

State of Florida
Department of Transportation



FDOT Traffic Plans

Signing & Pavement Markings

Signalization

Lighting

Course Guide

May 2018

PRODUCTION SUPPORT CADD OFFICE

TALLAHASSEE, FLORIDA

<http://www.fdot.gov/cadd>

FDOT Traffic Plans - Signing & Pavement Markings

Description

This course will teach designers the fundamental use of GEOPAK, MicroStation, and the Florida Department of Transportation (FDOT) Computer Aided Drafting and Design (CADD) standard resources and applications for Traffic Plans and Signing & Pavement Markings design based on a typical traffic plans design workflow.

This course includes but is not limited to:

- General topics on Traffic Plans and File Creation
- Exploring the FDOT Desktop Folder
- Create Files Application for Creating Project Base Files
- FDOT Traffic Plans Menu
- Levels and Level Filters
- Text Styles
- Annotation Scale
- Models
- Creating a Key Sheet
- Signing & Pavement Markings Tools
- Quantities and Reports
- Creating a Summary of Pay Items
- Sheet Navigator/Sheet Labeling Tools
- Printing Tools

Objectives

After this course, the designer will use GEOPAK, MicroStation and the FDOT CADD standard resources and applications for traffic plans, signing & pavement markings design, work with and understand a typical traffic plans design workflow to produce and present traffic plan design required for Digital Delivery.

Audience

Designers involved in preparation of the FDOT Signing & Pavement Markings Plans at the Beginner, Intermediate and Advanced levels.

Prerequisites

- Some manual drafting or related CADD product experience
- MicroStation Essentials (Bentley Learn)

Duration: 8 Hours

Professional Credit Hours: 6 PDHs

FDOT Traffic Plans - Signalization

Description

This course will teach designers the fundamental use of GEOPAK, MicroStation, and the Florida Department of Transportation (FDOT) Computer Aided Drafting and Design (CADD) standard resources and applications for Traffic Plans and Signalization design based on a typical traffic plans design workflow.

This course includes but is not limited to:

- General topics on Traffic Plans and File Creation
- FDOT Desktop Folder
- Creating Base Project Files
- FDOT Traffic Plans Menu
- Levels and Level Filters
- Text Styles
- Annotation Scale
- Models
- Creating a Key Sheet
- Signalization Tools
- Quantities and Reports
- Creating a Summary of Pay Items
- Sheet Navigator/Sheet Labeling Tools
- Printing Tools

Objectives

At the end of this course, the designer will use GEOPAK, MicroStation and the FDOT CADD standard resources and applications for Traffic Plans and Signalization design and work in and understand a typical Traffic Plans design workflow to produce and present Traffic Plans design required for Digital Delivery.

Audience

Designer involved in preparation of the FDOT Signalization Plans at the Beginner, Intermediate and Advanced levels.

Prerequisites

- Some manual drafting or related CADD product experience
- MicroStation Essentials (Bentley Learn)

Duration: 8 Hours

Professional Credit Hours: 6 PDHs

FDOT Traffic Plans - Lighting

Description

This course will teach designers the fundamental use of GEOPAK, MicroStation, and the Florida Department of Transportation (FDOT) Computer Aided Drafting and Design (CADD) standard resources and applications for Traffic Plans and Lighting design based on a typical Traffic Plans design workflow to produce and present Traffic Plans and Lighting design required for Digital Delivery.

This course includes but is not limited to:

- General Topics on Traffic Plans and File Creation
- Exploring the FDOT Desktop Folder
- Create File/Project Tool for Creating Base Files for a Project
- FDOT Traffic Plans Menu
- Levels and Level Filters
- Text Styles
- Annotation Scale
- Models
- Creating a Key Sheet
- Lighting Tools
- Quantities and Reports
- Creating a Summary of Pay Items
- Sheet Navigator/Sheet Labeling Tools
- Printing Tools

Objectives

At the end of this course, the designer will use GEOPAK, MicroStation and the FDOT CADD standard resources and applications for Traffic Plans and Lighting design and understand a typical Traffic Plans design workflow.

Audience

Designers involved in preparation of the FDOT Lighting Plans at the Beginner, Intermediate and Advanced levels.

Prerequisites

- Some manual drafting or related CADD product experience
- MicroStation Essentials (Bentley Learn)

Duration: 8 Hours

Professional Credit Hours: 6 PDHs

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1 INTRODUCTION

OBJECTIVE

This chapter divides into three sections:

- Computer Aided Drafting and Design (CADD) Standards & File Creation:
 - FDOTSS4 Desktop Folder
 - File Creation
 - Base Project File Creation
- FDOT Traffic Plans Menu Configuration
- MicroStation V8i Features/Concepts:
 - Levels
 - Civil Features
 - Text Styles
 - Annotation Scale
 - Models

GENERAL INFORMATION

This chapter reviews the FDOTSS4 working environment including how to create design files properly that meet Florida Department of Transportation (FDOT) CADD standards and introduces concepts and tools used to make producing plans much more efficient.

EXPLORING THE FDOTSS4 DESKTOP FOLDER

The FDOT CADD software installation installs a folder named FDOTSS4 on the desktop. This folder contains shortcuts to applications used when working on the FDOT projects.

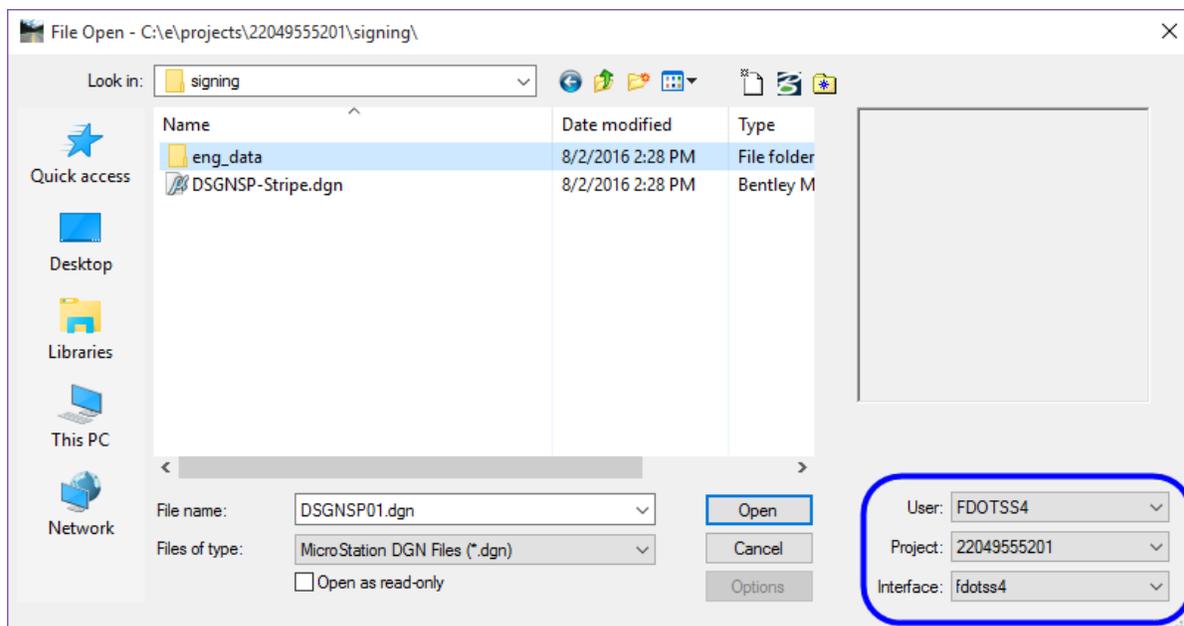
The figure below shows the contents of the FDOTSS4 folder.



Using these shortcuts to start the applications will provide the designer with the environment properly set with the FDOT CADD standards. The FDOT delivers shortcuts for starting PowerGEOPAK, MicroStation or MicroStation with GEOPAK Suite depending on the registry configuration.

Note When systems have MicroStation with GEOPAK Suite installed, there are two icons created to open the MicroStation session. One will open with GEOPAK activated and the other will not. To access some of the tools used with this course the icon to open with GEOPAK will be required.

Using the FDOT shortcut to start the application opens MicroStation Manager and sets the workspace, but does not set the Project. Set the Project 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 the application is opened. This is important to watch as most designers probably work on more than one project at a time. FDOT recommends always to use the .pcf file. If a .pcf file does not exist for the project or the project does not exist, use the Project drop down and select New Project to create the project and/or .pcf file. This does not overwrite any existing files that may already be in the project directory.

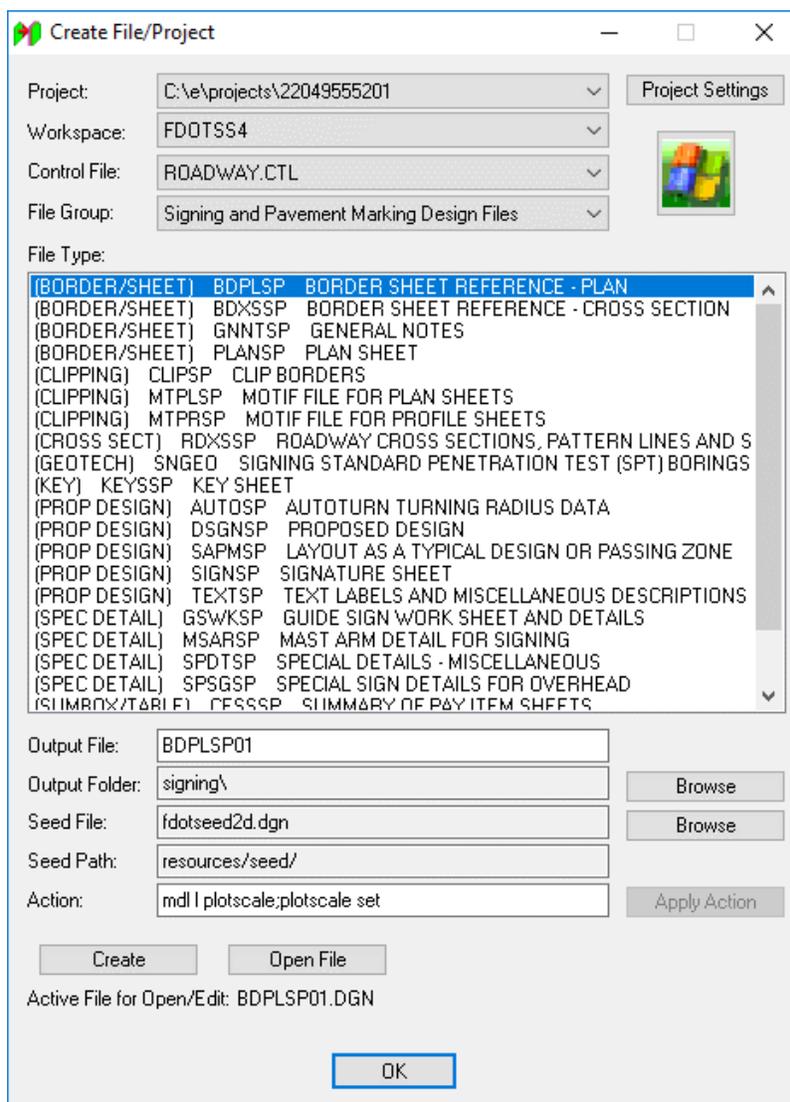


CADD STANDARDS & FILE CREATION

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 Manual* defines the naming convention used to create the different types of design files required in a project.

CREATING THE PROJECT BASE FILES

The FDOT recommends using the Create File/Project application to create design files (.dgn) and other files in accordance with the 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 there are other recommended methods for creating new projects. Create File/Project can be accessed from both inside and outside of the FDOTSS4 workspace.



Note The designer has the option to open the file after creation or create all the design files and open them later. Some files have an associated action such as setting the plot scale or creating models. Using the Open File option at the time of creation initiates these actions to occur. The Create File/Project dialog will remain open in the newly opened file.

Exercise 1.1 Create the Base Files for a Project

- **In this exercise, you will create Signing and Pavement Marking design files.**

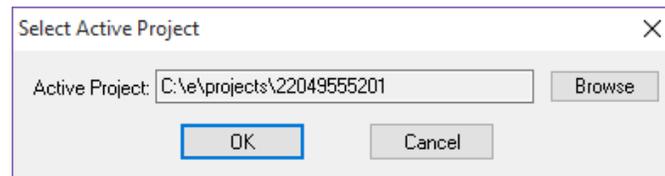
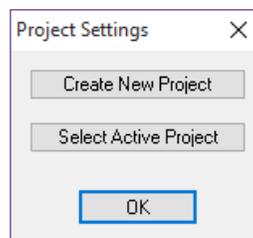
Note This process is the same for any Traffic Plans discipline.



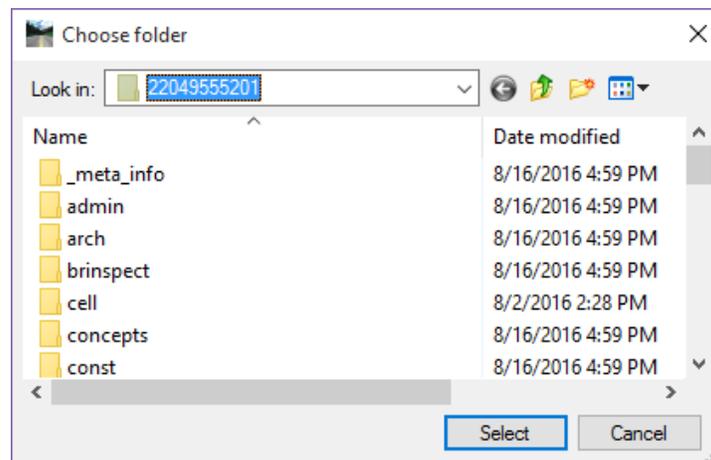
1. Open the FDOTSS4 folder on the desktop.



2. Double-click on the **Create Files** icon to launch the Create File/Project tool.
3. Click **Select Active Project**. This will open the Select Active Project dialog.



4. Browse to the *Projects* folder and select **22049555201**. Stop at the root folder.

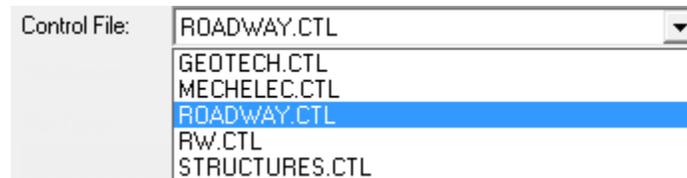


5. Click the **Select** button. This will select the project folder, close the Choose Folder dialog and return to the Select Active Project dialog.
6. Click **OK** on the Select Active Project dialog.
7. Click **OK** on the Project Settings dialog. The active project has been set.

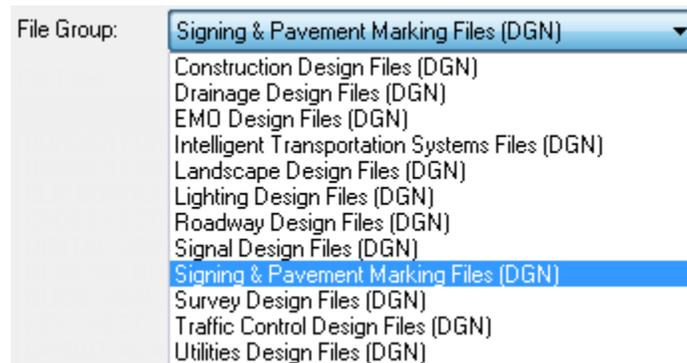
➤ **Load Appropriate Control File**

The control file sets the discipline to work in. Traffic Plan 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.

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



2. Click on **Roadway.ctl**. This loads the control file and the Create File/Project application now has enough information to begin creating design files in the specified Output folder.
3. 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.

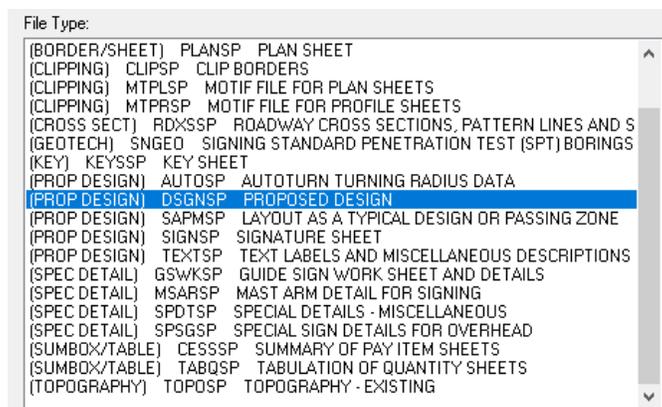


4. In the *File Type* category select:

(PROP DESIGN) DSGNSP PROPOSED DESIGN

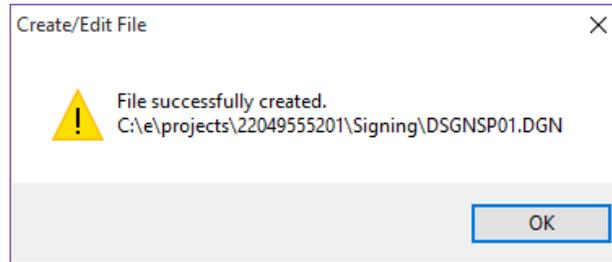
This selection populates the *Output File and Seed File* with the correct information.

Note Create File/Project allows the designer to browse to a different **Output Folder** if needed. In addition, the *Workspace* field is set to **FDOTSS4** by default.

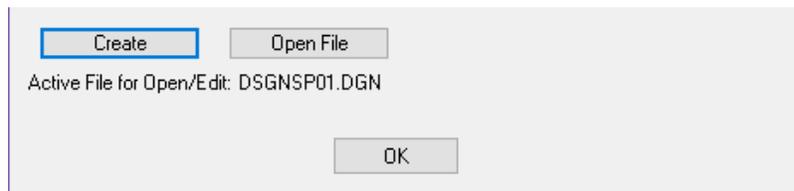


5. Click the **Create** button at the bottom of the dialog.

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



Note Clicking the **Open File** button at the bottom of the dialog can be used to open the newly created file. 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 *DSGNP02* and will not overwrite the existing file.



- (OPTIONAL) From Create File/Project, click the **Open File** button next to the *Create* button at the bottom of the dialog. MicroStation will open the newly created file. Review file and then **Close** MicroStation.

<OR> Click **OK** to close Create File/Project, close FDOTSS4 and go on to the (*Optional*) Exercise.

Exercise 1.2 (*Optional*) **Create Additional Files**

Use the Same File Group to Create Additional Design Files

- Using the Create File/Project tool create the **Tabulation of Quantity Sheets** file.
- In the *File Type* category select:
(SUMBOX/TABLE) TABSQSP TABULATION OF QUANTITY SHEETS
- Click the **Create** button.
- Click **OK** to acknowledge the file creation.
- Repeat these steps create the **Border Sheet Reference – Plan** file and the **Summary of Pay Item Sheets** file.
- Click **OK** on the Create File/Project to close the dialog.

Exercise 1.3 Opening the Workspace through the FDOTSS4 Desktop Folder

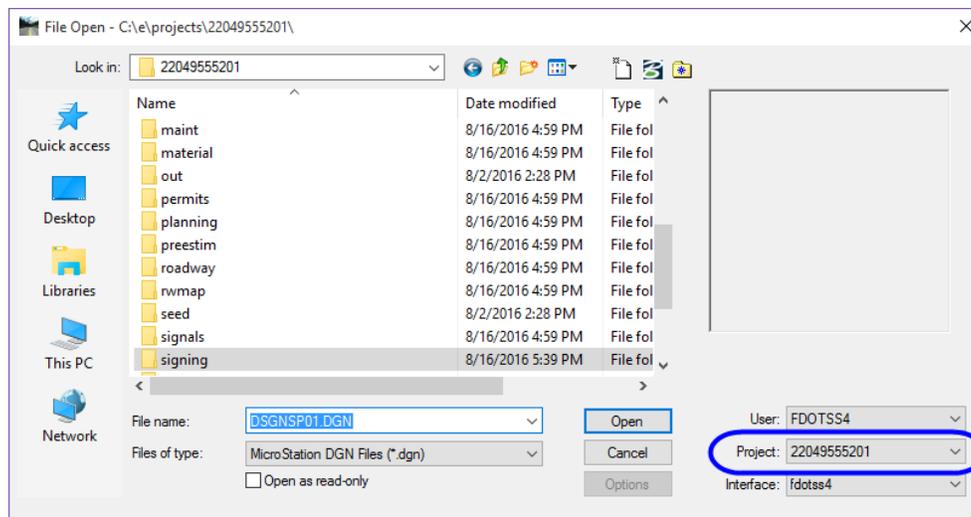
In this exercise, use the FDOTSS4 folder located on the desktop. This folder contains several shortcut icons. It is important to review and understand the use of each icon.



1. From the FDOTSS4 folder double-click on the icon labeled **FDOTSS4**.



2. From the File Open dialog, select the *Project 22049555201*. This selection will open the project in the correct root directory.

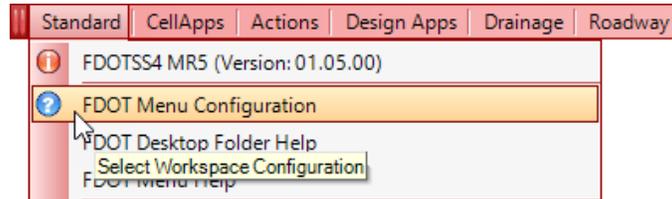


3. Navigate to the *Signing* folder.
4. Select the *DSGNP01.dgn* file and click **Open**.
5. Once the file is open, notice that the FDOTSS4 Menu appears. Take a moment to become familiar with this workspace configuration.

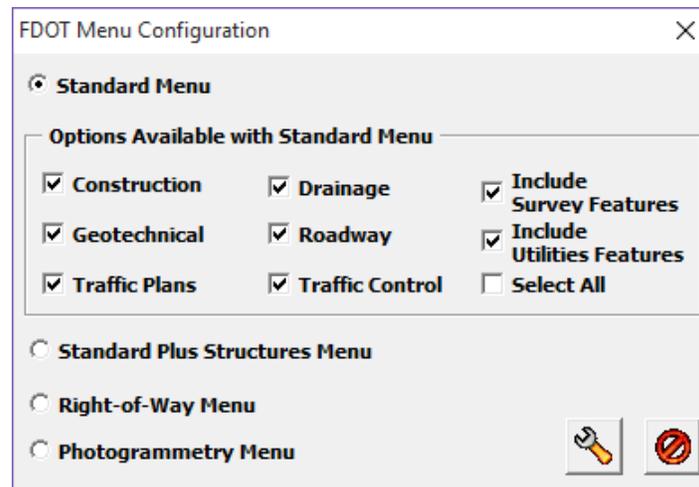
TRAFFIC PLANS MENU



As seen in the last exercise, the FDOTSS4 Menu loads when a file is loaded through the FDOT delivered workspace. The FDOT Menu, by default, opens in the Standard menu; the option to configure the FDOT Menu and load additional discipline menus is available through the FDOT Menu Configuration.



The figure below shows the possible FDOT Menu configurations.



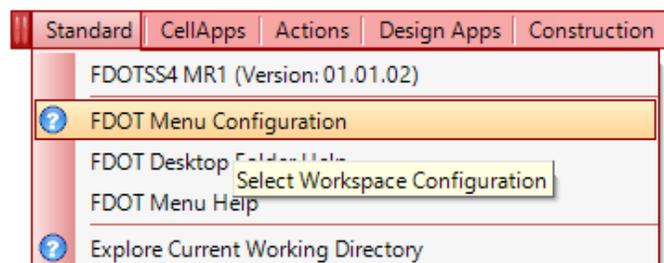
The top portion of the FDOT Menu Configuration dialog provides the option to load one or all the Standard (Roadway) Menu options. For example, one can load Traffic Plans along with Roadway or by itself.

Once the options have been selected click the **Update**  icon to load/unload menu options or the **Exit**  icon closes the dialog without making any changes.

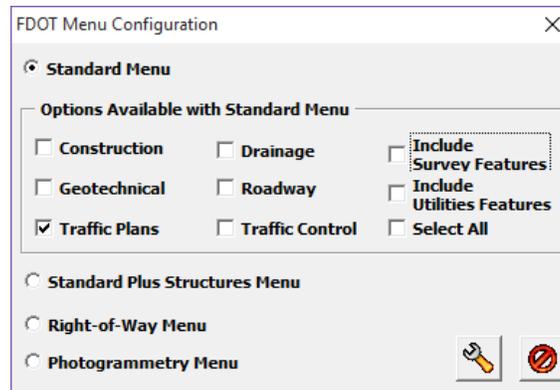
Note The options selected on the FDOT Menu Configuration dialog control the resources available. If there are resources needed (levels, cells, features, etc.) that are not available, check the FDOT Menu Configuration options and reset as needed to access the resources.

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

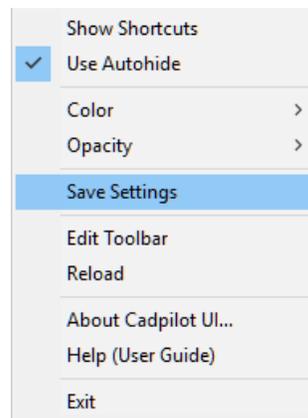
Continuing in *DSGNSP01.dgn*, from the FDOTSS4 Menu select **Standard > FDOT Menu Configuration** to open the FDOT Menu Configuration dialog.



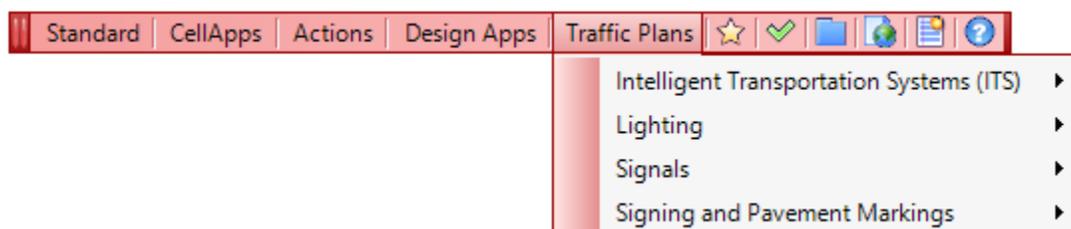
1. Change *Configuration* options to load the **Traffic Plans** menu.



2. Click the **Update**  button. The FDOTSS4 Workspace will have to be reloaded to apply the changes.
3. Select and hold the **solid bar** on the left of the FDOT Menu to drag it to a convenient location.
4. Right-click anywhere on the FDOT Menu to access the *Context Menu*.
5. From the *Context Menu*, select **Save Settings** to set the FDOT Menu settings.



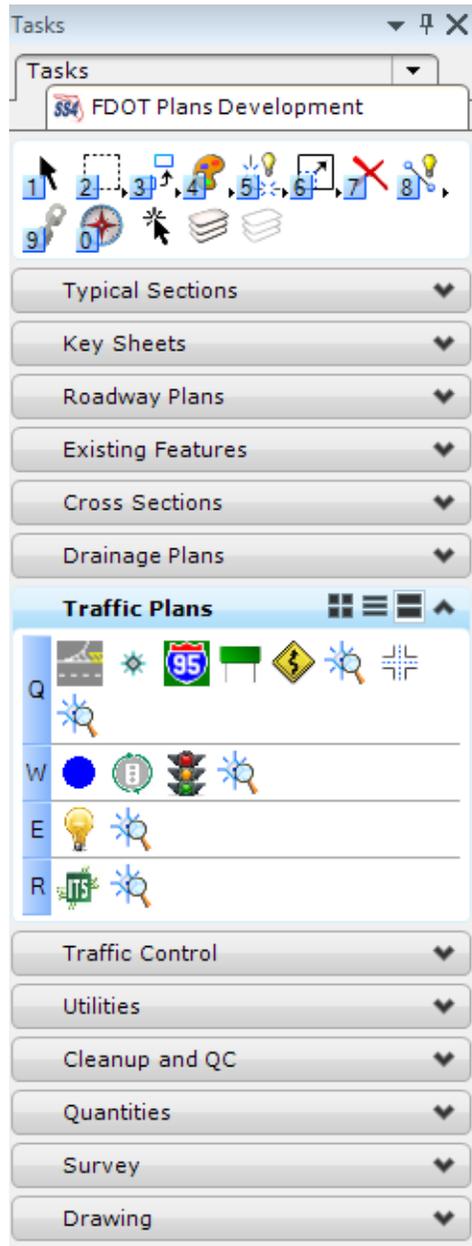
6. When the FDOT Menu reloads, the **Traffic Plans Menu** is the only discipline menu displayed. Take a moment to become familiar with this workspace configuration and the FDOT Menu.



TASK NAVIGATION WORKFLOW

FDOT PLANS DEVELOPMENT > TRAFFIC PLANS

The FDOT CADD software includes a customized Task menu, *FDOT Plans Development*. This menu is comprised of smaller discipline/task specific menus containing tools and links organized in step-by-step workflows.



ATTRIBUTES, TEXT AND MODELS

LEVELS

The FDOT has created six Standard Level libraries: Common, Survey, Right of Way, Roadway, Photogrammetry and Structures. There are approximately 1500 levels. The appropriate level library loads upon the creation or opening of a MicroStation file using the FDOT workspaces. The level name is a maximum of 18 characters and has three components: Level Name, State and View with the format: *object_sv*

Where: (**object** = Level) **_**(s = State) (**v** = View)

(S)tate Designations

p (proposed)

d (drafting element)

e (existing)

(V)iew Designations

p (plan)

r (profile)

x (cross section)

m (model)

An example of a plan view level is: **PavtMessage_ep**, where: *Level* = **PavtMessage**, *State* = **e** and *View* = **p**

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

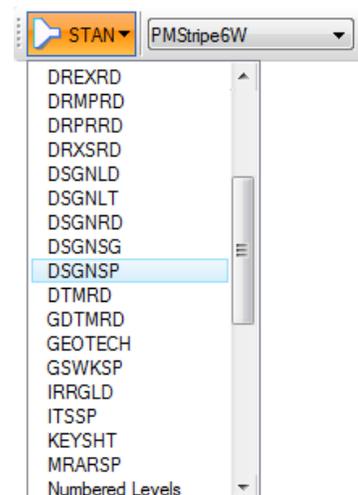
The levels symbology (color, weight and style) are set to *ByLevel*. which means that each level already has a color, weight and style associated to it. Designers cannot create additional levels.

RULES & FILTERS

FDOT has also created a set of Standard Rules that group the Standard Levels together for the purpose of Quality Control (QC) checking of the FDOT Standard design files ensuring compliance with the FDOT CADD Standards. FDOT delivers MicroStation Filters to reflect each of these Standard Rules to assist in users searching through the level menu. Discussion on these filters continues later in this section. The Standard Level Filters do not turn levels on or off, but they reduce the number of levels visible in the dialog box.

There are several locations to very easily activate a Standard Level Filter. Level filters can be loaded from the MicroStation Attributes Tool Palette, Level Manager, Level Display dialog, etc. There is a drop-down menu as seen in the figure below to load level filters, but it is only available when selecting “Active Level Filter”.

Note FDOT presets Standard Level Filters to each Standard File Name. The filters automatically set by default to those specific file names upon opening of the design file.



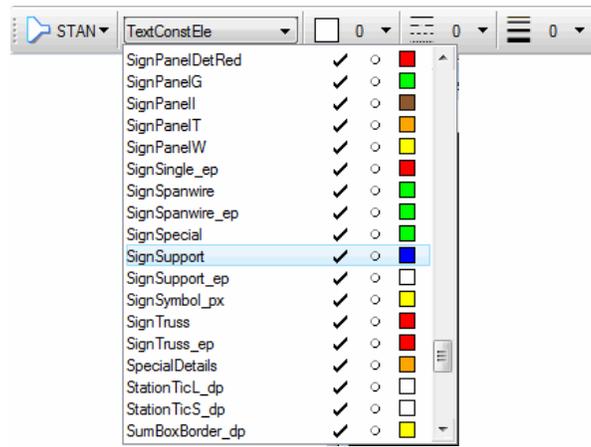
Exercise 1.5 Levels and Filters

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.

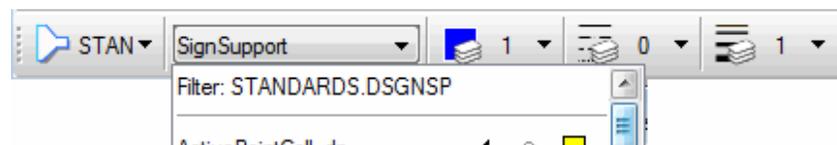
1. Continuing with *DSGNP01.dgn* in the *Default* model, select the **STANDARDS:DSGNP** option from the *Attributes* tool palette. This sets the active level filter.

Note As a refresher, a level filter isolates the levels seen in the level dialog so it is easier to navigate. FDOT groups the level filters by discipline and sets them by the filename.

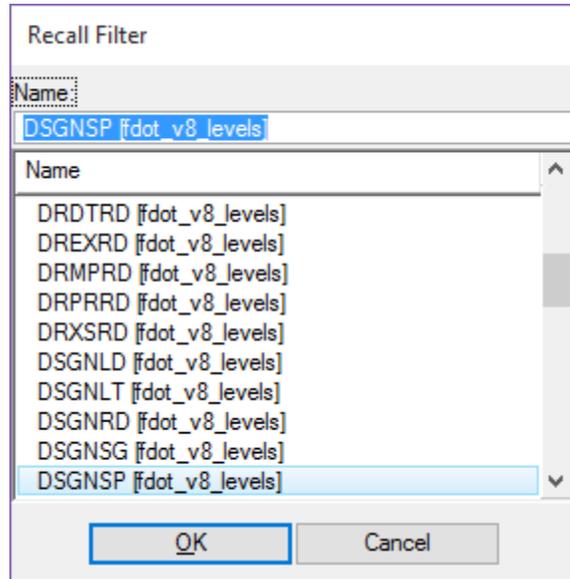
2. Set the active level:
 - a. In the *Attributes* tool palette, select the drop-down arrow next to the level names.



- b. Scroll down and select the level **SignSupport**. That sets the active Level and sets the *Color*, *Weight* and *Style* to **ByLevel** which means all entities drawn or placed will be under the influence of the layers properties.
3. Set the Level Filter:
 - a. In the *Attributes* tool palette, select the drop-down arrow next to the level name.
 - b. Scroll all the way to the top and select **Filter: STANDARDS:DSGNP**. This opens the Recall Filter dialog.



- c. Currently the Level Filter is set to **DSGNP**. Scroll down and select **Text [fdot_v8_levels]**.



- d. Click **OK**. This loads the *Text Levels* filter.
4. Take a moment to review the levels in this filter. Notice that all levels visible are associated to text. Level filters can save time when going from Line work to Text and so on.

CIVIL FEATURES

Civil Features define the symbology of elements much like using Place Influence with D&C Manager. Each design feature has only one definition. Within the feature definition, symbology is set up for each design view (Plan, Cross Section, Profile, or 3D). FDOT has set up the Feature Definitions that link back to the Native Styles within the GEOPK DDB for quantity calculations, symbology settings, the GEOPAK attribute tag, and any Adhocs defined in the DDB file.

FEATURE DEFINITIONS

Feature Definitions control symbology, annotation, and various other properties applied to the geometric elements.

FDOT built the Feature Definitions by using an existing feature table from the GEOPAK (DDB). Feature Definitions are used to:

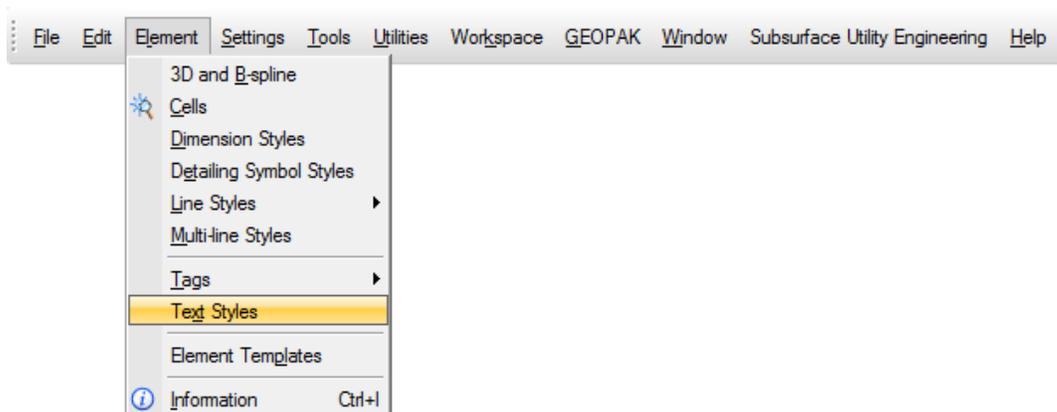
- o Define what the geometric elements are; what is being modeled such as curb, centerline, edge of pavement, etcetera.
- o Control symbology in various views, including capability to define differing symbology in plan, profile, and 3D spaces.
- o Define terrain model attributes (spot, break line, void, etcetera).
- o Define surface display characteristics.

TEXT STYLES

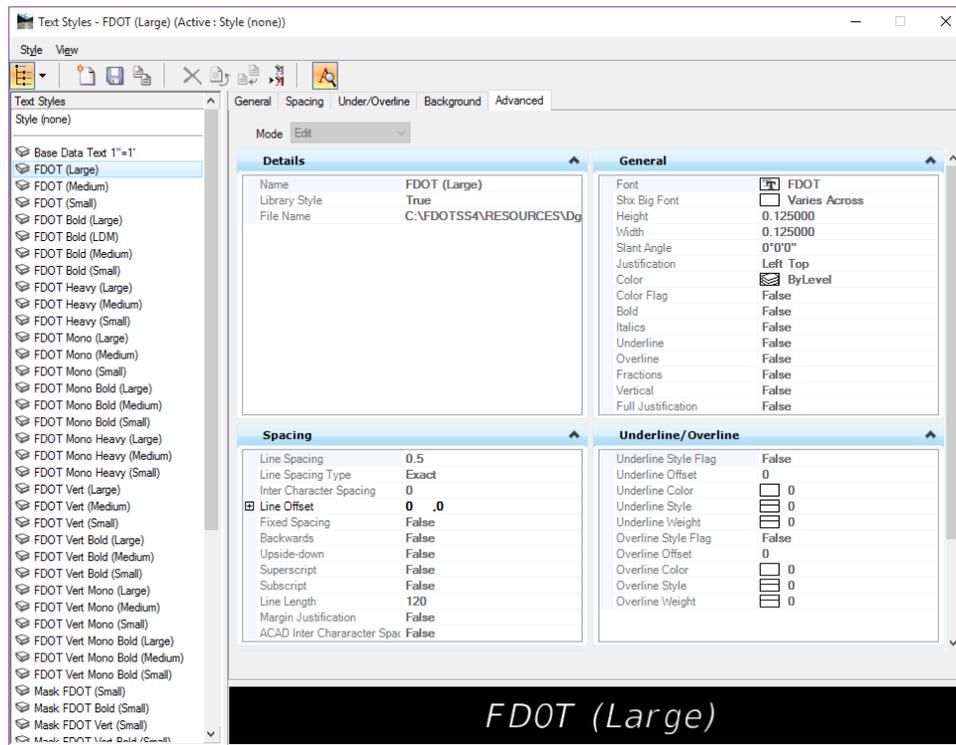
A text style is comprised of a group of text attributes, such as font, width, height, spacing, etc. Text styles take away the burden of having to set all the individual text parameters. FDOT delivers predefined text styles for use whenever possible. The text styles delivered by FDOT are at a scale of 1 to 1. This is important to remember placing text using Annotation Scale.

TEXT STYLES DIALOG

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



The Text Styles dialog shows all the text styles that exist in the design file, and all the parameter settings for each style. When a new file is created or an existing one is opened based on the FDOT Seed files all of the appropriate text styles are loaded.



TRUE TYPE FONTS

FDOT has integrated the use of True Type Fonts and restructured the Text Styles. The following implements the True Type Fonts:

- Cell Libraries
- DDB
- VBAs
- MDLs
- Spreadsheets

True Type Fonts will ignore MicroStation weights. The best method to show thicker text is to use the Bold font. The FDOT CADD Software delivers and installs the True Type Fonts in the *FDOTSS4\RESOURCES\Fonts* folder on the server and in the *Windows\Fonts* folder on the client.

Note *FDOT CADD Software also delivers old fonts but does not configure the menus and/or tools to use them.*

STYLE ORGANIZATION

| Fonts at Common Sizes | 40 Scale | 50 Scale |
|-----------------------|----------|----------|
| Large = .15 x Scale | 5.0 | 6.25 |
| Medium = .1 x Scale | 4 | 5 |
| Small = .07 x Scale | 2.8 | 3.5 |

MODELS

Models are independent sets of design data within the same file. Every MicroStation design file has at least one model named Default. Models consolidate files containing data used collectively.

An example is the cross section file, this one file (*Rdxsrd*.dgn*) has four models in it:

- o Pattrd – Pattern lines for cross sections
- o Rdxsrd – Cross Sections
- o Xsshrd – Cross Section Shapes
- o Rdxsrd_shg – Cross Section Sheets

Another example of how to use a model is with the alignment file or (*Algnrd*.dgn*). This file is for displaying the alignment Stationing, tick marks, PC, PT, PI, and curve data information. Typically, there could be multiple alignment files to cover all 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 creating a new model, 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.

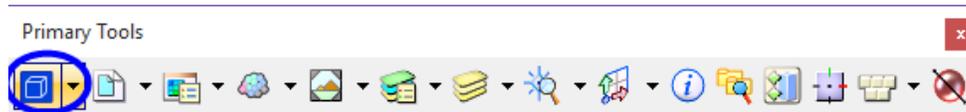
There are two types of models, Design and Sheet. The Design model is the actual geometry or line work and the Sheet model is the sheet file or border. Models are either 2D or 3D.

Note *If DGN files use multiple models, it is important to document their names and uses in 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 review QC reports. If creating temporary models to work in and the model fails compliance, the Project Journal documentation should provide an explanation, as long as this Model **IS NOT** referenced to any other design file.*

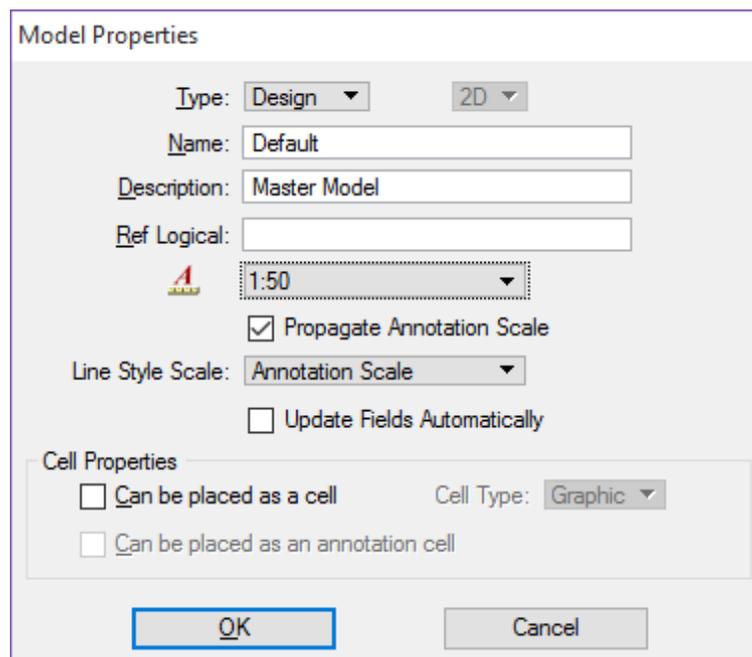
Exercise 1.6 Changing the Model

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 to experiment with some tools without adding unnecessary elements to the default model.

1. Continuing in *DSGNP01.dgn* open the Model Properties dialog. This dialog can be open by selecting *File > Models* or from the *Primary Tools* toolbar.



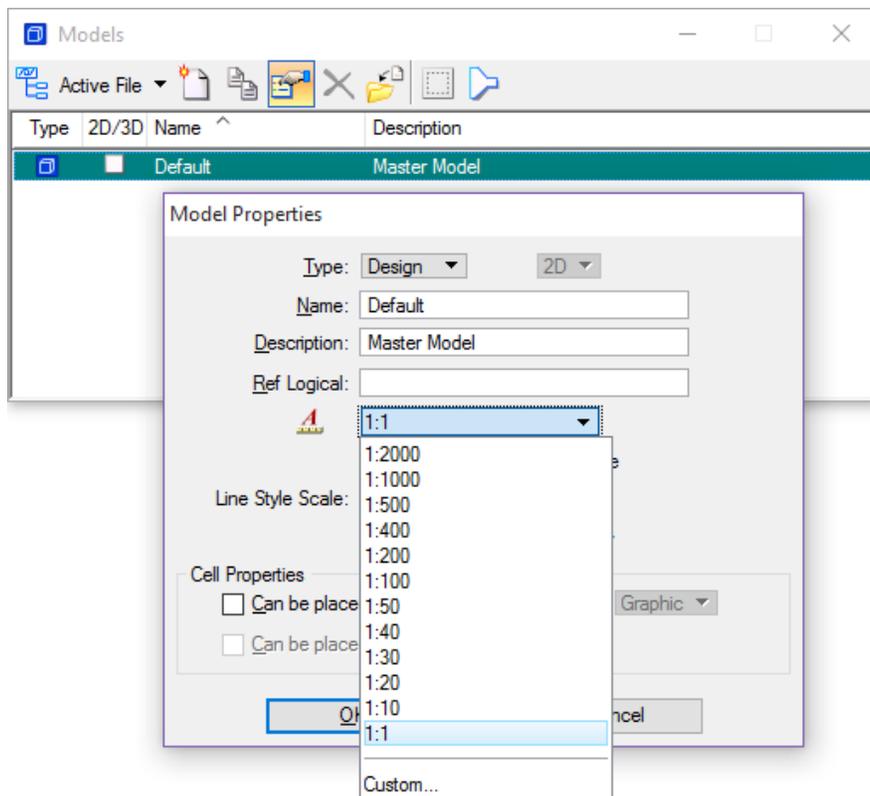
2. In the Model dialog, highlight the **Default** model.
3. Right-click on the **Default** model and select **Properties**. The Model Properties dialog opens.



4. Set Annotation Scale to 1"=50'.
5. Click **OK**. The Model Properties dialog closes.

ANNOTATION SCALE

Annotation Scale associates text and linestyles placed in a model to a specific scale so if the drawing scale changes in that model the text and linestyles dynamically change 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 the remaining text for this to function properly.



Using Annotation Scale also removes the burden calculating text height used at particular scales when placing text. Annotation Scale is model specific.

FDOT recommends to set this at the time the model creation and to select the Annotation Scale lock. This can also be set in the *Model Properties* as seen in the figure above.

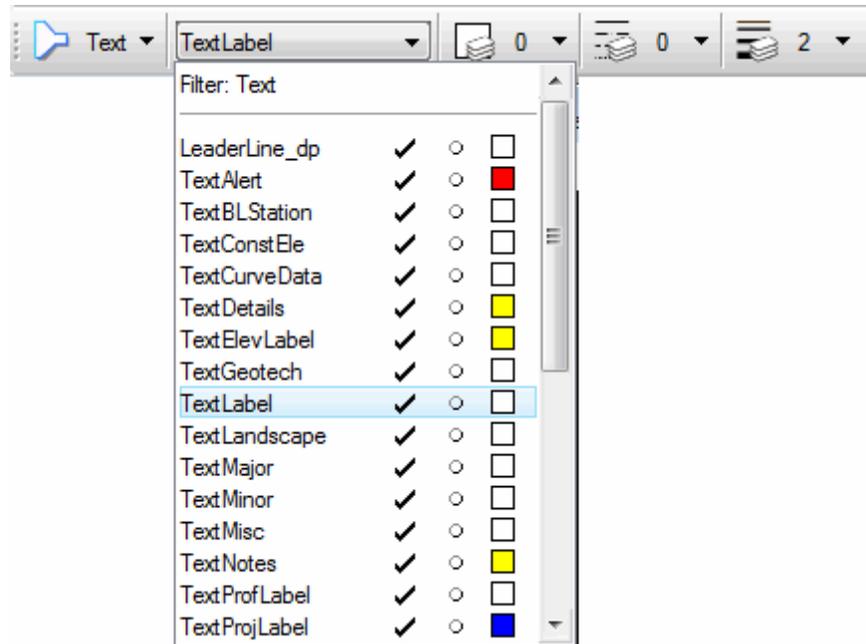
Important items to remember regarding Annotation Scale:

- o Model Specific
- o Annotation Lock must be on from the start
- o Can be synced to the plot scale using FDOT Menu
- o Can be set in the Model properties
- o Can be changed using the Drawing Scale
- o Do Not switch Annotation Scale ON and OFF

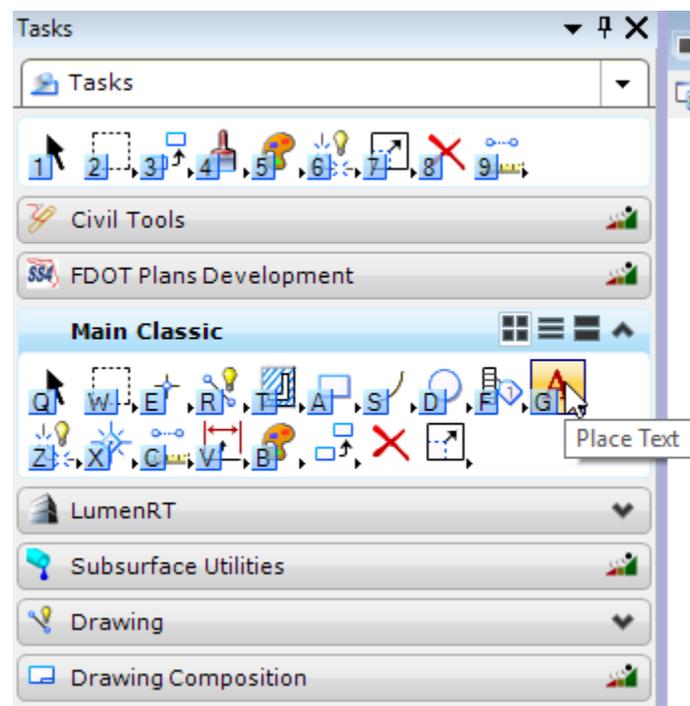
Exercise 1.7 Annotation Scale and Text Styles

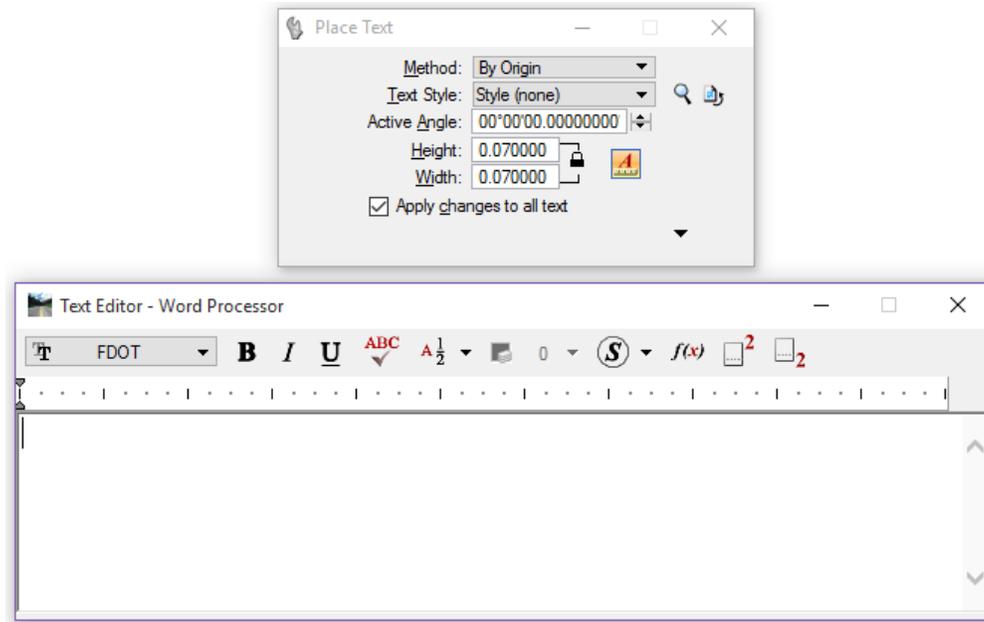
This is a brief introduction to placing text using FDOT delivered Text Styles. This discussion is in more detail later in this course.

1. Continuing with *DSGNSP01.dgn*, set the *active level* to **TextLabel**.



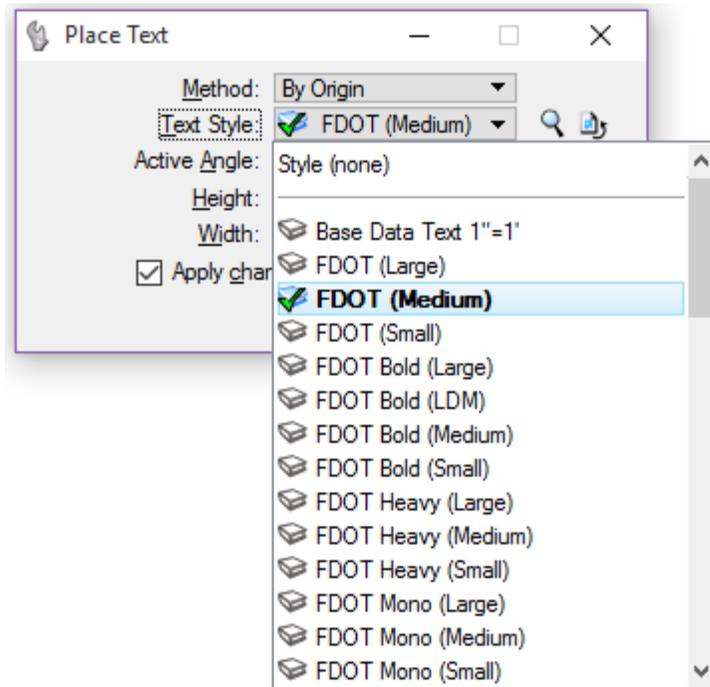
2. From the MicroStation Main Classic Task Menu, select the **Place Text** tool. The Place Text and Text Editor dialogs open.



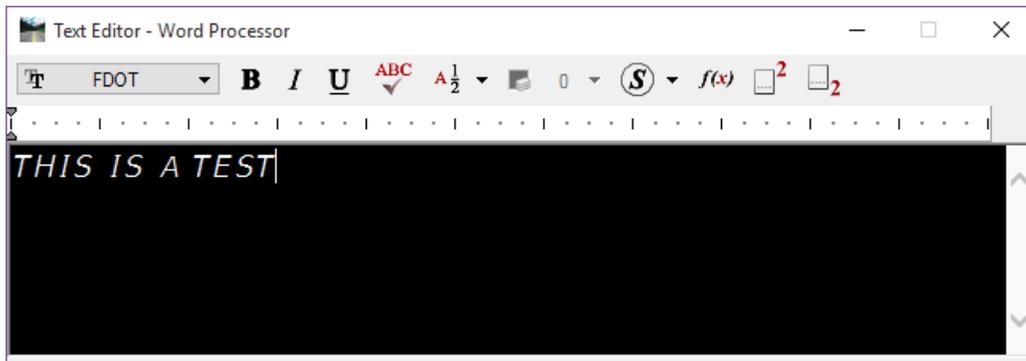


Note Notice that the Annotation Scale option is **active**. This was part of our Model Properties set in a previous exercise. Remember with Annotation Scale set there is no need to calculate what text height and width to use; this tool automates the calculation.

3. 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.



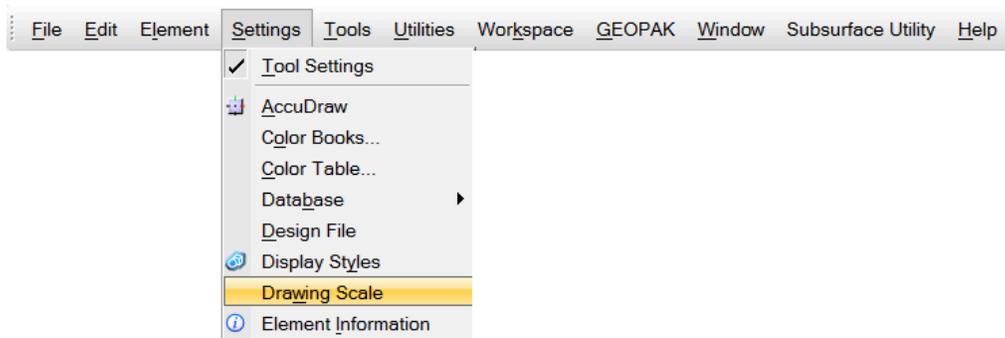
- From the MicroStation Task Navigator select the **Main Classic Menu > Display Text Attributes** tool



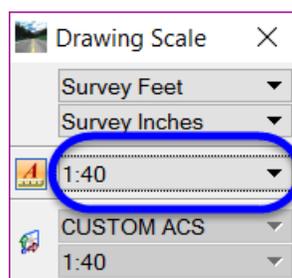
- Select the text just placed and notice the text attributes, the *Height* and *Width* are set to the correct size based on the Annotation Scale. No manual calculation required.

Display Text Attributes > TH=5.000000, TW=5.000000, LV=2, FT=FDOT Text: THIS IS A TEST, Level: TextLabel

- Open the Drawing Scale dialog by selecting the MicroStation menu **Settings > Drawing Scale**.



- Change the Scale from **1:50** to **1:40**. Note the change in size of the previously placed text.



- Take time to familiarize yourself with the Place Text dialog and other delivered Text Styles.
- Change the Drawing Scale back to **1:50**.
- Delete any text that was placed.
- Go to **File > Save Settings**.
- Close the design file.

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2 DESIGN TOOLS

OBJECTIVE

The objective of this chapter is to introduce common design tools used by all the Traffic Plans disciplines. These include the Design & Computation (D&C) Manager, Draw Cell by Feature, and Draw Cell Group by Feature.

INTRODUCTION

This chapter introduces several applications that are very useful to the designer to create Traffic Plans features:

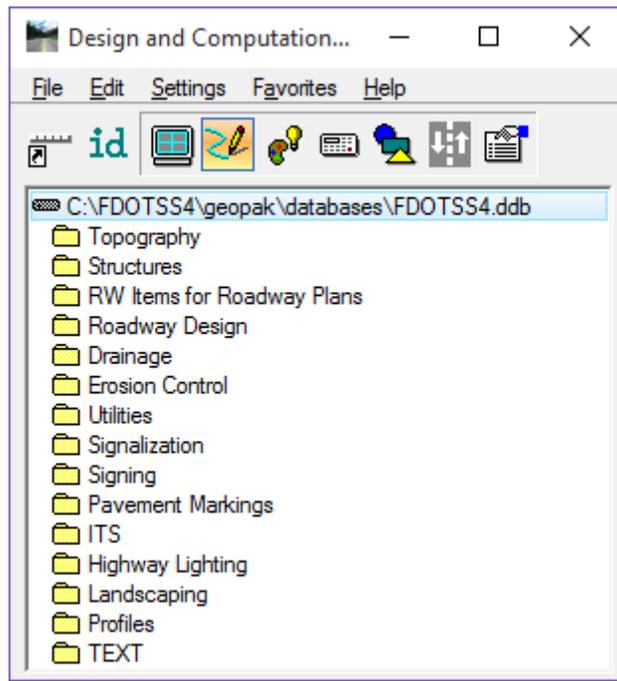
- **D&C Manager** A GEOPAK tool used to help designers draw elements, set symbology, and compute quantities. The FDOT CADD office provides a database set up with the correct symbology, cells, formulas and pay items needed to meet the FDOT standards.
- **Draw Cell by Feature** A GEOPAK tool used to place a single cell in the file along an alignment or MicroStation element. It uses the D&C Manager to insure the placement of cells with the correct symbology and pay information for calculations.
- **Draw Cell Group by Feature** A tool to place multiple cells along elements or alignments. It uses the D&C Manager to insure the placement of cells with the correct symbology and pay item information for calculations.

EXPLORING D&C MANAGER

The D&C Manager uses a proprietary DDB provided by FDOT. The installation of the FDOT CADD software places the latest D&C Manager DDB either on the server or on the local hard drive. For new projects, FDOT recommends copying the latest DDB file from the FDOT installation folder into the project SYMB folder and rename it to the eleven-digit Financial Identification Number (FIN) number. For the 22049555201 Project used as the example in this manual, the *FDOTSS4.ddb* is renamed to *22049555201.ddb*. This allows the designer to modify the DDB for specific parameters, and protects it from any future maintenance updates overwriting the file. The latest FDOT DDB file is located in the \FDOTSS4\GEOPAK\databases\ folder. The naming format is *fdot#####.ddb* where ##### is the year or version of the FDOT CADD Software.

It is highly recommended that every user that works on projects becomes very familiar with D&C Manager. D&C Manager sets symbology and automates quantity calculations for linear, each, and area quantities.

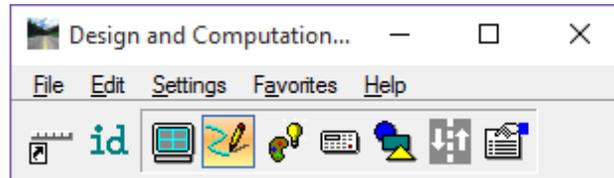
FDOT specifically set the DDB to create elements with the correct level symbology according to the FDOT CADD Standards. The DDB file is set up with discipline folders called categories. Inside of each category are items.



- **Categories** - The basic component of the hierarchical tree is the Category, represented by a folder icon. The categories in the *FDOTSS4.ddb* are divided by discipline. The figure above shows the Categories with a description relative to their discipline
- **Items** - The other DDB 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.
 -  **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, to draw COGO elements and/or compute quantities. FDOT tags graphics with a pay item attribute for additional stratification of features when running computations and defines computation for these items.

D&C MANAGER MENU BUTTONS

D&C Manager has a toolbar for easy access of different modes. Summarized below are the functions of each button. A later section in this chapter covers in more detail the tools used to create Pavement Marking plans.



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

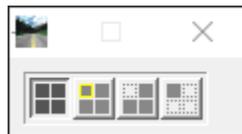


Identify Item. The **Identify Item** button sets the D&C Manager item to match a selected MicroStation element previously drawn by the D&C Manager or elements drawn with Graphical COGO and the SMD file. If the item you ID does not match an item in the active DDB, a message appears in the status bar saying: **No matching database item.**

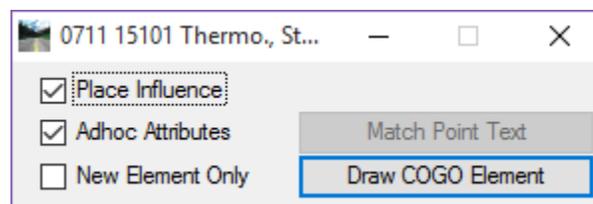


Display. The **Display** button filters the display of MicroStation elements in the design file so only the selected features display, highlighted or hidden. This button expands D&C Manager to show a collection bin. This collection bin is for controlling the display of multiple items at one time. To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

Buttons from left to right: Normal Display, Highlight Selection, Hide Selection and Display Only Selection.

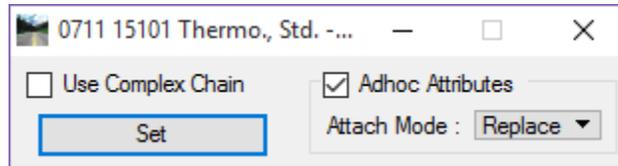


Design. The **Design** button plots COGO and MicroStation elements into MicroStation with the defined symbology when selecting **Place Influence**. Draw Plan and Profile dialog or MicroStation commands place elements.

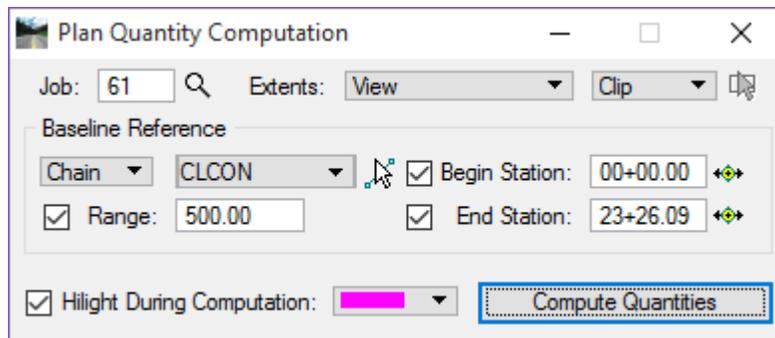




- **Set.** The Set button sets the symbology of previously drawn MicroStation graphic elements in accordance with the parameters of a selected item in the DDB. This tool fixes elements to meet CADD standards or attach/modify Adhoc Attributes.



- **Compute.** The Compute button tabulates quantities of items 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 or categories at one time. A second toolbox opens with the computation results.



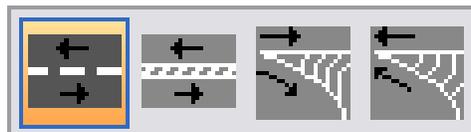
- **Shapes.** The Shapes button uses plan view MicroStation graphics that defines an enclosed area to create a filled shape for computing area quantities.

Note FDOT does not recommend this tool is for use when the Civil Tools have been used for the design. Use the Create Region tool instead with the Associative Region Boundary option toggled OFF.



- **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.

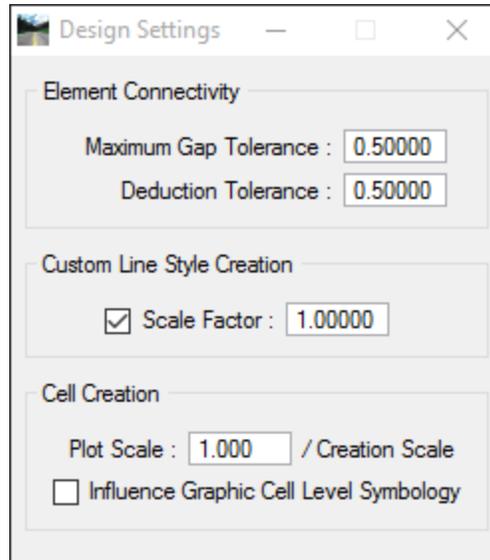
The four tools from left to right: Striping, Separation, Chevron Diverge, and Chevron Merge:



- **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

Before using D&C Manager to draw or compute items, address settings. 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 Compute mode utilizes the **Deduction Tolerance**. 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 to recognize cells and make the deduction.
- **Custom Line Style Creation** – The Custom Line Style **Scale Factor** sets a specific scale for custom line styles. Note this scale is only for custom line styles.
- **Cell Creation** – **Plot Scale** is 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.

***Note** When entering a drawing scale, all subsequent cells placed from the D&C Manager are scaled accordingly if the item is set to use creation scale. When placing a cell with place influence on, GEOPAK utilizes the drawing scale setting to compute an X & Y scale for use in the MicroStation Place Cell dialog.*

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

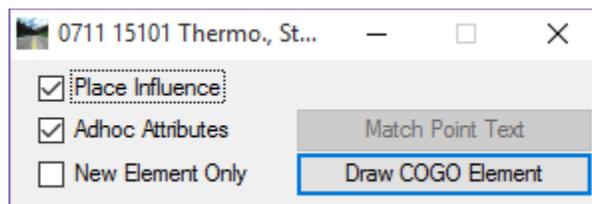
DESIGN MODE

Design Mode is the default mode when the D&C Manager opens. The following functions use the *Design Mode*:

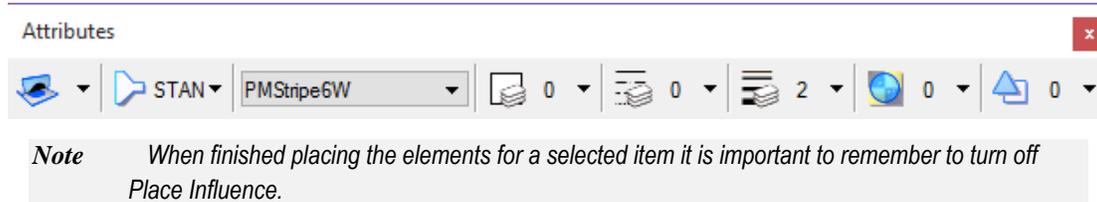
- Set Drafting Standards by use of the *Place Influence* command for the placement of MicroStation elements using MicroStation commands.
- Print COGO elements into the design file according to the drafting standards set by the item's defined parameters.
- Place Adhoc Attributes on an element.

Whether placed in the file by generic MicroStation commands or plotted from COGO, Draw Plan & Profile, the items can be placed as pay items for future tabulation.

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 DDB. With most items, a GEOPAK attribute is placed with the element. This attribute provides another identifier to make the element unique and used to sort features for calculating quantities.



When selecting *Place influence*, 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.



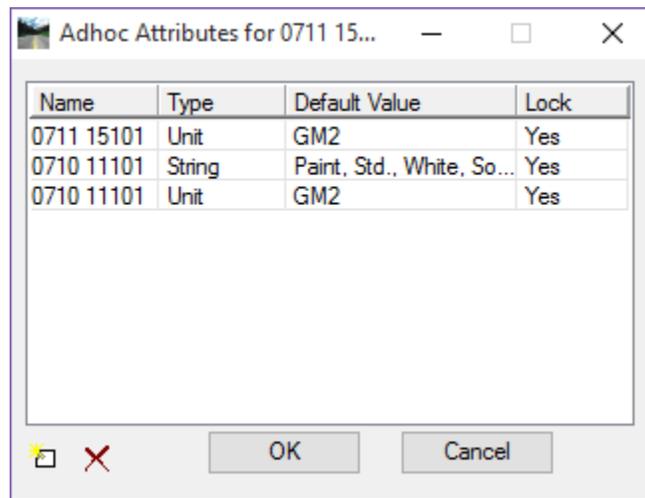
ADHOC ATTRIBUTES

An Adhoc Attribute is additional information about a particular element. Look at it as another property for the MicroStation element, i.e. *Level, Color, Weight, and Style*.

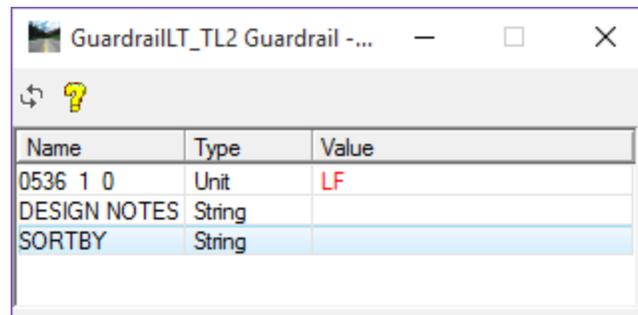
By placing an Adhoc on the line, the designer is giving that line additional information. That information could be a chain name, cross slope, profile name, thickness, etc. It is almost limitless as to what can be associated to an element with Adhocs. Other down-stream applications use these Adhocs.

Some Adhocs are placed in the background and the designer does not interact 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 with an item from D&C Manager. These Adhocs are part of the item and are set by default. Nothing indicated this information was set since all of the adhocs are locked for modification when placing elements.



Other Adhocs are interactive meaning the designer must fill in the parameters. An example is placing guardrails. There are adhocs added to the line that must be defined by the designer.



Note Adhocs with values displayed in red are locked for modification.

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

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

For more information on the D&C Manager, see the GEOPAK Help files.

DEFINING ADHOCS FOR QUANTITIES

Adhoc Attributes are tags that apply to graphic elements to provide more information. Adhoc Attributes are comprised of three types of information that require mandatory definitions: *Name*, *Type*, and *Value*.

- Name** An identifying term used when GEOPAK is searching for a specific Adhoc Attribute.
- Type** Identifies the nature of the information, and has a number of different setting options. The options are *Numeric*, *String*, *Unit*, *Quantity*, and *Remarks*.
- Value** The actual information to be used by GEOPAK, and is determined by the Type. For example, if the Type is *Numeric* then the Value must be a number.

FDOT has set up Adhoc Attributes for many of the Items in the **D&C Manager**. The functionality of these Adhocs range from setting variables used in the calculation of quantities to adding notes for later retrieval. It is important to note that in many cases specific projects may require modifying these Adhoc values. The creation process of design elements using the Civil Tools and Features will assign the default. FDOT recommends the review of these elements to ensure the correct values are set on the elements.

To calculate a quantity using adhocs, the Compute Parameters must be set to Adhoc Attributes and adhocs must consist of 1 to 3 adhocs set on an element. As a minimum, an adhoc using the pay item as the name, type set to Unit, and the value set to either the Standard Unit or an equation. If this is the only adhoc set, then D&C will use the item description. If this should be different, a second string adhoc, using the same name as the unit adhoc, can be set with the desired description. A third adhoc type, Quantity, may be used to override the calculated quantity from the design file.

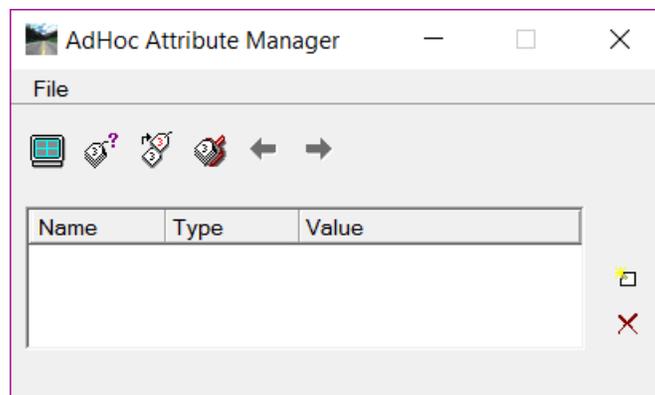
Note Place these adhocs on the elements **BEFORE** exporting the quantities to *Quantity Manager*.

Review chapter 5 of this training manual for more information on Adhocs and the D&C Manager.

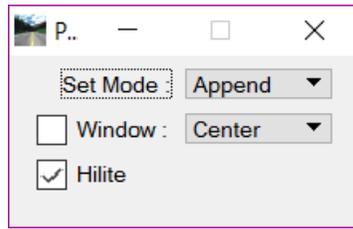
There are 3 tools that can be used to review, set, and/or modify adhocs on the MicroStation elements. These are the 3pc Adhoc Attribute Manager, FDOT Adhoc Manager, and the D&C Manager using either the Design mode or the Set mode.

ADHOC ATTRIBUTE MANAGER

Adhoc Attribute Manager is the tool used for tagging, reviewing, and manipulating Adhoc Attributes. It can be opened from the Road tools palette  or from the MicroStation menu option **GEOPAK > ROAD > 3PC Adhoc Attribute Manager**, or from the Task menu FDOT Plans Development > Quantities.



The File menu contains the option for Preferences.



- **Set Mode** – Defines the actions to take with adhocs when the Set Attribute option is used.
- **Append** adds any new adhocs from the list to the selected elements. It does not modify any of the adhoc values.
- **Replace** deletes all adhocs from the selected element and then adds the list of adhocs.

The Adhoc Attribute Manager has four icons on the tool bar for viewing and tagging elements with Adhoc Attributes. From left to right these icons are: Attribute Display Filter, Identify Element, Set Attribute, and Adhoc Scooper. The two icons on the right side are Create New Row and Delete Row.

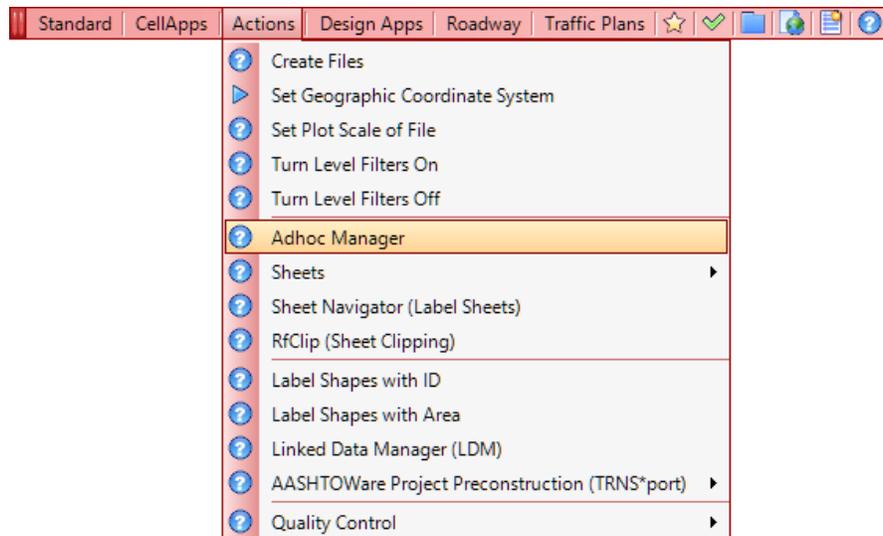
-  **Identify Element** - Click on the icon to select a MicroStation element. All adhocs on the element will be displayed in the window.
-  **Set Attributes** - Select the icon to set the defined adhocs on the selected element(s).

Note Click **F1** with the toolbox active to see the **GEOPAK Help** files for more detailed information.

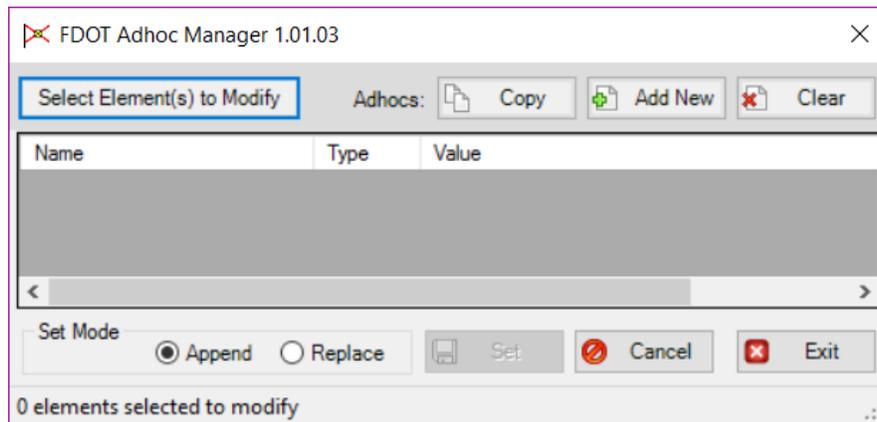
FDOT ADHOC MANAGER

FDOT has developed a comparable tool, FDOT Adhoc Manager, 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 > Adhoc Manager**.

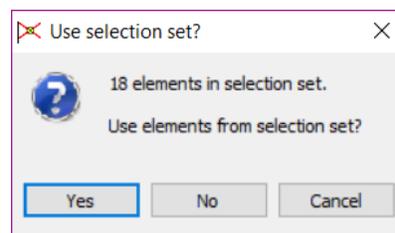


This opens the FDOT Adhoc Manager.

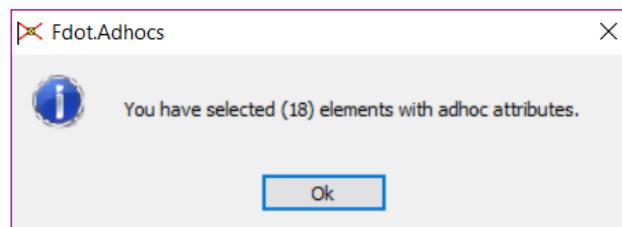


The FDOT Adhoc Manager tool is used to *Add New Adhocs*, *Edit New or Existing Adhocs*, *Copy Adhocs* for 1 element to another element or group of elements in a selection set and/or *Delete Adhocs* on elements within a DGN file.

- **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. When a selection set is used, a dialog will pop up asking to “Use selection set?”

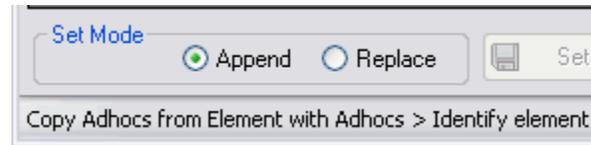


- o Clicking the **NO** or **Cancel** button will stop the selection process.
- o Clicking the **Yes** button will populate the FDOT Adhoc Manager dialog, if all Adhocs of the selected elements match or a single element is selected containing Adhocs and the elements are in the active design file. The following dialog will display indicating the number of elements in the selection set and if the element(s) selected have *Adhocs*.

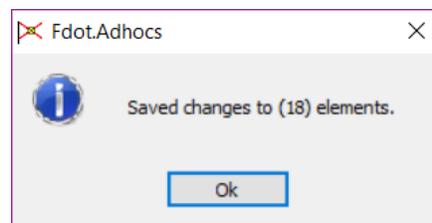


Note If elements are selected that do not have Adhocs, the dialog will state: “You have selected (number of elements) elements without Adhoc attributes.”

- **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 Manager status bar (lower left corner) the message will read: “*Copy Adhocs from Element with Adhocs > Identify Element*” when the **Copy** button is initialized.



- o Select the element with the *Adhocs* and the selected element’s *Adhocs* will populate the FDOT Adhoc Manager dialog.
- o 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 displays the designer the dialog below when 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. This function *does not* clear **Adhocs** from the selected elements.
- **Name (Column)** - This field lists the names of the *Adhocs*. The Name Field has a 23 character limitation.
- **Type (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 (Column)** - This field lists the *Value* of the *Adhocs*. The Value Field has a 45-character limitation.
- o **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.

- o **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.

The image shows a 'Set Mode' dialog box with two radio buttons: 'Append' (which is selected) and 'Replace'. To the right of these buttons is a 'Set' button with a floppy disk icon.

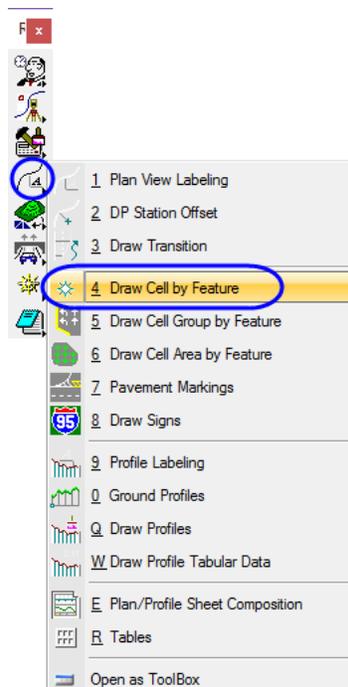
 - o **Append** - This radio button is to append new or copied **Adhocs** to an existing element (with or without existing **Adhocs**) without overwriting or removing any of the existing **Adhocs**. Click the **Set** button to complete the function of writing **Adhocs** to the selected element or group of elements in a selection set.
 - o **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.
 - o **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.

DRAW CELL BY FEATURE

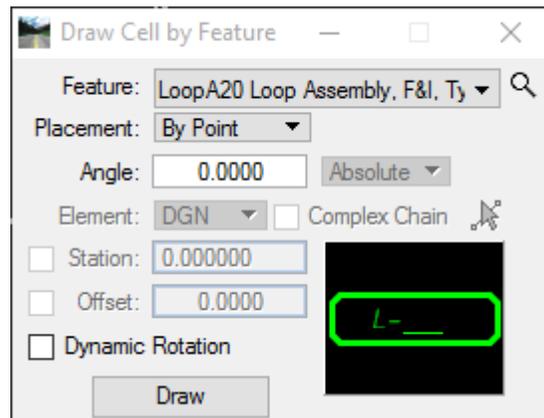
One of the options the designer has to draw the signal elements is the Draw Cell by Feature tool in GEOPAK. This tool is best suited for placing one cell at a time like a Mast Arm foundation or Loop Assembly.

The Draw Cell by Feature tool can be loaded from the MicroStation pull down menu **GEOPAK > Road > Plans Preparation > Draw Cell by Feature**.

This tool can also be loaded from the **Road Tools** palette.



The Draw Cell by Feature tool can be used to draw single cells in the design file. It uses Features which are defined in the D&C Manager. It will tag the cells with the attribute, symbology, and adhoc defined in the D&C Manager.



- **Feature** – Defines the item in the D&C Manager.
 -  Button used to open the Select Design & Computation Payitem dialog which is used to set the D&C Manager category to populate the drop down list.
 - Drop down list is used to select the item/cell to be drawn by the tool.
 - **Placement** – Defines how the cell will be placed in the design. There are two options:
 - **By Point** – This option is used to manually select the location in the file with a data point.
 - **On Element** – This option is used to define the location using an element in the file or a chain from the GPK file.
 - **Angle** – Sets the angle of cell. There are two options available:
 - **Absolute** – sets the angle based on 0 degrees as horizontal.
 - **Relative** – sets the angle relative to the element selected.
 - **Element** – Defines the type of element used for the location. There are two options available:
 - **DGN** – a MicroStation element drawn in the file
 - **Complex Chain** – toggle to allow the selection of a complex chain as the DGN element.
 -  - Identify Element - Button used to select an element from the file. The Station field will be populated with the begin length (0) of the element selected.
 - **Chain** – a chain stored in a GPK file. The Station field will be populated with the begin station of the chain selected.
 -  Identify Chain – Button used to select the chain from the graphic elements in the design file.
- Note** When selecting the Chain option, the GEOPAK User Preferences may need to be set to point to the GPK file location if it is in another directory. Most commonly it is found in the Roadway directory.
- **Station** – The station or distance along the element for the placement location.
 - **Offset** – the distance from the chain or element for the placement location.
 - **Dynamic Rotation** – Toggle to allow for manually rotating the cell once the location has been established.

DRAW CELL GROUP BY FEATURE

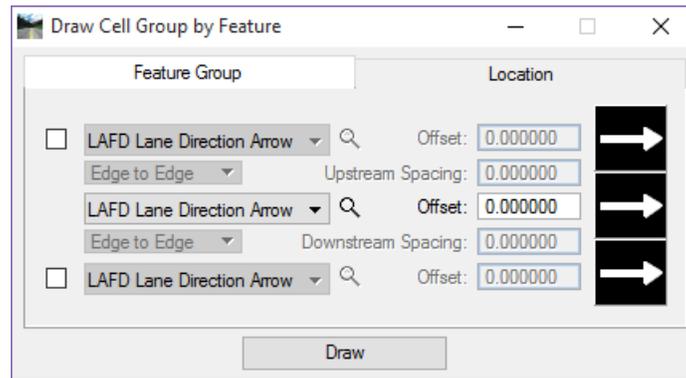
The Draw Cell Group by Feature tool can be used for placing Pavement Messages and Arrows, RPM's or any other cell you want to group together. It is not required to use this tool when placing cells, however, this tool will make the task of drawing Arrows and RPMs much easier. This tool can be opened on the Road tools pallet or on the menu **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 DDB as the tool will 'reset' to the DDB specified in the resource file every time the tool is closed and reopened. This GEOPAK DDB may not be the DDB intended for use with your active project.

The dialog consists of two tabs:

FEATURE GROUP TAB

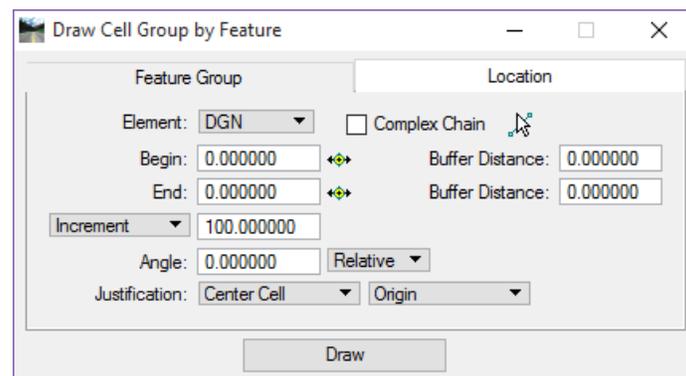
Feature Group defines the D&C Manager item(s) to use, which in turn selects the cell(s) to be placed, and the Offset from the selected element to place the item.



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 from the selected DGN Element or Chain when drawing the cell.

LOCATION TAB

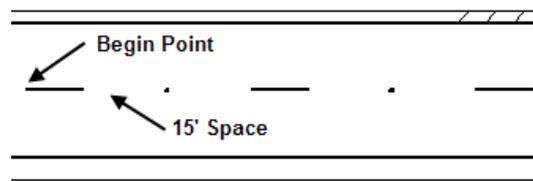
Location defines whether to use a DGN element or Chain, Begin and End stations, Spacing, Angle, and Justification.



- **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.

Note When selecting the Chain option, the GEOPAK User Preferences may need to be set to point to the GPK file location if it is in another directory. Most commonly it is found in the Roadway directory.

- **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 to center the RPM between the first and second stripe.



- **Spacing** – There are several options available to set the spacing between the cells, they are:
 - o **Increment** – This is a set value between cells.
 - o **Even** – Evenly spaces the cells at a user-specified spacing, the buffer distances are ignored.
 - o **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 and equidistant apart.
 - o **Once** – Only one set or cell is placed. The ending buffer distance is ghosted.
 - o **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.
 - o **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. Optionally, the Chain option can be used if the cells can be placed parallel to the selected alignment.

- **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.

CIVIL TOOLS

CIVIL FEATURES

Civil Features define the symbology of elements much like using Place Influence with D&C Manager. Each design feature has only one definition. Within the feature definition, symbology is set up for each design view (Plan, Cross Section, Profile, or 3D). FDOT has set up the Feature Definitions that link back to the Native Styles within the GEOPK DDB for quantity calculations, symbology settings, the GEOPAK attribute tag, and any Adhocs defined in the DDB file.

FEATURE DEFINITIONS

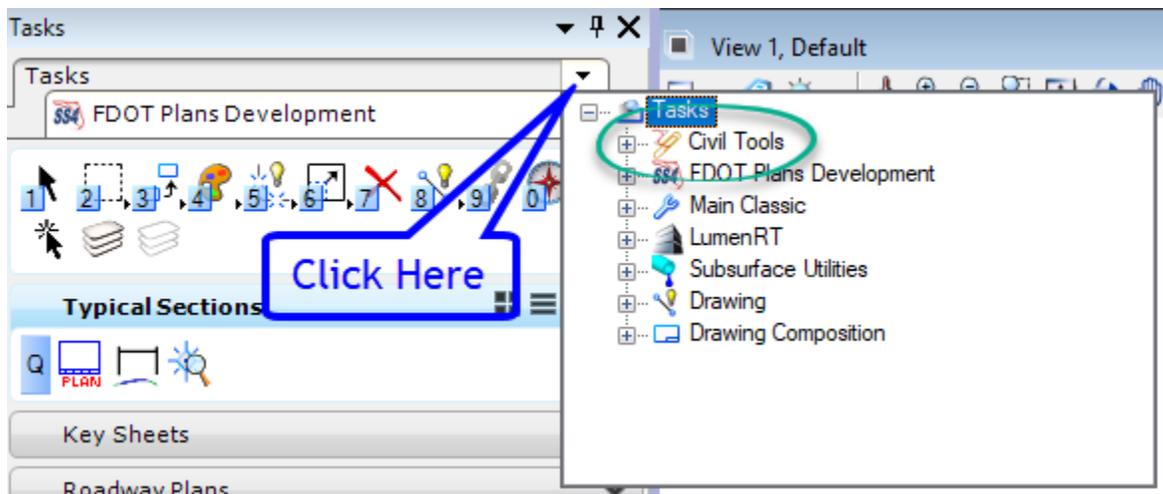
Feature Definitions control symbology, annotation, and various other properties applied to the geometric elements.

FDOT built the Feature Definitions by using an existing feature table from the GEOPAK (DDB). Feature Definitions are used to:

- o Define what the geometric elements are; what is being modeled such as curb, centerline, edge of pavement, etcetera.
- o Control symbology in various views, including capability to define differing symbology in plan, profile, and 3D spaces.
- o Define terrain model attributes (spot, break line, void, etcetera).
- o Define surface display characteristics.

CIVIL TOOL TASK MENU

The Civil Tools Task Menu contains tools for the OpenRoads Technology civil applications. These tools require the use of Civil Features. These tools will be used to layout an intelligent Signing Design that is dynamic with the Roadway Design.



3 CREATING A KEY SHEET

OBJECTIVE

The objective of this chapter is to teach the designer how to create a Key Sheet that meets the FDOT CADD standards and criteria defined in the Plans Preparation Manual.

