

CARLSON POINT CLOUD

Carlson PC is built on the Carlson methodology.

It runs through CAD or IntelliCAD in its own window and menu.

I chose this program because of their excellent support for their other products. They have not failed that support with this module.



Software for Land Development and Mining Professionals

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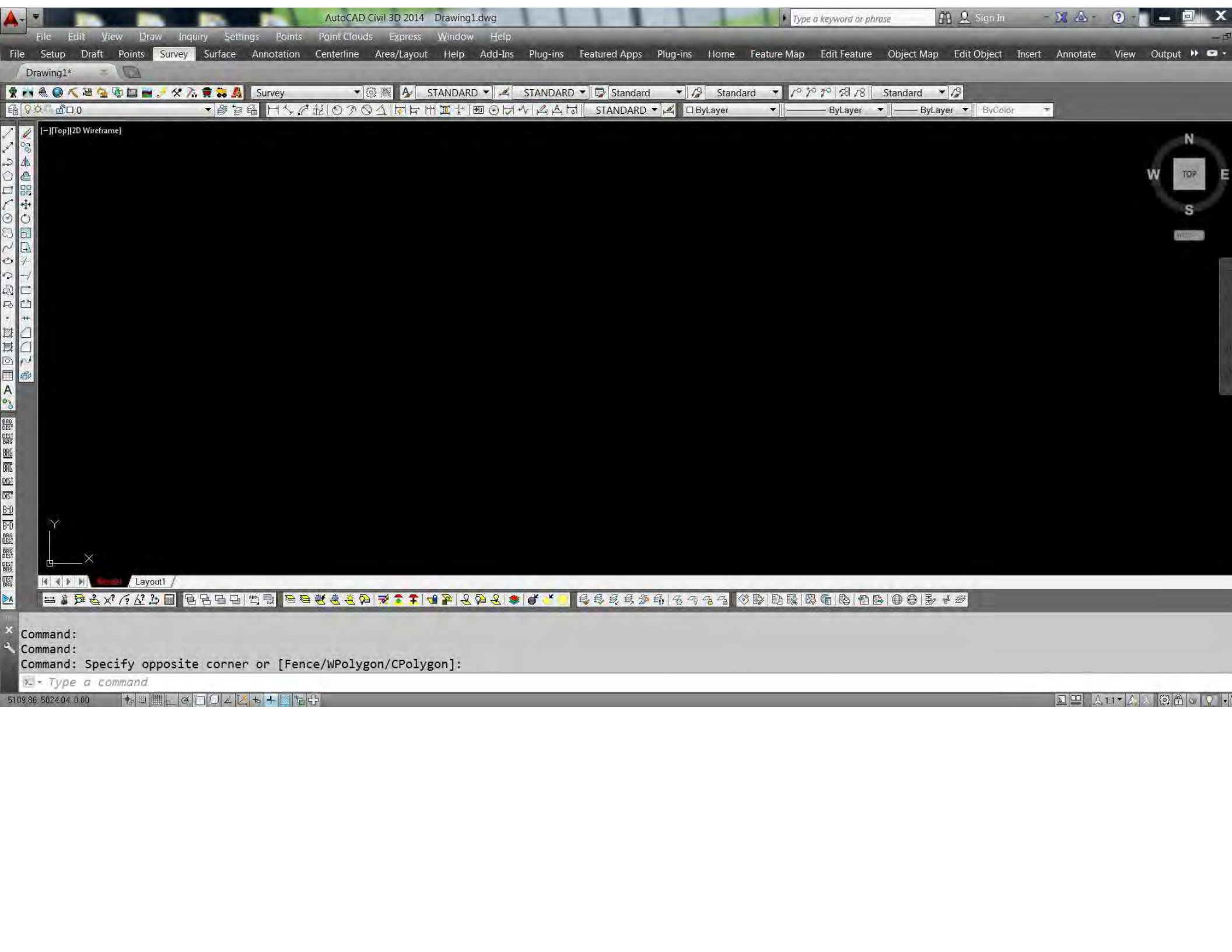
search...

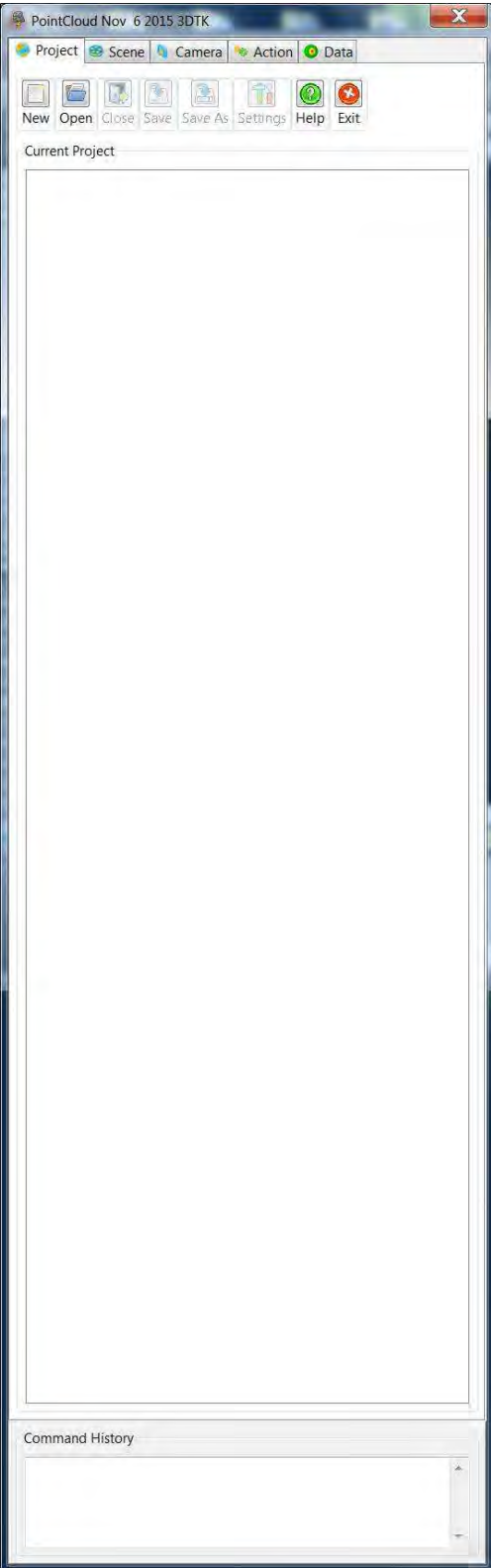
CARLSON POINT CLOUD

There are 3 engines available.

- Some **Carlson** engine that supports a small number of points.
- An older **Pointools** engine that supports up to One Billion Points.
- Finally there is a **3dtk** engine that has quite a bit of promise. I am not sure how many points 3dtk will take.

Don't plan on loading One Billion Points. Even the most powerful computer will become a snail.

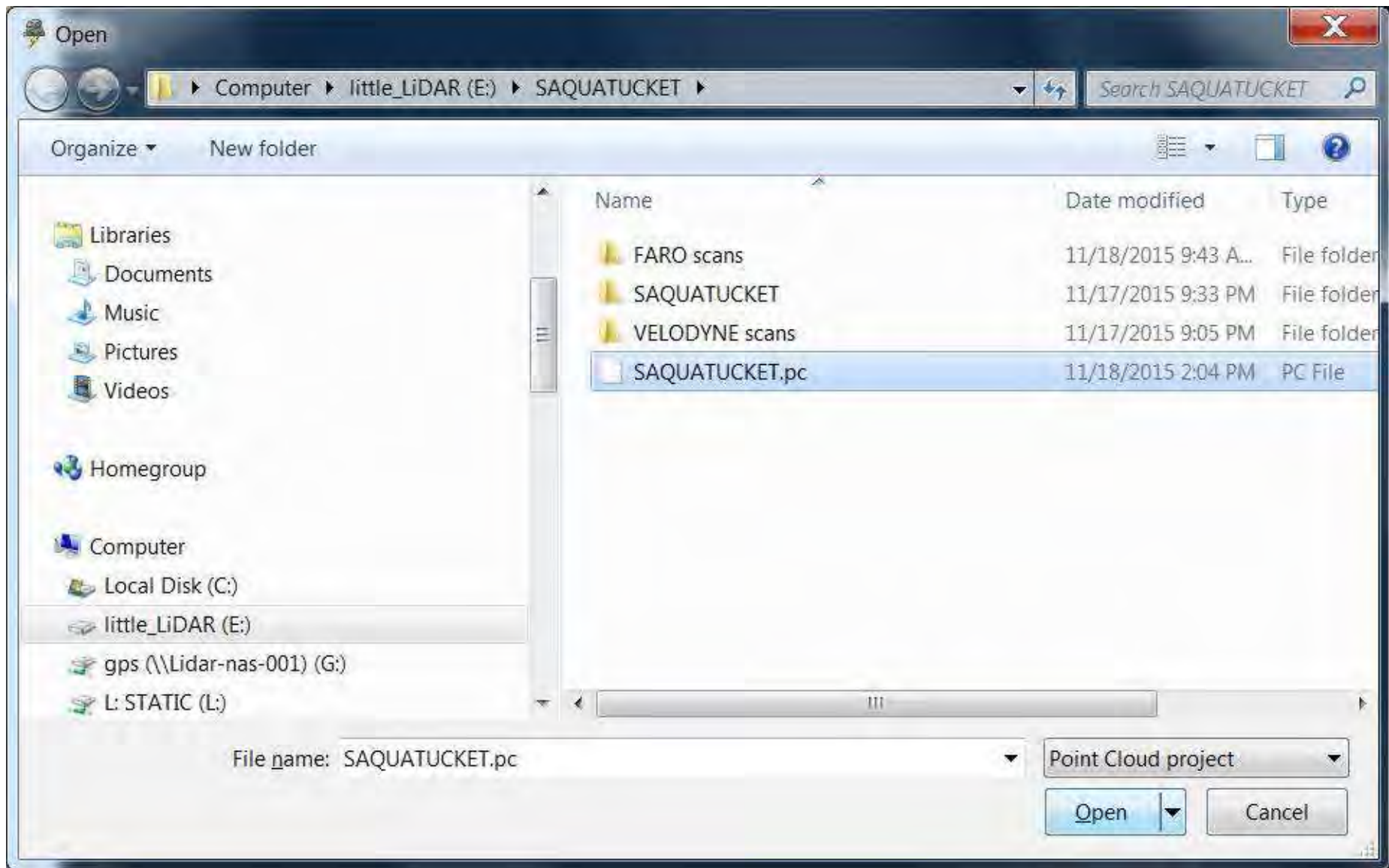




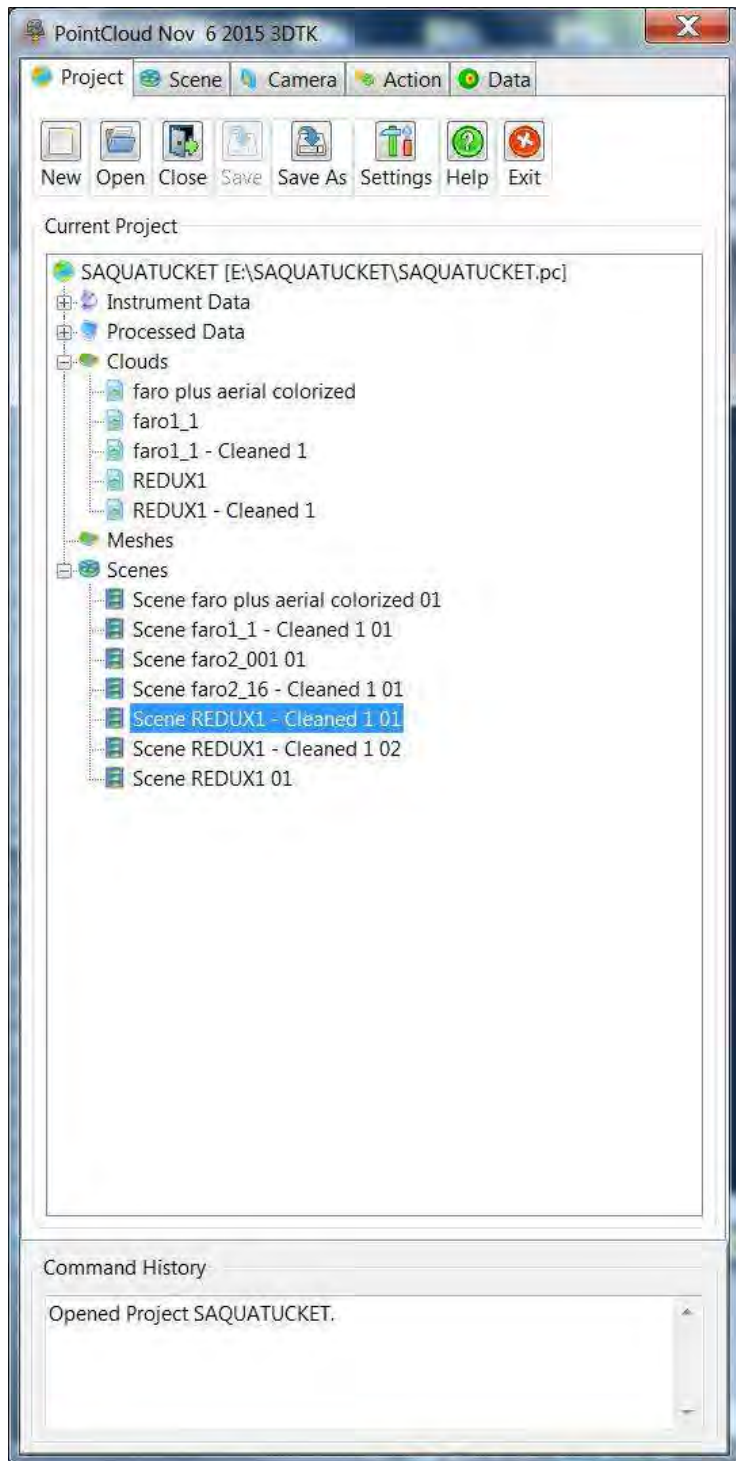
All point cloud functions are controlled through an independent manager.



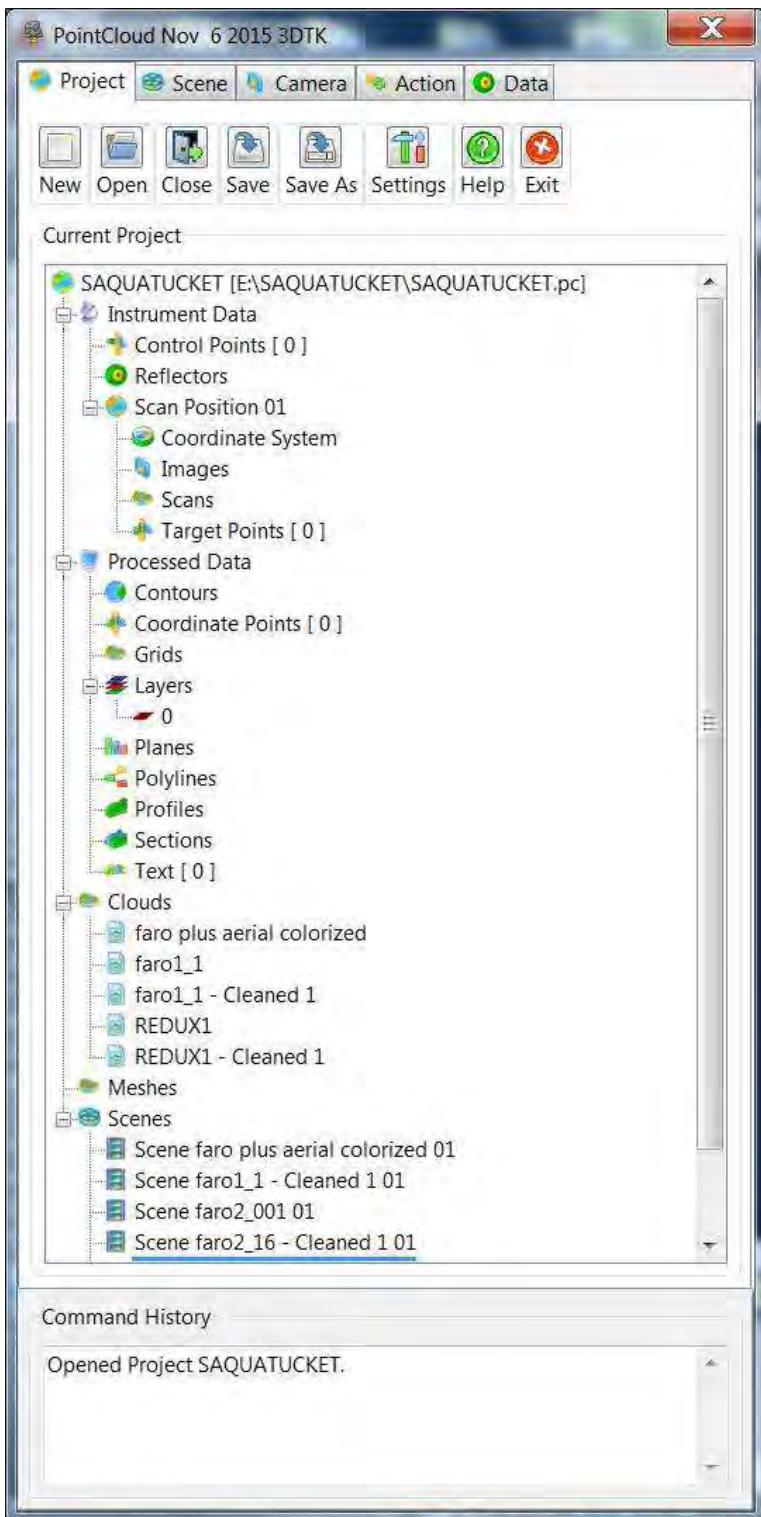
I have not bothered even trying the Carlson Engine. I have some older projects based on the Pointools Engine and I aim for that 3DTK engine.



Conveniently, I have a project started.



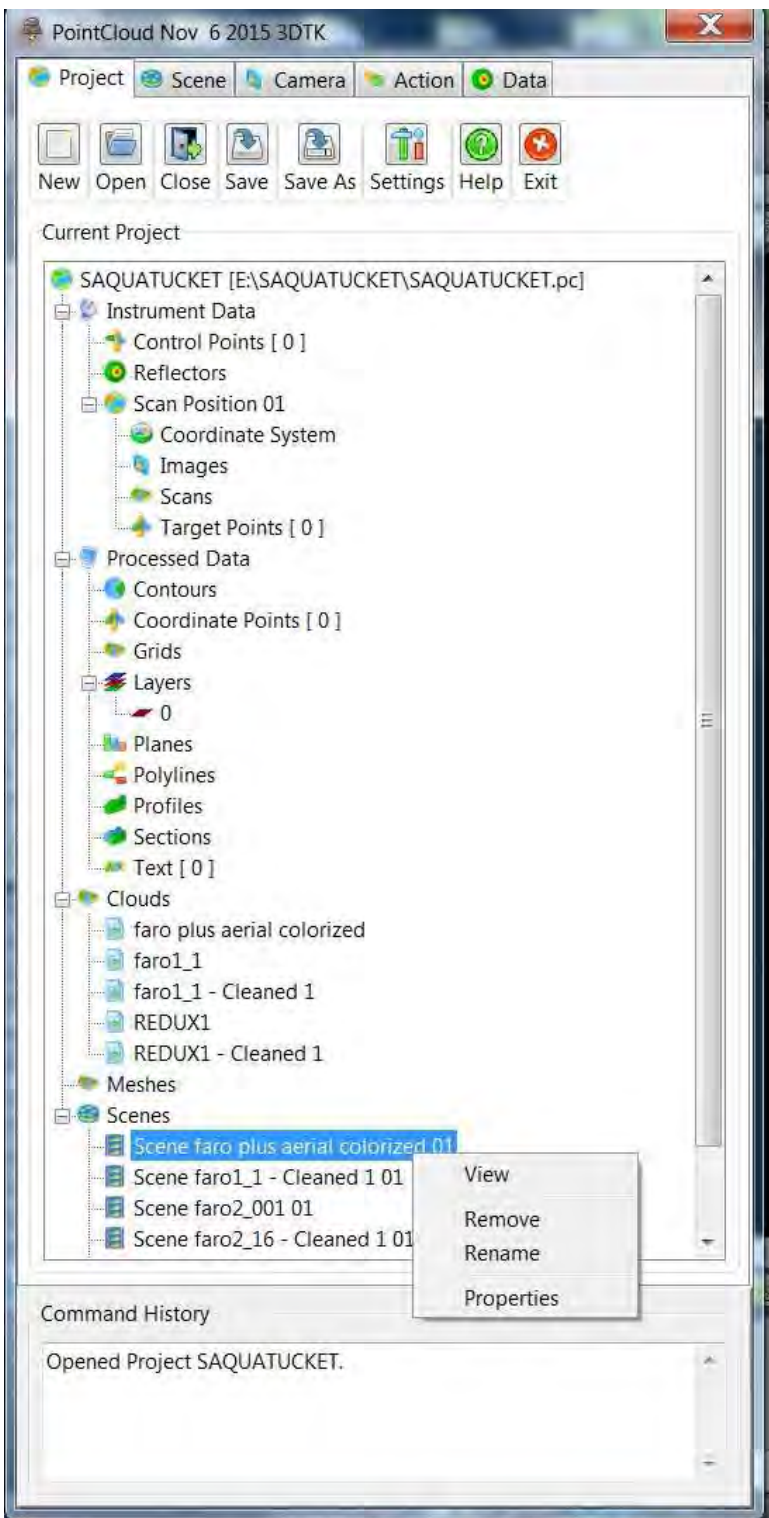
The Manager:
Here we see the clouds
associated with the project
and the Scenes associated
with the clouds



Carlson Point Cloud will register some raw scans (never tried it as I have other softwares to cover those needs).

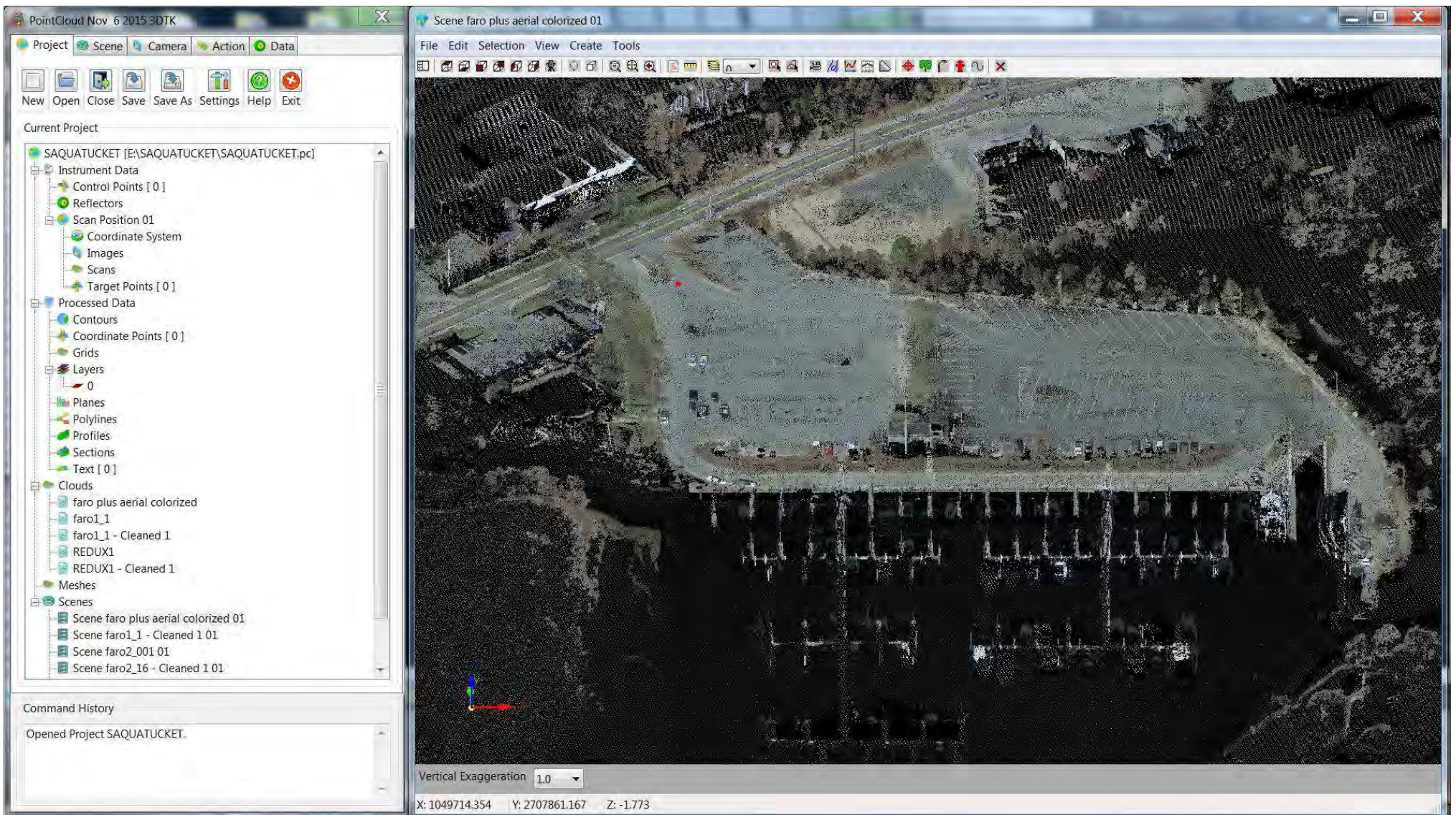
The Processed Data is what we have completed (not much yet):

- Contours – these are extracted from meshes that are created from clouds. Similar to FUGRO.
- Coordinate Points – Basically manually extracted.
- Grids – like the meshes.
- Layers – We can bring in the layers from a drawing.
- Planes – Flat surfaces
- Polylines – Extracted or imported from CAD
- Sections – Sections
- Text – Text objects



Scenes are created by viewing clouds. Since there are some options, it makes it easier to have some scenes setup to see the cloud the way you want to see it.

