

5.1 FILES

5.1.1 Manipulating a MicroStation version 8 DGN Files

To open a design file, open the pulldown File>Open Drawing. The 'Open' dialog will appear. Choose the desired CAD file. If the Drawing Window was not previously open, then it will appear with the CAD file.

There are two ways to close an opened CAD file. The first way is to select pulldown File>Close Drawing. Another way is to select the close control button at the top right corner of the Drawing Window. Closing a CAD file releases control of the design file. This allows the CAD file to be opened by MicroStation or otherwise manipulated by the designer.

ASAD has an option to 'Compress' the design file. Invoke this utility through CAD>File>Compress. The option shrinks the file size. It is recommended that ASAD designers regularly compress the design files they use. The most compelling reason to perform this function is to ensure design file integrity.

5.1.2 Reference Files

Like MicroStation, ASAD CAD utilizes files loaded into the current design file called reference files. As long as the reference files possess the same global origin and working units as the current file, they can be overlaid into the current design file. The elements in a reference file may be viewed, measured, and copied into the current design file, but they cannot be moved or deleted.

Certain attributes of a reference file may be manipulated by using the 'Reference Files' dialog. This dialog window is started using pulldown CAD>Reference Files. This dialog contains three main parts: attached file list, the display control, and the file attachment controls.

The attached file list contains a listing of attached files. The display controls determine how the reference files are viewed. Individual levels may be shown or hidden. The 'Display' check box determines whether the highlighted reference file is to be displayed or not. Similarly, the 'Reference Files On' check box toggles all the attached reference files on and off.

The 'Attach Reference File' section of the dialog is used to control the files attached as references. Files are attached by selecting the file to be attached. The filename must be entered into the 'FileName' key-in. The filename can be selected from a dialog by using the 'FileAssist' tool. The designer may enter a logical name for the attached file. This is required when the same file is attached multiple times. A description may also be entered.

Once the necessary file information is entered, the designer must push the 'Attach' button to attach the file. If the designer wishes to attach the reference file only until they close the Drawing Window or exit ASAD, then the 'AttachSessionOnly' option should be selected instead of the 'Attach' button. Files can be detached by highlighting the desired file from the Reference Files list and pushing the 'Detach' button.

The displayed levels for the Reference Files are controlled by highlighting the desired reference file from the 'Reference Files' list and then selecting the desired level to turn off or on. When the levels are selected, the 'Apply' button must be pressed to accept the display changes.

5.1.3 Plotting

There are two plot options available in ASAD. The first will plot a fenced area to the system default printer with graphics capabilities. An ink jet or laser jet are ideal for this purpose. The second option is to print the fenced area to a HPGL plotter.

5.1.4 View Control

The ASAD CAD view controls behave much like the view controls of most all CAD packages in use today. The view controls are located in two different parts of the screen. The first is the floating/dockable toolbar (see figure 5.1). The second set of view controls is at the bottom of the CAD drawing window (see figure 5.2)



Figure 5.1

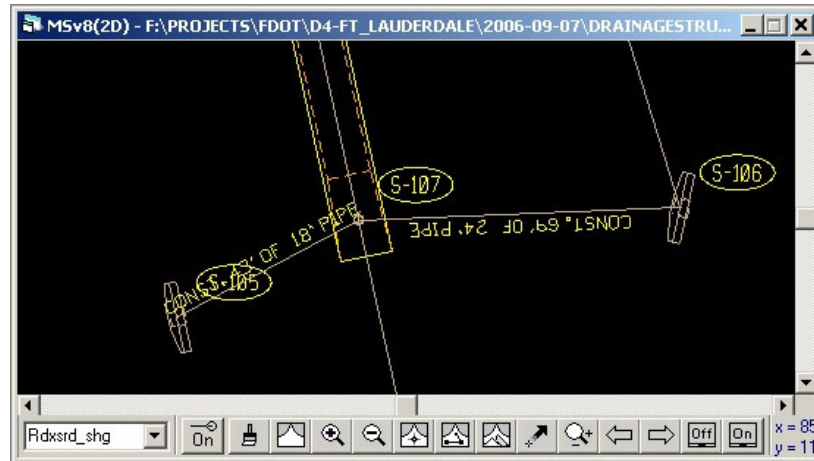


Figure 5.2

Of the controls, the first control is 'Update Window'. This option refreshes the current view of the Drawing Window. Next, the 'Window Area' function allows the designer to magnify a portion of the current view in the Drawing Window. After the command is initiated, the designer must select the area to be magnified. This is accomplished by clicking on the Drawing Window and windowing the region for magnification.

The 'Zoom In' and 'Zoom Out' commands magnify and reduce the area selected on the Drawing Window respectively. The 'Window Center' function is similar to the 'Window Area' command in that the designer selects the desired region of the view to magnify, but it will center the region within the limits of the screen.

The 'Fit Current System' is a valuable command and is unique to ASAD. It centers the Drawing Window view on the current drainage system. The 'Fit All' function sets the view window around every element in the CAD file.

The 'Dynamic Pan' and 'Dynamic Zoom' (available on the CAD window only) are new for ASADv3. Click and hold the left mouse button to pan or zoom.

'Previous View' and 'Next View' (available on the CAD window only) are also new for ASADv3. They allow the user to step backwards to previous views and step forward again.

5.1.5 Model Space

The current model name is displayed in the dropdown list at the bottom-left of the CAD drawing window. Selecting a different model will automatically update the CAD drawing window with the model. Models cannot be created or removed in ASAD. Those functions should be done in MicroStation.

5.1.6 Level Names & ASAD Master Level List

Previous versions of MicroStation used only numerical (1-63) values to designate levels. V8 introduced alphanumeric (letters and numbers) level names that can be created by the user. This results in more flexibility when dealing with levels in general but also creates a few problems. For instance, if a CAD file has too many levels (some may have hundreds), they become hard to manage and cumbersome to find the level you are looking for. Another nuisance occurs when a CAD file doesn't have the level you wish to draw to. In this case, you must create it.

Even though FDOT currently has over 1,300 levels defined for their projects, ASAD uses only fraction of these to draw the drainage portions of a project. Because of this, ASAD maintains a 'Master Level List' in each project database (*.mdb). Use pulldown menu CAD>Levels>ASAD Master Level List to open this window (see figure 5.3). This master list of level names is updated from the Level Names Library file (see section 1.2.2 on setting the path/filename) every time a project database (*.mdb) is opened. If there is an updated levels library, simply replace the file and the next time ASAD opens it will retrieve the latest level data. The ASAD master list has two primary functions. (1) it serves as an instant resource for creating new levels in CAD files and (2) it allows you to limit the levels which populate the Level Names pulldown boxes throughout ASAD. Setting the 'Active' field to 'Yes' will allow the level to be loaded into the pull downs while 'No' will exclude the level.

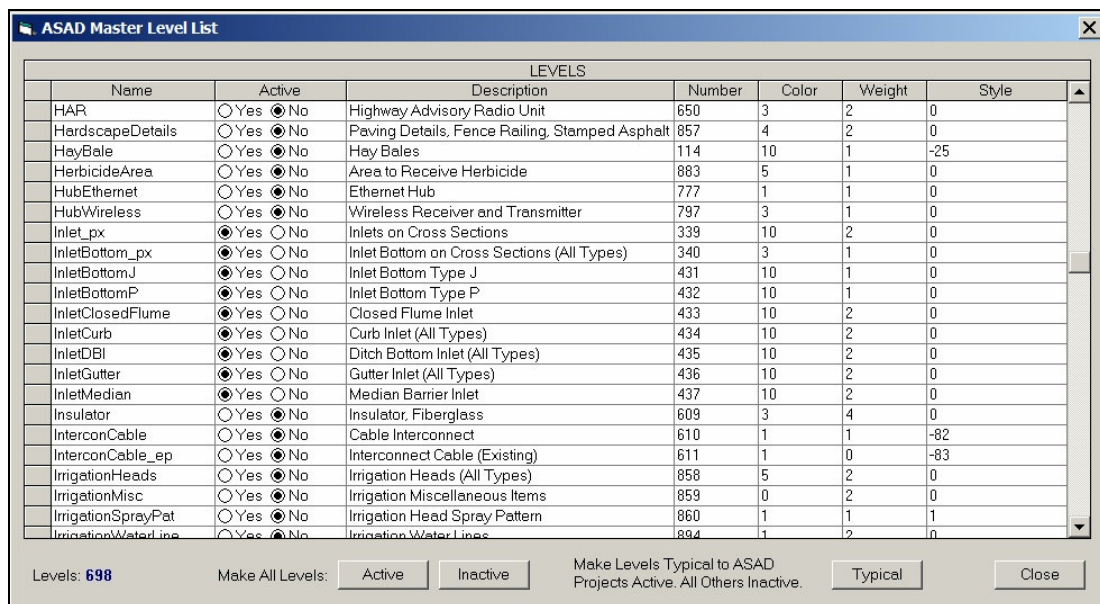


Figure 5.3

If you try to draw to a level that does not exist in the currently opened CAD file, the 'Missing CAD Level Names' window will popup (see figure 5.4). This window will display the missing level(s) and provide you with solutions to the problem. The quickest of these is the 'Auto' option. This will retrieve the missing level's Name, Description, Number, Color, Weight, and Style and create the new level in the CAD file. Results are displayed in the green list box at the bottom of the window. After the levels are created, close this window and return to the original drawing function to continue.

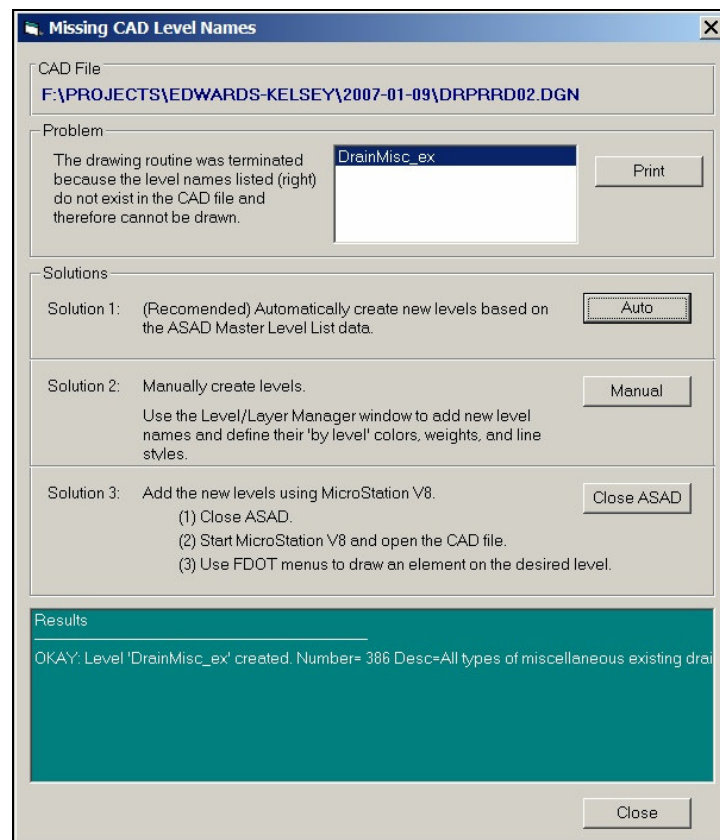


Figure 5.4

Print: Prints the list of missing level names to the default printer.

Auto: Automatically creates the missing level names into the currently open CAD file.

Manual: Use the Level/Layer Manager window to manually enter missing Level Names.

Close ASAD: Terminates the ASAD program thereby releasing **the current CAD file for MicroStation to manipulate (ie. create the missing levels).**

5.2 STORM SEWER GRAPHICS

5.2.1 Drawing in Plan View

The 'Draw Plan View' window is used to draw the following items in plan view:

- Drainage Systems: inlets, manholes, endwalls, pipes, French drain trenches, ditches and labels.
- Drainage Area Boundaries: lines and labels.
- Cross Section Pattern Lines: lines.



When opened, only the top portion of the window is displayed. This is the 'Template' portion. The 'Draw Plan View' window has 20 different 'templates' to which the user may store 20 different settings. These settings dictate which elements are to be drawn (i.e. inlets/pipe, area boundaries, pattern lines) and the characteristics (i.e. font, size, level, etc) of the text labels to be placed. The window below (see figure 5.5) shows the template number as seen here  1 , and the templates description ('FDOT Plan View at 40' Scale').



Figure 5.5

At the top portion of the window, the user has three options. (1) click on the 'Draw' button and the plan view will be drawn in the CAD window. (2) click on the black arrow buttons to move back or forward to another template (1-20) and then press 'Draw' to draw in the CAD window. (3) click on the downward pointing white triangle button to open the rest of the window (see figure 5.7).

