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One Point, Two Point, Red Point, Blue Point

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CV104-1P In this course, we will cover everything from creating a Point and importing and exporting Points, to the magical world of Point styles and Point label styles. And we haven't forgotten about those Point groups and description keys! We'll also explore the mysterious world of the "Create Points" toolbar. You'll see points like never before -- design, survey, surfaces -- you name it, we've got it! And just so I get my point across, we'll be talking about Points from A to Z!

About the Speaker:

Melanie has nearly 5 years of experience in the civil engineering industry -- over 2 years of practical field survey experience, plus over two years of land development/design experience on large commercial and industrial sites. She started working with LA CAD in 2005 and has taught hundreds of public and custom classes using AutoCAD, Land Desktop, and Civil 3D. Melanie is currently assisting over 40 civil engineering firms throughout California in implementing AutoCAD Civil 3D.

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Introduction

In this class students will gain a basic understanding of Points and how they are used in Civil 3D. Points play an extremely important role in the design process. Not only are they used by survey for base mapping and construction staking, but they are widely used as a design tool by engineers as well. In this class students will grasp the concepts of both Point Styles and Point Label Styles. Part of the learning process will include how to import and export points from Civil 3D and the workings of the Create Points Toolbar. Civil 3D has many Point Command Settings that can be adjusted to help increase workflow and productivity. We will cover command settings, not to mention the Point Groups and Description Keys. By the end of the session students should have an understanding of Points and Point Styles and how the styles can be added to a template file later use.

Points Creation

You can use the Create Points dialog box to create points using a variety of methods. You can also access these commands from the Points menu.

Choose commands from the following lists for point creation:

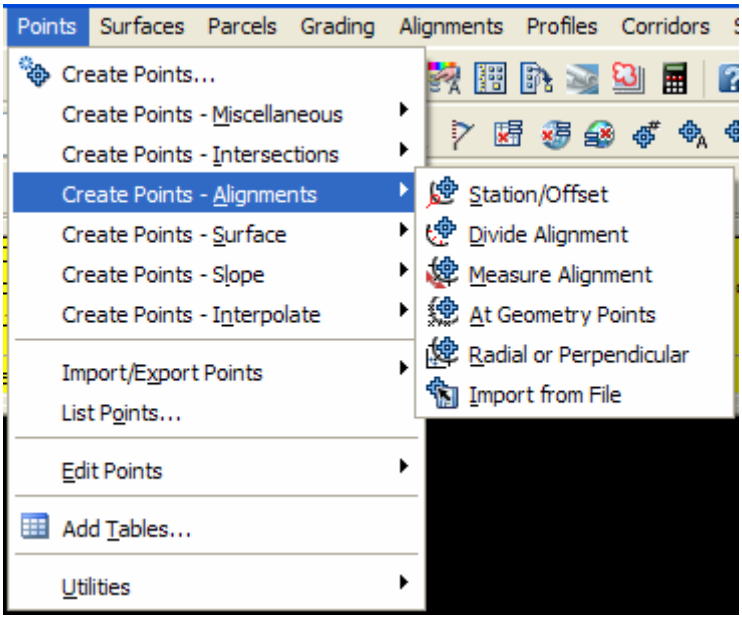
- Miscellaneous
- Intersection
- Alignments
- Surface
- Interpolation
- Slope
- Import Points

You can expand the Create Points dialog box to access the settings that are relevant to point creation. If you make changes to the settings in this dialog box the changes are reflected in the CreatePoints command settings.

How to Create Points based on an Alignment and Surface

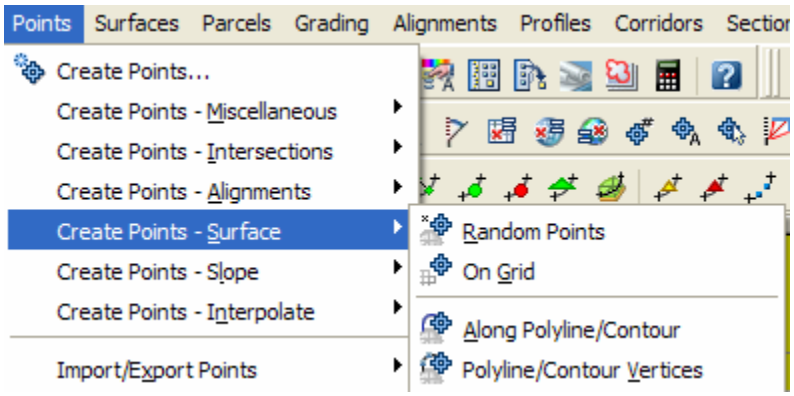
You can easily create points based on Alignment data (see Figure 01 on the following page).

Fig. 01



Or Create Points from a Surface object (see Figure 02 below) directly from the Points pull-down menu.

Fig. 02



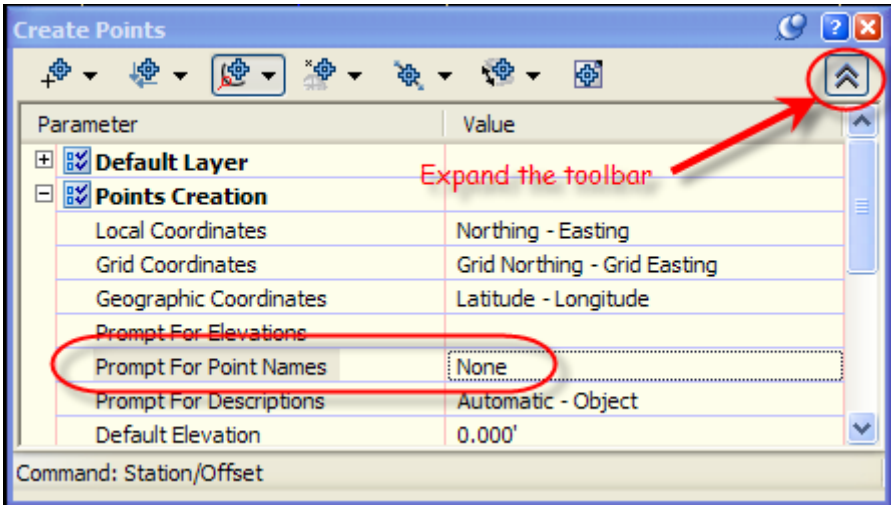
You may also choose to create points using the Points dialog box. This is accessed from either the Points pull-down → Create Points (at the top) or you can also access this by right-clicking on the points collection on the Prospector tab of the Toolspace → Create

We are now going to create points on an alignment in order to give us Geometry data for construction staking and we are going to add some spot elevations to our existing ground surface.

