

Session 19

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Producing Traffic Plans with the FDOT2004 CADD Software

Topic Description

This session will give an overview of how to prepare Traffic Plans using CADD with an emphasis on efficiency and automation of quantities. The session will also provide an overview of new tools under development for signalization and discuss future direction of CADD for Traffic Plans.

Speaker Biography

Esther has worked for FDOT for 22 years. The first eleven years in District 1 doing Traffic Plan design and Roadway design. The last eleven years she has been in the Engineering/CADD Systems office in Central office doing CADD support and training.

Creating Traffic Plans for FDOT

Using the Tools to Work Efficiently

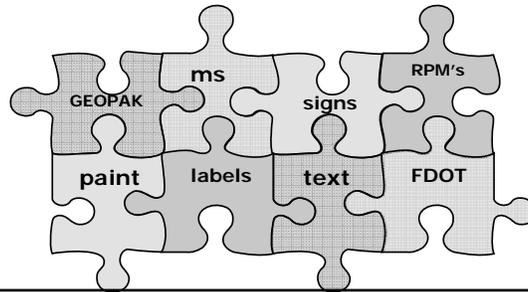
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Topics

- Traffic Plans SiteMenu
- Using GEOPAK
- Drawing pavement markings
- Creating sign assembly layouts
- Creating Signalization plans
- Creating Lighting plans
- Creating ITS plans
- Placing Labels on Traffic Plans
- Generating quantities
- Creating Tabulation of Quantity Sheets

Overview

- There are several CADD tools available for the efficient creation of various parts of Traffic plans. Creation of Signing & Pavement Marking is approximately 100% automated by use of the CADD tools. Tools for Signalization, Lighting and ITS plans are not as advanced but all of the symbology and standard cells have been created with some automation tools to aid the user in the design and layout.



Traffic Plans SiteMenu



- From the Traffic Plans SiteMenu the user can create all standard files and place any standard sheet, note or cell for all Traffic Plan components.
- Several programs are available to automate standard procedures, such as the SignCell program, population of the tabulation of quantity sheets and placement of cells.

GEOPAK / Civil Extension Tools



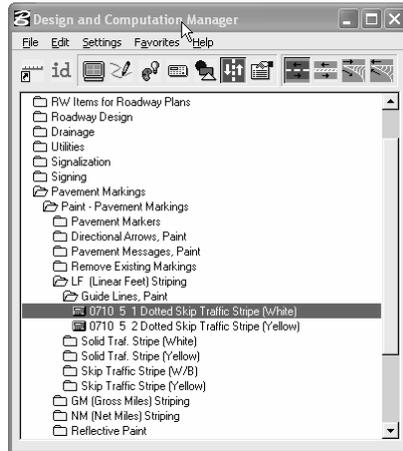
- Pavement Marking Program
- Draw Cell Group
- Design and Computation Manager
 - Drawing and quantity generation
- Plan View Labeler
- Sheet Layout

Signing & Pavement Marking Plans



- There are many tools available for the efficient creation of Signing & Pavement Marking Plans. Some are available from the FDOT SiteMenu and some are part of GEOPAK / Civil Extension.
- To automate this process the flow of creation is very important. This will be covered in the following slides.

Drawing Pavement Markings



- The Pavement Marking tools can be evoked from the Plans Preparation tool box or from the D&C Manager dialog.

Drawing Striping

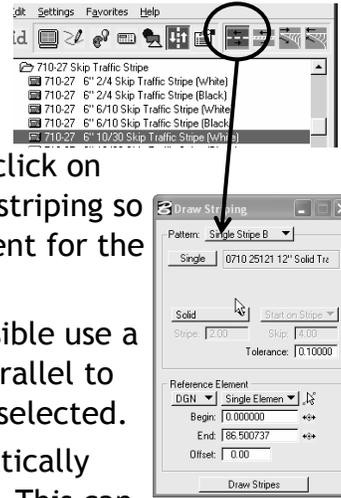
Overview



- Associate “patterns” to your most common striping components.
- You must have a reference element. This can be the baseline chain, edge of pavement or any other element(s) that the new stripe will be parallel to.
- If the “reference” element is in a reference file, then the *selection set* method must be used.
- Stop bars, cross walks, nose paint and pavement messages are drawn using other commands and tools.