Note: To get started quickly, setup a template using the 'Reset Template to Defaults' as seen in figure 5.6. This will setup all level/symbology and text characteristics based on the Drawing Scale selected.

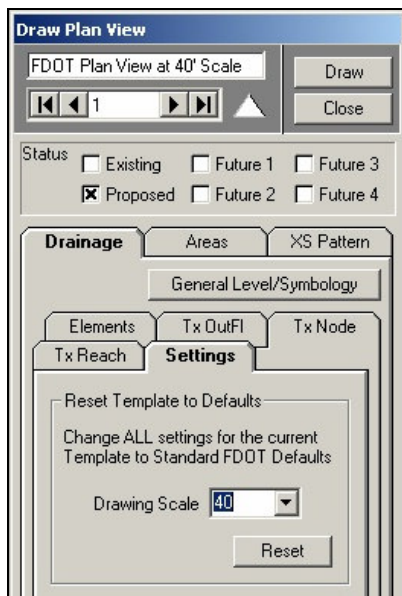


Figure 5.6

5.2.1.1 Drainage Systems

To setup the current template to draw the Drainage System, start with the 'Drainage' tab and the 'Elements' sub-tab (see figure 5.7). Then continue through the other sub-tabs.

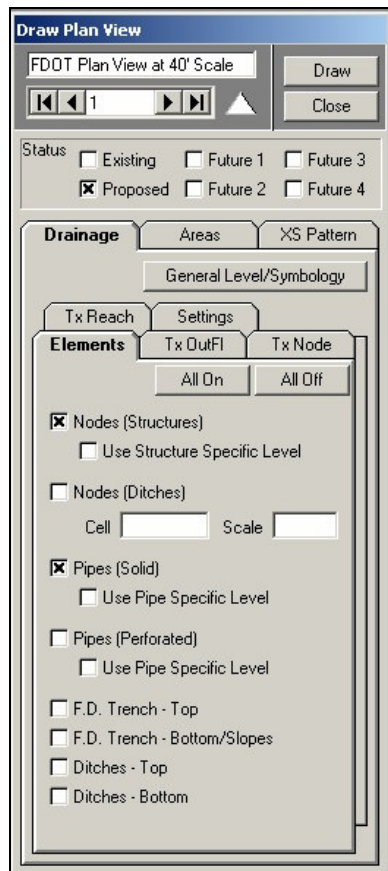
Elements (sub-tab):

Figure 5.7

Status (checkboxes): Select the nodes and reaches to be drawn by their status. For most projects this will be 'Proposed'

General Level/Symbology (button): This button opens another window which is used to set the level/symbology and text characteristics for each element and text label to be drawn. See section 5.x.x for further explanations of this window.

All On/Off (buttons): Turns on or off all of the checkboxes on the 'Elements' sub-tab.

The following checkboxes indicate the elements to be drawn.

Nodes (Structures): Inlets, manholes, endwalls.

Nodes (Ditches): Cells at ditch node locations.

Pipes (Solid): Standard solid wall pipes.

Pipes (Perforated): Perforated pipes in French drains.

F.D. Trench – Top: Top of French drain trench.

F.D. Trench –Bottom/Slopes: French drain trench bottom and side slopes.

Ditches – Top: Top of ditch.

Ditches – Bottom: Bottom of ditch

Cell: Name of the cell to be drawn at Ditch node locations.

Scale: The scale used when the 'Cell' is drawn.

determine Nodes (Structures) (checkbox): This option

Note: The fields 'Use Specific Level' are inactive in this version.

Tx OutFI (sub-tab):

This tab sets the plan view labeling of the outfall node.

Figure 5.8

Node Name (w/Oval) (checkbox): This option places the node name inside an oval.

Oval Width and Height: Sets the width and height of the oval.

Node Name (no Oval) (checkbox): Places the node without an oval.

HGL to Inlet El. Clear. (checkbox): Places the distance from the hydraulic grade line (HGL) to the inlet/top elevation. This is useful when reviewing HGL clearances.

User Defined: The user may define up to 6 lines of labels to be placed adjacent to the outfall node. Double-clicking on any textbox will invoke the 'User Define Text Variable' window (see figure 5.9).

X and Y (for all labels): To prevent the text from being on top of the node, define the distance in the X and Y directions from the node's North and East coordinates.

Decimal Places: Sets the default number of decimal places for the outfall labels. This setting may be overridden when using 'User Defined' labels.

Figure 5.9

Tx Node (sub-tab):

This tab sets the plan view labeling of all other nodes (collection nodes) in the system.

Figure 5.10

This sub-tab is identical to the Tx OutFI sub-tab. Refer to the Tx OutFI sub-tab of this same section (5.2.1.1) for details.

Tx Reach (sub-tab):

This sub-tab sets the plan view labeling of the reaches.

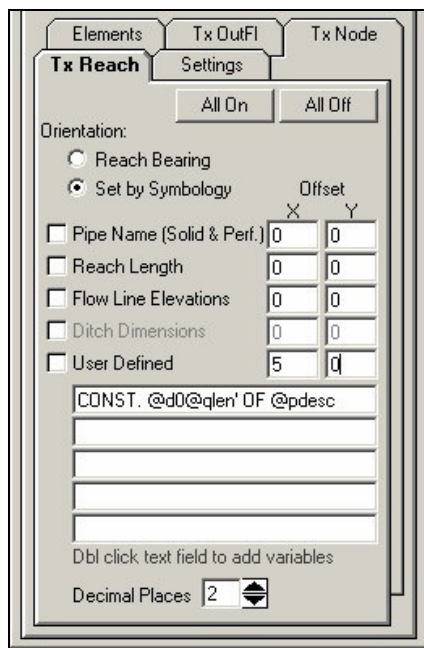


Figure 5.11

Orientation (option):

Reach Bearing: The reach labeling will be rotated to the same bearing as the reach.

Set by Symbology: The reach labeling is rotated to the angle set by the 'General Level/Symbology (button)' window. See section 5.x.x.

Pipe Name (Solid & Perf): Labels the pipe name.

Reach Length (checkbox): Labels the length of the reach.

Flow Line Elevations (checkbox): Places the flow line elevations at the end of each pipe.

User Defined (check & text boxes): : The user may define up to 5 lines of labels to be placed adjacent to the center of the reach. Double-clicking on any textbox will invoke the 'User Define Text Variable' window (see figure 5.9).

X and Y (for all labels): To prevent the text from being on top of the reach, define the distance in the X and Y directions from the reaches center point. When the option 'Reach Bearing' is selected, only an 'Offset' field will be displayed. This offset is the distance above the reach (positive offset) or below the reach (negative).

Decimal Places: Sets the default number of decimal places for the reach labels. This setting may be overridden when using 'User Defined' labels.

Settings (sub-tab):

Note: Each drawing window (Plan, Profile and Drain Structures) has a 'Reset Template to Defaults' function. This function is very helpful when starting a new project. It sets many variables and options that could be overlooked, especially by a new user.

Using the 'Reset Template to Defaults' as seen in figure 5.12. This will setup all level/symbology and text characteristics based on the Drawing Scale selected.

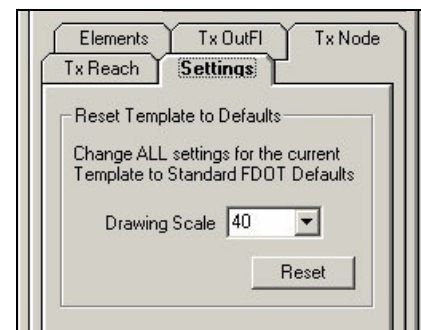


Figure 5.12

Drawing Scale: Scale of the drawing. In the case above, the scale is 1"=40', hence the 40.

Reset (button): Set the elements and labels to be drawn, the level/symbology, text fonts and size, and decimal rounding values to FDOT specifications

5.2.1.2 Drainage Area Boundaries

To setup the current template to draw the 'Drainage Area Boundaries', use with the 'Areas' tab (see figure 5.13).

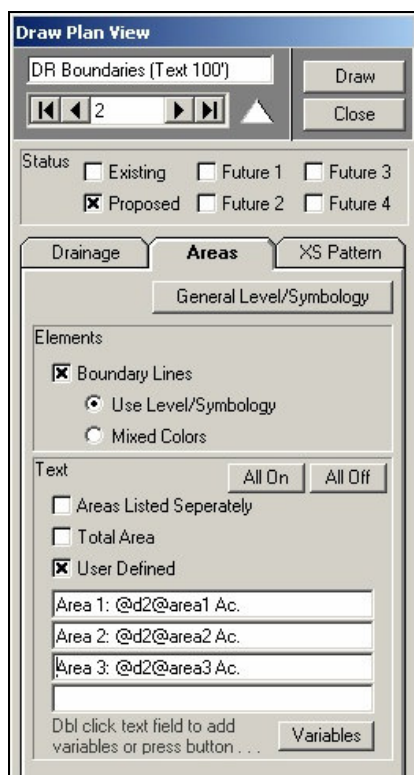


Figure 5.13

Status (checkboxes): N/A

General Level/Symbology (button): This button opens another window which is used to set the level/symbology and text characteristics for the drainage boundary information drawn. See section 5.x.x for further explanations of this window.

Boundary Lines (checkbox): Turns on/off the boundary line drawing routine.

Use Level/Symbology (option): Draws the boundary lines as per the settings in the 'General Level/Symbology' window.

Mixed Colors (option): Increments the color (0,1,2,...) for each area drawn. This allows the user to easily distinguish different areas from one another.

All On/Off (buttons): Turns on or off all of the checkboxes in the 'Text' section of the 'Areas' tab.

Areas Listed Separately (checkbox):

Total Area (checkbox):

User Defined (check & text boxes): The user may define up to 4 lines of labels to be placed in the center of the area. Double-clicking on any textbox will invoke the 'User Define Text Variable' window (see figure 5.9). In the case (see figure 5.11), the first user defined line would be labeled in CAD as 'Area 1: 1.13 Ac.' if area 1 had a value of 1.130283. This is due to the function '@d2'

setting the decimal places (of any value that follows) to 2.

5.2.1.3 Cross Section Pattern Lines

To setup the current template to draw the 'Cross Section Pattern Lines', use with the 'XS Pattern' tab (see figure 5.14). Pattern lines are lines drawn at the node's station, perpendicular to the baseline associated with that node. These pattern lines are used by GEOPAK to 'cut' cross sections. ASAD then uses the cross sections as the starting point to draw Drainage Structures (see section 5.2.3).

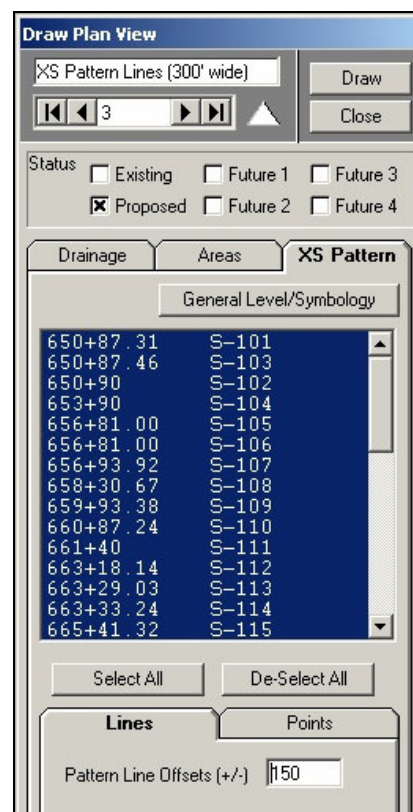


Figure 5.14


Status (checkboxes): By selecting the status, the user can limit which nodes are to have pattern lines drawn. For most projects this will be 'Proposed'

General Level/Symbology (button): This button opens another window which is used to set the level/symbology for the pattern lines to be drawn. See section 5.x.x for further explanations of this window.