1. Select your Points pull-down → Create Points – Alignments → At Geometry Points (refer to Figure 01 above)

2. Expand the Points Creation Toolbar → Expand the Points Creation collection → Set the Prompt for Point Names to **None** (see Figure 03 below)

Fig. 03

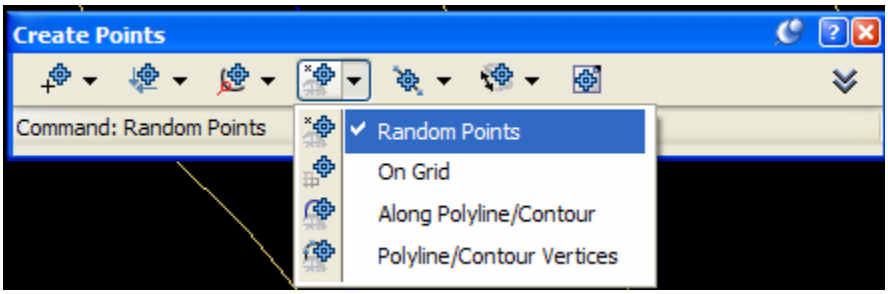


3. Select the alignment in the drawing that you wish to create the points for

4. Specify a starting and ending station range along the alignment where you wish to create your points (I will accept the default and create geometry points throughout the entire alignment), then compress the expanded toolbar

5. On the Create Points Toolbar, select Surface → Random points (see Figure 04 below)

Fig. 04



6. Select the surface object in your drawing that you wish to create the points for (note: you cannot hit enter and select the surface from the list, you MUST select the surface object in your drawing window)

You now have points on your surface where the elevation of the point reflects the elevation of the surface.

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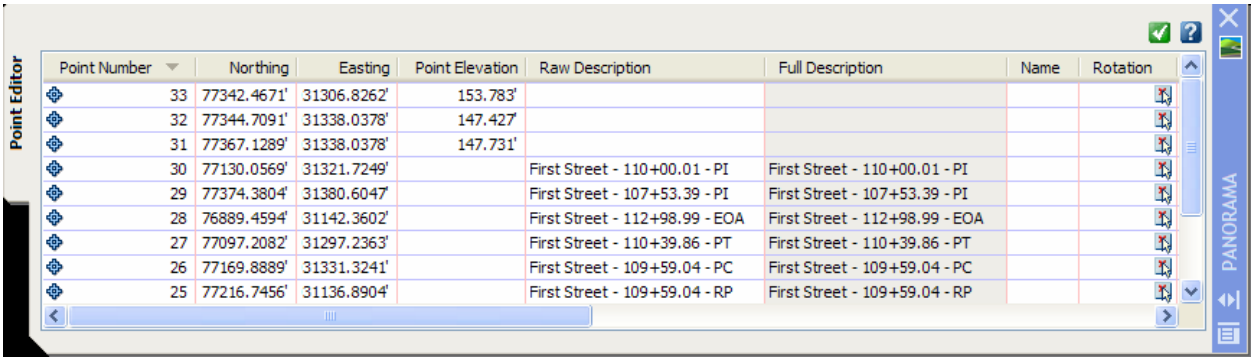
Editing Points

There are many ways to edit your points in Civil 3D! The first way, which may not be the most accurate way, is to simply select your point object, grab the grip and move it to your desired location. While choosing to use this operation allows you to snap to not only your desired location but also allows you to type in XYZ coordinate values while the grip is active. After dragging your points to the correct location (mainly used for design points, or survey staking points) you can lock the points to protect them by selecting the point group→ Right-click and select Lock point. These points CANNOT be password protected!

The other way to edit your points in Civil 3D is to select the point group on your ***Prospector tab → Right-click and select Edit Points***. This brings up a panoramic window that allows you to edit every aspect of your point such as Point Number, Northing, Easting, Elevation, Raw Description, Full Description and Rotation Angle just to name a few (see Figure 05 below).

Fig. 05



Point Number	Northing	Easting	Point Elevation	Raw Description	Full Description	Name	Rotation
33	77342.4671'	31306.8262'	153.783'				
32	77344.7091'	31338.0378'	147.427'				
31	77367.1289'	31338.0378'	147.731'				
30	77130.0569'	31321.7249'		First Street - 110+00.01 - PI	First Street - 110+00.01 - PI		
29	77374.3804'	31380.6047'		First Street - 107+53.39 - PI	First Street - 107+53.39 - PI		
28	76889.4594'	31142.3602'		First Street - 112+98.99 - EOA	First Street - 112+98.99 - EOA		
27	77097.2082'	31297.2363'		First Street - 110+39.86 - PT	First Street - 110+39.86 - PT		
26	77169.8889'	31331.3241'		First Street - 109+59.04 - PC	First Street - 109+59.04 - PC		
25	77216.7456'	31136.8904'		First Street - 109+59.04 - RP	First Street - 109+59.04 - RP		

Description Keys

Use description keys to automatically control some drawing point properties, including those controlling the point's appearance in the drawing, when you create or import points. Before you create drawing points using description keys, create a series of description keys. Then, when you create or import a drawing point, the point's raw description specifies which description key is used to create the point in the drawing. The properties defined for that description key are applied to the point as it is added to the drawing.

Code property: Used during description key matching, for example, if the code matches a point's raw description, then the properties specified in that description key are applied to the point when it is created. A description key code can contain characters and wild cards that expand the matching capabilities of the description key.

Format property: Translates the raw description for a point into a full description. The default is $*, which indicates that the full description is the same as the raw description.