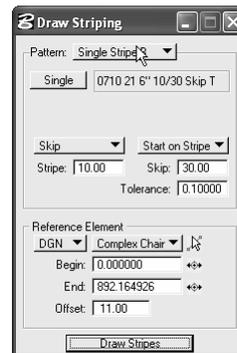
Solid Striping

- Select the appropriate pay item and click on *Draw Striping*. Note: Start with solid striping so it can be used as the reference element for the skip striping.
- Define the reference element. If possible use a chain, but if the lane lines are not parallel to the baseline a DGN element must be selected.
- The Begin and End points will automatically populate from the selected elements. This can be modified clicking on the begin or end distance button and then data pointing where the stripe needs to begin or end.
- Define the offset and click on *Draw Stripes*.



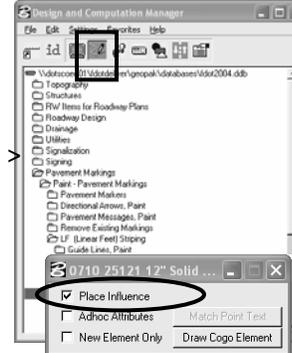
Skip Striping

- Select the pattern.
- Enter the stripe and skip length (if needed). Note: 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 place the stripe in reverse of the driving direction.
- Define the *Tolerance*.
- Identify reference element.
- Adjust *Begin* and *End* points as necessary.
- Define offset. If you have multiple lanes, give a datapoint for every lane.



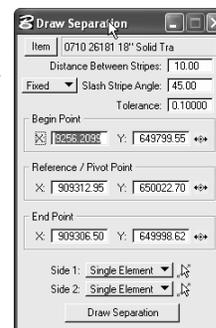
Stop Bars and Cross Walks

- Stop Bars - In Design Mode, double click on 24" solid traffic stripe. The message field in MicroStation will prompt "Construct Perpendicular from Element > Identify element": Select the adjoining solid yellow edge line to draw the stop bar. Note: *Place Influence* must be toggled on.
- Crosswalks - Select 12" solid traffic stripe, with place influence toggled on, draw a line the length/width of the crosswalk. Double click on the item again, define the width of the crosswalk as prompted to copy parallel and datapoint to accept.



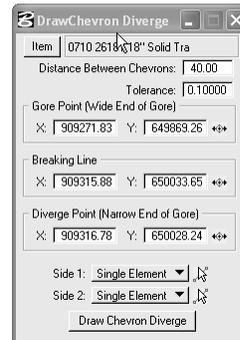
Drawing Separation Striping

- Select the item, then define the distance between stripes, stripe angle and tolerance. The stripe angle is set as either *Fixed* or *Variable*. Fixed stripes are parallel to the first stripe, relative to the Reference Point. If set to variable, the angle of the stripe is maintained between the stripe and the location side, even around curves.
- Use the solid stripe as side references.
- Identify the sides. Side 1 should be the line the stripe is drawn from and side 2 is the line the stripe is drawn toward.
- Click on *Draw Separation*.



Drawing Diverging Gore Markings

- Select the item.
- Define the distance between chevrons and the tolerance.
- Set the Gore Point and the Diverge point.
- Set the breaking line. Note: this point is very important as the lines are 45 degrees from this reference.
- Identify the sides. The order doesn't matter. However the software begins on side 2 and usually side 2 will be the longer segment.
- Click on *Draw Chevron Diverge*.

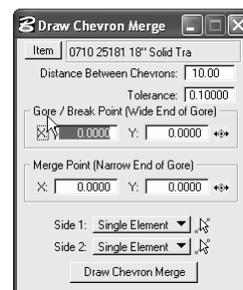


The screenshot shows the 'Draw Chevron Diverge' dialog box with the following fields and values:

- Item: 0710 2618 18" Solid Tra
- Distance Between Chevrons: 40.00
- Tolerance: 0.10000
- Gore Point (Wide End of Gore): X: 909271.83, Y: 649869.26
- Breaking Line: X: 909315.88, Y: 650033.65
- Diverge Point (Narrow End of Gore): X: 909316.78, Y: 650028.24
- Side 1: Single Element
- Side 2: Single Element
- Draw Chevron Diverge button

Drawing Merging Gore Markings

- Select the item.
- Define the distance between chevrons and the tolerance.
- Set the Gore Point. Note: for Merging gore markings, this also identifies the break point.
- Set the Merge point.
- Identify the sides. The order doesn't matter. However the software begins on side 2 and usually side 2 will be the longer segment.
- Click on *Draw Chevron Merge*.