GENERAL INFORMATION

The key sheet is the first sheet of a component set of the construction plans. The information shown on the key sheet varies depending on whether the component is the lead for the project. Traffic Plans components in most cases are not the lead and therefore do not require all the information that a lead key sheet requires. Refer to Chapter 3 Volume 2 of the *Plans Preparation Manual* for more information.

The following list contains the requirements for a Key Sheet.

- Place the standard border cell for a key sheet.
- Fill in the Financial Project ID, Federal Funds (if applicable), County Name/Roadway Section Number, & State Road Number.
- Fill in the Construction Contract Number, Fiscal Year, & Sheet Number.
- Place the project location map & North arrow (Lead Key Sheet Only).
- Place the Florida map cell and label project location (optional for sub-components).
- List Contract Plans Components (Lead Key Sheet Only).
- Place an Index of Sheets.
- Include “Early Works” Note under Index (if applicable).
- Place the Engineer of Record (EOR) information cell & fill out.
- List the Project Manager.
- Place the Governing Standards & Specification Notes (Lead Key Sheet Only).
- Place Design Standards Revision Note (if applicable).
- List Developmental Design Standards Note (if applicable).
- Complete Revision Box (if applicable).
- Complete Key Sheet Revision Box (if applicable).
- Place Goes-with Note for Strung Projects. (Lead Key Sheet Only).

PROJECT LOCATION MAP

Florida county maps are available for download from the FDOT Surveying & Mapping web page. <http://www.dot.state.fl.us/surveyingandmapping/countymap.shtm>. The county maps are available in DGN or PDF file format. Download the DGN file into the appropriate project directory. The Key Sheet Clipping tool uses this file to attach, scale and clip the map to the key sheet.

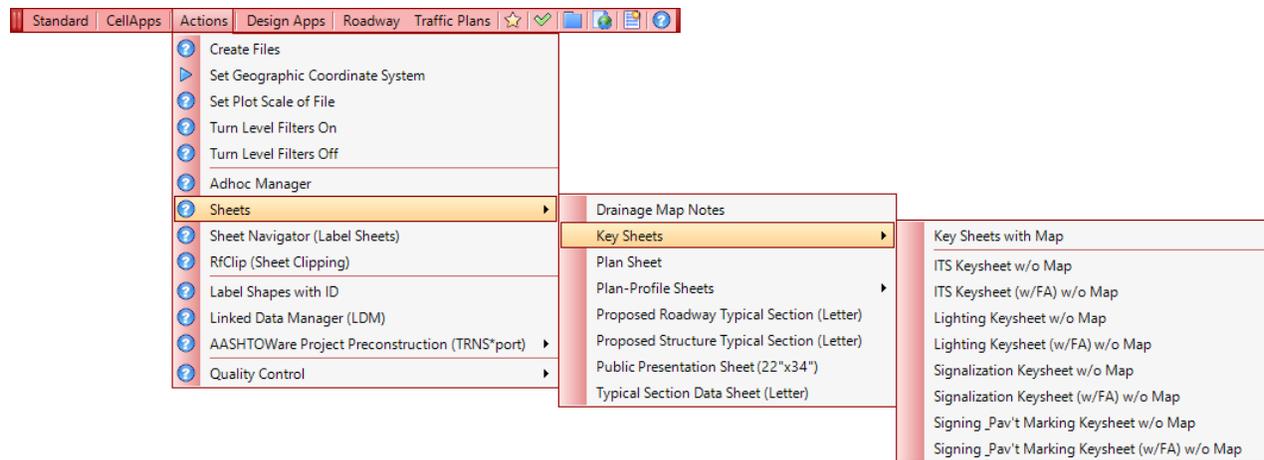
The tool places the Project Location Map in the center of the sheet and sized to ensure non-interference with other elements on the Key Sheet. Its purpose is to provide enough information to understand easily the project location. Township, Range, and County lines and numbers are shown to make the location clear.

The following list contains the requirements for the Location Map.

- Place the Section, Township and Range line labels.
- Label Begin & End Project Limits (Milepost - correct to three decimal places & Station - to 2 decimal places).
- Label Begin & End Bridge & Bridge Culvert Limits.
- Label Station Equations.
- Label Project Exception Limits.
- Label Rail Crossings within Construction Limits.

CREATE TRAFFIC DESIGN KEY SHEET

The FDOT Menu includes tools to aid in the creation of key sheets with location maps. The figure below shows the FDOT Menu options for creating a key sheet.

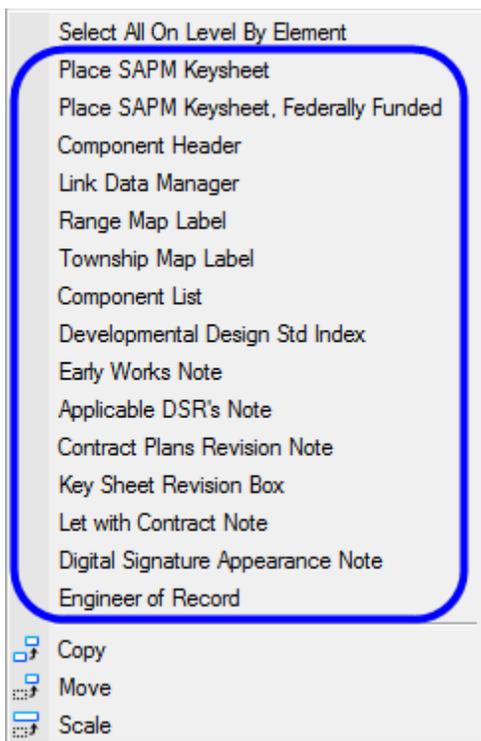


KEY SHEET WITHOUT MAP

There are multiple options to create a *Key Sheet with w/o Map*. These options are available for sub-component sets of plans that do not need a map. The Key Sheet design file is 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.

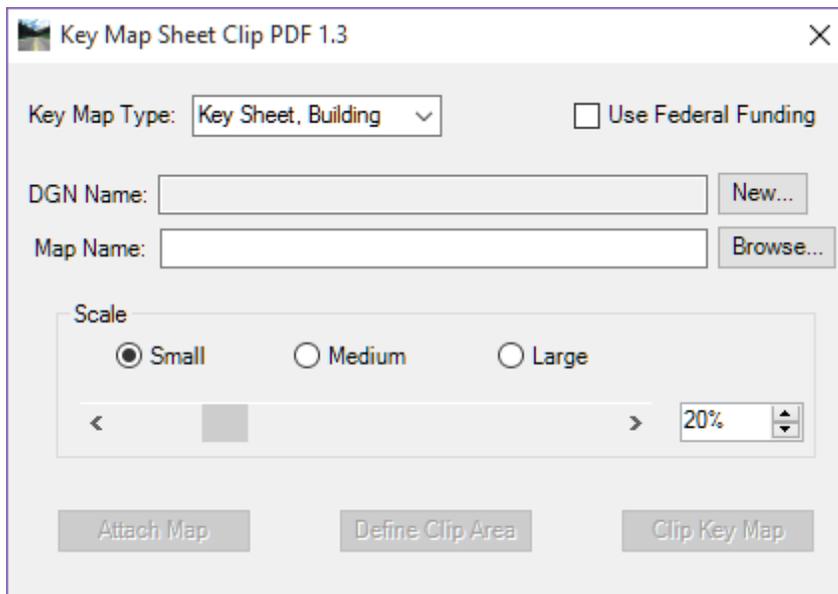
Right-click menu options are available in standard Key Sheet file, KEYSXX. The exact options will change based on the discipline (XX) key sheet file. The options include placing the discipline specific key sheet cell for a sub-component discipline as well as all the options needed for a lead key sheet. Links to place the Key Sheet cells are also available on the FDOT Menu under **Actions > Sheets > Key Sheet**.

Once the Key Sheet cell is placed in the file, the sheet is filled out with the required information for a sub-component set of 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 PDF tool. This tool creates the Key Sheet design file.



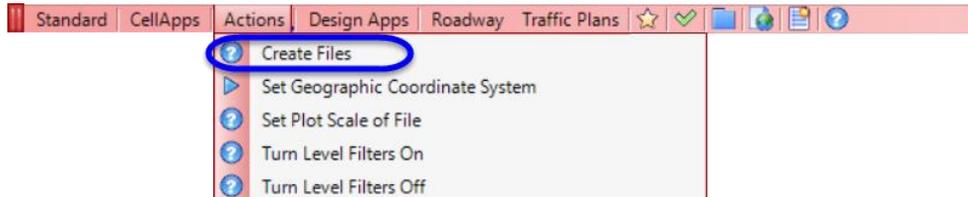
- **Key Map Type** – The list of disciplines for creating key sheets. As the component is selected, the DGN File Name will dynamically change accordingly.
- **Use Federal Funding** – If selected the Federal Funds Key Sheet cell is used.
- **DGN File Name** – Displays the working directory path and the design file name of the Key Sheet being created. 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.
- **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 discipline folder or the data folder in the project directory.
- **Scale** – This section of the dialog controls the size of the clip border for the map. General options for small, medium and large are available as default options. The slide bar below can be used to adjust the scale up and down. The scale can also be set by typing in the value or using the up/down arrow buttons.
- **Attach Map** – Attaches the PDF file to the DGN file. The *Define Clip Area* button will become active.
- **Define Clip Area/Clear Clip Area** – Attaches a square to the cursor for placement of the clip border for the map. The size of the square is defined by the Scale Place the square around the area to be clipped and enter a Data Point. Once the clip border has been placed the button changes to allow the option to clear the clip area and place again before clipping the map. The *Clip Key Map* button will become active.
- **Clip Key Map** – Clips the map and places the sheet cell. The scale of the sheet is set to 1.

Exercise 3.1 Create Key Sheet for Sub-component

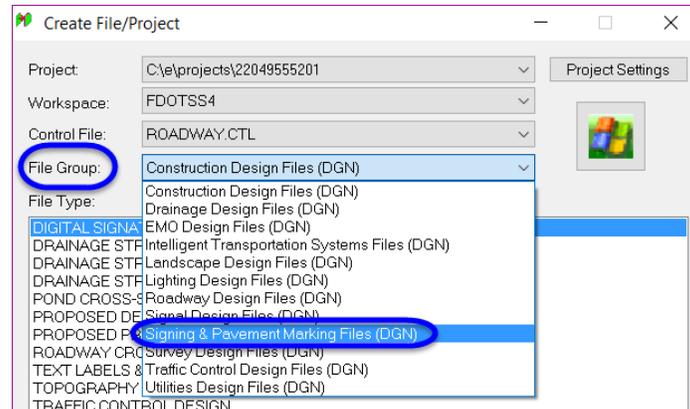
In this exercise, the recommended workflow will be used to create a Key Sheet for a sub-component set of plans.

➤ **Create the Key Sheet DGN file**

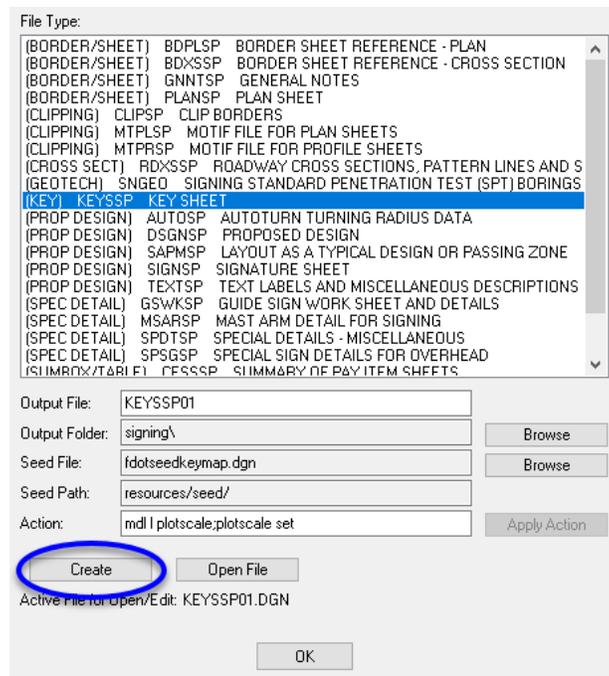
- Using the FDOT SS4 icon, open the MicroStation design file:
C:\e\projects\22049555201\roadway\DSGNP01.dgn. From the FDOT Menu select *Actions > Create Files*.



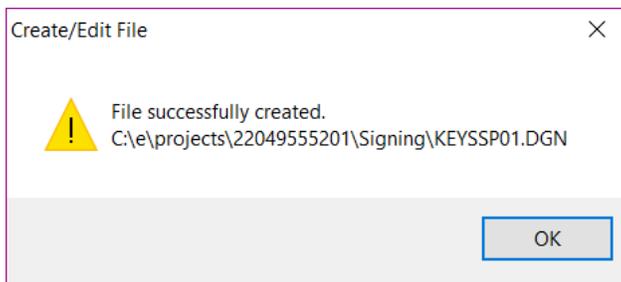
- On the Create Files/Project dialog set the *File Group* to **Signing & Pavement Marking Files (DGN)**.



- Under *File Type* select **(KEY) KEYSSP KEY SHEET** and click the **Create** button at the bottom of the dialog.



- Click **OK** on the Create/Edit File pop up box. The file has been successfully created.



- Click the **Open File** button. This will open the file and activate the *Set Plotscale* tool.

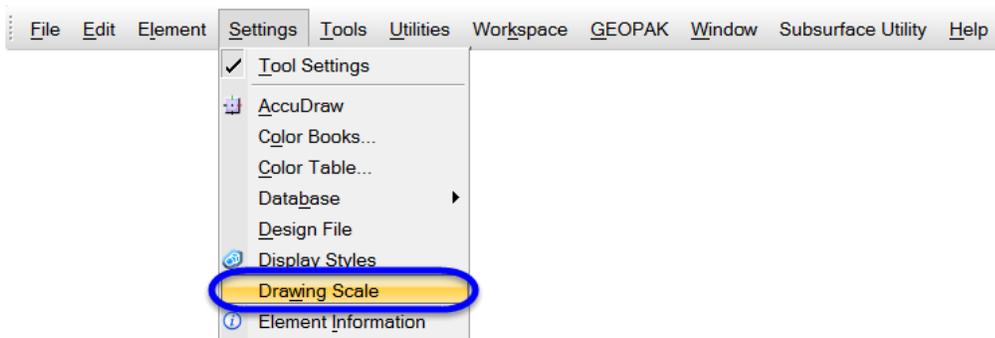


- In the *KEYSSP01.dgn* file, click **OK** on the Set/Update Plot Scale dialog to accept the scale of **50.0**.

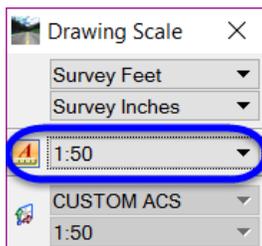


Note Since there is not a map on this Key Sheet, the plotscale of 50.0 will be acceptable.

- Click **OK** to close the Create File/Project dialog box.
- From the MicroStation menu select *Settings > Drawing Scale*.

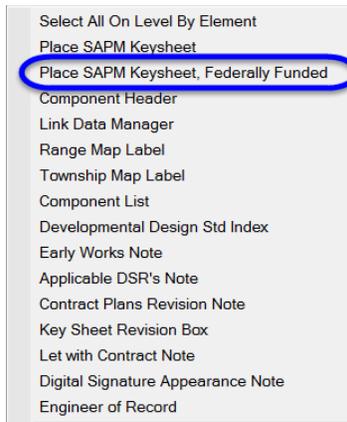


- Turn **On** Annotation Scale and set to **1:50** to match the plotscale.

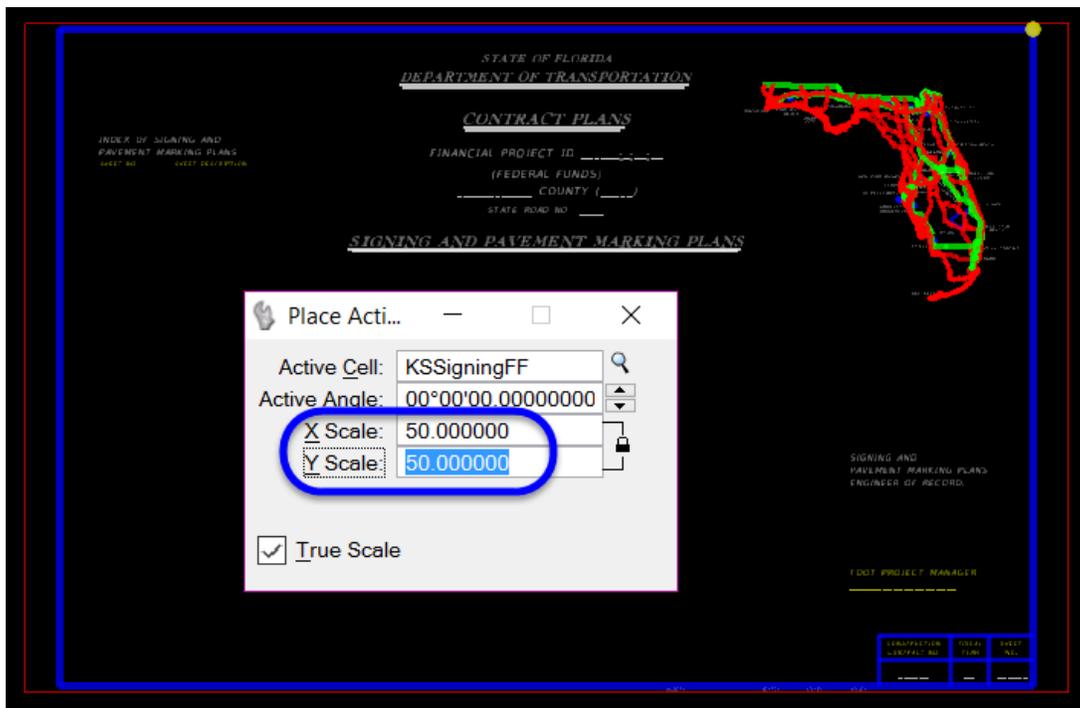


➤ **Place Key Sheet & Fill in Required Information**

1. Right-click and hold in the active view to get the context menu. Select the option **Place SAPM Keysheet, Federally Funded**.

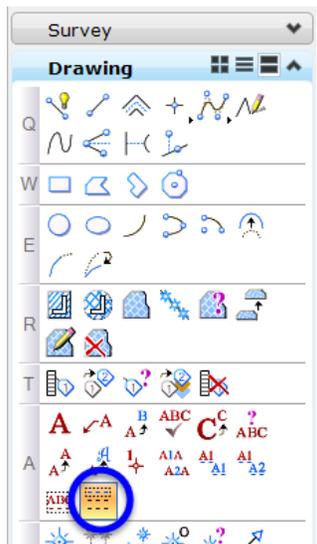


2. The Place Cell dialog will activate with the Key Sheet Border cell **KSSigningFF** set as the *Active Cell*. Set the *Scale* of the cell to **50.0** to match the plotscale and annotation scale that was set in the file.



3. **Data Point** anywhere in the MicroStation view to place the cell.
4. Fit the View to see the keysheet.

5. To edit the text fields inside the keysheet, go to the FDOT Plans Development Task Menu and select **Drawing > Auto Fill in Enter Data Fields.**

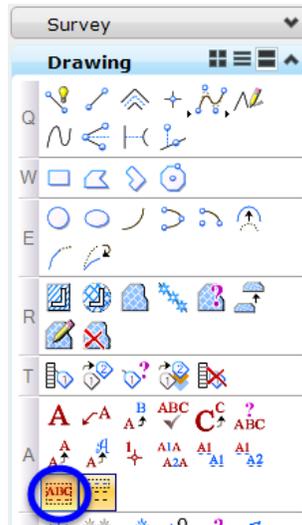


6. Click anywhere in the MicroStation view to start the tool.

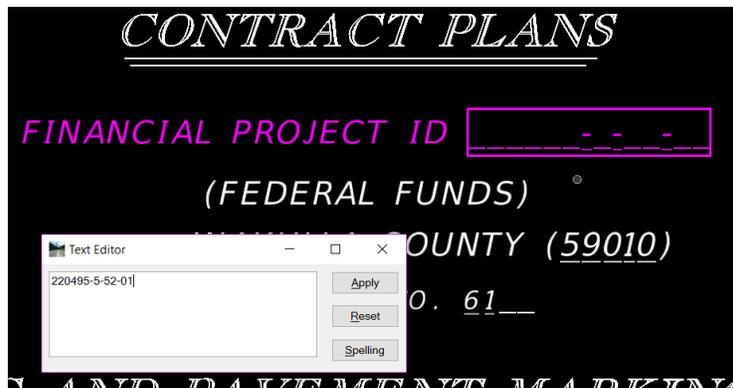


7. Type in **WAKULLA** for the *County* name, and hit the **Enter** key on the keyboard.
8. The tool selects the next empty data field in the file. Type in the following values to place all the information in the Key Sheet.
 - a. *Roadway Section Number:* 59010
 - b. *State Road No.:* 61
 - c. *Sheet No.:* S-1
 - d. *Fiscal Year:* 18
 - e. *Contract No.:* T-8888
 - f. *Project Manager:* Annie Engineer

- From the FDOT Plans Development Task Menu, select **Drawing > Enter Data Fields**.



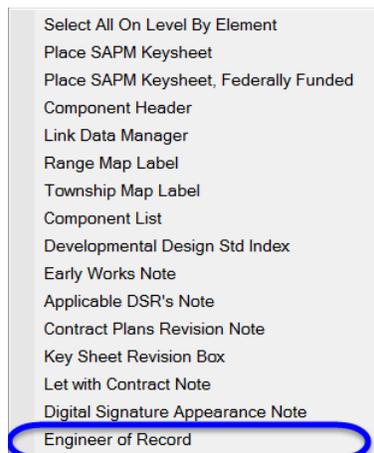
- Click on the enter data field for the *Financial Project ID*. The field will highlight and the Text Editor dialog opens.
- Enter the value **220495-5-52-01** and click in the screen to update the Project ID.



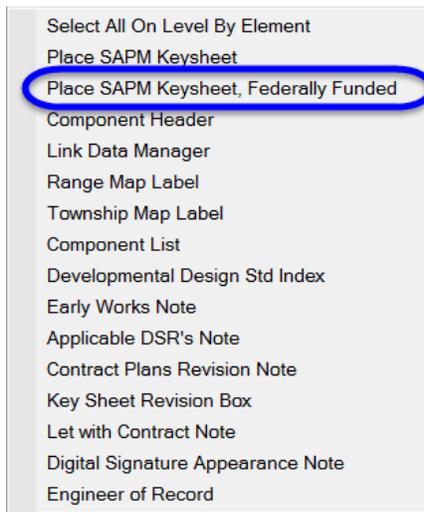
➤ **Place & Edit the Engineer of Record Information**

The Engineer of Record information is placed as cell that can be edited with the engineer’s information.

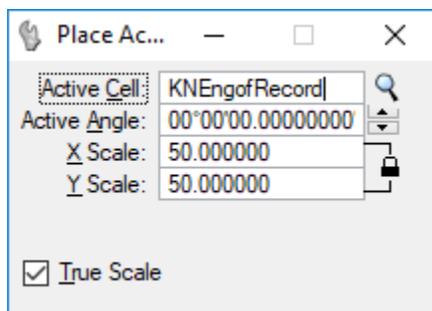
- Right-click and hold in the MicroStation view. From the context menu, select Engineer of Record.



- Right-click and hold in the active view to get the context menu. Select the option **Place SAPM Keysheet, Federally Funded**.

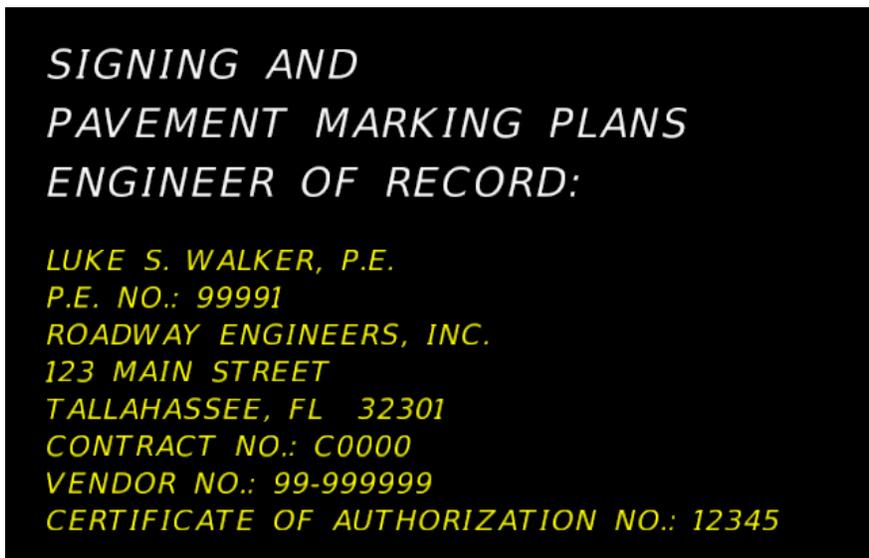


- The MicroStation Place Active Cell command will activate with **KNEngofRecord** set as the *Active Cell*.



- Data point** in the lower left corner of the **BLUE** Key Sheet border to place the cell.

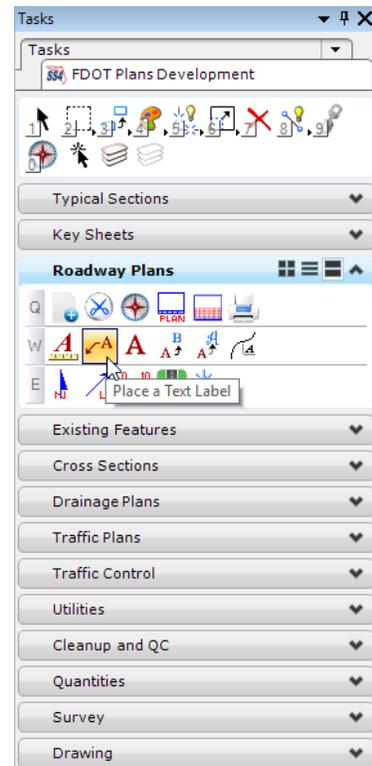
- Use the **Edit Text**  tool to enter the P.E. and company information as shown below.



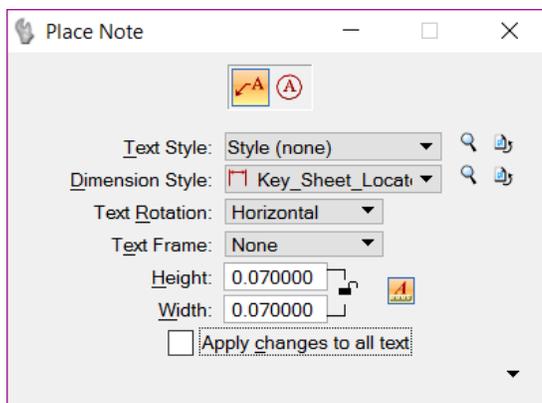
➤ **Label the Project Location on the Florida Map**

The Florida Map is optional for sub-component key sheets, however they are included on all key sheets cells.

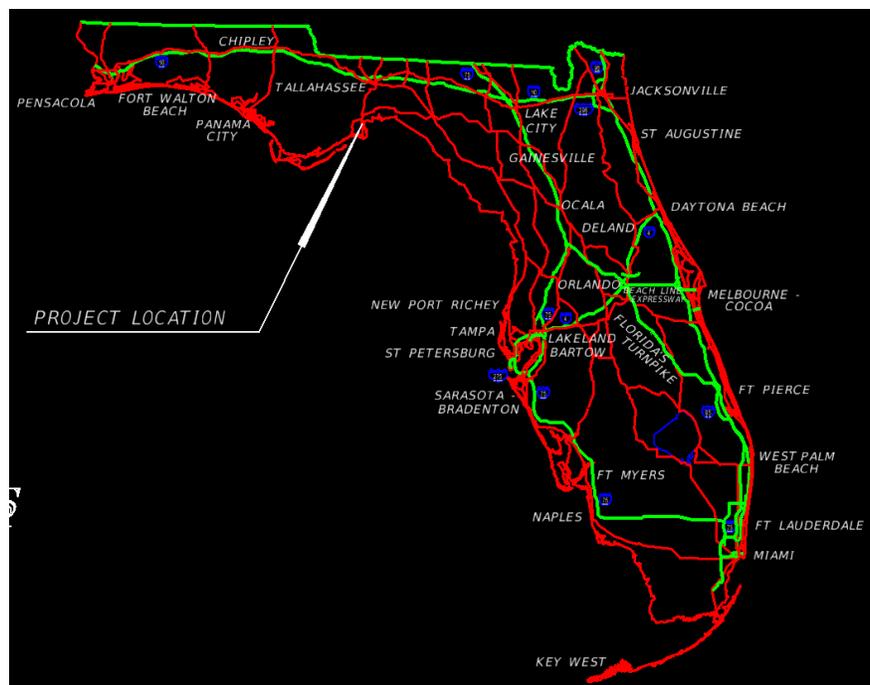
1. From the FDOT Plans Development Task Menu, select **Roadway Plans > Place a Text Label**.



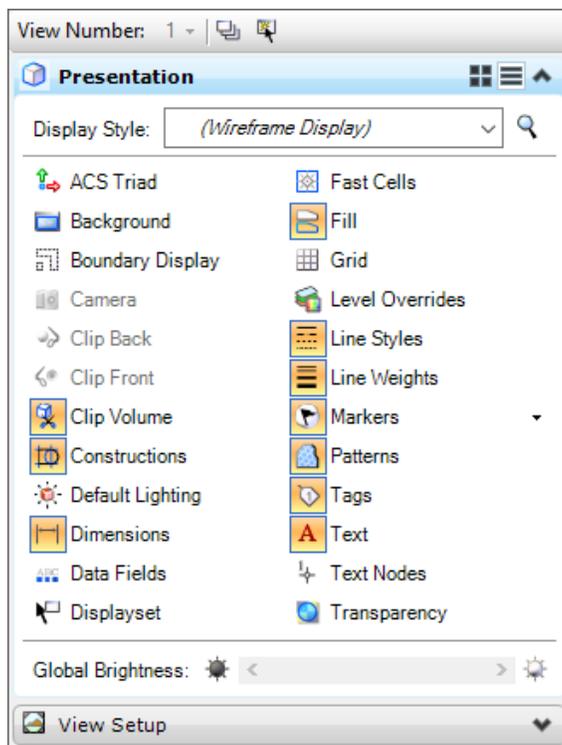
2. The Place Note dialog opens. Set the parameters on the dialog as shown below:



3. Type PROJECT LOCATION into the *Text Editor*, find the general project location on the Florida map and **data point**, position the label, and **data point** again to place it. The label should display as shown below.



4. Go to the MicroStation *View* options and turn **Off** *Data Fields*.



5. **Fit View** in MicroStation.
6. Select **File > Save Settings**.

➤ **Additional Key Sheet Information**

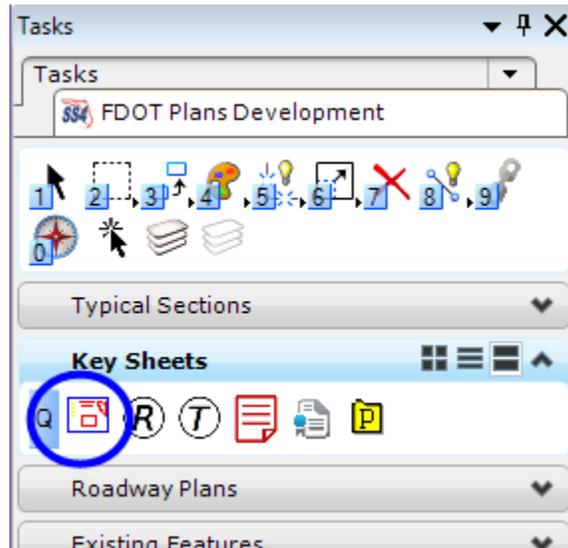
As the need arises, other items may be required on the Key Sheet. These include the Contract Plans Revision Note, the Key Sheet Revision Box, Developmental Design Standards list, Applicable DSR’s Note, and Early Works Note. These items can be placed as cells on the Key Sheet in the same way the Engineer of Record cell from the context menu and modified as needed using the Edit Text or Enter Data Field tools.

Exercise 3.2 Key Sheet with a Location Map (Optional)

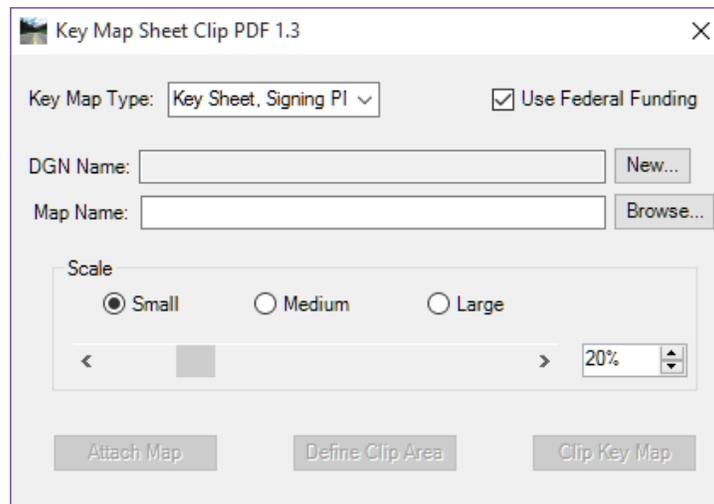
This optional exercise is provided to show how to use the FDOT Key Map Sheet Clip PDF tool.

➤ **Create the Key Sheet**

1. Continuing in the *KEYSSP01.dgn* file, from the FDOT Plans Development Task Menu, select **Key Sheets > Create Key Sheet**. This opens the Key Map Sheet Clip dialog.

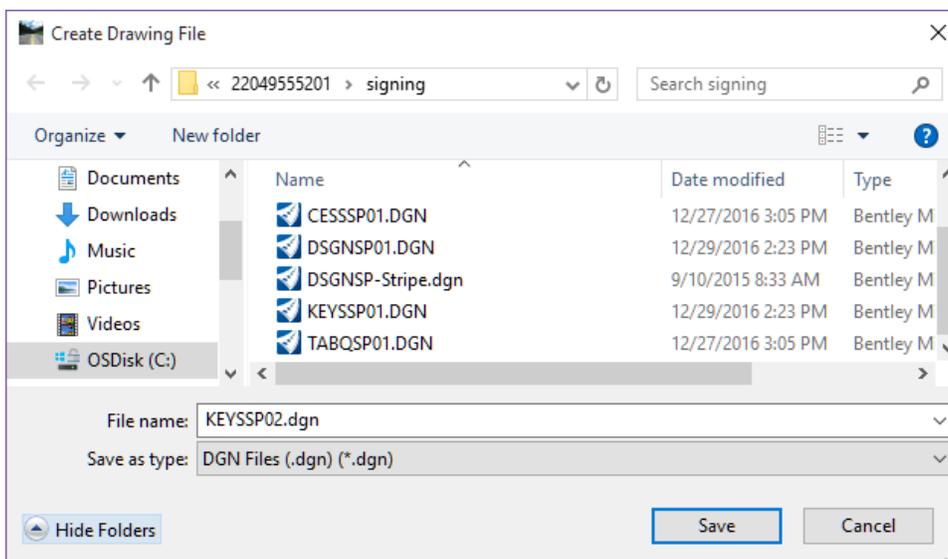


2. Set the top portion of the dialog as follows:
 - a. *Key Map Type* – **Key Sheet, Signing PM**
 - b. *Scale* – **Small**
 - c. Toggle **On Use Federal Funding**



3. For the *DGN Name*, click the **New...** button.

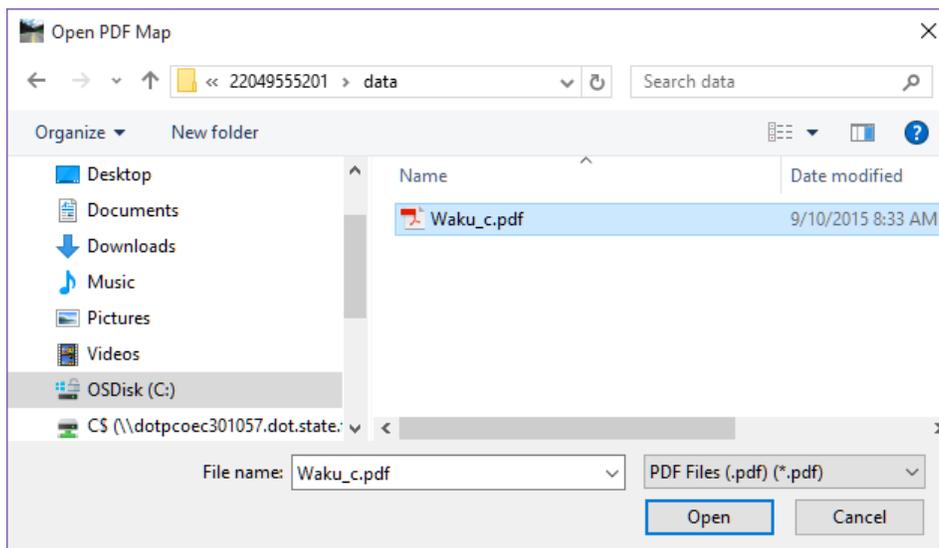
4. Modify the file name to *KEYSSP02.dgn* (if the tool did not default to the correct file name).



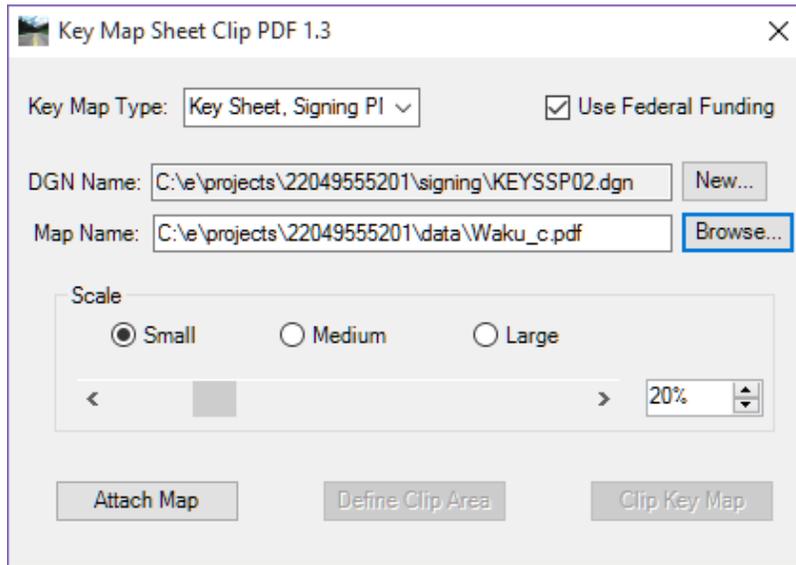
5. Click the **Save** button. This will create and open the Key Sheet File.
6. Click the **Browse...** button next to *Map Name*. The full county map PDF file can be downloaded from the FDOT Surveying and Mapping web site.
7. Navigate to the *C:\e\projects\22049555201\data* folder.

Note This folder location for the county map may vary at each office. It may also be saved to the discipline directory of the lead component.

8. Select the *Waku_c.pdf* file and click **Open**. This will populate the *Map Name* field in the Key Map Sheet Clip PDF dialog.



- Key Map Sheet Clip PDF dialog should display as shown below. Notice all the fields are populated, and the **Attach Map** button is now active.



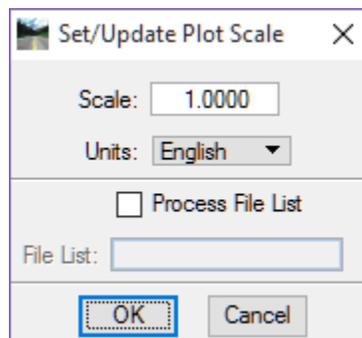
- Click the **Attach Map** button. The County Map PDF file is attached to the DGN file.
- Click the **Define Clip Area** button. A boundary is attached to the cursor.
- Use any of the MicroStation **zoom** or **pan** tools to move to the area of the project, the Intersection of SR61 and US98. The area does not have to be exact.
- Data Point** to place the *Clip Area* boundary. To redefine the clip area, click the **Clear Clip Area** button and repeat the steps to select a different clip area.
- Once the boundary is in the desired location, Click the **Clip Key Map** button. This clips the map PDF as a reference and places the key sheet cell.
- Close the Key Map Sheet Clip PDF dialog.

➤ **Label the Key Sheet – Sheet Navigator**

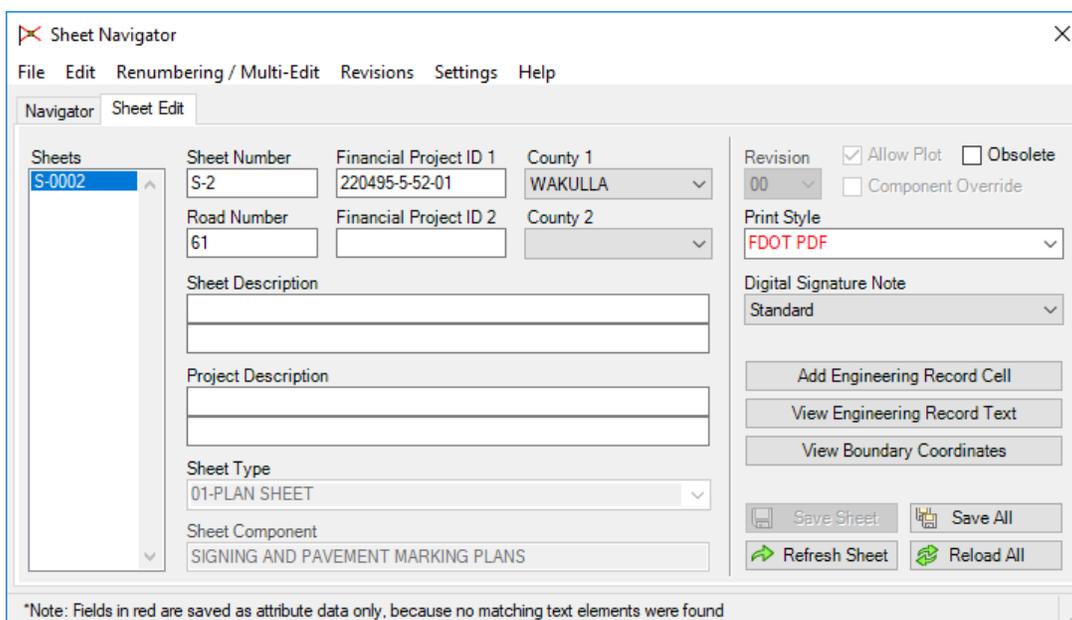
- Continuing in *KEYSSP02.dgn*, select **Actions > Set Plot Scale of File** from the FDOT Menu.

Note The plot scale of the file is set to **50**. This is the default value set in the seed file. The Key Sheet was placed at a scale of 1. It is very important to set the plot scale to match the sheet cell before completing *Sheet Navigator*; the Digital Signature Note is dependent on the plot scale.

- Set the *Scale* to **1.0** and click **OK**.



3. From the FDOT Menu, select **Actions > Sheet Navigator (Labels)** to launch Sheet Navigator.
4. From the Sheet Navigator **Sheet Edit** tab:
 - a. For the *Sheet Number*, type in the number **S-2**.
 - b. For the *Financial Project ID*, type in **220495-5-52-01**.
 - c. For the *County*, select the drop-down menu and navigate to **WAKULLA**.
 - d. For the *Road Number*, type in **61**.
 - e. For the *Print Style*, select **FDOT PDF** from the drop-down menu.
 - f. For the *Digital Signature Note*, select **Standard** from the drop-down menu.
5. Click the **Save Sheet** button. This will tag the file with all the pertinent information and populates the fields in the key sheet.



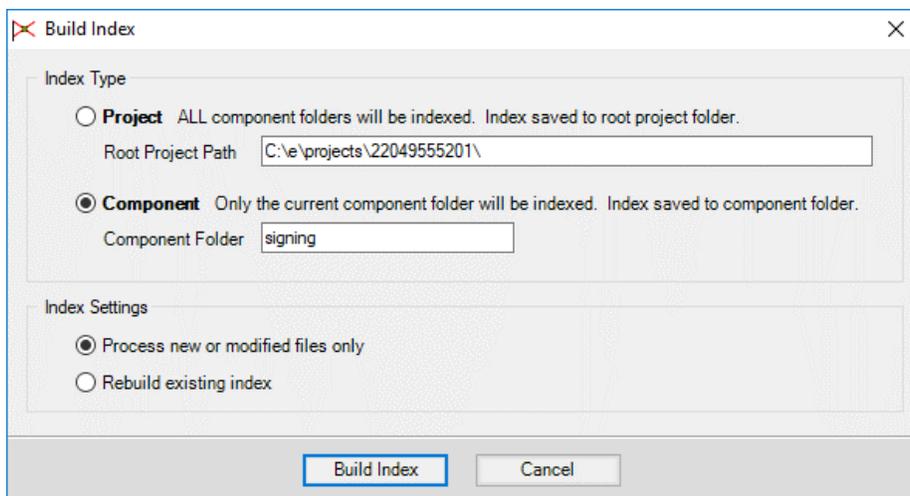
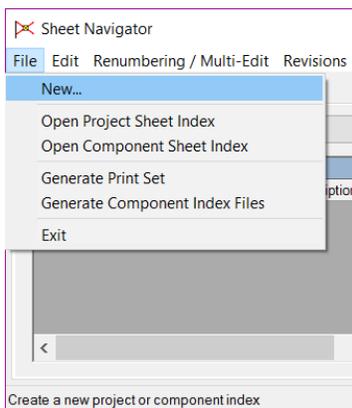
➤ **Creating and Placing the Key Sheet Index (Part 1)**

There are two options through Linked Data Manager (LDM) to link/create the index. The first option is to create a text file KSIndexSPM.txt. This file can be linked to the Key Sheet and manually updated as needed to keep the index current. This method requires manual updates to the text file linked to the key sheet. This is not the recommended workflow.

The second, recommended, option is to use Sheet Navigator to generate the index and then link this file to the key sheet using LDM. As sheets are added to the plans, update the index and then regenerate the component index. This process will help automate the sheet index list to keep it up to date.

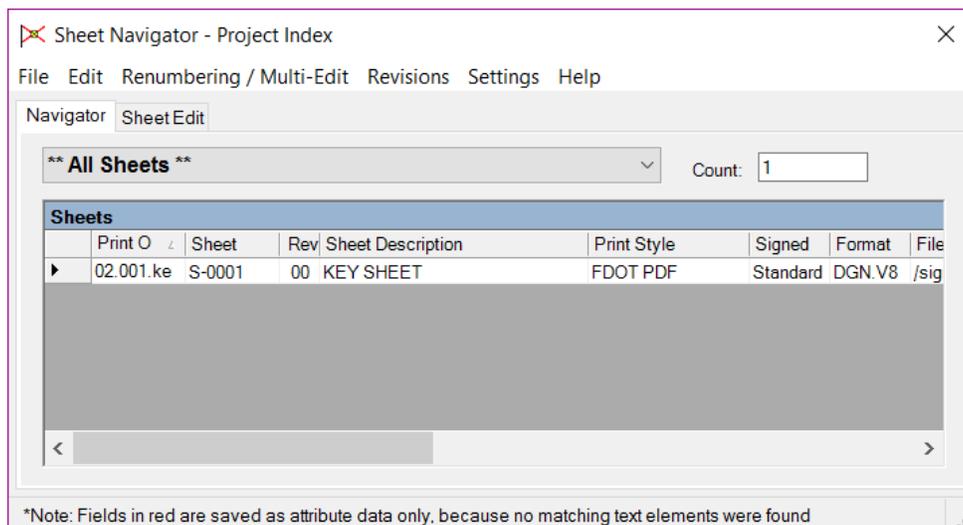
This part of the exercise will go through the recommended workflow using Sheet Navigator and LDM.

1. From Sheet Navigator, select the **Navigator** tab.
2. Select **File > New**. This opens the Build Index dialog.

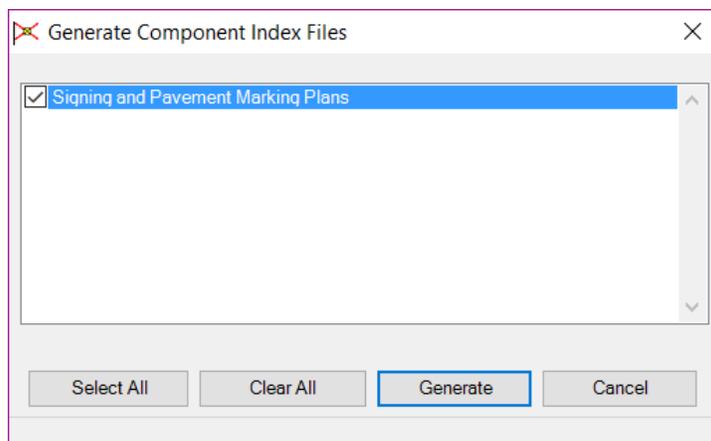


3. For the *Index Type*, select the **Component** option.
4. For the *Index Settings*, select the **Process new or modified files only** option.
5. Click the **Build Index** button. This creates *sheetinfo.xml* in the *Project* folder.

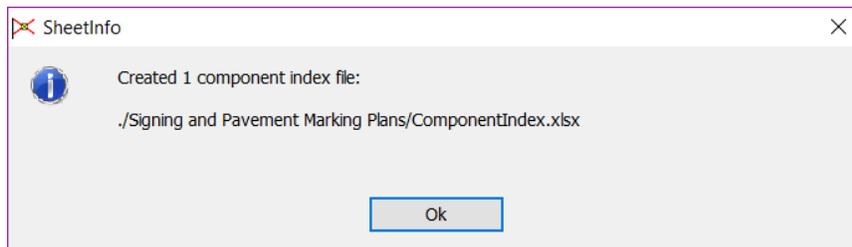
- MicroStation will close and the **CADmanage (CM.Batch)** process will run. When complete, MicroStation will re-open and Sheet Navigator will display the *Index* on the *Navigator* Tab.



- From Sheet Navigator select **File > Generate Component Index Files**. This opens the Generate Component Index Files dialog.



- Toggle **On** the check box for *Signing and Pavement Marking Plans*.
- Click the **Generate** button. Sheet Navigator will create 1 component index file saved to the discipline folder of the project directory.



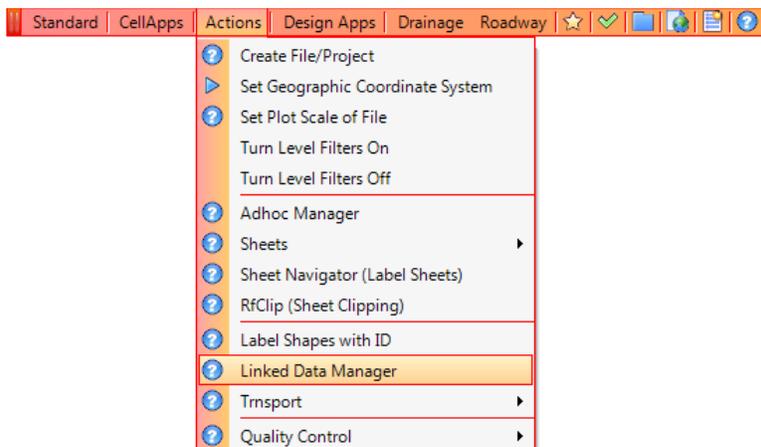
- Click the **Ok** button.
- Close Sheet Navigator.

➤ **Creating and Placing the Key Sheet Index (Part 2)**

1. Zoom in around the text *INDEX OF SIGNING AND PAVEMENT MARKING PLANS* on the left-hand side of the sheet.

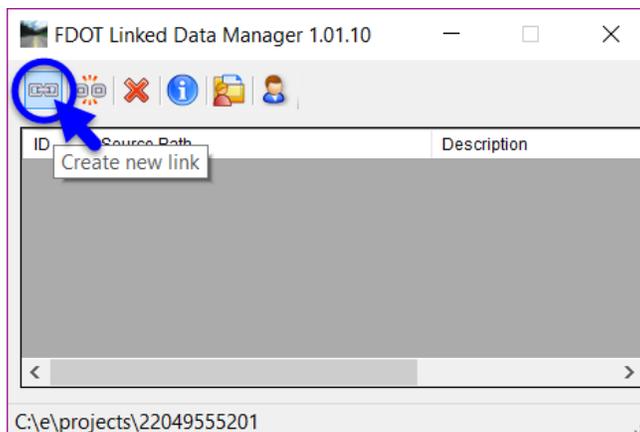


2. Navigate to the FDOTSS4 Menu **Actions > Linked Data Manager**.

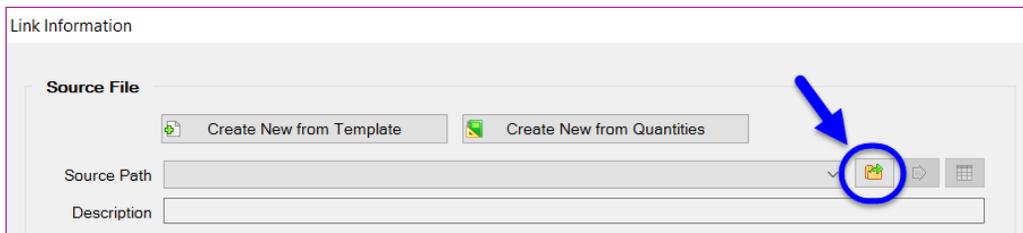


Note Linked Data Manager can also be accessed from the right-click menu.

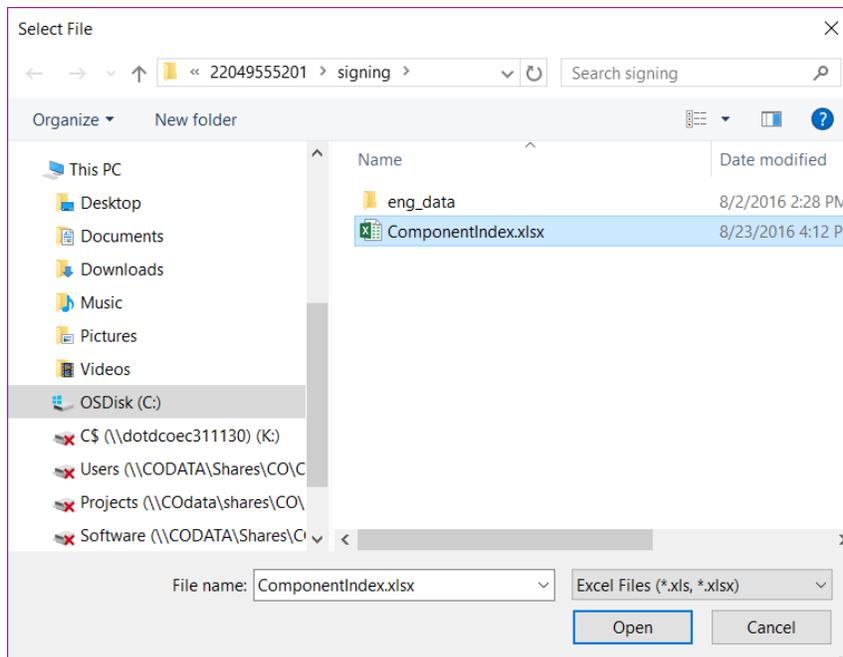
3. Click the **Create New Link** button.



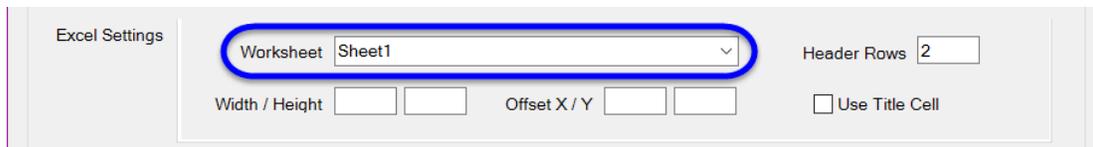
4. On the Link Information dialog, click the **Select Existing File** button.



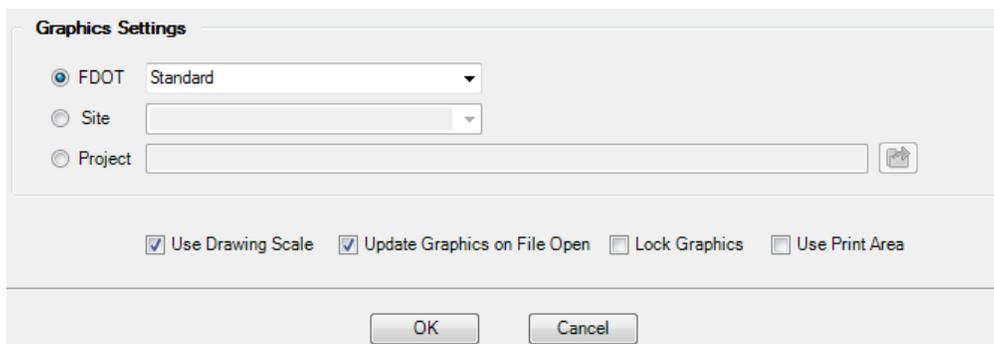
5. Select the *ComponentIndex.xlsx* and click the **Open** button.



6. For the *Excel Settings*, set the *Worksheet* to **Sheet 1** as shown below.



7. Set the *Graphic Settings* as shown below.



8. Click the **OK** button.

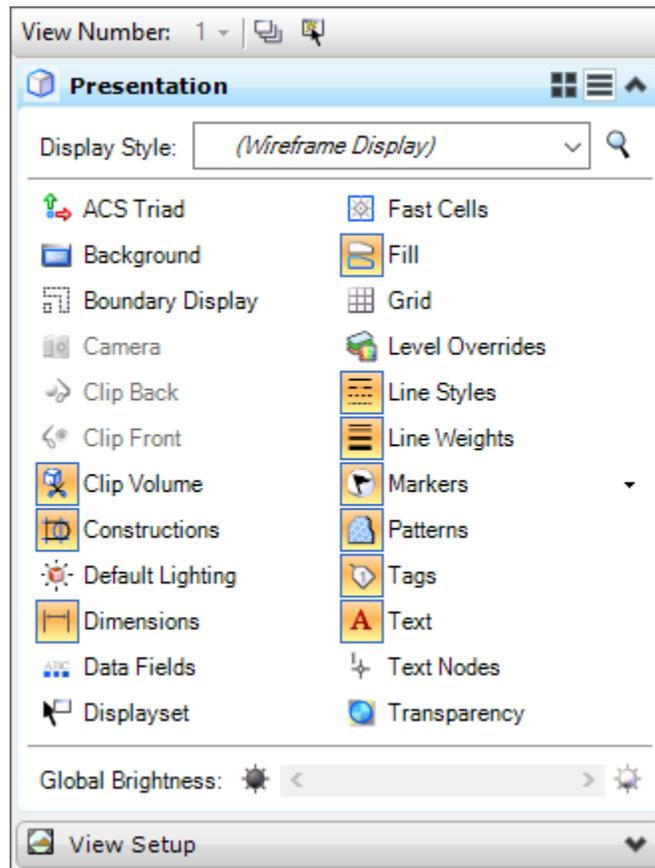
9. Snap to the origin of the text **SHEET NO.** This will line up the text properly.



10. **Data Point** to place the Text Link.
11. Close Linked Data Manager.
12. Take a moment to review the key sheet.

Note For more in-depth details on creating a lead key sheet with a location map, see the *FDOT Plan Development Workflows manual, Chapter 2*.

13. Go to the MicroStation *View* options and turn **Off Data Fields**.



14. **Fit View** in MicroStation.
15. Select **File > Save Settings**.

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4 CREATING MISCELLANEOUS SHEETS

OBJECTIVE

This chapter will teach the designers how to create miscellaneous sheets using the FDOT CADD resources.

- General Notes
- Special Details sheets

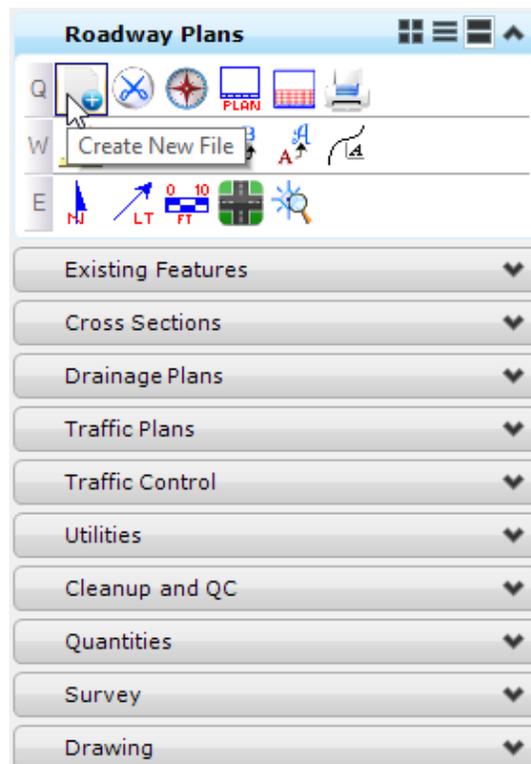
INTRODUCTION

Creating the General Notes sheet is now done through Linked Data Manager (LDM) and is a very simple process. Use the Create File/Edit tool to create the design file, use the FDOT Menu to place the sheet border and then use LDM to create the standard notes file and link it to the DGN file.

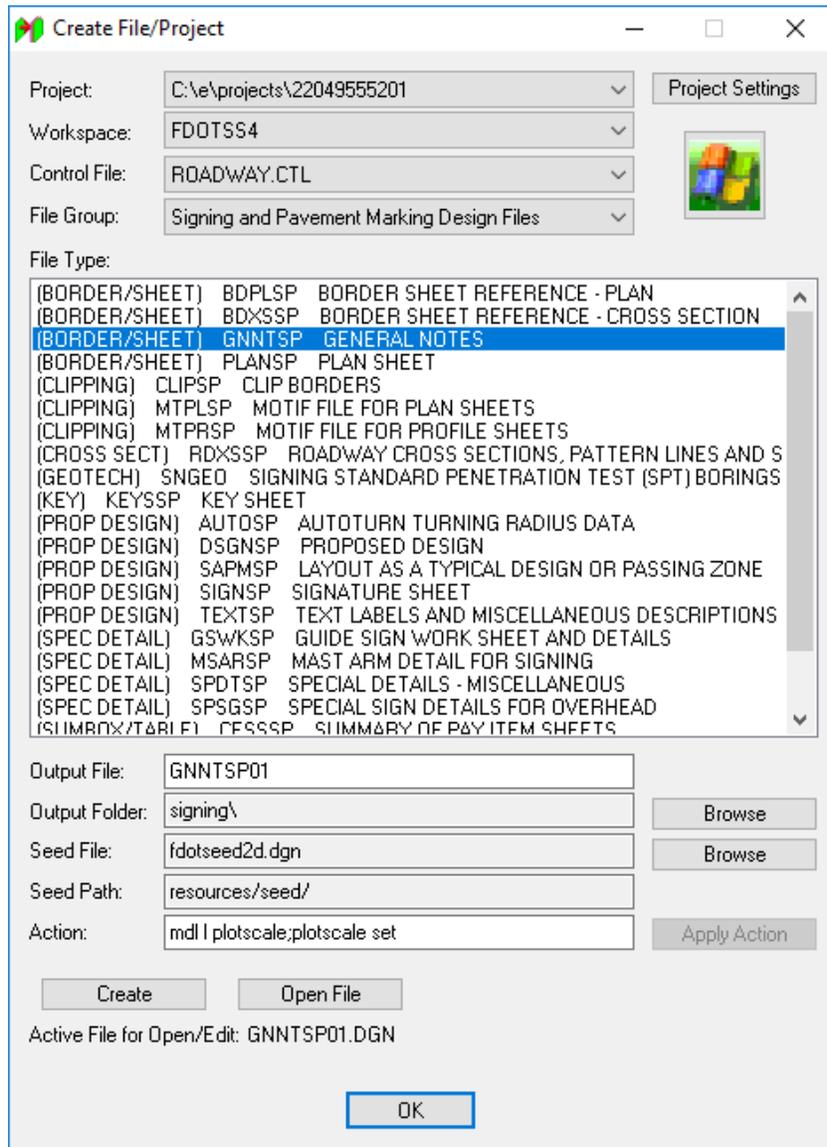
Exercise 4.1 *Create Signing & Pavement Markings General Notes Sheet*

In this exercise the designer will create the General Notes design file, place the standard plan sheet border, and place general notes on the sheet.

1. From the FDOT Plans Development Task Menu, select **Roadway > Create New File**.

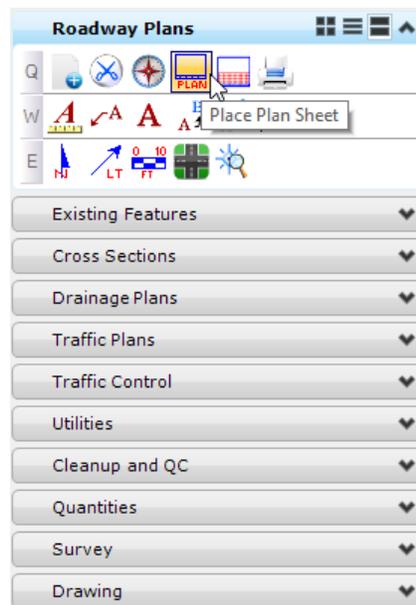


2. The Create File/Project dialog displays.
 - a. Complete the Create File/Project dialog as shown below to create the file *GNNTSP01.dgn* in the *signing* folder.

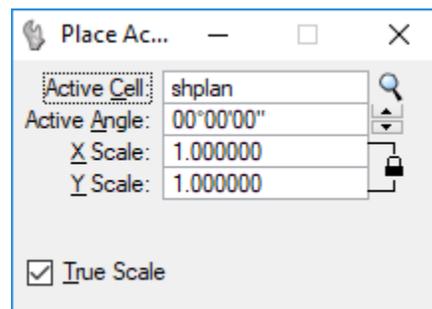


- b. Click **Create** to create the file and **Open File** to open the file.
 - c. Close the Create File/Project tool.
3. Once the file is open, set the *Plot Scale* to **1.0** and click the **OK** button on the Set/Update Plot Scale dialog.

- From the FDOT Plans Development Task Menu, select **Roadway > Place Plan Sheet** to place the plan sheet cell.



- The MicroStation Place Active Cell dialog displays with **SHPlan** set as the *Active Cell*. Set the *Scale* to **1.0**.



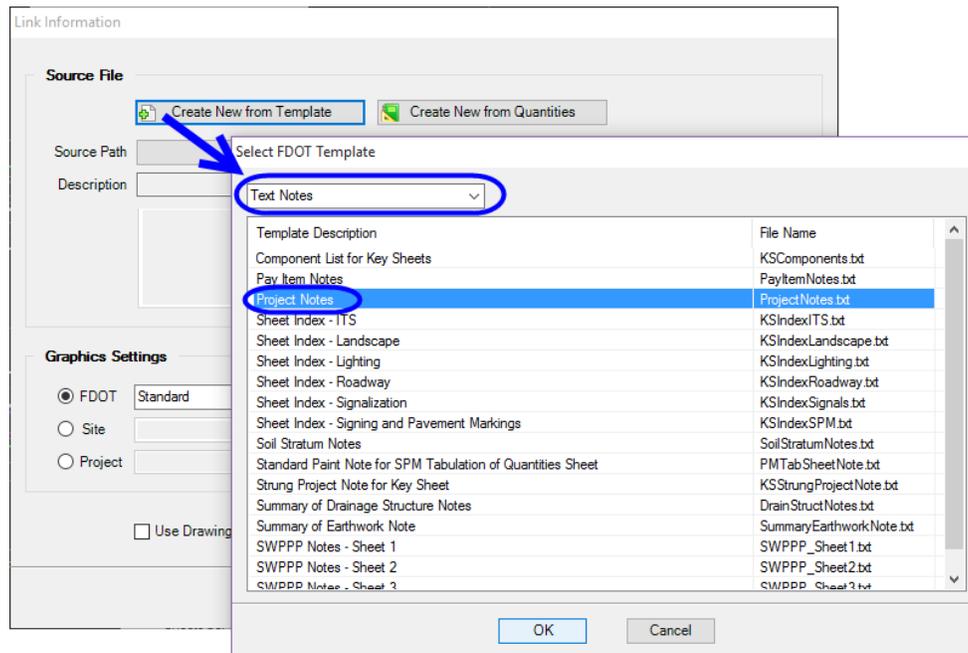
- Data point** to place the cell in the file. **Reset** when finished to get out of the *Place Cell* command.
- Fit the View. 
- From the FDOT Menu, select **Actions > Linked Data Manager**.
- Click the **Create New Link** icon.



- On the Link Information dialog, click the **Create New from Template** button.

11. On the Select FDOT Template dialog, select **Project Notes** from the list of *templates*.

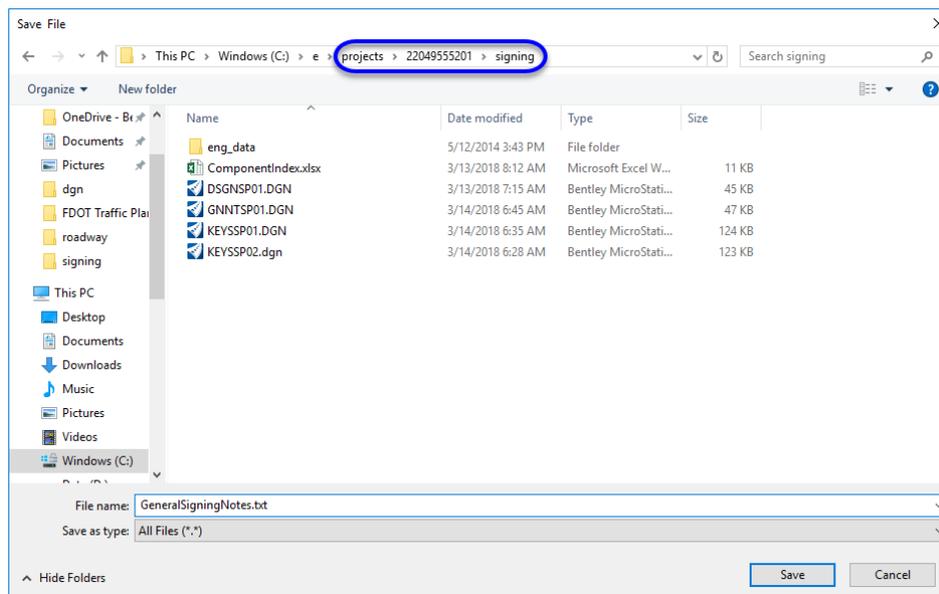
Note The Project Notes are available as Text Notes (.txt file) or a Word Document (.docx file.)



Note This template has the notes from the PPM for a Roadway component set of plans. It is being used to save time. Any Word or txt file can be linked to the file with the project/component specific notes.

12. Click the **OK** button to continue.

13. Rename the file to **GeneralSigningNotes.txt** and save the file to the *signing* folder.



14. Set the Link Information dialog as shown in the image below:

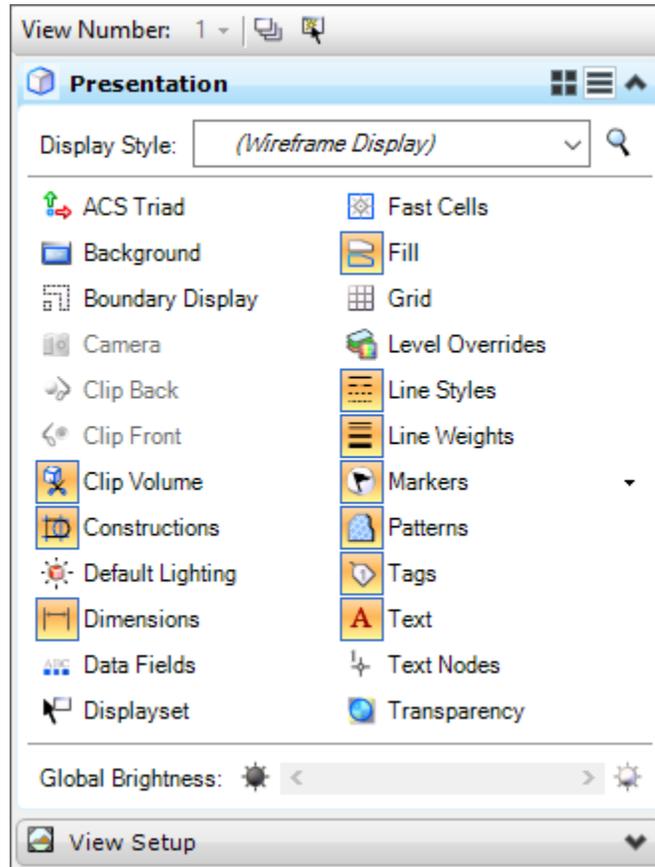
15. Click the **OK** button and place the **General Notes** in the center of the **Plan Sheet**.

16. From the FDOT Menu, select **Actions > Sheet Navigator (Labels)** to launch Sheet Navigator.

17. From Sheet Navigator Sheet Edit tab:

- a. For the *Sheet Number*, type in **S-3**.
- b. For the *Financial Project ID*, type in **220495-5-52-01**.
- c. For the *County*, select the drop-down menu and navigate to **WAKULLA**.
- d. For the *Road Number*, type in **61**.
- e. For the *Sheet Description*, type in **GENERAL NOTES**
- f. For the *Print Style*, select **FDOT PDF** from the drop-down menu.
- g. For the *Digital Signature Note*, select **Standard** from the drop-down menu.

18. Click the **Save Sheet** button.
19. Close the Sheet Navigator dialog.
20. Go to the MicroStation *View* options and turn **Off** *Data Fields*.



21. **Fit View** in MicroStation.
22. Select **File > Save Settings**.

Exercise 4.2 Create Standard Mast Arm Sheet

In this exercise, a Standard Mast Arm Tabulation Sheet will be created using the FDOT Task Menu, cells, and Linked Data Manager.

1. From the FDOT Plans Development Task Menu, select **Roadway > Create New File**.

2. The Create File/Project dialog displays.

Create File/Project

Project: C:\e\projects\22049555201 Project Settings

Workspace: FDOTSS4

Control File: ROADWAY.CTL

File Group: Signal Design Files

File Type:

- (BORDER/SHEET) BDPLSG BORDER SHEET REFERENCE - PLAN SHEET
- (BORDER/SHEET) GNNTSG GENERAL NOTES
- (BORDER/SHEET) PLANSG PLAN SHEET
- (CLIPPING) CLIPSG CLIP BORDERS
- (CLIPPING) MTPLSG MOTIF FILE FOR PLAN SHEETS
- (CLIPPING) MTPRSG MOTIF FILE FOR PROFILE SHEETS
- (GEOTECH) SGGEO SIGNALIZATION STANDARD PENETRATION TEST (SPT) BORIN
- (KEY) KEYSSG KEY SHEET
- (PROP DESIGN) DSGNSG PROPOSED DESIGN AND SIGNAL INFORMATION
- (PROP DESIGN) SIGNSG SIGNATURE SHEET
- (PROP DESIGN) TEXTSG TEXT LABELS AND MISCELLANEOUS DESCRIPTIONS
- (SPEC DETAIL) GSWKSG GUIDE SIGN WORK SHEET AND DETAILS
- (SPEC DETAIL) SSDTSG SPECIAL SIGN DETAILS AND MISCELLANEOUS DETAILS
- (SPEC DETAIL) VHLPNG SPECIAL LOOP DETAILS AND INSTRUCTIONS
- (SUMBOX/TABLE) CESSG SUMMARY OF PAY ITEM SHEETS
- (SUMBOX/TABLE) MSSGSG MAST ARM DETAIL AND TABLES**
- (SUMBOX/TABLE) PLDTSG POLE TABULATION AND DETAILS - ALL TYPES
- (SUMBOX/TABLE) TABQSG TABULATION OF QUANTITY SHEETS
- (TOPOGRAPHY) TOPOSG TOPOGRAPHY - EXISTING

Output File: MSSGSG01

Output Folder: signals\ Browse

Seed File: fdotseed2d.dgn Browse

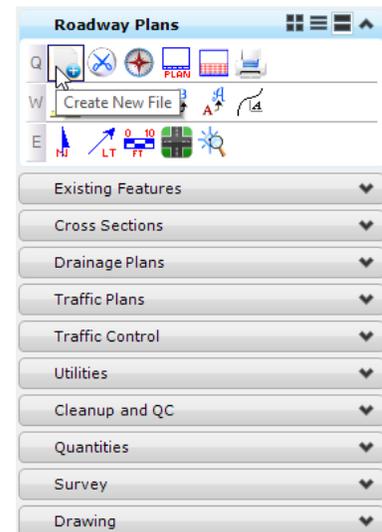
Seed Path: resources/seed/

Action: mdl | plotscale.plotscale set Apply Action

Create Open File

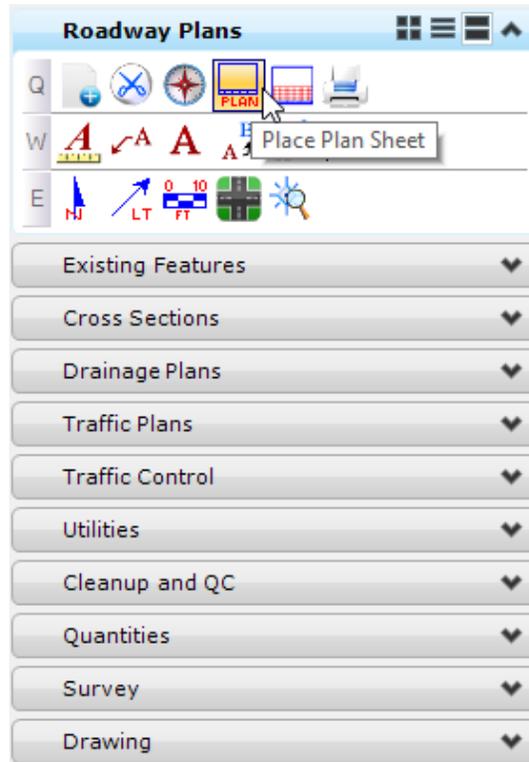
Active File for Open/Edit: MSSGSG01.DGN

OK

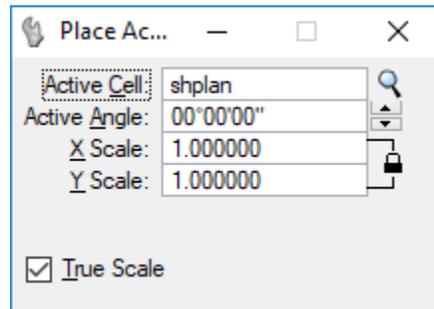


- a. Complete the **Create File/Project** dialog as shown below to create the file *MSSGSG01.dgn* in the *signals* folder.
- b. Click **Create** to create the file and **Open File** to open the file.
- c. Close the **Create File/Project** tool.

3. Once the *MSSGSG01.dgn* file is open, set the *Plot Scale* to **1.0** and click the **OK** button on the Set/Update Plot Scale dialog.
4. From the FDOT Plans Development Task Menu, select **Roadway > Place Plan Sheet**.

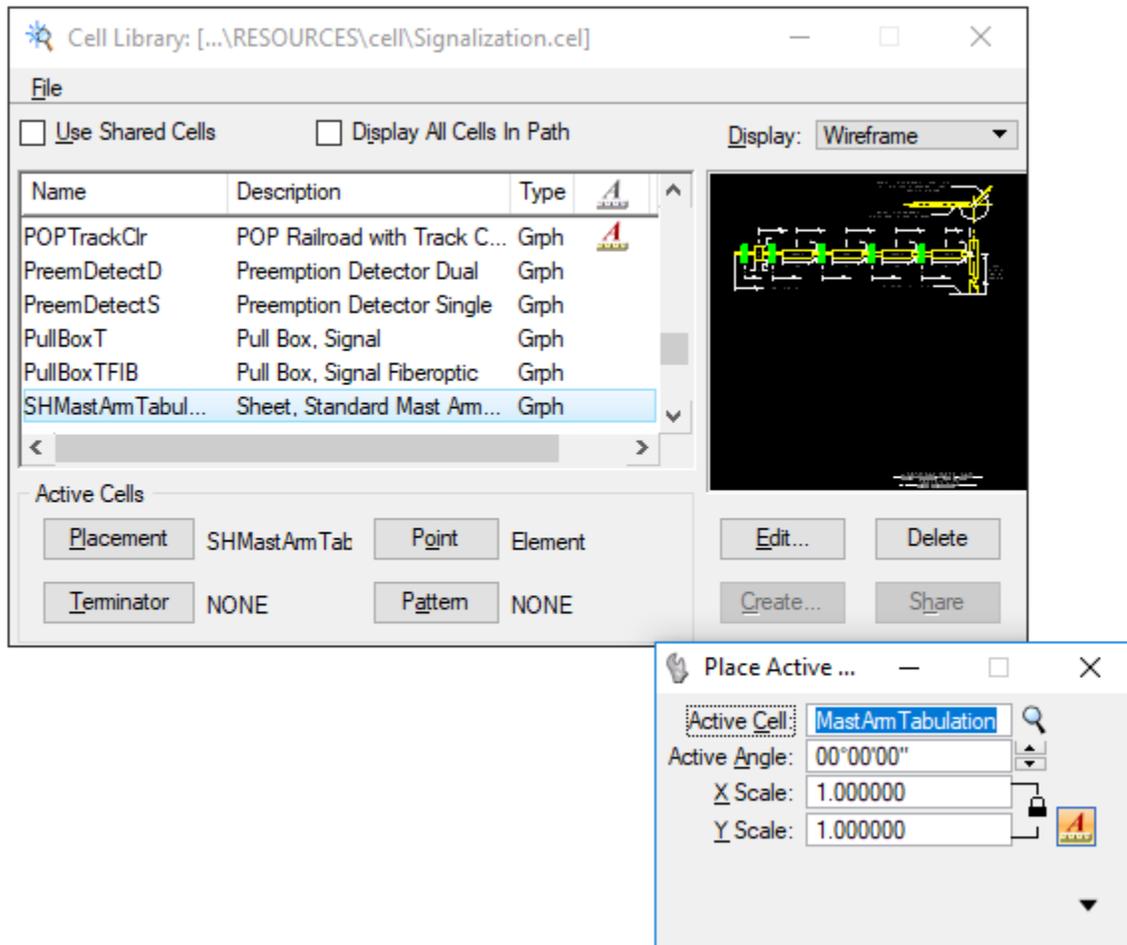


5. The MicroStation Place Active Cell dialog displays with **SHPlan** set as the *Active Cell*. Set the *Scale* to **1.0**.



6. **Data point** to place the cell in the file. **Reset** when finished to get out of the *Place Cell* command.
7. Fit the View.
8. From the MicroStation menu, go to **Element > Cells** and attach the *Signalization.cel* cell library using the File drop down list.

9. Scroll down to select the cell **SHMastArmTabulation** cell. Double-click on the cell name to make the cell the active cell and open the Place Active Cell dialog. Set the *Scale* to **1.0**.

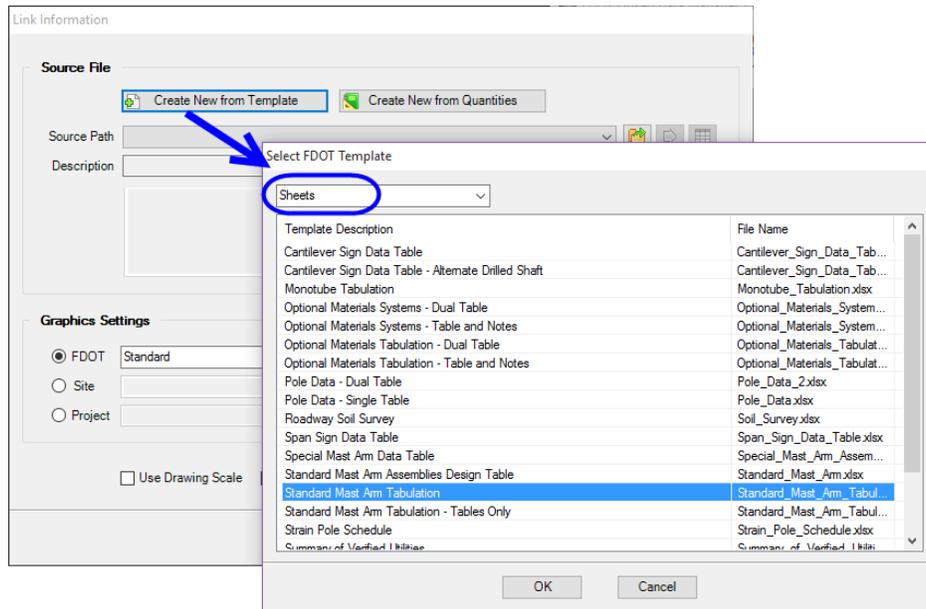


10. **Data point** in the top left corner of the **BLUE** border to place the cell in the sheet. **Reset** when finished to get out of the *Place Cell* command.
11. From FDOT Menu, select **Actions > Linked Data Manager**.
12. Click the **Create New Link** button.

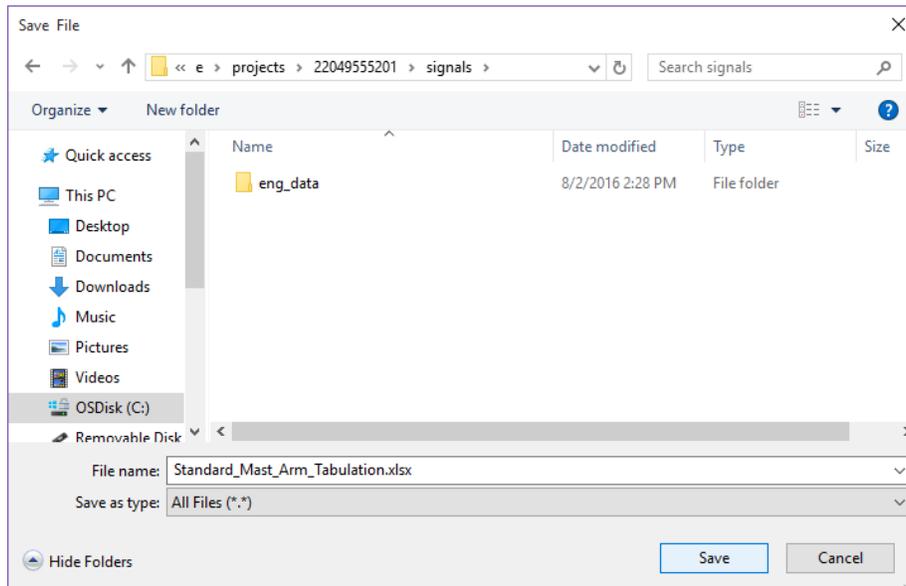


13. Click **Create New from Template** on the Link Information dialog.

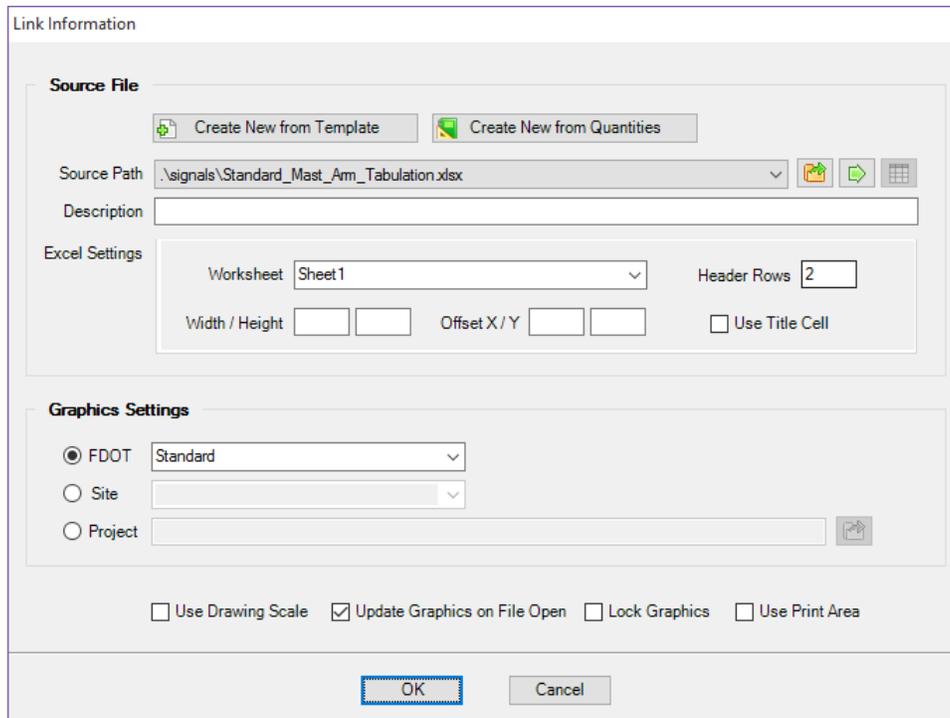
14. Select **Sheets** on the drop-down menu and then select **Standard Mast Arm Tabulation** from the list of *templates* on the Select FDOT Template dialog.



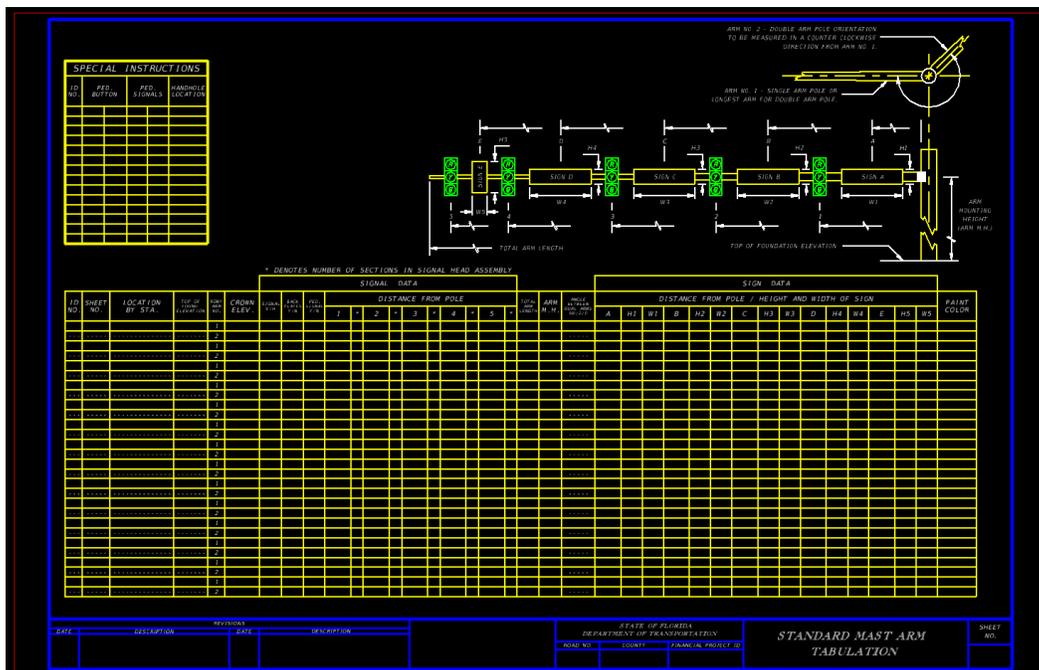
15. Click the **Ok** button to continue.
16. Save the **Standard_Mast_Arm_Tabulation.xlsx** file to the *Signals* folder.



17. Set the Link Information dialog as shown in the image below:



18. Click the **OK** button to place the link. **Data point** in the top left corner of the **BLUE** sheet border to place the link.



19. **Fit View** in MicroStation.