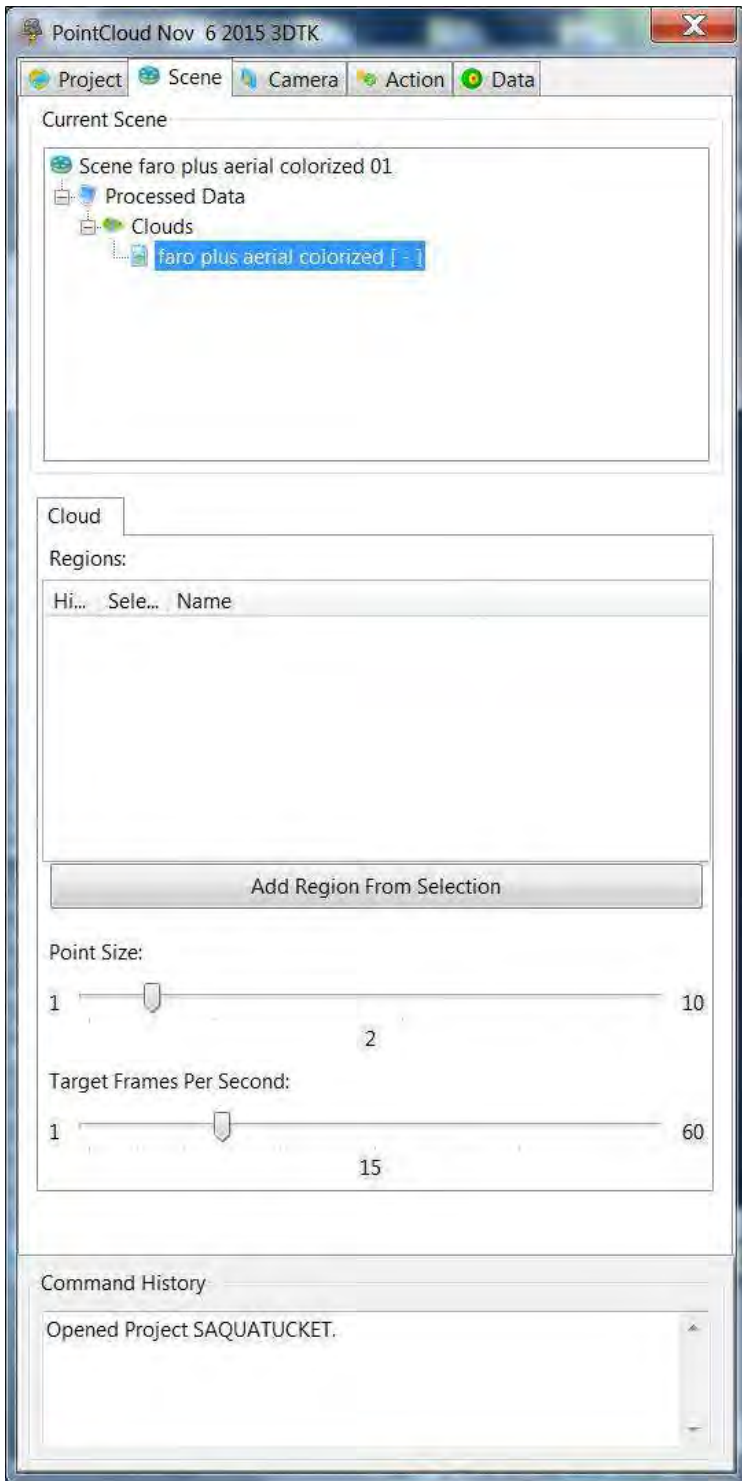
Carlson is not ready to change appearances on the fly.



Beautiful Saquatucket Harbor, Harwichport, MA

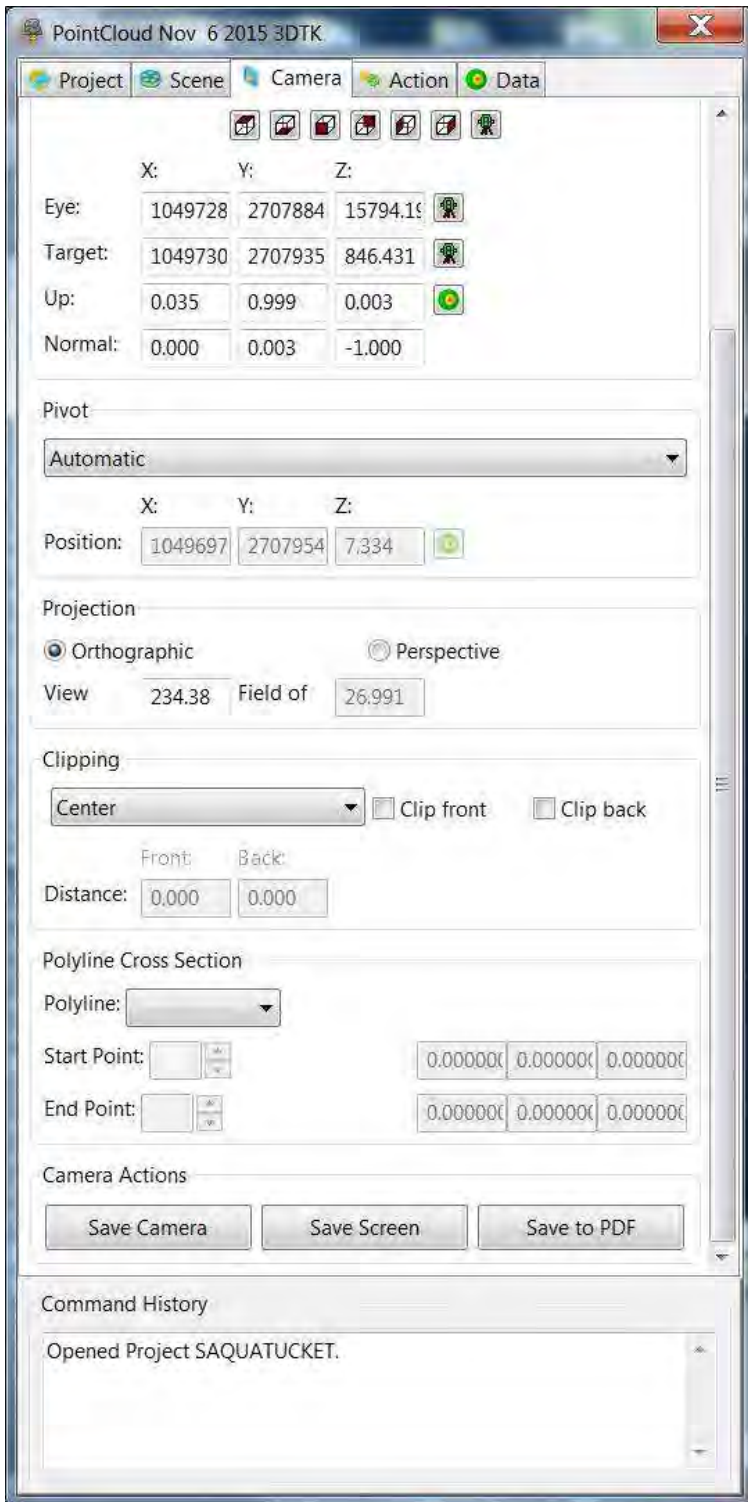
There is noise from the water.

This was colorized from 2014 Aerial Imagery (3" pixel) and it was scanned in the early Fall, 2015.



The manager has tabs

Scene will control different variables like the Point Size or the Intensity Ranging (When we have a cloud viewed by Intensity)



CAMERA

Oh the options....

Where are we? For the little it is worth, we get a readout.

The Pivot Point can be changed here – this is convenient for long routes.

Projections.

Clipping takes a bit of finesse and can add some frustration. It ultimately hides points outside of the range.

Polyline Cross Section (Beta)

This is awesome and this was one of my requests that they implemented.

You show cross sections from a polyline... we will see more



Finally some Action

Selection – a few tools to make selections

Edit – Show, hide, delete (mesh), image (mesh), smooth (mesh), Clean

Clean will strip out those lonely points. It will also reduce points where you have unnecessarily great densities (homogenize).

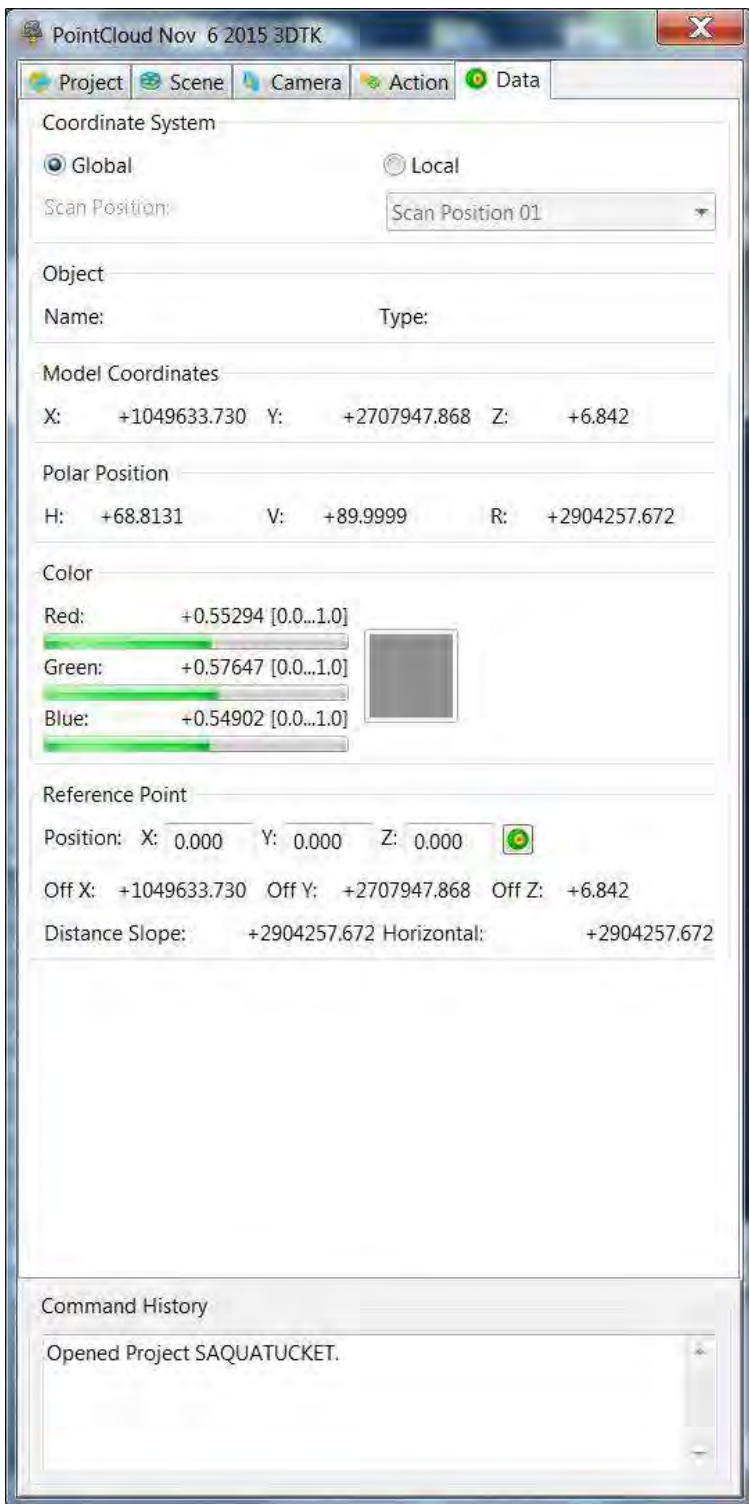
Transform – Need to relocate a cloud? We can do it.

Create -

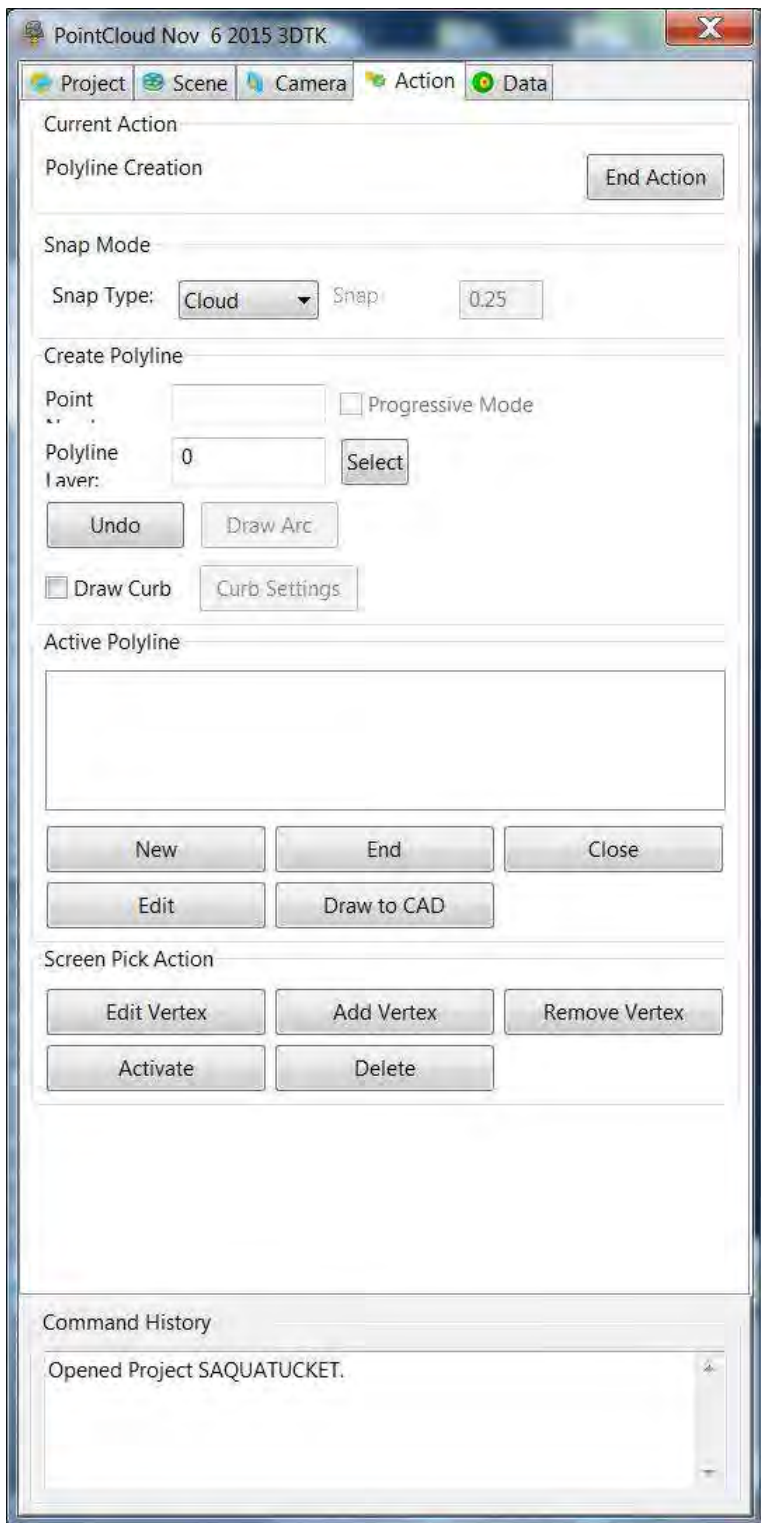
- Point – points with your F2F codes
- Polylines – simple 3-d polylines
- Cloud – Select an area and create a neww (smaller) cloud
- Mesh – A surface
- Text – Text
- Grid – Grid

Extract -

- Breaklines – from a mesh
- Contours – from a mesh
- Profile & Section – need a CL file in Carlson
- Bare Earth – Creates a new cloud with the ground only
- Plane – flat plane
- Intersections – Intersects two planes
- Polyline – Automatic extraction based on Intensity

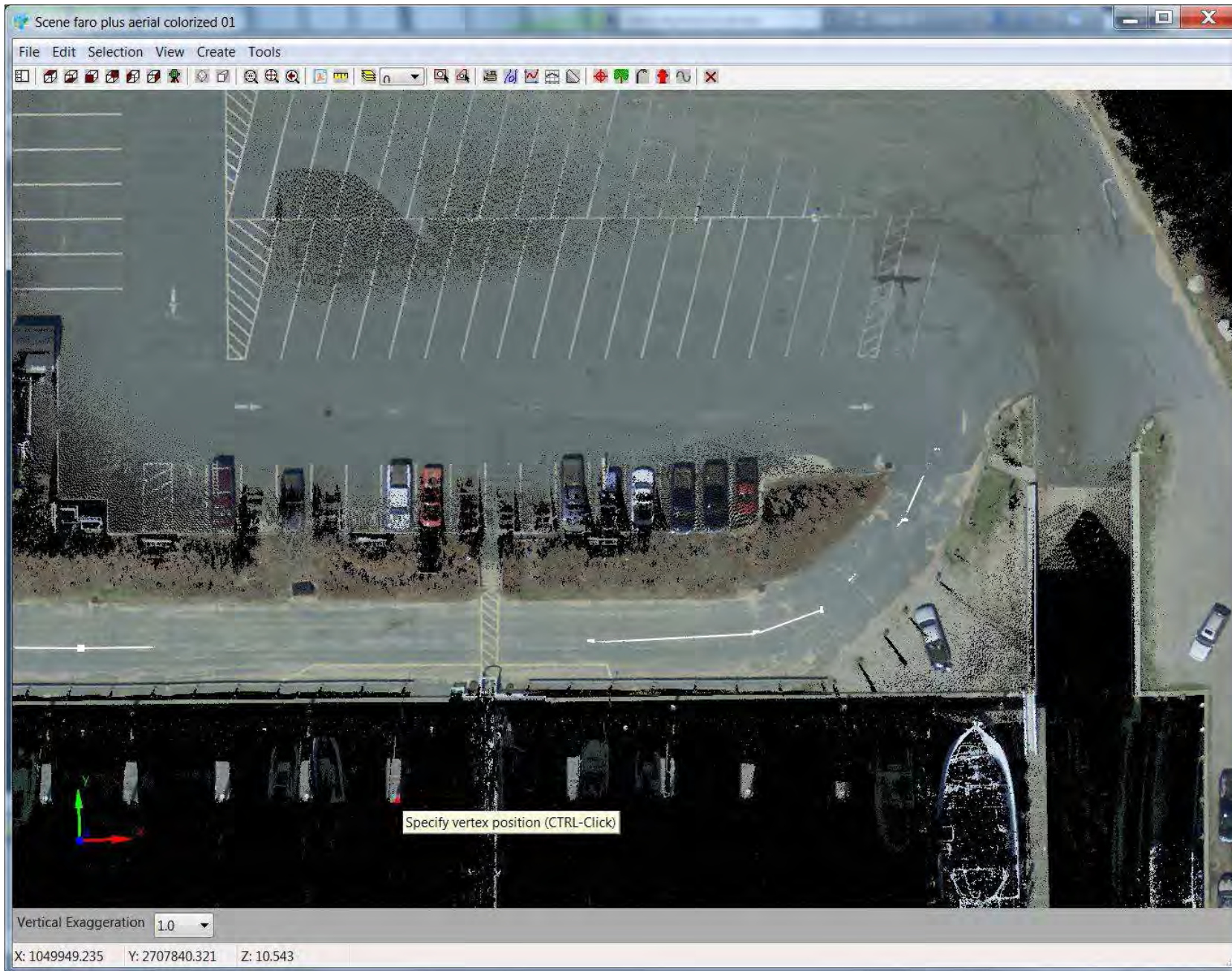


Data about a point.
Hover over the point and you
get some information.



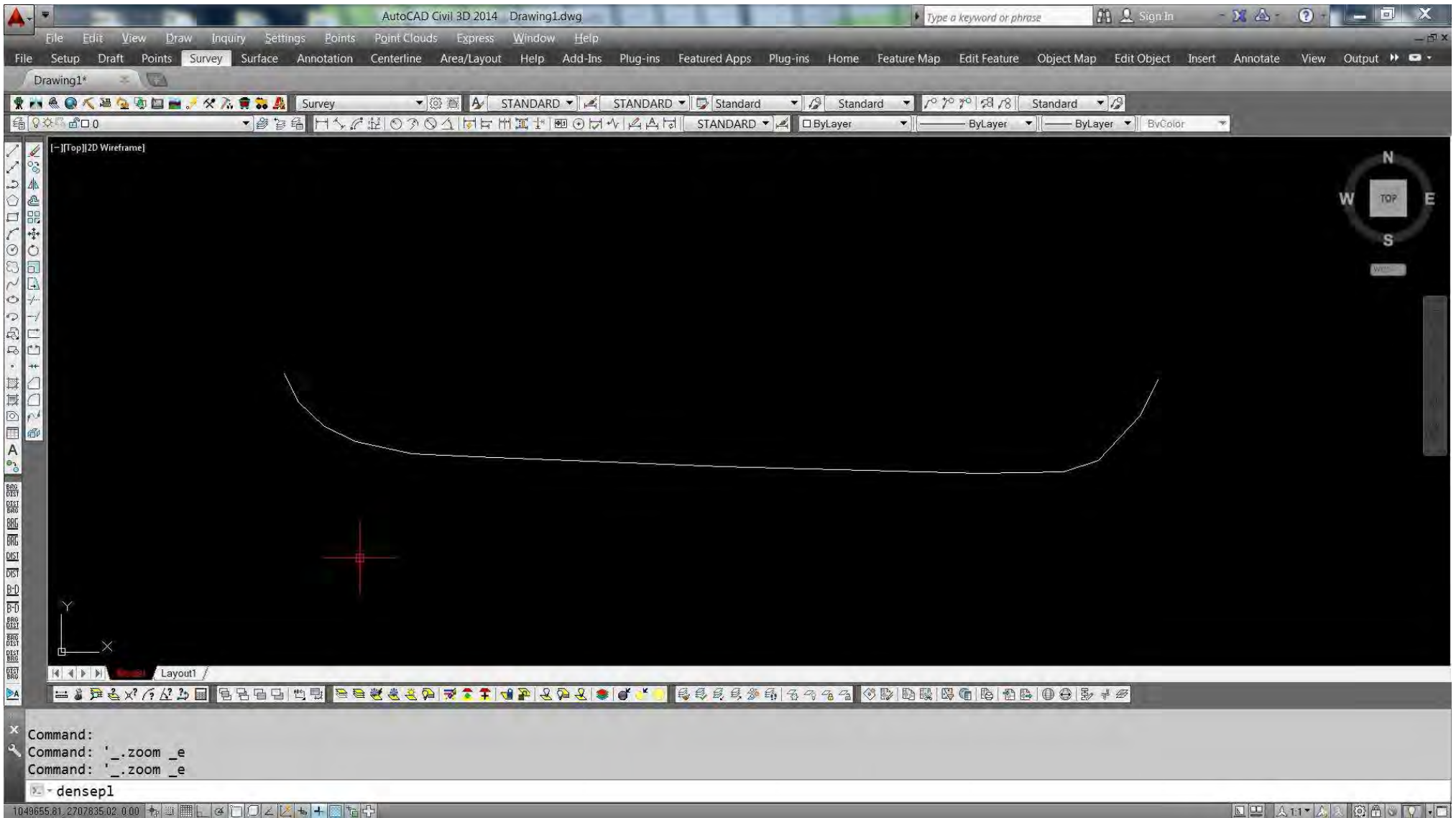
I started with a very rough centerline of a road in the scan.

Please note that I am using the 3d panoramics to see some objects and finishes.

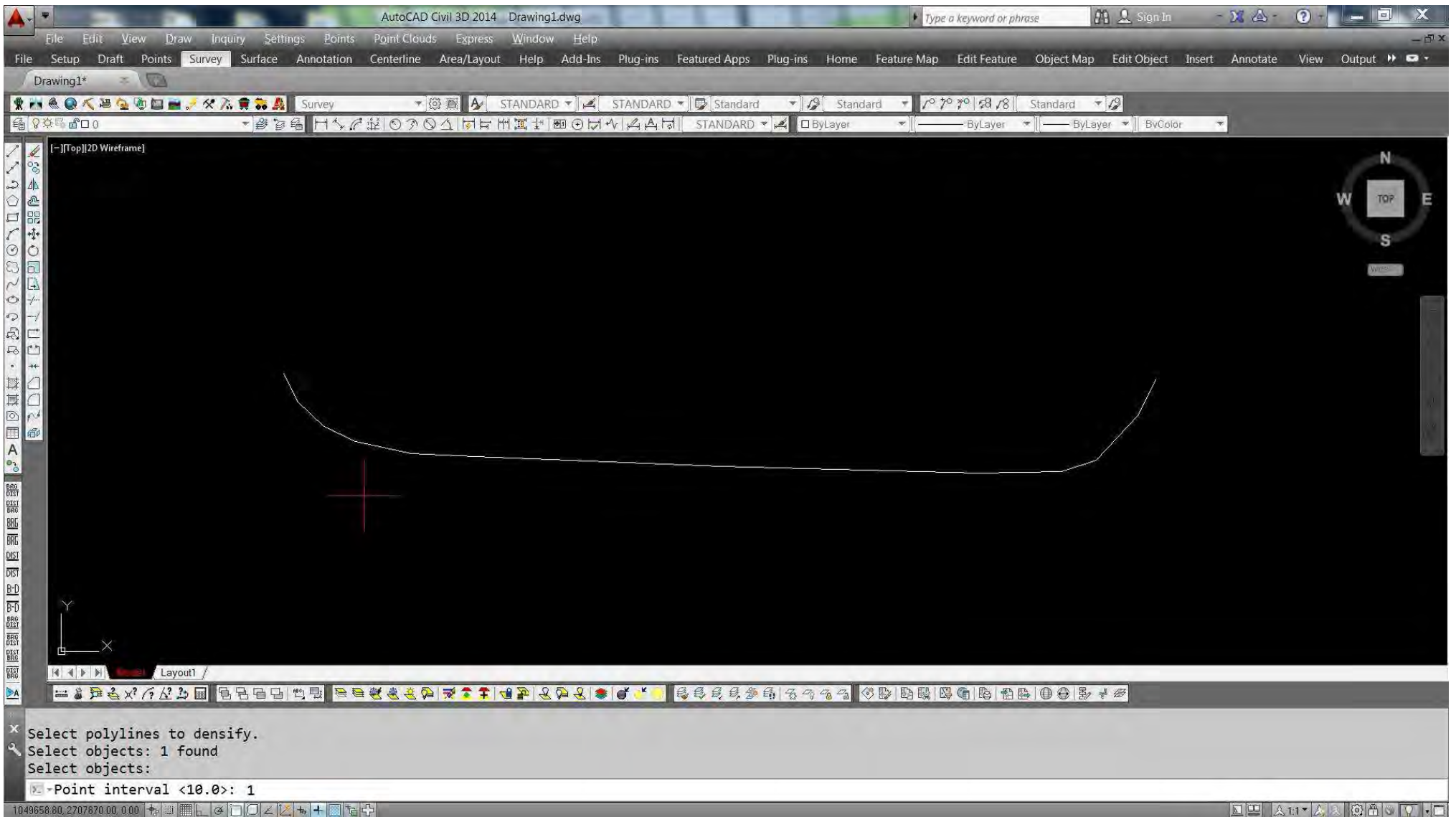


The Polyline is floating above and below the cloud.

Nothing to be concerned about, it is all in the rendering and we will see that polyline again.