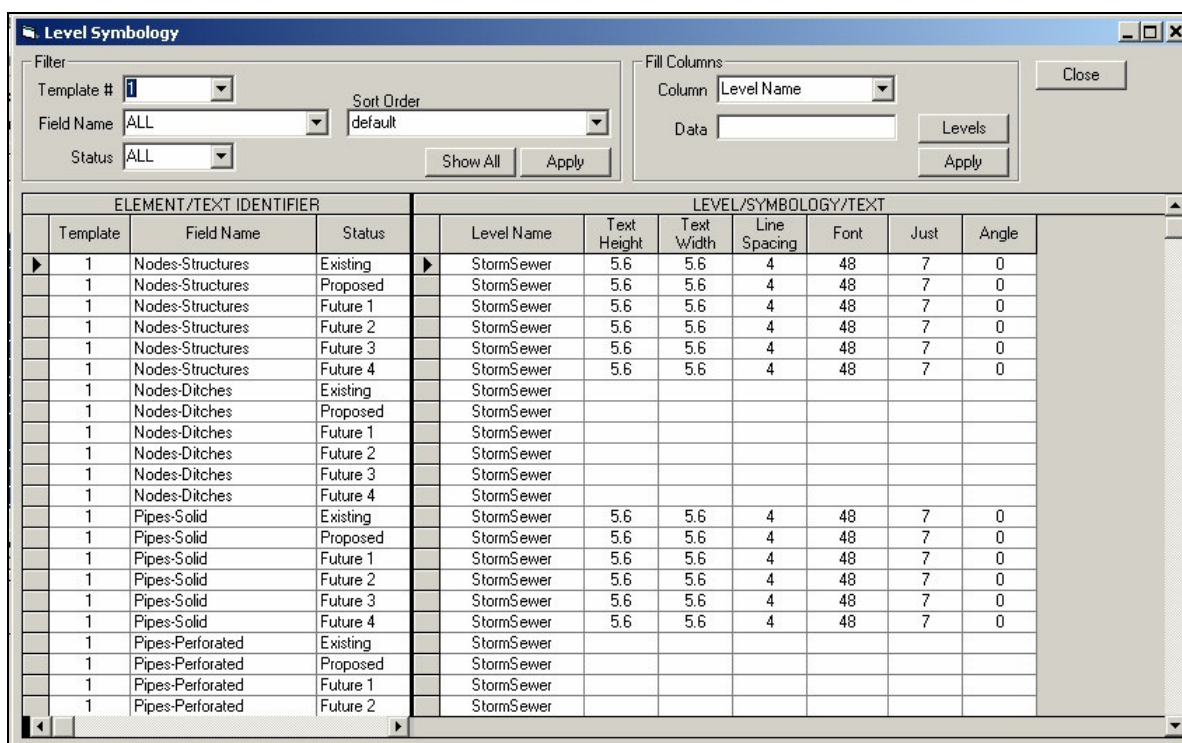
Select All, De-Select All (buttons): Use these buttons to select all or none of the nodes listed.

Pattern Line Offsets (+/-): Offset distance left & right of the baseline referenced by the node. In the case above (see figure 5.14), the pattern line would be 300' long (150' left of baseline, 150' right of baseline).

5.2.1.4 General Level/Symbology

This 'Level Symbology' window (see figure 5.15) contains the levels and text settings for every element and text field that is drawn by the 'Draw Plan View' and 'Draw Profile' windows. It is invoked by pressing the  button on either of those windows.

Each item is identified, first, by 'Template' number. This number is 1-20 for plan view and 21-40 for profile. The second identifier is 'Field Name'. This names the actual element or text label such as, 'Pipes-Solid' for solid pipes, or 'Ditches-Top' for the top of ditch bank. The third is 'Status'. Each 'Field Name' has 6 statuses. They are Existing, Proposed, Future 1, Future 2, Future 3, and Future 4. These are especially useful when using different level/symbology when drawing into CAD. Typically, 'Proposed' elements are drawn as solid lines while 'Existing' elements are drawn as dashed lines. 20 templates x 30 elements/text x 6 status = a lot of data.



ELEMENT/TEXT IDENTIFIER			LEVEL/SYMBOLGY/TEXT						
Template	Field Name	Status	Level Name	Text Height	Text Width	Line Spacing	Font	Just	Angle
1	Nodes-Structures	Existing	StormSewer	5.6	5.6	4	48	7	0
1	Nodes-Structures	Proposed	StormSewer	5.6	5.6	4	48	7	0
1	Nodes-Structures	Future 1	StormSewer	5.6	5.6	4	48	7	0
1	Nodes-Structures	Future 2	StormSewer	5.6	5.6	4	48	7	0
1	Nodes-Structures	Future 3	StormSewer	5.6	5.6	4	48	7	0
1	Nodes-Structures	Future 4	StormSewer	5.6	5.6	4	48	7	0
1	Nodes-Ditches	Existing	StormSewer						
1	Nodes-Ditches	Proposed	StormSewer						
1	Nodes-Ditches	Future 1	StormSewer						
1	Nodes-Ditches	Future 2	StormSewer						
1	Nodes-Ditches	Future 3	StormSewer						
1	Nodes-Ditches	Future 4	StormSewer						
1	Pipes-Solid	Existing	StormSewer	5.6	5.6	4	48	7	0
1	Pipes-Solid	Proposed	StormSewer	5.6	5.6	4	48	7	0
1	Pipes-Solid	Future 1	StormSewer	5.6	5.6	4	48	7	0
1	Pipes-Solid	Future 2	StormSewer	5.6	5.6	4	48	7	0
1	Pipes-Solid	Future 3	StormSewer	5.6	5.6	4	48	7	0
1	Pipes-Solid	Future 4	StormSewer	5.6	5.6	4	48	7	0
1	Pipes-Perforated	Existing	StormSewer						
1	Pipes-Perforated	Proposed	StormSewer						
1	Pipes-Perforated	Future 1	StormSewer						
1	Pipes-Perforated	Future 2	StormSewer						

Figure 5.15

To help wade through this data, is the **Filter** section (see figure 5.16). This section lets the user limit the data displayed in the data table (see figure 5.15).

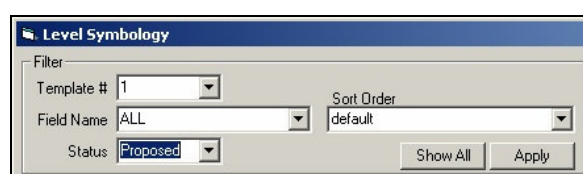


Figure 5.16

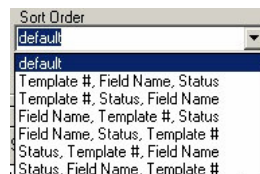


Figure 5.17

Template #: Select the Template number to view in the data table.

Field Name: Select the Field Name to view in the data table.

Status: Select the Status to view in the data table.

Sort Order: Sort the data table in this order (see figure 5.17)

Apply: After setting the above fields, the ‘Apply’ button will execute the filtering process. For example, look at figure 5.18 and notice that the data table as been filtered using Template=1, Field Name=ALL, Status=Proposed.

The 'Level Symbology' dialog box has the following settings: Template # 1, Field Name ALL, Status Proposed, Sort Order default. The 'Fill Columns' section has Column Level Name and Data empty. The data table below shows 7 rows of filtered data.

ELEMENT/TEXT IDENTIFIER				LEVEL/SYMBOLGY/TEXT							
	Template	Field Name	Status	Level Name	Text Height	Text Width	Line Spacing	Font	Just	Angle	
▶	1	Nodes-Structures	Proposed	▶	StormSewer	5.6	5.6	4	48	7	0
	1	Nodes-Ditches	Proposed		StormSewer						
	1	Pipes-Solid	Proposed		StormSewer	5.6	5.6	4	48	7	0
	1	Pipes-Perforated	Proposed		StormSewer						
	1	FD Trench-Top	Proposed		StormSewer						
	1	FD Trench-Bottom/Slopes	Proposed		StormSewer						
	1	Ditches-Top	Proposed		StormSewer						

Figure 5.18

The **Fill Columns** section is used to automatically fill a single column, but many rows, with a single piece of data. For instance, let's change the 'Level Name' of all 'Proposed' 'Fields' on Template #1. Since we have already filtered this data and it is the only data displayed in the data table, we can now use the 'Fill Columns' routine. Start by selecting the **Column** (from the Column dropdown box) to be changed, choose 'Level Name' (see figure 5.19).

The 'Fill Columns' dialog box shows 'Level Name' selected in the 'Column' dropdown. The 'Data' field is empty. The 'Levels' and 'Apply' buttons are visible.

Figure 5.19

Next, click on the **Levels** button (see figure 5.19) to select, invoke the 'Select a Level' window (see figure 5.20). Select 'ProposedDrainage' and click the **Accept** button. Pressing the **Apply** button in the 'Fill Columns' section (see figure 5.21) will copy the level name 'ProposedDrainage' to every row currently in the data table.

The 'Select a Level' dialog box shows a list of levels. 'ProposedDrainage' is selected. The 'Accept' and 'Cancel' buttons are at the bottom.

Figure 5.20

The 'Fill Columns' dialog box now has 'ProposedDrainage' entered in the 'Data' field. The 'Levels' and 'Apply' buttons are visible.

Figure 5.21

The data table, as seen in figure 5.22, now shows 'ProposedDrainage' in the 'Level Name' column for every record. Press the **Close** button and we're done.

Level Symbology


Filter: Template # 1, Field Name ALL, Sort Order default, Status Proposed. Buttons: Show All, Apply.

Fill Columns: Column Level Name, Data ProposedDrainage. Buttons: Levels, Apply, Close.

ELEMENT/TEXT IDENTIFIER				LEVEL/SYMBOLGY/TEXT							
Template	Field Name	Status	Level Name	Text Height	Text Width	Line Spacing	Font	Just	Angle		
1	Nodes-Structures	Proposed	ProposedDrainage	5.6	5.6	4	48	7	0		
1	Nodes-Ditches	Proposed	ProposedDrainage								
1	Pipes-Solid	Proposed	ProposedDrainage	5.6	5.6	4	48	7	0		
1	Pipes-Perforated	Proposed	ProposedDrainage								
1	FD Trench-Top	Proposed	ProposedDrainage								
1	FD Trench-Bottom/Slopes	Proposed	ProposedDrainage								
1	Ditches-Top	Proposed	ProposedDrainage								
1	Ditches-Bottom	Proposed	ProposedDrainage								
1	Node Name-no Oval	Proposed	ProposedDrainage	4	4	2	48	7			
1	Node Name-with Oval	Proposed	ProposedDrainage	7	5.25	5	48	7	0		
1	HGL to Inlet Elevation Clea	Proposed	ProposedDrainage								

Figure 5.22

5.2.2 Drawing in Profile View

The 'Draw Storm Sewer Profile' window is used to draw inlets, manholes, pipes, French drains, ditches and labels. When opened, only the top portion of the window is displayed. This is the 'Template' portion. The 'Draw Storm Sewer Profile' window has 20 different 'templates' to which the user may store 20 different settings. These 'templates' are numbered 21-40 (1-20 are used by the 'Draw Plan View' window). These settings dictate which elements are to be drawn (i.e. inlets, pipes, text) and the characteristics (i.e. font, size, level, etc) of the text labels to be placed. The window below (see figure 5.23) shows the template number as seen here , and the template's description ('FDOT Profile at 50' Scale').

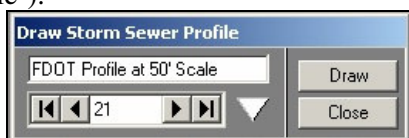


Figure 5.23

At the top portion of the window, the user has three options. (1) click on the 'Draw' button and the profile will be drawn in the CAD window. (2) click on the black arrow buttons to move back or forward to another template (21-40) and then press 'Draw' to draw in the CAD window. (3) click on the downward pointing white triangle button to open the rest of the window (see figure 5.24).

Note: To get started quickly, setup a template using the 'Reset Template to Defaults' as seen in figure 5.24. This will setup all level/symbology and text characteristics based on the Drawing Scale selected.

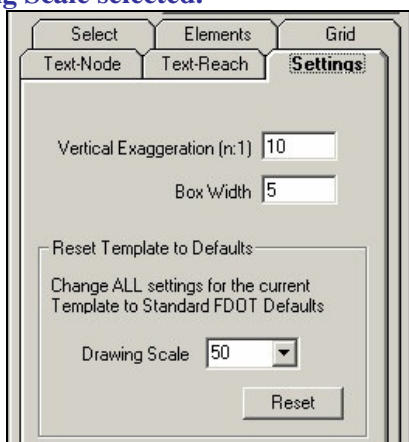


Figure 5.24

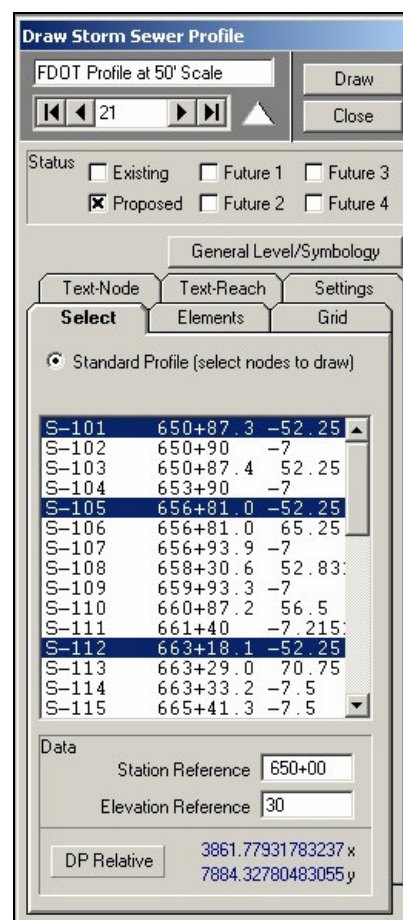


Figure 5.25

Status (checkboxes): Select the nodes and reaches to be drawn by their status. For most projects this will be 'Proposed'

General Level/Symbology (button): This button opens another window which is used to set the level/symbology and text characteristics for each element and text label to be drawn. See section 5.2.1.4 for further explanation of this window.