20. Select **File > Save Settings**.

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5 SHEET LAYOUT AND CLIPPING

OBJECTIVE

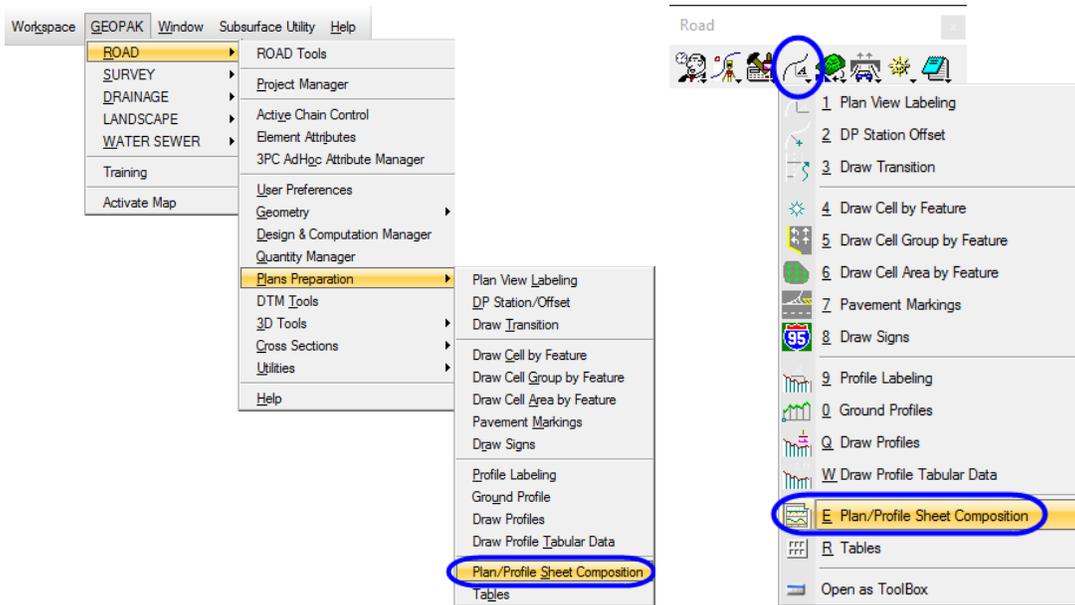
The objective of this chapter is to teach the designer how to layout and clip sheets.

INTRODUCTION

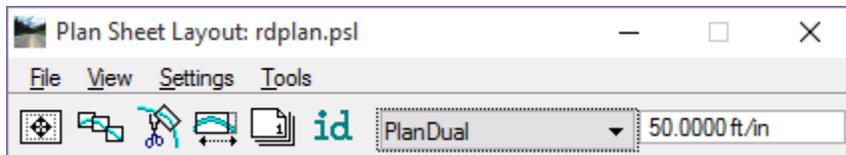
Sheet clipping is, simply, a method to get the information that is in the design file onto a printable plan sheet. The CADD office recommends using GEOPAK's **Plan/Profile Sheet Composition** tool to automate the sheet clipping process.

THE SHEET LAYOUT TOOL

The **Plan/Profile Sheet Composition** tool can be accessed from the MicroStation menu, select **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.

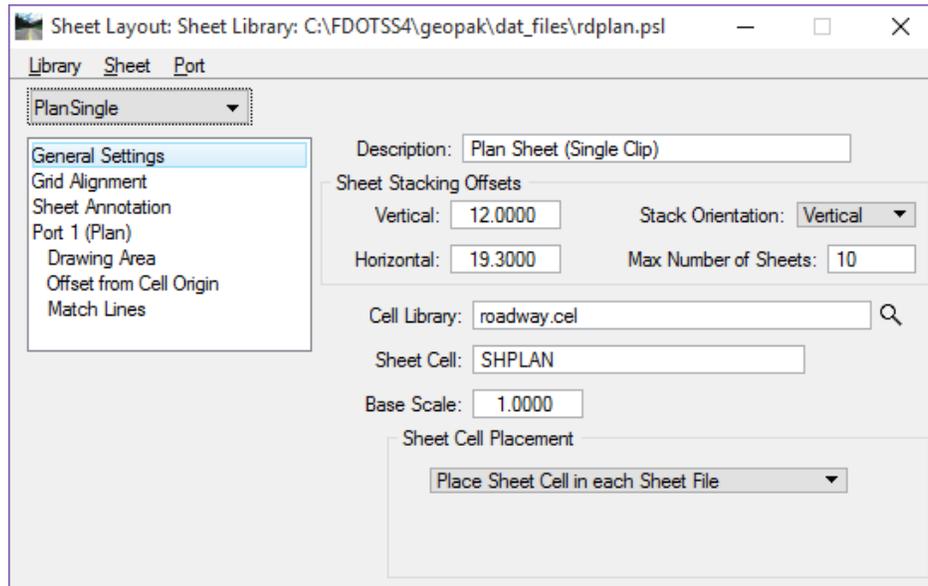


The Plan Sheet Layout tool uses an attached library that controls what sheet types are available. The Plan Sheet Library or *.psl* file is located in the `FDOTSS4\GEOPAK\dat_files` server folder.

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. The currently attached file is shown in the header of the dialog.

SHEET LIBRARY

The sheet library is accessed from the Plan Sheet Layout dialog menu **File > Sheet Library > Edit**. The Sheet Layout dialog displays as shown below.

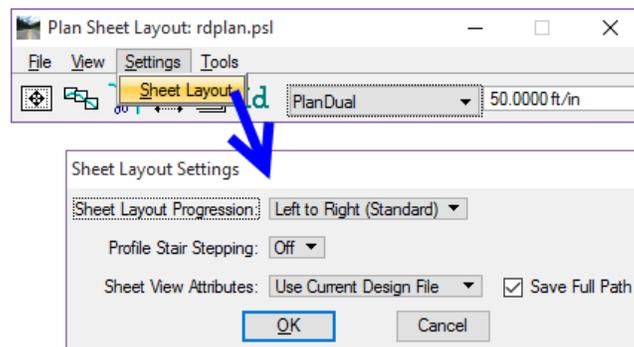


The most important parameters in Sheet Layout: Sheet Library dialog are the following:

- o **Cell Library** – Make sure the correct cell library is attached.
- o **Sheet Cell** – This is the name of the cell representing the border.
- o **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 then set the stair stepping ON, and how is the sheet view attributes set up, use the current design file or a Motif file.

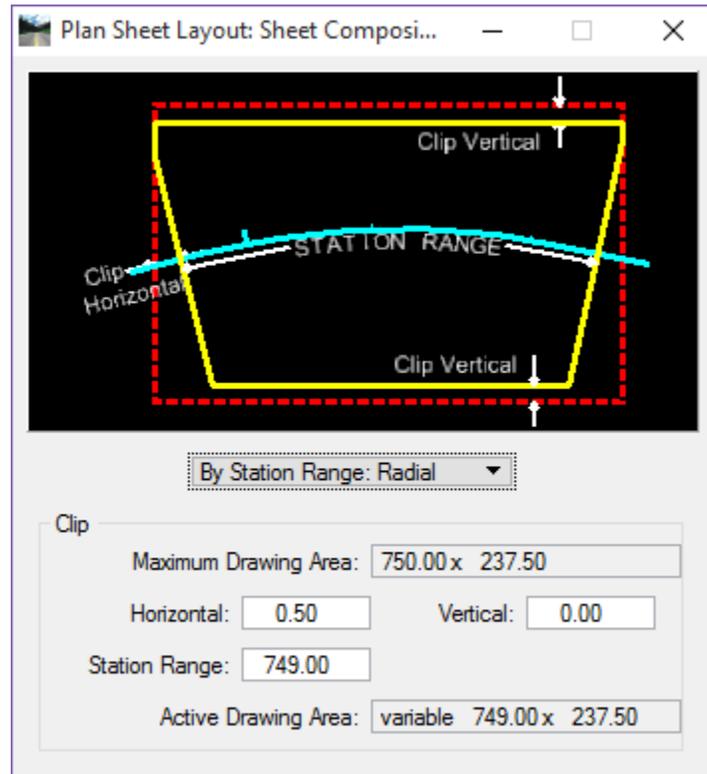


A Motif file is nothing more than a MicroStation design file with reference files attached and level symbology set up the way the plan sheets are to look when clipped (a settings file). FDOT has established a standard design file name *MTPLSP01.dgn*. Once the Motif file is created, attach the appropriate 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.

Note This should not be confused with Live Nesting.

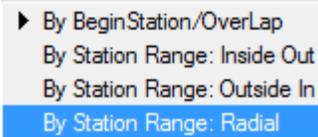
SHEET COMPOSITION

Sheet Composition controls how the limits of the sheets are handled.



The options are:

- o By Begin Station/Overlap
- o By Station Range: Inside Out
- o By Station Range: Outside In
- o By Station Range: Radial

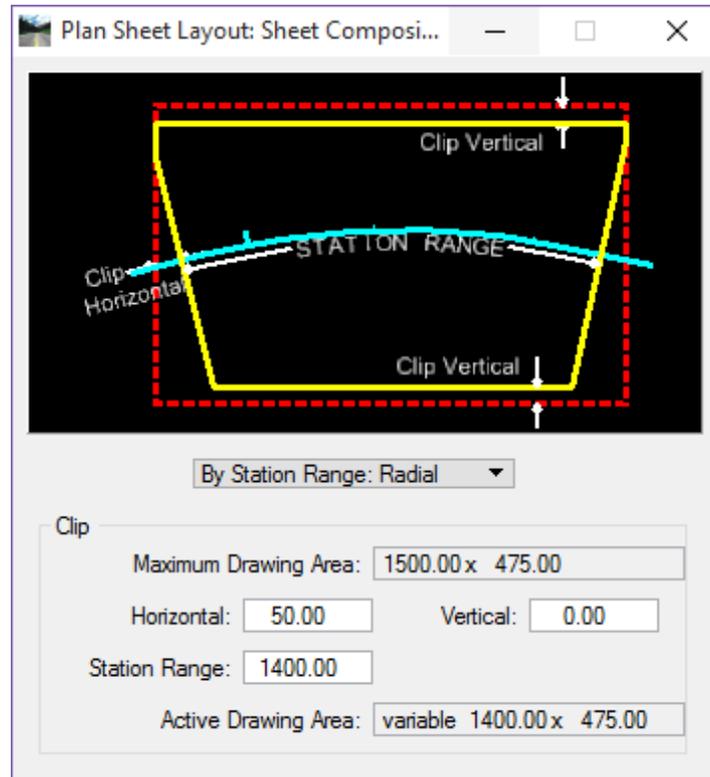


The *Station Range* is a factor of the Clipping Scale. Look in the **Plans Preparation Manual (PPM), Volume 2, Chapter 10**, for the values to be used in the *Station Range*. These values are filled in based on the scale entered, but may need to be adjusted to fix areas in sharp curves where portions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

Note These four options are covered in detail in the *GEOPAK Help files*. In this training course, the class will use the option *By Station Range: Radial*.

BY STATION RANGE RADIAL

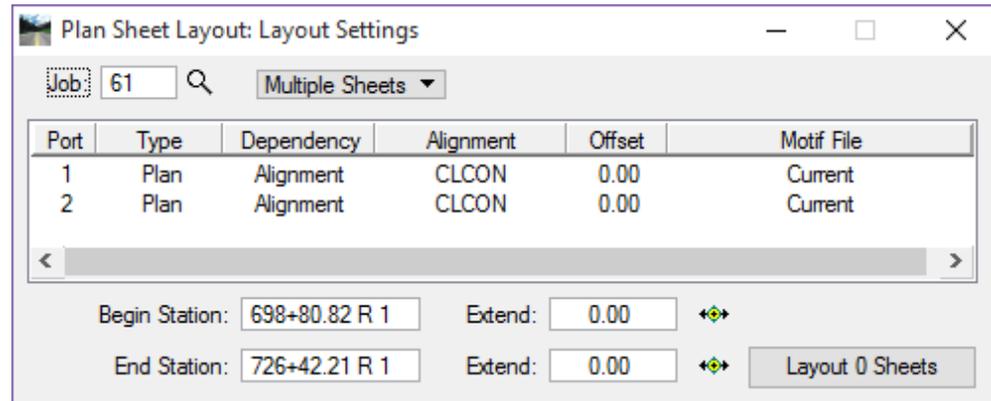
With this option the *Horizontal* distance is used to trim the Station Range. The Maximum Drawing Area, Horizontal and Station Range are inter-related. The resultant clipping shapes are not rectangular; instead, the Vertical edges are oriented perpendicular to the alignment, which results in rectangular 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.



- o 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.
- o **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.
- o **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.

SHEET LAYOUT

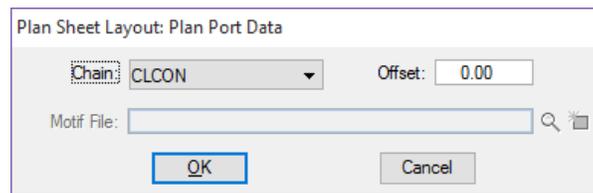
The Sheet Layout dialog is used to define the Ports, clipped areas on a sheet, and the station range to layout the clip borders.



- o **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.
- o **Multiple Sheets** – Used for clipping more than one sheet.
- o **Single Sheet** – Used for clipping only one sheet.

Note This option is often used for Signalization Plans where only the intersections are shown on the plan sheets. The scale should not be smaller than 1" = 50'.

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

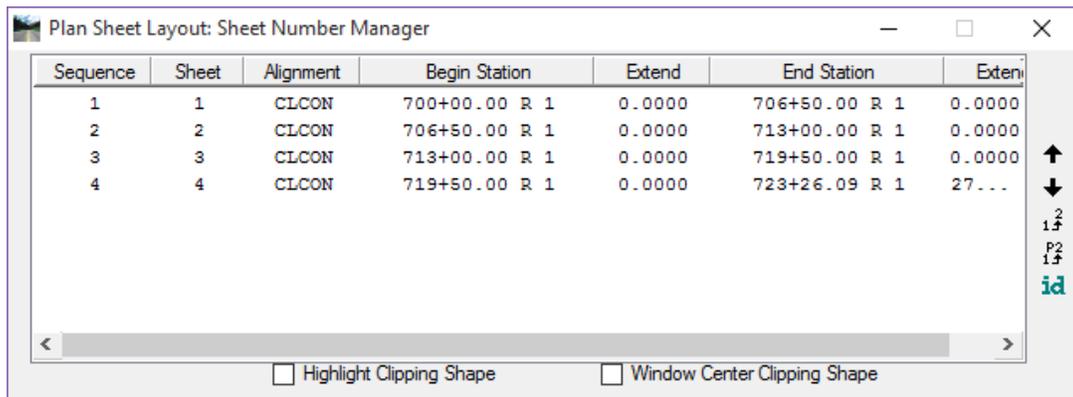


- o **Type** – This is either the Plan or Profile area. In a scenario like Traffic Plans there will only be a Plan port.
- o **Dependency** – This instructs the Port to either be dependent on an Alignment or another port.
- o **Alignment** – This is a GEOPAK chain that the sheets are clipped along.
- o **Offset** – This allows the designer to set the clip borders at an offset from the Alignment.
- o **Motif File** – This shows whether a separate motif file is used and if so what the name is.
- o **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.
- o **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.
- o **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 modifying sheet and sequence numbers on 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.

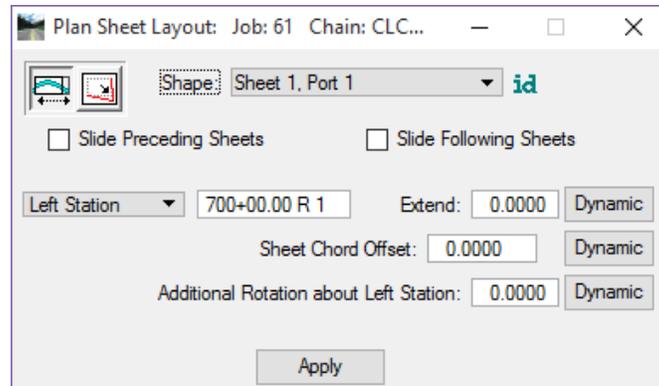
Keep in mind that this is the MicroStation design file name for the sheet not the actual sheet number that is placed in the title block. Knowing this, you should always run Sheet Number Manager and add a Prefix of '0' to the sheets so when the sheets are clipped the file names will be, as an example: *PLANSPO1.dgn* not *PLANSPI.dgn*. This will make organizing and managing the files in explorer much easier.



Note The Sheet Number can be modified to match the sheet number in the plans for easy reference when locating a sheet within a file to open.

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.

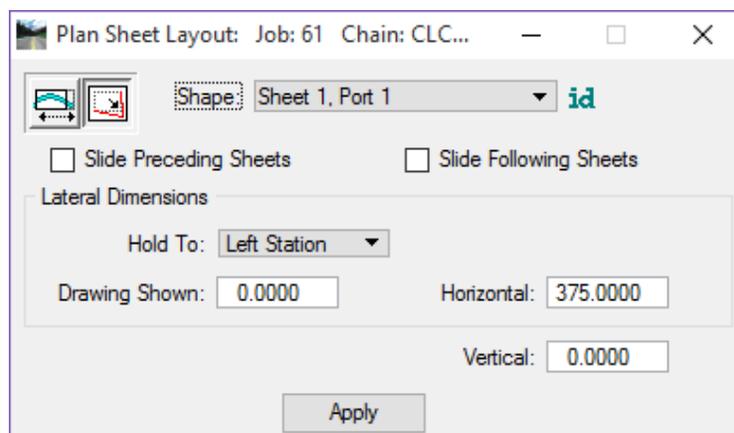


Slide Sheets is used to move the clip borders along the alignment. Type a specific station in the box and select the *Left Station*, *Center Station*, or *Right Station* to apply the new station. *Left Station*, *Center Station*, or *Right Station* refers to the portion of the clip border that is located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

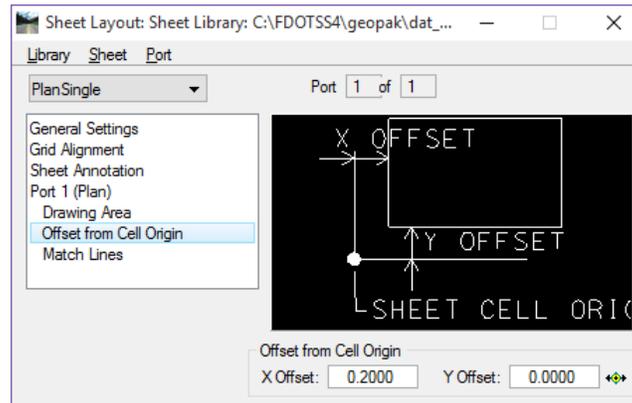
This option within the tool clips the plan sheets based on all of the previous settings.

- o The **Output File** section allows the designer to specify where sheet files are created and what to name them.
 - o **Directory** – Select the path where the new sheet files are to be placed.
 - o **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 assigned to the clip border(s). For example, if PLANSP is entered as the prefix, as the sheets are clipped the files are named PLANSPO1.DGN, PLANSPO2.DGN, PLANSPO3.DGN, etc.
 - o **Rotate Reference or Rotate View** – Rotate Reference rotates the reference files to be attached to the orientation of the plan sheet border and should be used when stacking more than one sheet per file. Rotate View rotates the plan sheet border to the orientation of the clip borders and is generally used when only one sheet per file is used.
 - o **Sheets per File** – Type the number of sheets to be created in each design file.
 - o **Sheet Range Begin and End** - Select the range of sheets to be created from the clip borders.
 - o **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 and will be grayed out if the annotation information is not set up in the Sheet Library.
- Note** Typically, this section is not used to label the sheets. Sheet Navigator is recommended to fill in this information on the sheets.
- o **Process Sheets** – This button starts the sheet clipping process.

SHEET LIBRARY ITEMS

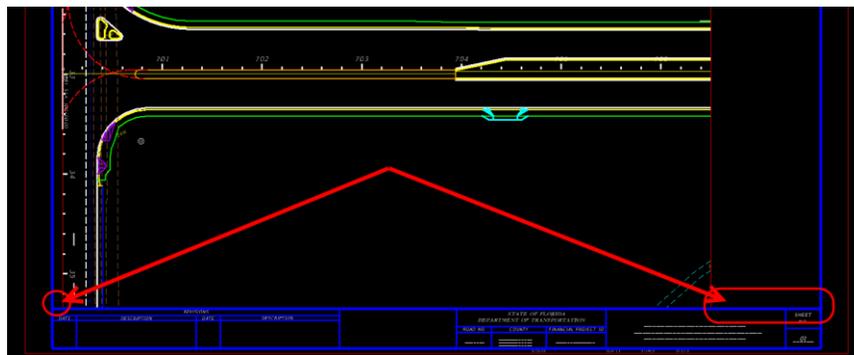
There are some settings in the sheet library that may need to be adjusted to make the plan sheets look correct. For example, if after the sheets are clipped and the offset for the left edge of the border to the clip limit is too small this can be adjusted in the library and the sheets re-cut.

The figure below shows the Offset from Cell Origin as 0.200. This value is based on master units (survey feet) measured on the plan sheet cell at a scale of 1. When the sheets are clipped, the space from the left edge of the border to where the clip sheet starts may be too small.

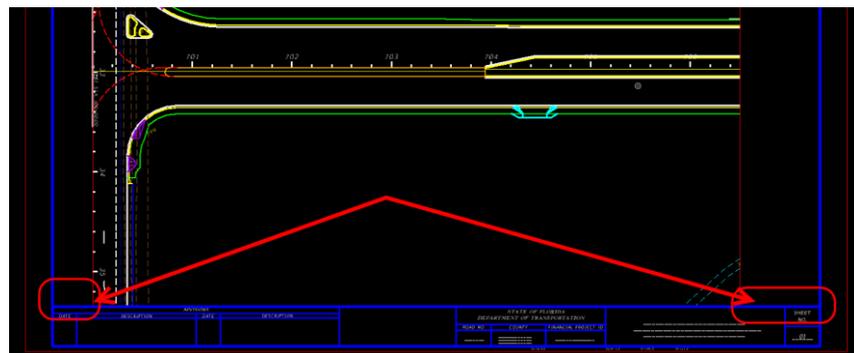


Note The defaults set up in the *rdplan.psl* are based on horizontal and vertical offsets being set to 0 on the Plan Sheet Layout: Sheet Composition dialog. If these settings are modified, it will result in the clipped area being off center on the sheet. To correct this, the Offset from Cell Origin will need to be adjusted in the Sheet Library.

The image below shows the 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.

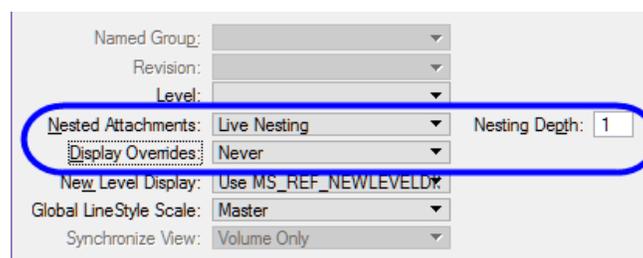


Exercise 5.1 Sheet Clipping

➤ Sheet Clipping (Part 1) – Border Setup

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

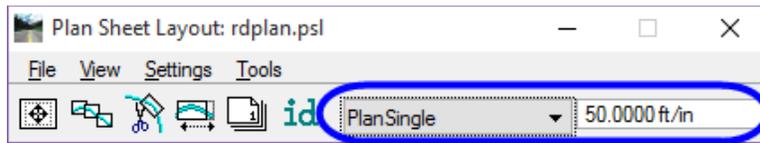
1. Open Border Sheet Design File
 - a. Open the *Border Sheet, BDPLSP01.dgn* created in *Chapter 1*.
 - b. Set the *Plot Scale* to **1.00**.
2. Setup Motif Design File
 - a. From the FDOT Menu, select **Actions > Create Files** to load the **Create File/Project** application.
 - b. Using what you have learned in this course guide create the *MTPLSG - Motif File for Plan Sheets* file. Create the file in the *signing* folder using the **Signing & Pavement Marking Files** Group. Refer to *Chapter 1* for assistance if needed.
 - c. Open the file *MTPLSP01.dgn*.
 - d. Reference in the *ALGNRD01.dgn (Algnrd_50 model)*, and *DSGNRD01.dgn (Default model)* from the *roadway* folder.
 - e. Reference in the *DSGNSP01.dgn* file from the *signing* folder.
 - f. Reference in the *TOPORD01.dgn* file from the *survey* folder.
 - g. Turn off any levels that should not be shown on the plan sheets.
 - h. Set the *Drawing Scale* to **1:50**.
 - i. **Fit View** and **Save Settings**.
3. Setup Clip Border Design File
 - a. From the FDOT Menu, select **Actions > Create Files** to load the **Create File/Project** application.
 - b. Using what you have learned in this course guide create the *CLIPSP - Clip Borders* file. Create the file in the *signing* folder using the **Signing & Pavement Marking Files** Group. Refer to *Chapter 1* for assistance if needed.
 - c. Open the new file *CLIPSP01.dgn*.
 - d. Set the *Plot Scale* to **50.00**.
 - e. Set the *Drawing Scale* to **1:50**.
 - f. Reference in the *MTPLSP01.dgn* with *Live Nesting* set to a *Nesting Depth* of **1** and the *Display Overrides* option to **Never**.



4. Fit View and Save Settings.

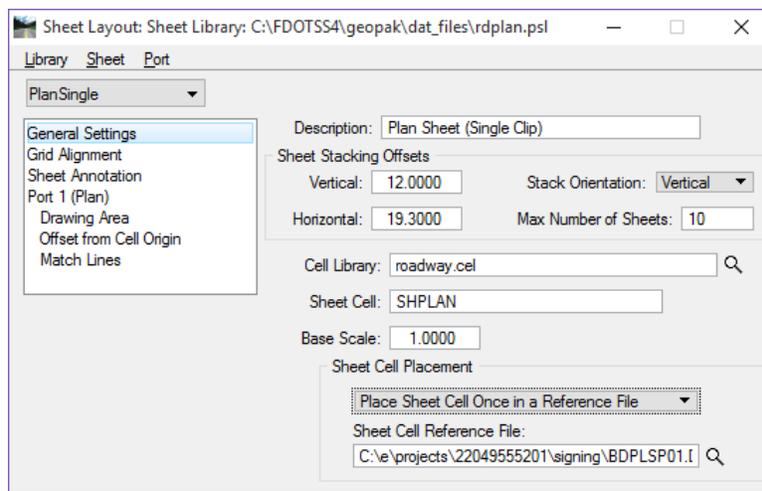
5. Start Plan Sheet Layout Tool

- Continuing in *CLIPSP01.dgn*, from the MicroStation menu, select **GEOPAK > ROAD > Plans Preparation > Plan/Profile Sheet Composition**. The Plan Sheet Layout dialog opens.
- In the Plan Sheet Layout dialog, select the **Sheet Type: PlanSingle**.
- Set the **Scale** to **50.00 ft/in**.

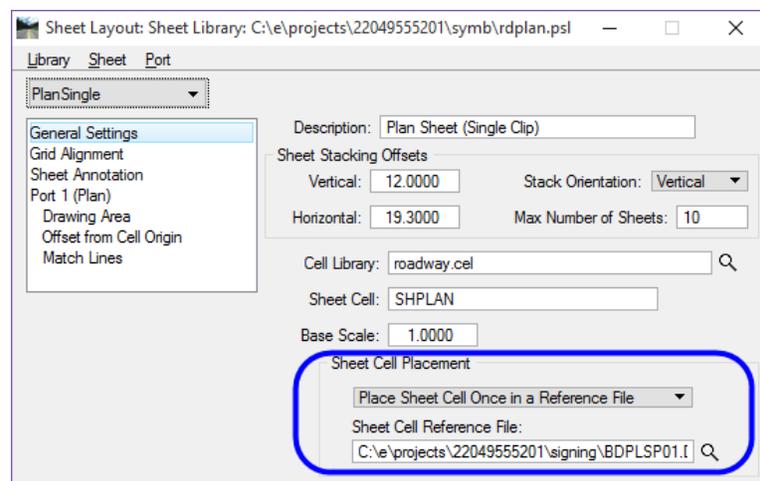


➤ Sheet Clipping (Part 2) - Sheet Settings

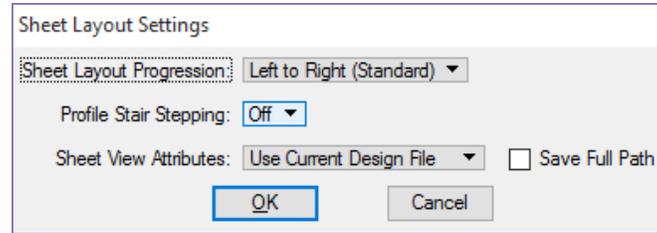
- In the Plan Sheet Layout dialog, select **File > Sheet Library > Edit**. The Sheet Layout: Sheet Library dialog opens.



- From the Sheet Library dialog, select **Library > Save As** to save a custom *.psl* file to the project *Symb* folder.
- 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 file, *BDPLSP01.dgn*, created earlier.



4. Close the Sheet Library dialog by clicking on the **X** in the upper right corner.
5. Click **Yes** to save the changes to the Sheet Library.
6. From the Plan Sheet Layout dialog, select **Settings > Sheet Layout**. The Sheet Layout Settings dialog opens.

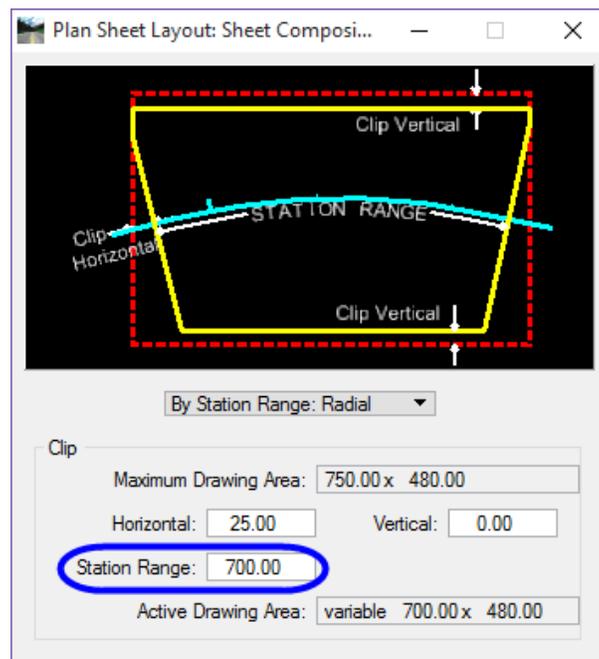


7. Set *Sheet Layout Progression* to **Left to Right (Standard)**.
8. Set *Profile Stair Stepping* to **Off**.
9. Set *Sheet View Attributes* to **Use Current Design File**.
10. Toggle **Off** *Save Full Path*.
11. Click **OK**.

➤ **Sheet Clipping (Part 3) – Sheet Layout**

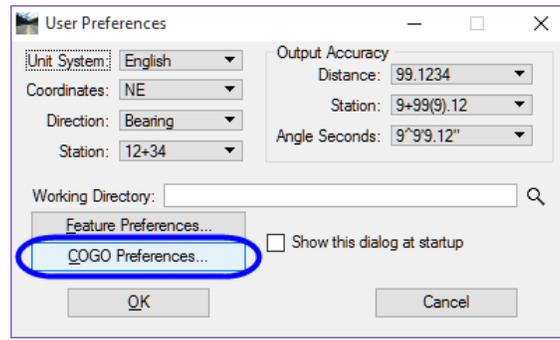
1. Sheet Composition

- a. From the Plan Sheet Layout dialog, click on the Sheet Composition icon .
- b. Set the *Method* to **By Station Range: Radial**.
- c. Set the *Station Range* to **700.00**. This will automatically set the **Horizontal** clipping to **25.00**.

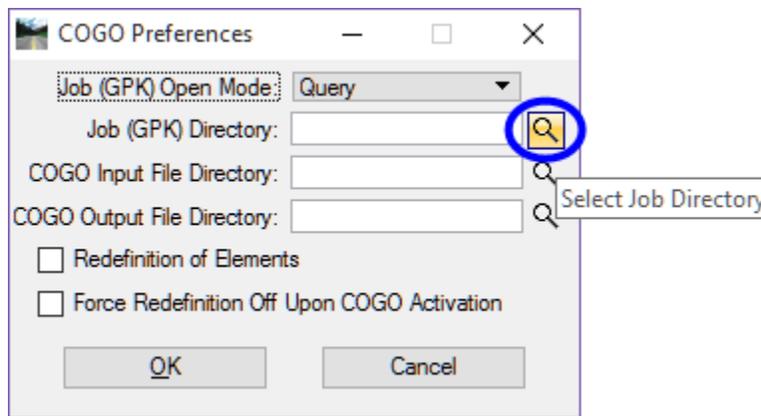


- d. Close the Sheet Composition dialog.

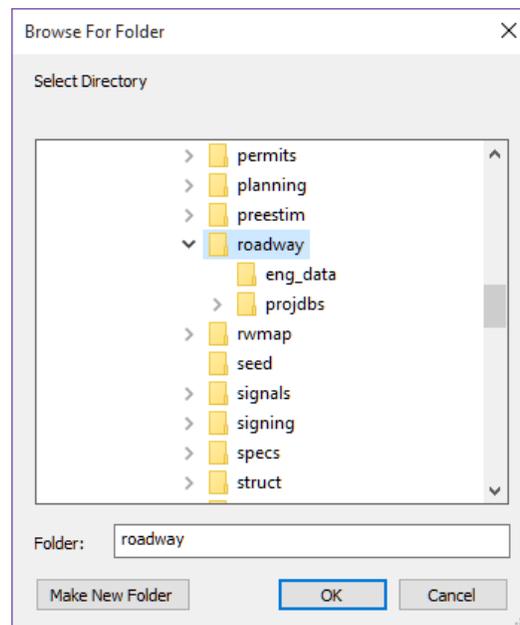
2. Set the working directory for the *GPK* file to look in the *roadway* folder.
 - a. Select **GEOPAK > ROAD > User Preferences**.
 - b. On the User Preferences dialog, select the **COGO Preferences** button.



- c. Click on the *Select Job Directory* icon.

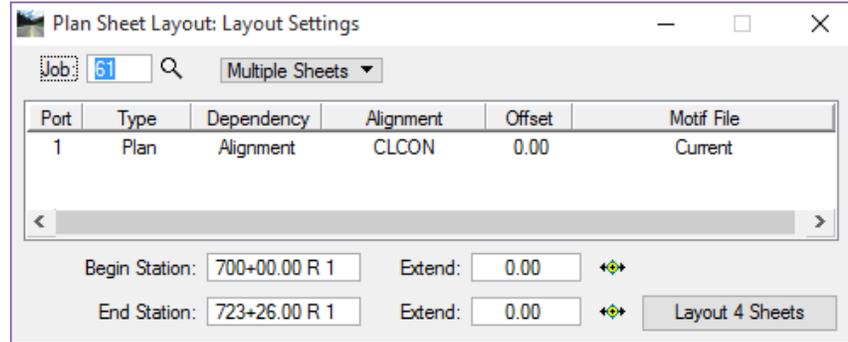


- d. Browse to the *roadway* folder and click **OK**.

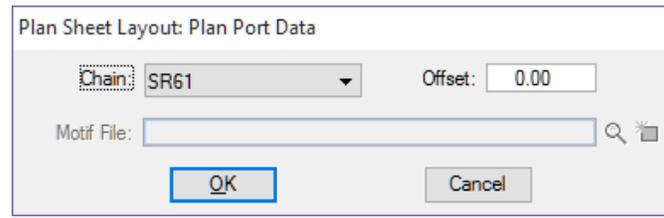


- e. Click **OK** on the COGO Preferences dialog.
 - f. Click **OK** on the User Preferences dialog.

- From the Plan Sheet Layout dialog, click on the **Sheets Layout** icon . The Layout Settings dialog opens.



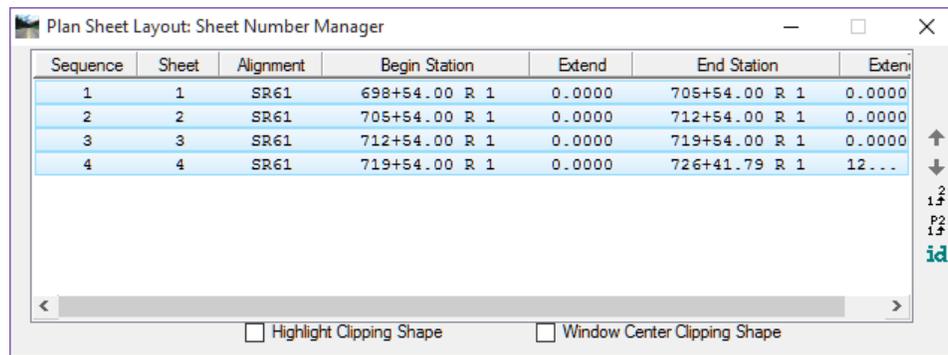
- Set the *Job Number* to **00**.
- Set the *Method* to **Multiple Sheets**.
- Double-click on **Port 1**. This opens Plan Port Data dialog.



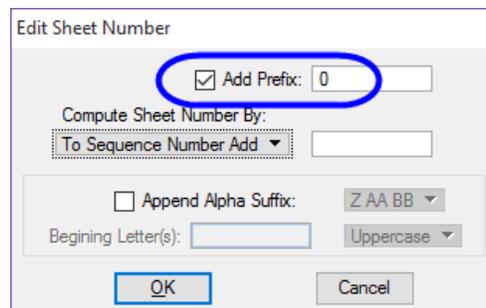
- Set the *Chain* to **SR61**.
- Set the *Offset* to **0.00**.
- Click **OK**.
- Click the **Layout 4 Sheets** button. The sheet clipping shapes are now drawn into the design file.
- Close Layout Settings.

➤ **Sheet Clipping (Part 4) - Sheet Number Manager**

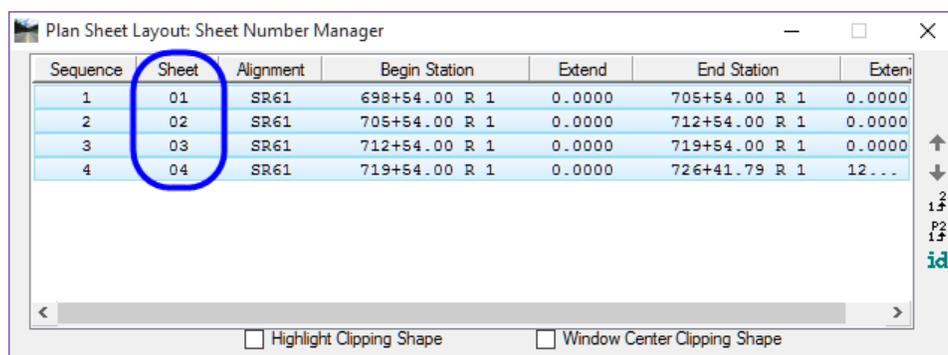
1. From the Plan Sheet Layout dialog, click on the **Sheet Number Manager** icon . The Sheet Number Manager dialog opens.



2. Select all the sheets in the dialog.
3. On the right side of the dialog, click on the **Edit Sheet Number** button . This opens the Edit Sheet Number dialog.



4. Toggle **On Add Prefix**.
5. Enter a **0** for the *Prefix*.
6. Click **OK**. This will change the *Sheet Number* to 01, 02, etc.



7. At the bottom of the Sheet Number Manager dialog, toggle **On Window Center Clipping Shape**.
8. Double-click on **Sheet 1**. This will zoom the design file and center on Sheet 1.
9. Close Sheet Number Manager.
10. Click **Yes** to Save Sheet Number Changes.

➤ **Sheet Clipping (Part 5) - Clip Sheets**

1. From the Plan Sheet Layout dialog, click on the **Clip Sheets** icon . This will open Clip Sheets.

2. For the *Directory*, use the *magnifying glass* to browse to the project *signing* folder.

3. For the *Sheet Number Prefix* enter **PLANSP**. The full file name will appear to the right of the prefix space.

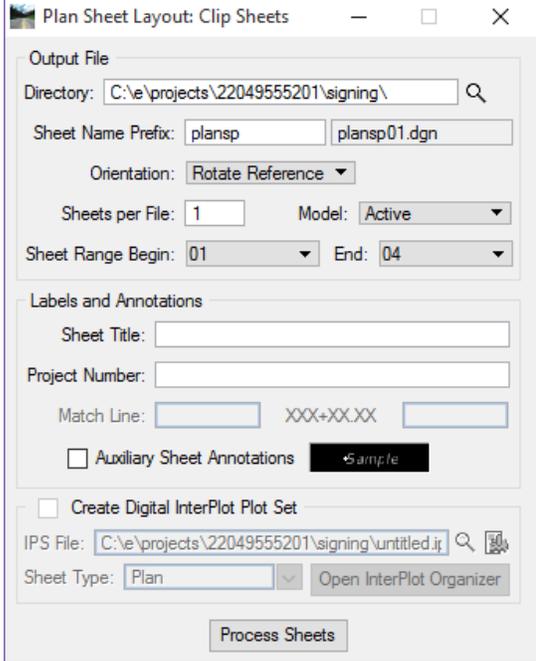
4. For *Orientation*, select **Rotate Reference**.

5. Set the *Sheets per File* to **1**.

6. Set the *Model* to **Active**.

7. Set the *Sheet Range Begin* set to **01**.

8. Set the *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. 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 blocks.

9. Click **Process Sheets**. The sheet clipping process will start.

10. All of the sheets are created with all of the references attached.

11. Once the sheets are created, close the Clip Sheets dialog.

12. Open *PLANSPO1.dgn* in the *signing* folder.

13. Review the sheet, the reference files, and level settings.

Note Make any and all changes to levels and references in the Motif file and save settings. The level change will show up in the plan sheet files.

14. Repeat this process to create the Lighting Sheets.

15. Close Plan Sheet Layout.

6 PAVEMENT MARKING TOOLS

OBJECTIVE

The objective of this chapter is to create Proposed Pavement Marking Features using the Design and Computation (D&C) Manager, FDOT Menu and GEOPAK tools.

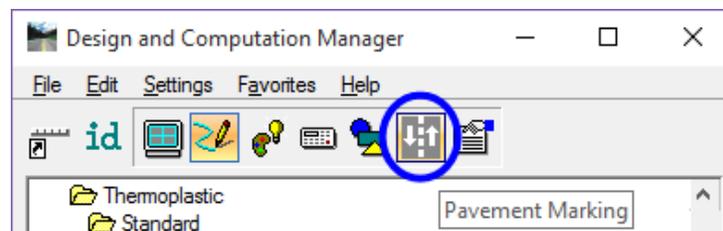
INTRODUCTION

This chapter demonstrates several applications that help to create a Pavement Marking set of plans:

- **D&C Manager** A GEOPAK tool used to help designers draw elements, set symbology, and compute quantities. The FDOT CADD office provides a database set up with the correct symbology, cells, formulas and pay items needed to meet the FDOT standards.
- **Pavement Marking Program** A set of tools within the D&C Manager used to draw in pavement markings in accordance with the FDOT Computer Aided Drafting and Design (CADD) standards.
- **Draw Cell Group by Feature** A tool to place multiple cells along elements or alignments. It uses the D&C Manager to insure the placement of cells, arrows and messages is with the correct symbology and pay item information for calculations.

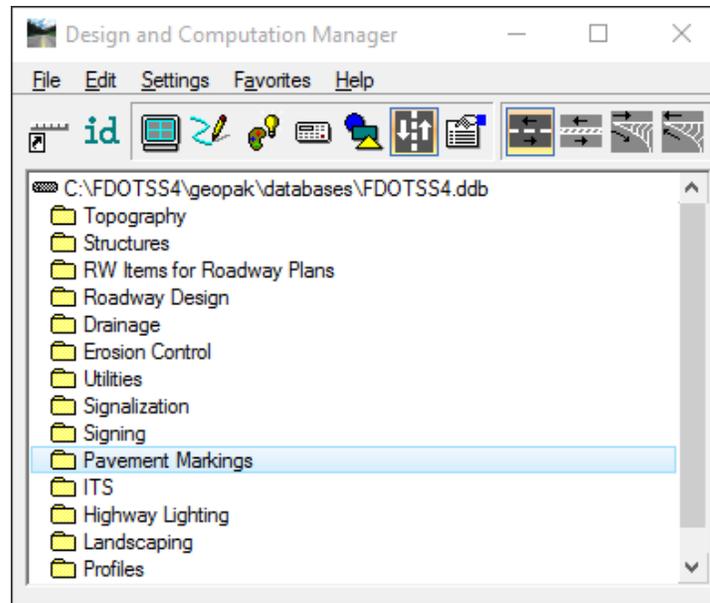
Refer to in the Plans Preparation Manual, Volume 2, Chapter 23 for more detail on developing the Signing and Marking set of plans. Refer to the Design Standards indexes and the *Plans Preparation Manual*, Volume I, chapter 7 for design criteria.

DRAWING PAVEMENT MARKINGS



Many of the Traffic Plan items are simple cells or line styles drawn and quantified using the D&C Manager. The Pavement Striping component of the D&C Manager facilitates the production of pavement striping plans. 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. 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 parallel pavement marking lines.

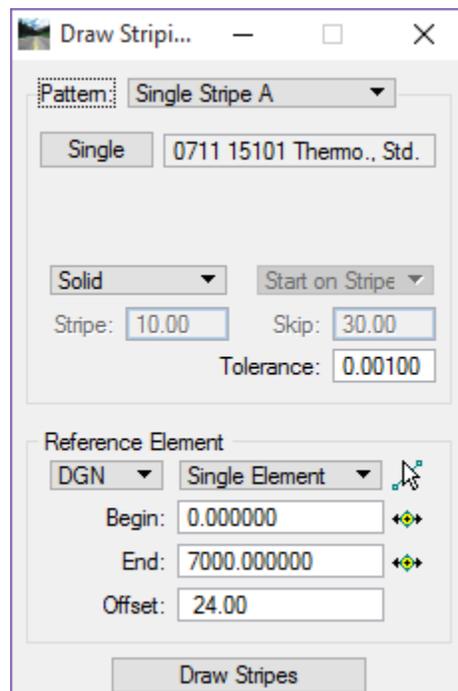


There are four additional tools in D&C Manager to aid in the design and layout of pavement markings.

DRAW STRIPING



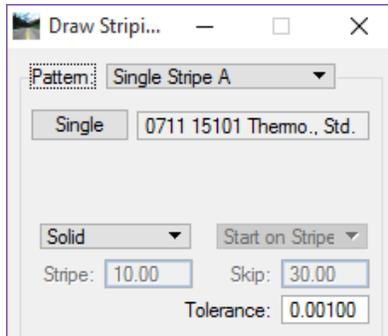
This Draw Striping tool draws all solid or skip pavement markings. The striping tool can reference a GEOPAK chain or an existing MicroStation linear element for length and offsets. The MicroStation elements can be in the active file or in a reference file.



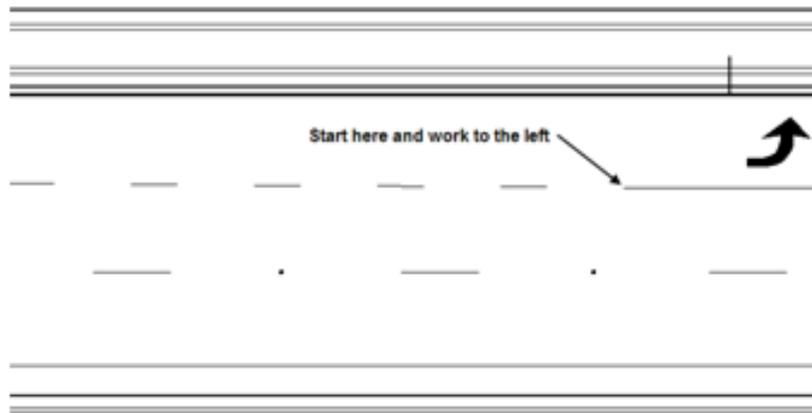
The Draw Striping tool has two parts, Pattern and Reference Element, with several preferences for you to set in each of the two parts. The following pages detail the Draw Striping tool.

PATTERN – SINGLE STRIPE OR DOUBLE STRIPE

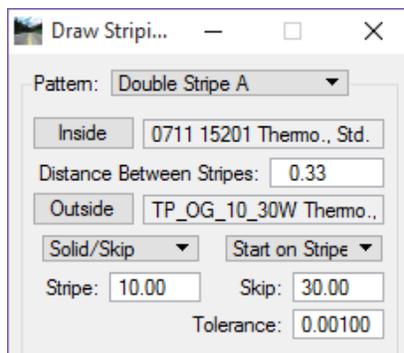
Single Stripe A or Single Stripe B options allow two different configurations to be stored in a resource file so the type of stripe placed is easily changed. It is a way to set favorites, example; set Single Stripe A to 6” solid white and set Single Stripe B to 6” solid yellow. To draw a 6” solid white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



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 stripe in reverse of the driving direction. The figure below shows this scenario.



Double Stripe allows for four possible configurations set up with a combination of Solid/Solid, Skip/Skip, Solid/Skip and Skip/Solid markings. The figure shows the Double Stripe A Pattern 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.



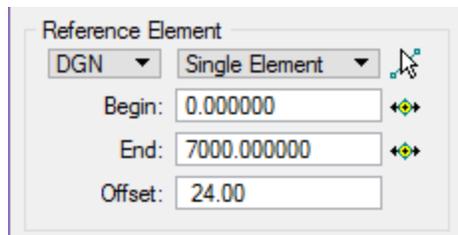
This is a typical set up for a two-lane roadway with a passing zone on one side, as depicted in the figure below.



- o **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.
- o **Tolerance** – If the length of a segment of pavement marking is less than the **Tolerance**, there is no placement of the line and only used at the ending point, to determine placement of the final piece of marking.

REFERENCE ELEMENT – DGN OR CHAIN

The Draw Striping tool uses Reference Elements to create/draw parallel lines and arcs.



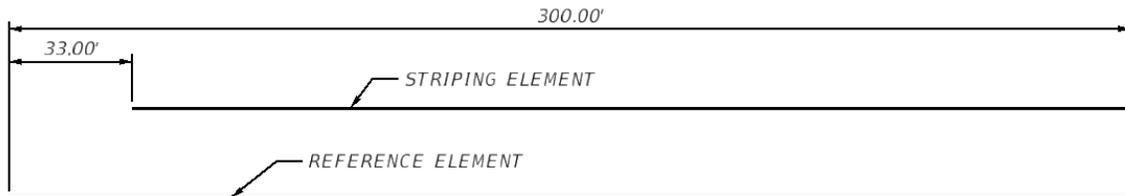
- o **Reference Type** – Drop down options to select the type of reference element to use, **DGN** or **Chain**.

Note *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 length of the element selected determines the end.
- **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. The MicroStation **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.

- o **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 along with 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.



- o **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 shows the Chain option. Notice the Begin and End values are populated with the beginning and ending station values of the selected chain.

- o **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.

The screenshot shows a dialog box titled 'Reference Element'. It contains the following fields:

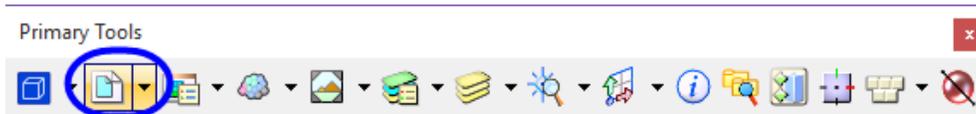
- A dropdown menu set to 'Chain'.
- A text box containing 'CLCON'.
- A 'Begin:' field with the value '700+00.00' and a double-headed arrow icon.
- An 'End:' field with the value '723+26.09' and a double-headed arrow icon.
- An 'Offset:' field with the value '24.00'.
- A 'Draw Stripes' button at the bottom.

- o **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.

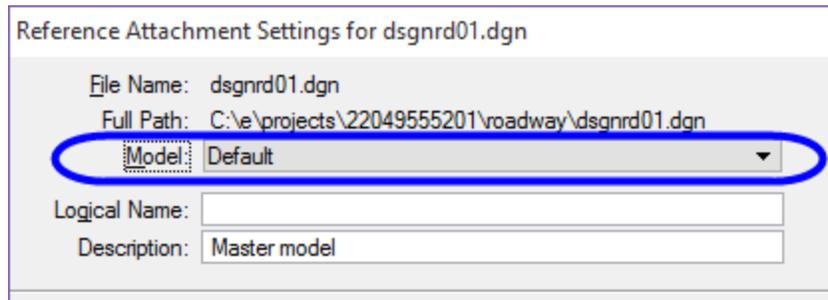
Exercise 6.1 *Setting up the Design File with References*

In a previous exercise, the DSGNRD01.dgn design file was created. We will now attach other design files as references before we start placing striping in the design file.

1. Continuing in the FDOTSS4 Workspace open the *DSGNSP01.dgn*.
2. Open the References dialog.



3. In the References dialog, select **Tools > Attach**. This opens the Attach Reference dialog.
4. Navigate to the *Roadway* folder.
5. Attach the reference file *DSGNRD01.dgn*.
6. Click **Open**. This opens the Reference Attachment Settings dialog.
7. In the Reference Attachment Settings dialog set the *Model* to **Default**.

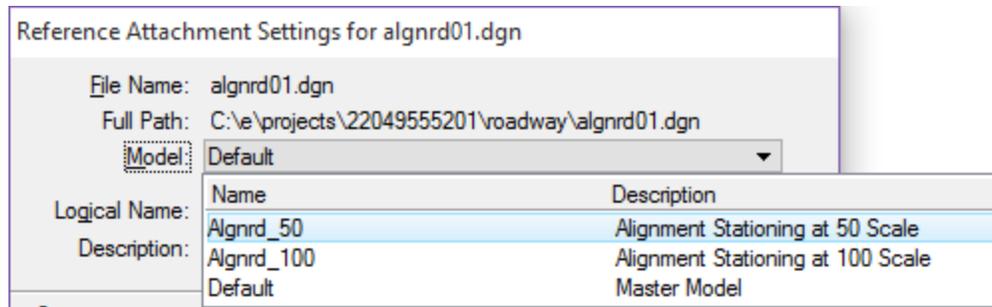


8. Click the **OK** button.
9. Repeat steps 3-8 to attach the *TOPORD01.DGN* file located in the *survey* folder.
10. In MicroStation, **Fit View**. Take a moment and zoom in close to the baseline, notice that there are no tick marks or stations.

Note *The Roadway Design File has the project alignments drawn on the CLConst_dp level, utilizing the Centerline (CL) Feature Definition. Stationing and tick marks are drawn in the Alignment file (algnrd*.dgn) at different scales in separate models.*

11. In the References dialog, select **Tools > Attach**.

12. Navigate to the *Roadway* folder and select the reference file: *ALGNRD01.dgn* (this is the alignment file containing the stationing and tick marks).
13. Click **Open**. This opens the Reference Attachment Settings dialog.
14. In the Reference Attachment Settings dialog set the *Model* to **Algnrd_50**.



15. Click the **OK** button.
16. Notice now that there are tick marks and stations.

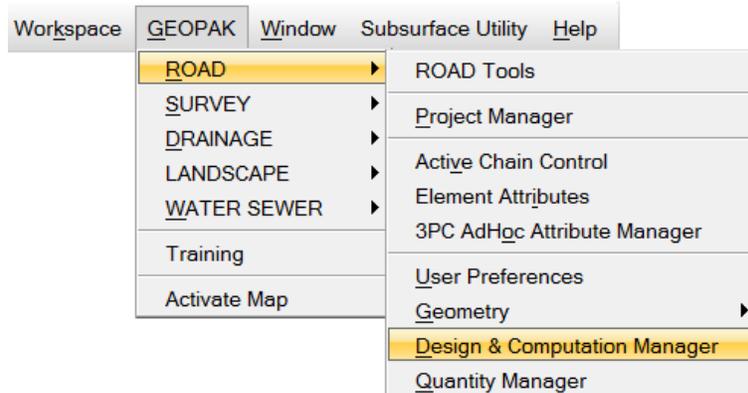


Note It may be necessary to attach the Existing Drainage and Utility files depending on the project. Refer to the Plans Preparation Manual Volume II - Chapter 23 for further guidance.

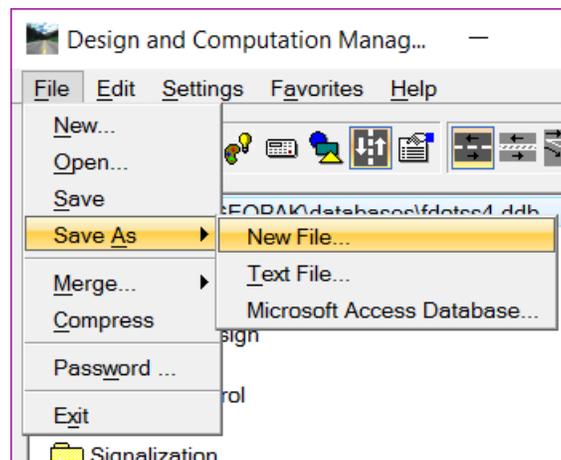
Exercise 6.2 Create a Project Specific Database

In this exercise, Design and Computation (D&C) Manager will be used to create a project specific database. A project specific database gives the designer the capability to modify database items for their specific project, if necessary, providing flexibility and advantages in production, multi-designer/discipline usage and project to project portability for common District/job related items.

1. Open the file *C:\e\projects\22049555201\signing\DSGNP01.dgn*.
2. From MicroStation, select **GEOPAK > ROAD > Design & Computation Manager**. The D&C Manager dialog will open with the *FDOTSS4 database (FDOTSS4.ddb)* file loaded.

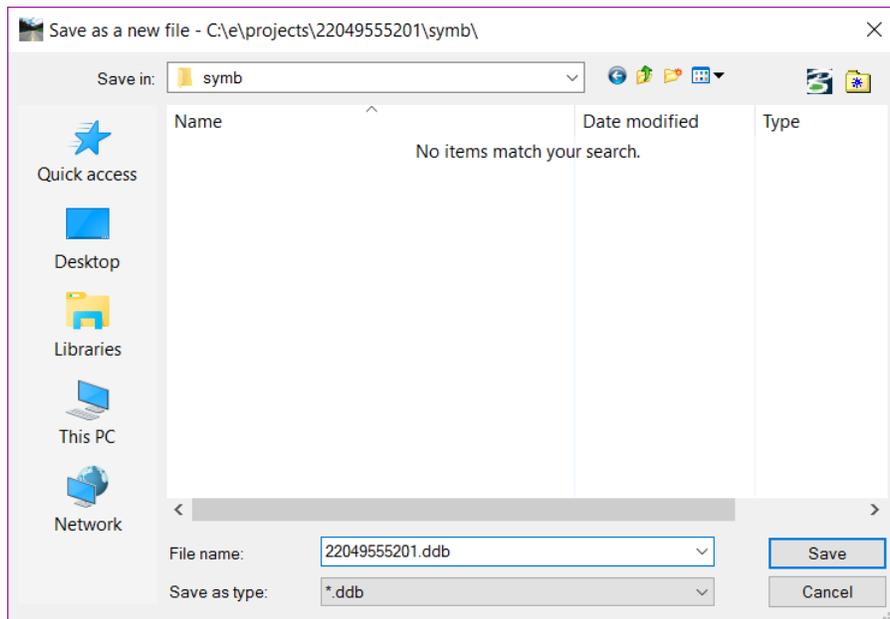


3. From D&C Manager select **File > Save As > New File...**

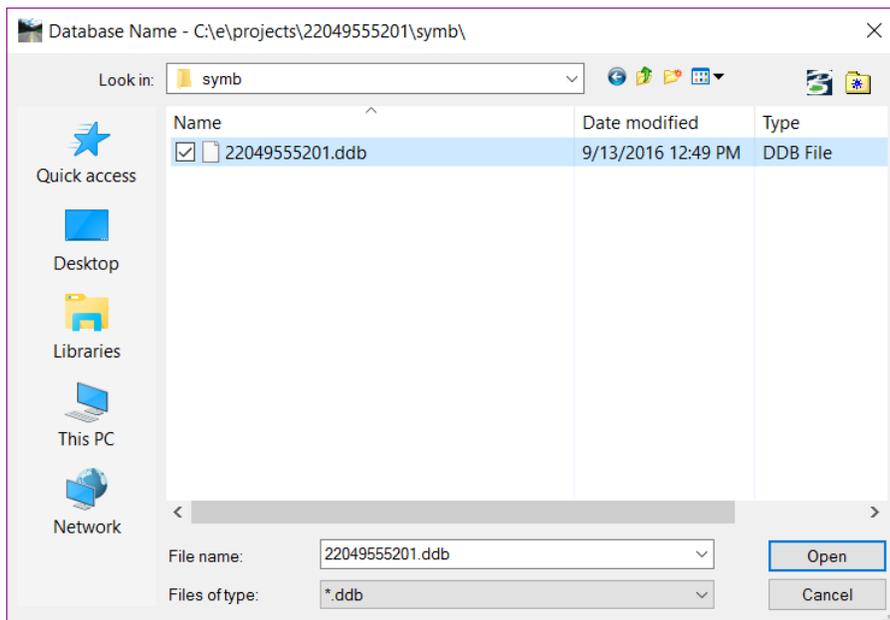


4. Navigate to the project *ymb* folder.

5. Rename the file as **22049555201.ddb** and click **OK**.



6. From D&C Manager select **File > Open** and navigate to the saved **.ddb** file in the **symb** directory. Select the file and click **Open**.

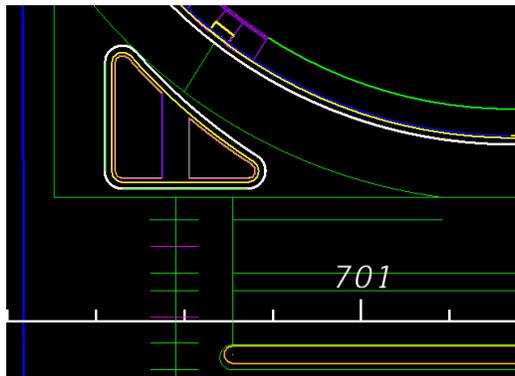


Exercise 6.3 Draw Crosswalk Markings

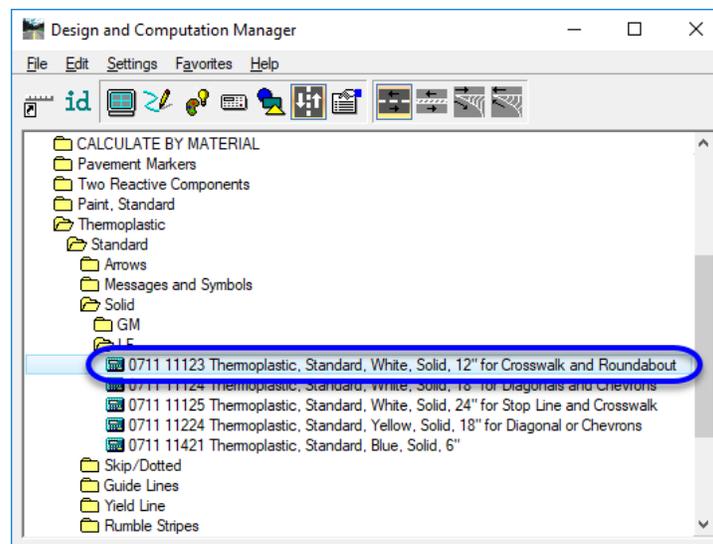
➤ Placing Special Emphasis Crosswalk Markings (Part 1)

In this exercise, use the D&C Manager to draw the solid pavement markings for the Special Emphasis Crosswalks. The process will start by placing the outside edge lines using construction lines in the *Striping Construction Lines.dgn* file as the reference elements. Use the D&C Manager and other MicroStation tools to place the longitudinal lines.

1. Continuing in the *DSGNP01.dgn*, attach the reference file *C:\e\projects\22049555201\signing\Striping Construction Lines.dgn* from the *signing* folder.
2. Zoom into the island on the left side of the **SR61** alignment between Stations 700+00.00 and 701+00.00.
3. Use MicroStation tools to *rotate the view* so the *SR61 Alignment* is going **left to right**.

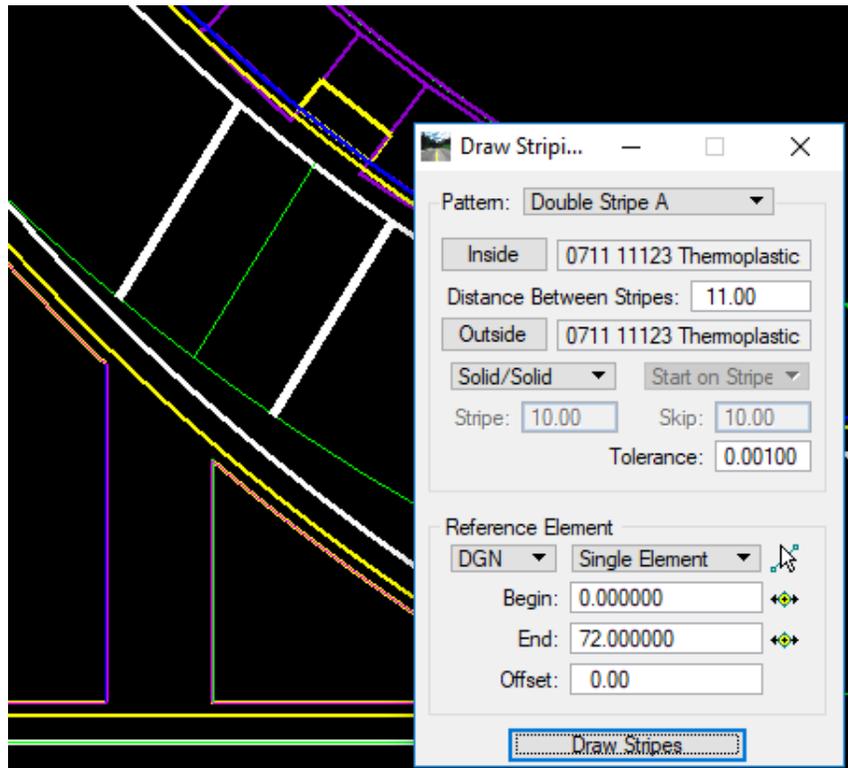


4. If D&C Manager is not open, on the MicroStation Menu, select **GEOPAK > ROAD > Design & Computation Manager**. Make sure to open the *Project DDB File, 22049555201.ddb*, saved in the *syb* folder.
5. From D&C Manager, select **Pavement Markings > Thermoplastic > Standard > Solid > LF > 0711 11123 Thermoplastic, Standard., White, Solid, 12” for Crosswalk and Roundabout**.



6. From D&C Manager, click on the **Pavement Markings Program** button . This appends the D&C Managers button bar with the Pavement Markings Program tools.

7. From D&C Manager, click on the **Striping** button  to open the Draw Striping tool.
 - a. Set the *Pattern* to **Double Stripe A**.
 - b. Click the **Inside** and **Outside** buttons to set the *striping* DDB item.
 - c. Set the *Distance Between Stripes* to **11.00**. (Standard width = 10' + 6" x 2 to centerline of striping each side. See Design Standards, Index 17346.)
 - d. The *type of line* should be set to **Solid/Solid**.
 - e. Set the *Reference Element* to **DGN**.
 - f. Select **Single Element** from the *Reference Type* drop down list.
 - g. Click the **Identify DGN Element** button  and select the *green construction line* between the island and the right edge of pavement.
 - h. Set the *Offset* to **0.00**. It is not necessary to use a plus or minus with this tool.
 - i. Click the **Draw Stripes** button.

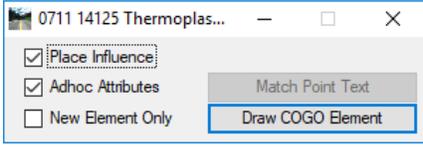


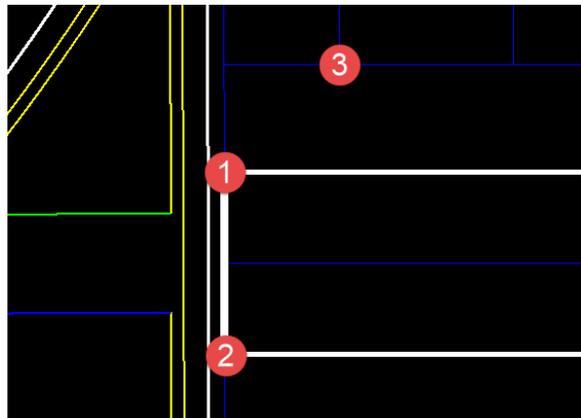
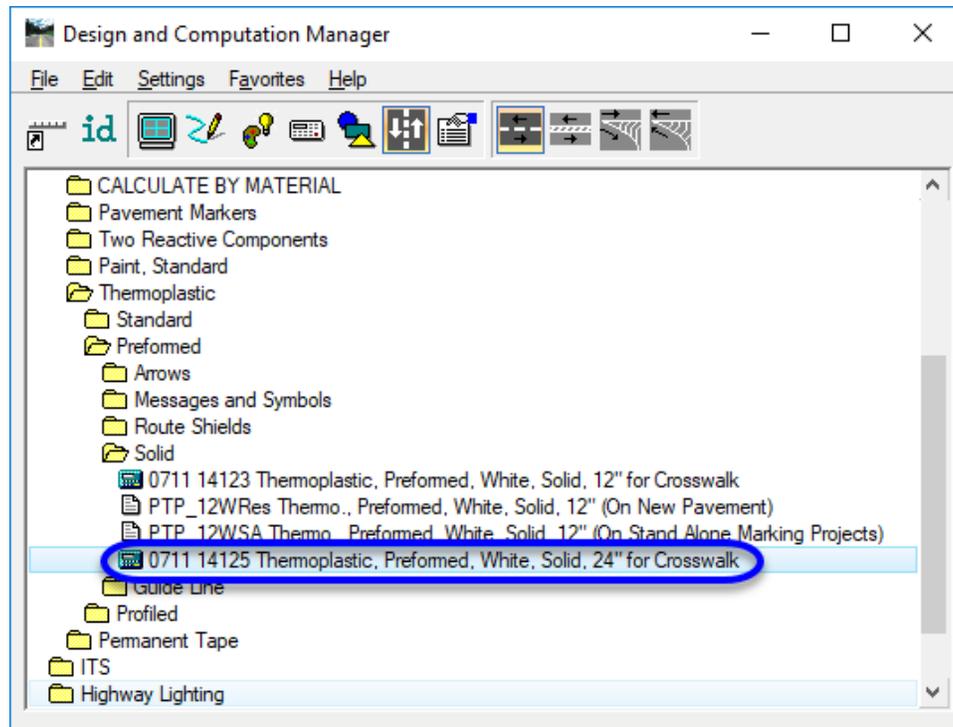
8. Place a *Data Point*. **Do Not Close** the Draw Striping dialog.

Note It is not necessary to close the Draw Striping 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.

9. Cleanup the 2 crosswalk striping lines with the **Trim to Element**  tool.
10. Repeat steps 7-10 at the other 2 cross walk locations in the intersection.

➤ **Placing Special Emphasis Crosswalk Markings (Part 2)**

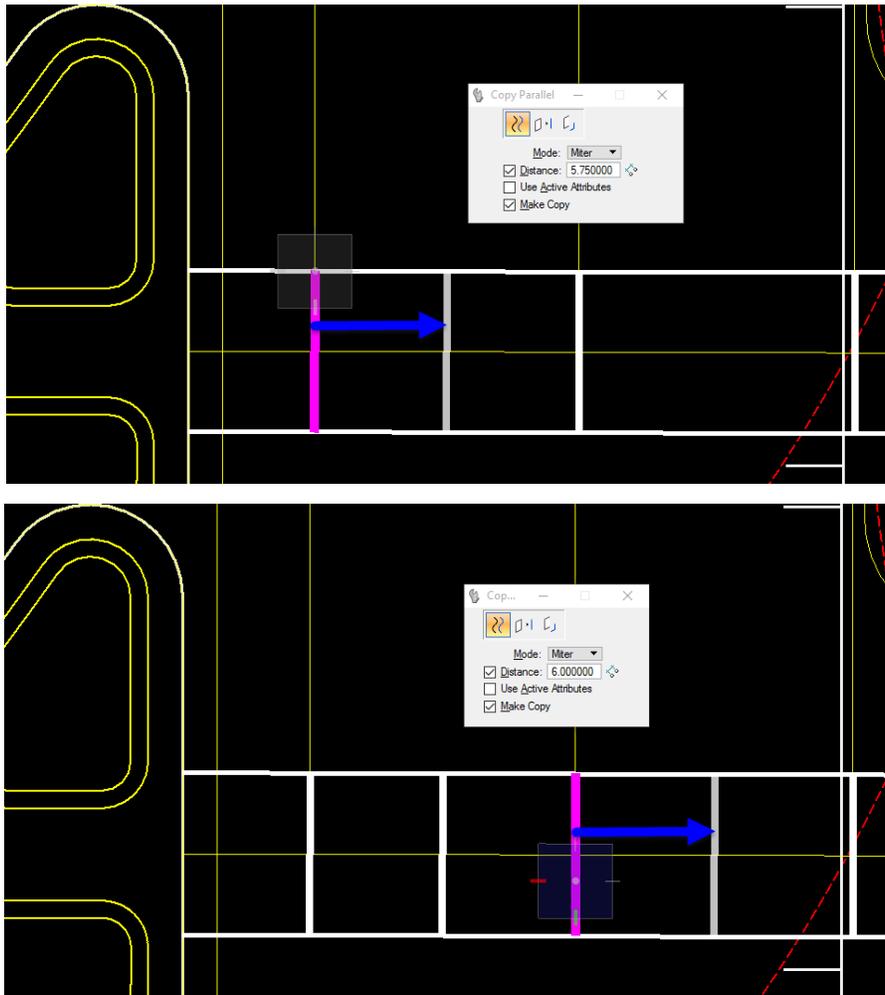
1. In MicroStation, select the **Place Smartline**  tool.
2. In the D&C Manager, select the **Design** tool  and toggle **On Place Influence**. 
3. Double click on the **Pavement Markings > Thermoplastic > Preformed > Solid > 0711 14125 Thermoplastic, Preformed, White, Solid, 24"** for Crosswalk.



4. *Snap (1) to the end of crosswalk line.*
5. *Snap (2) to the end of the other crosswalk line.*
6. Using the MicroStation **Move Parallel** command, *Snap (3) to the bike lane line to the right.* This places the initial 24" longitudinal crosswalk line at the bike lane.

- Use the Continuing with MicroStation **Copy Parallel**, copy the longitudinal crosswalk line across the intersection using the construction elements for locations.

Note Per the standard index, the longitudinal crosswalk lines must be drawn at the lane line locations, as well as $\frac{1}{2}$ way between the lane lines with maximum of 60" (5') between the edges of paint. This equates to a maximum of 7' between the centerline of the markings. For 12' lanes copy the lines parallel 6'.



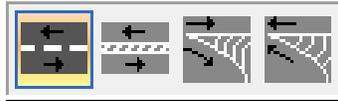
- Cleanup the crosswalk lines with the **Trim to Element**  tool. Click on each end of the lines and the adjacent edge of pavement to extend or trim the lines, if needed.
- Repeat these steps for the crosswalk across US 98.

Exercise 6.4 Draw Solid Yellow Striping

➤ Placing Solid Yellow Striping (Part 1)

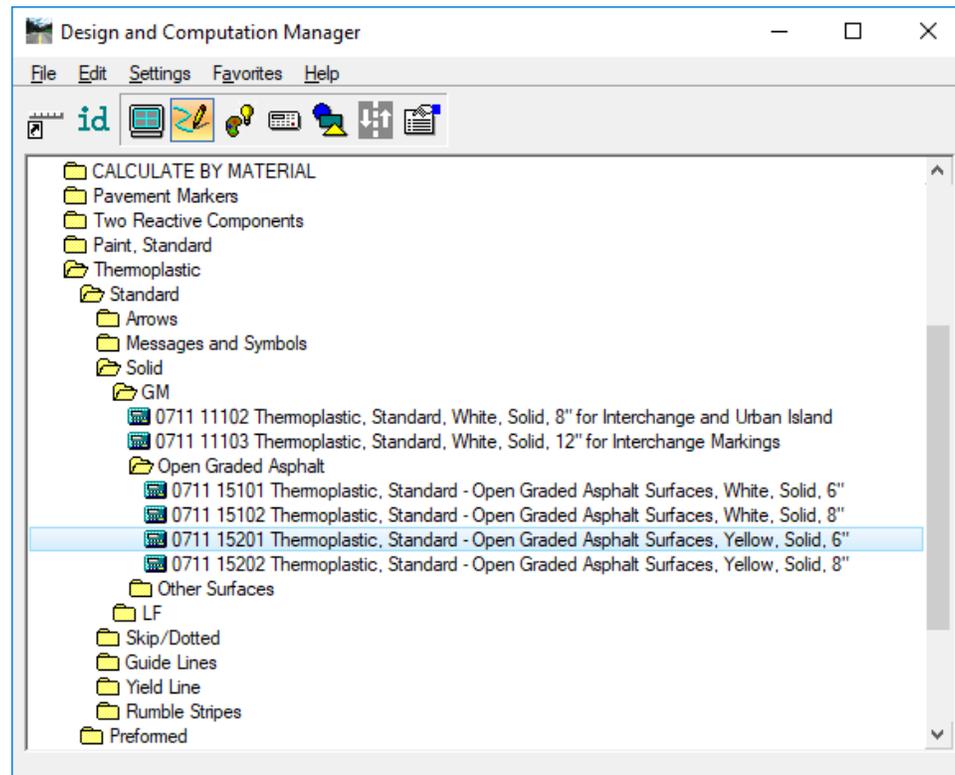
In this exercise, use D&C Manager to draw the solid pavement markings. The process will start by placing the right inside edge line using the right inside traffic separator line and the right inside curb face line as the reference elements. Thermoplastic items will be used in this exercise.

1. Continuing in the *DSGNP01.dgn* file, zoom in near **STA. 704+00**. This is where the inside edge lines are located.
2. From D&C Manager click the **Pavement Marking** button . This activates four additional pavement marking tools.



3. From D&C Manager navigate to the **Pavement Markings > Thermoplastic > Standard > Solid > GM > Open Graded Asphalt > 0711 15201 Thermoplastic, Standard - Open Graded Asphalt Surfaces, Yellow, Solid, 6''**.

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*.



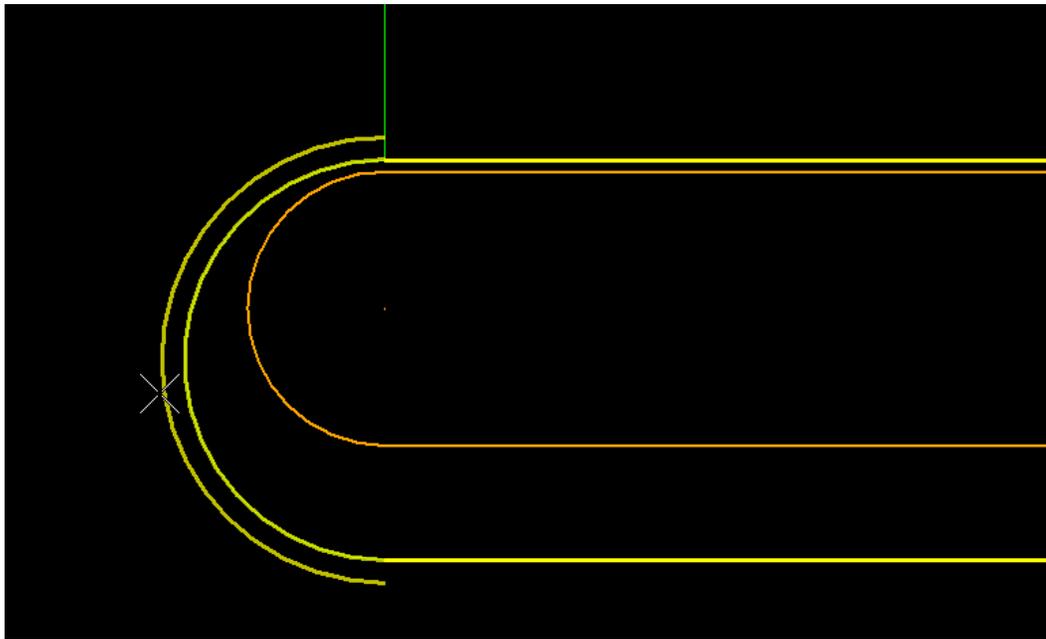
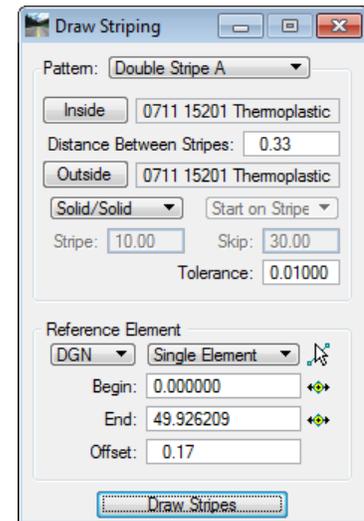
4. From D&C Manager, click on the **Striping** button  to open the Draw Striping dialog.
 - a. Set the *Pattern* to **Single Stripe A**.
 - b. Click on the **Single** button to set the active item.
 - c. The *type of line* should be set to **Solid**.
 - d. Set the *Reference Element* to **DGN**.
 - e. Select **Single Element** from the *method* drop down list.
 - f. Click the **Identify DGN Element** button and select the **Median Edge of Pavement** line on the *right* side of the *Centerline*.
 - g. Set the *Offset* to **0.17**.
 - h. Click the **Draw Stripes** button.
 - i. Move your cursor above the *edge of pavement line* and place a **Data Point**.
 - j. Right-click to end the command.
5. Use a similar process to place the striping on the *left* side of the *Median*.
 - a. On the Draw Striping dialog, change the *Reference Element DGN method* to **Selection Set**.
 - b. Click the **Identify DGN Element** button and select the *edge of pavement lines* on the left side of the *Median*. When all elements are selected click the **Identify DGN Element** button again. This will set the begin and end values which is the total length of all elements combined.
 - c. Set the *Offset* to **0.17**.
 - d. Click the **Draw Stripes** button.
 - e. Move your cursor above the *edge of pavement line* and place a **Data Point**.
 - f. Right-click to end the command.
6. Use the **Trim Elements to Intersection** tool to clean up the lines.
7. **Do Not Close** the Draw Striping dialog.

Note It is not necessary to close the Draw Striping 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.

8. Continue to place the median edge line and traffic separator pavement markings throughout the rest of the project if class time permits. For the traffic separator lines follow the **construction lines**.

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

1. Continuing in the *DSGNP01.dgn* file, zoom in around **STA. 701+00**.
2. Zoom in to the *Traffic Separator Nose*.
3. In D&C Manager, select **Item 0711 15201 Thermoplastic, Standard - Open Graded Asphalt Surfaces, Yellow, Solid, 6"**.
4. Set the *Pattern* to **Double Stripe A**.
5. Click the **Inside** and **Outside** buttons to set the selected item for both fields.
6. Set the *Distance Between Stripes* to **.33 (4")**.
7. Leave *type of line* set to **Solid/Solid**.
8. Set the *Reference Element* to **Single Element**. Click the **Identify DGN Element** button and select the **blue construction line** forming the outline in front of the traffic separator nose. This sets the *Begin* and *End* values.
9. Set the *Offset* to **0.17**.
10. Click the **Draw Stripes** button.
11. **Data Point** in the screen.
12. Right-click to end the command.

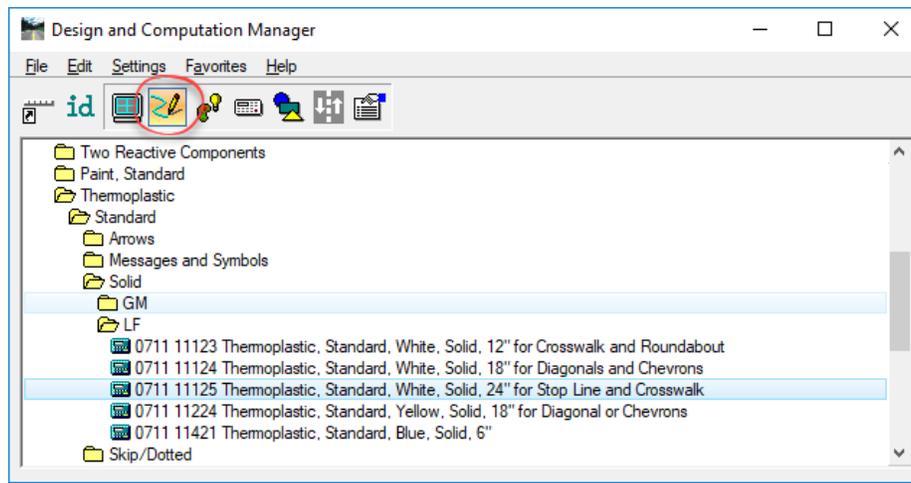


13. Continue to place the **6" Solid Double Yellow Pavement Markings** throughout the rest of the project if class time permits. The locations for these markings are indicated by blue construction lines.

Exercise 6.5 Draw Stop Bar Striping

In this exercise, the designer will use D&C Manager to place a stop bar.

1. Continuing in *DSGNP01.dgn*, zoom in around **Sta. 700+70.00**.
2. **Rotate view** as needed.
3. Open Design and Computation Manager.
4. Click on the **Design** icon.



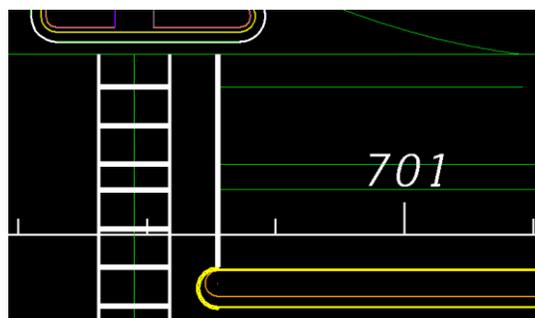
5. Navigate to and *double-click* on the item **Pavement Markings > Thermoplastic > Standard > Solid > LF > 0711 11125 Thermoplastic, Standard., White, Solid, 24” for Stop Line and Crosswalk**.
6. Read the message field in MicroStation.



7. **(Point 1) Snap** to the intersection of the *green construction lines* in place of where the stop bar is to be placed for the start point. Moving the cursor will show the direction in which the line will be drawn. Right-click if needed to draw the line across the lanes.

Note The construction line is drawn 5.5' from the 12" cross walk line. This accounts for the 4' gap required between the stripes plus the distance from centerline of the stripes to the edge of stripe.

8. **(Point 2) Snap** to the *Double Yellow Pavement Marking* near the Traffic Separator for the end point.
9. The figure below shows the stop bar placed.
10. Using the green construction lines, finish placing the *Stop Bar* in other areas throughout the class project.



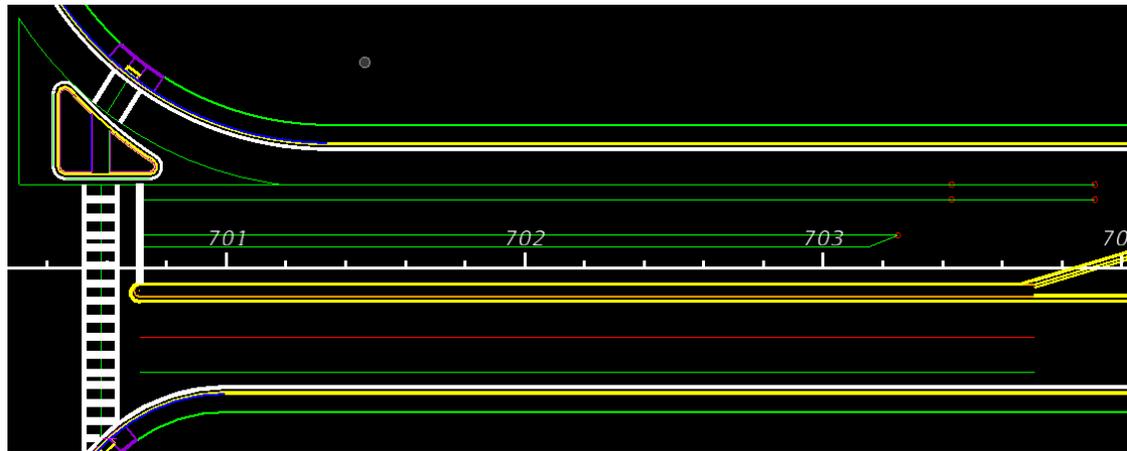
Exercise 6.6 Draw Solid White Turn Lane Line Striping

➤ Placing Solid White Turn Lane Line Stripe

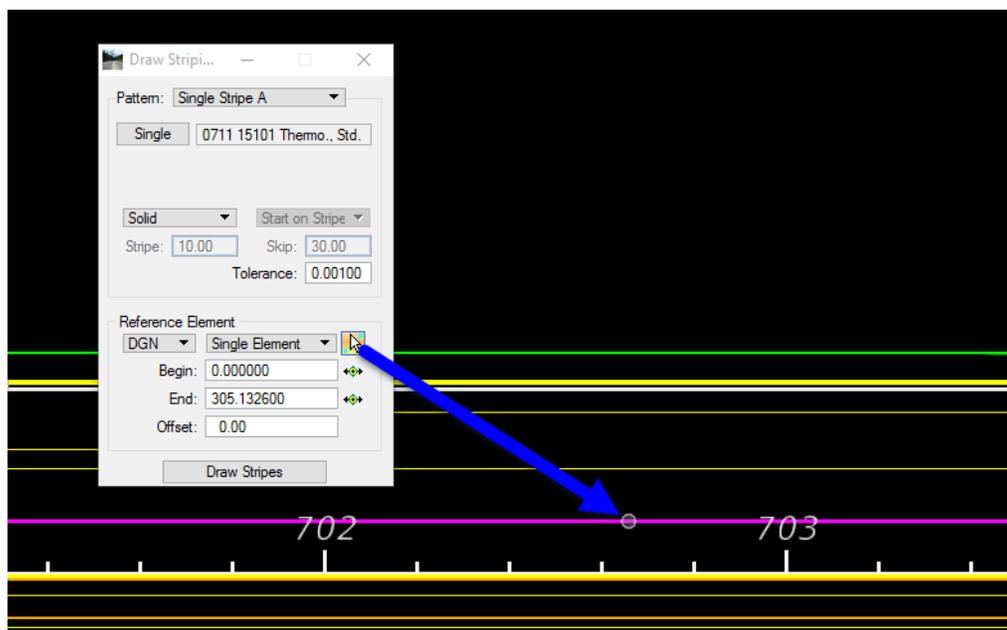
In this exercise, D&C Manager will be used to draw the 6" solid white lane lines for the intersection. Refer to index 301 for turn lane design criteria and index 17346 for special markings used in turn lanes and intersections.

1. Continuing in *DSGNP01.dgn* zoom into the area of the turn and through lanes, **station 700+70 to 704+00**.

Note All the green construction lines are the solid white lines that need to be placed in the intersection. The lines around the island will be 8" white. The remaining lines will be 6" white.



2. In D&C Manager, select the *Draw Striping* tool and select *Item 0711 15101 Thermoplastic, Standard - Open Graded Asphalt Surfaces, White, Solid, 6"*.
3. Set the *Pattern* to **Single Stripe A**.
4. Click the **Single** button. This will set the selected item from D&C Manager.
5. Set the *Reference Element* to **DGN** and **Single Element**.



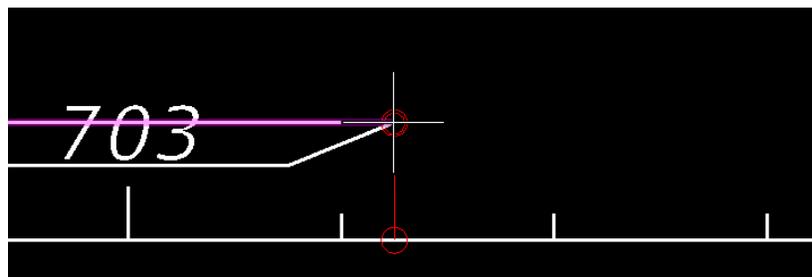
6. Click the **Identify DGN Element** button.
7. Select the *construction line* for the turn lane line. **Data point** again in the screen to accept the selection.
8. Set the *Offset* to **0.0**.
9. Click **Draw Stripes** and place a **Data Point** to accept the drawn lines.
10. Take a moment to review the pavement markings.
11. Continue to place the **6" Solid White Pavement Marking** throughout the rest of the project if class time permits. The **green construction lines** represent the **Solid White Pavement Markings**.
12. Repeat these steps for the striping around the Island using the item **0711 15102 Thermoplastic, Standard - Open Graded Asphalt Surfaces, White, Solid, 8"**.