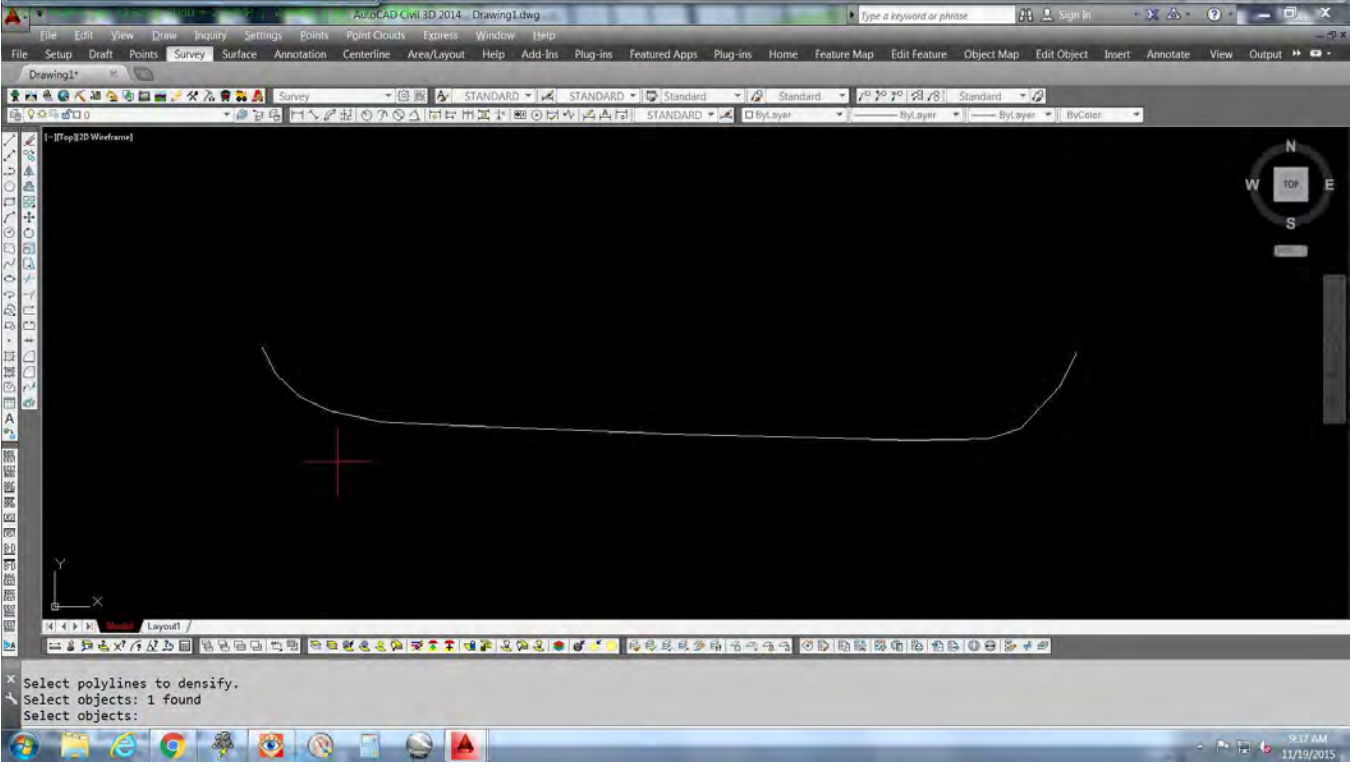
CAD is still open. We can draw that polyline into CAD without any issue. I am using the Carlson function DENSEPL to increase the number of vertices in the polyline. I am not sure where a button or menu items exists, I know I can type in DENSEPL and get what I need.

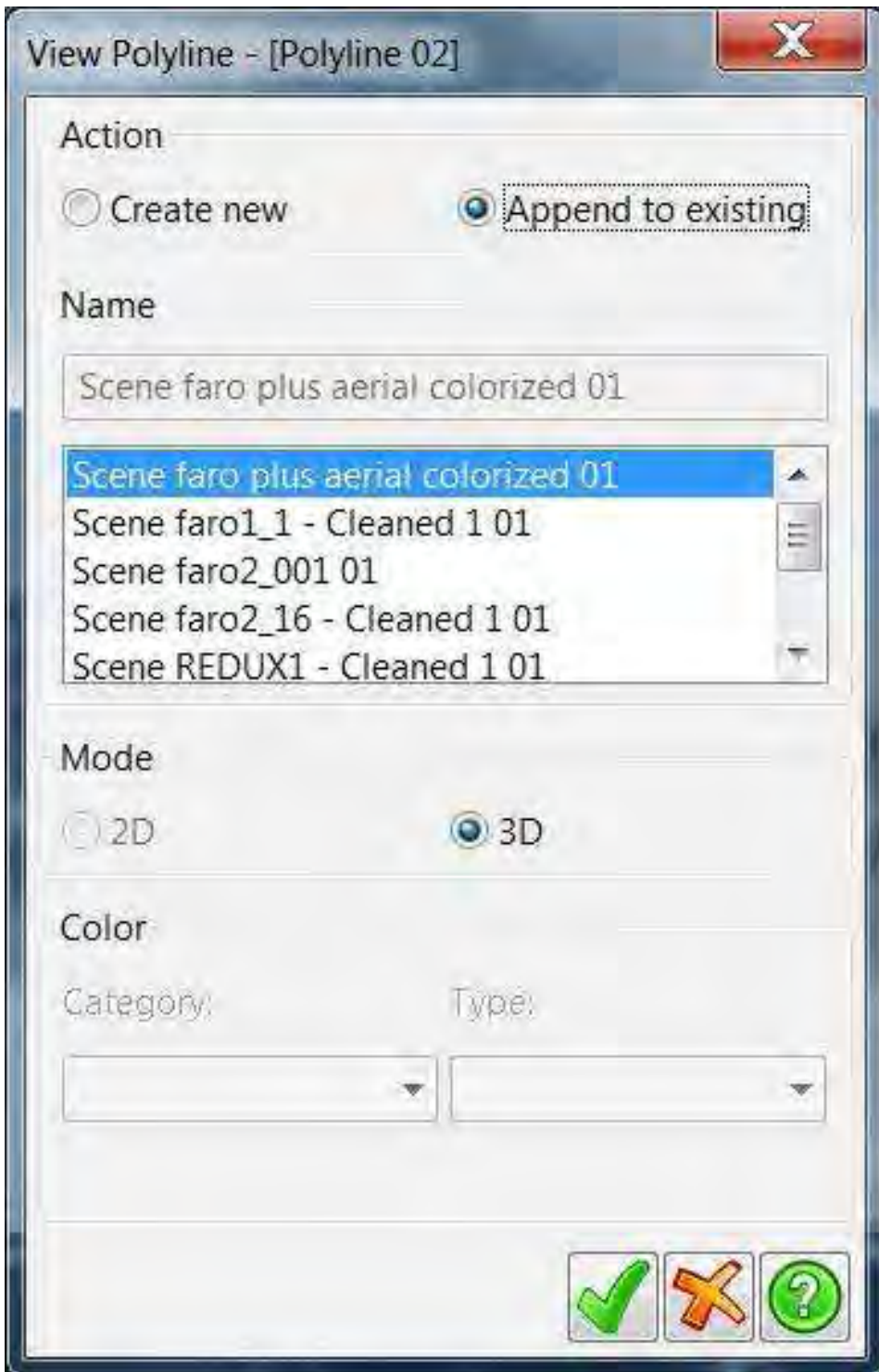


I am creating a new segment every foot.



Now I bring the Polyline from CAD back into CLOUD.

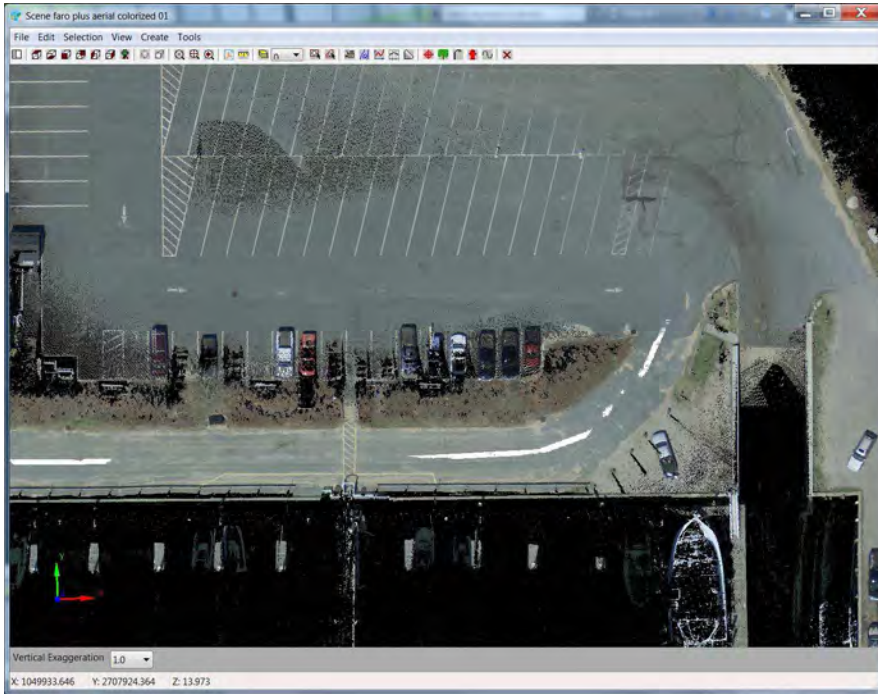




Those Scenes seem cumbersome. Why would you want a preset Scene?

Because we view more than just clouds. Sure there is usually a cloud in there, but we may also want to see Polylines or Points.

In this case, it is not essential to show the polyline in CLOUD, but there are times we want to see what is going on...

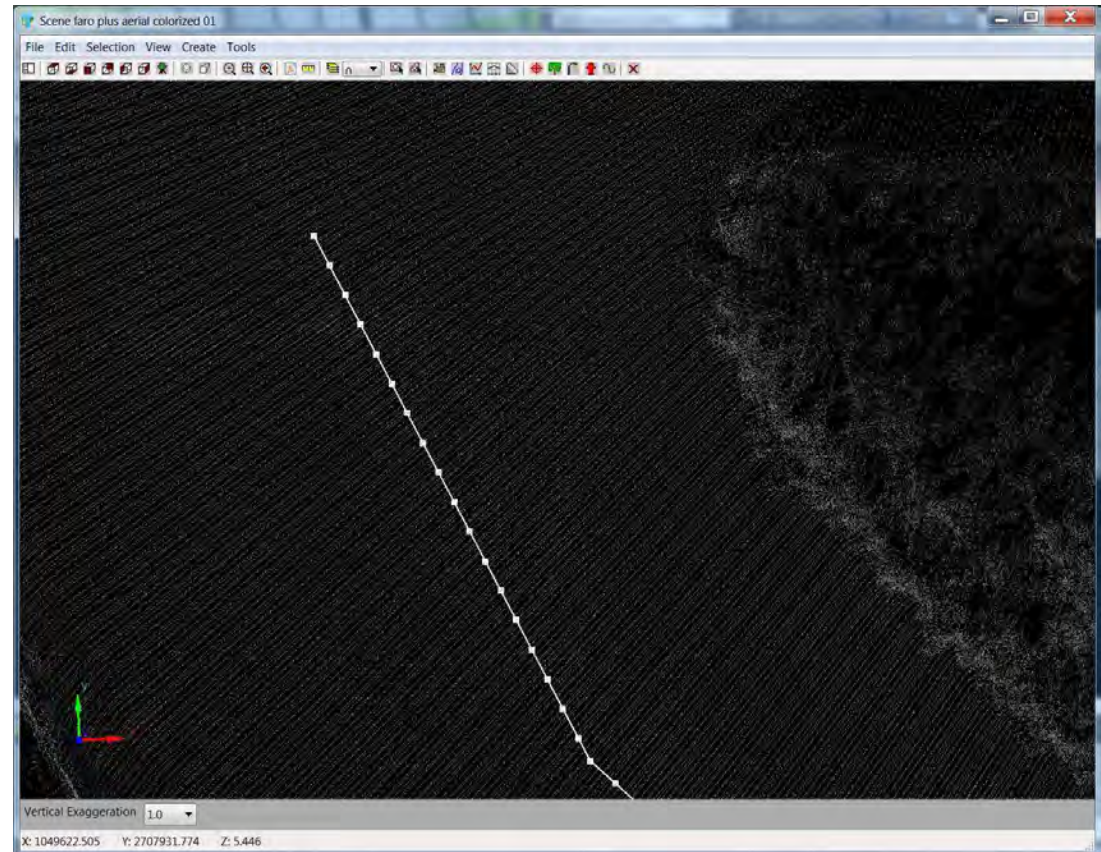


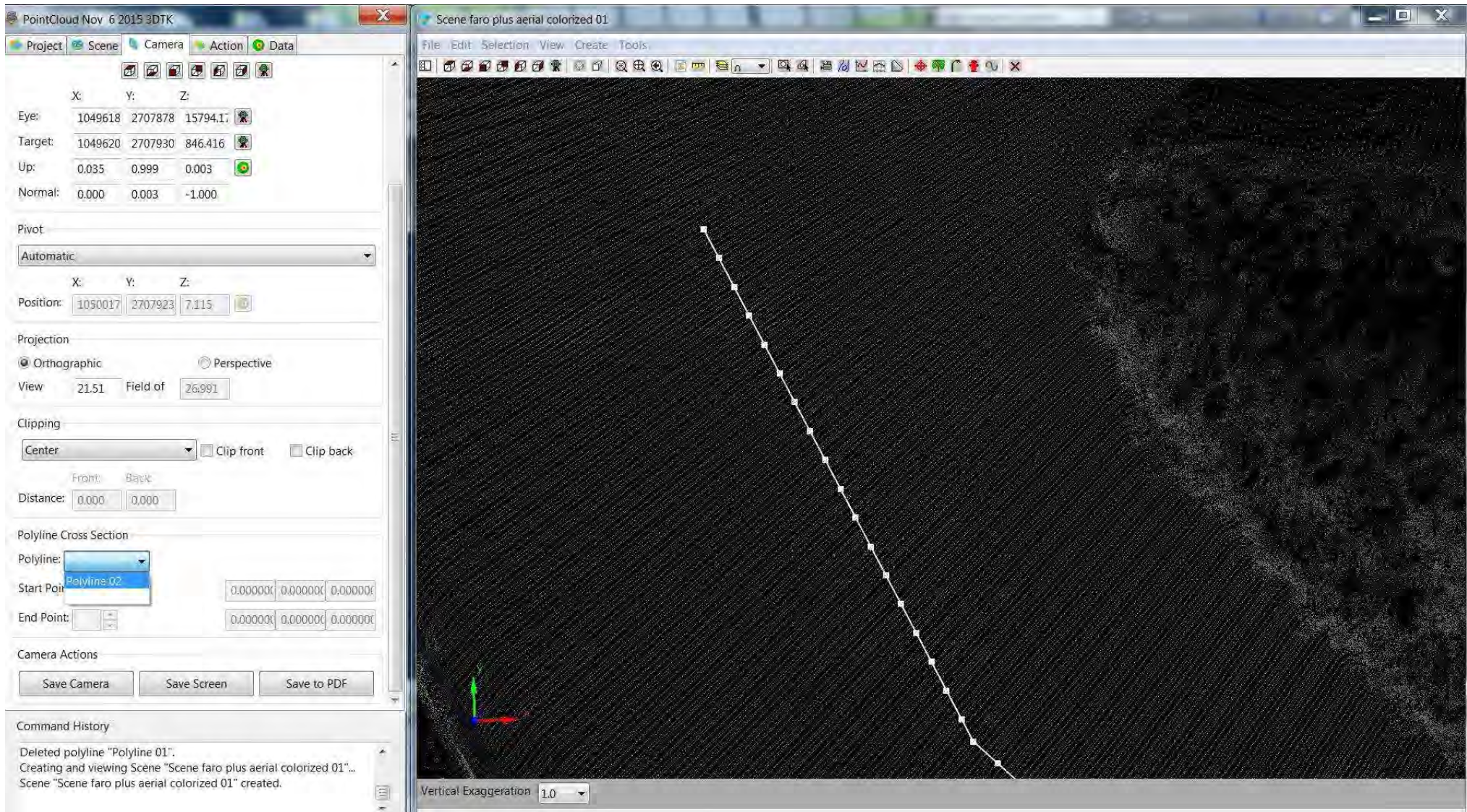
There it is.

The vertex sizes can be modified.

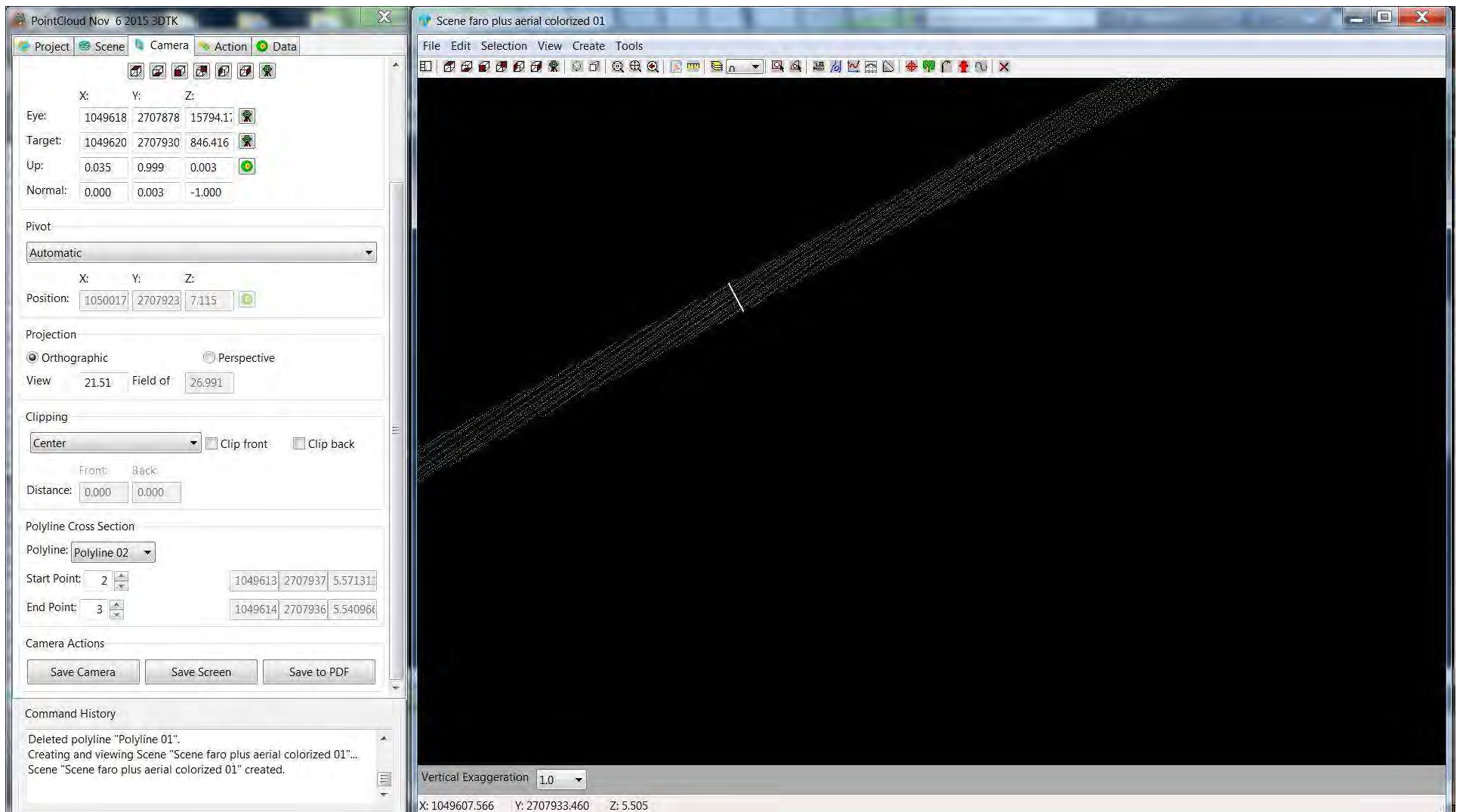
Zooming in brings back the visibility.

Oh what a lovely segmented polyline.

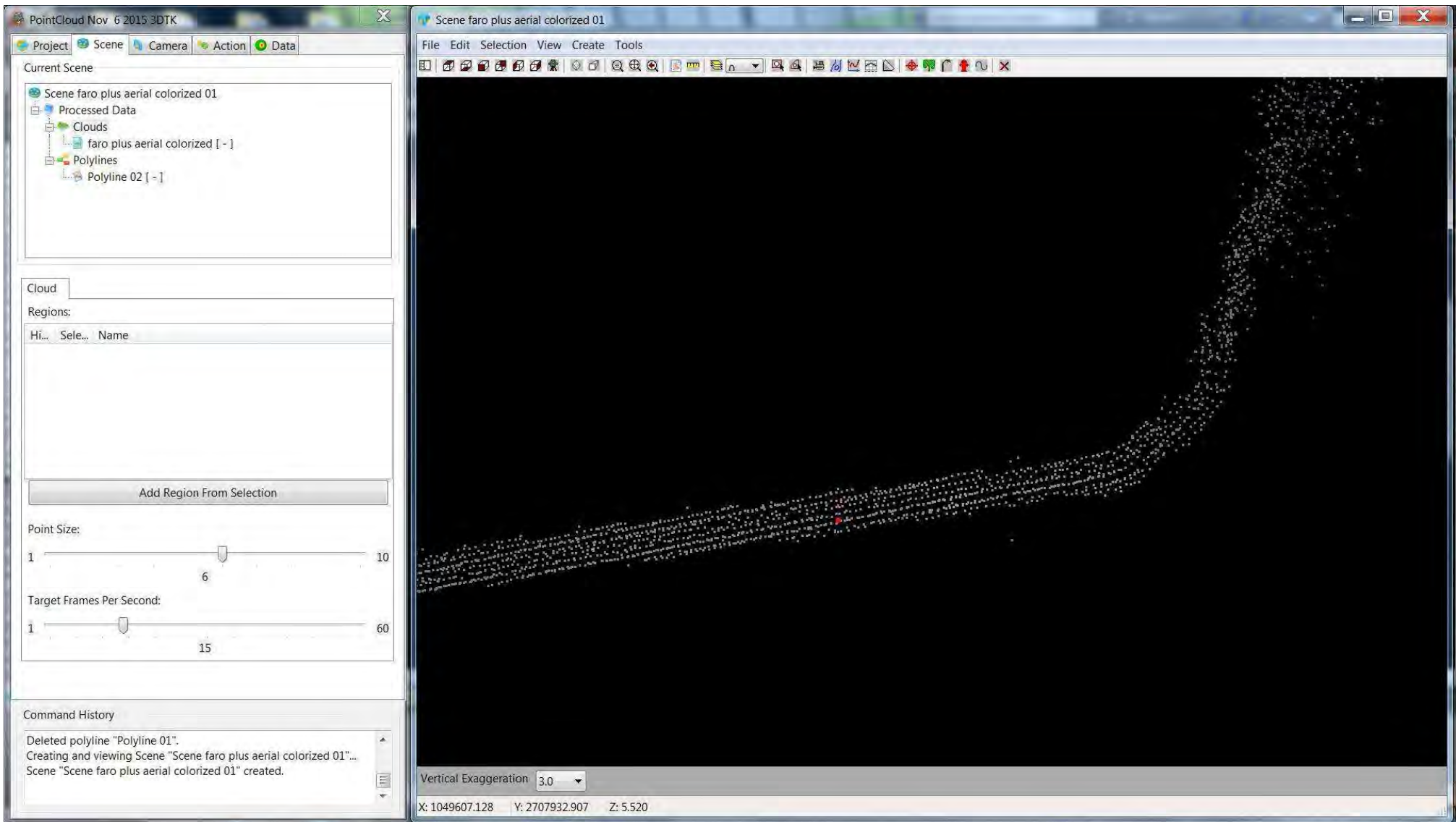




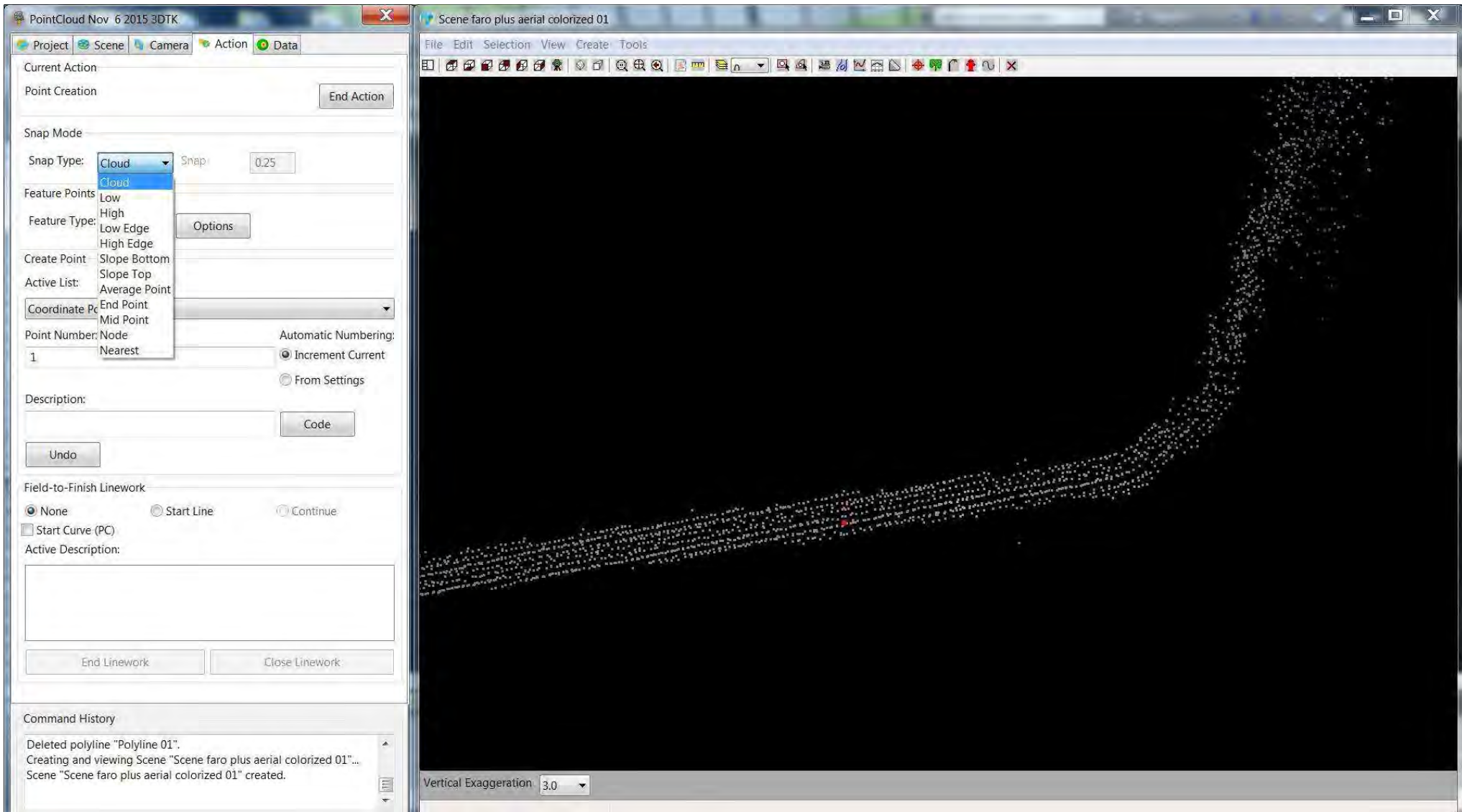
Now we can use this polyline for the CAMERA → POLYLINE CROSS SECTIONS



Just a slice.
All the other points are hidden.
More importantly, they are not in the way.