Select (tab):

Nodes (list): Select the nodes (with their outgoing pipes) to draw.

Station Reference: Enter the station equivalent to the x and y coordinates selected using the 'DP Relative' button.

Elevation Reference: Enter the elevation equivalent to the x and y coordinates selected using the 'DP Relative' button.

DP Relative (button): Click this button and then click (or snap and accept) a data point from the CAD window.

Elements (tab):

Select the elements to be drawn into profile (see figure 5.26)

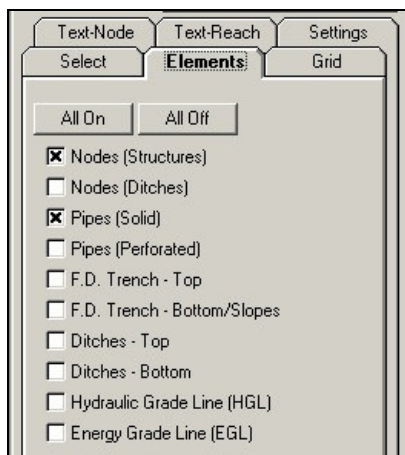


Figure 5.26

Most of these elements that are drawn, are actual structures or ground (ditches & trenches) features used by the contractor to build the project. The **Hydraulic Grade Line (HGL)** and the **Energy Grade Line (EGL)**, on the other hand, are typically used only during the design phase and turned off or removed prior to producing final construction plans.

Grid (tab): Not used in this version of ASAD.

Text-Node (tab):

This tab controls how the nodes are labeled in profile view (see figure 5.27).

All On/Off (buttons): Turns on or off all of the checkboxes on this tab.

Node Name (with Oval) (checkbox): This option places the node name inside an oval.

Oval Width and Height: Sets the width and height of the oval.

Node Name (no Oval) (checkbox): Places the node without an oval.

HGL to Inlet El. Clear. (checkbox): Places the distance from the hydraulic grade line (HGL) to the inlet/top elevation. This is useful when reviewing HGL clearances.

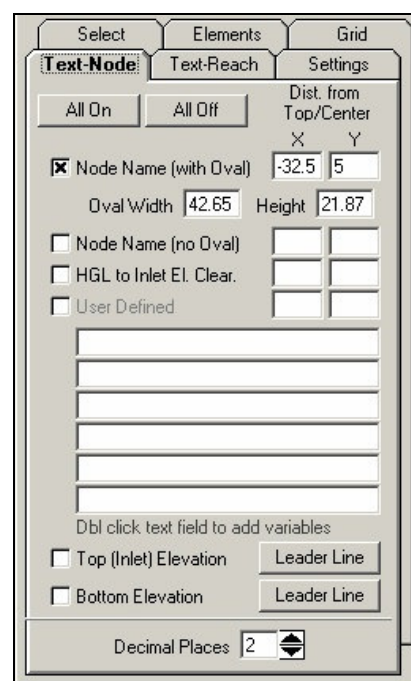


Figure 5.27

User Defined: The user may define up to 6 lines of labels to be placed adjacent to the outfall node. Double-clicking on any textbox will invoke the 'User Define Text Variable' window (see figure 5.9)

Top (Inlet) Elevation (checkbox): Place an inlet elevation label near the top of the node. Use the 'Leader Line' definition to position the label.

Bottom (Inlet) Elevation (checkbox): Place a bottom elevation label near the bottom of the node. Use the 'Leader Line' definition to position the label.

X and Y (for all labels): To prevent the text from being on top of the node, define the distance in the X and Y directions from the node's top/center point.

Leader Line (buttons): These buttons open the 'Leader Line Dimensions' window (see figure 5.28). This window is used to set leader line lengths and label orientation.

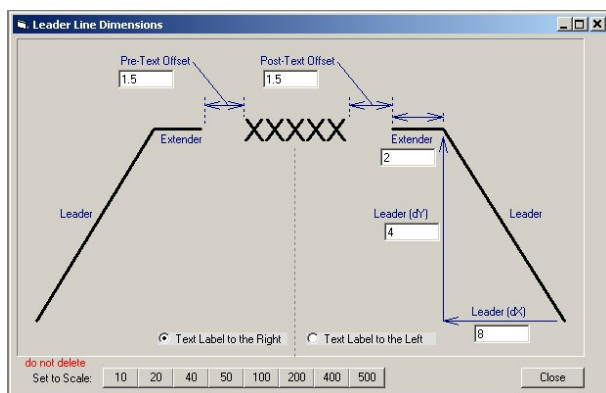


Figure 5.28

Decimal Places: Sets the default number of decimal places for the node labels. This setting may be overridden when using 'User Defined' labels.

Text-Reach (tab):

This tab controls how the reaches are labeled in profile view (see figure 5.29).

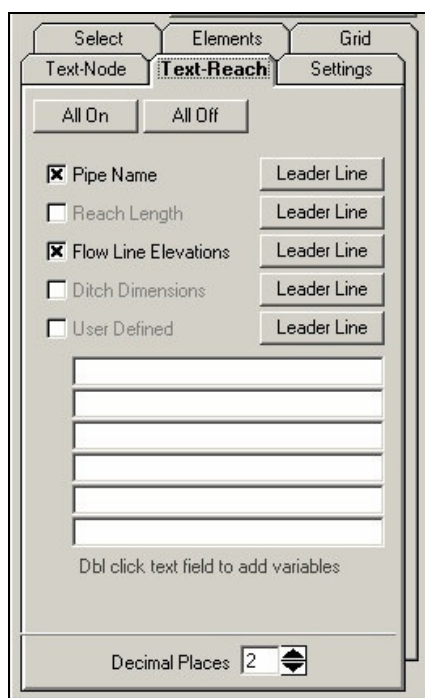


Figure 5.29

All On/Off (buttons): Turns on or off all of the checkboxes on this tab.

Pipe Name (checkbox): Labels the pipe name on the profile.

Flow Line Elevations (checkbox): Places the flow line elevations on the profile.

Leader Line (buttons): These buttons open the 'Leader Line Dimensions' window (see figure 5.28). This window is used to set leader line lengths and label orientation.

Decimal Places: Sets the default number of decimal places for the reach labels. This setting may be overridden when using 'User Defined' labels.

Settings (tab):

Note: Each drawing window (Plan, Profile and Drain Structures) has a 'Reset Template to Defaults' function. This function is very helpful when starting a new project. It sets many variables and options that could be overlooked, especially by a new user.

Using the 'Reset Template to Defaults', as seen in figure 5.30, sets all level/symbology and text characteristics based on the Drawing Scale selected.

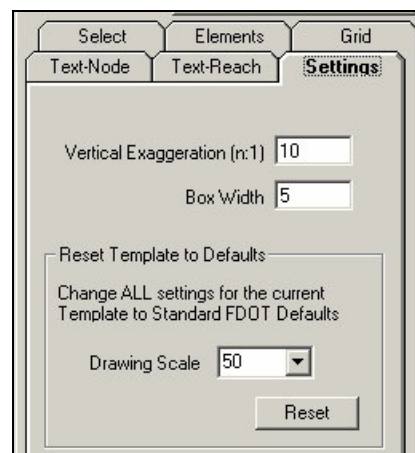


Figure 5.30

Drawing Scale: Scale of the drawing. In the case above, the scale is 1"=50', hence the 50.

Reset (button): Sets the elements and labels to be drawn, the level/symbology, text fonts and size, and decimal rounding values to FDOT specifications

5.2.3 Drawing in Cross Section View (Drainage Structures)

The Draw Drainage Structures window has four modes for drawing drainage structures. Each of the next four sections of this manual are dedicated to one of those modes. These modes are:

- Single Structure: DP Exact or Relative
- Multiple Structures: GEOPAK Cross Section Cells
- Multiple Structures: Plan Drawing
- Multiple Structures: Grid

When this window is started, it will be in the Single Structure mode as see in figure 5.31. Use the **Mode** dropdown box to select the mode desired.

5.2.3.1 Mode – Single Structure: DP Exact or Relative

This mode is the same as in ASAD version 2. It will draw one structure at a time.

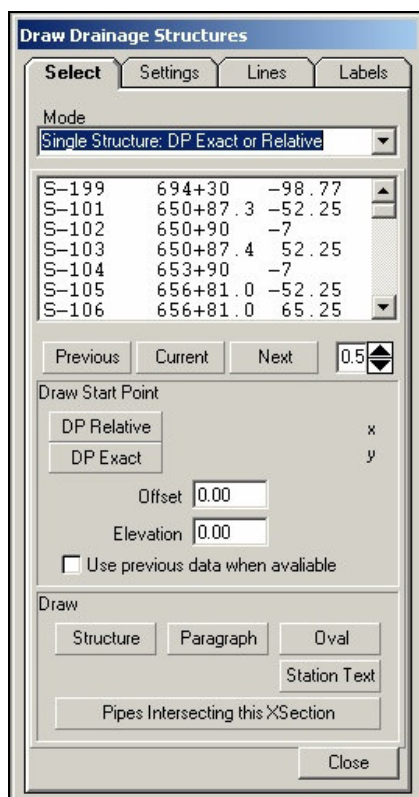


Figure 5.31

Previous, Current and Next (buttons): These buttons are used to move up and down through the node list.

DP Exact (button): Select the exact datapoint, in the CAD window, where you want the drainage structure to begin drawing.

DP Relative (button): Select a point, in the CAD window, that equates to the 'Offset' and 'Elevation' as entered below. Typically, this point is at the intersection of the vertical and horizontal lines of the GEOPAK cross section cell as pointed to by the arrow in figure 5.32.

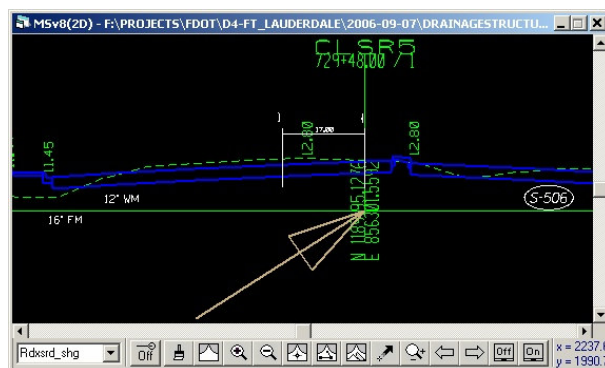


Figure 5.32

Offset: This value defines the offset of the point selected in the DP Relative button.

Elevation: This value defines the elevation of the point selected in the DP Relative button.

Structure (button): Draw the structure in the CAD window based on the point click (exact or relative)

Paragraph (button): Click this button and write-up paragraph will be attached to the cursor. Move the cursor in the CAD window and click the left mouse button to place it.

Oval (button): After the paragraph has been placed, click on this button to draw the oval (with the node name inside) above the paragraph.

Station Text (button): Use this button to drag the station onto the CAD window, click the left mouse button to place it. You can then place an oval (with the node name inside) above.

Pipes Intersecting the XSection (button): Scan the all drainage systems and draw any pipes that pass through the current cross section. This only works if DP Relative has been selected.

5.2.3.2 Mode – Multiple Structures: GEOPAK Cross Section Cells

This mode uses the information gathered from GEOPAK cross sections cells to draw drainage structures with little or no manual input from the user. This mode is extremely fast (200 structures in 60 seconds).

There is a sequence of four events to perform. They are Step 1: List, Step 2: Select, Step 3: Synchronize, and Step 4: Draw. Notice in figure 5.33, the screen has widened to accommodate this mode's layout.