Exercise 6.7 Draw 6/10 White Skip Striping

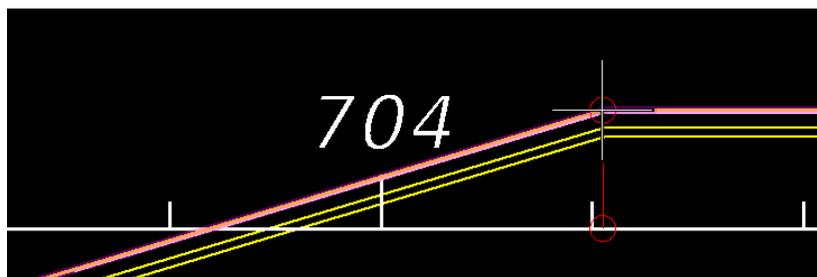
➤ Placing 6/10 White Skip Stripe (Part 1)

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 using the remaining construction line.

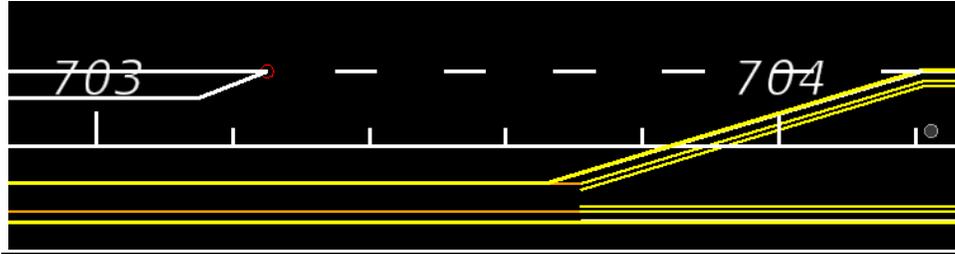
1. Continuing in *DSGNP01.dgn* zoom into the area around, **station 703+00 to 704+00**.
2. From D&C Manager, select **Pavement Markings > Thermoplastic > Standard > Guide Lines > TP_6_10Wgm TP_6_10Wgm Thermo., Std., White, Dotted Ext, 6" (6/10)**.
3. In the Draw Striping dialog, set the *Pattern* set to **Single Stripe B**.
4. Click the **Single** button to set the item active.
5. Set the *Stripe Type* to **Skip**. Set to **Start on Skip**.
6. Set the *Stripe Length* to **6.0** and the *Skip Length* to **10.0**.
7. Set the *Reference Element* to **Chain** and **SR61**.
8. Click the **Begin Station**  button and snap to the end of the **6" Solid White Turn Lane Line**.



9. Click the **End Station**  button and snap to the **6" Solid Yellow Median Pavement Marking Line**.



10. Set the *Offset* to **11.00**.
11. Click **Draw Stripes**.
12. Place a **Data Point** and reset to exit the command. The figure below shows the finished skip stripes.



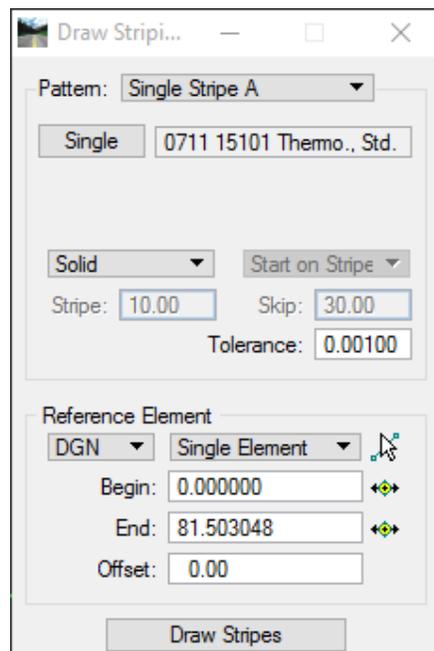
13. Continue to place the **6" white 6/10 skip stripe** throughout the rest of the project if class time permits. The locations will be indicated with **yellow construction lines**.

Exercise 6.8 Draw Bike Lane Striping

➤ Placing Solid White Striping for the Bike Lane (Part 1)

In this part of the exercise, D&C Manager Draw Striping tool will be used to draw the solid white Bicycle Lane line. Use the Design Standards Index 17347 for guidance on bike lane marking criteria.

1. Continuing in *DSGNP01.dgn*, select the D&C Manager item **0711 15101 Thermoplastic, Standard - Open Graded Asphalt Surfaces, White, Solid, 6"**.



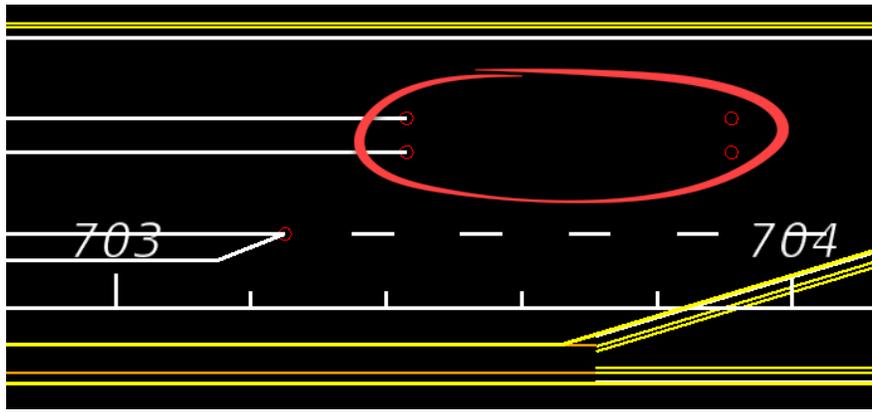
2. Set the *Pattern* to **Single Stripe A**.
3. On the **Draw Striping** dialog, click the **Single** button to make the item active.
4. The *type of line* should be set to **Solid**.
5. For the *Reference Element* change the option to **DGN**.
6. Set the *type of element* to **Single Element**.

7. Click the **Identify DGN Element** button and select the Outside Edge of Pavement line on the right side of the Roadway.
8. Set the *Offset* to **5.0**.
9. Click the **Draw Stripes** button.
10. **Data Point** to accept the placement of the line.
11. Use the **Trim to Element** tool to extend the Bike Line to the Crosswalk.
12. Continue to place the other bike lane markings using the **Draw Striping** tool. The locations are indicated with **pink construction lines**.

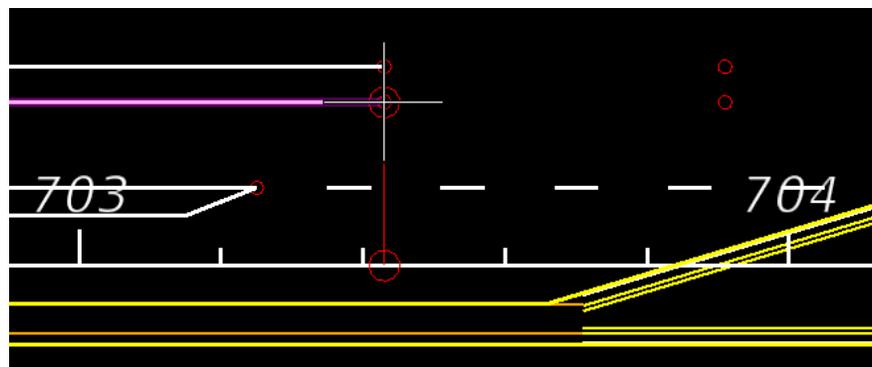
➤ **Placing Guide Line White Striping for the Bike Lane (Part 2)**

In this part of the exercise, D&C Manager Draw Striping tool will be used to draw the 2/4 white guide line required for the Bike Lane.

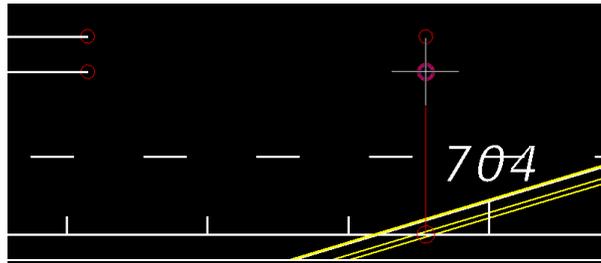
1. Zoom into the beginning of the *Bicycle Lane* around **Sta. 703+00 to 704+00**.



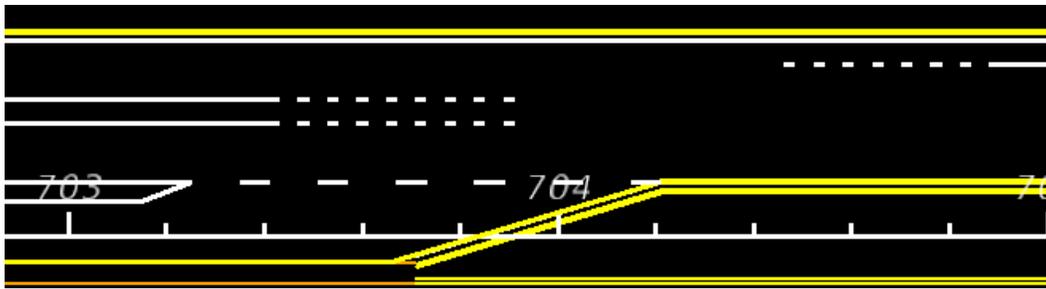
2. In D&C Manager, select *Item TP_2_4Wgm Thermo., Std., White, Guide Line, 6" (2/4)*.
3. In the Draw Striping dialog set the *Pattern* to **Single Stripe B**.
4. Click the **Single** button to set the item active.
5. Set the *Stripe Type* to **Skip**. Set to **Start on Skip**.
6. Set the *Stripe Length* to **2.0** and the *Skip Length* to **4.0**.
7. Set the *Reference Element* to **Chain** and **SR61**.
8. Click the **Begin Station**  button and snap to the end of the *6" Solid White Bike Lane Line*.



9. Click the **End Station**  button and snap to the Red circle indicating where the bike lane should end.



10. Set the *Offset* to **23.00**.
11. Click **Draw Stripes**.
12. Place a **Data Point** and reset to exit the command. Repeat this for the other bike lane line. The figure below shows the finished skip stripes.



13. Continue to place the **6" white 2/4 skip stripe** throughout the rest of the project if class time permits. The locations will be indicated with **aqua construction lines**.

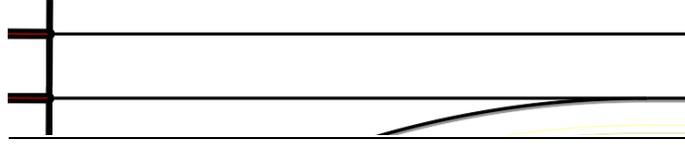
Exercise 6.9 Draw Lane Line – Solid & 10/30 Skip Striping

➤ Placing Solid 6" White Stripe (Part 1)

In this exercise, you will use the D&C Manager Draw Striping tool to place the 6" Solid White Pavement Marking Line for the edges of the road and around the median.

- Continuing in *DSGNP01.dgn* zoom in to the *Right Outside Edge of Pavement* line.
- From D&C Manager, select **Pavement Markings > Thermoplastic > Standard > Solid > GM > 0711 15101 Thermoplastic, Standard - Open Graded Asphalt Surfaces, White, Solid, 6"**.
- In the Draw Striping dialog, set the *Pattern* set to **Single Stripe A**.
- Click the **Single** button to set the item active.
- Set the *Stripe Type* to **Solid**.
- Set the *Reference Element* to **DGN** and **SR61**.
- Click the **Identify DGN Element** button and select the **Right Outside Edge of Pavement (EOPA33)** line on the *right* side of the *Centerline*.
- Set the *Offset* to **0.17**.
- Click the **Draw Stripes** button.
- Move your cursor above the *edge of pavement line* and place a **Data Point**.

11. Right-click to end the command.
12. Using the MicroStation **Trim To Element** command, extend the *6" Solid White Pavement Marking* line to the *24" White Crosswalk* line.
13. Your design should look something like this:

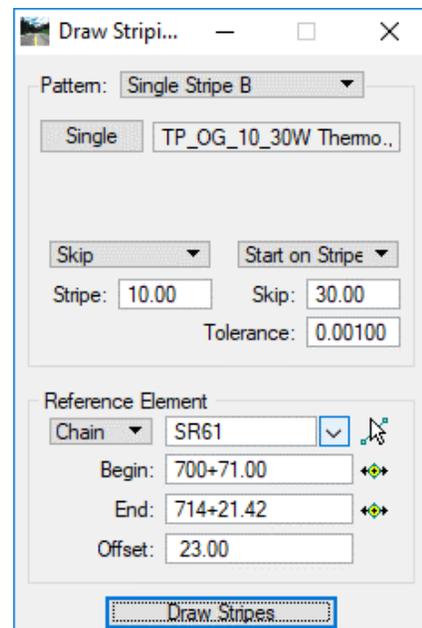


14. Continue to place the **6" solid stripe** throughout the rest of the project if class time permits.

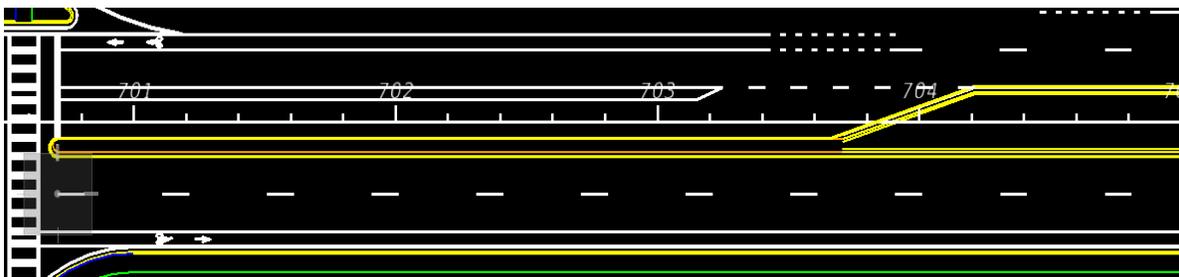
➤ **Placing 10/30 Skip Stripe (Part 2)**

In this exercise, place the single white 6" 10/30 Skip.

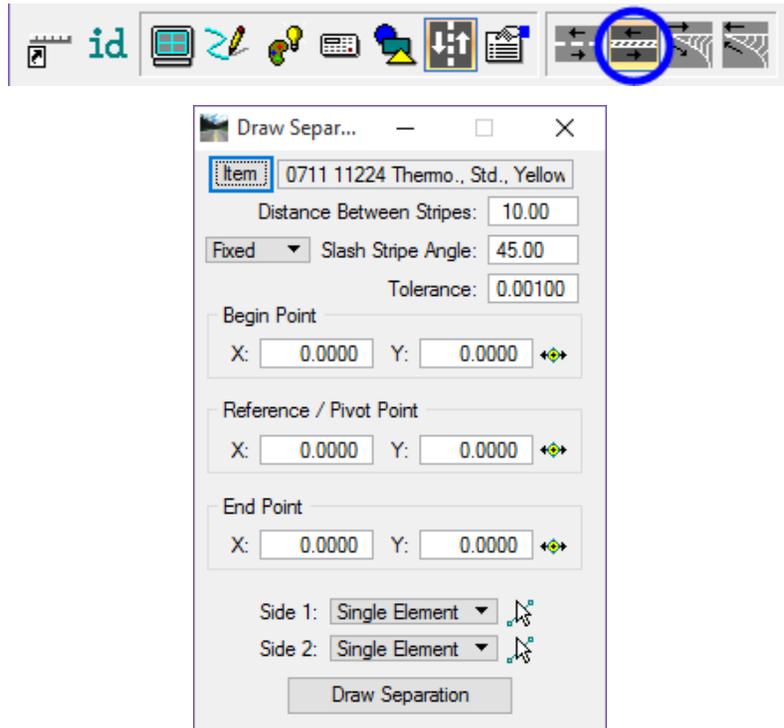
1. Continuing in *DSGNP01.dgn* zoom in to the right *Edge of Pavement Line*.
2. From D&C Manager, select **Pavement Markings > Thermoplastic > Standard > Skip/Dotted > Open Graded Asphalt > TP_OG_10_30W Thermo., Std. – OG, White, Skip, 6" (10/30)**.
3. In the Draw Striping dialog, set the *Pattern* to **Single Stripe B**.
4. Click the **Single** button to set the item active.
5. Set the *Line Type* to **Skip**.
6. Set to **Start on Stripe**.
7. Set the *Stripe length* to **10.0**.
8. Set the *Skip length* to **30.0**.
9. Set the *Reference Element* to **Chain** and **SR61**.
10. Set the *Begin Station* to **700+71.00**.
11. Set the *End Station* to **714+21.42**.
12. Set the *Offset* to **23.00**. This is the offset distance from the **SR61** reference chain to the **10/30 Skip Lane Line** that is being placed.



13. Click the **Draw Stripes** button. **Data point** to accept the placement of the line.
14. Continue to place the **6" 10/30 Skip Stripe** throughout the rest of the project if class time permits.



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.



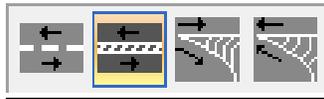
- **Item** – This is the pay item selected in D&C Manager. Clicking the *Item* button loads the selected item from D&C Manager.
- **Distance Between Stripes** - Refer to the indexes for the correct distance between stripes.
- **Slash Stripe Angle** – This is the angle, in degrees, of the stripe.
- **Fixed** - 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:
 - o Single Element – When selected, you are prompted to select the element.
 - o 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.
 - o 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 6.10 Draw Separation

In this exercise, you will draw an **18” Yellow Separation Marking** lines using the *Pavement Marking Tool Draw Separation*.

1. Open the *DSGNSP-Stripe.dgn* file, in the *Signing* folder.
2. Open the **Separation** Model.
3. Open D&C Manager and select the **Pavement Marking** mode.
4. Navigate to **Pavement Markings > Thermoplastic > Standard > Solid > LF > 0711 11224 Thermoplastic, Standard, Yellow, Solid, 18” for Diagonal or Chevrons**.
5. On D&C Manager, click on the **Separation Pavement Marking** icon to open the Draw Separation dialog.



Draw Separ...

Item: 0711 11224 Thermo., Std., Yellow

Distance Between Stripes: 10.00

Fixed ▾ Slash Stripe Angle: 45.00

Tolerance: 0.00100

Begin Point

X: 592326.04 Y: 1627284.50

Reference / Pivot Point

X: 592388.88 Y: 1627337.40

End Point

X: 592394.78 Y: 1627328.12

Side 1: Single Element ▾

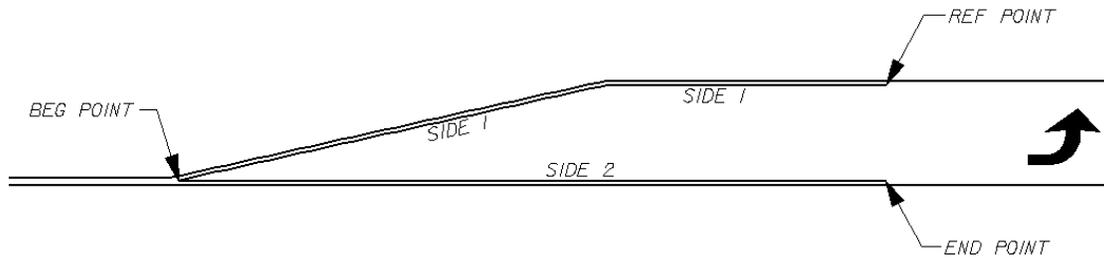
Side 2: Single Element ▾

Draw Separation

- a. Set the *Distance Between Stripes* to **10.0**.

Note Refer to **Index 17346** for Separation Marking spacing and angle criteria.

- b. Select **Fixed** for the *Stripe Angle Sequence*.
- c. Set the *Slash Stripe Angle* to **45.0°**.
- d. Set the *Begin Point*, *Reference/Pivot Point*, and *End Point* as shown in the figure. Use the locate buttons  next to each option before snapping to the lines.
- e. Use the *Tentative Snap* to select each **point**.



- f. For *Side 1* set the option to **Selection Set**.
 - g. Use *Element Selection* to select both lines representing **Side 1**, see figure above.
 - h. Once both lines are selected, click the **Accept Select Set** button next to the *Side 1* option.
 - i. **Clear** the selection set from *Element Selection*.
 - j. For *Side 2* set the option to **Single Element**.
 - k. Click the **Identify DGN Element** button.
 - l. Select **Side 2** as seen in figure above and data point to accept.
 - m. 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.
6. Place 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.

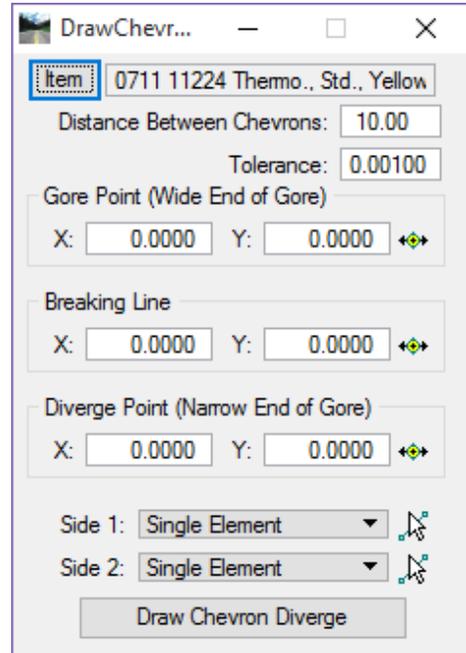
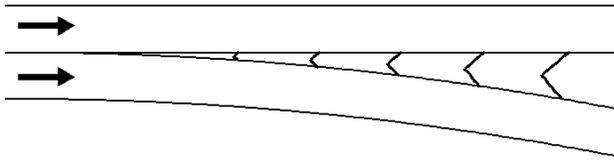


7. Close the Draw Separation tool. **Do Not Close D&C Manager**.
8. There are areas in the class project that require separation pavement striping. If time permits, try this technique on the class dataset.

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.



- **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.

Exercise 6.11 Draw Chevron Diverge

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.

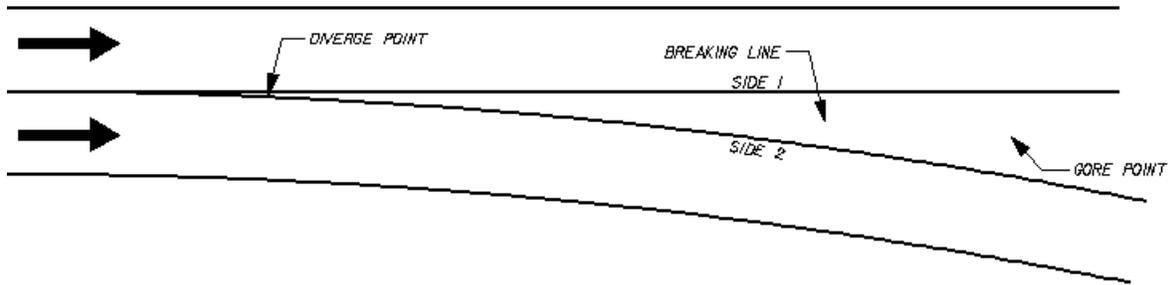
1. Continuing in *DSGNP-Stripe.dgn*, open the *model Diverge*.
2. In D&C Manager navigate to **Pavement Markings > Thermoplastic > Standard > Solid > LF > 0711 11124 Thermoplastic, Standard, White, Solid, 18" for Diagonals or Chevrons**.
3. In D&C Manager, click on the **Chevron Diverge Pavement Marking** icon. This opens the Draw Chevron Diverge dialog as shown below.

- a. Click the *Item* button if the item is not already set.
- b. Set the *Distance Between Chevrons* to **20.0**.

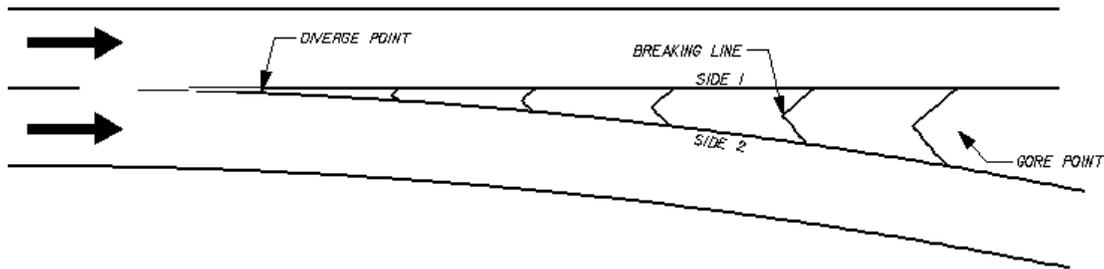
Note Refer to **Index 17345** for Chevron spacing.

- c. 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 locate buttons next to each option before snapping to the points.

Note These locations were preset to aid in the completion of this exercise, feel free to deviate from these points to view the differences in chevron placements.



- d. For *Side 1* set the option to **Single Element**.
 - e. Click the **Identify DGN Element** button.
 - f. Select the **Side 1** element as seen in figure above and data point to accept.
 - g. Repeat the above steps for *Side 2* selecting the **Side 2** element.
 - h. 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.
4. Place a **Data Point** to draw the stripes.
 5. The figure below shows the finished product. The stripes are placed in a graphic group for easy deletion.

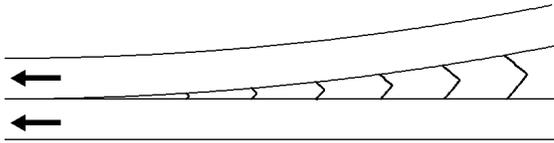


6. Close the Draw Chevron Diverge tool. **Do Not Close D&C Manager.**
7. There are areas in the class project that require diverge pavement striping around the island. If time permits, try this technique on the class dataset.

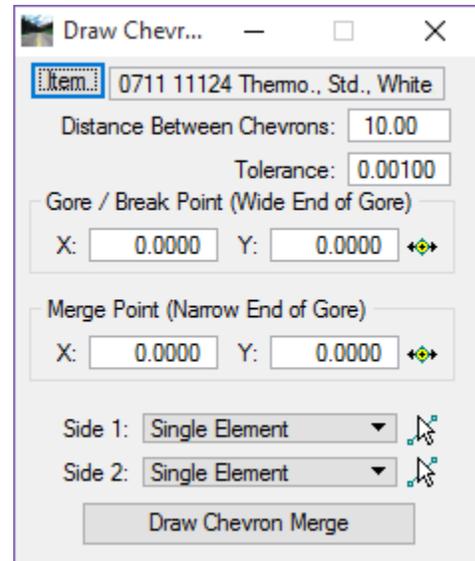
CHEVRON MERGE



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.



Exercise 6.12 Draw Chevron Merge

In this exercise the designer 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.

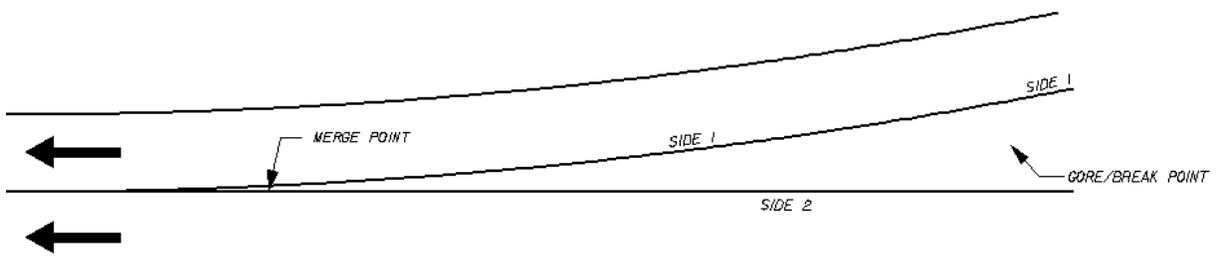
1. Continuing in *DSGNP-Stripe.dgn* open the model **Merge**.
2. In D&C Manager navigate to **Pavement Markings > Thermoplastic > Standard > Solid > LF > 0711 11124 Thermoplastic, Standard, White, Solid, 18" for Diagonals or Chevrons**.
3. In D&C Manager, click on the **Chevron Merge Pavement Marking** icon. This opens the Draw Chevron Merge dialog as shown below.

- a. Click the **Item** button if the item is not already set.
- b. Set the *Distance Between Chevrons* to **20.0**.

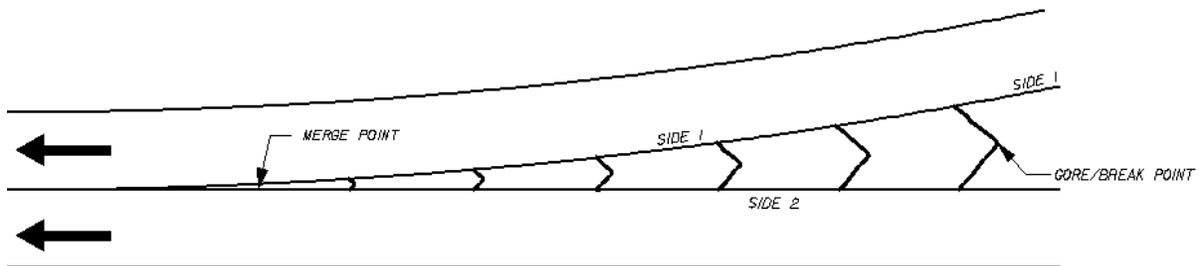
Note Refer to **Index 17345** for Chevron spacing.

- c. Set the *Tolerance* to **0.10**.
- d. Set the *Gore/Break Point (Wide End of Gore)* and *Merge Point (Narrow End of Gore)* as shown in the figure below. Use the locate buttons next to each option before snapping to the lines.

Note These locations were preset to aid in the completion of this exercise.



- e. For *Side 1* set the option to **Selection Set**.
 - f. Use *Element Selection* to select both lines representing **Side 1**, see figure above.
 - g. Once both lines are selected, click the **Accept Select Set** button next to the *Side 1* option.
 - h. Clear the selection set from *Element Selection*.
 - i. For *Side 2* set the option to **Single Element**.
 - j. Click the **Identify DGN Element** button.
 - k. Select the **Side 2** element as seen in figure above and data point to accept.
 - l. 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.
4. Place 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.



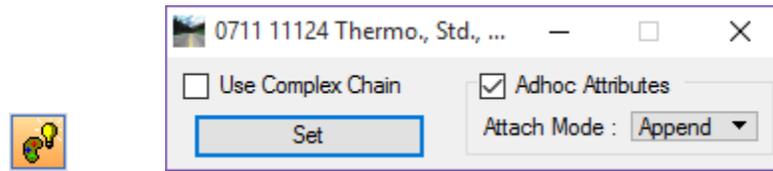
- 5. Close the Draw Chevron Merge dialog.

FIX ELEMENTS USING D&C MANAGER SET MODE

Design & Computation Manager has a **Set Mode** which is used to fix elements not drawn with no *Adhoc Attributes*.

Example: A project that contains pavement marking items and the designer is trying to compute quantities but nothing is being calculated. All elements are on the correct level but there is no *Pay Item* information on them.

The **Set** dialog and icon are shown below:



The workflow for this tool is:

1. Select the *Item* in D&C Manager.
2. Start the **Set** command.
3. Click the **Set** button.
4. Select the element in MicroStation to fix and accept it.

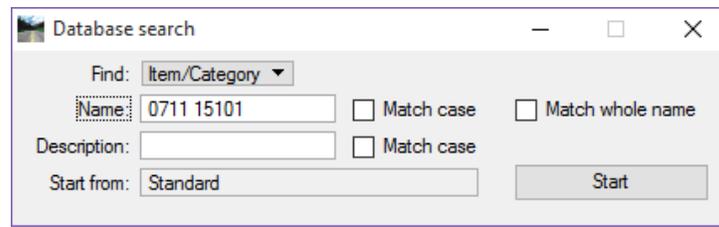
Note Use selection sets to fix multiple items at the same time.

Note 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 *Adhoc attributes* on the *pay item*. The *compute method* for most pavement marking items are set to *Adhoc Attributes*. If they are not set to the elements correctly, the elements will not calculate.

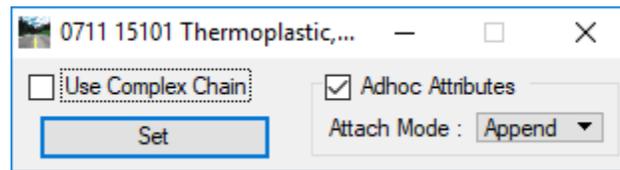
Exercise 6.13 Set MicroStation Elements to D&C Manager Item

In this exercise, the designer will set MicroStation lines to have *Adhoc Attributes* on them. The existing lines in the model are CADD compliant but will not quantify. This scenario is common when users in an office do not use D&C Manager to draw elements into MicroStation. The existing lines DO NOT have to be redrawn. Only set them to the appropriate D&C Manager item.

1. Continuing in the *DSGNP-Stripe.dgn* file, open the *model* **Fix Lines**.
2. Open D&C Manager. Click on the **ID** button  and select the elements in the **Fix Lines** model. Notice none of the elements match DDB items.
3. In D&C Manager, select **Edit > Find**.
4. In the Database Search dialog set the *Find* option to **Item/Category**.



5. In the *Name* field key-in **0711 15101**. Make sure to add the space in the name.
6. Click **Start**. This will set you on that *Item* and saves having to navigate to it.
7. Close the Database Search dialog.
8. On D&C Manager, click on the **Set** icon . The Set dialog opens.



9. Click the **Set** button on the dialog.
10. Select the **6" White Lane lines** in the design file and data point to accept setting the *Item*.

Note *It is not necessary to click on the Set button each time.*

11. In D&C Manager set the *Item* to **0711 15201**.
12. Use *Element Selection* to select the **6" Yellow Edge Lines**.
13. Click the **Set** button. No need to Data Point to accept the lines with this option; it is done all in one step.

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7 SIGNING TOOLS

OBJECTIVE

In this chapter the following topics will be covered:

- Draw Sign program
- GuidSIGN

INTRODUCTION

This chapter 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.

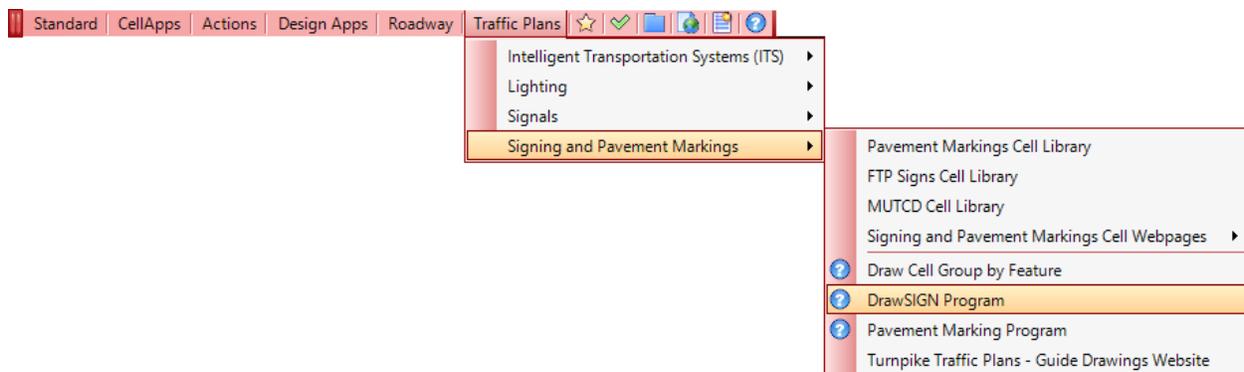
At this point, the designer may have an inventory of existing signs for their project. The designer has to decide which signs need to be removed, relocated, or replaced. This work should be done in the proposed design file, *DSGNP01.dgn*.

The Draw Sign program is another source for placing 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 for computation.

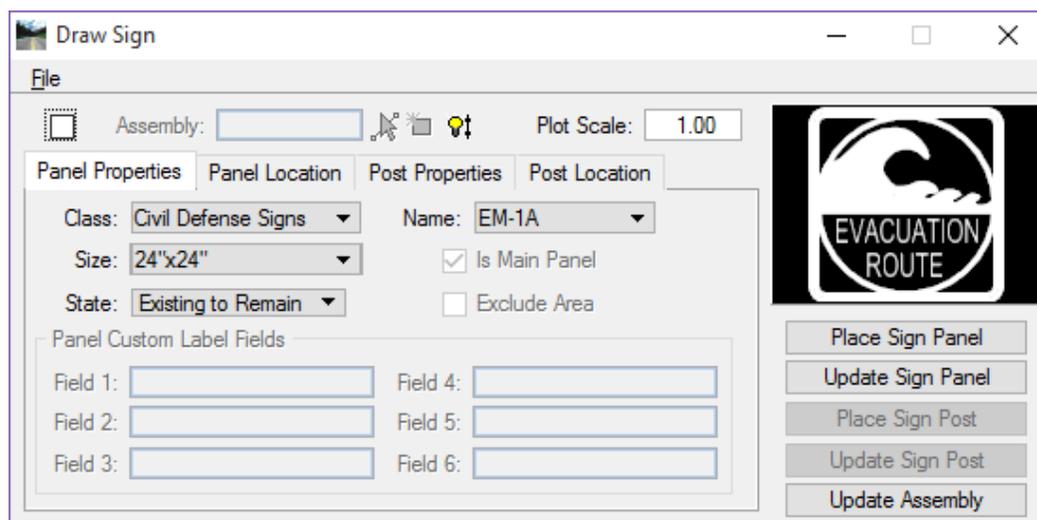
GuidSIGN, is a sign design program available from Transoft Solutions, and is included in this section and briefly explained.

DRAW SIGN PROGRAM

Available from FDOT Menu, the Draw Sign program is designed to assist in the placement of standard sign panels and posts 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.



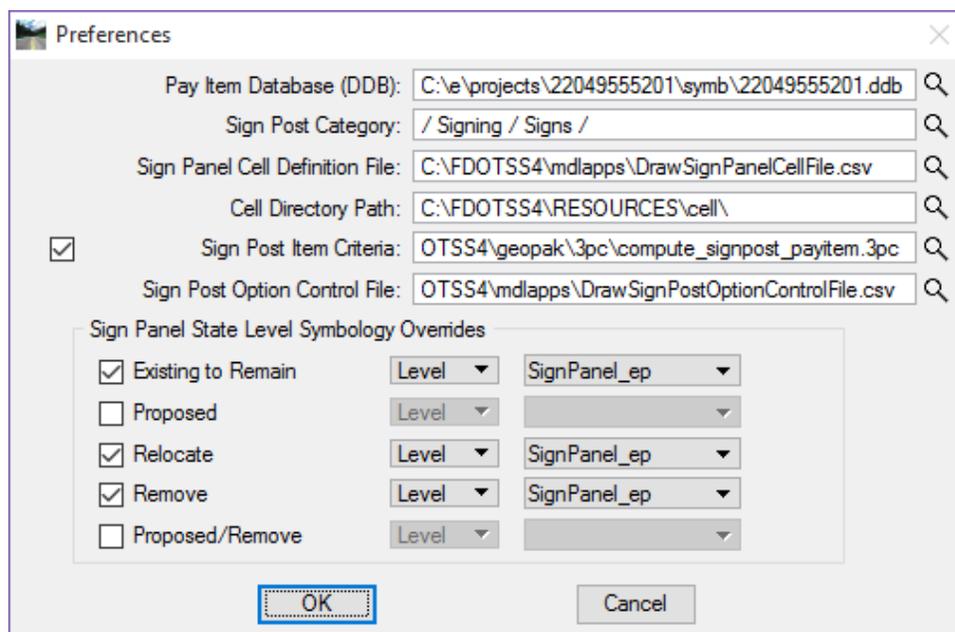
The Draw Sign program can also be accessed from the FDOT Plans Development > Traffic Plans task menu or from the MicroStation menu, GEOPAK > ROAD > Plans Preparation > Draw Signs.



The Draw Sign File menu has three options: **Preferences** is described in the following section, **Select GPK** which opens the Job Number dialog to select a different GPK file and **Exit** which closes the Draw Sign Program.

PREFERENCES

Preferences are set based on variables defined when the FDOTSS4 software is installed.

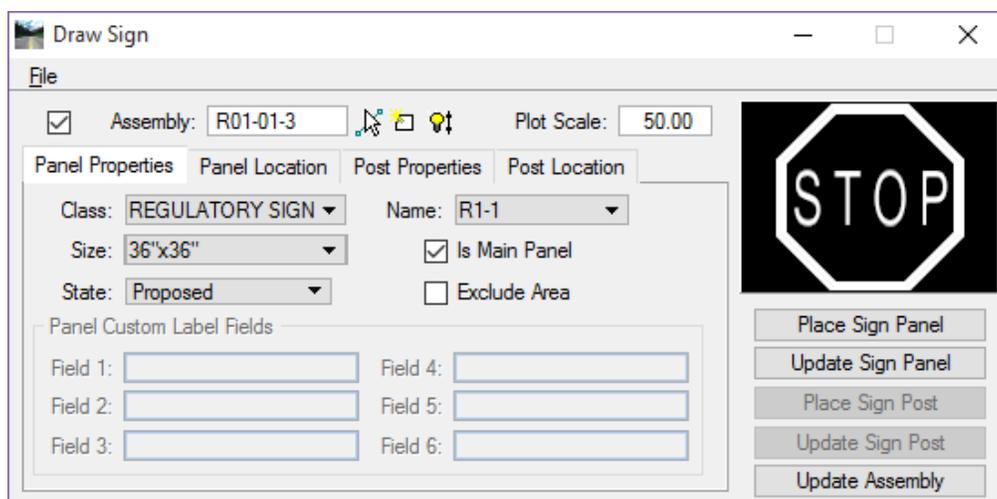


- **Pay Item Database (DDB):** Path to the *FDOTSS4.ddb* or project specific DDB. The path will be different for most users between districts depending on the type of installation performed for the FDOTSS4 software. If a project specific DDB is available it should be selected as shown in the image above.
- **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.

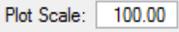
- **Sign Panel Cell Definition File:** Shows the path to the .csv definition file. This file defines the valid signs and sizes for all sign panels.
- **Sign Post Item Criteria:** This should always be selected. Otherwise, the 'Auto-Select' function will not operate and will require the user to manually 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

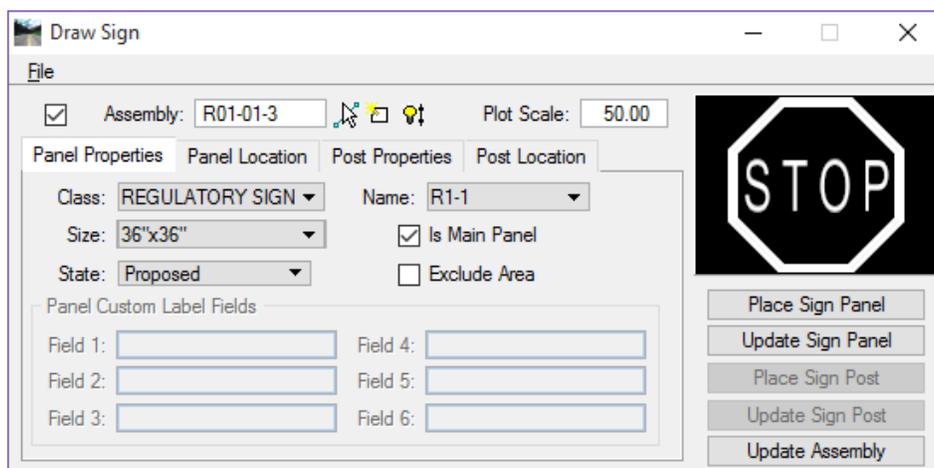
The assembly check box must be checked on to be able to create a new sign **Assembly**. The field to the right of **Assembly Toggle** is for the **Assembly Name**. The name will default to the name of the sign panel selected in the Panel Properties tab.



-  **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 the designer has to click this icon to apply a name to the group to create an assembly. If this button is not clicked all panels placed will be attached to the previously created assembly. This will cause erroneous pay items to be calculated.

-  **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. When placing signs created by GuidSIGN this will need to be adjusted for correct scaling of the special signs.

PANEL PROPERTIES TAB



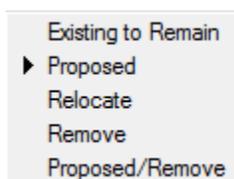
- Class** – This option allows the designer to select the class of sign panel to place, i.e. Regulatory, Warning and so on.
- Name** – The Name menu shows all of the available signs based on the selected Class. The names appear as they are in the MUTCD. This name will be carried up to the Assembly name 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. The wind calculation area is used to determine the pay item number, i.e. single post (700-1-AB) vs. multi-post (700-2-AB).

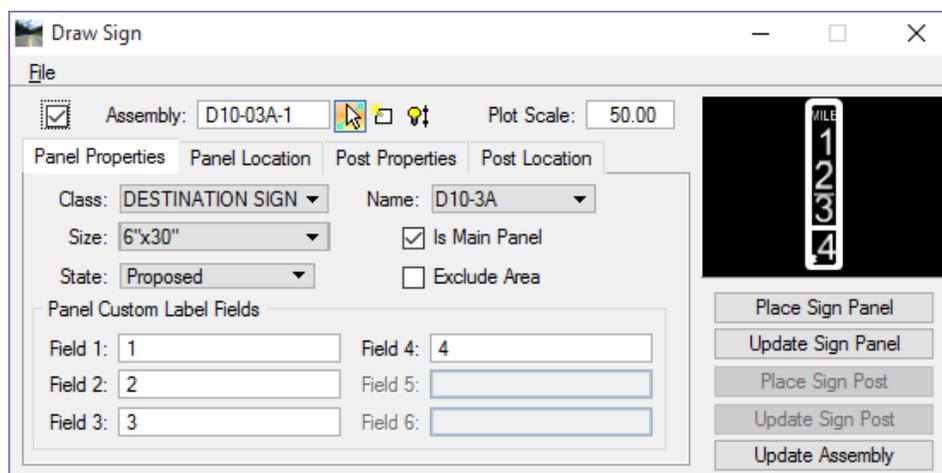


- **State** – This option sets the sign panel to the selected state. There are five options as seen in the figure below.

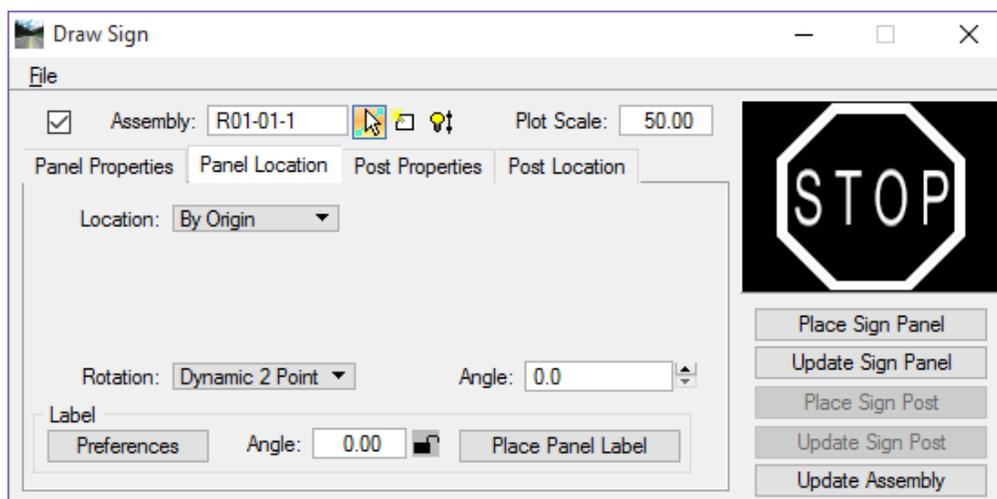


- **Panel Custom Label Fields** – This is where to fill in any open fields on a sign panel. Example, the Speed Limit sign has one field that needs to be filled in. When the Speed Limit sign is selected Field 1 becomes active to enter the speed. This will change the preview display to show the new speed. 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.

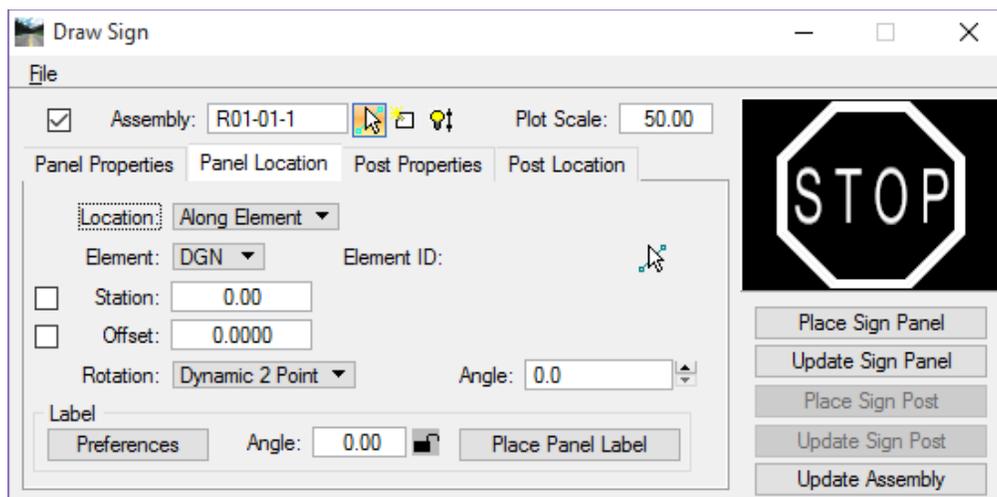
The figure below shows a sign with four fields active.



PANEL LOCATION TAB

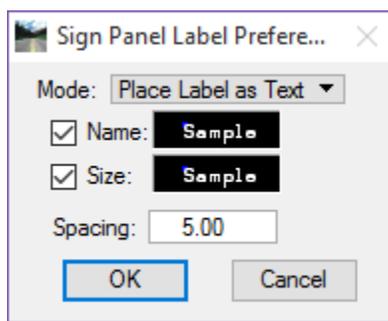


- **Location** – This determines where and how the sign panel will be located. Keep in mind the sign panel location is only for graphic representation. It is not critical that it be placed at a specific station and offset. There are two options:
 - **By Origin** – Places the Sign Panel by the origin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



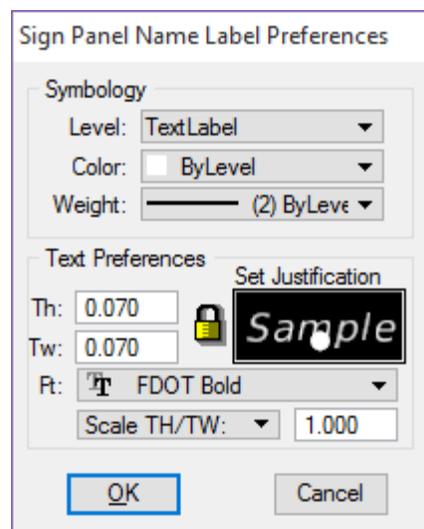
- **Mode** – There are two options for the Mode:

[Place Label as Text] – This option places the label as MicroStation text. Set the symbology of the text by double-clicking in the *Sample* text field for the Name and the Size. To place the text for the Name or Size the box must be checked on. When placing two text labels, the Spacing refers to the space between the origins of the two text labels.

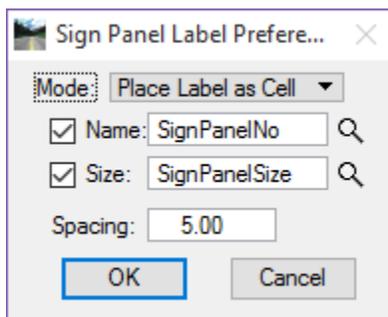
Double-clicking on the *Sample* text field opens the Sign Panel Name Label Preferences dialog where you can set the Level Symbology and Text Preferences.

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

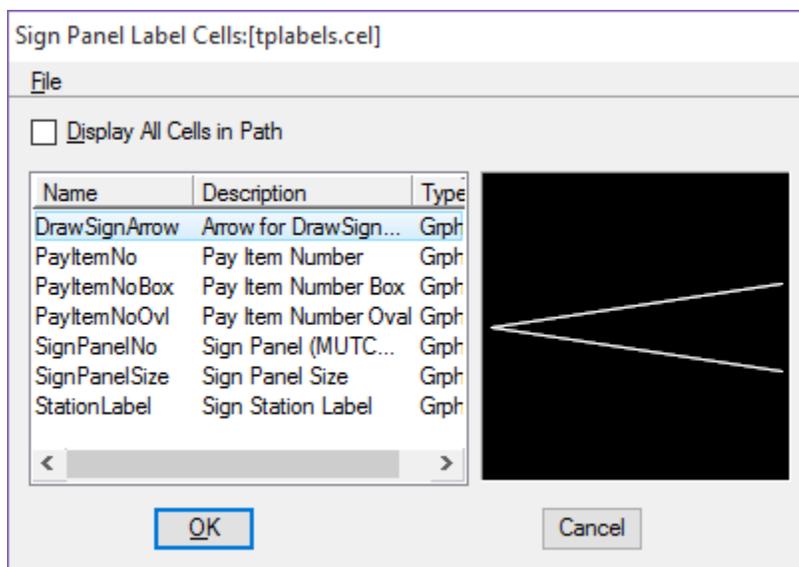
R1-1
36" x 36"



[Place Label as Cell] – This option requires selecting a cell for the Name and Size label. If an oval around the Sign Number is desired or required by the district, this is the option to use.



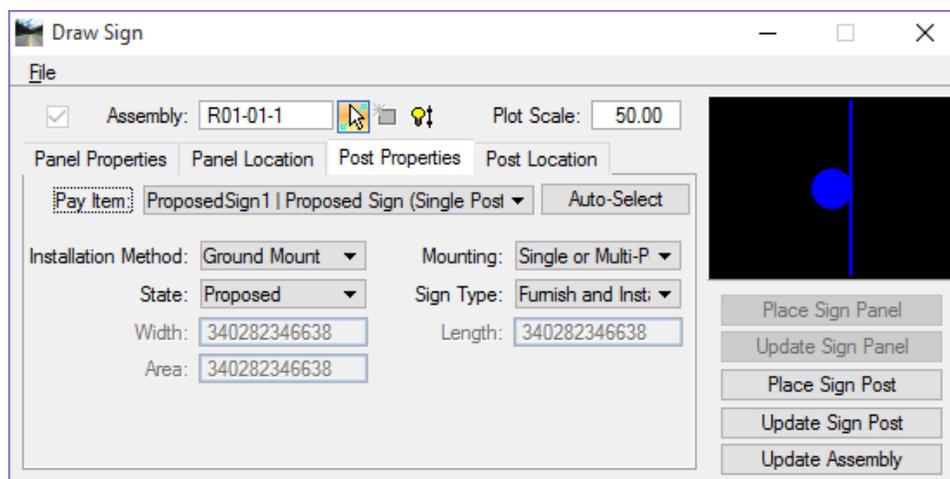
The magnifying glass icons next to the *Name* and *Size* allow the designer to browse to the cell library and select the appropriate cell. If checking both the Spacing allows for setting the space between the two cells.



- o **Angle** – This is the angle of the text label not the sign panel. This locks in by selecting the paddle lock icon. This angle also has an allowance for manual key in.
- o **Place Panel Label** – Used to place a label on a panel previously placed or on a panel replaced. Clicking on this option prompts you to select a sign panel.

POST PROPERTIES TAB

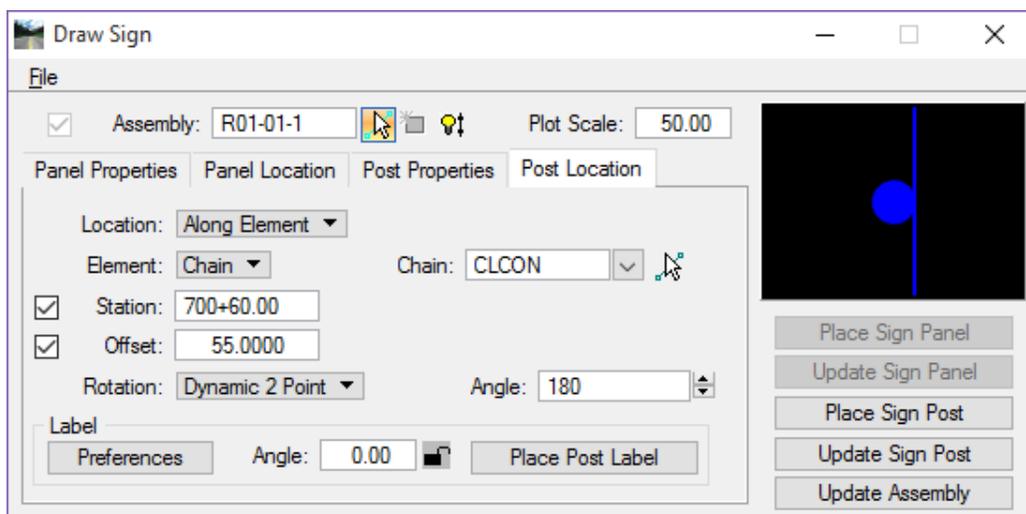
This tab is for setting up the type of sign support to be used for a specific sign assembly. It is broken into several options as described below.



- **Pay Item** – This is the pay item associated to a sign support. From the drop down list select a specific support. The options available under the DDB category defined in the Preferences and generates this list.
- **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 six options that are based on a CSV file defined in the Preferences.
 - *Ground Mount*
 - *Overhead*
 - *Panel Only*
 - *Electronic Display*
 - *Dynamic Message Signs*
 - *Internally Illuminated Signs*
- **Mounting** – the mounting options available are based on the Installation Method selected, according to valid Department pay items and standards.
- **State** – this option defines the condition of the support. There are five options:
 - *Existing to Remain*
 - *Proposed*
 - *Relocate*
 - *Remove*
 - *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 the 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

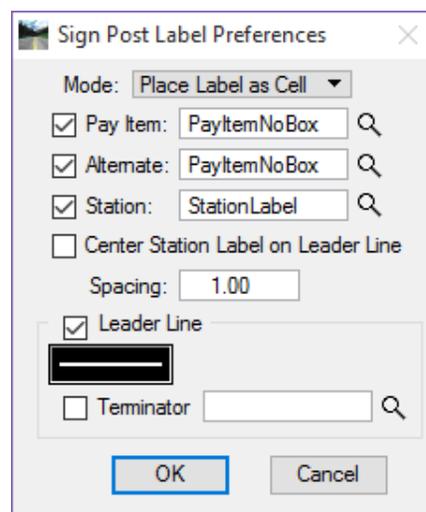
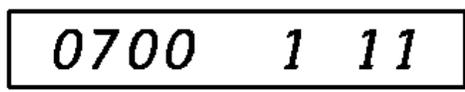
This defines where the post is to be located. The term post is a generic term referring to all types of sign supports. There are several options and methods for the placement of the post.



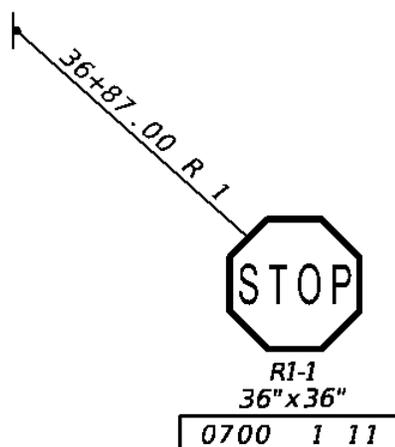
- **Location** – There are two options for defining the location of the post.
 - *By Origin* – Places the post dynamically by the origin of the cell.
 - *Along Element* – This option locates the post based on a referenced element. There are two options.
- **Element** – There are two options, DGN or Chain. 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* – Opens the Sign Post Label Preferences dialog and allows the designer to set the preferences for the Sign Post Label.

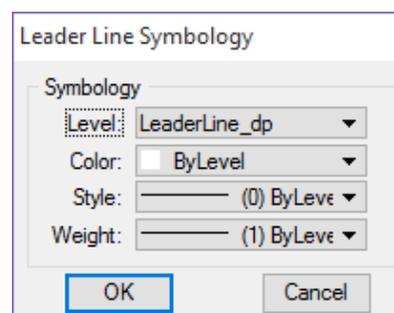
- **Mode** – If the Mode is set to Place Label as Cell, the designer will be required to browse to the cell library and select which pay item cell to place.
- **Pay Item** – This is the *Pay Item Number* text displayed with the sign panel. The figure below shows the Pay Item placed as a cell. This places a box around the pay item number.



- **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** – Labels the *Station* information. 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 **Set Feature** dialog where the symbology and text preferences can be customized.
- **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.



- **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.

- **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

There are 5 buttons along the right side of the Draw Sign dialog below the sign preview window. These buttons are used to place sign panels and posts, update panels or posts, and update an assembly. The available options depend on the which tab is active.

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

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

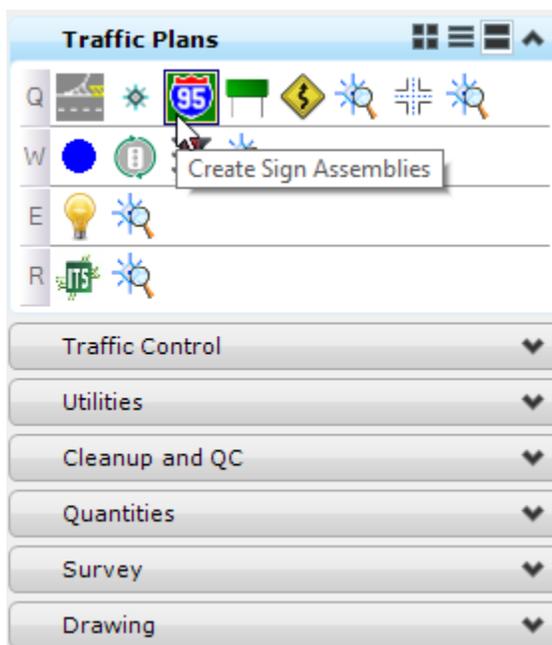
- **Update Sign Panel** – This is accessible when the Panel Properties or Panel Location tab is active. Use this option to update a previously placed Sign panel with new sign panel info. Example: If you placed a sign panel with the wrong size, use this option to update the panel with the new size. There is no need to delete and place a new sign panel.
- **Place Sign Post** – This is accessible when the Post Properties or Post Location tab is active. This places the sign post symbol.
- **Update Sign Post** – This is accessible when the Post Properties or Post Location tab is active. This option updates a sign post previously placed with new information. Example: if placing a sign post at a station and the post is moved 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.



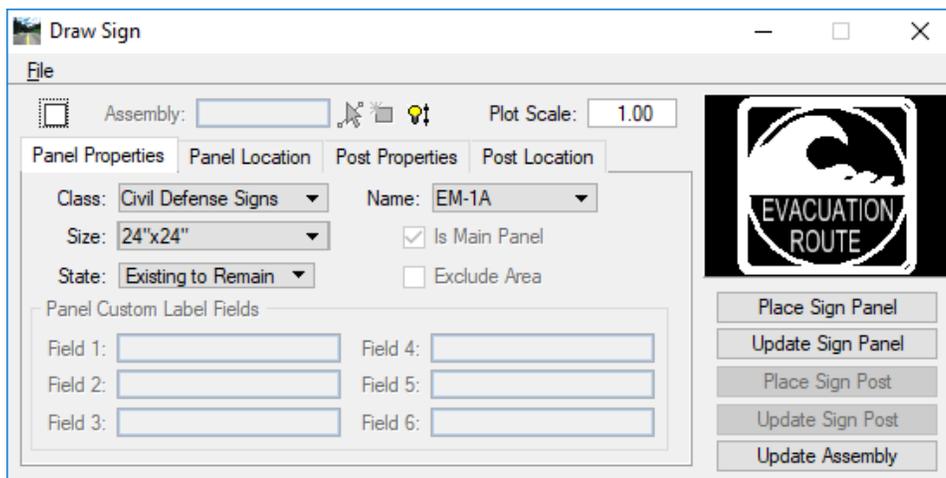
Exercise 7.1 Place Single Post Sign

➤ Panel Properties

1. Open the *DSGNP01.dgn* file and zoom in around Sta. **702+20.00**.
2. From the FDOT Plans Development Task Menu, select **Traffic Plans > Create Sign Assemblies**.



3. This opens the Draw Sign Program.

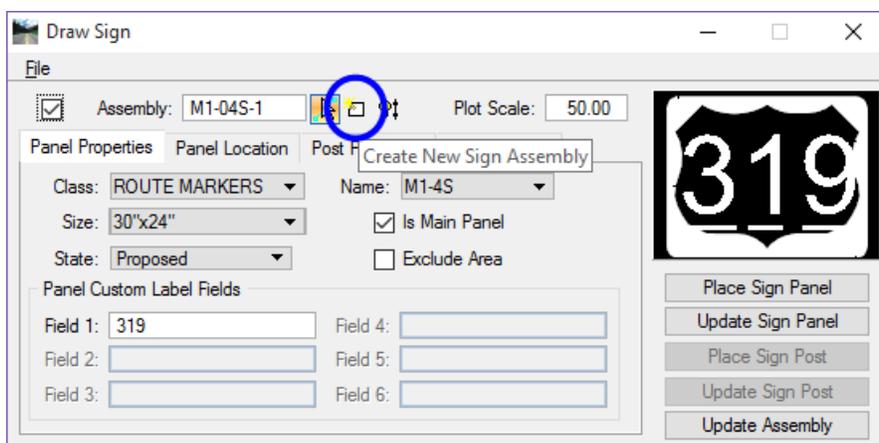


4. In the Draw Sign dialog, Toggle **On Assembly**.
5. Set the *Plot Scale* to **50.00**.

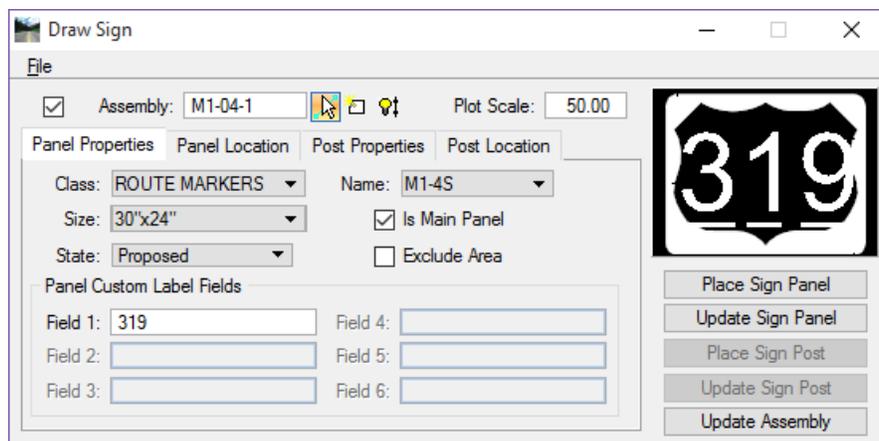
Note This should match the plot scale of the plan sheets.

6. Under the *Panel Properties* Tab:
 - a. Set the *Class* to **ROUTE MARKERS**.
 - b. Set the *Name* to **M1-4S**.
 - c. *Size* is **30"x24"**.
 - d. Toggle On **Is Main Panel**.
 - e. Toggle Off **Exclude Area**.
 - f. Set the *State* to **Proposed**.
 - g. For *Field 1* key-in **319** and press the Tab key on the key board. This will change the preview to reflect the state road number.

7. 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 **M-1-04S-1**.

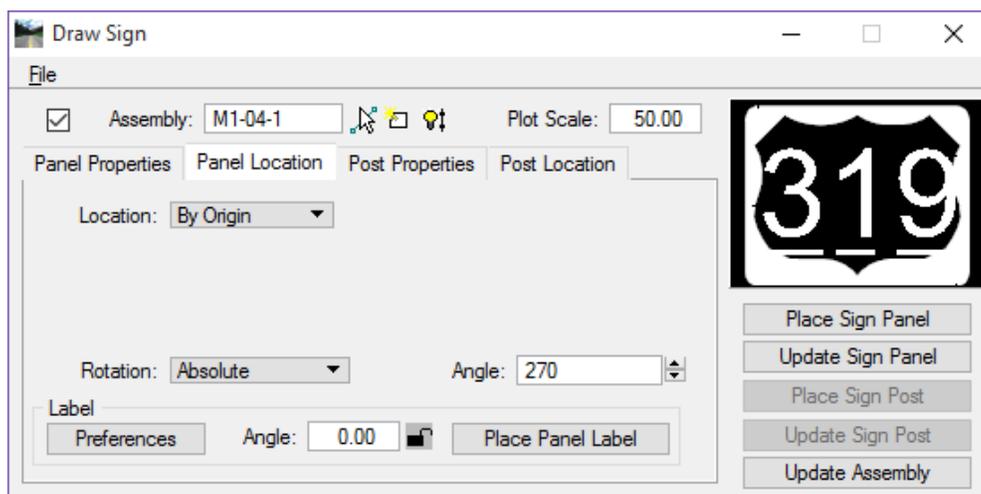


8. When the Sign panel is placed, this will also create a Named Group with the same name.



➤ **Panel Location**

1. Go to the **Panel Location** Tab.



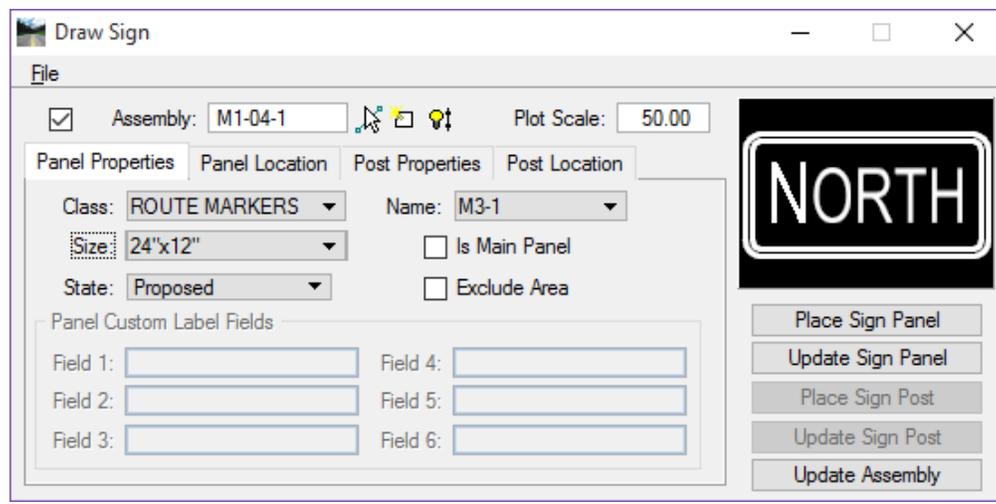
2. Make sure the view is rotated so that the *SR 61 Centerline* is horizontal on the screen.
3. Set the *Location* to **By Origin**. Keep in mind that the location of the sign panel is not the critical element, the post is. The panel needs to be placed in a location of clear visibility and far enough 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**.

Note The angle value is a dynamic function, it can be adjusted as the panel is being placed.

6. Under the *Label Section*, click the **Preferences** button. This opens the Sign Label Preferences dialog.
7. Toggle **Off Name** and **Size**. This turns the labels off. The labels will be placed in another exercise.

➤ **Place Sign Panel**

1. Click the **Place Sign Panel** button.
2. Move the cursor onto the screen and place a **Data Point**. Position the sign far enough away from the roadway to accommodate the post, and a leader line. The post will be placed at **Sta. 702+20.00**.
3. Next, you will place the **Route Marker NORTH** on top of this sign. Go back to the *Panel Properties* Tab:
 - a. Set the *Class* to **ROUTE MARKERS**.
 - b. Select the *Name* **M3-1** sign.

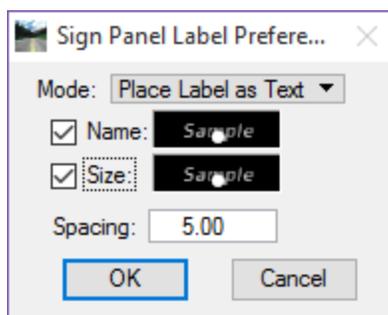


- c. *Size* is **24"x12"**.
 - d. Toggle **Off Is Main Panel**. It is not necessary that this sign panel be the Main Panel.
 - e. *State* is **Proposed**. The *Assembly Name* stays the same, both of the sign panels are in the same sign cluster/assembly.
4. Go to the **Panel Location** Tab: Everything in *Panel Location* stays the same as it was for the first sign.
5. Click the **Place Sign Panel** button.
6. Select the MicroStation **Midpoint** snap and tentative snap to the center top side of the sign panel.
7. Hit the **O** key on the keyboard to place an offset command **in AccuDraw**.
8. Move the cursor to the right of the M1-4S sign panel and type **0.33 (approx. 4')** in the **AccuDraw X** field.
9. **Data Point** to place the Sign.

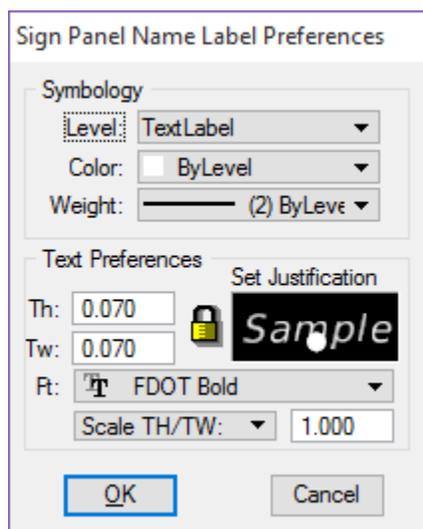


➤ **Place Sign Panel Labels**

1. On the **Panel Location** Tab, under the **Label** section, click the **Preferences** button. This opens the Sign Panel Label Preferences dialog.

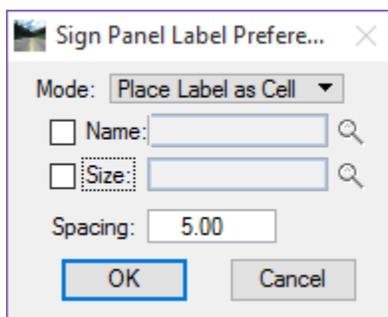


2. Set the *Mode* to **Place Label as Text**.
3. Toggle **On Name**.
4. Double-click on the *Sample Text* box. This opens the Sign Panel Name Label Preferences dialog.

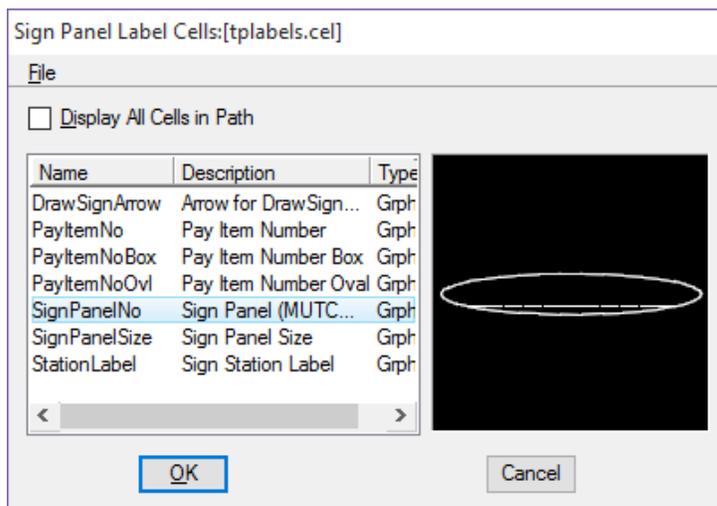


- a. In the *Symbology* section, set the *Level* to **TextLabel**.
 - b. Set the *Color* and *Weight* to **ByLevel**.
 - c. Set the **Text Height** and **Width** to **0.070**.
 - d. Set the *Justification* to **Center Bottom**.
 - e. Set the *font* to **FDOT Bold**.
 - f. Set the *Scale* to **TH/TW** and to **1.0**.
 - g. Click **OK**.
5. Toggle **On Size**.
 6. Right-click on the *Name Sample Text* box and select **Copy**.
 7. Right-click on the *Size Sample Text* box and select **Paste**. This is a quick way to setup the *label preferences* for both the **Panel Labels** and the **Post Labels**.

8. Set the *Mode* to **Place Label as Cell**.

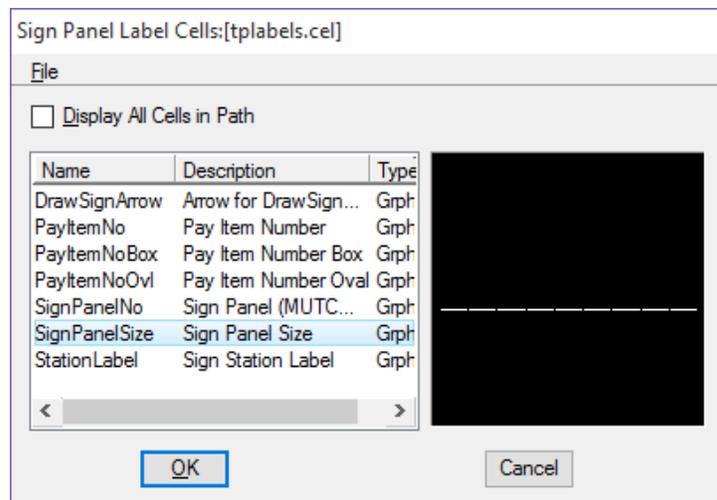


a. Toggle **On** the *Name* option and click the *magnifying glass* icon.



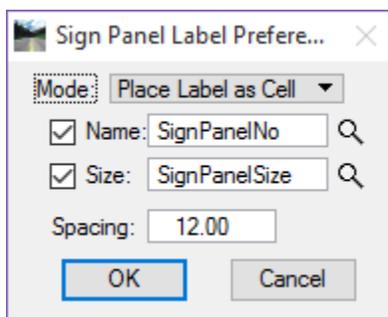
b. Select the **SignPanelNo** cell from the list and click the **OK** button.

c. Toggle **On** the *Size* option and click the *magnifying glass* icon.



d. Select the **SignPanelSize** cell from the list and click the **OK** button.

- e. Set the *Spacing* to **12.00**.



Note This is the space between the Sign Name and Sign Size cells and will need to be adjusted for scaling and personal preference.

- f. Click **OK** on the Sign Panel Preferences dialog.

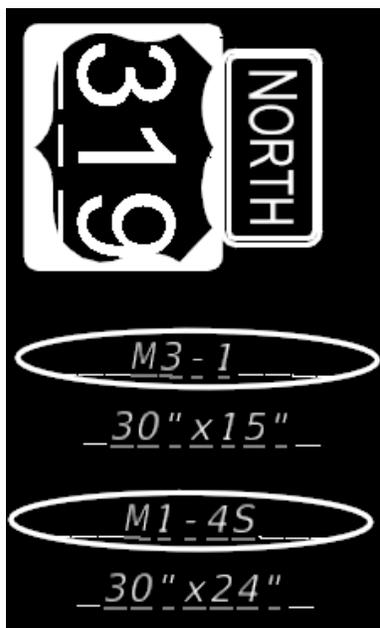
9. In Draw Sign, Panel Location tab, set the *Label angle* to **150.00** and lock it.

Note The angle 149.59 is the measured angle of a horizontal line drawn from the BL Const in an unrotated view.

10. Click the **Place Panel Label** button.

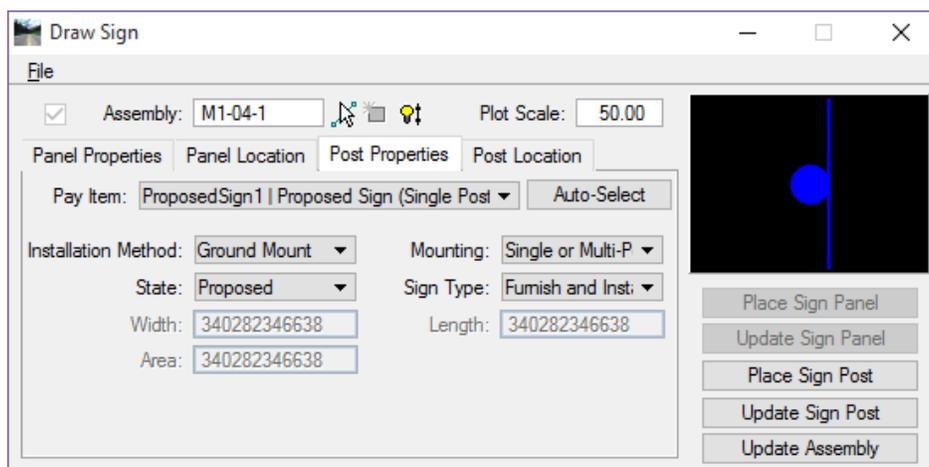
11. Select the **M3-1 (NORTH)** panel and place the labels below the sign panel assembly.

12. Click the **Place Panel Label** button and select the **M1-4S (US319)** panel. Place the label below the North panel label.

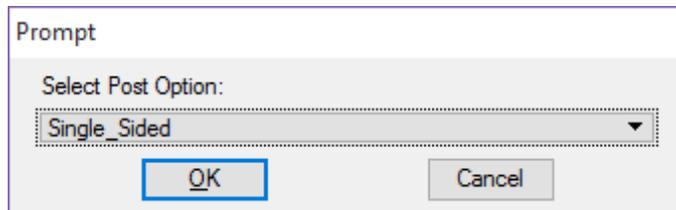


➤ Set Post Properties

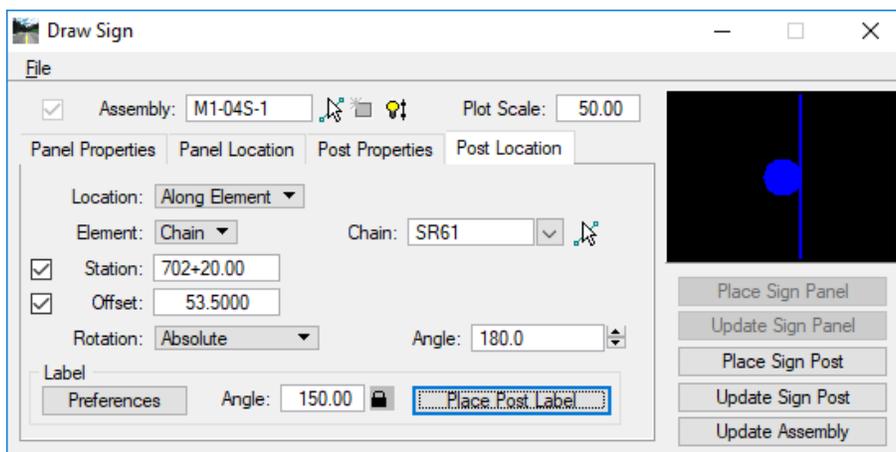
1. Go to the **Post Properties** Tab.



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 and pay item number based on these calculations.



7. Select **Single_Sided** from the Prompt dialog. This will select the cell and will tag that cell with *Adhoc Attributes* associated with the placement of a single sided single column post assembly.
8. Click the **OK** button.
9. Go to the **Post Location** Tab.



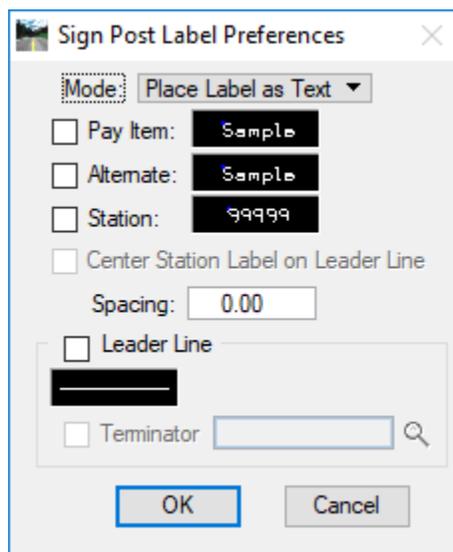
10. Set the *Location* to **Along Element**.
11. Set the *Element* to **Chain**.
12. Set the *Chain* to **SR61**.
13. Toggle **On** the *Station* and enter **702+20.00**.
14. Toggle **On** the *Offset* and enter **53.50**.

Note For the offset, you are required to set the post a minimum of 4.5' (2' + 2.5' sign width) from the face of curb based on **Index 17302 Case III**. This would be 46', however 53.5' will put the post 5.5' behind the sidewalk.

15. Set the *Rotation* to **Absolute**.
16. Set the *Angle* to **180.0**.

➤ **Set Label Preferences**

1. Go back to the **Post Location** Tab and click the **Label Preferences** button. This opens the Sign Post Label Preferences dialog.

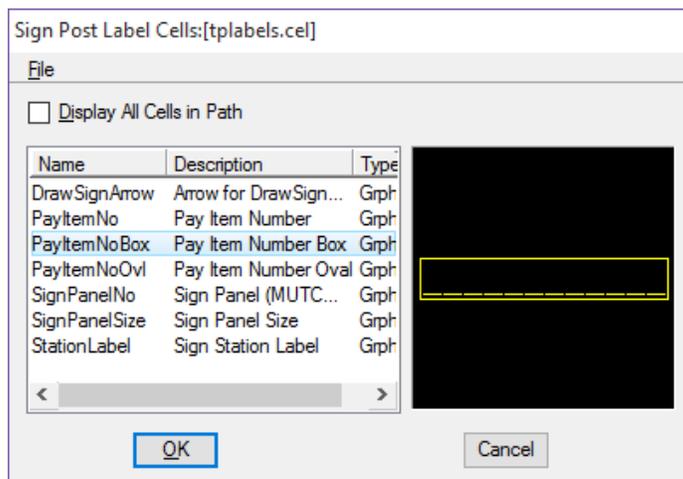


2. Set the *Mode* to **Place Label as Text**.
3. Toggle **On** *Pay Item*.
4. Double-click on the *Pay Item Sample Text* box. This opens the Sign Post Pay Item Label Preferences dialog.
 - a. In the *Symbology* section, set the *Level* to **TextLabel**.
 - b. Set the *Color* and *Weight* to **ByLevel**.
 - c. Set the *Text Height* and *Width* to **0.070**.
 - d. Set the *Justification* to **Center Bottom**.
 - e. Set the *font* to **FDOT Bold**.
 - f. Set the *Scale* to **TH/TW** and to **1.0**.
 - g. Click **OK**.

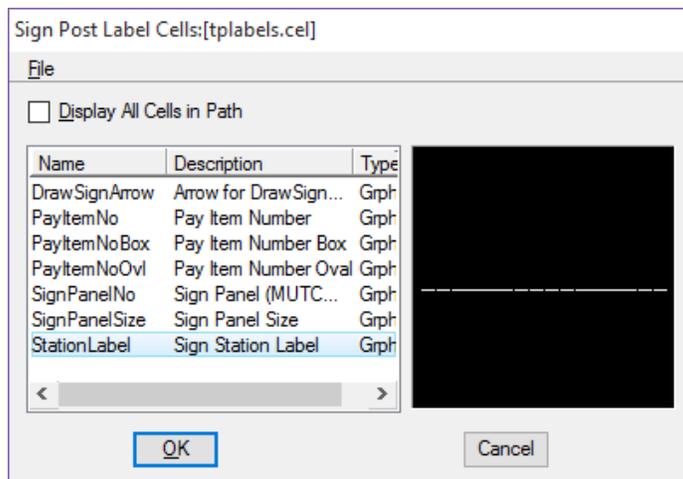
5. Toggle **On Alternate**.
6. Right-click on the *Pay Item Sample Text* box and select **Copy**.
7. Right-click on the *Alternate Sample Text* box and select **Paste**.
8. Toggle **On Station**.
9. Right-click on the *Station Sample Text* box and select **Paste**.

Note The text mode has to be setup prior to placing the labels in cell mode to setup the text parameters so the text in the cells are placed correctly.

10. Set the *Mode* to **Place Label as Cell**.
11. Click the *magnifying glass* icon next to the *Pay Item* field.



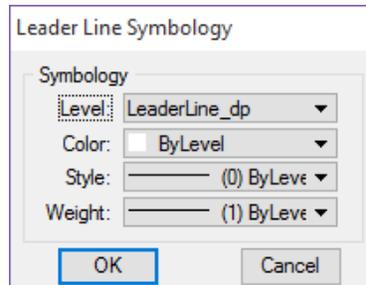
12. Select the **PayItemNoBox** cell from the list and click the **OK** button.
13. Repeat steps 11 & 12 for the *Alternate* field.
14. Click the *magnifying glass* icon next to the *Station* field.



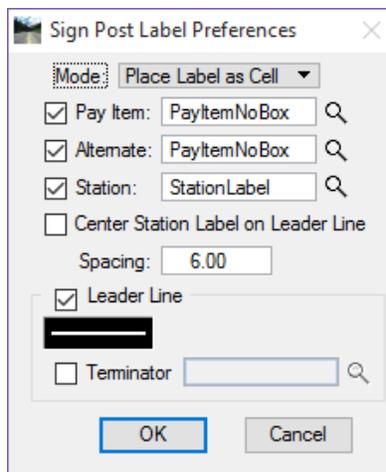
15. Select the **StationLabel** cell from the list and click the **OK** button.

➤ **Set the Station and Leader Line Symbology**

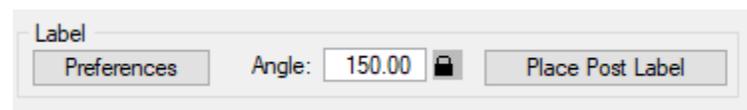
1. Set the *Spacing* to **6.0**. This is the space between the pay item label and the station label.
2. Toggle **On Leader Line**.
3. Double-click on the symbology box under Leader Line. This opens Leader Line Symbology.



4. Set the Level to **LeaderLine_dp**.
 - a. Set the *Color*, *Style* and *Weight* to **ByLevel**.
 - b. Click **OK** on the Leader Line Symbology dialog.
5. In the Sign Post Label Preferences dialog, click **OK**. No Terminator is used.

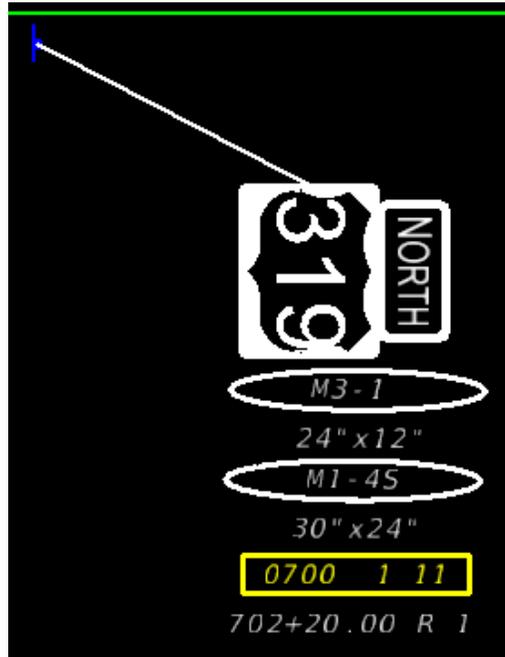


6. Next to the *Preferences* button, set the *Angle* to **150.0** and lock it. This is the same as the angle used when placing the sign panel text.



➤ **Place the Sign Post and Label**

1. Under the *Preview* window, click **Place Sign Post**.
2. **Data Point** to place the sign post.
3. Move the cursor under the previously placed *Sign Panel Labels* and **Data Point** to place the *Post Label*.
4. Now the leader line is attached to your mouse, snap to the left side of the main sign panel and place the leader line.

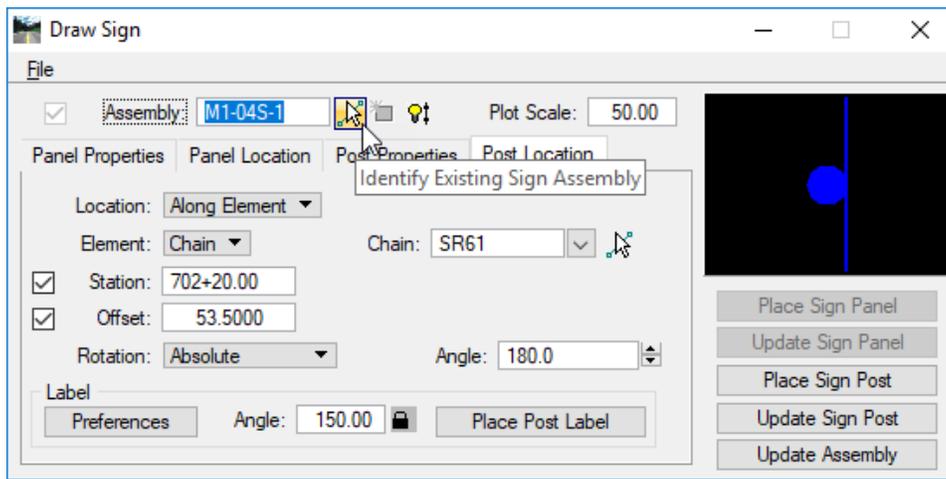


Exercise 7.2 Update Sign Post Location

In this exercise, you 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 *DSGNP01.dgn*, on the Draw Sign dialog, click the **Identify Existing Sign Assembly** icon and select the sign assembly.