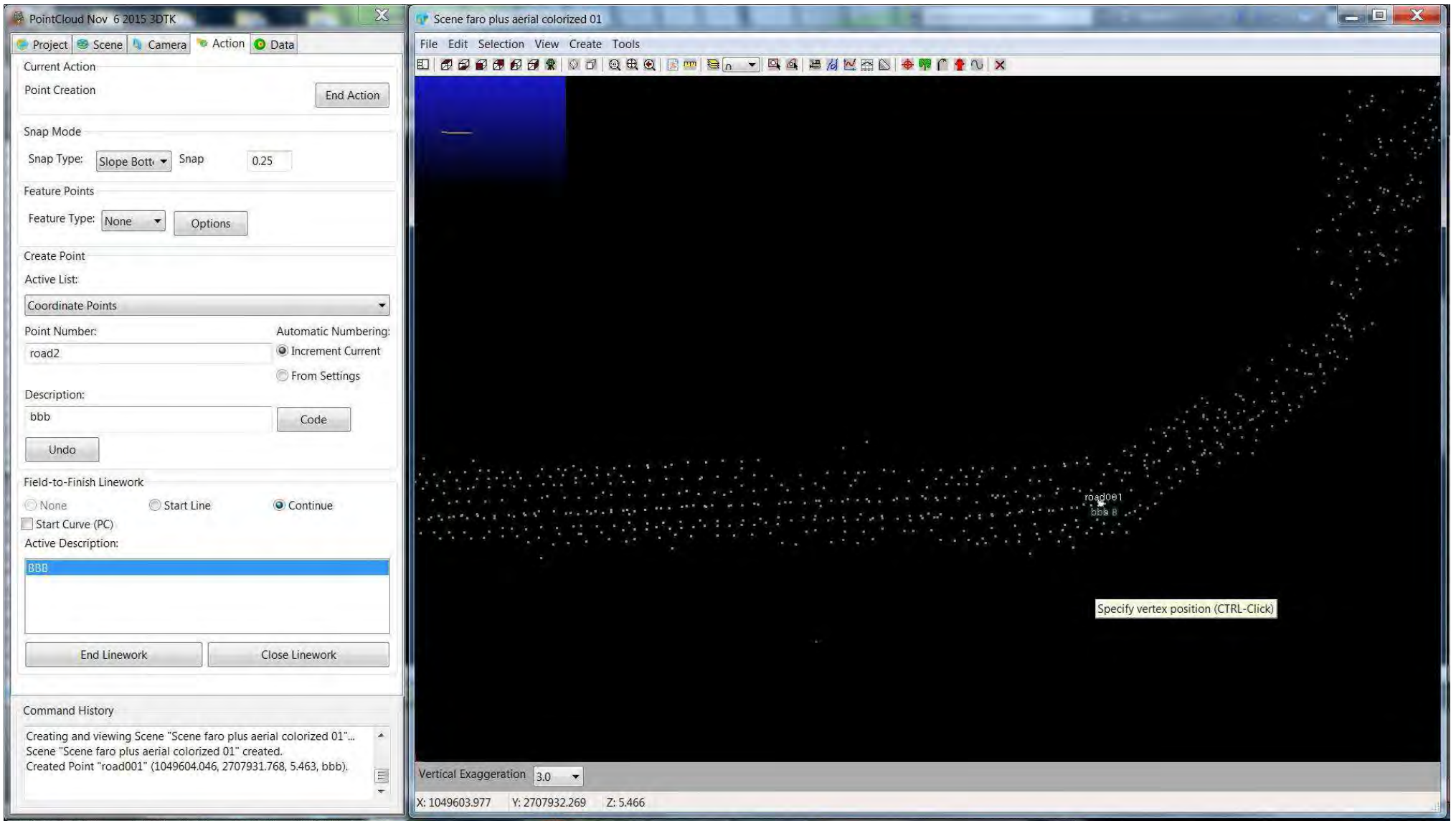
Exaggeration and viewing from the right angle helps to identify the Bottom of the Bituminous Berm (Yes I saw it in a panoramic and no I am not sharing the panoramic with you, sorry.)



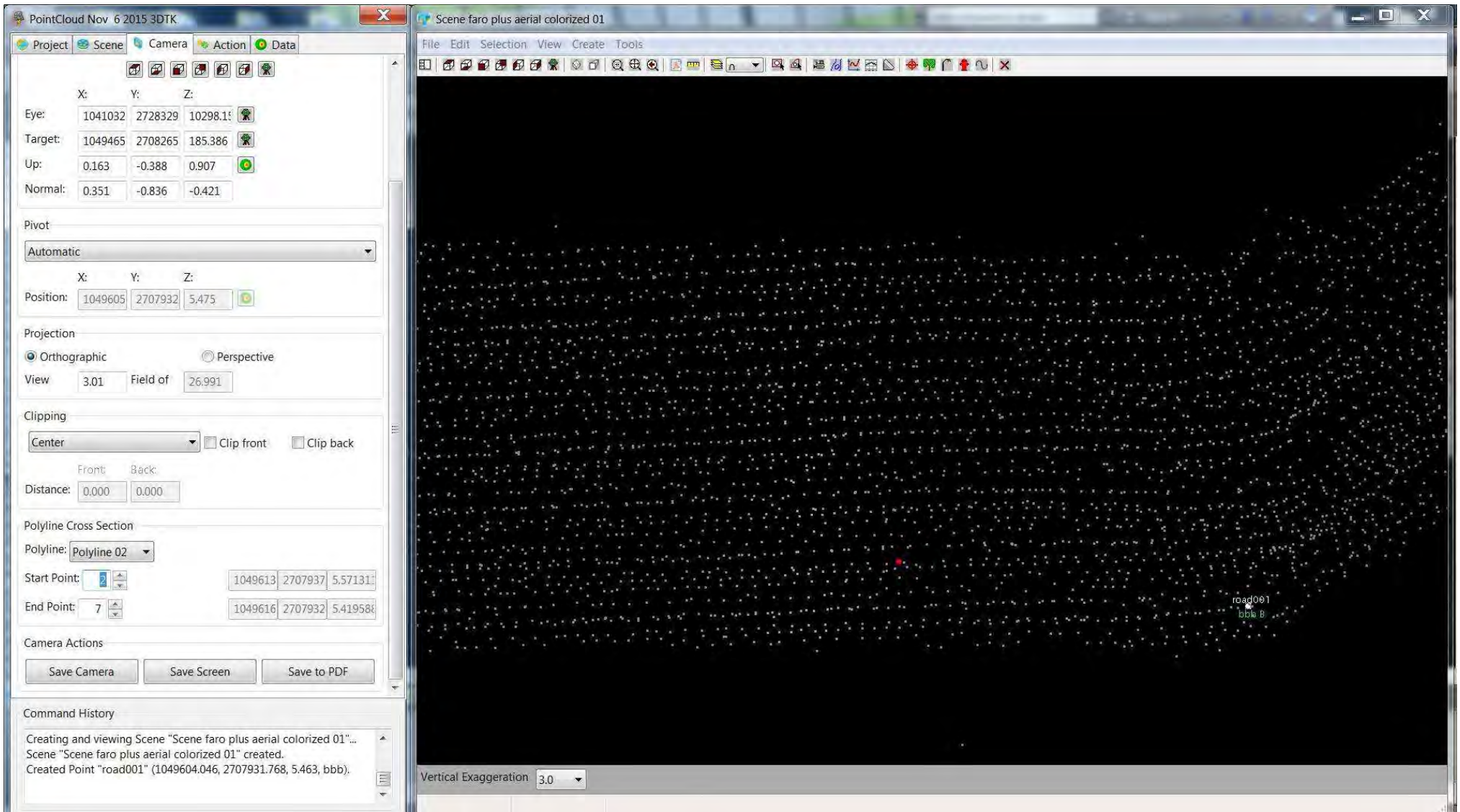
ACTION → POINT

We have some options of where to place a point. Cloud, Low, High, Low Edge, High Edge, Slope Bottom, Slope Top, Average Point, End Point, Mid Point, Node, Nearest

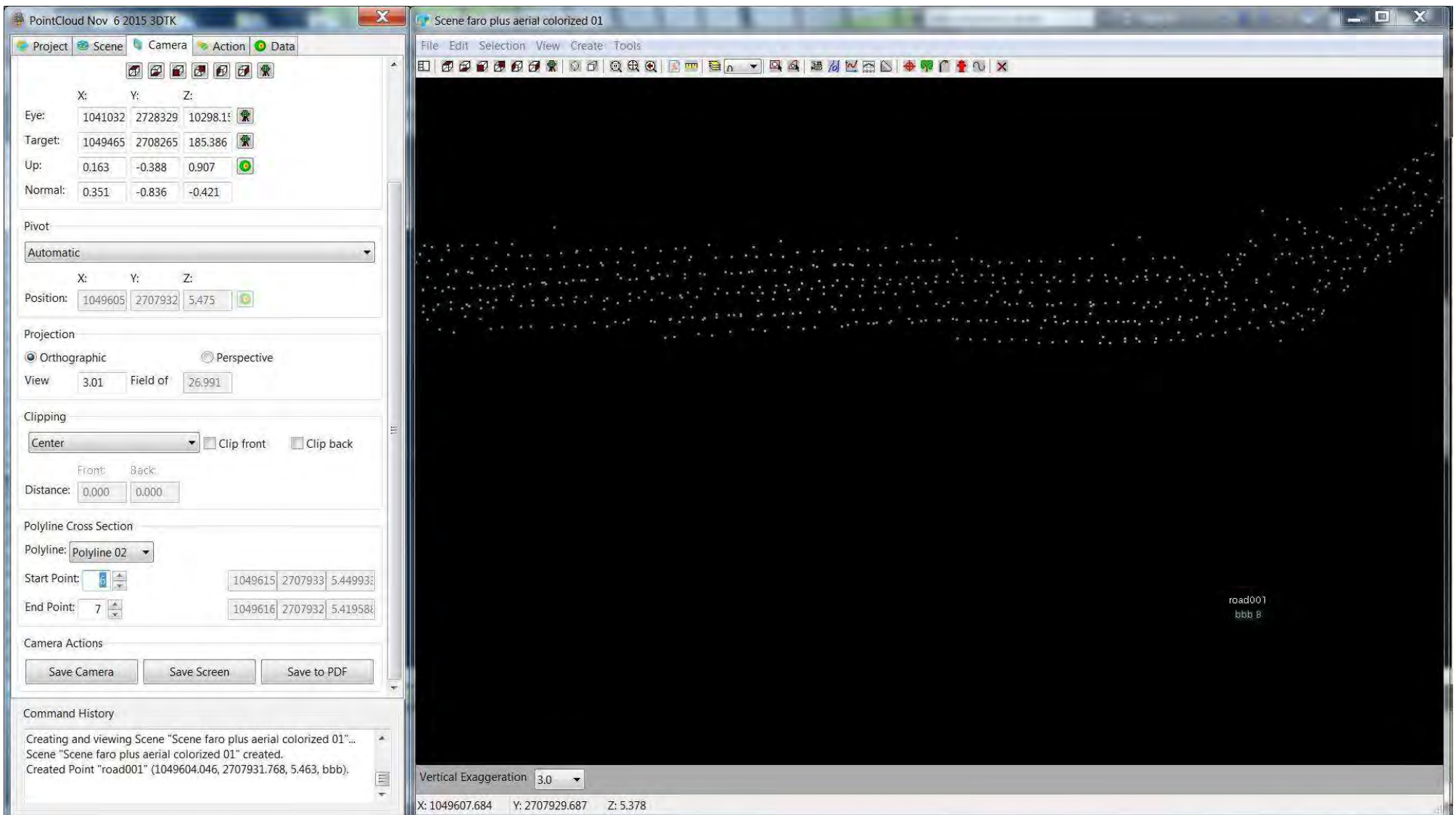
Each option has some options as well.



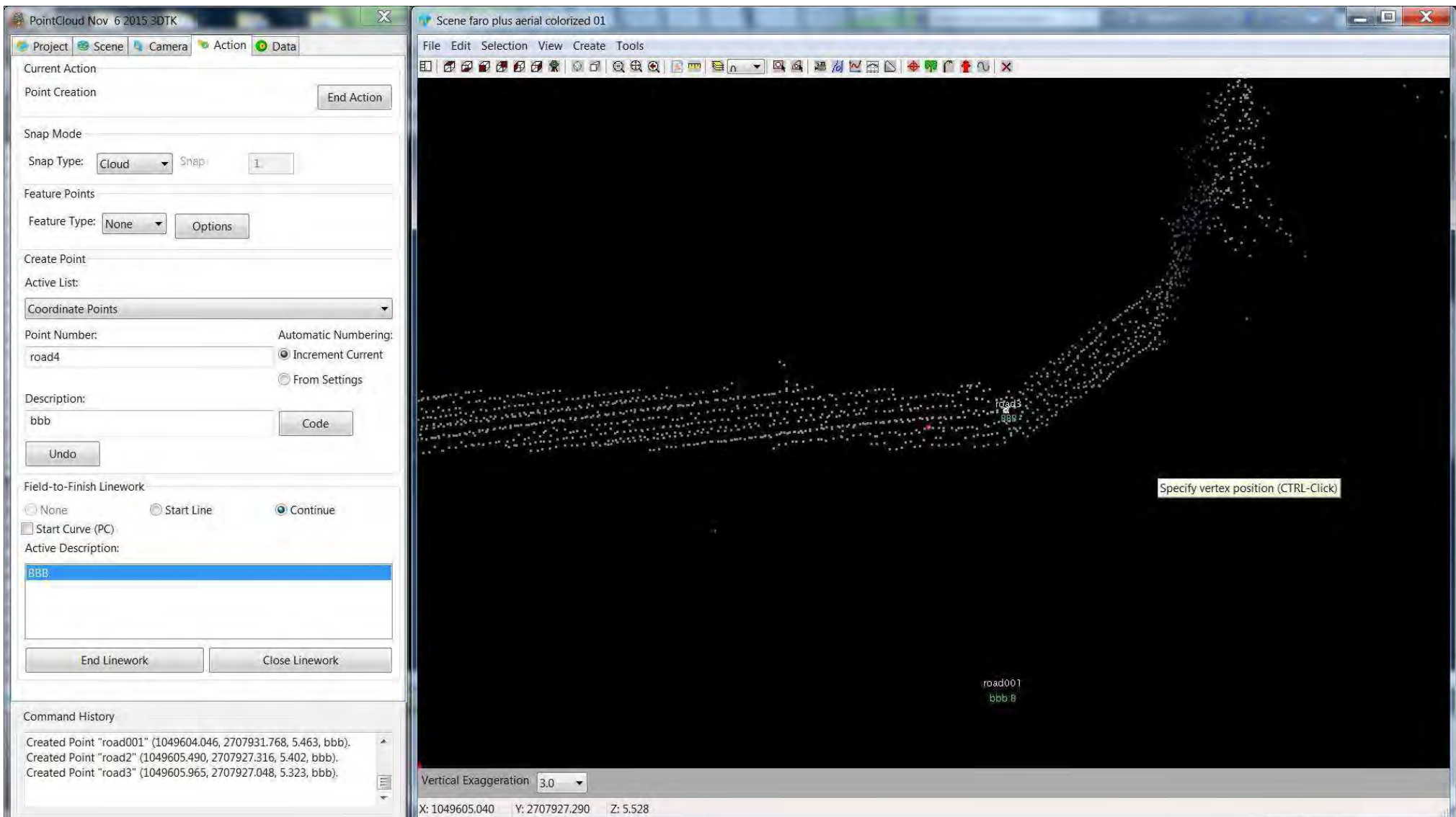
Using Slope Bottom with a snap radius of 0.25, a point can be placed at the Bottom of the Bituminous Berm (BBB).



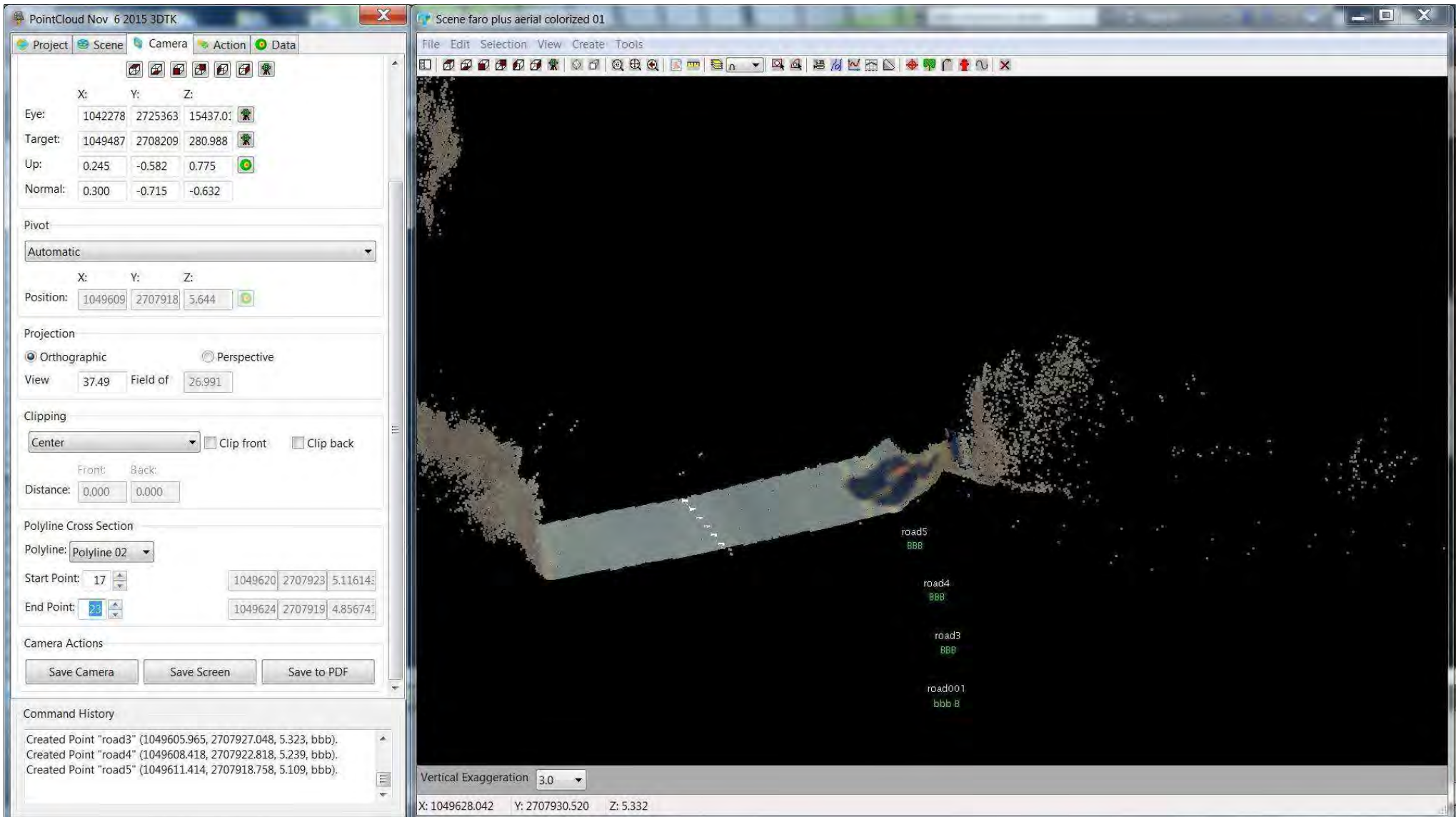
This is a new tool and is still a bit cumbersome. We have to advance segment by segment. They are working on streamlining this and they plan to include it in the next release. They will share Beta Versions if you ask the right people. This is ahead 5'.



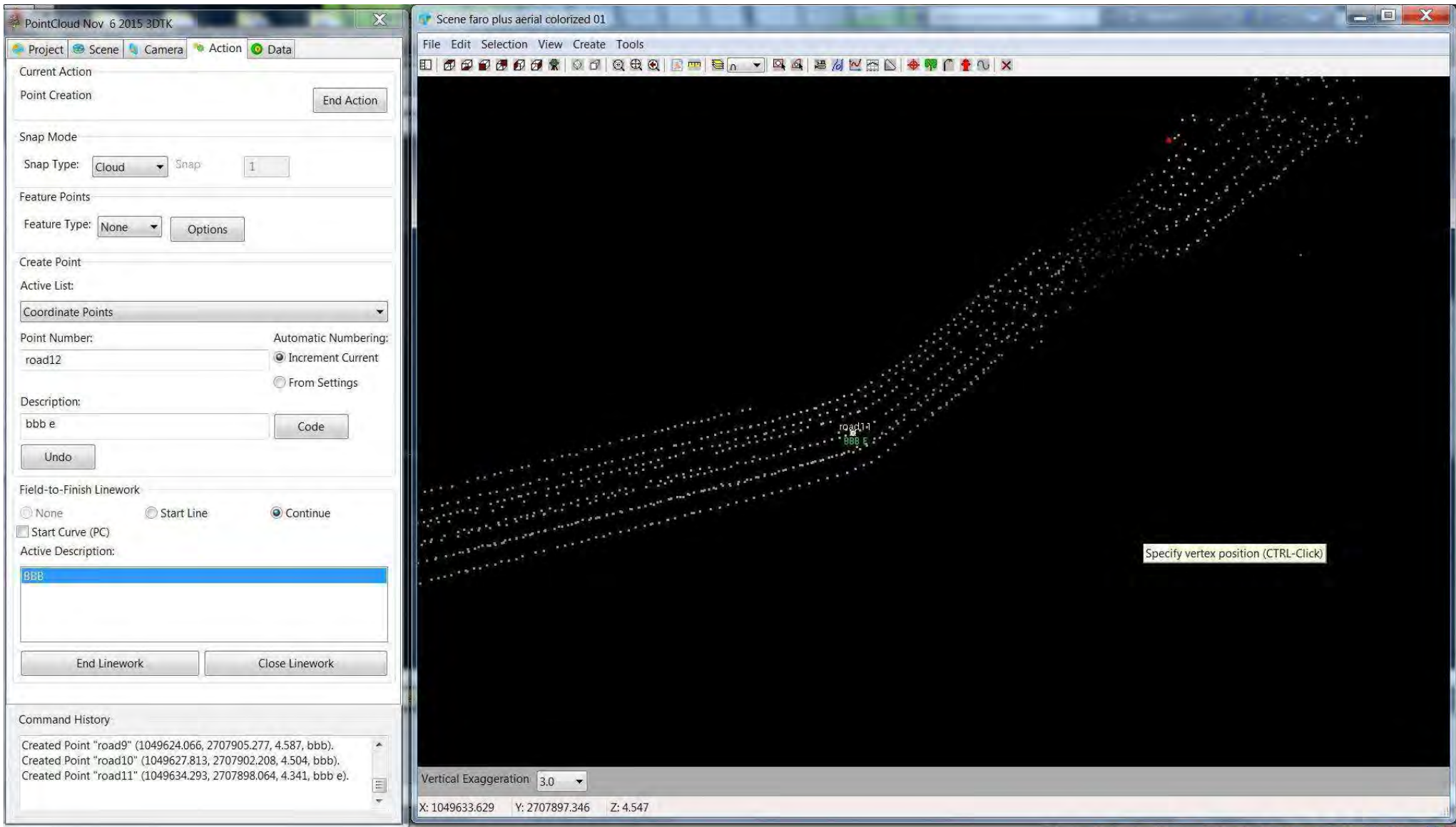
And we make the back catch up so we are viewing a 1' wide slice.



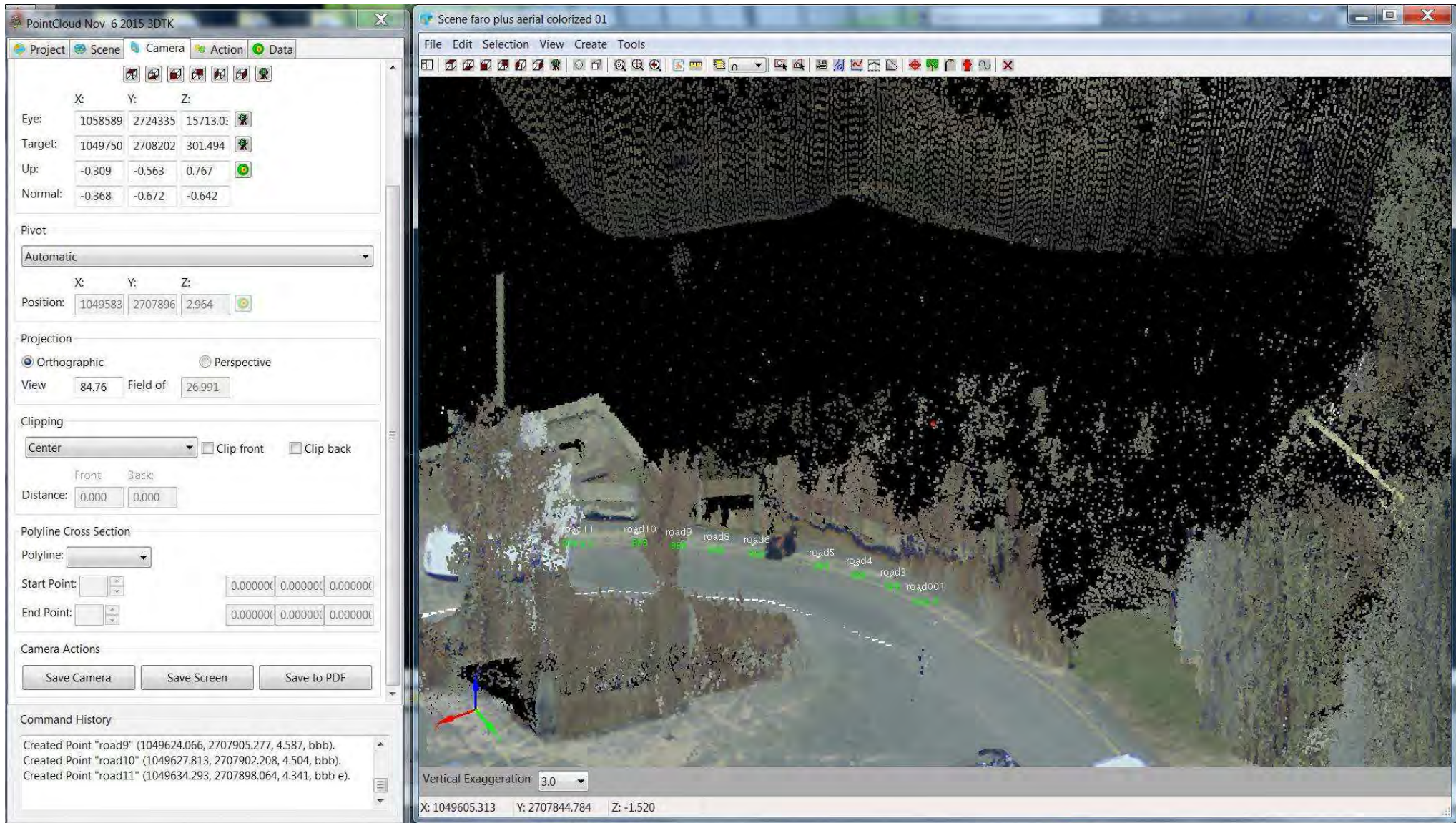
Now we can add the next point. Note, the section only controls the cloud, so we can still see the old point.