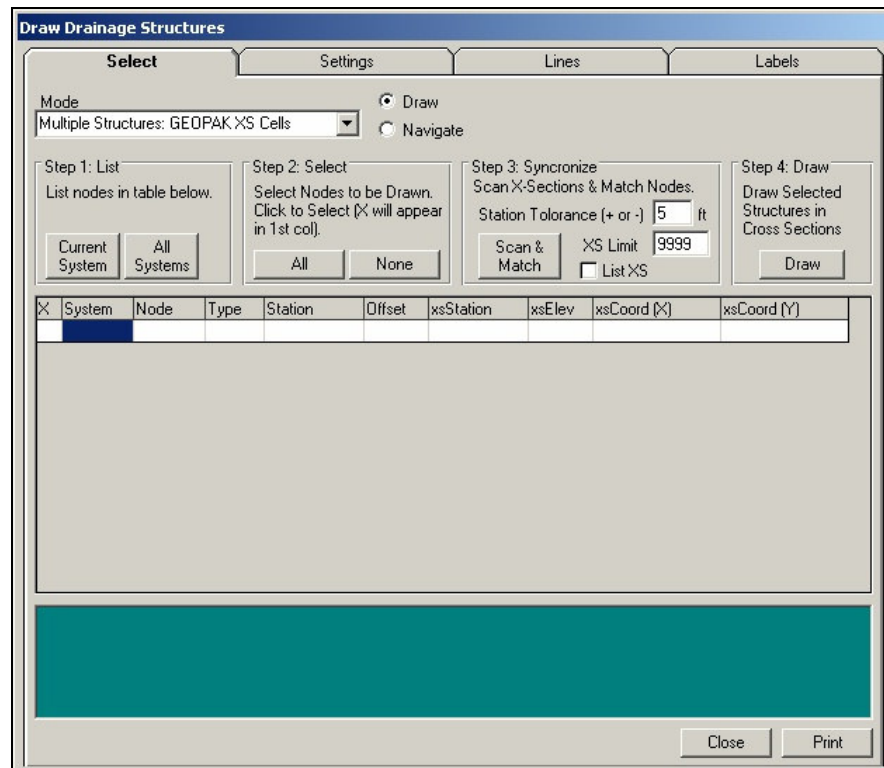


Figure 5.33

Step1: List

Current System and **All Systems** (buttons): These buttons are used to populate the list (in the bottom half of the window) with nodes from the current active system or all systems in the project database.

Step 2: Select

At this step the user should 'check', by clicking in the 'X' column, those nodes to be drawn.

All and **None** (buttons): These buttons will check or uncheck all nodes listed.

Step 3: Synchronize

Scan & Match (button): This button will step through the list of nodes and attempt to match-up each node with a GEOPAK cross section cell found in the CAD file. This is done by comparing the station of each node with the station of each cross section cell (from the CAD window). If the two are within the '**Station Tolerance**' (+/- 5 feet in this case), then the xsStation, xsElev, xsCoord (X), and xsCoord (Y) columns in the list will be updated with values gathered from the cross section cell.

Now that steps 1-3 have been completed, the window should look similar to figure 5.34. Take notice of the results window (green background with white text) at the bottom of the window. This section notifies the user of any nodes that were not matched-up or any other problems that may need attention.

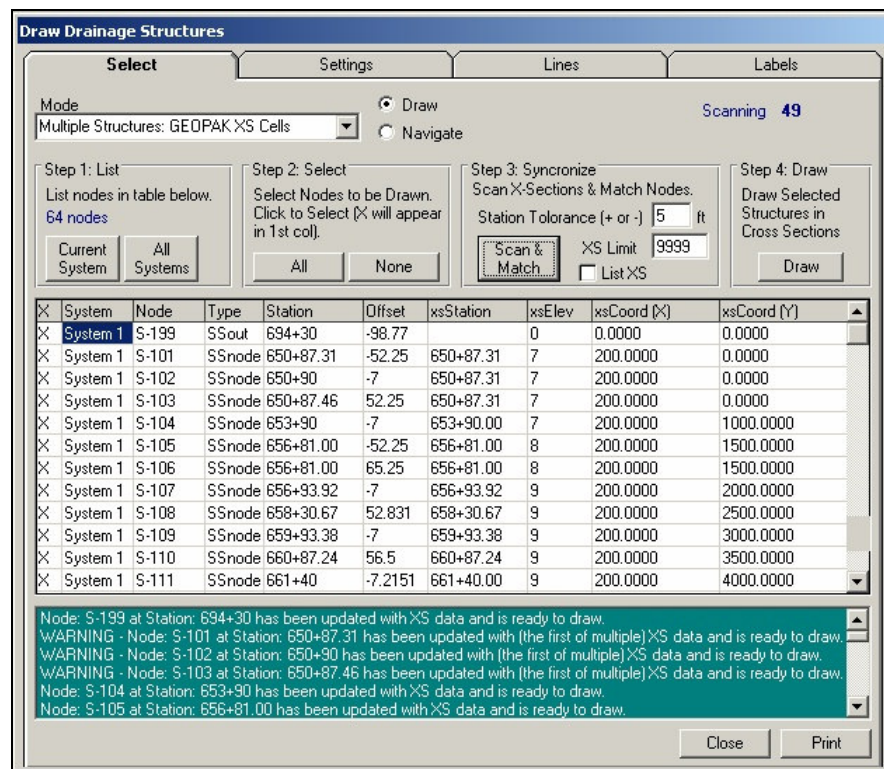


Figure 5.34

Step 4: Draw

Draw (button): Press this button and sit back and relax. For the next 60 seconds or so, ASAD will read through the list and draw those structures that are (1) checked ('X' in the far left column) and (2) have a non-zero xsCoord (X) **OR** xsCoord (Y) value. The CAD window will move from cross section to cross section as ASAD draws and labels the structures.

5.2.3.3 Mode - Multiple Structures: Plan Drawing

This mode (see figure 5.36) draws a cross sectional view of each node adjacent to node as drawn in plan view. This provides the unique perspective of seeing both the plan view and cross section view in the same CAD window (see figure 5.35).

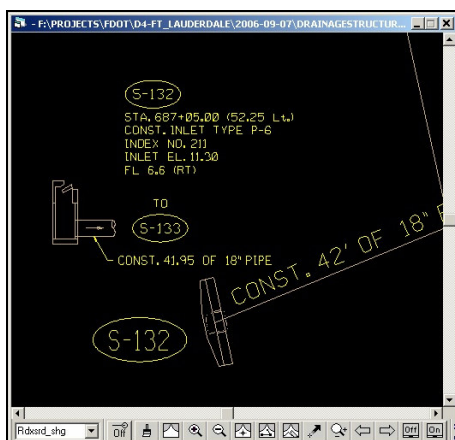


Figure 5.35

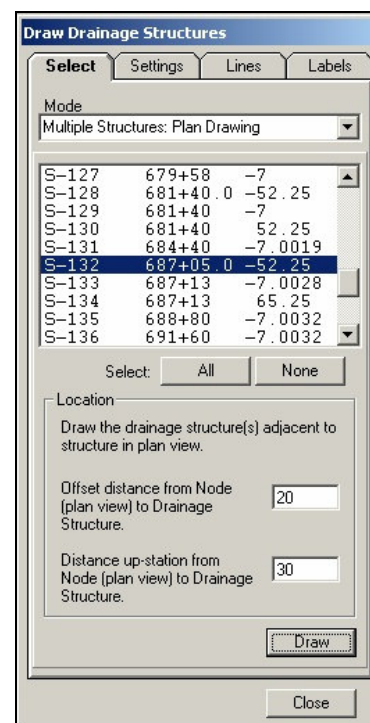


Figure 5.36

Select All or None (buttons): Use these buttons to select all or select none of the nodes to draw. The user may also click on the nodes to draw.

Offset distance from Node ...: This value determines how far (offset wise), from the nodes' north and east coordinates, the drainage structure (cross section view) is to be drawn.

Distance up-station from...: This value determines how far (up-station), from the nodes' north and east coordinates, the drainage structure (cross section view) is to be drawn.

5.2.3.4 Mode - Multiple Structures: Grid Layout

This mode (see figure 5.37) will draw the drainage structures into a user-defined grid (see figures 5.38 and 5.35) that can be reviewed in CAD or plotted to paper and reviewed for quality control purposes.

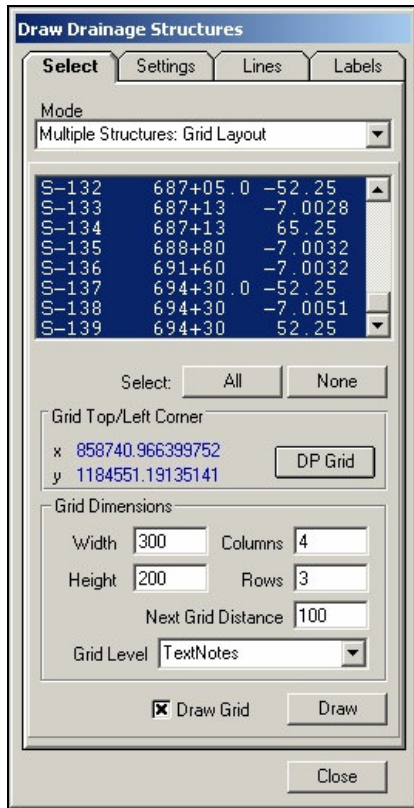


Figure 5.37

Select All or None (buttons): Use these buttons to select all or select none of the nodes to draw. The user may also click on the nodes to draw.

DP Grid: Click (or snap) on the top-left point of the first grid to be plotted.

Width and Height: Define the height and width of each grid.

Columns and Rows: Set the number of columns and rows in the grid. In this case, 12 (4 columns x 3 rows) structures will be drawn in each grid. Each cell in the grid is 75 units wide (width 300 / 4 columns) and 66.67 units high (height 200 / 3 rows).

Next Grid Distance: When multiple grids are needed, this value sets the distance between bottom of one grid and the top of the next. In this case (see figure 5.37) there are 40 nodes to be drawn. Since each grid holds 12 structures, it will take 4 grids to hold all of them.

Grid Level: The grid is drawn on this level name.

Draw Grid (checkbox): The grid lines can be turned off. Use this checkbox to turn on (checked) or off (unchecked) the grid lines.

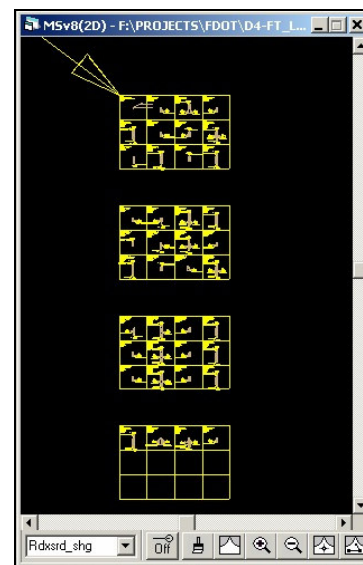


Figure 5.38

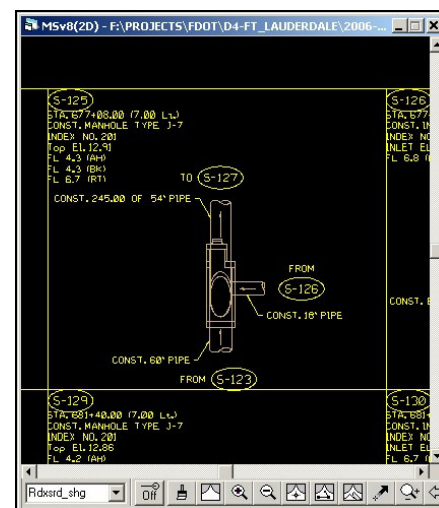


Figure 5.39

5.2.3.5 Settings, Line Level/Symbology, Labels

Whereas the 'Select' tab define which nodes to draw and the mode to draw them in, the other 3 tabs, 'Settings', 'Lines', and 'Labels', control the details about the drawing (i.e. levels, text sizes and fonts, leader lines, etc.)

Settings (tab):

Figure 5.40

Writeup Paragraph (checkbox): If checked, ASAD will automatically draw place the drainage structures' writeup as defined in the Structure Definition window.

Pipe Description Text (checkbox): If checked, the pipe label will be drawn.

To/From Pipe Ovals w/text (checkbox): When checked, the 'To/From Pipe' labels indicate the node at the other end of a pipe.

Opening Direction:

Pipe Cut Length: When a pipe going to or coming from a node, is drawn, the lines representing pipe are usually 'cutoff'.

Ahead, Sides (Left & Right), Back: Sets the distance the pipe is to be drawn in the ahead, left, right and back direction.

Reset Template to Defaults:

Drawing Scale: Scale of the drawing. In the case above, the scale is 1"=10', hence the 10.

Reset (button): Sets the elements and labels to be drawn, the level/symbology, text fonts and size, and decimal rounding values to FDOT specifications

Lines (tab):

Figure 5.41

Set All Levels on This Tab (button): Use this button to change all of the 'Level Name' dropdown boxes to the same value as the first dropdown box (Top Level/Symbology: Existing) in the column. In other words, select the level name in the top-most box and then press this button to copy it to the other 11 boxes.

Level Name (dropdown boxes): Define the level to be used when the drainage structure is drawn based on the Status of the Top and the Bottom of the node as defined in the Node Edit window

Labels (tab):

The labels tab contains 3 sub-tabs. They are D.S. (stands for drainage structure) Paragraph, Ovals, and Pipe Description.