2. Identify the **Sign Post** placed. Notice the whole assembly will highlight.
3. Select the MicroStation **Move Element** command.
4. Using AccuDraw, move the previously placed **Sign Post 15'** to the left.
5. In Draw Sign, click the **Update Sign Post** button. Click OK on the prompt for the Post Option. This will adjust the leader line to the new post location.

Note To update the station label information, delete the existing label and use the Place Post Label option on the Post Location tab. The option to place the label on the leader line allows for the stationing to update when the leader line is adjusted with the Update Sign Post option.

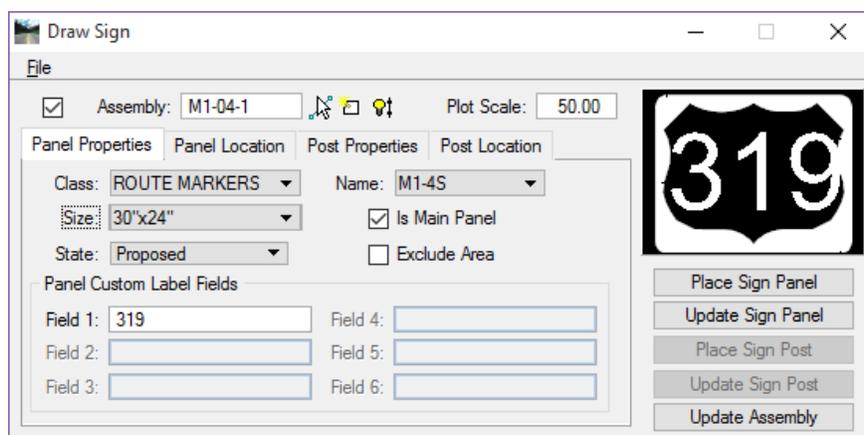
6. Go to **Edit > Undo** and **Undo** the update and move the post back to *station 702+20.00*.

Exercise 7.3 Place Multi-Post Sign

In this exercise, you will use the same process as in the previous exercise to place a slightly more complicated sign assembly.

➤ Panel Properties – First Sign: M1-4S

1. Continuing in *DSGNP01.dgn*, zoom in around **Sta. 703+00**.
2. On the Draw Sign dialog, open the **Panel Properties** Tab.



3. At the top of the Draw Sign dialog, click the **Create New Sign Assembly** button . This will fill in the *Assembly name* field with the name **M-1-04S-1**. Modify the name to **M-1-04S-2**. When the Sign panel is placed, this will also create a Named Group with the same name.



➤ Panel Location

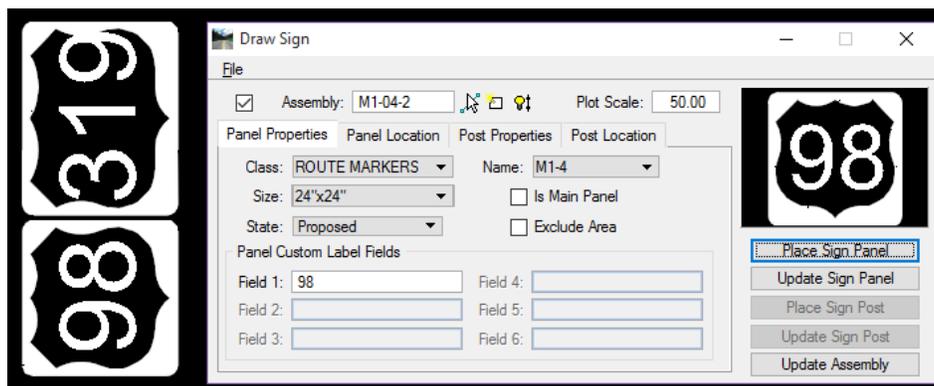
1. Go to the **Panel Location** tab.
2. Set the *Location* to **By Origin**.
3. Set the *Rotation* to **Absolute**.
4. Set the *Angle* to **90.0**.
5. Under the *Label* section, click **Preferences**. This opens the **Sign Label Preferences** dialog.
6. Toggle **Off Name** and **Size**. The labels will be placed in another exercise.

➤ Place Sign Panel

1. Click the **Place Sign Panel** button.
2. Position the sign far enough away from the roadway to accommodate a leader line with a station on it and **Data Point** to place the sign.

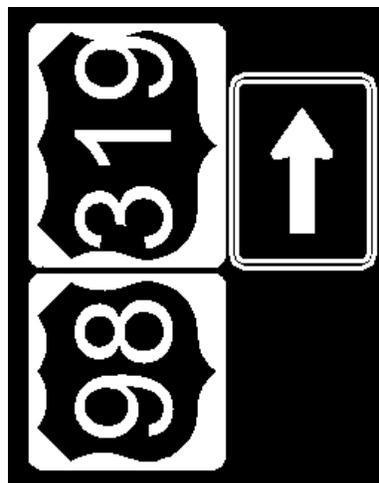
➤ **Panel Properties – Second Sign: M1-4**

1. Set the *Name* to **M1-4**.
2. Set the *Size* to **24"x24"**.
3. Toggle **Off Is Main Panel**.
4. Toggle **Off Exclude Area**.
5. Set the *State* to **Proposed**.
6. In *Field 1* key-in **98** and press Tab on the keyboard. This will change the preview to reflect the state road number.
7. Click the **Place Sign Panel** button and place the US98 sign to the left of the US319 sign panel.



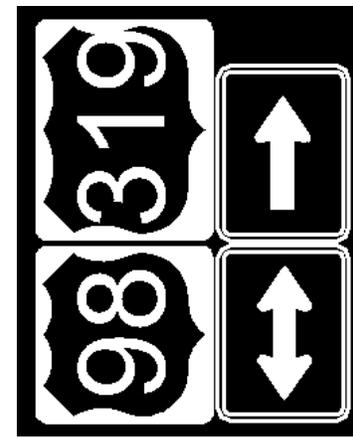
➤ **Panel Properties – M6-1R**

1. On the **Panel Properties** Tab, set the *Name* to **M6-1R**.
2. Set the *Size* to **21"x15"**.
3. Toggle **Off Is Main Panel**.
4. Toggle **Off Exclude Area**.
5. Set the *State* to **Proposed**.
6. Click the **Place Sign Panel** button and place the *Directional Arrow Sign* under the US319 sign panel.



➤ **Panel Properties - M6-4**

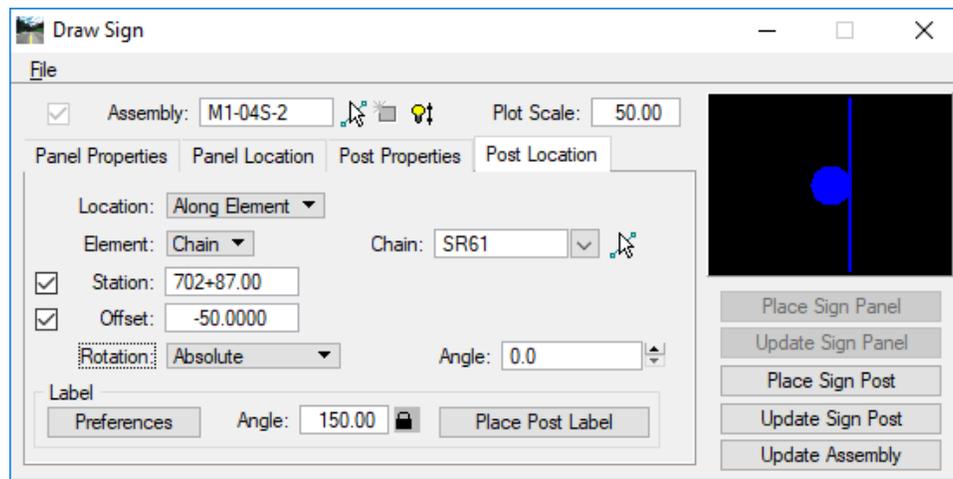
1. On the **Panel Properties** Tab, set the *Name* to **M6-4**.
2. Set the *Size* to **21"x15"**.
3. Toggle **Off Is Main Panel**.
4. Toggle **Off Exclude Area**.
5. Set the *State* to **Proposed**.
6. Click the **Place Sign Panel** button and place the *Directional Arrow Sign* under the US98 sign panel.



➤ **Set Post Properties**

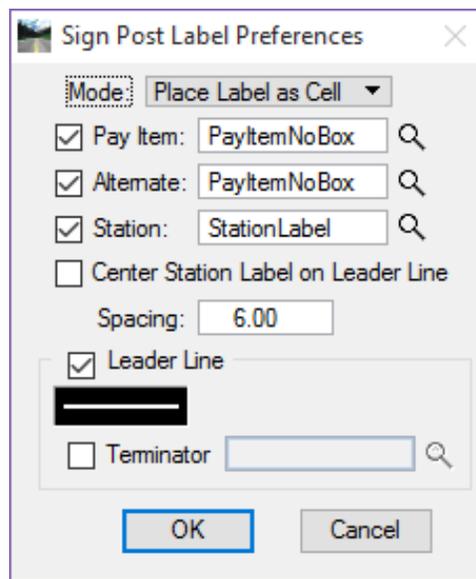
1. Go to the **Post Properties** Tab.
2. Set the *Installation Method* to **Ground Mount**.
3. Set the *Mounting* to **Single or Multi-Post**.
4. Set the *State* to **Proposed**.
5. Set the *Sign Type* to **Furnish and Install**.
6. Click the **Auto-Select** button. This will calculate the sign panels placed and set the sign post and pay item number based on these calculations.
7. Select **Single_Sided** from the Prompt dialog and click the **OK** button. This will select the cell and will tag that cell with *Adhocs Attributes* associated with the placement of a single sided single column post assembly.
8. Click the **OK** button.
9. Go to the **Post Location** tab.
10. Set the *Location* to **Along Element**.
11. Set the *Element* to **Chain**.
12. Set the *Chain* to **SR61**.
13. Toggle **On Station** and enter **702+87.00**.
14. Toggle **On Offset** and enter **-50.00**.
15. Set the *Rotation* to **Absolute**.

16. Set the *Angle* to **0.0**.



➤ **Set Label Preferences**

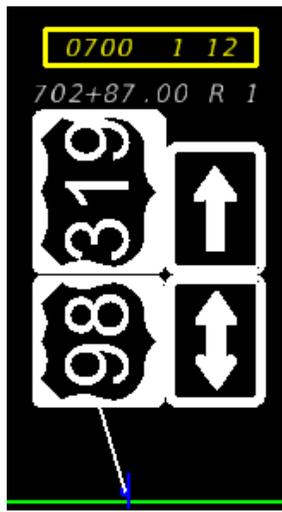
1. On the **Post Location** Tab, under the *Label* section, click the **Preferences** button. This opens the Sign Post Label Preferences dialog.
2. Double check that the preferences are set as shown below.



3. Click **OK** to close the Label Preferences dialog.

➤ **Place the Sign Post**

1. On the Draw Sign dialog, under the preview window, click **Place Sign Post**.
2. **Data Point** to place the sign post cell.
3. Move the cursor above the previously placed *Sign Panel Labels* and **Data Point** to place the *Post Label*.
4. Now the leader line is attached to your mouse, snap to the left side of the US98 sign panel and place the leader line.



➤ **Place Sign Panel Labels**

1. On the **Panel Location** tab, under the *Label* section, click **Preferences**. This opens the Sign Panel Label Preferences dialog.
2. Toggle **On Name** and *Size*.
3. Click **OK** on the Sign Panel Preferences dialog.
4. Click the **Place Panel Label** button.
5. Select the each panel and place the labels as shown in the sign panel assembly image below.



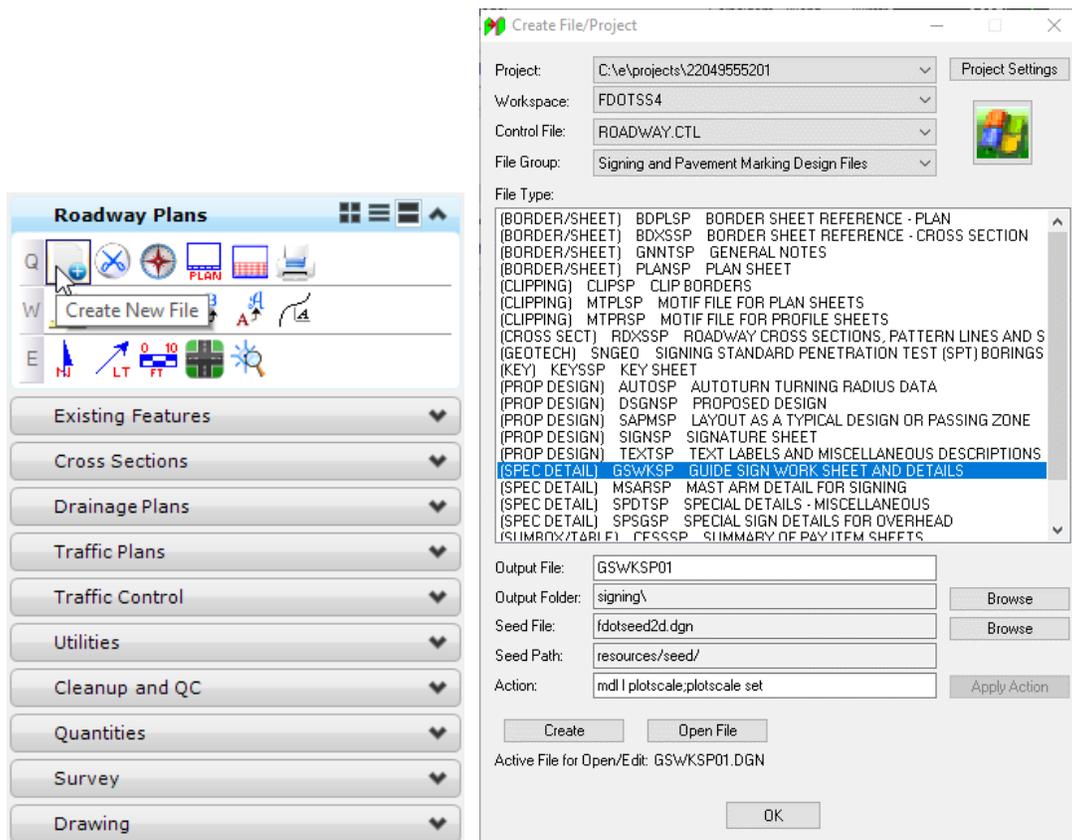
6. Take some time to place more sign panel assemblies along the project.

Exercise 7.4 Creating the GuidSIGN Work sheet (Part 1)

➤ Create a new design file and load GuidSIGN

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

1. From the FDOT Plans Development Task Menu, select **Roadway > Create New File**.

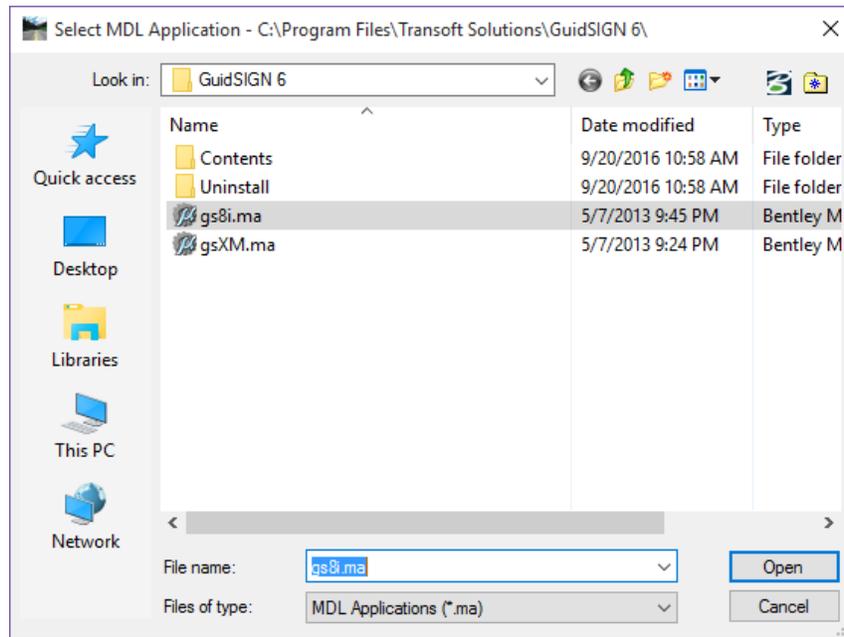


2. The Create File/Project dialog displays.
 - a. Complete the Create File/Project dialog as shown above to create the file *GSWKSP01.dgn* in the *signing* folder.
 - b. Click **Create** to create the file and **Open File** to open the file.
 - c. Close the Create File/Project tool.
3. Once the file is open, set the *Plot Scale* to **50.0** and click the **OK** button on the Set/Update Plot Scale dialog. The scale of the sheet border will be adjusted with the GuidSIGN program.
4. Close the Create File/Project dialog.
5. Set the *Drawing Scale* to **1:1**.
6. From MicroStation, select **Utilities > MDL Applications**. This opens the MDL dialog.

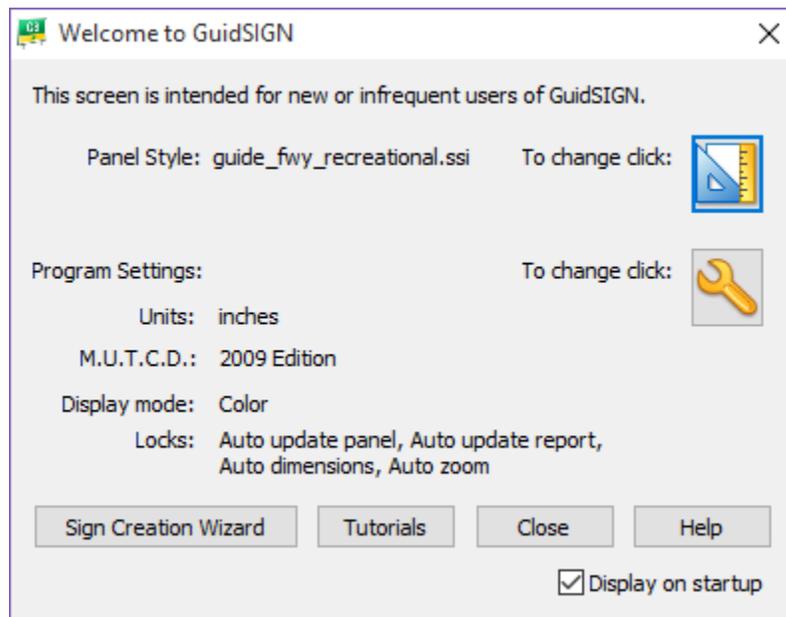
Hint A function key can be programs for loading GuidSIGN. The key-in command is `mdl load "c:\Program Files\Transoft Solutions\GuidSIGN 6\Gs8i.ma"`. The user must include the quotes.

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

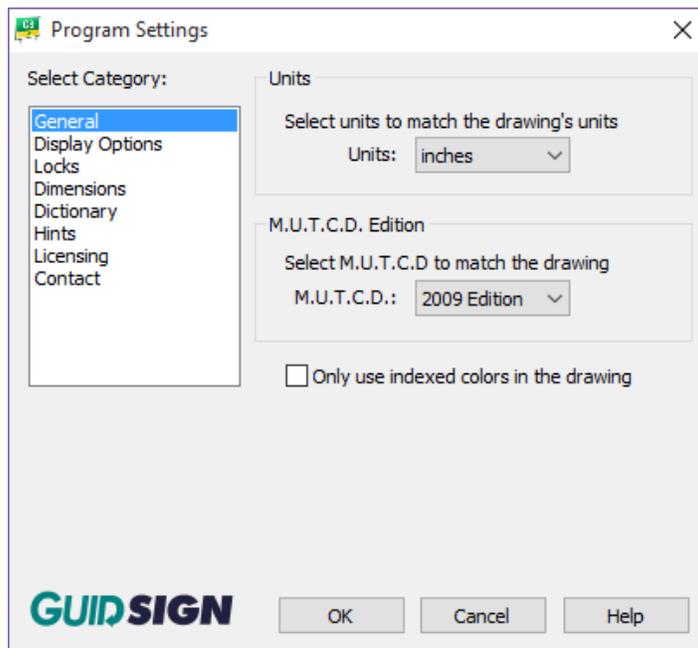
8. Select the *Gs8i.ma* file and click **OK**. This opens GuidSIGN.



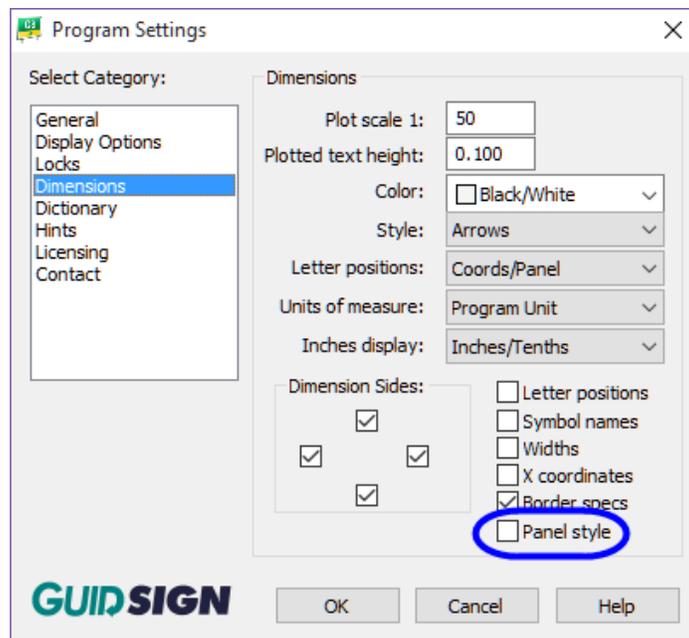
Note If this is the first time GuidSIGN is loaded the Welcome to GuidSIGN will open.



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



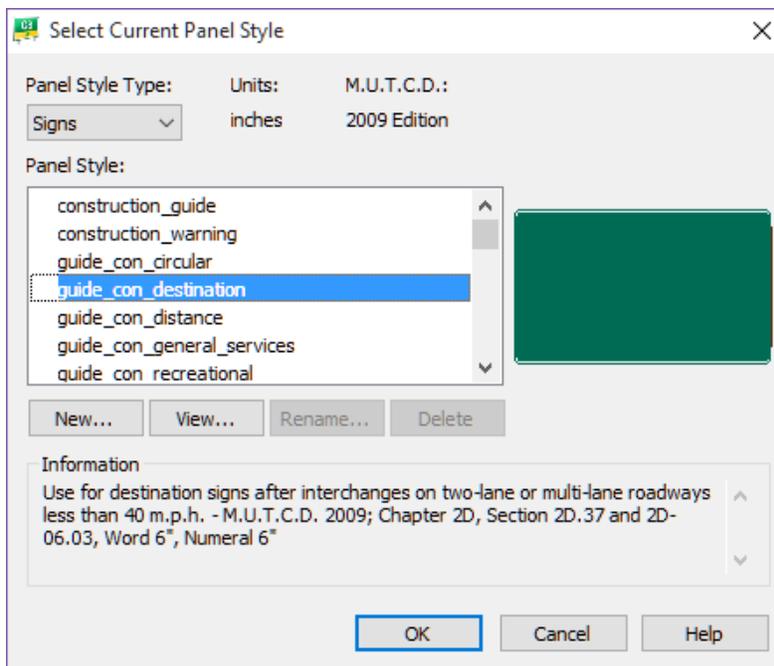
- Under the *General* category set *Units* to **Inches**.
- Set *M.U.T.C.D.* to **2009 Edition**.
- DO NOT** Toggle On **Only use indexed colors in the drawing**.
- Under the *Display Options* category set the *Display Mode* to **Color**.
- Under the *Locks* category ensure all **Locks** are toggled on.
- Under the *Dimensions* category toggle off the option for **Panel style**.



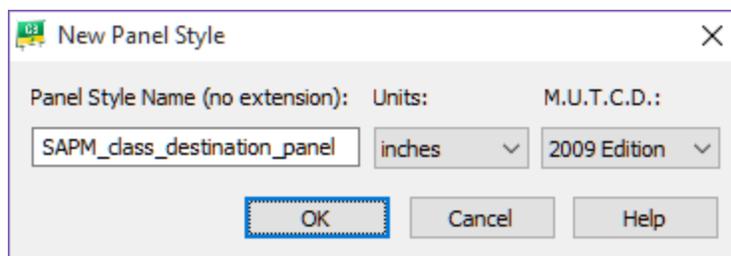
- Close the Program Settings dialog.

➤ **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_con_destination** style.



2. Click the **New** button. This opens the New Panel Style dialog.



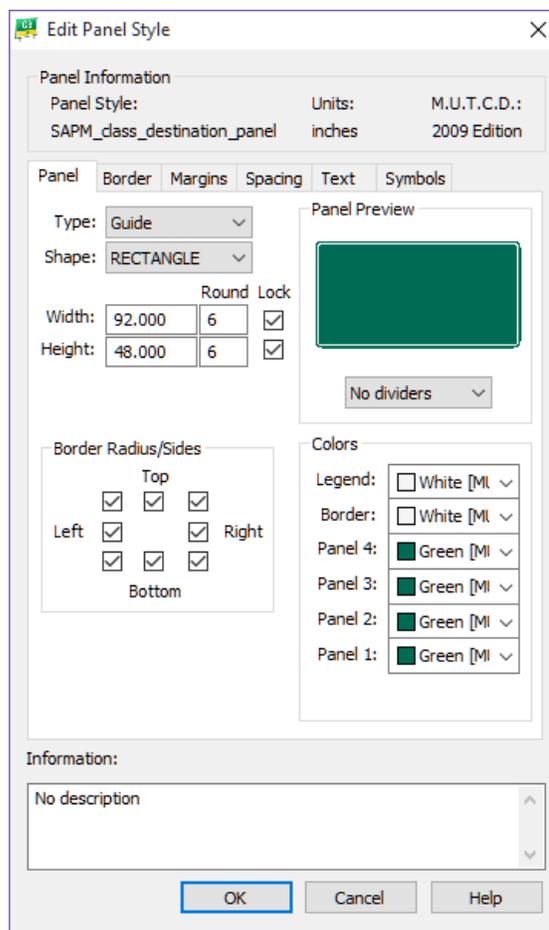
Note A panel style represents a set of parameters that specify the characteristics of a sign (sign shape, color, border radius, thickness, fonts, size of arrows and shields, and spacing between text and symbols). The highlighted panel style is used to create new panels.

3. Type **SAPM_class_destination_panel** in the Panel Style Name field.

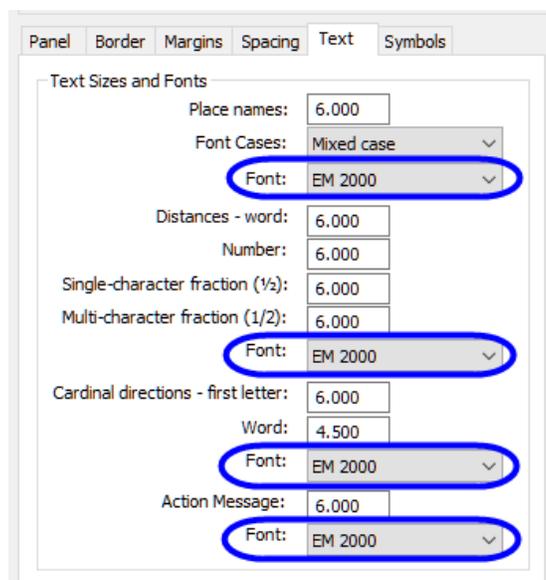
4. Click the **OK** button to save the new *Panel Style* and open the Edit Panel Style dialog.
5. On the **Panel** tab, set the following:

Note The Height and Width fields throughout the GuidSIGN program accepts the user input in inches.

- a. Width: **92.00** (7' 8") displayed in inches.
- b. Height: **48.00** (4') displayed in inches.
- c. Round: 6 (Will round to the nearest six inch incrementally.)
- d. Lock: Toggle On. (Locks the sign size as set in the Height and Width fields.)
- e. Set the colors to the name of the color for the Legend, Border and all the Panels. (**Green [MUTCD]** and **White [MUTCD]**.)



6. Go to the **Text** tab:
 - a. Set all the *Font* drop down lists to the **EM 2000** Font.

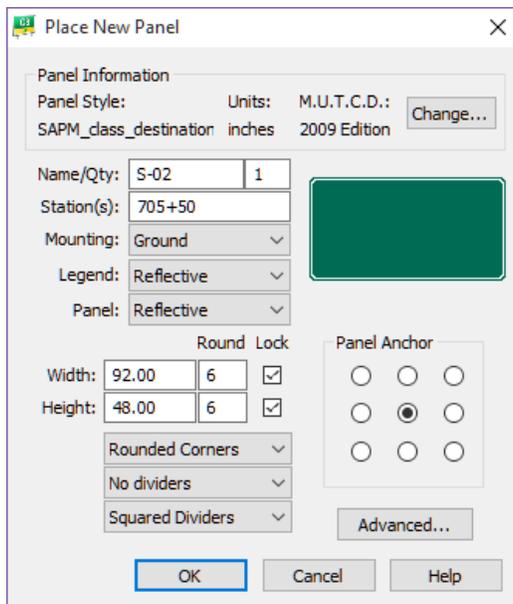


- b. Click the **OK** button on the Edit Panel Style dialog.
7. With the new *SAPM_class_destination_panel* style highlighted, click the **OK** button on the Select Current Panel Style dialog.

➤ **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. Dismiss the Welcome to GuidSIGN dialog by clicking the **Close** button. (This is to have the maximum amount of screen real estate.)
2. Continuing with GuidSIGN, click the Place New Panel  button. This opens the Place New Panel dialog.



The screenshot shows the 'Place New Panel' dialog box with the following settings:

- Panel Information: Panel Style: SAPM_class_destination, Units: inches, M.U.T.C.D.: 2009 Edition, Change...
- Name/Qty: S-02, 1
- Station(s): 705+50
- Mounting: Ground
- Legend: Reflective
- Panel: Reflective
- Width: 92.00, Height: 48.00
- Round: 6, Lock: 6
- Rounded Corners: [dropdown]
- No dividers: [dropdown]
- Squared Dividers: [dropdown]
- Panel Anchor: [radio buttons]
- Buttons: OK, Cancel, Help, Advanced...

3. Set the *Name* to **S-02** and *Quantity* to **1**. The name entered here will be the name that appears in the report on the Guide Sign Worksheet. This is typically a number.
4. Set the *Station(s)* to **705+50**.

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.

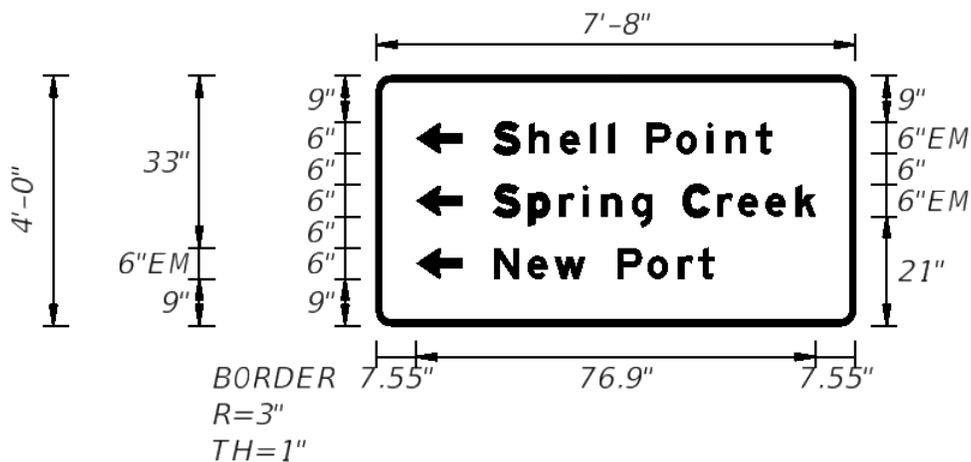
5. Set *Mounting* to **Ground**. (The options are **Overhead** or **Ground**.)
6. *Legend* to **Reflective**.
7. *Panel* to **Reflective**.
8. Panel *Width* and *Height* are already set by the style selected, the new *SAPM_class_destination_panel* style.
9. Set the *Panel* to **Round Corners and No Dividers**. (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 will dynamically resize, if the lock toggles are not checked, 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.

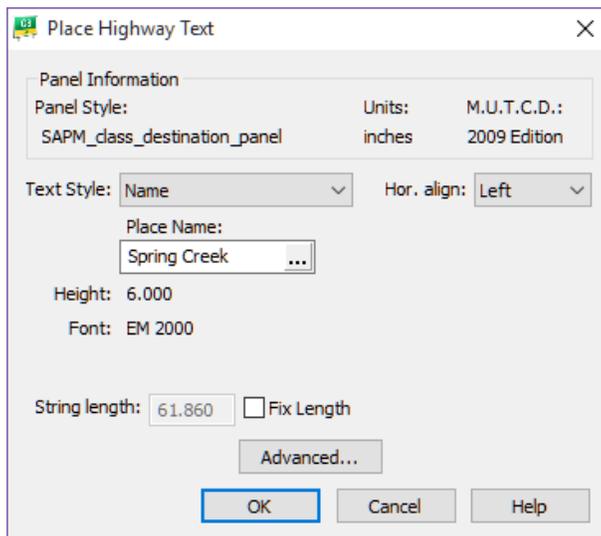
10. Click **OK**. The Sign Panel will be attached to the cursor.
11. Place a **Data Point** to place the empty sign panel in the design file.

➤ **Place Highway text**

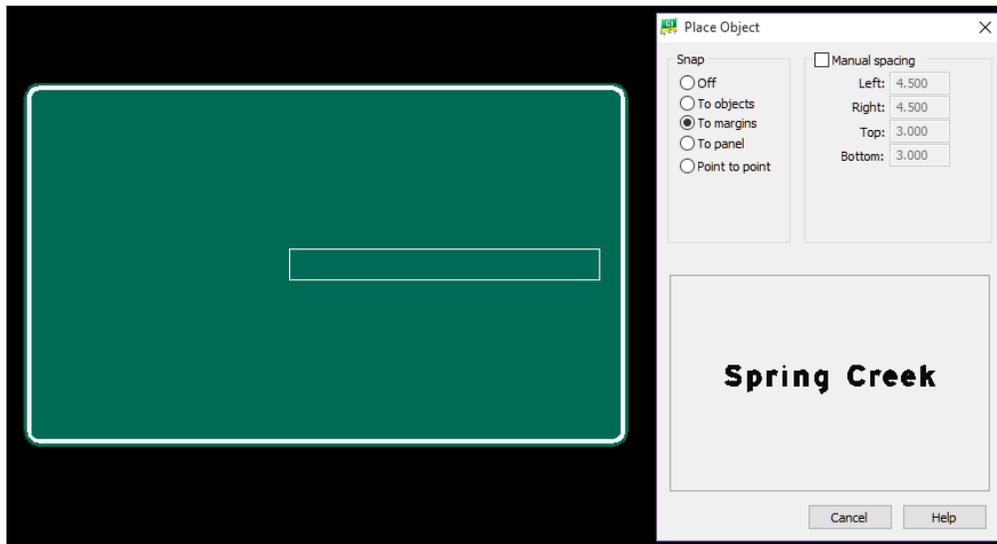
In this exercise, the designer will place text in the sign panel. When complete the sign will look like that shown in the figure below. Each district has specific sign standards, which need to be followed. Be sure to communicate with the Traffic Design personnel prior to starting this design process.



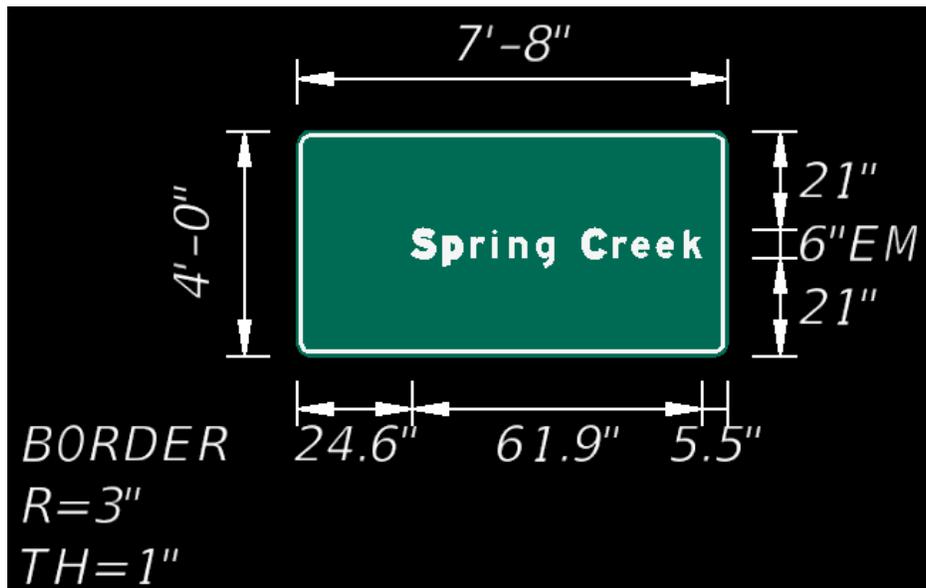
1. In the GuidSIGN, click **Place Highway Text** . (This prompts to select a point inside the sign panel. Watch the Message Center for prompts.)
2. Select inside of the sign panel. (This opens Place Highway Text dialog.)
3. Set the *Style* to **Name**. (This should be set by default.)
4. Set the *Hor. Align* to **Left**.
5. Under *Place Name* key-in **Spring Creek**.



6. Click **OK**. The text box will be attached to the cursor and **Place Object** dialog opens.

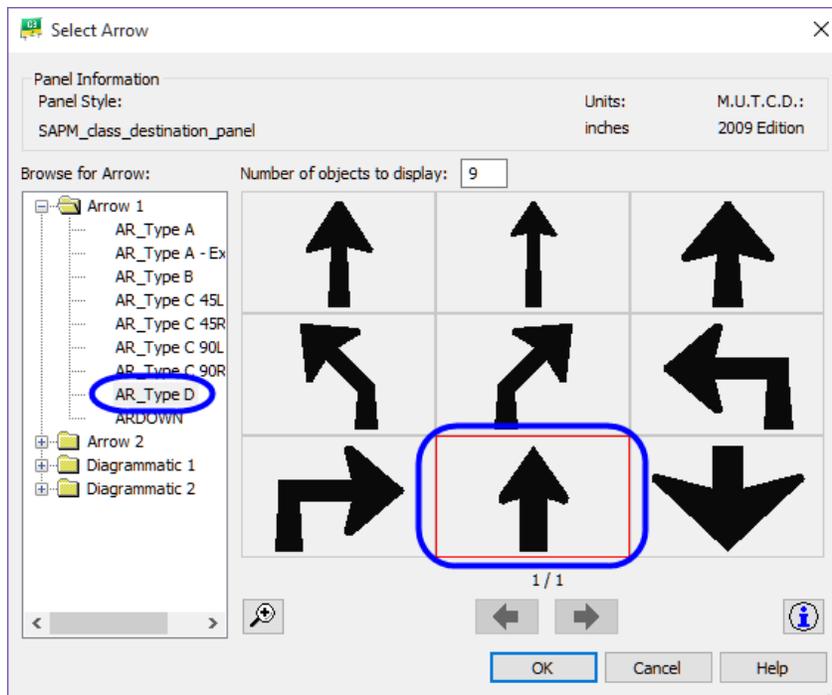


7. Under *Snap* set the option to **To margins**.
8. Line the **Text Object** box to the center right of the Panel.
9. Place a **Data Point** inside of the sign panel. The figure below shows what the sign should look like at this point.

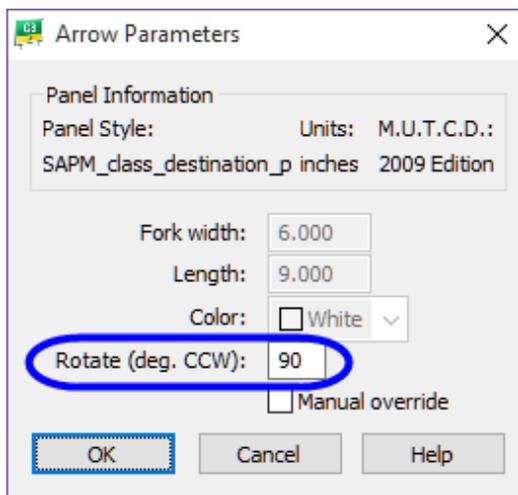


➤ **Place and Adjust Text and Arrow**

1. Click **Place Arrow** .
2. Select inside of the sign panel. This opens Select Arrow dialog.

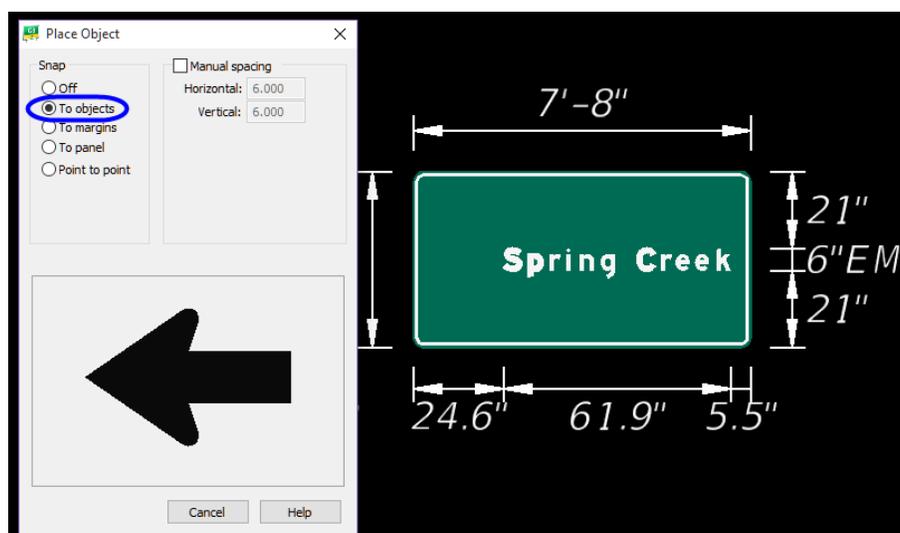


3. Select **Arrow 1 > AR_Type D** and click the **OK** button to set up the *Arrow Parameters*.

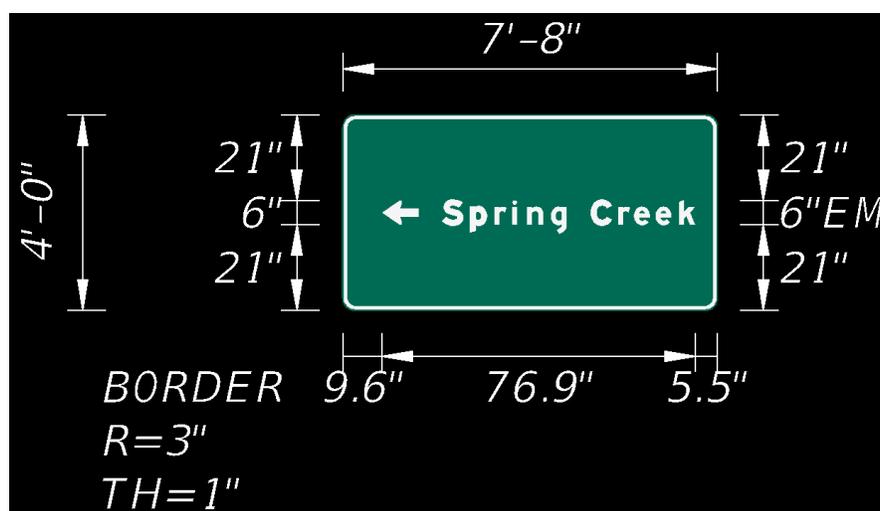


- a. Set the Rotate (deg.CCW) to **90**.
- b. Click the **OK** button.

4. On the Place Object dialog, **Snap** should be set on **To Objects**.

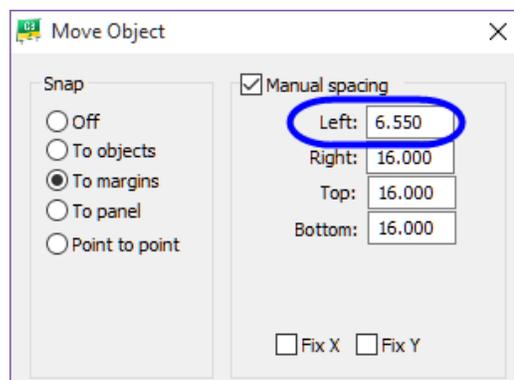


5. Place the cursor inside of the sign panel in front of the line of text and place a **Data Point**. The figure below shows what the sign should look like at this point.

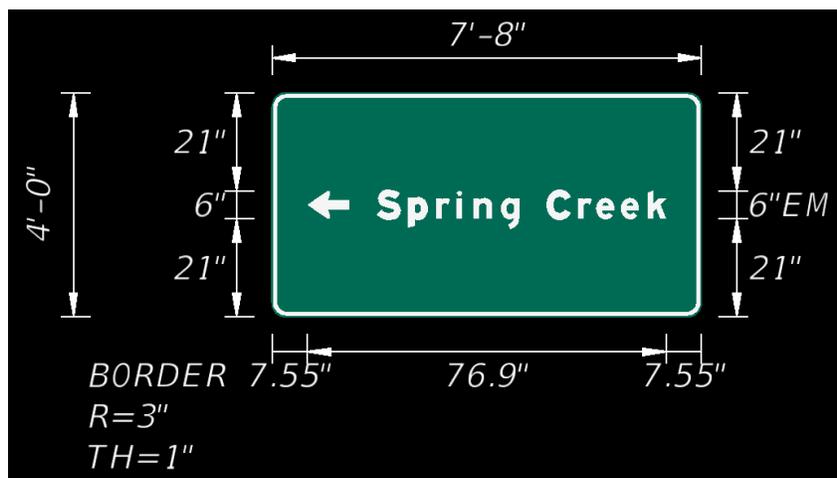


6. Next, adjust the text and arrow object to the margins of the sign panel.

- Click the Move Single Object tool  from the GuidSIGN toolbar.
- Select the **Arrow** placed on the sign panel.
- On the **Move Object** dialog, check on the **Manual spacing** toggle.
- Type **6.55** in the Left field. (All other fields do not matter. This is just to get the left margin (right side of the sign panel) correct before placing the rest of the objects on the sign panel. This is calculated by the 1" border thickness and 6.55 for the left margin.)
- Place a **Data Point** on the Sign Panel to accept the move of the Arrow Object.



7. Click the Move **Single Object** tool  from the GuidSIGN toolbar.
8. Select the **Spring Creek** highway text placed on the sign panel.
9. On the Move Object dialog:
 - a. Check on the **Manual spacing** toggle.
 - b. Type **6.55** in the Right field. (All other fields do not matter. This is just to get the right margin (left side of the sign panel) correct before placing the rest of the objects on the sign panel. This is calculated by the 1" border thickness and 6.55 for the left margin)
 - c. Place a **Data Point** on the Sign Panel to accept the move of the **Highway Text Object**. The figure below shows what the sign should look like at this point.

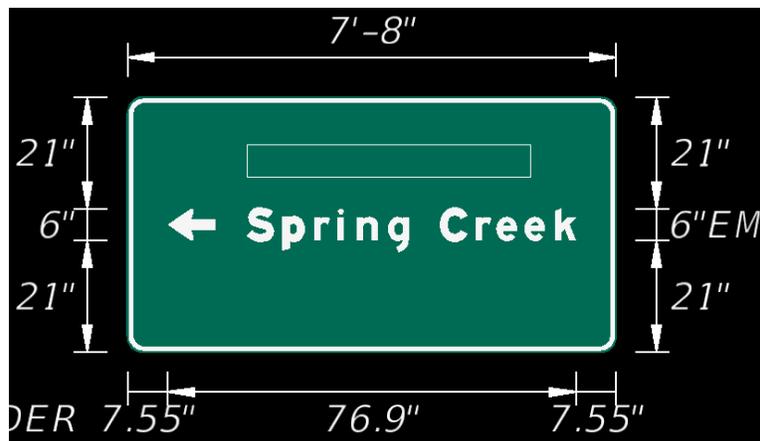


10. Now, since the margins for the largest sign panel objects (the arrow and highway text) are set correctly, the rest of the arrow and text objects can be easily placed and already aligned. Remember, the best method for placing objects on a sign panel with the GuidSIGN program is to start with the largest object first. When placing subsequent objects, again use the same concept. Place next largest object and so on.

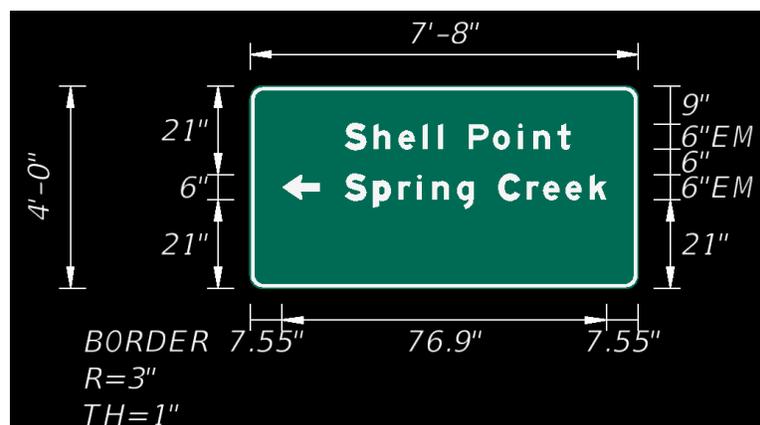
➤ **Place Highway Text**

In this exercise, the designer will place a text object in the sign panel.

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 dialog.
3. Set the *Style* to **Name**. This should be set by default.
4. Set the *Hor. Align* to **Left**.
5. Under *Place Name* key-in **Shell Point**.
6. Click **OK**. The text box will be attached to the cursor and Place Object dialog opens.
7. Under *Snap* set the option to **To Objects**.
8. Line the **Text Object** box to the **top** left side of the *Spring Creek Highway Text Object*.



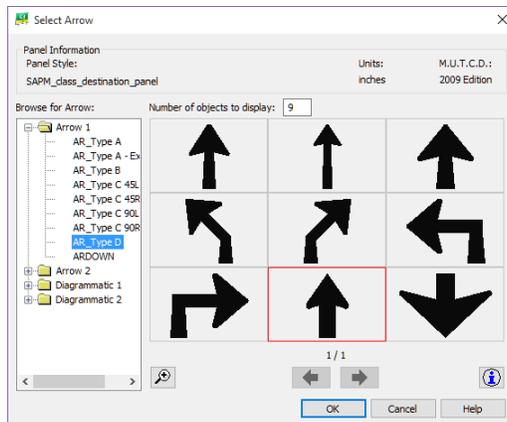
9. Place a **Data Point** inside of the sign panel. The figure below shows what the sign should look like at this point.



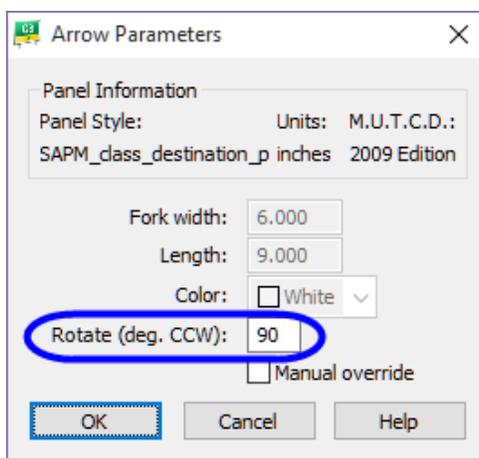
➤ **Place Arrow**

Next, place the direction arrow object on the sign panel.

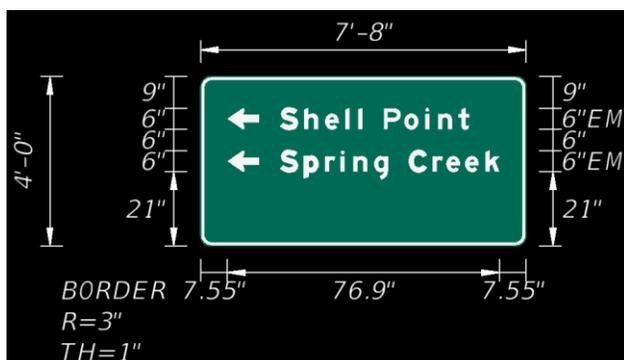
1. Click **Place Arrow**  and select inside of the sign panel. This opens **Select Arrow** dialog.



2. Select **Arrow 1 > AR_Type D** and click the **OK** button to set up the *Arrow Parameters*.
3. Set the Rotate (deg.CCW) to **90**.



4. Click the **OK** button.
5. *Place Objects* should be set on **To Objects**.
6. Place the cursor inside of the sign panel in front of the line of the **Shell Point** text object and place a **Data Point**. The figure below shows what the sign should look like at this point.



➤ **Place Highway Text**

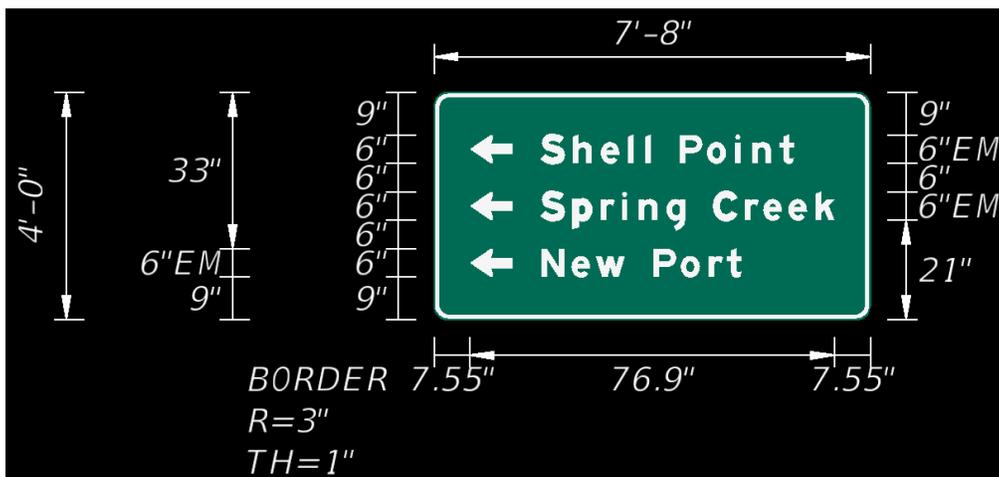
In this exercise, the designer will place the last text object in the sign panel.

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 dialog.
3. Set the *Style* to **Name**. This should be set by default.
4. Set the *Hor. Align* to **Left**.
5. Under *Place Name* key-in **New Port**.
6. Click **OK**. The text box will be attached to the cursor and Place Object dialog opens.
7. Under *Snap* set the option to **To Objects**.
8. Line the **Text Object** box to the **bottom** left side of the *Spring Creek Highway Text Object*.
9. Place a **Data Point** inside of the sign panel.

➤ **Place Arrow**

Next, place the direction arrow object on the sign panel.

1. Click Place Arrow .
2. Select inside of the sign panel. This opens Select Arrow dialog.
3. Select **Arrow 1 > AR_Type D** and click the **OK** button to set up the *Arrow Parameters*.
4. Set the Rotate (deg.CCW) to **90**.
5. Click the **OK** button.
6. *Place Objects* should be set on **To Objects**.
7. Place the cursor inside of the sign panel in front of the line of the **New Port** text object and place a **Data Point**. The figure below shows what the sign should look like at this point.

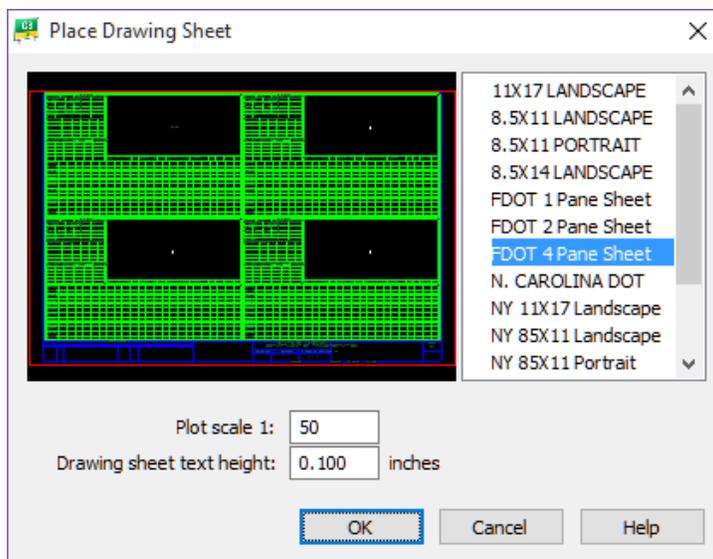


Exercise 7.5 Creating the GuidSIGN Work Sheet (Part 2)

➤ Place Sheet Border

In this exercise the designer will place the FDOT standard 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** dialog.
2. Select inside of the sign panel. This places the sheet border.



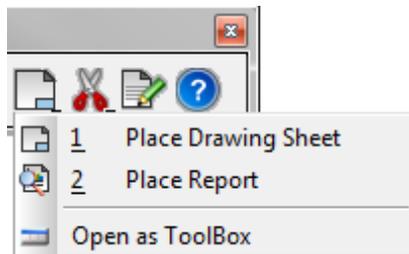
3. On the right side of dialog, select the sheet **FDOT 4 Pane Sheet**.
4. Set the *Plot Scale* to **50**.
5. Set the Drawing sheet text height to **0.10**.
6. Click **OK**.

Note The sheet will be placed at the Sign Panel Origin which is set in the style. In the class example the sign panel origin is in the center of the sign panel. The FDOT Sheets cells and Report cells are designed to be placed on the center of the sign panel. The user does not have to snap to the center of the panel. Just simply data point anywhere inside the sign panel for proper placement.

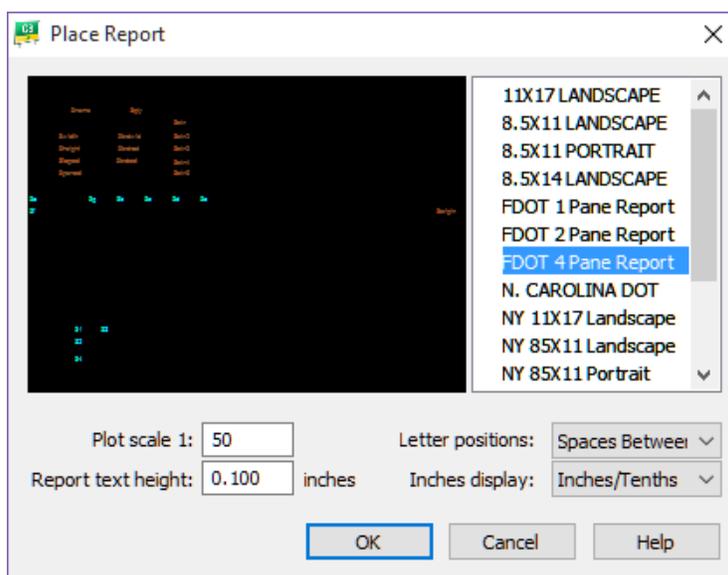
➤ **Place Report**

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

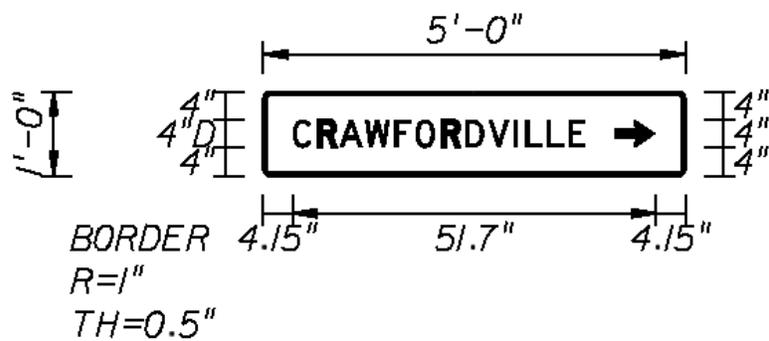
1. On the GuidSIGN tool bar, click and hold the down arrow on the **Place Drawing Sheet** icon  and select the **Place Report** selection from the menu.



2. The GuidSIGN Toolbar will now have the Place Report icon  displayed. **Data Point** inside of the sign panel.



3. On the right hand side of the dialog, select the report **FDOT 4 Pane Report**.
4. Set *Plot scale 1* to **50**.
5. Set the Report text height to **0.10**.
6. Set *Letter positions* to **Spaces Between**.
7. Set *Inches display* to **Inches/Tenths**.



| Sign Name | Chain | Station |
|-----------|-------|----------|
| S-06 | BL98 | 36+20.00 |

2. Use the **SAPM_class_destination_panel** style to create the new sign panel for S-03 and as a reference to create a new style for the new sign panel S-06.
3. For the S-03 sign panel the border radius should adjust to the above dimensions automatically, however, the first letter in the text objects will need to be adjusted in the advanced dialog when placing the highway text.
4. The border thickness and the font changes for the S-06 sign panel which will need to be configured in a new style.

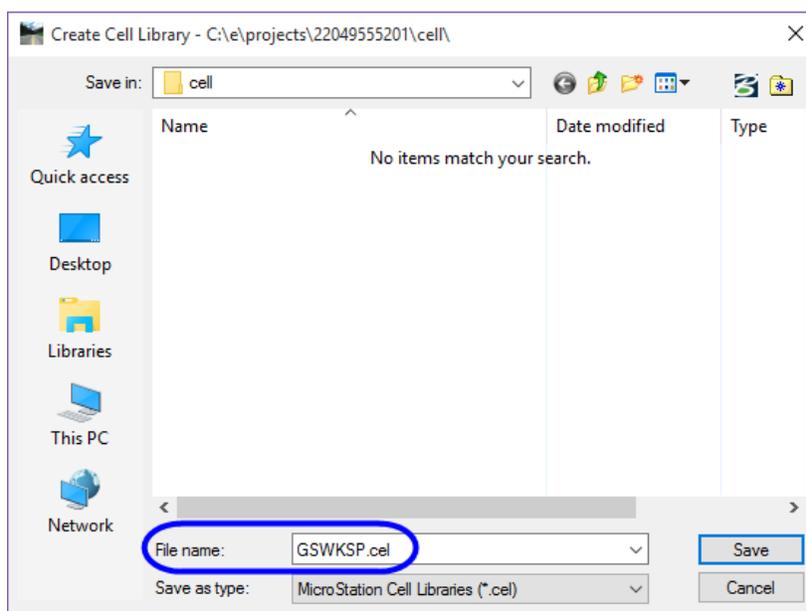
Note Keep in mind the recommended method of placing objects on sign panels.

Exercise 7.6 Place Guide Sign into Design File

In this exercise you 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 > FDOT Cell Libraries**. This opens the Cell Library dialog.
2. In the Cell Library dialog, select **File > New**. This opens Create Cell Library dialog.
3. Set the File name to **GSWKSP.cel** and place it in the *C:\e\Projects\22049555201\cell* folder. The file name and location is **CRITICAL** for the Draw Sign program to work properly.



4. 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. The Draw Sign program is looking for the names S-01 thru S-120.

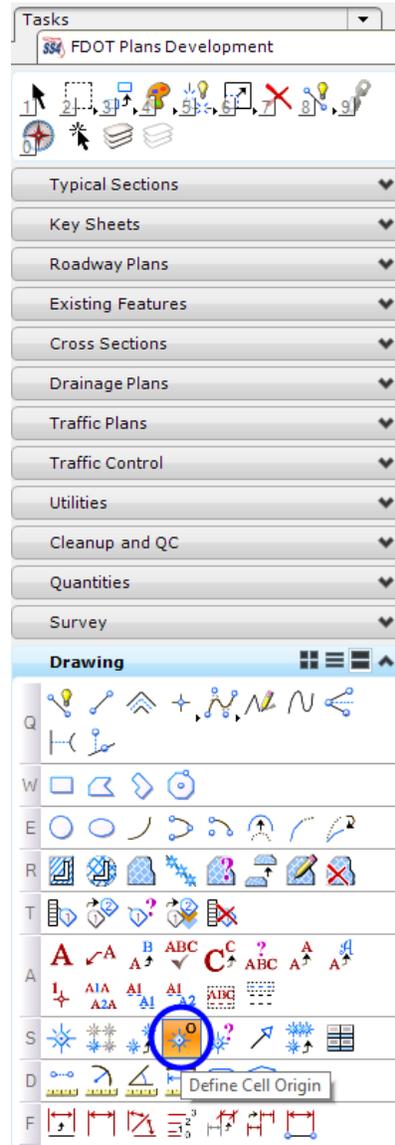
1. Continuing in *GSWKSP01.dgn*, zoom in around the first Guide Sign panel created.
2. If you closed the cell library, open the **GSWKSP.cel** library.

Note It is **CRITICAL** to have the correct cell library open before creating a new cell.

3. On the GuidSIGN menu, click the **Program Settings** icon .
4. In *Program Settings > Display Options* set the *Display Mode* to **Black and White**. This turns fill off and color off making the cell much more legible when placed in the design file.
5. Click **OK**.
6. Using either the *Fence* command or *Element Selection*, select the **sign panel elements**.

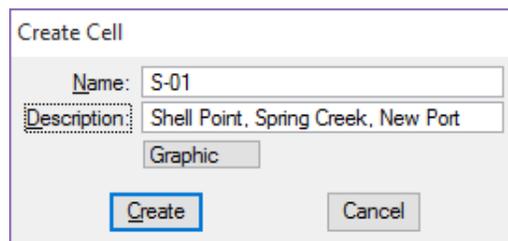
DO NOT include the dimensions.

- Set the *Cell Origin* by selecting the MicroStation **Define Cell Origin** tool from the **FDOT Plans Development > Drawing Task Menu**.

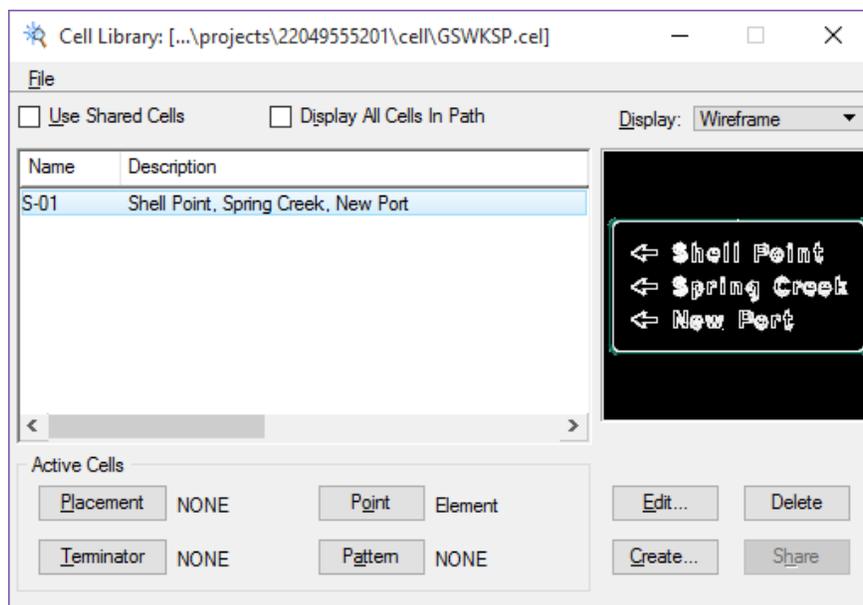


Note Set the origin on the bottom of the panel at the midpoint of the sign. The origin is critical for sign placement with Draw Sign.

- In the Cell Library dialog, select **Create**.
- For the *Name* key-in **S-01**. This will also be the name of the sign assembly.
- The *Description* is optional. It can be useful if there are several signs on the project.

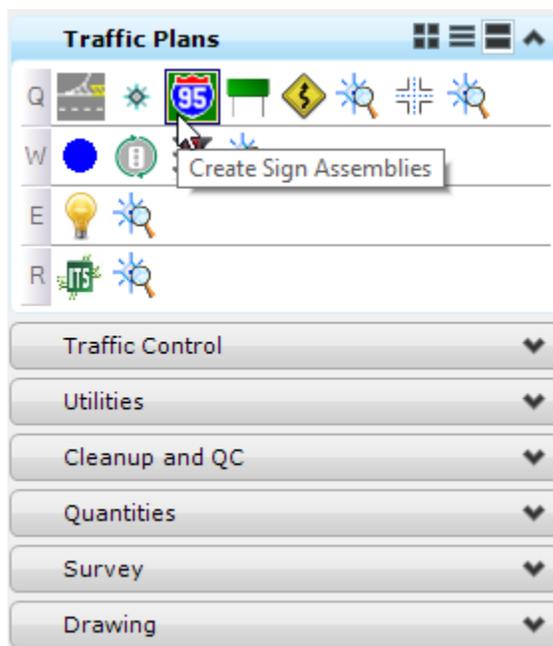


11. Click **Create**. This adds the new cell to the cell library.



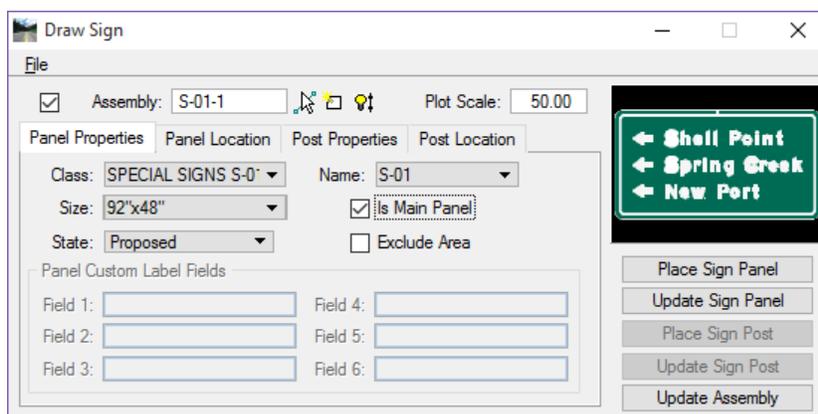
➤ **Create New Sign Assembly for Guide Sign**

1. Open *DSGNP01.dgn* file.
2. From the FDOT Plans Development Task Menu, select **Traffic Plans > Create Sign Assemblies**.



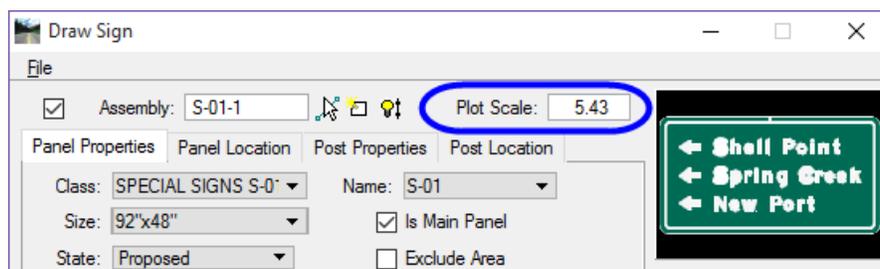
3. In Draw Sign, toggle **On Assembly**.
4. Go to the **Panel Properties** Tab.
5. Set the *Class* to **SPECIALS SIGNS S-01 THRU S-20**.
6. Set the *Name* to **S-01**.
7. Click **Create New Assembly**.

8. Check the **Size** dropdown menu to see if the **92"x48"** (7' 8" x 4') size is there. If so, 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. 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. In the exercise example, type **92"x48"**, **30.67** and press the **Enter** key or the **Tab** key on the keyboard to set the new custom size.



9. On the Draw Sign dialog, set the *Plot Scale* to **5.43**.

Note The conversion factor for GuidSIGN is located on page 6-32. The table indicates the dialog plot scale should be set to 5.43 for 50 scale design. This controls the size of the sign panel. The scale can be adjusted for a better esthetic look.



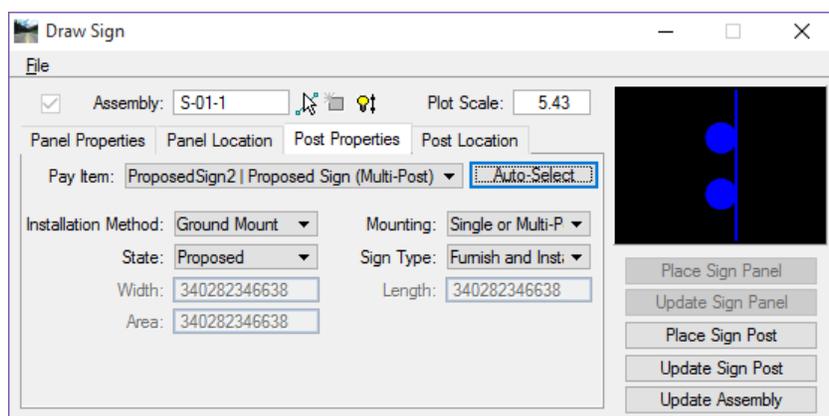
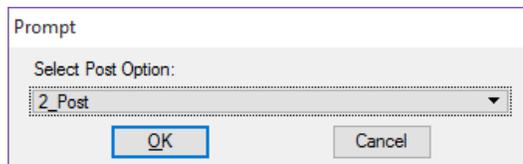
10. Toggle **On** Is Main Panel.
11. Set the *State* to **Proposed**.

➤ **Panel Location**

1. Open the **Panel Location** Ttab.
2. Set the *Location* to **By Origin**.
3. Set the *Rotation* to **Absolute**.
4. Set the *Angle* to **90**.
5. Under the *Label* section, select **Preferences**.
6. In the Sign Panel Label Preferences dialog, toggle **Off** both *Name* and *Size*.
7. Click **OK**.
8. Zoom into the area around **Station 705+50** on the left side of **SR 61** roadway.
9. Place the **Sign Panel** a general location on the left side of the roadway.

➤ **Post Properties**

1. Open the **Post Properties** Tab.
2. Set the *Plot Scale* in this tab to **50.00**.
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*, click OK to accept the **2_Post** option.
9. Ensure the *Pay Item* sets to **ProposedSign2 | Proposed Sign (Multi-Post)**.

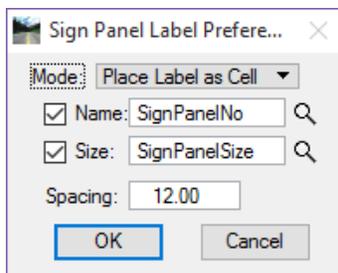


➤ **Post Location**

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 **SR61**.
4. Toggle On *Station* and enter **705+50.00**.
5. Toggle On *Offset* and enter **-50.00**.
6. Set the *Rotation* to **Relative**. This will place the sign post at a relative angle from the element or chain selected.
7. Set the *Angle* to **0**.
8. Change the *Plot Scale* to **50.00**.
9. Click the **Place Sign Post** button to place the *Post*, *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 Cell**.



3. Toggle **On** *Name* and *Size*.
4. Click **OK** on the Sign Panel Label Preferences dialog.
5. Click on the **Place Panel Label** button.
6. Select the **S-01 Sign Panel** by double-clicking on the panel.
7. 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.

8. Using the Guide Sign Worksheet as a guide, repeat **Exercise 6.6** for the **S-03** and the **S-06** sign panels if time permits.

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8

SIGNALIZATION TOOLS

OBJECTIVES

The objective of this chapter is to teach the designer how to use Design and Computation (D&C) Manager, the FDOT Menu and other GEOPAK tools to create proposed Signal features.

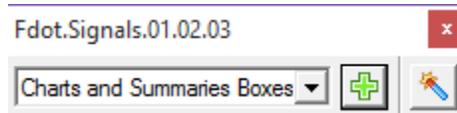
INTRODUCTION

This section discusses several applications and resources that help the designer in the creation of proposed signal features to meet FDOT criteria and CADD standards. These include the FDOT Signals Application, FDOT Signal Pole Application, cell libraries, D&C Manager, and Draw Cell by Feature.

Refer to the *Plans Preparation Manual*, Volume II, chapter 24 for more detail on developing the Signalization plans. Refer to the Design Standards indexes and the *Plans Preparation Manual*, Volume I, chapter 7 for design criteria.

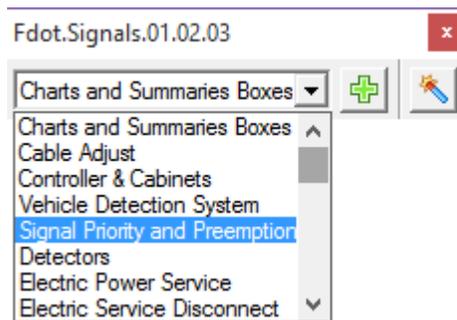
FDOT SIGNALS APPLICATION

The FDOT Signals Application was developed to assist in the placement of cells needed during the development of the Signalization Plan Sheets. These cells are placed in the DSGNSG.dgn file. It is recommended to attach the CLIPSGXX.dgn file to insure placement within the area of the plan sheet clip borders.



The FDOT Signals Application can be accessed from the FDOT Menu, Traffic Plans > Signals or from the FDOT Plans Development > Traffic Plans task menu.

The first dialog to appear contains a drop-down list of categories.



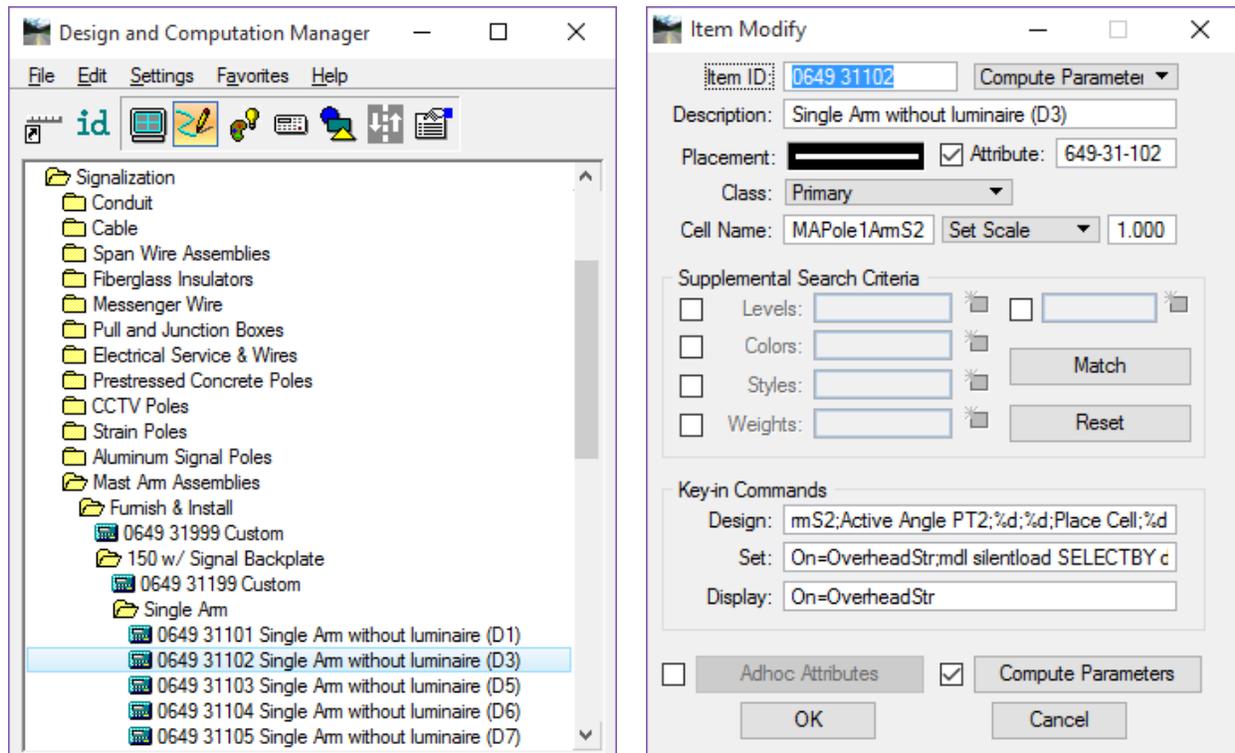
The green “+” button, Add New Items to the Design File, opens up a second dialog box in which to choose the feature to place in the design file. This dialog will vary in the information displayed depending on the category and item chosen.

The image shows two screenshots of dialog boxes from the Signalization Tools application. The top dialog box is titled "Charts and Summaries Boxes (Signalization.cel)" and has a "Pay Item" dropdown menu set to "Timing Chart, Railroad Preemption ()". Below the dropdown is a "Place Tagged Cell" button with a green checkmark icon. The bottom dialog box is titled "Signal Priority and Preemption System (Signalization.cel)" and has a "Pay Item" dropdown menu set to "Signal Priority and Preemption System (663-1-ABC)". Below the dropdown are three more dropdown menus labeled "A - Operation", "B - Assembly Type", and "C - Components". At the bottom of this dialog is a "Place Tagged Cell" button with a grey checkmark icon.

Note The xml file controlling the drop-down option needs to be updated. It is important, when using this tool, to verify the pay items numbers from within Design, Quantities, & Estimates (DQE) after the cell has been placed in the design file. Another option is to place cells using the D&C Manager, which is kept up to date with the latest pay items and cells.

REVIEW D&C MANAGER SIGNALS ITEMS

Before placing the Signals items it is important to understand how they are set up. The ddb file that FDOT delivers will have cells assigned to the Signal items to assist in the production of plan elements. These items may also have scales and rotations that need to be addressed when placing them. Knowing how the item is set up prior to placing it will alleviate having to experiment, delete and redraw. One advantage to using D&C Manager to draw the mast arms and other Signal elements is that the elements can be automatically quantified. The figure below shows the Mast Arm item in D&C Manager.



Selecting and then right-clicking on an item offers the options to review or modify the item. The Item Modify or Item Review dialog allows the designer to review how an item will work when placed with D&C Manager.

The top portion of the dialog shows information about the selected item such as pay item number, description, symbology and Cell Name. The bottom portion, Key-in Commands, describes what actions will be taken when the designer double-clicks on this item in D&C Manager.

In the Design field notice the string of commands that takes place when this item is selected for placement. One of the important items the designer needs to be aware of is when this item is placed it requires 2 points to set the rotation.

For more information on the D&C Manager, see Exploring D&C Manager in Chapter 5 or the GEOPAK Help files.

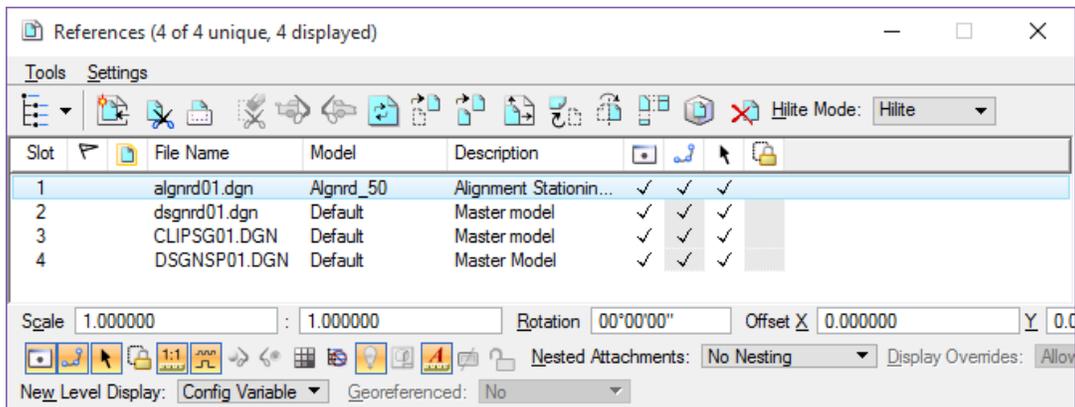
Exercise 8.1 *Place Signal Poles using D&C Manager*

In this exercise, the designer will place a Mast Arm Signal Pole at a specified station and offset.

➤ **Create Signal Design File**

1. Create and open the *DSGNSG01.dgn* and attach the following reference files:

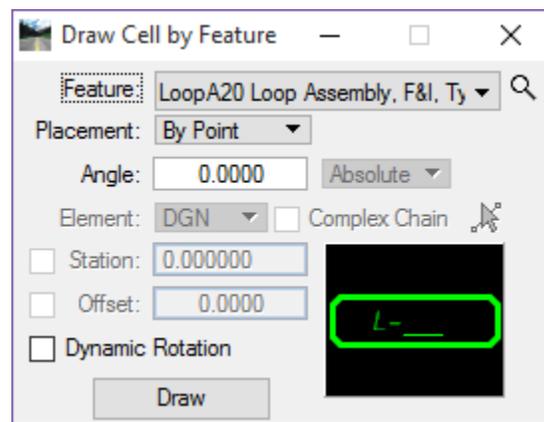
- **DSGNRD01.dgn** from the *roadway* folder, *Default* model.
- **ALGNRD01.dgn** from the *roadway* folder, *Algnrd_50* model.
- **DSGNP01.dgn** from the *signing* folder, *Default* model.



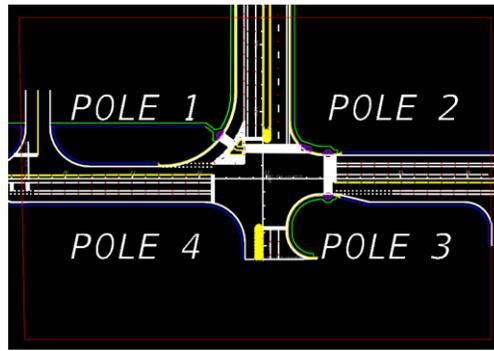
2. Zoom in around station **33+00** on the **BL98** alignment. This is near the center of the intersection. Rotate the view so that *BL98* is horizontal.
3. Open the Level Display and turn **Off** all of the levels in the *DSGNP01.dgn* except the **SignSupport** level. This will clean up the view around the intersection.
4. Save Settings

➤ **Start Draw Cell by Feature and Place Mast Arm Poles**

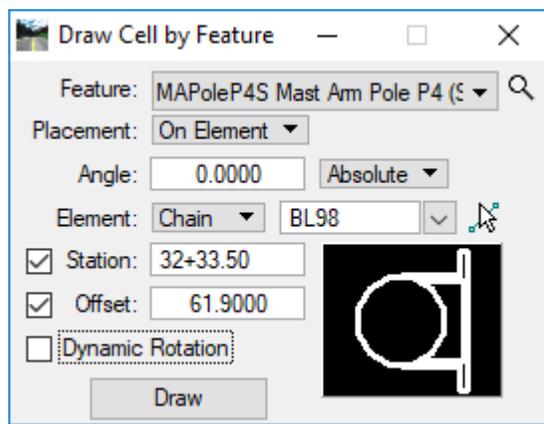
1. From the MicroStation menu, select **GEOPAK > Road > Plans Preparation > Draw Cell by Feature**. This opens Draw Cell by Feature dialog.



- The first pole to be setup is **Pole No. 4**. The quadrants for pole locations are shown in the picture below.



- Set the *Feature* to **MAPoleP4S Mast Arm Pole P4 (Single Arm)**.



- Set the *Placement* to **On Element**.
- Set the *Angle* to **0.0** and **Relative**.
- Set the *Element* to **Chain**.

Note If necessary, set the *GEOPAK File* to **Job61.gpk** file.

- Set the *Chain* to **BL98**.
- Toggle **On Station** and key-in **32+33.50**.
- Toggle **On Offset** and key-in **61.90**.
- Click the **Draw** button and move the cursor to the right side of the baseline and **Data Point**.
- Right-click to **Reset** the command.
- Repeat steps 2–11 for **Poles 1-3**. (See BOE for Pay Item Details.)

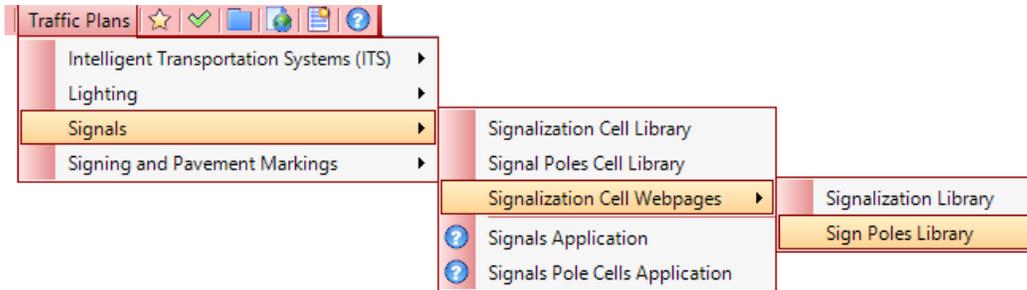
| Pole No. | Feature | Station | Offset | Angle |
|------------|--|----------|--------|-------|
| Pole No. 1 | MAPoleP3S Mast Arm Pole P3 (Single Arm) | 32+57.70 | -49.00 | 270° |
| Pole No. 2 | MAPoleP4S Mast Arm Pole P4 (Single Arm) | 33+53.00 | -71.50 | 180° |
| Pole No. 3 | MAPoleP5S Mast Arm Pole P5/P6 (Single Arm) | 33+53.00 | 63.00 | 90° |

Exercise 8.2 Place Arm from Signal Cells Web Page

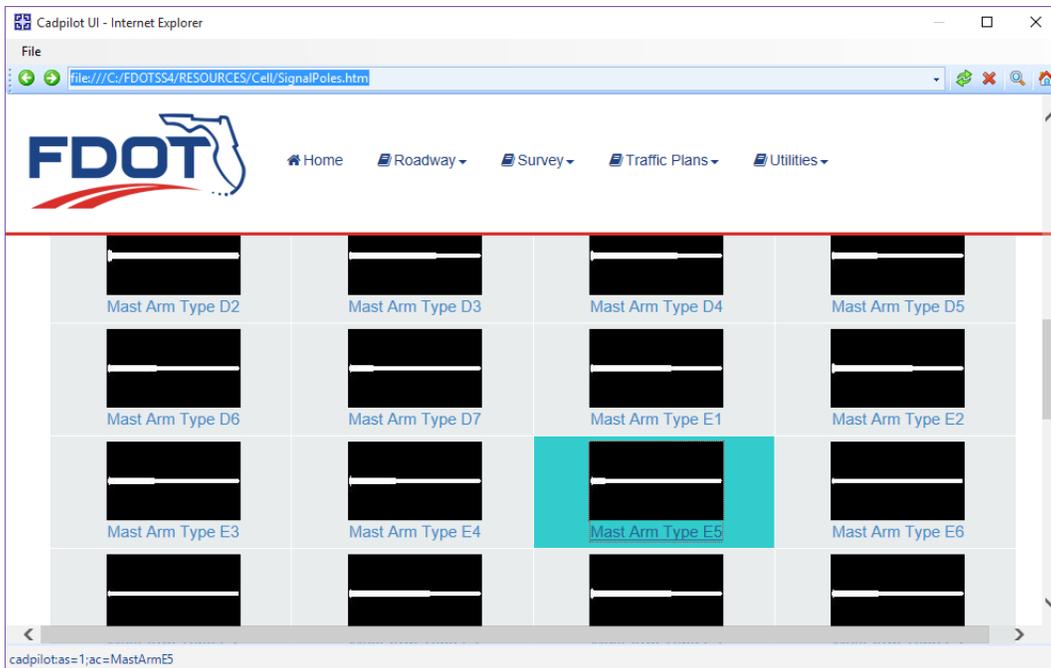
The Mast Arm on the Signal Pole can be placed by using the Signal Cells web page from FDOT Menu or directly from the Cell Library in MicroStation. The Arm is not drawn with D&C Manager.

In this exercise you will place the Mast Arms on the poles placed in the previous exercise.

