

Surveyor Tools Neo

for
Microstation
Release 1

January 7, 2024

INTRODUCTION

Surveyor Tools is a set of programs which runs inside of Microstation that was developed from 2014 to 2023. It is meant to be useful to surveyors, but not intended to replace surveying software, it is merely some tools that were incidentally constructed to make workflow easier for the author and his colleagues.

Surveyor Tools Neo is an abridged, more refined version of Surveyor Tools. The code has been rewritten to be better organized and easier to understand than the original in the hope that the author's successors can maintain it as needed. There is far too much code to clean up all of the original tools, so only the most important tools are carried over to Surveyor Tools Neo. Tools for drawing topo, cross sections, and general drafting were left out.

Although originally created just for the author and his colleagues, the author hereby declares Surveyor Tools Neo an open-source project with no copyright restrictions. This ensures there is no doubt that the author wants others to use and modify and maintain this code as they see fit.

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PLATFORMS

Surveyor Tools Neo should work on the Microstation V8i series from SS3 on, but it has only been tested on Power Inroads V8i SS10. It should also work on Connect Edition, but it has only been tested on ORD CE.

INSTALLATION, UPDATE, REMOVAL

Please note that Surveyor Tools Neo can also be installed alongside the original Surveyor Tools. There's no need to uninstall Surveyor Tools first.

The program file is named SurveyorToolsNeo.mvba. The first step is to put the file where Microstation can access it. The same file should work for V8i and Connect Edition, but if you are going to use it in both you should heed Jon Summers' warning and keep a copy for each in different directories.

● [Jon Summers](#) Wed, Jan 8 2020 3:16 PM

Grot said:

Guidance for migrating VBA from v8i to CONNECT

In addition to [Robert Hook](#)'s useful blog, consider separating your 32-bit and 64-bit projects.

Often, a MicroStation V8i VBA project can be used with MicroStation CONNECT and will run without modification. However, because VBA builds the project for the host environment there may be resulting conflicts in the pseudo-code if you attempt to share the same project between the two versions of MicroStation. Keeping 32-bit and 64-bit projects in their own folders eliminates that possibility.

Regards, Jon Summers

[LA Solutions](#)

Once you have placed the file or files where they are to reside, open the VBA Project Manager. In V8i you access it on the Microstation menu

Utilities>Macro>Project Manager

For Connect Edition just type "VBA Project Manager" into the search box and launch it from there. At the VBA Project Manager, click on the *Load Project* button and open SurveyorToolsNeo.mvba.

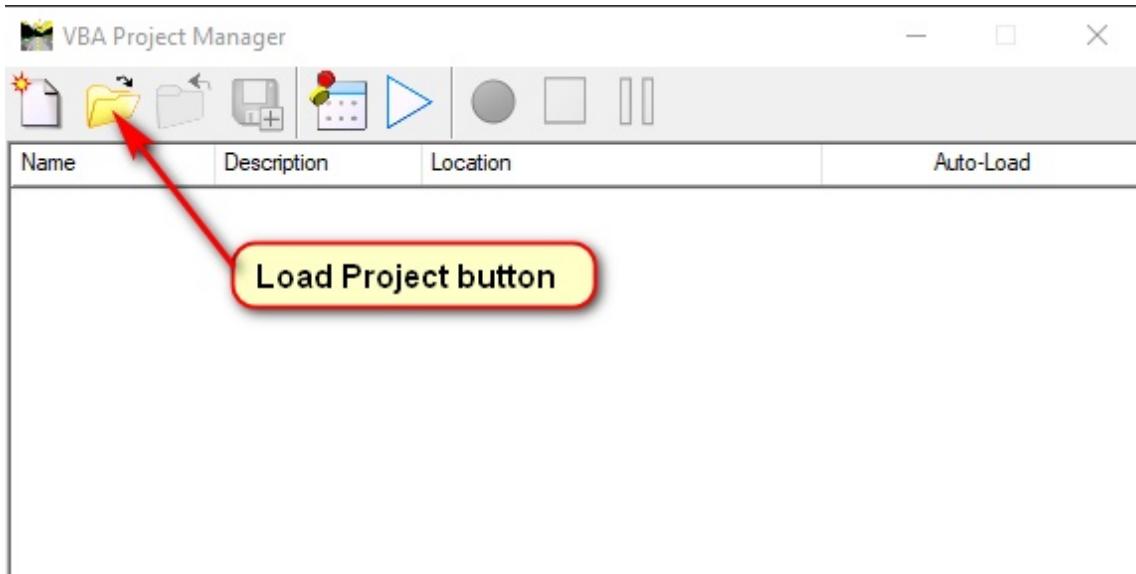


Figure 1

Make sure the Auto-Load option is checked for SurveyorToolsNeo.

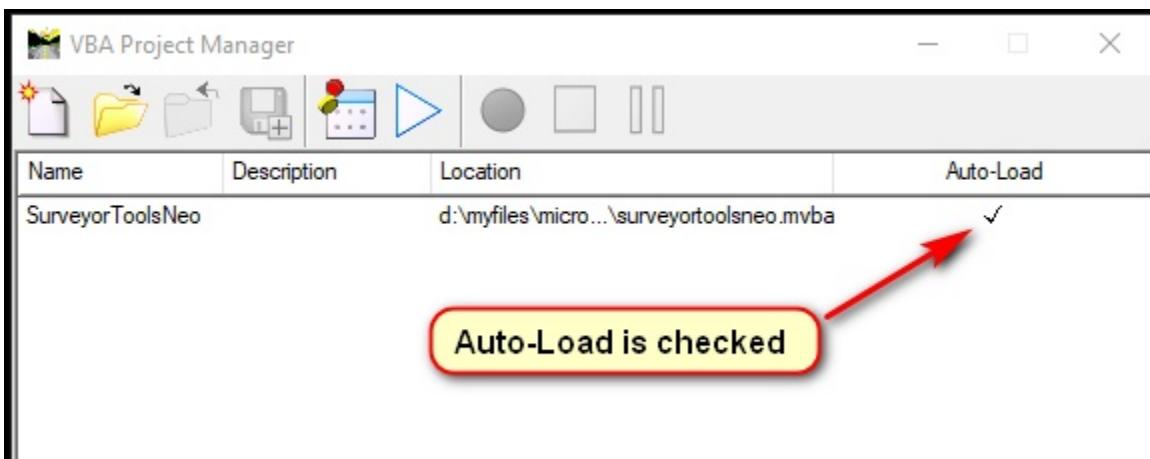


Figure 2

And that's about it for the installation. The next time you start Microstation, the tool bar will appear. Although, if you can't wait, you can key in "vba run opener" on the Microstation command line and that will launch the toolbar.

Updating or rolling back the program is as simple as exiting Microstation and replacing the SurveyorToolsNeo.mvba file. That's it.

Removing the program is also simple. Uncheck the Auto-Load, close Microstation, then delete the SurveyorToolsNeo.mvba file.

GENERAL USAGE

Master unit

There is one proviso. You must use some kind of foot as your master unit. Either the International foot or the U.S. Survey foot is okay. No unit checking is ever done.

Toolbar

The main way to access the tools is with the toolbar. In the upper left corner is the azimuth mode indicator. If it shows a "S" like in Figure 3, then it's in South azimuth mode. If it shows a "N" then it's in North azimuth mode.

Next to the azimuth mode indicator is the "Open when Microstation starts" checkbox. If you have this checked, then the toolbar will appear when Microstation starts up. If it isn't checked, then the toolbar won't appear when Microstation starts up. **To launch the toolbar when it's not present, key in on the Microstation command line "vba run opener"** and the toolbar should appear.

The icons on the buttons of the toolbar are not the best. Maybe you can guess their meaning, maybe you can't. However, if you click on the title bar to give it the focus, then hover the pointer over the buttons, the controltip will show you the name of the tool. Hopefully the name will suggest its function adequately. Of course, pressing the buttons will launch the tool mentioned by the controltip.

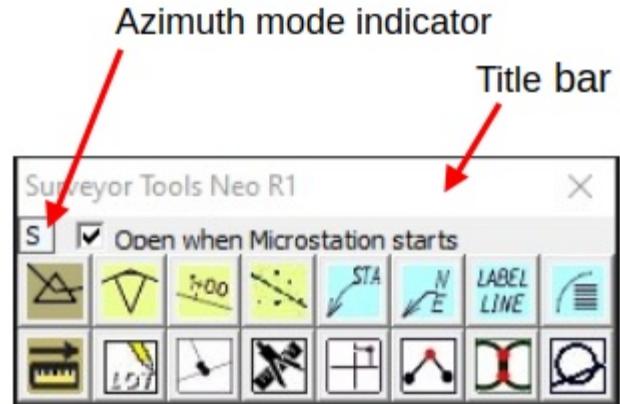


Figure 3

Entering coordinates

Here in Figure 4, we have a snippet of a file plan. It calls out a coordinate of 5955.76 S, 4884.82 E and provides us a perfect example for entering coordinates.

The Northing fields will accept the entry in several ways. There is the traditional way of just entering it as an ordinary number, "-5955.76". Then the most useful way is to have the sign at the end, "5955.76-". And, of course, you can enter a "s" at the end instead, "5955.76s".

The sign at the end is the most useful because you read the value from left to right and so you read the "S" last. This maintains the cadence and the minus sign is on the number pad keeping your hand at the number pad.

There are skilled people out there who read ahead before entering anything, but for the rest of us, we have this feature.

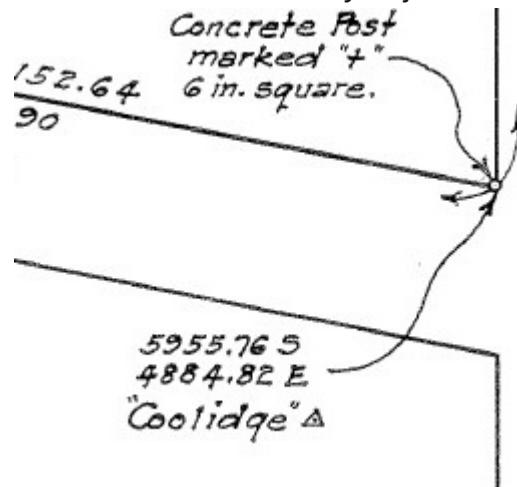


Figure 4

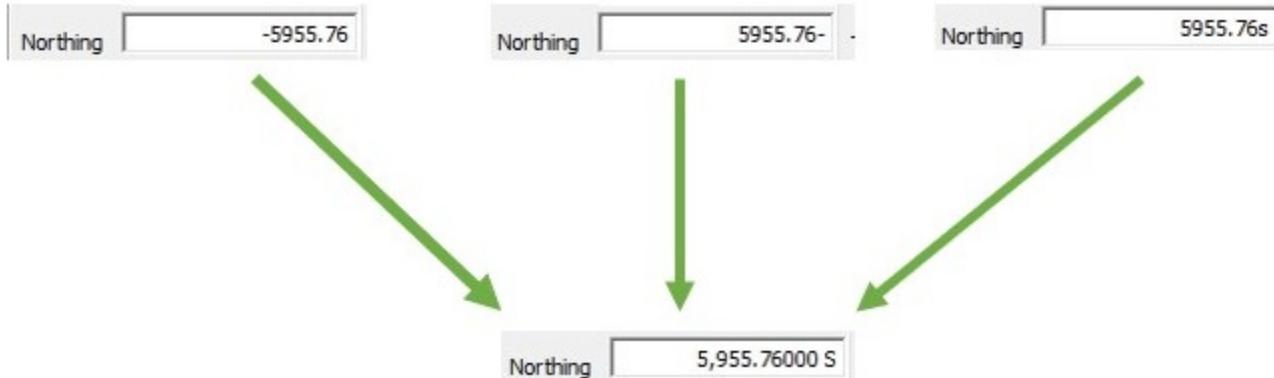


Figure 5

Once it is entered, it gets formatted and reentered into the field. In this case, the field is from the Plot Lot program so the field is formatted to five decimal places. You can also edit the formatted text, and as long as it fits the format, it will work.

The Easting can be entered like a normal number, "4884.82". You could also enter it with the plus sign in the front to emphasize the East, "+4884.82". You can also enter the sign at the end since it's how you read it and thus maintain that cadence, "4884.82+". You can also stick the "e" on the end for similar reasons, "4884.82e".



Figure 6

Thinking of North as plus and South as minus, East as plus and West as minus will help make keying in coordinates a painless task. This association will also help with entering bearings if you ever need to do that.

Entering directions

Directions fields will accept azimuth or bearing formats. Azimuths follow the traditional ddd.mmss format. Say the azimuth is $25^{\circ} 03' 54''$ the entered would be "25.0354". The entry would be formatted and reentered into the textbox. The formatted text is also editable if you make small mistakes and don't want to reenter it.



Figure 7

Entering bearings is similar to entering Northing Easting. S $25^{\circ} 03' 54''$ E could be entered "s25.0354e" or it could be entered "-25.0354+". This helps keep the cadence. Remember, North is plus and South is minus. East is plus and West is minus .

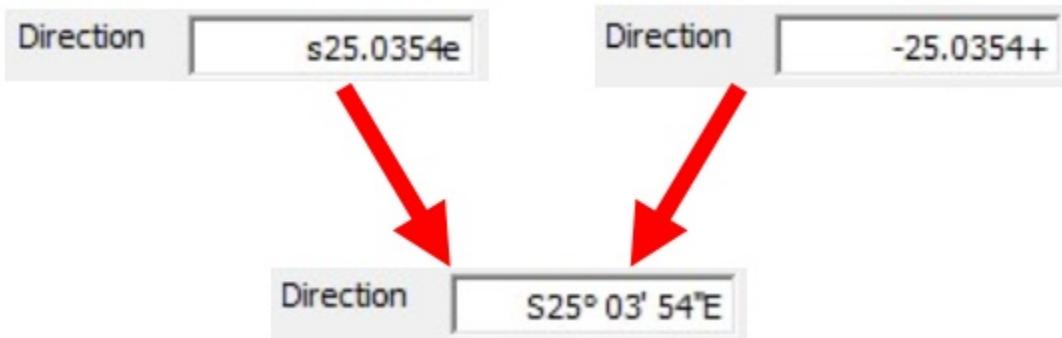


Figure 8

Implied precision

Where it is appropriate to have a fixed precision, the field will have a fixed precision. The Curve Solver fields have fixed precision. It is appropriate to have a fixed precision there. Other programs, like the Draw Traverse program, have an implied precision in their entry fields. Implied precision is very similar to the floating precision you experience on your hand held calculator, except for two things. There is a maximum allowed precision for the different data types. And, the trailing zeros aren't truncated.

Let's say we enter "1.00" into a direction field, it would format it as $1^{\circ} 00'$ not $1^{\circ} 00' 00''$ as it might if it were fixed precision.



Figure 9

Settings, attributes

Most of the tools will allow you to predefine the attributes of the graphic elements they create. The attributes are specific settings. The dialog boxes for the various tools use "Settings" and "Attributes" for the tabs almost interchangeably. It's not clear if this is right or wrong, but that's how it is. The Label Line tool, for example, uses "Attributes" even though it has the Settings button on it in addition to the attributes for the text.

The *Settings* button will bring up the Settings dialog box which has only a few things to consider.

The North Azimuth checkbox will put it in North Azimuth mode if checked. Font Size is the size of the characters when they are printed.

Tether color is the color of tethers and other temporary graphics that are used while placing graphic elements.

Plot Scale is the scale of master units to the inch being plotted.

Surveyor Tools Neo does NOT use the scale built into the cad

file. Elements placed with these tools will not change with the cad file scale.

In VBA, you are allowed to save text to the system registry. All of the settings are saved this way. The *Clear Storage* button deletes these settings.

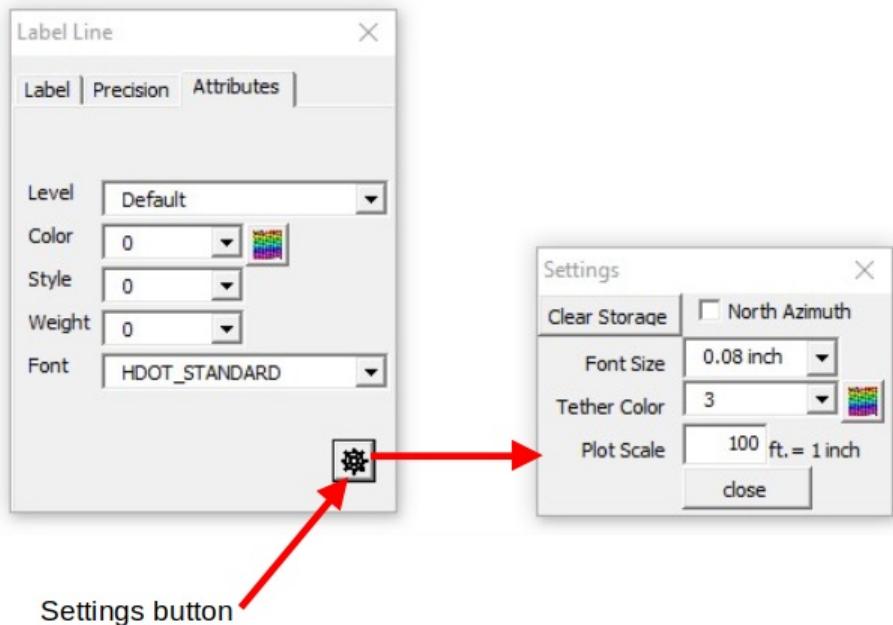


Figure 10: Settings Button

Color chooser

The Color Settings combo boxes will have a colorful little button next to it. See Figure 11. This button will bring up a dialog box for you to graphically pick a color number from the color table. See Figure 12.



Figure 11: Colorful Button



Figure 12

Autocad files

These tools are not intended to work with Autocad format files. Microstation V8i allows one to work directly in Autocad format (.dwg, .dxf), however, some of these tools will not work with Autocad files. Some will, but others will crash horribly. No effort has been made to make these tools work with Autocad files. If they do work, it was not by intention. The Draw Drop Diagram tool and the Plot Lot tool do not work with Autocad files, so avoid using these tools with Autocad files.

Vanishing dialog boxes

Many of the dialog boxes will vanish when picking things. This is to free up space for you to locate what you are picking.

TOOL DESCRIPTIONS

Arc/Arc Intersect

This tool finds the intersection of two arcs given the radius points and their radii. Most times there are two solutions, so graphically you pick the desired solution. The lines from the radius points to the intersection point are drawn. Optionally, the tool will also draw the directions and distances from the radius points to the intersection.

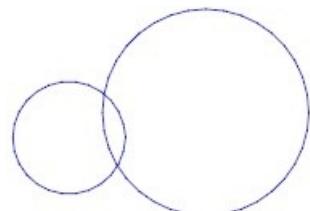


Figure 13

Arc/Line Intersect

This tool finds the intersection point between an arc and a line given the radius point, radius, point on line, and direction of the line. Usually, there are two intersection points, you graphically choose the desired point. Optionally, the tool will also draw the directions and distances from the radius point to the intersection and the point on line to the intersection.

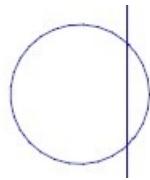


Figure 14

Az/Az Intersect

This tool finds the intersection point between two lines given a point on each line and the direction of each line. Despite the name, bearings can be used to define the lines. Optionally, the tool will also draw the directions and distances from the points on line to the intersection.

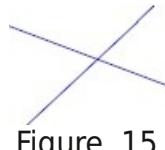


Figure 15

Compass Rule 2D

This tool is a specialized adaptation of the traditional compass rule adjustment for traverses. It is designed around the workflow of creating boundary study worksheets and other similar activities. It is such a weirdo tool that this subsection has many many pictures.

To use this program, a compass rule file is required, so first press the *New* button and create a file.

Start here,
create a new
compass rule
file.

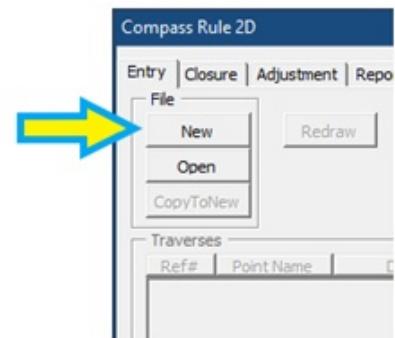


Figure 16

Enter the backsight azimuth
of the first traverse here.

file 2D-new.cra

File | Adjustment | Reports | Traverses | Settings | Side Shot Settings | Drop Diagram Settings |

Start point (values for the first traverse point)

Back Sight Azimuth: 300° 14' 40" Northing: -6,246.3600 Elevation: 0.0000
Easting: -2,869.9200

Redraw New Point Name Description B.S. Angle F.S. Angle HD

Delete Edit Insert

Traverses

B.S. Angle Side Shot Angle HD Point Name Description D

Program azimuth: 1° 23' 45" +180 Mark Clear Delete Edit Insert Ina, by coord.

Enter coordinate of
the first traverse here.

Press this button to
enter the first and
subsequent traverses.

Enter the backsight azimuth and the initial coordinate of the first traverse.

Then press the *Insert* button on the *Traverses* frame to enter your traverses. The dialog box in Figure 18 will show up. Use it to enter your traverses. Don't worry, elevations are not required and you can also go back and edit things later if you need. The form tries to help you by guessing at some of the entries.

Figure 17

As you enter the traverses into the circuit, they are listed in the *Traverses* list box. One of the entries should be highlighted. That is your selected traverse. New traverses will be inserted below the selected one. Side shots will be entered for the selected traverse. You must close the *Insert Traverse* dialog box to add the side shots. See Figure 19.

To enter the side shots by angle and distance, press the *Insert* button to bring up the dialog box shown in Figure 20. The traverse that the side shot is from is shown at the top. Just enter your side shot information and press *Enter* to add the side shot to the traverse.

The *Draw Drop Diagram* checkbox is for marking if you want the drop diagram for this side shot included in the drawing and for averaging.

Point Name (setup) AHU-5
Desc magnail
Plot elev.
Elevation 0.00
Back Sight 329° 13' 28"
Fore Sight 237° 38' 52"
HD 556.815
FS point name AHU-6
Cancel Enter

Press to insert this traverse into circuit.

- Enter the name of the traverse.
- Enter the traverse description.
- Enter the traverse elevation.
- Enter horizontal angle to previous traverse.
- Enter horizontal angle to forward traverse.
- Enter horizontal distance to forward traverse.
- Enter name of forward traverse.

Optionally, if you want the program to draw a drop diagram for you, you can include the record coordinate and the coordinate of the position where you want the diagram drawn. This portion is not required to fill in. You can do it before you enter your side shot or you can edit your side shot and add that information later. Editing the side shot later seems to be easier.

If you use the “+” button for the record coordinate, two tether lines and a circle are shown to help find the where the side shot lands. One tether line is from the traverse point to where the side

Figure 18

Ref#	Point Name	Description	B.S. Angle	F.S. Angle	HD
0	AHU-1	magnail	75° 22' 14"	212° 00' 45"	329.89
1	AHU-2	magnail	32° 00' 45"	220° 47' 16"	377.845
2	AHU-3	magnail	40° 47' 16"	237° 38' 52"	556.815
3	AHU-4	hub&tack	57° 38' 52"	149° 13' 28"	324.735

The selected traverse

Press to insert side shots by angle and distance.

Press to insert side shots by coordinate file.

Notice forward traverse name is moved up.

Notice the backsight is now the reverse of the previous foresight.

Notice foresight name is incremented.

Figure 19

shot lands, and the other is from where the side shot lands to the mouse pointer. The circle is centered on where the side shot lands. This should make it easier to find the corner you want to pick. See Figure 21.

Picking the location for the drop diagram looks like picking the record coordinate except there is also a cross representing the diagram. The cross is there to provide an idea of how the placement will look. See Figure 22.