Optional description key properties include:

- point style
- point label style
- layer
- point symbol scaling information
- point symbol rotation information

Creating a Description Key

1. On your Settings tab expand the Point collection → Right-click on Description Key Sets and select New
2. Right-click on the new Description Key Set → Edit Keys
3. Below is a screen capture of the text file that we will import (see Figure 06 below)

Fig. 06

```
18,2506.26079768,3348.71081124,229.02000000,TREE OAK 7
19,2458.95392261,3167.01360365,238.89000000,TREE OAK 4
21,2471.75366838,3354.84728246,229.90000000,TREE OAK 5
23,1762.20392797,2945.15132545,300.35000000,GS
24,1703.02477883,3004.80857474,298.13000000,GS
25,1717.33815935,3072.02824200,291.36000000,GS
26,1742.62801104,3167.77153370,281.07000000,GS
27,1618.11071640,3223.61410784,278.02000000,GS
28,1611.02152689,2992.81897084,296.97000000,GS
29,1592.31018332,3259.41253958,275.66000000,TREE OAK 6
30,1584.32632943,3429.07095650,271.44000000,TREE OAK 6
31,1576.47744011,3598.94407502,270.26000000,TREE OAK 7
32,1568.48812565,3768.66186283,266.08000000,TREE OAK 7
33,1560.49167784,3938.42929261,267.41000000,TREE OAK 6
34,1552.64679621,4108.16668541,275.99000000,TREE OAK 5
```

4. The surveyor was able to capture the drip line of the trees that were shot out in the field and by using description keys we are able to change the point description from TREE OAK 5 to 5' OAK TREE and we are also able to assign the point maker to be a tree and have it scale based on the drip line value captured in the field
5. Type TREE* into the Code field. This will pick up any point that has a prefix of TREE by using the wildcard (*). This code is case sensitive

6. Check the Point Style box and select Tree for the Point Style

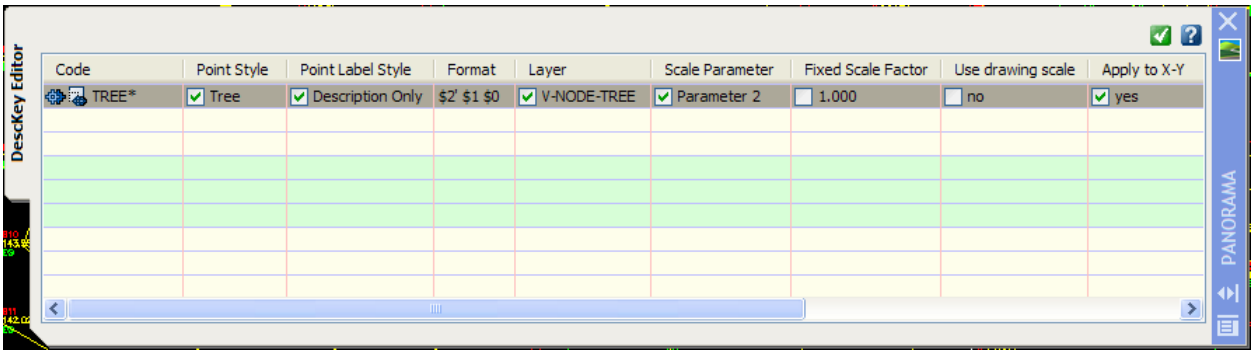
7. Check the Point Label Style box and select Description only

8. For Format we are going to re-arrange the words used in the original text file. Each word in the point's raw description is assigned a parameter, starting with Parameter 0, Parameter 1 for the next word, and Parameter 2 for the third and so on. As can see from Figure 07 below, I have arranged the Parameters to the Full Description in the drawing they will now read 5' OAK TREE instead of TREE OAK 5 by using the $ as a wildcard to pick up the parameter that the surveyor used and just re-ordering the words

9. Specify the layer to be V-NODE-TREE

10. In order to use the Scale Parameter option you must first check the Apply to X-Y, then set the Scale Parameter to Parameter 2, as that is the parameter that has the numeric value for the drip line

Fig. 07



Import and Export Points

You can use commands to import point data, export point data, and transfer point data between files.

Using Autodesk Civil 3D, you can:

- Import points into a drawing from either an ASCII (text) file or a Microsoft® Access database (.mdb) file.
- Export points from a drawing to either an ASCII (text) file or a Microsoft® Access database file.
- Transfer points from an ASCII (text) file or a Microsoft® Access database file to another file. You can convert the point data during the transfer, which can include changing the coordinate zone.

Importing points is a quick way to place points into a drawing. For example, if a surveyor collects point data using a data collector, the data can be downloaded from the collector as an ASCII (text) file and then imported directly into an AutoCAD Civil 3D drawing.

To import points from an ASCII file you can right-click on Points on the Prospector tab and select Create and use the last icon on the Create Points toolbar or use the points pull down menu → Import/Export Points → Import Points

Point Command Settings

Use the Settings tree Point collection shortcut menu to establish defaults for all point-specific settings and to override the drawing ambient settings for all point-related commands. Use the Commands collection under the Settings tree Point collection to override point-specific settings or drawing ambient settings for a specific command.

Point Groups

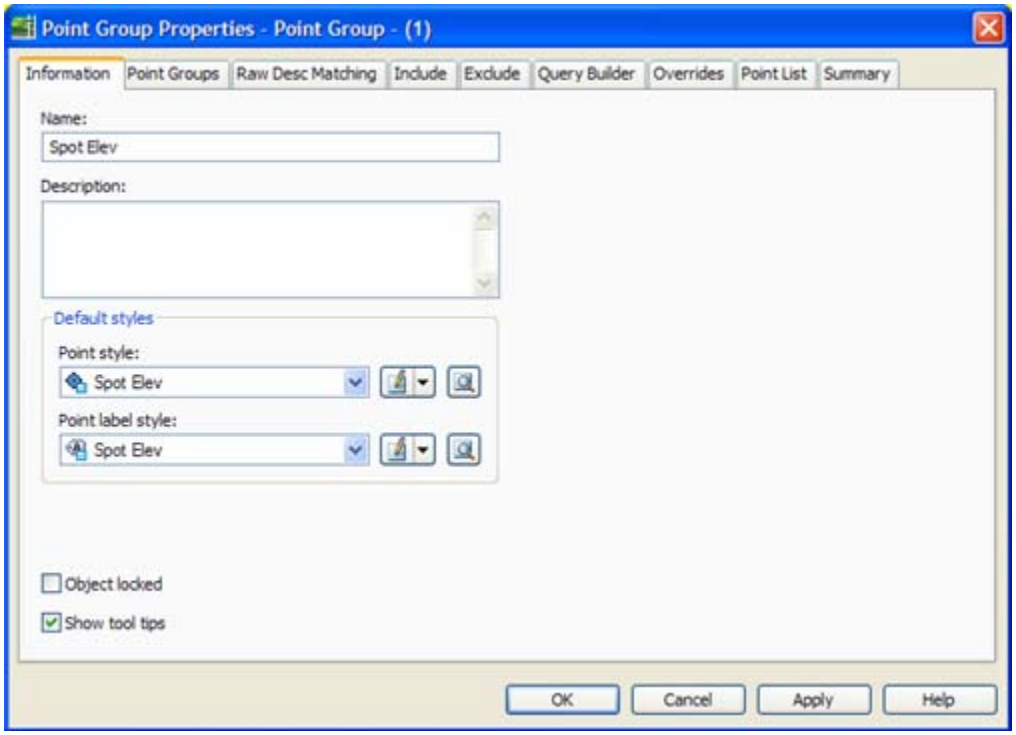
Point groups provide a flexible and convenient way to identify points that share common characteristics or those are used to perform a task, such as creating a surface or drawing a breakline. You can use point groups to create groupings of points using point number, point name, point elevation, raw (field) or full description, and other characteristics.