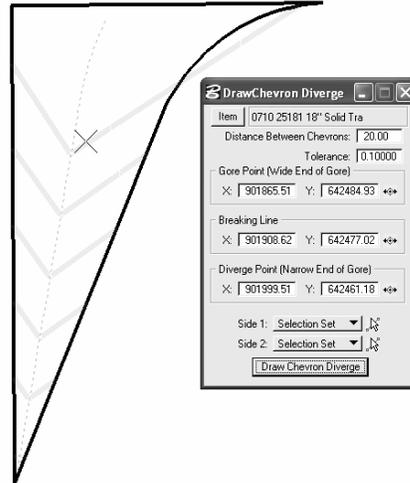


The screenshot shows the 'Draw Chevron Merge' dialog box with the following fields and values:

- Item: 0710 25181 18" Solid Tra
- Distance Between Chevrons: 10.00
- Tolerance: 0.10000
- Gore / Break Point (Wide End of Gore): X: 0.0000, Y: 0.0000
- Merge Point (Narrow End of Gore): X: 0.0000, Y: 0.0000
- Side 1: Single Element
- Side 2: Single Element
- Draw Chevron Merge button

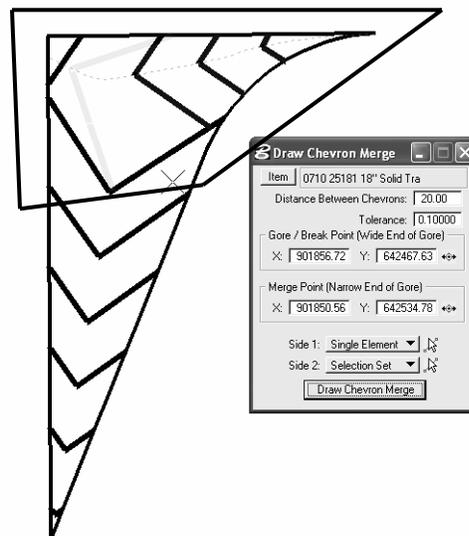
Drawing Island Markings

- This requires the use of both the Chevron Diverge and Chevron Merge dialogs.
- Begin with drawing the diverging section. Note: this may require some minor cleanup of lines and drawing temporary lines.



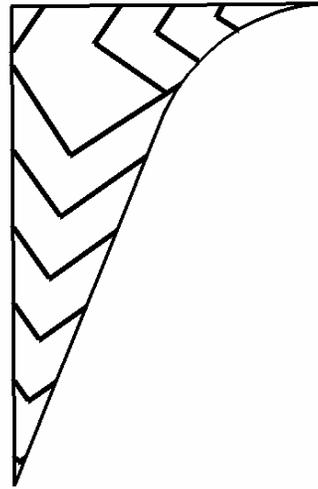
Drawing Island Markings

- Using the side of the island and the top chevron, identify the area for merging chevrons.
- Again this may require minor cleanup and the creation of temporary lines.



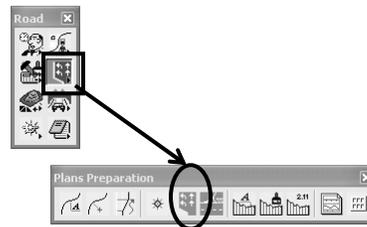
Drawing Island Markings

- The final product should be a standard island as accurately spaced as the geometrics of the island will allow.



Pavement Messages and Arrows

- Open Draw Cell Group by Feature.
- Use the solid paint lines as reference elements.
- Using the magnifier icon, browse to the category in the D&C Database and select the group of items. This will then populate the drop down list.
- Enter the *Offset* distances & *Spacing*.



Note: The layout of the cells are from top to bottom with the top being the closet to the "beginning".