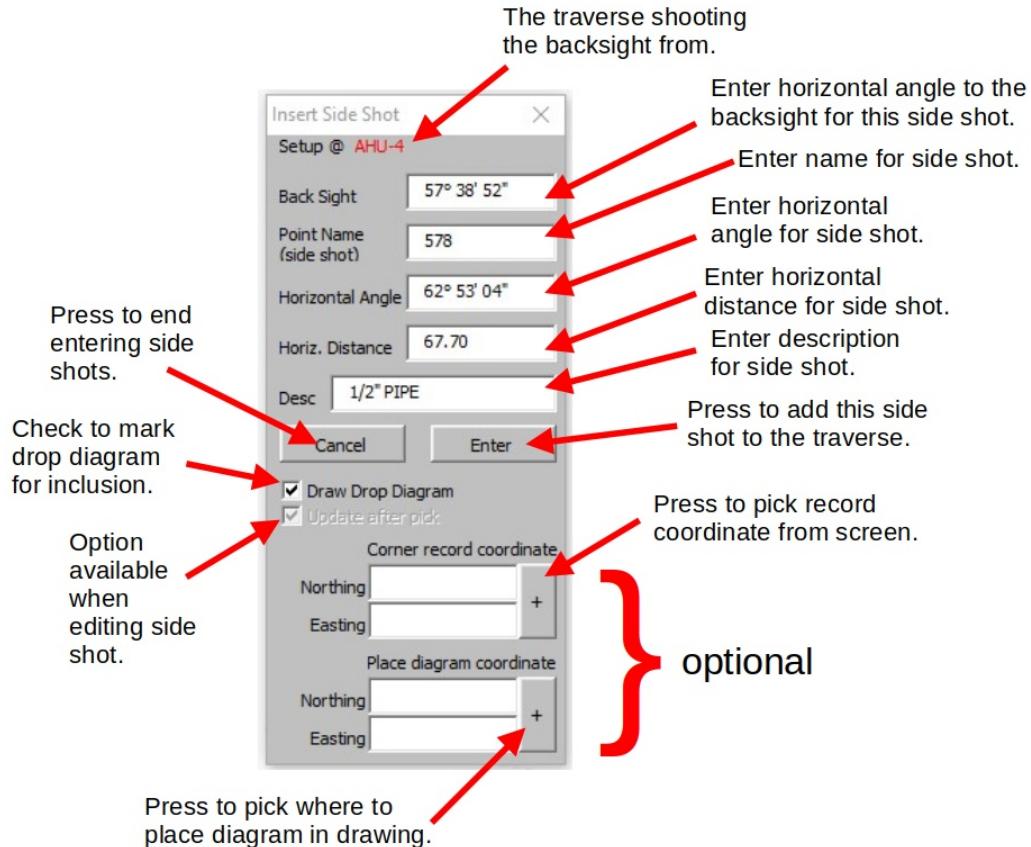


Figure 20

When you've picked the two points, you might have the expectation that the side shot has been entered for the traverse. This is not how the program was designed to behave. You still need to press the *Enter* button to add it to the traverse. That's why nothing gets redrawn at this point. In Figure 23 the side shot has not been entered yet, so nothing takes place.

Once you enter the side shot the drawing should automatically redraw. Any changes should cause a redraw and any changes to the circuit should cause a rewrite to the file. In Figure 24 the side shot has been entered and many changes have taken place. Notice the optional text boxes at the bottom of the dialog have been cleared out.

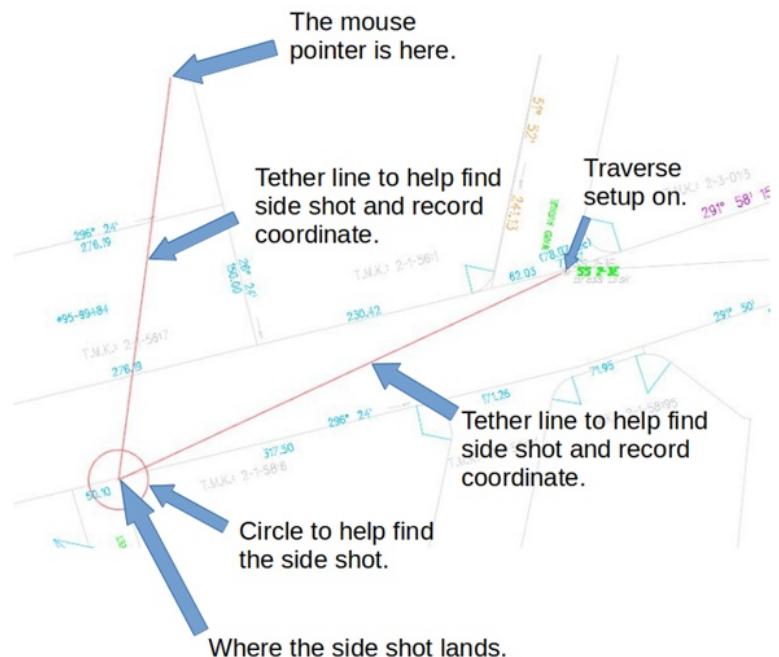


Figure 21

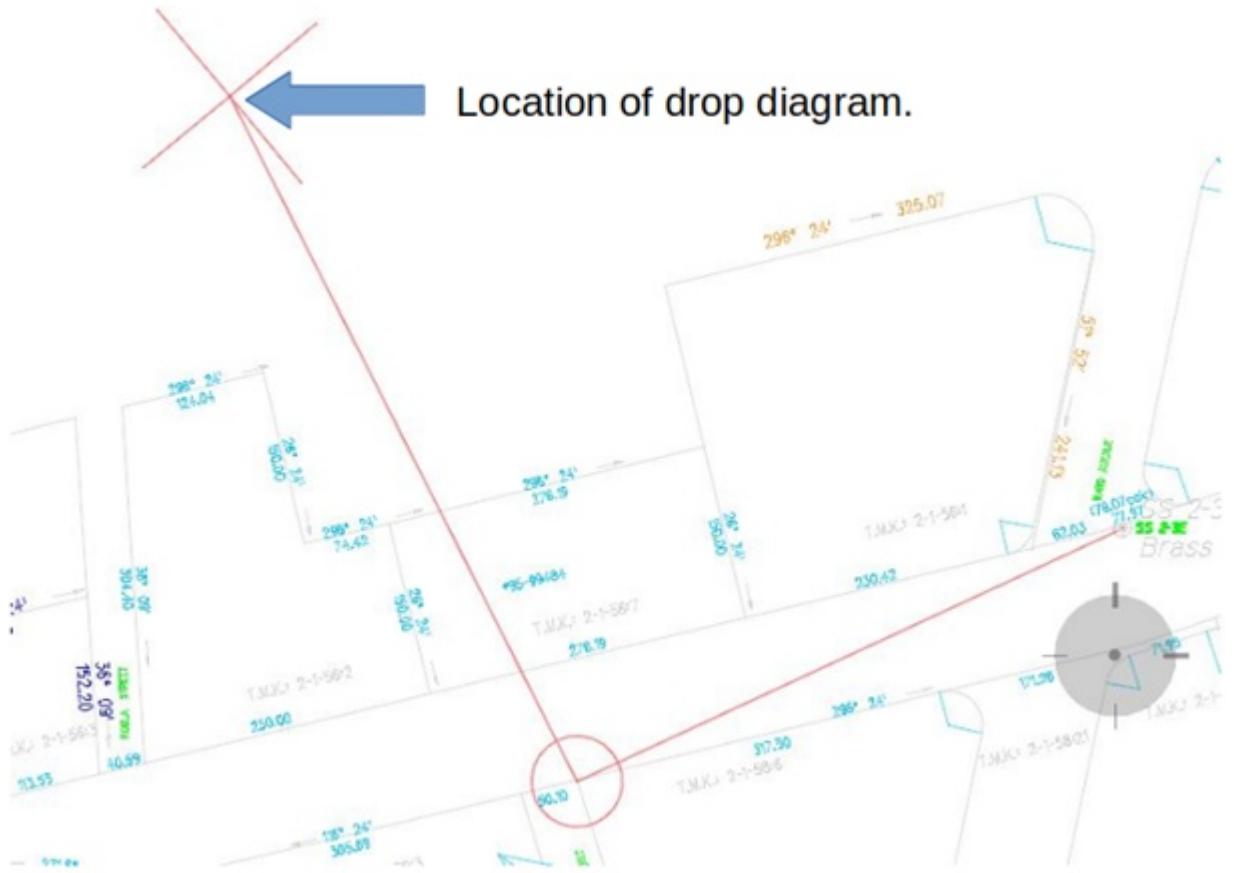


Figure 22

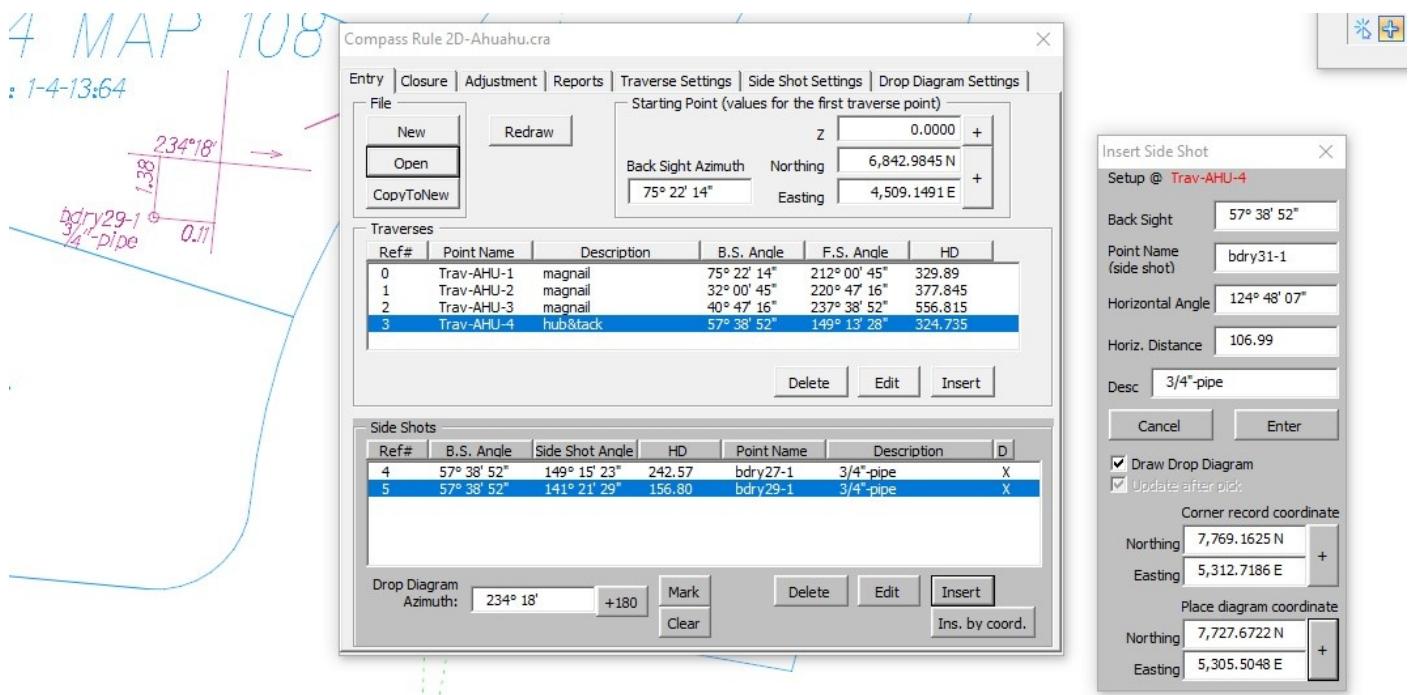


Figure 23: Side Shot Not Entered Yet

Dialog box is ready for entering next side shot.

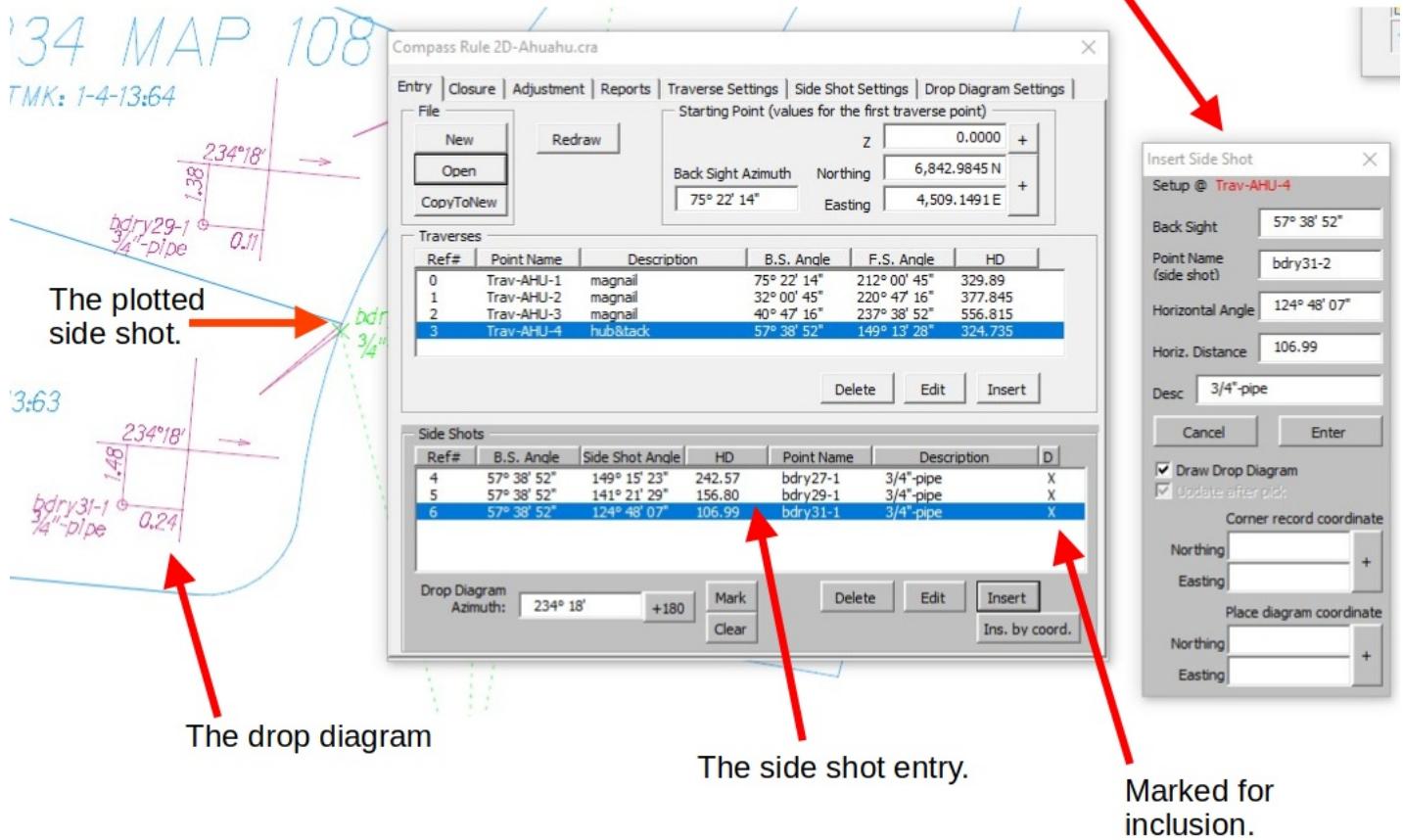


Figure 24: After Side Shot Is Entered

The drop diagram azimuth orients the diagram. The diagram is designed to be read from left to right, so choose an azimuth going approximately left to right on your drawing. See Figure 25.

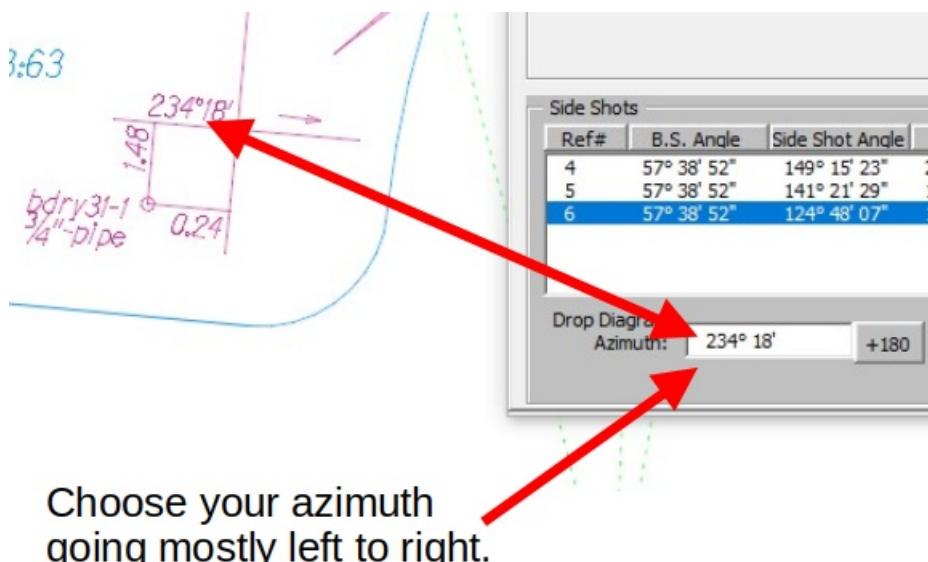


Figure 25: Drop Diagram Azimuth

There is a second way to enter your side shots. If you have a coordinate file of your side shots, you could press the *Ins. by Coord.* button shown in Figure 19. which brings up the dialog box shown in Figure 26.

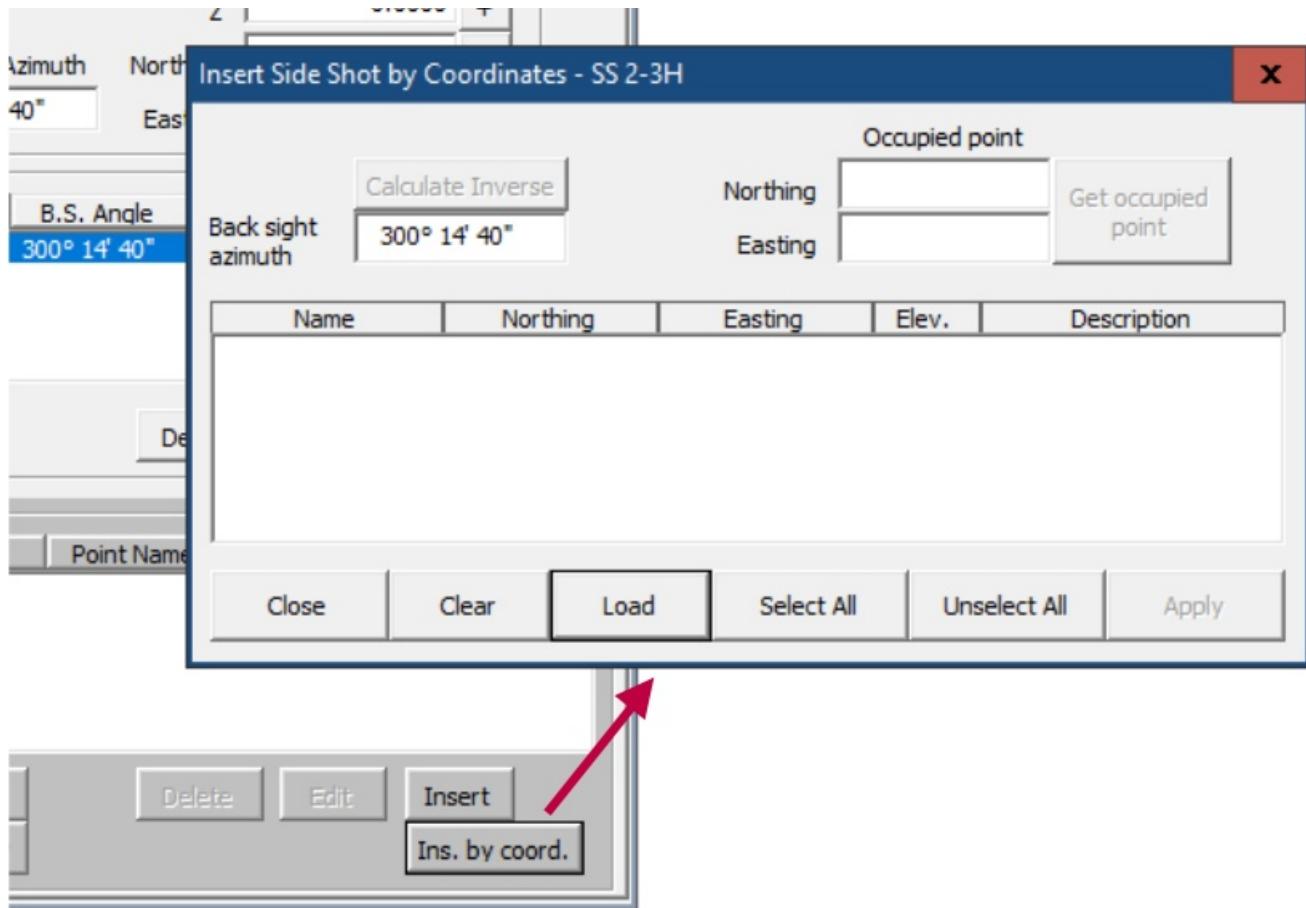


Figure 26: Ins. by Coord. Dialog Box

To use it, press the load button and choose the file to load from. You can only load one file at a time, but you can load more than one file. It's probably best to load your control points as well as the side shots.

For this to work, you need to enter the traverse point coordinate that was used to do the fieldwork. In Figure 27, one can see that the point Trav Like-2 is highlighted and the Get occupied point button is enabled. In this case the highlighted coordinate is the one we want to use so just press the Get occupied point button and the values get entered in the fields and the point is deselected. See Figure 28. Of course, you could just type in the coordinate.

Insert Side Shot by Coordinates - Trav Like-2					
Back sight azimuth		Occupied point			
Calculate Inverse		Northing	Easting	Get occupied point	
Name	Northing	Easting	Elev.	Description	
AHU-6	7,911.0660	5,066.1233	0.0000	"Y" cut	
bdry18-1	7,915.9086	5,040.0085	0.0000	3/4"-pipe	
bdry22-2	7,901.3090	5,110.8822	0.0000	3/4"-pipe	
Trav Like-2	8,062.6315	4,929.4760	0.0000	hub&tack	
bdry7-1	8,002.0630	4,903.1059	0.0000	iron pin	
bdry7-2	8,004.7641	4,905.7829	0.0000	3/4"-pipe	
bdry8-1	8,040.2980	4,963.8356	0.0000	3/4"-pipe	

Figure 27

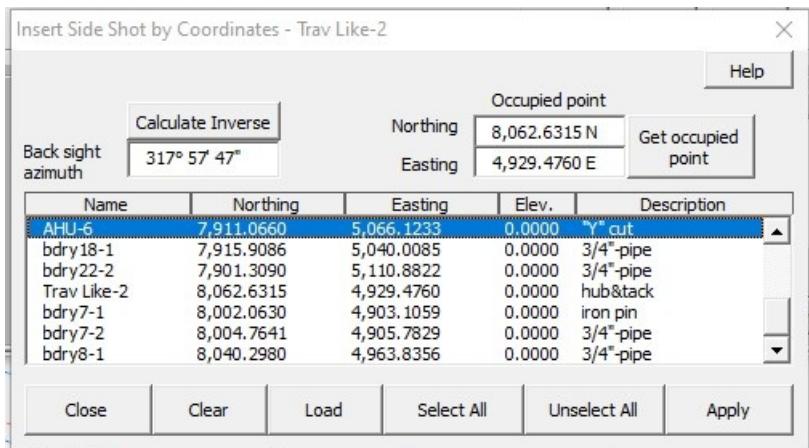


Figure 28

We've selected AHU-6 because that is the backsight point. The backsight azimuth in the circuit is filled in the Back sight azimuth box, but it might not be what you used when doing the fieldwork. With the correct point selected, we press the *Calculate Inverse* button to check. See Figure 29. The *Enter* button will enter the value in the box if you want. *Cancel* will continue without entering.

