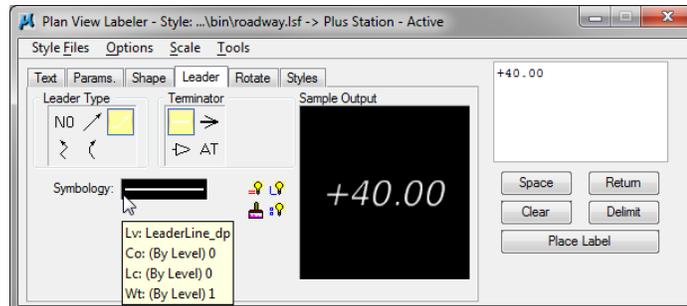


13. In the **Params.** Tab set the *Font* to **FDOT Bold**.
 14. In the **Shape** tab set the *Offset* to **1.5**.

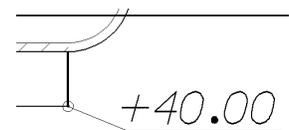
Note Even though this is set to not draw a shape, the Offset feature will control how far the text label is off of the leader line if the line goes under the label.



15. In the **Leader** Tab set the *Leader Type* to a **Two Point** leader line.



16. Set the *Terminator* to **No Terminator**.
 17. Set the *Level* to **LeaderLine_dp**. (Should already be set.)
 18. On the **Rotate** Tab, click the **Element** button under **Set Angle By**.
 19. Select the lane line as the element. This will set the rotation of the text label and start the Place Label function.
 20. Position the cursor to the Right of the stop bar and issue a **Data Point**. This places the text.
 21. Move the cursor all the way to the bottom right side of the text label and issue a **Data Point**. This starts the construction of the leader line under the text label.
 22. Move the cursor to the left under the text label and issue a **Data Point** on the left side of the text.
 23. Take a moment to review the labels placed and become more familiar with this tool.
 24. Close Plan View Labeler.



Exercise 4.8 Check Compliance of Design File

In this exercise, the student will run a check of the design file to check the CADD compliance up to this point. FDOT delivers a tool to perform this.

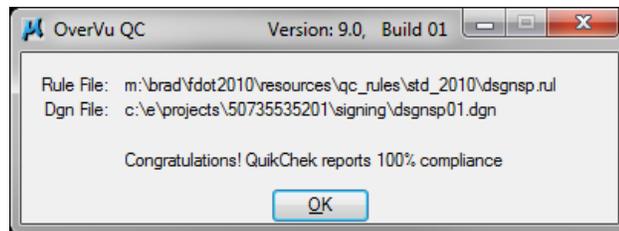
If the compliance is less than the minimum based on the CPCH, FDOT delivers tools to aid in fixing elements in the file to bring the compliance up to at least the minimum. This design file is considered a critical file meaning it is shared across disciplines, used in quantity calculations for pay items or used in automation by downstream applications. Critical files shall meet a 95% threshold of compliance. Non-critical files shall be at least 80% compliant.

If submitted files do not meet the required compliance, a variance must be obtained from the FDOT project manager and documented in the project journal.

1. Continuing in *Dsgnsp01.dgn* select the green check mark over a clipboard icon at the end of the FDOT Menu. This starts the **QCCompliance** process.



2. Once the file is scanned, the OverVuQC dialog will report the compliance of the design file.

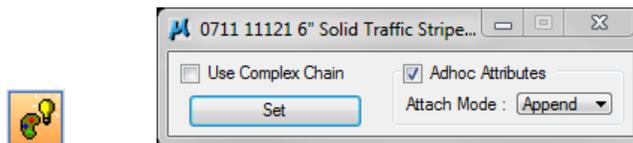


3. If you do nothing this box will close on its own. Clicking **OK** will close the dialog.

FIXING ELEMENTS NOT DRAWN WITH D&C MANAGER

The Set command is used to fix elements that were not drawn with D&C Manager. Example: a project that contains pavement marking items and the designer is trying to run quantities but nothing happens. All of the elements are on the correct level but there is no D&C Manager attribute on them.

Once invoked, the Set command opens the dialog seen below. This dialog allows the designer to set a MicroStation element to a D&C Manager item and also add Adhoc attributes to those elements.



The workflow of this tool is:

- Select the item in D&C Manager.
- Start the Set command.
- Click the Set button.
- Select the element in MicroStation to fix and accept it.
- Use selection sets to make it easier to fix multiple items at the same time.
- The Adhoc Attribute feature has the same functionality as in Design mode. It is suggested to always leave this selected. It will not add or change anything if there are no Adhocs attributes on the pay item.

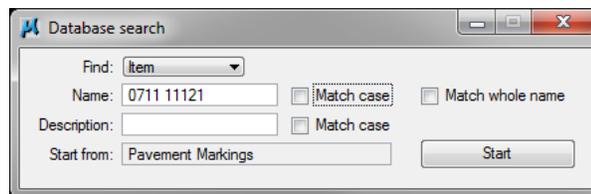
Exercise 4.9 Set MicroStation Elements to D&C Manager Item

In this exercise, the student will set MicroStation lines to have D&C Manager attributes on them. These lines are 100% CADD compliant but they will not quantify. This scenario is common when all users in an office do not use D&C Manager to draw elements into MicroStation. No one will have to redraw the lines, only set them to the appropriate item.

1. Open **Dsgnsp-Stripe.dgn** in the *signing* folder.
2. Open the *model* **Fix Lines**. This is set up for this exercise only.
3. Run QCCompliance. Notice file is 100% compliant.
4. Open D&C Manager.

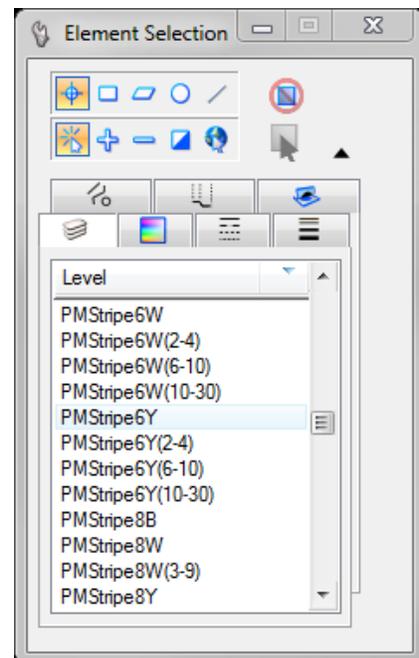
Next, you will use the search function to locate the item in D&C Manager.

5. Use the **ID** button and  select the elements in the **Fix Lines** model. Notice the Model checks out at **100%**, but none of the elements match **DDB** items.
6. In D&C Manager, select **Edit > Find**.
7. In the Database Search dialog set the *Find* option to **Item**.
8. In the *name field* key-in **0711 11121**. Make sure to add the space in the name.



9. Click **Start**. This will set you on that item and save having to navigate to it.
10. Close the Database Search dialog.

11. On D&C Manager, click the **Set** icon . This opens the set dialog.
12. Click the **Set** button.
13. Select the **6" White Lane lines** and accept them. It is not necessary to go back to the Set button each time.
14. In D&C Manager set the *Item* to 0711 11221 6" Solid traffic Stripe (Yellow).
15. Use PowerSelector and select the **yellow edge lines**.
16. Click the **Set** button. There is no need to Data Point on the screen to accept the lines with this option; it is done all in one step.



5 SIGNAGE TOOLS

OBJECTIVE

In this chapter the following topics will be covered:

- Draw Sign program
- GuidSIGN
- Placing Notes and Text

INTRODUCTION

This section covers the sign applications available in the Traffic Plans Menu. There are Signing Web Pages included, containing all sign cells from the *M.U.T.C.D. and Standard Highway Sign* book. These cells can be placed anywhere within the design file.

At this point, the designer may have an inventory of existing signs for their project. The designer has to decide which signs need to be removed, relocated, or replaced. This work should be done in the proposed design file, *dsgnsp01.dgn*, created in Section One.

The Draw Sign program is another source of proposed and existing sign cells. It allows the designer to browse through a selection of standard cells, place them in the design file, and link them to D&C Manager items.

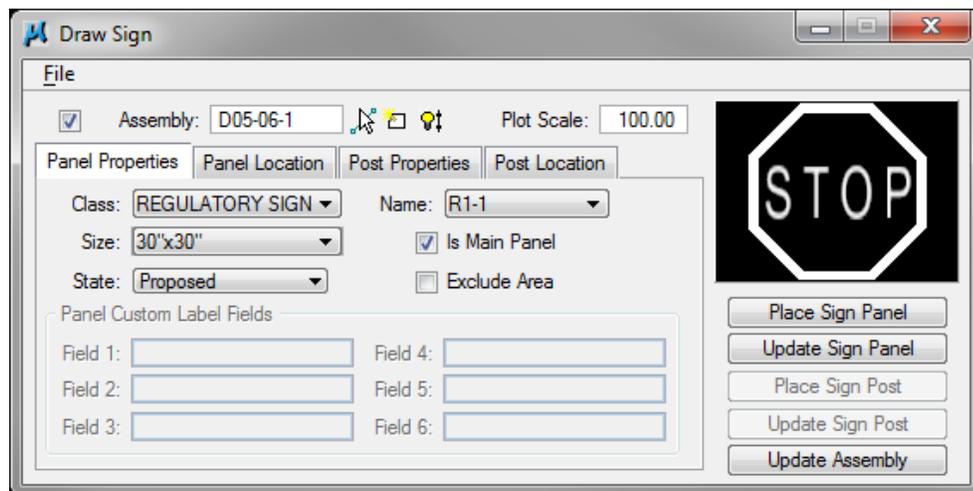
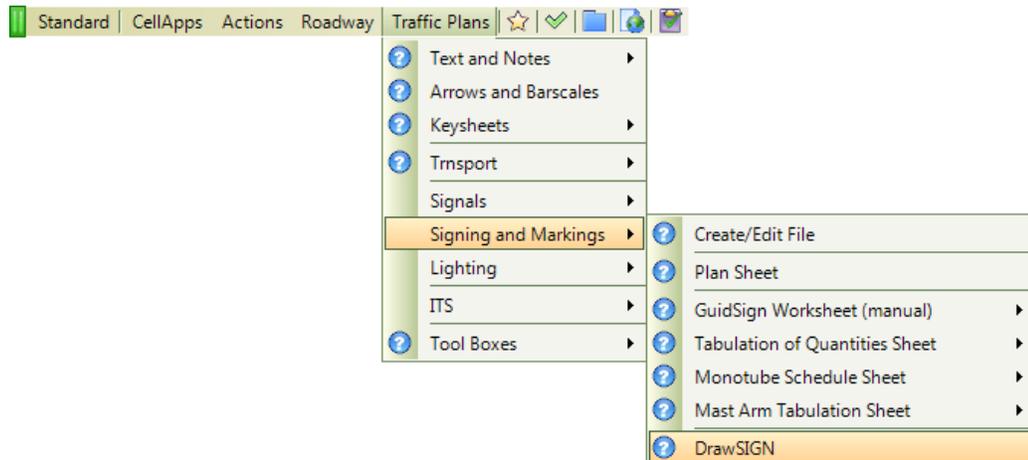
GuidSIGN, a sign design program available from Transoft Solutions, is included in this section and briefly explained.

When labeling, GEOPAK Plan View Labeler allows the designer to place many styles of customized labels, from simple annotation to the pay items box label. Use the Plan View Labeler to label the locations of the proposed signs that are placed in the design.

QC tools for signing are also included to make sure that Signing & Pavement Marking Plans are in accordance with FDOT standards.

DRAW SIGN PROGRAM

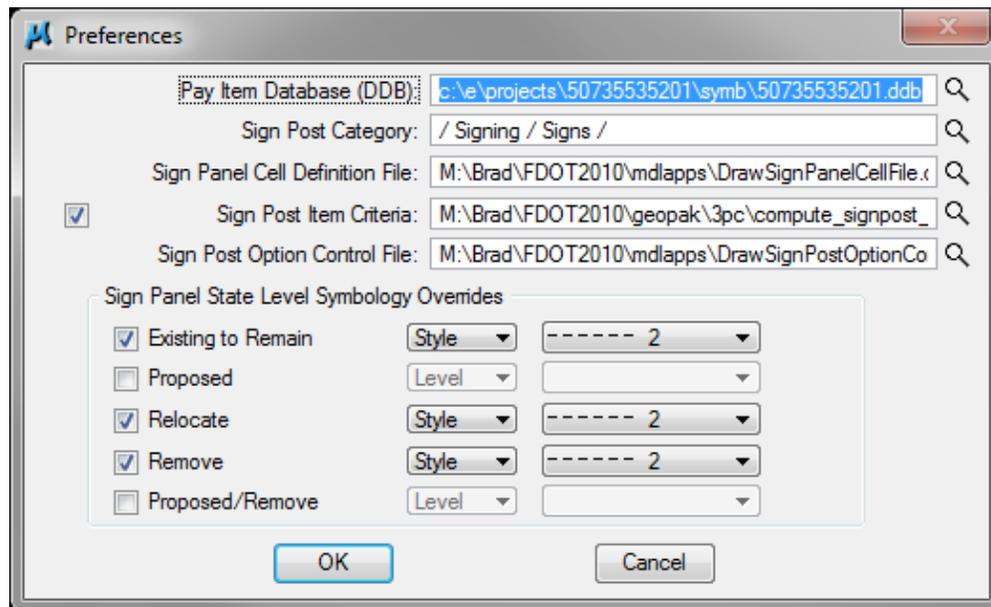
Available from FDOT Menu, the Draw Sign program is designed to assist in the placement of standard sign panels and post location in the signing and marking plans. This tool was written by Bentley Systems, Inc and uses Geopak Adhoc attributes to assist you in automated quantities through D&C Manager. All the signs that are in the *Standard Highway Sign Book* and the *Florida Roadway and Traffic Design Standards* have been included in the setup.



The Draw Sign **File** menu has two options: **Preferences** is described in the following section and **Exit** which closes the Draw Sign Program.

PREFERENCES

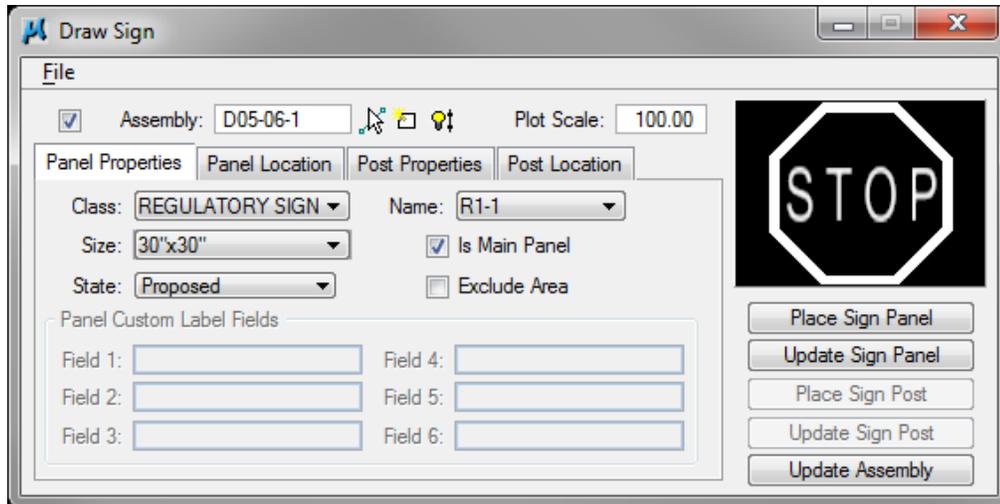
Preferences are set based on variables defined when the FDOT2010 software is installed.



- **Pay Item Database (DDB):** Path to the FDOT2010.ddb. The path will be different for most users between districts depending on the type of installation performed for the FDOT2010 software. If a project specific database is available it should be selected as shown in the image above.
- **Sign Post Category:** Defines the category in the .ddb from which the program searches for the items containing the Sign Post Symbols when the 'Auto-Select' button is used to initiate the 3pc compute sign post criteria file.
- **Sign Panel Cell Definition File:** Shows the path to the .csv definition file. This file defines the valid signs and sizes for all sign panels.
- **Sign Post Item Criteria:** This should always be selected. Otherwise, the 'Auto-Select' function will not operate and will require the user to manually select the correct post. This field shows the path to the .3pc file the DrawSign program uses to calculate the appropriate support according to panel sizes and installation method.
- **Sign Post Option Control File:** Shows the path to the support file that controls the selections on the Post Properties Tab for Installation Method, Mounting, State and Sign Type.
- **Sign Panel State Level Symbology Overrides:** This is where to set symbology overrides for the individual States of the Sign Cell. The options are to override the Level, Color, Weight and Style. This allows the same cell library to be used for all states. Thus, the level can be changed to SignPanel_ep for existing signs and the rest of the symbology is automatically set.

ASSEMBLY

The assembly check box must be checked on to be able to create a new sign **Assembly**. The field to the right of **Assembly** is for the **Assembly** name. The name will default to the name of the sign panel selected in the Panel Properties tab.



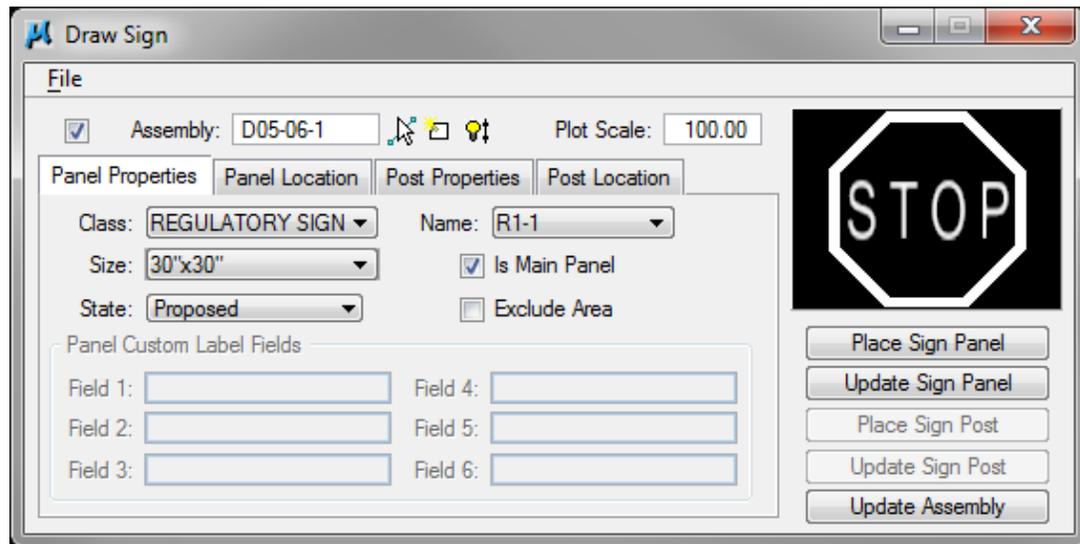
 **Identify Existing Sign Assembly** – Used to select an existing sign assembly. To use this function, click on the icon and select an existing sign assembly in the design file. This will display the **Named Group** name in the Assembly field and highlight the grouped elements in the design file allowing you to modify or update the selected Assembly.

 **Create New Sign Assembly** – Once the **Panel Properties** have been filled in click this icon to apply a name to the group.

 **Create Assembly by Selection Set** - This gives the designer the ability to select multiple sign panels that have been placed without GEOPAK Adhoc attributes, and create a **Named Group** Assembly from the selected elements in the design file. In addition, the designer can select a previously placed assembly, copy the assembly using MicroStation tools, place the assembly at another location in the design file and create a new **Named Group** Assembly. The designer can then use the Update Assembly function to update the new Assembly with the correct location information such as the Station.

 **Plot Scale** – controls the size of the sign assembly graphics and the text labels placed with the Draw Sign program.

PANEL PROPERTIES TAB



- **Class** – This option allows the designer to select the class of sign panel to place, i.e. Regulatory, Warning and so on.
- **Name** – The Name menu shows all of the available signs based on the selected Class. The names appear as they are in the MUTCD. This name will be carried up to the Assembly name when the **Create New Sign Assembly** option is selected. If the sign selected contains text fields that require user input the **Panel Custom Label Fields** at the bottom of this tab become active and the required key-in fields are accessible.
- **Size** – This menu allows the designer to select the size of sign panel to place. Selecting the size also controls the size label and the sign panel square footage used for calculating wind area and width. It is the designer's responsibility to know what size sign to use, do not assume this tool has the intelligence built in to determine the correct size to set for the sign panels of the project.
- **Is Main Panel** – This must be checked on for all panels that are defining the width of the sign assembly. There will be some sign configurations that have more than one sign panel but only one of those panels may be considered the Main Panel. The figure below shows this scenario, M1-4 is the **Main Panel**. M3-1 is not part of the main panel definition. However, both of these signs make up the assembly.

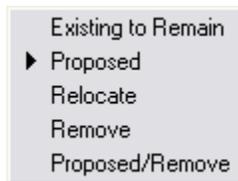


- **Excluded Area** – This is checked on when placing a sign panel whose area is to be ignored when calculating square footage for a sign assembly. Example, in the configuration below, Exclude both signs on the back. In other words, do not include the signs on the back in the area for wind calculations.



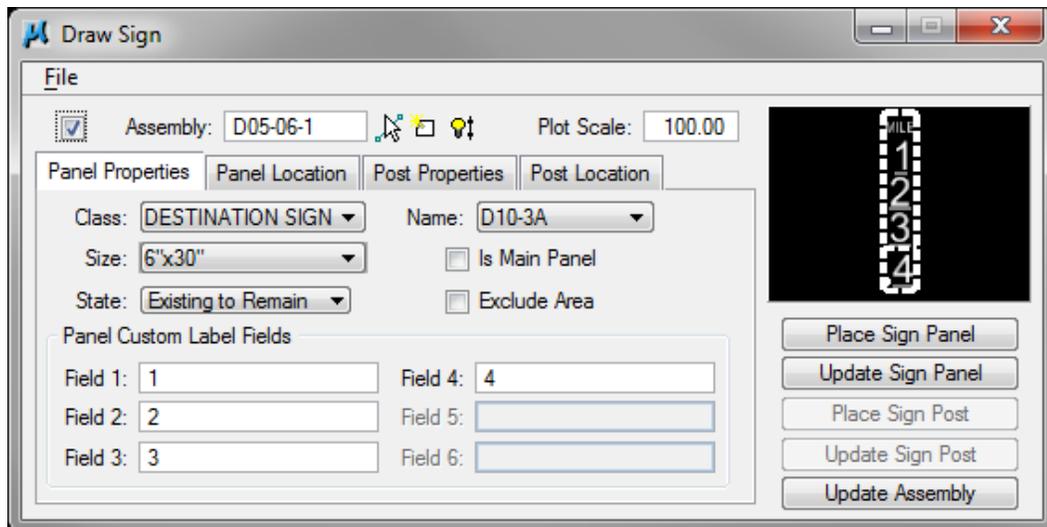
Note FDOT is now calculating the area of all sign panels back to back or otherwise going on a single post to include in the sign panels in the pay item.

- **State** – This option sets the sign panel to the selected state. There are five options as seen in the figure below.

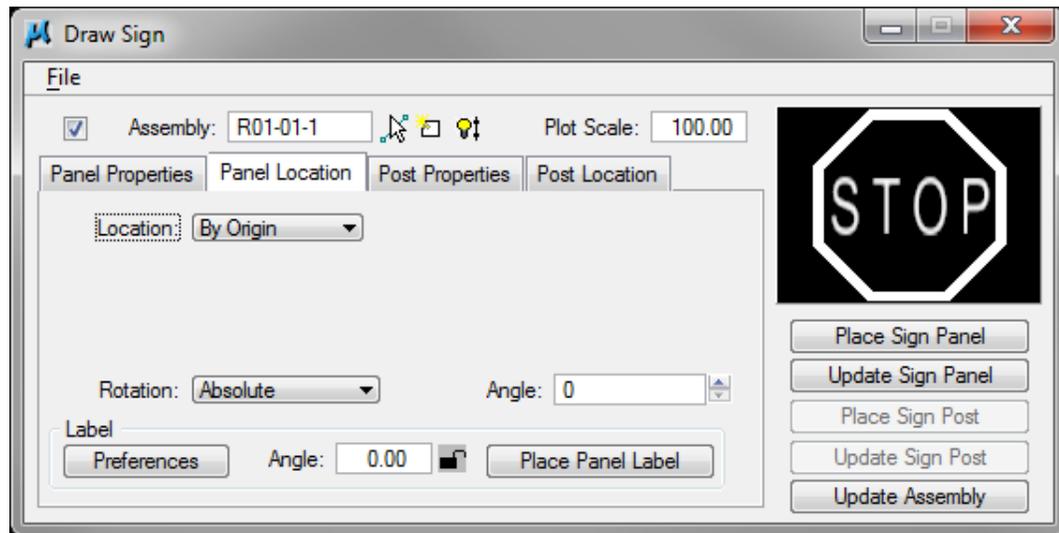


- **Panel Custom Label Fields** – This is where to fill in any open fields on a sign panel. Example, the Speed Limit sign has one field that needs to be filled in. When the Speed Limit sign is selected Field 1 becomes active to enter the speed. This will change the preview display to show the new speed. If a sign is selected with more than one field in it the Draw Sign tool will recognize this and the appropriate number of fields will become active. This is where to enter the text to be placed on the sign. Example, a speed limit sign, **R2-1**, requires you to enter the speed this is done in **Field 1** in this tab.

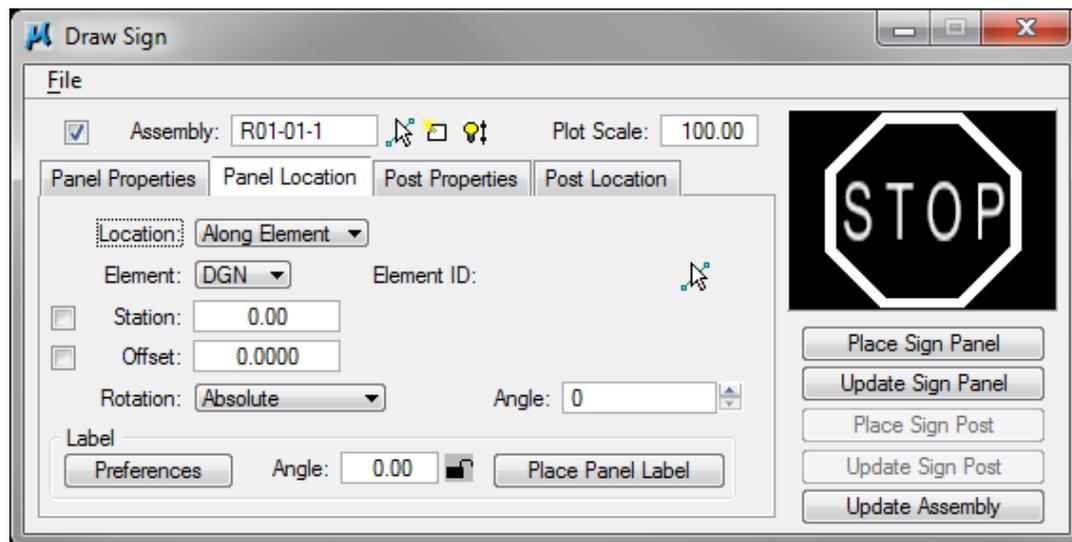
The figure below shows a sign with four fields active.



PANEL LOCATION TAB

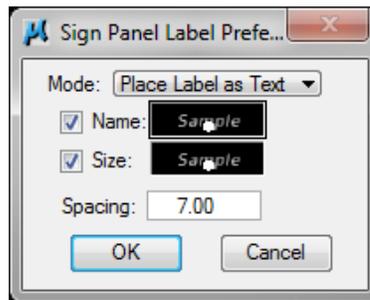


- **Location** – This determines where and how the sign panel will be located. Keep in mind the sign panel location is only for graphic representation. It is not critical that it be placed at a specific station and offset. There are two options:
 - By Origin – Places the Sign Panel by the origin of the cell.
 - Along Element – This expands the Panel Location tab as seen below.



- **Element** – There are two options, DGN or Chain. The options are described below.
 - *DGN* – This is a MicroStation element like an edge of pavement or lane line. When selected this option gives a numeric value based on the length of the element selected to place the offset from. The Element ID will show the numeric value of the element.
 - *Chain* – This is a GEOPAK chain stored in COGO. This option opens another drop down menu for selecting the chain. Once the chain is selected, the station field will be filled in with beginning station of the chain. Key-in a specific station and offset by checking on either of the options and typing the value in the field.

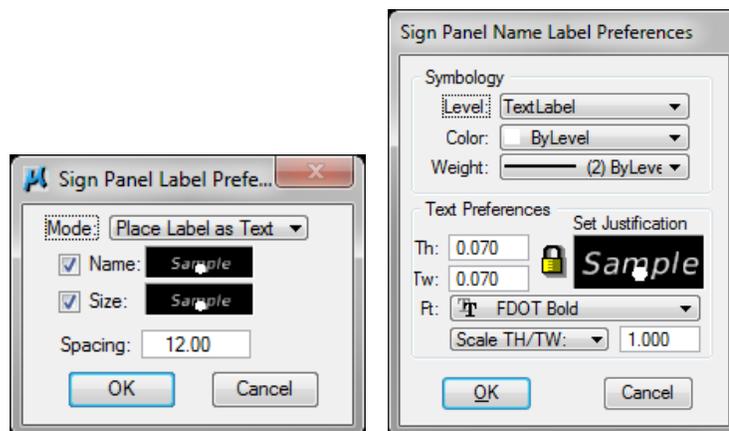
- **Rotation** – This controls the rotation of the sign panel. There are three options:
 - *Dynamic 2 Point* – This allows for a 2 **Data Point** placement. The first **Data Point** is to place the Sign Cell by the Sign Cell origin. Then rotate the Sign Cell around until the desired angle is met. The second **Data Point** is to place the Sign Cell at that set location and angle.
 - *Absolute* – This Uses 1 **Data Point** and the Sign Cell will be placed by origin at the angle that is keyed into the **Angle** field.
 - *Relative* – This option is only supported when Along Element for location is used. The angle of rotation is based on the selected element.
- **Angle** – This controls the sign panel angle before the sign panel is placed.
- **Label** – This section controls what to label when the sign panel is placed and Angle of the label.
 - *Preferences* – This opens the Sign Panel Label Preferences dialog.



Mode – There are two options for the Mode:

1. *Place Label as Text* – With this option the label will be placed as MicroStation text. Set the symbology of the text by double clicking in the Sample text field for the Name and the Size. In order to place the text for the Name or Size the box must be checked on. The Spacing refers to the space between the origins of the two text labels if both are placed.

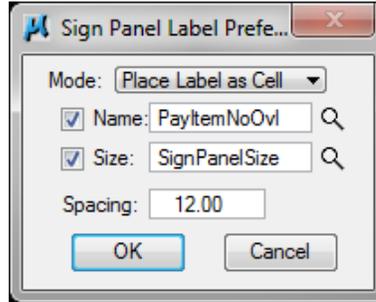
Double clicking on the Sample text field opens the Sign Panel Name Label Preferences dialog where you can set the Level Symbology and Text Preferences.



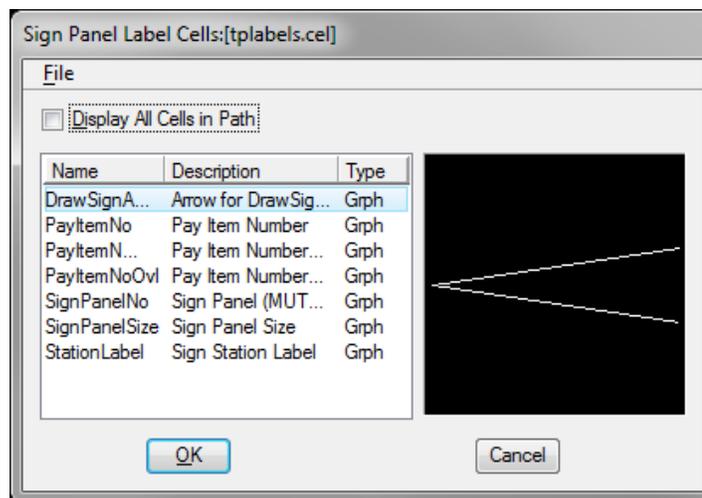
The figure below shows what the text label looks like, both the Name and Size are shown

R1-1
36" x 36"

2. *Place Label as Cell* – This option requires selecting a cell for the Name and Size label. This is the option to use if an oval around the Sign Number is **desired or required by the district**.



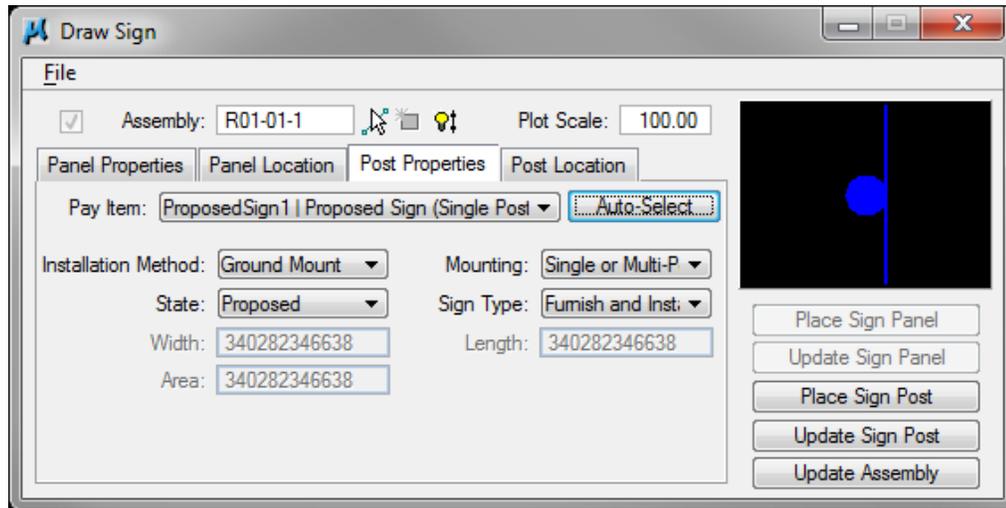
The magnifying glass icons next to the name and Size allow **the designer** to browse to the cell library and select the appropriate cell. The Spacing is for setting the space between the two cells if both are checked on.



- *Angle* – This is the angle of the text label not the sign panel. This can be locked in by selecting the paddle lock icon also the angle can be keyed in manually.
- *Place Panel Label* – This is used to place a label on a panel that was previously placed or on a panel that was replaced. Clicking on this option prompts you to select a sign panel.

POST PROPERTIES TAB

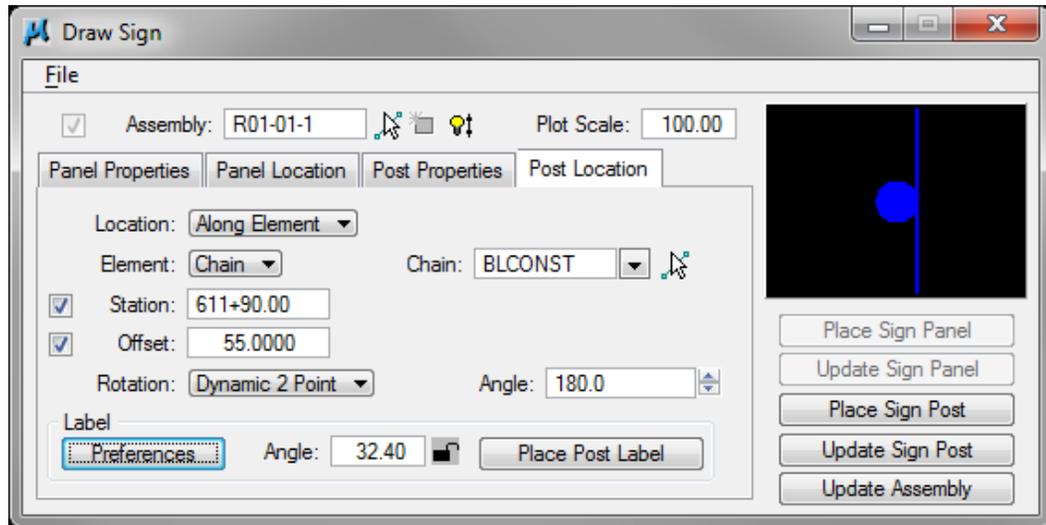
This tab is for setting up the type of sign support to be used for a specific sign assembly. It is broken into several options as described below.



- **Pay Item** – This is the pay item associated to a sign support. From the drop down list select a specific support. This list is generated from the options available under the DDB category defined in the Preferences.
- **Auto-Select** – This initiates a 3pc program that will calculate the type of support to be use based on the Sign Panel Selected in the Panel Properties and the installation method and mounting defined. Always verify that the correct post is selected.
- **Installation Method** – There are three options that are based on a CSV file defined in the Preferences.
 1. Ground Mount.
 2. Overhead.
 3. Panel Only
- **Mounting** – the mounting options available are based on the Installation Method selected, according to valid FDOT pay items and standards.
- **State** – this option defines the condition of the support. There are 5 options:
 1. Existing to Remain.
 2. Proposed.
 3. Relocate.
 4. Remove.
 5. Proposed/Remove.
- **Sign Type** – Based on the selected Installation Method, a list of valid options is available from a drop down menu for mounting the sign panels according to FDOT design standards
- **Width, Length, Area** – They are ghosted out unless overhead support is selected as the installation method and a mounting type of Truss or Cantilever is selected, as these values are required to define the correct pay item for these support types.

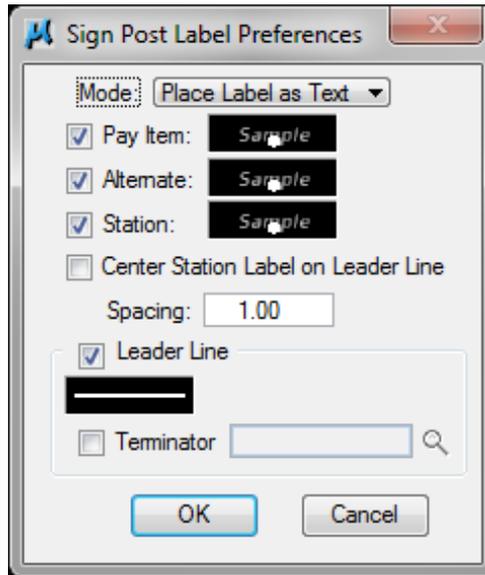
POST LOCATION TAB

This defines where the post is to be located. The term post is a generic term referring to all types of sign supports. There are several options and methods for the placement of the post.



- **Location** – There are two options for defining the location of the post.
 - *By Origin* – Places the post dynamically by the origin of the cell.
 - *Along Element* – This option locates the post based on a referenced element. There are two options.
- **Element** – There are two options, DGN or Chain. The options are described below.
 - *DGN* – This is a MicroStation element like an edge of pavement or edge line. The Station field with this option refers to the length of the element selected. The offset is how far from the MicroStation element to place the post.
 - *Chain* – This is a GEOPAK chain stored in COGO. The Station and Offset in this option refers to the actual station along the chain and offset from the chain.
- **Rotation** – This is for the rotation of the sign post. There are 3 options for rotation.
 - *Dynamic 2 Point* – The first **Data Point** is to place the Post cell by the cell origin. Then rotate the Post cell around until the desired angle is achieved. The second **Data Point** is to place the Post cell in the design file.
 - *Absolute* – The post is placed horizontally plus the specified angle keyed into the Angle field.
 - *Relative* – This option is only supported when Along Element is used. The angle of rotation is based on the selected element.

- **Label** – This section controls what to label when the sign Post is placed and Angle of the label.
 - *Preferences* – This opens the Sign Post Label Preferences dialog.



Mode – This is the same as discussed in the Sign Panel Label Preferences.

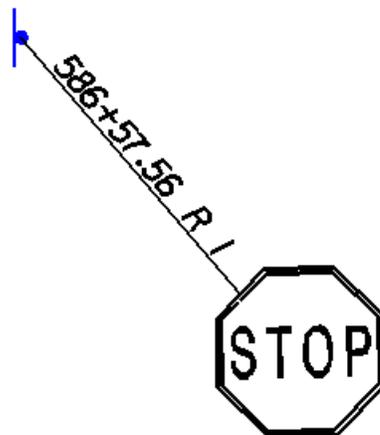
Pay Item – This is the Pay Item number text displayed with the sign panel.

Alternate – This is set up to place an Alternate label if configured for one, for example if the state is Proposed / remove it will place two pay items; one for the new sign assembly and one for removal of the existing sign assembly.

Station – This is the Station label. (This is not valid unless the Along Element / Chain option was used to place the post).

Double clicking inside of the Sample text field opens the Sign Post Label Preference dialog where you can customize the symbology and text preferences as discussed for the Sign Panel labels.

Center Station Label on Leader Line – Toggle on to center the station on the leader line. Note the Leader Line section toggle must be on in order for this option to be accessible. The figure below shows the Station label centered on the leader line



Spacing – If more than one option is selected, this is the distance between the lines of text in the multi-line label. Example: Pay Item Number and Station.

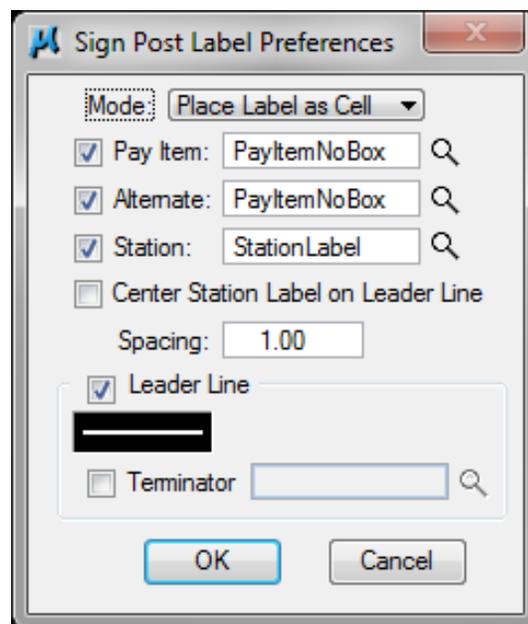
Leader Line – If selected this will draw a leader line from the origin of the sign post to a point selected by **the designer**. Double click inside the symbology field to open Leader Line Symbology dialog, which is used to set the level symbology of the leader line.



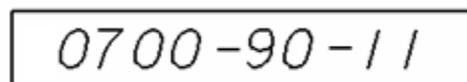
Terminator – If selected this will draw an arrow head at the end of the leader line at the sign post.

Note Each district has their own preference on how the signs are to be labeled, make sure to communicate with your project manager prior to setting up the label features.

If the Mode is set to Place Label as Cell, **the designer** will be required to browse to the cell library and select which pay item cell to place.



The figure below shows the Pay Item placed as a cell. This places a box around the pay item number.



- **Angle** – This is the angle of the text label not the sign post. This can be locked by selecting the paddle lock icon also the angle can be keyed in manually.
- **Place Post Label** – This is used to place a label on a post that was previously placed or on a post that was replaced. Clicking on this option prompts you to select a sign post.

- **Draw Sign Buttons** – These are the buttons along the right side of the Draw Sign dialog below the sign preview window.



- *Place Sign Panel* – This is accessible when on the Panel Properties or Panel Location tab. Pressing this button will place the Sign Panel.

Note Make sure you have created a new sign assembly first before placing the sign panel.

- *Update Sign Panel* – This is accessible when on the Panel Properties or Panel Location tab. Use this option to update a previously placed Sign panel with new sign panel info. Example: If you placed a sign panel with the wrong size, use this option to update the pane with the new size. There is no need to delete and place a new sign panel.



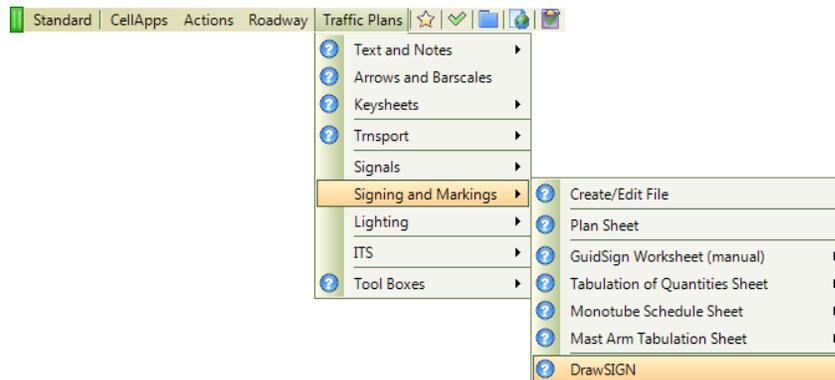
- *Place Sign Post* – This is accessible when on the Post Properties or Post Location tab. This places the sign Post symbol.
- *Update Sign Post* – This is accessible when on the Post Properties or Post Location tab. This option updates a sign post previously placed post with new information. Example: if placing a sign post at a station and the post must move, using MicroStation tools, move the post then click this button and the station label and leader line will automatically adjust to the new location.
- *Update Assembly* – If the designer has to move an assembly in the design file because of placement error or revision to the design, use this to update the assembly with the new location information.

Exercise 5.1 Draw Sign

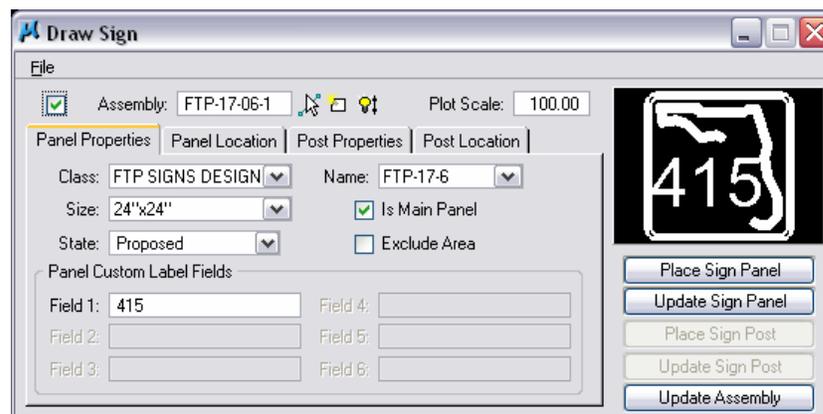
➤ Draw Sign (Part 1)

✓ Panel Properties

1. Open the file C:\e\Projects\50735535201\signing\Dsgnsp01.dgn.
2. Open GEOPAK Project Manager.
3. Open the project **SR415.prj**. This is located in the roadway folder.
4. Zoom in near Sta. **560+00**.
5. From FDOT Menu, select **Traffic Plans > Signing & Markings > Draw Sign**. This opens the DrawSIGN Program.