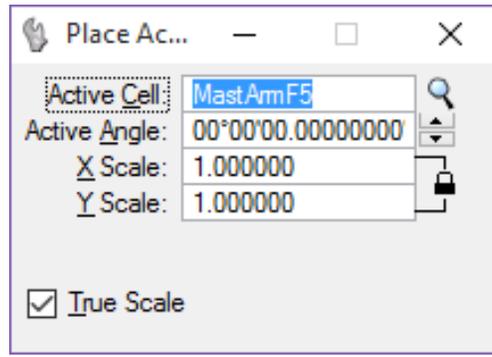
1. Continuing in the *DSGNSG01.dgn* file, zoom in to **Pole No. 4** placed around station **32+30**.
2. From FDOT Menu, select **Traffic Plans > Signals > Signalization Cell Webpages > Signal Poles** library. This opens the Signal Poles Cells web page.



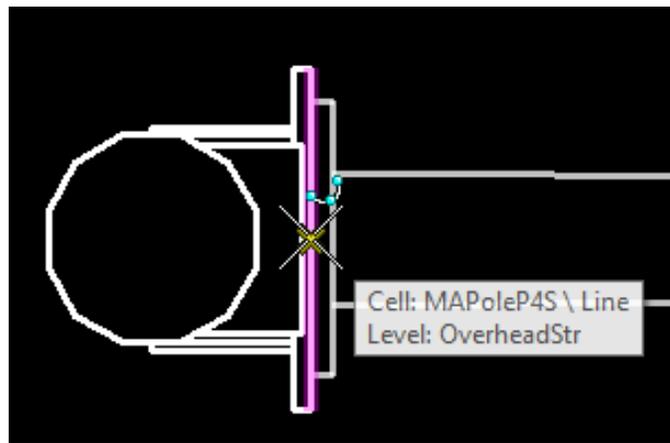
3. Scroll down and select the cell **Mast Arm Type E5**.



- This will activate the **MicroStation Place Active Cell** command and set *MastArmE5* as the active cell.



- Set the *Active Angle* to **0.0**.
- Set the *X* and *Y* *Scale* to **1.0**.
- Snap** to the middle of the face plate of the Signal Pole and **data point** to place the *Mast Arm*.



- Right-click to **Exit** the **Place Active Cell** command.
- Click the **Open Browser**  icon near the end of the FDOT Menu to recall the webpage.
- Repeat steps 3–9 for **Poles 1-3**. Rotate Mast Arm direction as needed:

| Pole No. | Mast Arm Cell | Angle |
|------------|--|-------|
| Pole No. 1 | Mast Arm Type A50 (Single) | 270° |
| Pole No. 2 | Mast Arm Type A60 (Single/Double-Heavy Duty) | 180° |
| Pole No. 3 | Mast Arm Type A70 (Single/Double) | 90° |

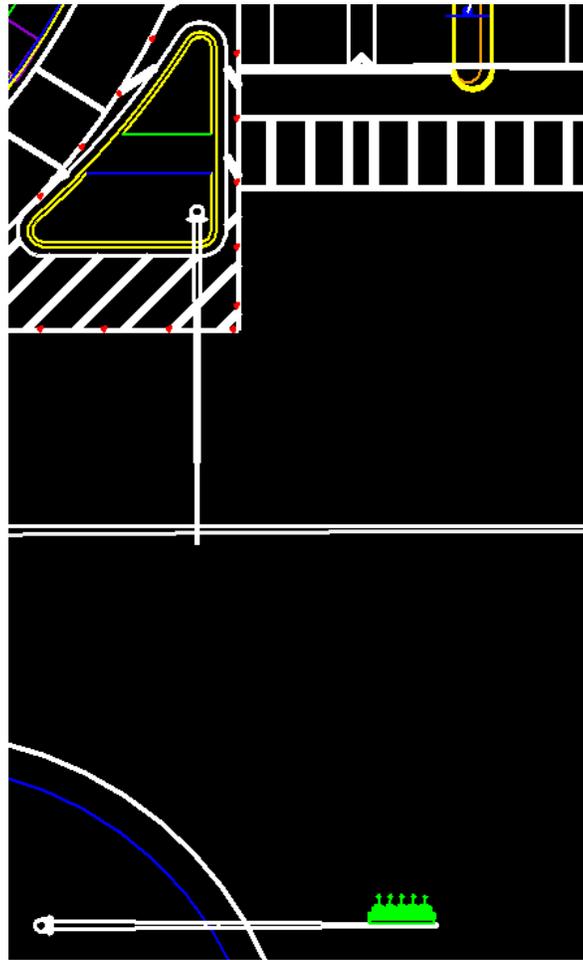
Exercise 8.3 Place Signal Head

In this exercise, the designer will place a **Signal Head** on the **Mast Arm** using **D&C Manager**.

➤ **Place Signal Head 5 Section 1 Way**

1. Continuing in *DSGNSG01.dgn*, zoom to the intersection around **Pole No. 4**.
2. In D&C Manager, navigate to and double-click on the Item *Signalization > Traffic Signals > Furnish & Install > Aluminum > 5SHORAL, Traffic Signal, Furnish & Install, Aluminum, 5 Section Straight, 1 Way*.
3. Place the Traffic Signal Head by placing **2 points** in the design file to set the angle. The first point should be on the signal side of the mast arm where the mast arm is connected to the pole connection plate. The second point should be on the signal side of the mast arm at the very end of the mast arm. **Tentative snap** to these points and then data point. This will set the signal to the angle of the mast arm.
4. Place the *Signal Head* along the mast arm so that it is centered to the opposing turn lane.

Note Turn on all of the levels in the *DSGNP01.dgn* file to see the striping and verify the placement of the signal head.

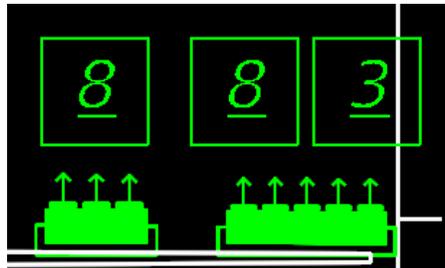


➤ **Place Signal Head 3 Section 1 Way**

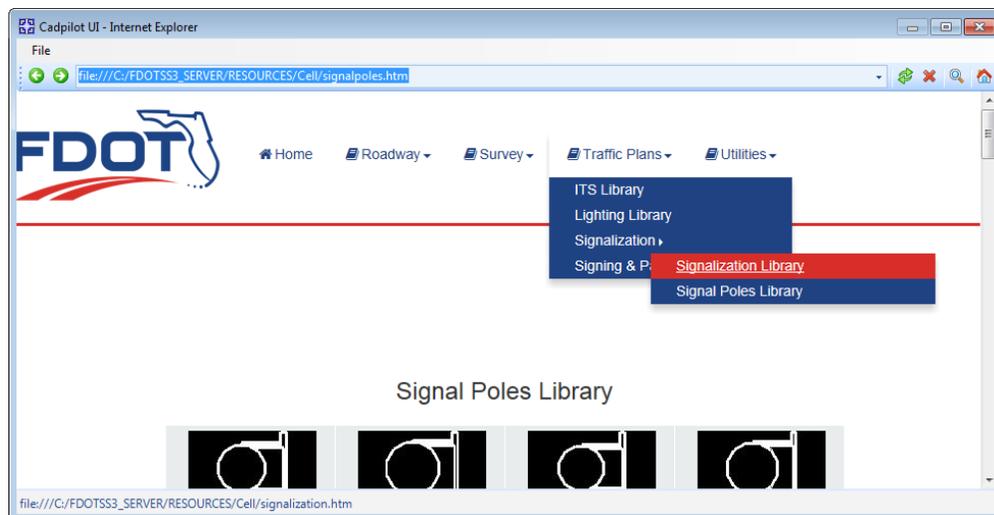
1. In D&C Manager, navigate to and double-click on the Item *Signalization > Traffic Signals > Furnish & Install > Aluminum > 3SHORAL, Traffic Signal, Furnish & Install, Aluminum, 3 Section, 1 Way*.
2. Place the Traffic Signal Head by placing **2 points** in the design file to set the angle. The first point should be on the signal side of the mast arm where the mast arm is connected to the pole connection plate. The second point should be on the signal side of the mast arm at the very end of the mast arm. **Tentative snap** to these points and then data point. This will set the signal to the angle of the mast arm.
3. Place the *Signal Head* along the mast arm so that it is centered to the opposing lane.
4. Repeat steps 1–8 to complete placing signals heads on **Mast Arm Assembly Poles 1-3**.

➤ **Place Signal Head Number**

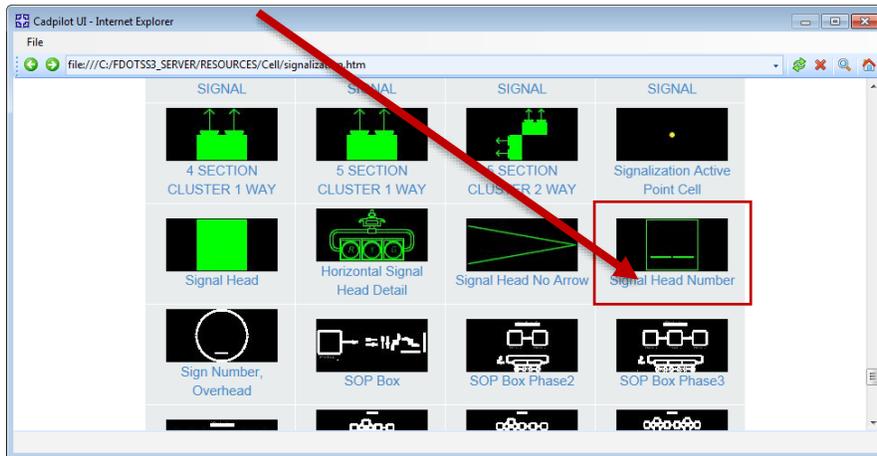
In this part of the exercise the designer will complete the **Signal Heads** by placing a signal number. The next figure shows the finished product.



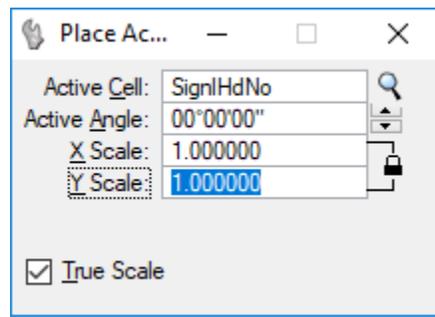
1. If the *Signal Poles Library Cell Webpage* was dismissed, click the **Open Browser**  icon near the end of the FDOT Menu to recall the webpage.
2. Scroll back to the top of the *Signal Poles Library Cell Webpage* and select **Traffic Plans > Signalization > Signalization Library**.



3. Scroll to find the **Signal Head Number** cell selection and click the image or the text link.



4. This will activate the MicroStation **Place Active Cell** command and set *SignHdNo* as the active cell.

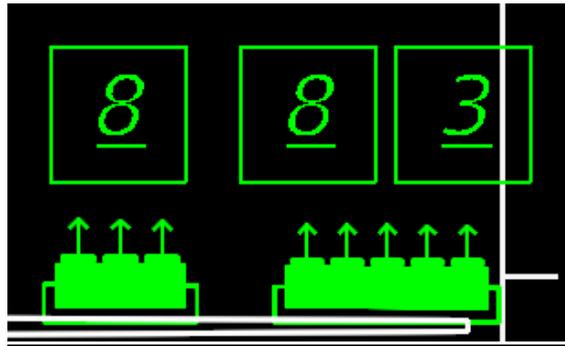


5. Set the *Active Angle* to **0.0**.
6. Set the *X* and *Y Scale* to **1.0**.
7. Position the **Signal Head Number Box** centered above the **3 Section, 1 Way Signal Head and Data Point**.
8. Place **2 Signal Head Number Boxes** on the **5 Section, 1 Way Signal Head** offset from center, but both boxes centered about the **Signal Head**.



9. Using the MicroStation *Fill in Single Enter Data Field* , click inside the **Signal Head Number Box** for the **3 Section, 1 Way Signal Head** and enter the number **8**.
10. **Data point** in the view to accept this value.
11. Right-click to **Cancel** the command.

12. Repeat steps 9-11 to fill in the **Signal Head Number Boxes** for the **5 Section, 1 Way Signal Head**. The first box enter the number **8**. The last box enter the number **3**.



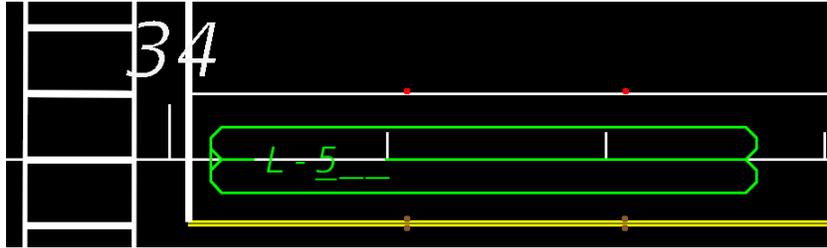
13. Repeat steps 1-11 to place the **Signal Head Number Boxes** on all the Mast Arms throughout the project. Use the data in the table below:

| Pole No. | Signal Heads | Box 1 | Box 2 |
|------------|------------------|-------|-------|
| Pole No. 1 | 3 Section, 1 Way | 2 | |
| Pole No. 1 | 5 Section, 1 Way | 2 | 5 |
| Pole No. 2 | 3 Section, 1 Way | 4 | |
| Pole No. 2 | 5 Section, 1 Way | 4 | 7 |
| Pole No. 3 | 3 Section, 1 Way | 6 | |
| Pole No. 3 | 5 Section, 1 Way | 6 | 1 |

Note The Enter Data Fields in each Signal Head Number Box has 2 spaces which can be cleaned up by removing one of the spaces using the Text Editor – Word Processor.

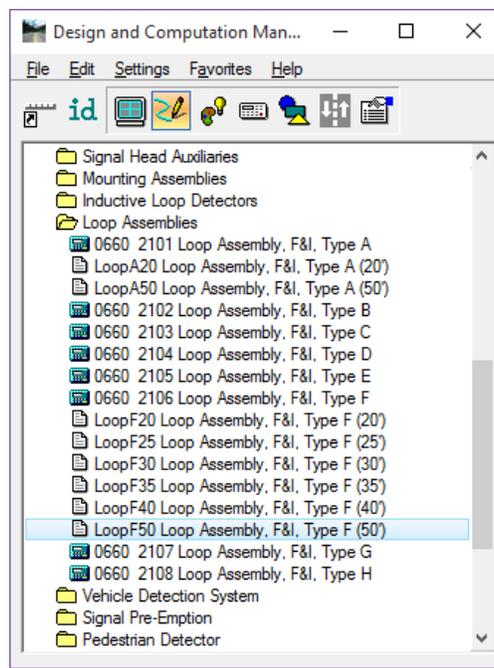
Exercise 8.4 Place Loop Assemblies

In this exercise the designer will continue working in the same intersection and place the Loop Detectors, using D&C Manager, that correspond to the Signal Heads placed in the previous exercise. Refer to Design Standard *Index 17781* for additional design criteria for Loop Assemblies. The figure below shows the Loop placed 2' behind the stop bar centered in the turn lane.



➤ Place Loop Type F

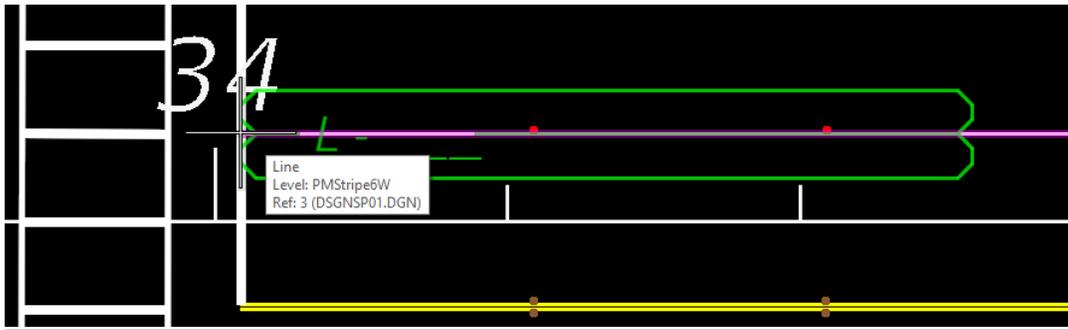
1. Continuing in *DSGNSG01.dgn* zoom in around Station **34+00**.
2. Activate AccuDraw if it is turned **Off**.
3. Open D&C Manager and navigate to *Signalization > Loop Assemblies*.



4. Scroll to find **0660 2106 Loop Assembly, F&I, Type F > LoopF50 Loop Assembly, F&I, Type F (50')** and double-click on the item. This will prompt to set the active rotation angle, for the loop, using 2 points. Use the pavement marking lines to set the angle.
 - a. For **point 1** snap to the left end of the 6" white lane line nearest the stop bar and issue a data point.
 - b. For **point 2** snap to the other end of the same 6" white lane line and data point. After this point is selected the Loop cell will be attached to the cursor.

Note If the wrong rotation was picked, right-click to cancel the command then go back to D&C Manager and double-click on the item again to restart the command.

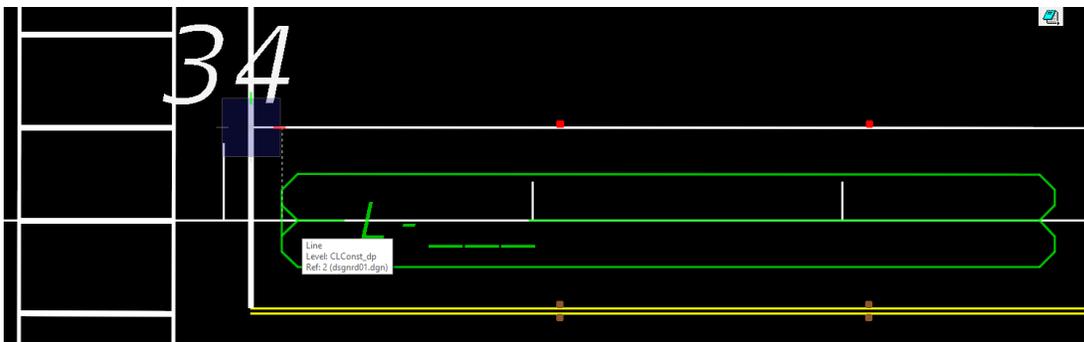
5. Tentative Snap to the 6" White Lane line at the stop bar.



6. In the AccuDraw dialog, type the letter **O** in the *Y coordinate* field and press enter. This sets the AccuDraw Origin at the end of that line.
7. In the AccuDraw dialog, type **-6** in the *Y coordinate* field and press enter.

Note This is half of a 12' lane. Pressing **Enter** locks the Y axis.

8. In the AccuDraw dialog, type **2** in the *X coordinate* field and press enter.
9. **Data Point** to place the **Loop**.

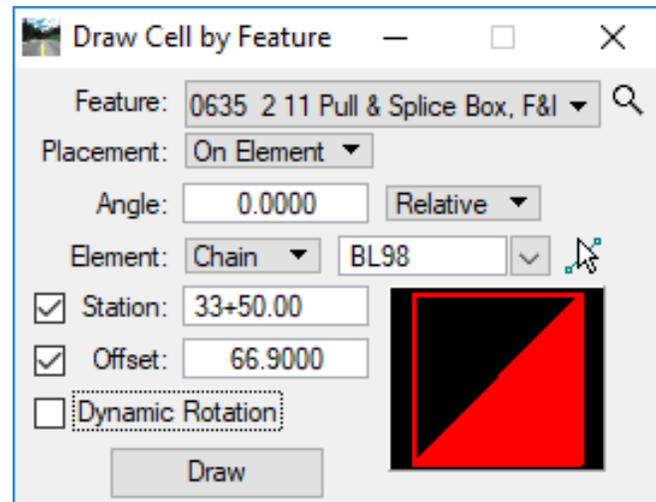


10. Right-click to **Exit** the command.
11. Using the MicroStation *Fill in Single Enter Data Field* tool select the Loop.
12. In the Text Editor dialog, type in the number **5**.
13. **Data Point** in the view to accept the value.
14. Right-click to **Exit** the command.
15. Repeat these steps to finish placing the remaining Loops throughout the project, using different types and sizes. The Loop Assembly details and layout can be found in a file named **LoopAssemblies.dgn**. Reference that file to your current design file.

Exercise 8.5 Place Pull Box

In this exercise, the designer will use D&C Manager in conjunction with the *Draw Cell by Feature* tool to place several pull boxes around the intersection. By using D&C Manager, the designer will be able to generate automated quantities.

1. Continuing in *DSGNSG01.dgn*, zoom in around **Pole No. 3**.
2. From MicroStation go to **GEOPAK > Road > Plans Preparation > Draw Cell by Feature**. The Draw Cell by Feature dialog opens.



3. Set the *Feature* **0635 2 11 Pull and Splice Boxes, F&I, 13" x 24" Cover Size**.
4. Set the *Placement* to **On Element**.
5. Set the *Angle* to **0.0** and **Relative**.
6. Set the *Element* to **Chain** and **BL98**.
7. Toggle **On Station** and set it **33+50.00**.
8. Toggle **On Offset** and set it to **66.90**.
9. Click the **Draw** button. The **Pull Box cell** will be attached to the cursor. **Data Point** to place the cell between the *Back of Sidewalk* and *Pole No. 3*.

10. Repeat steps 7-9 to place **Pull Boxes** at the following *offsets* and *stations*:

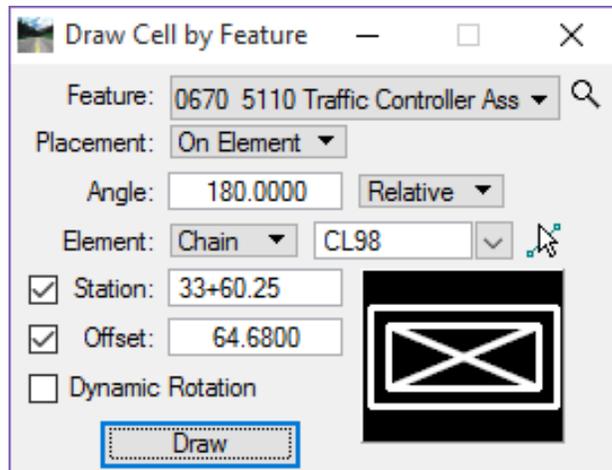
| Station | Offset/Side |
|----------|-------------|
| 30+74.00 | 42.50/RT |
| 32+25.00 | 45.00/RT |
| 32+30.00 | 65.30/RT |
| 32+53.00 | 49.00/LT |
| 32+56.50 | 64.00/LT |
| 33+48.50 | 72.00/RT |
| 33+56.00 | 65.00/RT |
| 33+56.00 | 70.00/RT |
| 33+65.00 | 67.50/RT |
| 33+66.00 | 58.00/LT |
| 33+75.00 | 46.00/RT |
| 33+86.00 | 51.00/LT |
| 34+01.00 | 43.00/RT |
| 34+34.00 | 66.00/RT |
| 35+29.00 | 47.00/RT |



Exercise 8.6 *Place Controller Assembly*

In this exercise the designer will use the Draw Cell by Feature tool to place a Base Mounted Controller.

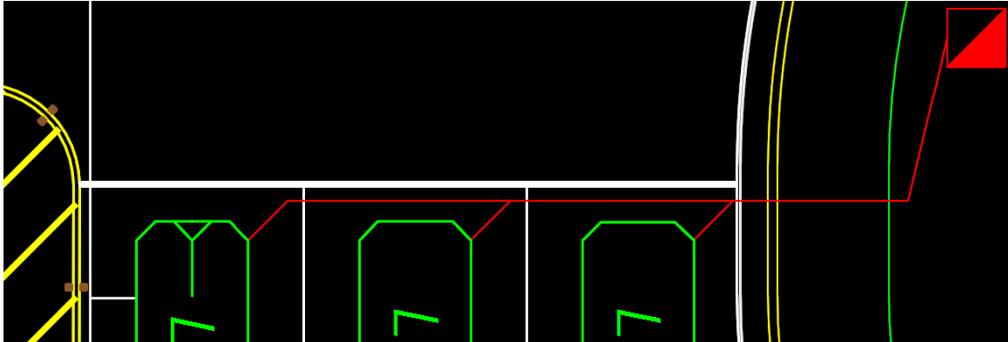
1. Continuing in *DSGNSG01.dgn*, zoom in around **Pole 3**.
2. Open the Draw Cell by Feature tool.
3. In the Draw Cell by Feature dialog, select the item **0670 5110 Traffic Controller Assembly, F&I, NEMA**.
4. Set the *Placement* to **On Element**.
5. Set the *Angle* to **0.0** and **Relative**.
6. Set the *Element* to **Chain** and **BL98**.
7. Toggle **On Station** and set it **33+60.25**.
8. Toggle **On Offset** and set it to **67.50**.



9. Click the **Draw** button. The **Controller Assembly cell** will be attached to the cursor. **Data Point** to place the cell.

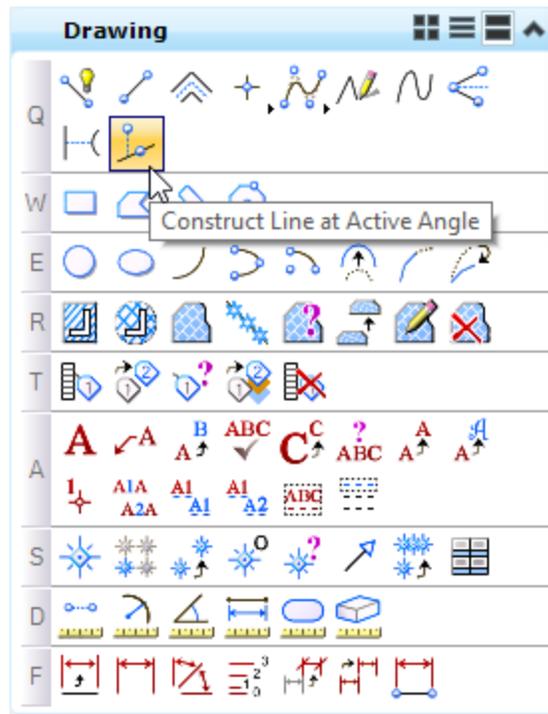
Exercise 8.7 Draw Loop Lead in Wire

In this exercise the designer will draw the Loop Lead-In wire from the end of the Loop Detectors to the Pull Box. The lead-In is paid for under the Loop Detector so the designer will draw this line using the MicroStation Place SmartLine command. The figure below shows the Loop Lead-In drawn from Loop Detectors to the Pull Box.

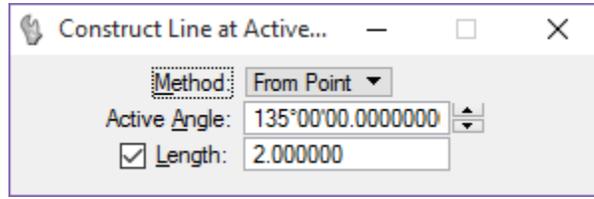


➤ **Draw Loop Lead-In**

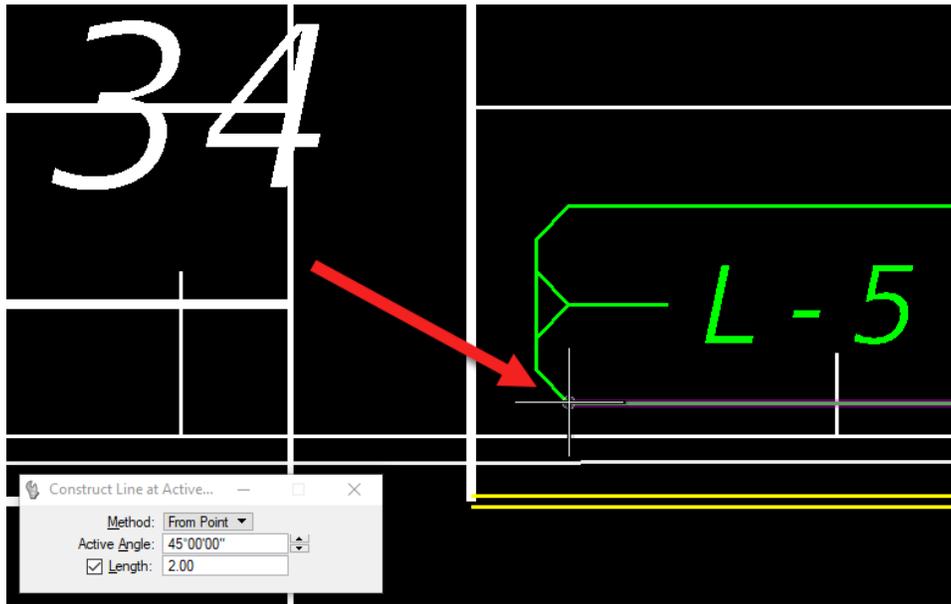
1. Zoom in around the first *Loop Detector* placed earlier.
2. In MicroStation, set the *Level* to **LoopLI**.
3. From the FDOT Plans Development Task Menu, select **Drawing > Construct Line at Active Angle**.



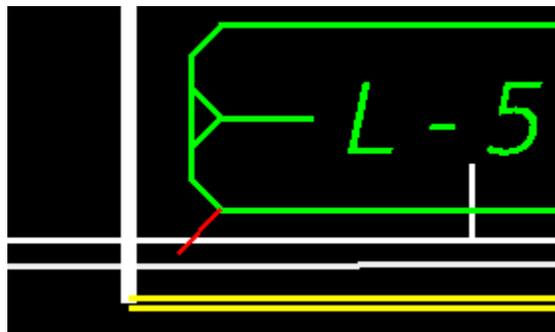
4. Set the *Method* to **From Point**.
5. Set the *Active Angle* to **45°**.
6. Check on the *Length* and enter **2.0**.



7. Snap to the end of the **Loop Detector** near the *6" Double Yellow Lines*.



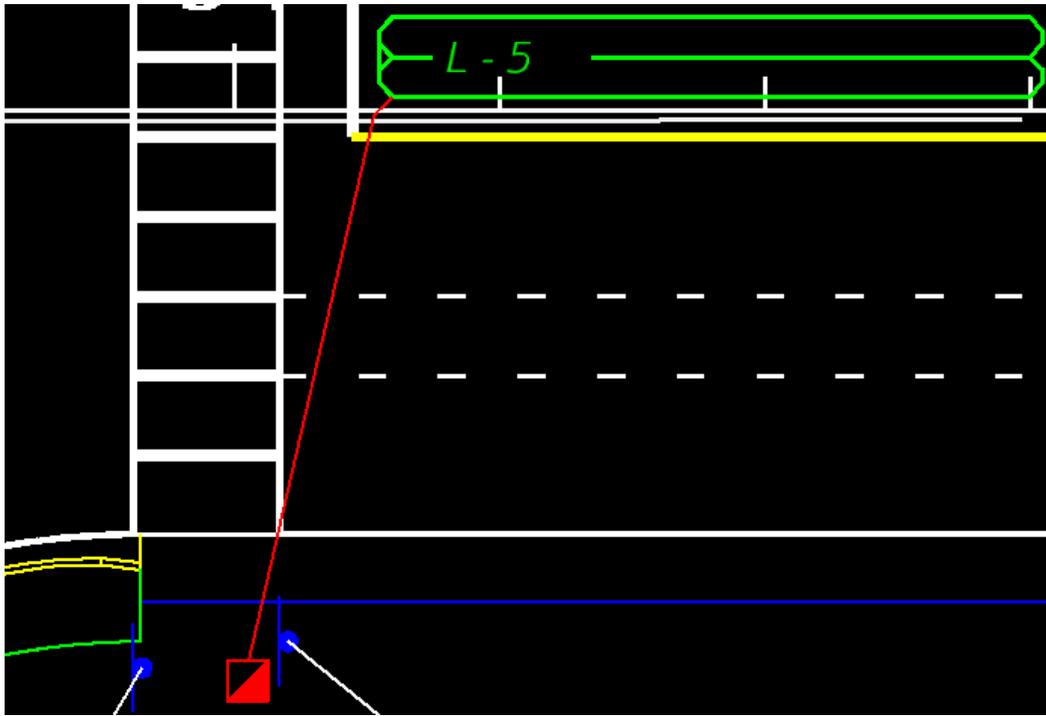
8. **Data Point** to accept the *From Point*.
9. Move the cursor towards the *6" Double Yellow Lines* and place a second **Data Point**. The image below shows the *Lead-In Wire* connected to the *Loop Detector*.



10. Repeat this process for the remaining **Loop Detectors**.

➤ **Draw the Loop Lead-In that connects the Loop Detectors to the Pull Box.**

1. Using the *Place Line* command, draw a line from **Loop L-5** to the **Pull Box** at Station 34+00.00/Rt. as shown in the image below.



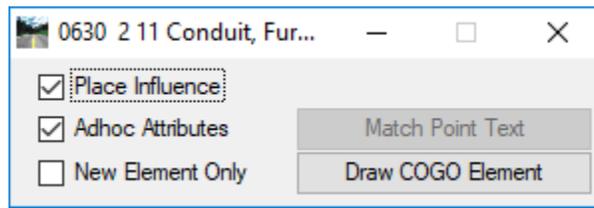
Note The location of the Pull Boxes will be dependent on each individual project. The placement of Loops, Types of Loops used and Loop Lead-In wire placement may vary from district to district, consult with the district traffic engineers regarding these issues.

Exercise 8.8 Draw Conduit

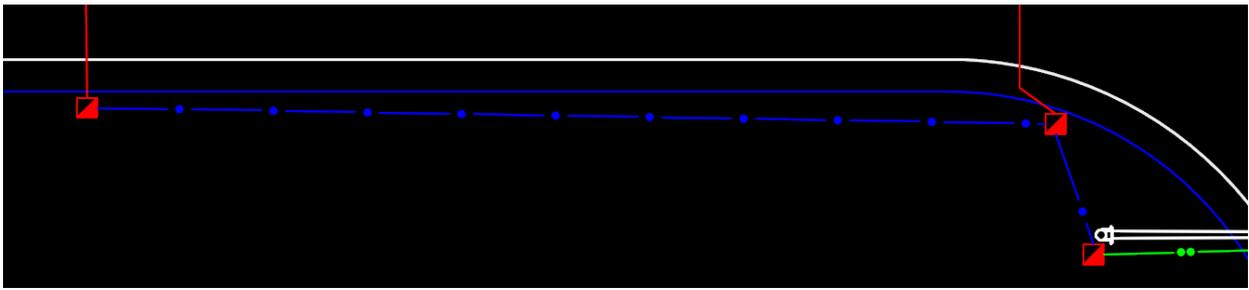
In this exercise the designer will draw conduit from Pull Box to Pull Box and then to the Controller Cabinet.

➤ Place Conduit Underground

1. Continuing in *DSGNSG01.dgn*, zoom in near the **Pull Box** at Station **30+74.00** placed in a previous exercise.
2. Open D&C Manager.
3. In D&C Manager, double-click on **Signalization > Conduit > 630 2 11 Conduit, Furnish & Install, Open Trench**.
4. Make sure **Place Influence** is toggled on. This will set the MicroStation level symbology.



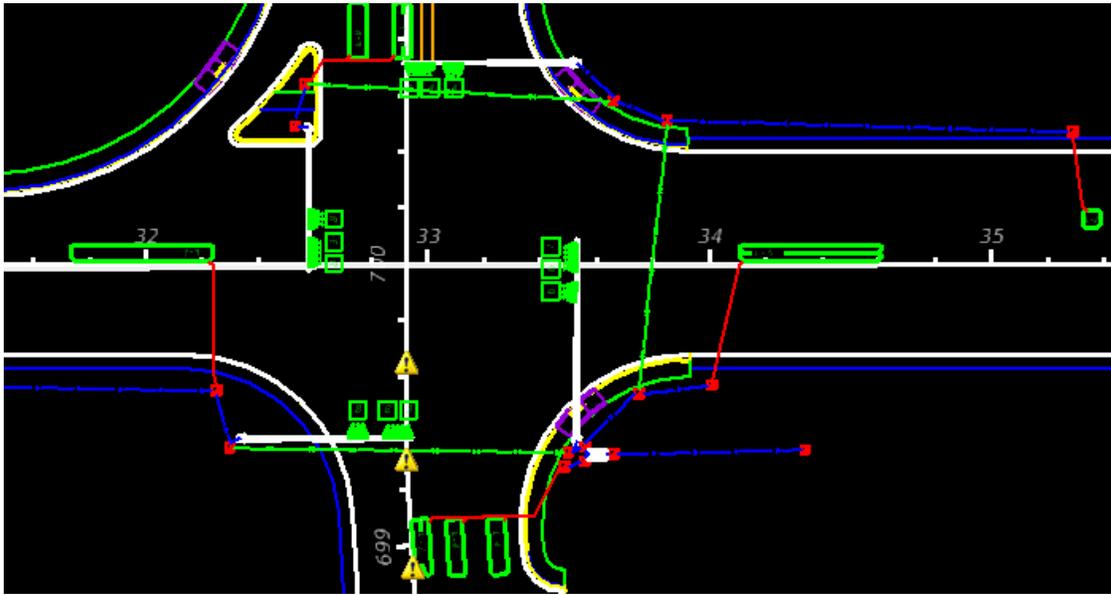
5. Using the MicroStation *Place SmartLine* tool, draw a line from one Pull Box to the next Pull Box as shown in the image below:



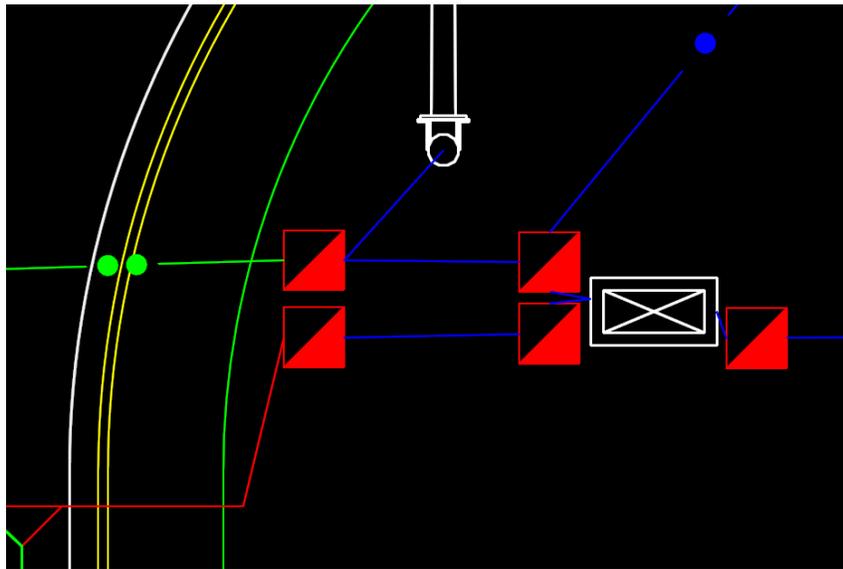
Note The designer could navigate to Task Navigator > Civil Tools > Horizontal Geometry > Line

Between Points  instead of opening the D&C Manager, and use this Civil Tool, selecting the Conduit, Furnish & Install, Open Trench or Contractor's Option or the Conduit, Furnish & Install, Underground or Underpavement - Directional Bore from the feature drop down list, in order to draw conduit in the *Dsgnsg01.dgn* file.

- Continue to connect the remaining pull boxes with conduit for the entire intersection using **0630 2 11 Conduit, Furnish & Install, Open Trench** and **0630 2 12 Conduit, Furnish & Install, Directional Bore**, for areas under the pavement. The intersection should look like the image below when complete.

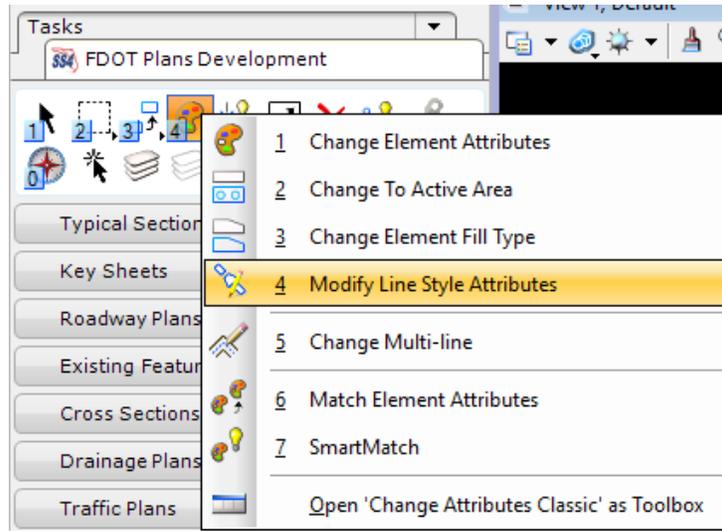


- Zoom in to one of the *Signal Poles* and draw a **Conduit** line from the **Signal Pole** to the **Pull Box**.

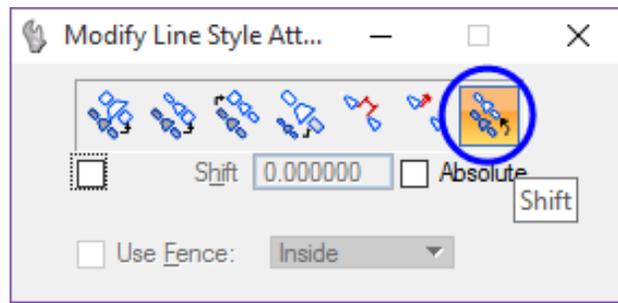


- From D&C Manager, toggle **Off Place Influence**.

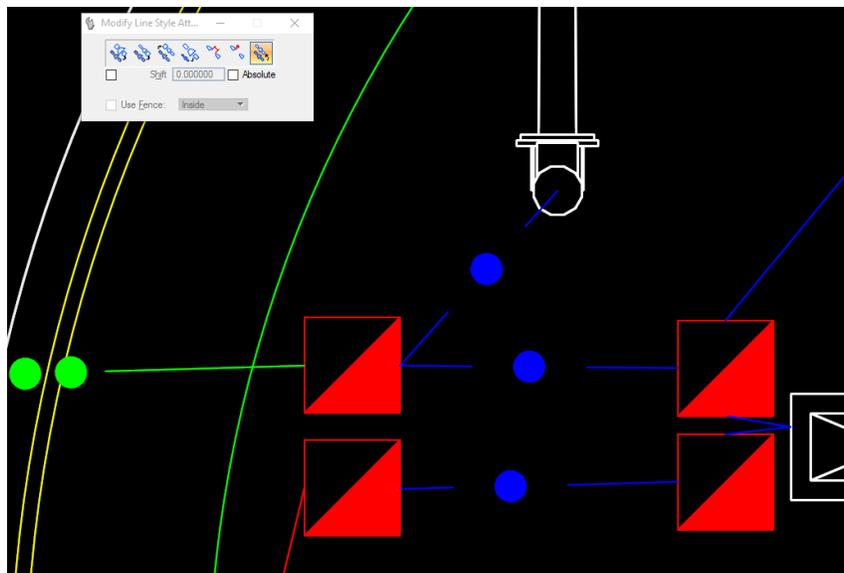
- Open the Modify Line Style Attributes tool from the *Change Attributes* tools.



- On the Modify Line Style Attributes tool box select the **Shift** option.



- Select one of the shorter lines of conduit. Move the cursor to shift the lines style so that the dots of the custom line style appears and **data point** to shift the line.

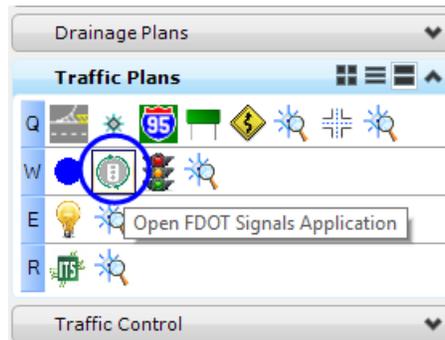


Exercise 8.9 Create Signals Plan Sheet Signal Head and Timing Chart Details

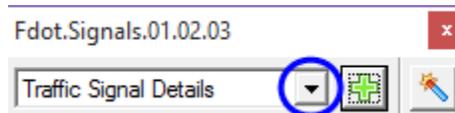
➤ **Place Signal Head Details (Part 1)**

In this exercise the designer will use the FDOT Signals Application to place the Signal Head Detail.

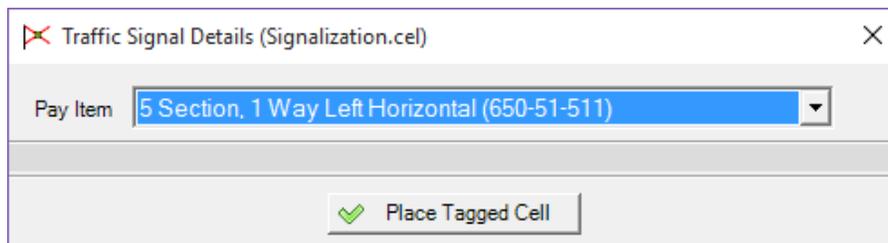
1. Open the *DSGNSG01.dgn* file.
2. Attach the *CLIPSG01.dgn* file as a reference.
3. Zoom to the upper left side of the plan sheet clip border referenced in from the *CLIPSG01.dgn* file.
4. From the FDOT Plans Development Task Menu, select **Traffic Plans > Open FDOT Signals Application**.



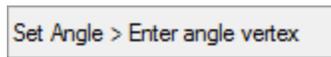
5. Select the **Traffic Signals Details** from the drop down menu.



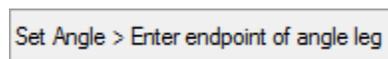
6. Click the **Green Plus** icon  to open the Traffic Signal Details dialog.
7. From the *Pay Item* drop down list select **5 Section 1 Way Left Horizontal (650-51-511)**.



8. Click the **Place Tagged Cell** button on the bottom of the Traffic Signals Details dialog.
9. The MicroStation *status bar* indicates the angle of the cell needs to be entered. Set the angle by placing **2 points** in the design file.



10. Set the angle so that the cell will be placed horizontal. **Point 1: Snap** to the left top corner of the *clip border*.

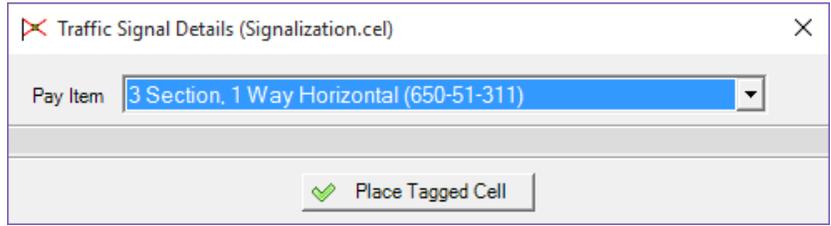


11. **Point 2: Snap** to the right top corner of the *clip border*.

Note This tool may not place the cell at the correct scale and may require the use of MicroStation tools to scale the cell correctly.

12. **Data point** to place the cell near the top left -corner of the plans sheet. Right-click to **Exit** the command.

13. On the Traffic Signal Details dialog, select **3 Section 1 Way Left Horizontal (650-51-311)** from the *Pay Item* drop down list.



14. Click the **Place Tagged Cell** button on the bottom of the Traffic Signals Details dialog.

15. Place the cell next to the first cell placed. Right-click to **Exit** the command.

16. The *Assembly* text and *Pay item* number box contain *Data* fields which can be edited using the *Edit Data Fields* tool in MicroStation.

17. The *5 Section, 1 Way* will have **4 assemblies** and the *3 Section, 1 Way* will have **4 assemblies**. Use the MicroStation **Fill In Single Enter-Data Field** tool to update the number of assemblies for each Signal Head.

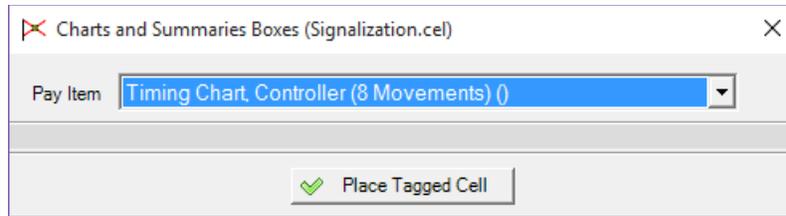


18. Close the Traffic Signal Details dialog.

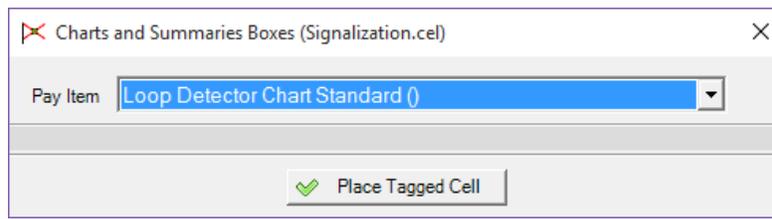
➤ **Place Controller and Loop Detector Charts**

In this exercise, the designer will place the Timing Charts for Controllers and Loop Detectors Charts.

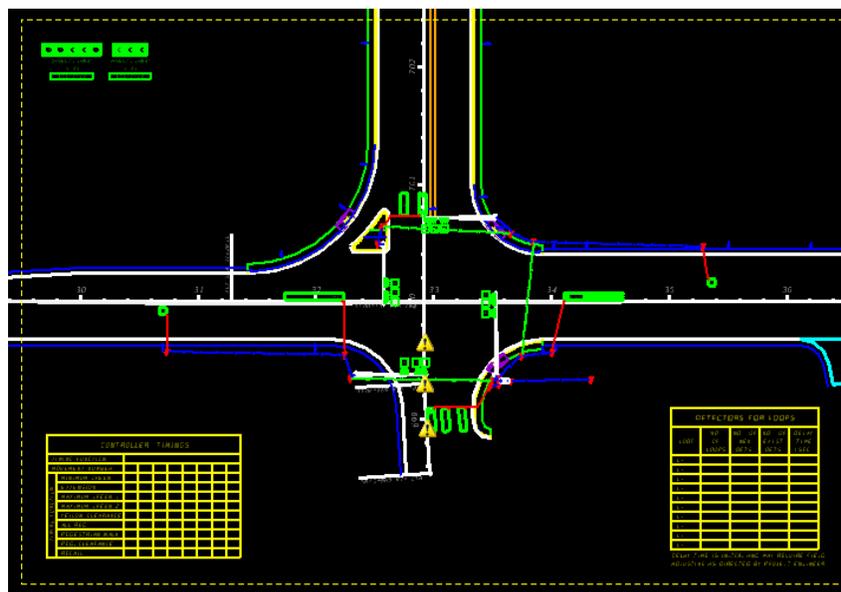
1. Continuing in *DSGNSG01.dgn*, zoom to the bottom left corner of the *sheet clip border*.
2. On the FDOT Signalization Application dialog, select **Charts and Summary Boxes** from the drop-down menu.
3. Click the **Green Plus** icon  to open the Charts and Summaries dialog.
4. On the *Pay Item* drop-down list select **Timing Chart, Controller (8 Movements)**.



5. Click the **Place Tagged Cell** button on the bottom of the Charts and Summaries dialog.
6. Place the cell in the design file in bottom left corner of the *sheet clip border*.
7. Repeat the previous steps to place the **Loop Detector Chart Standard ()**.



8. Both cells have *data fields* built into them to aid the user in populating the data.
9. Your design should now look similar to the image below.



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9 LIGHTING TOOLS

OBJECTIVE

The objective of this chapter is to teach the designer how to use Design and Computation (D&C) Manager, the FDOT Menu and other GEOPAK tools to create proposed lighting features.

INTRODUCTION

This chapter discusses several applications and resources that help the designer in the creation of proposed lighting features to meet FDOT criteria and CADD standards. These include the cell libraries, D&C Manager, Draw Cell by Feature, and Draw Cell Group by Feature.

Refer to the *Plans Preparation Manual*, Volume II, Chapter 25 for more detail on developing the Lighting plans. Refer to the Standard Plans for Road and Bridge Construction Indexes and the *Plans Preparation Manual*, Volume I, Chapter 7 for design criteria.

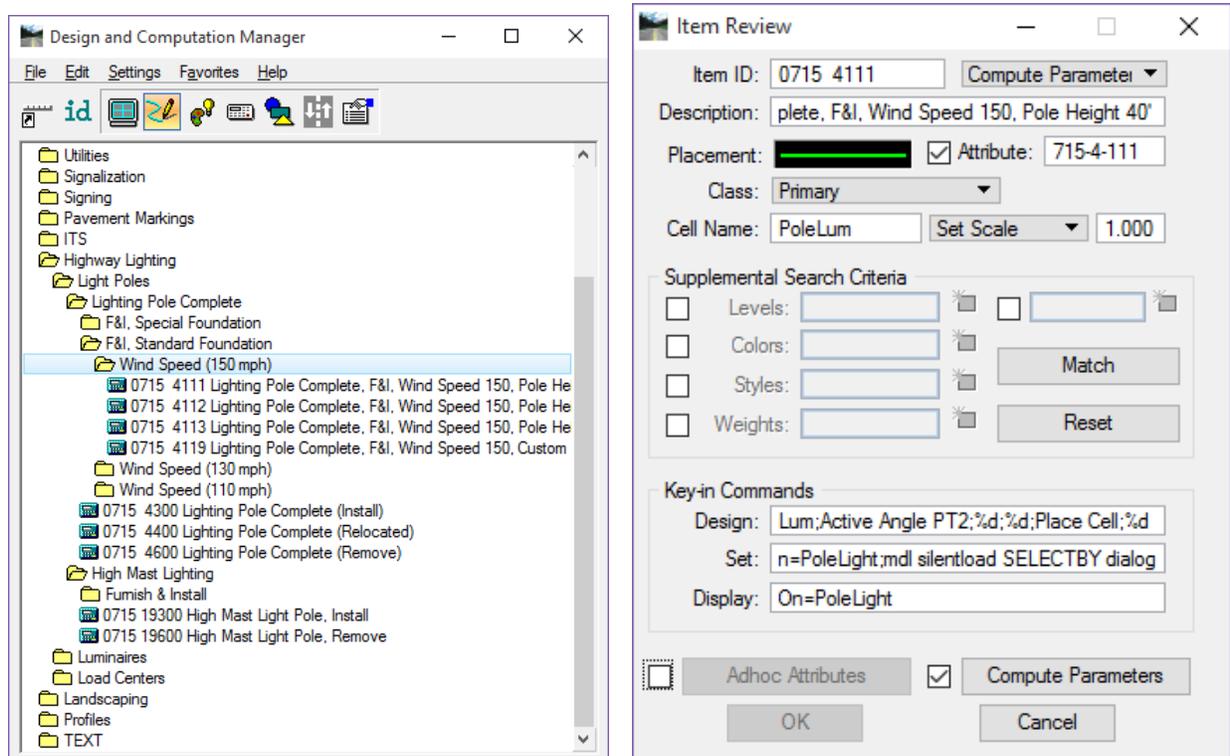
DRAWING LIGHT POLES

Generating the proposed lighting design is the responsibility of the engineer. It is also the engineer's responsibility to make sure an acceptable program is used to generate the proposed design. Currently FDOT uses AGI 32 when the design is done in-house. It is possible that the proposed design is done by the lighting manufacturer or power company; however, they will have to generate an acceptable report that is to be submitted to FDOT for review. This report can be used by the in-house designers to create the lighting design files i.e. light pole spacing.

There are a couple of ways to approach drawing the Light poles into MicroStation, one is to import the elements from the AGI 32 lighting program into MicroStation and then place the light pole cell on top of the AGI 32 element. Another way is to reference the AGI 32 file into the lighting design file then place the light pole cell on top of the AGI 32 element. A third option is to take the report generated from AGI 32 or another acceptable lighting program which details the spacing of the light poles then use D&C Manager in conjunction with other GEOPAK tools to draw the light poles at the specified spacing.

REVIEW LIGHT POLE ITEM IN D&C MANAGER

Before placing the *Light Poles* it is important to understand how the Light Pole items are set up. The next figure shows the Light Pole item in D&C Manager.



Selecting and then right-clicking on an item offers the options to review or modify the item. The Item Modify or Item Review dialog allows the designer to review how an item will work when placed with D&C Manager.

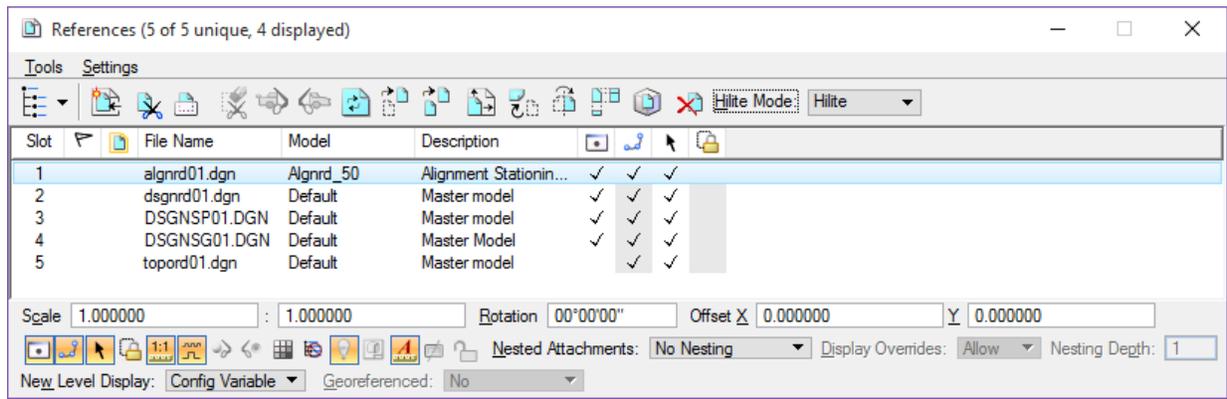
The top portion of the dialog shows information about the selected item such as pay item number, description, symbology and Cell Name. The bottom portion, Key-in Commands, describes what actions will be taken when the designer double-clicks on this item in D&C Manager.

In the Design field notice the string of commands that takes place when this item is selected for placement. One of the important items the designer needs to be aware of is when this item is placed it requires 2 points to set the rotation.

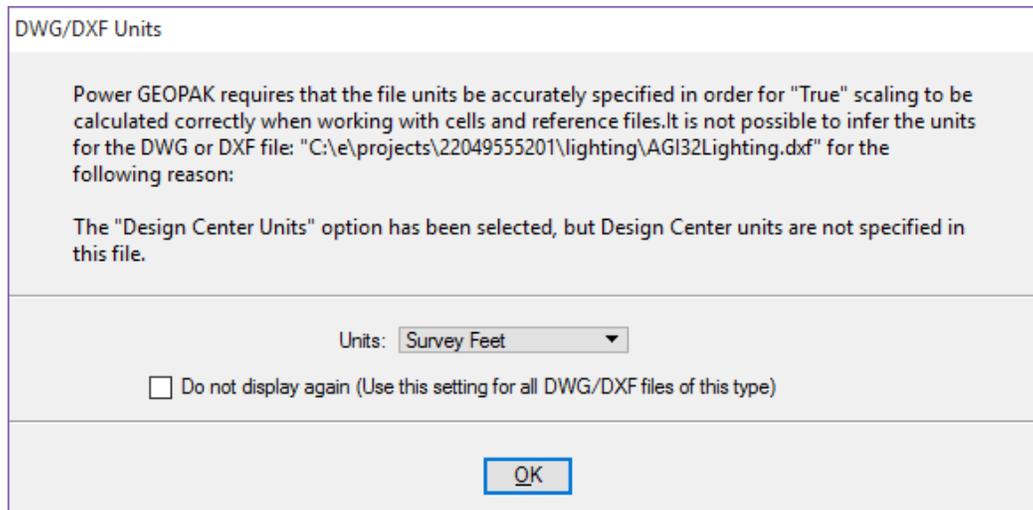
Exercise 9.1 Place Light Poles Using Draw Cell Group by Feature

In this exercise the designer will place *Light Poles* at a specified spacing and offset supplied from a referenced AGI 32 Lighting DXF file.

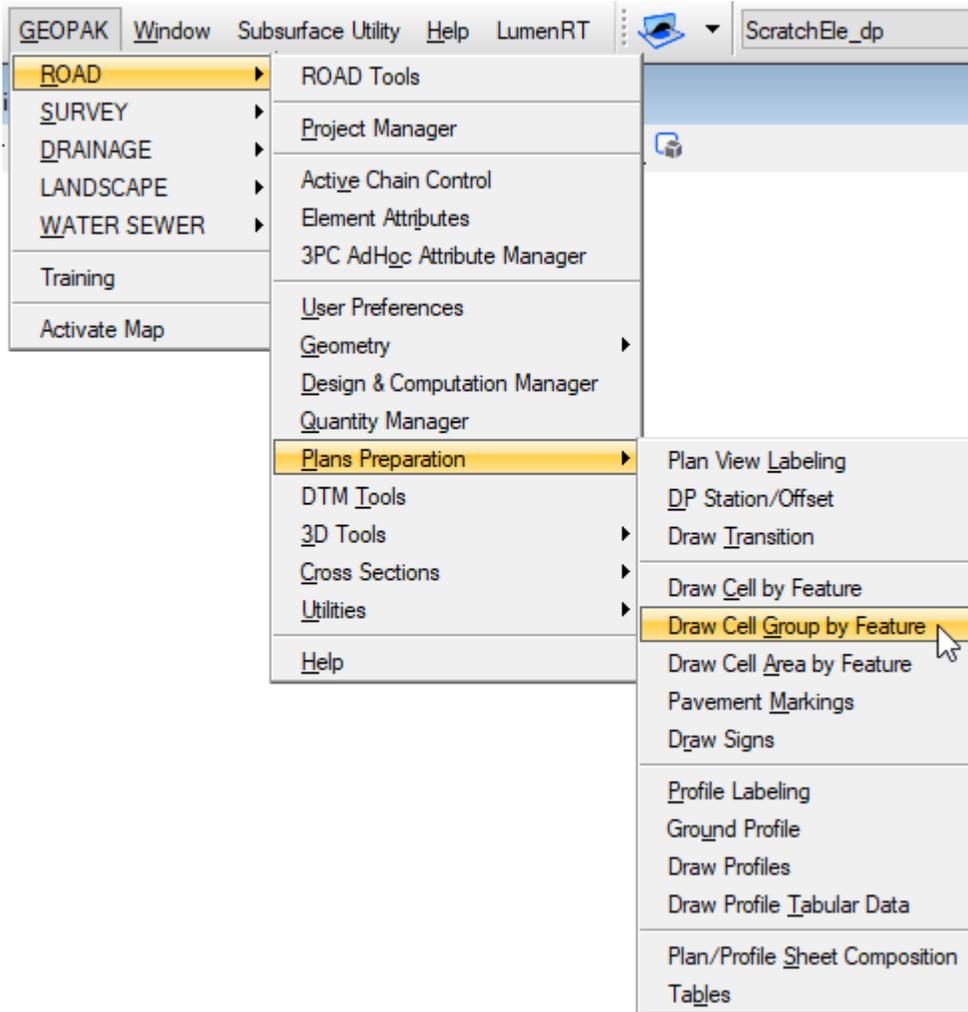
1. From the FDOT Menu, select **Actions > Create Files** to load the **Create File/Project** application.
2. Using what you have learned in this course guide create the *DSGNLT01.dgn – Proposed Design* file. Create the file in the *lighting* folder using the **Lighting Design Files** Group. Refer to *Chapter 1* for assistance if needed.
3. Attach the following reference files:
 - **DSGNRD01.dgn** from the *roadway* folder, *Default* model.
 - **ALGNRD01.dgn** from the *roadway* folder, *Algnrd_50* model.
 - **DSGNP01.dgn** from the *signing* folder, *Default* model.
 - **DSGNSG01.dgn** from the *signals* folder, *Default* model.
 - **TOPORD01.dgn** from the *survey* folder, *Default* model.



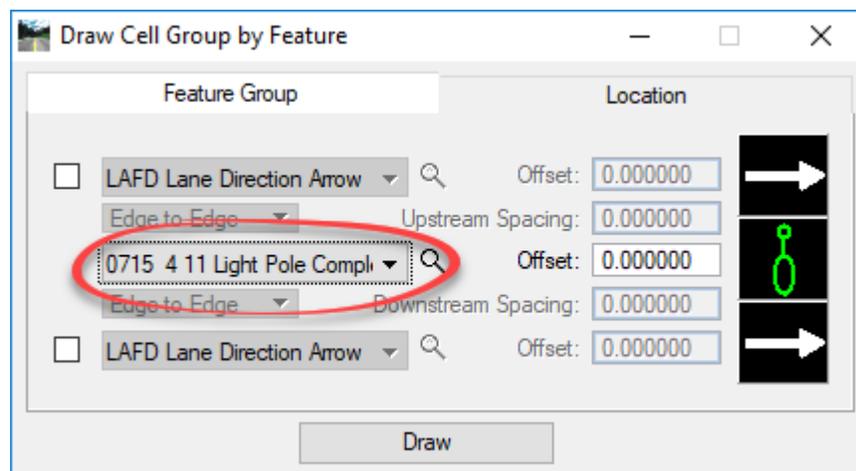
4. Reference in the *AGI32Lighting.dxf* file. The light poles locations are along the **SR61 Corridor** offset from the *SR61 Alignment*.
5. On the **DWG/DXF Units** dialog, leave the dialog set to **Survey Feet** and click the **OK** button.



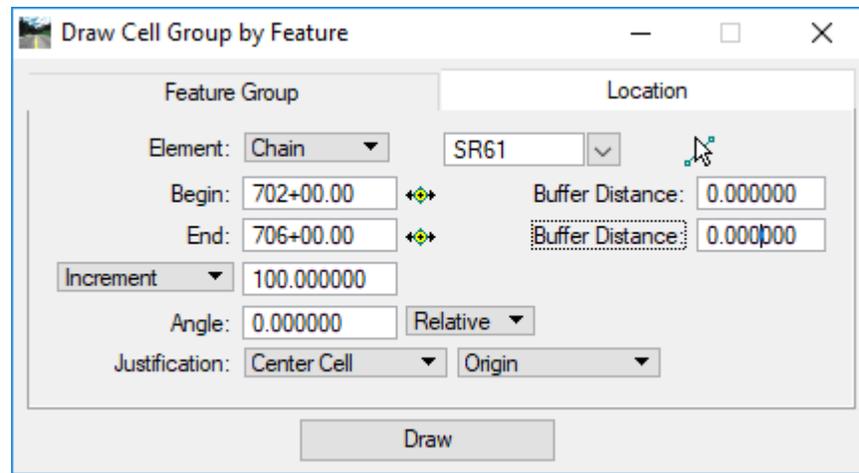
6. Zoom in around the *Station Range 702+00.00 to 706+00.00*.
7. From the MicroStation menu, select **GEROPAK > ROAD > Plans Preparation > Draw Cell Group by Feature**. The Draw Cell Group by Feature dialog opens.



8. On the **Feature Group** Tab, select the **0715 4111 Light Pole Complete, F&I, Standard Pole, Standard Foundation, 30' Mounting Height** item in the middle drop-down list.



9. Set the *Offset* to **52.0**. This will be the offset from the **SR 61 Alignment** to the center of the light pole origin. Typically, this information would come from the lighting design software.
10. Select the **Location** tab:
 - a. Set the *Element* to **Chain**.
 - b. Set the *Chain* select **SR61**.
 - c. Set the *Begin Station* to **702+00.00**.
 - d. Set the *End Station* to **706+00.00**.
 - e. Set the *Begin* and *End Buffer Distance* to **0.00**.
 - f. Set the placement spacing option to **Increment** and the *Value* to **200.00**.
 - g. Set the *Angle* to **0.00°** and **Relative**.
 - h. Set the *Justification* to **Center Cell** and **Origin**.



- i. Click the **Draw** button. **Data point** on the left side of the centerline to place the cells.
11. Modify the *Begin/End Station* values to **701+00.00** to **705+00.00**.
12. Modify the *Angle* value to **180°**.
13. Click the **Draw** button. **Data point** on the right side of the centerline to place the cells.

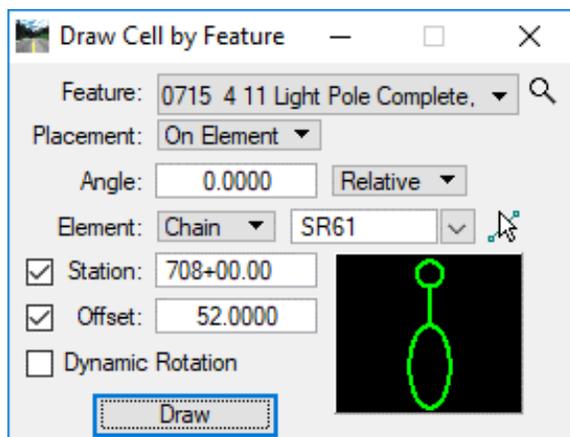
Note The designer could also stagger the placement of the poles by adding 100' to the *Begin* and *End Station Buffer Distances*.

Exercise 9.2 Place Light Poles Using Draw Cell by Feature

➤ Place Light Poles at Specified Spacing and Offset

In this exercise the designer will place *Light Poles* at specified stations and offsets.

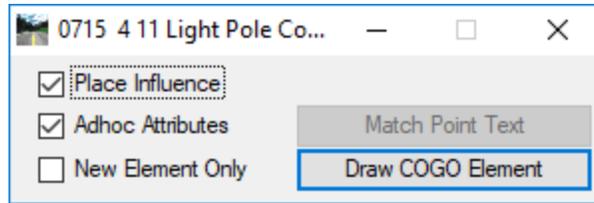
1. Continuing in *DSGNLT01.dgn*, zoom in around the *Station Range 707+00.00 to 714+00.00*.
2. From the MicroStation menu, select **GEROPAK > ROAD > Plans Preparation > Draw Cell by Feature**. The Draw Cell by Feature dialog opens.



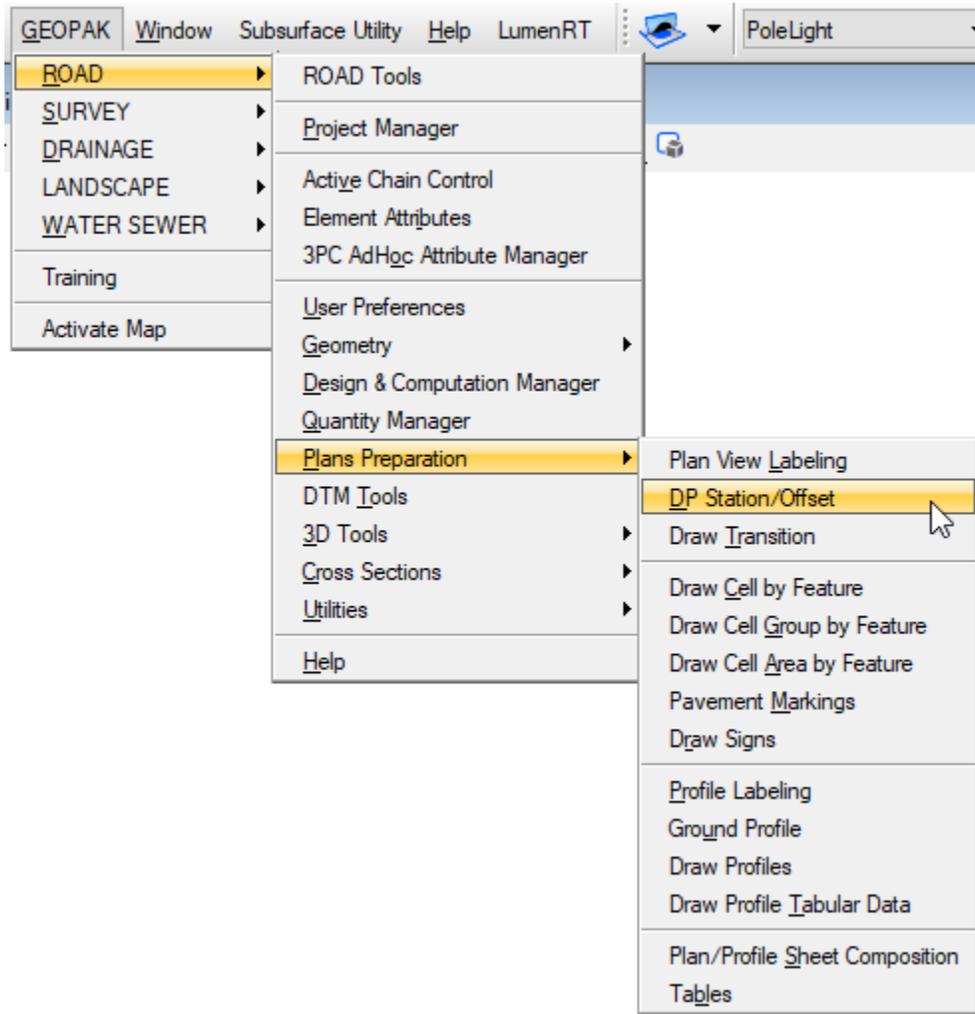
3. Set the *Feature* to the **0715 4111 Light Pole Complete, F&I, Standard Pole, Standard Foundation, 30' Mounting Height** item in the middle drop-down list.
4. Set the *Placement* to **On Element**.
5. Set the *Angle* to **0.0°**; **Relative**.
6. Set the *Element* to **Chain SR61**.
7. Set the *Station* to **708+00.00**.
8. Set the *Offset* to **52.0**.
9. Click the **Draw** button. Data point to the left of the centerline to place the cell at the referenced location.
10. Continue placing the remaining light poles on the left of the centerline, every 200' to Station 714+00.
11. Close the Draw Cell by Feature dialog when finished.

Exercise 9.3 Draw Light Poles Using D&C Manager

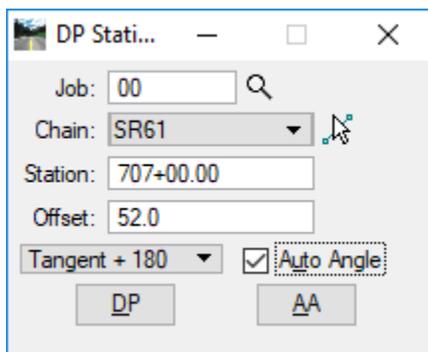
1. From the MicroStation menu, select **GEROPAK > ROAD > Design & Computation Manager**.
2. Navigate to and select item **Highway Lighting > Light Poles > Light Pole Complete > F&I, Standard Foundation > 0715 4111 Light Pole Complete, F&I, Standard Pole, Standard Foundation, 30' Mounting Height**.
3. From the Design and Computation Manager dialog, click on the **Design** icon .
4. Toggle **On Place Influence**.



5. Open the *Place Active Cell* tool. Check that the *Active Cell* is set to **PoleLum** and the *X and Y Scale* is set to **1.0**.
6. From the MicroStation menu, select **GEROPAK > ROAD > Plans Preparation > DP Station/Offset**.



7. On the DP Station Offset dialog:



- a. set the *Job* to **00**.
- b. Set the *Chain* to **SR61**.
- c. Set the *Station* to **707+00.00**.
- d. Set the *Offset* to **52.0**.

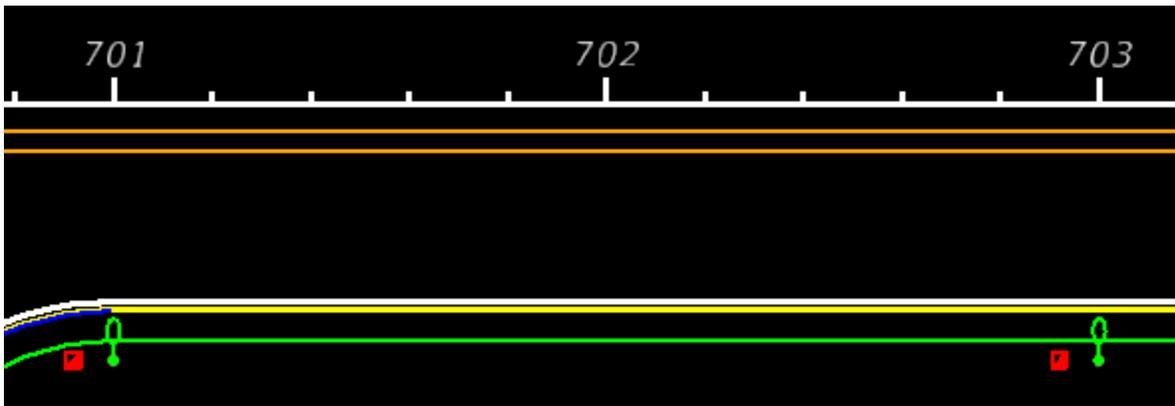
Note Positive and negative are important on this dialog. Moving the cursor from one side of the alignment to the other will not change the location of cell placement.

- e. Set the *Placement* to use **Tangent + 180** with the *Auto Angle* option toggled **On**.
 - f. Click the **DP** button to place the cell.
8. Repeat Step 7 modifying the station to place the light poles on the right side of the alignment every **200'** through to Station **713+00.00**.
 9. Right-click to exit *Place Active Cell* command.
 10. Close the *Place Active Cell* and *DP Station/Offset* dialogs.

Exercise 9.4 Pace Pull Boxes using Design and Computation Manager

In this exercise the designer will use the D&C Manager to place Pull Boxes.

1. Continuing in *DSGNLT01.dgn*, **rotate** the view so that the *SR61 Alignment* is horizontal.
2. From the MicroStation menu, select **GEROPAK > ROAD > Design & Computation Manager**.
3. From the Design and Computation Manager dialog, click on the **Design** icon .
4. Toggle **On Place Influence**.
5. Navigate to the **Signalization > Pull and Junction Boxes > Pull and Splice Boxes** category and double-click on the item **0635 2 11 Pull and Splice Box, F&I, 13" x 24" Cover Size**.
6. The MicroStation *status bar* indicates the active angle must be set. Set the active angle by placing **2 points** in the design file. Set the angle so that the cell will be horizontal to the centerline.
7. Once the angle is set, the Place Cell dialog will activate with the Pull Box cell **PullBoxT** set as the *Active Cell*. Set the *Scale* of the cell to **1.0**
8. Place 2 Pull Boxes:
 - (1) Left of the Light Pole at Sta. 701+00.00
 - (2) Left of the Light Pole at Sta. 703+00.00

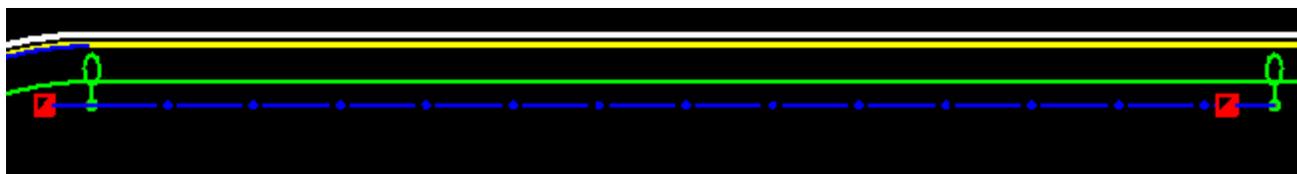


9. Continue to place pull boxes throughout the project.

Exercise 9.5 *Draw Conduit Under Ground between Light Poles*

In this exercise the designer will use D&C Manager to draw the conduit between the light poles and pull boxes.

1. Continuing in *DSGNLT01.dgn*, zoom in to the **Pull Box** placed near Station 701+00.
2. From the MicroStation menu, select **GEROPAK > ROAD > Design & Computation Manager**.
3. From the Design and Computation Manager dialog, click on the **Design** icon .
4. Toggle **On Place Influence**.
5. Navigate to the **Signalization > Conduit** category and double-click on the item **0630 2 11 Conduit, Furnish & Install, Open Trench**.
6. The MicroStation *symbology* will be set and the Place SmartLine command activated. Draw a line from the pull box to the light pole and from the pull box to the next pull box. See figure below.



Note The designer could also place the conduit by navigating to *Tasks > Civil Tools > Horizontal Geometry > Line Between Points*  and selecting the *Conduit, Furnish & Install, Open Trench* from the feature drop down list.

7. Continue to place the rest of the *Conduit* using **0630 2 11 Conduit, Furnish & Install, Open Trench** and **0630 2 12 Conduit, Furnish & Install, Directional Bore** to connect all of the light poles.

Note These same tools can be used to place the load center, electrical service & wires, other poles that may be required, etc.

10 LABELING TOOLS

OBJECTIVE

The objective of this chapter is to introduce the GEOPAK Plan View Labeler which can be used by all the Traffic Plans disciplines.

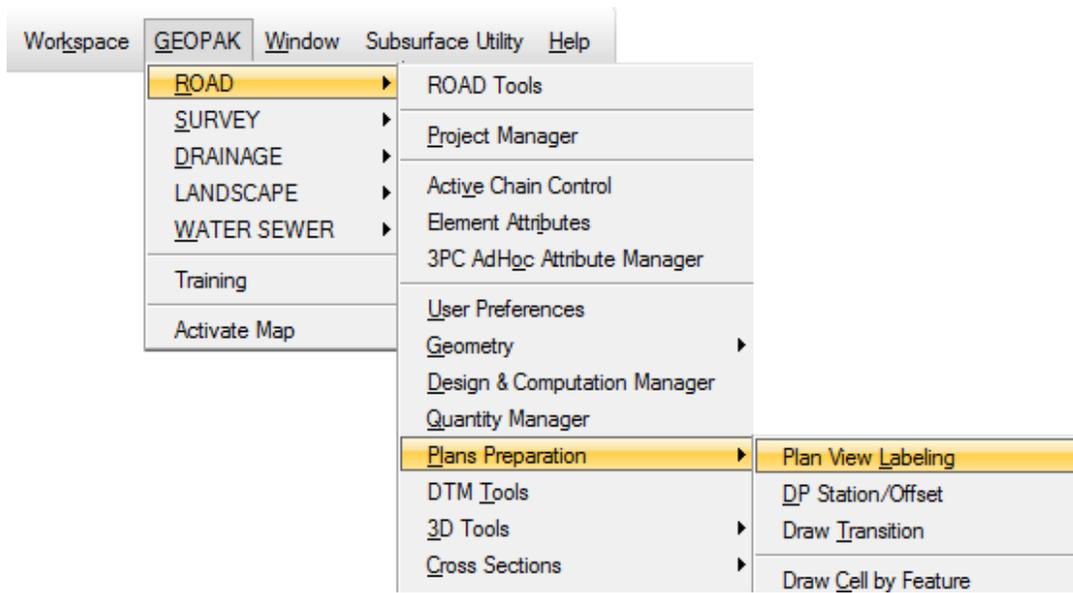
INTRODUCTION

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.

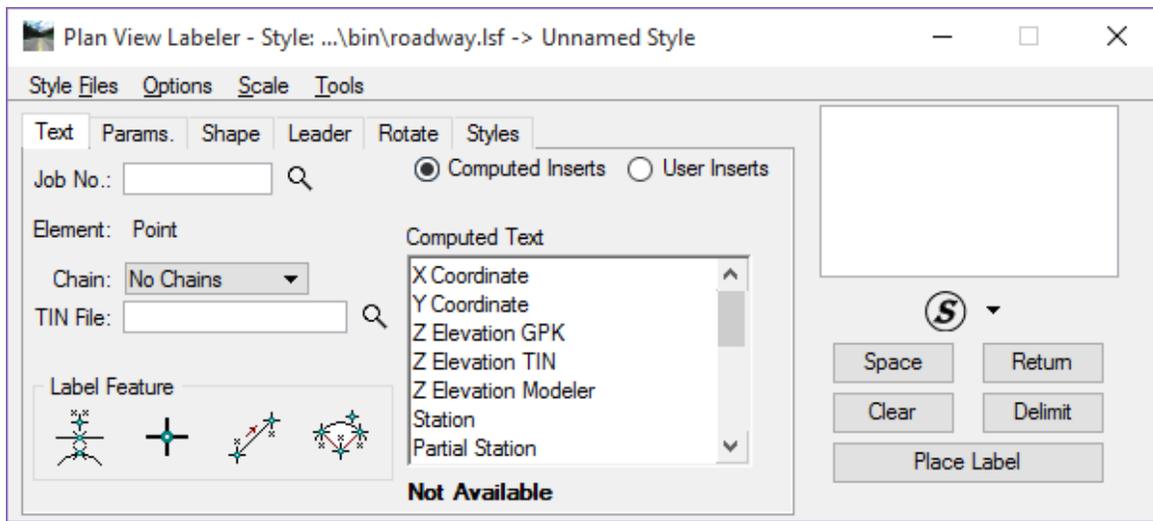
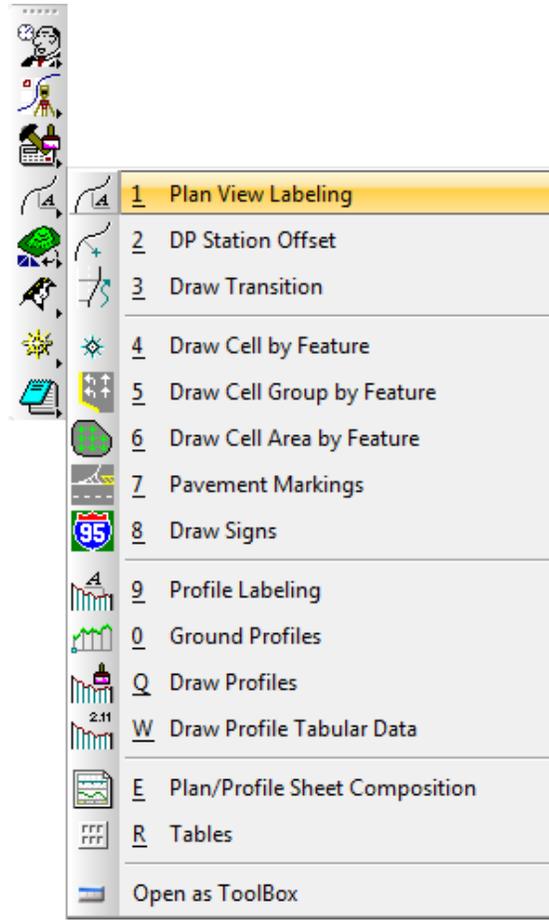
Labels can be created with leader lines and arrow heads as part of the custom label. The arrow heads can be terminators delivered by FDOT or the standard arrows built into the labeler. Again this makes for very consistent plan labeling if all users use the same labels.

ACCESSING THE PLAN VIEW LABELER

Plan View Labeler can be launched from the MicroStation menu **Applications > GEOPAK > ROAD > Plans Preparation > Plan View Labeling**



<or> from the **GEOPAK Road Tools** palette.

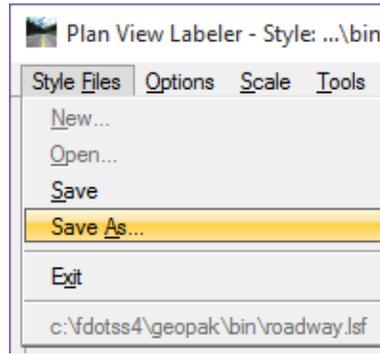


MENU BAR

Four menus are available on the Plan View Labeler dialog, **Style Files**, **Options**, **Scale**, and **Tools**.

STYLE FILES

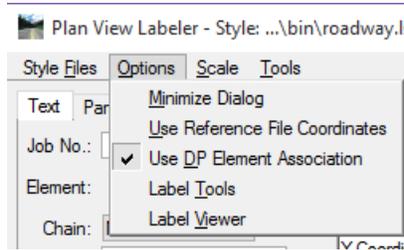
The **Style Files** menu contains options to create **New**, **Open**, **Save** or **Save As** style files (.lsf), as well as **Exit** the dialog. Previously used style files are listed at the bottom of the menu for quick access.



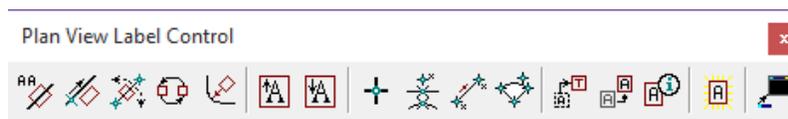
Note When first opening the tool in the FDOT workspace, some of the options will be grayed out and unavailable. It is recommended that the provided LSF file be copied to the local project directory before making any custom edits. It should be saved to the project symb directory.

OPTIONS

The **Options** menu contains commands to assist the designer when placing labels.



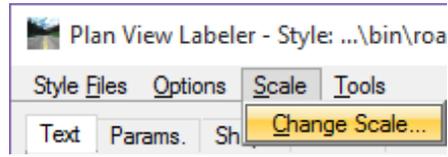
- *Minimize Dialog* – Minimizes the dialog box when selecting Place Label.
- *Use Reference File Coordinates* – Uses the coordinates from the master plan file when placing a label in a plan sheet that has rotated reference files not rotated view.
- *Use DP Element Association* – Enables the association between MicroStation elements and data point labels snapped to the element. If using this option to modify the element labeled, the point labels move with the element when the label update feature is used.
- *Label Tools* – Opens the **Plan View Label Control** toolbox, as shown below. This toolbox contains common tools for placing and modifying labels.



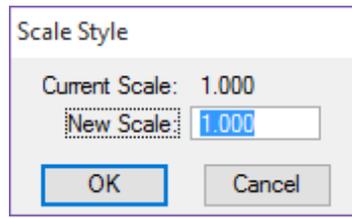
- *Label Viewer* – Activates **Label View** and displays a preview of the label with the ability to place the label from the dialog.

SCALE

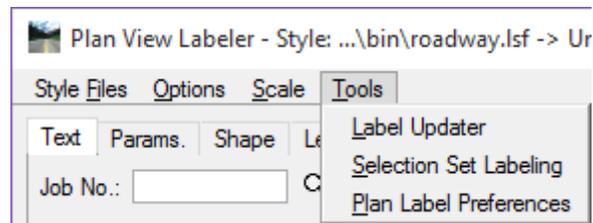
The **Scale** menu option opens the **Scale Style** dialog. This tool changes the scale of a label placed and uses the original creation scale to scale the label.



For example, a label created with text set to 0.07 at a scale of 1.000 draws with text at 3.5 when changing the scale to 50.000.



TOOLS



- **Label Updater** – Replaces any label that has been previously placed by Plan View Labeler with the Use DP Element Association option selected and corrects the label to the new contents based upon changed information.
- **Selection Set Labeling** – Allows for placement of multiple elements that need labeling in a selection set and mass labeled at one time.
- **Plan Label Preferences** – Customizes plan view labels. There are options for Bearing, Distance, Elevation, and Area.

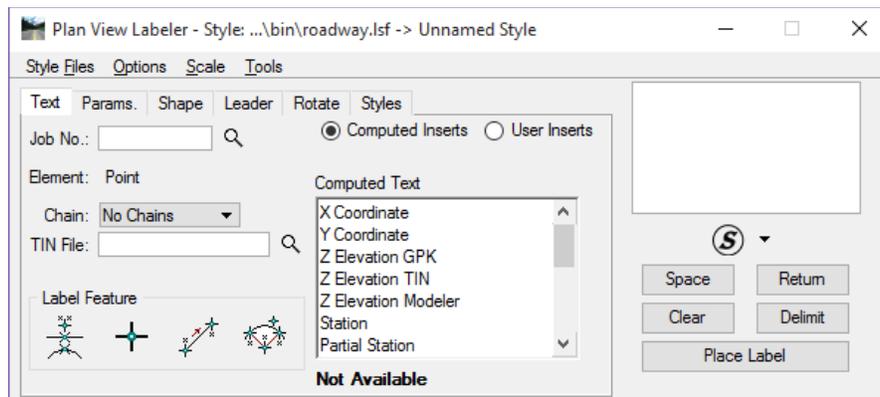
For more information on these tools, see the GEOPAK help files.

TOOL TABS

The Plan View Labeler dialog is composed of 6 tabs that are used to define the various attributes for the labels.