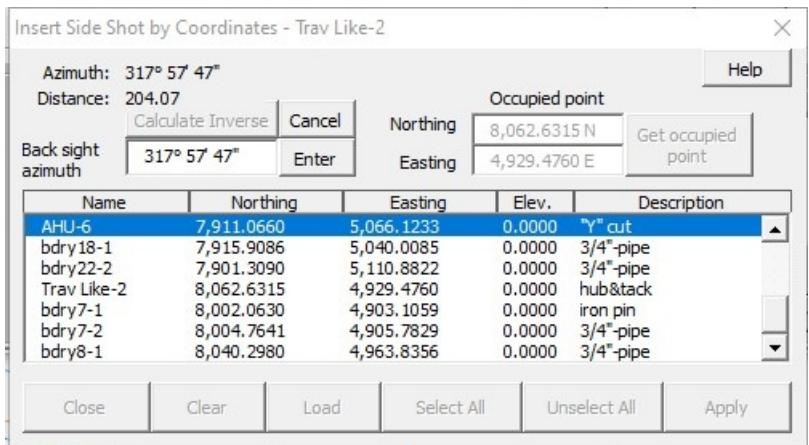


Figure 29

Next, you select the desired side shots from this setup. It's multi-select, so you can select more than one at a time. Press the *Apply* button. If you are going to add more side shots with this set of coordinates, then press the *Close* button. Using the *Close* button instead of the X will keep all the points loaded up so they will be there when you press the *Ins. by Coord.* button again. This is useful if you are entering points for more than one setup. The X will end everything.

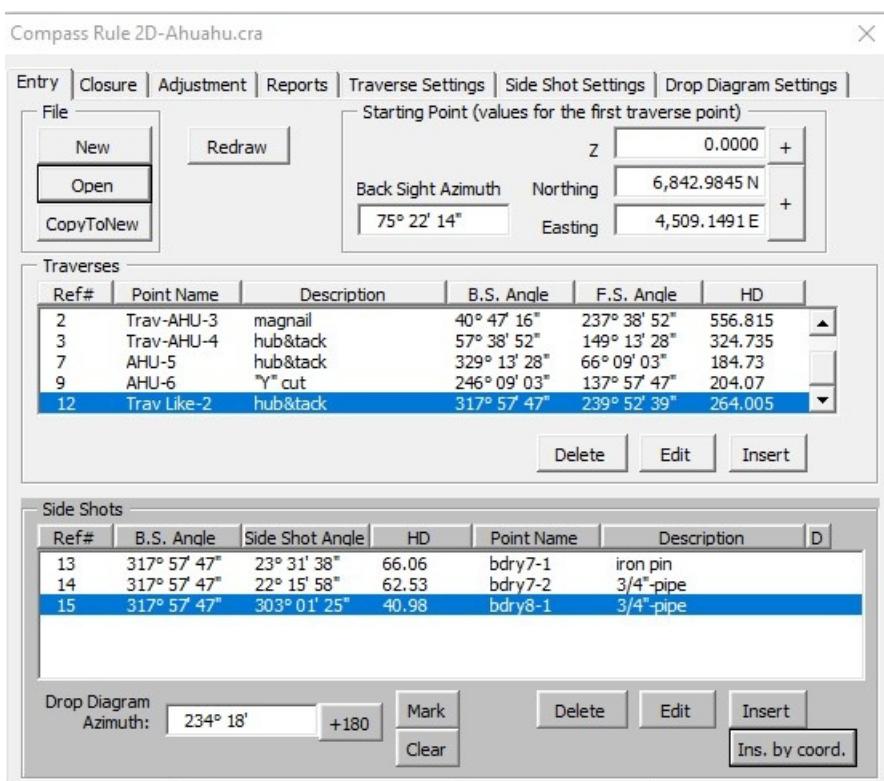


Figure 30

When editing the side shots, the Update after pick option becomes available. When the box is checked, your entries will be entered and the drawing updated after you pick record or diagram coordinate. This provides a nicer user feedback. You still need to press *Cancel* or *Enter* to end the dialog box. It's probably easiest to enter the side shots, then come back and edit them to provide the drop diagram points.

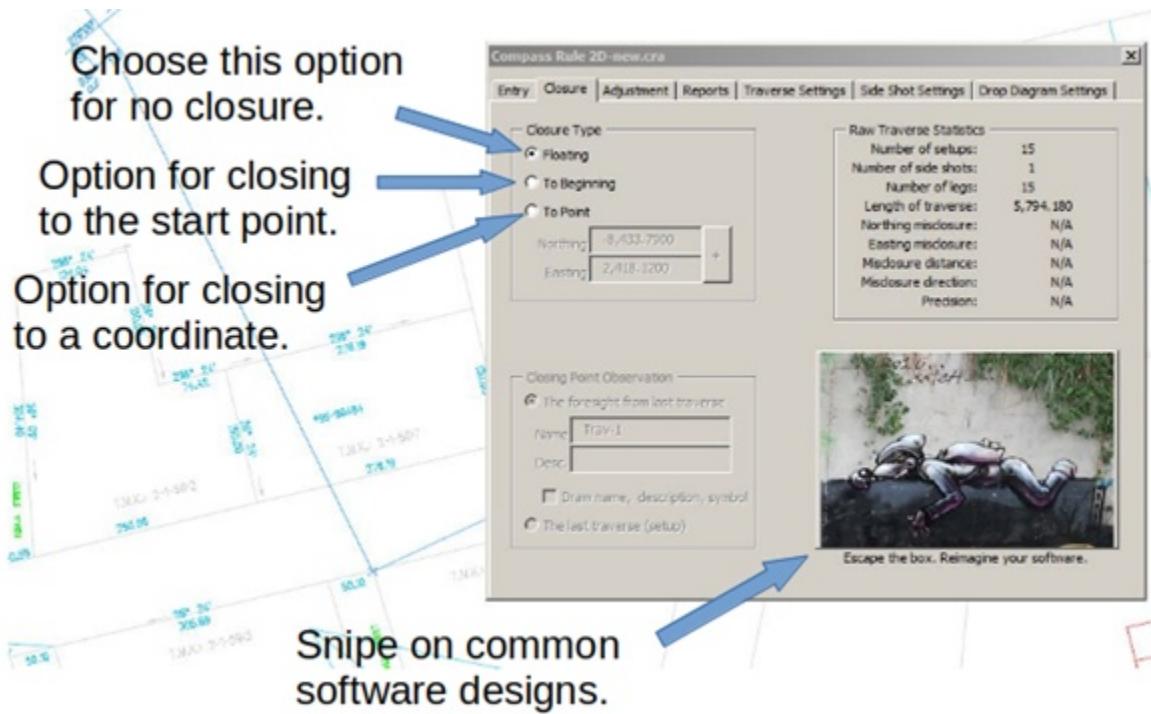


Figure 31: The Closure Tab

Choose your closure type. The "To Point" option for closing your traverse to a point you know the coordinate of other than the starting point. Enter or pick from the screen the coordinate of the closing point into the text boxes below the "To Point" option. Notice the statistics are updated when you do this. "To Beginning" is for when you close your traverse to the same point you began with. Choose "Floating" if you don't close the traverse to a known point.

Next, if you're not floating, you need to choose which observation is the one to the closing point. Under Closing Point Observation the foresight from last traverse option is used when your foresight from the last traverse in your circuit points to the closing point. This is normally the case. You are given the Name and Desc fields so that you can include it in the report and optionally create the text elements in the drawing.

"The last traverse (setup)" option is used when the last setup is also the closing point. This is mainly for the situation when there are side shots taken from the closing point. When the last setup is the closing point, the foresight from the last setup is just a dead leg. It does nothing at this point. Future versions of this program might do something with it, but at this time it does nothing.

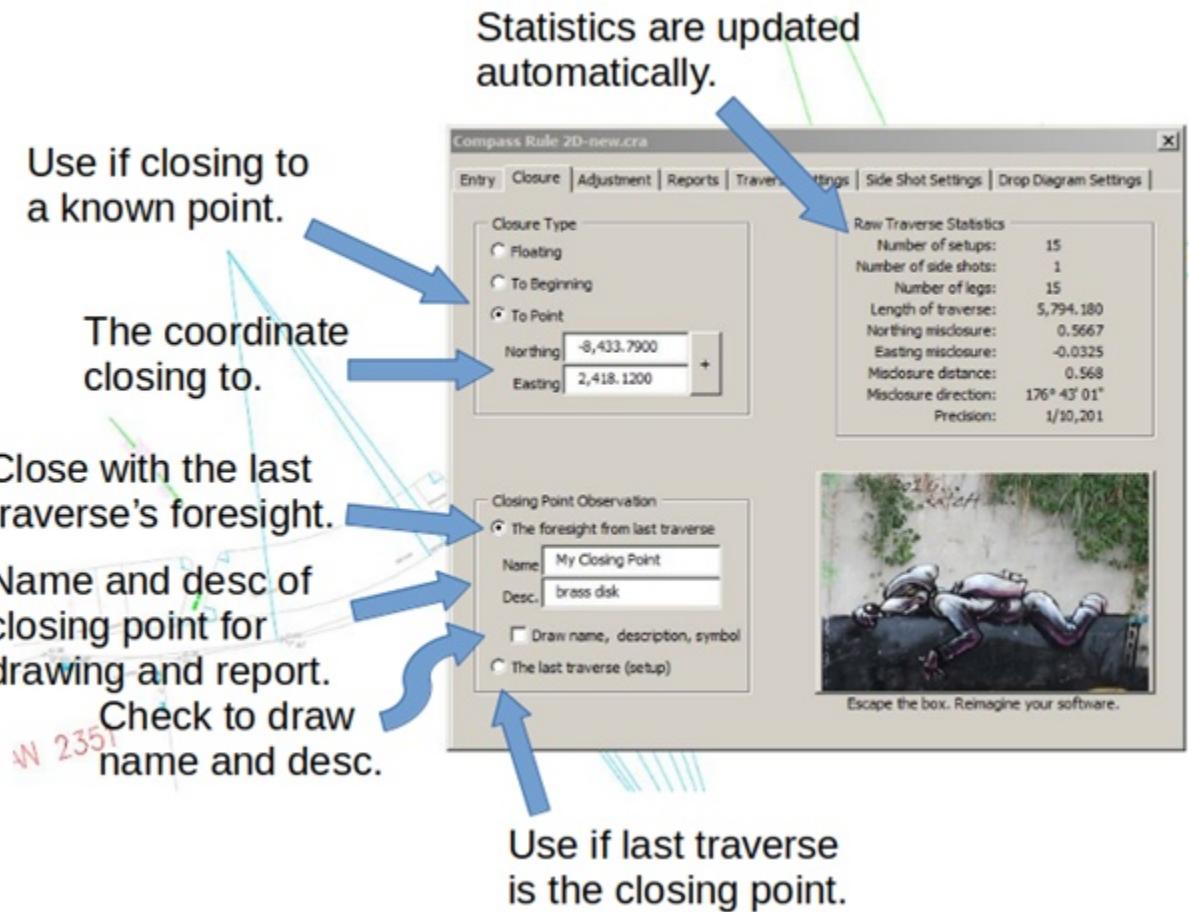


Figure 32: Closure Type To Point

The "To Beginning" option is for when your traverse closes to the starting point of the traverse. Choose this when your traverse ends where it begins. Notice in Figure 33 the Name and Desc are deactivated. That's because when closing to the beginning that information is taken from the first traverse.

This option for closing back to starting point.

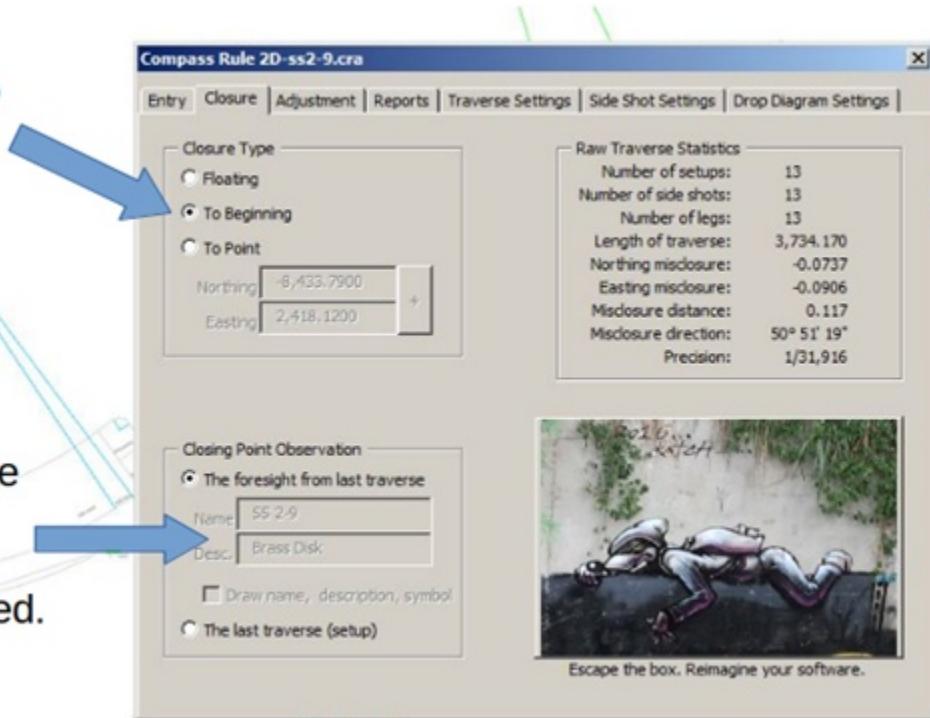


Figure 33: Closure Type To Beginning

Now that the closing point information has been entered, the Raw Traverse Statistics are updated.

Let's look at the Adjustment tab Figure 34. At the top are the radio buttons for PRELIMINARY and FINAL. These are the phases of adjustment and pertain mainly to the drop diagrams. The adjustment phases do not compound. That is, the final adjustment does not adjust the preliminary adjusted values. Think of it as two different scenarios which can be switched between. The report and the drawing and the drop average will only be based on the current phase. Of course, the exception is the drop diagrams themselves (which is part of the drawing) will show the drops for both phases when in the FINAL phase. When in the preliminary phase, the drops are only shown for the preliminary adjustment.

Notice in Figure 34 that Holding Observations drop-down boxes and the matching coordinate text-boxes are enabled despite their groups not being active. This is a nonstandard behavior for a user interface, but it is intentional. It is meant to give one the opportunity to make these choices prior to applying them. This is important because the graphic elements are updated with changes.

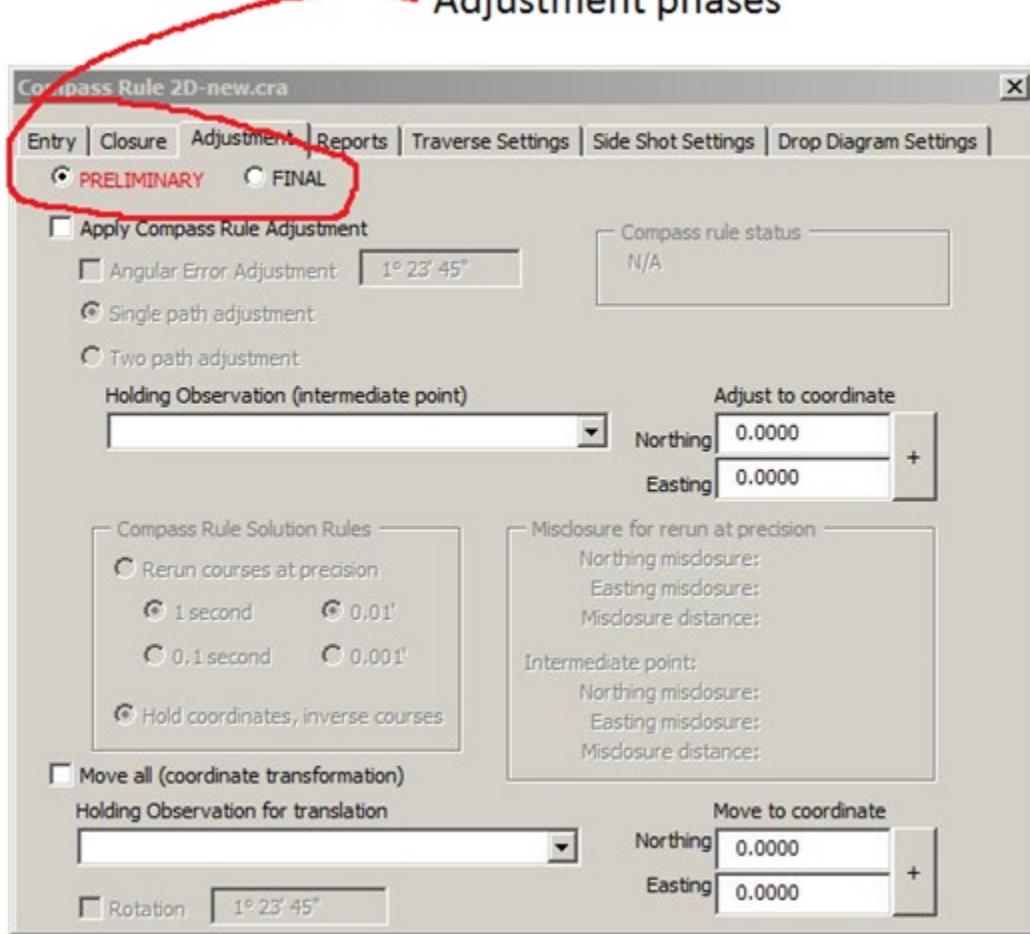


Figure 34: Adjustment Tab

The compass rule adjustment can only be applied if the circuit is not floating. You need some type of closure to perform a compass rule adjustment, so the compass rule adjustment will not be available when floating. On the other hand, the Move all (coordinate transformation) adjustment can be applied to a floating circuit as well as one that has a compass rule adjustment applied. In the case when there is also a compass rule adjustment applied, the compass rule is applied first then any rotation and translation is applied to those resulting coordinates. No scaling is available.

Now let's go over the compass rule adjustment features. When checked, the "Angular Error Adjustment" checkbox will apply the angular adjustment to the circuit before doing the compass rule. It takes the angle that's in the text box next to the check box and prorates it evenly over all the turns. It does not add the angle in the box to each turn.

The "Single path adjustment" option is your classic compass rule adjustment that prorates the horizontal error proportionate to the leg length from first leg to the last leg.

The "Two path adjustment" is unique to this software and basically just breaks the circuit up into two traverse paths and compass rule adjusts both. You choose an intermediate point (a traverse or a side shot observation) from the drop-down box and enter a coordinate you want that point to be adjusted to. Then check the "Apply Compass Rule Adjustment" box. That's about it. It will try and adjust from the starting point to the intermediate point as well as from the intermediate point to the closing point. If this is not done the way you want it, then you'd have to break things up manually and that's where the *CopyToNew* button is useful.

Now look at the example in Figure 35. Let's say that SS 2-3K is our intermediate point and we want to pick the coordinate for it. It's very busy around the point. It has the symbol we want to pick the coordinate from, it has the symbol from the raw traverse nearby, it has the traverse lines going in and out of the symbol. It's very difficult to pick on the correct element here.

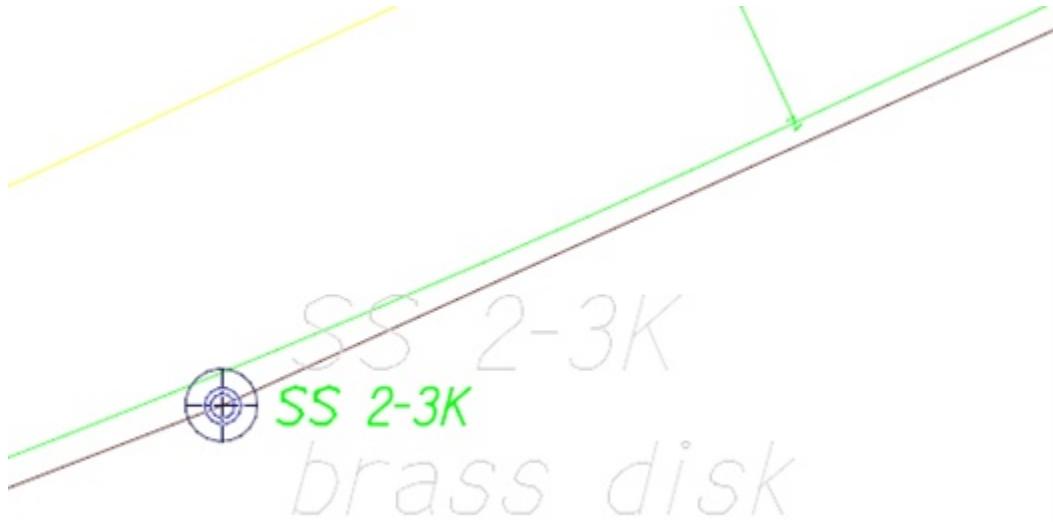


Figure 35

One thing you could do to make things easier is since this is a traverse, you could set the symbol to none under the Traverse Settings while you pick on the element. See Figure 36. Now you have one less object to avoid.

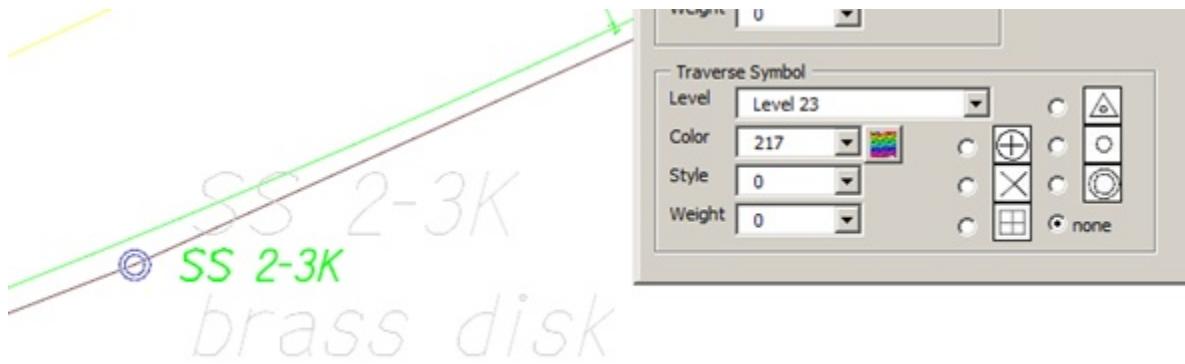


Figure 36

The next thing you could do is to delete the traverse lines.

When you pick on the coordinate, the traverse will redraw anyway, so it's okay to delete the lines and clear up the area near the symbol. See Figure 37.

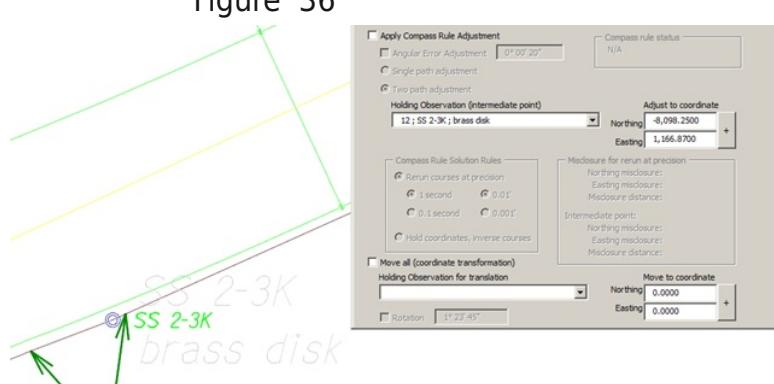


Figure 37

Okay, moving on to the Compass Rule Solution Rules. This is a feature usually only found in home made software like this. It's not usually found in commercial software. You have the option of recalculating/redrawing the circuit holding the courses at the specified precisions. With this option the coordinates are regenerated using the courses, and it's likely that the closure will no longer be perfect. The Misclosure for rerun at precision frame shows you the misclosure for this recalculation. If you choose the Two path adjustment option, then there are two closing points and so two misclosures are shown.