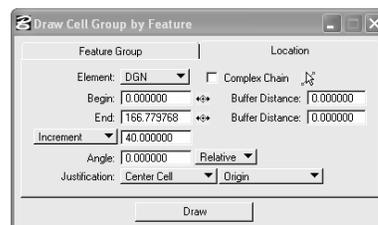
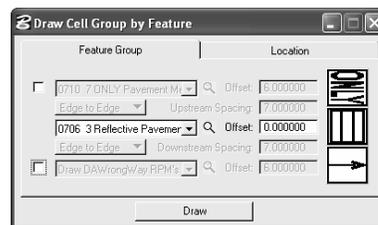
Pavement Messages and Arrows

- Click on the Location tab.
- The element can be a DGN element or a chain. Normally it will be a DGN element such as an edge line.
- When defining the element, datapoint on the element once to select it and a second time at the endpoint that will be the “Begin” point of the element.
- Define the “method” by which the cells will be spaced. This can be set to increments, maximum distances, etc.
- If the cell is to be rotated, define the rotation.
- Define *Justification*. Distances are based on justification.



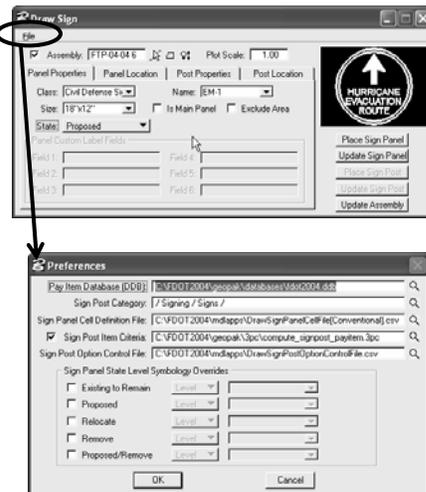
Raised Pavement Markers

- RPM's do not have to be shown, they can be calculated using adhoc attributes on the paint, but it is much easier to verify quantities if they are shown.
- The spacing “method” is increment and justification is Center Cell.



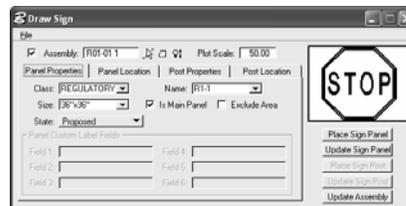
Placing Sign Assemblies

- Available from the Traffic Plans SiteMenu > Signing & Markings > Sign Cell Program, this program automates the placement of the sign cells, the support cell, pay items and all applicable labels.
- Before using the program the user should check the preferences and modify any that are incorrect. These are then saved in a resource file.



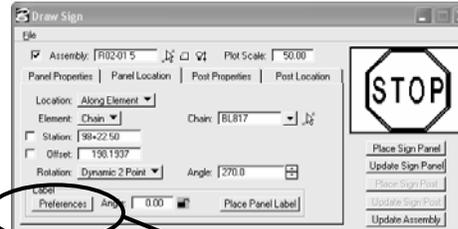
Draw Sign - Panel Properties

- By default all panels are placed as assemblies (a grouping of the sign panels, support & labels).
- After selecting the sign panel from the class and name drop downs, (normally the main panel is selected first) set the size and the state.
- Identify if this is a new assembly or an existing assembly.
- "Is Main Panel" must be toggled on for all panels that are the defining width of the sign assembly. The Panels that have "Exclude Area" toggled on are not included in the calculation of the pay item.
- Set *Plot Scale* and click on the Panel Location tab.

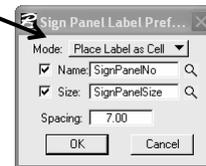


Draw Sign - Panel Location

- Set the location as either by *Origin* or *Along Element*. The Element can be a chain or a DGN element. The Station and Offset can be set. The rotation is set by Dynamic 2 point, absolute or relative.

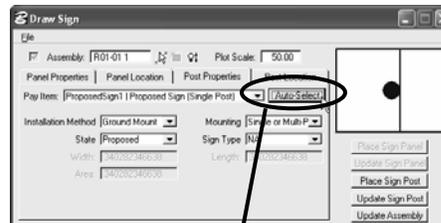


- Set the label preferences.
- Click on *Place Sign Panel* and datapoint to define the location. If the sign panel label is toggled on, it will prompt to place the labels. However the labels can be placed at anytime in the future if desired.