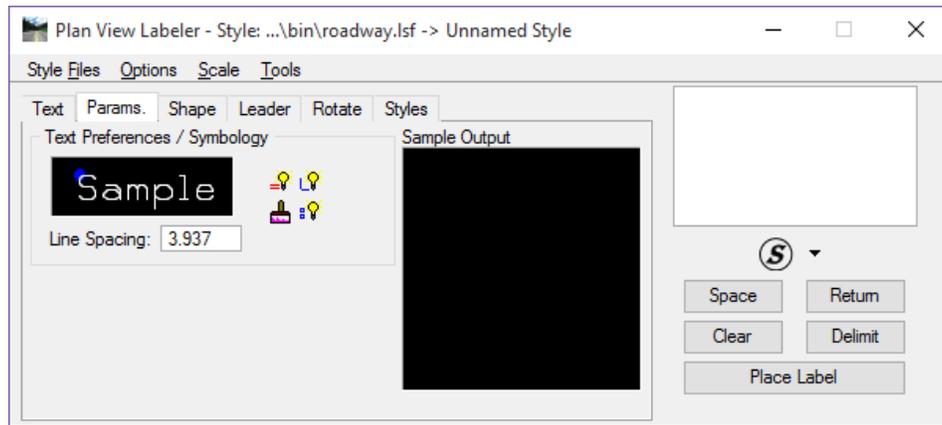
TEXT TAB

The **Text** Tab composes the contents of the label. Various types of text values can be extracted from MicroStation elements using a GEOPAK files such as the GPK file and TIN file. Custom User Inserts are also available. FDOT provides a basic file for designers.

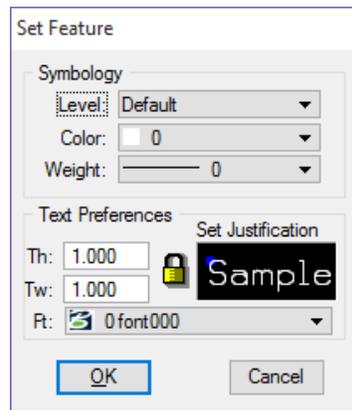


- *Job No.* – The working alignment definition fills this option from the project .gpk file. Use the *magnifying glass* button to browse and pick the .gpk from a list.
- *Chain* – The alignment utilized for labeling.
- *TIN File* – GEOPAK binary TIN file name utilized for Z Elevation in the computed text options. Click the *magnifying glass* button to open a TIN file dialog box and select the specified file.
- *Label Feature:*
 -  **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.
- *Inserts* – Two options are available, *Computed Inserts* and *User Inserts*. The list will change depending on the type of element selected on the Label Features portion of the dialog. If the value is a number, the rounding or number of decimal places shown is controlled with the drop down at the bottom right of the list. Double - clicking on a list item will copy the value to the Label preview window on the far right of the dialog.

PARAMS. TAB



The **Params.** Tab is used to set up the *Text Preferences* and *Symbology*. Double-clicking on the **Sample** text box opens the Set Feature dialog.

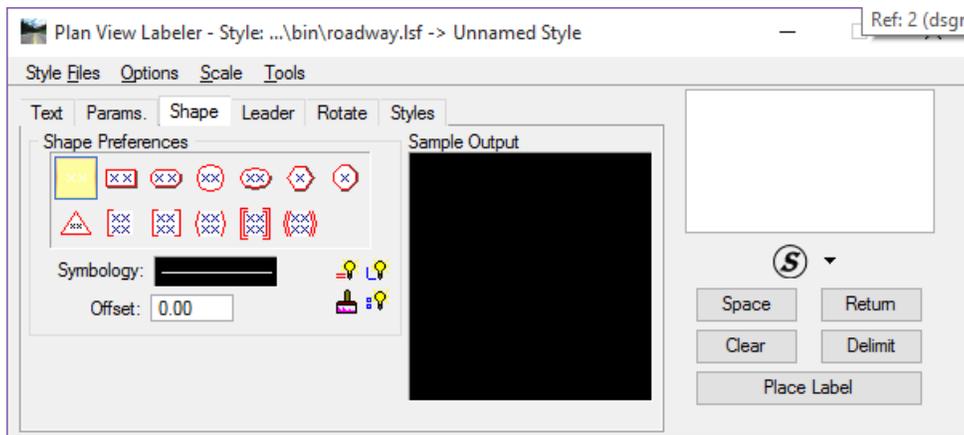


Below the **Sample** text box, the line spacing can be set. Remember this is based on the Scale that has been set for the labels.

-  **Set By Current** Populates the Level, Color, and Weight from the active level symbology in MicroStation.
-  **Set By Element** Populates the Level, Color, and Weight from a selected element in MicroStation.
-  **D&C Symbology** Populates the Level, Color, and Weight from an item selected in Design & Computation Manager.
-  **Set All Parameters** Populates the current tab symbology settings to the other tabs, Shape and Leader, with the current settings. This saves having to repeat this process on the next two tabs.

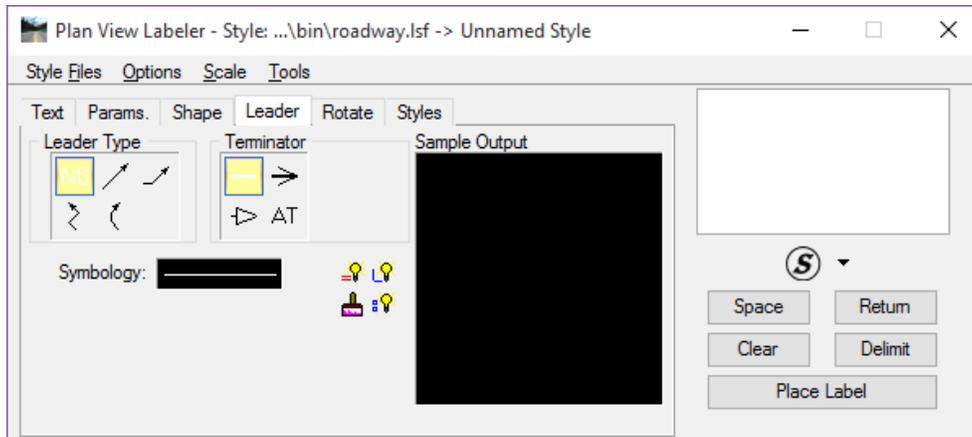
SHAPE TAB

The **Shape** Tab is used to define shapes around the label, symbology for these shapes, and the offset or margin from the text to the shape.



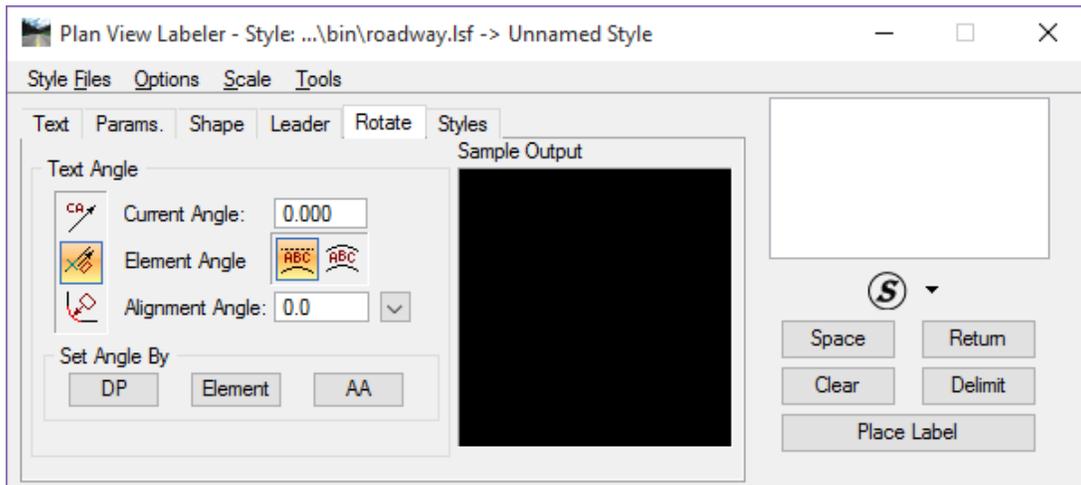
LEADER TAB

The **Leader** Tab is used to define a leader line and terminator for the label. The *Leader Type* section defines the type of line drawn. The *Terminator* options define the terminator to be used. **AT** is the active terminator set in the file. Double-clicking on **AT** will open the cell library to select the terminator to use. Note that the cell library needs to be attached when defining the active terminator. The symbology for the leader line is also defined on this tab.



ROTATE TAB

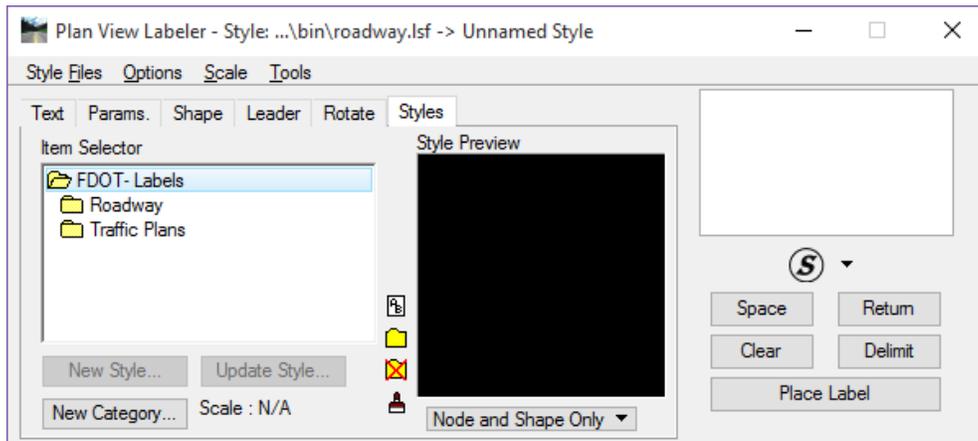
The Rotate tab provides multiple options for defining how the text label should be rotated during placement.



- *Current Angle* – Sets the angle to the current angle.
- *Element Angle* – Sets the angle relative to the selected MicroStation element.
- *Alignment Angle* – Uses the chain specified in the text tab to rotate the label at an angle relative to the chain. Use this option before or during the placement of a label.
- *Set Angle By*
 - o *DP* – Sets the label angle by selecting two data points in the drawing.
 - o *Element* – Sets the label angle by picking a MicroStation element.
 - o *AA* - Sets the label angle by setting the rotation to the current active angle.

STYLES TAB

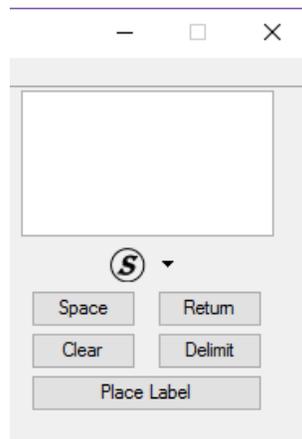
The **Styles** Tab creates, sets, and manages label styles.



- *Item Selector* – List view of the available style in the attached style file library. The list is shown with folders, or categories, providing a way to organize styles.
- *Categories:*
 - o Rename Style/Category
 - o Create Style Category
 - o Delete Style Category
 - o Refresh Style List
- *Styles options:*
 - o Select Style Item – makes the selected style active and populates all the tabs with the style settings.
 - o Delete Style Item
 - o Copy Style Item
 - o Rename Style/Category
 - o Refresh Style List
- *New Style* – Once a new style has been created and placed in the design file, select the category to save the new style, then select the New Style button. The Create Style dialog opens to set the name and scale for the new style.
- *New Category* – Opens the **Create Category** dialog to set the name for the new category. It creates the new category under the selected category in the same way categories are created within the D&C Manager.
- *Update Style* – Once a label has been placed in the file, the Update Style option can be used to update or modify existing styles in the library.

Note It is very important to note that before a style can be created or updated, the label **MUST** first be placed in the design file. How closely the label is zoomed into directly affects the Style Preview. When zoomed out too far, the text cannot be read in the preview windows.

LABEL BUILDER (SHOWN ON ALL TABS)



- *Window* – Shows the preview of the label.
- *Insert Symbol* – Provides a drop-down list of symbols that can be inserted into the label.
- *Space* – Places a space in the label at the position of the cursor.
- *Return* – Places a return to start a new line of text in the label.
- *Clear* – Clears out the contents of the label to start a new label.
- *Delimit* – Places a line between lines of text.
- *Place Label* – Attaches the label to the pointer for placement in the drawing.

Exercise 10.1 Create a Custom Text Label

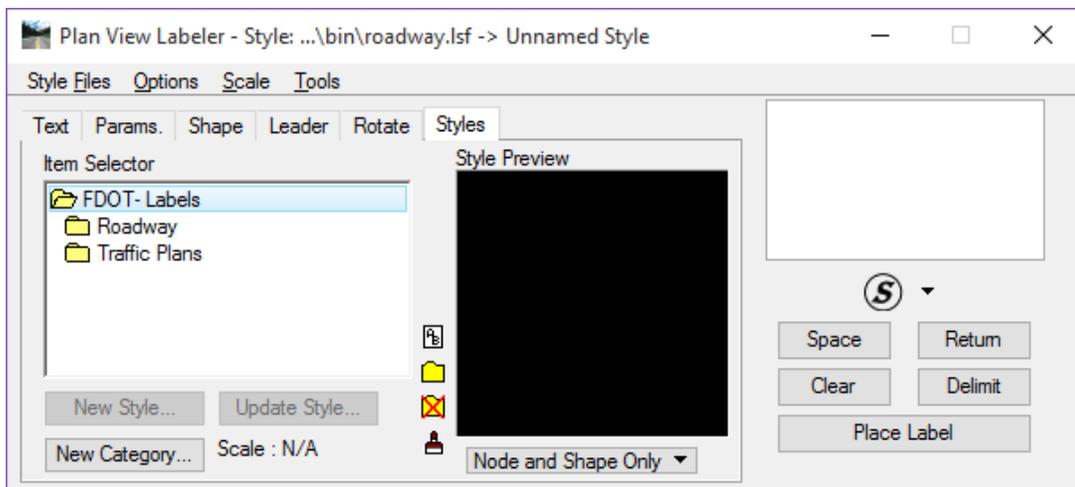
In this exercise, the designer will create a custom label for Light Poles as shown in the next figure.



1. Open the *DSGNLT01.dgn* file located in the *lighting* folder.
2. Zoom in to *Station 701+00.00*.
3. Un-rotate the view.

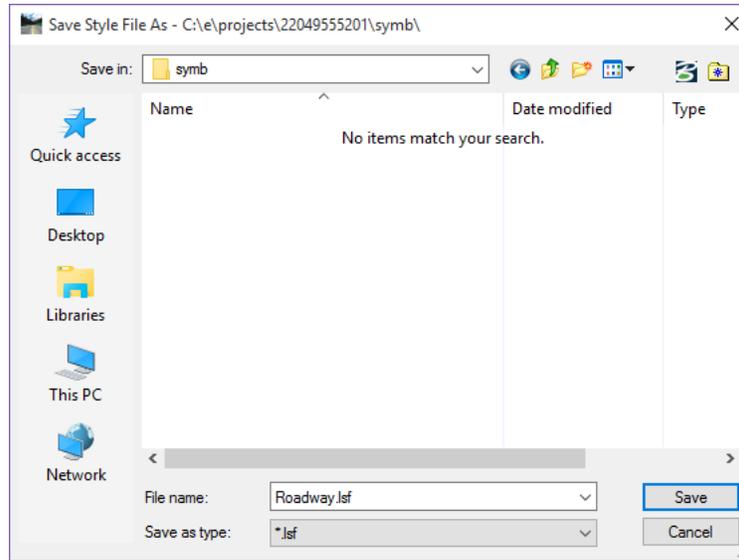
Note *The label preview functionality of this tool will show the label at an un-rotated view angle not honoring the rotated view in which it is created. For a cleaner library, it is best to un-rotate the view before creating custom labels.*

4. Open Plan View Labeler. From the MicroStation menu go to **GEOPAK > ROAD > Plans Preparation > Plan View Labeling**

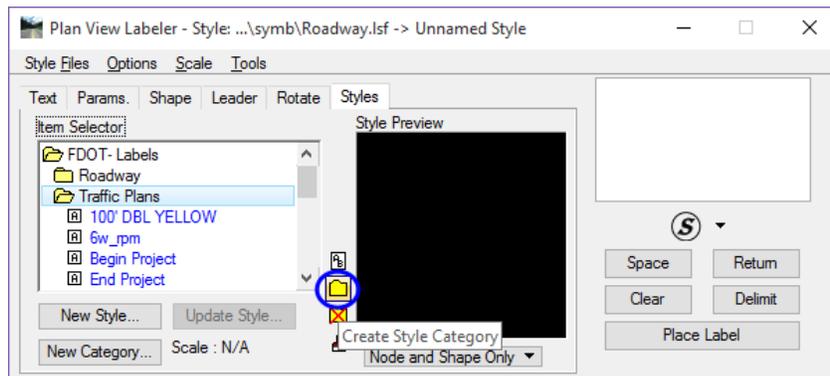


5. From the *Style Files* menu, select **Save As**.

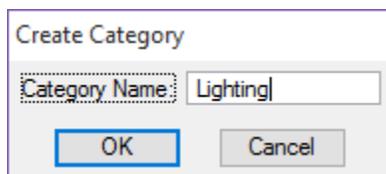
- Navigate to the Project *symp* folder.



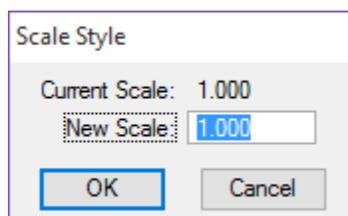
- Click **Save**.
- Go to the *Styles* tab, double-click on the **Traffic Plans** category folder.
- Click on the **Create Style Category** button.



- On the Create Category dialog, type in **Lighting** and click **OK**.

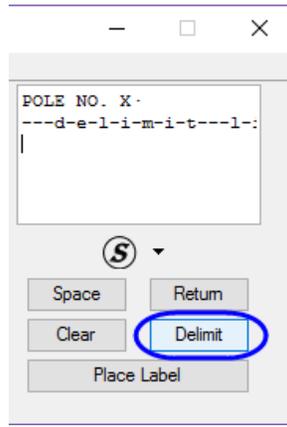


- From the *Scale* menu, select **Change Scale**. The Scale Style dialog opens.



- Set the *New Scale* to **1.00** and click **OK**. This will ensure the custom label can be used at any scale.

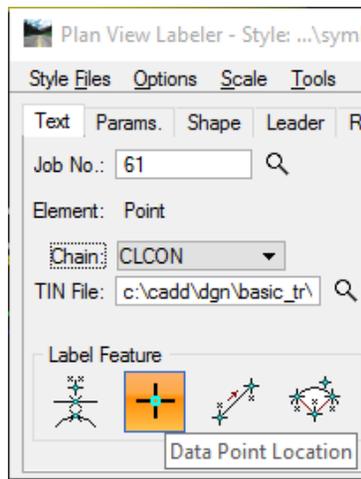
13. Go to the **Text** Tab.
14. Using the magnifying glass icon, set the *Job No.* to **00**.
15. Set the *Chain* to **SR61**.
16. In the *Label Builder Window*, type POLE NO. X.
17. Click the **Delimit** button. This will draw the leader line between to two lines of text in the label.



18. Type in **STA.** and then click on the **Space** button.

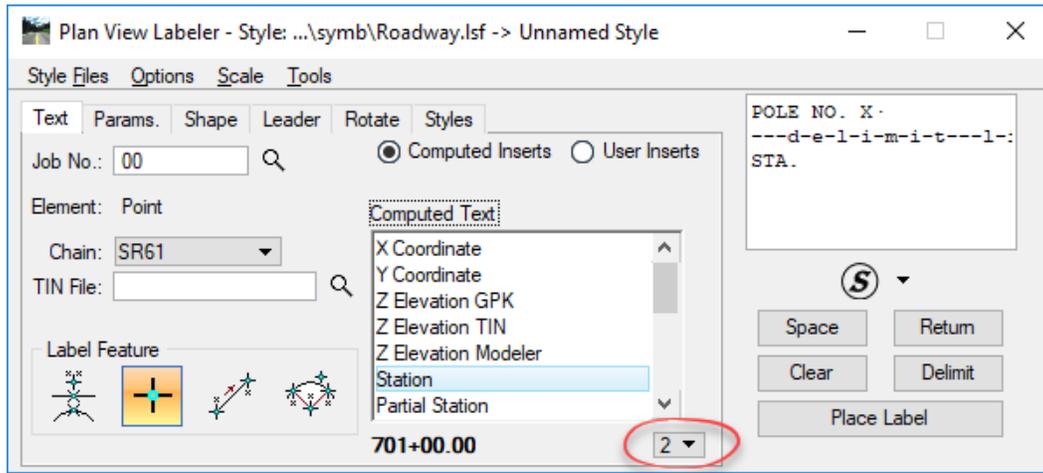
Note To insert most spaces, the space bar on the keyboard can be used. However, it is important to use the Space button to add spaces before computed text inserts. If the keyboard is used, it will break the automation.

19. From the *Label Feature* section, select the **Data Point Location** button.

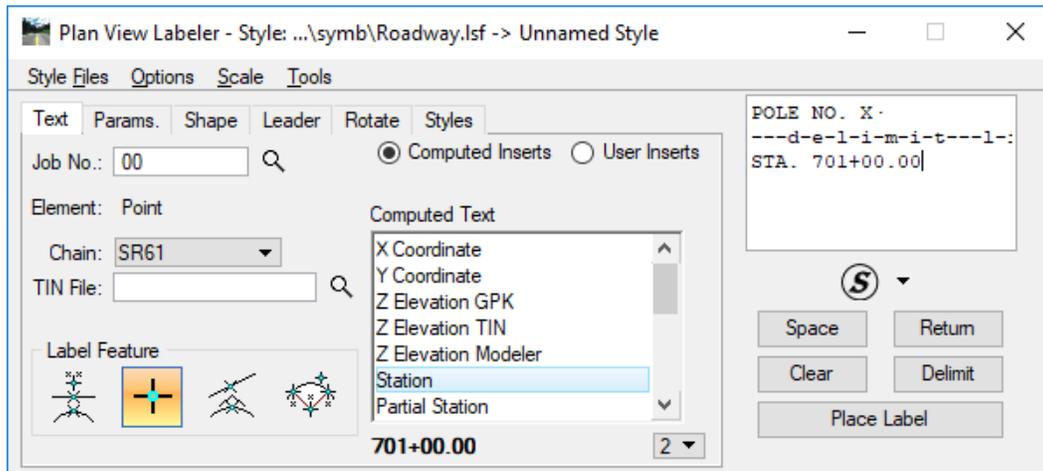


20. Set the *Snap* option to **Origin** and snap to the first light pole on the left side of the road at *Station 701+00.00*.

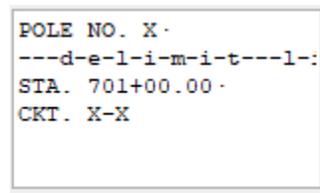
21. In the *Computed Text* window, single-click to select **Station**. DO NOT double-click on **Station**.
22. Set the *Station rounding* to **2**.



23. Now, double-click on **Station**. This pushes the station text over to the Label Builder window.

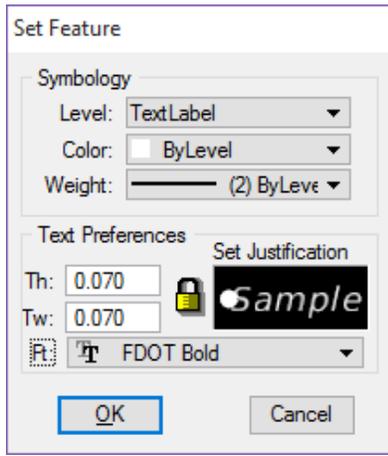


24. Click the **Return** button or hit **Enter** on the keyboard.
25. Type in **CKT. X-X**.

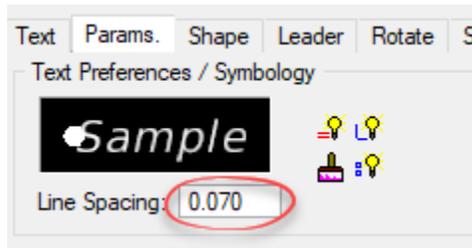


26. Go to the **Params** Tab.

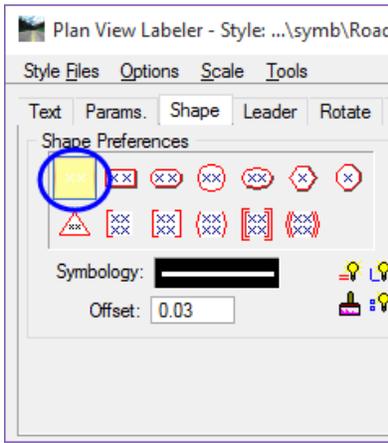
- 27. Double click on the **Sample Text Box**. The **Set Feature** dialog opens.
- 28. Set the *Symbology* and *Text Preferences* as shown below and click **OK**.



- 29. Set the *Line Spacing* to **0.070**.

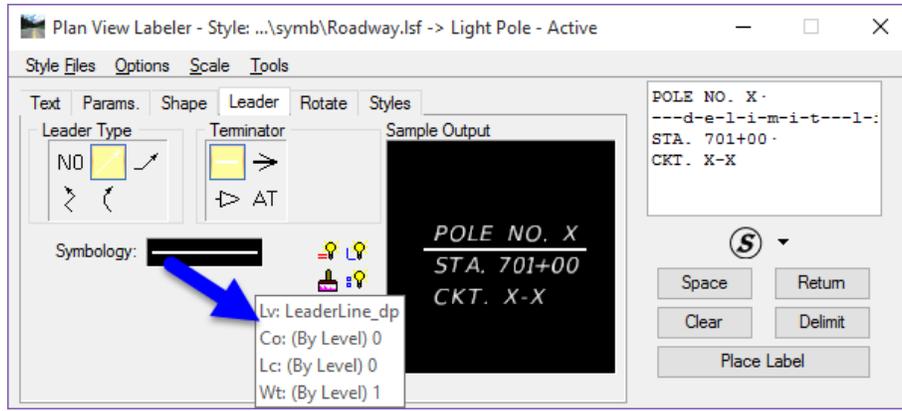


- 30. Go to the **Shape** Tab.
- 31. Select the first option: **No Shape**.

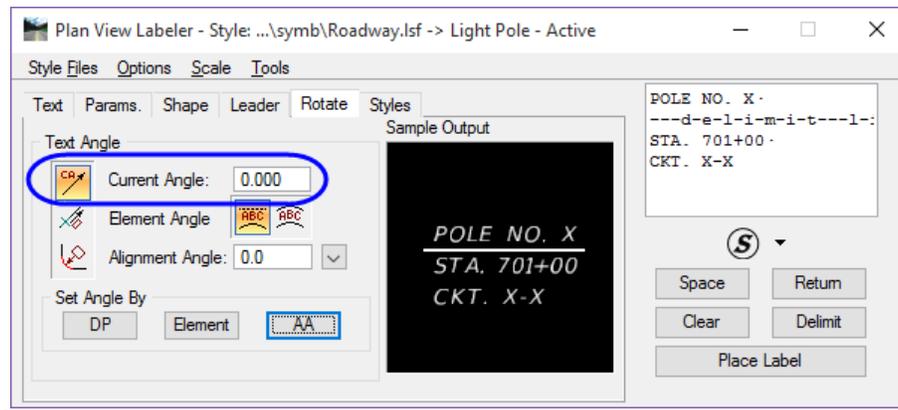


- 32. Go the **Leader** Tab.
- 33. Set the *Leader type* to **One Point Leader**.
- 34. Set the *Terminator* to **No Terminator**.
- 35. Set the *Symbology* to **LeaderLine_dp**.

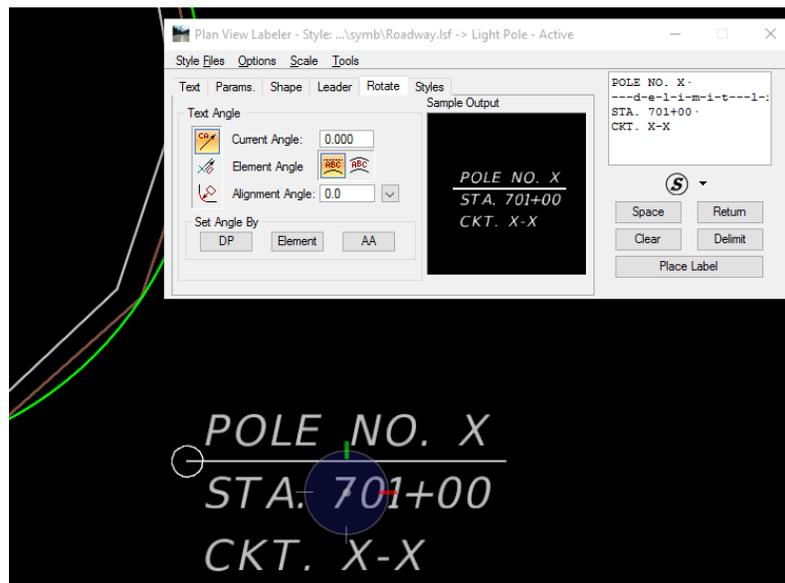
- Set the *Color* and *Weight* to **ByLevel**.



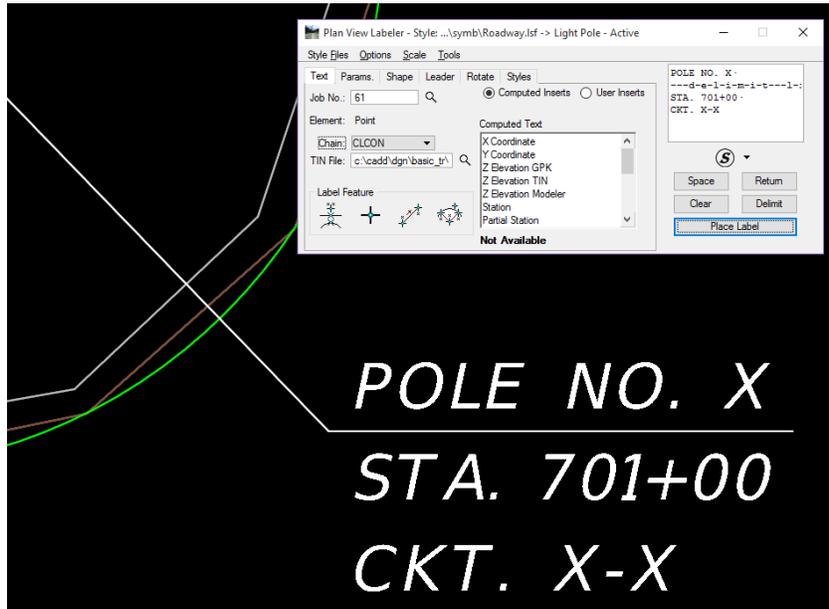
- Go to the **Rotate** Tab.
- Toggle **On Current Angle** and set the value to **0.00**.



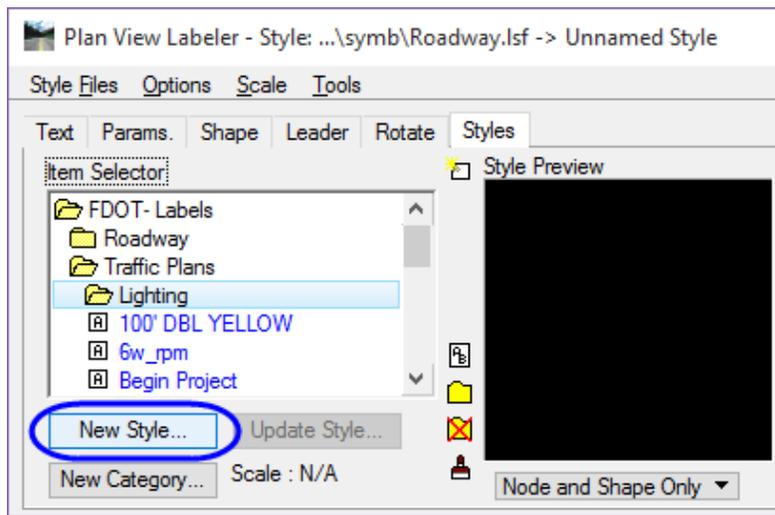
- Zoom in close to the *light pole*.
- Click the **Place Label** button.
- Move the cursor *near the light pole* and issue a **Data Point** to place it.



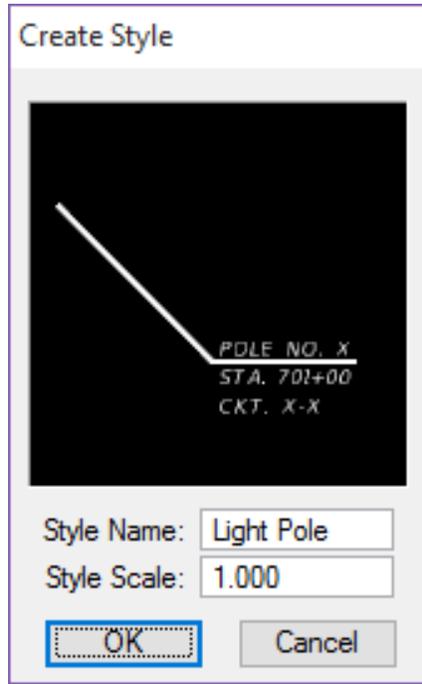
15. Move the cursor to the *left and right along the label*, notice how the hinge point changes as the cursor gets close to the ends of the label.
16. **Data Point** to connect the leader line to the light pole and complete the label placement.



17. Right-click to exit placement.
18. On the Plan View Labeler dialog, go to the **Styles** Tab.
19. Select the **Traffic Plans > Lighting** category.
20. Click the **New Style** button. The Create Style dialog opens. A temporary label must be placed before this option is available.

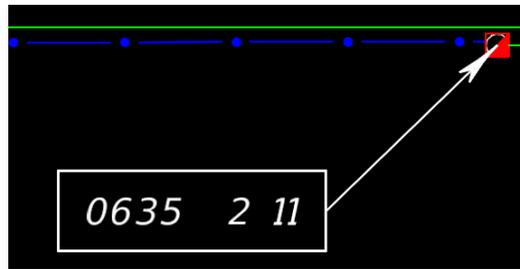


21. Enter the *Style Name* **Light Pole**.



22. Leave the *Style Scale* to **1.0**.
23. Click **OK**. This adds the new style to the *Lighting* category.
24. On the Plan View Labeler dialog, go to **Styles Files > Save**.
25. Delete the temporary label just placed in the design file.
26. Other examples of Labels:

Use the steps provided in this exercise to create the following labels. The *Yellow* text are *Computed Inserts* that will update depending on the data point location or type of element selected.

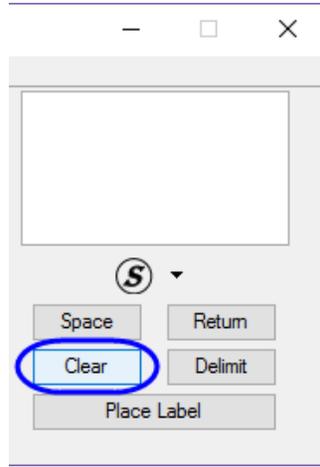


Hint To get the centerline symbol, type in “\161” in the Label Builder window.

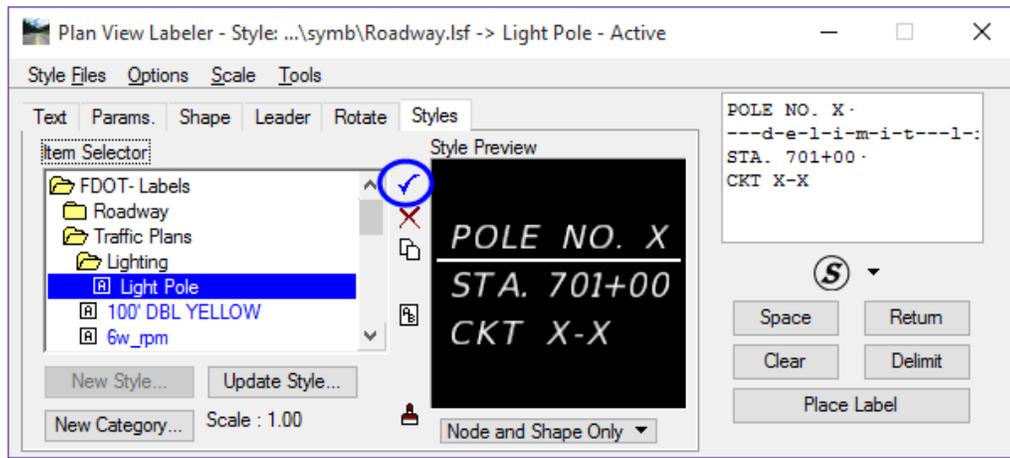
Exercise 10.2 Place Custom Text Label

In this exercise the designer will place the new custom label created in the previous exercise.

1. Rotate the view so that the *SR 61 Alignment* is horizontal.
2. On the Plan View Labeler dialog, click the **Clear** button.

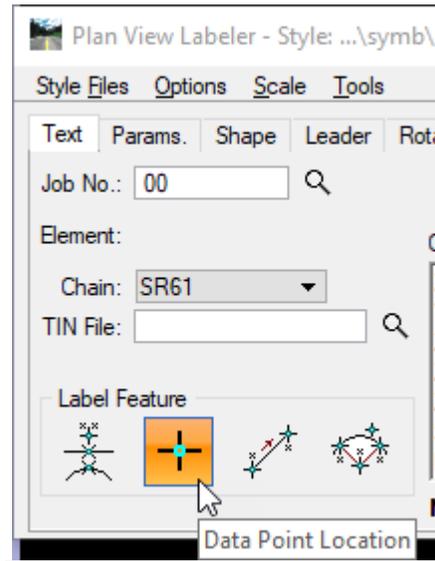


3. Go to the **Styles** Tab. In the *Item Selector* window, select the newly created label **FDOT-Labels > Roadway > Traffic Plans > Lighting > Light Pole**.
4. Double-click on the *style* or click the **Blue** check mark icon. This will activate the Label and place

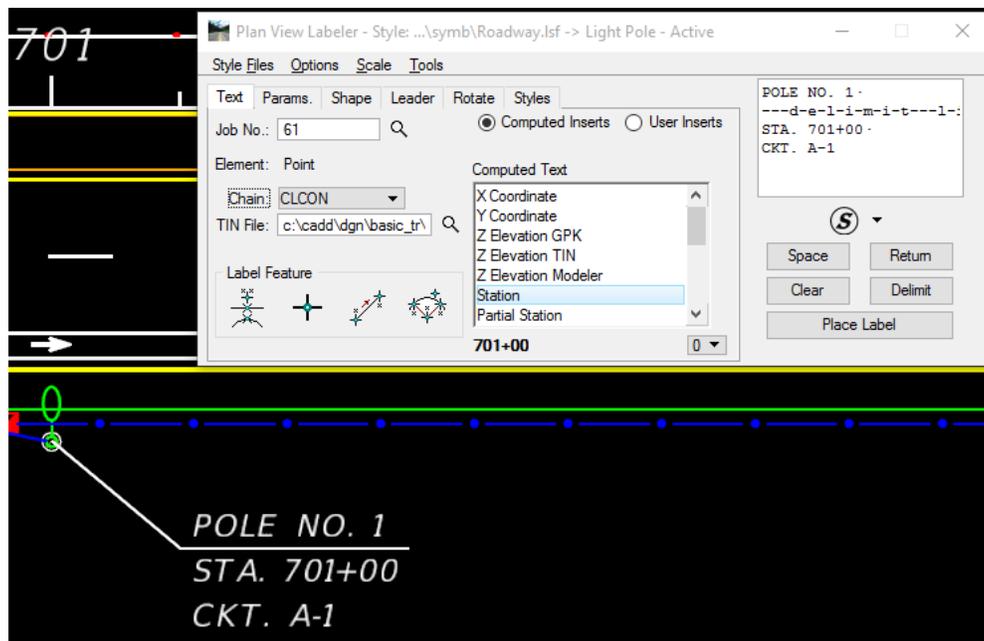


5. From the *Scale* menu, select **Change Scale**.
6. Set the *New Scale* to **50.00** and click **OK**
7. Zoom out so the label will fit in the view.
8. In the *Label Builder* Window, edit the *Pole Number* to be **POLE NO. 1**.
9. Edit the *Circuit* to be **CKT. A-1**.

10. Go to the **Text** Tab.
11. In the *Label Feature* section, select the **Data Point Location** button.

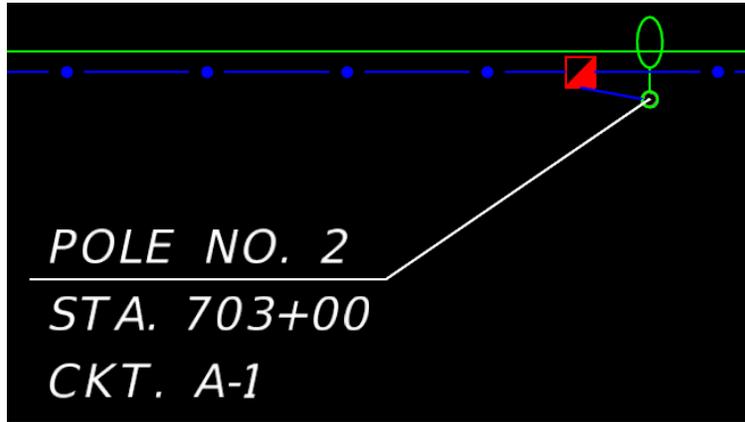


12. Set the *snap* option to **Origin** and snap to the first light pole on the left side of the road at Station **701+00.00**.
13. Click the **Place Label** button.
14. Move the cursor to the *right and below the light pole* and **Data Point**.
15. Move the cursor to the *left of the label* and **Data Point**. This completes the label placement.



16. Pan to the second light pole on the right side of the road at Station **703+00.00**.
17. Go to the **Text** Tab.
18. In the *Label Feature* section, select the **Data Point Location** button.

19. Snap to the **Origin** of the second light pole. Notice the station dynamically changes in the *Label Builder* Window.
20. In the *Label Builder* window, edit the *Pole Number* to **POLE NO. 2**.
21. Click the **Place Label** button.
22. Place the label.



23. Repeat this process on the remaining light poles, modifying the label variables as needed. Circuit 2 (CKT. A-2) will be the light poles on the left side of the roadway.
24. Close Plan View Labeler.

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11 QUANTITIES AND REPORTS

OBJECTIVE

In this chapter the CADD Quantity Workflow will be covered. Topics include:

- Generate Quantities and Export to Quantity Manager
- Quantity Manager Overview
- Create Tabulation of Quantities Sheet using Linked Data Manager (LDM)

INTRODUCTION

This chapter covers applications used to generate and document quantities in the plans. This workflow includes calculating the quantities using the D&C Manager, exporting the quantities to Quantity Manager, and using Linked Data Manager (LDM) to create the Tabulation of Quantities sheet using the Quantity Manager database.

The workflow to export quantities from Quantity Manager to Designer Interface for AASHTOW are Project Preconstruction and create the Summary of Pay Items sheet is documented in the FDOT Automated Quantities training manual.

GENERATE QUANTITIES

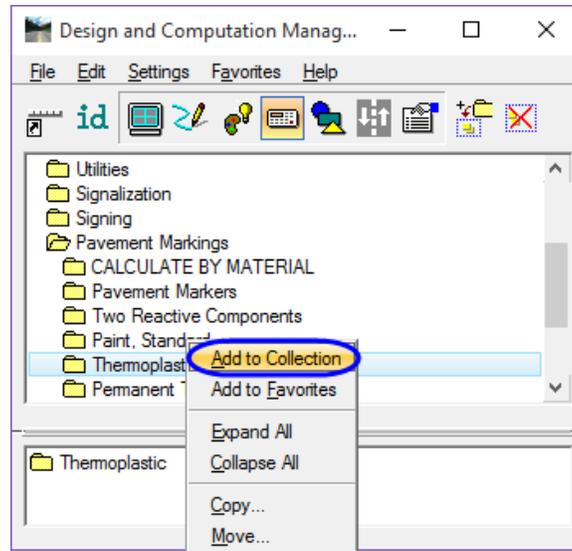
Quantities can be generated from the elements drawn in MicroStation using D&C Manager or tagged with the GEOPAK attribute. The GEOPAK Draw Cell by Feature tools and the Open Roads Civil Tools use the D&C Manager database in the background to set and tag the elements being drawn. Quantities may also be generated manually or using other software.

Traffic Plans components use **Tabulation of Quantities** sheets to document quantities. D&C Manager has the ability to generate individual sheet quantities using the clip borders created using the Plan/Profile Sheet Composition tool.

Note In order to use this method, the clip borders must be in the active file. It is recommended to calculate the quantities in the CLIPXX file with the DSGNXX file referenced.

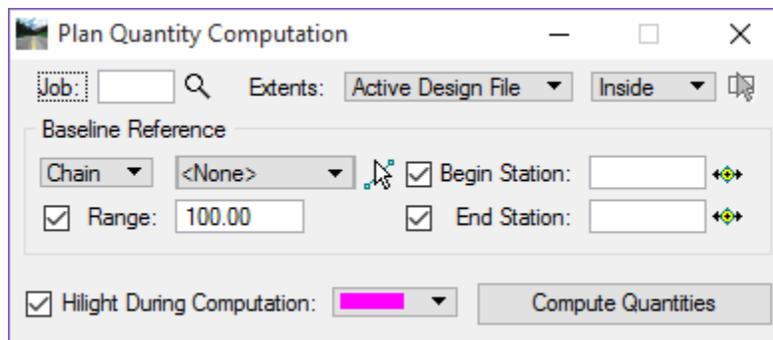
D&C MANAGER COMPUTE MODE

The Compute mode tabulates quantities of items placed by 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. Using this bin is optional. Quantities may also be calculated with a single item or category selected. To load items into the collection bin, double-click on the item or right-click and select *Add to Collection*. 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, the list can be saved for future use. To save a collection right-click in the collection bin area and select *Save Collection*.

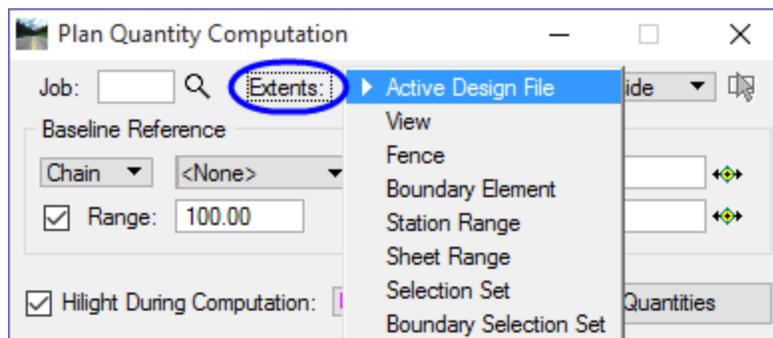


COMPUTING QUANTITIES

Plan Quantity Computation opens when the **Compute** icon is selected.

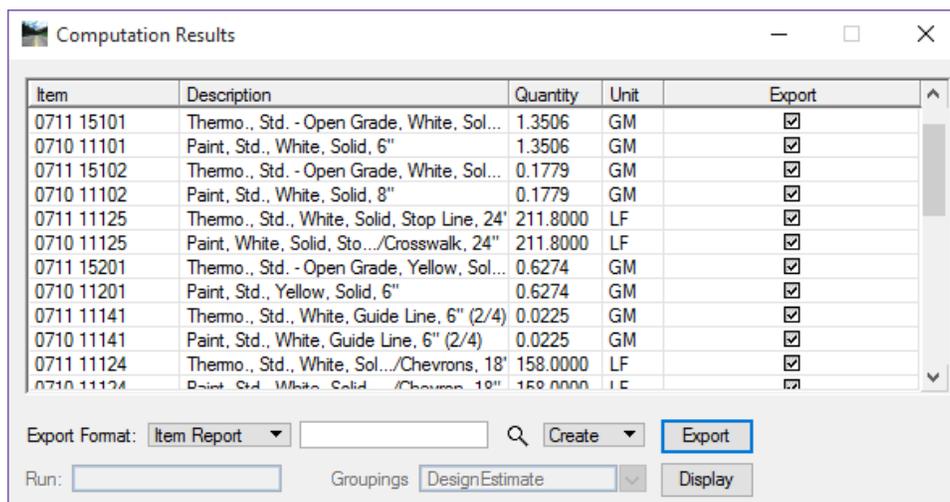


- *Job* – COGO database for the project used for chain information (.gpk file)
- *Extents* – List of options for limiting the area and elements included in the quantity calculations.



- o *Active Design File* – All elements in the Active Design File are candidates for computation.
- o *View* – Only the selected items that are displayed in MicroStation view one are computed.
- o *Fence* – A MicroStation fence must be placed, and all specified graphical features, which satisfy both the fence and the Range, will be tabulated.

- o **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.
- o **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.
- o **Sheet Range** – Sheets (clip borders) placed with the Plan/Profile Sheet Composition tool are used to define the area of computation.
- o **Selection Set** – A MicroStation selection set is defined to set the elements to be computed.
- o **Boundary Selection Set** – A MicroStation selection set of the Boundary (not the actual candidate compute elements) must be created prior to computing.
- **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.
- **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.



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.*

- o **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) defined in the Compute Settings. This option is required when taking the quantities into Quantity Manager.
 - 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.
- **File Name** – field next to the Export Format is the output file. Using the hourglass allows the designer to browse to a specific folder.
 - **Create or Append** – two export options for the quantities. 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.
 - 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.
 - Groupings: Value to define the **TRANSPORT** Grouping in Quantity Manager.
 - **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 11.1 *Generate Quantities and Export to Quantity Manager*

➤ **Create a Collection**

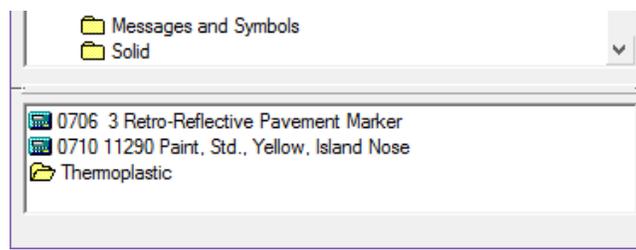
In this part of the exercise the designer will create a collection of items used to generate quantities.

1. Open the *CLIPSP01.dgn* in the *signing* folder.
2. Open D&C Manager. From the MicroStation menu go to **GEOPAK > ROAD > Design and Computation Manager**.

3. Click the **Compute** icon .

Note *If there are items in the collection bin of D&C Manager, right-click in the collection area and select **Clear Collection**.*

4. Navigate to the **Pavement Markings > Thermoplastic** folder, right-click on the folder and select **Add to Collection**.
5. Double-click on the item **Pavement Markings > Paint, Standard > Island Nose > 0710 11290 Painted Pavement Markings, Standard, Yellow, Island Nose** to add the item to the collection.
6. Double-click on the item **Pavement Markings > Pavement Markers > 0706 3 Retro-Reflective Pavement Markers** to add the item to the collection.



➤ **Use the Display Tool to Review the Quantity Items**

1. Click the **Display** icon on D&C Manager .
2. On the Display toolbox, click the **Highlight** icon. This will highlight all of the items in the collection.



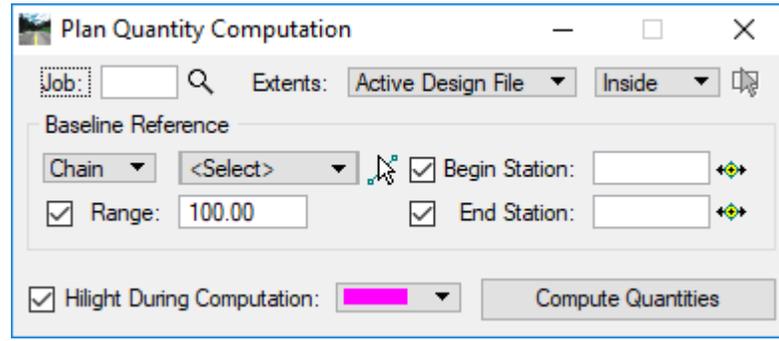
3. Take a moment to review the design file.

Hint *It may be helpful to turn off all the reference files except for the *DSGNP01.dgn* in order to more clearly identify any elements not being highlighted.*

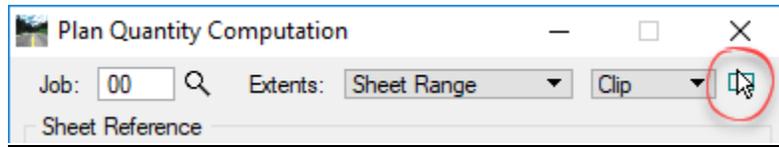
4. Set the *Display* to **Normal**.
5. Close the Display toolbox.

➤ **Compute Quantities**

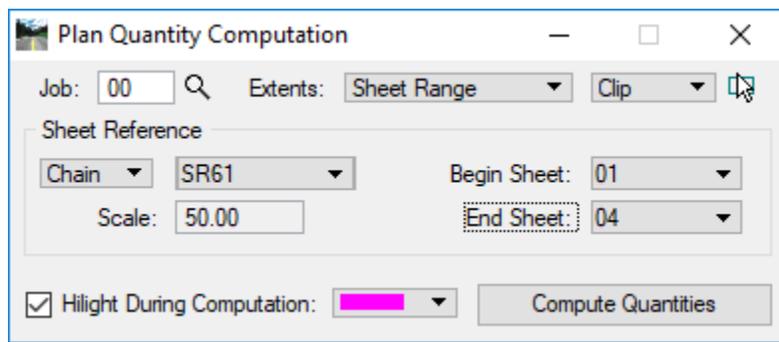
1. On D&C Manager dialog, click the **Compute** icon. The Plan Quantity Computation dialog opens.



2. Set the *Job* number is **00**.
3. Set the *Extents* to **Sheet Range**.
4. Set to *Method* to **Clip**.
5. Toggle **On** Highlight During Computation.
6. Click **Identify a Plan Sheet Clip Boundary** button.

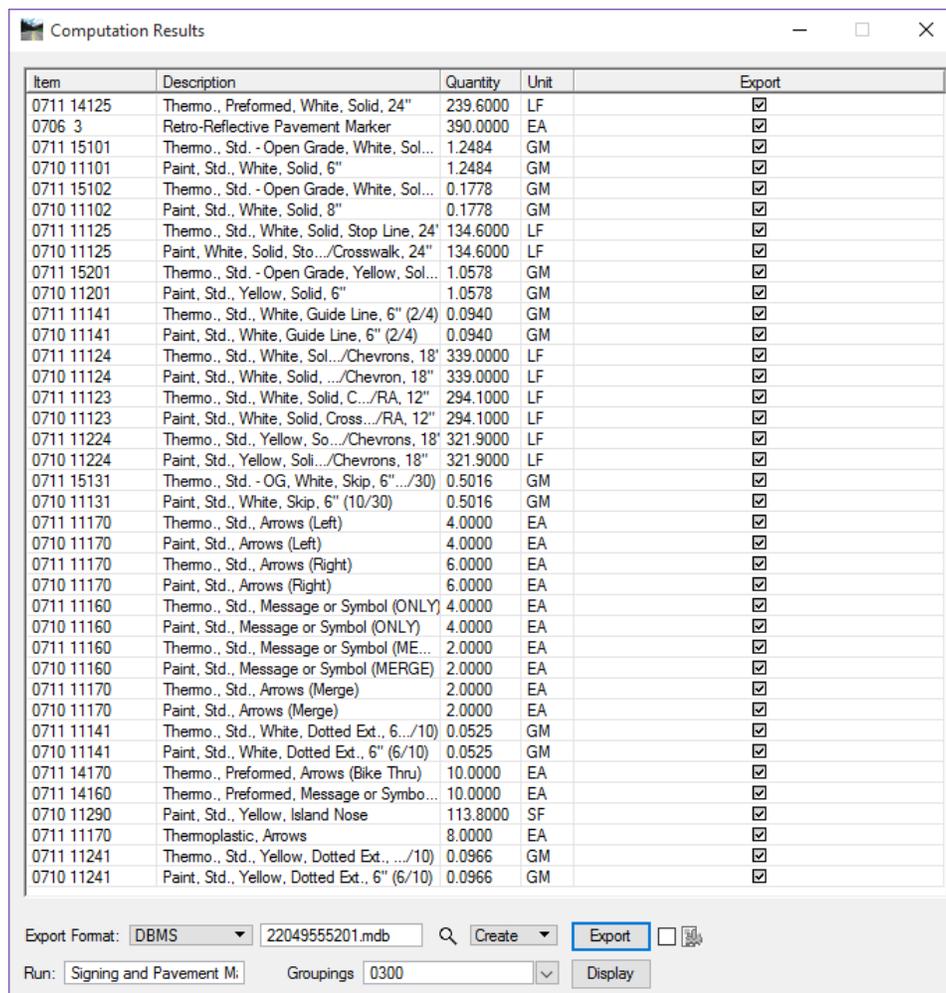


7. Select the first sheet **Clip Border** on the *SR61 Alignment*.
8. The *Sheet Reference* is automatically set to **Chain** and **SR61**.
9. The *Begin Sheet* is set to **01**. Set the *End Sheet*, **04**.



10. Click the **Compute Quantities** button. The Computation Results dialog opens.

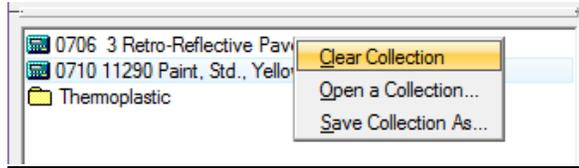
➤ **Export Quantities to DBMS for Quantity Manager**



1. Set the *Export Format* to **DBMS**. This is the required format for Quantity Manager.
2. Enter the file name **22049555201**. The *.mdb* file extension will be added automatically.
3. Set the *Result Output Option* to **Create**.
4. (Optional) In the *Run* field, enter **Signing and Pavement Markings**.
5. In the *Groupings* field, type in **0300**.
6. Click the **Export** button. The *.mdb* file will be created in the *signing* folder.
7. Close the Computation Results dialog.
8. Close the Plan Quantity Computation dialog.

➤ **Add Signing Quantities to Quantity Manager**

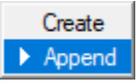
1. On the Design and Computation Manager dialog, right-click inside the *Collection* bin and select **Clear Collection**.



2. On the D&C Manager dialog, right-click on the **Signing** folder and select **Add to Collection**.

3. Click on the **Compute** icon .

4. On the Plan Quantity Computation dialog, click the **Compute Quantities** button.

5. On the Computation Results dialog, change the *Result Output Option* to Append. 

6. Click the **Export** button.

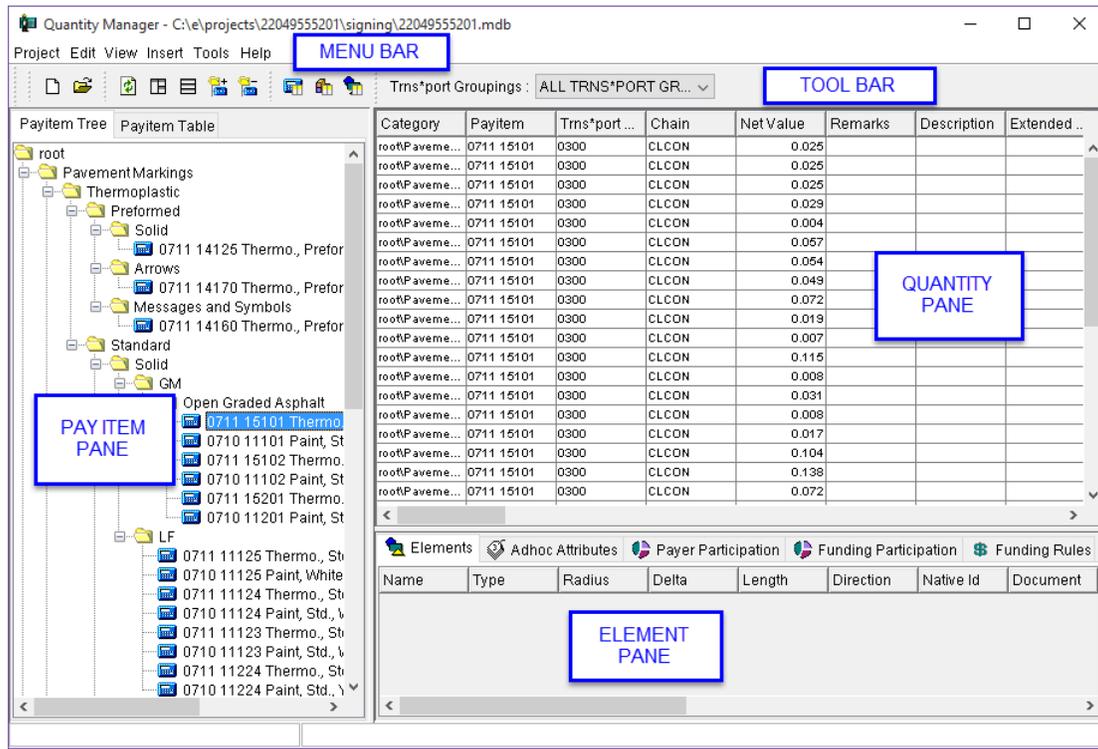
QUANTITY MANAGER

Quantity Manager is the GEOPAK tool used to store, organize, and manipulate quantities generated by the D&C Manager. Pay items and quantities can also be stored in the database manually. Once the information is loaded into Quantity Manager, the designer can then export the data from Quantity Manager in a format that can be imported into Designer Interface. Linked Data Manager uses the Quantity Manager database to automate the creation of the Tabulation of Quantities Sheets. It is not the intent of this chapter to provide full training on all of the functions within Quantity Manager. For more in depth information, see the Bentley Help files.

Quantity Manager can be loaded from the Road toolbox, from the MicroStation menu, select **GEOPAK > ROAD > Quantity Manager**, or from the **FDOT Plans Development > Quantities Task menu**, select the **Quantity Manager** icon.

QUANTITY MANAGER DIALOG

Quantity Manager has three parts, as shown in the following figure: *Menu bar*, *Tool Bar* and *Window Area*. The Window area has three panes: *Pay Item*, *Quantity*, and *Element*.



PAY ITEM PANE

The Pay Item Pane is located on the left side of Quantity Manager in Normal View and is the top pane when tiled horizontally. Two tabs control the display type for the Pay Item pane:

- *Payitem Tree* – This tab displays the contents in a hierarchical structure easily navigated in the same manner as D&C Manager.
- *Payitem Table* – This tab displays the database Pay Items in a table format that contains additional information about Pay Items and is useful for selecting multiple items.

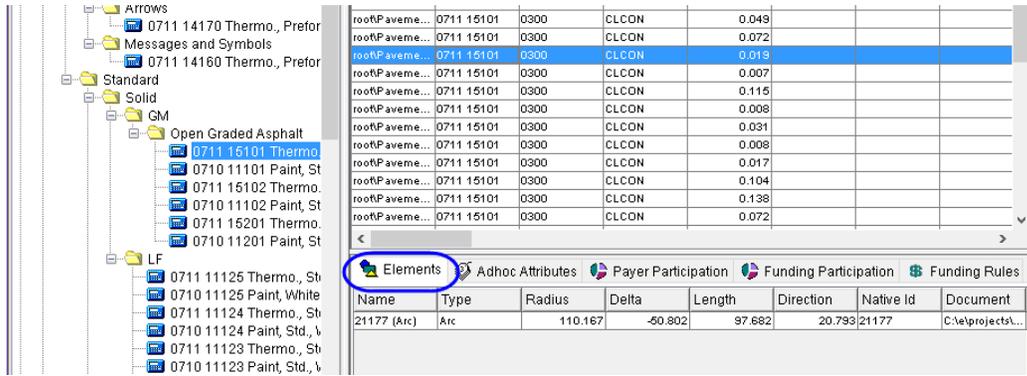
QUANTITY PANE

The Quantity Pane displays only quantity information under the current Phase selected on the tool bar about the specifically selected Pay Item or Category. The information is customizable by selecting which columns to display and sorts by clicking on any of the column headers.

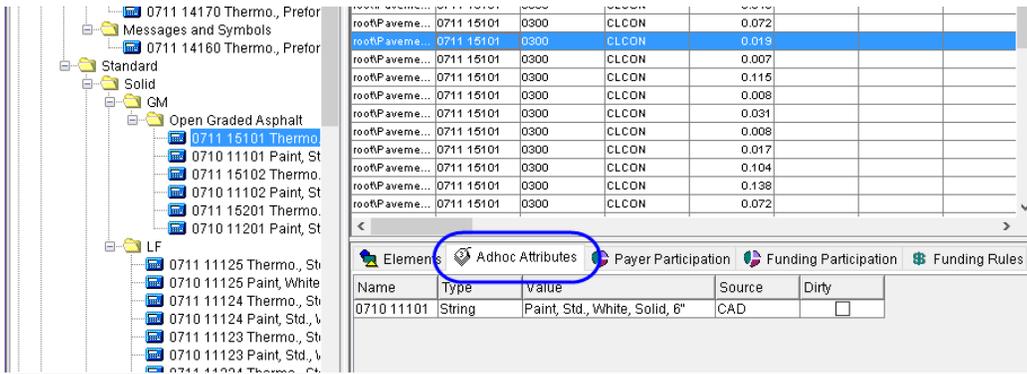
ELEMENT PANE

The Element Pane displays information specific to the selected Quantity. Each tab displays different attributes. The Elements tab shows all the elements that make up that Quantity. Adhoc Attributes tab displays any Adhoc related to the Quantity. Funding Participation, Funding Rules, and Payer Participation tab displays information related to funding sources.

7. In the *Top Pane* of the Quantity Manager, select one of the quantity rows.
8. In the *Bottom Pane* of the Quantity Manager, select the **Elements** Tab and review the components of the selected quantity.



9. In the *Bottom Pane*, select the **Adhoc Attributes** Tab. The Adhoc tags display for this element.

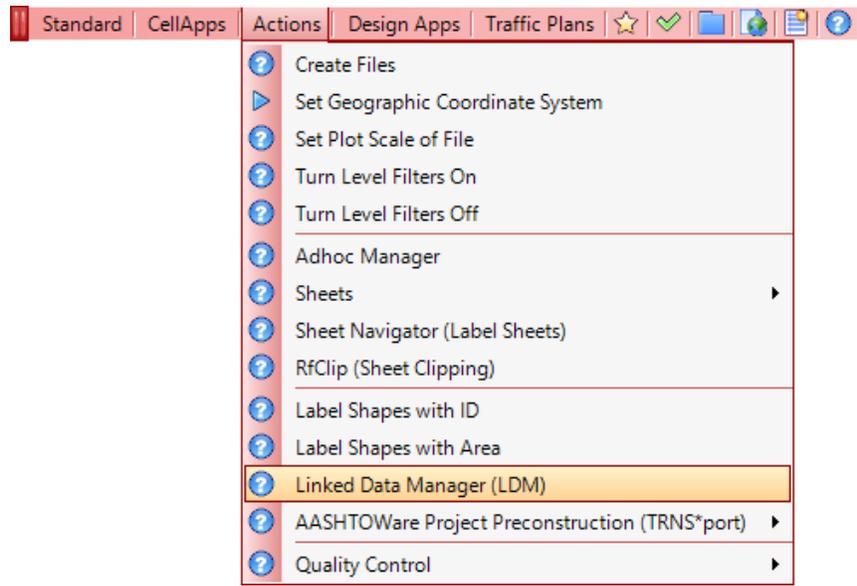


10. Close the Quantity Manager dialog.

LINKED DATA MANAGER BASICS

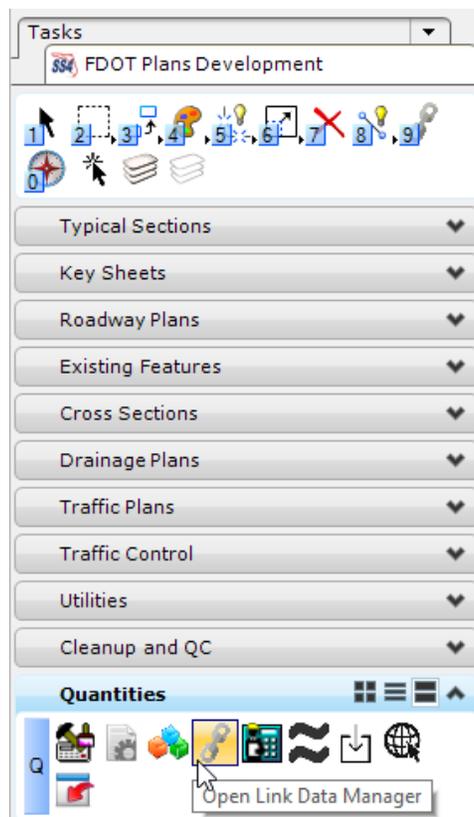
Linked Data Manager creates a link between documents (excel files, word documents, text files, etc.) and MicroStation Design Files (.dgn) for easy placement and updating of Summary Boxes, Notes, and other charts.

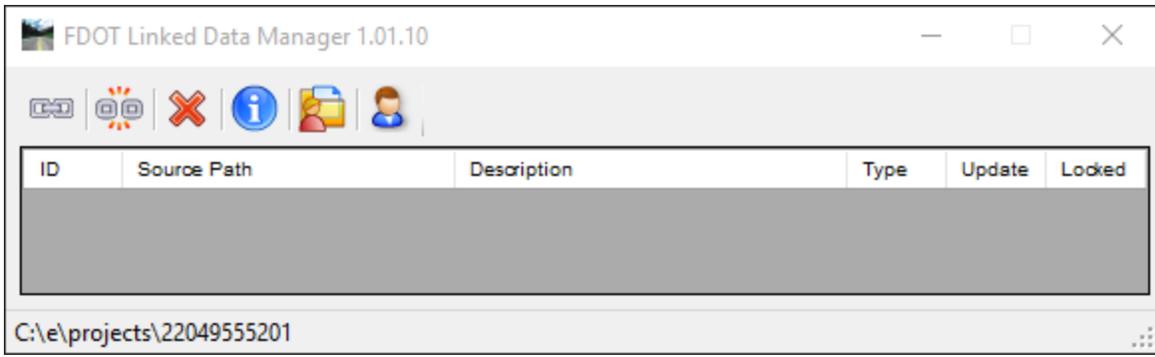
Access Linked Data Manager (LDM) from **FDOT Menu > Actions > Linked Data Manager**.



<OR>

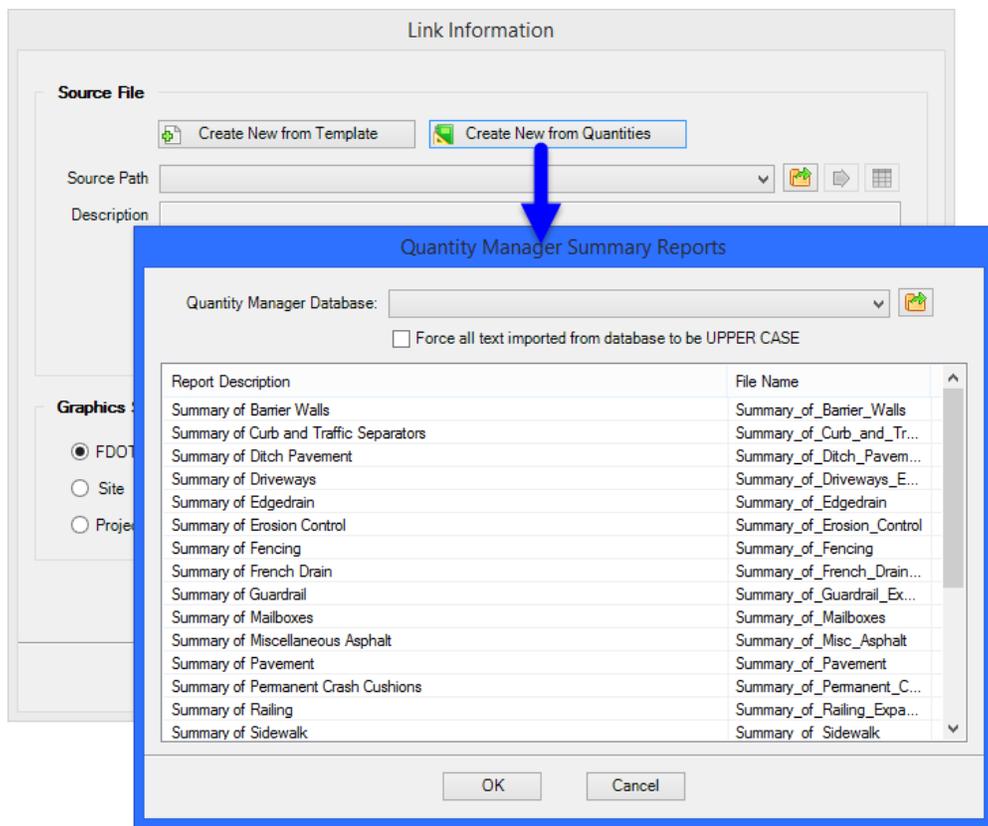
From the **FDOT Plans Development > Quantities Tasks menu**.





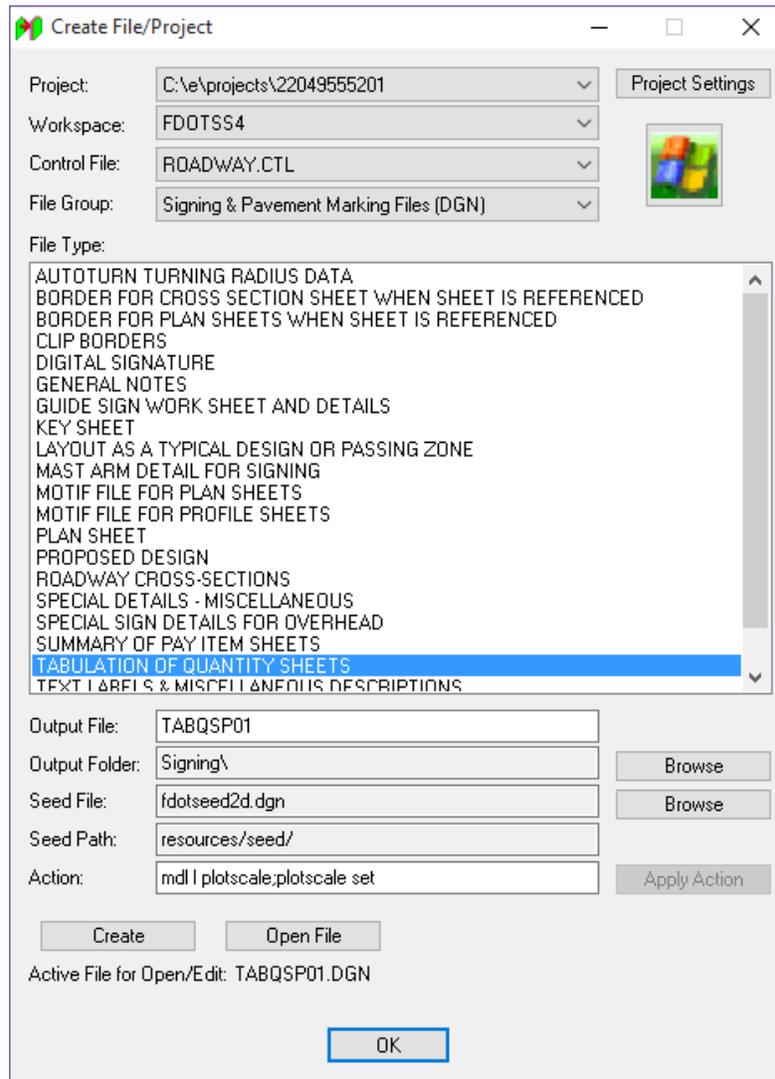
Note For more in-depth information on the features of this tool, refer to the LDM Help file or Posted Webinars.

LDM provides an automated option (*Create New from Quantities*) to create FDOT Summary Boxes, Tabulation of Quantities, and Notes.



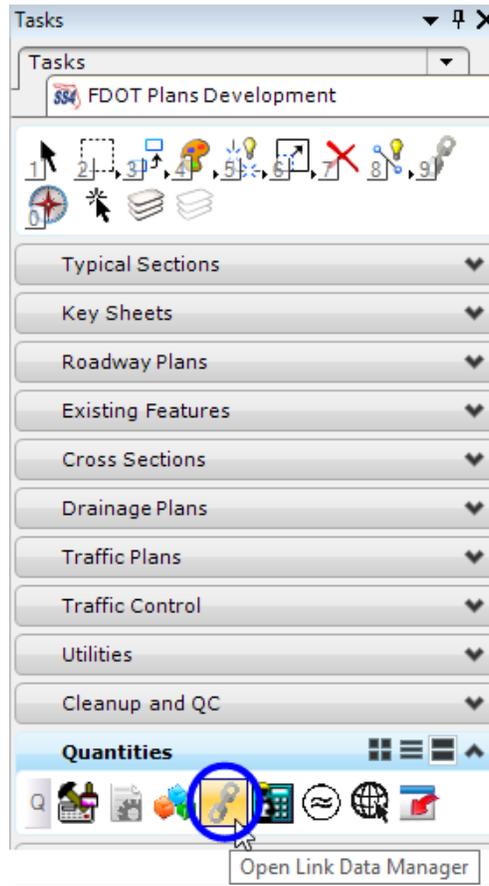
Exercise 11.3 Create Tabulation of Quantities Sheet from Quantities

1. Continuing in the MicroStation file *CLIPSP01.dgn*, on the FDOT Menu, select **Actions > Create File/Project**.
2. Set the *File Group* to **Signing & Pavement Marking Files (DGN)**.
3. On the *File Type* list, select **(SUMBOX/TABLE) TABQSP TABULATION OF QUANTITY SHEETS**.

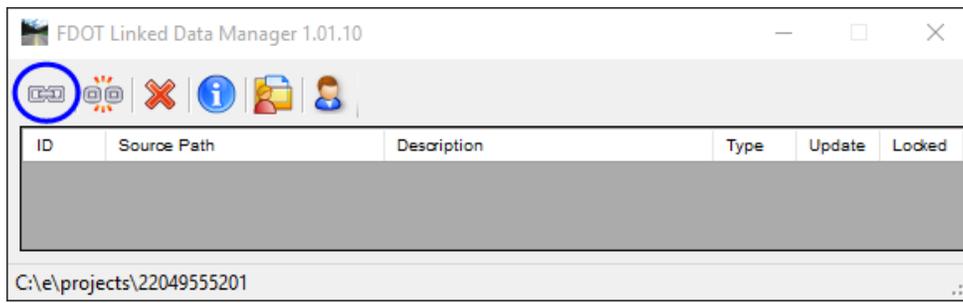


4. Click the **Create** button.
5. Click **OK** confirming that the *File successfully created*.
6. Click the **Open File** button to open the new file.
7. Once the file is open, click **OK** on the **Set Plot Scale** dialog, and close the **Create File/Project** dialog.

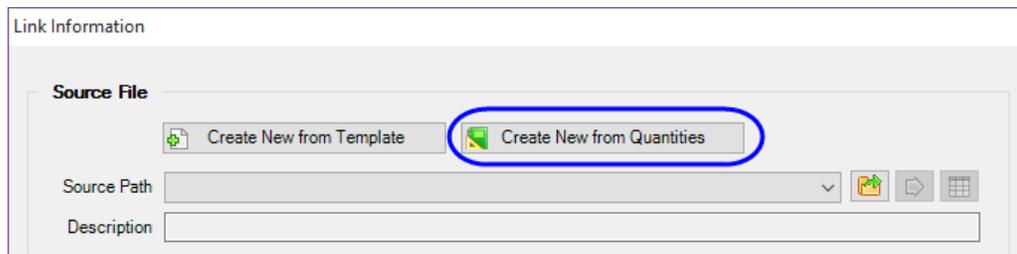
- Go to the **FDOT Plans Development > Quantities > Open Linked Data Manager**.



- From LDM, select the **Create Link** button.

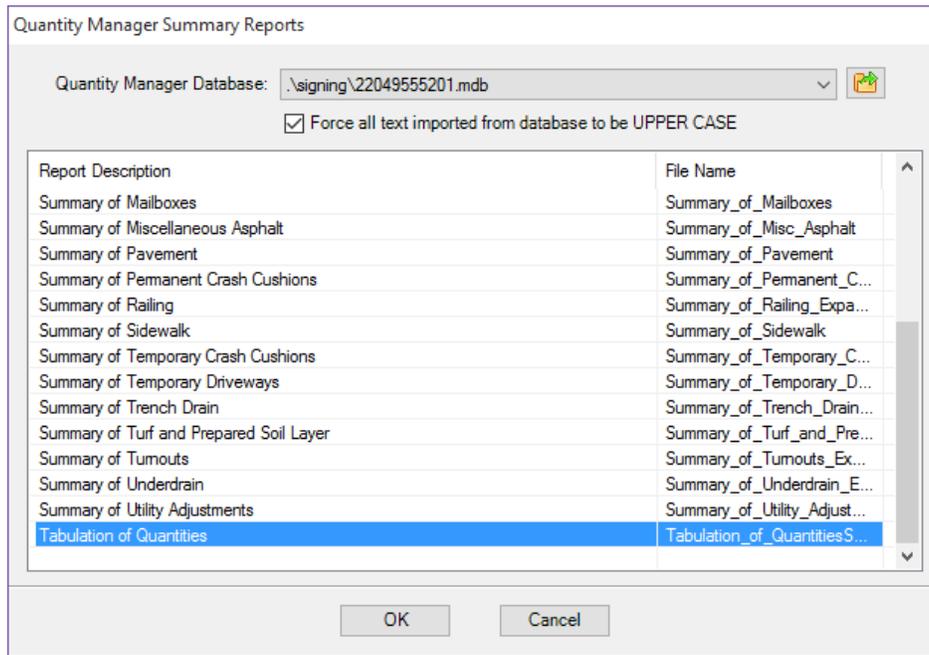


- On the Link Information dialog, select the **Create New from Quantities** button.

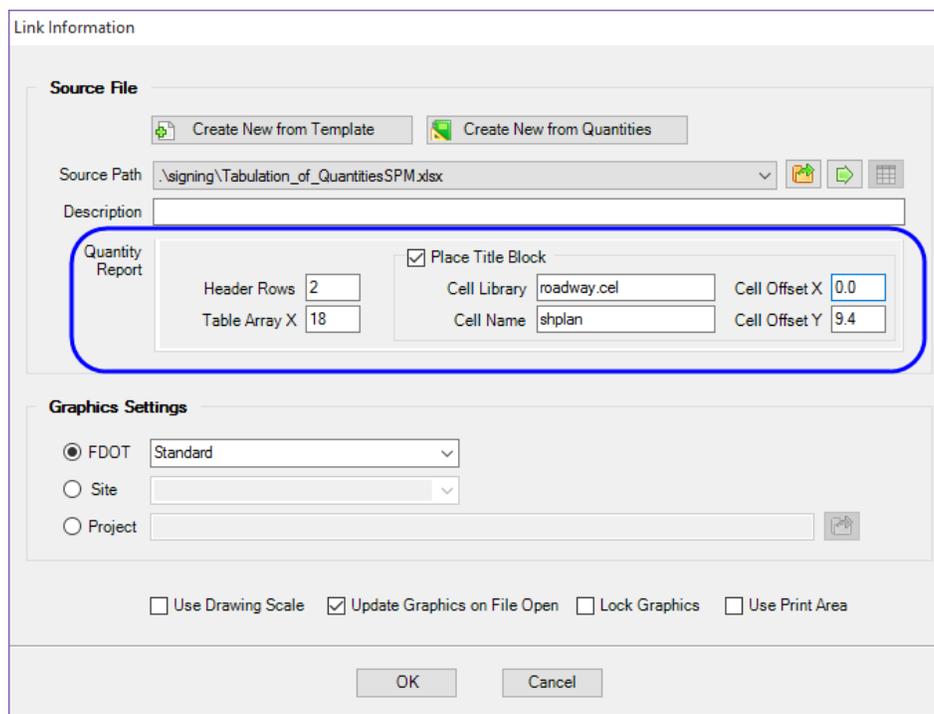


- On the Quantity Manager Summary Reports dialog, click the **Browse** button  and select the database file *22049555201.mdb*.

12. Toggle **On** the option to *Force all text imported from database to be UPPER CASE*.
13. Select the **Tabulation of Quantities** in the report list and click **OK**.



14. Save the Excel file to the project *signing* folder.
15. On the Link Information dialog, the *Source Path* populates. Complete the dialog as shown below and click **OK**.

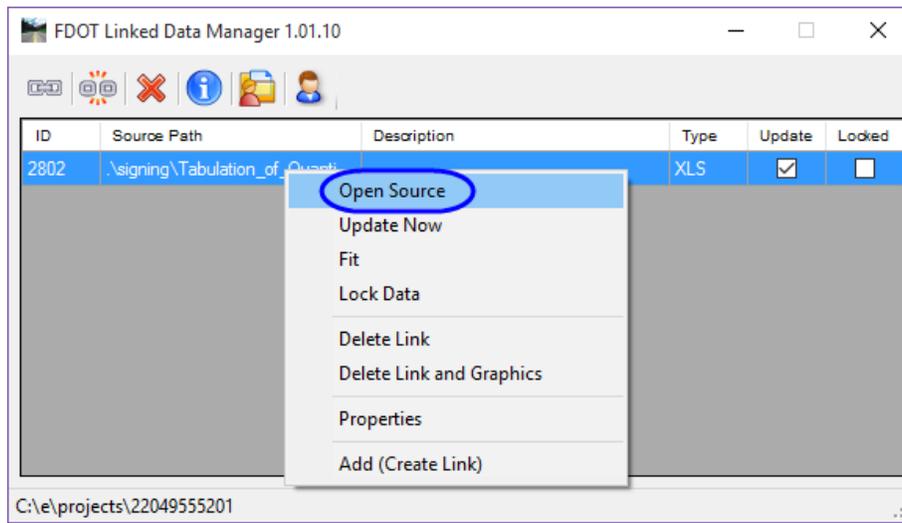


16. The Sheet is now attached to the cursor. Data Point in the design file to place the sheet.

| PAY ITEM NO. | DESCRIPTION |
|--------------|---|
| 0700 1 11 | SINGLE POST SIGN FURNISH&INSTALL LESS THAN 12 |
| 0700 1 12 | SINGLE POST SIGN, FURNISH & INSTALL, 12-20 |
| 0700 1 74 | SINGLE POST SIGN, FURNISH & INSTALL, MORE THAN |
| 0700 2 12 | MULTI-POST SIGN, FURNISH & INSTALL, 12 |
| 0700 2 13 | MULTI-POST SIGN, FURNISH & INSTALL, 21 TO 30 |
| 0700 2 18 | MULTI-POST SIGN, FURNISH & INSTALL, 12 |
| 0706 3 | RETRO-REFLECTIVE PAVEMENT MARKER |
| 0710 11101 | PAINT, STD., WHITE, SOLID, 6" |
| 0710 11102 | PAINT, STD., WHITE, SOLID, 8" |
| 0710 11123 | PAINT, STD., WHITE, SOLID, CROSSWALK/RA, 12" |
| 0710 11124 | PAINT, STD., WHITE, SOLID, DIAG./CHEVRON, 18" |
| 0710 11125 | PAINT, WHITE, SOLID, STOP LINES/CROSSWALK, 24" |
| 0710 11131 | PAINT, STD., WHITE, SKIP, 6" (10/30) |
| 0710 11141 | PAINT, STD., WHITE, DOTTED EXT., 6" (6/10) |
| 0710 11160 | PAINT, STD., MESSAGE OR SYMBOL (MERGE) |
| 0710 11170 | PAINT, STD., ARROWS (MERGE) |
| 0710 11201 | PAINT, STD., YELLOW, SOLID, 6" |
| 0710 11224 | PAINT, STD., YELLOW, SOLID, DIAG./CHEVRONS, 18" |
| 0710 11241 | PAINT, STD., YELLOW, DOTTED EXT., 6" (6/10) |
| 0710 11290 | PAINT, STD., YELLOW, ISLAND NOSE |
| 0711 11123 | THERMO., STD., WHITE, SOLID, CROSSWALK/RA, 12" |
| 0711 11124 | THERMO., STD., WHITE, SOLID, DIAG./CHEVRONS, 18" |
| 0711 11125 | THERMO., STD., WHITE, SOLID, STOP LINE, 24" |
| 0711 11141 | THERMO., STD., WHITE, DOTTED EXT., 6" (6/10) |
| 0711 11160 | THERMO., STD., MESSAGE OR SYMBOL (MERGE) |
| 0711 11170 | THERMOPLASTIC, ARROWS |
| 0711 11224 | THERMO., STD., YELLOW, SOLID, DIAG./CHEVRONS, 18" |
| 0711 11241 | THERMO., STD., YELLOW, DOTTED EXT., 6" (6/10) |
| 0711 14125 | THERMO., PREFORMED, WHITE, SOLID, 24" |
| 0711 14160 | THERMO., PREFORMED, MESSAGE OR SYMBOL (BIKE) |
| 0711 14170 | THERMO., PREFORMED, ARROWS (BIKE THRU) |
| 0711 15101 | THERMO., STD. - OPEN GRADE, WHITE, SOLID, 6" |
| 0711 15102 | THERMO., STD. - OPEN GRADE, WHITE, SOLID, 8" |
| 0711 15131 | THERMO., STD. - OG, WHITE, SKIP, 6" (10/30) |
| 0711 15201 | THERMO., STD. - OPEN GRADE, YELLOW, SOLID, 6" |

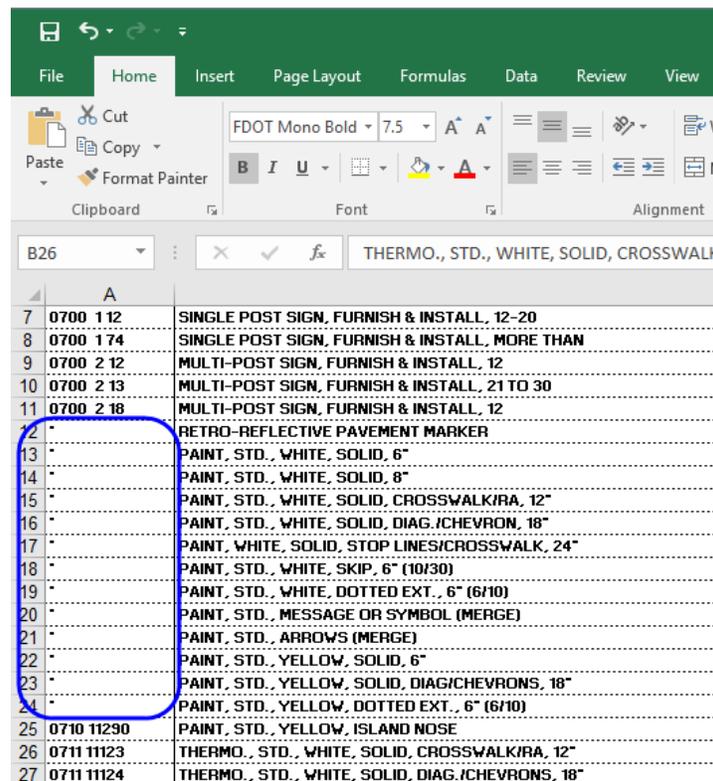
Note Notice that the items included with pay item 710-90 are shown with the pay item numbers. These should have an "*" shown instead. Also note that some of the items like the arrows and messages are shown totaled together per pay item and not broken out by type of marking. Depending on the District, these items may need to be broken out by type in the sheet.

17. Right-click on the new link in the LDM dialog and select **Open Source**. Excel opens.



18. In *Column A*, select the pay item **0706 3** for the **Retro-reflective Pavement Markers**. Type in an asterisk (*).

19. Using the cursor, select the green square at the bottom right corner of the cell and drag it down to copy the value down through all the paint items.