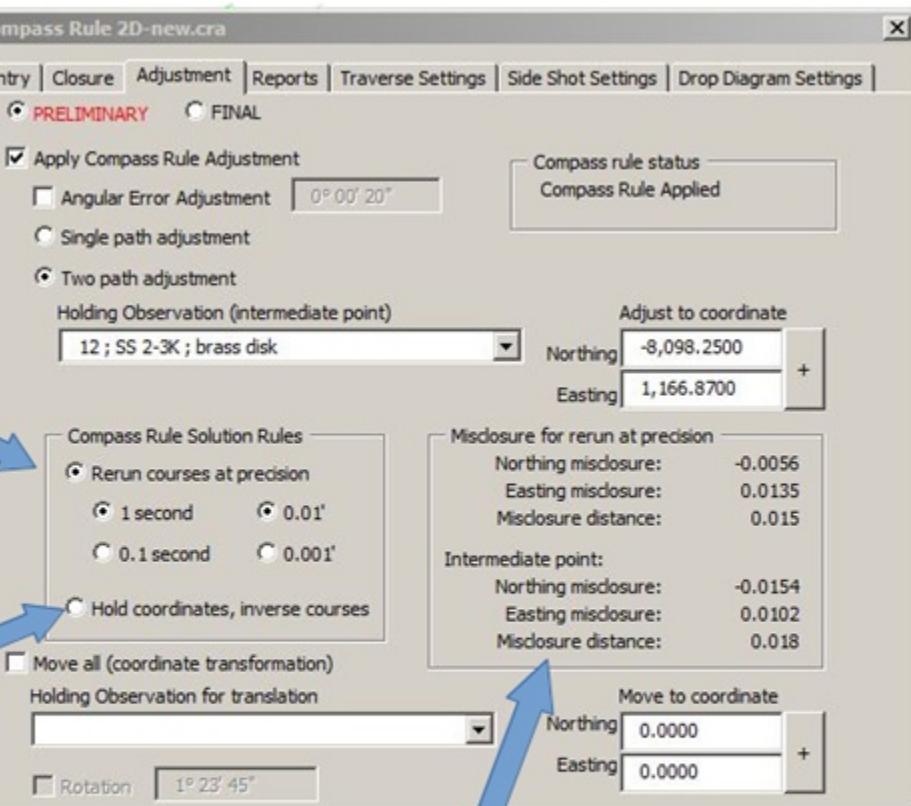
The "Hold coordinates, inverse courses" option is your text book method of compass rule adjustment. It just prorates the error to each leg and gives you that coordinate. The new courses are just inversed. So basically, it is holding the coordinates over the courses.

The "Move All (coordinate transformation)" option can do a limited translation and rotation on the circuit. It is not feature-rich, but it is useful for most things this application was designed for. You can apply it without closing your traverse, so it is useful for backing up from boundary markers found in the field to check the field notes. You can use it to hold a specific marker and adjust the circuit that way. If you think there is a twist, you can calculate the twist and rotate about one of the observation points by that amount. What more do you need?

If you have a rotation, all the points are rotated about the starting point by the angle in the text box. If you have a translation, you move all the points in the direction and distance from the chosen calculated observation to the Move to coordinate.

This option to reruns the courses held to these precisions.

This option holds the lines formed by the compass ruled coordinates.



New misclosures are calculated based on the courses when rerun at the chosen precision.

Figure 38: Compass Rule Solution Rules

Next is the Reports tab. The reports tab provides a way to generate report and coordinate files, and to annotate your compass rule file for the next person. There are several fields you can fill in with information that will appear in the report. There are also several options you can tailor to your liking in the report. The Inv. Prec. When ambiguous frame is a way to set how you'd like the azimuth and distance to appear in the report unless a precision is given somewhere else. The traverses you key in are of a certain precision and those entries should retain their original precision unless they are added to something of a higher precision. The traverse values of the compass rule adjusted values don't have a given precision, so they are ambiguous.

Pressing the Generate Report button will have the dialog box prompt you for a filename. Microstation VBA is limited in capabilities and so having it create a text file that is loaded by Windows into its default text editor is the way it's handled here. It's a versatile way to do it, but we are subject to the whims of Windows operating system.

Note that changing things on the Reports tab should not cause a redraw.

The Export button does something like the Generate Report button. It creates an ascii file with the coordinates in it, but it doesn't launch it in the default text editor for you to review.

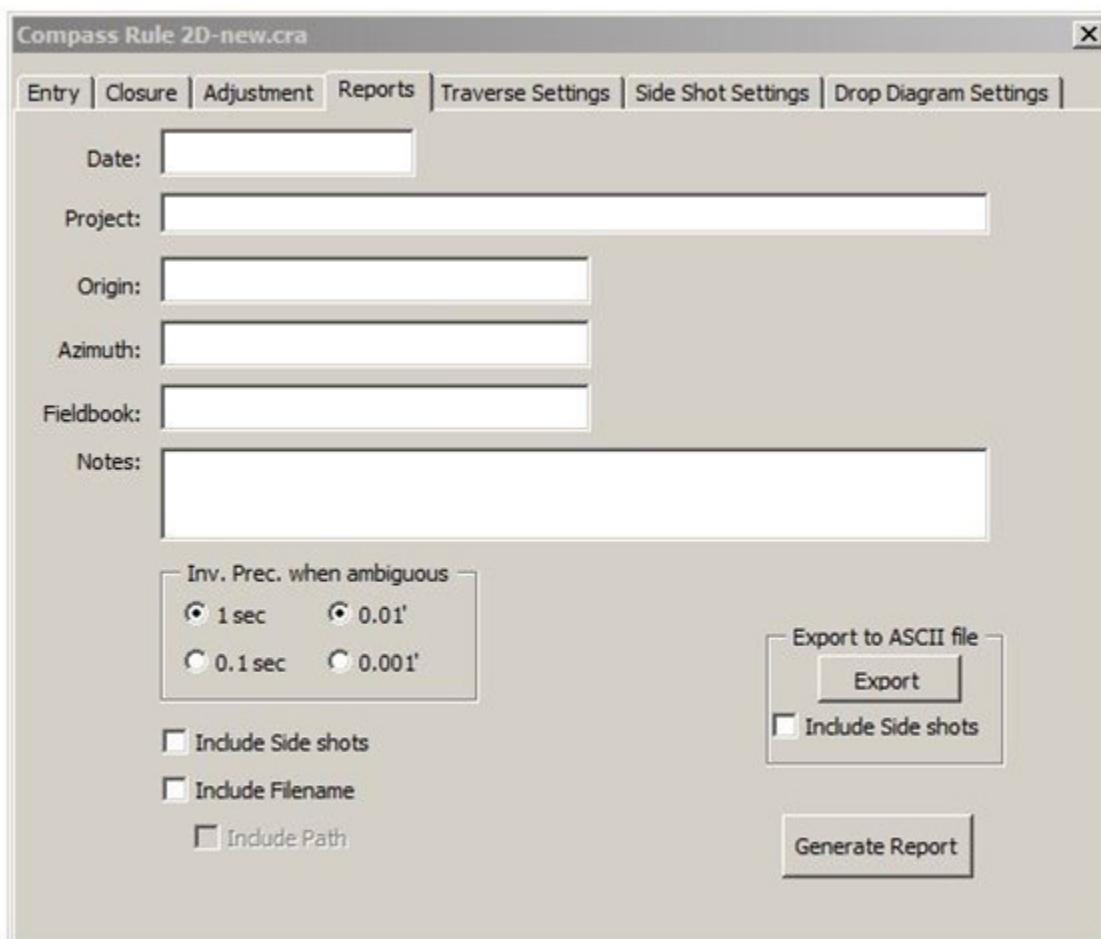


Figure 39: Reports Tab

The Traverse Settings tab is the most mundane of all the tabs. There is almost nothing on this tab that deserves an explanation. It seems quite self-explanatory. Perhaps it should be mentioned that you need to have "Point Name" checked and "Description" and "Elevation" checked if you want those text elements created. Also, that you can adjust the position of those text elements relative to the point with the values in the Traverse Text Offset frame. That's about it.

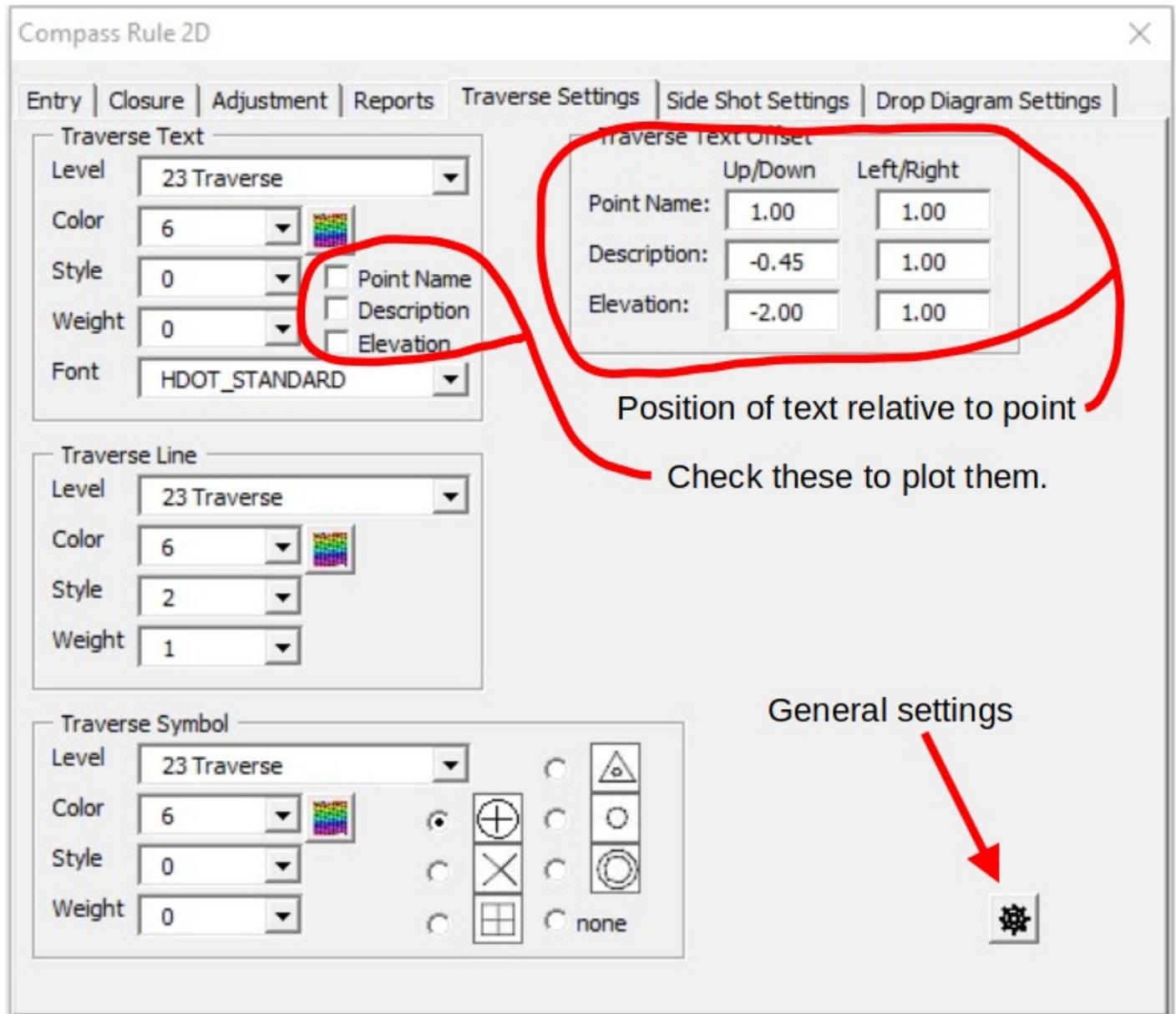


Figure 40: Traverse Settings Tab

The Side Shot Settings tab has similar features to the Traverse Settings tab. You also need to check the "Point Name" and "Description" check boxes if you want those elements drawn for the side shots. However, the Side Shot Settings tab has a few options that do need a little explaining.

There are several reasons you might want to turn off drawing the side shots. Maybe you want to create a traverse map. Maybe the side shots are in the way of something you want to pick on. Whatever the reason, you can toggle the side shots on and off in your drawing. The Turn Off side shots check box is the option to not have the side shots drawn. The drop diagrams will not be drawn either when this box is checked.

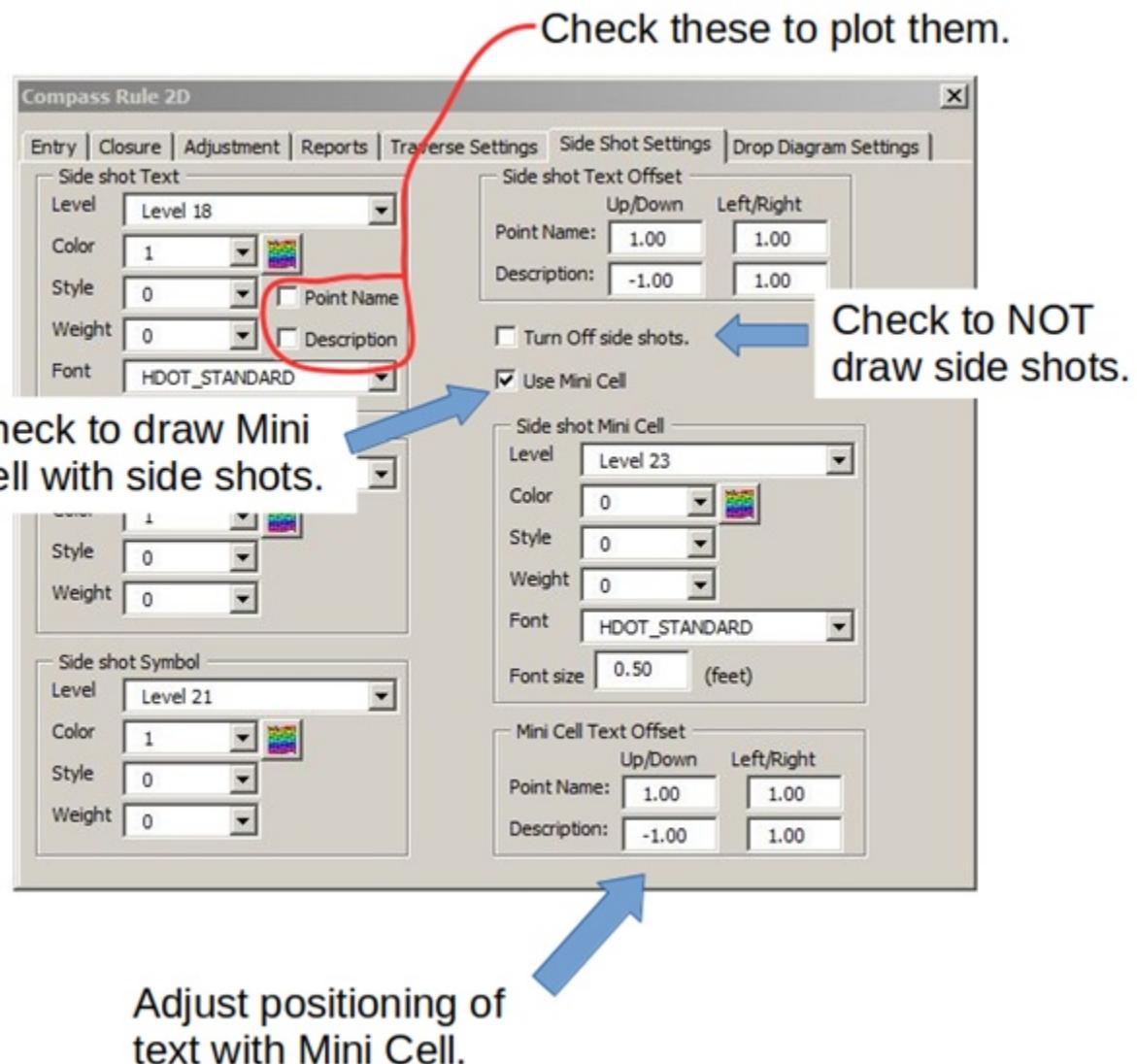


Figure 41: Side Shot Settings Tab

The Drop Diagram Settings tab has some unique features to it. First, on the Drop Diagram frame, there are two colors you can designate, the Preliminary Color, and the Final Color. The Preliminary Color is the color that'll be used for the Preliminary phase of the drop diagram. The Final Color is used to draw the “updated” or final phase of the diagram. It’s a good idea to make the two colors contrast one another so it is easy to see at a glance.

When checked, the Leader Line option will draw a line from the side shot to almost the drop diagram if it is far enough away.

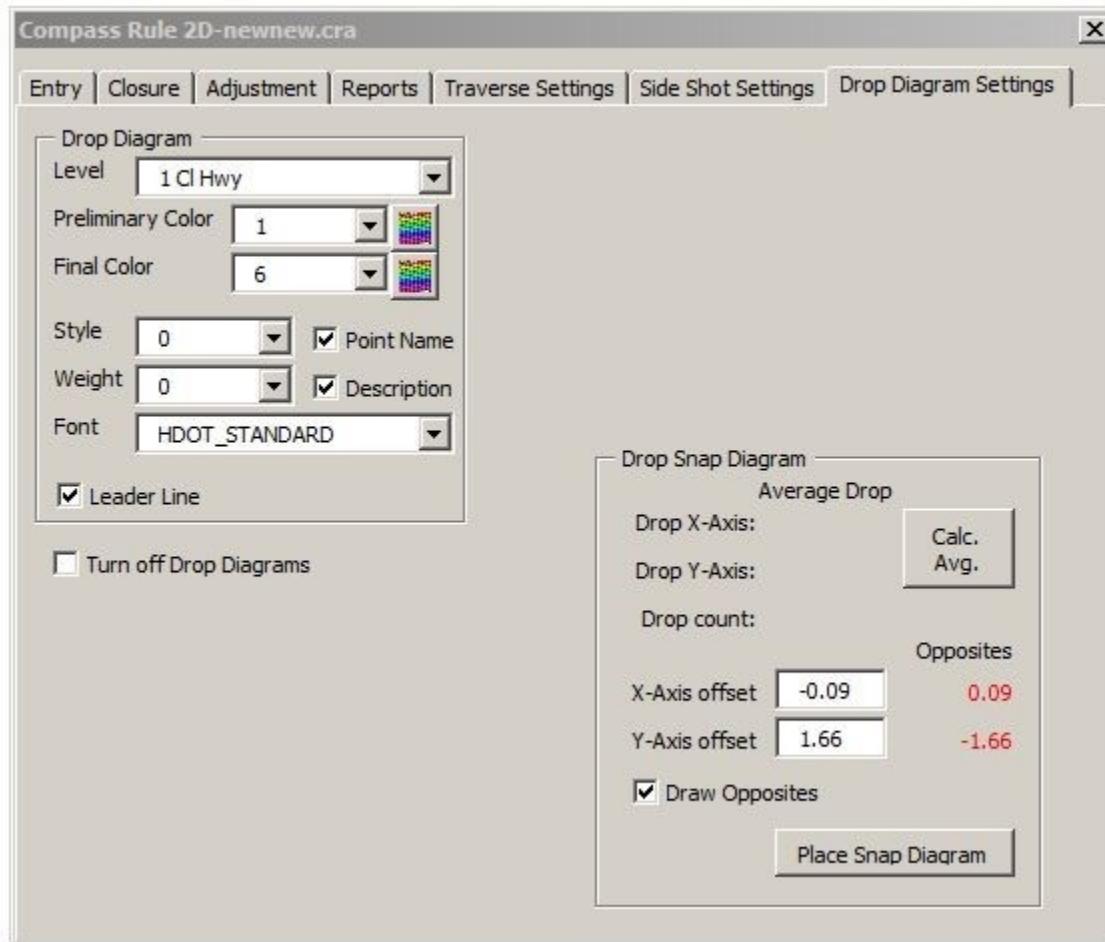


Figure 42: Drop Diagram Settings Tab

Sometimes you want to have the side shots drawn without the drop diagrams. The Turn off Drop Diagrams option will disable drawing the drop diagrams but allow the side shots to still be drawn.

The Drop Snap Diagram frame is a tool for when you want to do a translation to hold an average drop or some other desired offset. The Calc. Avg. button will calculate the average drop based on the valid drop diagrams that are marked for inclusion. If a diagram has a dimension that is so large that it is shown as stars, then it isn’t included. If the diagram doesn’t have a placement coordinate, then it isn’t included. If the button is successful, then the averages are shown as well as how many diagrams were included in the average.

The Place Snap Diagram button will create a diagram which is intended for snapping to. Instead of calculating a coordinate to move something to, a diagram in the form of a graphic group is created for you to use as a snap point. In addition, it leaves a marker for you to look at and understand what you did in the future. To keep this tool versatile, you need to key in the offsets, because there may be times when you want to move to an offset you’ve determined some other way. This is

where things get a little confusing. If you want to use the average drop to move things by, then you want to move them in the opposite direction. To make things easier on the mind, the Draw Opposites feature is included. If the box is checked, then the opposite or negative values will be used for the snap diagram. The opposite values will be shown to the right of the keyed-in values. Once you've entered the values all you need to do is press the Place Snap Diagram button and place the diagram on your desired point graphically.

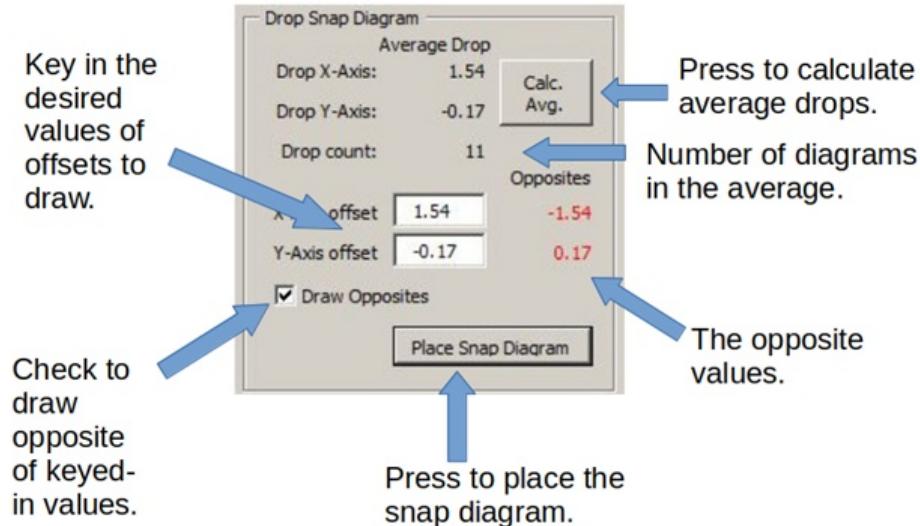


Figure 43: Drop Snap Diagram Frame

So, what is your desired point? Well, perhaps that's an individual choice, but probably one of your traverse points in the preliminary phase would be a good idea. Although, you can't tell from the graphics, in Figure 44, the diagram is placed on traverse point AL-44. This is the traverse point when the adjustment phase is Preliminary. Next, you would switch to the Final phase. The adjustments at this point probably should be set to the same as you had in the Preliminary phase.