6. In Draw Sign, check on **Assembly**.
7. Set the *Plot Scale* to **100.00**. This should match the plot scale of the plan sheets.
8. In the Panel Properties set the *Class* to **FTP SIGNS DESIGN STANDARDS 2008 - 2010**.
9. Set the *Name* to **FTP-17-6**.
10. *Size* is **24"x24"**. This should be set as the default.
11. Check on **Is Main Panel**. Do not check Exclude Area.
12. Set the *State* to **Proposed**.
13. For *Field 1* key-in **415** and click the **Tab** key on the key board. This will change the preview to reflect the state road number.
14. At the top of the Draw Sign dialog,, click the **Create New Sign Assembly** button . This is the middle button. This will fill in the *Assembly name* field with the name **FTP-17-06-1**. When the Sign panel is placed, this will also create a Named Group with the same name.

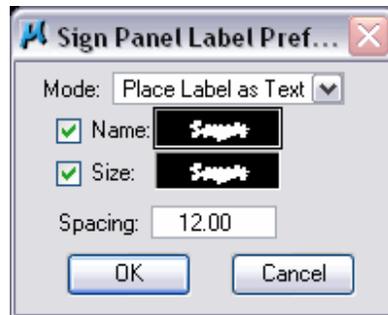


✓ Panel Location

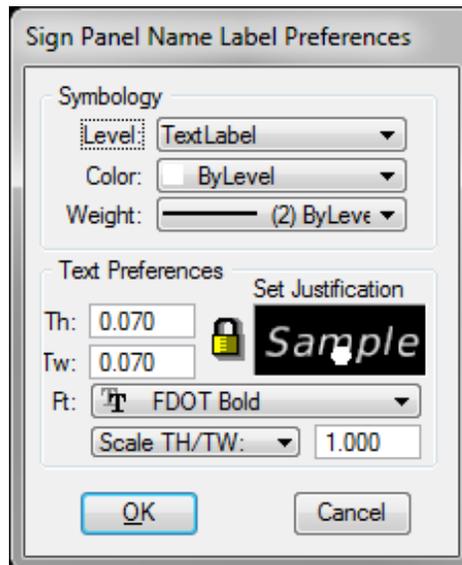
1. Open the **Panel Location** tab.
2. If the view is not rotated so that the BL Const is horizontal on the screen, rotate the view by two points using the tick marks as reference points.

Note Rotating the view to the rotation of the sheet limits is very important for display purposes. The sign panels should at the same rotation as the plan sheet

3. Set the *Location* to **By Origin**. Keep in mind that the location of the sign panel is not the critical element, the Post is. The panel needs to be placed in a location of clear visibility and far enough away from the Post so that the station text will fit on the leader line.
4. Set the *Rotation* to **Absolute**. This locks in the rotation angle of the panel.
5. Set the *Angle* to **270.0**. Use the Up and Down arrows to adjust the value or key it in. This is a dynamic function, it can be adjusted as the panel is being placed
6. Under *Label*, click **Preferences**. This opens the Sign Label Preferences dialog.

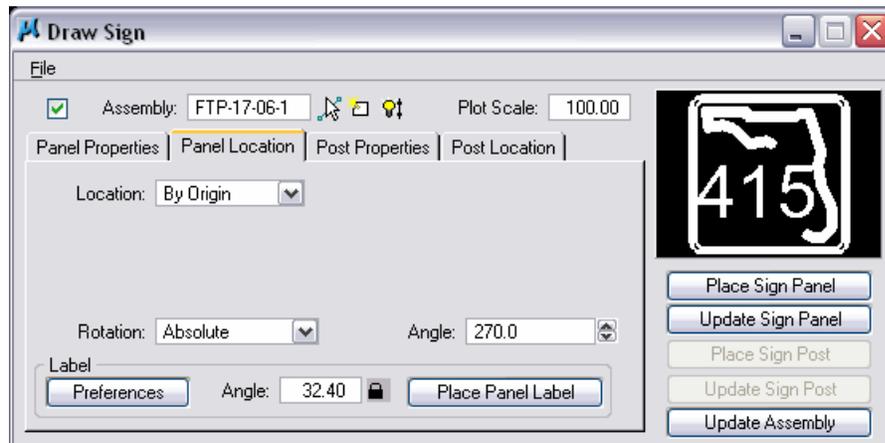
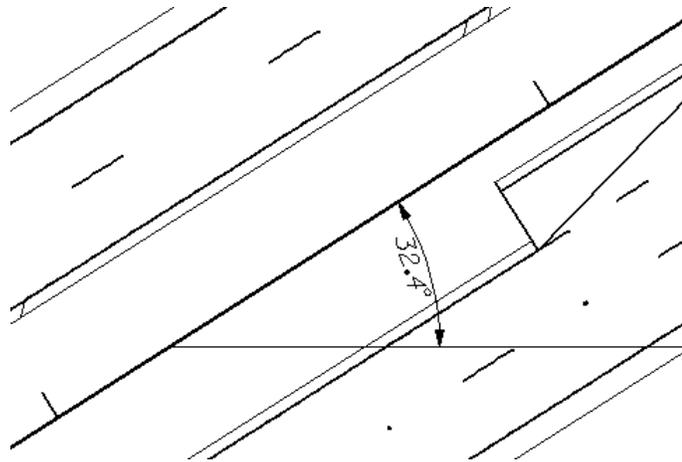


7. Set the *Mode* to Place Label as Text.
8. Toggle on **Name**.
9. Double Click on the **Sample** text. This opens the Sign Panel Label Preferences dialog.



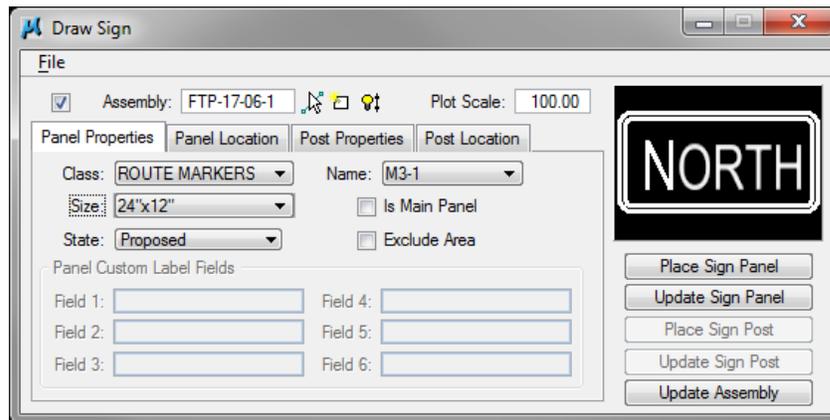
10. In the *Symbology* section, set the *Level* to **TextLabel**. This should be the default.
11. Set the *Color* and *Weight* to **ByLevel**. Next, you will set the Text Preferences.
12. Set the *Text Height* and *Width* to **0.070**. This is the desired text size at 1 to 1, the plot scale will adjust this to the correct size.

13. Set the *Justification* to Center Bottom.
14. Set the *font* to **FDOT Bold**.
15. Set the *Scale* to **TH/TW** and size to **1.0**.
16. Click **OK**.
17. Toggle on **Size**.
18. Right click on the *Name field sample text* and select **Copy**.
19. Right click on the *Size field sample text* and select **Paste**. This is a quick way to setup the *label preferences* for both the **Panel Labels** and the **Post Labels**.
20. Set the *Spacing* to **15.00**. This is the space between the Sign Name and Sign Size text.
21. Click **OK** on the Sign Panel Preferences dialog.
22. In Draw Sign, set the *angle* to **32.4** and lock it. The angle **32.4** is the angle of a horizontal line drawn from the BL Const.

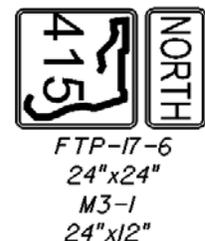


✓ *Place Sign Panel*

1. Click the **Place Sign Panel** button.
2. Move the cursor onto the screen and issue a **Data Point**. Position the sign far enough away from the roadway to accommodate a leader line with a station on it
3. Move the cursor below the sign panel and issue a second **Data Point** to place the Sign Number and Sign Size.
4. Next, you will place the Route Marker NORTH on top of this sign.
5. Go back to the **Panel Properties** tab. Next, you will select the **M3-1** sign.

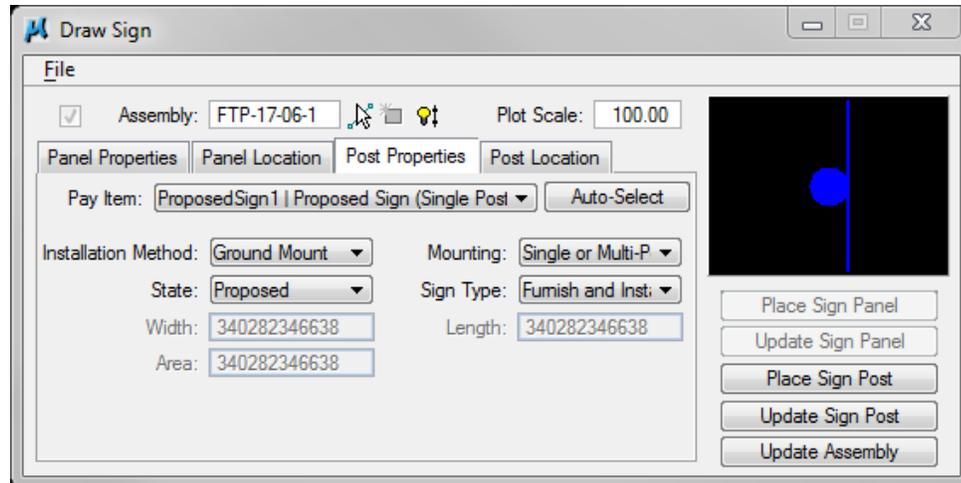


6. Set the *Class* to **ROUTE MARKERS**.
7. Select the *sign* **M3-1**. This is the sign Name.
8. *Size* is **24"x12"**.
9. Toggle OFF **Is Main Panel**. It is not necessary that this sign panel be the Main Panel.
10. *State* is **Proposed**. The Assembly Name stays the same, both of the sign panels will be covered in the one name.
11. Go to the Panel Location tab.
12. Everything in *Panel Location* stays the same as it was for the first sign.
13. Click the **Place Sign Panel** button.
14. Move the cursor onto the screen above the first sign and issue a **Data Point**. Use AccuDraw and snap to the top of the first sign panel then move over approx 4'. This location is for graphic representation, it should just look good.
15. Place the text below the First sign panel text. This is a personal preference issue, be consistent with how you place sign labels so the plans will look professional.
16. Use Power Selector and AccuDraw to move the Sign Names and Sizes so they are centered under the two sign panels.
17. Next, you will set up the Sign Post properties.

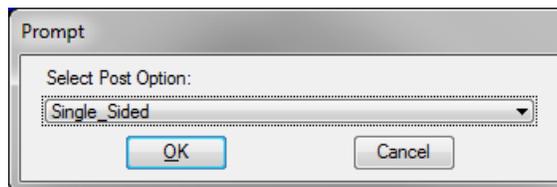


✓ Set Post Properties

1. Go to the **Post Properties** tab.
2. Set the *Installation Method* to **Ground Mount**.
3. Set the *Mounting* to **Single or Multi-Post**.
4. Set the *State* to **Proposed**.
5. Set the *Sign Type* to **Furnish and Install**.
6. Click the **Auto-Select** button. This will calculate the sign panels placed and set the sign post based on these calculations and set the pay item number.



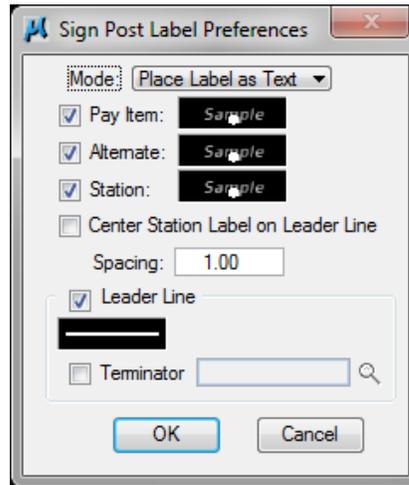
7. Select **Single_Sided** from the prompt. This will select the cell and will tag that cell with adhoc associated with the placement of a single sided single column post assembly.



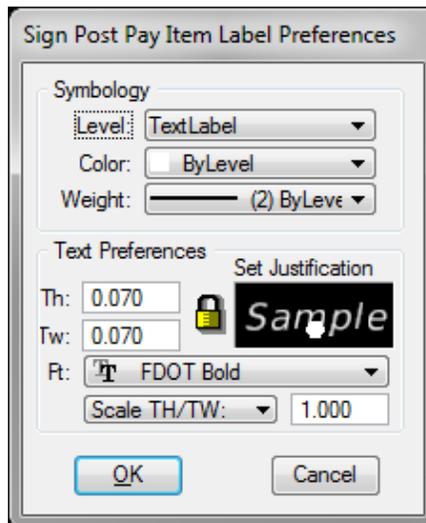
8. Go to the **Post Location** tab.
9. Set the *Location* to **Along Element**.
10. Set the *Element* to **Chain**.
11. Set the *Chain* to **BLCONST**.
12. Toggle on the *Station* and enter **559+08**.
13. Toggle on the *Offset* and enter **56.00**. For the offset, you are required to set the post a minimum of 12' off the edge of travel lane based on index 17302 Case II.
14. Set the *Rotation* to **Absolute**.
15. Set the *Angle* to **180.0**. Key this in or use the Up and Down arrows.
16. Next, you will set the text label preferences.

✓ Set Label Preferences

1. Under **Label**, click the **Preferences** button. This opens the Sign Post Label Preferences dialog.



2. Set the Mode to Place Label as Text.
3. Toggle on Pay Item, Alternate and Station.
4. Double Click on the **Pay Item Sample** text. This opens the **Sign Post Pay Item Preferences** dialog.



5. Under the Symbology section, set the Level to **TextLabel**. This should be the default.
6. Set the **Color** and **Weight** to **ByLevel**. Next, you will set the Text Preferences.
7. Set the Text **Height** and **Width** to **0.070**. This is the desired text size at 1 to 1, the plot scale will adjust this to the correct size.
8. Set the **Justification** to Center Bottom.
9. Set the **font** to **FDOT Bold**.
10. Set the **Scale** to **TH/TW** and size to **1.0**.
11. Click **OK**.

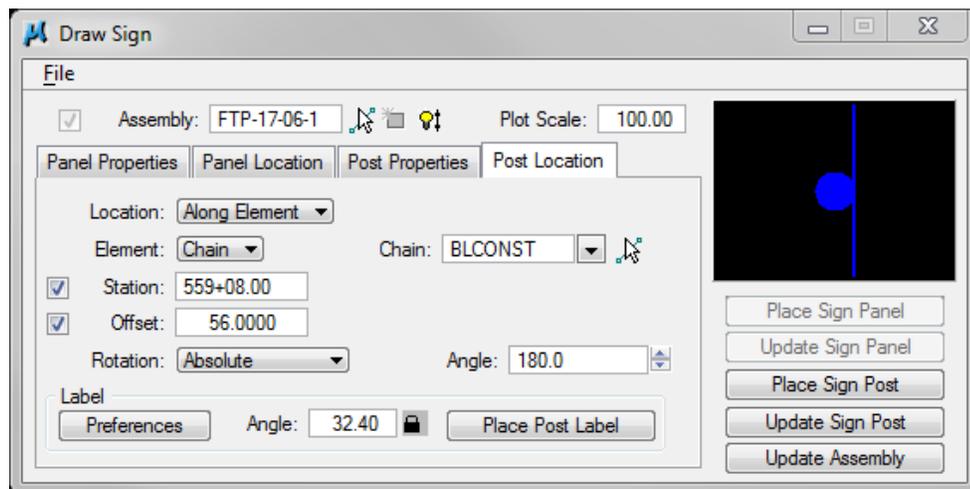
✓ Set the Station and Leader Line Symbology

1. Right click on the *Pay Item field sample text* and select **Copy**.
2. Right click on the *Alternate* and the *Station field sample text* and select **Paste**. This is a quick way to setup the *label preferences* for both the **Panel Labels** and the **Post Labels**.
3. In Sign Post Label Preferences, toggle on **Center Station Label on Leader Line**.
4. Set the *Spacing* to **1.0**. This is the space from the justification of the station label to the leader line.
5. Toggle on **Leader Line**.
6. Double click on the symbology box under **Leader Line**. This opens Leader Line Symbology.



7. Set the *Level* to **LeaderLine_dp**.
8. Set the *Color*, *Style* and *Weight* to **ByLevel**.
9. Click **OK** on Leader Line Symbology.
10. In Sign Post Label Preferences, click **OK**. No Terminator is used.
11. Next to the *Preferences* button, set the *Angle* to **32.40** and lock it. This is the same as the angle used when placing the sign panel text.

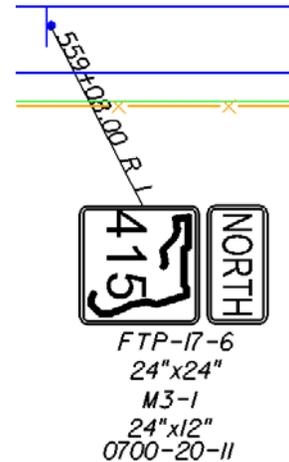
Next, you will place the sign post in the design file.



✓ *Place the Sign Post*

1. Under the preview window, click **Place Sign Post**.
2. Issue a **Data Point** on the sign post, this will become the hinge point for the leader line. Because you have Station and Offset locked, you will see the post at that location. Next place the Pay Item Number.
3. Move the cursor under the previously placed sign text and place the Pay Item Number by issuing a **Data point**.
4. Now the Station label and leader line are attached to your mouse, snap to the left side of the main sign panel and issue a **Data Point**.

The figure, which is the same as what is now in your design file, has several personal preferences applied to it. The location of the panel text and whether or not to use a leader line with the station label is purely personal/district specific. Prior to starting work on a project be sure to address these issues with the project manager, this will save hours of cleanup.



➤ **Update Sign Post Location (Part 2)**

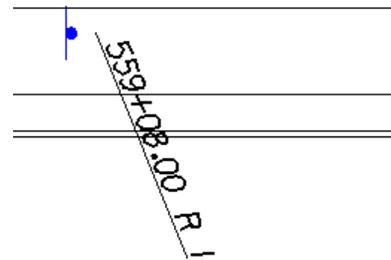
In this exercise, the student will use the Update Sign Post function. This allows you to move a previously placed sign post then automatically update the leader line and station label.

✓ *Move Sign Post and Update label*

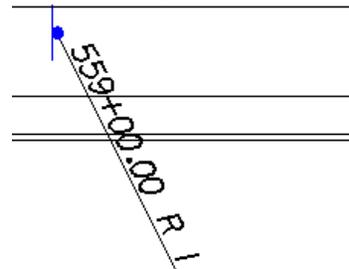
1. Continuing in *Dsgnsp01.dgn* select the MicroStation **Move Element** command.
2. In the Draw Sign dialog, click the **Identify Existing Sign Assembly** button. This is at the top of the dialog next to the *Assembly name*, the first button.
3. Identify the **Sign Post** placed. Notice the whole assembly will highlight, this is correct.

Note This is a very important step when there is more than one sign assembly placed in the design file. The correct sign assembly Must be selected.

4. Using AccuDraw, move the previously placed **Sign Post 8'** to the left. This is an arbitrary number. Use AccuDraw to maintain the 12' min. offset.



5. In Draw Sign, click the **Update Sign Post** button. This will update the station label and adjust the leader line to the new post location.

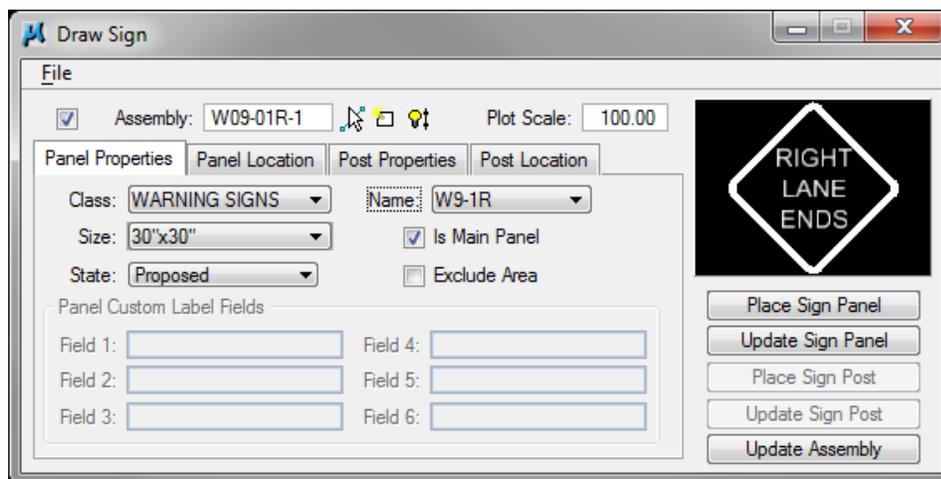


➤ **Place Right Lane Only Sign (Part 3)**

In this exercise, the student will use the same process as in the previous exercise to place this sign with the exception of the text labels. In this exercise, the student will use the place cell option.

✓ Panel Properties

1. Continuing in *Dsgnsp01.dgn* Zoom to near **Sta. 612+00**.
2. Rotate the view to make the BL Const horizontal on the screen. Use the tick marks as a reference.
3. If Draw Sign is closed, open the Draw Sign program.
4. Open the Panel Properties tab.
5. Toggle on **Assembly** name.
6. Set *Plot Scale* to **100.00**.
7. Set the *Class* to **Warning Signs**.
8. Select the *sign* **W9-1R**. This is the sign **Name**.
9. *Size* is **30"x30"**.
10. Toggle On Is Main Panel.
11. Set the *State* to **Proposed**.
12. At the top of the Draw Sign dialog, click the **Create New Sign Assembly** button. This is the middle button with the picture of the star burst on it.



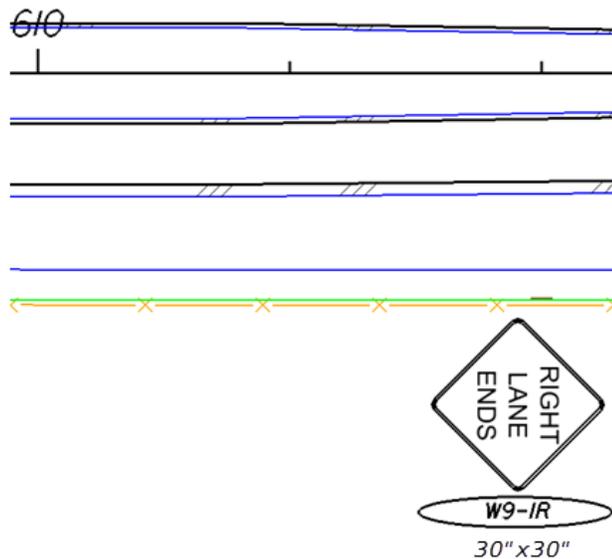
Note The sign Assembly name will inherit the sign name and add a number one on at the end. If there is more than one of these assemblies, the name will increment to number two and so on.

✓ Panel Location

1. Open the **Panel Location** tab.
2. Set the *Location* to **By Origin**.
3. Set the *Rotation* to **Dynamic 2 Point**.
4. Set the *Angle* to **0**.
5. Under *Label*, click Preferences. This opens Sign Panel Label Preferences.
6. Set the *Mode* to Place Label as Cell.
7. Toggle on **Name**. Next, you will browse and select a cell.
8. Click on the **Magnifying Glass** icon. This is on the right side of the *Name* field.
9. In Sign Panel Labels Cells, select the cell **SignPanelNo**.
10. Click **OK**. This takes you back to the Sign Panel Label Preferences dialog.
11. Toggle on **Size**.
12. Click on the **Magnifying Glass** icon.
13. In Sign Panel Labels Cells, select the cell **SignPanelSize**.
14. Click **Ok**.
15. Set the *Spacing* to **15.00**.
16. Click **Ok**.
17. Next to *Preferences* set the *Angle* to **52.06**.

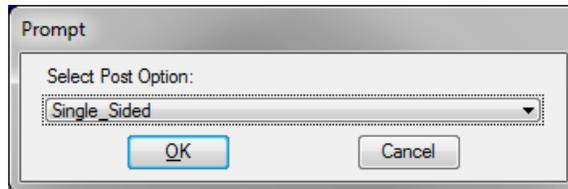
✓ Place Sign Panel

1. Click the **Place Sign Panel** button. This is below the preview window.
2. Move the cursor onto the screen and issue a **Data Point** to place the sign panel.
3. Rotate the sign panel dynamically to the right and issue a second **Data point**.
4. Position the text label below the sign panel.



✓ Sign Post Properties

1. Open the Post Properties tab.
2. Set the *Installation Method* to **Ground Mount**.
3. Set the *Mounting* to **Single or Multi-Post**.
4. Set the *State* to **Proposed**.
5. Set the *Sign Type* to **Furnish and Install**.
6. Click the Auto-Select button. This will calculate the sign panel placed and set the sign post based on this calculation and set the pay item number.



7. Select the **Single Sided** option number for the post type.
8. Click **OK**. This selects the correct sign post and pay item.

✓ Post Location

1. Open the **Post Location** tab.
2. Set the *Location* to **Along Element**.
3. Set the *Element* to **Chain**.
4. Set the *Chain* to **BLCONST**.
5. Toggle on **Station** and set it to **611+90**.
6. Toggle **ON** the *Offset* and set the distance to **55.0**. This will maintain the min 12' offset from the edge of travel lane required as per index 17302.
7. Set the *Rotation* to **Absolute**.
8. Set the *Angle* to **180.0**.

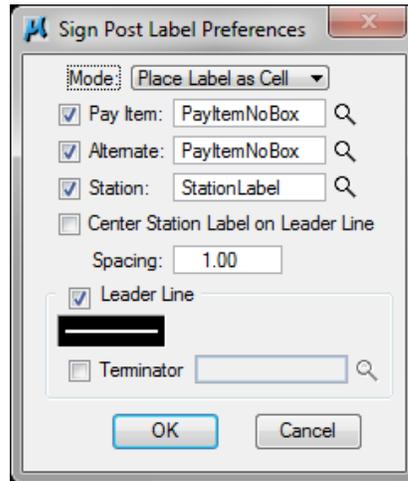
✓ Label Preferences Off and Place Sign Post

In this part of the exercise you will not place the Pay Item number or Station label. This will be done in a second step to show the flexibility of this tool when labeling and modifying signs.

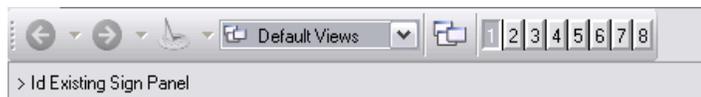
1. Under *Label*, click **Preferences**.
2. Toggle OFF **Pay Item**.
3. Toggle OFF **Station**.
4. Toggle OFF **Leader Line**.
5. Click **OK**. Next, you will place the sign post.
6. Click Place Sign Post.
7. Issue a **Data Point** on the screen. This will place the sign post cell at the exact station and offset.

✓ Label Preferences On and Place Labels

1. Under Label, click **Preferences**.



2. Set the *Mode* to Place Label as Cell.
3. Toggle ON **Pay Item**.
4. Click the *Magnifying Glass* icon and select the **PayItemNoBox** cell.
5. Toggle ON Station. (Leave Center Station on Leader Line toggle off.)
6. Click the *Magnifying Glass* icon and select the **StationLabel** cell.
7. Toggle ON **Leader Line**.
8. Set the *Level* of the Leader Line to **LeaderLine_dp**. Use the symbology box to set this.
9. Click **OK**.
10. Click **Place Post Label**. This is in the Label portion of the dialog next to preferences.
11. Select the **Sign Post** placed and issue a **Data Point** to accept it. Remember to read the messages.



12. Move the cursor under the sign panel and issue a **Data Point** to place the text labels.
13. Snap to the edge of the sign panel to complete the leader line.



Note The label is not a part of the assembly. Use the Add Element function in the Named Group tool to add the label to a selected assembly.

GUIDSIGN PROGRAM

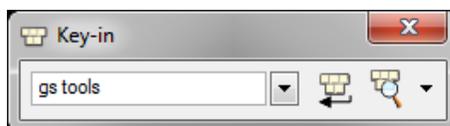
GuidSIGN is an intuitive, user-oriented software program that automates the process of designing roadway signs. The program incorporates many user-suggested features and allows users to quickly create finished shop drawings, complete with title block, sign layout, and letter location tables. The designer can create Sign Panels with very little input. However, knowledge of sign standards is required. Letter shapes, spacing, sign sizes and symbols used in GuidSIGN are based on the following publications: *Standard Alphabets for Highway Signs and Pavement Markings*, *Standard Highway Signs (1979) (2004)* and *Manual On Uniform Traffic Control Devices (1988) (2003) and (2009)*.

GuidSIGN enables the designer to create signs with minimal input, using standard sizing controls, or by specifying controlling size parameters. Select a sign style, and the program automatically calculates the appropriate border, margins, fonts, layout, shape and size for the selected lettering.

GuidSIGN is loaded by selecting **Gs8i.ma** from **Utilities > MDL Applications** menu. You will need to browse to **C:\Program Files\Transoft Solutions\GuidSIGN 5** to locate this file. When the command is executed, the GuidSIGN toolbox appears as shown in the following figure. At the time of this writing, GuidSIGN version 5.1 was used for this training guide.



If the GuidSIGN Tool bar is closed inadvertently, the tool bar can be redisplay by typing **GS TOOLS** at the command prompt during the current Microstation session.



Hint Always design the largest sign panel first when using GuidSIGN

It is ok to stop at practically any point of the Sign Design process and finish the sign design at a later time. It is not necessary to complete the process in one session. All sign panel preferences are stored with the sign panel, which allows the designer to start and stop, as needed.

For correct sheet placement and scaling please see the following **GuidSIGN Scale Conversion Factor Table**.

GuidSIGN Scale Conversion Factor	
Sheet Scale	Plot Scale
10	1.09
20	2.18
25	2.72
30	3.25
40	4.35
50	5.43
60	6.5
75	8.16
80	8.7
100	10.85

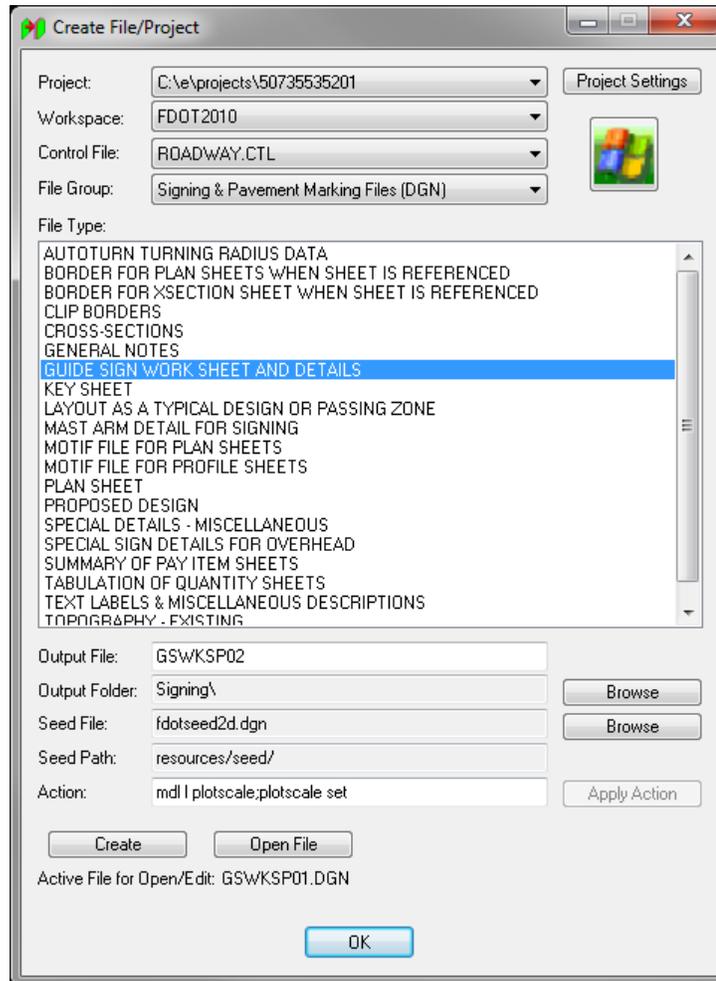
Exercise 5.2 Creating the GuidSIGN Work sheet

➤ Creating the GuidSIGN Work sheet (Part 1)

✓ Create a new design file and load GuidSIGN

In this exercise, the student will create a new design file using the **FDOT Create File/Project** tool and then load the **GuidSIGN** program.

1. From the FDOT Menu, select **Traffic Plans > Signing and Markings > Create/Edit File** tool. (This can be done from inside MicroStation or from the FDOT2010 folder on the desk top.)

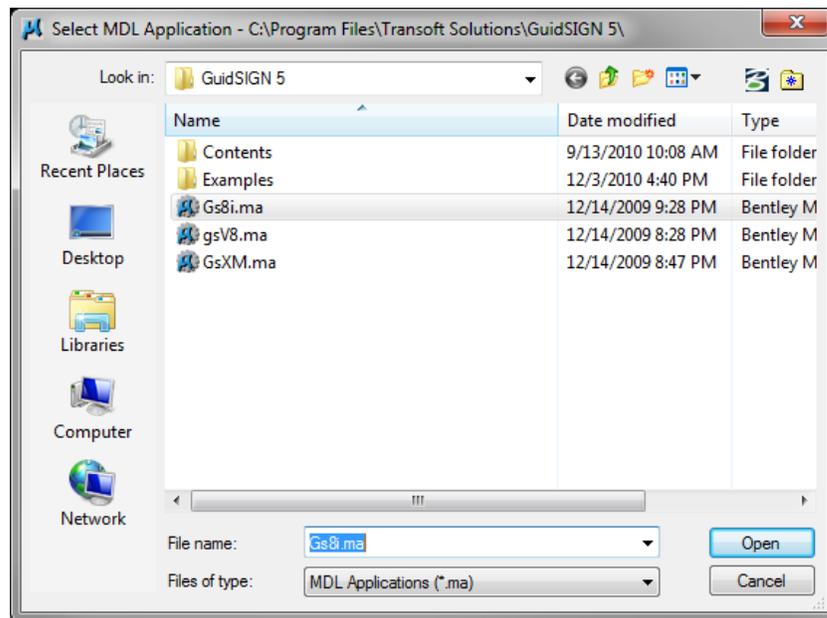


2. Create and Open the file **GSWKSP01.dgn** in the *signing* folder.
3. Close the Create File/Project tool.
4. Set the *Plot Scale* to **50**. The scale of the sheet border will be adjusted with the GuidSIGN program.
5. From MicroStation, select **Utilities > MDL Applications**. This opens the MDL dialog.

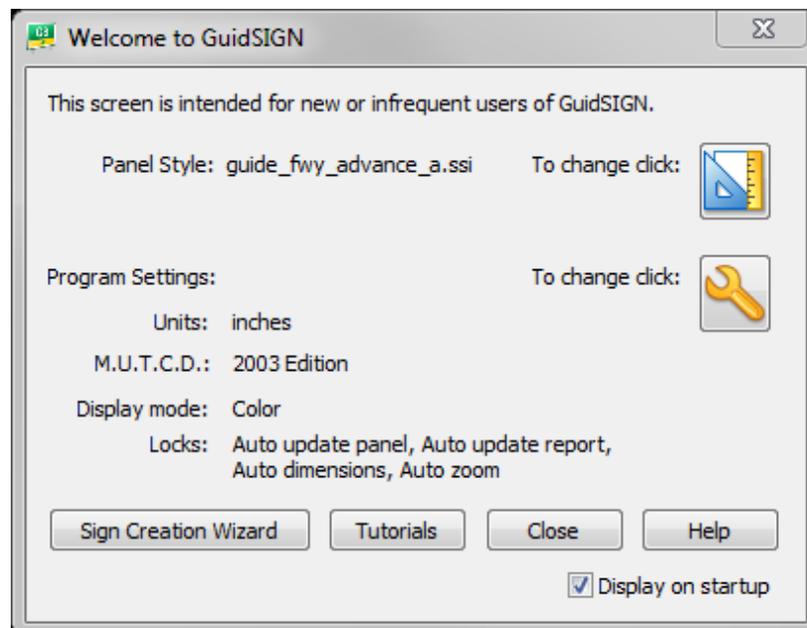
Hint The user can program a function key for loading GuidSIGN. The key-in command is **mdl load "c:\Program Files\Transoft Solutions\GuidSIGN 5\Gs8i.ma"**. The user must include the quotes.

6. Click the Browse button and navigate to the c:\Program Files\Transoft Solutions\GuidSIGN 5\ folder.

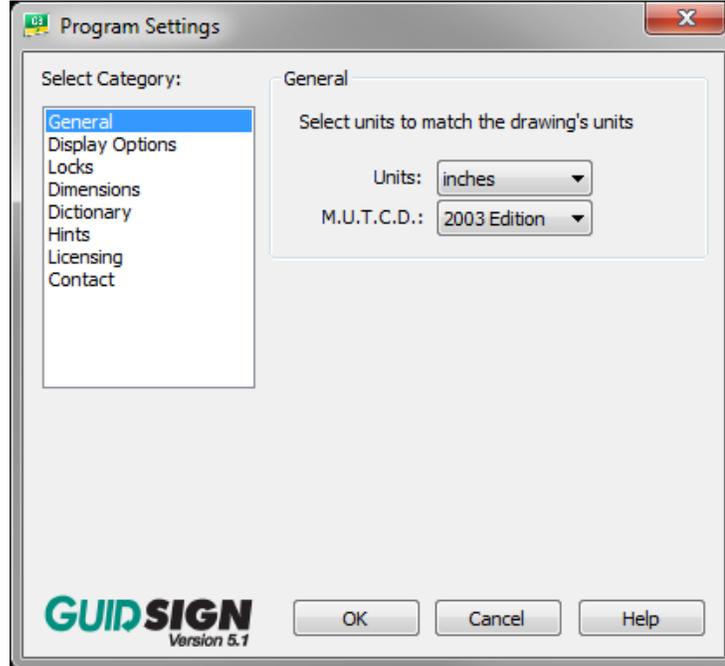
7. Select the **Gs8i.ma** file and click **OK**. This opens GuidSIGN.



Note If this is the first time GuidSIGN is loaded the Welcome to GuidSIGN will open.



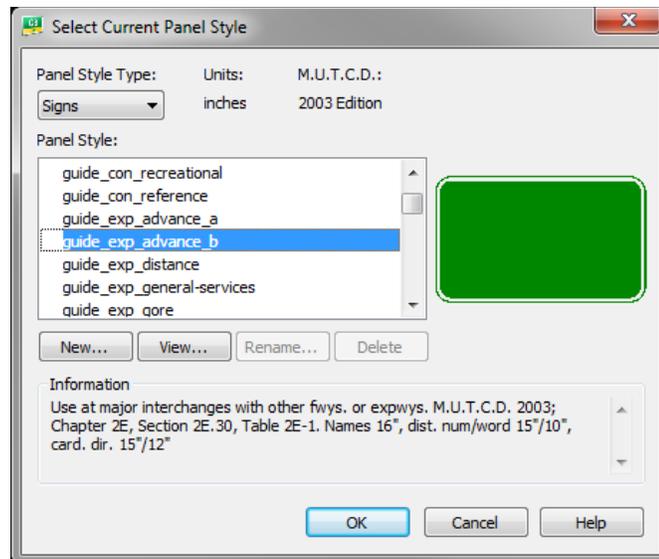
8. On the Welcome screen, click the **Program Settings** icon . This opens Program Settings dialog.



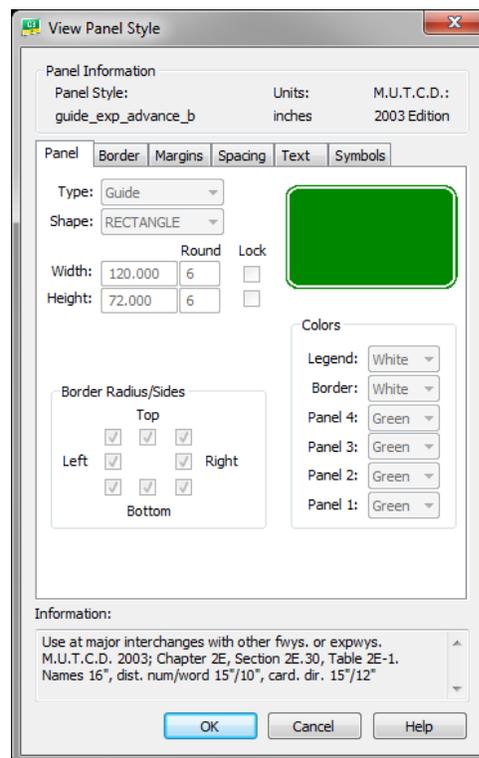
9. Under the *General* category set *Units* to **Inches**.
10. Set *M.U.T.C.D.* to **2003 Edition**.
11. Under the *Display Options* category set the *Display Mode* to **Color**.
12. Under the *Locks* category ensure all **Locks** are toggled on.
13. Close the Program Settings dialog.

✓ Set the GuidSIGN Preferences and Panel Style

1. On the Welcome screen, click the **Panel Styles** icon . This opens Select Current Panel Style dialog. Select the **guide_exp_advance_b** style. (Later in this exercise this style will be changed to the correct style to show the flexibility of the tool.)



2. Click **View**. This opens the View Panel Style dialog.



3. This also sets the selected Panel Style as the default panel style.

Note A panel style represents a set of parameters that specify the characteristics of a sign (sign shape, color, border radius, thickness, fonts, size of arrows and shields, and spacing between text and symbols). The highlighted panel style is used to create new panels.

✓ Place New Panel

It is important to note that you should always start the sign design process with the largest sign that will be placed on the sheet. This sign will dictate the scale of the sheet.

1. Close the View Panel Style dialog by clicking the **OK** button.
2. Close the Select Current Panel Style dialog by clicking the **OK** button.
3. Dismiss the Welcome to GuidSIGN dialog by clicking the **Close** button. (This is to have the maximum amount of screen real estate.)
4. Continuing with GuidSIGN, click the **Place New Panel**  button. This opens Place New Panel.

5. Set the *Name* to **1** and *Quantity* to **1**. The name you enter here will be the name that appears in the report on the Guide Sign Worksheet. This is typically a number.
6. Set the *Station(s)* to **555+00**.

Hint If you have multiple locations for this sign i.e. quantity more than 1, you use the Advanced option on this dialog to set multiple stations and these stations will show up on the report.

7. Set *Mounting* to **Ground**. The options are **Overhead** or **Ground**.
8. *Legend* to Reflective.
9. *Panel* to **Reflective**.
10. Panel *Width* and *Height* are fine at the **default** sizes; these will adjust as text is placed on the sign.
11. Set *Round* to **6**. This is 6", which is a FDOT standard.
12. Set the *Panel* to **Round Corners** and **No Dividers**. If your sign has dividers, there are other options on how to display the dividers.

Note This data is stored with the sign and can be included in reports. The sign panels are dynamically resized as text and symbols are added to the sign. You may have to come back and re-set the Rounding to 6" after the sign is placed in the sheet.

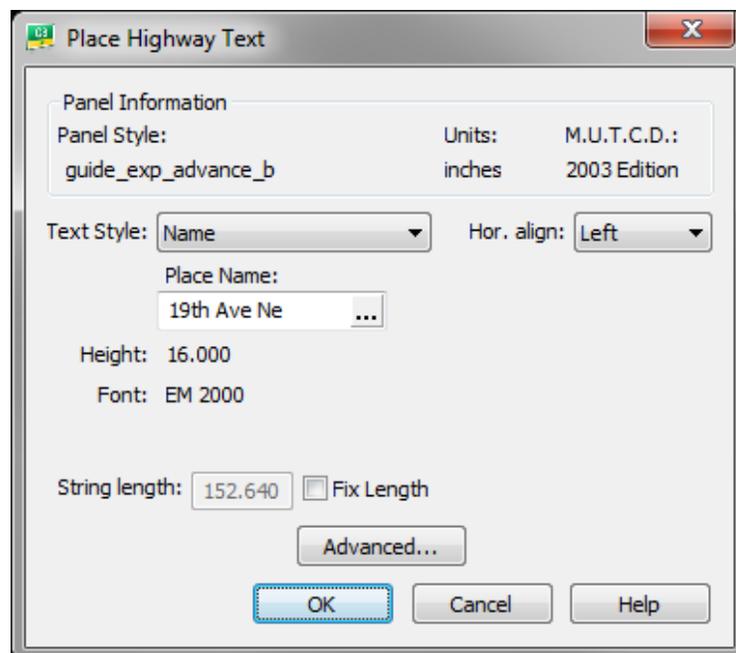
13. Click **OK**. The Sign Panel will be attached to the cursor.
14. Issue a **Data Point** to place the empty sign panel in the design file.

✓ *Place Highway text*

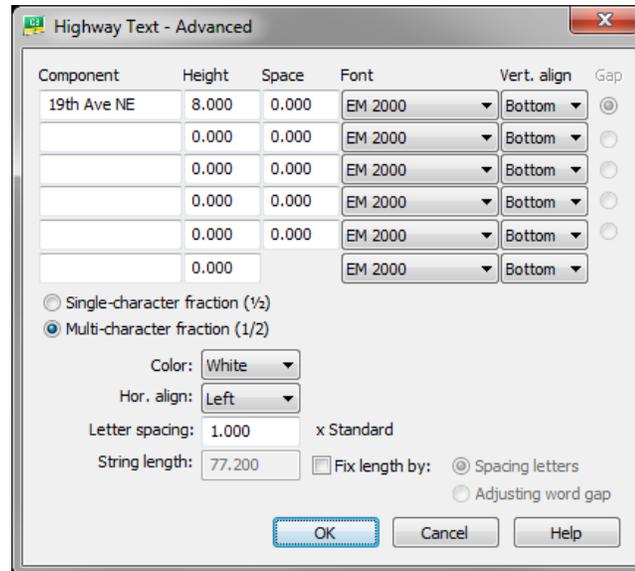
In this exercise, the student will place text in the sign panel. When complete the sign will look like that shown in the figure below. Keep in mind that each district may have specific sign standards, which need to be followed. Be sure to communicate with the Traffic Design personnel prior to starting the design process, this will save having to redo signs after a review.



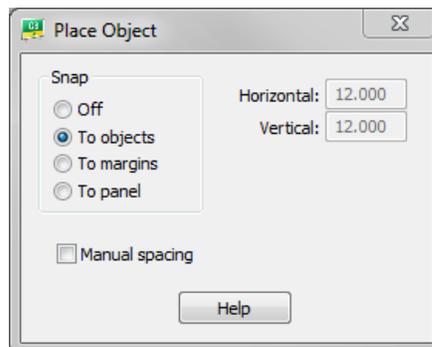
1. On the GuidSIGN toolbox, click **Place Highway Text** . This prompts you to select a point inside the sign panel.
2. Select inside of the sign panel. This opens Place Highway Text.
3. Set the *Style* to **Name**. This should be the default.
4. Set the *Hor. Align* to **Center**.
5. Under *Place Name* key-in **19th Ave NE**. No space should be between the **19** and **th**.