Point groups also play a fundamental role in controlling how a point displays in a drawing. If you have a set of points that share common display characteristics, you can use a point group to identify the point style and point label style for all the points in the point group, instead of assigning a point style and a point label style to each individual point. Also, using a point group you can quickly change the style or label style for all the points in a point group at once, instead of changing each point individually.

Creating a New Point Group

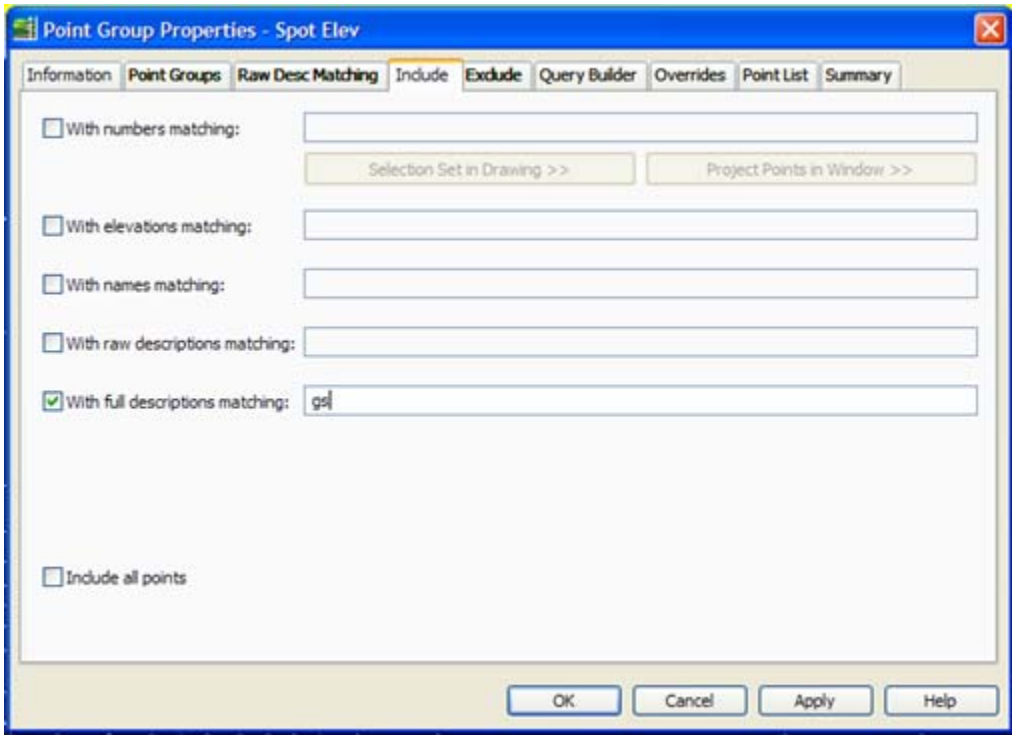
1. Right-click on the Point Group collection on your Prospector and select NEW
2. On the Information tab of the Point Group Properties dialog box, under Name type Spot Elev, (adding a description is optional). Select the Spot Elevation Point style and Point label style (see Figure 08 on the following page)

Fig. 08



3. Select the Include tab in the Point Group Properties dialog box, check the full description matching box and type in GS for your full description. * The description is NOT case sensitive (see Figure 09 below)

Fig. 09

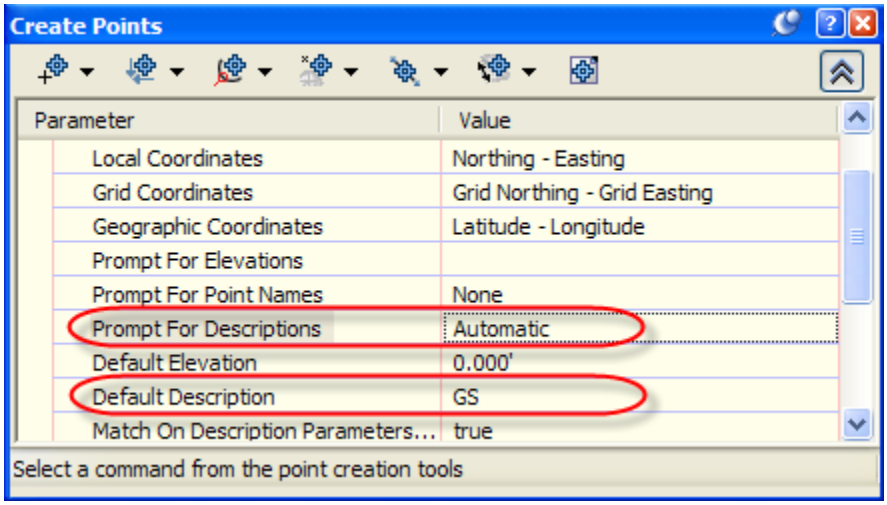


4. Hit OK to the Point Group Properties dialog box

5. Right click on the Points collection on your Prospector tab and select Create to bring out the Create Points toolbar

6. Expand the Create Points Toolbar → Expand Points Creation → under Prompt for Descriptions set this value to Automatic → under Default Description type in GS for Ground Shots → Compress the toolbar (see Figure 10 on the following page)

Fig. 10

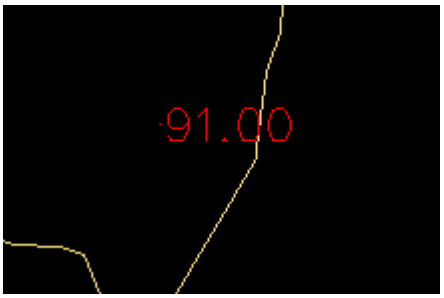


7. Select Surface: Random Points (must have a surface in the drawing to pull your elevations from) and place some points in the drawing using the description GS (refer back to Figure 04)

If you see a (!) Shield next to your Spot Elevation point group simply right-click on the group and select Update to have the points populate to the correct group (see Figure 11 below).