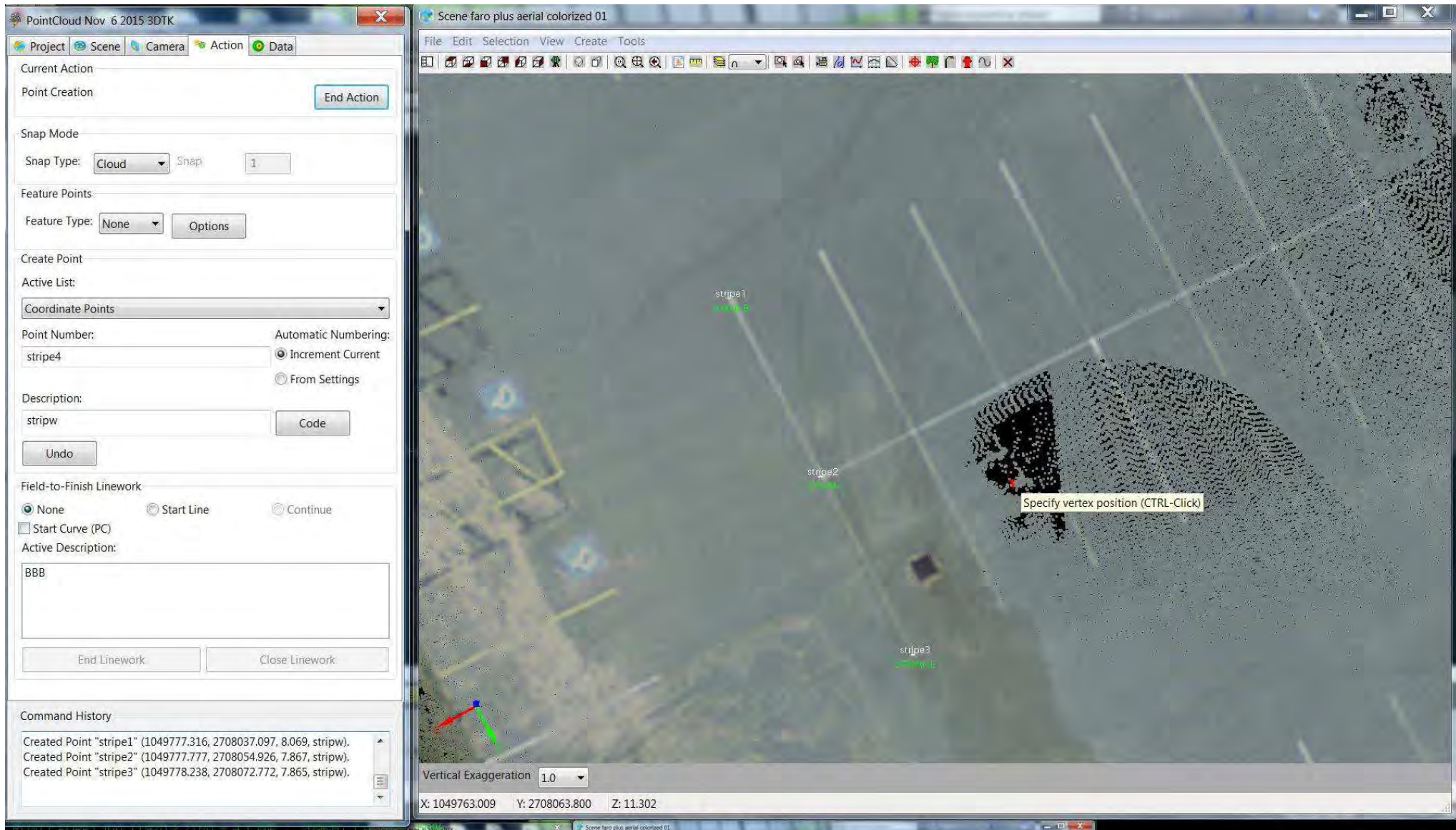
We can chug along our polyline and make our Virtual Survey.



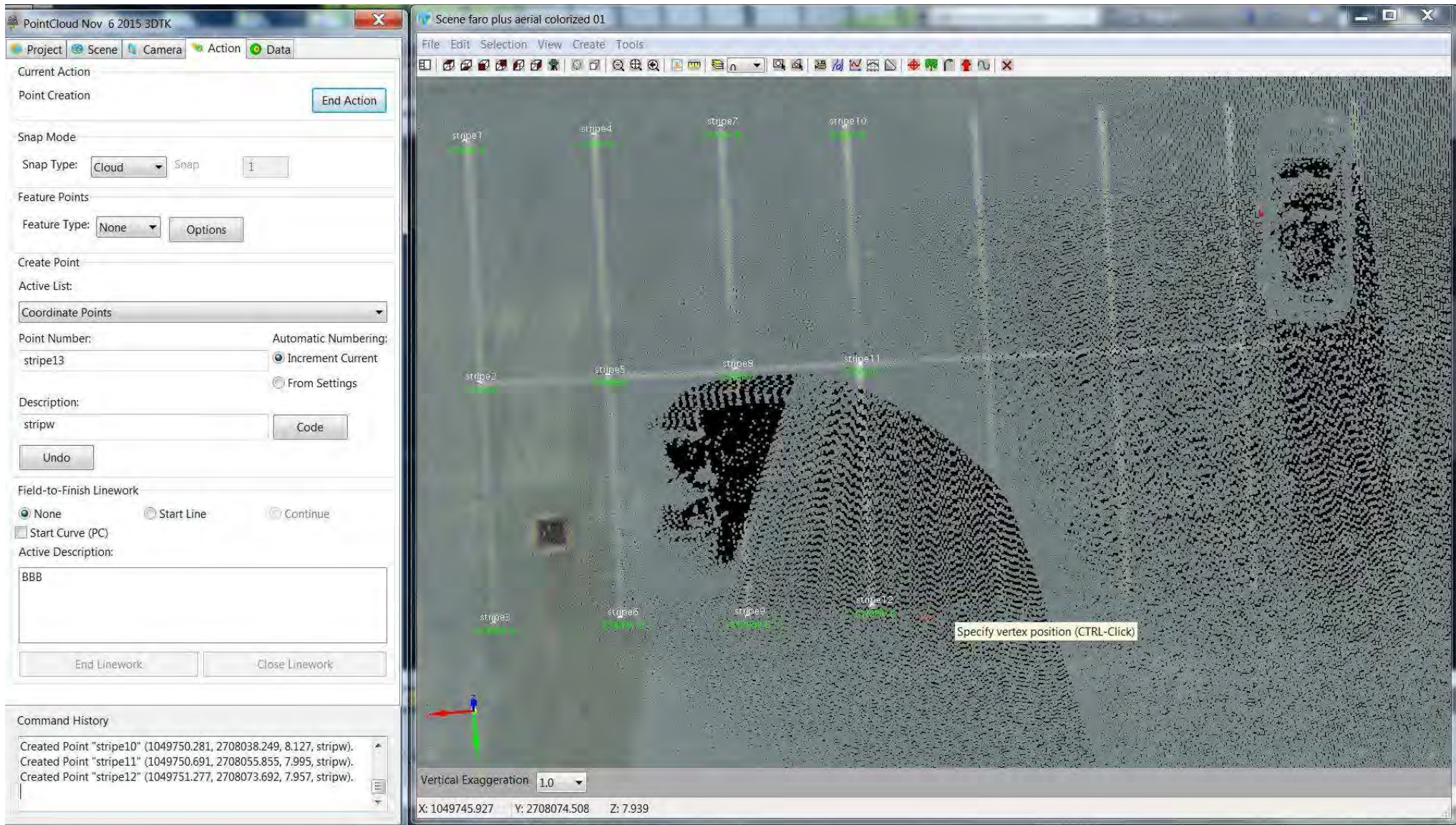
Ever forget to add the End Line code? We don't worry, we just press the End Linework button.



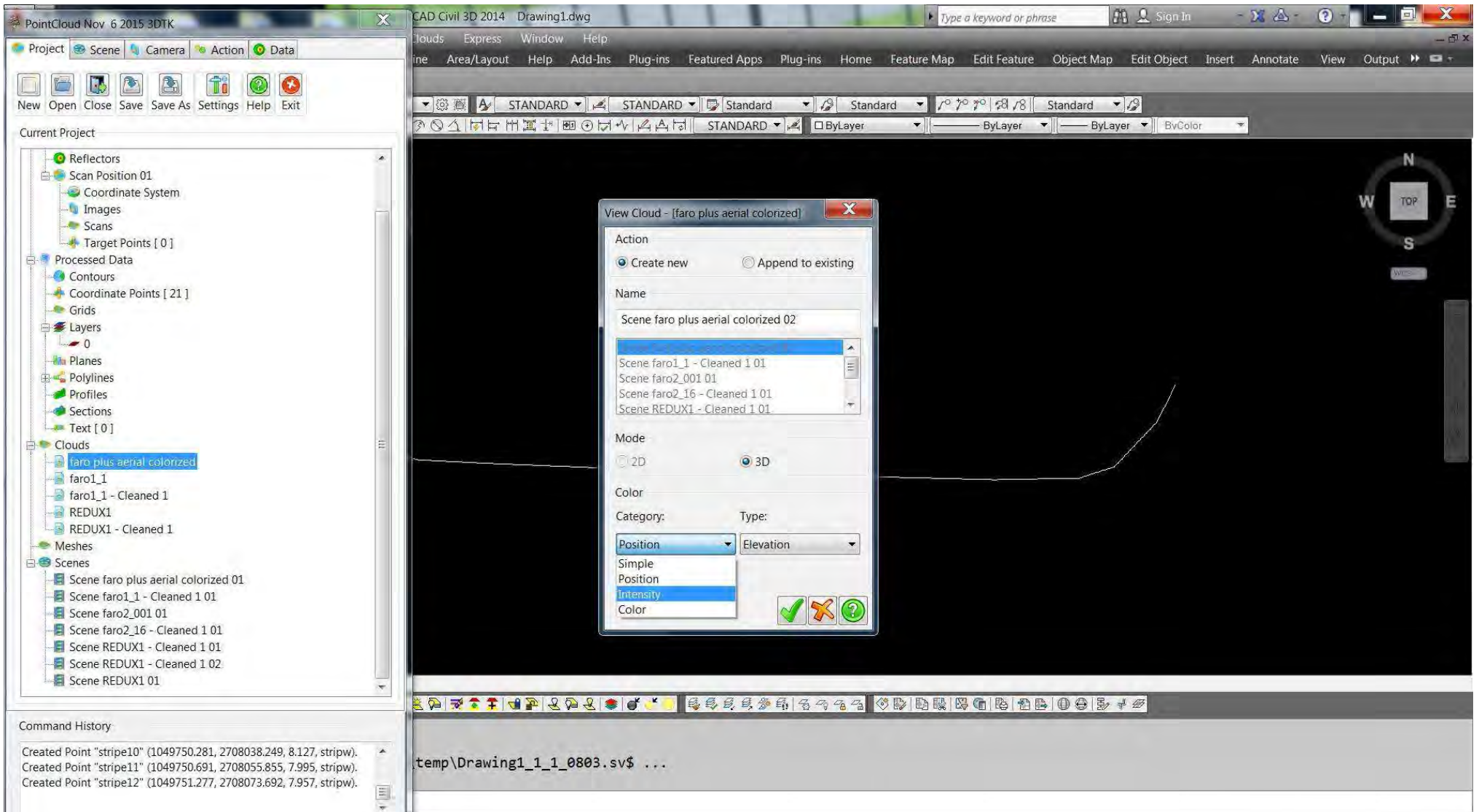
Maneuvering and checking is important.
It is very easy to click on a rogue point.



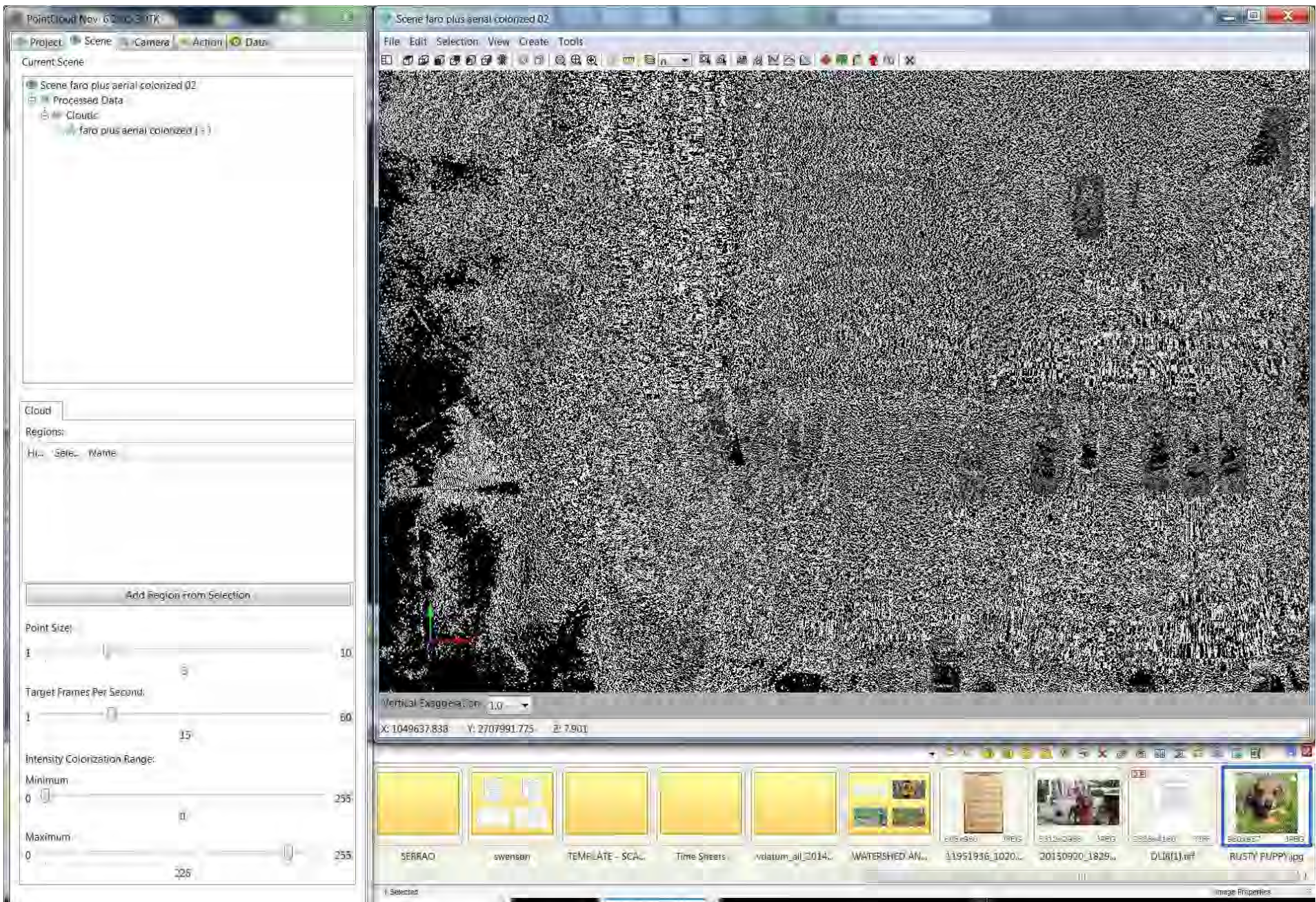
You can extract points based on the imagery.
Yeah, you can do that in CAD too.



You can also forget that you changes the code STRIPW when you transitioned into Point Cloud... and how good was that imagery?



Some viewers will let you change the flavor of the cloud on the fly. Carlson is not geared that way.



The initial intensity view is overwhelming. Yes this does look like static.

PointCloud Nov 6 2015 3DTK

Project Scene Camera Action Data

Current Scene

- Scene faro plus aerial colorized 02
 - Processed Data
 - Clouds
 - faro plus aerial colorized [-]

Cloud

Regions:

Hi...	Sele...	Name
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Add Region From Selection

Point Size: 1 10

Target Frames Per Second: 1 60

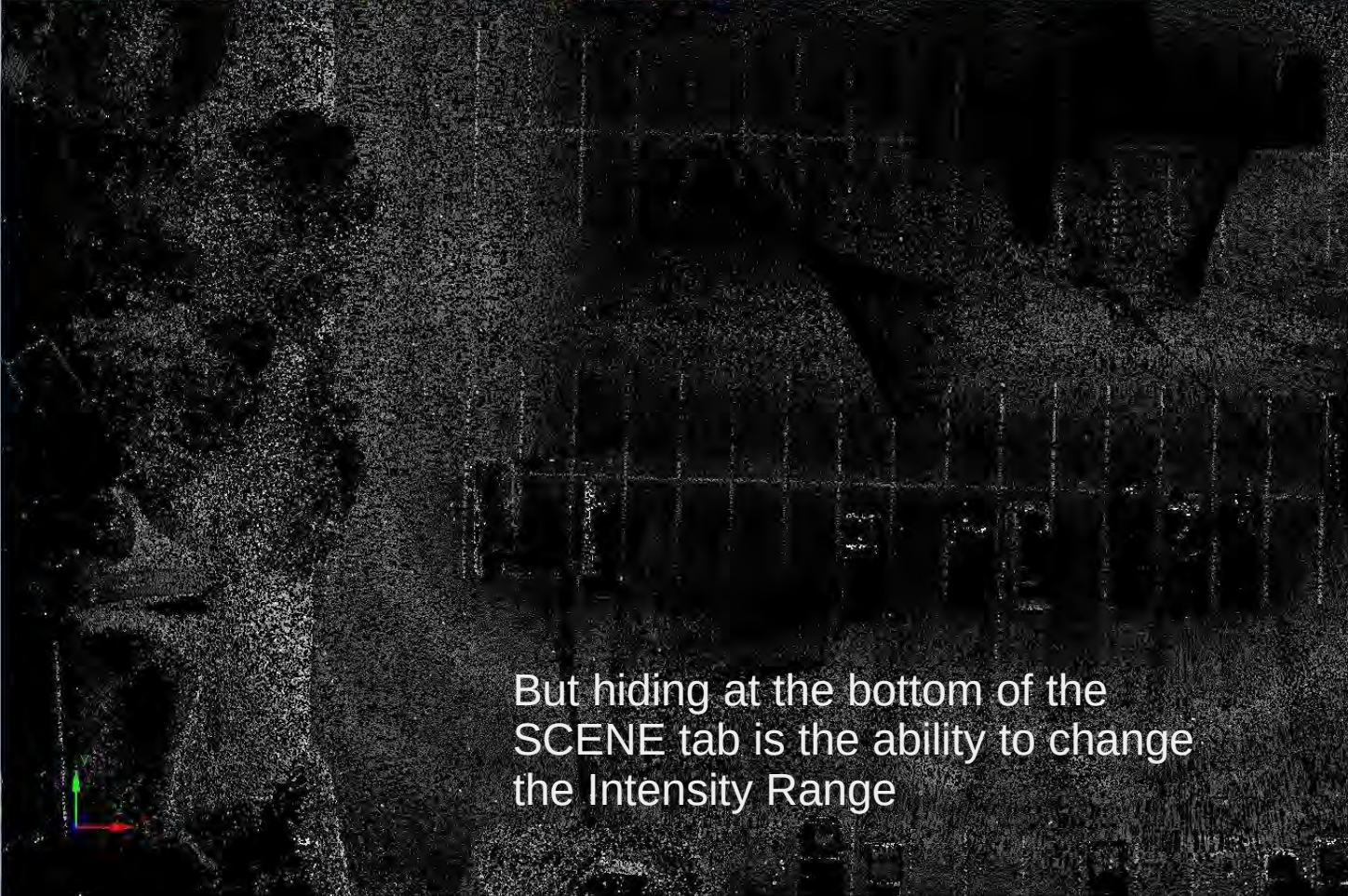
Intensity Colorization Range:

Minimum 0 255

Maximum 0 255

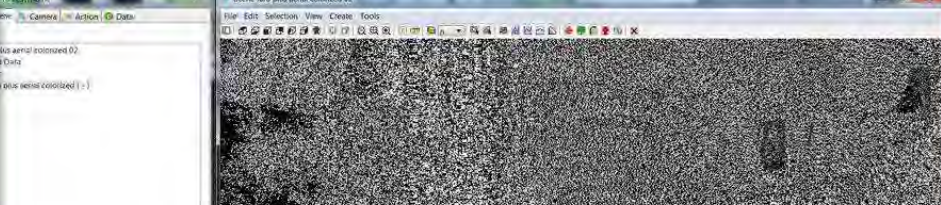
Scene faro plus aerial colorized 02

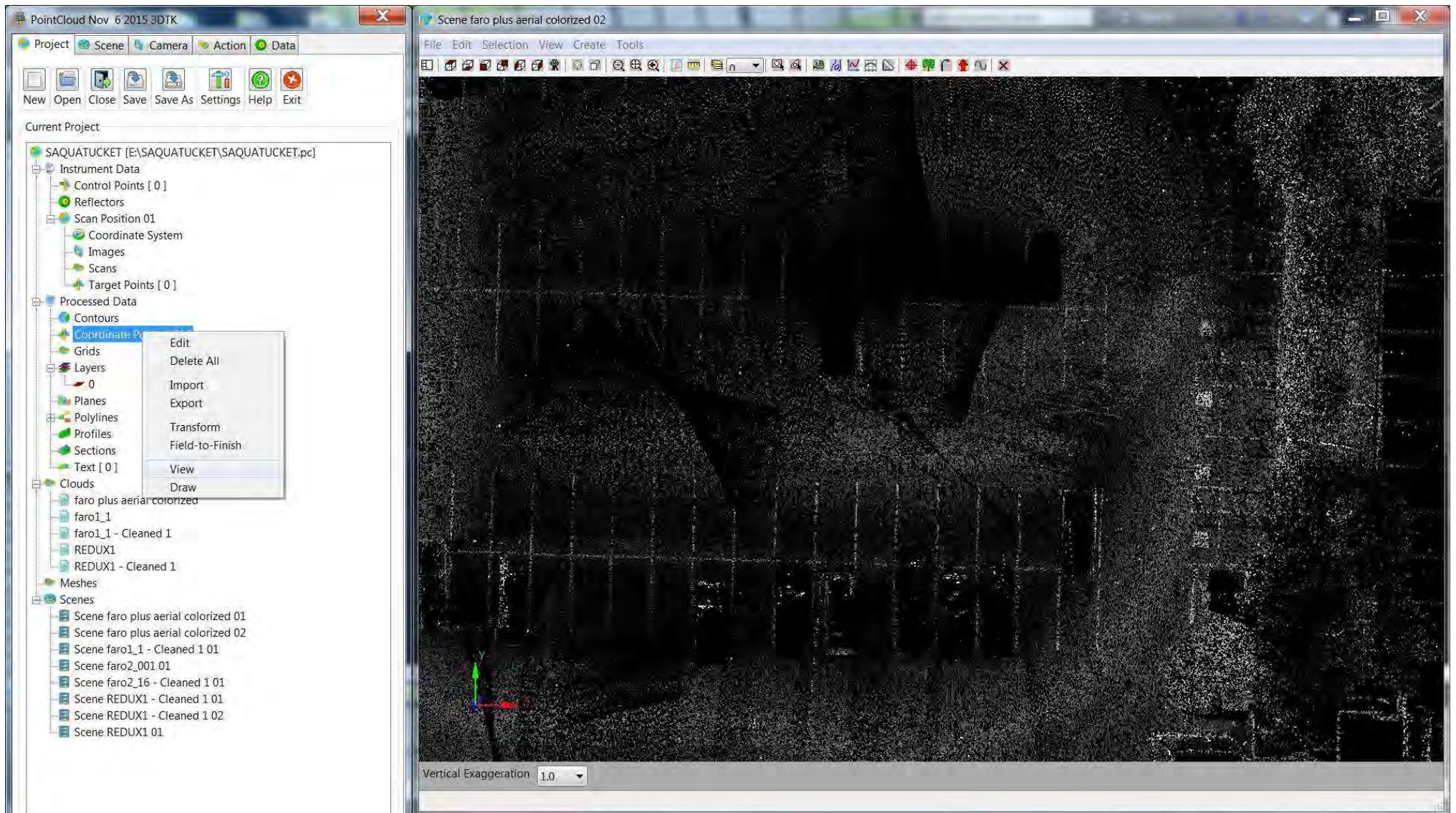
File Edit Selection View Create Tools



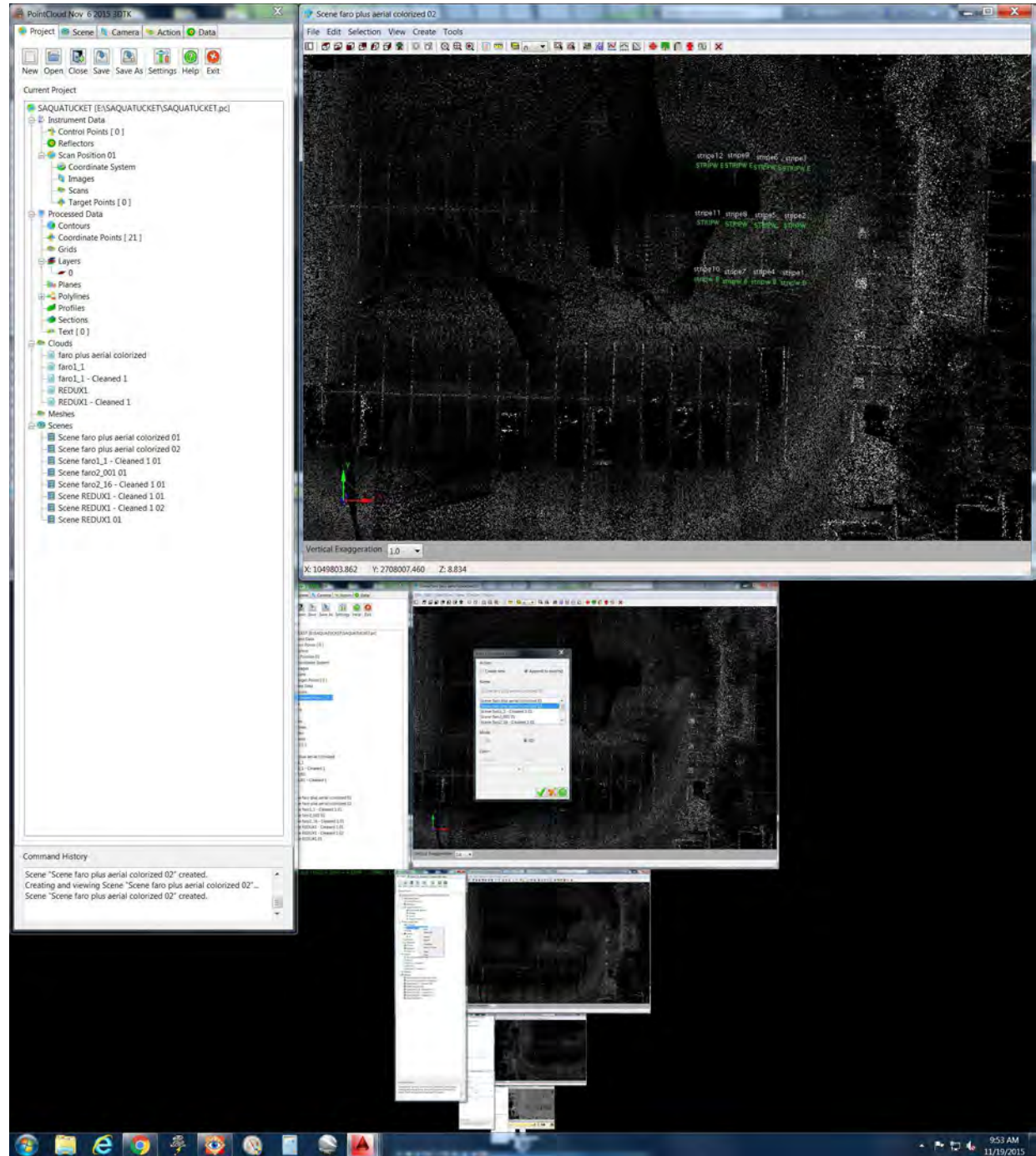
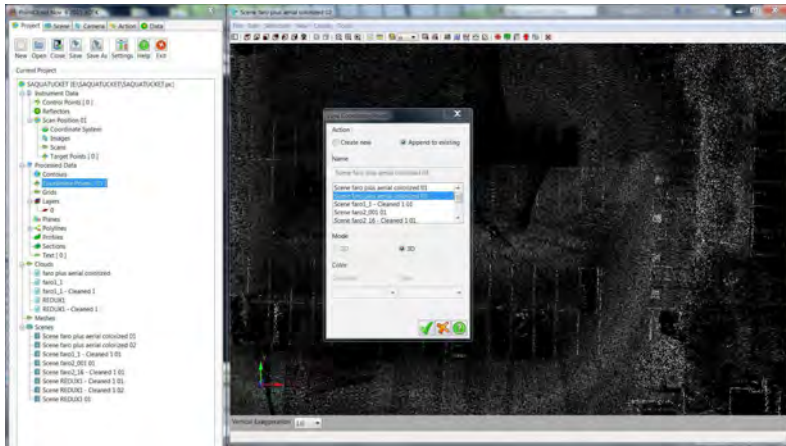
Vertical Exaggeration 1.0