20. Select **File > Save** to save the changes in the Excel file.

12 SHEET NAVIGATOR

OBJECTIVE

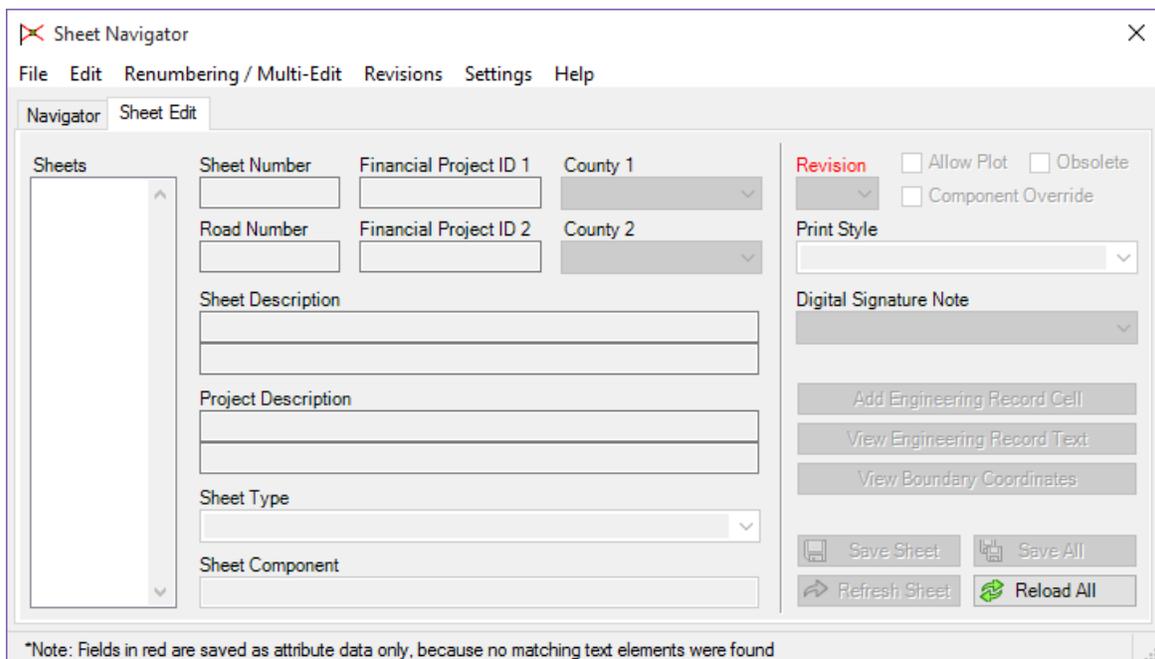
In this chapter the following topics will be covered:

- Overview of Sheet Navigator
- Create an Index
- Auto Numbering and Renumbering
- Edit Multiple Sheets

INTRODUCTION

Sheet Navigator is an application developed by Florida Department of Transportation (FDOT) to fill out the sheet information, retrieve sheet information from previously created sheets, index all sheets in a component or project, and update sheet information on all sheets. When Sheet Navigator starts it scans the active file for sheets, retrieves any sheet data that it finds and stores the data in GEOPAK adhoc tags on points at the corners of each sheet. This sheet information is later used to create the index of the project and to automate of sheets for delivery of the contract plan set.

OVERVIEW



Sheet Navigator has the ability to Auto Number sheets, number/re-number single or multiple sheets, create the Index of Sheets for the Key Sheet and create the *.pset for printing with Print Organizer. Sheet Navigator can also tag a sheet as Obsolete so sheets are not selected and indexed. This allows the designer to create exhibits or temporary sheets in the project without the worry of 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.

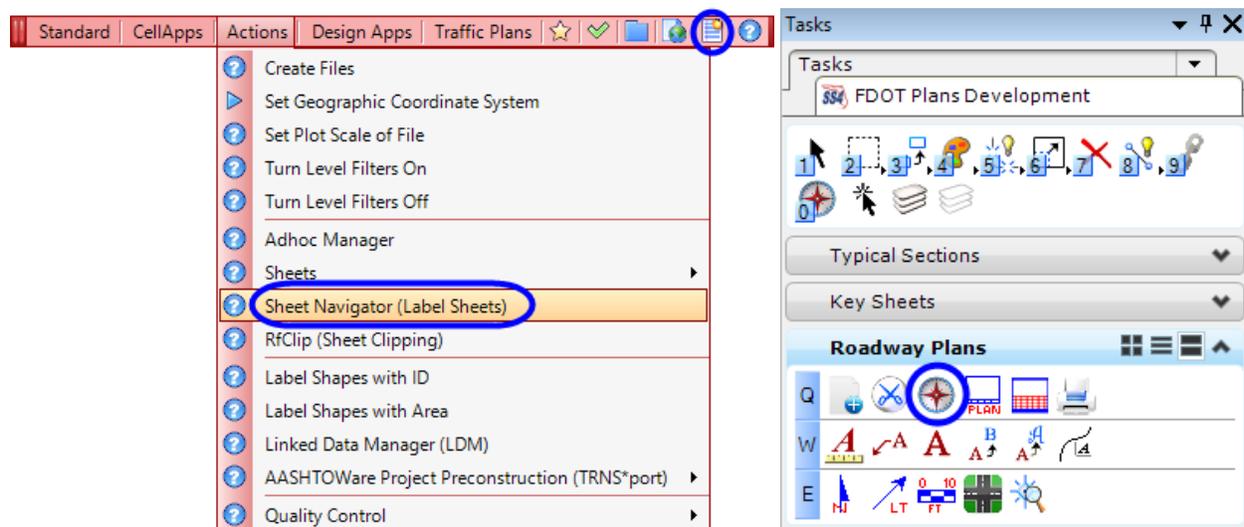
Sheet Navigator creates an index named Sheetinfo.xml located in either the root project folder or in the component folder depending on how the designer created the index. This index is crucial to Sheet Navigator functioning properly when working in the Auto Numbering, Renumbering or Multi Sheet Edit mode.

Sheet Navigator is used to:

- Number Sheets
- Label Sheet Title Blocks
- Auto Number Sheets
- Renumber Sheets
- Apply Revision Text

SHEET NAVIGATOR DIALOG

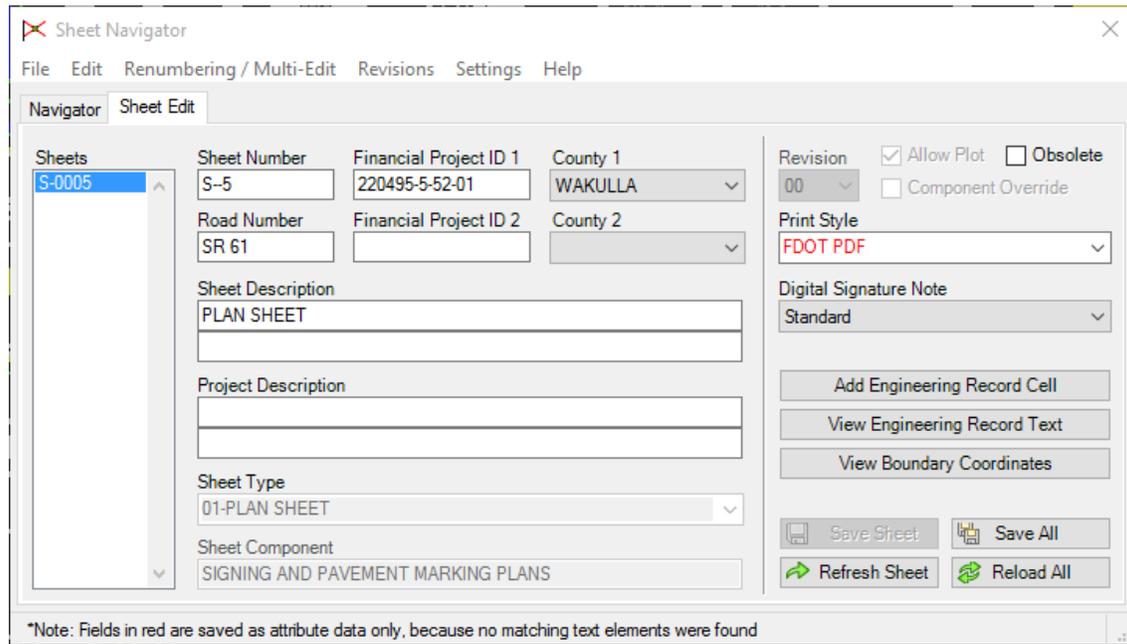
Sheet Navigator can be accessed through the **FDOT Menu > Actions > Sheet Navigator (Label Sheets)** <OR> from the Sheet Navigator button on the end of the FDOT Menu <OR> from the **FDOT Plans Development Task Menu > Roadway Plans > Open Sheet Navigator**.



The Sheet Navigator application consists of two tabs: *Navigator* and *Sheet Edit*. The application defaults to the *Sheet Edit* tab when the dialog opens.

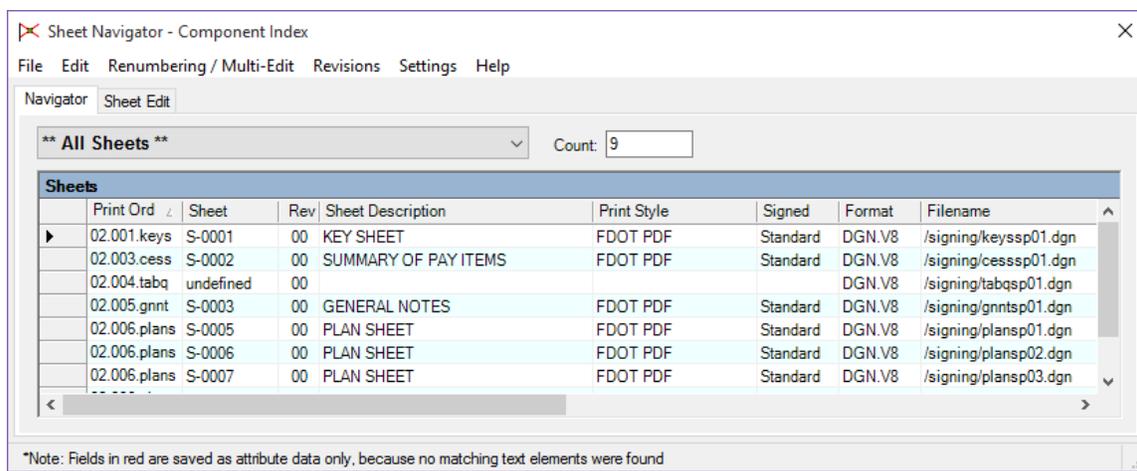
SHEET EDIT TAB

The **Sheet Edit** tab is used for populating the standard title block information.



NAVIGATOR TAB

The **Navigator** tab displays the list of sheets contained in an index file (*SheetInfo.xml*). Prior to using any of the multi-sheet edit functions available on the **Navigator** tab, the Project Index file (*SheetInfo.xml*) must be created by Sheet Navigator. It is automatically created in the root of the project folder. The XML file contains all of the information from the adhoc attribute tags. To create the XML file select **File > New** from the Sheet Navigator main menu. An index file can be created for the entire project or a specific component.



SHEET NAVIGATOR - PROJECT INDEX

Sheet Navigator does not load or create a project index by default. A project index file must be created by the designer for renumbering, revisions, and multi-sheet editing.

Build Index

Index Type

Project ALL component folders will be indexed. Index saved to root project folder.
Root Project Path

Component Only the current component folder will be indexed. Index saved to component folder.
Component Folder

Index Settings

Process new or modified files only

Rebuild existing index

An existing project index file (*SheetInfo.xml*) can be opened by selecting **File > Open** from the Sheet Navigator main menu. The default location for the project index file is the root project folder.

Note For more information on Sheet Navigator, see the *FDOT Help files*.

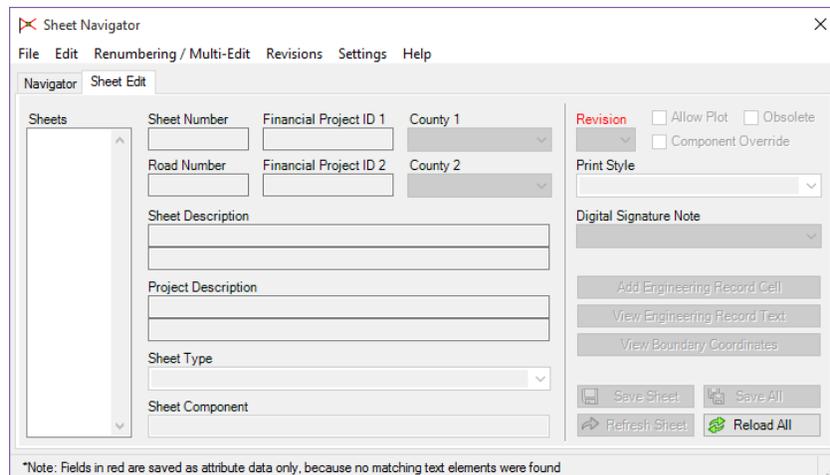
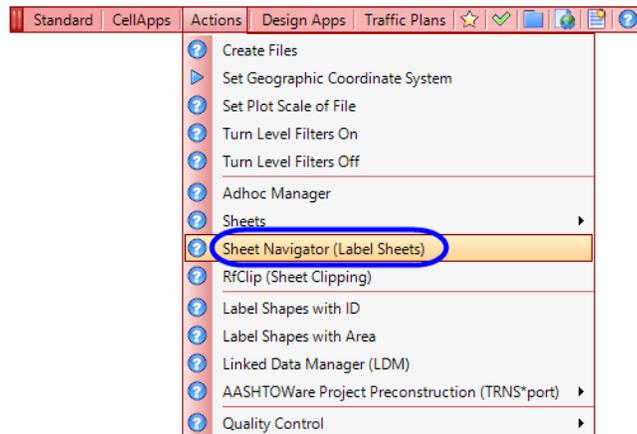
Exercise 12.1 Create Component Index

In this exercise a new *Component Index* will be created for the Signing & Pavement Marking Plan sheets.

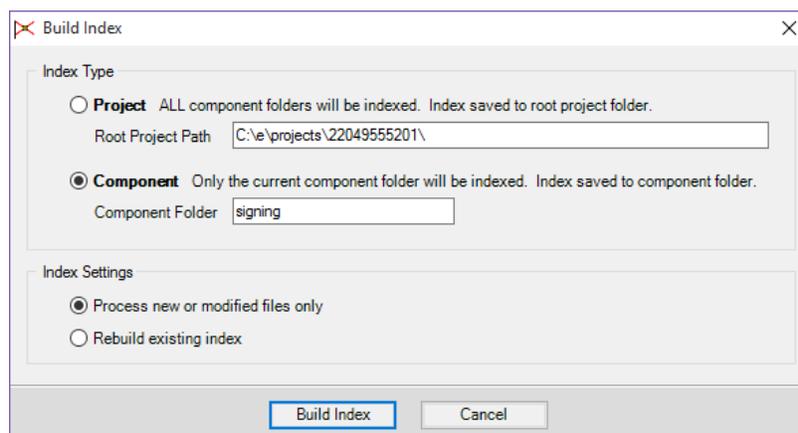
1. Open the *DSGNP01.dgn* file.

Note This exercise can be completed from any design file.

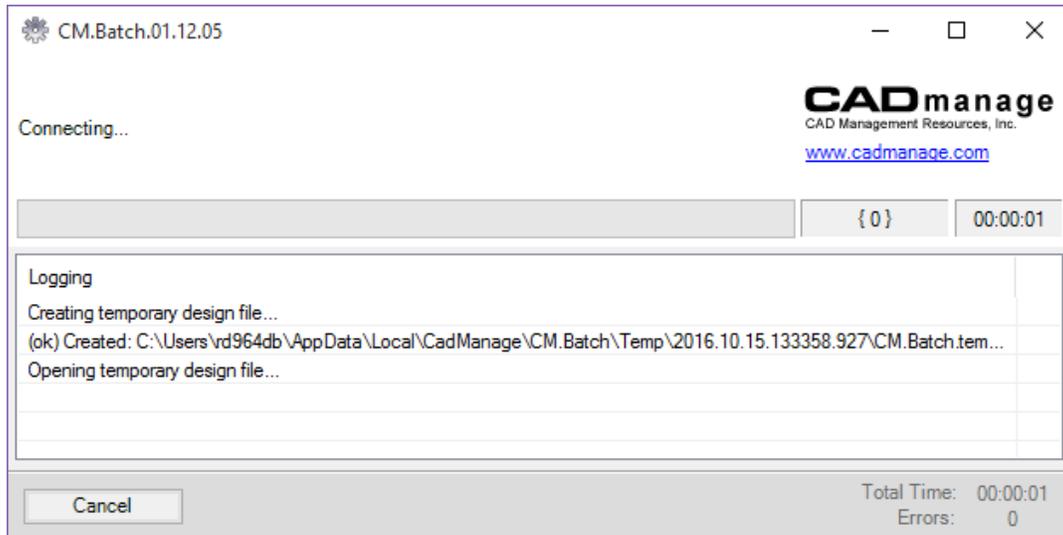
2. From the FDOT Menu, select **Actions > Sheet Navigator (Label Sheets)**.



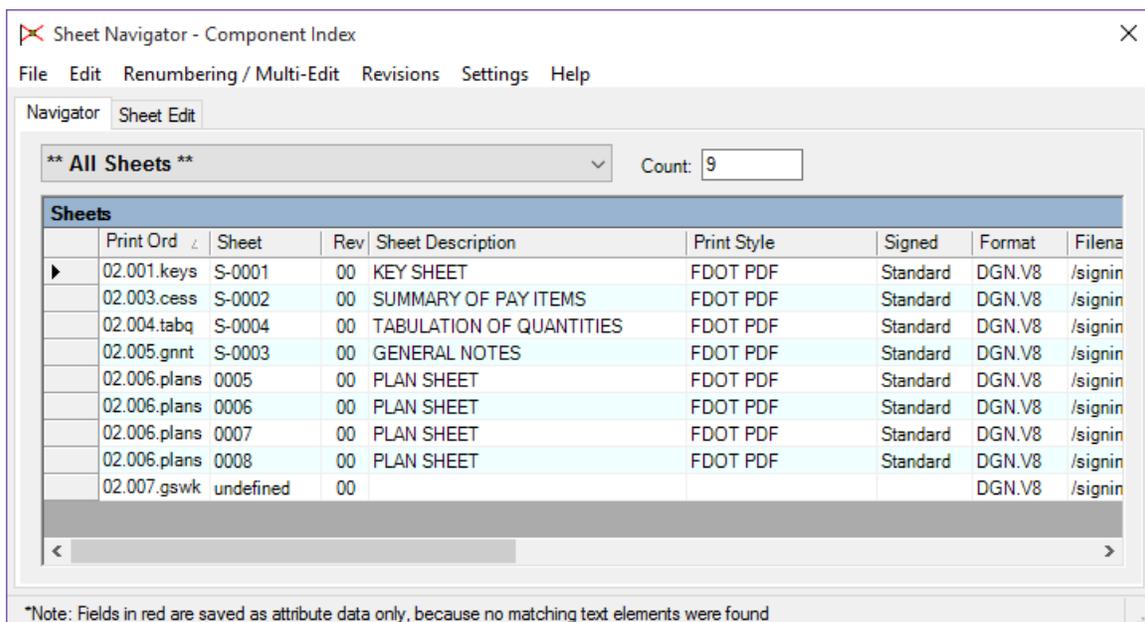
3. In Sheet Navigator, select the **Navigator** Tab.
4. Select **File > New**.



- a. Under *Index Type*, select the **Component** option.
 - b. Under *Index Settings*, select **Process new or modified files only**.
 - c. Click the **Build Index** button. This will create the *sheetinfo.xml* in the *signing* folder. All other discipline folders are ignored.
5. MicroStation will close and the **CADmanage (CM.Batch)** batch process will run.



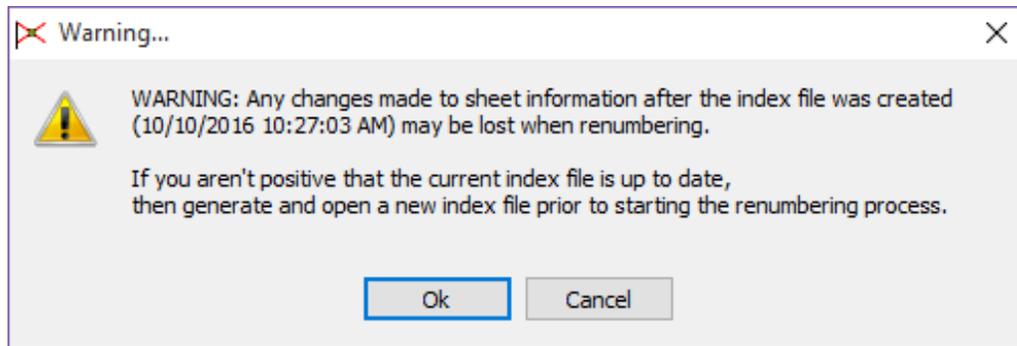
6. When the process is finished, MicroStation re-opens and an index of sheets appears in **Sheets** list.



Exercise 12.2 Renumbering of Sheets

After the index process is complete, the Navigator tab will be populated with a list of sheets found in the signing folder. The project has some sheets already have information filled in using Sheet Navigator or other tools. However, there are several sheets that have missing information and are not numbered or numbered incorrectly. Sheet Navigator can be used to fill out missing information, tag the sheets with the standard Digital Signature Note and number each individual sheet in a batch process. The following steps will cover the basics of this process.

1. From the Sheet Navigator menu, select **Renumbering/Multi-Edit > Start Process**.
2. Click **OK** on the Warning dialog.

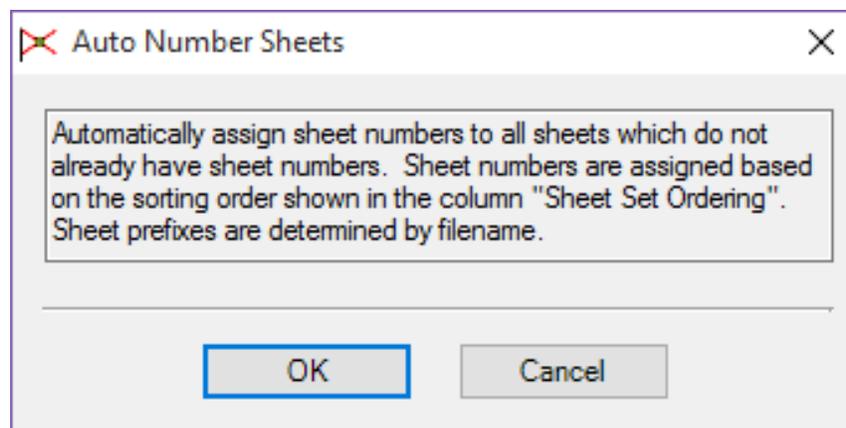


3. Select **Renumbering/Multi-Edit > Auto Numbering > Auto Numbering Mode**.

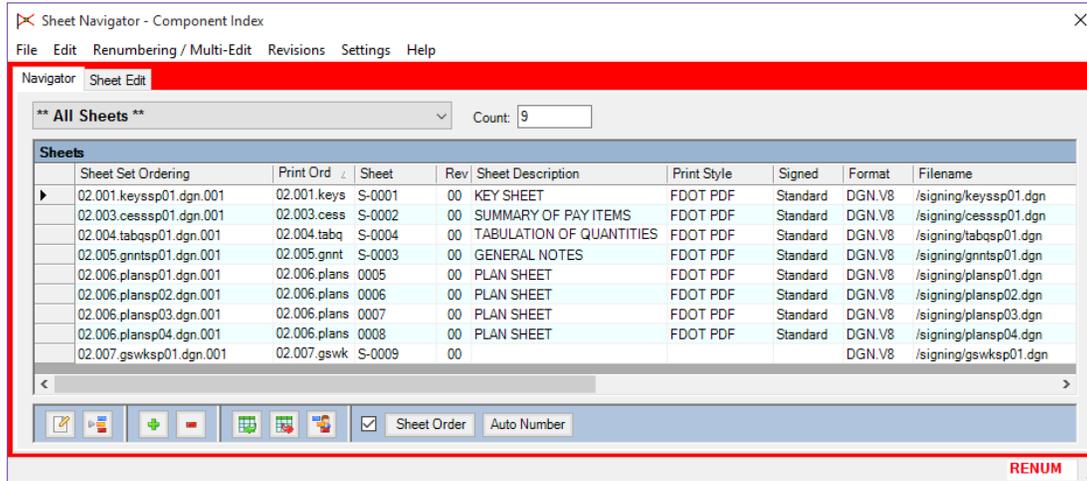
Note You could also use the check box at the bottom of the dialog to activate this option.



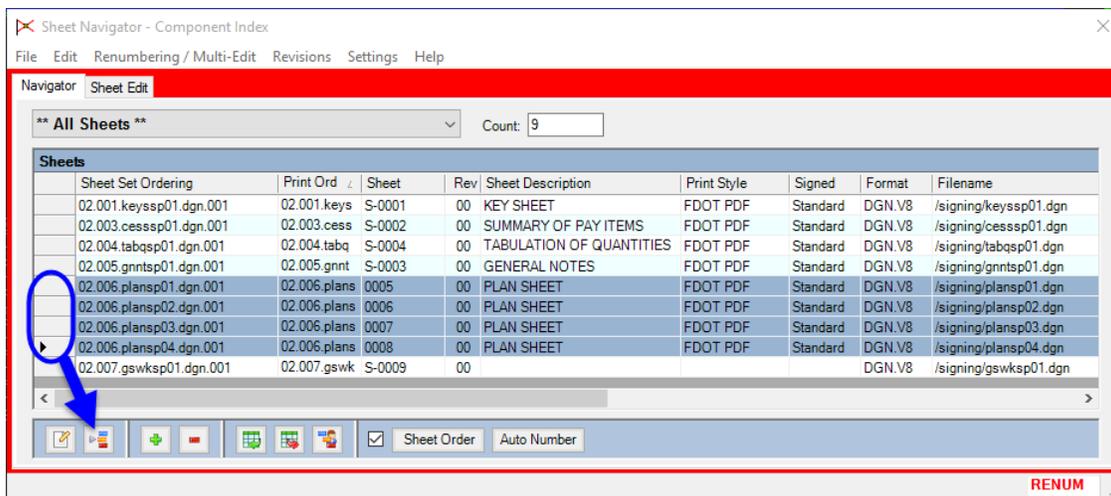
4. Click on the **Auto Number** button at the bottom of the Sheet Navigator dialog.
5. Click **OK** on the Auto Number Sheets dialog.



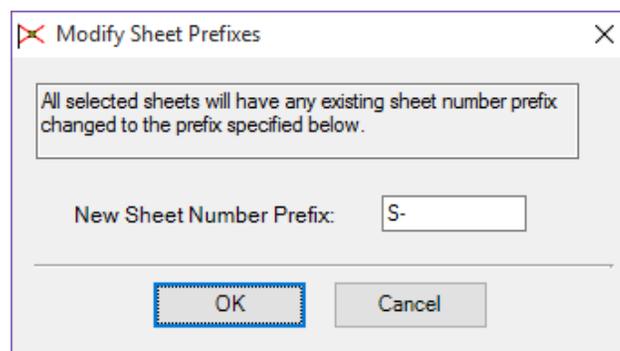
Note Notice in the figure below that the undefined sheet now has a number assigned, however, all the information shown is not correct. Corrections will need to be done using other tools available in Sheet Navigator.



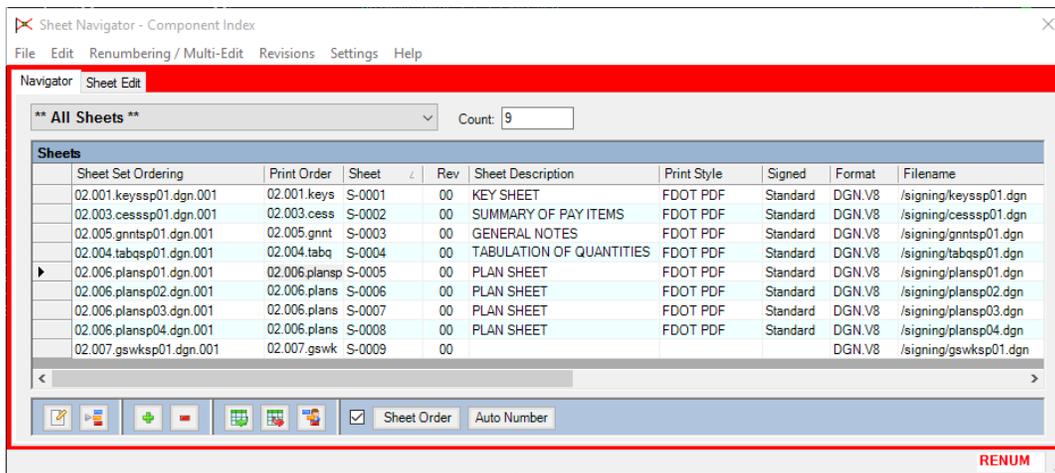
- Click in the **grey column** to the left of the *Sheet Set Ordering* column. Drag the cursor across the column <OR> Use the **Ctrl** and/or **Shift** keys to select the sheets that do not have the correct prefix.



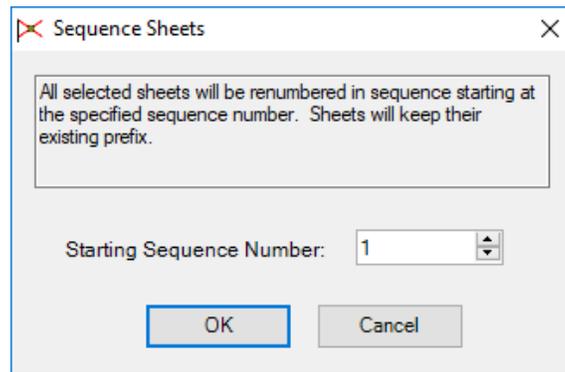
- Click the **Modify Sheet Prefix** button  at the bottom of the Sheet Navigator dialog.



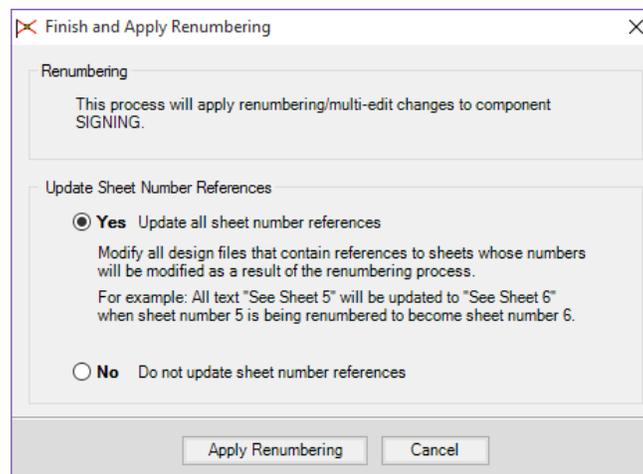
- In the *New Sheet Number Prefix* field, type in **S-**.
- Click **OK**. The sheet prefixes have now been assigned to those selected sheets.



8. Select all the sheets in the *Index*. Click the **Sequence Sheet Numbers** button  at the bottom of the Sheet Navigator dialog.
9. In the Starting Sequence Number field type **1** and click **OK**.



10. When finished making edits, select **Renumbering/Multi-Edit > Finish and Apply Changes**.

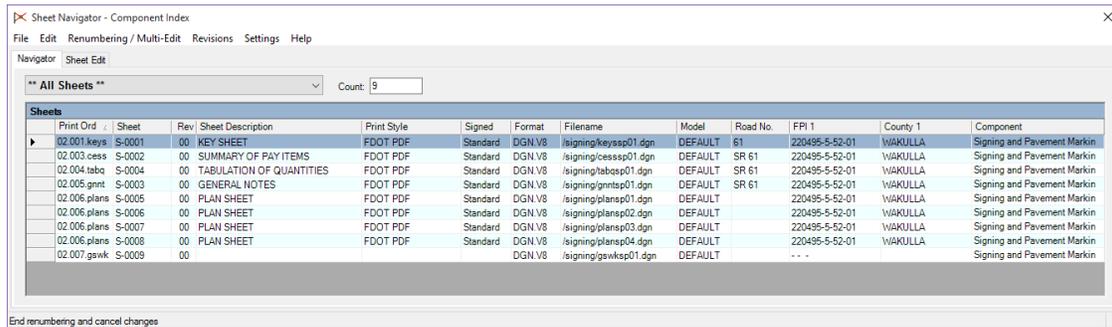


- a. Toggle **On Yes** to *Update all sheet number references*.
 - b. Click the **Apply Renumbering** button to apply the changes made. This will open the batch process again to update the MicroStation files.
11. Once finished all sheets will all be renumbered accordingly.

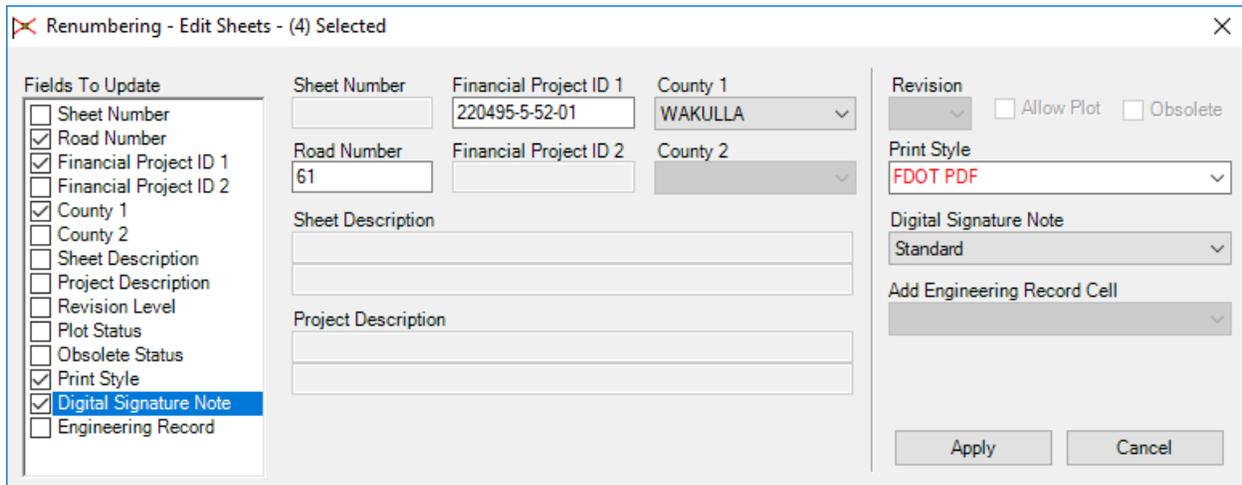
Exercise 12.3 Use Multi-Edit to Add/Modify Sheet Information

Some of the sheets in the index are missing additional sheet information such as the *Road Number*, *FPID #*, *Print Style* or *Sheet Description*. In this exercise the missing information will be added to multiple sheets

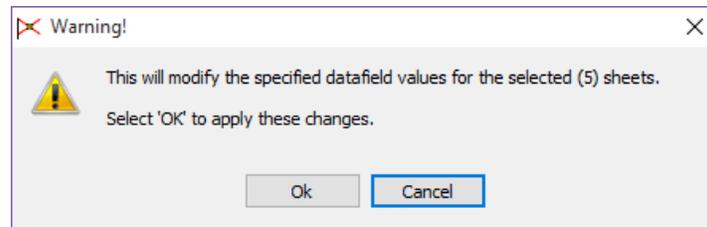
1. Continuing in the *DSGNP01.dgn* file.
2. Select the **Navigator** tab on the Sheet Navigator dialog. Extend the dialog out to view all of the available columns.



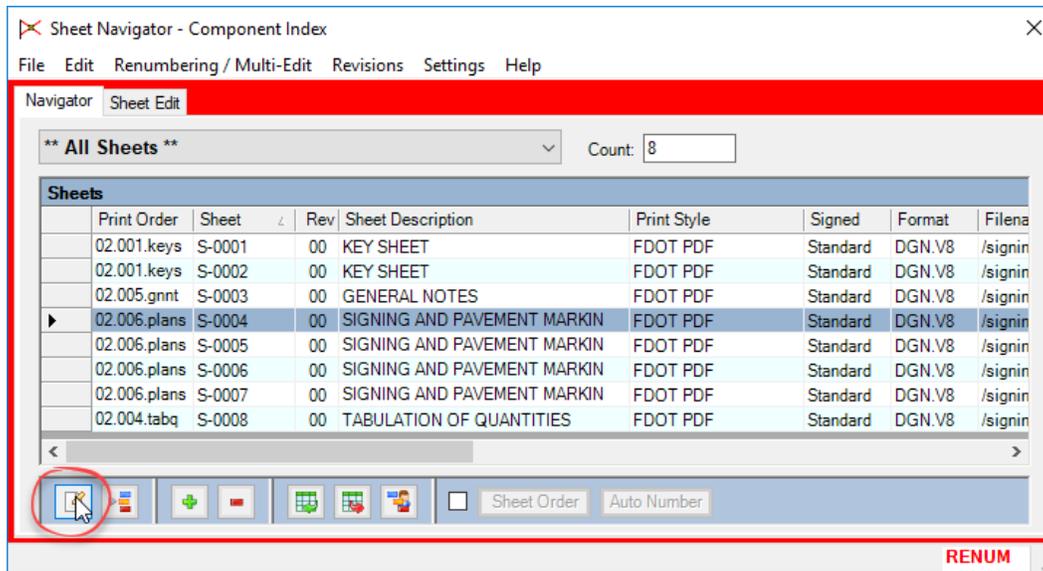
3. Select **Renumbering/Multi-Edit > Start process**.
4. Click **OK** on the Warning dialog.
5. Select the sheets in Sheet Navigator that need to be edited.
6. Select **Renumbering/Multi-Edit > Edit Sheet(s)**. This opens the Renumbering – Edit Sheets dialog.



7. Under *Fields to Update*, toggle **On Road Number**, **Financial Project ID 1**, **County 1**, **Print Style** and **Digital Signature Note**. This activates those fields in the dialog.
 - a. Key-in **61** in the *Road Number* field.
 - b. Key-in **22049555201** in the *Financial Project ID 1* field.
 - c. Select **Wakulla** from the *County 1* drop-down list.
 - d. Select **FDOT PDF** from the *Print Style* drop-down list.
 - e. Select **Standard** from the *Digital Signature Note* drop-down list.
 - f. Click **Apply**.



8. Click **OK** on the Warning dialog.
9. Select *PLANSPO1.dgn* in the Sheet Navigator dialog.
10. Click the **Edit Selected Sheets** button.



11. The Renumbering – Edit Sheet dialog opens. In the *Sheet Description* field key-in **SIGNING AND PAVEMENT MARKING PLANS**.
12. Repeat this for the remaining *Plan Sheets*.
13. Select **Renumbering/Multi-Edit > Finish and Apply Changes**.
14. Toggle **On Yes** to *Update all sheet number references*.
15. Click the **Apply Renumbering** button to apply the changes made. This will open the batch process again to update the MicroStation files.
16. Once finished all of the sheet information will all be changed accordingly.

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13 PRINTING TOOLS

OBJECTIVE

In this chapter the following topics will be covered:

- Printing from the Print dialog.
- Print to a PDF file.
- Create a Print Set file.
- Printing from Print Organizer.

INTRODUCTION

This section covers the basics of printing from within MicroStation. FDOT delivers several plot drivers that can be used to plot hard copies, 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.

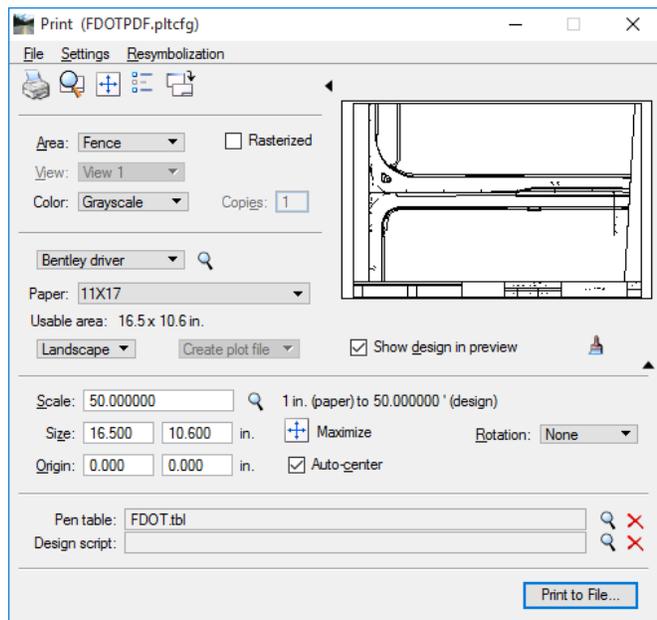
Designers can produce plots several different ways through MicroStation. Each district office may have its own set of printing procedures and plot drivers, contact the CADD manager if there are any questions regarding printing. The intention of this chapter is to explain two printing options, (1) printing through the Print dialog and printing through Print Organizer.

FDOT delivers a document in the FDOTSS4\Resources\plot\ directory that better explains all the delivered plot drivers. Review this document before printing, as there is important information that may be helpful.

MICROSTATION PRINT DIALOG

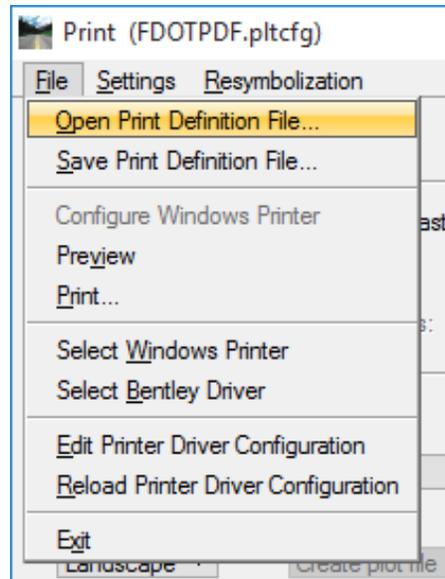
The Print dialog can be opened from the menu option *File > Print* or by using the keyboard shortcut *Ctrl P*. Depending on the office/site standards, the Print dialog opens with a standard plot driver. This is a Workspace Configuration setting and should be set by the CADD manager. In this course guide, the class will be using the *FDOTPDF.pltcfg* for printing to a PDF file.

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.



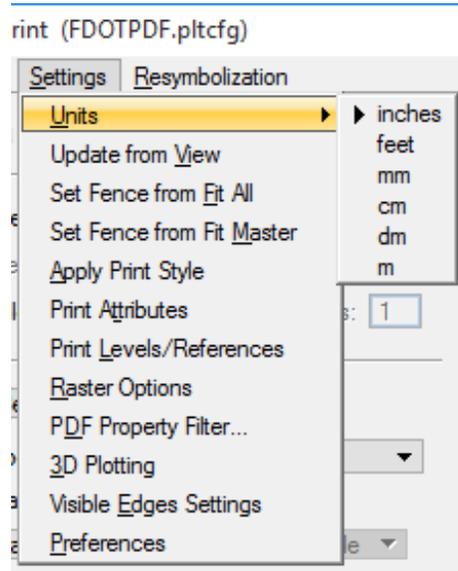
FILE MENU

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.



SETTINGS MENU

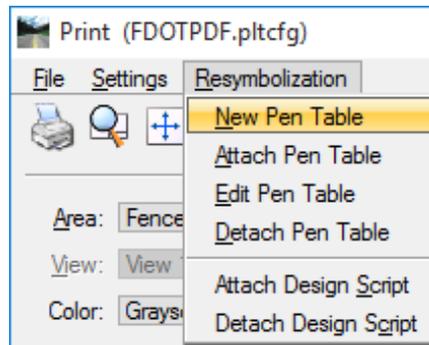
The *Settings* menu contains options for setting the *Units* (inches, feet, mm, cm, dm, m), *Update from View*, *Print Attributes* (like level symbology and whether to plot the print border along with several other attributes), *Set Fence from Fit All*, *Set Fence from Fit Master*, *Apply Print Style*, *Raster Options*, *3D Plotting* (ghosted), *Hidden Line Removal* and *Preferences*.



RESYMBOLIZATION MENU

Pen tables allow the designer to re-symbolize their design. In other words, the designer can produce a 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 *Resymbolization* 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 Pen Table can be modified to perform other functions as well.



PRINT ICONS



- Submits the print



- Opens a Print Preview window



- Maximizes the plot to fit the printable area



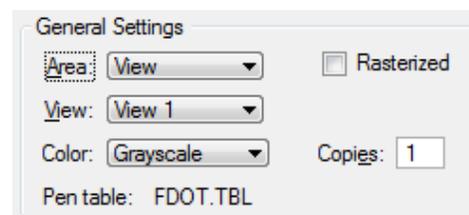
- Opens the Print Attributes dialog



- 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.

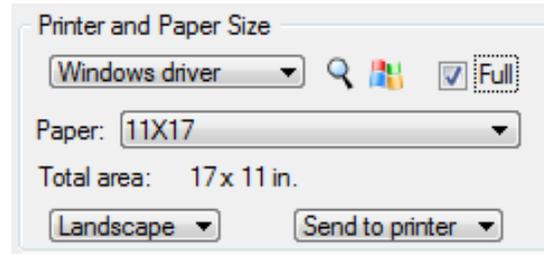


The *Rasterized* option is used for rendering and/or displaying transparencies. However, it does generate larger plot files and is a considerably slower process. When this option is selected MicroStation will convert both raster and vector data into a single raster image and send it to the printer.

Note The *Rasterized* toggle option is not for printing files with images attached.

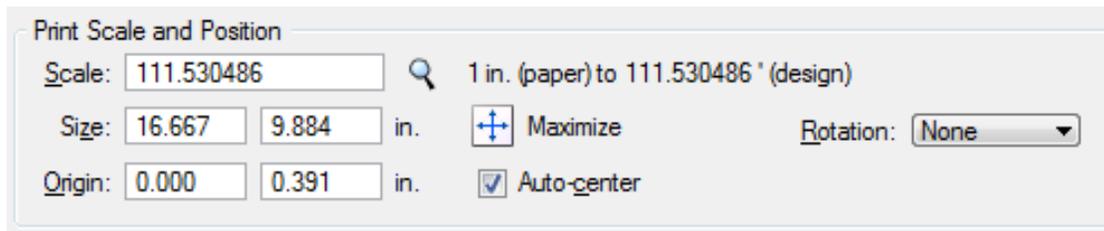
PRINTER AND PAPER SIZE

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 to plot as Landscape or Portrait. The *Full Sheet* toggle, will maximize the print size to the selected paper size when toggled on.



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.



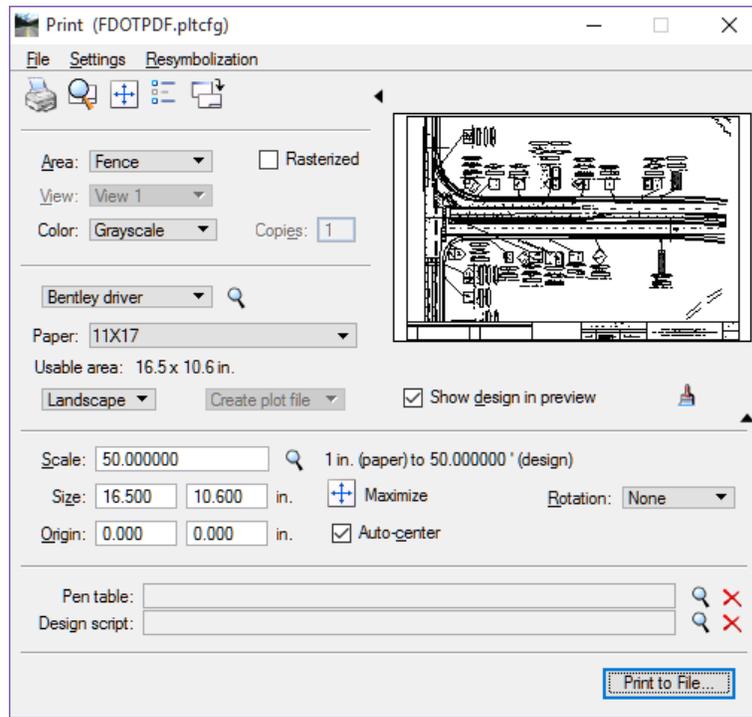
Note This is one of the settings that can be saved into the definition file so when loaded for each plot the scale will always be set to the correct scale.

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.

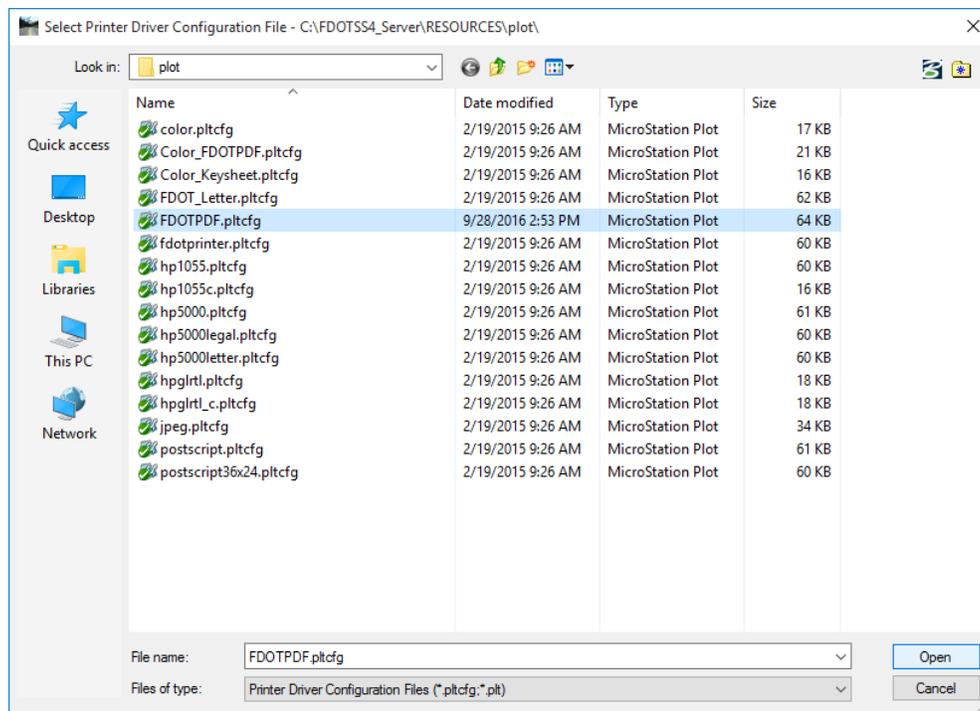
The right-hand side of the Print dialog shows a preview of what is to be printed.

Exercise 13.1 *Print to a PDF File with the Print Dialog*

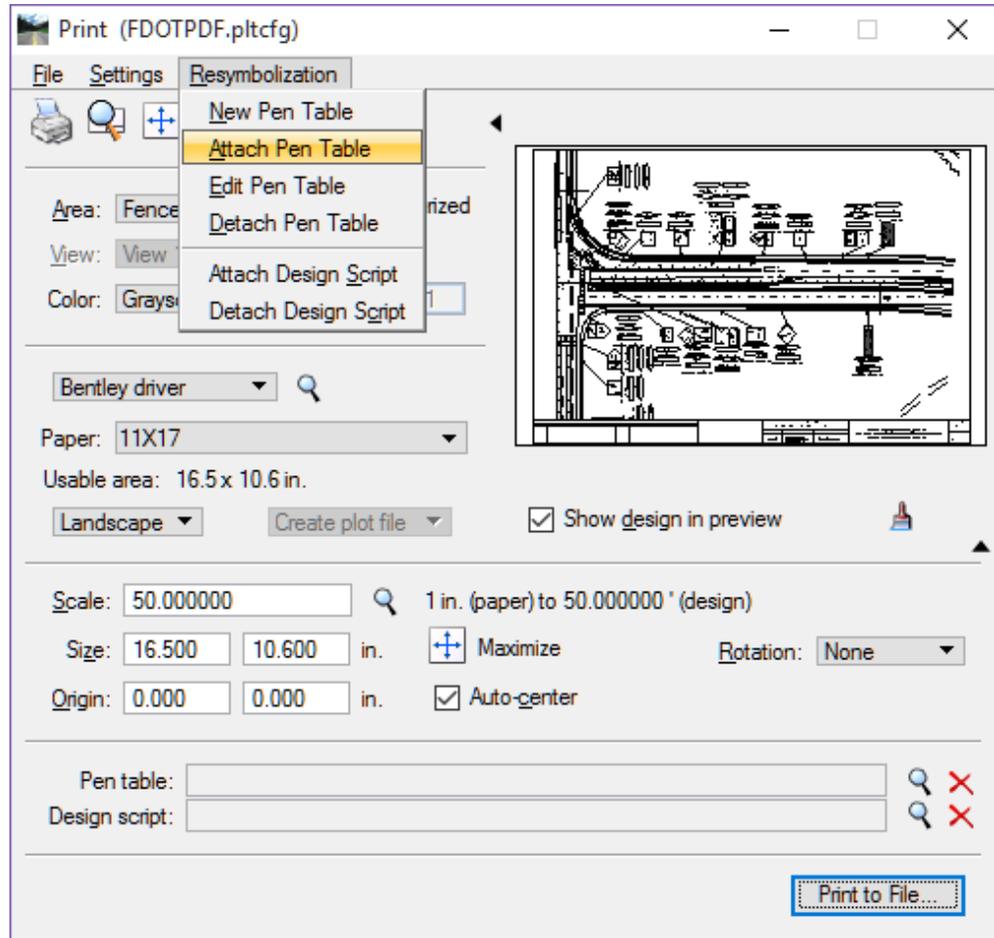
1. Open *PLANSP01.dgn* in the *signing* folder.
2. Place a fence on the sheets *plot border*. This is the red shape around the outside of the *sheet border*.
3. Select **File > Print**. This opens the Print dialog and sets a default plot driver.



4. In the Print dialog, select **File > Select Bentley Driver**. This opens Select Printer Driver Configuration Files dialog.

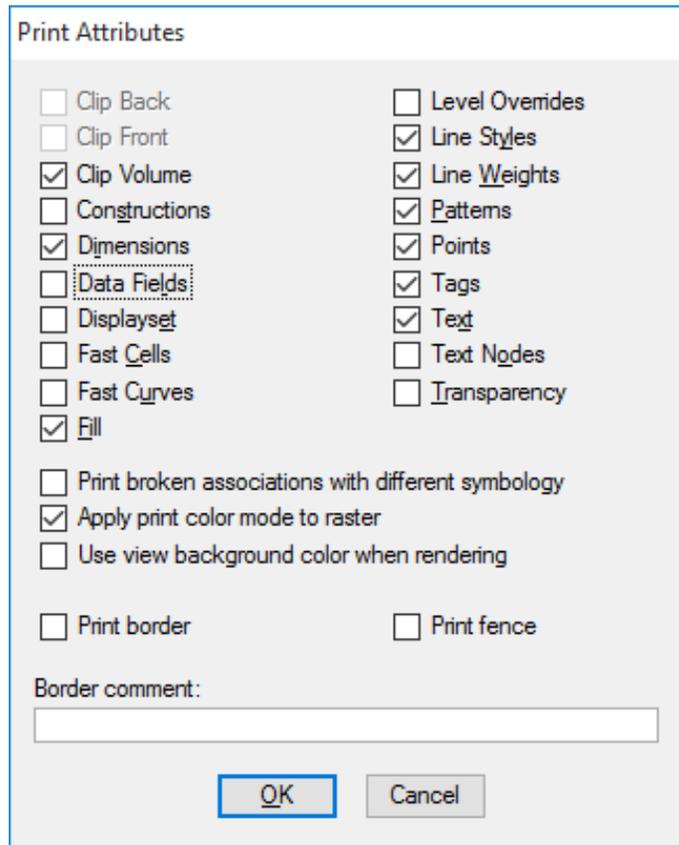


5. Browse to *FDOTSS4\RESOURCES\plot* and select **FDOTPDF.pltcfg**.
6. Click **Open**. This loads the **FDOT PDF** plot driver and changes the settings in the Print dialog.
7. From the Print dialog, select **Resymbolization > Attach Pen Table**.



8. Browse to *FDOTSS4\RESOURCES\plot* and select **FDO_GrayExisting.tbl**
9. Set the *Paper Size* to **11 x 17**. (This is the default setting in the plot driver.)
10. The *Print Scale* and *Paper Size* should automatically be set to **50.00** and **16.5 x 10.6** respectively. These values should come from the sheet size.

- Click the **Print Attributes** icon  or select **Settings > Print Attributes**. This opens Print Attributes dialog.



- Toggle **Off** *Constructions*. This will turn off the red plot border.
- Toggle **Off** *Data Fields*.

Note It is also recommended to toggle OFF the *Print Border* and *Print Fence* options.

- Click **OK**.

- Click the **Print** icon . This opens **Save Print As** dialog. The default location for the plot files is the *eng_data* folder under the discipline folder.
- Click **Save**. This accepts the default file name and location and creates the *pdf* file.
- From the FDOT Menu, select **Standard > Explore Current Working Directory**.
- Browse to the *signing > eng_data* folder and double-click on *PLANSP01.pdf*.
- Review the PDF file. Close the file when finished.

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:

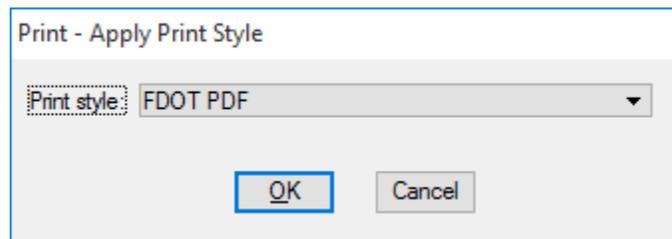
- Store print definition properties for easy re-use.
- Maintain drawing standards by managing display parameters, using particular scale, or specified pen table.
- Set properties for the entire print set, such as printer name or printer driver configuration file.
- Apply print definition properties when 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.

Exercise 13.2 *Using Print Styles with the Print Dialog*

Using Print Styles can drastically reduce the number of steps needed to complete this process because all settings can be predefined in the Print Style. For example, with a properly defined Print Style you would simply have to:

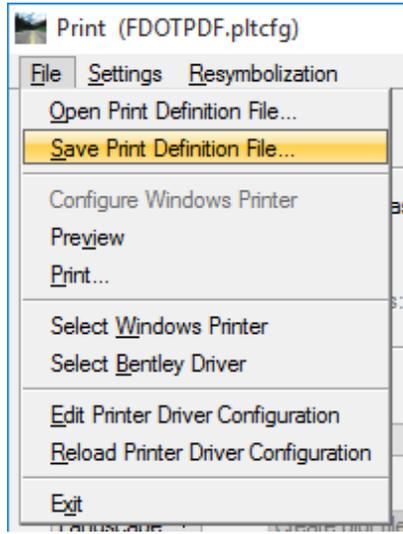
1. Continuing in the *PLANSP01.dgn* file, select **File > Print**. The Print dialog opens.
2. Select **Settings > Apply Print Style**.
3. Select the *Print Style* **FDOT PDF** from the list and click **OK**.



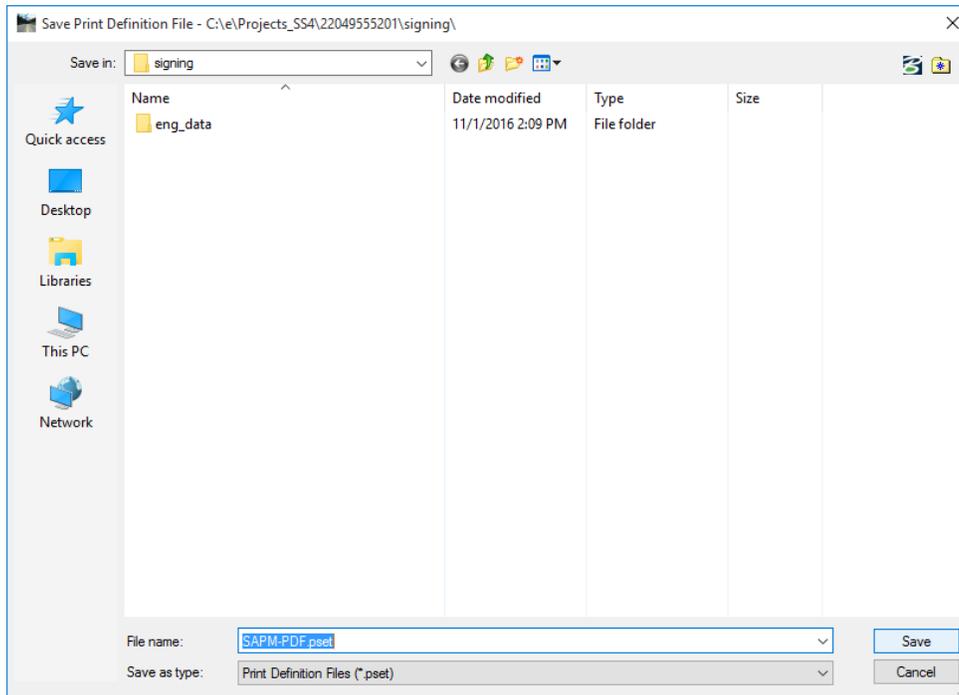
➤ **Save the Print Settings**

Now that the print settings are set as desired, it is a good idea to save these settings for future use and for other users to use so for consistent output.

1. In the Print dialog, select **File > Save Print Definition File**. This opens Save Print Definition File dialog.



2. Key-in **SAPM-PDF** for the *File name*.



3. Click **Save**. This saves the settings to a ***.pset** file that can be used in subsequent plotting jobs.
4. Close the Print dialog.

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, or drag and drop links from Project Explorer to compose print sets. (Sheet Navigator can also be used to create 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.

Note Project Explorer links are not covered in this course guide. For more information on Project Explorer links, please see the MicroStation help file.

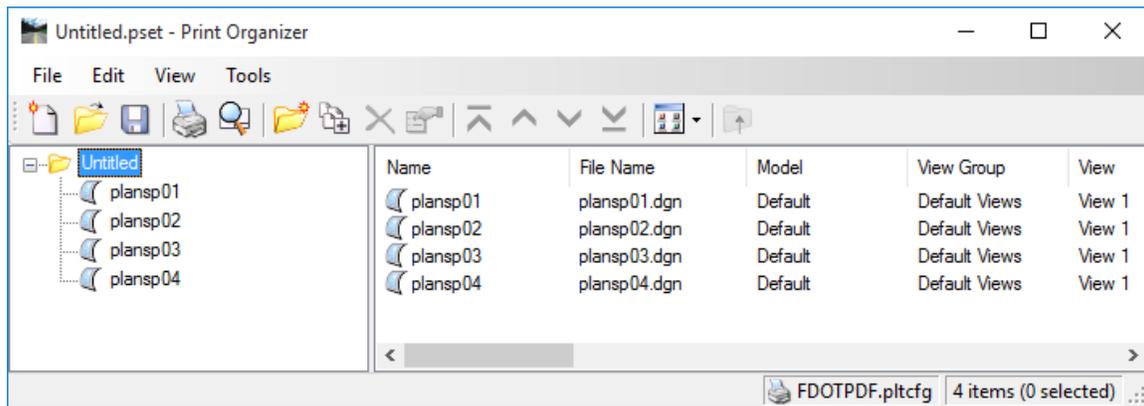
Print Organizer lets the designer work the same print driver configuration files as the Print dialog. This allows users to send printing either directly to the default system printer or to a file saved to print later.

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. 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 In-place Editing Feature** — Allows 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 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 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 DIALOG



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).

➤ **Creating a .pset File**

1. Open a design file.
2. From the MicroStation menu, select **File > Print Organizer**. The Print Organizer dialog opens.
3. From the Print Organizer, select **File > Save As**.
4. Navigate to the desired location.
5. Key-in the *File name*.
6. Click the **Save** button.
7. Once the *Print Set* (.pset) file has been created, the designer can begin to organize the *Print Set* by adding folders and/or Files.

➤ **Adding Folders to the Print Set**

Use 1 of the following methods:

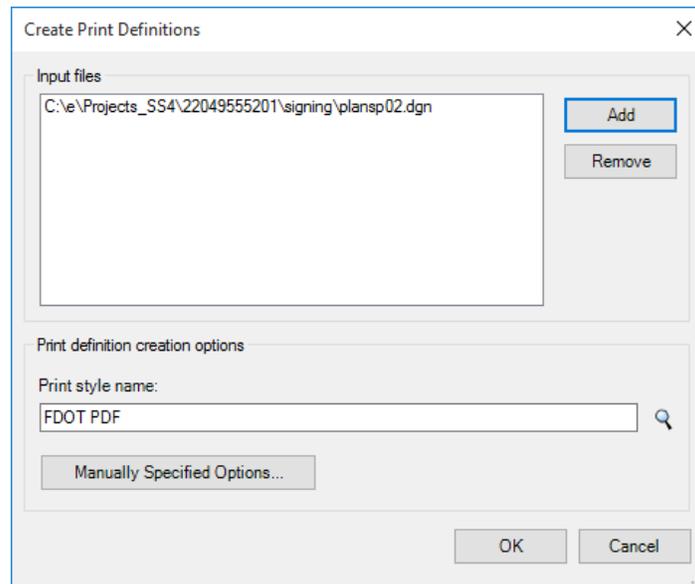
- From the menu, select **File > Add Folder to Set**.
- Click on the **Add Folder to Set** icon.
- Right-click on the parent folder and select **Add Folder to Set**.

➤ **Adding Files to the Print Set**

Use 1 of the following methods:

- From the menu, select **File > Add Files to Set**.
- Click on the **Add Files to Set** icon.
- Right-click on the parent folder and select **Add Folder to Set**.
- Drag and Drop files from Windows Explorer.

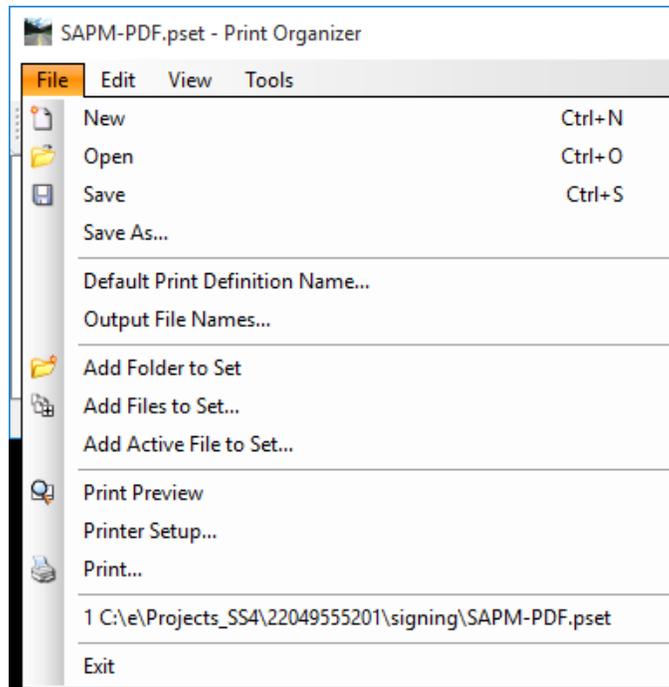
When adding folders and/or files to the *Print Set*, the designer is given the opportunity to apply a Print Style or to manually define options.



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.

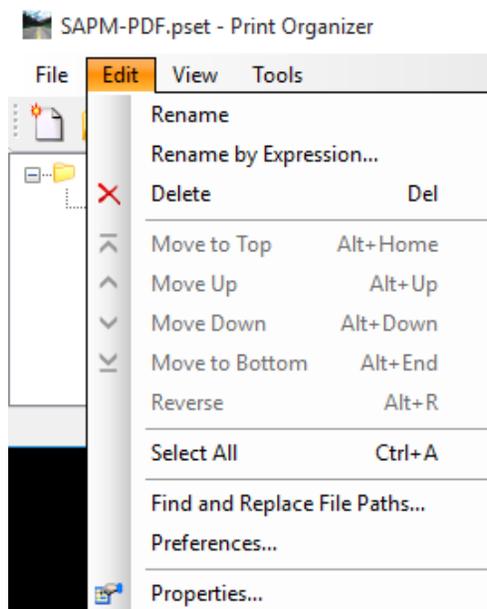
FILE MENU

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 Print, Selecting and Editing a Print Driver/Configuration, and Reloading the Driver after Editing.



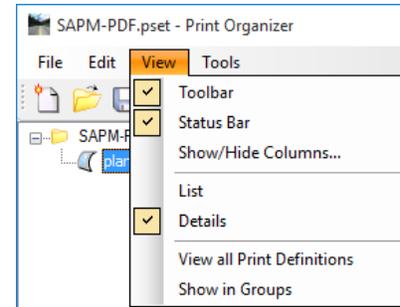
EDIT MENU

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).



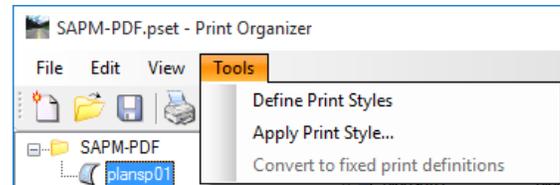
VIEW MENU

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 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



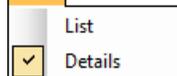
- Moves selected Print Definition up one position in the Print Definition pane



- Moves selected Print Definition down one position in the Print Definition pane



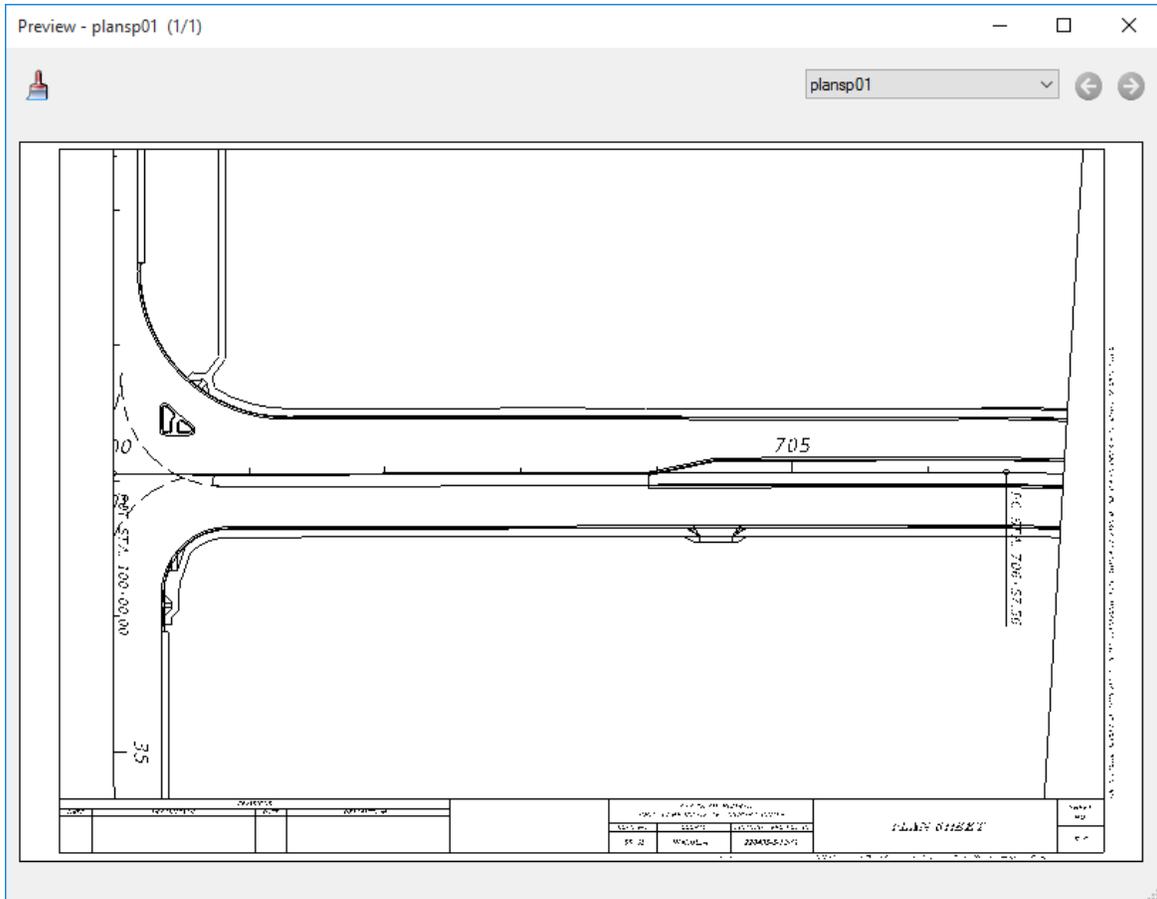
- Moves selected Print Definition to the Bottom of the list in the Print Definition pane



- Toggles between Details and list view for the Print Definition

PRINT 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**.



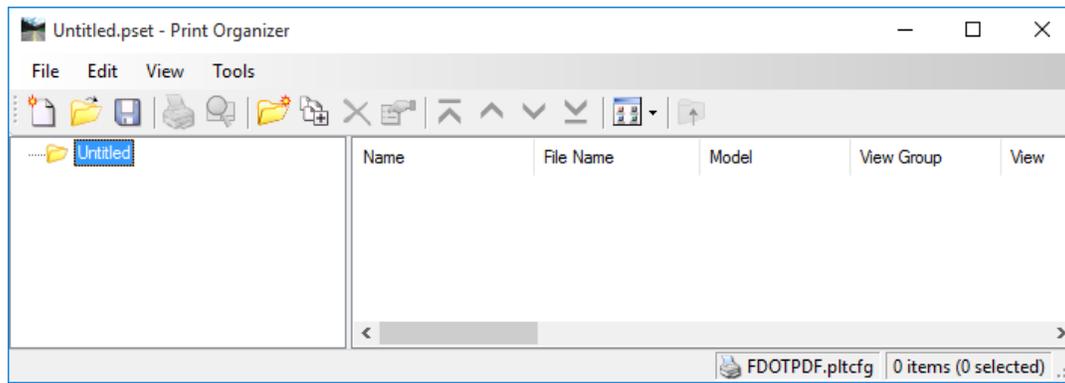
Exercise 13.3 *Printing with Print Organizer*

➤ **Open and Modify an Existing Print Set**

In the previous exercise, a Print Set (*.pset) file was created 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 designer will open and make specific changes to the SAPM-PDF.pset file.

❖ **Open an Existing Print Set (.pset) File**

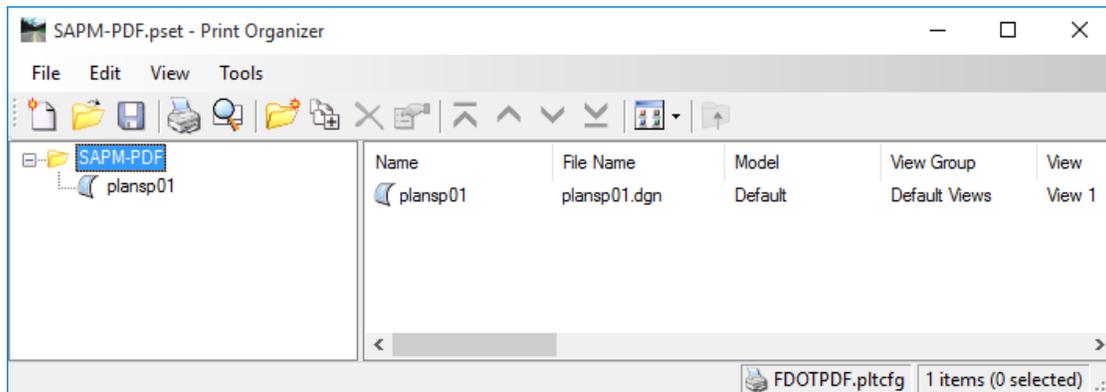
1. Open the *DSGNSP01.dgn* file.
2. From the MicroStation Menu, select **File > Print Organizer**. This opens the Print Organizer dialog.



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\22049555201\signing* folder.

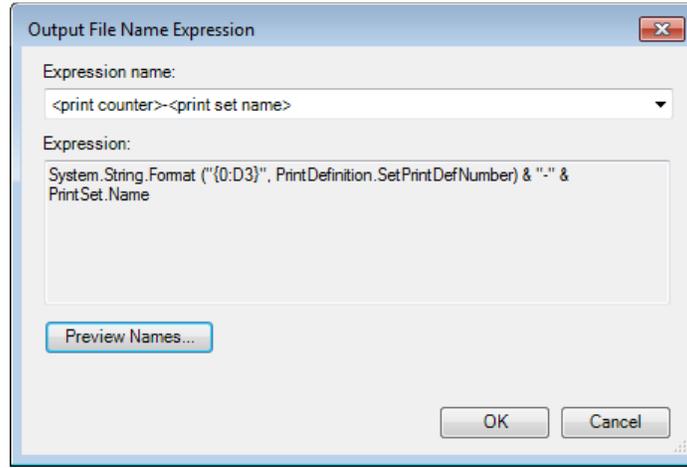
4. Select the **SAPM-PDF.pset** file created in the previous exercise. The *Print Set file* information will now populate the Print Organizer dialog.



❖ **Modify a Print Set – Changing the Output File Name**

In this exercise, the designer 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.

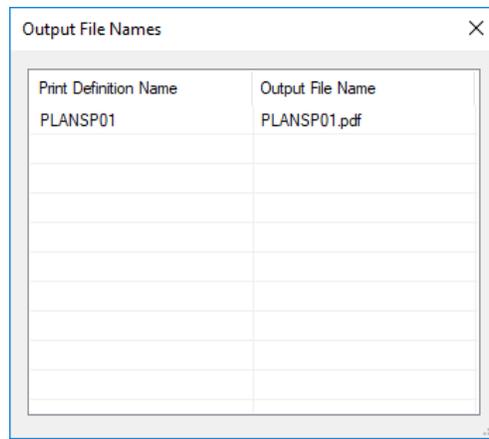
1. From the Print Organizer menu, select **File > Output File Names**. This will open the Output File Name Expression dialog.



2. Click the **Preview Names** button. This will open the Output File Names dialog. Notice the default *Output File Name* is *001-SAPM-PDF.pdf*.
3. On the Output File Name Expression dialog, 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 *Expression name* list, select **<print definition name>**. Notice the *Output File Name* has changed to *PLANSP01.dgn*.



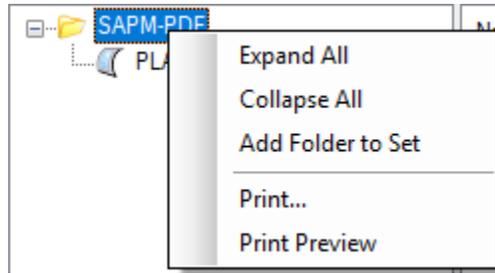
5. Close the Output File Name dialog.
6. Click the **OK** button on the Output File Name Expression dialog to set the selected *Output File Name Expression* to the **Print Definition Name**.

Note All files added to this Print Set will now have the same output file name until changed by the designer.

❖ Modify a Print Set – Add Folders to a Print Set

In this exercise, the designer 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 different subcategories.

1. From the Print Organizer, right-click on the **SAPM-PDF** category.



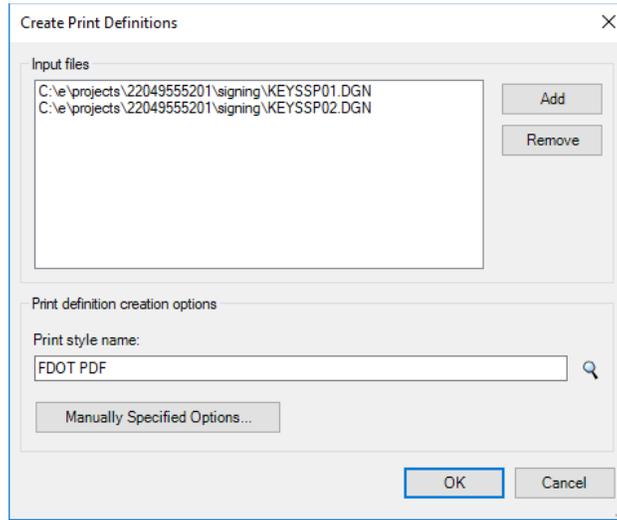
2. Select **Add Folders to Set** from the contextual menu. This will pop in a new folder under the **SAPM-PDF** Print Set folder.
3. Rename the folder **Key Sheets**.
4. Repeat steps 1-3 for the following folders.
 - Plan Sheets
 - Summary of Quantities
 - General Notes
 - Tabulation of Quantities
 - GuidSIGN Sheet

Note *If the folders are out of order use the arrow icons to move the folders into the desired position.*

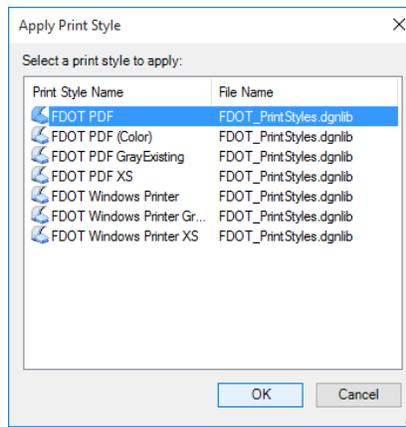
5. From the Print Organizer toolbar, click the **Save** icon .

❖ **Modify a Print Set – Add Files to a Print Set: Drag & Drop**

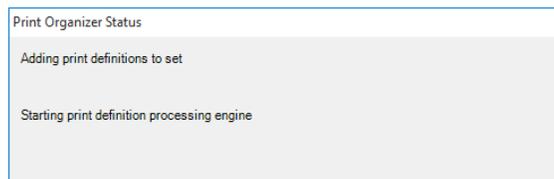
1. From the FDOT Menu, select **Standard > Explore Current Working Directory**. This will open Windows Explorer to the *signing* folder of the current project.
2. Select *KEYSP01.dgn* and *KEYSP02.dgn* in the Windows Explorer window.
3. Drag and drop both files on the **Key Sheet** folder category in Print Organizer. This opens the Create Print Definitions dialog.



4. Click the *magnifying glass* icon next to the *Print Style Name* select the **FDOT PDF** Print Style from the list of *Print Style Names*.



5. Click the **OK** button on the Apply Print Style dialog.
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 FDOT delivered *FDOT_PrintStyles.dgnlib* (FDOT PDF), the Print Set Pen Table may revert to the standard pen table for that Print Style.

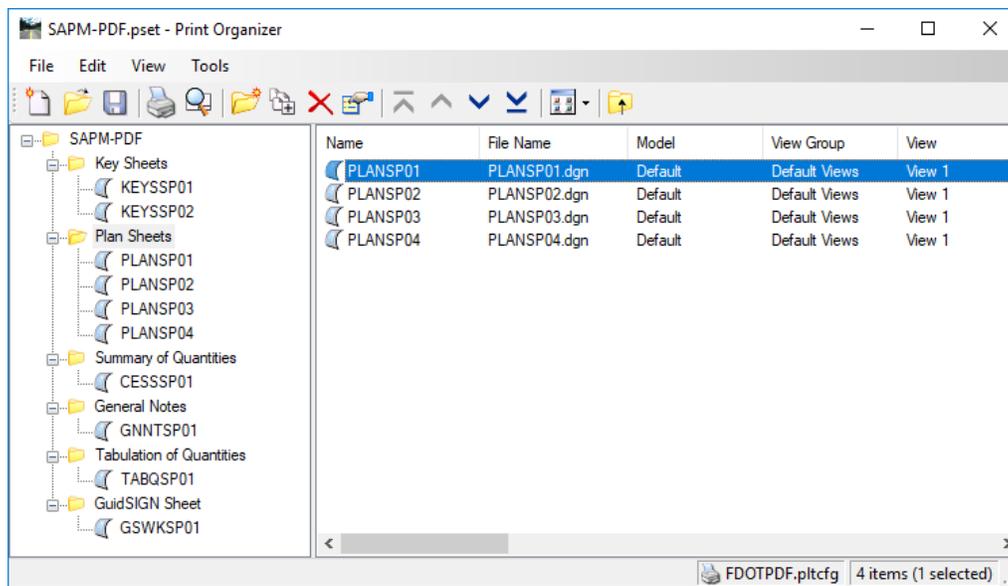
❖ Modify a Print Set – Add Files to Set: Icon

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 Style Names*.
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 1-8 placing the appropriate sheet files in the associated folders. Make sure to place the existing *PLANSP01.dgn* Print Definition in the **Plan Sheets** folder.

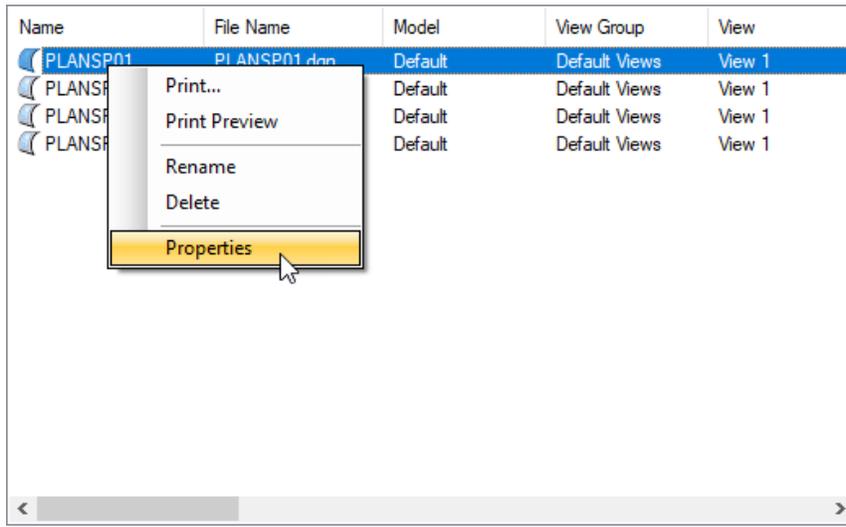
❖ Modify a Print Set – Setting the Pen Table for a Single File

This exercise will apply a Pen table to one of the Print Definitions in the existing Print Set.

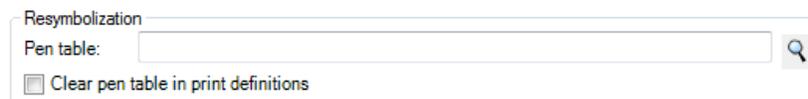
1. In the *Print Definitions* pane, highlight any one of the **Print Definitions**.



- Right-click on the **Print Definition**.



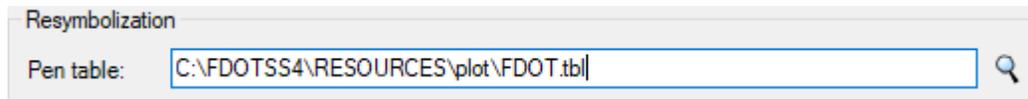
- Select **Properties** from the contextual menu. This opens the Modify Properties dialog.



- On the **Main** tab, in the *Resymbolization* section of the dialog, click the *magnifying glass* icon next to the **Pen Table** field. This opens the **Select Pen Table** dialog. Navigate to `\\FDOTSS4\RESOURCES\plot` folder and select the *FDOT.tbl* Pen Table.

Note Key Sheets will use the *FDOT_Keysheet* Pen Table and Plan Sheets will use the *FDOT_GrayExisting* Pen Table.

- Click the **Open** button.

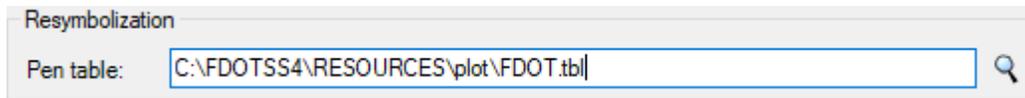


- Click the **OK** button on the Properties dialog to accept the selected *Pen Table*.
- From the Print Organizer menu, select **File > Save** to save the changes made to the **SAPM-PDF.pset** *Print Set* file.

❖ **Modify a Print Set – Setting the Pen Table for Multiple Files**

This exercise will apply a Pen table to all of the Print Definitions in the existing Print Set.

1. Highlight the **SAPM-PDF** folder.
2. On the Print Organizer dialog, select **View > View all Print Definitions**.
3. In the *Print Definitions* pane, highlight the *KEYSSP01.dgn* file.
4. Hold the *Shift* key on the keyboard down and click the *GSWKSP01.dgn* file.
5. Right-click on the highlighted list of **Print Definitions**.
6. Select **Properties** from the contextual menu. This opens the Modify Properties dialog.
7. On the **Main** tab, in the *Resymbolization* section of the dialog, click the *magnifying glass* icon next to the **Pen table** field. This opens the Select Pen Table dialog. Navigate to *\\FDOTSS4\RESOURCES\plot* folder and select the *FDOT.tbl* Pen Table.



8. Click the **Open** button.
9. Click the **OK** button on the Properties dialog to accept the selected *Pen Table*.
10. From the Print Organizer menu, select **File > Save** to save the changes made to the **SAPM-PDF.pset** *Print Set* file.

➤ **Preview Sheets in The Print Set**

This exercise will show how to preview the sheets in the Print Set.

1. On the Print Organizer dialog, right-click on the **SAPM-PDF** folder and select **Print Preview** from the contextual menu. This will open the Preview dialog.
2. Use the **Preview Navigation** buttons or drop-down list to review the sheets in the Print Set.

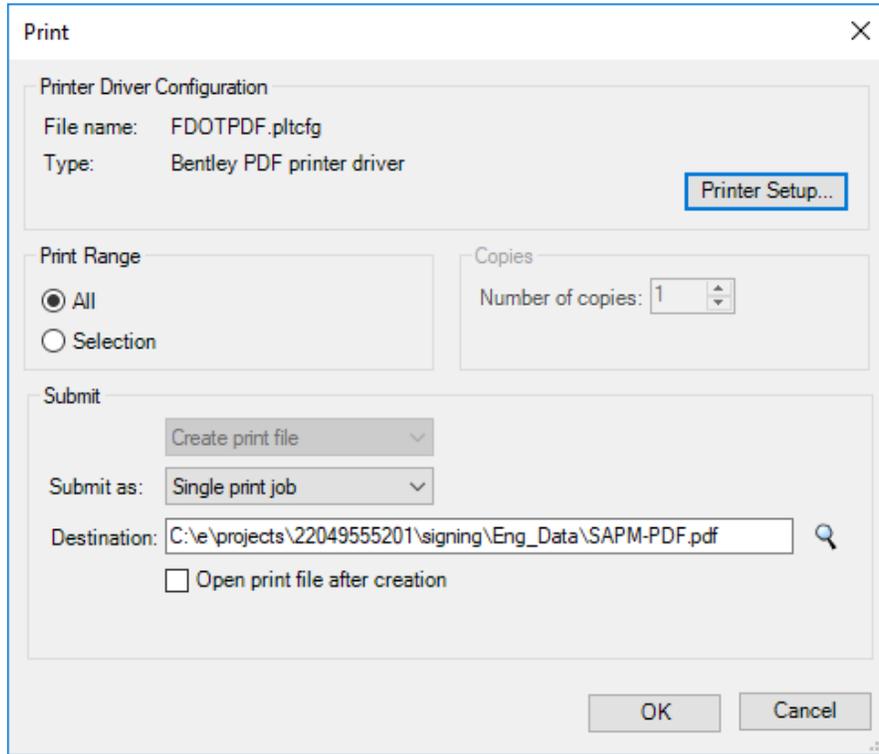


3. Close the Preview dialog by clicking the **X** in the upper right corner of the dialog.

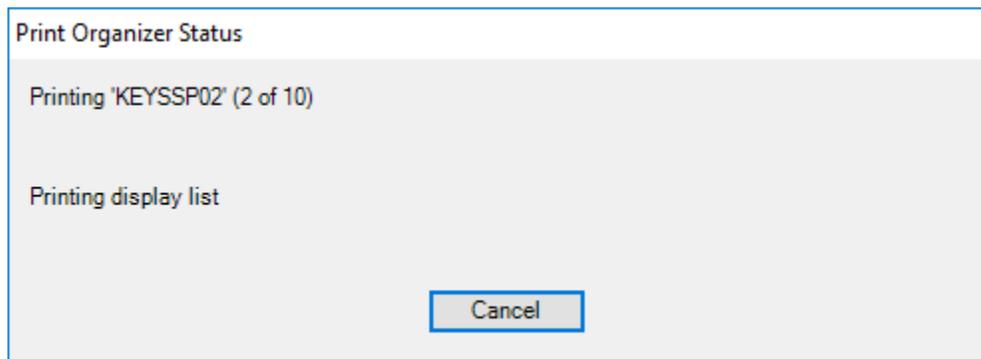
➤ **Printing the Sheets**

This exercise will cover plotting all the sheets in the Print Set to a PDF using Print Organizer.

1. On the Print Organizer dialog, right-click on the **SAPM-PDF** 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. A Print Organizer Status dialog will appear as Print Organizer runs through its process.



5. From the FDOT Menu, select **Standard > Explore Current Working Directory**. This will open Windows Explorer to the *signing* folder of the current project.
6. Double-click on the **eng_data** folder.
7. Open and review the **SAPM-PDF.pdf** file.