6. Click the **Advanced** button. This opens the Highway Text – Advanced dialog.
7. You need to fix the ‘e’ in NE to be upper case. GuidSIGN will change it to a lower case ‘e’ and it can only be changed using **Advanced**. If you place the text, you can go back and fix it with the edit text tool.



8. Under *Component*, change the lower case ‘e’ to upper case.
9. Under *Height* change the Height to **8.0**.
10. Click **OK**. The text box will be attached to the cursor and **Place Object** opens.
11. Under *Snap* set the option to **To objects**. This should be the default setting.



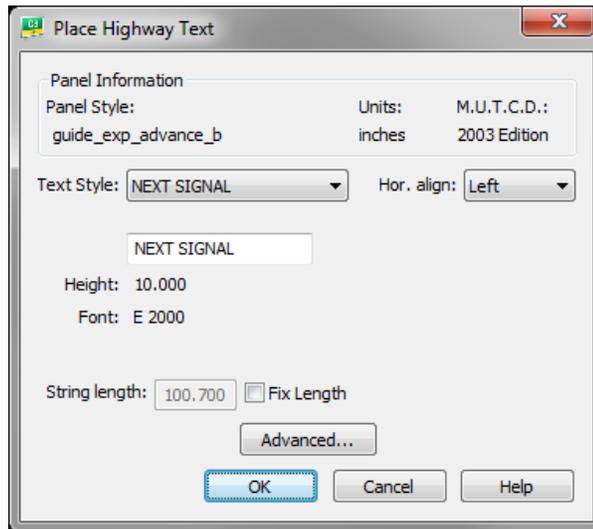
12. Issue a **Data Point** inside of the sign panel. The figure below shows what the sign should look like at this point. The height and width of the sign panel will be adjusted to meet FDOT standards.



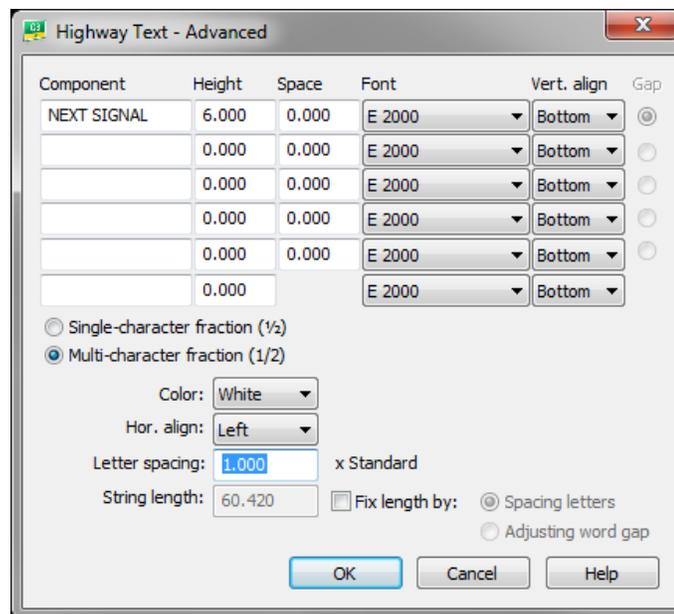
✓ *Place Highway text*

Next, you will place the second piece of text and then adjust the size of the sign panel.

1. Click Place Highway Text .
2. Select inside of the sign panel. This opens **Place Highway text**.
3. Next to *Style*, select **NEXT SIGNAL**. This will fill in the text field.

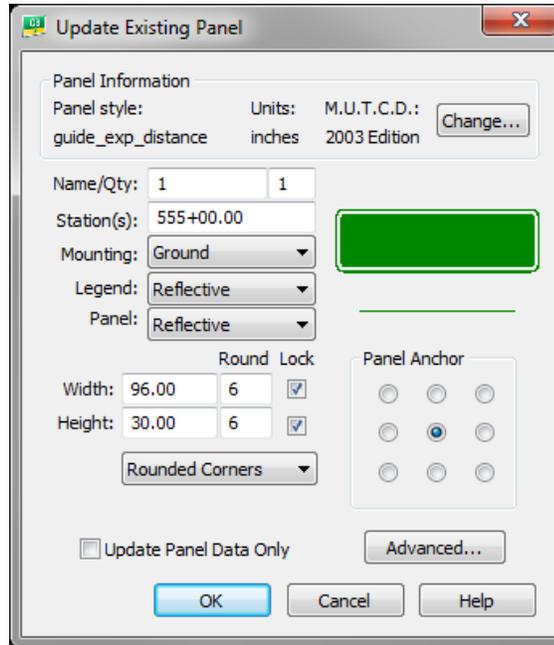


4. Click the **Advanced** button.
5. Change the *Height* to **6.00** as shown in the figure below.



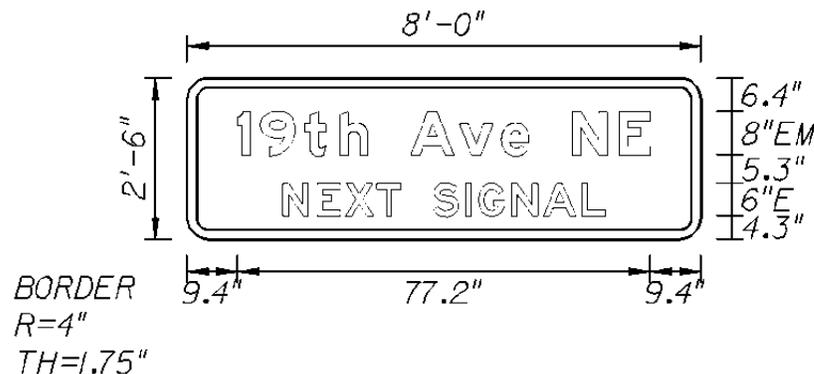
6. Click **OK**.

7. *Place Objects* should be set on **To Objects**.
8. Place the cursor inside of the sign panel below the first line of text and issue a **Data Point**.
9. From the GuidSIGN menu, click on **Update Existing Panel** .
10. Select inside of the sign panel. This opens Update Existing Panel.



Next, you set the panel parameters to the final size. The sizes used in this exercise are based on a district requirement. These do not apply to all FDOT districts.

11. In the *Panel Information* section of the dialog, click the **Change...** button.
12. From the **Select Current Panel Style** dialog, highlight the **guide_exp_distance** panel style from the *Panel Style:* list box. (Earlier the incorrect panel style was selected to show the flexibility of the tool.)
13. Click the OK button on the Select Current Panel Style.
14. Set the *Width* to **96.0** and *Round* to **6** and **Lock** it.
15. Set the *Height* to **30.0** and *Round* to **6** and **Lock** it.
16. Setting the *Round* to **6** rounds the dimensions to 6".
17. Click **OK**. This updates the sign panel and re-dimensions it.

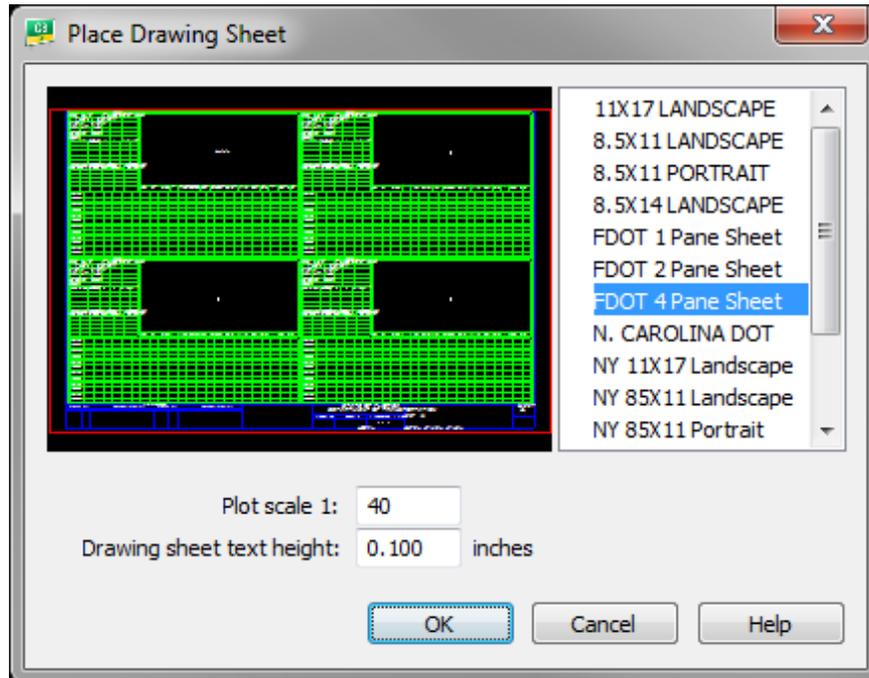


➤ **Creating the GuidSIGN Work sheet (Part 2)**

✓ Place Sheet Border

In this part of the exercise the student will place the standard FDOT sheet border using GuidSIGN. There are several standard sheet borders delivered with the GuidSIGN program.

1. On the GuidSIGN tool bar, click **Place Drawing Sheet** . This opens Place Drawing Sheet.
2. Select inside of the sign panel. This places the sheet border.



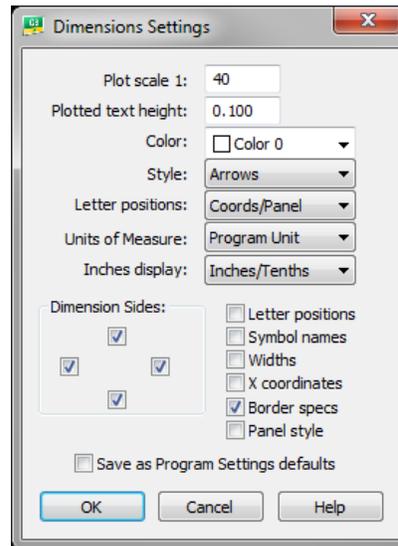
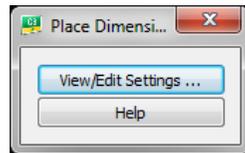
3. On the right side of dialog, select the sheet **FLDOT 4 Pane Sheet**.
4. Set the *Plot Scale* to **40**.
5. Set the Drawing sheet text height to **0.10**.
6. Click **OK**.

➤ **Creating the GuidSIGN Work sheet (Part 3)**

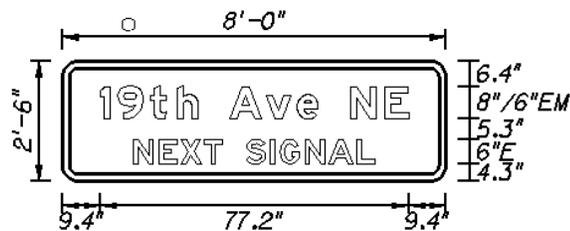
✓ Update panel dimensions

Next, you will update the dimensions and edit the 8" dimension to read 8"/6" EM.

1. On the **GuidSIGN** tool bar, click **Place Dimensions** .
2. On the **Place Dimensions** dialog, click the **View/Edit Settings** button.



3. Set the **Plot Scale** to **40**. This should match the sheet border scale.
4. Set the Plotted text height to 0.10.
5. Toggle off **Border Specs**. All other options can be left as is.
6. Click **OK**.
7. Select inside of the sign panel. This will update the panel dimensions.
8. Click the MicroStation Edit Text.
9. Select the 8" EM dimension along the right side of the panel.
10. Edit the text to read 8"/6"EM.

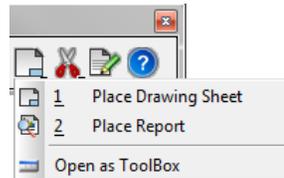


➤ **Creating the GuidSIGN Work sheet (Part 4)**

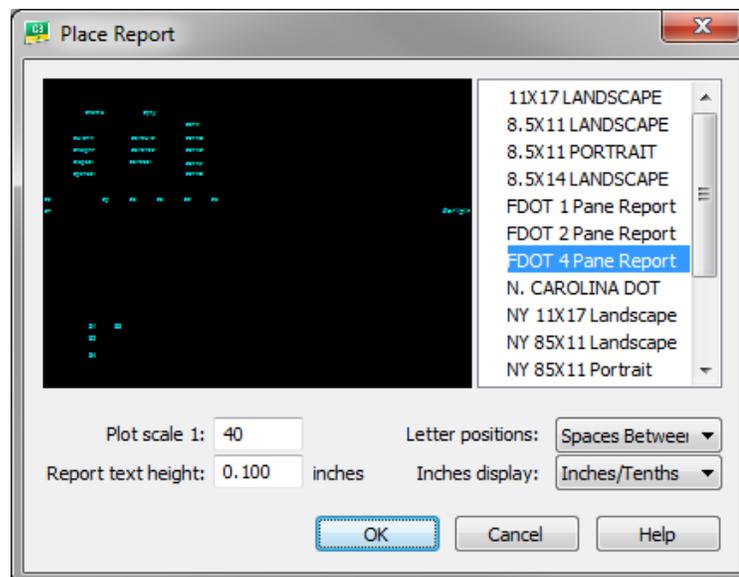
✓ Place Report

In this part of the exercise you will place the report associated to the selected border.

1. On the GuidSIGN tool bar, click and hold the down arrow on the **Place Drawing Sheet** icon  and select the **Place Report** selection from the menu.



2. **Data Point** inside of the sign panel.
3. Click the Place Report icon .



4. On the right hand side of the dialog, select the report **FLDOT 4 Pane Report**.
5. Set the *Plot scale 1* to **40**.
6. Set the Report text height to **0.1**.
7. Set *Letter positions* to **Spaces Between**.
8. Set *Inches display* to **Inches/Tenths**.
9. Click **OK**.
10. This plots the report into the sheet border.

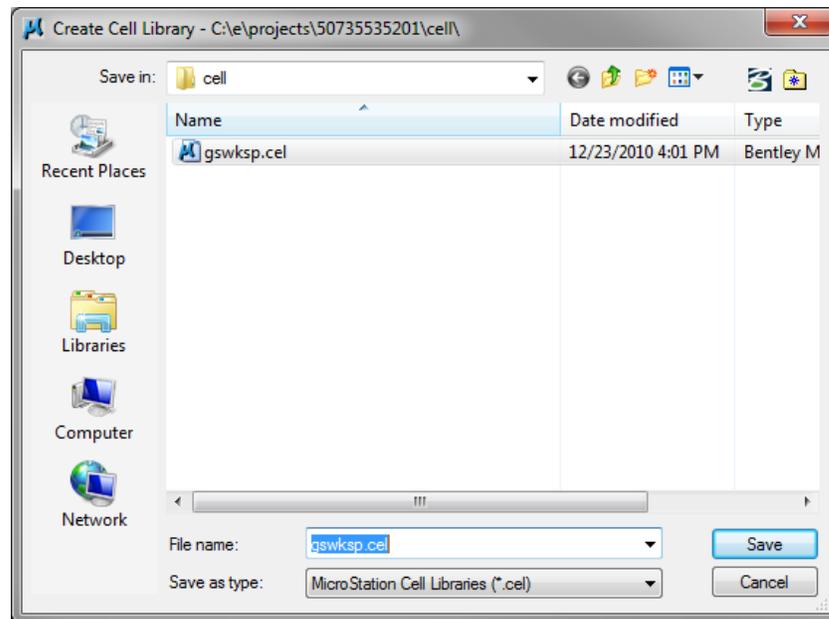
Note If you need to make changes to the sign panel all you need to do is place the report again, the old report text is automatically deleted.

Exercise 5.3 Place Guide Sign into design file

In this exercise the student will create a cell library then create a cell of the guide sign panel and finally place the cell using the Draw Sign program to place the guide sign panel in the signing and pavement marking design file.

➤ **Create a guide sign cell library**

1. Continuing in *GSWKSP01.dgn* navigate to **FDOT Menu > CellApps > Cell Libraries**. This opens the **Cell Library** dialog.
2. In the **Cell Library**, select **File > New**. This opens Create Cell Library.
3. Set the Directory for the new cell library to **C:\e\Projects\50735535201\cell**. This location is critical for the Draw Sign program to work properly.
4. Key-in the name of the new cell library **GSWKSP.cel**. This library name is also critical for the Draw Sign program to work properly.

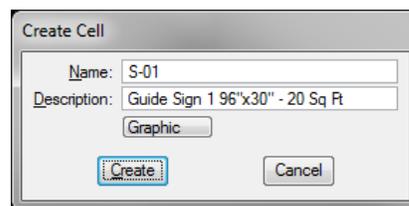


5. Click **Save**. This creates the new cell library and makes it the active cell library.

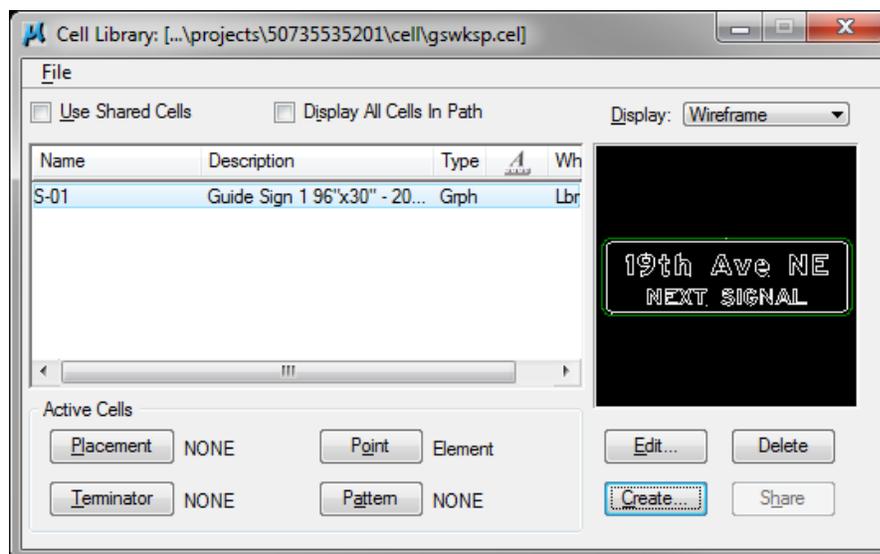
➤ Create Guide Sign Cell

In this part of the exercise you will create a new cell of the Guide Sign panel. The name of the cell is very important; it must match the name of the sign assembly in the Draw Sign program, which at this point you have not yet created. The Draw Sign program is looking for the name S-01 thru S-120.

1. Continuing in *GSWKSP01.dgn* zoom in around the Guide Sign panel.
2. If you closed the cell library, open the **gswksp.cel** library. It is critical to have the correct cell library open before creating a new cell.
3. On the GuidSIGN menu, click **Program Settings icon** .
4. In **Program Settings > Display Options** set the **Display Mode** to **Outline**. This turns fill off and color off which makes the cell much more legible when placed in the design file.
5. Click **OK**.
6. Using either the *Fence* command or *PowerSelector*, select the **sign panel elements**. Do Not include the dimensions.
7. Set the **Cell Origin**. Set the origin on the bottom of the panel at the midpoint of the sign. The origin is a personal preference.
8. In the Cell Library dialog, select **Create**. Next, you will enter the cell name.
9. For the *Name* key-in **S-01**. This will also be the name of the sign assembly.
10. The **Description** is optional. It can be useful if there are several signs on the project.

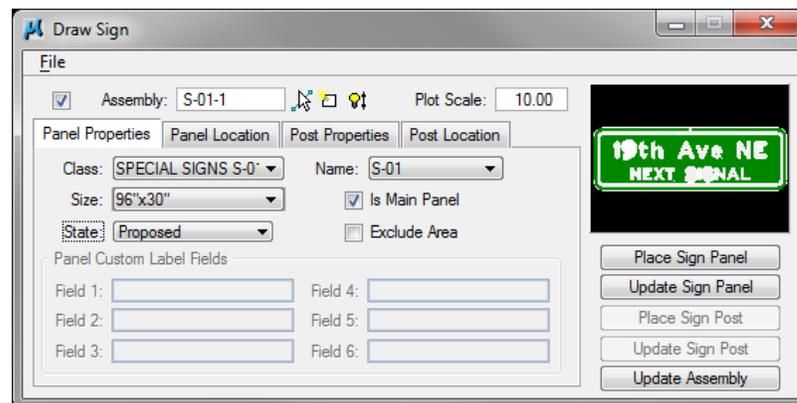


11. Click **Create**. This adds the new cell to the cell library.



➤ **Create New Sign Assembly for Guide Sign**

1. Open Dsgnsp01.dgn.
2. From FDOT Menu, load the Draw Sign program.
3. In Draw Sign, toggle on **Assembly**.
4. Open the Panel Properties tab.
5. Set the *Class* to SPECIALS SIGNS S-01 Thru S-20.
6. Set the *Name* to **S-01**.
7. For *Size*, key-in **96" x 30"**.
8. Check the menu; if the **size** is there, select it. If the size is not in the list, click on the size drop down list and click the **ESC key** on the keyboard. This will allow for the addition of a custom size to be entered. This is for all signs. The most common accepted format for a custom size is as follows; example: **30"x30"**, **6.25** where 30"x30" is the sign size and 6.25 is the square footage for wind load calculations.
9. Toggle on Is Main Panel.
10. Set the *State* to **Proposed**.
11. Click Create New Sign Assembly.
12. Set the *Plot Scale* to **10.00**. This will most likely never be the same as the sheet scale because the cell of the guide sign is not at 1 to 1.

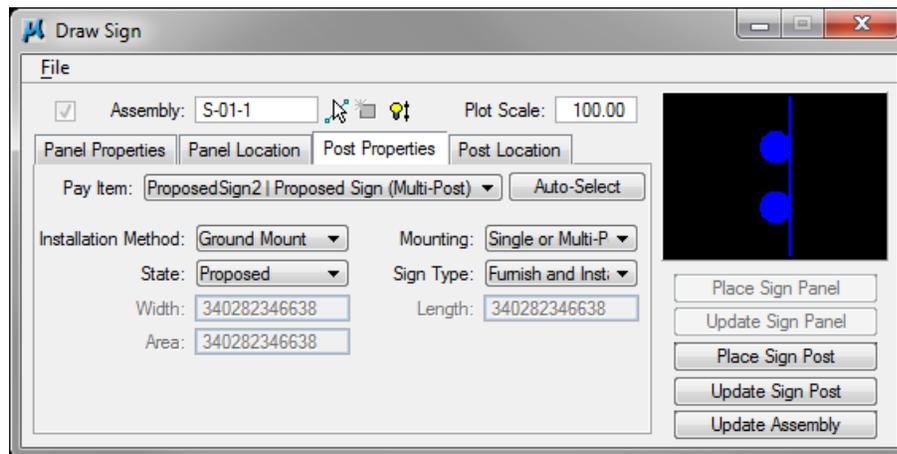


➤ **Panel Location**

1. Open the **Panel Location** tab.
2. Set the *Location* to **By Origin**.
3. Set the *Rotation* to **Dynamic 2 Point**.
4. Set the *Angle* to **0.0**.
5. Under *Label*, select **Preferences**.
6. In the Sign Panel Label Preferences dialog, toggle **off** both **Name** and **Size**. This is because the scale of the sign panel is smaller than 100. The labels will be placed in a separate step at a different scale.
7. Click **OK**.
8. Zoom into the area around **Station 560+00.00**.
9. Place the Sign Panel a general location on the right side of the roadway.
10. Rotate the sign panel accordingly and issue a **Data Point** to place the sign.

➤ **Post Properties**

1. Open the Post Properties tab.
2. Set the *Plot Scale* in this tab to **100.00**. (If the Active Scale has changed set it to 100, as well.)
3. Set the *Installation Method* to **Ground Mount**.
4. Set the *Mounting* to **Single or Multi-Post**.
5. Set the *State* to **Proposed**.
6. Set the *Sign Type* to **Furnish & Install**.
7. For the *Pay Item* click the **Auto Select** button.
8. At the *Prompt*, select **2_Post**.
9. Ensure the *Pay Item* specifies ProposedSign2 | Proposed Sign (Multi-Post).

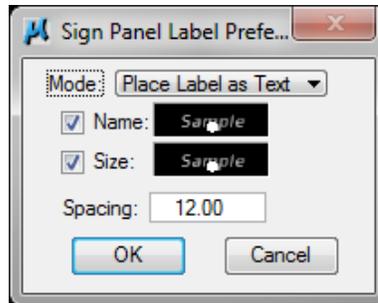


➤ **Post Properties**

1. Go to the **Post Location** tab and set the *Location* to **Along Element**
2. Set the *Element* to **Chain**.
3. Set the *Chain* to **BLCONST**.
4. Toggle on the *Station* and enter **561+00.00**.
5. Toggle on the *Offset* and enter **56.0**. For the offset, you are required to set the post a minimum of 12' off the edge of travel lane based on index 17302 Case II.
6. Set the *Rotation* to **Absolute**.
7. Set the *Angle* to **180.0**. Key this in or use the Up and Down arrows.
8. Click the **Place Sign Post** button to place the post and place the **Post Label** and **leader line** accordingly.

➤ **Set Special Sign Panel Label Preferences and Place Label**

1. Under the **Panel Location** tab, click the **Preferences** button. This opens the Sign Panel Label Preferences dialog.
2. Set the *Mode* to Place Label as Text.

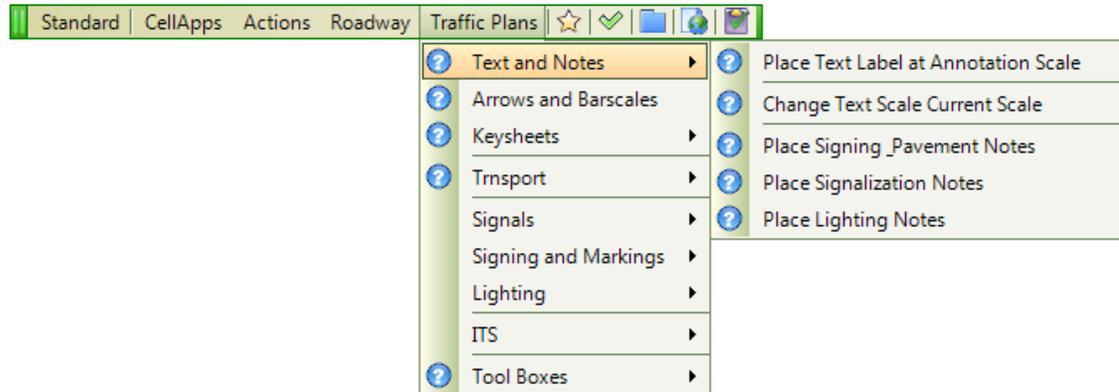


3. Toggle on **Name** and **Size**.
4. Click OK on the Sign Panel Label Preferences dialog.
5. Next to the *Preferences* button, set the *Angle* to **32.40**. This is the same as the angle used when placing the sign post text.
6. Lock the **Angle** on.
7. Click **OK** on the **Place Panel Label** button.
8. Select the **S-01 Sign Panel** by double clicking the panel.
9. Place the panel label accordingly.

Note You can use the GuidSIGN program to change the attributes of the Sign Panels created with GuidSIGN to show as full color, black and white or outlined by accessing the Display Options from the Program Setting on the GuidSIGN tool bar.

PLACING TEXT AND NOTES

This section will cover some of the Text and Notes features found in FDOT Menu.



Place text Label at Annotation Scale – Places text at the plot scale. This command also automatically sets the font and text element attributes.

Change Text Scale to Current Scale – Changes existing annotation text scale so that it is equal to the current plot scale. Be careful with this option, it changes any text to match the current scale. Works great if the project changed from 20 scale to 50 scale, this adjusts all MicroStation text to the new scale in one click.

Place Signing & Pavement Notes – This option opens a text file with standard general notes in it, which should be edited for each specific project. This text file should be kept current through the life of the project. The text file “spnotes.txt” is copied to the working directory.

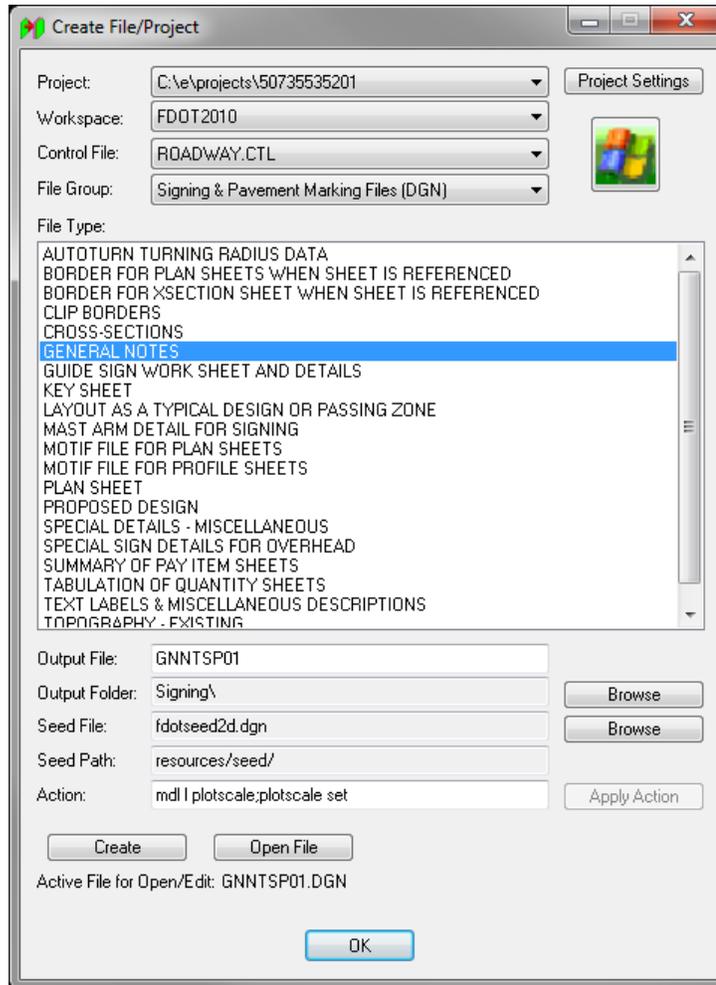
Place Signalization Notes – This option opens a text file with standard general notes in it, which should be edited for each specific project. This text file should be kept current through the life of the project. The text file “sgnotes.txt” is copied to the working directory.

Place Lighting Notes – This option opens a text file with standard general notes in it, which should be edited for each specific project. This text file should be kept current through the life of the project. The text file “ltnotes.txt” is copied to the working directory.

GENERAL NOTES SHEET

Creating the general notes sheet from FDOT Menu is a very simple process. Use the Create File/Edit tool to create the design file, then use the Text and Notes menu to place the sheet border and standard notes.

The figure below shows the Create File/Project tool with the *Signing and Pavement Marking General Notes* sheet selected.

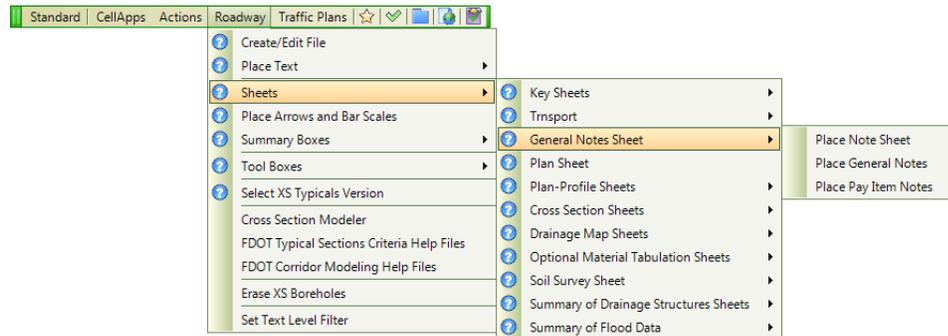


The Create File/Project invokes the Set/Update Plot Scale. The plot scale is very important as many other applications look for this information to work properly.

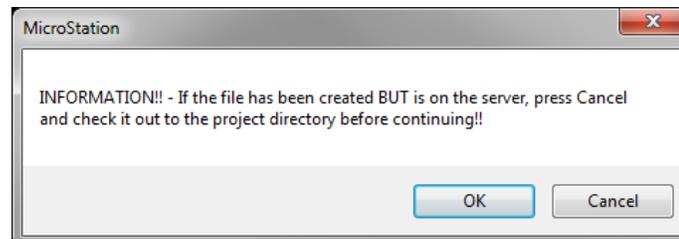
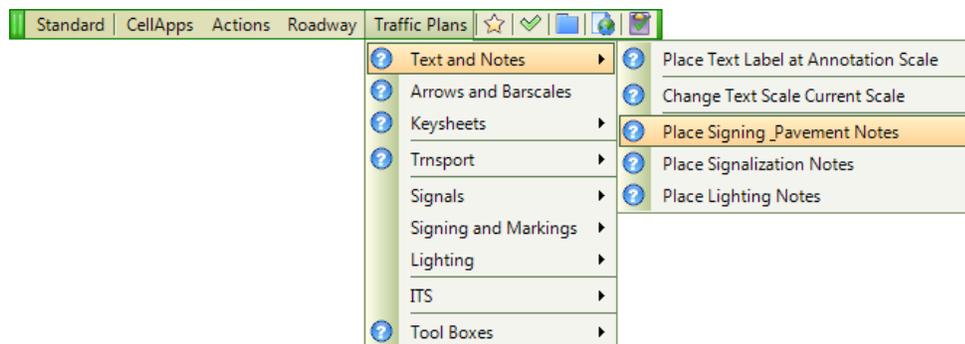
The figure below shows the Set/Update Plot Scale tool. The default scale is **50**. You are responsible for setting this to the correct scale.



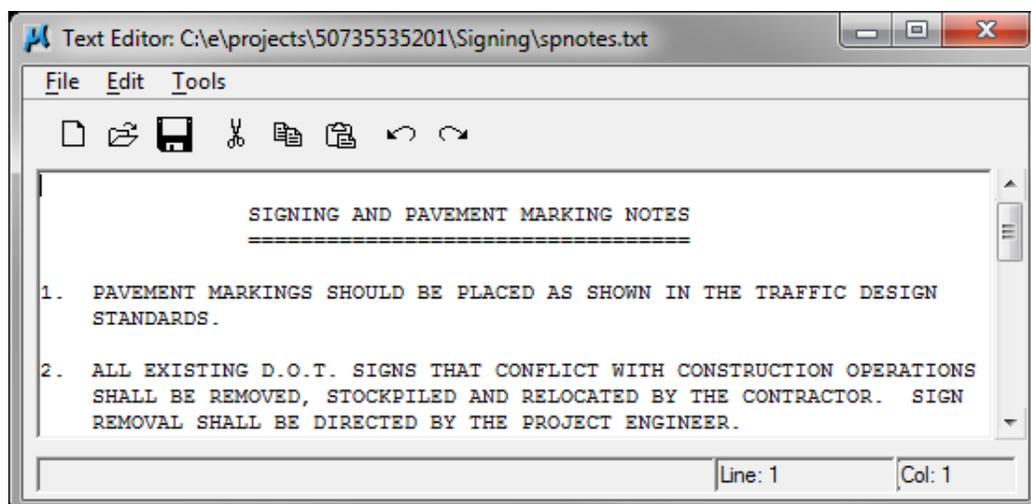
To place the general notes sheet cell, from the FDOT Menu, select **Roadway > Sheets > Place Note Sheet**, as shown in the figure below.



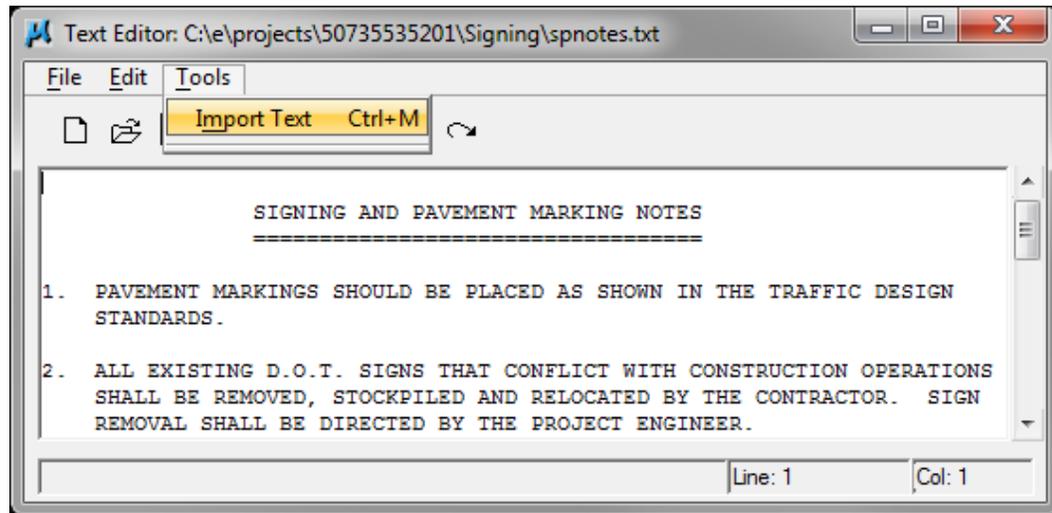
To place the actual notes, from FDOT Menu, select **Traffic Plans > Text and Notes > Place Signing & Pavement Notes**, as shown in the figure below.



Selecting this item starts to open the standard general notes delivered with the FDOT software. An Information dialog will appear as shown above. This file is a standard text file and should be edited for each project. As long as the plot scale is set properly, importing this text will bring it in at the correct size.



To import the notes, select from the text editor menu: **Tools > Import** and issue a **Data point** in the file.



Exercise 5.4 Create Signing & Pavement Markings General

In this exercise the student will create the General Notes Design File and place the Signing & Pavement Markings General Notes on the general notes sheet cell.

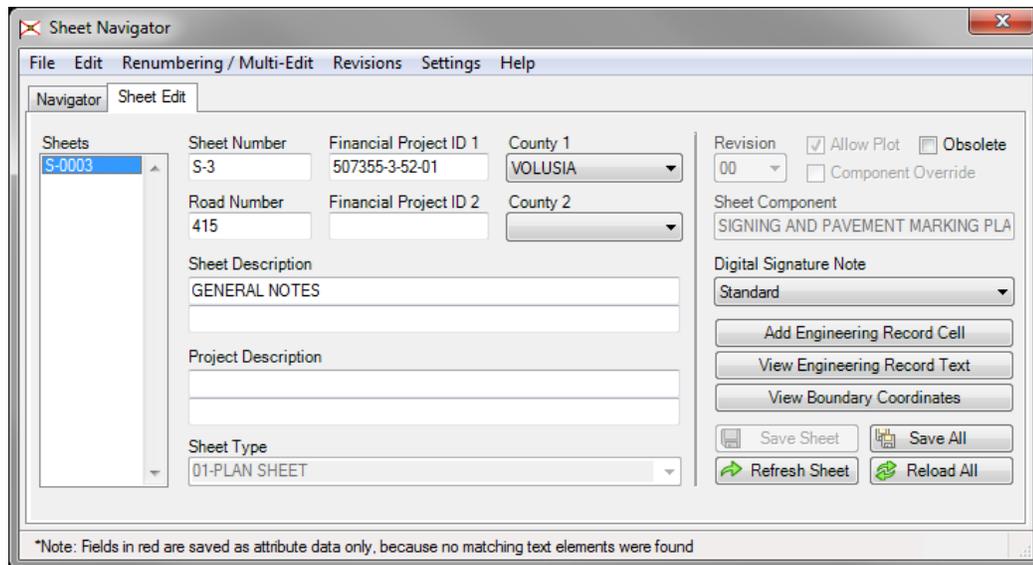
1. From the FDOT Menu, select **Traffic Plans > Signing and Markings > Create/Edit File** tool. (This can be done from inside **MicroStation** or from the **FDOT2010** folder on the desk top.)
2. Create and Open the file **GNNTSP01.dgn** in the *signing* folder.
3. Close the Create File/Project tool.
4. Set the *Plot Scale* to **50**.
5. From the FDOT Menu, select **Roadway > Sheets > Place Note Sheet** to place the general notes sheet cell.
6. The sheet will be on the cursor. Issue a **Data Point** in the design file to place the sheet cell.
7. From FDOT Menu, select **Traffic Plans > Text and Notes > Place Signing & Pavement Notes** to place the actual general notes.
8. Click **OK** on the Information dialog. The Microstation Text Editor will open.
9. Edit the text if necessary and if the text was edited select **File > Save** to save the changes.
10. From the Text Editor Menu, select **Tools > Import Text** to import (copy) the text into the design file.
11. Issue **Data Point** in the design file in the appropriate place where the general notes would be placed within the sheet border.

SHEET NAVIGATOR

The next step after creating a new sheet file is to run **Sheet Navigator**. This will tag the sheet file with important information used by downstream applications, specifically **Electronic Delivery**. **Sheet Navigator** will be covered in great detail later in this training course.



Before running **Sheet Navigator** it is very important that the **Plot Scale** is set correctly. If the Plot Scale is not correct, the **Digital Signature Note** will not display properly.



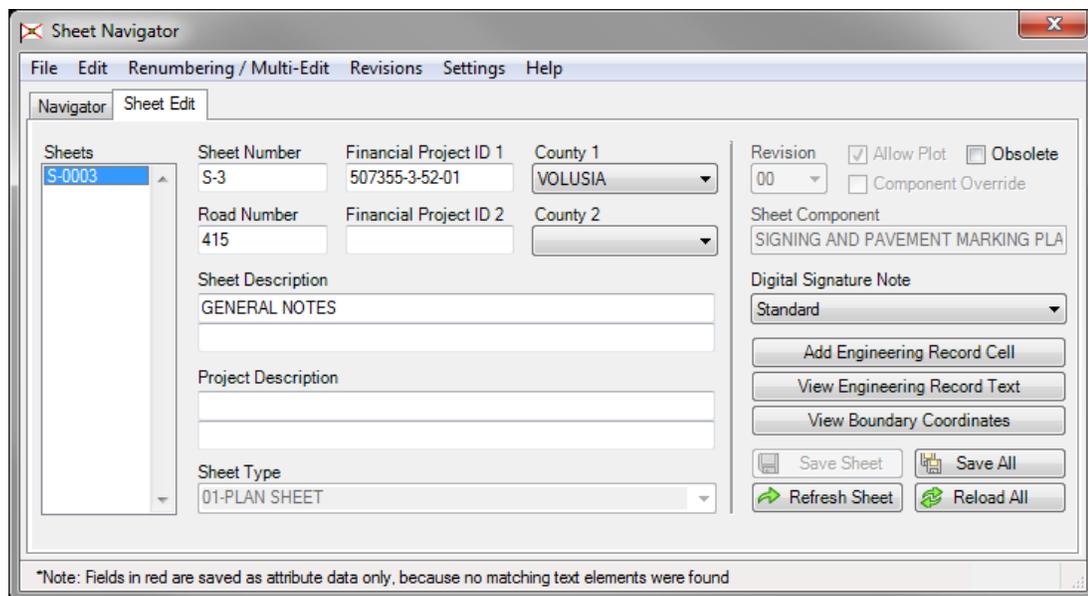
After populating **Sheet Navigator** with all of the pertinent information, clicking "**Save Sheet**" tags the sheet with this data that can now be mined by the **Electronic Delivery** software.

Note Chapter 7 goes into a more in depth instruction on **Sheet Navigator**.

Exercise 5.5 Adding Sheet Information with Sheet Navigator

In this exercise the student will add the General Notes sheet information with the Sheet Navigator Application.

1. From the FDOT Menu, select Actions > Label Sheets (Sheet Navigator) tool.
2. In Sheet Navigator fill in the *Sheet Number* with **S-3**.
3. For the *Financial Project ID 1*, click inside the blank field. This will populate the field with the correct **Financial Project ID**.
4. For the *County* select the drop down arrow and navigate to **Volusia** County.
5. For the *Road Number* type in **415**. Do not include **SR** in the field; it is part of the sheet file.
6. For the *Digital Signature Note* select the drop down then select **Standard**.
7. Click the **Save Sheet** button. This will tag the file with all of the pertinent information for creating the electronic delivery index and populates the fields in the key sheet.



8. Click the **X** in the upper right hand corner to close Sheet Navigator.

6 QUANTITIES AND REPORTS

OBJECTIVE

In this chapter the following topics will be covered:

- Defining Adhocs for Quantities
- Import Project Properties from TRNS*PORT
- Generate Quantities and Export to Quantity Manager
- Generate CSV File in Quantity Manager
- Export Quantities for TRNS*PORT
- Place Quantities on Tabulation of Quantities Sheet

INTRODUCTION

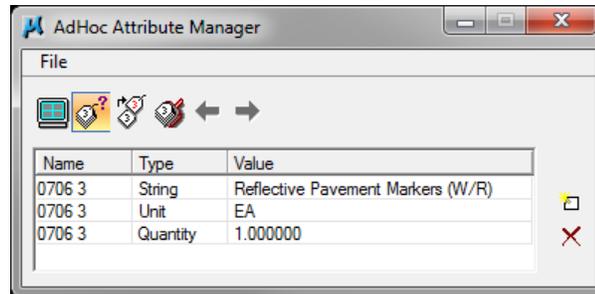
This section covers applications used to produce quantities and then place the quantities on a plan sheet or computation book. Being able to produce quantities based on your design elements should be your ultimate goal. Producing automated quantities shows the individuals knowledge of the software and best design practices. Team work is crucial to achieving this goal, if everyone in the design squad is not following the same procedures, as it applies to cadd standards, producing automated quantities will be much more difficult.

DEFINING ADHOCS FOR QUANTITIES

Adhocs are additional information that can be used to better define an element or associate a quantity to an element. Several of the items in the FDOT ddb file have Adhocs associated to them. It is very important to become familiar with the items in the ddb that have Adhocs, understand how they operate and how they affect quantities. FDOT and GEOPAK provide tools that allow the designer to select elements and view what attributes and Adhocs are associated to those elements. The designer can also review an item in D&C Manager to determine if there is an Adhoc associated to it. Review chapter 4 of this training manual for more information on Adhocs.

ADHOC ATTRIBUTE MANAGER

This tool can be used to view Adhocs or Set Adhocs. It can be opened from the Road tools palette  or from **Applications > GEOPAK ROAD > GEOPAK 3PC Adhoc Attribute Manager**.



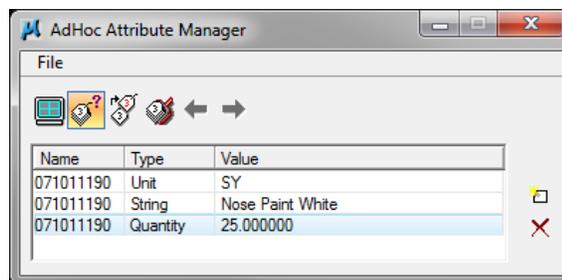
Identify Element - Using this tool is as simple as clicking on the  icon and selecting a MicroStation element. If it was drawn with Adhocs associated to the element, they all display as shown above. If there are no Adhocs then the display will be blank. The figure above is showing the Adhocs of Reflective Pavement Markers (W/R). The information displayed is purely for quantities.