D.S.Paragraph (sub-tab):

Draw Drainage Structures

Select Settings Lines Labels

D.S. Paragraph Ovals Pipe Description

Use EDIT>STRUCTURE DEFINITIONS window, ANNOTATION tab to edit writup paragraphs. [Diagram]

Position (for Drop Structures)

Vertical Distance 31

☒ Round Elevation in Multiples of 10

Post-Rounding Adjustment (+/-) -0.4

Horizontal Distance 17

☒ Round Offset in Multiples of 10

Post-Rounding Adjustment (+/-) 0.5

Position (for Endwall Structures)

Vertical Distance 31

☒ Round Elevation in Multiples of 10

Post-Rounding Adjustment (+/-) -0.4

Horizontal Distance 17

☒ Round Offset in Multiples of 10

Post-Rounding Adjustment (+/-) 0.5

Paragraph Text Level/Symbology

Height 1.4 Width 1.4 Spacing 1 Font 48 Level Name TextNotes

Set All Levels on this Tab, Ovals Tab & Pipe Description Tab

Close

Figure 5.42

Diagram (button): Displays a diagram of some of the fields listed below (see figure 5.43)

Vertical Distance: Sets the vertical distance from the structure to the top-left corner of the paragraph.

Round Elevation in Multiples of: This setting works with the Vertical Distance value to round the actual vertical position (y) to be exactly on the grid of the drainage structure sheets. This ensures a neat and orderly placement of the paragraph label.

Post-Rounding Adjustments (+/-): This setting is a fine-tuning adjustment up or down after the rounding has occurred.

How does this all come together?

In the case above, assume an inlet has an inlet elevation of 51.43'. To this, we add 31' (Vertical Distance) which results in a tentative paragraph vertical position of 82.43'. Now, let's apply the 'Round Elevation to Multiples of 10' routine which rounds our vertical position to 80.00'. We don't want the actual top-left piece of text (1st line of the paragraph) to be right on the grid, we want it to be just under the grid line, so 'Post-Rounding Adjustments' value of -0.4' is added to our vertical position (80.00') which results in the top-left corner of our paragraph being drawn at vertical position 79.60'.

Horizontal Distance: Sets the horizontal distance from the structure to the top-left corner of the paragraph.

Round Offset in Multiples of: This setting works with the Horizontal Distance value to round the actual horizontal position (x) to be exactly on the grid of the drainage structure sheets. This ensures a neat and orderly placement of the paragraph label.

Post-Rounding Adjustments (+/-): This setting is a fine-tuning adjustment left (-) or right (+) after the rounding has occurred.

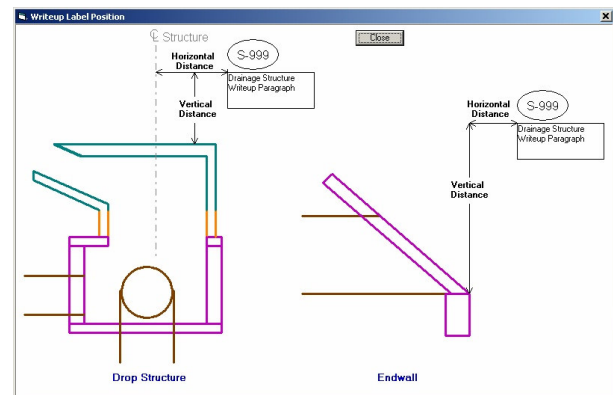


Figure 5.43

Ovals (sub-tab):

Draw Drainage Structures

Select Settings Lines Labels

D.S. Paragraph Ovals Pipe Description

Level Symbology

Height 5 Width 10 Font TextNotes Level Name

Oval Text 1.75 1.75 48 TextNotes

Outer Text 1.4 1.4 48 TextNotes

Oval above D.S. Paragraph Oval at Pipe End (To/From)

[Diagram]

Vertical Distance from Top-Left corner of Writup 1

Horizontal Distance from Top-Left corner of Writup 0

Close

Figure 5.44

Ovals: Height, Width, Level Name: All of the ovals drawn by the 'Draw Drainage Structures' window are defined by these fields.

Oval Text: Height, Width, Font, Level Name: All of the labels drawn inside ovals by the 'Draw Drainage Structures' window are defined by these fields.

Outer: Height, Width, Font, Level Name: Some ovals at pipe-cut ends denote the node at the other end of the pipe. There is usually a label, outside the oval, indicating direction such as 'To' or 'From'. All of these labels, which are drawn by the 'Draw Drainage Structures' window are defined by these fields.

Vertical or Horizontal Distance from Top-Left corner of Writeup: These two values determine the distance up/down and left/right of the oval relative to the paragraph.

'Oval at Pipe End (To/From)' (sub-tab):

This sub-tab is used to define where the pipe-cut ovals will be placed relative to the pipe ends. Also the location of the 'To' and 'From' labels are set in this sub-tab.

	Ahead	Back	Left	Right
Vertical Distance	5.5	-6.5	0	0
Horizontal Distance	0	3	-8.5	8.5
Orientation (see Diagram)	Left	Left	Above	Above
Offset	6.5	6.5	4.5	4.5

The outer text will indicate direction of flow using 'To' or 'From' notation.

☐ Display 'To' & 'From' labels in upper and lower case.

☒ Display 'TO' & 'FROM' labels in ALL upper case.

Figure 5.45

Diagram (button): This button will open the next two figures (5.46 and 5.47). These diagrams provide better view of how this data is used.

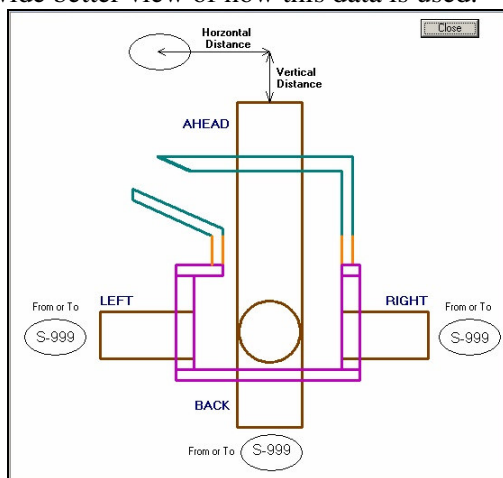


Figure 5.46

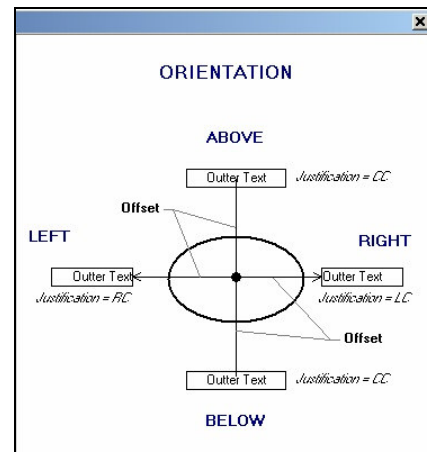


Figure 5.47

Pipe Description (sub-tab):

Line Terminator

☐ No Terminator

☒ Draw Terminator as Lines

Arrowhead Length: 1

☐ Use Cell

Name: Scale: 1

Description Label

Cut Pipes:

Incoming (From) Pipes: CONST. @desc

Outgoing (To) Pipes: CONST. @length OF @desc

Connected Pipes:

On Same Cross Section: CONST. @length OF @desc

Level/Symbology

	Height	Width	Font	Level Name
Text	1.4	1.4	48	TextNotes
Leader Line				TextNotes
Line Terminator				TextNotes

Figure 5.48

The 'Dimensions' section controls the leader line from the pipe Description Label to the pipe.

Pointer Leader: The diagonal portion of the leader line that starts at the pipe and angles up a 60 or 120 degree angle. This line connects to the Leader Extender.

Leader Extender: This portion of the leader line picks up at the top of the Pointer Leader and extends horizontally to the Description Label.

Pre and Post Text Offset: This is the distance from where the Leader Extender ends and the Description Label begins. If the Leader Extender is to the right of the Description Label then the 'Post' value applies. If the Leader Extender is to the left

of the Description Label then the 'Pre' value applies.

Line Terminator (option): Select between (1) no line terminator, (2) the line terminator to be drawn as simple lines, or (3) draw the line terminator as a cell.

Description Label:

Cut Pipes: Incoming (From) Pipes: This string sets the format for pipe Description Labels for the pipes coming 'in' to the node being drawn.

Cut Pipes: Outgoing (To) Pipes: This string sets the format for pipe Description Labels for the pipe exiting the node being drawn.

What is a Cut Pipe? A 'cut pipe' refers to those pipes that are drawn, in the drainage structure, as only a portion of a pipe with a cut end (see figure 5.49)

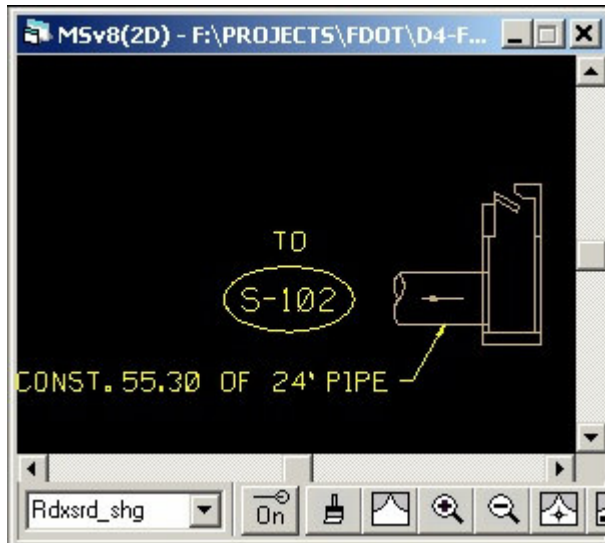


Figure 5.49

Connected Pipe: On Same Cross Section: This sets the format of the pipe Description Label for those pipes that connect between two nodes on the same cross section.

Pipe Length: Decimal Places: Set the number of decimal places for the pipe length. This number can be 0 – 4.

Level/Symbology:

Text Height, Width and Font: Set the text height, text width and font for the pipe Description Label.

5.2.4 Drawing Summary of Drainage Structure Sheets (SDS)

The 'Summary of Drainage Structure' (SDS) window is used to tabulate the quantities of structures and pipes in the FDOT standard format. Start this window by using pulldown Compute/Reports>Summary of Drainage Structures. As seen in figure 5.50, this screen employs a Step 1, Step 2, etc. approach to computing and drawing/exporting the summary of drainage structures data.

00 <P/F> 5	01 <Structure #> 10	02 <Station> 15	03 <Offset> 20	04 <Type> 30	05 <Pipe Size> 35	06 <Pipe Length> 40	07 <Barrels> 50	08 P-5 1020180	09 P-5(>10) 1020185	10 P-6 1020200	11 J-6 1020210
	S-101	650+87	LT	Inlet Pipe	24"	41	1			1	
	S-102	650+90	LT	Manhole, f	42"	295	1				
	S-103	650+87	RT	Inlet Pipe	24"	55	1			1	
	S-104	653+90	LT	Manhole, f	42"	299	1				
	S-105	656+81	LT	Inlet Pipe	18"	43	1			1	
	S-106	656+81	RT	Inlet Pipe	24"	69	1			1	
	S-107	656+94	LT	Manhole, f	48"	162	1				
	S-108	658+31	RT	Inlet Pipe	18"	147	1	1			
	S-109	658+61	LT	Manhole, f	48"	274	1				
	S-110	660+87	RT	Inlet Pipe	18"	239	1	1			
	S-111	661+40	LT	Manhole, f	48"	188	1				
	S-112	663+18	LT	Inlet Pipe	18"	43	1			1	
	S-113	663+29	RT	Inlet Pipe	18"	74	1			1	
	S-114	663+33	LT	Manhole, f	54"	203	1				
	S-115	665+41	LT	Manhole, f	54"	369	1				
	S-116	668+06	LT	Inlet Pipe	18"	107	1			1	
	S-117	669+15	LT	Inlet Pipe	18"	41	1			1	

Figure 5.50

5.2.4.1 Step 1: Clear Column Setup (tab):

00 <P/F> 5	01 <Structure #> 10	02 <Station> 15	03 <Offset> 20	04 <Type> 30
	S-101	650+87	LT	Inlet Pipe
	S-102	650+90	LT	Manhole
	S-103	650+87	RT	Inlet Pipe

Figure 5.51

Clear Column Setup (button): Start creating a new SDS table by clearing the table and the column headers. Column headers contain the column #, the column identifier (<Station>, P-1, 18RCP, etc), and the

column order number which is used to set the order in which the columns appear in the table. This step gives you a clean slate to work with.