These points will automatically populate to the Spot Elevation Point Group and use the correct Point and Point Label Style that you previously specified when creating the point group. You can also create your point groups beforehand and save them to a template file. Use that template file to create a new drawing and when you create or import points your Point Groups will automatically populate.

Fig. 11



Point Styles

Defines how a point marker is displayed in the drawing. To change a point's marker, either edit the point style or change the point so that it references a different point style. In this example we are going to look at how to change the point marker, how to turn off the display of your point marker, and how to create a new Point Style.

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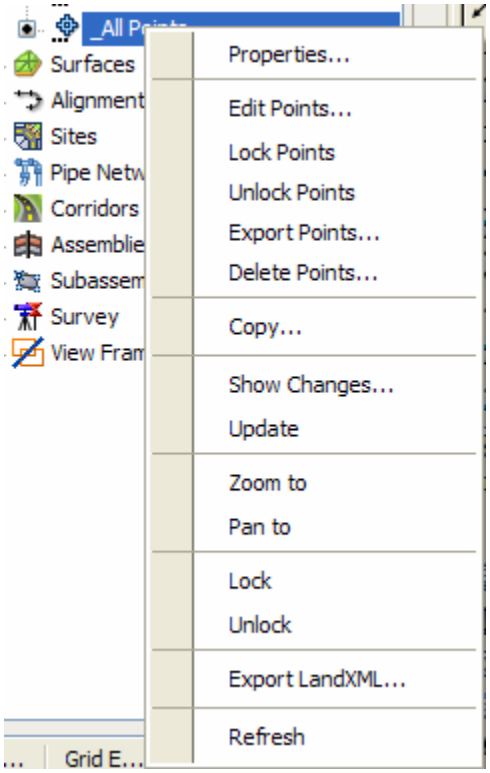
Controlling Point Style Display

The first step is to select the points that you wish to change the display for. This is done by expanding your point groups collection on your Prospector tab, right-click on the point group that you wish to change and select properties at the top (see Figure 12 below).

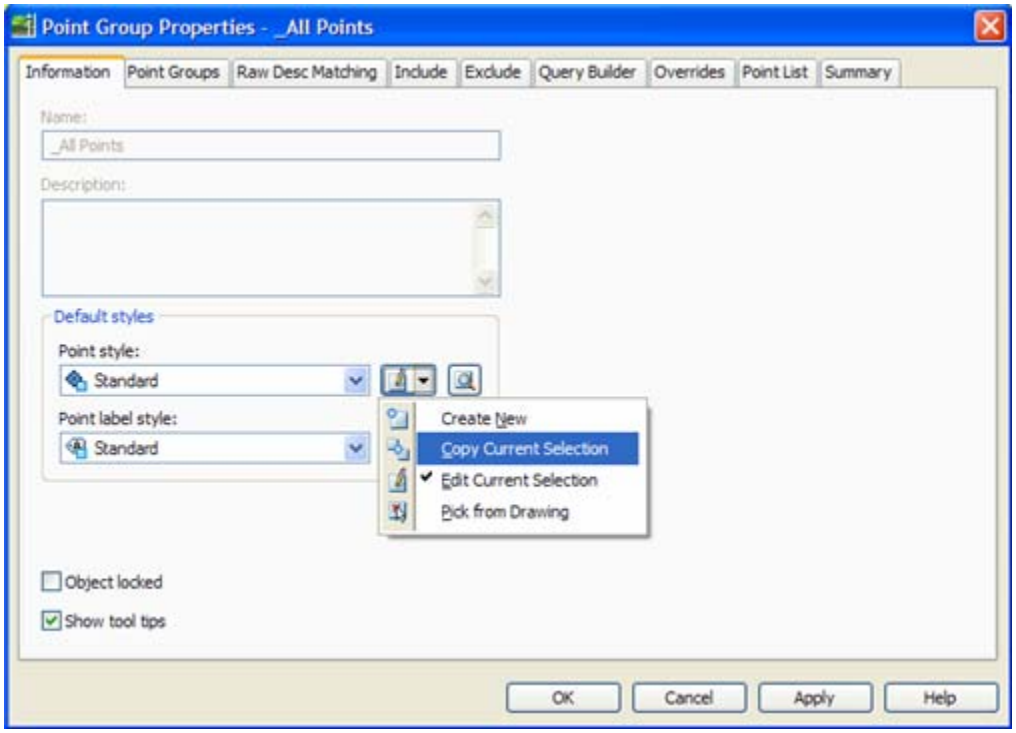
Fig. 12



1. On your Prospector Tab of your Toolspace expand the drawing collection → expand the Point Groups collection → Right click on the point group you wish to modify and select Properties

2. While in the Point Group Properties dialog box→Information tab you must then select the drop-down arrow next to your Point style. This will give you a list of all point styles available in the current drawing. If the label style you are looking for does not exist on the list you must then select the drop-down arrow to the right of the Point style arrow (see Figure 13 on the following page). You then have the option to Create New, which creates a brand new Point Style that can be saved to your drawing or template, Copy Current Selection, Edit Current selection or Pick from Drawing, which allows you to select a style that is already in use in the drawing window. Select Edit Current Selection

Fig. 13



3. Select the Display tab, under View Direction make sure you have 2D selected. Then under Component display turn your Marker and Label components off. Next you will go back to View Direction and switch it to 3D and verify that the Marker and Label components are set to ON. What we have done here is made sure that our points are NOT visible when looking at our drawing from a Top or Plan View, but when we switch our view to 3D (for example SW Isometric) your points will be visible. Hit OK and OK again to go back to your drawing view