Set Attributes - Select this icon  to set Adhocs on an item, for example: The Nose Paint quantity on traffic separators or median openings. There is currently a limit of 48 attributes that can be associated to an element. If the designer wants to create their own Adhoc for a scenario, it is a multiple step process.

The designer needs to create three new rows for the Adhoc, it needs:

- Unit
 - String
 - Quantity
1. The designer would need to start with a blank AdHoc Manager dialog.
 2. Click the **Add New Row** icon  on the right side of the dialog.
 3. The **Name**, in this example, is the pay item number in **D&C Manager**, example **071011190**.
 4. The **Type** is **Unit** for the first row, **String** for the second row and **Quantity** for the third row.
 5. The **Value** is **SY** for the first row, **Nose Paint White** for the second row and **25** for the third row, as shown below.

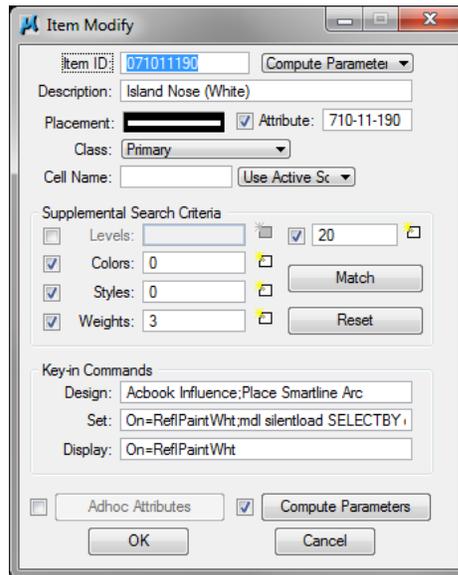
Note SY must be in UPPERCASE.



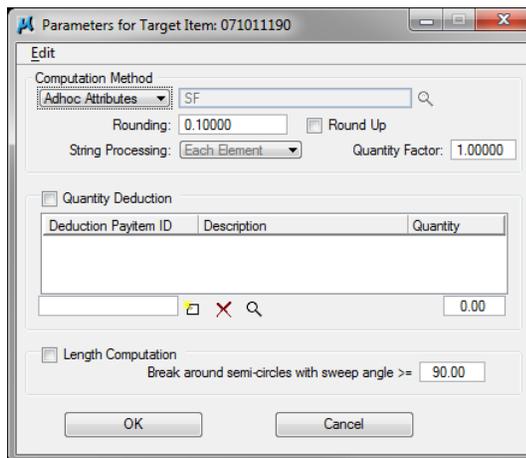
Note The Quantity Value is the area measured in MicroStation.

6. Then click the **Set Attributes** icon  and select the element to add the Adhoc to. The element set in this example is a line drawn in MicroStation in the area of the nose paint. The length of the line is not important.

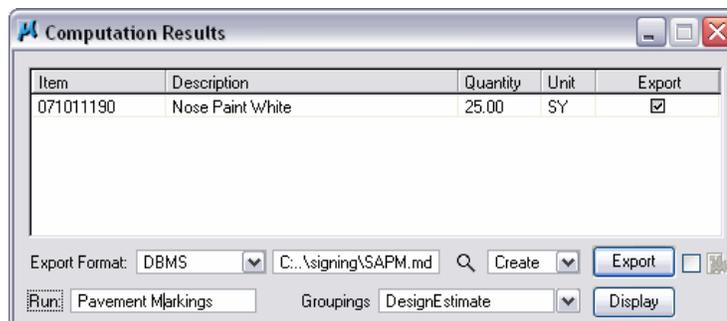
The item in D&C Manager will have to be set to compute by Adhoc. Use the **Modify Item** option to check the **Compute Parameters**. Right click on the item in D&C Manager to modify the item.



Click the **Compute Parameters** button located on the bottom right of the dialog. Notice in the Figure below that the **Computation Method** is set to **Adhoc Attributes**. The item must be set to use **Adhoc Attributes** as the computation method, if D&C Manager is to use the **Adhoc** quantity attached to an element for computation.



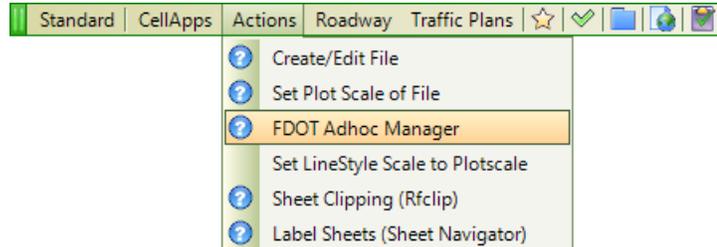
The figure below shows the quantity computation after the **Adhoc** has been applied. Keep in mind that the quantity of **25 SY** was not calculated by the Adhoc but rather the value of **25** was assigned to the pay item via an **Adhoc**.



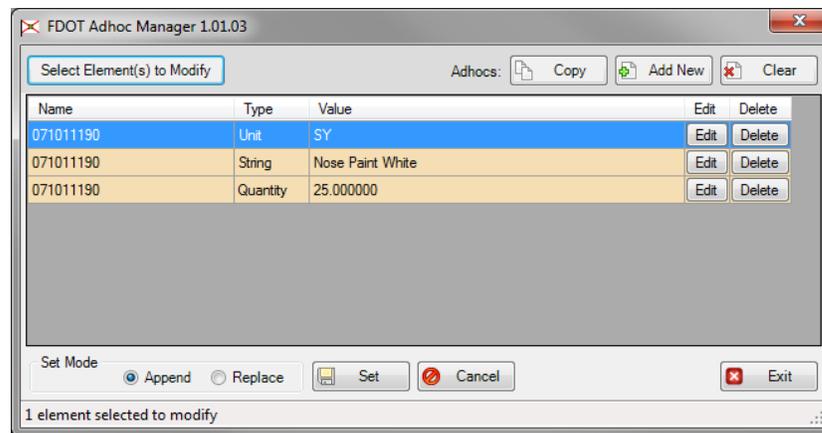
FDOT ADHOC MANAGER

As previously mentioned, FDOT has taken steps to reduce cost by developing a comparable tool that can place GEOPAK AdHocs without having a full GEOPAK license active.

The FDOT Adhoc Manager can be loaded from the FDOT Menu option: **Actions > FDOT Adhoc Manager**.

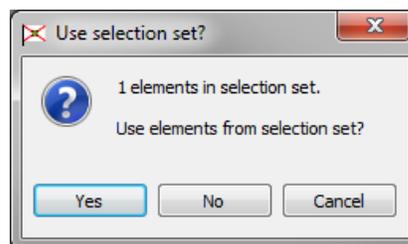


This opens the FDOT Adhoc Manager.



The FDOT Adhoc Manager tool is used to *Add New Adhocs*, *Edit New or Existing Adhocs*, *Copy Adhocs* for 1 element to another element or group of elements in a selection set and/or *Delete Adhocs* on elements within a **DGN** file without having to use a GEOPAK License.

- Select Elements(s) to Modify** - In order to review *Adhocs* on an element, first the designer must create a selection set of 1 or more elements in MicroStation and then click the *Select Elements(s) to Modify* button. Before loading this application the designer can create a selection set using MicroStation *Element Selection* tools and when the FDOT Adhoc Manager is loaded the application will use that selection set and the dialog shown below will show.



Clicking the **NO** or **Cancel** button will stop the selection process.

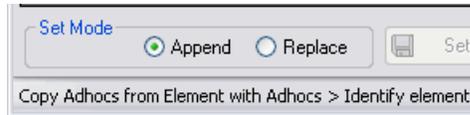
Clicking the **Yes** button will populate the FDOT Adhoc Manager dialog, if all *Adhocs* of the selected elements match or a single element is selected containing *Adhocs*.

The following dialog will show indicating the number of elements in the selection set and if the element(s) selected have *Adhocs*.



Note If elements are selected that do not have Adhocs, the dialog will state: "You have selected (number of elements) elements without Adhoc attributes."

- **Copy** - To copy the *Adhocs* from 1 element to another element or to a group of elements in a selection set, a selection set will have to be selected first and then the **Copy** button clicked. In the **FDOT Adhoc Managers** status bar (lower left corner) the message will read: "*Copy Adhocs from Element with Adhocs > Identify Element*" when the **Copy** button is initialized.

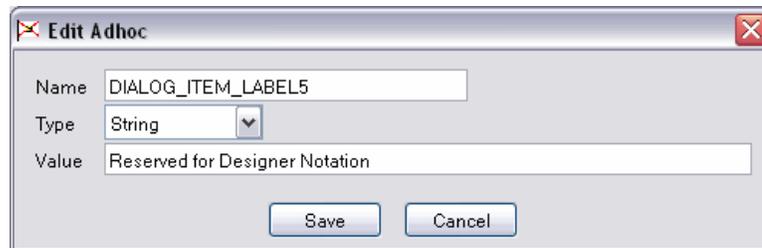


Select the element with the **Adhocs** and the selected element's **Adhocs** will populate the FDOT Adhoc Manager dialog. To **Set** the **Adhocs** to the selection set elements, click the **Set** button.



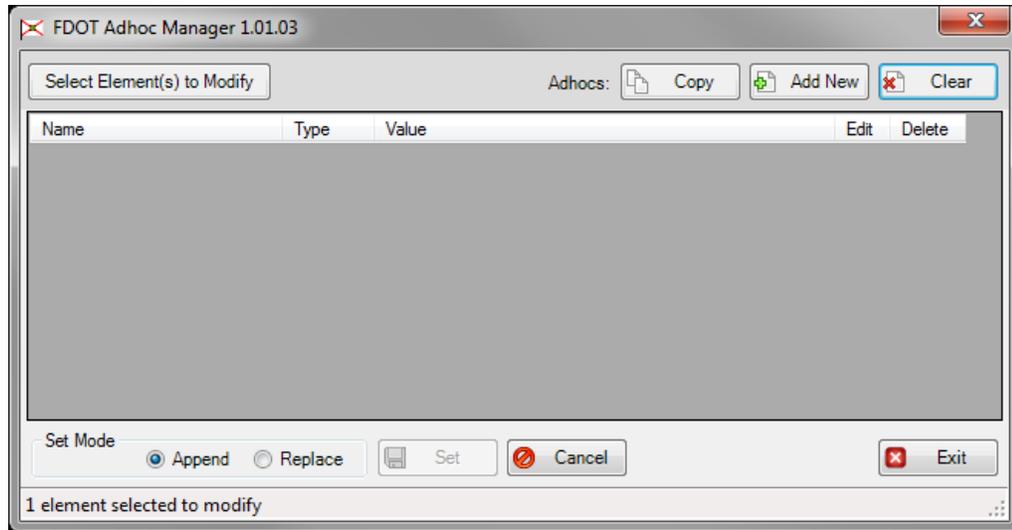
When the **Set** button is initialized the FDOT Adhoc Manager writes the *Adhocs* to the selected element(s) and gives the designer the above dialog when this function is complete. Click the **OK** button to continue.

- **Add New** - Initializing this button creates a new row for adding the additional *Adhocs* and loads the **Edit Adhoc** dialog for the designer to complete the creation of the new *Adhoc*.



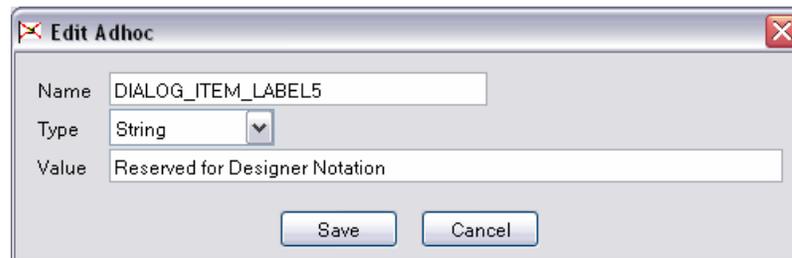
This dialog gives the designer the ability to name the *Adhoc*, select the type of *Adhoc* (*String, Numeric, Quantity, Remarks, Unit or None*) and to give the *Adhoc* a value.

Note The Name Field has a 23 character limitation and the Value field has a 45 character limitation.



- **Clear** - This button will clear the listed **Adhocs** from the FDOT Adhoc Managers dialog when initialized. This function *does not* clear **Adhocs** from the selected elements.
- **Name Field (Column)** - This field lists the names of the **Adhocs**.
- The Name Field has a 23 character limitation.
- **Type Field (Column)** - This field lists the *Type of Adhoc* whether it's a *String*, *Numeric*, *Quantity*, *Remarks*, *Unit* or *None* (if no type is specified).
- **Value Field (Column)** - This field lists the *Value* of the *Adhocs*.

Note The Value Field has a 45 character limitation.



- **Edit Button** - This dialog gives the user the ability to name the **Adhoc**, select the type of **Adhoc** (**String**, **Numeric**, **Quantity**, **Remarks**, **Unit** or **None**) and give the **Adhoc** a value. To complete the **Edit** of an **Adhoc**, set the **Set Mode** to **Replace** and the click **Set** button save changes to the element.
- **Delete Button** - This function is to delete the Adhoc on the row initialized. When the Delete button is clicked the row will be removed for the **Adhoc** list. However, the operation is not complete until the **Set Mode** is set to **Replace** and the **Set** button is clicked.
- **Set Mode** - This gives the user a way to select either to Append to the elements Adhocs or to Replace them.

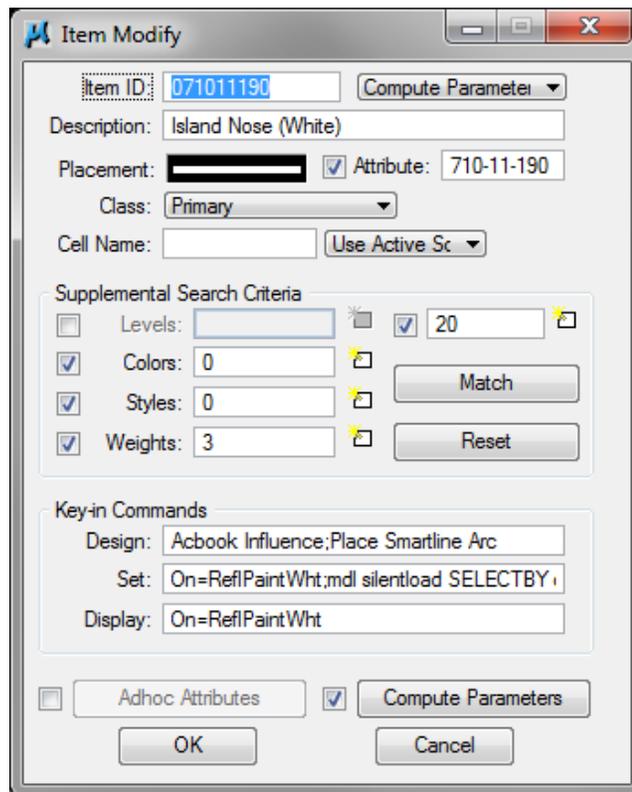


- *Append* - This radio button is to append new or copied **Adhocs** to an existing element (with or without existing **Adhocs**) without overwriting or removing any of the existing **Adhocs**. Click the **Set** button to complete the function of writing **Adhocs** to the selected element or group of elements in a selection set.
- *Replace* - This radio button is to replace new or copied elements to any element whether or not the element has **Adhocs** or not. **Replace** means that any existing **Adhocs** will be removed and replaced with the new **Adhoc(s)**. Use this **Set Mode** for deleting **Adhocs**. Click the **Set** button to complete the function of writing **Adhocs** to the selected element or group of elements in a selection set.
- *Set Button* - Once any additional **Adhocs** are added, copied or deleted, set the **Set Mode** to either **Append** or **Replace**. Click the **Set** button to complete the function of writing **Adhocs** to the selected element or group of elements in a selection set.
- **Cancel Button** - Stops the current operation but will not return the FDOT Adhoc Manager to a clean slate. It may be necessary to click the **Clear** button to clear the dialog.
- **Exit Button** - Closes the FDOT Adhoc Manager application.

D&C MANAGER – MODIFY ITEM

In this section you will learn how to modify an Item to add an *Adhoc*. By doing this, the *Adhoc* is added as the item is drawn. The process is similar to how the *Adhoc* was created in the last example.

In D&C Manager, you right click on the item you want to add the *Adhoc* to, example: *Item ID: 071011190* is white reflective nose paint. Notice in the figure below that the *Adhoc Attributes* option is clear.



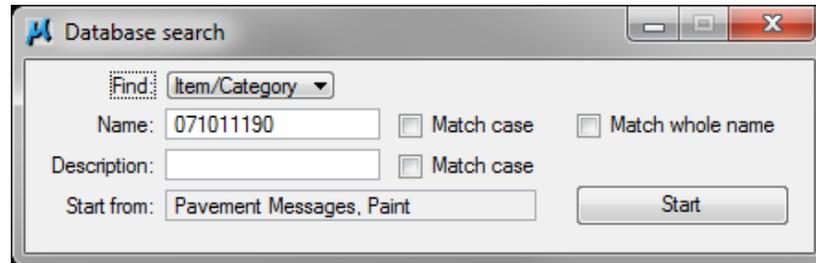
Exercise 6.1 Add an Adhoc to D&C Manager Item

➤ **Modify Item 071011190 add an Adhoc**

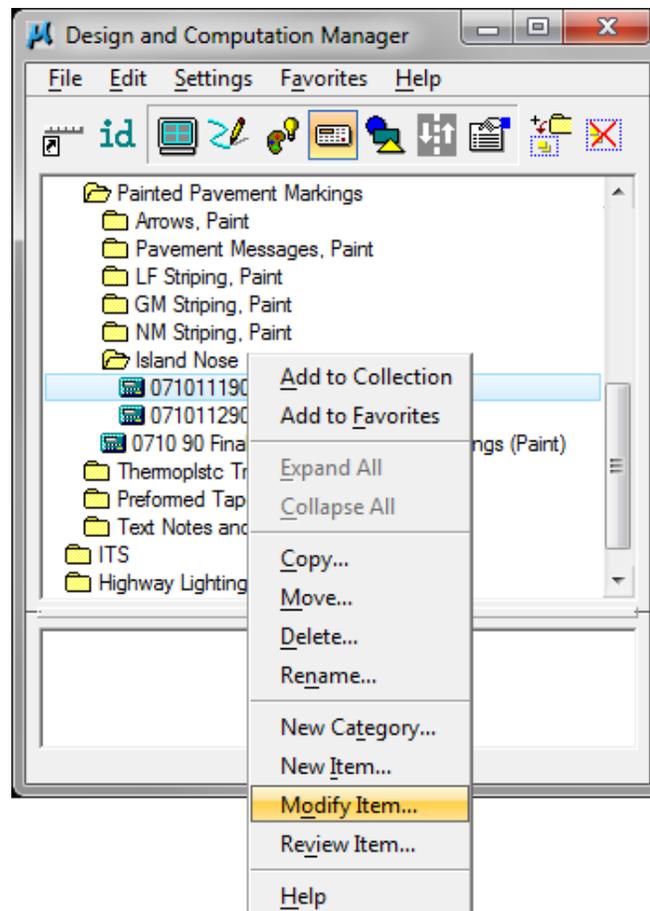
1. Open **Dsgnsp01.dgn** in the *Signing* folder.
2. Start D&C Manager. Make sure the correct ddb file is loaded.

Note It is recommended that the FDOT delivered ddb file be copied into the project Symb folder and renamed to the eleven digit fin number. This allows you to modify the ddb file without fear of overwriting it when updates are released.

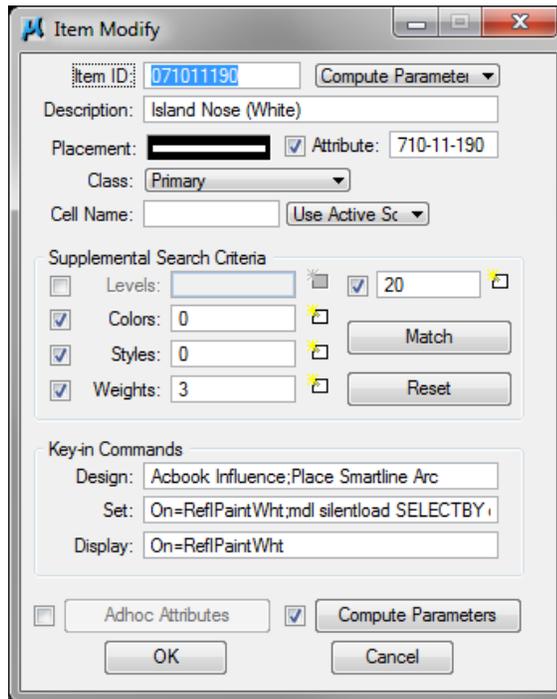
3. Use the **Edit > Find** option in D&C Manager to search for item **071011190**. This is for **Reflective Island Nose Paint (White)**.



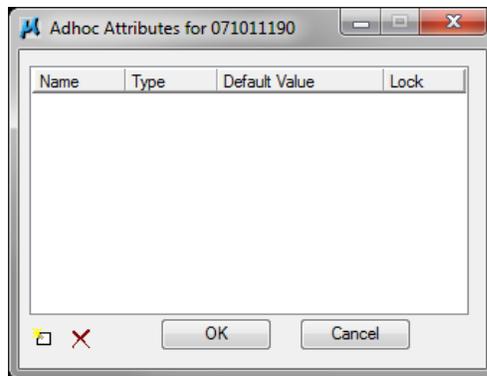
4. Right click on Item **071011190** and select **Modify Item** from the menu. This opens Item Modify.



- On **Item Modify**, make sure that the **Attribute** option is selected. This is located in the top right side of the dialog.



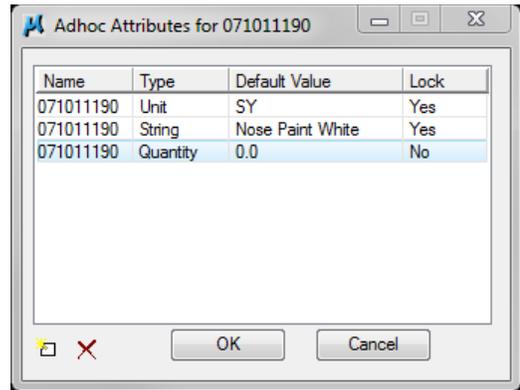
- Toggle on **Adhoc Attributes**. By default this will be off if there are no Adhocs assigned to the item.
- Click the **Adhoc Attributes** button. This opens **Adhoc Attributes**.



- Click the **Add New Row** icon. This is the same process as used earlier; you need a name a type and a default value.
- For the *Name* click on **New1** and Key-in **071011190**. This is the pay item and must match the D&C Item name.
- For the *Type*, select **Unit**.
- For the *Default Value*, key-in **SY**. This is Square Yards.
- Toggle the **Lock** to **Yes**. Toggling this on locks the item so when an element is drawn you cannot change it.

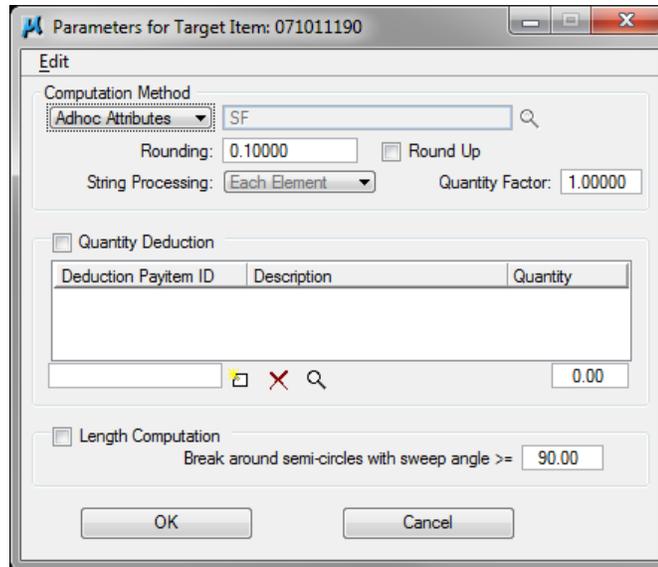
➤ **Add New Row for Description and Quantity**

1. Click **Add New Row** again. It is necessary to create three rows for the Adhoc.
2. For the *Name* click on **New1** and Key-in **071011190**. You can copy and paste from the first entry.
3. For *Type*, select **String**. This is a description of the item.
4. For the *Default Value*, key-in **Nose Paint White**. This will show up on the quantity reports.
5. Toggle the *Lock* to **Yes**.
6. Click **Add New Row** again.
7. For the *Name* click on **New1** and Key-in **071011190**.
8. For *Type*, select **Quantity**.
9. For the *Default Value* leave it at **0.0**. You will edit this as the elements are drawn.
10. Toggle the *Lock* to **No**. You will fill this in with the area calculated.
11. Click **OK**. This takes you back to the Item Modify dialog.



➤ **Set Compute Parameters**

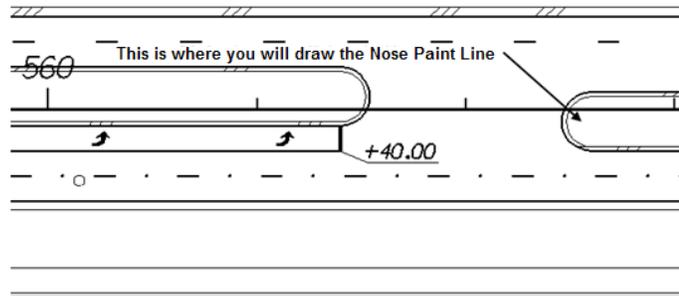
1. On Item Modify, click **Compute Parameters**. This opens Parameters for Target Item.
2. Under *Computation Method*, select **Adhoc Attribute**. If this is already set, then ignore this step.



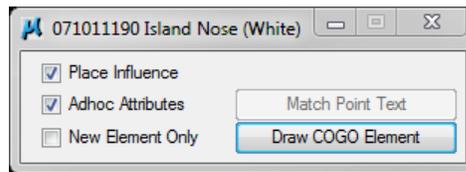
3. Click **OK** to close and save changes in the Parameters for Target Item dialog.
4. Click **OK** on the Item Modify dialog.
5. In D&C Manager, select **File > Save**. This will save this change to the **DDB** file.

➤ **Place A Line with an Adhoc**

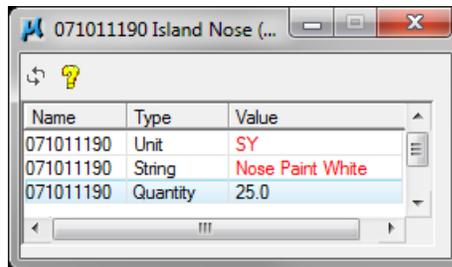
1. Continuing in *Dsgnsp01.dgn* zoom to near **Sta 562+50**. The figure below shows where you will be working.



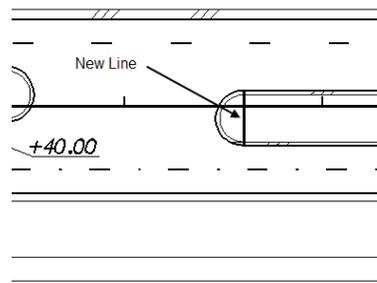
2. If item **071011190** is not selected, select it. This is the item modified.
3. In D&C Manager, select **Design** mode .
4. In *Design* mode toggle on **Place Influence** and **Adhoc Attributes**.



5. Notice when **Adhoc** is selected that Adhoc Editor opens. Also, notice that two of the rows values are red; this is because when you created the *Adhoc* earlier the two options were locked.



6. Set the Quantity AdHoc's Value to **25.0**.
7. Select MicroStation's **Place Line** tool. The **DDB** item is set to place an arc, however, this can be changed on the **Place SmartLine** dialog.
8. Draw a line from one end of the radius of the median to the other end.

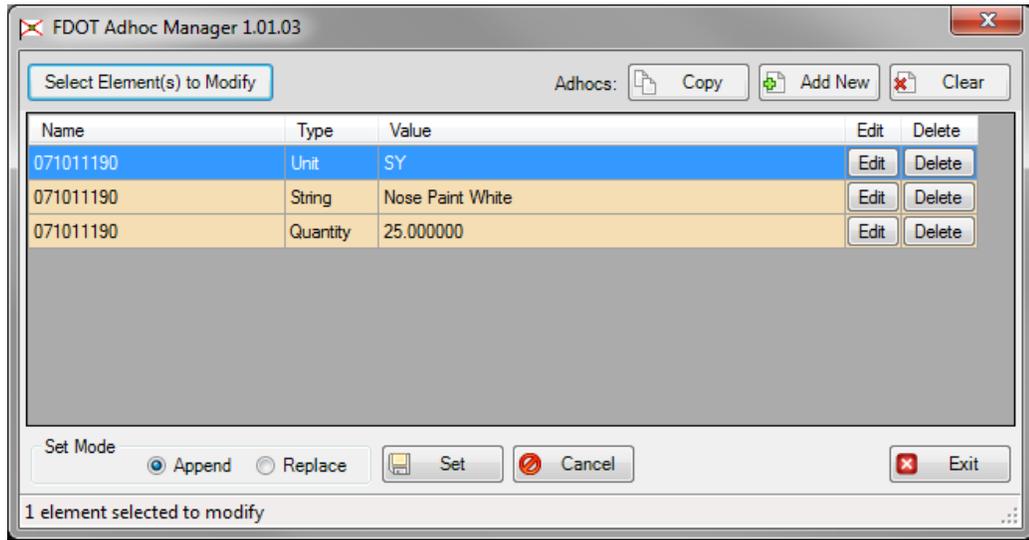


Note The length of the line makes no difference, it could be one inch and the item will quantify. The Adhoc is only additional information about an item.

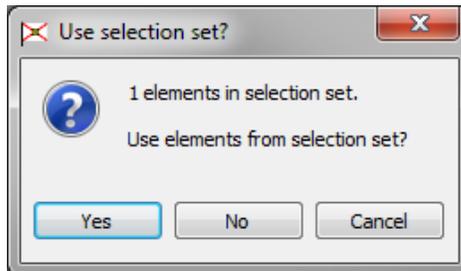
9. Toggle off **Place Influence**.

➤ **Use FDOT Adhoc Manager to Check Element**

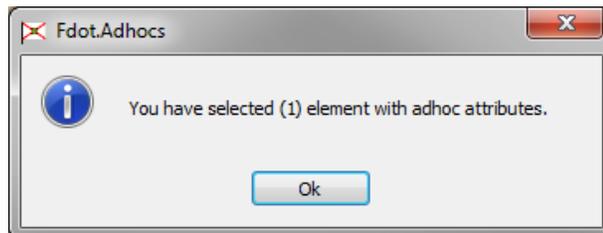
1. From the FDOT Menu, select **Actions > FDOT Adhoc Manager** to open the FDOT Adhoc Manager.



2. Select the line drawn in the previous exercise.
3. In FDOT Adhoc Manager, click Select Element(s) to Modify.
4. Click **Yes** on the Use selection Set? dialog to accept the select collection set. The Adhoc information will populate the dialog; this is what will show up when automated quantities are run.



5. Click **OK** on the Fdot.Adhocs dialog.



6. Review the **AdHocs** of the *Island Nose Element*.
7. Close FDOT Adhoc Manager.

GENERATE QUANTITIES

Quantities are generated from the elements designed and drawn in MicroStation using D&C Manager. All of the elements drawn in the previous exercises can now be automatically quantified because D&C Manager was used to draw the elements.

D&C Manager has the ability to generate individual sheet quantities or the entire project at one time. D&C Manager can export to a **CSV** file that can be imported into the *Tabulation of Quantities* file or it can export to a data base that can then be opened with Quantity Manager.

Quantity Manager is a standalone program that can organize and manipulate the data created by D&C Manager and quantities generated manually then create reports, which can be used to produce an electronic comp book. Quantity Manager can also export the quantities to TRNS*PORT that takes away the need to have a designer manually enter all of the project pay items. This task alone can save hours over the lifespan of a project, not to mention removing the possibility of human error. In addition, Quantity Manager can export to a **CSV** file, which can then be used to create the *Tabulation of Quantities* sheet.

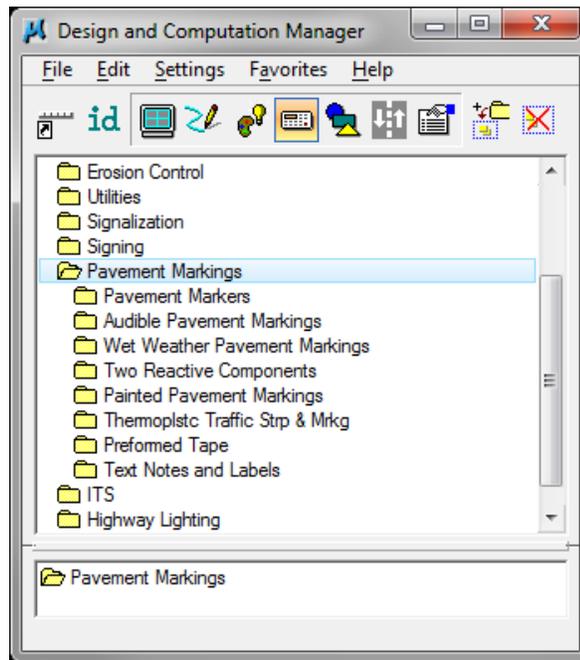
Signing and Pavement Marking quantities are considered sheet quantities, which mean there is a *Tabulation of Quantities* sheet in the plan set that breaks down the quantities per sheet. For a roadway project, the designer does not produce sheet quantities but rather creates the quantities on a project basis and then using Quantity Manager to create *Comp Book* forms.

Note When calculating quantities with D&C Manager, Locate must be OFF in all attached Reference files. Otherwise, GEOPAK will crash.

QUANTITIES TO TRNS*PORT WORKFLOW

1. Generate quantities using D&C Manager then export to a database file.
2. Export the project properties xml file from TRNS*PORT. This can be done any time after the notice to proceed has been executed.
3. Open the project in Quantity Manager; this is the database file, usually in *Access Database* format (mdb).
4. Import the project properties into Quantity Manager; this is the xml file from TRNS*PORT.
5. Create a Funding Rule in Quantity Manager; this is really the item category. Example 0300 is the category for Signing and Pavement Marking. This *Funding Rule* associates the items in Quantity Manager to a category in TRNS*PORT.
6. Apply the *Funding Rule* to the appropriate items.
7. Export the Quantities from Quantity Manager to a format TRNS*PORT can read. This is an xml file also. Name it using the 11 digit FIN number .xml.
8. Upload the quantities to TRNS*PORT. This alleviates the need for a user to manually enter pay items and quantities.
9. Export the quantities from Quantity Manager into a csv file to be used on the *Tabulation of Quantities* sheet.

D&C MANAGER QUANTITIES



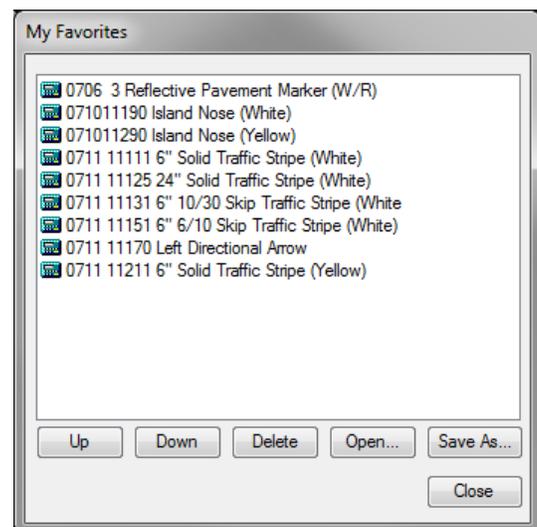
From D&C Manager when the *Compute* option is selected, D&C Manager expands to add a list box at the bottom of the dialog. This is the *Collection* bin; this is where to add the items from D&C Manager that is to be quantified. To load the items into the collection bin double click on the item. To clear the collection bin, right click in the collection bin area and select *clear collection*. Once all of the items are added to the collection bin they can be saved of for future use. To save a collection right click in the collection bin area and select *Save Collection*. Save the file to the project.

The figure above shows the collection bin populated with the *Pavement Marking* category ready for quantity calculation. The items will not be in numerical order when loaded into the collection bin; they are displayed in the order that they are added.

TO OPEN AND ORGANIZE THE COLLECTION

1. In D&C Manager go to **Favorites** > **Organize Favorites**, This opens My Favorites.
2. In My Favorites, click **Open**.
3. Browse to the folder where you saved the collection and select the file. The collection file will have a **.col** extension.
4. Use the **Up** and **Down** buttons to organize the items.
5. Click **Save As** to save the changes.

Note The items can also be organized in the output from D&C Manager or in Quantity Manager prior to going onto sheets.



REVIEW ITEMS PRIOR TO COMPUTING QUANTITIES

Prior to computing any quantities it is important to review the items that are about to be computed. D&C Managers **Display Tool** will aid in this task. To activate the **Display** tool, click on the  icon.



Normal Display – the items of interest change back to their original element symbology.



Highlight Selection – the desired elements are displayed in the current MicroStation highlight color, while any other elements remain unchanged.



Hide Selection – the desired items are not displayed in the view, however all other elements are displayed. This is the reverse of the **Display Only Selection** tool.



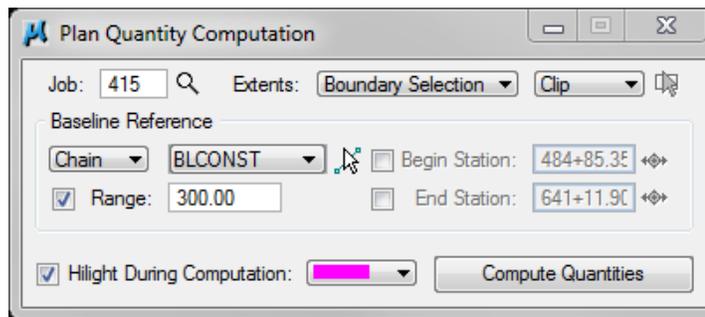
Display Only Selection – only the items in the collection box appear, while the rest are not displayed in the view.

Using the **Highlight Selection** zoom in close to the project elements and make sure that whatever is placed in the collection bin for computing quantities highlights.

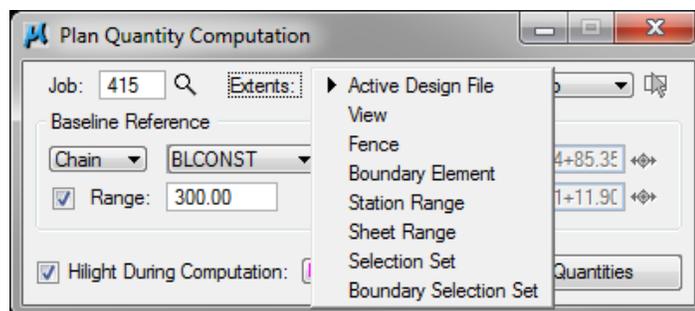
Note Always set the option back to Normal Display before closing the tool.

COMPUTING QUANTITIES

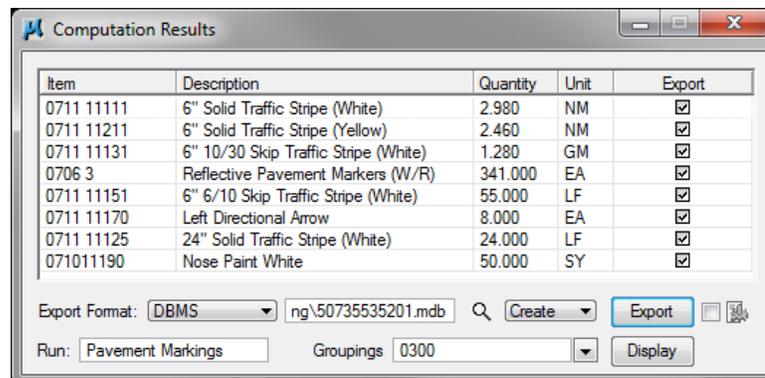
Plan Quantity Computation opens when the **Compute** is selected.



- **Job** is the GEOPAK gpk file, if you are using Project Manager than this will be set.
- **Extents:** is a list of options for limiting the area and elements included in the quantity calculations. The figure below shows the options available.



- *Active Design File* – All elements in the *Active Design File* are candidates for computation.
 - *View* – Only the selected items that are displayed in **MicroStation** view one are computed. If the view includes area outside of the *Range*, the *Range* will override.
 - *Fence* – A **MicroStation** fence must be placed, and all specified graphical features, which satisfy both the fence and the *Range*, will be tabulated.
 - *Boundary Element* – A previously drawn closed shape is used to determine quantities. When selected, you are prompted to select the closed shape. This mode is sensitive to the **MicroStation** *Inside*, *Overlap* and *Clip* modes.
 - *Station Range* – A *Baseline Reference* (chain or dgn) must be defined for this option. The range fields default to the extent of the chain. Key-in a station or by clicking **Begin** or **End Station** icons, graphically define the station range. Perpendicular projections to the station(s) define the extent of the computations. This option is not ideal for sheet quantities.
 - *Sheet Range* – Sheets placed with the *Plan Profile Sheet Composition* tool can be utilized. Select the option that displays the sheet range. This option will work in our scenario.
 - *Selection Set* – A **MicroStation** selection set of the candidate compute elements must be created prior to computing.
 - *Boundary Selection Set* – A **MicroStation** selection set of the *Boundary* (not the actual candidate compute elements) must be created prior to computing. This option will work in our scenario. When this option is used, it uses the element **ID** number in **Quantity Manager** to organize the data for each individual sheet.
- **Baseline Reference** allows the designer to define a **Chain** or **DGN** element for offsets and station values for reports. In addition the **Range**, if set, is measured from the selected **Chain** or **DGN** element to search for candidate items. Setting the **Baseline Reference** to **None** limits the type of output that can be generated as no station / offset values can be computed.
 - When using **Sheet Range** or **Boundary Elements** it is not necessary to toggle on **Begin** and **End** Station limits.
 - **Highlight During Computation** when selected, all **MicroStation** elements computed are highlighted in the selected highlight color.
 - **Compute Quantities** starts the computation process and when completed opens the **Computation Results** dialog box.



Note It is imperative that you review these results before going any further. If there are any errors or omissions now is the time to fix or add them.

- *Export Format* sets the type of output the designer wants to generate from the reported quantities. There are several formats:

Comp Book – A more detailed report that lists not only quantity summaries, but also geometric properties such as plan view coordinates and station/offsets for located elements. File is in ASCII format.

Item report – Quantities Summary listing pay items, descriptions, units and total quantities for located elements. File is in ASCII format.

Item Table – Contains the same information as the Item Report, but formatted in tabular form.

DBMS – Very detailed information including calculated and rounded quantities, geometric properties, pay item numbers, descriptions, station / offset values, etc. The format is the selected database (i.e., Microsoft Access, Oracle, SQL Server, and dbase is set in the Compute Settings tool. This option is required when taking the quantities into Quantity Manager. This is the option used in this training guide.

CSV By Item –Summary listing pay items, descriptions, units and total quantities for located elements. Format is CSV (coma separated values).

CSV By Element – A more detailed report that lists not only quantity summaries, but also geometric properties such as plan view coordinates and station/offsets for located elements. Format is CSV (coma separated values).

Table – User defined table column properties. A column for designating the appropriate symbol is also included, as well as Adhoc attribute data. This option is used to generate legends such as for landscape plans.

- Next to the **Export Format** is a field for entering the file name of the output file, using the hourglass allows the designer to browse to a specific folder.
- When exporting the quantities there are two options, **Create** or **Append**. This will place the quantities into a new file or append them to a previously created file.
- **Run** and **Groupings** are only used for the DBMS export format to Quantity Manager. The **Run** is a user key-in and any logical description, like Pavement Marking or Preliminary, can be used. This description will be passed to Quantity Manager. There are several default **Groupings** included in the drop down menu, however, you are only concerned with creating the **0300 Grouping** for Signing & Pavement Markings. This is the recommended **Grouping** when exporting to Quantity Manager, as this is the only grouping that can be passed to TRNS*PORT.
- **Export** commences the output file process and creates the quantity file. In this training, you will be exporting to DBMS, which will create an MDB file that can then be opened with Quantity Manager.

Exercise 6.2 Create and Save a Collection of Favorites

➤ Create and Save a Collection of Favorites (Part 1)

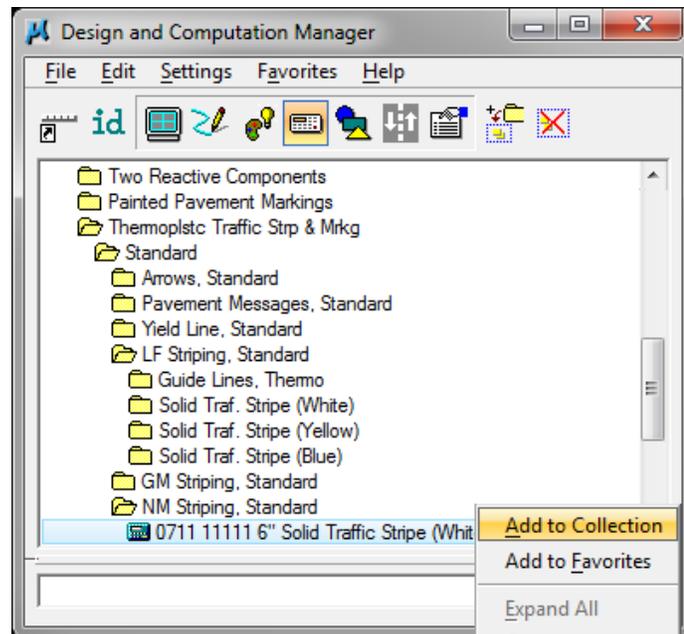
✓ Create Collection of Items

In this part of the exercise the student will create a collection of items used to generate quantities and save the collection as a favorite to be used with future processes.

1. If closed, open **Dsgnsp01.dgn** in the *Signing* folder.
2. Open D&C Manager.
3. Zoom in near **Sta 560+00**.
4. Click on the **Compute** icon in D&C Manager. This is the calculator icon.
5. If there are items in the collection bin of D&C Manager, right click in the collection area and select **Clear Collection**.

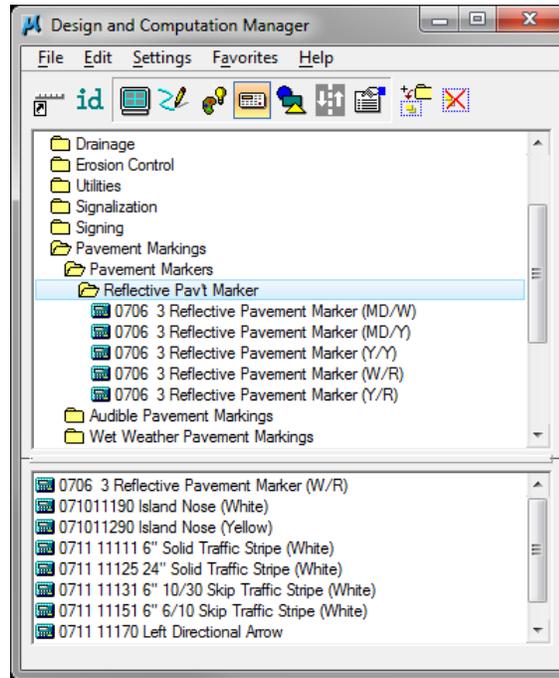
Next, you will use the **ID** tool in D&C Manager to identify and add pavement marking items to the collection. Once all of the items are identified, you will save the collection.