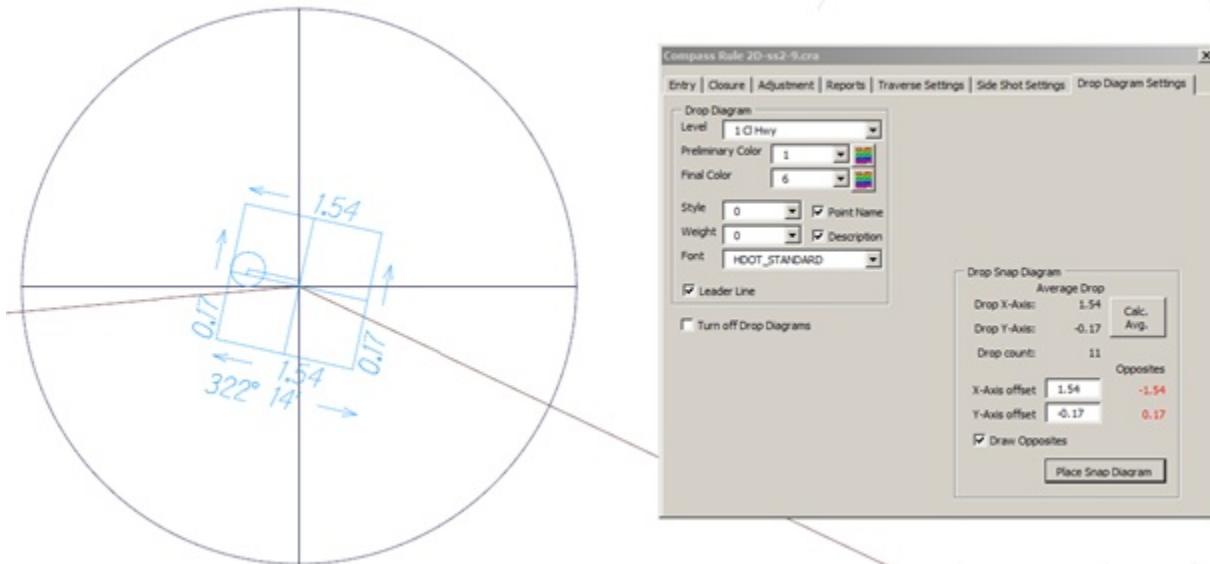


Figure 44: Snap Diagram Placed At AL-44



Figure 45: Translation Parameters

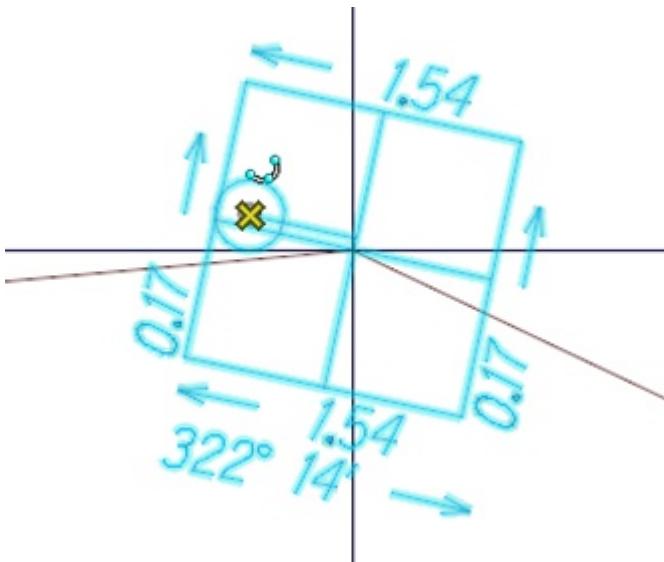


Figure 46: Snap To Center Of Diagram Circle

At the bottom of the Adjustment tab, we would set our Holding Observation for translation to AL-44. See Figure 45. Also, we would pick the Move to coordinate from the snap diagram. You pick the center of the small circle in the diagram. See Figure 46.

Once you've entered your parameters for the translation, just check the Move all checkbox and it should be applied. You can see how the traverse point has moved to the center of the little circle in Figure 47.

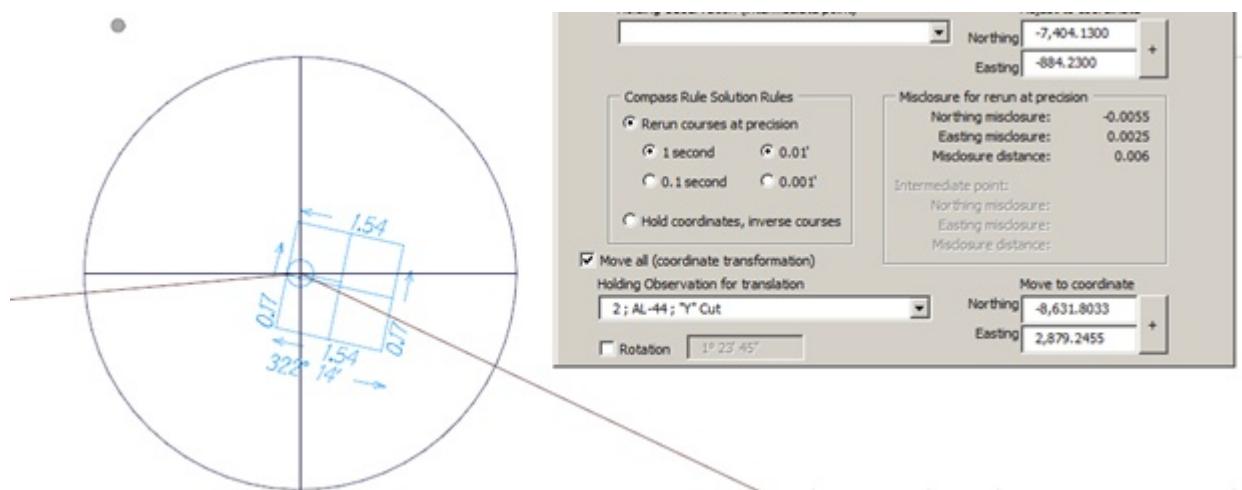


Figure 47: Moved To Snap Point

The drop diagrams are also updated to reflect the move. See Figure 48.

Going back to the Drop Diagram Settings tab, we can calculate the average drop again and now the averages for both axes are 0.00. See Figure 49.

Now for some details about how this program works. The graphic elements this program creates have tags associated with them. The tags are so the program knows that it created the elements and is to delete them with redraws. It is to only delete the elements that go with this file and were created by this program, so it also creates tags with the

unique identifier for each element. This allows one to make copies of the elements that won't get deleted with redraws.

Notice, if you create two different compass rule files for the same drawing, they don't erase each other's elements. Sometimes one wants to make a copy of an existing file that does not delete the currently drawn elements. That's where you'd use the CopyToNew button on the Entry tab. It creates a new file with a different unique file identifier. It has all the same information as the current file, just another identifier for this new file. Currently, when you use this feature, it does not switch to the new file. It is behaving as designed, but this design may change in future versions.

Another aspect of this is that you can make copies of an element that won't get erased with redraws. Most times you'd like the program to redraw everything, but not always. For example, as you run your traverses you'd like to have the program draw the name and description, but once you've finished entering your circuit, you'd probably rearrange the names and descriptions. You can do this. Just make copies of them, arrange the copies where you'd like them, uncheck the check boxes for them on the Traverse Settings tab so that the originals go away.

The program won't redraw unless you change something or click on a drop-down box. This is also by design. Sometimes you want to load a file so that you can print out the report or export some coordinates. On the other hand, sometimes you want to load a file so that you can draw the traverses in a different file. It won't automatically draw on load. This is what the Redraw button on the Entry tab is for.

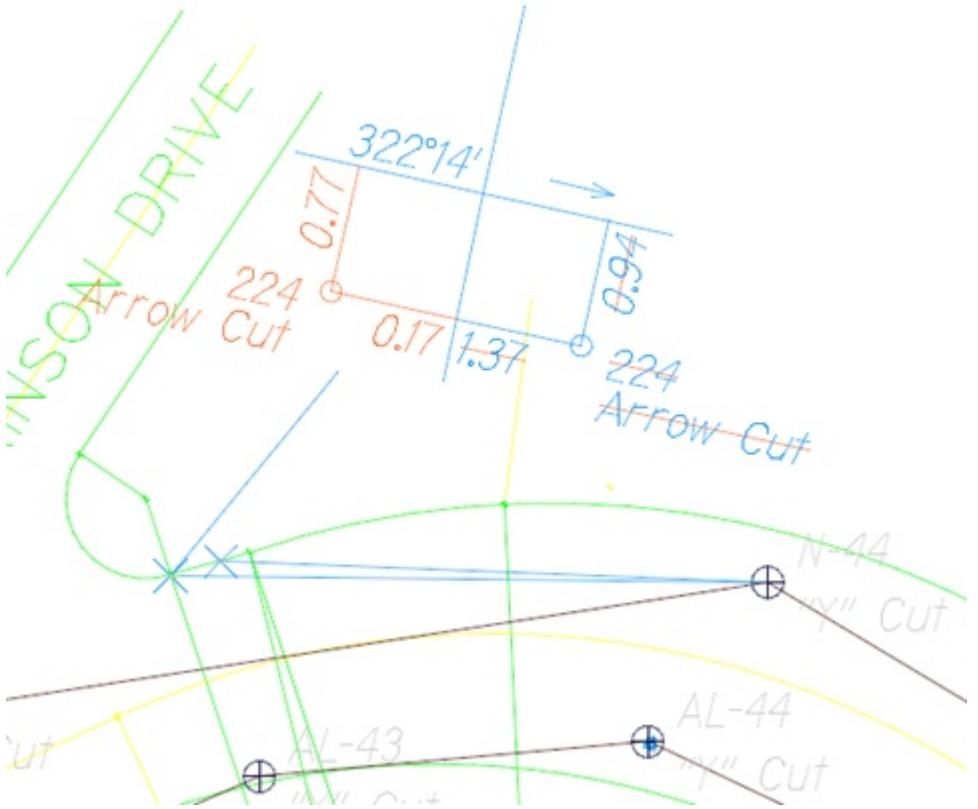


Figure 48: Drop Diagram Automatically Updated

Drop Snap Diagram	
Average Drop	
Drop X-Axis:	0.00
Drop Y-Axis:	0.00
Drop count:	11
Opposites	
X-Axis offset	1.54
Y-Axis offset	-0.17
<input checked="" type="checkbox"/> Draw Opposites	
Place Snap Diagram	

Figure 49

Curve Solver

This is a unique tool. The concept is unique. The way you use it is unique. The criteria is unique. Originally created for checking baseline curves, this tool has expanded to drawing the curve, tangents, radial lines, and tangent sections of a baseline. This allows for checking coordinates, clearances, and stationing. Yes, stationing. Commercial software doesn't seem to use rounding to do stationing calculations and often times labels stationing which is inconsistent with the stated length of curves and length of tangent portions of the baselines. This tool takes the approach of creating the baseline elements using a defined precision, holding geometry. This is different from an engineering perspective which looks at designing a baseline possibly arbitrarily rather than recreating a predefined baseline.

Using the tool is simple. For curves you choose left or right curve, fill in the fields, and if the solution is acceptable, you can optionally draw it interactively. The blue letters are the variables that were solved for. You can use the radio buttons to choose which variables you want to enter. The *Pass to line* button will enter the P.T. Station and the tangent out direction to on the Line tab and bring that tab to the front if there is a valid solution.

The Line tab works about the same way. You fill in the fields. If the solution is okay, you can optionally draw it. The *Pass to curve* button passes the P.C. station and the ingoing tangent to the Curve tab and moves it on top.

The rest of the items on this tool have to do with the elements it draws. The options should be understandable, so they won't be covered in this iteration of the manual.

One tip. If you have compound curves or reverse curves, the Tangent lines option is useful. You draw the tangent lines with the curve and just use the label line tool to show the tangent in of the next curve. You can even use the pick button to enter the text.

If you choose PT Station as one of the variables to enter for your curve, what it does is calculate the delta which would be appropriate for that station and uses that delta at the specified precision for the solution. It is unlikely most software solves it like this, but remember, we are holding geometry over baseline length.

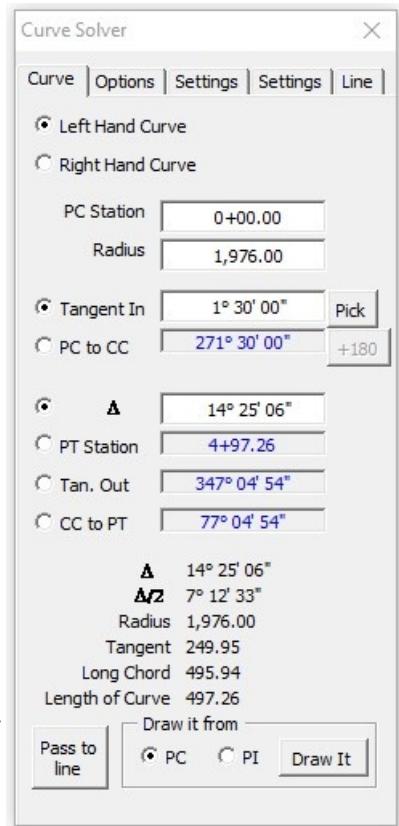


Figure 50

Draw Traverse

This tool was originally created for drawing traverse maps. It has proven itself to be useful for other generic uses as well. You can use it to plot points for other tools to snap to like the Curve Solver. You can use it to plot traverse points since they are often shown with ties to the baseline. You can use it to create snap point to move objects to different elevations.

Operation is easy. If you want to draw the setup point, fill in the coordinate, enter whatever other information you want for it, choose your options and click the Draw Setup Point button. The forward traverse is drawn from the setup point, so that coordinate needs to be entered. You enter the information you want to include for the forward traverse and then click the Draw ForeSight button. If you chose "Traverse" mode, then the forward traverse will now automatically become the new setup point.

Of course some of the elements will be drawn in a poor place. Just move them to your liking. There is nothing unusual about these graphic objects.

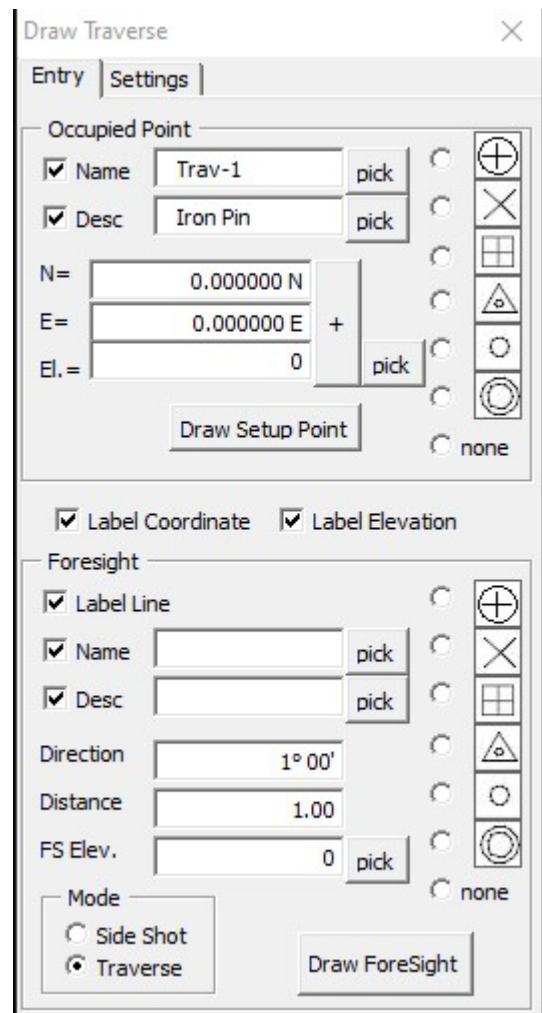


Figure 51

Drop Diagram

This tool is possibly unique to Hawaii where it was created. It draws a diagram showing the relationship of the record point to the physical marker found in the field, in other words, the calculated position versus the measured position of a property corner or control point.

Say you located some property pins and you plotted them with your calculated property lines. See Figure 52. You would use this tool to make diagrams showing how they land in relation to where the calculated corner is.

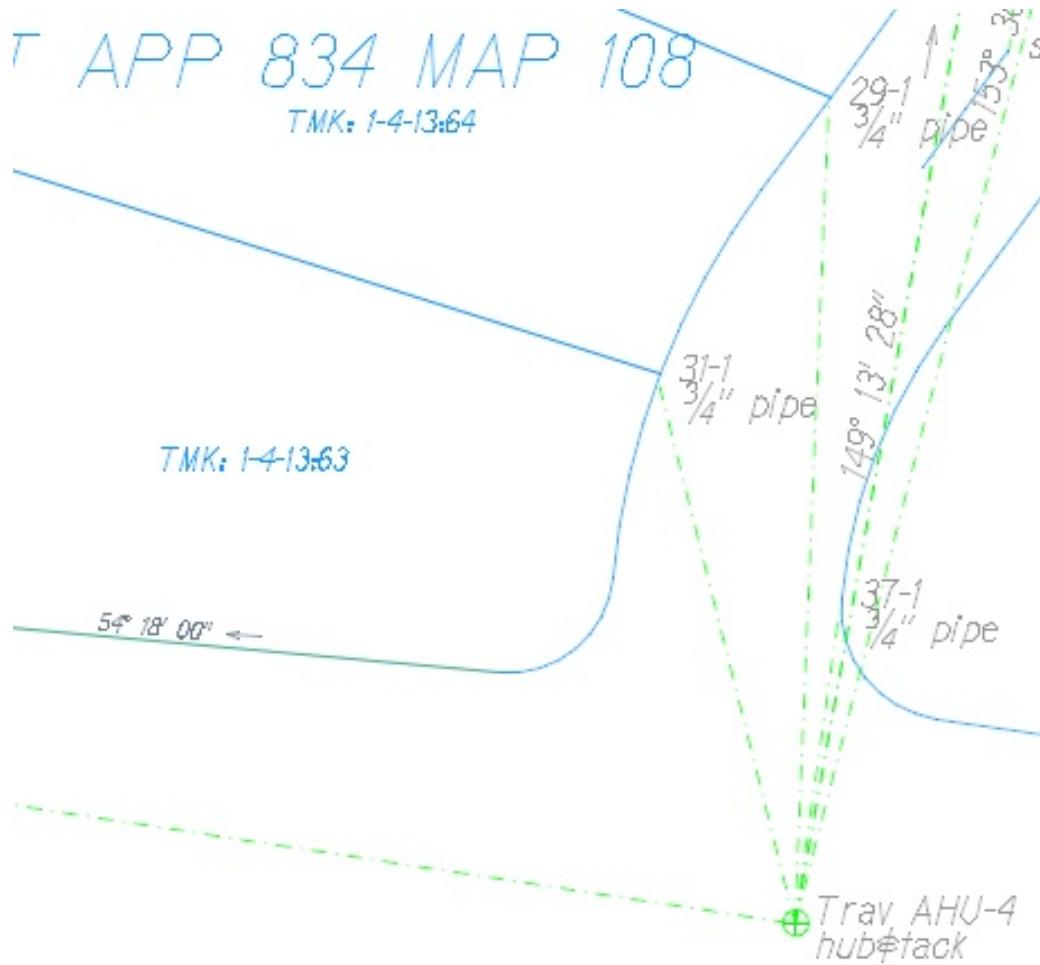


Figure 52

Before you do anything else, go to the Settings tab and set the levels and colors. You should put the leader on a different level than the diagram itself. You should make the Revision color different from the rest of the diagram. It'd be good to choose a font that has the degrees symbol for the caret. Don't worry. You only need to set the settings once.

Now, go to the Main tab and enter the Reference Direction. Usually, you want to make this the same direction as the street, depending on what you are doing. The diagram is meant to be read from left to right, so pick an azimuth that points more to the right of your drawing. In this case, the street is labeled as going $54^\circ 18' 00''$, in this case the azimuth is pointing more to the left than to the right. We should point it more to the right. The reverse of that azimuth would be best. It is already labeled, so you can just use the pick button to enter the text into the field. Once it's entered, you can press the +180 button to reverse the direction.

The Description fields can also be entered by picking the text elements. These will likely already be labeled in your drawing.

For the coordinates, you cannot key the values in. You must pick the coordinates using the "+" button next to the coordinates display. The Record coordinate is the calculated coordinate and the Ground coordinates is the measured coordinate. If this is improper terminology, just edit the user form to your liking. The display is set to two decimal places to make it easier to see if they are similar but not the same point.

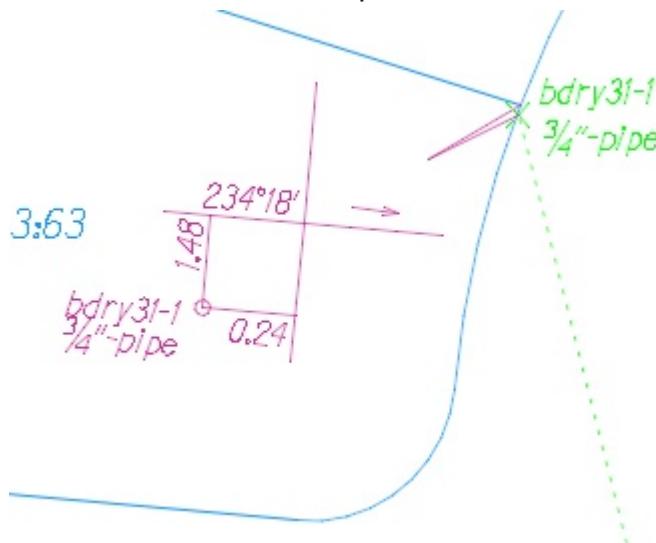


Figure 53

boundaries, but most times you move the control point values. It is all up to you. In our example, the control points are moved. See Figure 54. For clarity, only one diagram has been placed. After the adjustment, we need to go with our dialog box and gather the same information we did earlier, but with the adjusted coordinates. Once you've done that, instead of pressing the "Draw it" button, you press the "Revise Diagram" button. Again, the dialog box hides so it's not in the way. Click on the diagram you want to revise and it should revise.

Now you are ready to draw the diagram. Press the "Draw it" button. The dialog box hides so that it won't be in the way when you place the diagram. Pick the spot where you want the diagram to be placed. Usually, you do this for all the markers you've located. Figure 53 shows a diagram before adjustment is made. Notice there are two leader lines. One line goes to the record point and the other goes to the ground point. This makes finding the same points easier when you revise the diagram.