5.2.4.2 Step 2: Scan Database and Build SDS Table (tab):

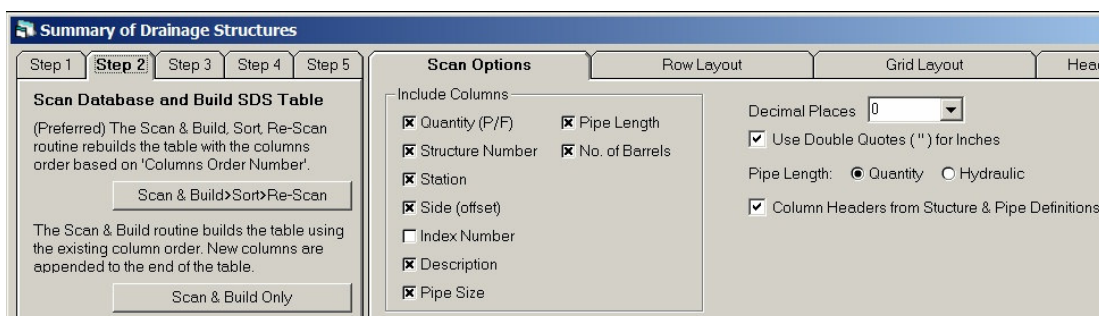


Figure 5.52

Scan & Build>Sort>Re-Scan (button): This button has a long title, but it deserves it; it does a lot of work. First, it scans all nodes and reaches in every system and builds the SDS table. Next, it sorts the column headers based on their Column Order Number (see sections 3.6.5 and 3.7 for more on column data as defined in the Structure and Pipe definitions, respectively). Finally, it scans the node and reach data again and places the data into the correct columns. All of this with a push of a button.

Scan & Build Only (button): This button is similar to the above button except it assumes that you have the columns already in order. It scans the data and places it into the appropriate column without any sorting.

Include Columns (checkboxes): This section determines which of the 'Standard' FDOT columns should be included in the SDS table.

Decimal Places (dropdown list): Sets the number of decimal places the quantities will be rounded to.

Use Double Quotes for Inches (checkbox): Turns, on or off, the option of displaying double quotes (") after the pipe size value in the <Pipe Size> column. The double quote (") indicates the measurement is in inches.

Pipe Length (option): This option selects the source of the pipe length quantities. Select 'Quantity' or 'Hydraulic' (center-to-center) length.

Column Headers from Structure & Pipe Definitions (checkbox): This option tells ASAD to get the column headers and column order number from the structure and pipe definitions. The alternative is for the user to manually create the column identifiers for each column.

5.2.4.3 Step 3: Reset ALL Levels to FDOT Standards (tab):

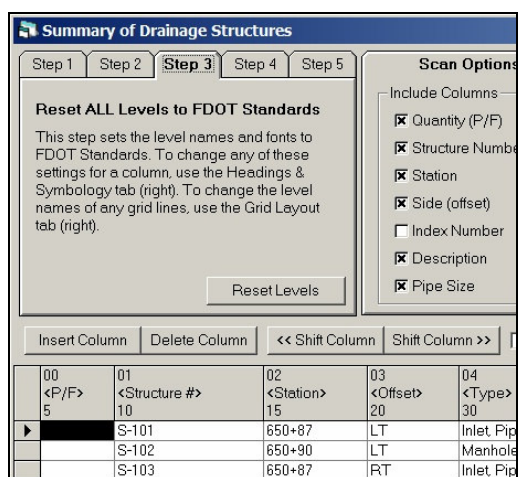


Figure 5.53

Reset Levels (button): This button will automatically reset ALL levels for ALL the elements (text and lines) to be drawn into CAD. The levels will be set to FDOT standards.

5.2.4.4 Step 4: Compute Text Sizes, Row, Column and Sheet Spacing (tab):

Summary of Drainage Structures

Step 1 Step 2 Step 3 **Step 4** Step 5

Worksheet for Computing Text Sizes, Row & Column Spacing, and Sheet Spacing

Worksheet

Scan Options

Include Columns

☒ Quantity (P/F)

☒ Structure Number

☒ Station

☒ Side (offset)

☐ Index Number

☒ Description

☒ Pipe Size

Insert Column Delete Column << Shift Column Shift Column >>

00 <P/F>	01 <Structure #>	02 <Station>	03 <Offset>	04 <Type>
5	10	15	20	30
	S-101	650+87	LT	Inlet Pipe
	S-102	650+90	LT	Manhole
	S-103	650+87	RT	Inlet Pipe

Figure 5.54

Worksheet (button): This button invokes SDS Sheet Dimensioning Tool (see figure 5.55) that is used to compute the size of the text (headers, details, sub-totals, and totals) as well as row heights and column widths.

SDS Sheet Dimensioning Tool

Input

Max Height 384

Head Row 1 2 %

Head Row 2 2 %

Head Row 3 2 %

Head Row 4 1.5 %

Sub-Total Row 1.5 %

Grand Total Row 1.5 %

of Main Body Rows 35

TH % of Row HT 60 %

TW % of TH 75 %

Sheet Width 616

Columns 24

Column Reserve 10 %

Results

	Row Height	Text Height	Text Width
Header 1	7.6800	4.6080	3.4560
Header 2	7.6800	4.6080	3.4560
Header 3	7.6800	4.6080	3.4560
Header 4	5.7600	3.4560	2.5920
Detail	4.7451	2.8471	2.1353
Sub-Total	5.7600	3.4560	2.5920
Grand-Total	5.7600	3.4560	2.5920

Default Column Width 23.1000

☒ Automatically set column width for identifier columns

Text Justification 7 (7 = CenterCenter)

Sheet Spacing 500

Compute Print Apply Cancel

Figure 5.55

SDS Sheet Dimensioning Tool (window): The Summary of Drainage Structure (SDS) sheets are usually drawn, into CAD, to fit inside a border. The task of computing line spacing, font sizes, and columns widths, to fit into a border, can be quite time consuming. The 'SDS Sheet Dimensioning Tool' (see figure 5.55) window was created to automate this process. Enter in the fields (below) and let ASAD do the number crunching.

Max Height: The maximum height from the top-left corner, of the draw able portion of the border, to the lower-left corner.

Head Rows 1-4: The percentage of the MaxHeight allocated for the four rows of column Header labels. These values are typically 2% for rows 1-3 and 1.5% for row 4.

Sub-Total & Grand Total Rows: The percentage of the MaxHeight allocated for the Sub-Total and Grand Total Rows. These values are typically 1.5%.

of Main Body Rows: The number of rows on each sheet filled with data. Thirty-five (35) strikes a nice balance of quantity of data per sheet verses readability of the sheet.

TH % of Row HT: The text height relative to the distance between row lines. Default is 60%.

TW % of TH: The text width relative to the text height. Default is 75%.

Sheet Width: The width from the top-left corner, of the draw able portion of the border, to the top-right corner.

Columns: The number of columns in the SDS. When the 'SDS Sheet Dimensioning Tool' window opens, it will have the number of columns as per the SDS table. If other columns (such as 'Sod', 'Steel', 'Class I, Concrete', etc) are needed, simply add to this number to ensure enough space for all columns.

Column Reserve: This is used to reserve extra space at the right side of the table for columns that may be added at the end of the process. The 'Remarks' column is a good example of this. The default is 15% of 'Sheet Width'

Text Justification: This is used to set the text justification for the Header, Detail, and Totals text. This should be set to '7' for Center-Center.

Sheet Spacing: Set the distance from the top left corner of the first sheet to the top left corner of the next sheet below.

Automatically set column widths for identifier columns: The first eight columns (identifier columns such as Station, Barrels, Structure Number, etc.) do not all have to be set to the default column width. They are usually some percentage of the default width. For instance the Qty column (noted by <P/F>) is usually about 35% of the default column width while the Station (noted by <Station>) is typically 140% of the default widths. Turn on (Checked) this check box to compute the column width using this method. If this checkbox is off (Unchecked) then each of these columns will be assigned the default column width.

Compute (button): Computes the text heights and widths, the line spacing, and column widths as seen in the 'Results' section (see figure 5.55).

Print (button): Prints the results to a default printer.

Apply (button): Writes the 'Results' to the appropriate fields in other tabs of the 'Summary of Drainage Structures' window.

5.2.4.5 Step 5: Draw into CAD or Export to a Text File (tab):

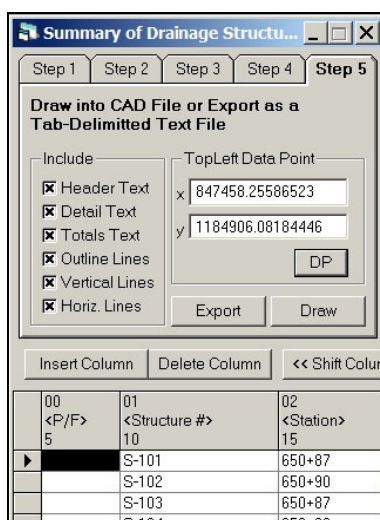


Figure 5.56

Include (section): Sets which elements of the drawing to draw.

DP (button): Select the top-left corner of the border. All elements will be drawn relative to this point.

Draw (button): Draw in to CAD.

Export (button): Export is another way to manipulate the SDS data. You will prompt for a file name to export to. This routine creates a tab-delimited ASCII file which can be easily opened with Excel.

5.2.4.6 SDS Data Table

The bottom half of the SDS window (figure 5.57) is the Data Table. This is the SDS data is located and where columns and headers can be added, changed, moved and deleted.

Summary of Drainage Structures

Step 1 Step 2 Step 3 Step 4 Step 5

Clear Column Setup
This step clears out all previous column setup data. This allows for a fresh new 'Scan and Build' of the data table (below).
Clear Column Setup

Scan Options

Include Columns:

- ☒ Quantity (P/F)
- ☒ Pipe Length
- ☒ Structure Number
- ☒ No. of Barrels
- ☒ Station
- ☒ Side (offset)
- ☐ Index Number
- ☒ Description
- ☒ Pipe Size

Decimal Places: 0

☒ Use Double Quotes (") for Inches

Pipe Length: ☒ Quantity ☐ Hydraulic

☒ Column Headers from Structure & Pipe Definitions

Insert Column Delete Column << Shift Column Shift Column >> ☐ Shift Header Only (<10)

Check for Zero Column Totals

00	01	02	03	04	05	06	07	08	09	10	11
<P/F>	<Structure #>	<Station>	<Offset>	<Type>	<Pipe Size>	<Pipe Length>	<Barrels>	P-5	P-5(>10)	P-6	J-6
5	10	15	20	30	35	40	50	1020180	1020185	1020200	1020210
	S-101	650+87	LT	Inlet Pipe	24"	41	1			1	
	S-102	650+90	LT	Manhole	42"	295	1				
	S-103	650+87	RT	Inlet Pipe	24"	55	1			1	
	S-104	653+90	LT	Manhole	42"	299	1				
	S-105	656+81	LT	Inlet Pipe	18"	43	1			1	
	S-106	656+81	RT	Inlet Pipe	24"	69	1			1	
	S-107	656+94	LT	Manhole	48"	162	1				
	S-108	658+31	RT	Inlet Pipe	18"	147	1	1			
	S-109	658+61	LT	Manhole	48"	274	1				
	S-110	660+87	RT	Inlet Pipe	18"	239	1	1			
	S-111	661+40	LT	Manhole	48"	188	1				
	S-112	663+18	LT	Inlet Pipe	18"	43	1			1	
	S-113	663+29	RT	Inlet Pipe	18"	74	1			1	
	S-114	663+33	LT	Manhole	54"	203	1				
	S-115	665+41	LT	Manhole	54"	369	1				
	S-116	668+06	LT	Inlet Pipe	18"	107	1			1	
	S-117	669+15	LT	Inlet Pipe	18"	41	1			1	

Figure 5.57

Insert Column (button): Click on the top of a column. The entire column should highlight Blue. Then click on the 'Insert Column' button to insert a new column. Use the 'Dropdown List' (see below) to establish a column name (i.e. 18RCP, <Offset>, etc.)

Delete Column (button): Click on the top of a column. The entire column should highlight Blue. Then click on the 'Delete Column' button to insert a new column.

<< Shift Column >> (buttons) and Shift Header Only (checkbox): The two 'Column Shift' buttons and the 'Shift Header Only' checkbox work in concert with each other. The 'Column Shift' buttons will move an entire column (header and maybe the data) to the left or right. The 'Shift Header Only' setting determines if the entire column (header plus data) or only the header gets moved to the left or right.

(dropdown list): Click anywhere in a column (to give that column focus) and select a new column header name.

Check for Zero Column Totals (button): This routine scans all of the columns and reports those that have no numerical data in them (see figure 5.58). This makes it easy to find columns that may no longer have any quantities.