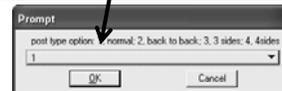


Draw Sign - Post Properties

- After placing the panels the support can be placed from the Post Properties tab.
- Select the installation method, state, mounting and sign type if applicable.

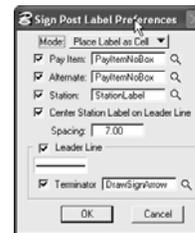
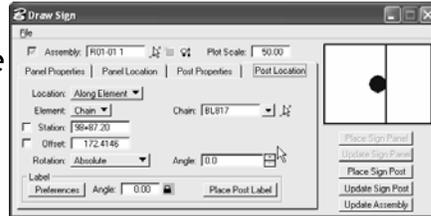


- Click on the Identify existing sign assembly icon, and select the sign panel. Then click on the Auto-Select button. The program will use the information stored on the sign panels and the installation information set on this tab to calculate the support and pay item information.



Draw Sign - Post Location

- Set the location as either by *Origin* or *Along Element*. The Element can be a chain or a DGN element. The Station and Offset can be set. The rotation is set by Dynamic 2 point, absolute or relative.
- Set the label preferences.
- Click on *Place Sign Post* and datapoint to define the location. If sign post label is toggled on, it will prompt to place the labels. However labels can be placed at anytime.



Draw Sign - Misc. Features

- Copy sign assembly by selection set - this allows the user to select a sign group that has already been placed in the file and use it at a new location without re-entering the information.
- Update Sign Panel allows the user to change sign panel fields or sizes without redrawing all of the information.
- Update assembly will update the entire sign assembly including panel and post properties.

Special Signs



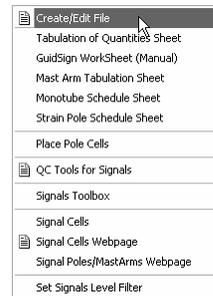
- Design special signs using GuidSign (or by some other method if desired).
- The sign can then be placed in plan view from the DrawSign program or by grouping the sign detail in the Guide Sign Worksheet and placing it in the plan sheet as a no name cell.
- Tag attributes manually.



Note: a more automated process is being reviewed for this task.

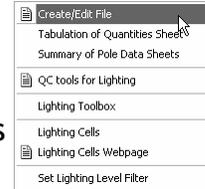
Signalization Plans

- The creation of a signalization design file consists mostly in the placement of cells and labels. The FDOT Signal menu provides for all standard signal cells and symbology. A toolbox is available to aid in the efficient retrieval of these cells and standards.
- Currently a signalization program is underway that will aid in the layout of a signalized intersection, including intelligent tagging of the elements for quantity purposes.



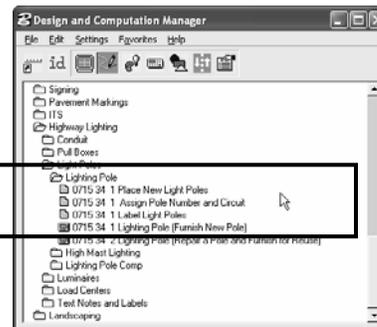
Lighting Plans

- The creation of a lighting design file includes the initial design and calculation for the placement of the lights then in the actual placement of cells and labels. The design of the lighting is done through an external program, the placement of the lights can then be done manually in MicroStation or through a 3PC file ran from the Design & Computation Manager program. The FDOT Lighting menu provides all standard lighting cells and symbology. A toolbox is available to aid in the efficient retrieval of these cells and standards.



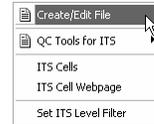
Drawing Light Poles and Labels from the D&C Manager

- Placing light poles and labels from the D&C Manager requires 3 steps:
 1. Place new light poles
 2. Assign pole number and circuit
 3. Label light poles



This process requires a GPK file, chain information and that the design elements adhere to the D&C Manager features.

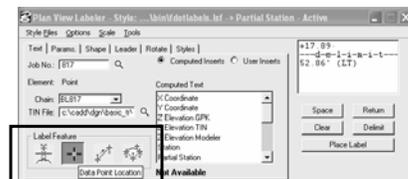
ITS Plans



- Currently the creation of an ITS design file consists in the placement of cells, linestyles and labels. The FDOT ITS menu provides all current standard ITS cells and symbology. However the standards for this plan set component is still under formation.