But hiding at the bottom of the SCENE tab is the ability to change the Intensity Range

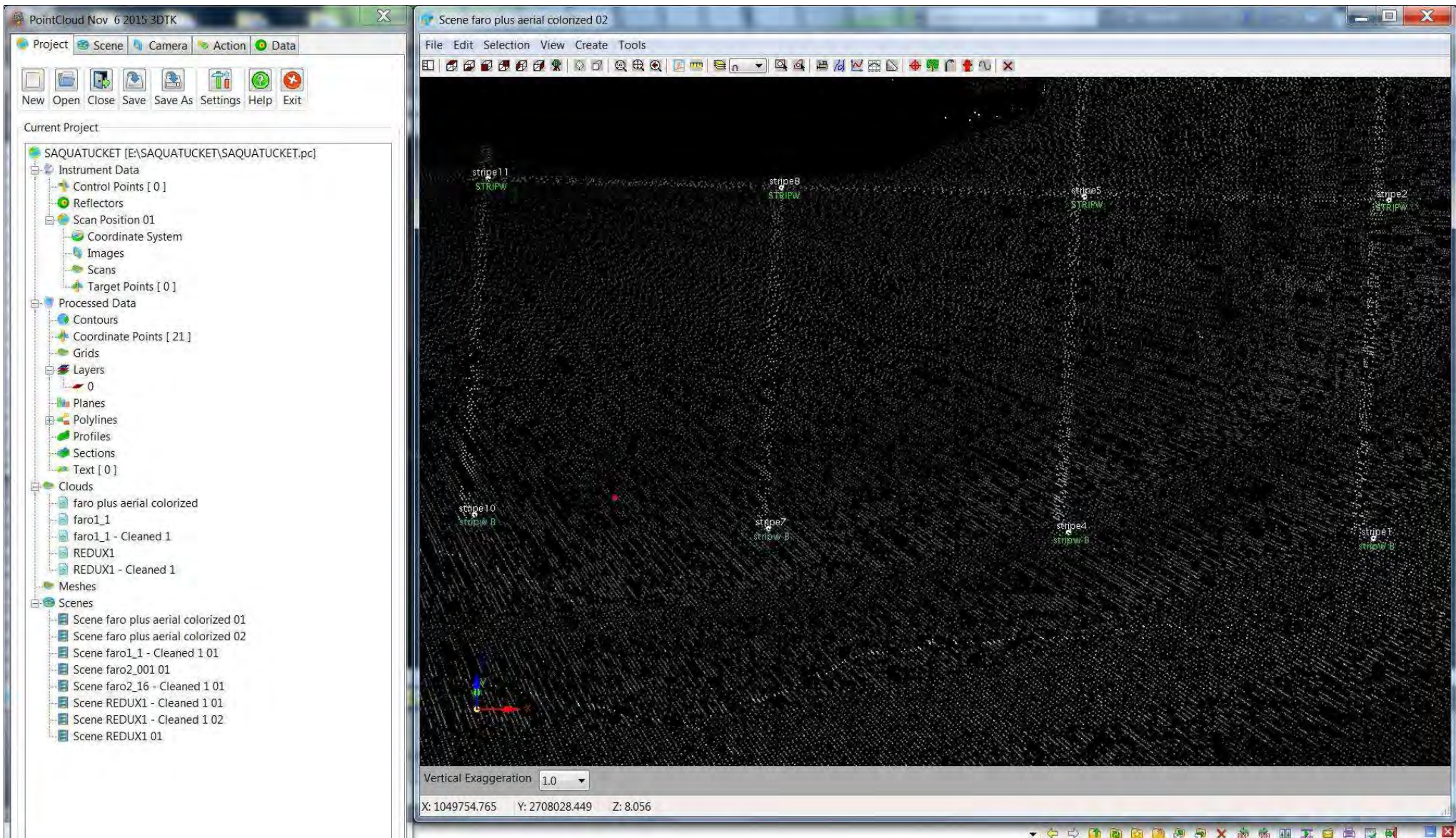




Now we can see the locations of the stripes.



Because it is a new Scene, we do not have the same objects like those Points. We can bring them into this scene.



Those aerials are pretty close. Not perfect, just pretty close.

The screenshot displays a 3D software interface with a 'Coordinate Points' window open. The window contains a table with the following data:

Name	X	Y	Z	Description
road001	1049604.04621000010	2707931.76805000010	5.46250900000	bbb B
road3	1049605.96484400010	2707927.04834000020	5.32300000000	BBB
road4	1049608.41796900010	2707922.81835900010	5.23900000000	BBB
road5	1049611.41406299990	2707918.75830100010	5.10900000000	BBB
road6	1049616.89843799990	2707912.06738300020	4.86100000000	BBB
road8	1049620.54687500000	2707908.41259799990	4.64300000000	BBB
road9	1049624.06640599990	2707905.27734400010	4.58700000000	BBB
road10	1049627.81250000000	2707902.20752000020	4.50400000000	BBB
road11	1049634.29296900010	2707898.06445300020	4.34100000000	BBB E E
stripe1	1049777.31640599990	2708037.09668000000	8.06900000000	stripw B
stripe2	1049777.77734400010	2708054.92627000020	7.86700000000	STRIPW
stripe3	1049778.23828099990	2708072.77246099990	7.86500000000	STRIPW E
stripe4	1049768.14062500000	2708037.37646500020	8.08700000000	stripw B
stripe5	1049768.61718799990	2708055.13037100020	7.84800000000	STRIPW
stripe6	1049769.18750000000	2708073.07763700000	7.83200000000	STRIPW E
stripe7	1049759.12109400010	2708037.52636699980	8.12100000000	stripw B
stripe8	1049759.51171900010	2708055.46630899980	7.94200000000	STRIPW
stripe9	1049760.17578099990	2708073.76757800020	7.89400000000	STRIPW E
stripe10	1049750.28125000000	2708038.24853499980	8.12700000000	stripw B
stripe11	1049750.69140599990	2708055.85546900010	7.99500000000	STRIPW
stripe12	1049751.27734400010	2708073.69238300020	7.95700000000	STRIPW E

The interface also shows a 3D point cloud visualization on the right side, with labels for 'stripe2' and 'stripe1'. The status bar at the bottom indicates '21 Coordinate Points, 0 Selected' and 'X: 1049755.608 Y: 2708045.919 Z: 8.010'.

Back to the Processed Data section: We can review and edits the points.

The screenshot displays the Bentley MicroStation interface. A 'Coordinate Points' dialog box is open, showing a table of 12 points. The table has the following columns: Name, X, Y, Z, and Description. The points are listed as follows:

Name	X	Y	Z	Description
road001	1049604.04621000010	2707931.76805000010	5.4625090000000	bbb B
road3	1049605.96484400010	2707927.04834000020	5.3230000000000	BBB
road4	1049608.41796900010	2707922.81835900010	5.2390000000000	BBB
road5	1049611.41406299990	2707918.75830100010	5.1090000000000	BBB
road6	1049616.89843799990	2707912.06738300020	4.8610000000000	BBB
road8	1049620.54687500000	2707908.41259799990	4.6430000000000	BBB
road9	1049624.06640599990	2707905.27734400010	4.5870000000000	BBB
road10	1049627.81250000000	2707902.20752000020	4.5040000000000	BBB
road11	1049634.29296900010	2707898.06445300020	4.3410000000000	BBB E E
stripe1	1049777.31640599990	2708037.09668000000	8.0690000000000	stripw B
stripe2	1049777.77734400010	2708054.92627000020	7.8670000000000	STRIPW
stripe3	1049778.23828099990	2708072.77246099990	7.8650000000000	STRIPW E
stripe4	1049768.14062500000	2708037.37646500020	8.0870000000000	stripw B
stripe5	1049768.61718799990	2708055.13037100020	7.8480000000000	STRIPW
stripe6	1049769.18750000000	2708073.07763700000	7.8320000000000	STRIPW E
stripe7	1049759.12109400010	2708037.52636699980	8.1210000000000	stripw B
stripe8	1049759.51171900010	2708055.46630899980	7.9420000000000	STRIPW
stripe9	1049760.17578099990	2708073.76757800020	7.8940000000000	STRIPW E
stripe10	1049750.28125000000	2708038.24853499980	8.1270000000000	stripw B
stripe11	1049750.69140599990	2708055.85546900010	7.9950000000000	STRIPW
stripe12	1049751.27734400010	2708073.69238300020	7.9570000000000	STRIPW E

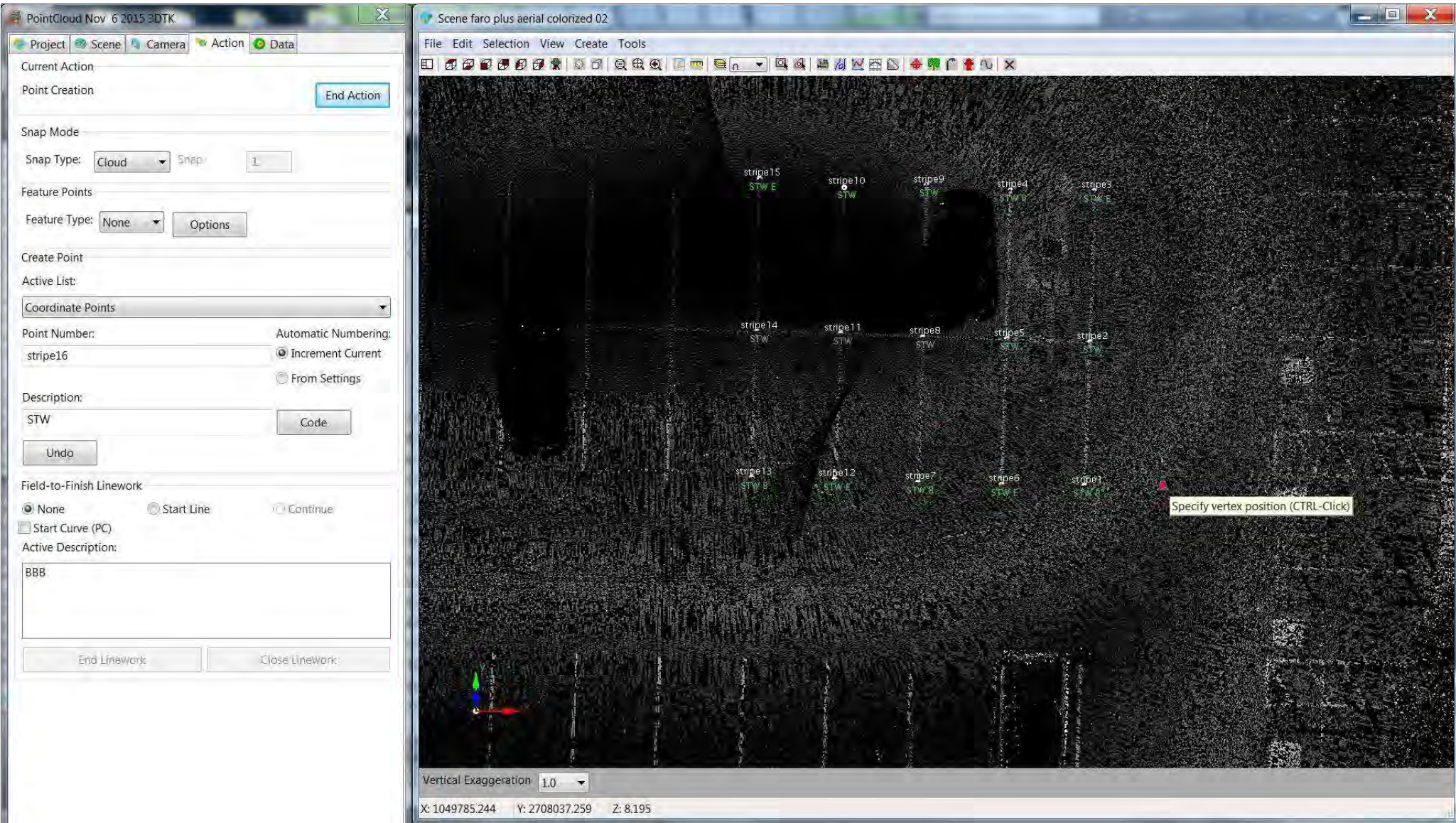
The dialog box also includes a toolbar with icons for adding, deleting, and editing points. The status bar at the bottom of the dialog indicates '21 Coordinate Points, 12 Selected'. The background shows a 3D point cloud of a road and stripes, with labels for 'stripe2 STRIPW' and 'stripe1 STRIPW E'.

We could add points from elsewhere and we can delete points from this list.

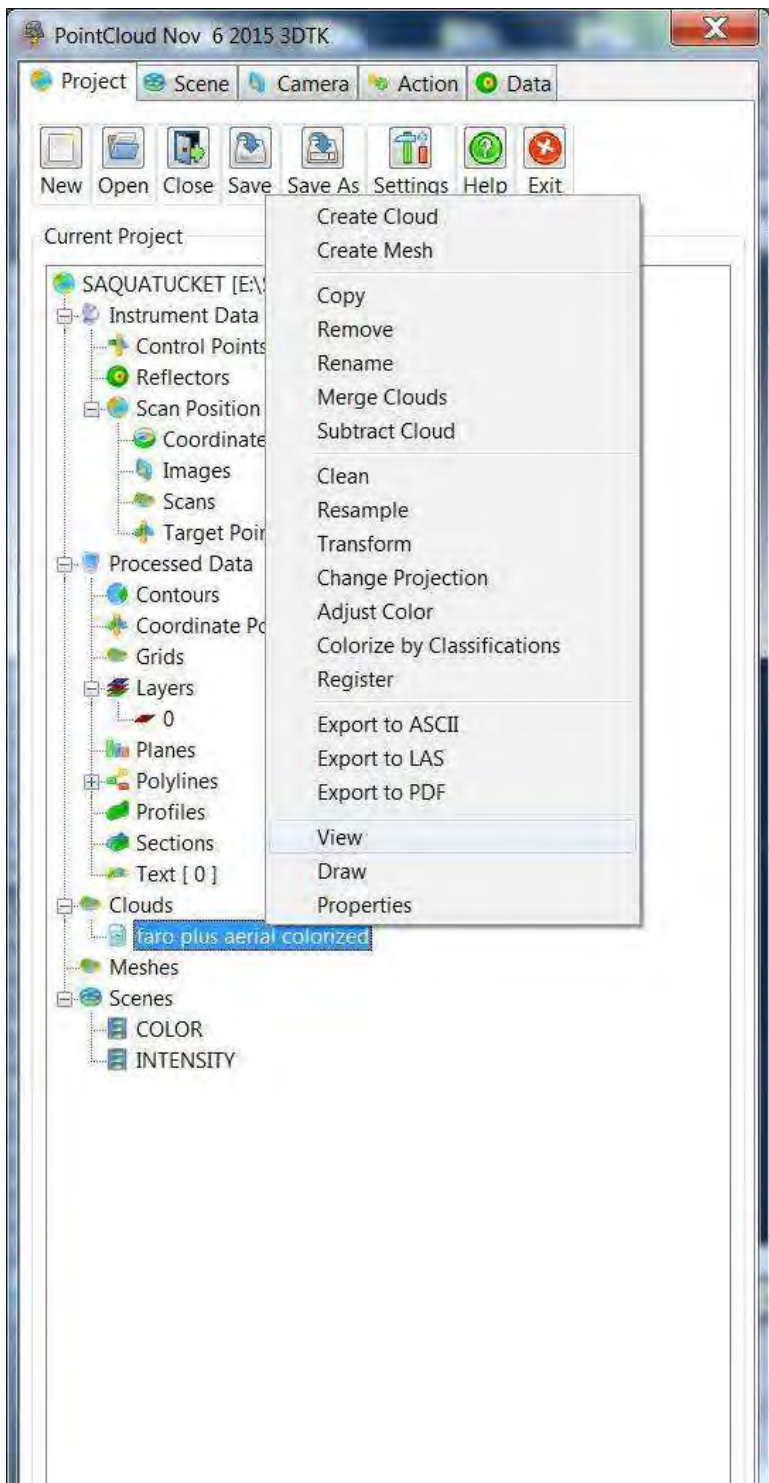
Descriptor Keys field list 2009-04-01.xls [Compatibility Mode] - Microsoft Excel

	A	B	C	D	E	F	G	H	I	J	K	L
25	RB	Re-Bar	SWAMP	Swamp, Edge of								
26	SB	Stone Bound	WRACK	Wrackline								
27	ST	Witness Stake	MARSH	Salt Marsh								
28				ROADS								
29		TRAVERSE / MONUMENT SUFFIXES	ED	Edge of Dirt Road or Drive								
30	S	Set	EG	Edge of Gravel / Stone								
31	F	Found	ES	Edge of Shell								
32	B	Broken / Obliterated	EP	Edge of Pavement								
33	T	Tipped	EC	Edge of Concrete								
34		BMF, IPS, MHBB, LCBT	BCC	Bottom Concrete Curb								
35			TCC	Top Concrete Curb - back edge								
36		STRUCTURES	BSC	Bottom Stone Curb - gutter line								
37	BLD	Building corner	TSB	Top Stone Curb - back edge								
38	DK	Deck corner	BBB	Bottom Bituminous Berm - gutter line								
39	FF	First Floor	TBB	Top Bituminous Berm - back edge								
40	TOF	Top of Foundation	TAC	Top Asphalt Curb								
41	TOS	Top of Slab	BAC	Bottom Asphalt Curb								
42	FND	Foundation corner	STW	White Stripe								
43	POOL	Pool, inground - Edge or corner	STY	Yellow Stripe								
44	POOLA	Pool - Above Ground	PATH	Path								
45				FIELD CODES								
46	FEN	Fence		Space B = begin line (ex: TOB B)								
47	FENC	Fence - Chain Link		Space E = end line (ex: TOB E)								
48	FENG	Guard Rail		No Space NE = no elevation (ex: TOBNE)								
49	FENP	Fence - Picket										
50	FENR	Fence - Rail										

Have your Field Codes on hand. STRIPW from my 2009 list became STW in my 2014 list... It is so obvious. We are revising our list to be as minimal as possible to speed up the extractions.



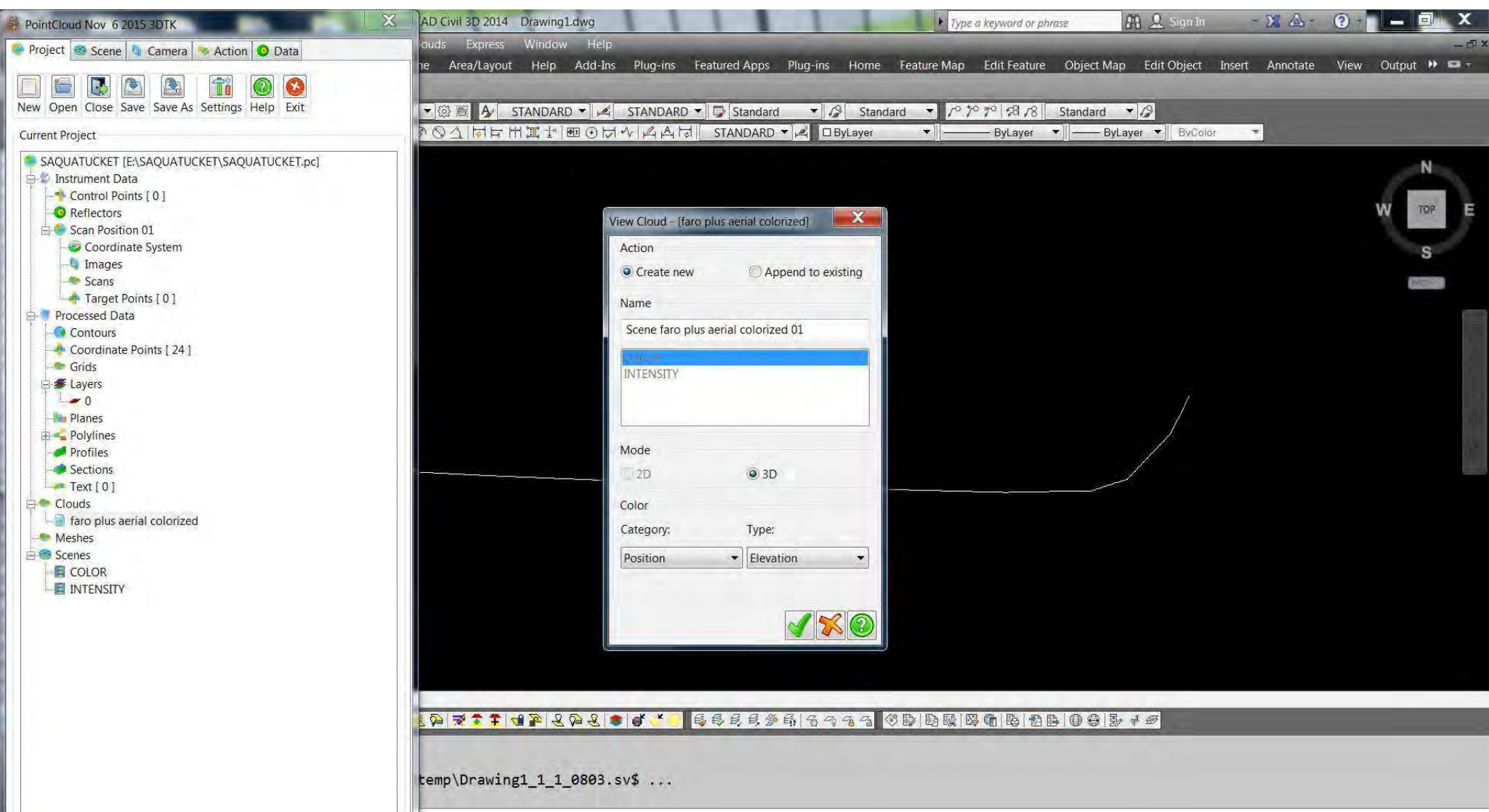
Stripes are easy. We can select the end of each stripe. We can quickly add the B and E (+7/-7) codes. We can extract all the parking spaces in a relatively short amount of time.