Typically, the next thing that happens is you make an adjustment. You could move the calculated

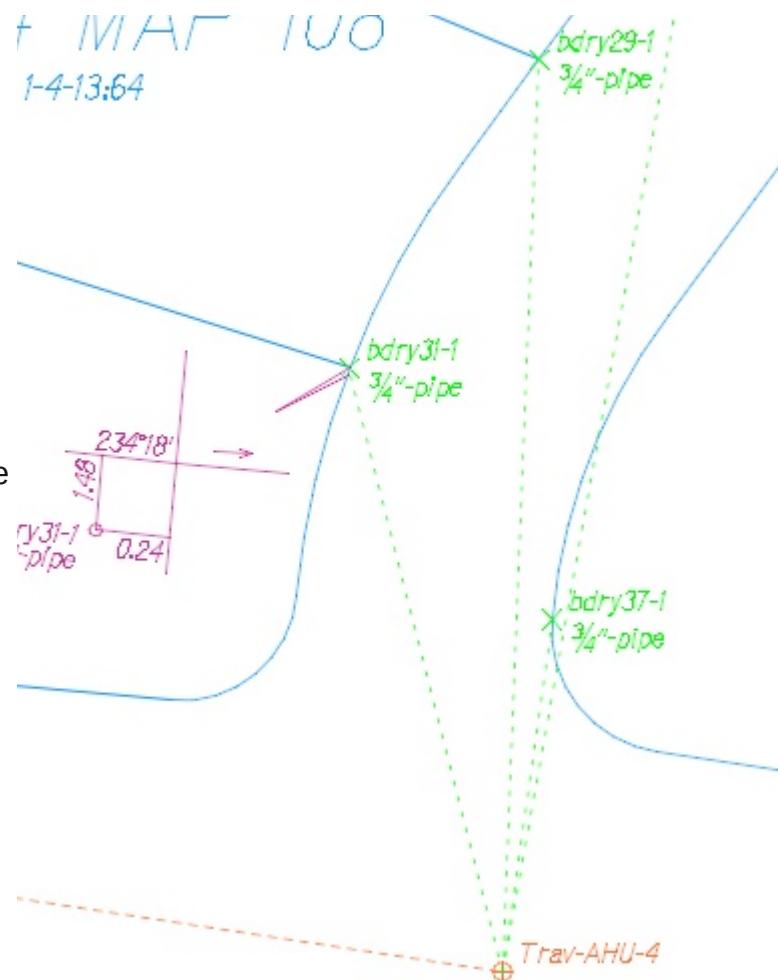


Figure 54: Adjusted Controls

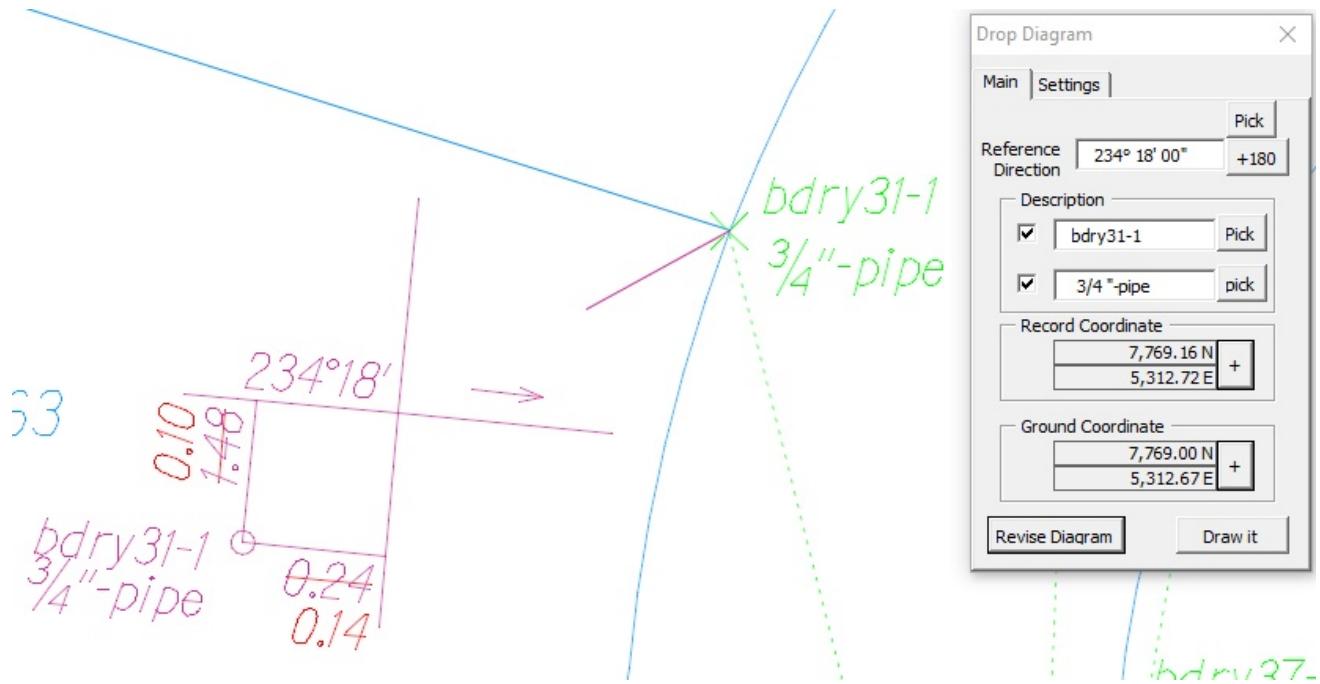


Figure 55: Revised Diagram

Dup Finder

This is another weirdo tool in that you won't likely find it anywhere else. Its main purpose is to eliminate redundant points from your point file to prepare it for doing a boundary study. So say you used the Plot Lot tool to create a worksheet. You would also use it to create a point file of the property corners. In that file of points you've created, there are redundant points. Lots and lots of redundant points. Just one parcel should have the first and last point redundant. The neighboring parcels will usually have points in common too. There ends up being quite a few redundant points. For a boundary study, we don't want all those redundant points. If you are staking out a lot, you do want the start and end point of the lot so that you know the correct azimuth and distance of the last course. This is not for doing that.

You use this tool by first loading your coordinate file. You can load more than one file if you have things broken up into sections, but you can only load one file at a time. It's best to have Microstation open to your worksheet so you can make sense of the graphics.

In our example, see Figure 56, we've loaded our coordinate file and it's drawn circles at the points in the coordinate file. Don't worry. The circles are temporary graphics. Notice that some circles are highlighted. This indicates that there are circles that overlap. You control the diameter of the circle by entering the diameter into the "Diameter" textbox. This controls the overlap. In this example there aren't any short courses so we can use a diameter of five feet, but sometimes there are courses that are only a few tenths of a foot long. You should be aware of them when you generate the lot closures. You may need to toggle them on later.

There is a "+" button for helping to figure out what a point is. You can click the button, the dialog box hides and you pick near the point you are interested in. When the dialog box comes back, the list should have scrolled to nearest point in the first row.

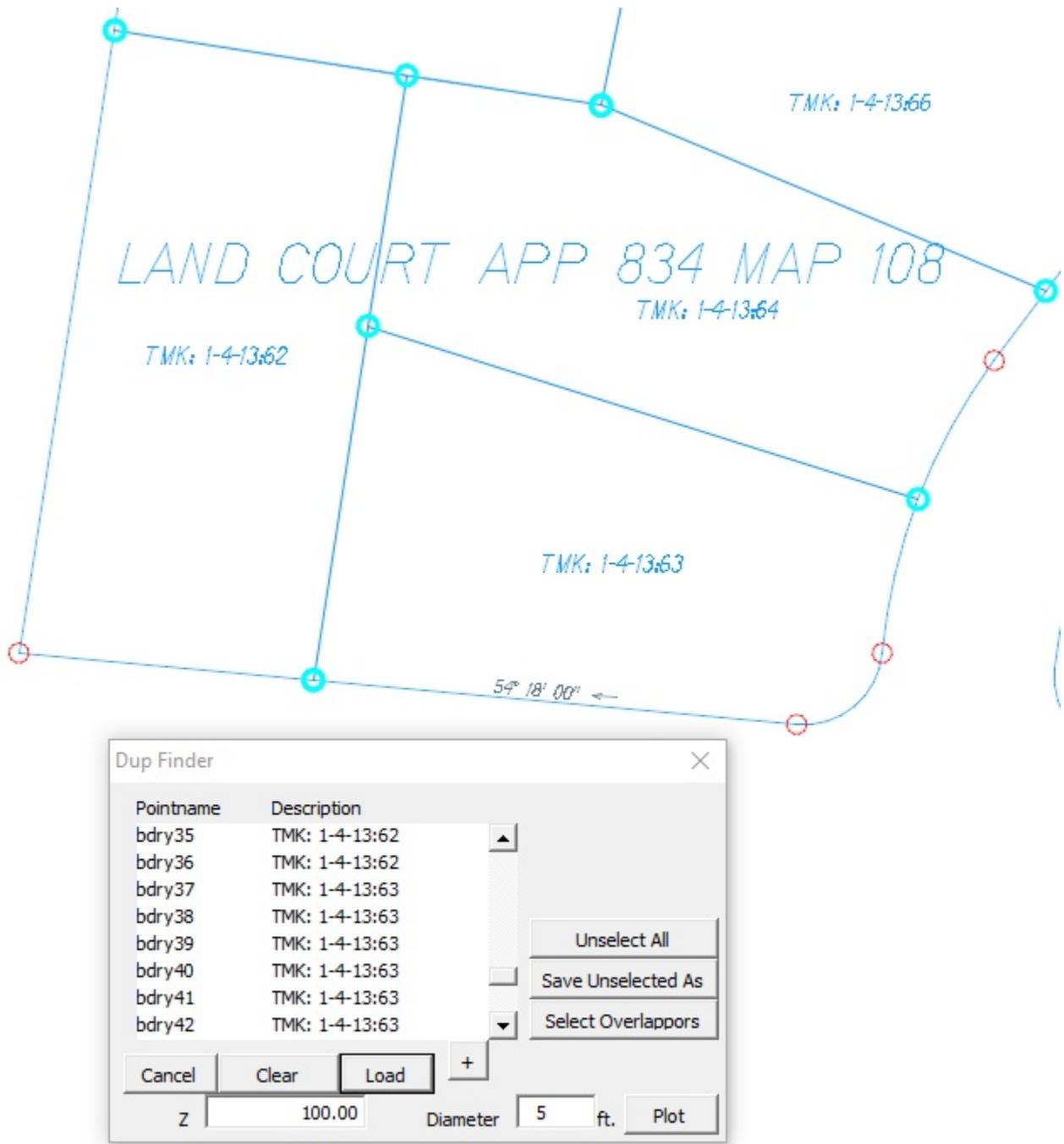


Figure 56

Clicking on items in the list will toggle selection for them. If the item is highlighted, it is selected. If it is selected, it is not considered for overlapping. It is ignored. The *Select Overlappers* button will select the points in the list which determine are causing the overlapping condition. Notice the circles aren't highlighted in Figure 57. It only bases it on the points which are not selected, so if you have a point you don't wish to be selected during this process you can select the point which are causing that point to overlap prior to using this feature. Or, you can just deselect it after using this feature.

Once you have selected points the way you desire, you can save the unselected points to a file. Just press the *Save Unselected As* button and create the file you wish to save it to.

The *Plot* button will just make the circles into permanent graphic elements in your drawing.

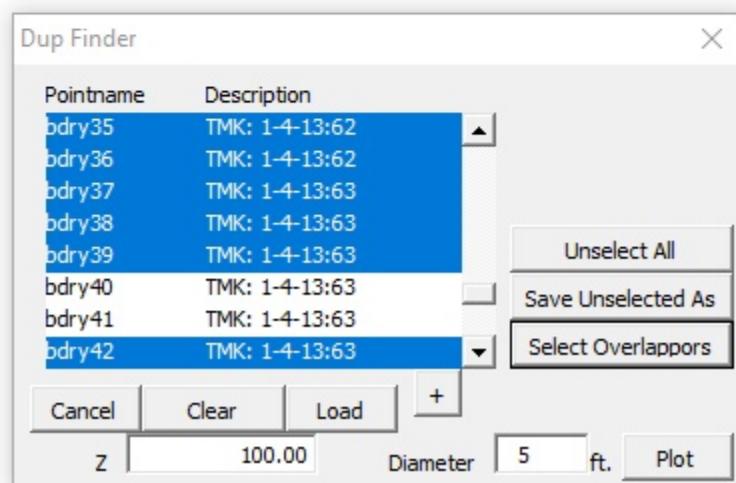
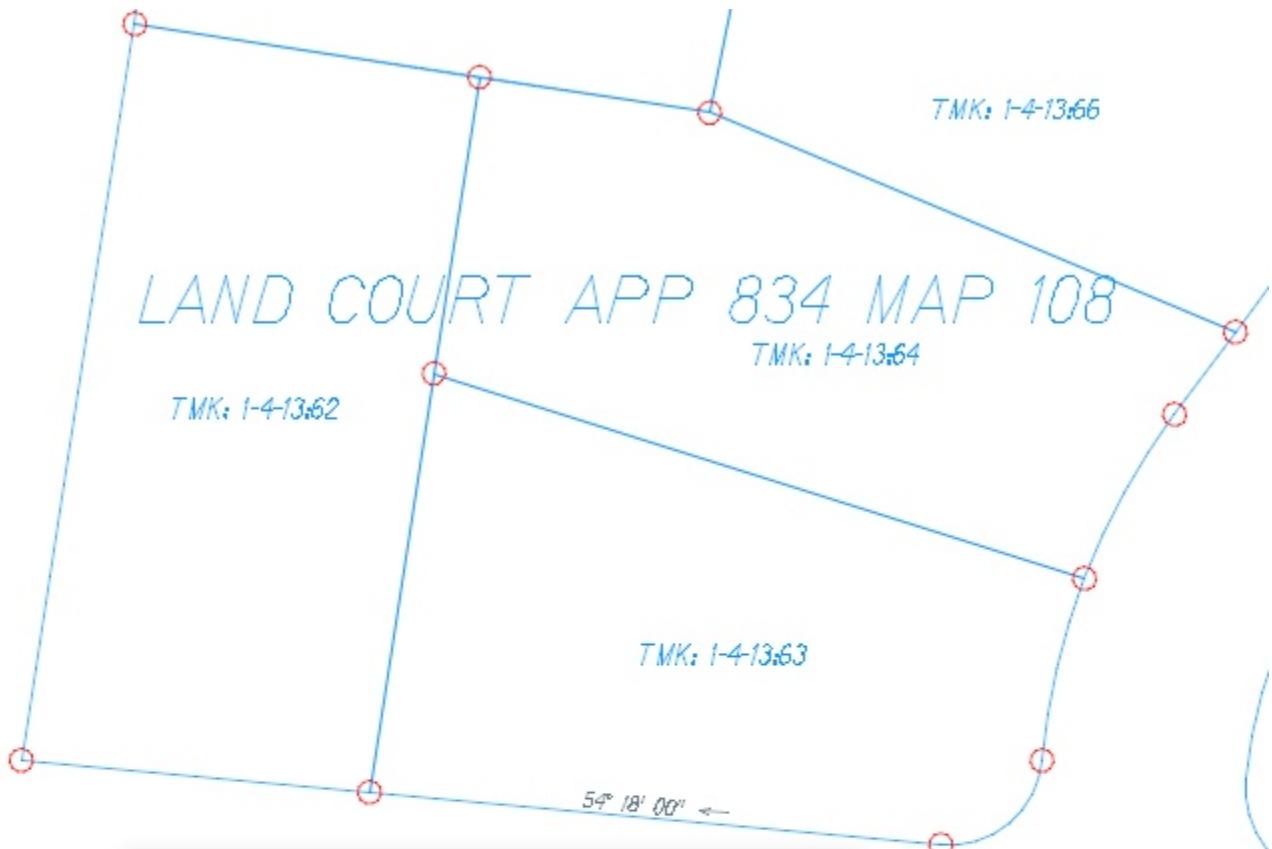


Figure 57: Selected Overlappers

Label Coordinate

This tool labels the coordinate of a given point in your drawing. You just pick the point and then pick the place you want to place the graphic elements. You also have the option to also send the coordinate to a coordinate file. Coordinate precision settings will determine the precision of the text placed in your drawing as well as the coordinate placed in the file.

The "Override picked elevation" allows you to use the elevation in the textbox for the text element and the coordinate file instead of the Z value from the picked point. This can be useful when points are plotted in a 2D file.

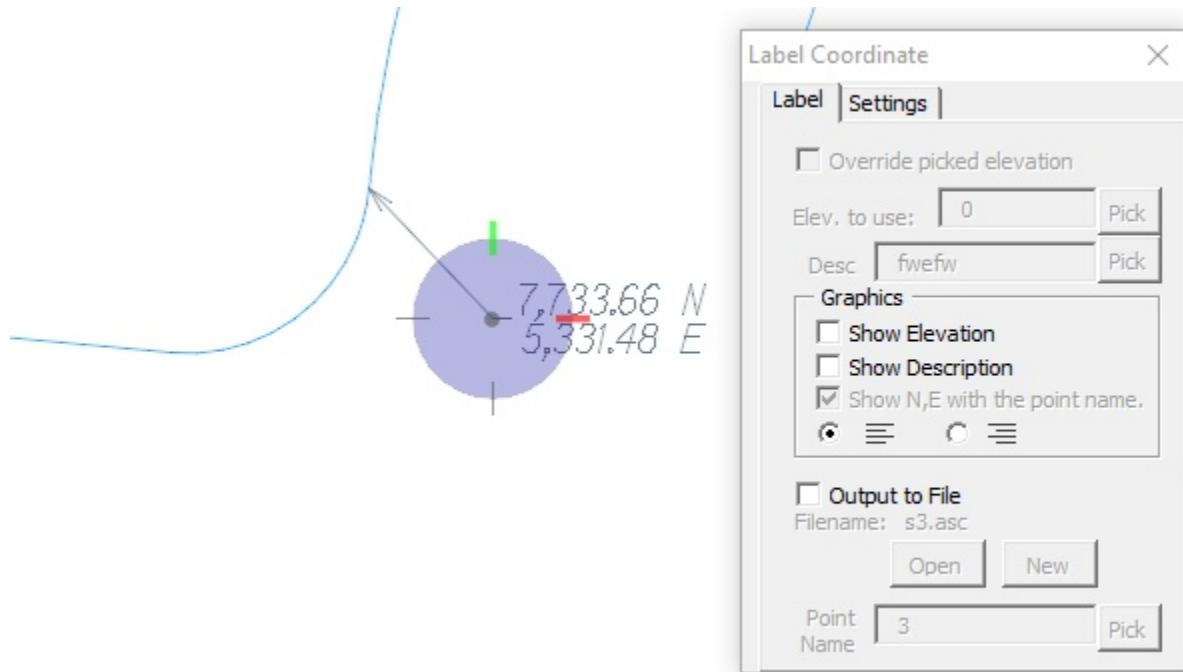


Figure 58: Label Coordinate Tool

Label Curve

This tool creates a curve data graphic group. To use it, you choose the horizontal curve then pick the place you want to place the curve data. This tool only work with arcs that are on the x-y plane. If the arc is tilted off of the plane, then it won't work with this tool.

The tool is useful when the curve data is missing or erroneous.

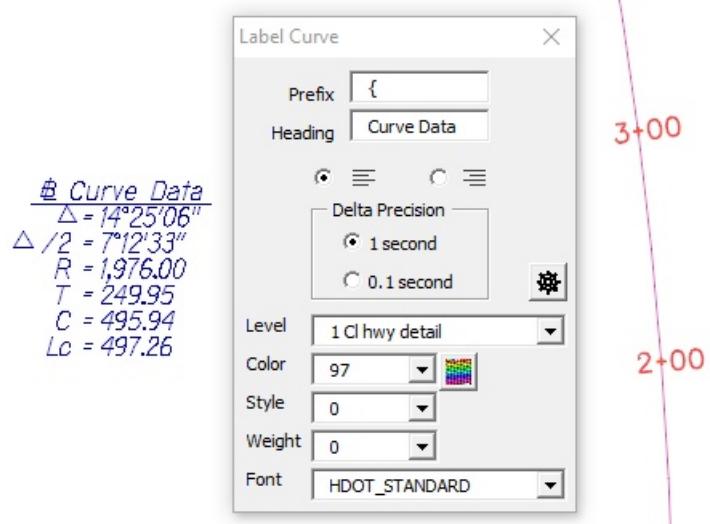


Figure 59: Label Curve Tool



Label Line

This tool labels a line with direction or distance or direction and distance. It tries to adjust the style to the length of the line. It only works on lines, not linestrings or complex elements. To use this tool, choose the line then the temporary graphics should appear to help you finalize the position of the graphic elements. Usually, you will be choosing which side of the line elements will go. If you include the direction then also you choose if it's the direction forward or the direction back.

Sometimes the elements will not fit on the line. When this happens, you will have a leader appear and you can place the text with a leader. If you are placing text with a leader and the direction was included, it is the direction from the start of the line to the end of the line unless the "Use back direction with Leader." checkbox is checked.



Label Station

If you have drawn a baseline segment with the Curve Solver, you can use this tool to label the station and offset of someplace in your drawing. Just choose the segment you want the station relative to and pick the point you want labelled with station and offset. Place the label interactively. You can continue labelling or cancel and choose a different segment, cancel again and end the tool.



Measure Direction

This tool is often called "Inverse Azimuth," but since it optionally gives bearings instead, it's been named the more generic "Measure Direction." Like the name suggests, this tool measures the direction and horizontal distance between two points. You have the option of azimuth or bearings as the output. It just seemed too cluttered to display both at once, so you have to choose. You can also change the precision of the measurements.

Operation is simple. Just pick the start point and then pick the end point. A tether is provided to give feedback.



Plot by Station

If you have a baseline segment you created with the Curve Solver tool, you can plot points by station and offset. First you choose the baseline segment you want the station and offset to refer to.

Then, key in the elevation you want it plotted at. If you are using this to plot cross section notes, then checking the "return here" box will be useful. The focus will return to the Elevation field after the point is plotted if it is checked, otherwise it will return to the station field.

If you enter the Offset field with a plus sign, it will make the offset to the Right. If you enter it with a minus sign, it will make the offset to the Left.

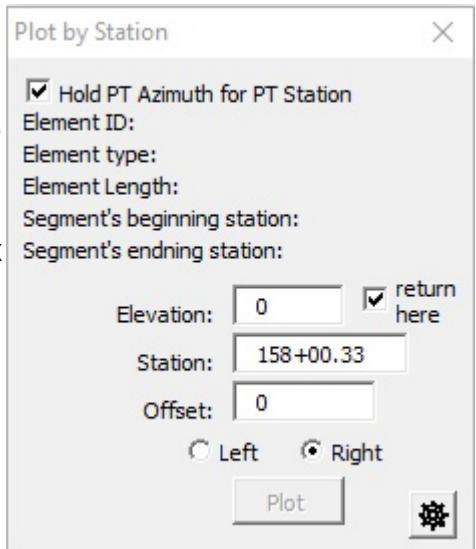


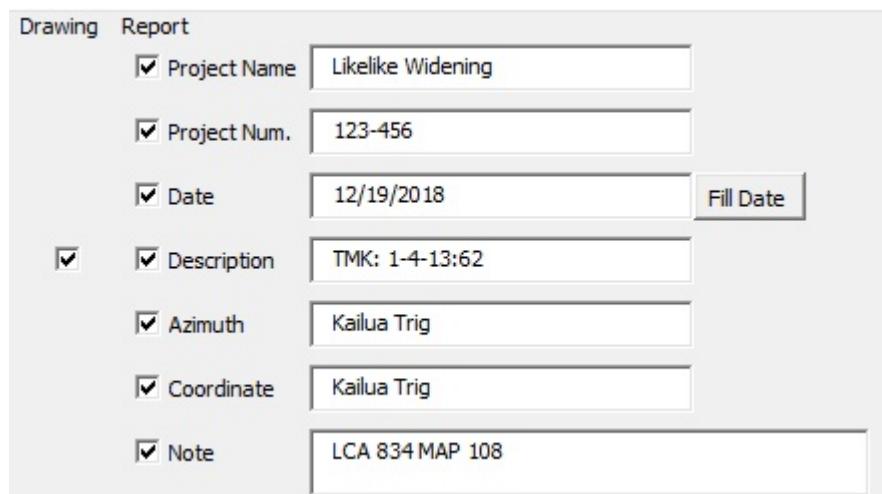
Figure 60: Plot by Station Tool

Plot Lot

This program is intended for calculating, drawing and providing a good lucid report from legal descriptions and maps. It is useful for working right-of-ways, cadastral worksheets, lots and parcels. There are many examples of this type of program, both commercial and do-it-yourself. Some have regional differences, but they all hope to accomplish the same task. Many of the do-it-yourself versions lack features like drawing the line work, and commercial software tends to design things around an engineer's workflow instead of a surveyor's workflow. The point is, there are a lot of programs out there to do this, but none of them are satisfying. They all seem off-putting in some way. Plot Lot attempts to solve as many of these shortcomings as possible, at least for surveyors in Hawaii.

Once you start up the Plot Lot program, the dialog box should be on the Report/Files tab. Plot Lot requires you have a file to work in, so when you first start it up most of the buttons are disabled. First thing to do is to create a new file. Click on the *New* button at the top (See Figure 61) not the one in the Export frame, and create a new file in a directory that is meaningful to you.

While you are at this tab, you might as well fill in the text boxes. The text in the text boxes will be saved with your Plot Lot file. Sometimes you might want to just change a few things in these boxes but keep most of it with each subsequent file. If this is the case, then there is an option on the Settings tab (See Figure 62) for clearing out these text boxes (or not to clear out) when you create a new file.