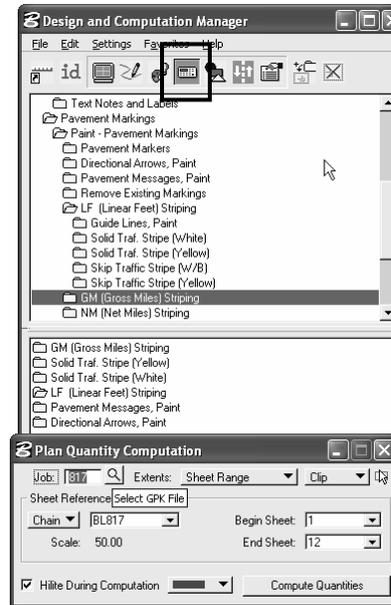
Placing Labels

- In GEOPAK Plan View Labeler, click on the *Styles* tab and select Traffic Plans.
- Select *Scale* from the menu & set it to the plot scale of the file.
- Select the type of label. This will set all of the text parameters.
- Click on the Text tab. Set the Job number and Chain. Click on the *Label Feature*. For most labels this will be the *Data Point Location* icon. Datapoint in the file then click on Place Label to complete.



Quantities

- Compute quantities from the clip file.
- Add the Traffic plan category such as Pavement Markings to the collection field.
- Click on the compute icon.
- Define the gpk and chain.
- Set the *Extents* to *Sheet Range* and select the *Begin* and *End Sheet* number.
- Click on *Compute*.



Quantities

Note: this option creates a database that is accessed through Quantity Manager. These quantities can then be directly imported into Trnsport.

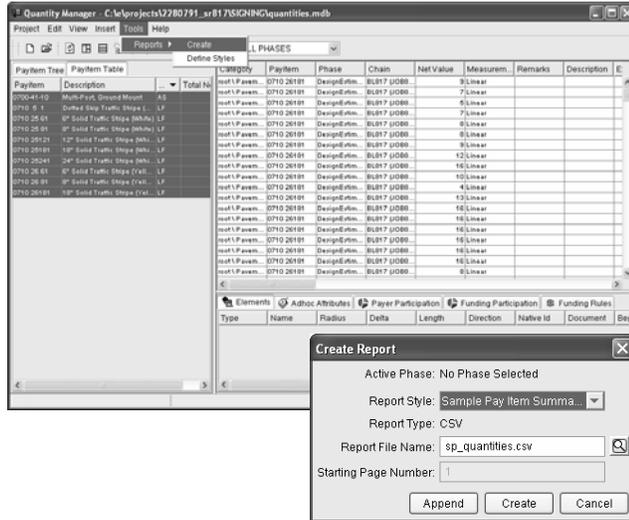
The image shows the "Computation Results" dialog box, which contains a table with the following data:

Item	Description	Quantity	Unit	Export
0700-41-10	Multi-Post, Ground Mount	1.000000	AS	<input checked="" type="checkbox"/>
0710 5 1	Dotted Skip Traffic Stripe (White)	12.000000	LF	<input checked="" type="checkbox"/>
0710 7	Pavement Messages, Painted	70.000000	EA	<input checked="" type="checkbox"/>
0710 7	ONLY Pavement Message	13.000000	EA	<input checked="" type="checkbox"/>
0710 7	BUS Pavement Message	6.000000	EA	<input checked="" type="checkbox"/>
0710 23 61	6" Solid Traffic Stripe (White)	5.140000	NM	<input checked="" type="checkbox"/>
0710 23 81	8" Solid Traffic Stripe (White)	0.463000	NM	<input checked="" type="checkbox"/>
0710 24 61	6" Solid Traffic Stripe (Yellow)	2.958000	NM	<input checked="" type="checkbox"/>
0710 25 61	6" Solid Traffic Stripe (White)	192.00...	LF	<input checked="" type="checkbox"/>
0710 25 81	8" Solid Traffic Stripe (White)	1924.00...	LF	<input checked="" type="checkbox"/>
0710 25121	12" Solid Traffic Stripe (White)	3249.00...	LF	<input checked="" type="checkbox"/>
0710 25181	18" Solid Traffic Stripe (White)	595.00...	LF	<input checked="" type="checkbox"/>
0710 25241	24" Solid Traffic Stripe (White)	1436.00...	LF	<input checked="" type="checkbox"/>
0710 26 61	6" Solid Traffic Stripe (Yellow)	1146.00...	LF	<input checked="" type="checkbox"/>
0710 26 81	8" Solid Traffic Stripe (Yellow)	568.00...	LF	<input checked="" type="checkbox"/>
0710 26181	18" Solid Traffic Stripe (Yellow)	556.00...	LF	<input checked="" type="checkbox"/>