6. Click the **ID** icon in D&C Manager.
7. Select the white edge line and accept it. This will take you to the item **0711 11111 6" Solid Traffic Stripe (White)**.

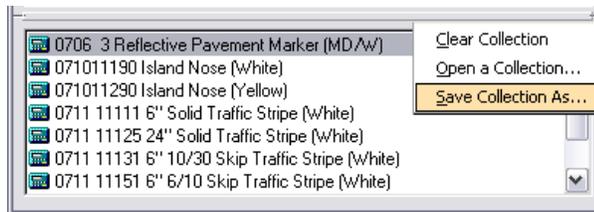


8. Right click on the item and select **Add to Collection**. This will place the item in the collection bin.
9. Click the **ID** icon, select the **10/30 skip line**, and accept it.
10. Right click on the item and select **Add to Collection**.

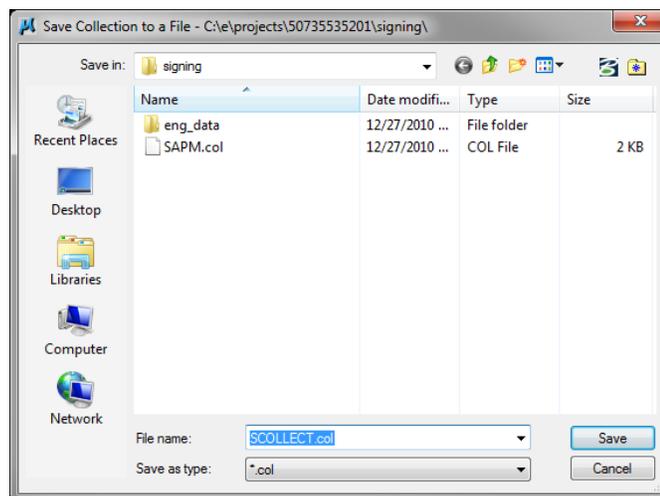
- Repeat this process to add the rest of the Pavement Marking items used into the collection bin.



- Click the **ID** icon, select one of the **RPMs**.
- Right click on the item and select **Add to Collection**.
- Right click in the collection bin and select **Save Collection As**. This opens **Save Collection** to a file. The location will default to the working directory.



- Enter a file name for the collection, example: **SAPM**. The extension **.col** will be added automatically.



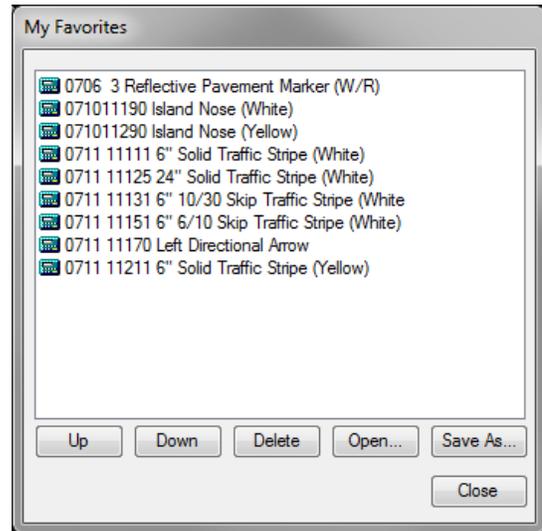
- Click **Save**.

✓ Organize the Collection

1. In D&C Manager, select **Favorites > Organize Favorites**. This opens My Favorites.



2. In My Favorites, click **Open**.
3. Navigate to the *Signing* folder and select **SAPM.col**. This loads the D&C items into My Favorites.
4. Using the **Up** and **Down** buttons, put the items in numerical order from lowest to highest.



5. Click **Save As**.
6. Select the **SAPM** file and click **OK** to overwrite it.
7. Click **OK** on the Alert dialog warning you that the file already exists.
8. Close My Favorites.
9. Right click in the collection bin and select **Open a Collection**.
10. Select **SAPM** in the *Signing* folder.
11. Click **OK** to open the file. This will load the items in the collection in numerical order.

➤ **Review the Quantity Items (Part 2)**

✓ Use the Display tool to review items

1. Continuing in *Dsgnsp01.dgn* click the **Display** tool on D&C Manager.

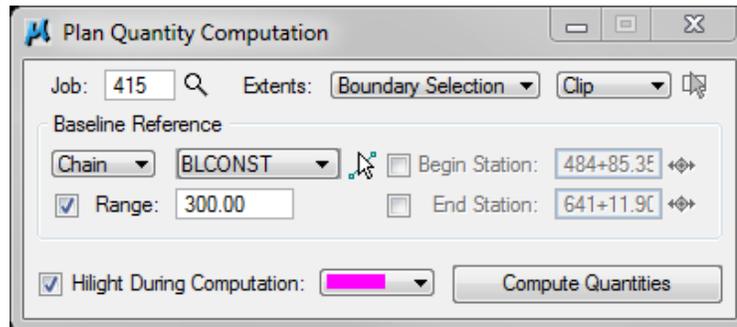


2. On the *Display* tool, click the **Highlight** icon. This will highlight all of the items in the collection.
3. Take a moment to review the design file.
4. Set the *display option* to **Normal**.
5. Close the *Display* tool.

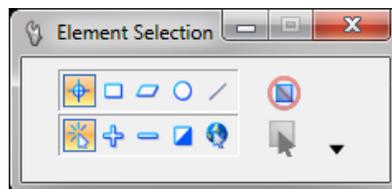
Exercise 6.3 *Generate Quantities and Export to Quantity Manager*

➤ **Compute quantities**

1. Continuing in *Dsgnsp01.dgn* reference in **Clipsp01.dgn** from the Signing folder.
2. Zoom out so you can see the first five clip borders.
3. On D&C Manager, click the **Compute** icon. This opens Plan Quantity Computation.



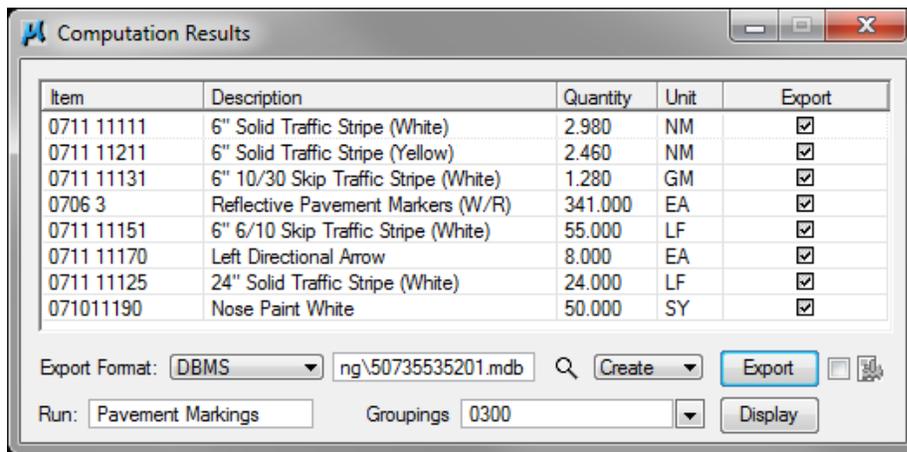
4. The *Job* number is **415**.
5. Set the *Extents* to Boundary Selection Set.
6. Set to *method* to **Clip**.
7. Set the *Baseline Reference* to **Chain**.
8. Select the *Chain*, **BLCONST**.
9. Toggle on **Range**.
10. Set the *Range* value to **300.00**. This is how far from the chain the software will look for items to compute.
11. Toggle on Highlight During Computation.
12. In MicroStation, use *Power Selector* to select the first five clip borders.



13. Click **Compute Quantities**. This opens Computation Results.

➤ **Export Quantities to DBMS for Quantity Manager**

1. Set the *Export Format* to **DBMS**. This is the required format for Quantity Manager.
2. Using the **Magnifying Glass** icon browse to the *Signing* folder.
3. Enter the file name **50735535201.mdb** (it's recommend to use the fin number). The MDB file extension will be added automatically.
4. Click **Save**.
5. Set to **Create**. The options are **Create** or **Append**.
6. For *Run*, enter Pavement Markings.
7. For *Groupings*, type in **0300**. This option must be selected.

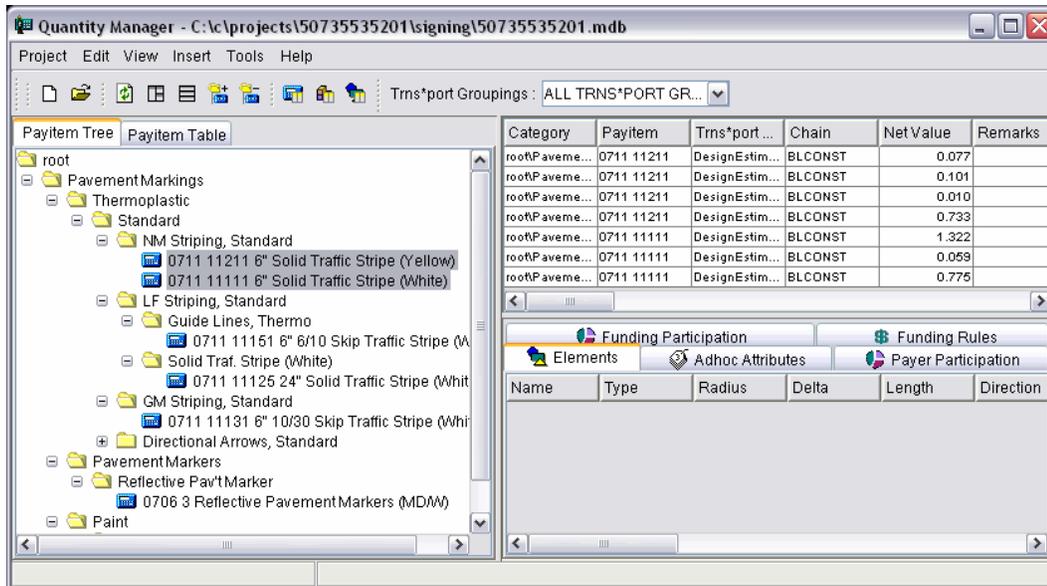


8. Click **Export**. This creates the MDB file.
9. Close Computation Results. Next open the **Current Working Directory** and make sure the file was created.
10. From FDOT Menu, select Standards > Explore Current Working Directory.
11. You should see the **MDB** file (**50735535201.mdb**) in the *Signing* folder.
12. Close Windows Explorer.

QUANTITY MANAGER

As mentioned earlier in the training guide, **Quantity Manager** is a stand-alone program that organizes and manages the quantities generated from D&C Manager. Quantity Manager can also be used to enter non graphic quantities such as **Mobilization**. Once the information is loaded into Quantity Manager, the designer can then export the data from Quantity Manager into a spreadsheet that can then be placed in **CAD** on the **Tabulation of Quantities** sheet. Quantity Manager also creates the **Computation Book** and can export the quantities to an xml file to be uploaded into TRNS*PORT.

Quantity Manager can be loaded from the **Road Tools Palette** or from the **Applications** pull down menu.



QUANTITY MANAGER WORKFLOW

1. Open Quantity Manager.
2. Open the **Project** created by D&C Manager. This is the **MDB** file created in D&C Manager.
3. Import the **Project Properties** xml file. This is created in TRNS*PORT then exported to an xml file.
4. Create **Funding Rules** for all of the categories in the project.
5. Apply the **funding rules** to appropriate items.
6. Export quantities to **xml** file to be loaded into TRNS*PORT.
7. Create **csv** file, using delivered styles from FDOT, to be used to create **Tabulation of Quantities** sheet.
8. If creating a **Comp Book**, create **pdf** files using delivered styles from FDOT.

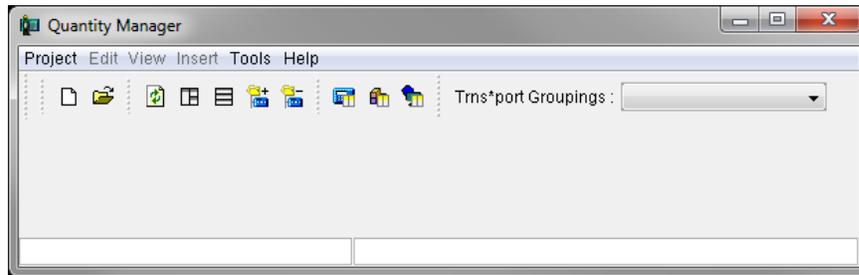
Note FDOT offers a full training course on **Quantity Manager** that most users have already attended. In this training guide you will only use some basic functions of **Quantity Manager**.

Exercise 6.4 Import Project Properties from TRNS*PORT

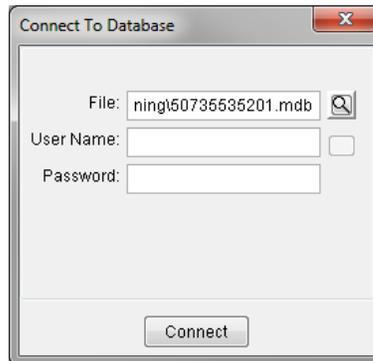
➤ Import Project Properties from TRNS*PORT (Part 1)

✓ Open Quantity Manager and import Project Properties

1. Open **Dsgnsp01.dgn**. Quantity Manger can be opened in any design file.
2. From the Road tools palette select Quantity Manager. The  icon is located under the Project Manager icon in the same menu as D&C Manager.

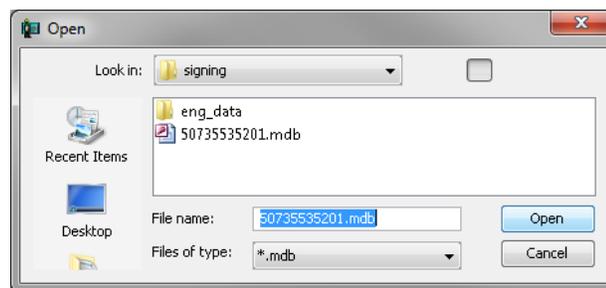


3. In Quantity Manager select **Project > Open**. This opens Connect to Database.



Note DO NOT enter a user name or password as FDOT will not be able to use the database.

4. For the *File*, click the **magnifying glass** icon.



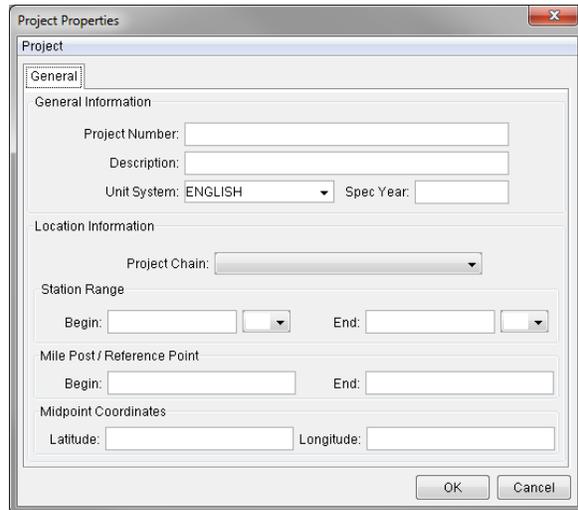
5. Browse to the *Signing* folder and select the **project mdb** file. In this exercise, select **50735535201.mdb**. This is the file created in D&C Manager.

Note If your discipline is part of the Roadway set of plans it is possible that all you will be required to do is make sure that all of your **MicroStation** elements are drawn with D&C Manger and check the quantities but not create a database. The Roadway user will typically create one project database of all quantities. In this example, the SAPM plans are stand alone.

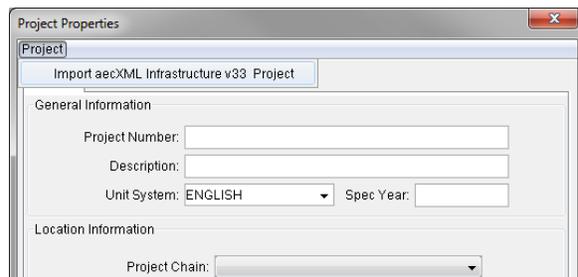
6. Click **Open**. This takes you back to **Connect To Database**.
7. Click **Connect**. This loads the project database into **Quantity Manager**.

✓ *Load Project Properties from TRNS*PORT*

1. Continuing in Quantity Manager, select **Project > Properties**. This opens Project Properties.



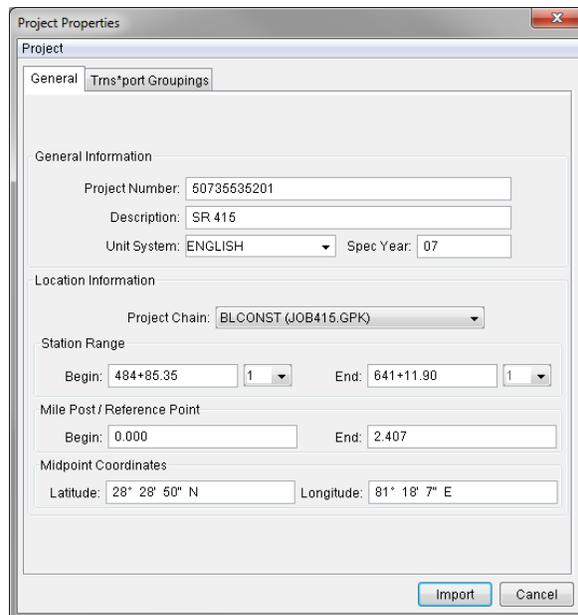
2. In Project Properties, select **Project > Import aecXML**.



3. Browse to the project *Signing* folder and select **50735535201_PL.xml** (PI for Project Information). This is the file exported from TRNS*PORT.

Note The 50735535201 Project Information XML file is the aecXML Export from the Designer Interface. This file is not the same as the 50735535201_SP.xml file. The _SP file is a Summary of Payitem Report exported from the Designer Interface whereas the _PI file contains information such as TRNS*PORT Groupings.

4. Click **Open**. This loads the project properties. As seen in the figure below notice that the *General Information* is now filled in.
5. For the *Location Information*, select the drop down menu then select the chain **BLCONST**. This will populate the *Begin* and *End Station*.
6. For the *Begin Mile Post* enter **0.000**.
7. For *End Mile Post* enter **2.407**.
8. For Midpoint Coordinates set Latitude to **28 28 50**.
9. Set *Longitude* to **81 18 7**.
10. Click **Import**. This loads the Project Properties into Quantity Manager and marries them with the project database, the **MDB** file.



Note Unless something in TRNS*PORT changes that affects the project properties you will not have to reload the project properties xml file for this database.

➤ **Create Funding Rule and Apply to items (Part 2)**

✓ Create funding rule

In this part of the exercise the student will create a funding rule for the **Signing and Pavement Marking** category, 0300. The funding rule in this example is not about money but rather it is used to associate pay items to a category.

1. Open **Quantity Manager** if it is closed.

2. In Quantity Manager, select **Edit > Funding > Rule**. This opens Funding Properties.

3. At the bottom of the dialog, click the **New Funding Rule** icon . This creates a new rule under the Funding portion of the dialog with the name **New Funding Rule 1**.

4. Click on **New Funding Rule 1**. This populates the Name and Description fields with default settings; these will have to be changed.

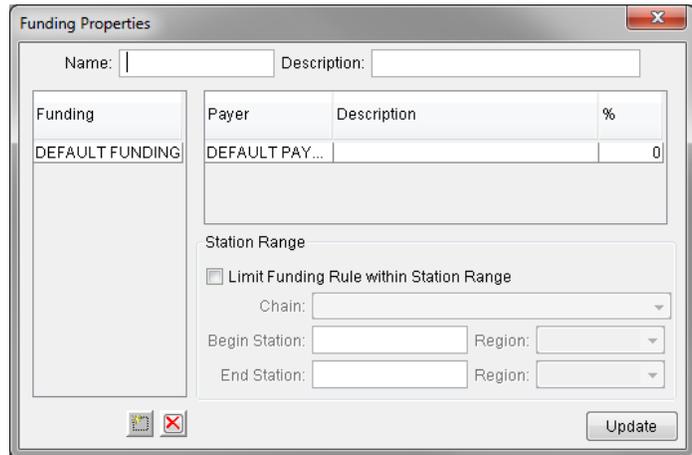
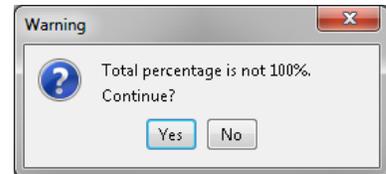
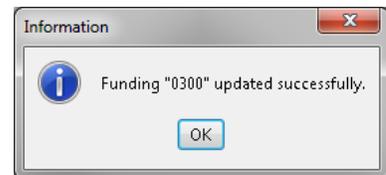
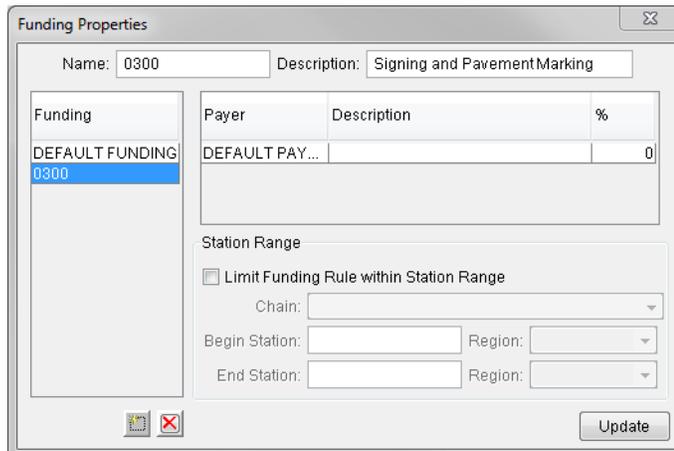
5. Change the *Name* to **0300**. This is the Category number for Signing and Marking.

6. Change the *Description* to **Signing and Pavement Marking**. The *Description* MUST contain at a minimum one word that matches the description in TRNS*PORT.

7. Click **Update**.

8. On the Warning dialog, click **Yes**. This opens an Information dialog.

9. On the Information dialog, click **OK**. This adds the new funding rule to the project.

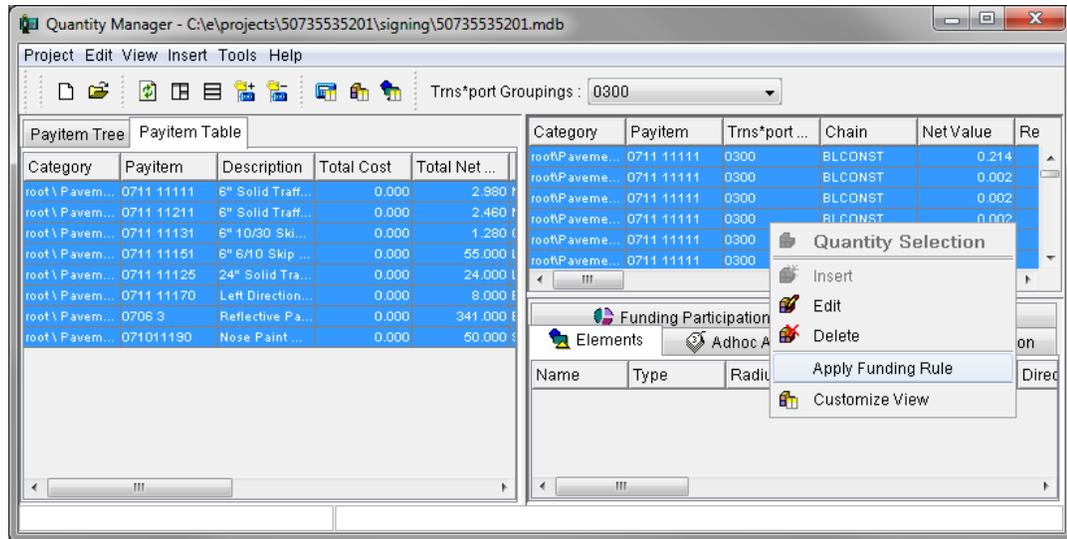
10. Close Funding Properties. Next, you will apply the new funding rule to all selected items that this category applies to.

✓ Apply Funding Rule

1. Continuing in Quantity Manager, in the left hand pane select the **Pay item Table** tab . This displays all of the pay items for the project.
2. Select the first item then using the **Shift** key on the keyboard select the last item in the table. This will display all of the items and quantities in the right hand pane.
3. Select **Edit > Select all**. This selects all of the items in the database.

Note Only do this if all of the items in the database are the same category.

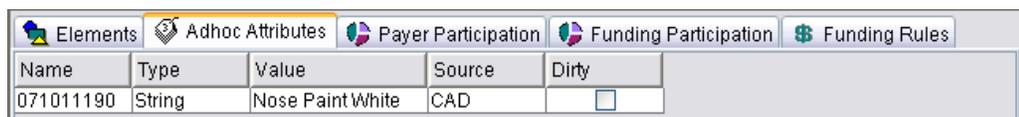
4. Right mouse click in the right hand pane and select **Apply Funding Rule**.



5. In Apply Funding Rule, select the **Funding Rule 0300**. This is the funding rule created earlier.



6. Click **Apply**. This will apply the **0300** category to all of the selected items. It may take several seconds to process.
7. Take a moment to review the items by navigating the tabs in the bottom pane.
8. In the top right pane select item **0710 11190 Island Nose Paint**.
9. Select the **Adhoc Attributes** tab and review the information. This data came from D&C Manager when quantities were run.



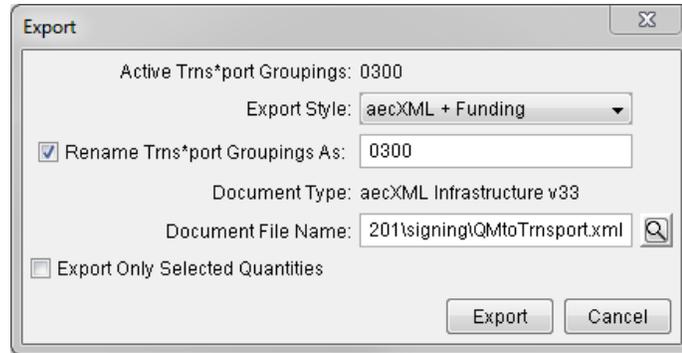
10. Select the **Funding Rules** tab; notice the category number.



➤ **Export Quantities for TRNS*PORT (Part 3)**

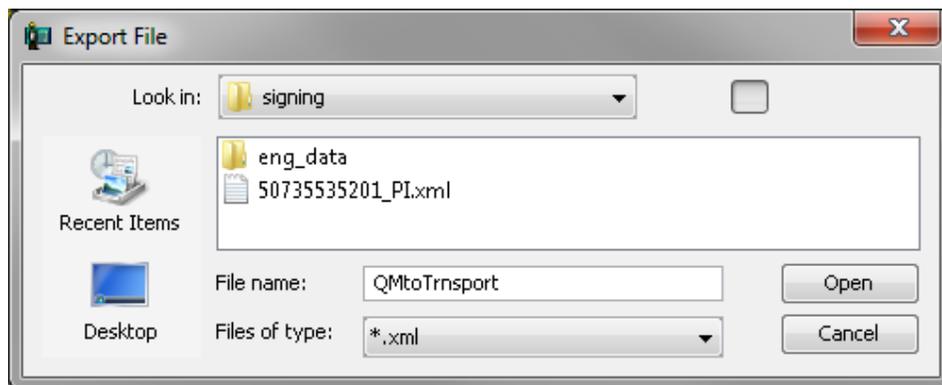
✓ Export quantities for TRNS*PORT

1. In Quantity Manager in the left hand pane, select the **Pay item Table** tab.
2. Select the first item then using the Shift key on the keyboard select the last item in the table.
3. Select **Project > Export > Export**. This opens the Export dialog.
4. Set the *Export Style* to **aecXML + Funding**. Use the drop down menu to select this.
5. Toggle on *Rename TRNS*PORT Groupings As* and type in **0300**. By default, it is set to **DesignEstimate**.



6. For *Document File Name* click the **magnifying glass** icon and browse to the *Signing* folder.
7. Enter a new file name for the TRNS*PORT **xml** for this example use **QMtoTrnsPort**. This name is not important other than you must remember it for the upload process.

Note Do not overwrite the xml file that is in the signing folder, this is the project properties xml file. You may need this to import into **Quantity Manager** if errors are found.



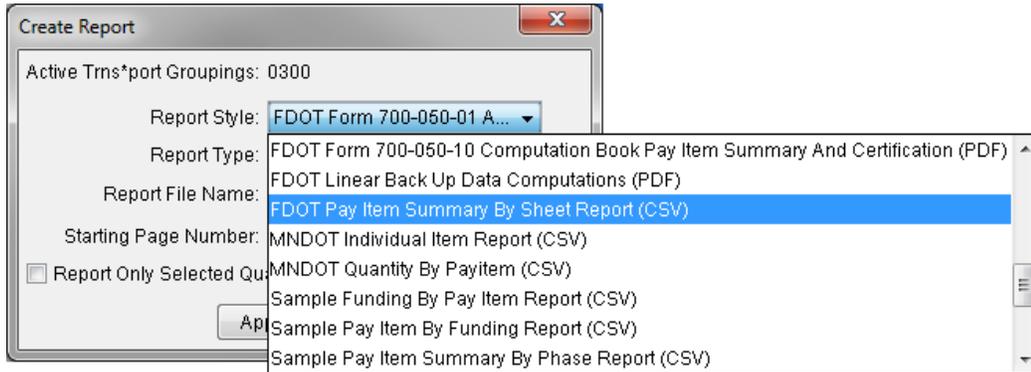
8. Click **Open**. This loads the file name into the Export dialog.
9. Click **Export**, Click **OK** again to confirm the Export process.

➤ **Generate CSV file in Quantity Manager (Part 4)**

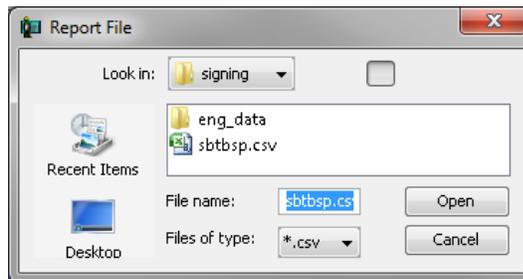
In this exercise the student will create a csv output file from Quantity Manager. This csv file will then be converted to **SBTBSG.xls**, which tools on the FDOT Menu can open and import into the **Tabulation of Quantities Sheet**.

✓ Create CSV File

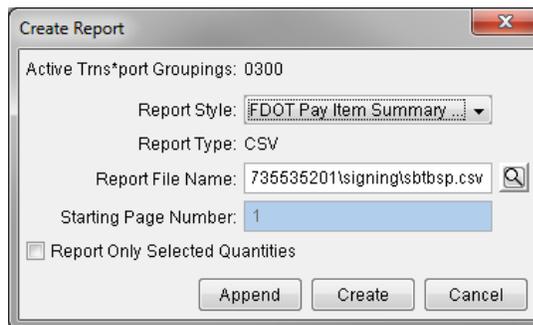
1. In Quantity Manager, select **Tools > Reports > Create**. This opens Create Report.



2. From *Report Style* select the drop down arrow and select **FDOT Pay Item Summary By Sheet report (CSV)**.
3. For the *Report File Name* click the **magnifying glass** icon and browse to the *Signing* folder.
4. Enter a file name, for this example use **SBTBSP** the csv extension will be added automatically.



5. Click **Open**.



6. On the Create Report dialog, click **Create**. This will open the csv file in Excel. Do not close Excel.
7. Click **Cancel** on the Create Report dialog.
8. Close Quantity Manager.

- ✓ Save csv file to xls format and Sort the data



1. In Excel, select the **Office** button and then **Save As**.
2. For the *Save As*, type select **Excel 97-2003 Workbook (*.xls)**.
3. Select the **data** in Excel from **Name** column to **Total** column.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Blank	Name	DescripticUnit		Sheet 4017 (Shape)		Sheet 4018 (Shape)		Sheet 18075 (Shape)		Sheet 4013 (Shape)		Sheet 4014 (Shape)		Total
2	X	71011190	Nose Pain SY		0		0		0		50		0		50
3	X	0706 3	Reflective EA		70		70		61		70		70		341
4	X	0711 1111: 6"	Solid Tr NM		0.601		0.6		0.537		0.66		0.6		2.998
5	X	0711 1112: 24"	Solid T LF		0		0		0		24		0		24
6	X	0711 1113: 6" 10/30 S	GM		0.28		0.28		0.232		0.28		0.28		1.352
7	X	0711 1115: 6" 6/10 Sk	LF		0		0		0		55		0		55
8	X	0711 1117: Left Direc	EA		0		2		0		6		0		8
9	X	0711 1121: 6"	Solid Tr NM		0.53		0.471		0.468		0.46		0.53		2.459
10															

Note All "X"s must be UPPERCASE or the report will not import correctly into MicroStation.

4. In Excel, select the Data Tab > Sort & Filter and Sort A to Z icon .
5. Click **Save**. Do not close Excel.

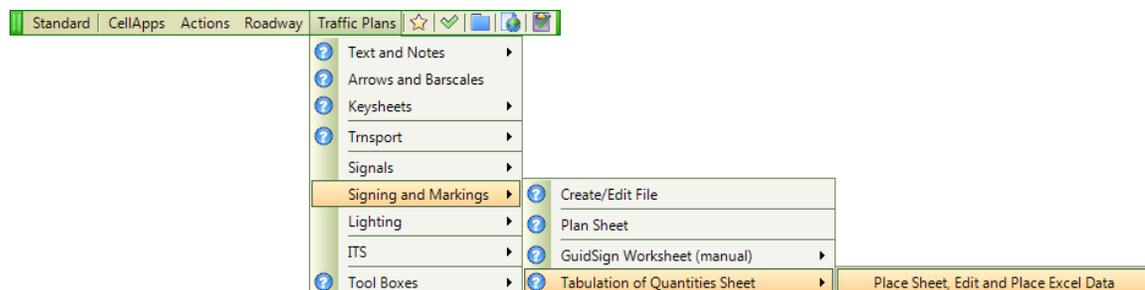
Note This process of converting the csv file to an xls file is to ensure that the FDOT Menu tools for editing and importing Excel data works properly.

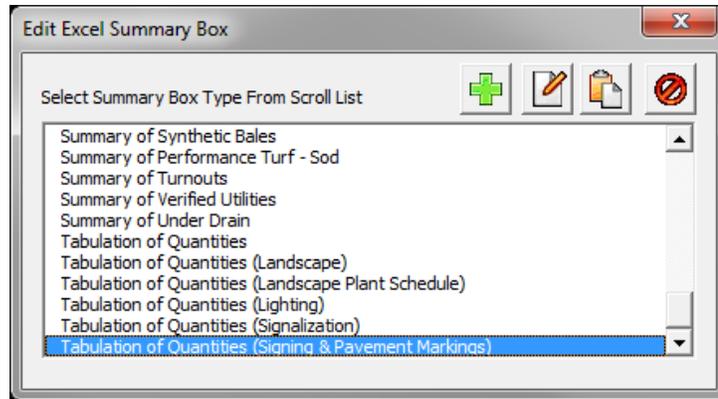
➤ **Create Tabulation of Quantities Sheet (Part 5)**

Next you will create the Tabulation of Quantities Sheet and import the excel data created in Quantity Manager.

- ✓ Create Tabulation of Quantity Sheet from FDOT Menu

1. If MicroStation was closed, reload MicroStation from the desktop folder FDOT2010 shortcut.
2. If the *Tabqsp01.dgn* file was created in an earlier exercise, open the **Tabqsp01.dgn** in the *Signing* folder and skip steps 3-7.
3. If the *Tabqsp01dgn* file was NOT created, open the **Dsgnsp01.dgn** in the *Signing* folder.
4. From FDOT Menu, select Traffic plans > Signing & Markings > Create/Edit File.
5. Using Create File/Project, select the active project and create the **Tabulation of Quantity Sheet**. This file goes in the *Signing* folder.
6. Open the **Tabqsp01.dgn** file.
7. Accept the *Plot Scale* of **50**.
8. From FDOT Menu, select **Traffic Plans > Signing & Markings > Tabulation of Quantities Sheet > Place Sheet, Edit and Place Excel Data**. This opens the Edit Excel Summary Box dialog with the *Tabulation of Quantities (Signing & Pavement Markings)* highlighted.





9. Click the **Place Sheet** icon  to start the place the **Tabulation of Quantity Sheet** process.
10. Issue a Data Point in the view to place the Tabulation of Quantity Sheet.
11. Perform a **Fit View**.

✓ Place Excel Data

1. Continuing in *Tabqsp01.dgn* zoom in around the upper left corner of the sheet near the text **PAY ITEM NO.**
2. From Edit Excel Summary Box dialog, select **Place Text** icon .

Note If you closed the Excel file then Edit Excel Data needs to be performed first. Click the Edit Input icon . This will open the Excel file if one exist or create a new SBTBSP.xls file for data entry.

3. Snap to the end of the first horizontal line under the text **PAY ITEM NO.**
4. Issue a **Data Point** to accept the location.
5. Review the data.
6. Using **Power Selector**, select the **Totals** from the last plan sheet column and move to the correct column in the sheet file.
7. Run **Sheet Navigator** to fill in the Title Block, Sheet Number, Financial Number, County, Road Number and add the Digital Signature Note.
 - *Title Block* – **TABULATION OF QUANTITIES** (Should be filled out already.)
 - *Sheet Number* – **S-4**
 - *Financial Number* – **507355-3-52-01** (Tab or double click this field to fill automatically.)
 - *County* – **Volusia**
 - *Road Number* – **415**
 - *Digital Signature Note* – **Standard**
8. Close Sheet Navigator.
9. Close Excel.

7 SHEET NAVIGATOR

OBJECTIVE

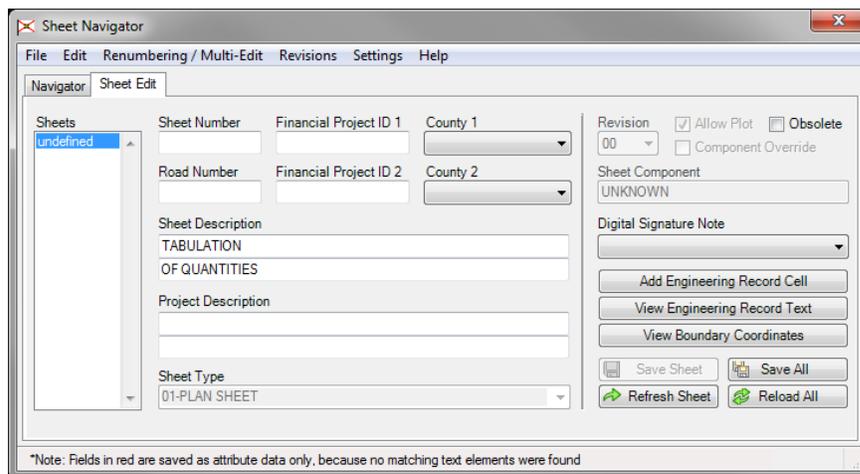
In this chapter the following topics will be covered:

- Overview of Sheet Navigator
- Sheet Navigator Work Flow
- Auto Numbering and Renumbering
- Edit Multiple Sheets

INTRODUCTION

This section covers the application **Sheet Navigator**, which is used to label and tag sheets for electronic delivery. Its functions include entering of sheet title block information, auto numbering of sheets, renumbering sheets and performing Multiple Edits on sheets. Using this tool will greatly reduce the time needed to number sheets in a set of plans or even renumber sheets after sheets have been added or removed from the set, which is a common occurrence over the life span of a project.

OVERVIEW



Sheet Navigator is one of the single most important tools in preparing a project for Electronic Delivery. Sheet Navigator has the ability to Auto Number sheets, Number single or multiple sheets and Re-Number sheets. Sheet Navigator can also tag a sheet as Obsolete so that electronic delivery indexer does not select the sheet and index it. This allows the designer to create exhibits or temporary sheets in the project without the worry of electronic delivery including them in the plans package. Sheet Navigator can also perform multiple sheet edits at one time such as adding the Road Number or the Digital Signature Note to multiple sheets.

Sheet Navigator creates an index named Sheetinfo.xml located in either the root project folder or in the component folder depending on how the designer created the index. This index is crucial to Sheet Navigator functioning properly when working in the Auto Numbering, Renumbering or Multi Sheet Edit mode.

Sheet Navigator is used to:

- Tag sheets for Electronic Delivery
- Number Sheets
- Label Sheet Title Blocks
- Auto Number sheets
- Renumber Sheets
- Apply Revision text

SHEET NAVIGATOR WORKFLOW

10. Create Sheet files using GEOPAK or FDOT Menu.

Note The Border can be in the active file or a reference file.

11. Open Sheet file in MicroStation.

12. Start Sheet Navigator from FDOT Menu: Actions > Label Sheets (Sheet Navigator).

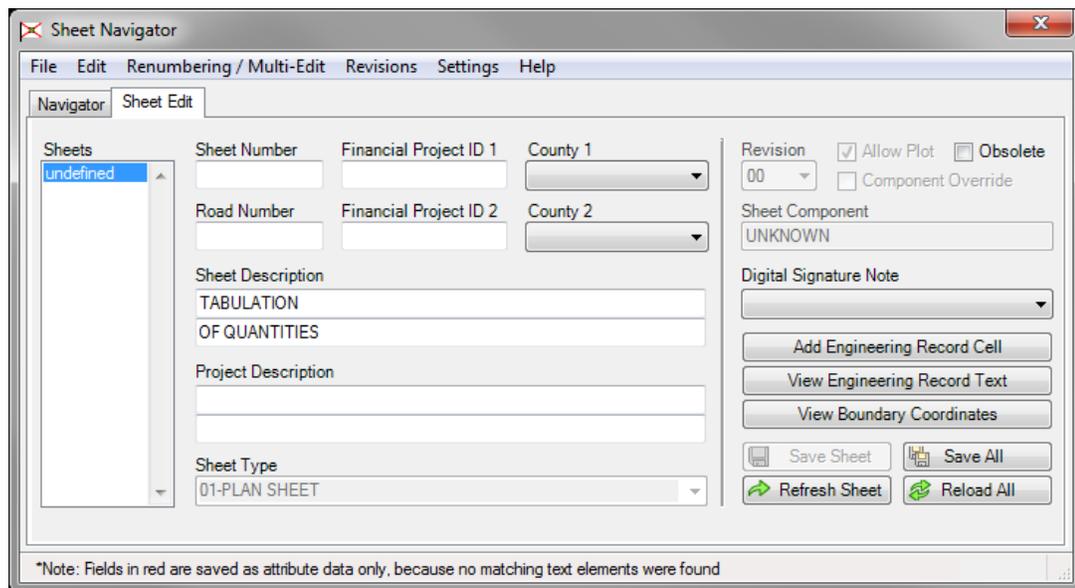
13. Populate fields in Sheet Navigator.

14. Add Digital Signature note.

15. Save data to sheet file.

SHEET EDIT TAB

The **Sheet Edit** tab is used for populating the standard title block information.

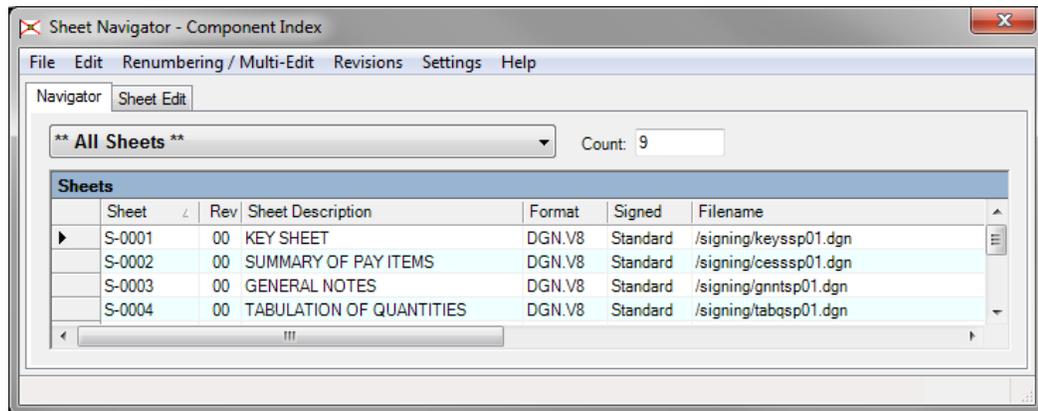


- **Sheets** – This shows the number of sheets in the active file and also the sheet number if they have been numbered. Sheets show as Undefined if they have not been numbered.
- **Sheet Number** – This is the actual sheet number example S-3.

- **Financial Project ID 1** – Eleven digit FIN number. This is automatically populated by clicking in the field. A project configuration file must be selected when opening MicroStation for this to work.
- **County 1** – If the project spans two counties this is for the first county. From the drop down menu, select the county.
- **Road Number** – This is the State Road number of the project alignment.
- **Financial Project ID 2** – For stung projects, this is for the second project FIN number.
- **County 2** – This is for the second county name if your project spans two counties.
- **Sheet Description** – Example: Tabulation of Quantities.
- **Project Description** – This is used on Structural sheet borders and provides a brief description of the project.
- **Sheet Type** – This is filled in automatically and is triggered by text in the sheet cell. 01-Plan Sheet is the default sheet type if none of the standard text strings are found. Refer to FDOT Menu for more information on this tool.
- **Revision** – Shows what revision if any the selected sheet has applied to it.
- **Allow Plot** – Controls whether the sheet will be converted to a PostScript image when using FDOT's Electronic Delivery Software.
- **Obsolete** – Toggled On will make the selected sheets obsolete or inactive which means the electronic delivery software ignore these files.
- **Component Override** – Allows the designer to assign a sheet to a different discipline other than the default discipline. The default discipline is the discipline in which the MicroStation file resides.
- **Sheet Component** – Describes what is the plan set component of the selected sheet based on the sheet number. Example: S-4 is component Signing and Pavement Marking where 4 is the Primary component.
- **Digital Signature Note** – From the drop down menu, select the type of electronic Delivery Signature to place in the file. This cell uses the plot scale of the file.
- **Add Engineering Record Cell** – Places the Engineer of Record cell in the file.
- **View Engineering Record Text** – reads the data in the Engineer of Record cell and displays it.
- **View Boundary Coordinates** – Displays the coordinates of the sheet boundary.
- **Reload All**– Closes and re-opens Sheet Navigator. If changes have been made to Sheet Navigator the designer will be warned to save the changes or cancel.
- **Refresh Sheet** – Refreshes Sheet Navigator and MicroStation. If changes have been made to Sheet Navigator the designer will be warned to save the changes or cancel.
- **Save Sheet** – Saves changes and updates the MicroStation file.
- **Save All** – Saves changes to all sheets and updates the MicroStation files.