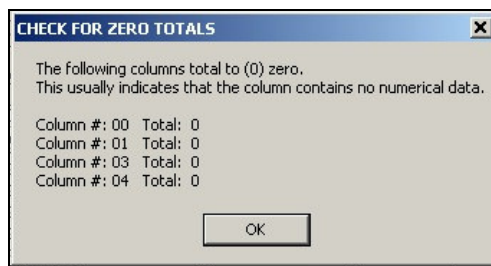


Figure 5.58

5.2.4.7 Row Layout (tab):

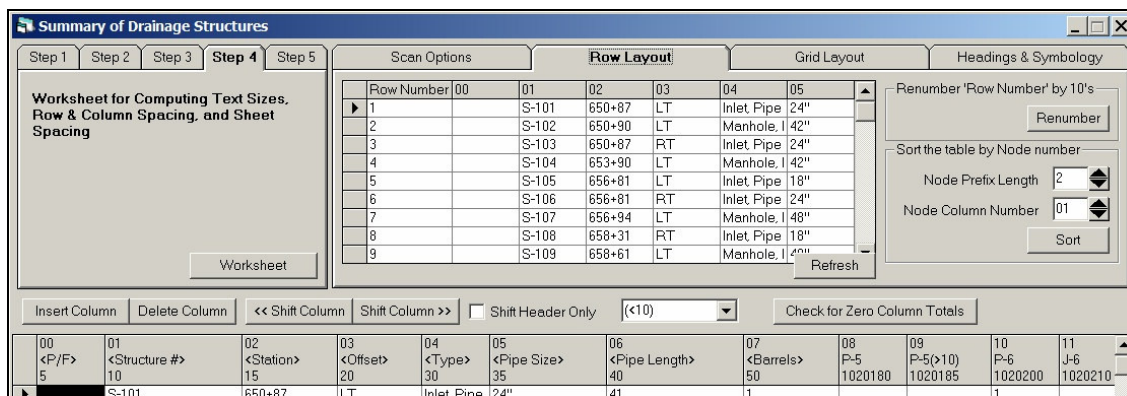


Figure 5.59

Row Number (column) and **Refresh** (button): The value in each row determines the order of the SDS table (see figure 5.52). Simply key in a different value on any row and press the ‘Refresh’ (button) to change the order of the table.

Renum Rows by 10’s (button): When the ‘Row Numbers’ are number by one’s as they are in figure 5.52, there is no way to change the order from 2 through 5 with manually renumbering all of the rows. Use the ‘Renum Rows by 10’s’ button to change the row numbers to 20, 30, 40, and 50, thereby allowing you to change any row number to, for example, 35. This would logically place it between 30 and 40.

Node Prefix Length, Node Column Number and Sort by Node Number (button): The two settings work with the ‘Sort by Node Number’ button to reorder the rows in a node number order. The ‘Node Prefix Length’ tells the ‘Sort by Node Number’ routine to where to make the break between the string character portion of the node name and the numerical portion of the node name. The ‘Node Column Number’ setting indicates, to the ‘Sort by Node Number’ routine, which column contains the node number.

Note: When naming nodes, it is always a good idea to keep the length of the character portion of the node name consistent throughout the project. Names such as S-103, O-41, and B-3 show a consistent length (2 chars) of the character portion of the node name, while OUT-10, A-2, BB-321 have INCONSISTANT lengths of the character portion of the node name.

5.2.4.8 Grid Layout (tab):

Symbology & Dimensions (sub-tab):

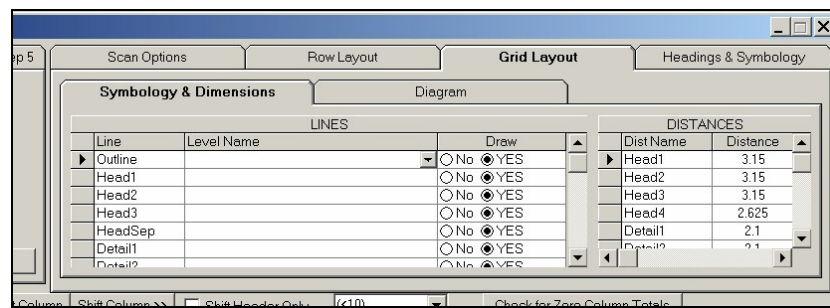


Figure 5.60

LINES (table): This table contains the 'Level Names' and the 'Draw' On/Off settings for every line drawn (CAD) in SDS table. See figure 5.61, 'Drawing' sub-tab, to better see where the 'Lines' are on the drawing.

DISTANCES (table): This table contains the distances between lines as seen in 'Diagram' sub-tab in figure 5.54.

Diagram (sub-tab):

The diagram (see figure 5.61) sub-tab shows each line of the SDS as drawn in CAD. Each line has a name and each distance has a name.

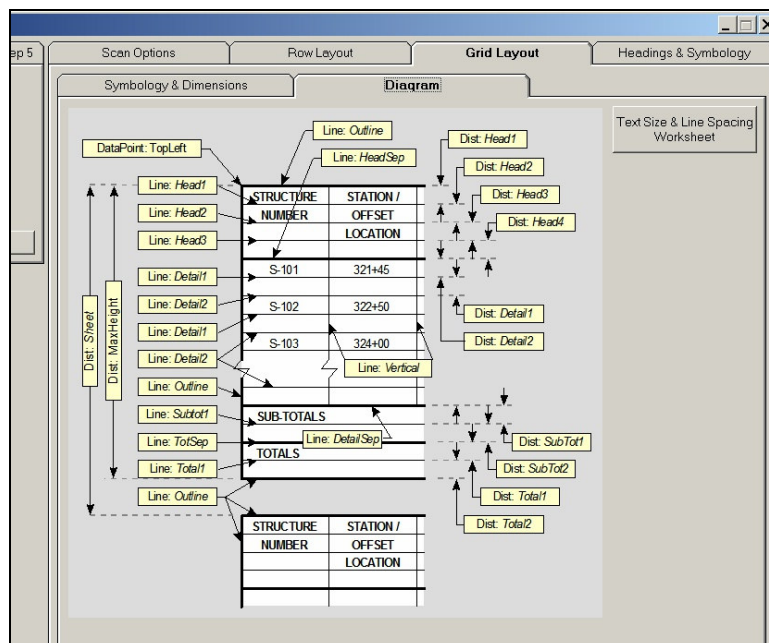


Figure 5.61

Text Size & Line Spacing Worksheet (button): Click to open the SDS Sheet Dimensioning Tool (see figure 5.55)

5.2.4.9 Headings & Symbology (tab):

Headings (sub-tab):

The data displayed in the top of the 'Headings' sub-tab reflects only data for the column that has focus. In the case of figure 5.62, column #08 has focus.

Figure 5.62 shows the 'Headings & Symbology' dialog box. The 'Headings' tab is selected, displaying settings for four heading lines. The 'Level' dropdown is set to 'TextNotes'. The 'Tx Ht' and 'Tx Wd' are set to 4.608 and 3.456 respectively. The 'Just' dropdown is set to 7 (center-center). The 'Text String' field contains 'STORM SEWER PIPE' for line 1, 'ROUND' for line 2, and '18"' for line 3. A 'Copy level/symbology settings to ALL columns' button is present. Below the settings is a preview table showing the layout of the SDS sheet columns.

03 <Offset> 20	04 <Type> 30	05 <Pipe Size> 35	06 <Pipe Length> 40	07 <Barrels> 50	08 18RCP 510018	09 24RCP 510024	10 30RCP 510030	11 42RCP 510042
LT	Inlet Pipe	24"	41	1		41		
LT	Manhole, I	42"	295	1				295
RT	Inlet Pipe	24"	55	1		55		
LT	Manhole, I	42"	299	1				299
LT	Inlet Pipe	18"	43	1	43			

Figure 5.62

Level (dropdown boxes): Sets the CAD Level name to which the 'Headings' data will be drawn.

Tx Ht & Tx Wid: Sets the text height and width.

Just: Sets the text justification. This is usually 7 (center-center).

Text String: This is the actual Header text that is drawn at the top of the column.

Copy level/symbology settings to ALL columns (button): Copies these setting (less the Text Strings) to all other columns.

<< 10 >> (buttons): Automatically place strings '<10' or '>10' in the bottom text string position. This is a short cut to filling in some common data.

Details (sub-tab):

Figure 5.63 shows the 'Details' sub-tab in the 'Headings & Symbology' dialog box. The 'Level' dropdown is set to 'TextNotes'. The 'Tx Ht' and 'Tx Wd' are set to 2.965 and 2.224 respectively. The 'Just' dropdown is set to 7 (center-center). A 'Copy level/symbology/decimal settings to ALL columns' button is present.

Figure 5.63

Level, Tx Ht & Tx Wid, Just, Copy level/symbology settings to ALL columns (button): Same as the heading sub-tab except they apply to the detail text portion of the SDS sheet.

Totals (sub-tab):

Figure 5.64 shows the 'Totals' sub-tab in the 'Headings & Symbology' dialog box. The 'Level' dropdown is set to 'TextNotes'. The 'Tx Ht' and 'Tx Wd' are set to 3.6 and 2.7 respectively. The 'Just' dropdown is set to 7 (center-center). The 'Dec Plcs' dropdown is set to 0. A 'Copy level/symbology/decimal settings to ALL columns' button is present.

Figure 5.64

Level, Tx Ht & Tx Wid, Just, Decimal Places, Copy level/symbology settings to ALL columns (button): Same as the heading sub-tab except they apply to the totals and sub-totals text portion of the SDS sheet.

Width (sub-tab):

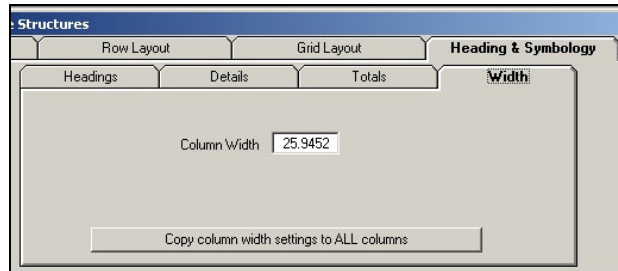


Figure 5.65

Column Width: This value sets the width of each column in the table. Each column has its own Column Width value.

5.2.5 Drawing Cells in a Grid

The Draw Cells window (see figure 5.66) is used to draw cells in grid layout (see figure 5.67). This is typically used to review cells as they are drawn by ASAD. This window can be opened using pulldown CAD>Cells>Draw Cells in Grid or CAD>Storm Sewer> Draw Cells in Grid.

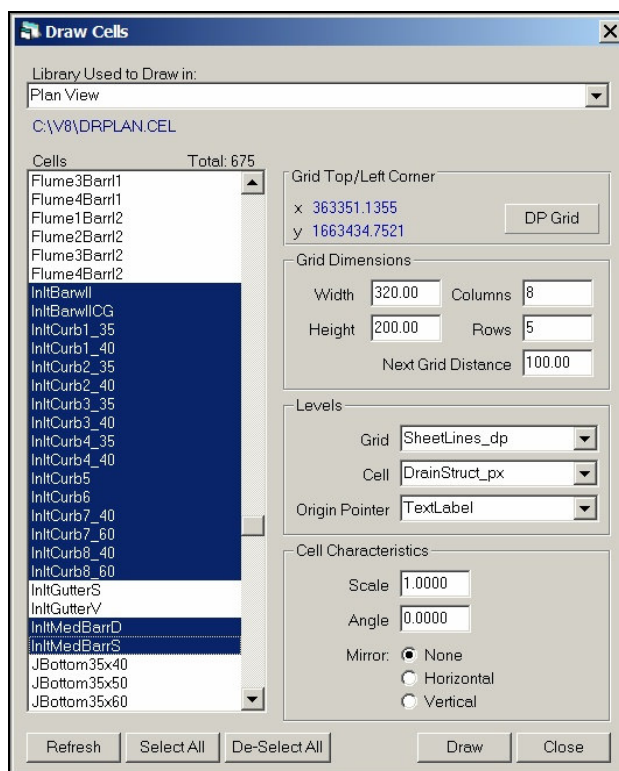


Figure 5.66

Library Used to Draw in (dropdown box): Drawing plan view, profile view and cross section view have cell libraries associated with them (see section 1.2.2). Select the cell library to draw from.

DP Grid (button): Datapoint on the screen to set the top-left corner of the first grid.

Width & Height: Height and width of each grid.

Columns & Rows: The number of columns and rows in each grid.

Next Grid Distance: The distance from the bottom-left corner of one grid to the top-left corner of the next grid.

Levels: Grid, Cell, and Origin Pointer (dropdown boxes): Select the levels to draw to.

Scale: Select the scale of the cells to be drawn.

Angle: Set the angle of the cells to be drawn.

Mirror: Mirror (flip) the cells either about the x axis (Mirror Horizontal) or about the y axis (Mirror Vertical) or no mirroring.



Figure 5.67