Below the table, there are fields for "Export Format" (set to DBMS), a file name "quantities.mdb", and buttons for "Create", "Export", "Run" (set to sp1), "Phase" (set to DesignEstimate), and "Display".

- Set export format to DBMS.
- Keyin a file name.
- Set Phase to DesignEstimate.
- Run name is optional.

Formatting Quantities in Quantity Manager



- From the table view in QM select all pay items and sort.
- From the menu select Reports > Create.
- Select the report style Sample Pay Item Summary by Sheet.
- Enter a file name & click on create.

Placing Quantities on Tab Sheet

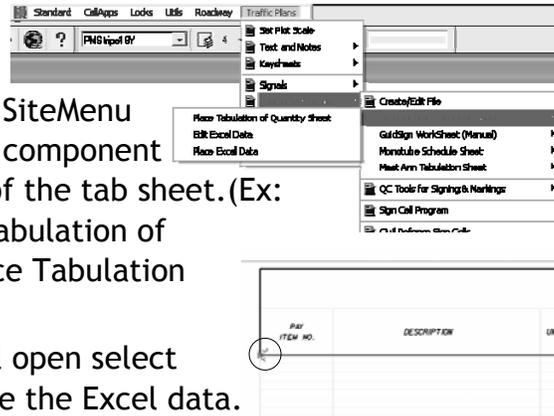
The screenshot shows a Microsoft Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H	I	J	K
1	Name	Description	Total	Sheet 1	Sheet 10	Sheet 11	Sheet 2	Sheet 3	Sheet 4	Sheet 5	
2	0700-41-10	Multi-Post, Ground Mount	1	1	0	0	0	0	0	0	
3	0710 5 1	Dotted Skip Traffic Stripe (White)	12	0	12	0	0	0	0	0	
4	0710 25 61	6" Solid Traffic Stripe (White)	192	0	79	0	0	0	0	0	
5	0710 25 81	8" Solid Traffic Stripe (White)	1924	245	249	86	0	273	0	365	170
6	0710 25 121	12" Solid Traffic Stripe (White)	3249	330	144	148	0	385	929	170	
7	0710 25 181	18" Solid Traffic Stripe (White)	555	201	16	35	73	12	0	71	
8	0710 25 241	24" Solid Traffic Stripe (White)	1435	45	77	91	0	34	263	44	
9	0710 26 61	6" Solid Traffic Stripe (Yellow)	1146	0	134	722	0	0	0	0	
10	0710 26 81	8" Solid Traffic Stripe (Yellow)	568	0	31	34	0	160	92	203	
11	0710 26 181	18" Solid Traffic Stripe (Yellow)	556	0	9	29	0	151	43	140	

- The CSV file must be modified to add a column to the left of the data with an X for every row that is placed on the tabulation of quantity sheet.
- A column must be inserted for the units and the total column has to be moved to the right of the data.
- Save as sbtb?.xls, where the ?? Is replaced with component abbreviation (sp, sg, lt or it).

Tabulation Sheet

- From the Traffic Plans SiteMenu select the appropriate component option for placement of the tab sheet. (Ex: Signing & Markings > Tabulation of Quantities Sheet > Place Tabulation of Quantity Sheet.)
- With the Excel file still open select the component to place the Excel data. (Ex: Signing & Markings > Tabulation of Quantities Sheet > Place Excel Data.)
- Data point on the left endpoint of the top row.



More Information

- FDOT Traffic Plans Course (the V8 version should be available this year)
- On-line web training
- <http://www.dot.state.fl.us/ecso/>
- ECSO support:
 - 850-245-1600
 - Ecso.support@dot.state.fl.us