Drawing Report

Project Name Likelike Widening

Project Num. 123-456

Date 12/19/2018

Description TMK: 1-4-13:62

Azimuth Kailua Trig

Coordinate Kailua Trig

Note LCA 834 MAP 108

Figure 62: Plot Lot Text Boxes

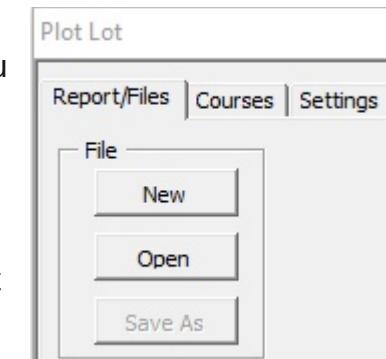
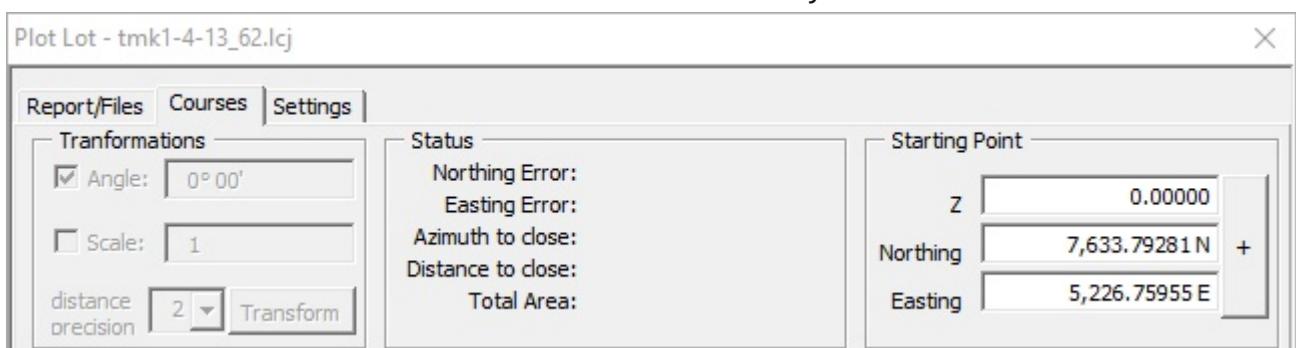


Figure 61

Next, you would go to the Courses tab. At the top are the text boxes where you fill in the starting point. While this is a two-dimensional program, it plots in three dimensions when available. That's why there is a field for the Z value. You can either key in the values or you can click on the "+" button and pick the point on your drawing if you have the starting point plotted somehow. Don't worry. You can change this later if you want to.



Plot Lot - tmk1-4-13_62.lcj

Report/Files Courses Settings

Transformations

Angle: 0° 00'

Scale: 1

distance precision 2 Transform

Status

Northing Error:
Easting Error:
Azimuth to close:
Distance to close:
Total Area:

Starting Point

Z 0.00000

Northing 7,633.79281 N +

Easting 5,226.75955 E

Figure 63: Starting Point

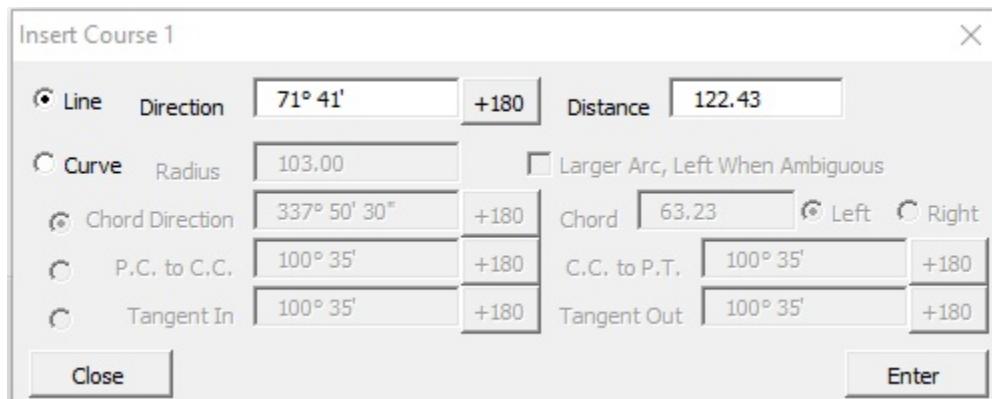


Figure 64: Insert Course Dialog Box

Now you can enter your courses. You could have entered your courses first. It doesn't matter from the program's standpoint. Perhaps it's just a good habit. Go to the bottom of the page and click on the Insert button. A dialog box comes up for entering courses. Just choose the type of course you want to enter, fill in the text boxes then click on the Enter button. Simple enough, right? Click on the Close button when you are finished entering the courses. Did you notice the boundary lines and radial lines are drawn in temporary graphics as you keyed in the courses? Maybe not if your view was not showing the area your boundary is in. Also, the temporary graphics are not going to appear in views 7 and 8 so you can see only the permanent graphics in these views.

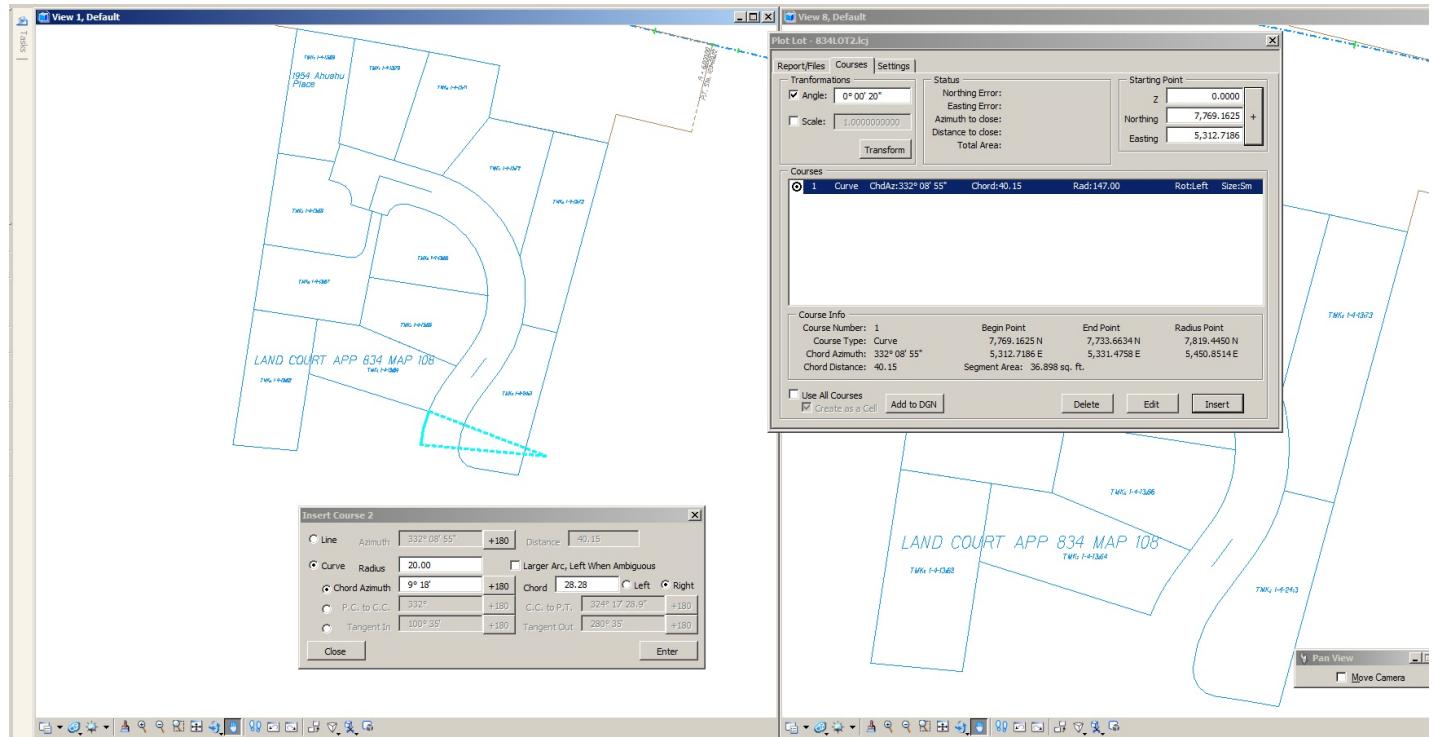


Figure 65: Temporary graphics in View 1 and none in View 8

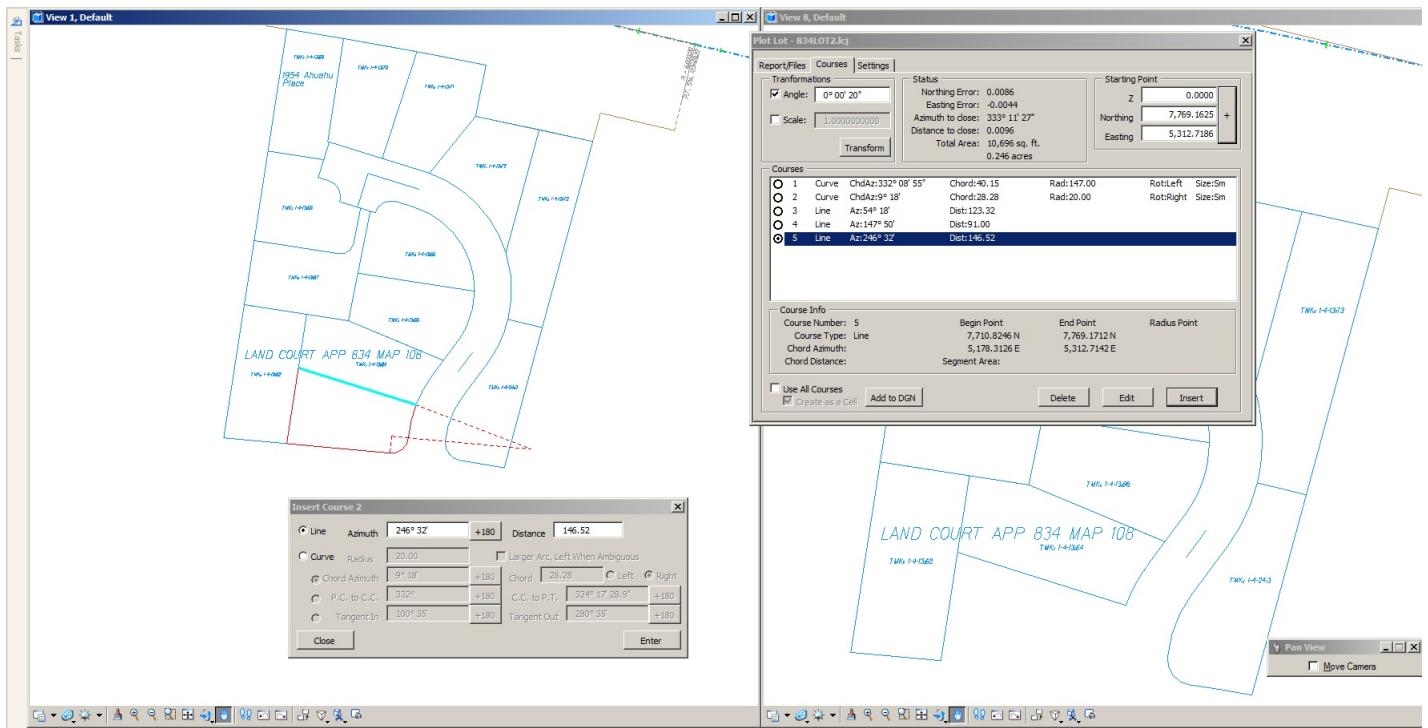


Figure 66: Entire lot entered, selected course is highlighted.

As mentioned in the beginning of this document. You can enter your directions and angles in the ddd.mmss format. You can also enter it with the ^ and ' and " characters, but that's too much work unless you are just editing an entry. The +180 buttons alongside of the text boxes will do as suggested and add 180 degrees to the entry in the text box it's alongside of, effectively giving you the back direction. The direction and distance entries use implied precision and that's how they'll appear in the report.

So, you made a mistake entering a course. No problem. Close the dialog you are using to enter the courses and highlight the course you made the mistake in and click on the Edit button. You could also just double click on the course and you get the same effect. The edit dialog box comes up with the entry you want to change. Change it then enter it. That's it. Everything is recalculated and redrawn.

The status box at the top of the page shows you your closure error and area to help with determining if you got it right as well as the azimuth and distance of the mis-closure if you didn't get it right. The azimuth and distance help you look for missing legs or wrong distances. Note that on the temporary graphics, the radial lines are included (see Figure 66) regardless of the setting or check boxes. This is so that you

visually can verify that you have the curve going the correct direction. You could very easily enter the mirror curve and the difference in area might be too small to notice.

You may have noticed the buttons with up and down facing triangles near the *Insert* button. Those appear when you have more than one course. They are for barrel rolling your courses. You might enter the metes and bounds description from a deed and it probably doesn't start on the same corner you need to hook up with on your drawing. That's where these come in. You can move the last course to become the first course or you can move the first course to be the last course. Then you can just use the "+" button at the start point and snap to the hook up point in your drawing.

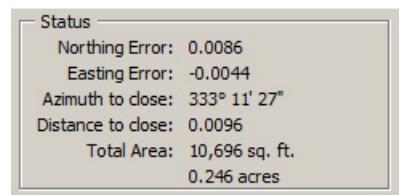


Figure 67: Status Box

If you look at the course info at the bottom of the page, it shows you information about the selected course. This is to help you checking the course without going to the graphics. For the curves, you can look at the chord azimuth and distance as a check if you entered the radials or tangents to define your curve. The radius points are also shown, which is useful for localizing your error.

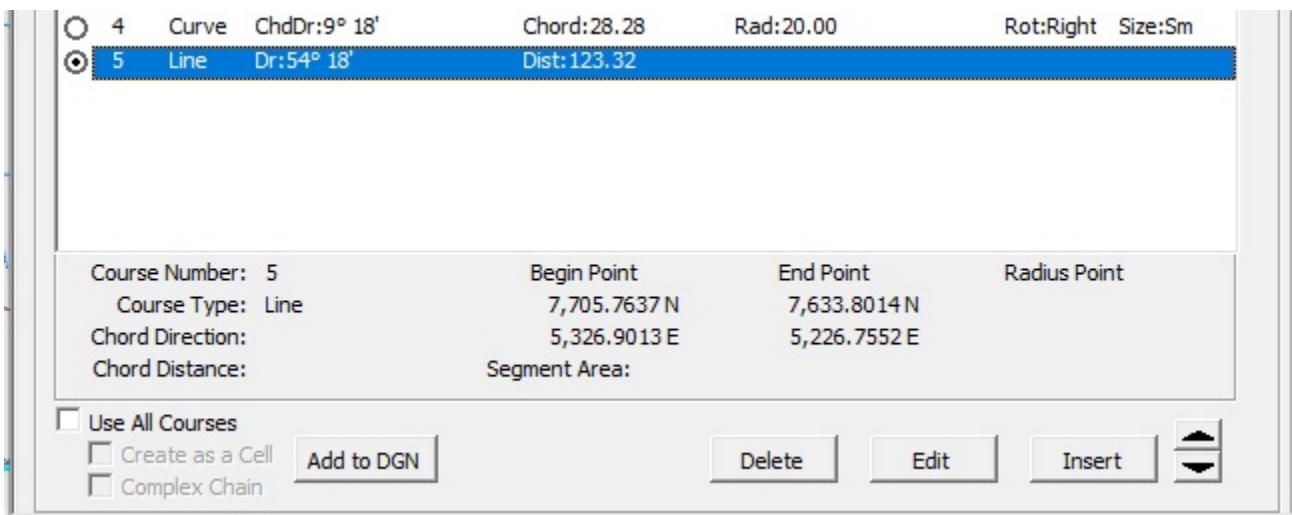
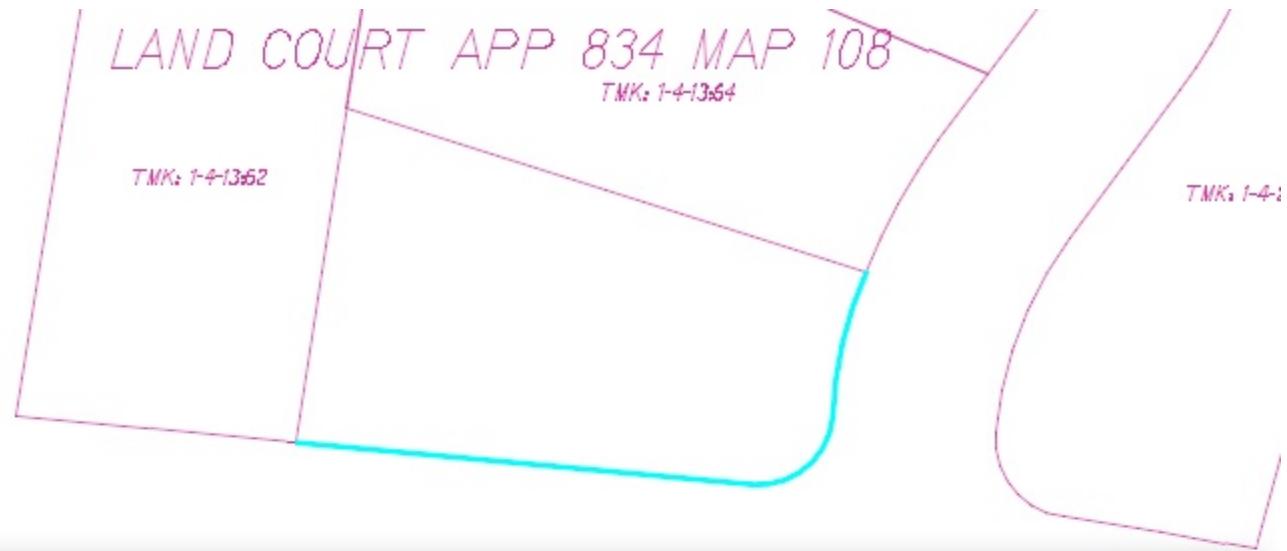


Figure 68: Course Info

Now that you've entered everything correctly, what's next? Well, since you are already at the Courses tab, you could add this circuit to the drawing. See the check boxes near the *Add to DGN* button, "Use All Courses" and "Create as Cell" and "Complex Chain." They give you the choice of just adding all the courses to the drawing or just some of them. If you choose to add them all, then you can have it add it as a cell (graphic group) or a complex chain. In this case the complex chain which is just like a polyline in Autocad. This is useful if you want to be Civil 3D friendly. If you choose both cell and complex chain, it puts the complex chain in a cell with what ever other options you included.

Click the *Add to DGN* button and the window becomes a verification dialog. If you didn't choose to use all the courses, then the list box changes to a multi-select style and you just select the courses you want to exclude from the drawing which reduces the number of redundant and overlapping lines. If your view is showing the area of the boundary, then you should see which boundaries are to be added to the drawing. Choosing the redundant lines is where having views seven and eight not display the temporary graphics is useful. You can keep one of those views open to the same area so you can see when you have added the permanent graphics. Click on the *Add It* button to add the permanent graphics or click on *Cancel*.



Plot Lot - tmk1-4-13_63.lcj

Report/Files	Courses	Settings																																								
<input type="checkbox"/> Transformations <input checked="" type="checkbox"/> Angle: 0° 00' <input type="checkbox"/> Scale: 1 distance precision: 2 <input type="button" value="Transform"/>	Status Northing Error: 0.0086 Easting Error: -0.0044 Azimuth to close: 333° 11' 27" Distance to close: 0.0096 Total Area: 10,680 sq. ft. 0.245 acres	Starting Point Z: 0.00000 Northing: 7,769.16255 N Easting: 5,312.71857 E																																								
Courses <table border="1"> <tr> <td><input type="checkbox"/></td> <td>1</td> <td>Curve</td> <td>ChdDr:332° 08' 55"</td> <td>Chord:40.15</td> <td>Rad:103.00</td> <td>Rot:Left</td> <td>Size:Sm</td> </tr> <tr> <td><input type="checkbox"/></td> <td>2</td> <td>Curve</td> <td>ChdDr:9° 18'</td> <td>Chord:28.28</td> <td>Rad:20.00</td> <td>Rot:Right</td> <td>Size:Sm</td> </tr> <tr> <td><input type="checkbox"/></td> <td>3</td> <td>Line</td> <td>Dr:54° 18'</td> <td>Dist:123.32</td> <td></td> <td></td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>4</td> <td>Line</td> <td>Dr:147° 50'</td> <td>Dist:91.00</td> <td></td> <td></td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>5</td> <td>Line</td> <td>Dr:246° 32'</td> <td>Dist:146.52</td> <td></td> <td></td> <td></td> </tr> </table>			<input type="checkbox"/>	1	Curve	ChdDr:332° 08' 55"	Chord:40.15	Rad:103.00	Rot:Left	Size:Sm	<input type="checkbox"/>	2	Curve	ChdDr:9° 18'	Chord:28.28	Rad:20.00	Rot:Right	Size:Sm	<input type="checkbox"/>	3	Line	Dr:54° 18'	Dist:123.32				<input checked="" type="checkbox"/>	4	Line	Dr:147° 50'	Dist:91.00				<input checked="" type="checkbox"/>	5	Line	Dr:246° 32'	Dist:146.52			
<input type="checkbox"/>	1	Curve	ChdDr:332° 08' 55"	Chord:40.15	Rad:103.00	Rot:Left	Size:Sm																																			
<input type="checkbox"/>	2	Curve	ChdDr:9° 18'	Chord:28.28	Rad:20.00	Rot:Right	Size:Sm																																			
<input type="checkbox"/>	3	Line	Dr:54° 18'	Dist:123.32																																						
<input checked="" type="checkbox"/>	4	Line	Dr:147° 50'	Dist:91.00																																						
<input checked="" type="checkbox"/>	5	Line	Dr:246° 32'	Dist:146.52																																						
Course Number: Course Type: Chord Direction: Chord Distance: Begin Point End Point Radius Point Segment Area:																																										
<input type="checkbox"/> Use All Courses <input type="checkbox"/> Create as a Cell <input type="checkbox"/> Complex Chain Select courses NOT to include in DGN. Add it when ready, else cancel. <input type="button" value="Add to DGN"/> <input type="button" value="Cancel"/> <input style="background-color: orange; color: white; border-radius: 5px; padding: 2px 10px;" type="button" value="Add It!"/> <input type="button" value="Delete"/> <input type="button" value="Edit"/> <input type="button" value="Insert"/>																																										

Figure 69: Selected courses omitted when adding to drawing.

If you add the graphics to the drawing and you had the Description check box under the Drawing column checked, then the dialog box will hide and the text in the Description text will be waiting for you to place it. There should be a tether line anchored to the start point and the boundary should be highlighted.

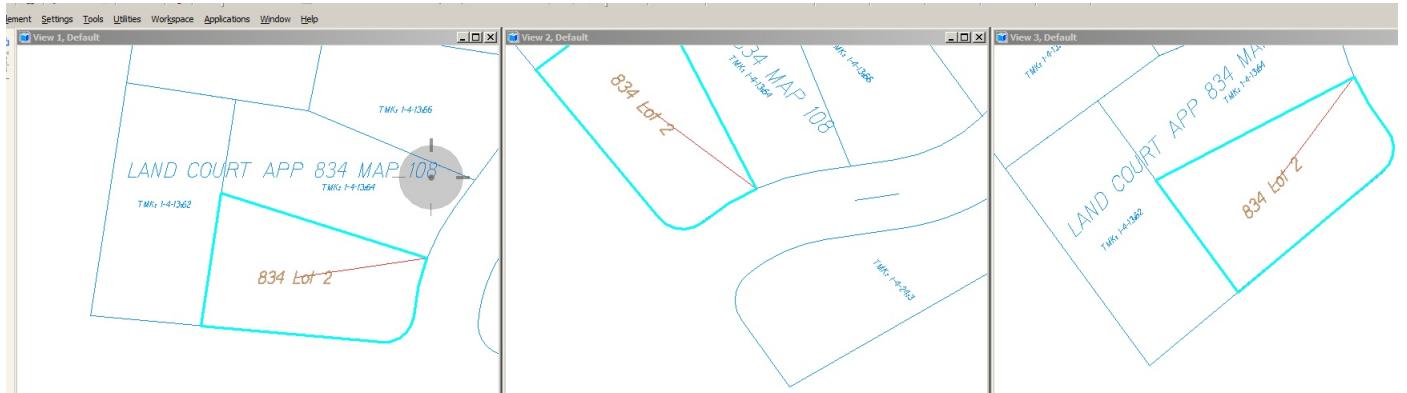


Figure 70: Views 1, 2, 3. Placing text from view 1.