NAVIGATOR TAB

The Navigator tab is used for the Auto Numbering, Renumbering and Editing of multiple sheets at one time.

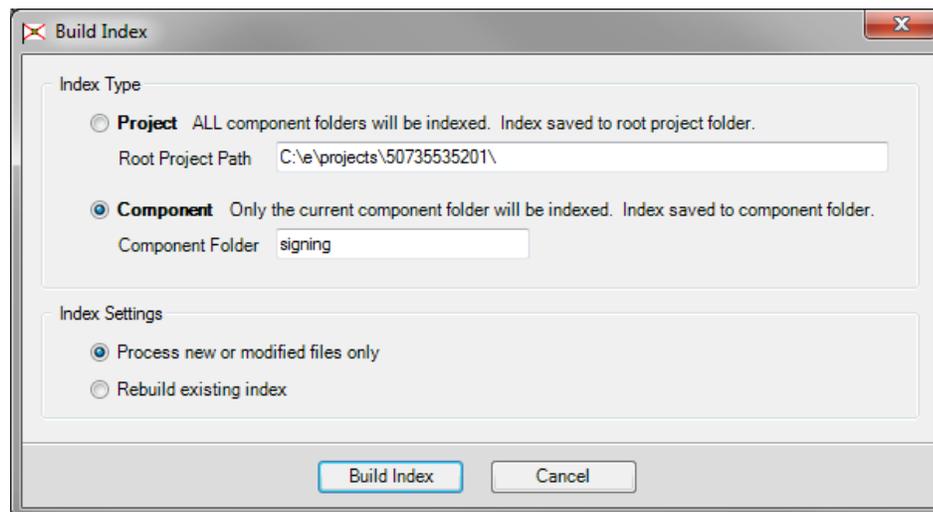


AUTO NUMBERING AND RENUMBERING

This is a multi step process where the designer will need to first auto number the sheets then renumber those sheets because the auto numbering process uses arbitrary numbers based on the file name. Example: Keyssp01.dgn is already numbered S-1, when Auto Numbering is started, Plansp01 is auto numbered S-1. This process can save the designer a lot of time on large projects and it takes the tedious operation of having to open every sheet file and run Sheet Navigator manually. If a project has to be renumbered because of adding or removing sheets, Sheet Navigator automates the entire process.

Auto Numbering or Renumbering Workflow:

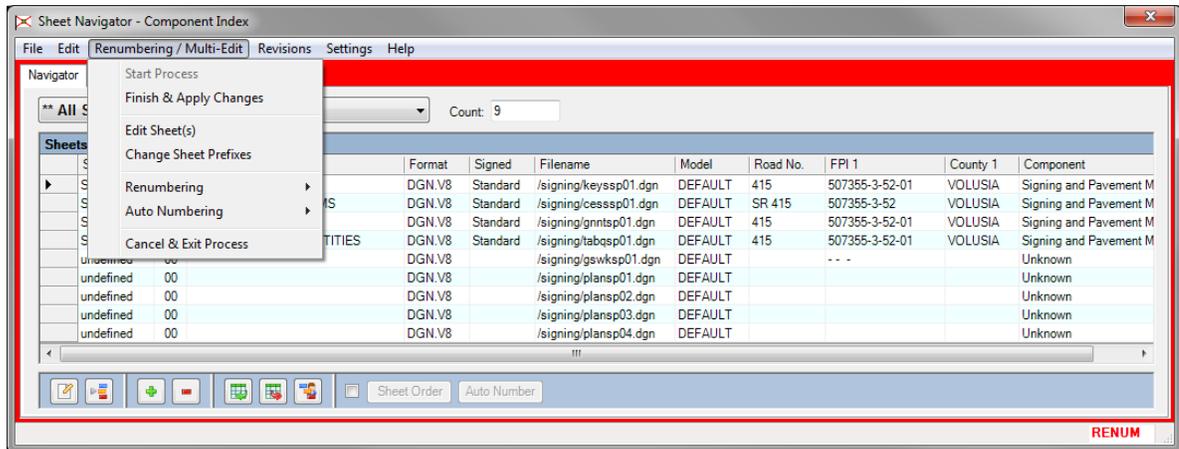
1. Create a Sheet Navigator index file named **sheetinfo.xml**. This can either be a project index or component index.



2. Selecting **Project** will create an **index file** that covers all disciplines in the project; this is the option to use if the designer is the Prime and need to number all of the sheets on the project.
3. Selecting **Component** is used when the designer is only concerned with a specific discipline. The discipline name will default to the working directory that Sheet Navigator was started in.

Note It is very important that the Sheetinfo.xml is always current. If there is any doubt as to how up to date this file is always create a new Sheetinfo.xml. It only takes a short amount of time to create this file and it hurts nothing to override the existing file.

4. Open the **sheetinfo.xml** file.
5. Start the **numbering** process.
6. Select the process to run: Auto Number, Renumber or Edit Sheets.



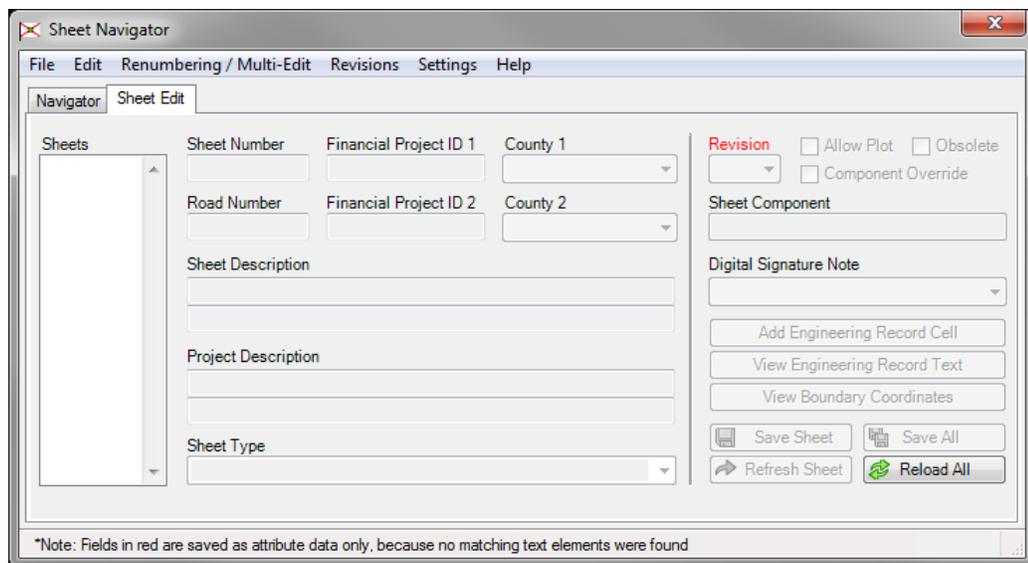
7. **Finish** and **Apply** changes.
8. **Cancel & Exit Process** allows the designer to stop the process without making any changes if an error was made.

Exercise 7.1 Auto Numbering and Renumbering

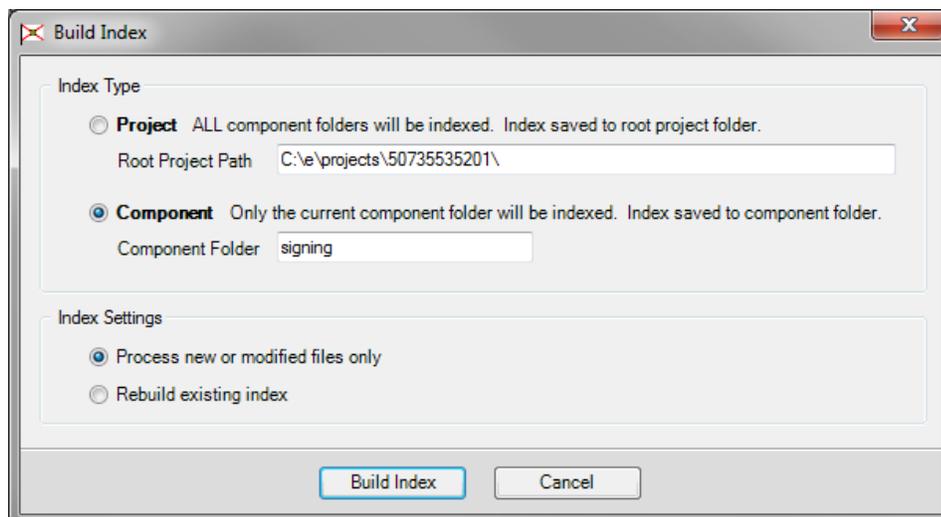
➤ Auto Numbering and Renumbering (Part 1)

✓ Auto number then Renumber sheets

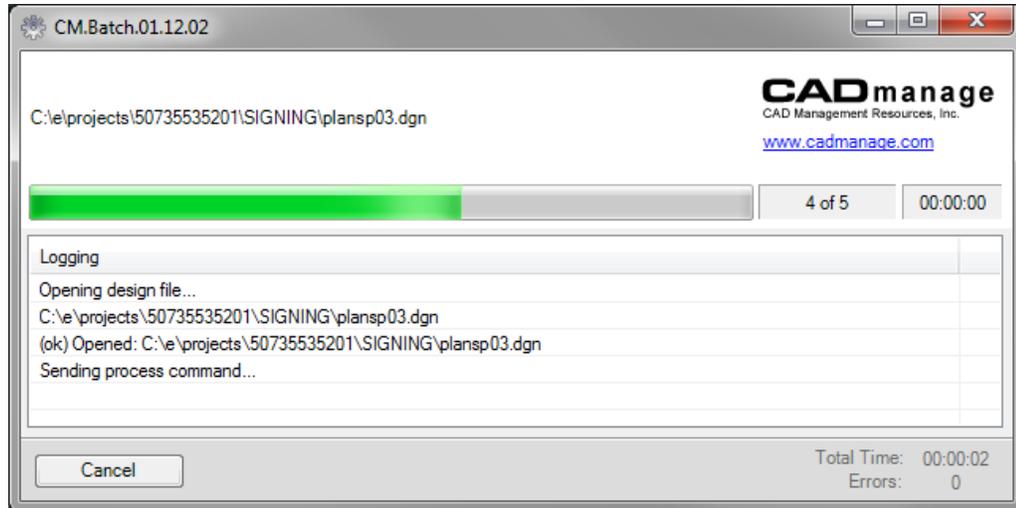
1. Open **dsgnsp01.dgn**. This exercise can be completed from any design file.
2. From FDOT Menu, select **Actions > Label Sheets (Sheet Navigator)**. This opens Sheet Navigator.



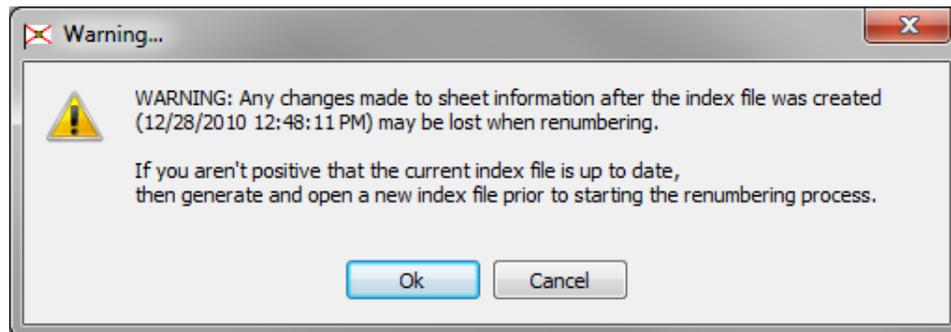
3. In Sheet Navigator, select the **Navigator** tab.
4. In the *Navigator* tab, select **File > New**. This opens Create New Index.



5. Select the **Component** option.
6. Click the **Build Index** button. This creates **sheetinfo.xml** in the *Signing* folder. All other discipline folders are ignored.
7. MicroStation will close and the **CADmanage (CM.Batch)** process will run.



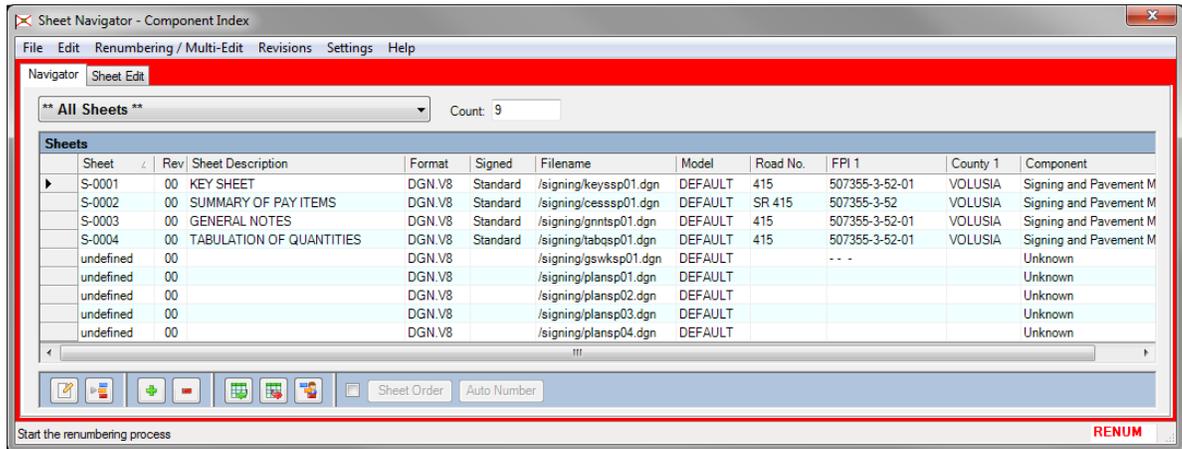
8. Select Renumbering/Multi-Edit > Start process.
9. Click **OK** on the Warning dialog.



10. Several options have been added to the Sheet Navigator dialog.
11. Select **Renumbering/Multi-Edit > Auto Numbering > Auto Numbering Mode**. You could also use the check box at the bottom of the dialog to activate this option.

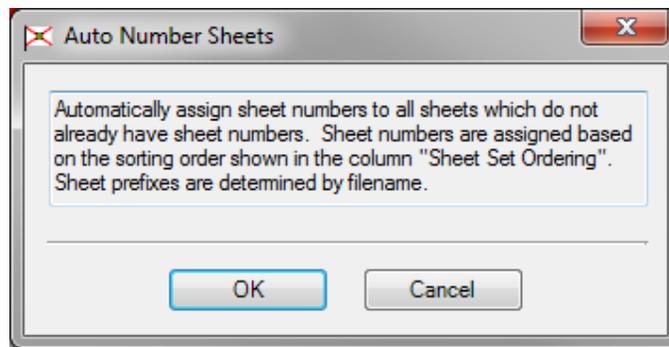


- The figure below shows all of the sheets, some are numbered and others are tagged as undefined which means the undefined sheets have not been numbered. When auto numbering is run, plansp01 might be numbered S-0001.

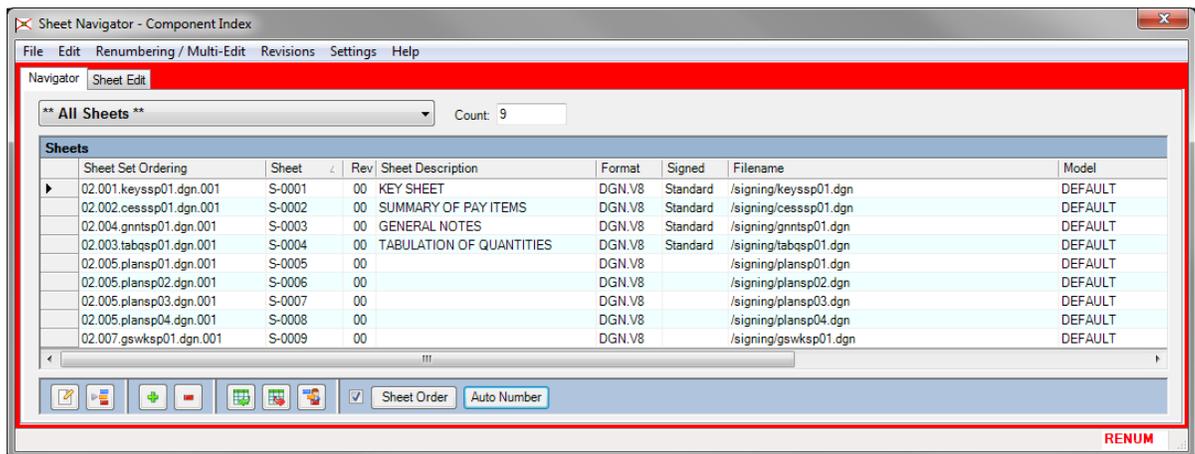


- Click Auto Number.

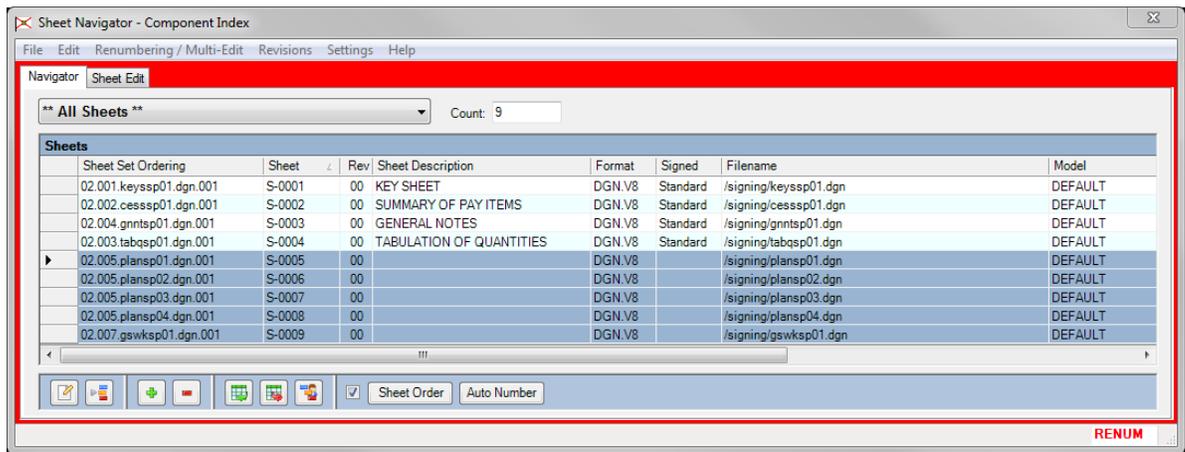
- Click **OK** on the Auto Number Sheets dialog. This is information about the logic used to number sheets.



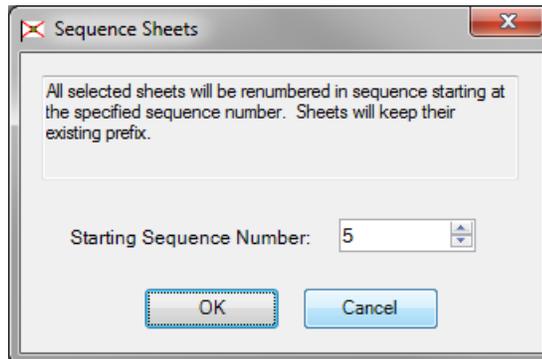
- Notice in the figure below that the undefined sheets now have numbers, however, they may not be correct. If the sequence numbers are incorrect, you will need to renumber these sheets.



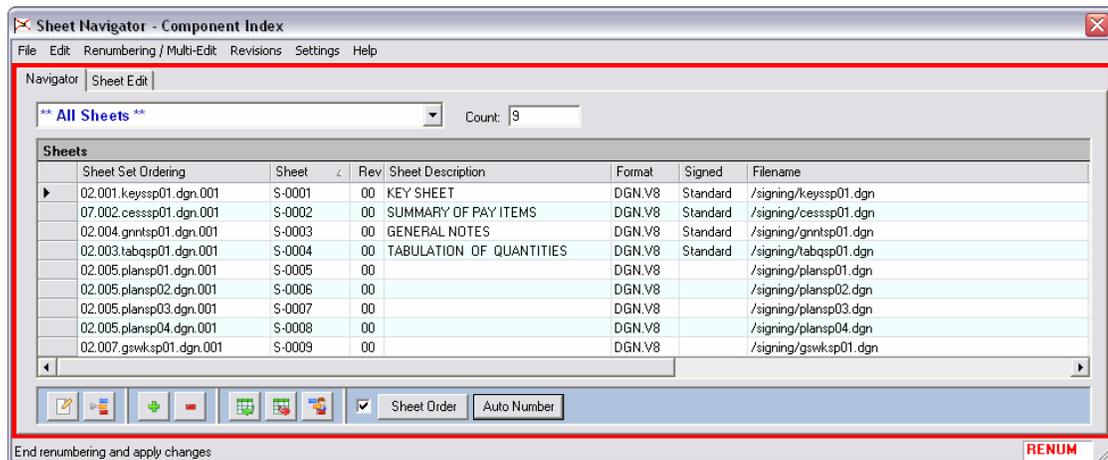
- Click in the grey column before the *Sheet Set Ordering* column and drag across the five auto numbered sheets.



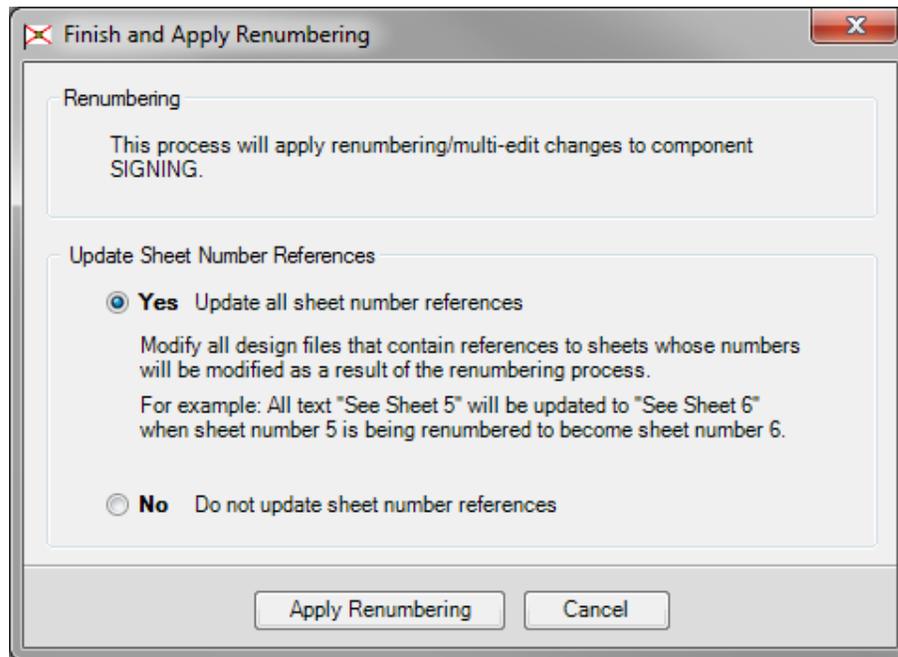
- Click the **Sequence Sheets** button  at the bottom of the dialog. This will make **Plansp01** sheet number **S-0005** and increment the other selected sheets accordingly.



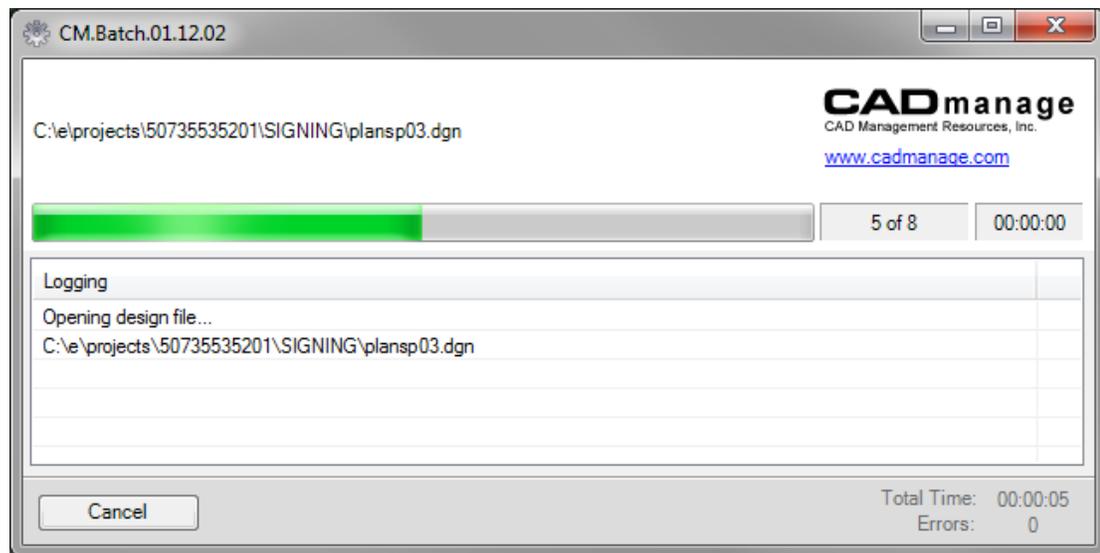
- Set *Starting Sequence Number* to **5**. This changes *Plansp01* from **S-0001** to **S-0005** and increments the other selected sheets by the same number.
- Click **OK**. Notice the Sheet numbers have now been changed. Next, you need to save the changes and update the design files.



20. Click Renumbering/Multi-Edit > Finish and Apply Changes.

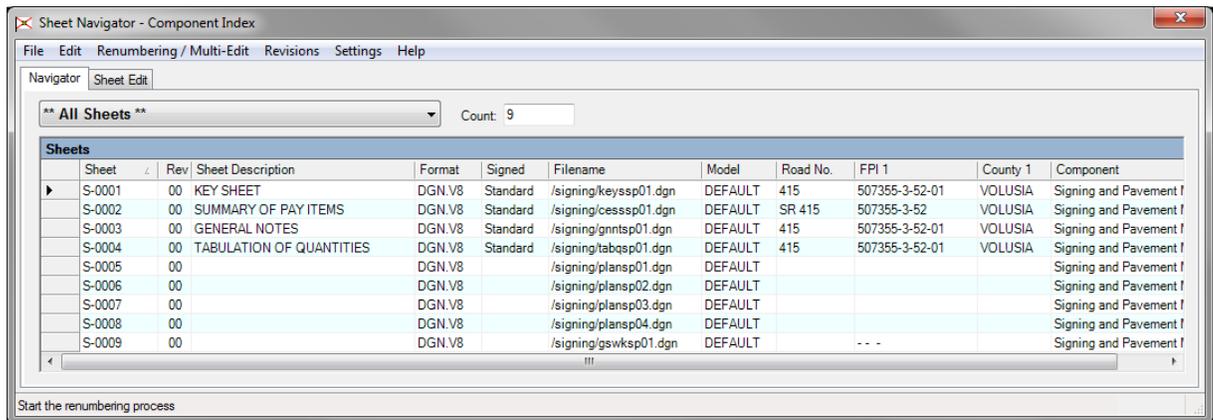


21. Toggle on **Yes** to Update all sheet number references.
22. Click **Apply Renumbering** on the Finish and Apply Renumbering dialog to apply changes. This will open the MicroStation files and add the sheet numbers to the sheets.



23. Notice in the figure below that the sheets are now numbered sequentially. This was accomplished with never entering any of the design files, totally automated. This is a huge time saver on large projects.

Note **Sheet Navigator** can also be used to open files in the index by double clicking on the file.



24. Double click on sheet **S-0005**, this will open **plansp01.dgn** and set Sheet Navigator to the *Sheet Edit* tab. Notice that the design file has been edited to have a sheet number.
25. In Sheet Navigator open the *Navigator* tab. Notice that several sheets do not have a **Road Number**. In the next exercise you will use this tool to add the **Road Number** to multiple sheets.

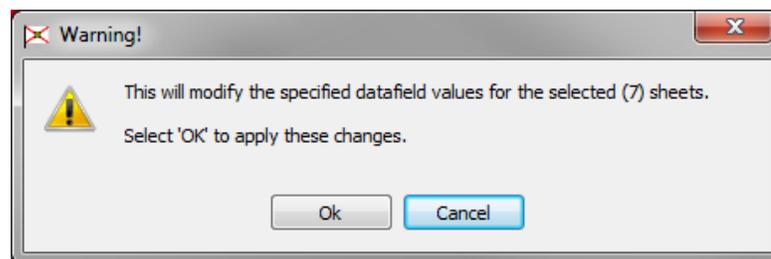
➤ **Use Multi-Edit to Add Road Number (Part 2)**

✓ Add SR 415 to all sheet files

1. Continuing in the *Dsgnsp01.dgn*. This exercise can be completed from any design file.
2. Select Renumbering/Multi-Edit > Start process.
3. Click **OK** on the Warning dialog.
4. Click the sheet **S-0003** and drag down across sheet **S-0008**. This selects the seven sheets with missing or the incorrect **Road Number**. You must click and drag over the box on the far left side next to the Sheet number where the black arrow is shown. You can also use the Ctrl and Shift keys to select files.
5. Select **Renumbering/Multi-Edit > Edit Sheet(s)**. This opens Renumbering – Edit Sheets.
6. Toggle on **Road Number**. This activates the *Road Number* field in the dialog.

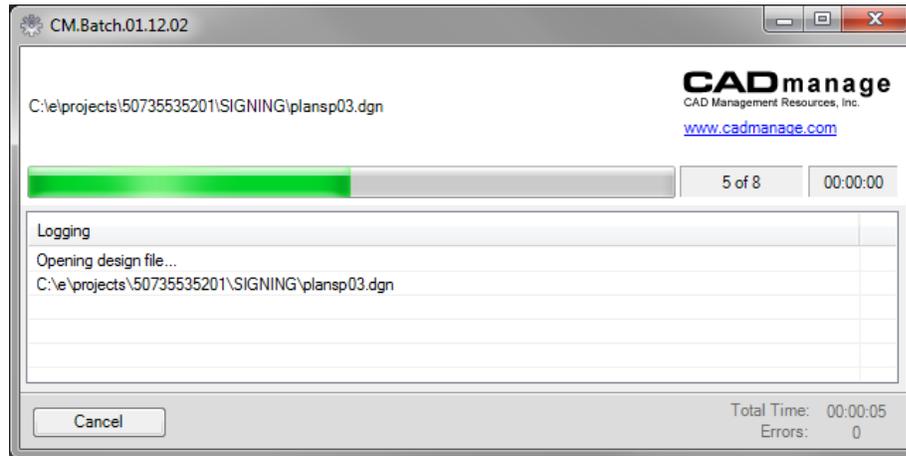
The screenshot shows a dialog box titled "Renumbering - Edit Sheets - (7) Selected". On the left, a list of fields to update includes "Road Number" which is checked. The main area contains several input fields: "Sheet Number", "Financial Project ID 1", "County 1", "Road Number" (containing "SR 415"), "Financial Project ID 2", "County 2", "Sheet Description", "Project Description", "Digital Signature Note", and "Add Engineering Record Cell". On the right, there are checkboxes for "Allow Plot" and "Obsolete", and "Apply" and "Cancel" buttons.

7. Key-in **SR 415** in the *Road Number* field.
8. Click **Apply**.
9. Click **OK** on the Warning dialog.

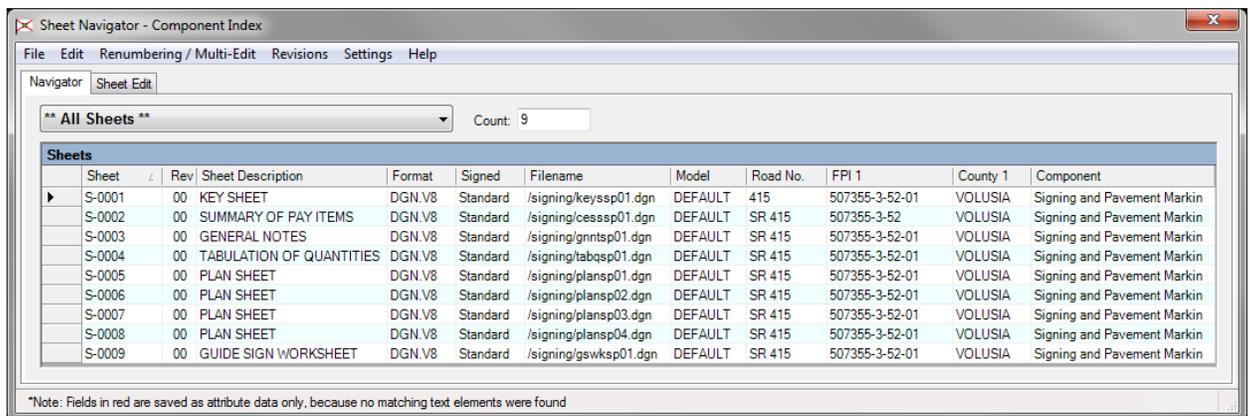


10. Click Renumbering/Multi-Edit > Finish and Apply Changes.
11. Toggle on **Yes** to Update all sheet number references.

12. Click **Apply Renumbering** on the Finish and Apply Renumbering dialog to apply changes. This will open the MicroStation files and add the sheet numbers to the sheets.



13. Click **OK** on the SheetInfo dialog. This will start the editing process. When finished Sheet Navigator will reload and show the multi-sheet edit changes. Use the proceeding steps to make any additional sheet edits such as Digital Notes or Sheet Descriptions.



14. Double Click on any sheet selected and review the change.
 15. Close Sheet Navigator.

Note For the Guide Sign Worksheet refer to the scaling noted in Chapter 5, page 5-26. The Guide Sign Worksheet will probably have to be cleaned up by deleting the Digital Signature Note and setting the plot scale and the active scale.

8 PLOTTING TOOLS

OBJECTIVE

In this chapter the following topics will be covered:

- Plotting from MicroStation's Print Dialog
- Plot to PDF
- Create Print Set file
- Plotting from MicroStation's Print Organizer

INTRODUCTION

This section covers the basics of plotting from within MicroStation. FDOT delivers a number of plot drivers that can be used to plot hard copy paper plots or electronic post script or pdf files. The plot drivers control how MicroStation displays the graphics on paper or in an electronic file.

Designers can produce plots several different ways through MicroStation. Each district office may have its own set of plotting procedures and plot drivers, contact the CADD manager if there are any questions regarding plotting. The intention of this chapter is to explain two plotting options, plotting through MicroStation's Print Dialog and plotting through MicroStation's Print Organizer.

Note Print Organizer replaces Batch Print. When the designer needs to produce plots from sets of design files, models and/or Project Explorer links, use Print Organizer. Print Organizer creates print sets, which are used to identify, save, recall, and print a particular set of files and/or models.

FDOT delivers a document in the FDOT2010\Resources\plot\ directory that better explains all of the delivered plot drivers. Review this document before plotting, as there is important information that may be helpful.

MicroStation's print engine required many changes for the V8i platform to ensure compatibility with this edition's reworked graphics display subsystem. In addition, there are a number of other upgrades to printing functionality.

We will discuss what is new with plotting in MicroStation V8i and will see how to edit the new printer drivers and pen tables later in this chapter.

PRINT DEFINITIONS/SETS

A print set is a collection of print definitions and folders. Print definitions are created when the designer adds files, models, or Project Explorer links to Print Organizer. Each print definition consists of a reference to a DGN file, like a sheet model in a DGN file with properties, such as size and scale.

Note Project Explorer links are not covered in this course guide. For more information on Project Explorer links, please see the **MicroStation** help file.

The steps required to create print definitions are:

1. Open the Print Organizer dialog.
2. Add the DGN files, models, or Project Explorer links.
3. Specify the print definition creation options.

Print Organizer creates print set (.pset) files as a container for print definitions, folders that group print definitions, and global set information pertaining to the print set.

If the same set of files is going to be plotted on a regular basis the designer can save the set of files as a print set (.pset) file. A print set is used to identify, save, recall, and print a particular set of files and/or models.

The designer can open multiple instances of the same print set file, but only the first instance has write access. Subsequent instances of the print set will open in read-only mode. Read-only mode allows the designer to preview and print the files, but if the designer wants to make changes they will need to save the print set with a different name.

Print Organizer allows the designer to define hierarchical organized print sets. To define this type of print set, the designer will first create folders and sub-folders below the root folder. Print definitions, which are created when files are added, are then organized in the folders and sub-folders.

NAME EXPRESSIONS

The print definition name expression is used to determine the print definition names. The print definition name expression can also be used to rename print definitions.

An expression is composed of a series of components, where a component may be a symbol, a number, a string, or an operator. The symbols available for use in expressions are published by various symbol providers, and are grouped by symbol sets such as System.String, System.Path, PrintSet, and PrintDefinition. To generate an HTML report showing all available symbol sets and the symbols available in each, select Utilities > Report Symbols from the Named Expressions dialog.

An example output file name expression is shown in the following table. The result of the output file name expression is 001-plans.pdf, assuming the print set name is "plans.pset" and the printer driver configuration file is pdf.pltcfg.

Expression	Result
System.String.Format ("{0:D3}", PrintDefinition.SetPrintDefNumber) & "-" & System.Path.GetFileNameWithoutExtension (PrintDefinition.SourceFile)	001-plansp01.pdf

PRINT STYLES

Print styles provide an easy way of defining default print definition properties for both Print Organizer and the Print dialog.

The following can be done using print styles:

- store print definition properties so that they can be easily reused
- maintain drawing standards by managing display parameters, using a particular scale, or specifying a pen table
- set properties for the entire print set, such as printer name or printer driver configuration file
- apply print definition properties when creating print definitions or changing printers such as, Paper Size, Pen Table, Plot Driver, Fence Definitions (plot border)

Print styles are useful if the designer frequently uses the same print definition properties every time they print. For example, if the designer prints at a particular size with a specific pen table, they can define those print definition properties in a print style and apply them when the designer creates print definitions or when they change printers. This is accomplished by identifying a print style as a default print style or by assigning a print style to a printer driver configuration file.

The designer can also store groups of commonly used print definition properties in a print style and then reference them on-demand. This method of referencing print styles is helpful when the designer uses a group of print definition properties for more than one project.

The following should be considered and/or set when creating and applying Print Styles:

1. Print area should be Fence
A fence will be created based on the Print Definition created on the Fence tab.
Rasterized should be unchecked unless the style is intended to show Rasterized features like transparencies.
2. If workspaces are left blank, the current workspace in use will be used.
3. Create Plot Definitions from Models should be set to “All design models.”
4. Define as many search attributes as possible.

Note These options will reduce the search time by filtering out elements.

5. Define the display attributes to be used when creating prints.
6. Select the Printer Configuration file to be used with the print style.

WHERE ARE PRINT STYLES STORED?

Print Styles are stored in DGN Library (DGNLIB) files. In the FDOT workspace the default styles are stored on the server in FDOT_PrintStyles.dgnlib. However, the following are the recommended files and locations for additional Print Styles:

- Site Specific Print Styles can be stored in a file named Custom_PrintStyles.dgnlib in the FDOT2010\RESOURCES\Dgnlibs directory on the server.
- User Specific Print Styles can be stored in a file named USER_PrintStyles.dgnlib in the local \FDOT2010\Workspace\prefs\ directory.
- Project specific Print Styles can be stored in the symb directory.

PRINT DIALOG

The Print dialog provides the necessary tools for plotting at any stage during a project. The Print dialog is used to produce plots of the active design file and its references.

The designer can perform all printing operations from the Print dialog, which is opened by choosing **File > Print** for the MicroStation Menu bar.

The following can be done from the Print Dialog:

- Select a printer driver and edit its configuration file.
- Create a pen table to resymbolize the print.
- Specify monochrome, grayscale, or true color output.
- Create print definition files.

The Print dialog lets the designer work with two types of printers: the Windows system and a Bentley driver. The two (2) types are:

- **Windows driver** — the designer has access to the functionality of the Windows printer driver to print directly to the system printer device, create an Enhanced Windows metafile, or save to print later.
- **Bentley driver** — the designer can save the print to disk to send to a printer later.

USING PRINT STYLES IN PRINT DIALOG

There are many benefits to using Print Styles in the single sheet Print dialog.

- No need to place a fence.
- No need to select a plot driver.
- No need to select a pen tables.
- No need to adjust display settings.

Note Once a Style has been applied you can override settings if needed

APPLYING A PRINT STYLE

The steps to apply a Print Style in the Print Dialog are:

1. To apply a Print Style, select **Settings > Apply Print Style** from the Print dialog.
2. You will be prompted to select a Print Style from a drop down list of available styles.

PRINT ORGANIZER

Print Organizer is a batch utility for printing and reprinting sets of design files, models and/or Project Explorer links that are stored in a print set (.pset) file.

The following can be done using Print Organizer:

- print, preview, or publish multi-sheet print sets
- drag and drop files from Windows Explorer, drag and drop models from the Models dialog, drag and drop links from Project Explorer, or use Sheet Navigator to compose print sets
- create hierarchical organized print sets
- set print preferences per item
- edit the properties of individual or groups of print definitions
- define and reuse named collections of print definition properties
- create PDF output with hierarchical bookmarks
- integrate with Project Explorer, to view, print, compose, and navigate print sets

Print Organizer lets the designer work the same printer driver configuration files as the Print dialog. This allows for printing to be sent either directly to the default system printer or to a file saved to print later.

Print Organizer, same as the Print dialog, lets the designer work with two types of printers: the Windows system and a Bentley driver. The two (2) types are:

- **Windows driver** — the designer has access to the functionality of the Windows printer driver to print directly to the system printer device, create an Enhanced Windows metafile, or save to print later.
- **Bentley driver** — the designer can save the print to disk to send to a printer later.

Print Organizer stores project settings in a print set file with a .pset extension. Each print definition consists of a reference to a DGN file, like a sheet model in a DGN file, along with properties, such as size and scale.

The individual files and models within a print set file are referred to as print definitions and can be hierarchically grouped in folders and sub-folders.

Print definitions are created when the designer adds files and/or models to Print Organizer. Assigning the proper values to print definition properties is an essential part of creating a print set; therefore, Print Organizer provides several methods to assign print definition properties and each method is used in a different context. These methods are:

- **Print Styles** — Allows the designer to define and reuse named collections of print definition properties that are stored in a DGN library. The designer can apply a print style when creating print definitions. To create a print style, select Print Organizer's Tools > Define Print Styles menu item.
- **Print Organizer's in-place editing feature** — Allows the designer to edit individual properties for one or more print definitions by double-clicking the property in Print Organizer's right pane to change its value. To edit a property for a group of print definitions, select the print definitions, and then double-click the property to change its value.
- **Single or multi-edit properties dialogs** — Allows the designer to edit a group of print definition properties for one or more print definitions. To edit a single print definition, double-click it to open the Properties dialog or right-click it and select Properties from the pop-up menu. To edit a group of print definition properties, select the print definitions from the Print Organizer dialog and select Edit > Properties.

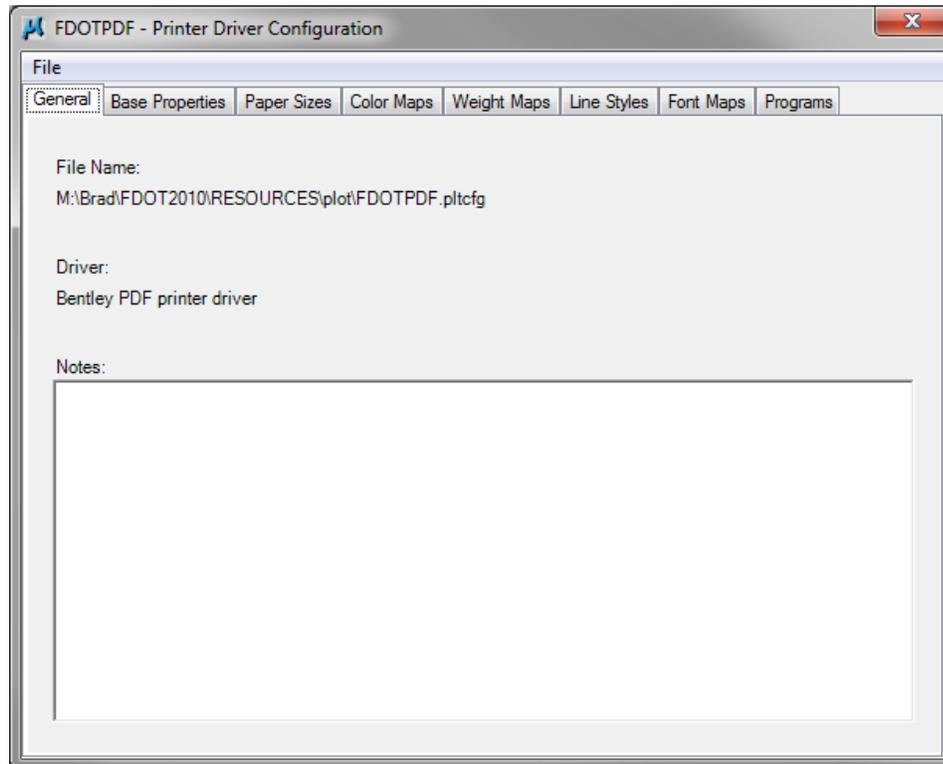
- **Print Definition Creation Options dialog** — Allows the designer to specify print definition properties when creating print definitions. To open this dialog, select Manually Specified Options on the Create Print Definitions dialog.

Print Organizer supports named expressions for print definition and output file names. Named expressions are created using the Define Named Expression dialog and are stored in the configured DGN libraries. Once a named expression is defined, it is accessible in Print Organizer.

EDIT PRINTER DRIVER CONFIGURATION

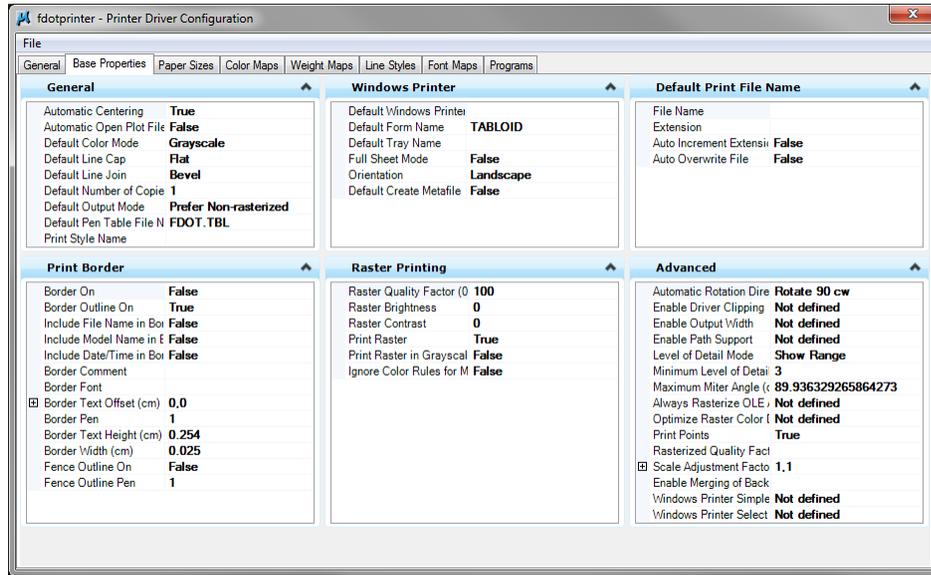
Since MicroStation V8i supports both PLT and PLTCFG files, the Print dialog was enhanced to recognize which type of printer driver is currently attached and opens the appropriate editor when the designer, from the Print Dialog, selects **File > Edit Printer Driver Configuration**. PLT files will open in Notepad, just as they did in the past, and PLTCFG files will open in a new editor that is included in MicroStation V8i.