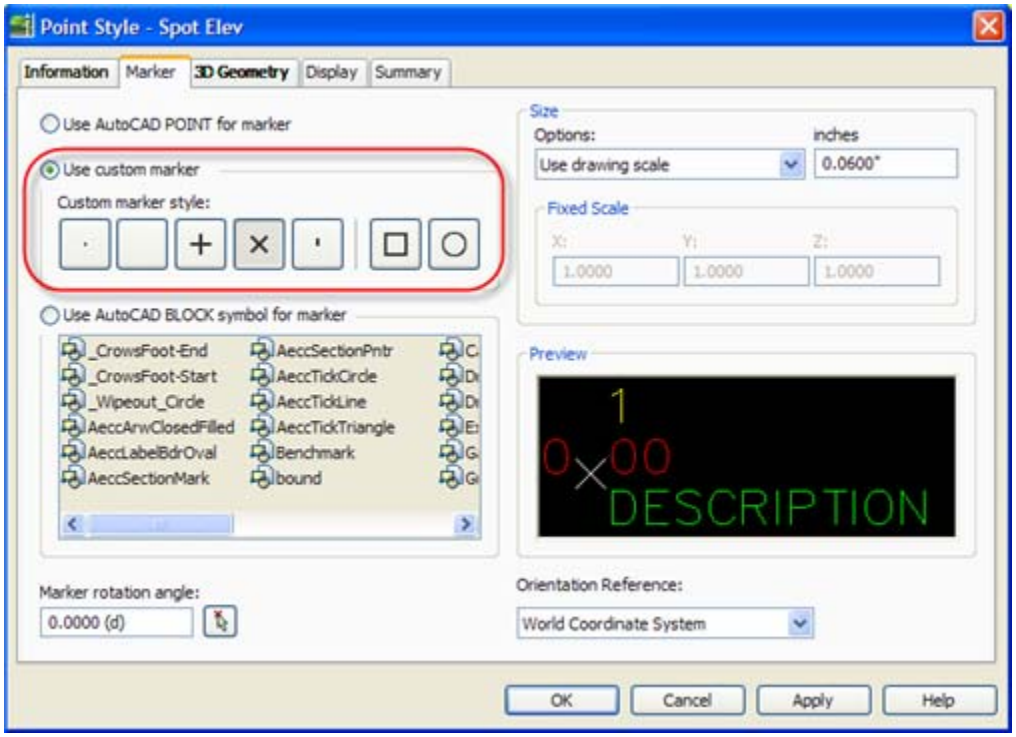
Creating a New Point Style

1. Select your Point Group → Right-click and select Properties → Select the drop-down arrow to the right of your Point style→ Copy Current Selection

2. In the Point Group Properties dialog box select the Information tab at the top → Under 'Name' type in Spot Elev

3. Select the Marker tab at the top → Select the Use Custom Marker radio button on the upper left → Select the (.) as your maker (see Figure 14 on the following page) → Hit OK to the Point Style Properties → Make sure you have selected the Spot Elev point style from the list → Hit OK to the Point Group Properties and you should notice that the style for all of your makers in that point group has now changed

Fig. 14



Note: You may also select the Use AutoCAD BLOCK symbol for marker radio button and select a block that exists in your drawing as your Point style or you have the ability to right-click and browse to the location of the block that you need located outside of your current drawing.

Point Label Styles

Defines how a point label (or text associated with your point) is displayed in your drawing. Keep in mind that your Point Style (your marker) and your Point Label Style are two different objects. In this example we are going to look at how to change the point label style, how to create a no display for your point label style, what component information can be displayed in your point label, and how to create a new Point Label Style.

Controlling Point Label Style Display

1. The first step is to select the points that you wish to change the display for. This is done by expanding your point groups collection on your Prospector tab, right-click on the point group that you wish to change and select properties at the top of the right-click menu, refer back to Figure 12.

2. While in the Point Group Properties dialog box→Information tab you must then select the drop-down arrow next to your Point label style. This will give you a list of all point label styles available in the current drawing. If the label style you are looking for does not exist on the list you must then select the drop-down arrow to the right of the Point label style arrow. You then have the option to

Create New, which creates a brand new Point label style that can be saved to your drawing or template, Copy Current Selection, Edit Current Selection or Pick from Drawing, which allows you to select a style that is already in use in the drawing window. Select Edit Current Selection

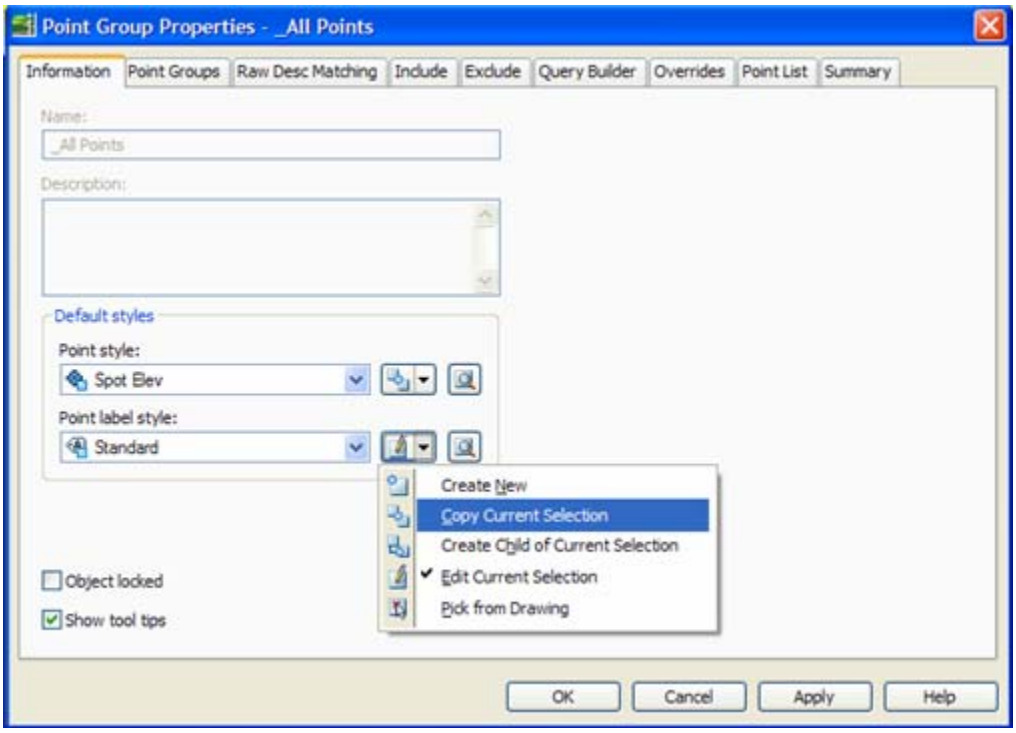
3. Select the General tab, under Label → Visibility set this value to false

4. This will make the visibility of your Point label false in both 2D and 3D views. In the Label Style Composer dialog box → General tab you also have the ability to set the layer of which your point labels reside on (then you can toggle the labels off by changing the layer state). In order to do this you must select the layer in the value column → select the ellipses button (…) to the right and in the Layer Selection dialog box you have the ability to select the layer that you want your Point labels to reside on or select the New button in the top right to create a new layer to put your Point label on.