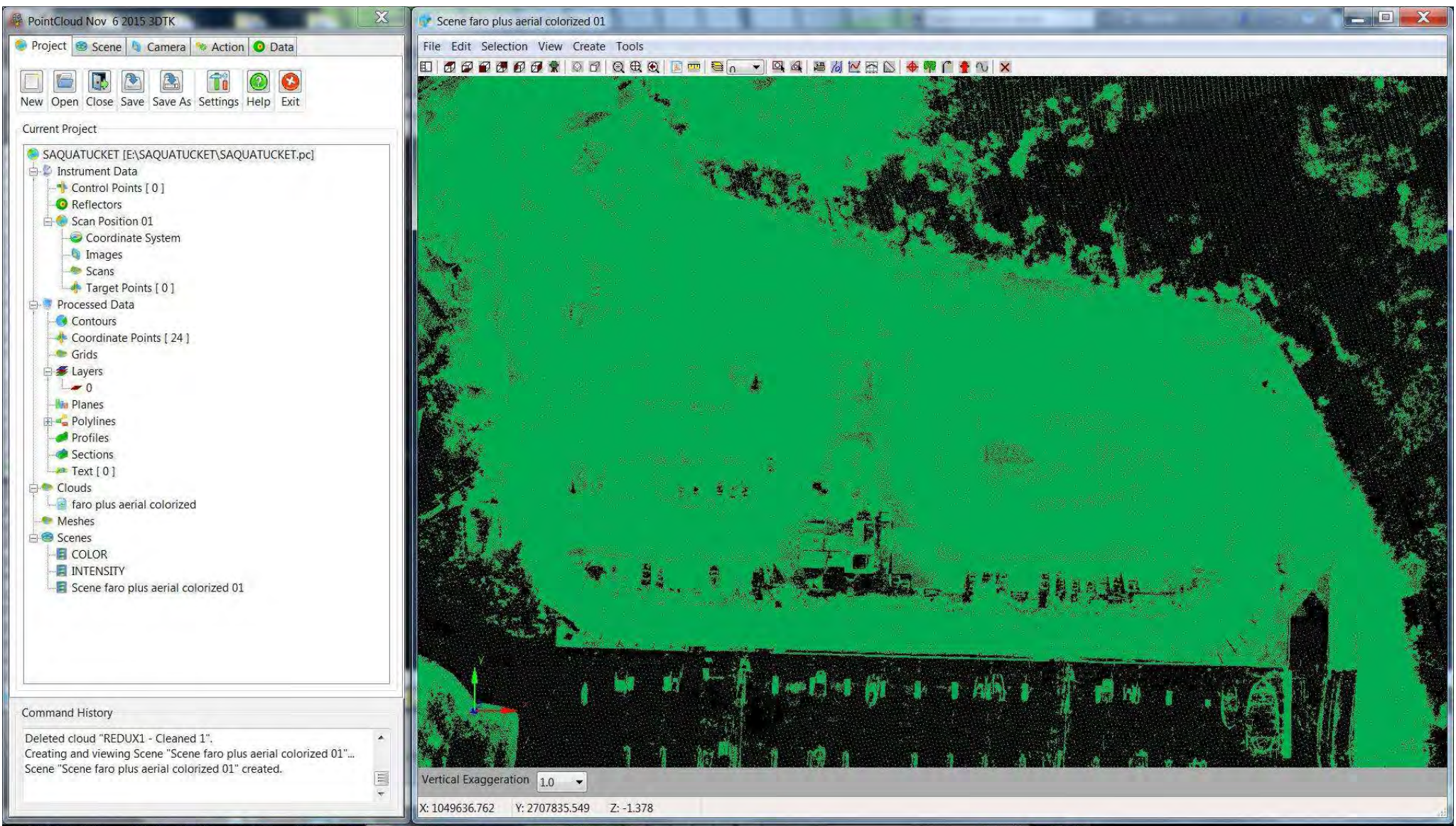
The project can get very confusing. There are automatic cloud naming conventions that are found in the settings. Even then, there can be quite a bit of unnecessary or confusing lists of clouds.

So, I find it important to clean the project several times throughout the day. Rename the Clouds, Scenes, Polylines and otherwise.

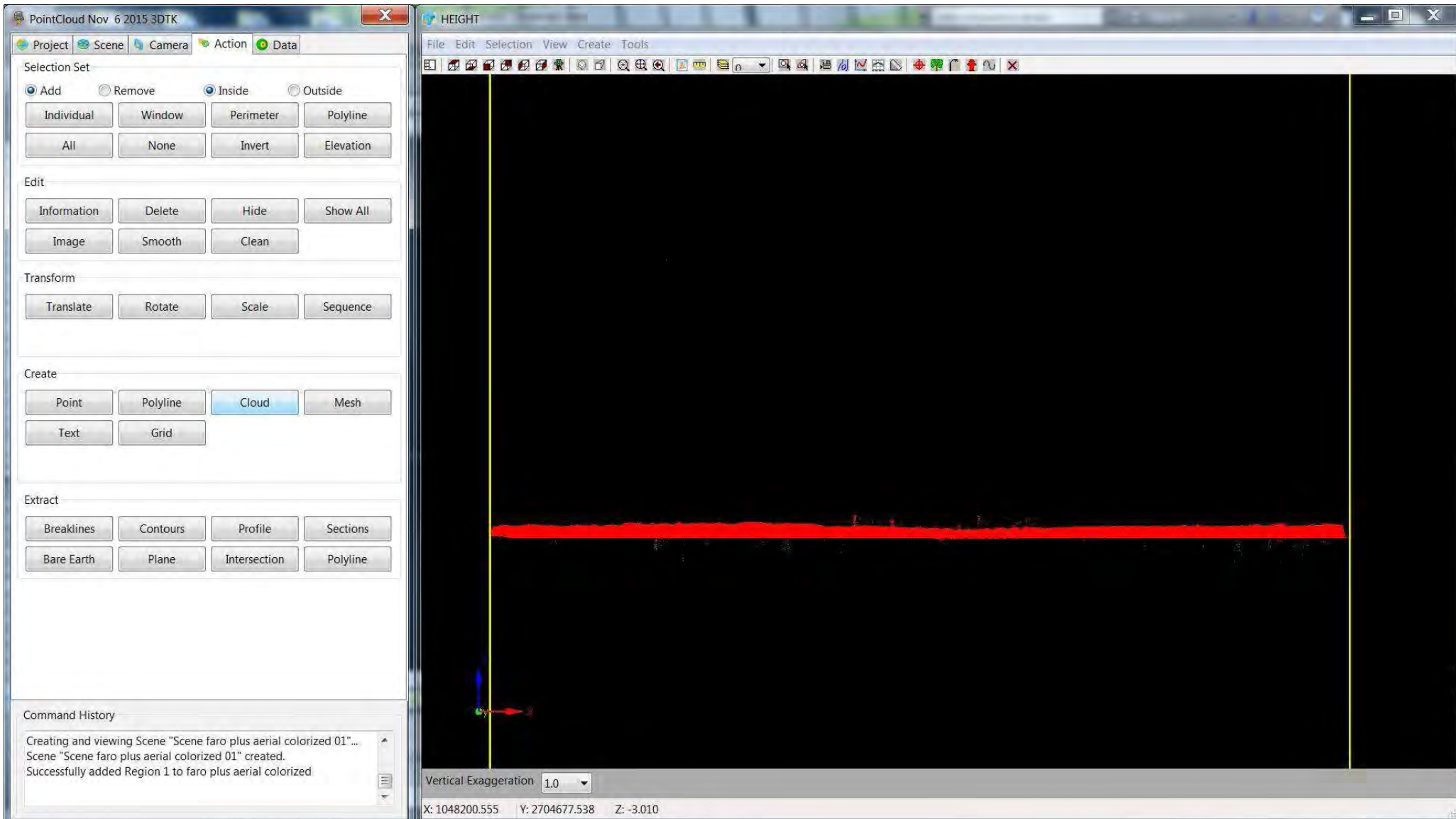
Imagine yourself opening the project in the future.



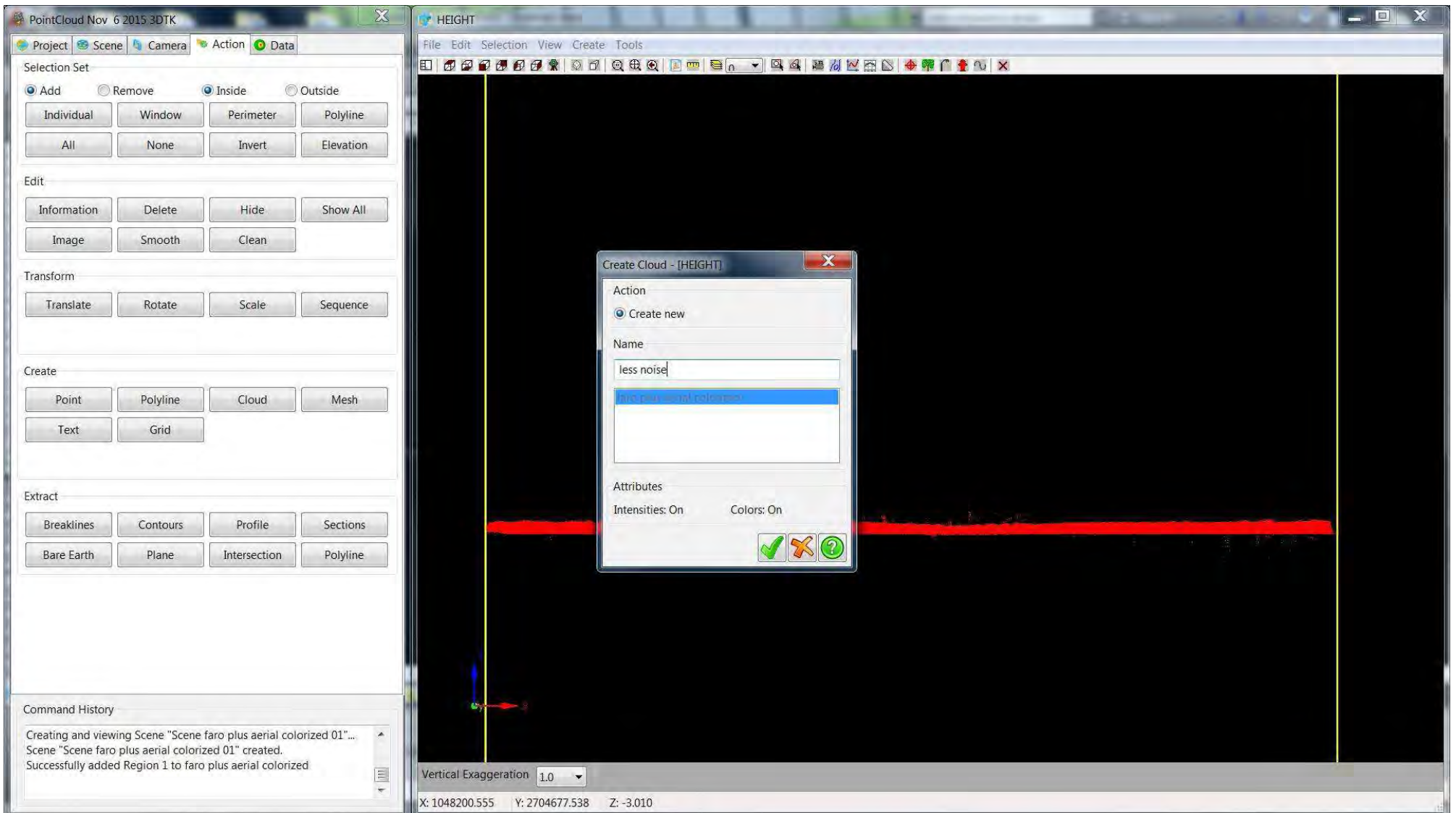
Create scenes to use later – COLOR, INTENSITY, HEIGHT of the whole cloud are rather simple names for clouds you may return to over and over again.



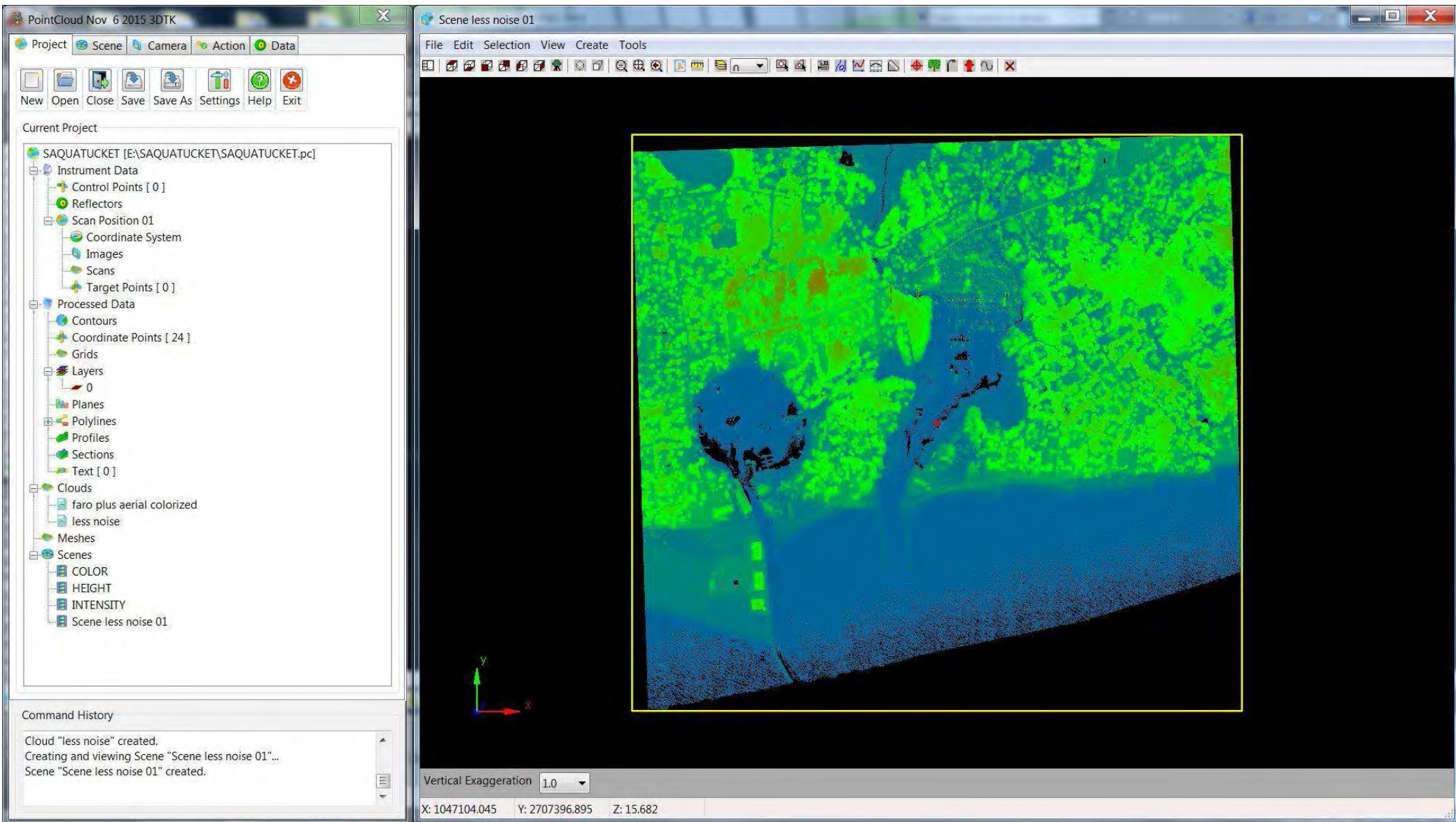
Cloud by height will soon have better controls for the elevation change for the colorization. This cloud has a bunch of Noise and the color banding is stretched from the low to the high points...



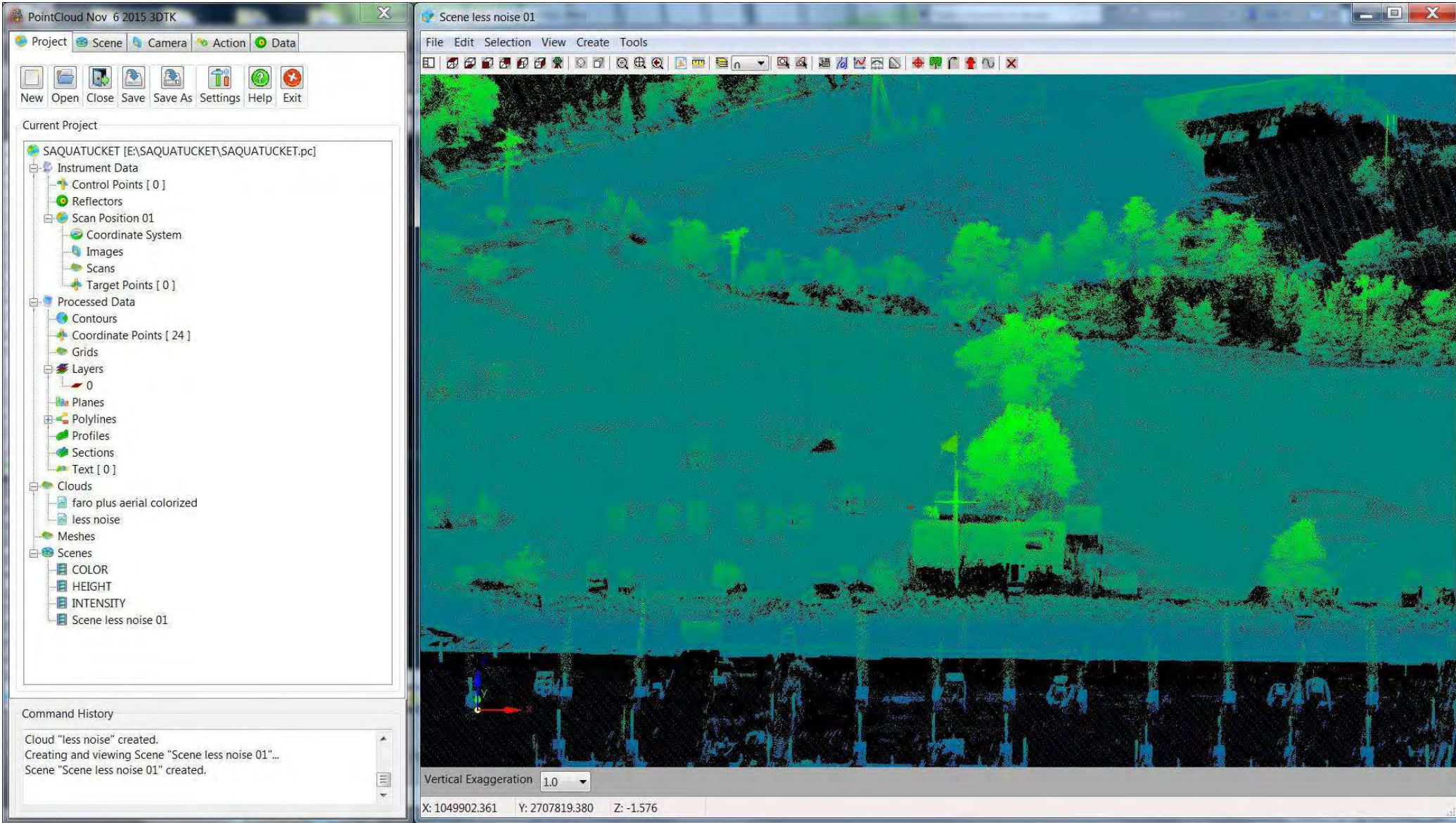
This is the same cloud viewed from a side. Someone with good eyes may pick out some points above and below the cloud (Noise). The points in red are the bulk of the cloud.



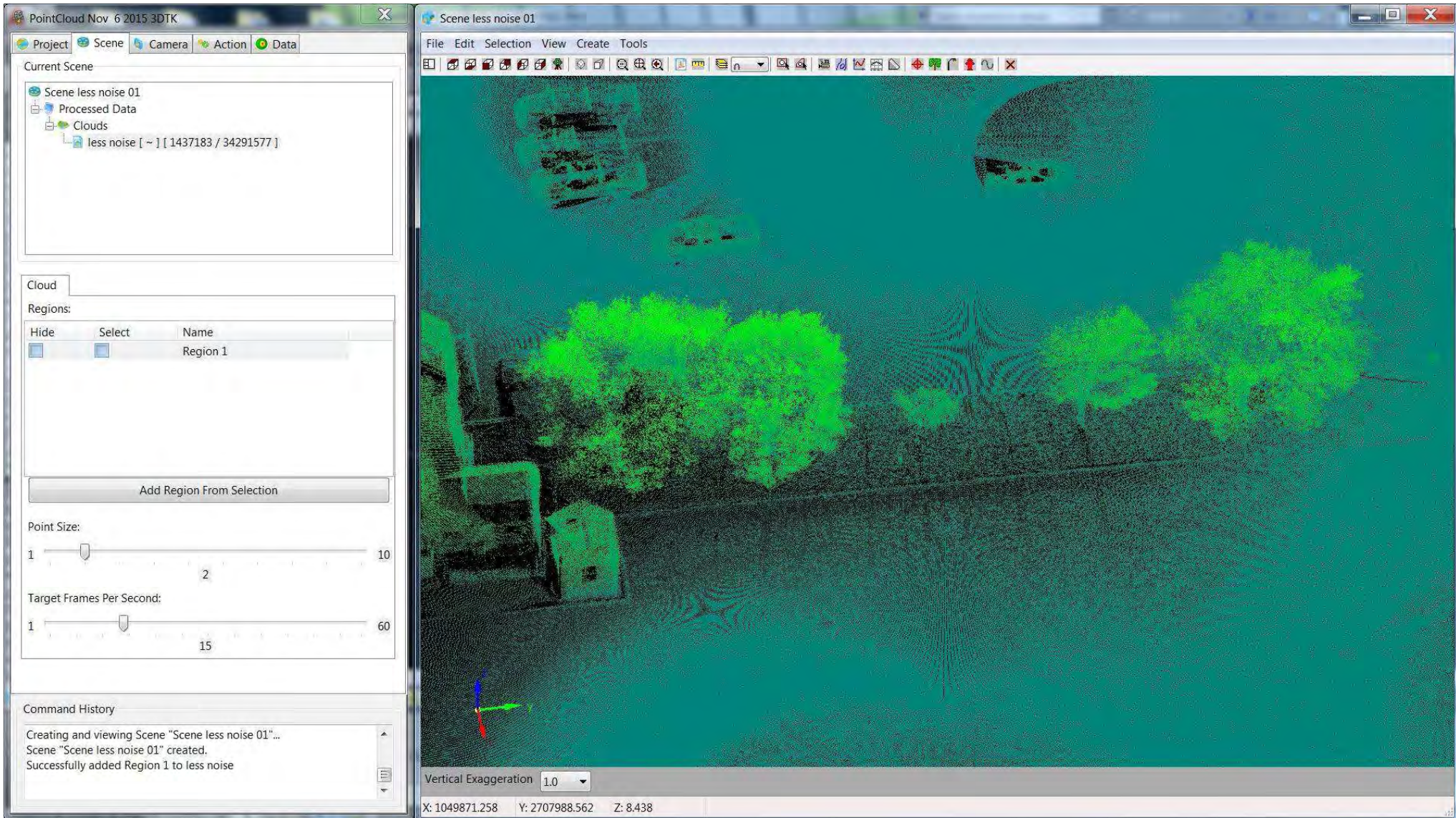
So we make a new cloud to eliminate the noise. Keep track of these extra clouds for when you perform your project clean up.



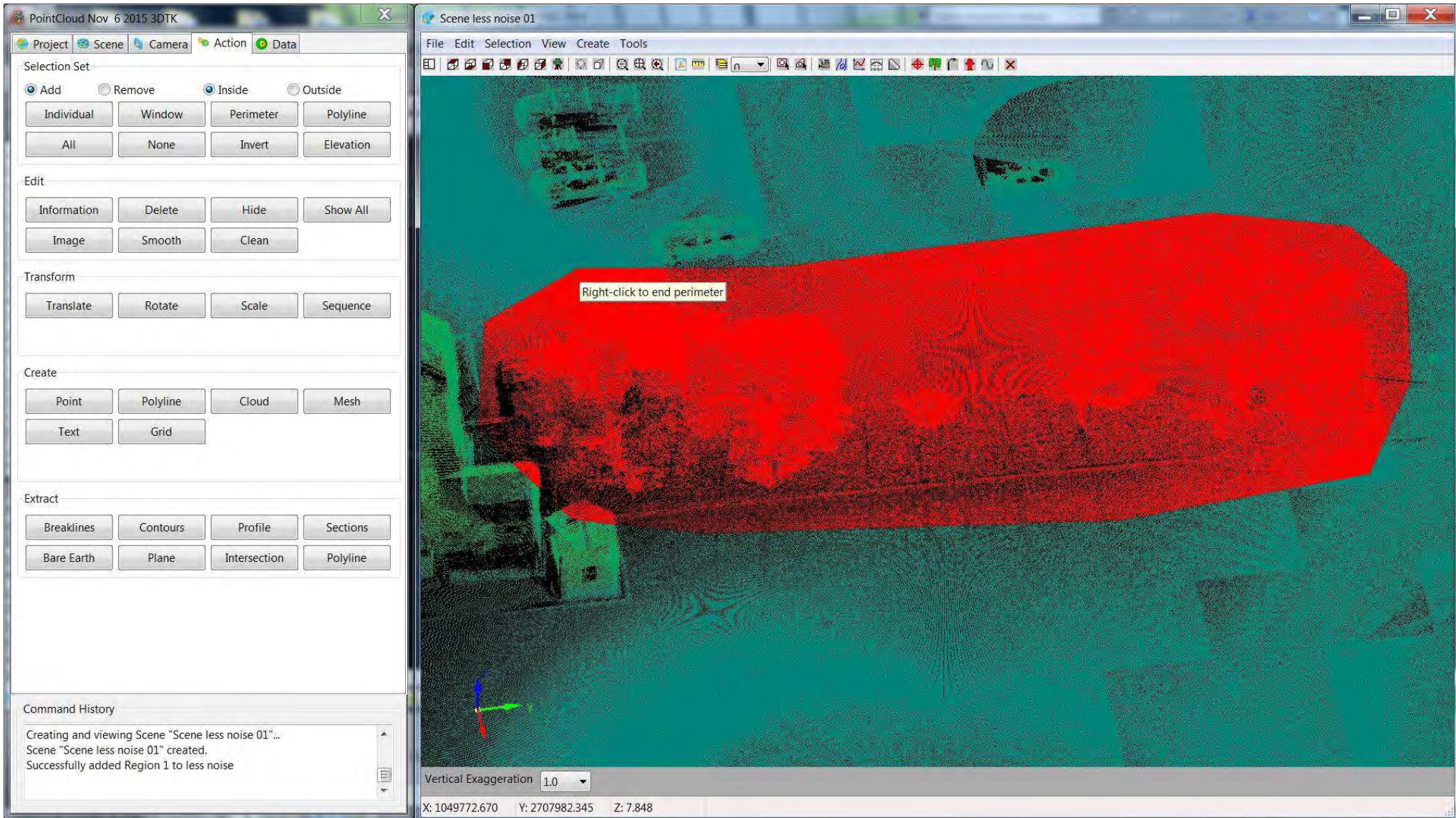
Now when we create a SCENE based on height we can see some colorization. This will get better.