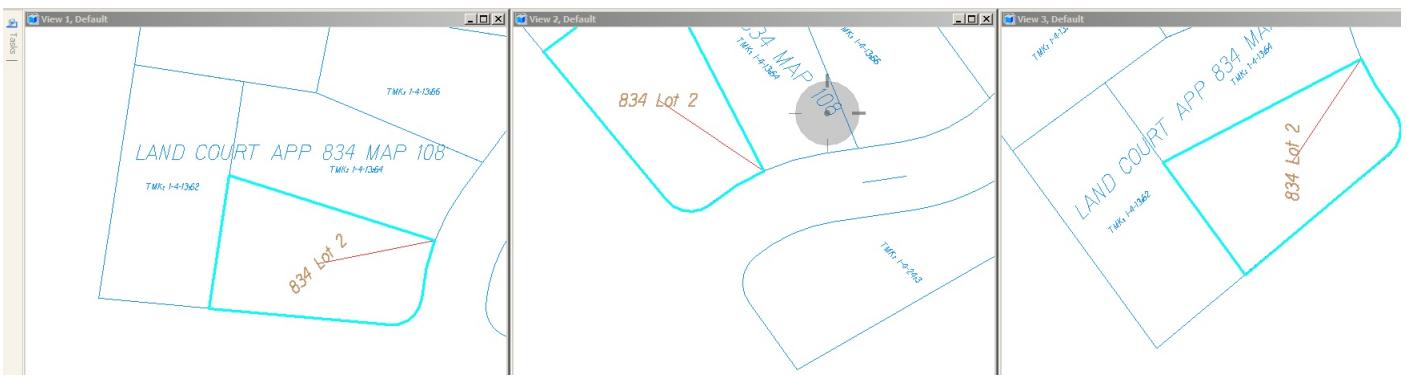


Figure 71: Views 1, 2, 3. Placing text from view 2.

The same will happen with the Area text if that check box is checked.

The Plot Scale on the Settings tab controls the size of the text. This operation of placing text differs from similar operations in other programs in that the rotation of the text will be based on the view your pointer is in. It will change when you move it over the different views. This gives you the opportunity to change the way the text fits in the lot or parcel you are drawing while placing the text. You should have different views rotated at different angles available for different situations. Be careful though. If your view is rotated other than on the Z-axis, then so will your text.

Okay, if you go back to the Report/Files tab, you can see the Report frame. You don't have many options for generating reports, just the Chord precision. This lets you set the precision in decimal places of the calculated chord distance.

When you click the Generate Report button, it should bring up the dialog box for you to choose a filename. This is because it needs to write the report to a file. Choose a filename and then it should launch that file in whatever program your operating system has associated with a .txt file. Most times it's going to be Notepad. At this point you can add comments to it, print it, save it as something else. You can use it as you see fit.

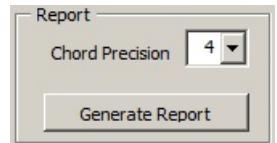


Figure 72: Report Frame

You may have noticed a Save As button on the Report/Files tab. This can be useful if you have numerous lots with the same dimensions and only the starting point is different. You can finish the first one, do a Save As, change the information in the text boxes appropriately then pick yourself a new start point. It sure beats keying in the same courses over and over.

Another use could be when you want to convert your existing courses to another origin. Sometimes if you are working in the area where the properties are begining to shift into neighboring coordinate systems, the legal descriptions are in a different coordinate system than you are working with. What you'd want to do is enter the courses in the original system, then save that file as something else and use the transformations tools.

On the Export to ASCII frame, you will notice you have the New and Open buttons and the label "file" where a filename may or may not be displayed after it. It operates just like with the Label Coordinate program. You open or create a file for the program to dump coordinates in starting at the point name shown. It is simple and just appends it to whatever is in the file. The point name will increment when you've added the points. If you check the Use Lot Description box, it will use the text in the Description field above the Azimuth field for the point description in the export file instead of the text below the check box.

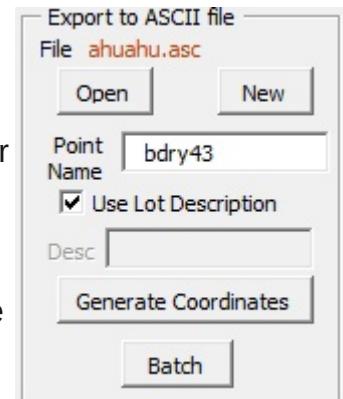


Figure 73: Export To ASCII File Frame

The *Batch* button is for creating the coordinate file from a bunch of Plot Lot files instead of the currently loaded file. Click the *Batch* button and the dialog for opening files comes up. Navigate to where you keep your files. You can multi-select with this dialog box, and that's how you are going to choose them. You can use the Shift and Ctrl in conjunction with the mouse pointer to pick the files you want. Using the Shift key and the mouse pointer to anchor on the first in the list then pressing the End key is another useful thing to do.

They will be evaluated in the order that they appear in the list, so it might be useful to order the files by date modified with the oldest on top. You do this by clicking on the Date modified heading. It might take more than one click.

Once you've selected what you want, just click the *Open* button and that's it.

There are a couple of very valid ideas about what this feature could do. What the Transformations feature on the Courses tab actually does is modify the existing entries and recalculates using the new entries. It does NOT just apply a rotation and scale to just the linework, although that would be a valid concept. It adds the angle to all the courses in your file and/or a scale factor to all the distances including the radius. This is the more useful approach for this application.

This feature is useful when using maps in different coordinate systems. It is a good idea to back up your file before using this feature.

The Angle option will add the angle in the box to each entered course in your lot closure. The precision will be the higher of the two for each course. That is, the precision of the individual course entry or the precision of the angle in the box will determine what the precision of the new entry will be.

The distances will have the scale factor applied to them, then rounded to the original precision of the entry or the distance precision in the drop down box, whichever is higher. If something becomes too big or goes to zero or below, it will flag an error and the file will be reloaded.

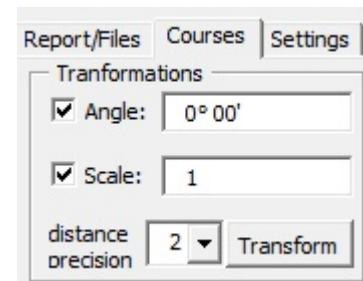


Figure 74: Transformations Frame

On the Courses frame of the Courses tab, there is a "+" button. This button is for picking a course from the screen. When you click the button, the window will hide so you can graphically pick a course. You don't need to pick exactly on the course, just near it. The course that is nearest to where you pick will be the selected course when the window returns.

This is useful when you have many courses, especially if you made a blunder.

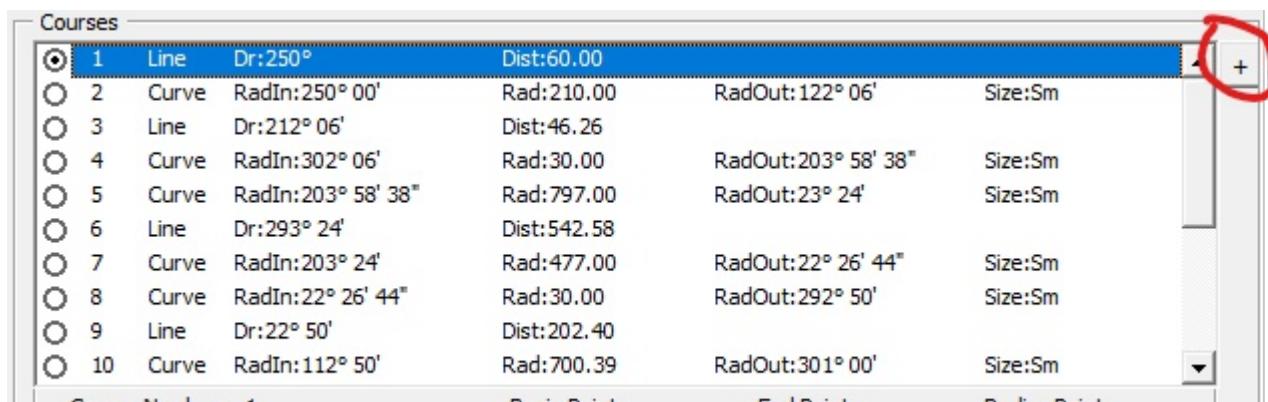


Figure 75: Course Pick Button

On the Settings tab, you can set how the different types of elements are placed in the drawing. This probably won't change much once you've set it. This is pretty much self-explanatory except for the Font Scale text box. It is recognized that you may want to use different sized fonts for a given plot scale for the different text. You may want the Description text larger than the Area text. You can do this by adding a scale factor in this box. The number will be multiplied by the standard font size to arrive at the final font size.

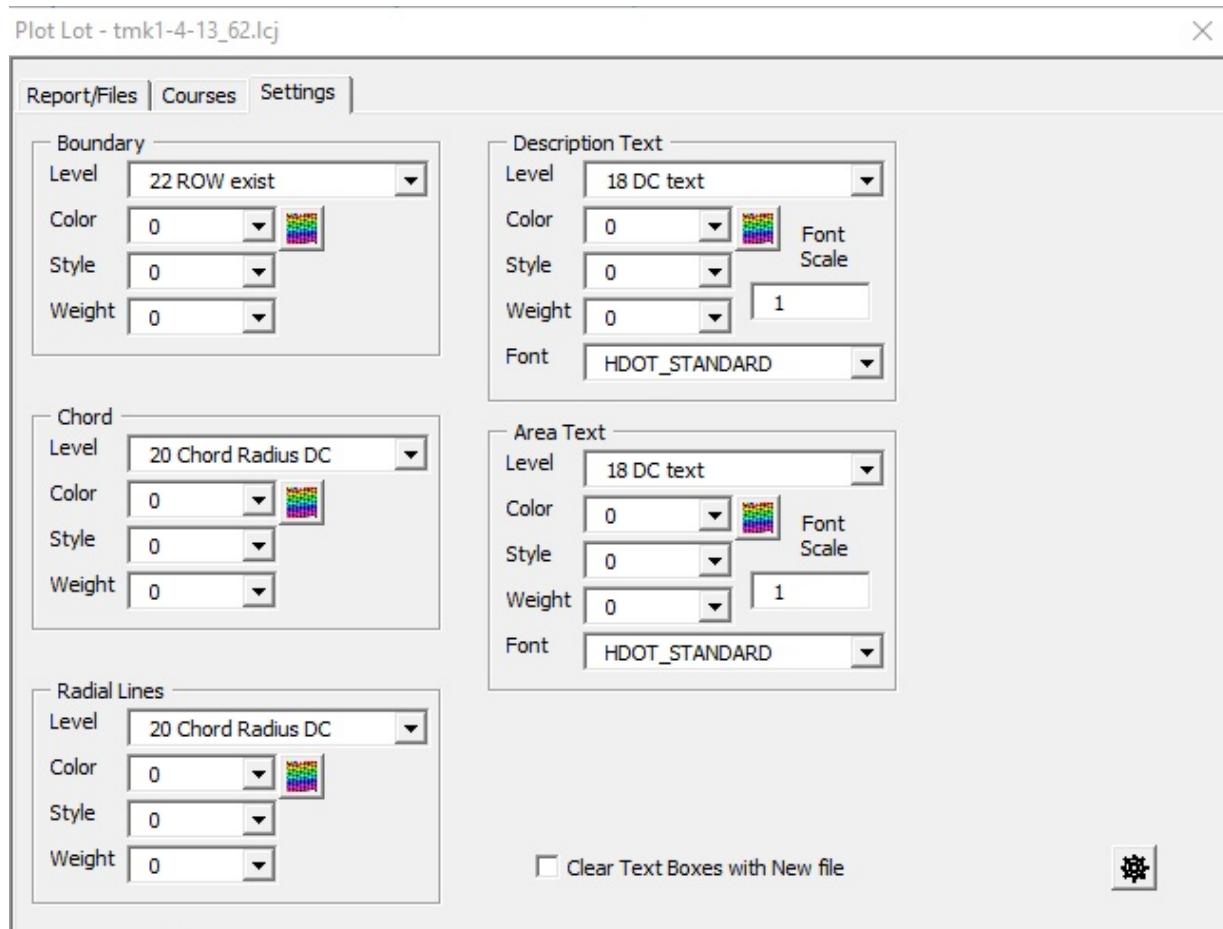


Figure 76

Station Text

If you have created a baseline segment with the Curve Solver, then you can use this tool to place the tick marks and stationing text along the segment. To use, pick on the baseline segment. The information about the element should be displayed and filled in. At this point you can change the "Start at Station" and "End at Station." This controls range of stationing the tool will place. Sometimes you don't want it on top of the cardinal stations. Or, sometimes you want to use different styles of stationing over different ranges, maybe the baseline is oriented differently on different sheets.

The elements placed by this tool are just regular graphic elements. You can delete them, manipulate them, change their attributes, and even copy them. However, they have tags with

them that note the baseline element they were created for. These tags allow the tool to erase the previously placed elements to be replaced by new ones. This feature makes changing the styles an easy task. It's hard to get things looking right the first time around, and sometimes you just change your mind.

The settings and options can be saved to a file and later loaded. This allows one to create different styles for different occasions.

Altough everything is sized according to the Plot Scale, it is recognized that one might want the stationing text to be a little bigger or a little smaller than all the other text. The Font Scale is where this helps out. The text is scaled by the amount entered in the textbox.

Anyway, just play around with all the settings until you get something you like, then save it to file with the Save As button.

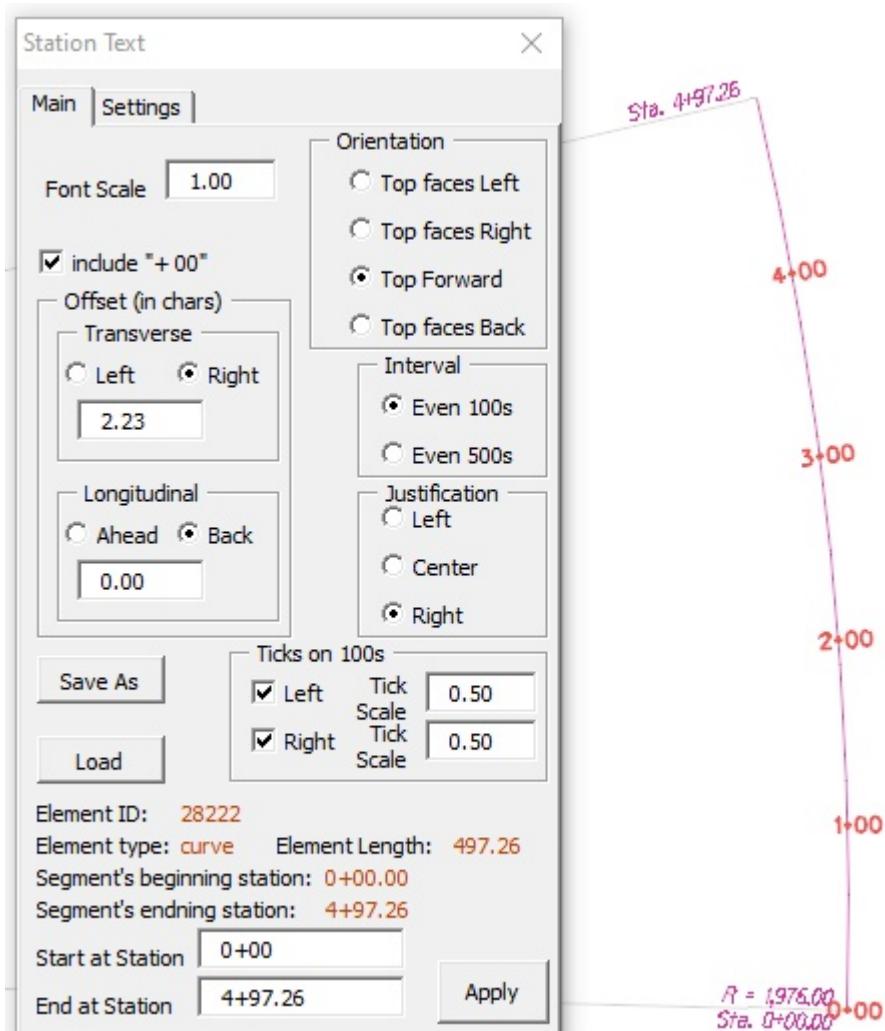


Figure 77

TAGS

Some of the programs will create elements that have tags associated with them. They are set to be hidden when they are created, but sometimes for whatever reason they become visible. They appear as text situated near one of the graphic elements created by this program. Under normal circumstances they should not become visible, but sometimes they appear. This is also true of other software that uses tags and is not unique to these programs.

When exporting to Autocad format files, tags become a problem. Autocad does not have an equivalent to tags or tag sets so they get converted to what Autocad calls “attributes.” When converted to attributes, the tags created by these programs become visible and they serve no purpose in Autocad nor can they be used by these Microstation programs working with an Autocad file, so it is recommended that the Tags option when exporting files be left off. In other words, have it filter the tags on export.

The lack of an equivalent for tags and tag sets is the main reason the Draw Drop Diagram program won’t work with Autocad files the way it is designed. A different strategy would need to be developed to have this work in both file formats.

FILE EXTENSIONS

Some of the Surveyor Tools Neo programs can create files. Some of these files can be used by the programs, others are just generic and are intended for use with other software. All the files created by Surveyor Tools Neo are “acsii” or text files, so they are human readable.

The extensions and their file usage are as follows:

- asc – used for coordinate files
- cra – used for compass rule adjustment traverses
- jss – used for stationing text settings
- lcj – used for lot closures
- txt – used for report files

The choice to make .asc the extension for coordinate files may seem like a poor one since the Trimble import filter only recognizes .csv and .txt files, but that’s how it is. The reason .csv was not chosen was commas and or quotation marks may legitimately occur in the description field which could cause problems with various software. The .txt extension was not chosen since it was better suited to reports wanting fixed pitched fonts like the ones created by the Plot Lot program. The .asc extension was chosen since many will associate that extension with a text editor and that would make it easily read.

THE SOURCE CODE

Someday it may be necessary to adjust or fix something or maybe even add a new feature, so you'll need to know how to get to the source code. Surveyor Tools Neo is written in Microstation VBA. The source code does not have a password. In V8i with the project already loaded, from the Microstation menu, go to Visual Basic Editor.

Utilities>Macro>Visual Basic Editor

This should bring up the Visual Basic Editor window.

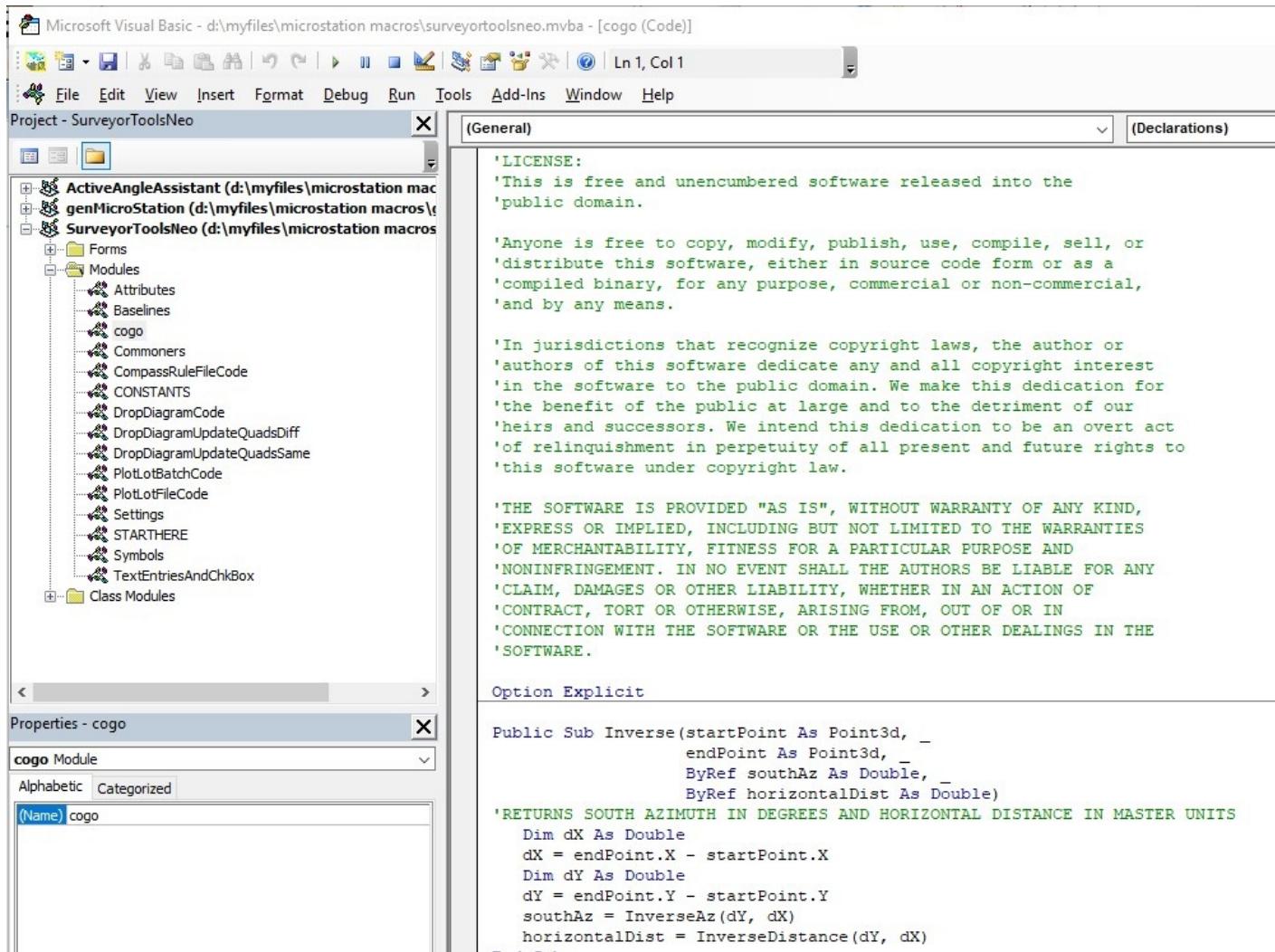


Figure 78: Visual Basic Editor

If the tree for the SurveyorToolsNeo is not open, click on the plus sign next to it to expand the tree. The expanded tree should show the modules for this project. Right-click on one of the modules to bring up the context menu. Choose "View Code" to bring up the code. That's about it. Make your changes and exit.

For Connect Edition, open the VBA Project Manager. Entering “vba project manager” into the search box is probably the easiest way to open it. Then, press the button with the pencil icon. See Figure 69. The rest is the same as V8i.



Figure 79

The book Learning MicroStation VBA by Jerry Winters is very very helpful for learning to program Microstation in VBA. It may be available in pdf form on the internet. It's highly recommended for beginners. It's well worth it even if you have to buy it off of Amazon.com. Bentley's website has a wealth of information on programming VBA for Microstation as well, but it's probably not easily understood by people who have not programmed Microstation's API. There is also a help file that comes with the installation of Microstation. It gives details about methods that aren't covered elsewhere. It's named something like MicroStationVBA.chm.

The STARTHERE module is where to begin if you want to trace how a program works. They all start in that module. If you want to create a new program, then the TextEntriesAndChkBox module has most if not all of the code for text fields. The FrmSample form is useful to see how things could be done. Perhaps in the specific programs things may be handled differently to meet the needs of a specific tool, but the samples give a clear simplified example of how the code could be used.

The code in Surveyor Tools Neo definitely does not follow the good programming practices guideline. The author is not a programmer and does not feel obligated to follow those guidelines. The author uses a style of coding that best fits his abilities and preferences. If you are changing this code, do not feel obligated to continue with this style of coding. Refactor as much as you wish. Once you've made changes, that's it. It's good to go. You don't need to compile anything unless you want to.