Creating a New Point Label Style

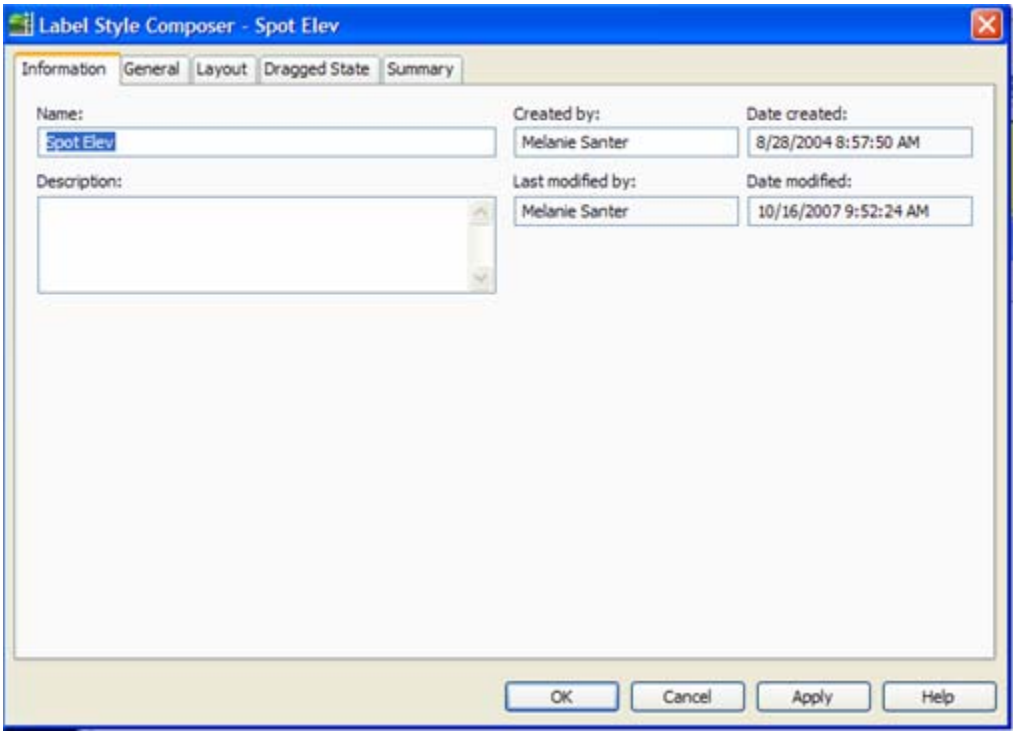
1. Select your Point Group that you wish to create a new label style for → Right-click and select Properties → Select the drop-down arrow to the right of your Point label style→ Copy Current Selection (see Figure 15 below)

Fig. 15



2. Select the Information tab at the top and under ‘Name’ type Spot Elev. Please refer to Figure 16 below

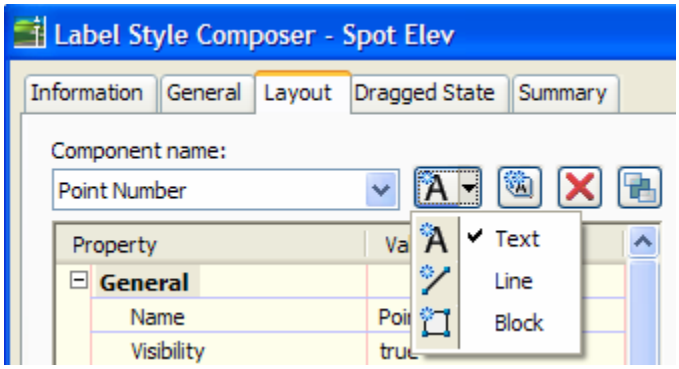
Fig. 16



3. Select the Layout tab in your Label Style Composer

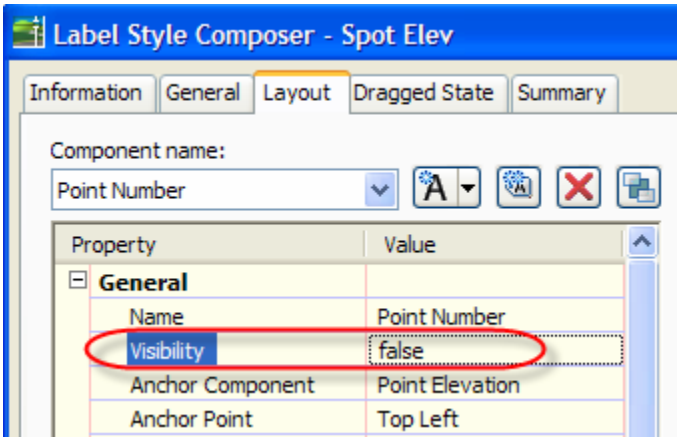
4. We are going to turn of all the components except for the elevation component. You will notice under your Component name pull-down at the top you have four types of components for this label style. You should see the Table Tag, Point Number, Point Elevation and Point Description. To the right of the Component name there is also a drop-down arrow allowing you to add other components to your Point Label. Civil 3D gives you the ability to add Text Components, Line Components or AutoCAD Block Components to your Label Style to meet your needs, please refer to Figure 17 on the following page. Also, the red X to the far right allows you to delete a selected component.

Fig. 17



5. Switch your Component name to Point Number, under General→Visibility, set the Value to false. Refer the Figure 18 below

Fig. 18



6. Switch your Component name to Point Description, under General→Visibility, set the Value to false

7. Your preview window on the right hand side of your label style composer should now show a marker with only your elevation showing. If you DO NOT see the correct information in your preview window please make sure that your preview window is set to Point Label Style.