General Tab - A new user interface is provided for creating and editing the new PLTCFG printer driver configuration files. The new tab based interface with drop-downs to define optional setting will reduce the chance of typos. The General tab displays the file name and type of driver that is currently being edited. It also provides a notes area where the user can provide a description of the driver and any important instructions for it use. This is equivalent to the comments that were common in the top of many of the old PLT files.



Base Properties Tab - The Base Properties tab is divided into several categories. This is where most changes will be made when customizing a driver. The dialog is resizable and each category can be expanded or minimized individually.

When editing a printer driver, keep in mind that, many of these settings control the default values that will appear in the Print dialog. When a driver is configured properly the end user should not be required to make adjustments in their normal plotting process.

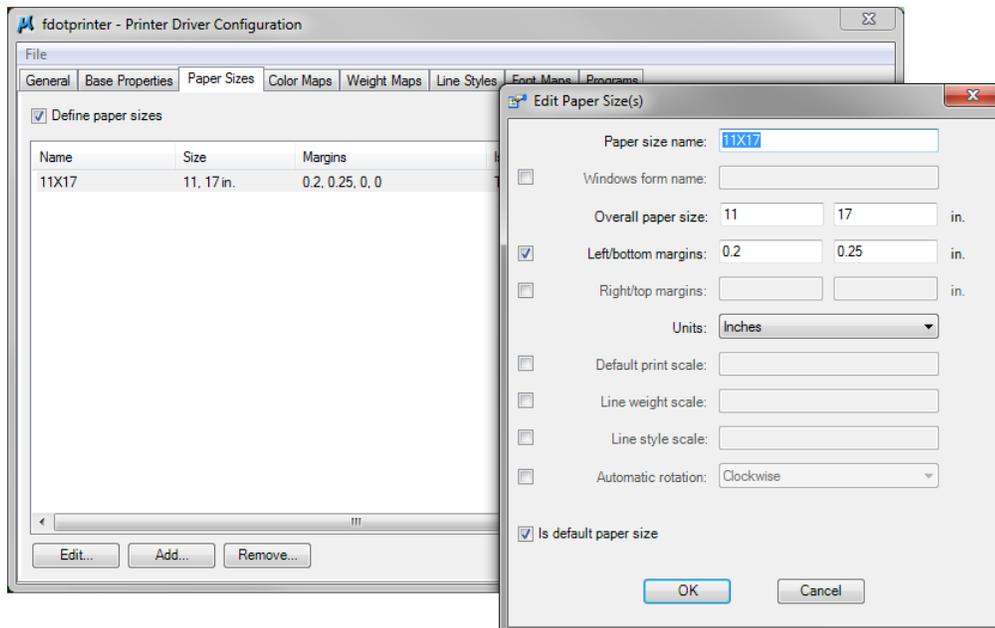


Paper Sizes Tab - The Paper Sizes tab allows the designer to define the page size and layout for each paper size that will be available when using the selected driver. For the sheet to default to the correct scale in the Print dialog the paper size must be properly defined.

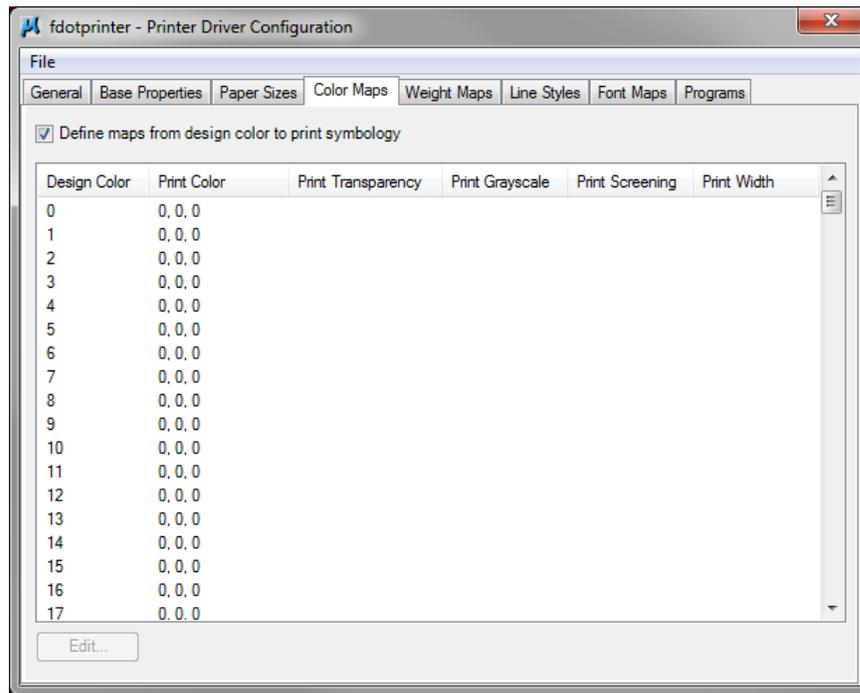
In MicroStation V8 the size record was equal to the size of the plot border:

$$\text{size} = (10.600, 16.500) / \text{num} = 11 / \text{off} = (0.20, 0.29) / \text{name} = 17 \times 11$$

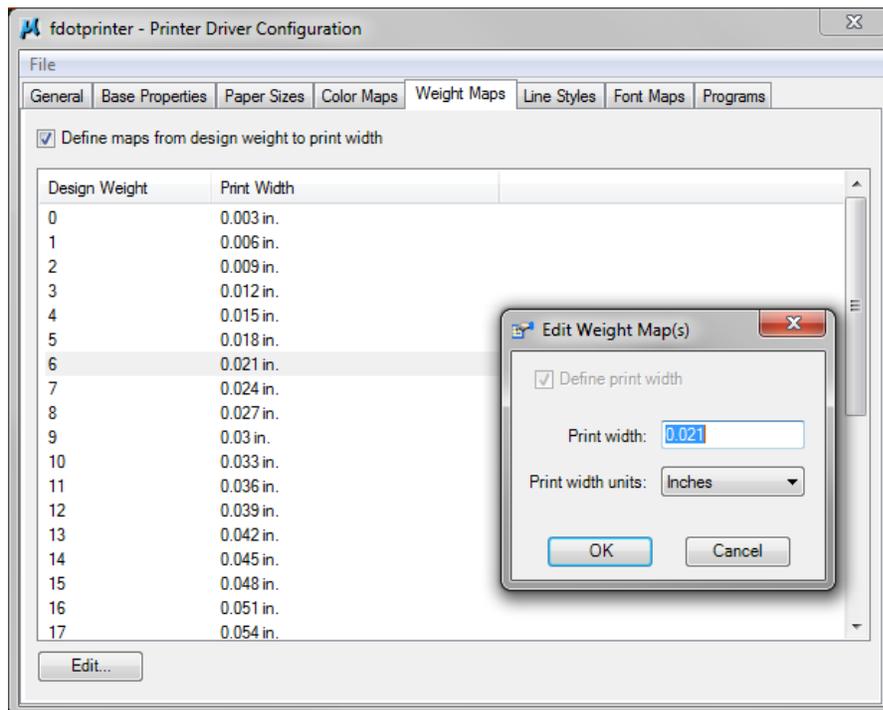
In MicroStation XM and V8i the "Size" will equal the paper size which is 11 X 17 and the margins are used to adjust the printable area to match the size of the plot borders which are 10.6 x 16.5.



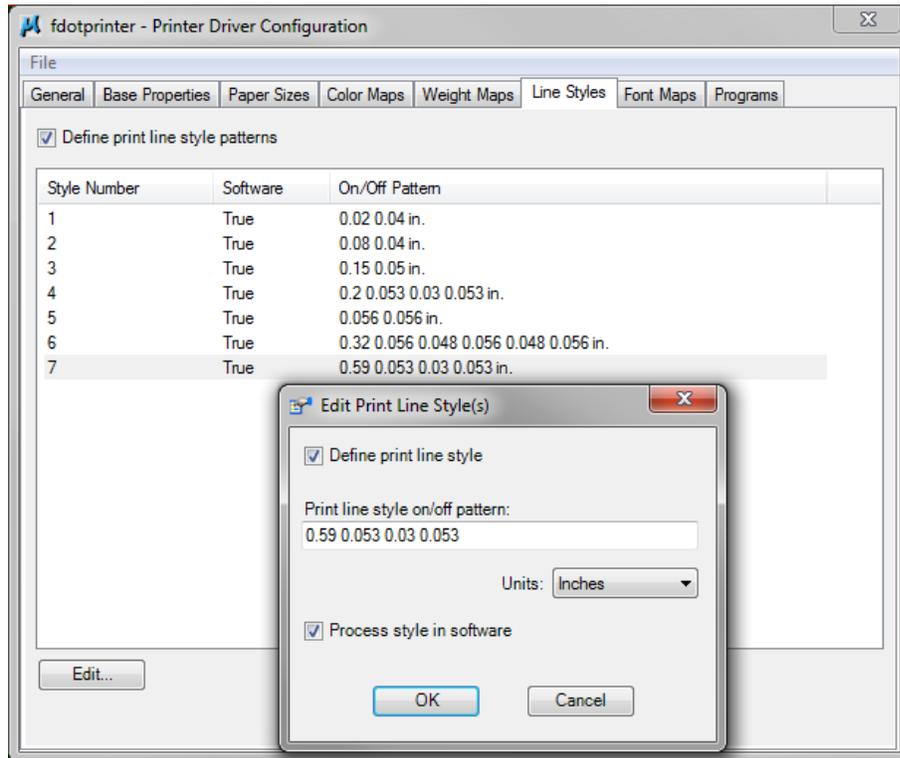
Color Maps - The Color Maps tab allows the designer to define the color to be printed for each color in the design file. Typically FDOT drivers are configured for black and white printing with only color 20 defined as a grayscale color.



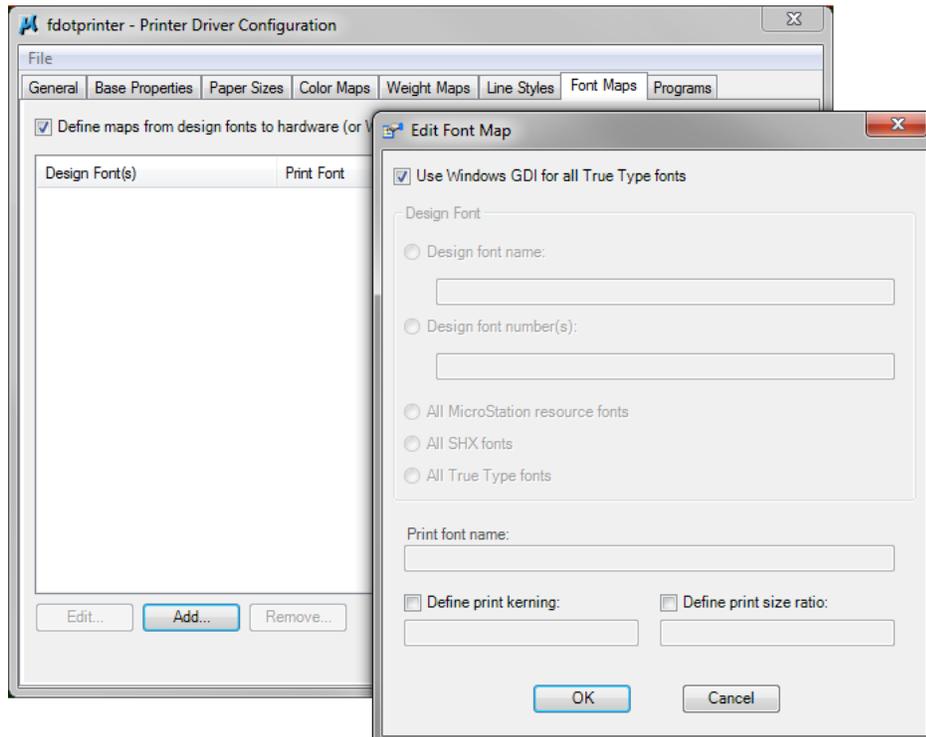
Weight Maps Tab - The Weight Maps tab is used to define the thickness each line weight will be printed at. These settings may need to be adjusted, depending on hardware, to get a quality print that can be reproduced or copied well.



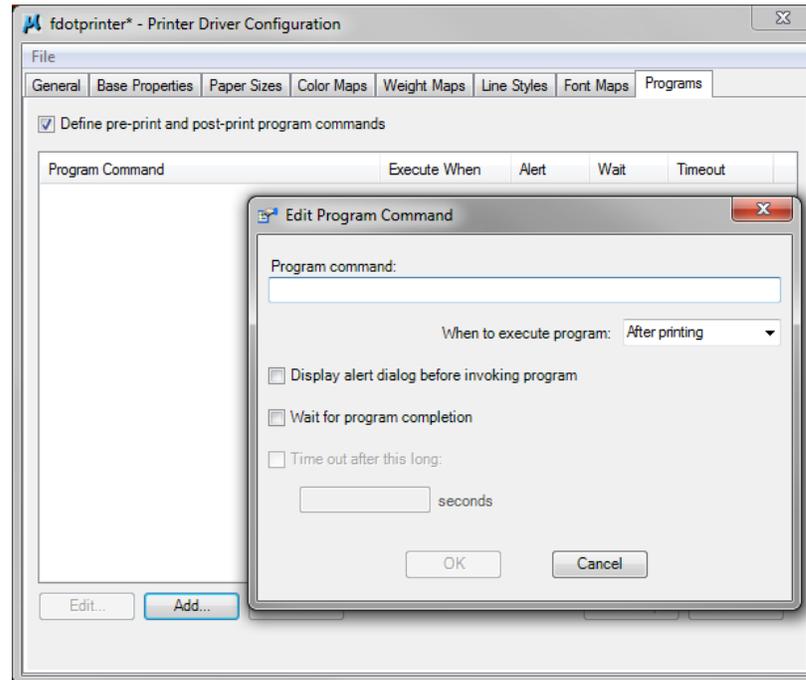
Line Styles Tab - The Line Styles tab is used to define the way each of the standard MicroStation line styles will be printed. These styles have been customized in each of the FDOT printer drivers.



Font Maps Tab - The Font Maps tab allows the designer to replace the MicroStation fonts with Windows fonts when printed.



Programs Tab - The Programs tab allows the designer to run a program either before or after the print is processed.



CONVERTING PLT FILES TO PLTCFG

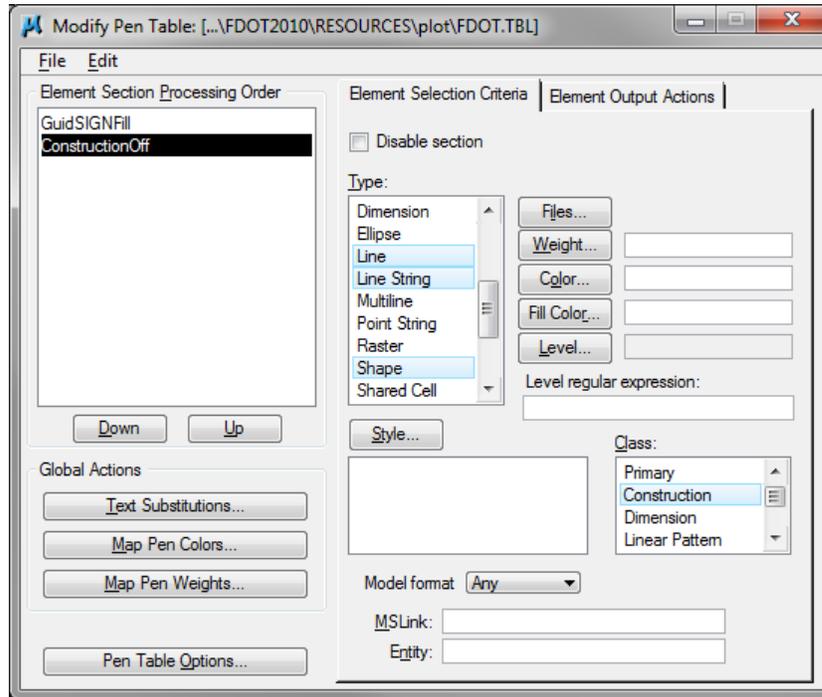
The PLTCFG files are XML files, consequently changing the extension will not convert the files. When using the Edit Printer Driver, the designer must first select an existing PLTCFG file to open the new PLTCFG Editor. If a PLT file is active, it will open the Print dialog Notepad instead of the new PLTCFG Editor.

Steps to Convert PLT to PLTCFG:

1. Start MicroStation using the FDOT2010 icon and open a file with a sheet border.
2. Fence the sheet border.
3. Select **File > Print** from the MicroStation menu to open the Print dialog.
4. Select the Bentley driver option and click on the **Select Printer Driver Configuration Fill** button to select a driver.
5. Navigate to the **\FDOT2010\RESOURCES\plot** directory and select any **PLTCFG file** to edit.
6. With a PLTCFG file active in the Print dialog, select **File > Edit Printer Driver Configuration** from the Print dialog menu.
7. The new Printer Driver Configuration Editor will open. From the editor select **File > Open**.
8. Navigate to the **PLT** file to be converted and click on the **Open** button.
9. Notice that the PLT file was opened read only. PLT files opened in this editor can only be opened with read access. To modify the file the designer will need to **Save** it as a PLTCFG file which will convert it to an XML file instead of the ASCII text format used for PLT files.
10. Select **File > Save As** from the menu and save the file as a .pltcfg.
11. Adjust Paper sizes. Now that the printer driver has been converted to the new format and the designer will need to adjust the paper sizes as shown earlier.

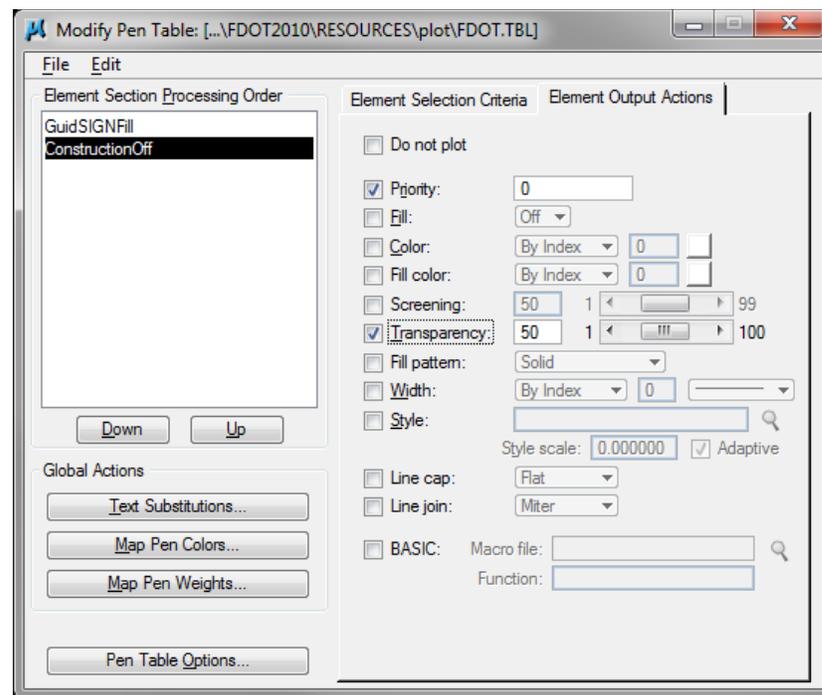
MODIFY PEN TABLE ENHANCEMENTS

ELEMENT SELECTION CRITERIA



Wildcards can be used to select levels by entering the expression in the “Level regular expression” field and Tags have been added to the list of element types available.

ELEMENT OUTPUT ACTIONS



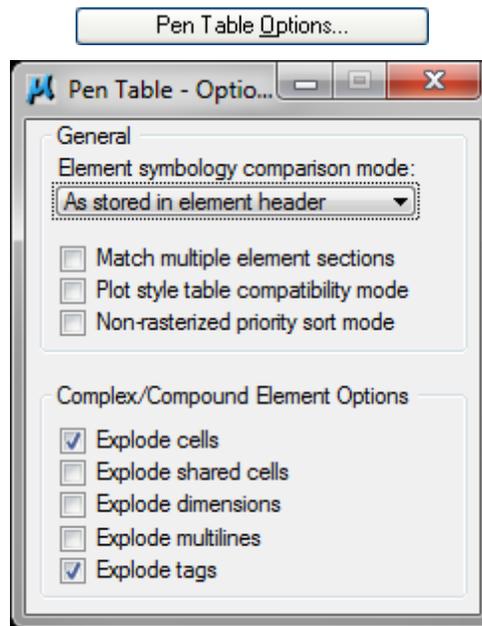
TRANSPARENCY

Pen table transparency is supported for any printer driver capable of printing in rasterized mode. If pen table transparency is used when printing in non-rasterized mode, the transparency values do not have any effect.

PRIORITY

Pen table priority does not have any effect for printing 3D files. Priority is implemented for printing 3D files through Z depth, using hardware acceleration when possible, so the pen table is no longer required to make multiple passes through the element list. This permits some actions that were not possible with the 2004 Edition, such as assigning different priorities to individual components of a shared cell.

PEN TABLE OPTIONS



The designer can set up a pen table to apply more than one section to an element. If Match multiple element sections is on in the Pen Table Options dialog box, the sections will be selected and applied in descending order, starting at the top of the list and working downwards.

If this setting is off (the default), once a section has been selected by its input criteria and its output actions applied, pen table processing on that element stops. In the V8i Edition the Element symbology comparison mode setting in the Pen Table Options dialog box affects only the manner in which the input criteria treats level symbology. There are two modes from which to choose:

- **As stored in element header** — the element header symbology is matched against the input criteria.
- **As displayed in view** — the view symbology is matched against the input criteria.

MODIFY FDOT PEN TABLE

The following are the steps that will modify the standard FDOT pen table (FDOT.tbl) so that all of the elements in a referenced file will be plotted as if they were all color 20.

1. Have the **Print Definition File** already open before proceeding.
2. To edit the **Pen Table** select **PenTable > Edit** from the menu. This will open the **Modify Pen Table**.
3. Make a copy of the standard **FDOT pen table** by selecting **File > Save As** from the menu and give it a logical name.
4. Select the last item in the **Processing Order** field and then select **Edit > Insert New Section Below**.
5. The **Insert Section** dialog will appear prompting you for a Name. Enter a **logical name**.
6. Click **OK** to continue.

Note Make sure the new item is selected in the **Processing Order** field and then select all of the items in the **Type** field. The easiest way to do this is to click on any one of the items and then hit **Ctrl + A** on the keyboard. If you only wanted to gray scale a certain type of element like a shape then you would only select the appropriate items in the **Type** field.

7. Click the **Files** button to define the references to be processed.
8. The **Identify Files** dialog will appear. In the bottom field enter the **logical name** of the reference to apply the resymbolization to or part of the name and wildcards for files with multiple sheets.

Note When specifying a logical name for a reference in the pen table, you can enter the complete logical name, or you can enter an expression pattern consisting of one or more wild cards. The following table identifies the wild cards that you can use for matching logical names.

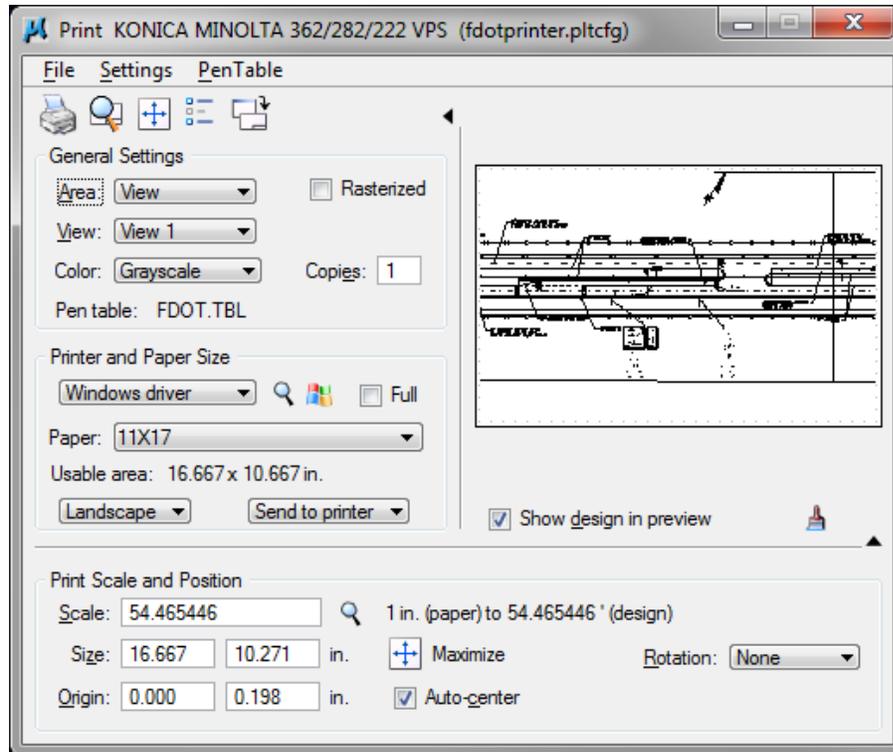
Wild Card	Used to
(.)	Match any character. This serves as a single character wild card.
(*)	Match zero or more occurrences of the preceding character. This is used in combination with any character or with the single character wild card (.). Automatically includes the root word.
(+)	Match one or more occurrences of the preceding character. This is used in combination with any character or with the single character wild card (.). Automatically excludes the root word.

9. Click **Add**.
10. **Add** any other **logical names** to process and then click **OK** to return to the **Modify Pen Table** dialog.
11. From the **Modify Pen Table** dialog box, click on the **Element Output Actions** tab.
12. Select the **Color** checkbox and set the *color* to **20** as shown below.
13. Select **File > Save** from the menu to save the changes.
14. Close the **Modify Pen Table** dialog.
15. Select **File > Save Print Definition File** and save changes to the open **Print Definition File**.
16. Select **File > Reload Printer Driver Configuration**.

PLOTTING IN MICROSTATION FROM THE PRINT DIALOG

The Print dialog can be opened from the tool bar in MicroStation or from the menu option *File > Print* or by using the keyboard shortcut *Ctrl P*. This will open the Print dialog as shown below. Depending on the office/site standards, the Print dialog opens with a standard plot driver. This is a Workspace Configuration setting and should be set by the CADD manager. In this course guide, the class will be using the *fdotprinter.pltcfg* for plotting to a device. *Fdotprinter.pltcfg*, as described in the help document, is a copy of the Bentley *printer.pltcfg* driver with weights and styles set to FDOT standards.

Note Many of the old file formats (PLT, INI, SPC) were changed back in MicroStation XM. Some of the old formats can be used in V8i, but any files created using the new formats in V8i will not be backwards compatible.

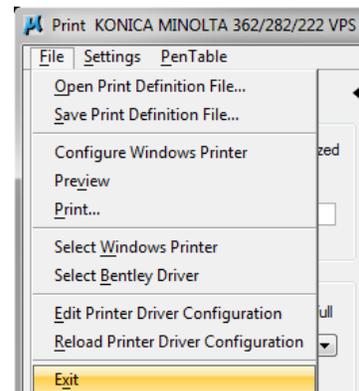


All options for adjusting printing settings are contained in the menu bar at the top of this dialog and the icon bar directly below it. The selected printer driver configuration file appears in the title bar of the dialog.

FILE MENU

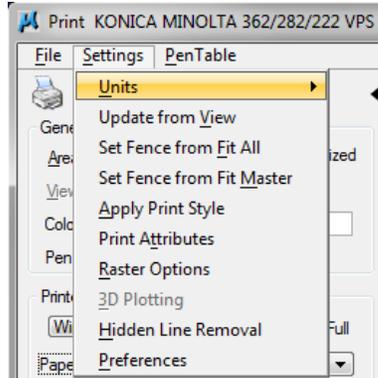
The File menu contains options for setting up the plots, previewing the plot, selecting and editing a plot driver/configuration, and reloading the driver after editing.

The format of the printer drivers has changed to XML and they now have the extension PLTCFG. MicroStation V8i will continue to support many of the old PLT files but Bentley encourages users to convert their existing drivers because they will drop support of the PLT format at some point in the future. FDOT has converted all of the drivers normally provided and include only the PLTCFG version in the FDOT2010 Software Suite.



SETTINGS MENU

The *Settings* menu contains options for setting the *Units* (inches, feet, mm, cm, dm, m), *Update from View*, *Print Attributes* (like level symbology and whether or not to plot the print border along with several other attributes), *Set Fence from Fit All*, *Set Fence from Fit Master*, *Apply Print Style*, *Raster Options*, *3D Plotting* (ghosted), *Hidden Line Removal* and *Preferences*.

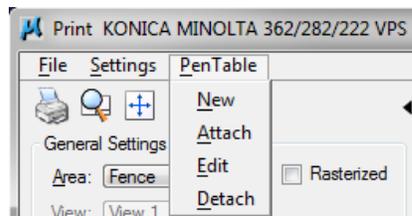


A new Preferences dialog was added enhancing the capabilities in a more user friendly layout.

PEN TABLE MENU

Pen tables allow the designer to resymbolize their design. In other words, the designer can produce printed output that looks different from the on-screen view of the design. Thus, from a single design file, by using different pen tables, can produce printed output having different element symbology to that of the original design. Pen tables are created using the Print dialog's pen table editor. They are supported in both Print Organizer and the Print dialog.

The **PenTable** menu is for **Creating, Attaching** and **Editing Pen Tables**. Pen Tables can be used to do several things during the plot process. FDOT delivers one Pen Table that fills in the fields at the bottom of the plots with the file name, date and user name. This file can be modified to perform other functions but understand that any modifications made will affect all users if the Pen Table is located on the server.



PRINT ICONS



- Submits the print



- Opens a Print Preview window



- Maximizes the plot to fit the printable area



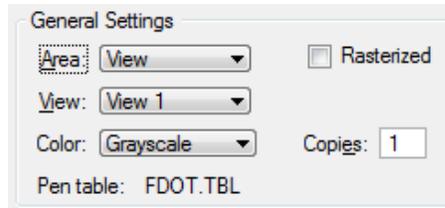
- Opens the Print Attributes dialog



- Updates the print preview to match the design file

GENERAL SETTINGS

The **General Settings** area is where to select the plot area and which view to plot from. It also shows which if any pen table is loaded, how many copies to plot and the color status.

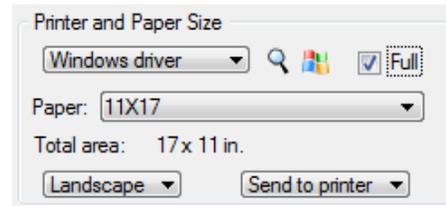


Rasterized option was added in MicroStation XM and is available in V8i. This option should only be used for rendering or transparencies because it generates larger plot files and is a considerably slower process. When this option is selected MicroStation will convert both raster and vector data into a single raster image and send it to the printer.

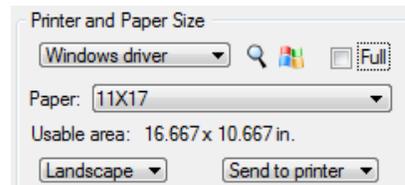
Note The Rasterized toggle option is not for printing files with images attached.

PRINTER AND PAPER SIZE

The **Printer and Paper Size** section is for selecting whether to use a Windows printer or a Bentley driver. Clicking on the magnifying glass allows the designer to browse and load a plot driver. Clicking the Windows icon lets the designer configure the windows printer. The designer can also select the paper size and whether or not to plot as Landscape or Portrait. The Full Sheet toggle, when on will maximize the print size to the selected paper size as seen in the figure below.

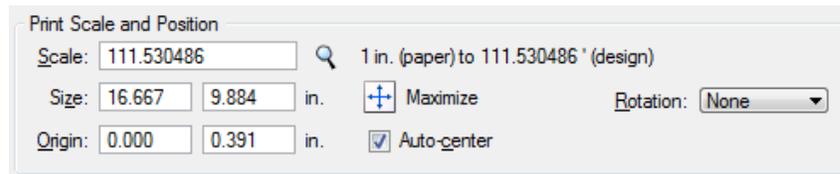


The figure below shows the same plot area with Full Sheet cleared.



PRINT SCALE AND POSITION

Print Scale and Size is where to fill in an exact plot scale. Typically, how this works is the designer places a fence around the plot border of the design file; this will calculate a scale and display it in this portion of the dialog as seen below. Next, round this odd number up to the actual scale. In the example shown below the actual print scale is 100.00.



Note This is one of the settings that can be saved into the definition file so when loaded for each plot the scale will always be set to the correct scale.

The designer has the ability to adjust the X Origin and Y Origin print position. These values change the position on the print on the paper.

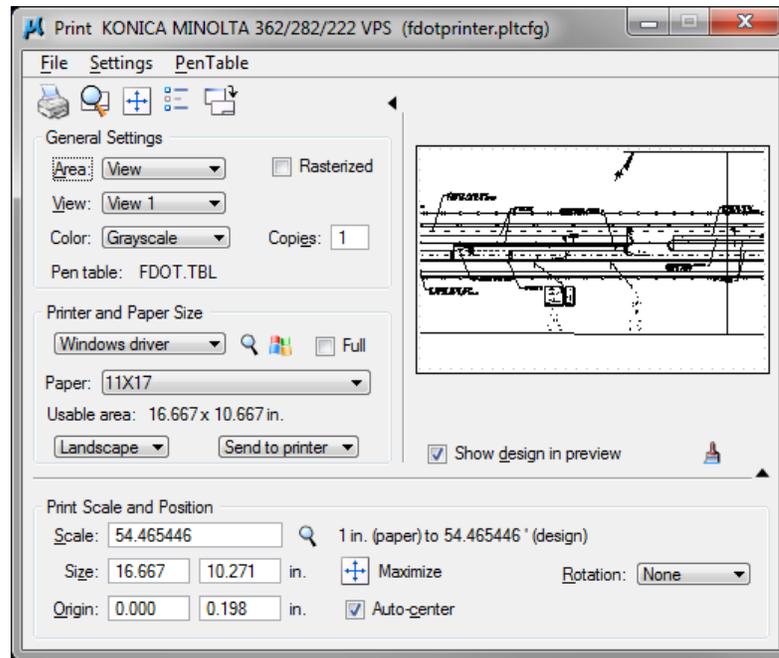
The right hand side of the Print dialog shows the preview.

Exercise 8.1 Plotting with the Print Dialog

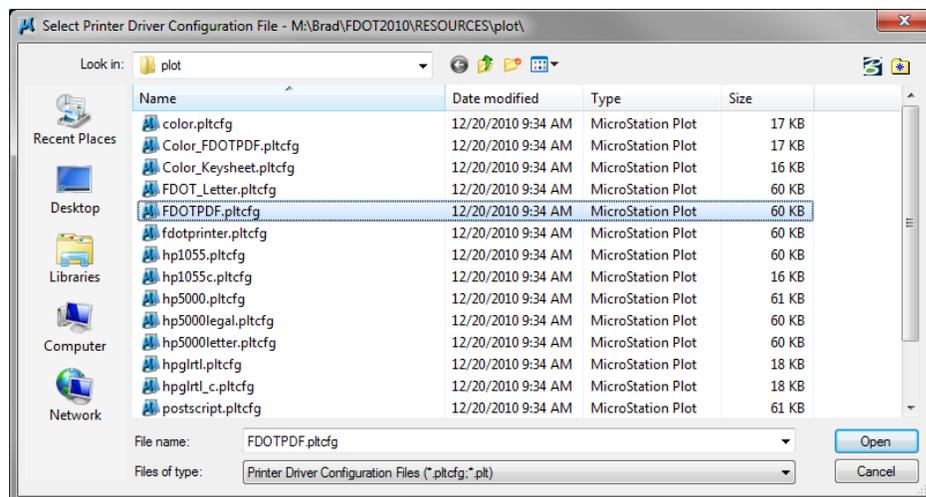
➤ Plotting with the Print Dialog (Part 1)

✓ Plot to a PDF File

1. Open **Plansp01.dgn** in the *Signing* folder.
2. Place a fence on the sheets **plot border**. This is the red shape around the outside of the border.
3. Click on the **Print** icon on the MicroStation Standard tool palette or select **File > Print**. This opens the Print dialog and sets a default plot driver.

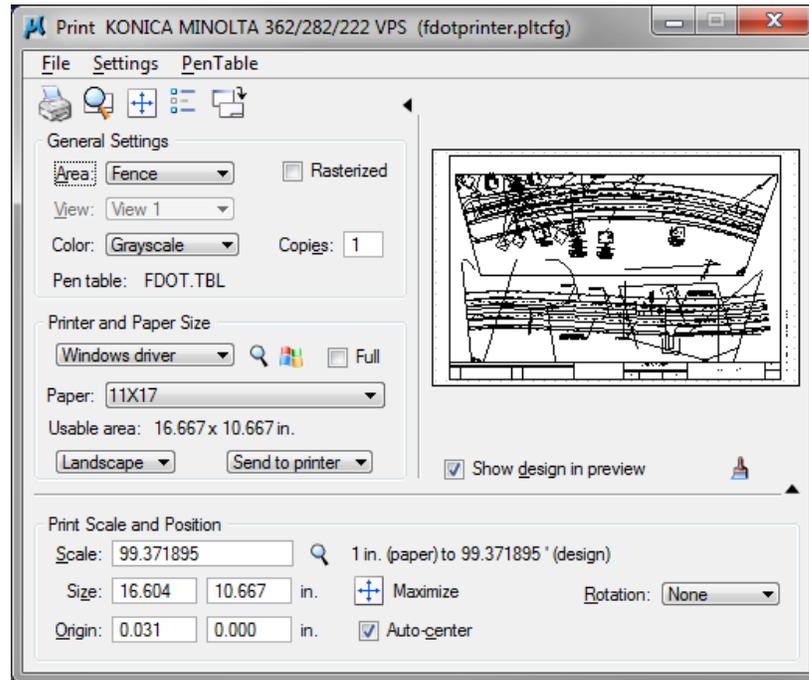


4. In the Print dialog, select **File > Select Bentley Driver**. This opens Select Printer Driver Configuration Files dialog.

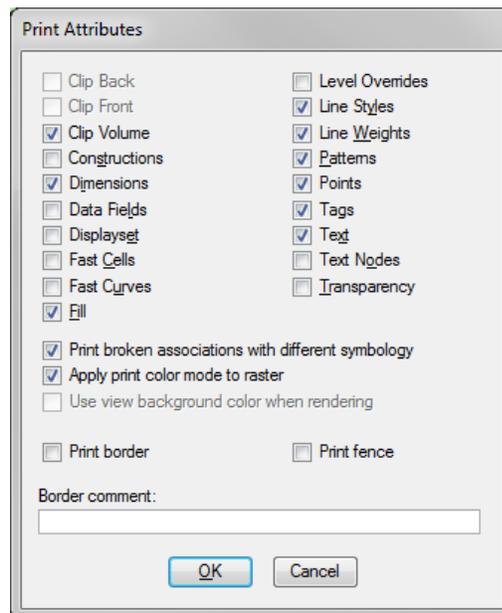


5. Browse to **FDOT2010\RESOURCES\plot** and select **fdotpdf.pltcfg**.
6. Click **Open**. This loads the *fdotpdf* plot driver and changes the settings in the Print dialog.

- This plot driver automatically loads the fdot.tbl pen table. Review the dialog in the *General Settings area*.



- Set the *Paper Size* to **11 x 17**. This is the default setting in the plot driver.
- Set the *Print Scale* to **100.00**.
- Click the **Print Attributes** icon  or select **Settings > Print Attributes**. This opens Print Attributes.

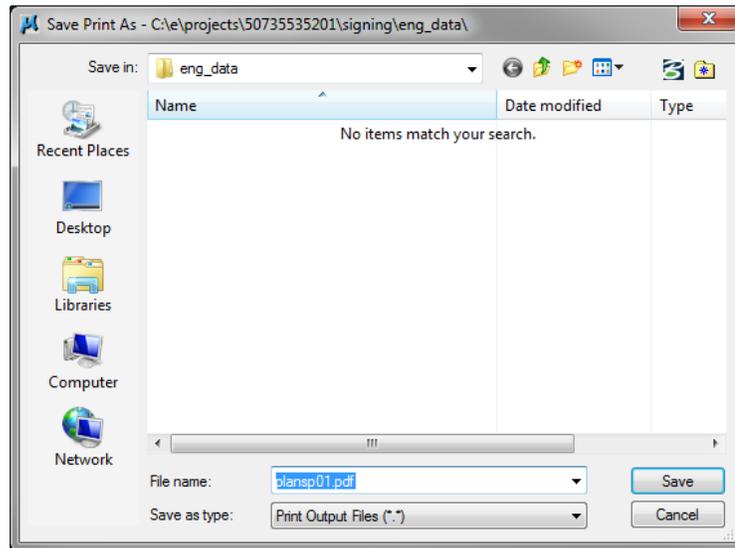


- Toggle off **Constructions**. This turns off the red plot border.

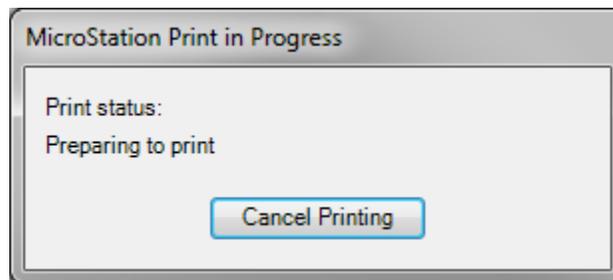
Note It is also recommended to toggle off the Print Border and Fence Boundary options.

- Click **OK**.

13. Click the **Print** icon . This opens **Save Print As**. The default location for the plot files is the *eng_data* folder under the discipline folder as shown below.



14. Click **Save**. This accepts the default file name and location and creates the **pdf** file. Wait for the printing process to complete. This will be indicated by the following dialog disappearing.



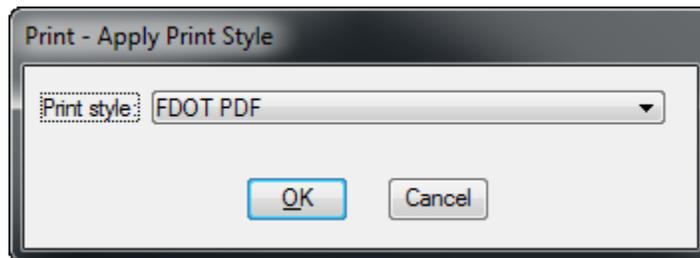
15. From **FDOT Menu**, select **Standard > Explore Current Working Directory**.
16. Browse to the **eng_data** folder.
17. Double click on **Plansp01.pdf**. This will open the plot file for review.
18. Close the **pdf** file.

➤ **Plotting with the Print Dialog (Part 2)**

✓ Using a Print Style

Using Print Styles can drastically reduce the number of steps needed to complete this process because all of the setting defined in these can be predefined in the Print Style. For example, with a properly defined Print Style you would simply have to:

1. Open **Plansp01.dgn** in the *Signing* folder.
2. Click on the **Print** icon on the MicroStation Standard tool palette or select **File > Print**. This opens the Print dialog and sets a default plot driver.
3. Select Settings > Apply Print Style from the menu
4. Choose the appropriate Print Style from the list and click OK



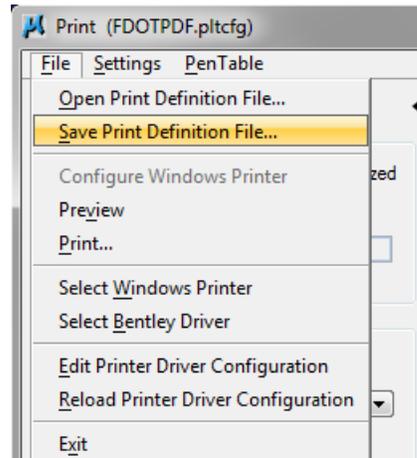
5. Click the **Print** icon . You could **then** view the PDF file as before.

➤ **Plotting with the Print Dialog (Part 3)**

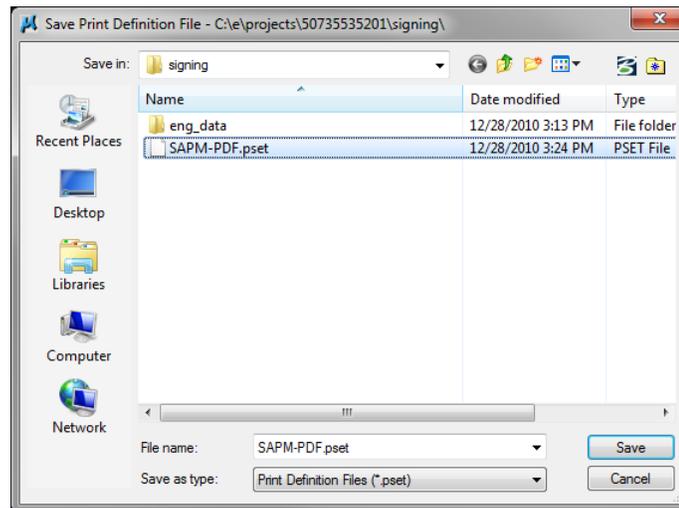
✓ Save the print settings

Now that you have all of the print settings set the way you want them, it is a good idea to save these settings for future use and also for other users to use so that you get consistent output.

1. In the Print dialog, select **File > Save Print Definition File**. This opens Save Print Definition File dialog.



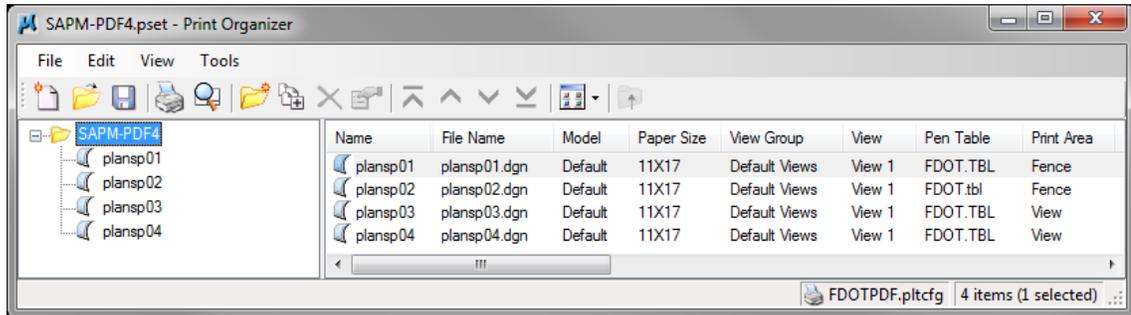
2. In Save Print Definition File, type in **SAPM-PDF**. The file name will default to the MicroStation file name.



3. Click **Save**. This saves the settings to an ***.pset** file that can be used in subsequent plot jobs.
4. In the Print dialog, select a different plot driver from **File > Select Bentley Driver**. Select **fdotprinter.pltcfg** for this example. Notice how all of the plot settings have changed.
5. In the Print dialog open the **Definition** file you saved, **File > Open Definition File**.
6. In the *Signing* folder, select **SAPM-PDF.pset**.
7. Click **Open**. This **will** set all of the plot preferences the way you saved them for the pdf plot.
8. Close the Print dialog.

PLOTTING IN MICROSTATION FROM THE PRINT ORGANIZER

PRINT ORGANIZER INTERFACE



Before executing a print job from Print Organizer, open a file not included in the print job. Monitor the Message Center. If any problems occur with the print job there will be a notification in the Message Center which might assist the designer in correcting the problem.

With Print Organizer, the designer can import old JOB (*.job) files. However, when the old JOB file is opened with Print Organizer, a conversion will take place. The old Batch Specification file must be available. A warning dialog will appear indicating the plot border level (PlotBorder_dp) is not in the reference files. After the conversion, the designer can organize the Print Set as desired and save the configuration as a *Print Set* file (*.pset).

A *Print Set* file (*.pset) is easily created and saved with the following steps:

1. Open a design file (preferably one (1) not included in the print job).
2. Select **File > Print Organizer** from the MicroStation menu.
3. In Print Organizer, select **File > Save As**.
4. Define the name and location to store the **.pset** file before clicking the **Save** button.

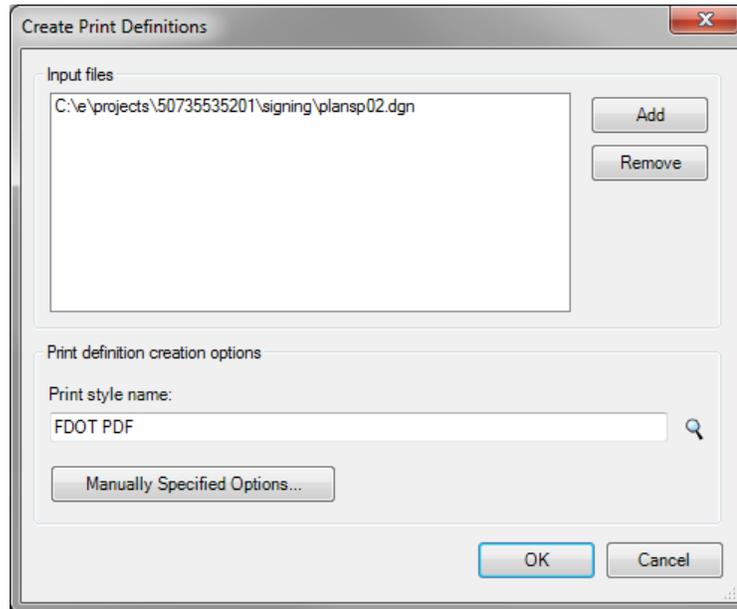
Once the *Print Set* file has been created, the designer can begin to organize the *Print Set* by adding folder and/or Files. To add folders to the *Print Set*, use one (1) of the following methods:

- Select **File > Add Folder to Set** from menu
- Click on **Add Folder to Set** icon
- Right-click parent folder and select **Add Folder to Set**

To add files to the *Print Set*, use one (1) of the following methods:

- Select **File > Add Files to Set** from menu
- Click on **Add Files to Set** icon
- Right-click parent folder and select **Add Folder to Set**
- Drag and Drop from Windows Explorer

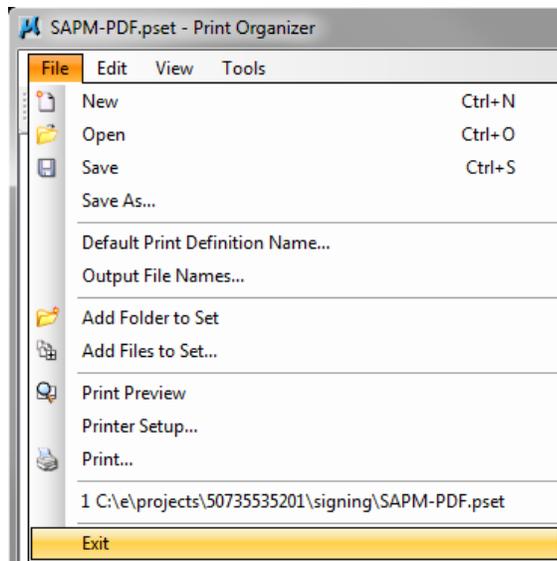
When adding folders and/or files to the *Print Set*, the designer is given the opportunity to apply a Print Style or to manually define options (Manually Specified Options).



The Print Organizer interface can be arranged to easily view the information the designer is most interested in. From the Print Organizer Menu Bar, navigate to **View > Show/Hide Columns** or Right-click on the column header in the Print Definition pane to turn on or off the column headers. The designer can also drag columns to position the columns in the order that best suits them.

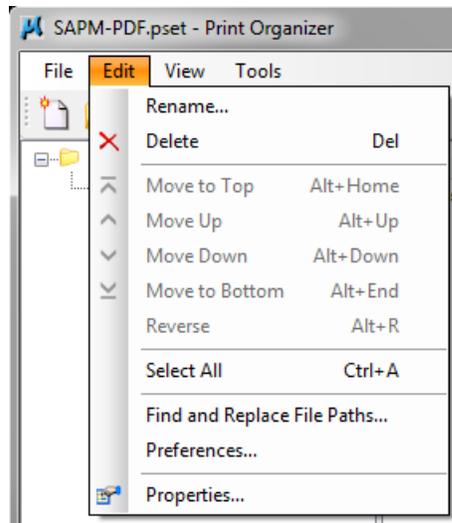
FILE MENU

The *File* menu contains options for *Creating New Print Set Files*, *Editing Existing Print Set Files*, *Setting the Default Print Definition Name (Named Expression)*, *Setting the Output File Names (Named Expression)*, *Adding Folders to the Print Set*, *Adding Files to the Print Set*, *Previewing the Plot*, *Selecting and Editing a Plot Driver/Configuration*, and *Reloading the Driver after Editing*.



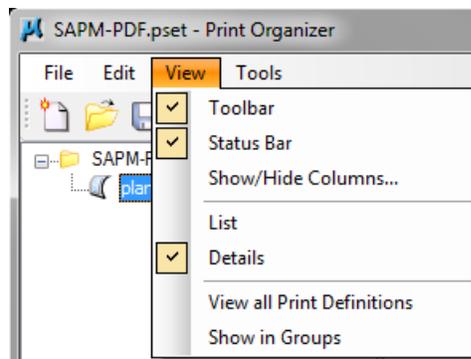
SETTINGS MENU

The *Edit* menu contains options for *Renaming Print Definitions*, *Deleting Print Definitions*, *organization of the Print Definitions*, *selecting Print Definitions*, *managing the paths of selected or all Print Definitions*, *Setting Preferences* and *Properties of the selected Print Definition(s)*.



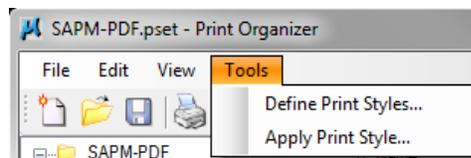
VIEW MENU

The *View* menu contains options for *Toggling on/off the Toolbar*, *Toggling on/off the Status Bar*, *Show/Hide Columns in the Print Definition pane*, *whether to view Details or List in the Print Definition pane* and *View all Print Definitions* or *Show Print Definitions in Groups*.



TOOLS MENU

The *Tools* menu contains options for loading the *Define Print Styles* tool or loading the *Apply Print Styles* tool.



PRINT ORGANIZER ICONS



- New Print Set file.



- Opens an Existing Print Set file



- Saves a Print Set file



- Prints to the selected Printer or File



- Opens the print preview window



- Add Folders to Print Set



- Add Files to Print Set



- Deletes Print Definition(s)



- Opens the Print Definitions Properties dialog



- Moves selected Print Definition to the Top of the list in the Print Definition pane



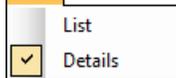
- Moves selected Print Definition up one position in the Print Definition pane



- Moves selected Print Definition down one position in the Print Definition pane



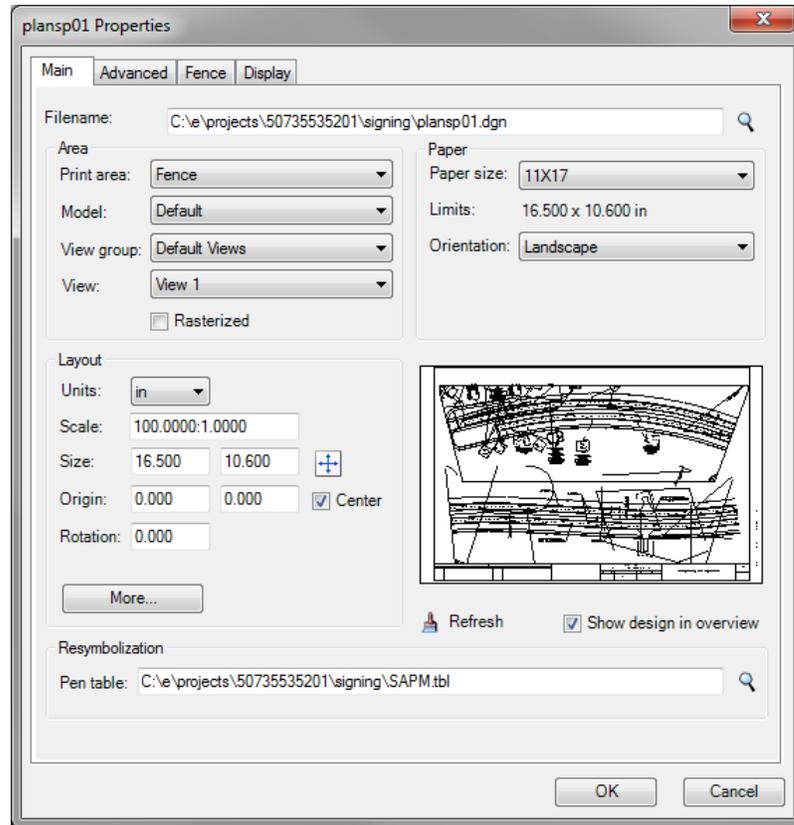
- Moves selected Print Definition to the Bottom of the list in the Print Definition pane



- Toggles between Details and list view for the Print Definition

PRINT DEFINITION PROPERTIES - MAIN TAB

When a Print Definition is selected, navigate to **Edit > Properties** from the **Print Organizer Menu bar** or click the **Properties icon** on the **Print Organizers Toolbar** to access the **Print Definition Properties**. The **Main Tab** is much like setting up the **General Settings (Area and Resymbolization) Printer and Paper Size (Paper)** and **Print Scale and Size (Layout)** sections on the **Print Dialog**.



- **Area** – section is where to select the plot area and which view to plot from.

Note Rasterized option was added in **MicroStation XM** and is available in **V8i**. This option should only be used for rendering or transparencies because it generates larger plot files and is a considerably slower process. When this option is selected **MicroStation** will convert both raster and vector data into a single raster image and send it to the printer. The Rasterized toggle option is not for printing files. PDF files created with the Rasterized option turned on will not have searchable text.

- **Paper** – section is for selecting the paper size and whether or not to plot as Landscape or Portrait.
- **Layout** – section is where to fill in an exact plot scale, size and adjust the X Origin and Y Origin print position. How this worked is the designer placed a fence around the plot border which would calculate a scale and display it in this portion of the dialog. This odd number would have to be rounded up to the actual scale. This is now done by applying a Print Style to the Print Definition.

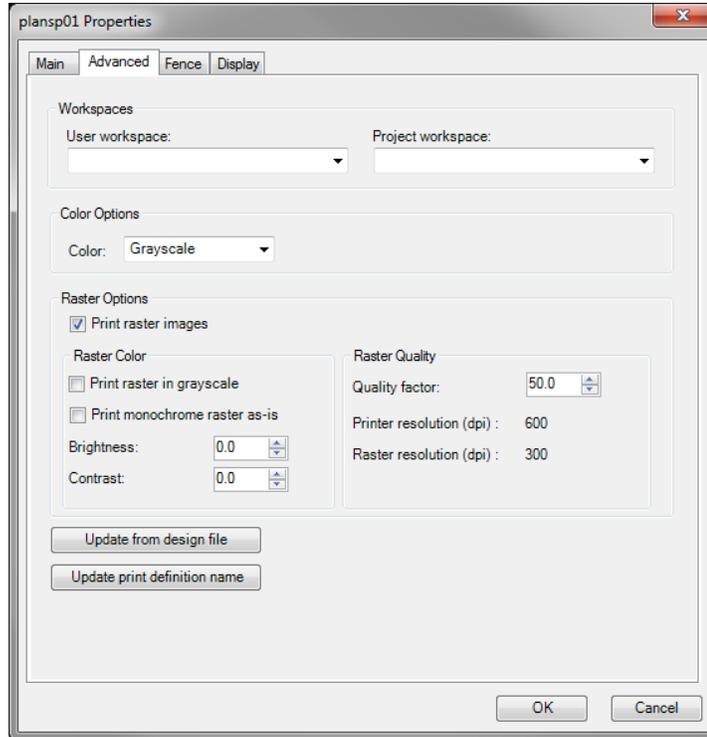
Note The designer has the ability to adjust the X Origin and Y Origin print position. These values change the position on the print on the paper.

The right hand side of the **Print dialog** shows the preview.

- **Resymbolization** – shows the path and which pen table is loaded. The Pen Table is applied by the Print Style.

PRINT DEFINITION PROPERTIES - ADVANCED TAB

When a Print Definition is selected, navigate to *Edit > Properties* from the **Print Organizer** menu or click the *Properties* icon on the **Print Organizers** toolbar to access the *Print Definition Properties*. The *Advanced* tab is used to specify workspace, color options and raster options (color/quality), update from design file and update print definition name for the selected print definition.



- **Workspaces** – section is where to specify a User Workspace and/or a Project Workspace.
 - *User Workspace* – determines which resource files to use based on that workspace configuration in the user configuration file (.ucf). Such resources may include fonts and linestyles.
 - *Project Workspace* – essentially the project name. This could also determine which resources to use if resources such as fonts and linestyles are configured in the project configuration file (.pcf).

Note Leaving these the workspace options blank allows Print Organizer to use the defaults set up by the workspace configuration.

- **Color Options** – section is for selecting Monochrome, Grayscale, or True Color from and list. The available options depend on the selected printer.

Note When the Plot to 3D check box is selected, the color is set to True Color and cannot be changed.

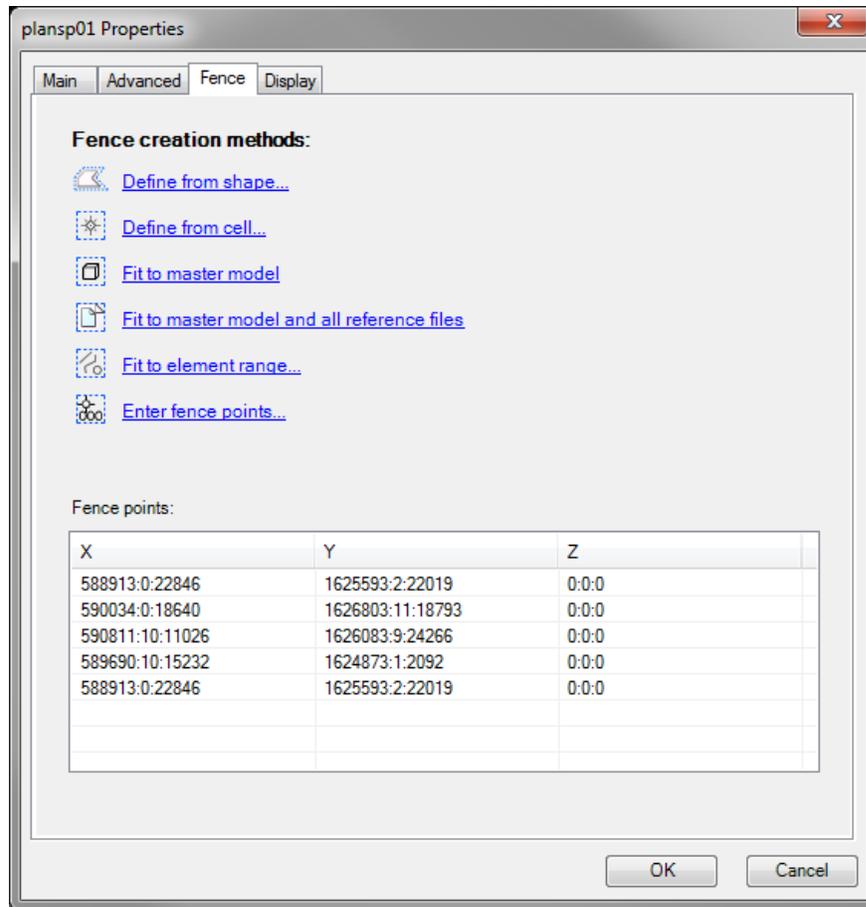
- **Raster Options** – section is where to enable or disable printing all raster types such as Raster Manager Attachments and imported DGN rasters. If the check box is toggled off the Raster Color and Raster Quality are disabled (ghosted).

Note For more information on the Raster Option settings, please see the **MicroStation** help file.

- **Update from design file** – Updates the print definition with current data from the design file and its reference files.
- **Update from design file** – Updates the print definition name using the expression name specified on the Default Print Definition Name Expression dialog.

PRINT DEFINITION PROPERTIES - FENCE TAB

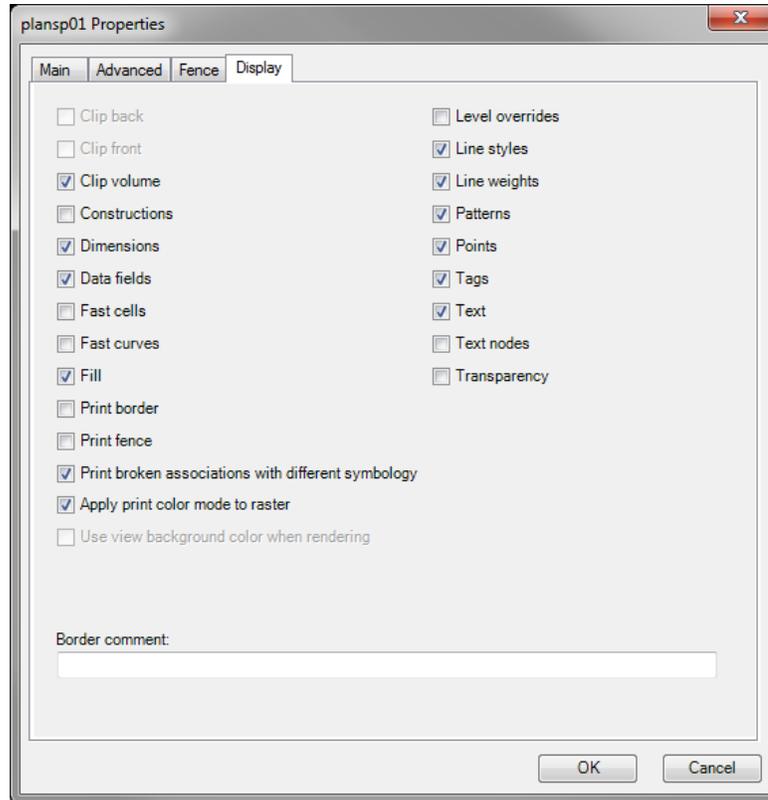
When a Print Definition is selected, navigate to *Edit > Properties* from the **Print Organizer** menu or click the *Properties* icon on the **Print Organizers** toolbar to access the *Print Definition Properties*. The *Fence* tab is used to specify fence creation methods for the selected print definition.



- **Define from Shape** – section is used to specify the plot area by describing shapes whose actual coordinates define the print area.
- **Define from cell** – section is used to specify the plot area by describing a cell whose actual coordinates define the print area.
- **Fit to master model** – section is automatically calculated to include every element in the master model. The fence points are displayed in the Fence points list box.
- **Fit to master model and all reference files** – is automatically calculated to include every element in the master model and all references. The fence points are displayed in the Fence points list box.
- **Fit to element range** – is used to specify the plot area by describing a fence whose coordinates are based on the range of specified elements. The fence points are displayed in the Fence points list box.
- **Enter fence points** – is used to specify the fence points that define a print area.

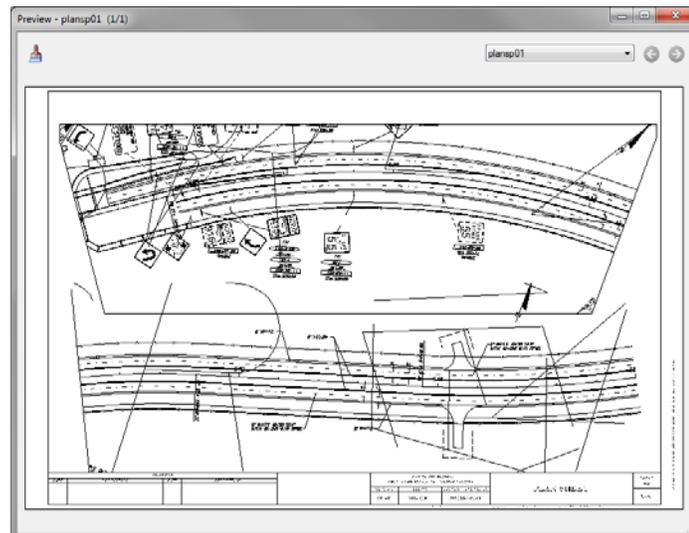
PRINT DEFINITION PROPERTIES - DISPLAY TAB

When a Print Definition is selected, navigate to *Edit > Properties* from the **Print Organizer** menu or click the *Properties* icon on the **Print Organizers** toolbar to access the *Print Definition Properties*. The *Display* tab is used to specify various display attributes for the selected print definition.



PRINT PREVIEW

A *Print Preview* can be generated of a file, selection of files, or entire folder of files by either selecting *File > Print preview* from the **Print Organizer** menu, clicking the *Print Preview* icon or right-clicking the file name and select *Print Preview*.



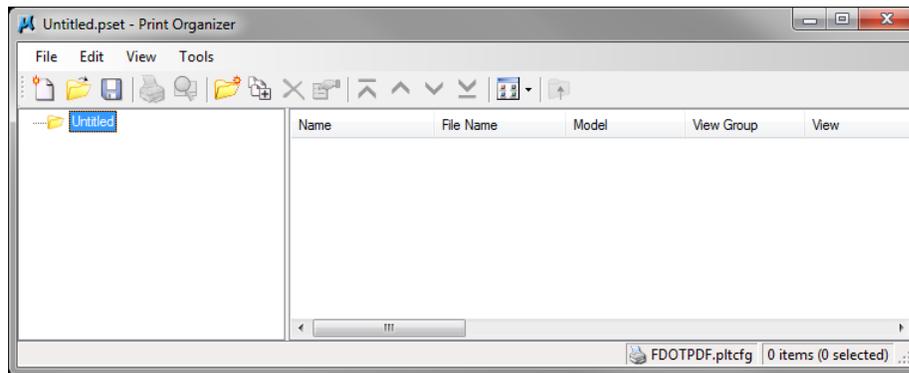
Exercise 8.2 Plotting with Print Organizer

➤ Open and Modify an Existing Print Set (Part 1)

In the previous exercise the class saved a Print Set (*.pset) file based on the setup of the Print Dialog. As previously mentioned in this chapter, Print Set files and Print Styles can be utilized by the Print Dialog and Print Organizer. In this exercise the student will open and make specific changes to the SAPM-PDF.pset file and save those changes to the existing Print Set file.

✓ Open an Existing Print Set

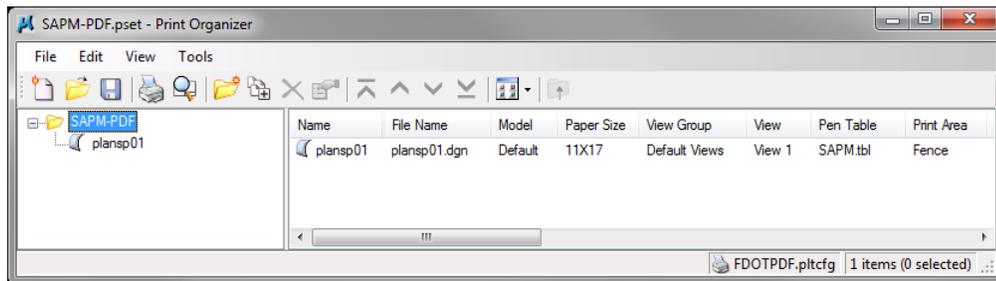
1. Open the **Dsgnsp01.dgn** file.
2. From the MicroStation **Menu Bar**, select **File > Print Organizer**. This opens the **Print Organizer** dialog.



3. In the **Print Organizer** dialog, select **File > Open**. This opens the **Open Print Set file** dialog.

Note The Open Print Set file dialog should open to the c:\e\projects\50735535201\signing folder.

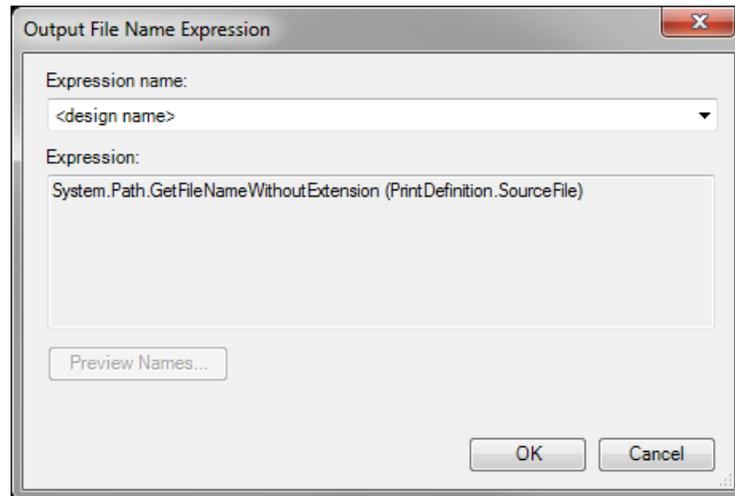
4. Select the **SAPM-PDF.pset** file created in the previous exercise. The **Print Set** file information will now populate the **Print Organizer** dialog.



✓ *Modify an Existing Print Set – Output File name Expression*

First, the class will modify the Output File Name Expression. In the previous exercise the output file was named **Plansp01.pdf**. Currently the output file name would be **001-SAPM-PDF.pdf**. The following steps will make **Print Organizer** match the previous exercises output file name.

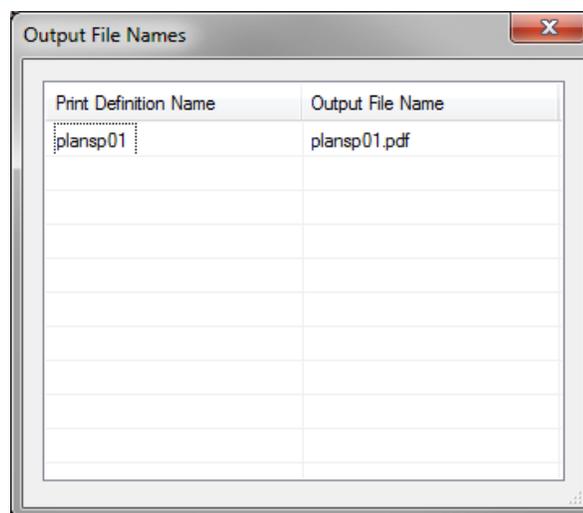
1. From the **Print Organizer** menu, select **File > Output File Names**. This will open the Output File Name Expression dialog.



2. Click the **Preview Names** button. This will open the Output File Name dialog. Notice the output file name for the default (**001-SAPM-PDF.pdf**).
3. With the Output File Name dialog still open click the down arrow for the **Expression name** list to view all the available output file name expressions.

Note For custom Output File Name Expressions select Custom from the list.

4. The default is set to **<print counter>-<print set name>**. From the list select **<design name>**.
5. Notice the *Output File Name* has changed to the correct output **plansp01.dgn**.



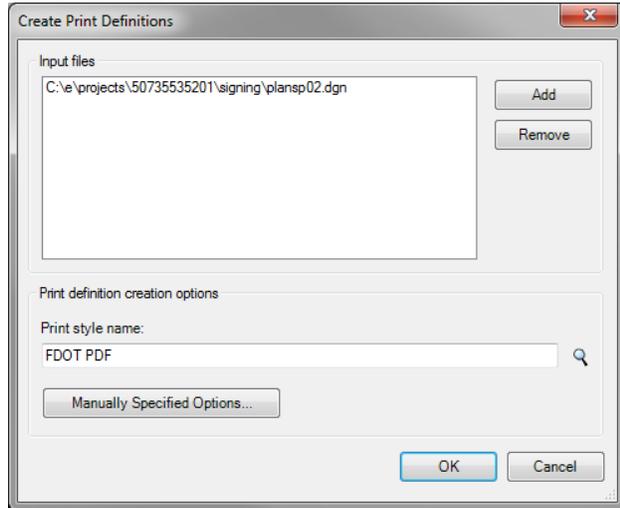
6. Close the Output File Name dialog by clicking the **red X** in the upper right hand corner of the dialog.
7. Click the **OK** button on the Output File Name Expression dialog to set the selected output file name expression to the **Print Set**.

Note All files added to this Print Set will now have the same output file name until changed by the designer.

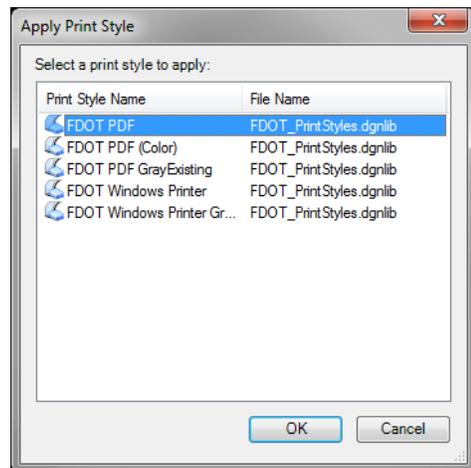
✓ *Modify an Existing Print Set – Add Files to Set*

Now, the class will add the Plansp02.dgn file to the Print Set.

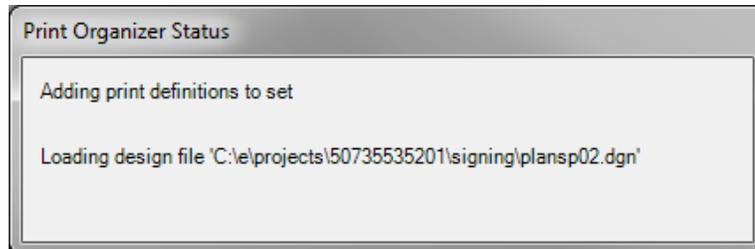
1. From the FDOT Menu, select **Standard > Explore Current Working Directory**. This will open Windows Explorer to the **Signing** folder of the current project **50735535201**.
2. Select **Plansp02.dgn** in the Windows Explorer window.
3. Drag and drop **Plansp02.dgn** on the **SAPM-PDF Print Set** category in Print Organizer. This opens the Create Print Definitions dialog.



4. Click the **magnifying glass** icon next to the *Print Style Name* field to select a **Print Style**.
5. Select the **FDOT PDF Print Style** from the list of *Print Styles*.



6. Click the **OK** button on the Create Print Definitions dialog. A Print Organizer Status dialog will appear as Print Organizer runs through its process.

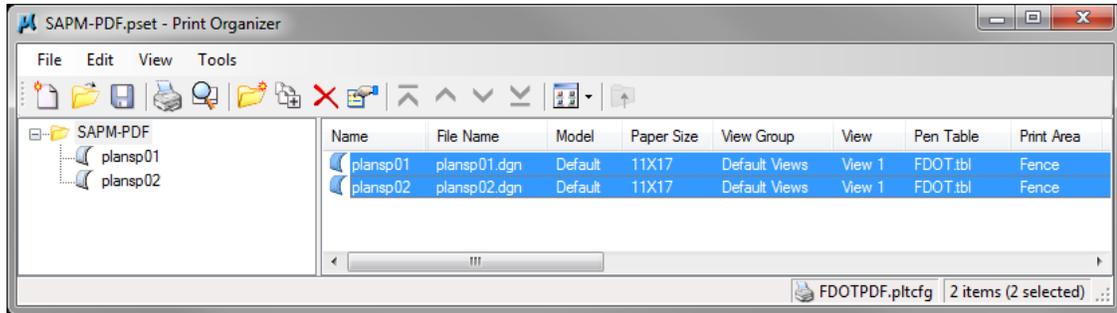


Note By setting the Print Style from the FDOT deliver FDOT_PrintStyles.dgnlib (FDOT PDF), the Pen table for the entire Print Set may revert to the standard pen table for that Print Style.

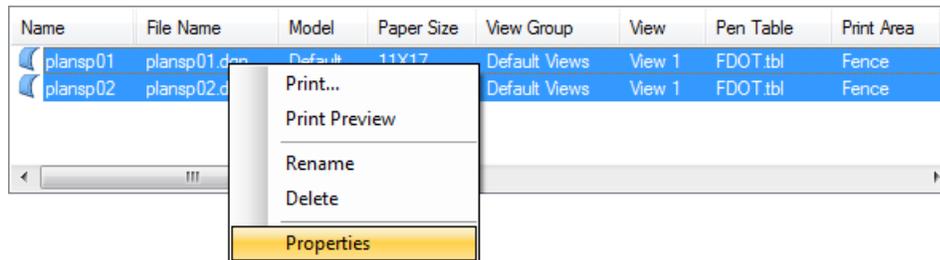
✓ *Modify an Existing Print Set – Setting Pen Table for Multiple Print Definitions*

The class will apply the previously created Pen Table (from Exercise 27) to all the Print Definitions listed for the existing Print Set.

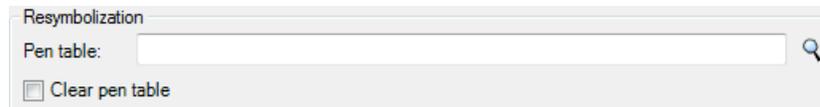
1. In the *Print Definitions* pane, highlight the first **Print Definition**, hold the shift key on the keyboard down and click the last **Print Definition**. This will highlight all **Print Definitions** listed.



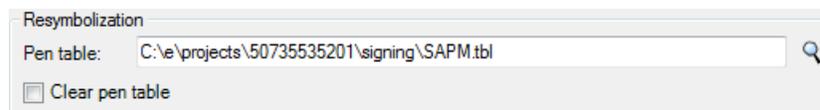
2. Right-click on the highlighted list of **Print Definitions**.



3. Select **Properties** from the contextual menu. This opens the Modify Properties dialog.



4. On the *Main* tab, in the *Resymbolization* section of the dialog, click the **magnifying glass** icon next to the *Pen table* field. This opens a Windows Explorer window to navigate to the location where the **SAPM.tbl** file is stored.
5. Navigate to the c:\e\projects\50735535201\signing folder.
6. Select the **SAPM.tbl** pen table.
7. Click the **Open** button.

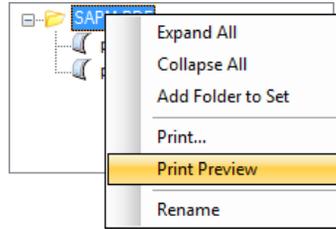


8. Click the **OK** button on the Modify Properties dialog to accept the select pen table for the select **Print Definitions**.
9. From the Print Organizer menu, select **File > Save** to save the changes made to the **SAPM-PDF.pset Print Set** file.

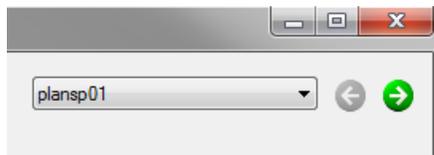
✓ Modify an Existing Print Set – Preview Sheets in The Print Set

The class will now preview the sheets in the Print Set.

1. In the *Print Set* category pane, right-click on the **SAPM-PDF** category (folder).



2. Select **Print Preview** from the contextual menu. This will open the Preview dialog.
3. Use the **Preview Navigation** buttons or drop down list to review the Plan Sheets in the Print Set.



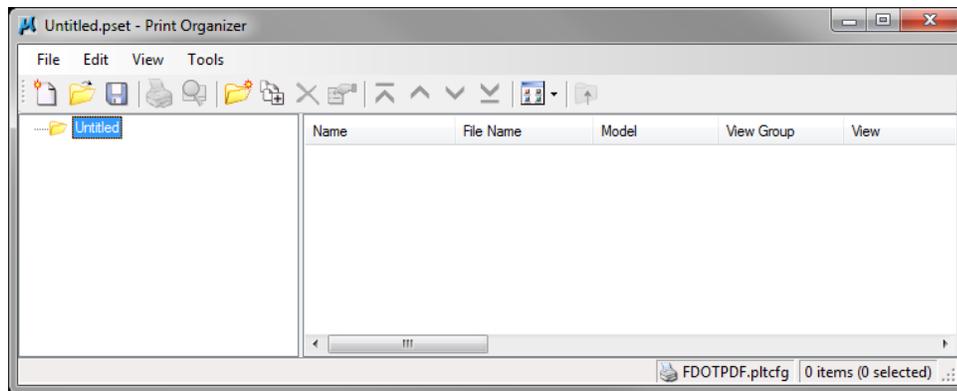
4. Close the Preview dialog by clicking the **red X** in the upper right hand corner of the dialog.

➤ **Plotting with Print Organizer (Part 2)**

In the previous exercise the class modified an existing Print Set (*.pset) file which was based on the setup of the Print Dialog. In this exercise the student will create a new Print Set file and plot multiple sheets to PDF format through Print Organizer.

✓ Creating A New Print Set

1. Continuing in the *Dsgnsp01.dgn* file.
2. Open **Print Organizer** from the MicroStation menu, select **File > Print Organizer**.

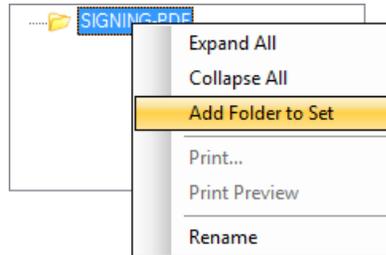


3. From Print Organizer, select **File > New** or click the **New** icon  from the Print Organizer toolbar.
4. Select **File > Save** or click the **Save** icon  from the Print Organizer toolbar. This opens the Save Print Set file dialog.
5. In the *File Name* field type **SIGNING-PDF.pset** (.pset will be filled in by the program).
6. Click the **Save** button to save the **SIGNING-PDF.pset** file to the *Signing* folder.

✓ Creating A New Print Set – Add Folders to Set

Now, the class will add Folders to the Print Set. This will produce a multi-sub category Print Set to allow the designer to control different Print Definitions for the multiple subcategories. Typically, this will be done for a project Print Set adding folders by discipline and sub category (folders) under the discipline categories for different intersections or side streets.

1. From the Print Organizer, right-click on the **SIGNING-PDF** category.



2. Select **Add Folders to Set** from the contextual menu. This will pop in a new folder under the *SIGNING-PDF Print Set* category.
3. Rename the folder **Keysheet**.
4. Repeat steps 7-9 for the following folders.
 - **Plan Sheets**
 - **Summary of Quantities**
 - **General Notes**
 - **Tabulation of Quantities**
 - **GuidSIGN Sheet**

Note If the folders are out of order (personal preference) use the arrow icons to move the folders into the desired position.

5. From the Print Organizer toolbar, click the **Save** icon .

✓ Creating A New Print Set – Add Files to Set: Drag & Drop

Now, the class will add Files to the Print Set.

1. From the FDOT Menu, select **Standard > Explore Current Working Directory**. This will open Windows Explorer to the *Signing* folder of the current project **50735535201**.
2. Select the **Keyssp01.dgn** in the Windows Explorer window.
3. Drag and drop **Keyssp01.dgn** on the *SIGNING-PDF Print Set* category in Print Organizer. This opens the Create Print Definitions dialog.
4. Click the **magnifying glass** icon next to the *Print Style Name* field to select a **Print Style**.
5. Select the **FDOT PDF Print Style** from the list of *Print Styles*.
6. Click the **OK** button on the Create Print Definitions dialog. A Print Organizer Status dialog will appear as Print Organizer runs through its process.

Note The Print Organizer Status dialog will be followed by a series of Print Organizer 'warning' dialogs indicating the plot border level (PlotBorder_dp) is not a valid level for the Plansp02.dgn files reference files.

7. Click the **OK** button on all Print Organizer 'warning' dialogs.

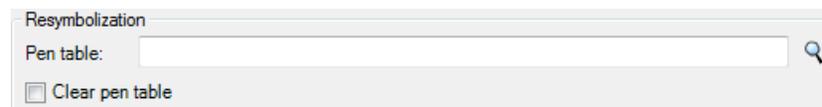
✓ Creating A New Print Set – Add Files to Set: Menu Selection

1. In the Print Organizer, highlight the **Summary of Quantities** folder in the *Print Set* category pane.
2. From the Print Organizer toolbar, select the **Add Files to Set** icon  or navigate to **File > Add Files to Set** from the Print Organizer menu. This opens the Create Print Definitions dialog.
3. Click the **Add** button to open the Select Files dialog.
4. Navigate to the *signing* folder and select the **Cesssp01.dgn** file.
5. Click the **Done** button.
6. Click the **magnifying glass** icon next to the *Print style name* field to select a **Print Style**.
7. Select the **FDOT PDF Print Style** from the list of *Print Styles*.
8. Click the **OK** button on the Create Print Definitions dialog. A Print Organizer Status dialog will appear as Print Organizer runs through its process.
9. Repeat steps 12-18 for the remaining folders placing the appropriate sheet file in the associated folder.

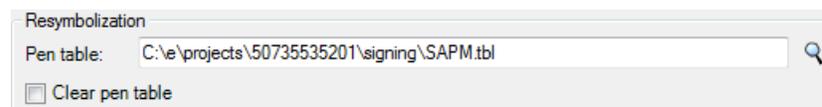
✓ Modify an Existing Print Set – Setting Pen Table for Multiple Print Definitions

The class will apply the previously created Pen Table (from Exercise 27) to all the Print Definitions listed for the existing Print Set.

1. In the *Print Definitions* pane, highlight the first **Keyssp01.dgn Print Definition**, hold the **Shift** key on the keyboard down and click the **Tabqsp01.dgn Print Definition**.
2. In the *Print Definitions* pane, hold the **Ctrl** key on the keyboard down and click the **GSWKSP01.dgn Print Definition**. This will leave the Plansp*.dgn files not selected.
3. Right-click on the highlighted list of **Print Definitions**.
4. Select **Properties** from the contextual menu. This opens the Modify Properties dialog.



5. On the *Main* tab, in the *Resymbolization* section of the dialog, click the **magnifying glass** icon next to the *Pen table* field. This opens a Windows Explorer window to navigate to the location where the **SAPM.tbl** file is stored.
6. Navigate to the **c:\e\projects\50735535201\signing** folder.
7. Select the **SAPM.tbl** pen table.
8. Click the **Open** button.

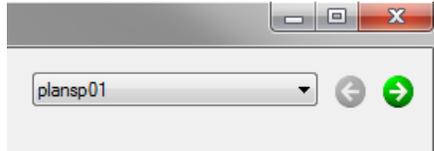


9. Click the **OK** button on the Modify Properties dialog to accept the select pen table for the select **Print Definitions**.
10. From the Print Organizer menu, select **File > Save** to save the changes made to the **SAPM-PDF.pset Print Set** file.

✓ Modify an Existing Print Set – Preview Sheets in The Print Set

The class will now preview the sheets in the Print Set.

1. In the *Print Set* category pane, right-click on the **SIGNING-PDF** category (folder).
2. Select **Print Preview** from the contextual menu. This will open the **Preview** dialog.
3. Use the **Preview Navigation** buttons or drop down list to review the Plan Sheets in the Print Set.

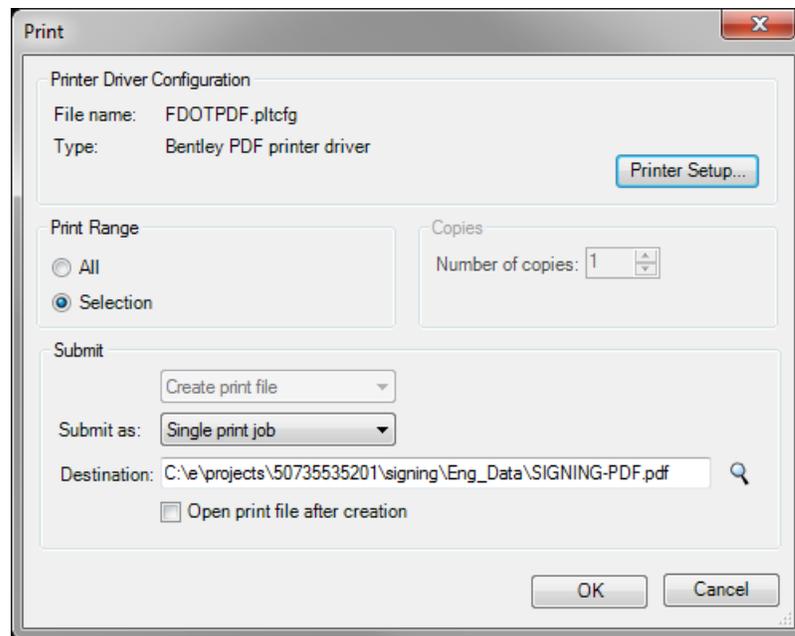


4. Close the **Preview** dialog by clicking the **red X** in the upper right hand corner of the dialog.

✓ Modify an Existing Print Set – Preview Sheets in The Print Set

The class will now plot all sheets in the Print Set to PDF through Print Organizer.

1. In the *Print Set* category pane, right-click on the **SIGNING-PDF** category (folder).
2. Select **Print** from the contextual menu or click the **Print** icon  for the **Print Organizer** toolbar. This will open the **Print** dialog.



3. Click the **OK** button at the bottom of the **Print** dialog.
4. From the **FDOT** Menu, select **Standard > Explore Current Working Directory**. This will open Windows Explorer to the *Signing* folder of the current project **50735535201**.
5. Double click the **eng_data** folder.
6. Open and review the **SIGNING-PDF.pdf** file.