8. Select OK for your Label Style Composer, Select OK for your Point Group Properties dialog box and your changes should be reflected on your screen for the points in the selected group.

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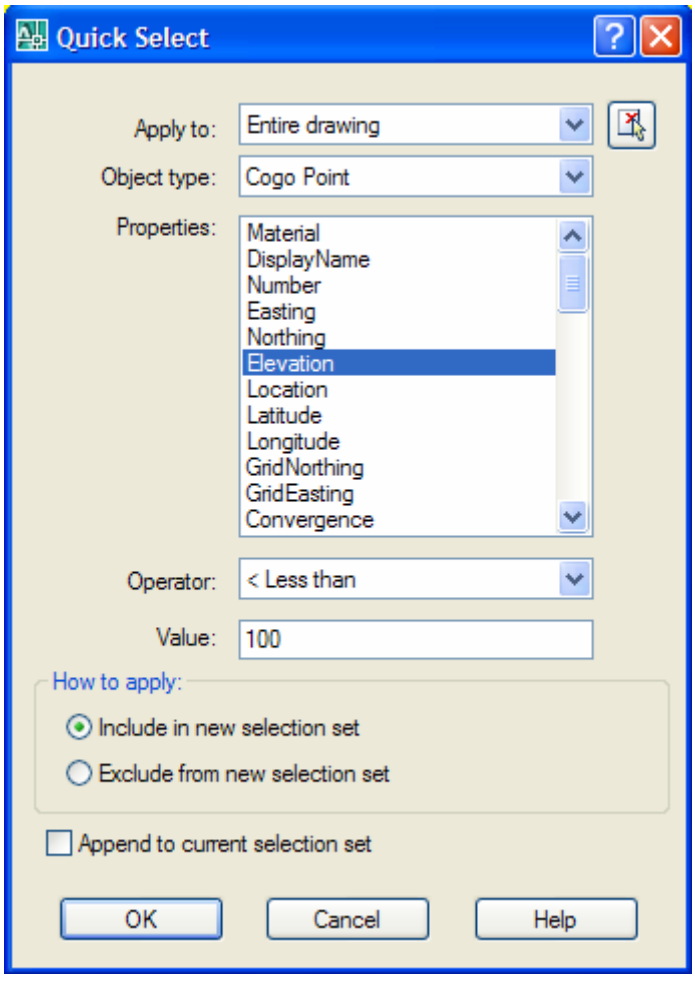
Quick Select

With Quick Select, you can quickly define a selection set based on filtering criteria that you specify, and if an Autodesk or a third-party application was used to add a feature classification to an object, you can select objects by classification property. With object selection filters, you can name and save filters for future use. Quick select is a great tool for selecting points with the same raw description, full description, point style, point label style, rotation angle, the list goes on and on, you will have to check it out for yourself to see all of the options made available to you.

1. Right-click anywhere in the drawing with nothing selected in your drawing window→Quick Select
2. Apply to the Entire drawing and for your Object type select Cogo Point, under Properties select Elevation, Operator < Less than and Value of 100 (see Figure 19 below)

Fig. 19



This is a GREAT way to weed out blow shots in a Topo!

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Point Tables and Point Table Styles

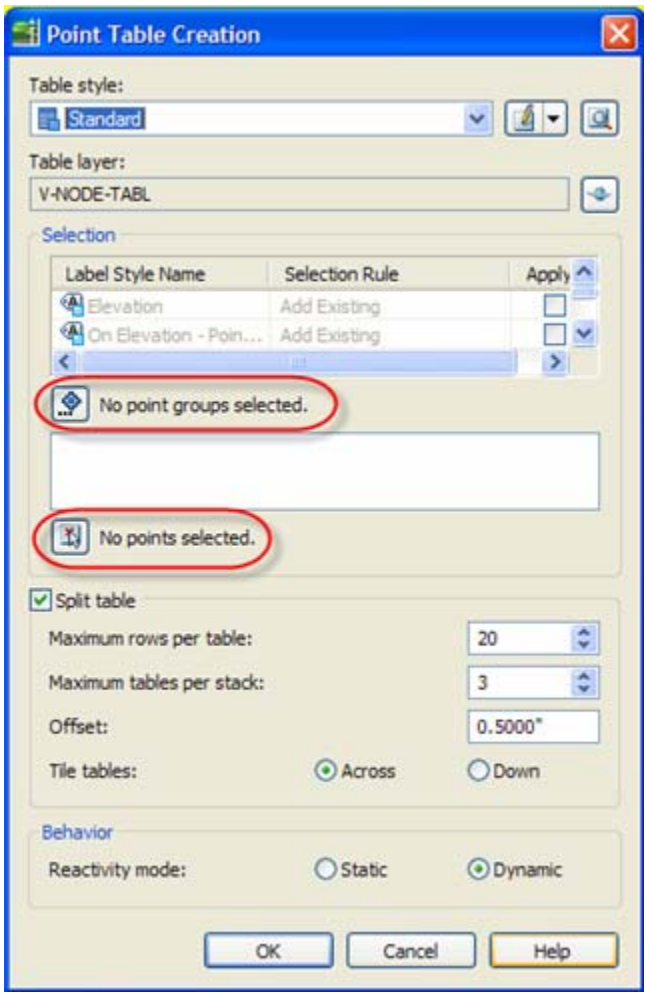
Use Point tables to display information about points in a drawing. When you insert a point table into a drawing, specified point information is automatically displayed in the table.

Creating a Point Table

1. Go to your Points pull-down menu → Add Tables

You can either select the points that you want to add to your table by an already defined point group, a Point Label Style, or by point selection method, which allows you to manually select points in your drawing window (see figure 20 below).

Fig. 20



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Point Reporting Tools

You can use the Point Reporting tools to create a point list that can be printed out and given to the survey crews out in the field.

To utilize these tools go through the following steps:

1. General menu → Toolbox (This will give you an additional tab on your toolspace called Toolbox)
2. Select your toolbox tab → Expand Reports Manager → Expand Point → Right-click on your Points List report → Execute
3. Select the point group or groups that you wish to create a points list from

In order to change the Client and Customer information in your Points List report (or any other report that you may choose to execute) see Figure 21 below on how to Edit Report Settings.

Fig. 21