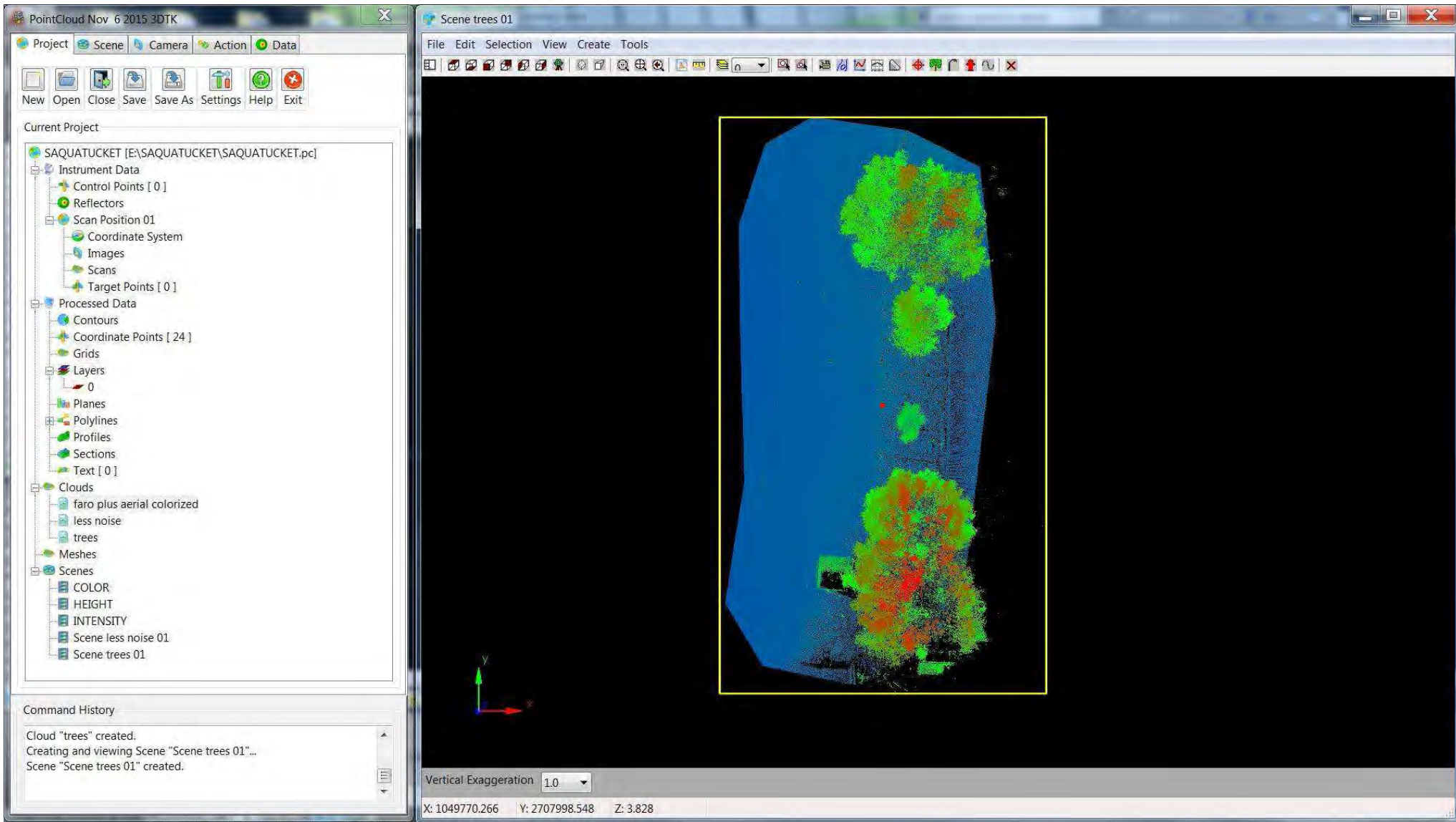
The trees are green, the parked cars show up.



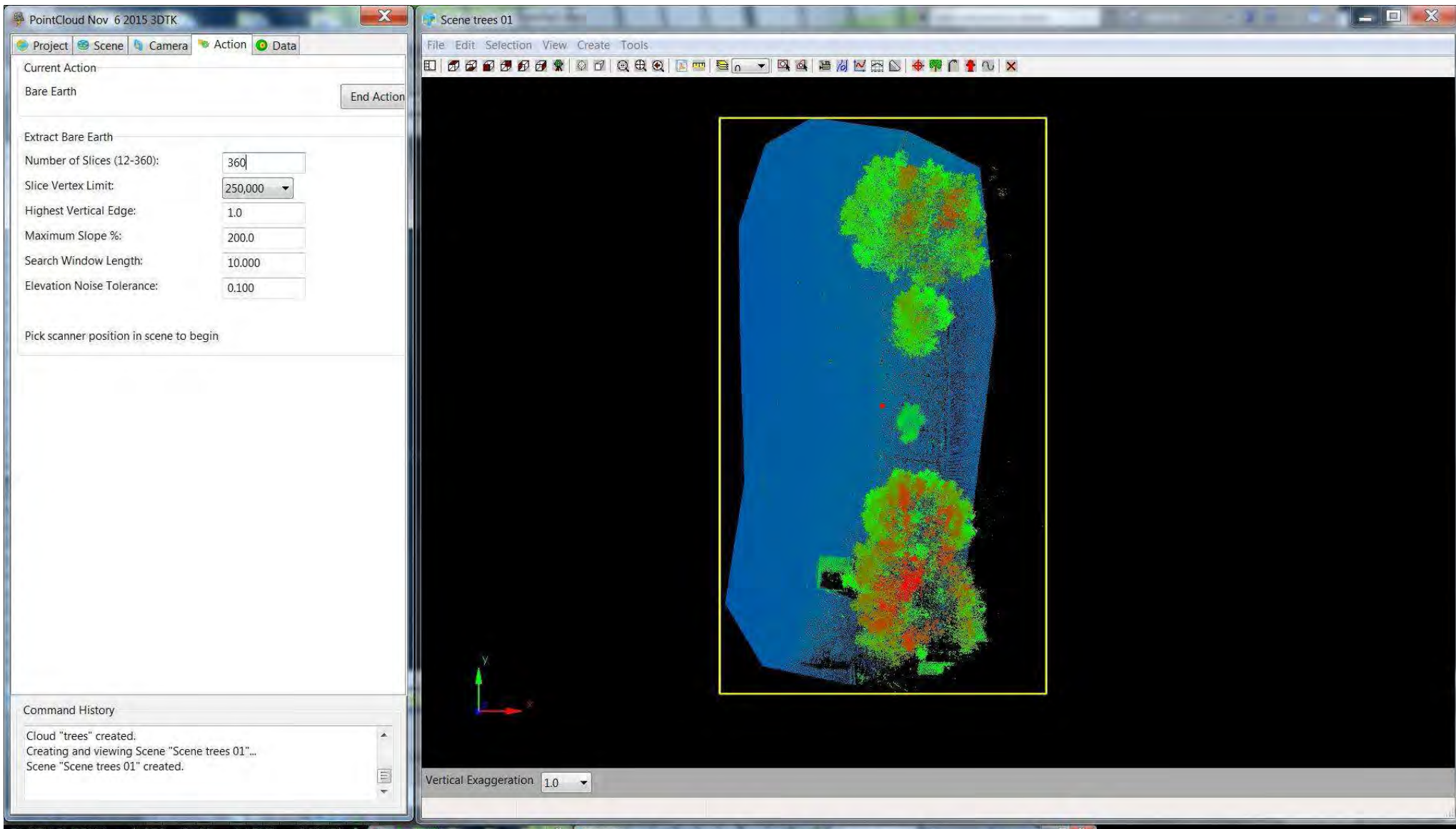
I want to extract some trees. We can see them, so let's get them.



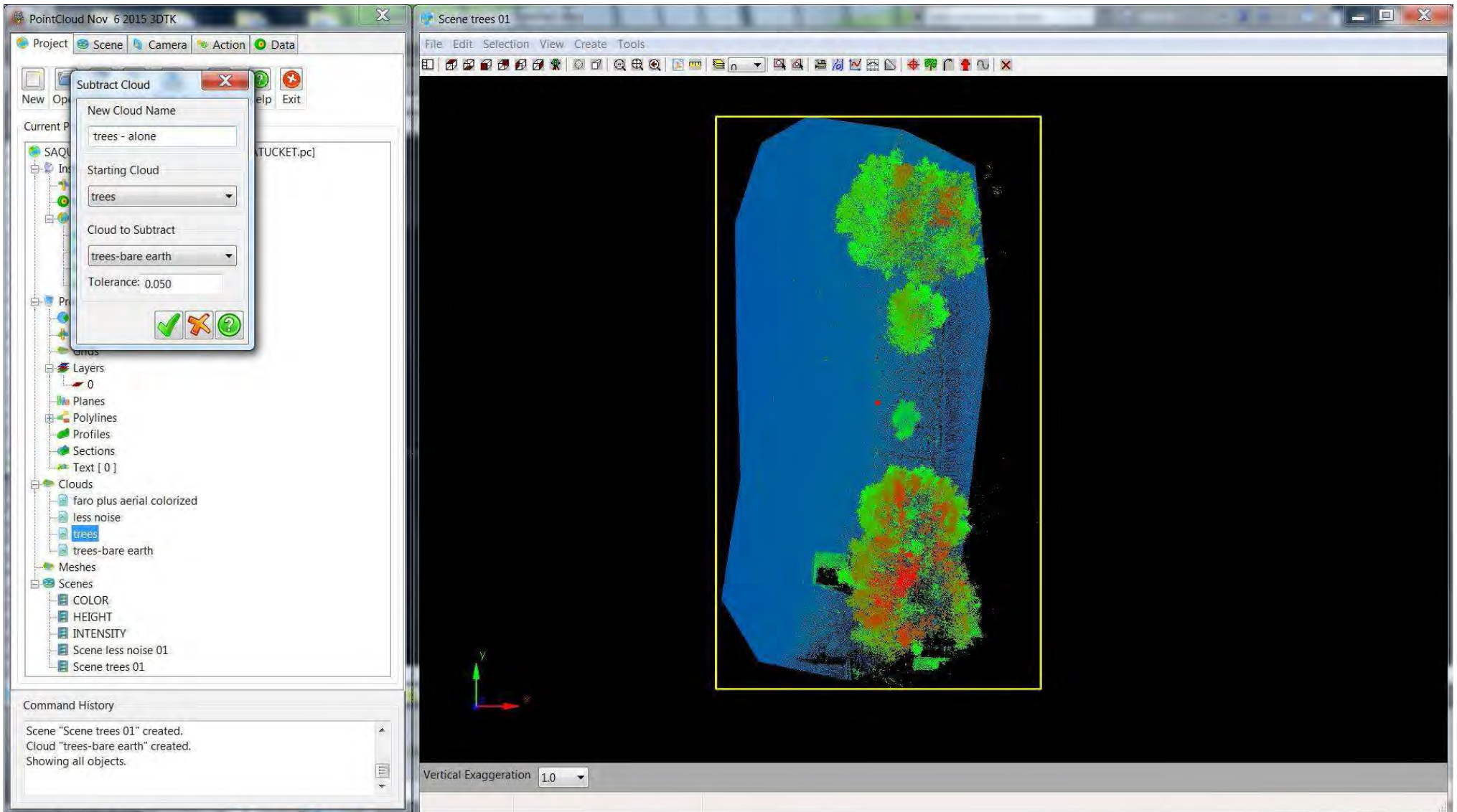
We can make the project messy again by selecting the area and extracting a little cloud. Little clouds are faster and easier with the tree extraction.



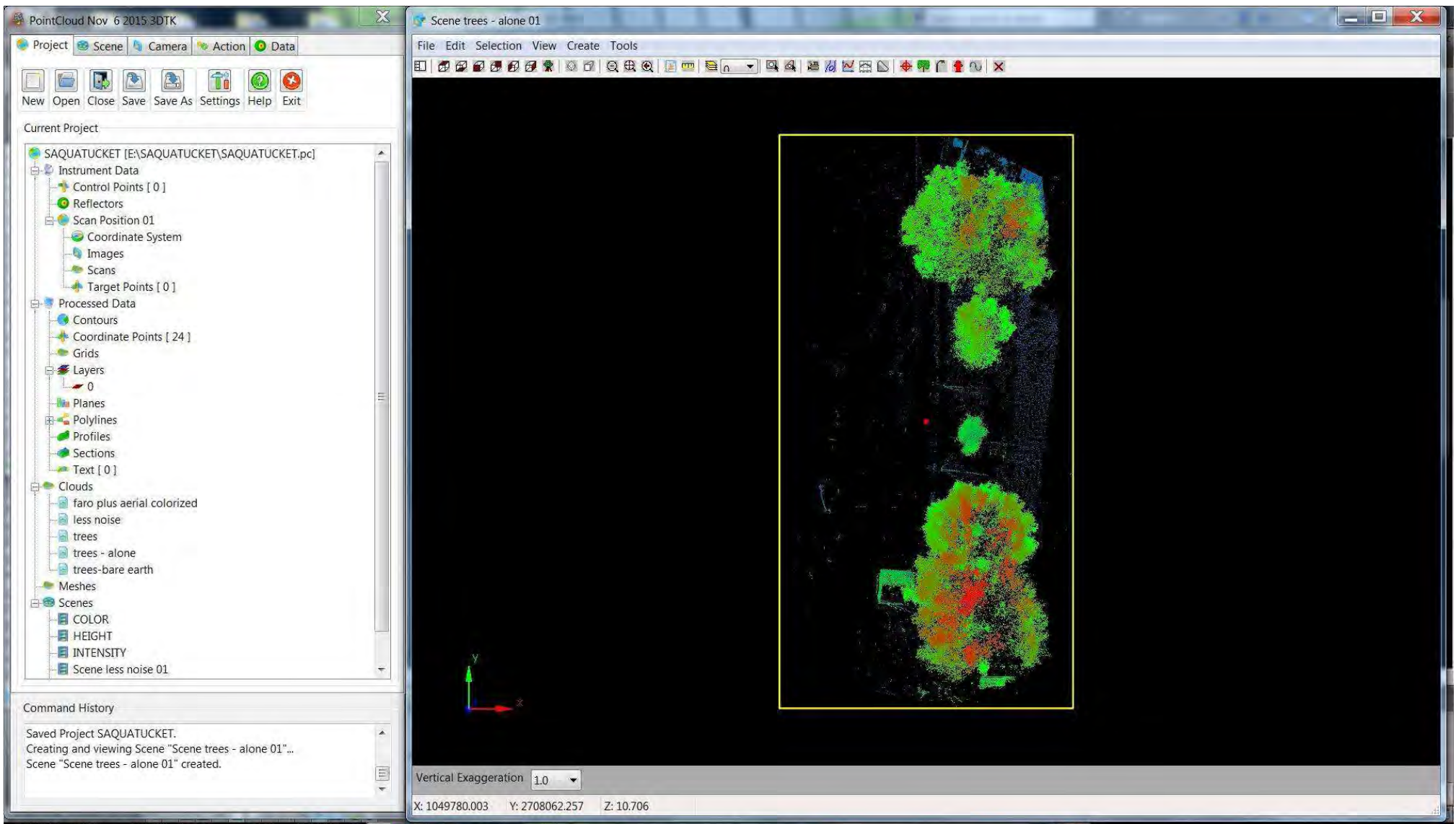
The new cloud has less noise and less range, the height view is even better.



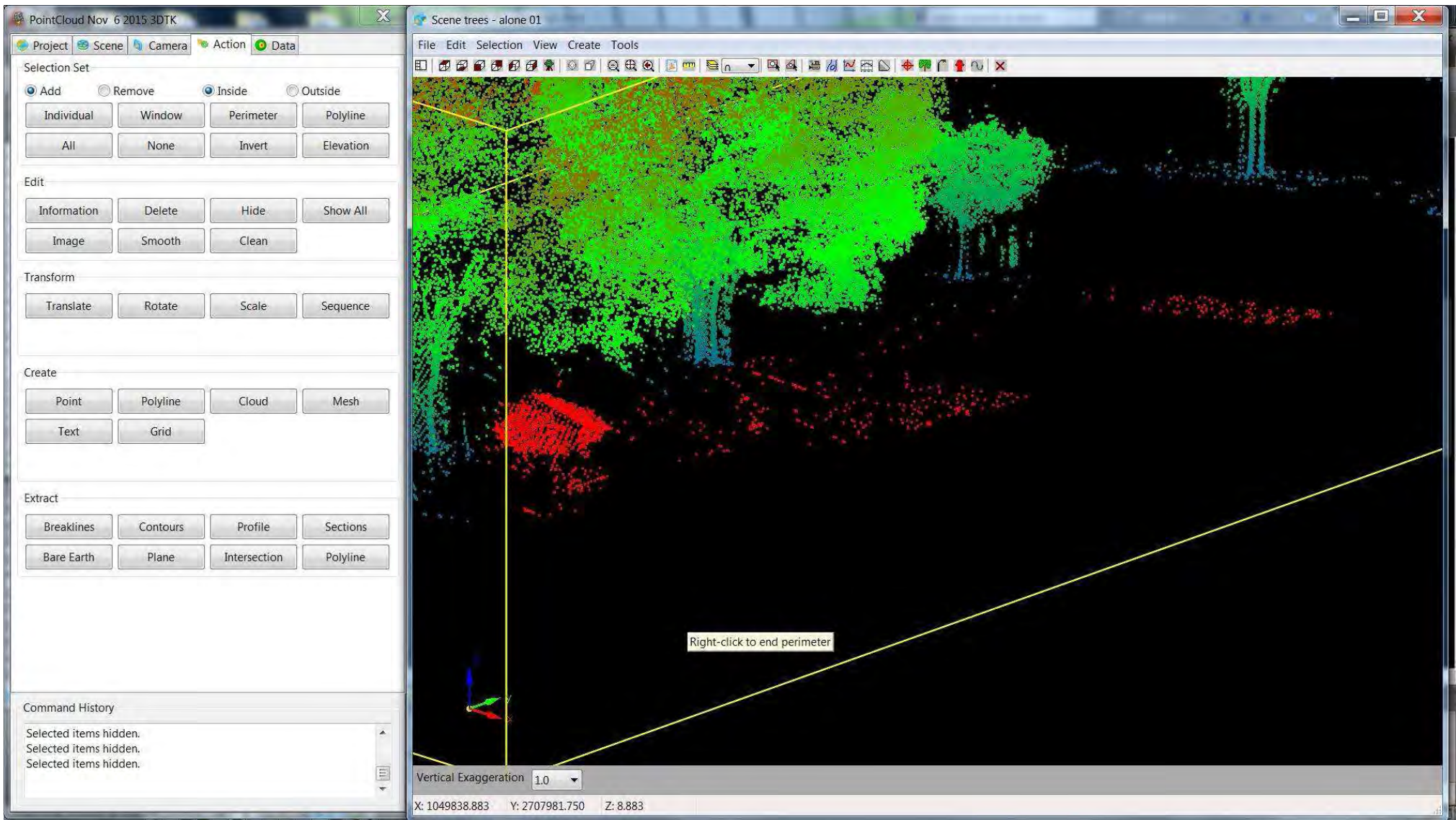
We can use the Bare Earth function to create a new cloud with the Ground. This function is based on some variables...



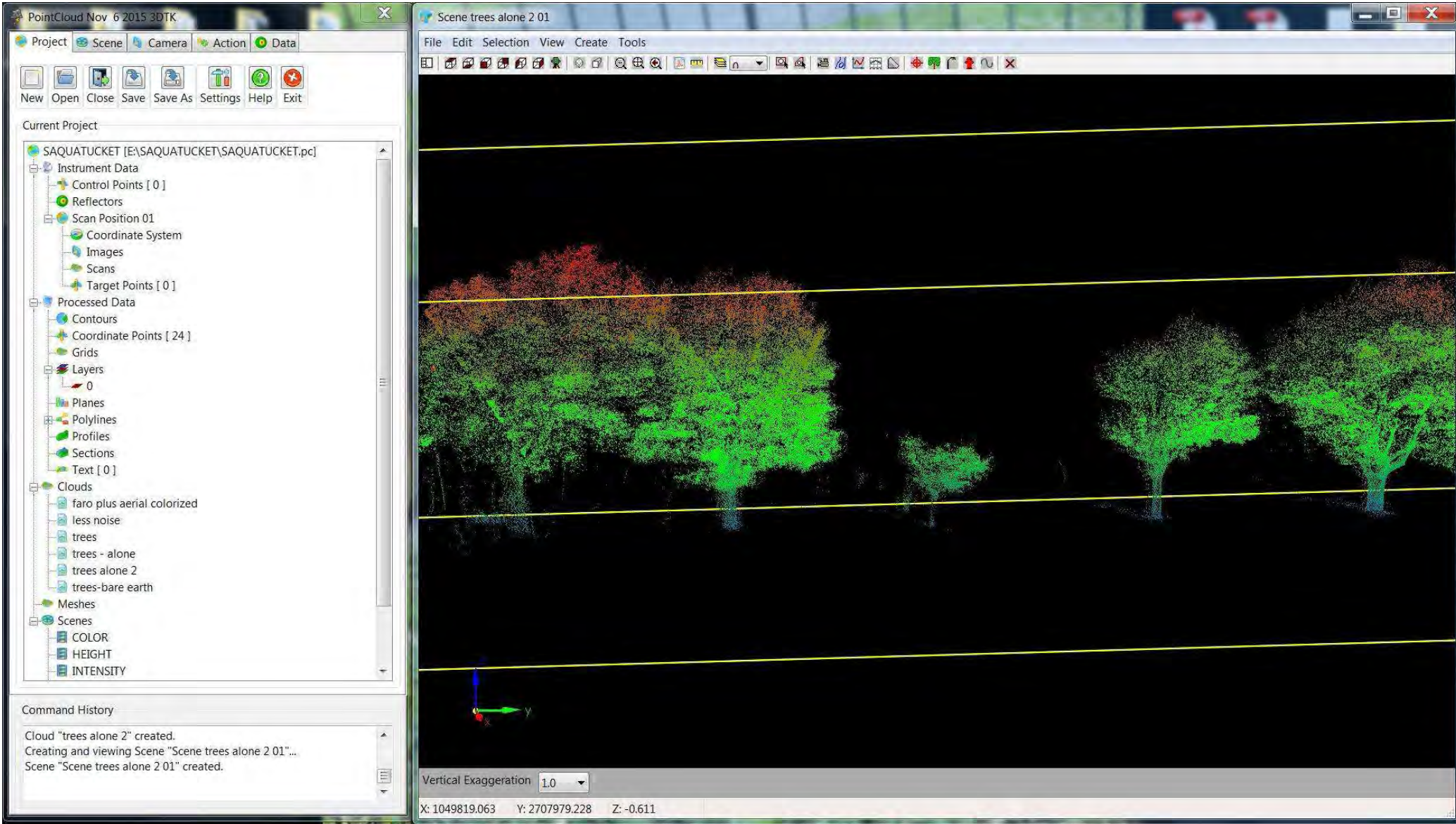
Here is another function I requested: SUBTRACT cloud. Carlson had MERGE CLOUDS for a while to put many into one, but what if you want to remove something? What if you cleaned all the trees and made little clouds for each? Then you could create something closer to Bare Earth by merging the trees into one cloud and subtracting that cloud from the big cloud.



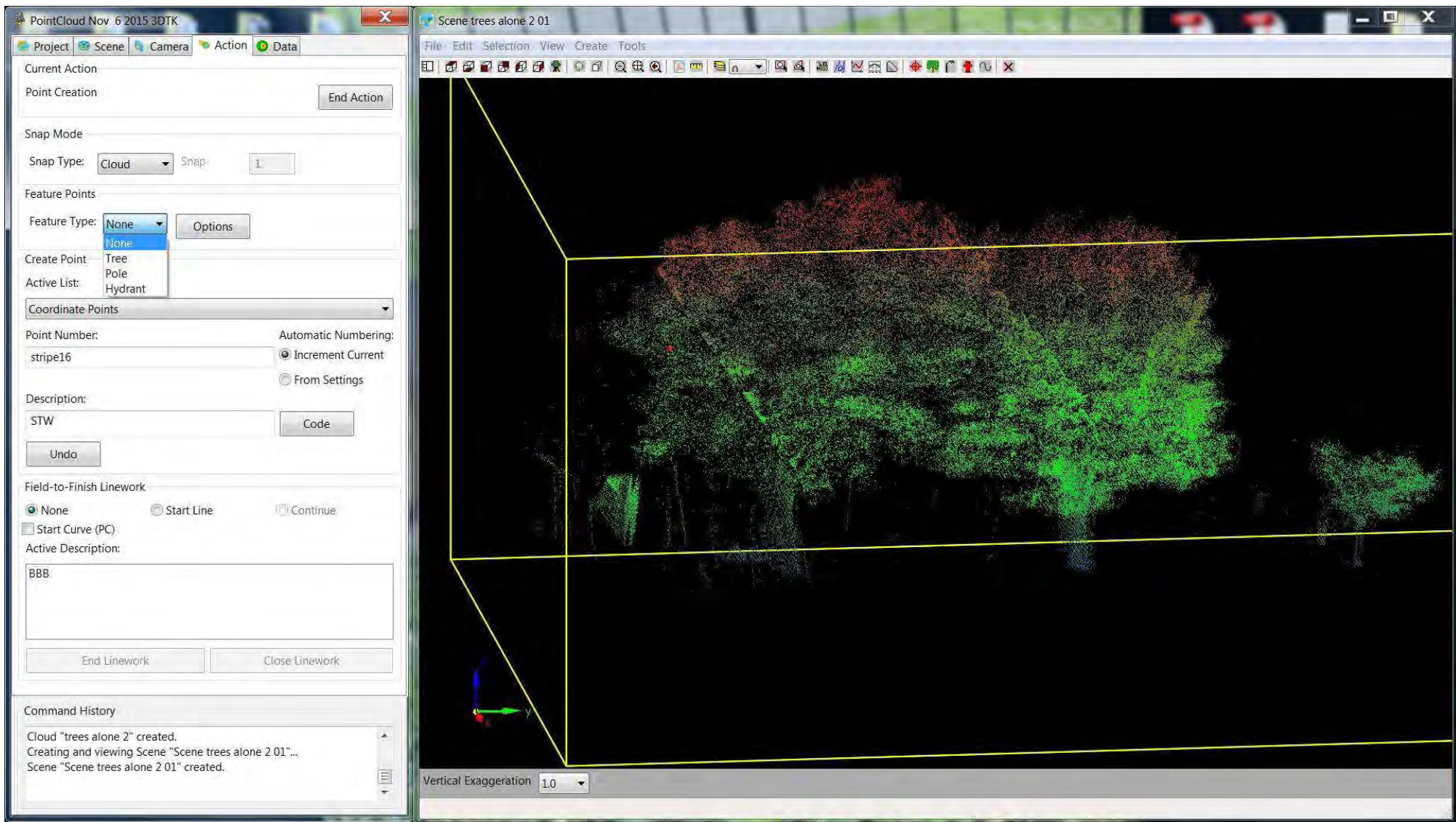
Not too bad, but we still have some points on or near the ground. We can select those and hide them, then select the visible and create a new cloud.



We can look from any angle, so we can grab points under the trees.

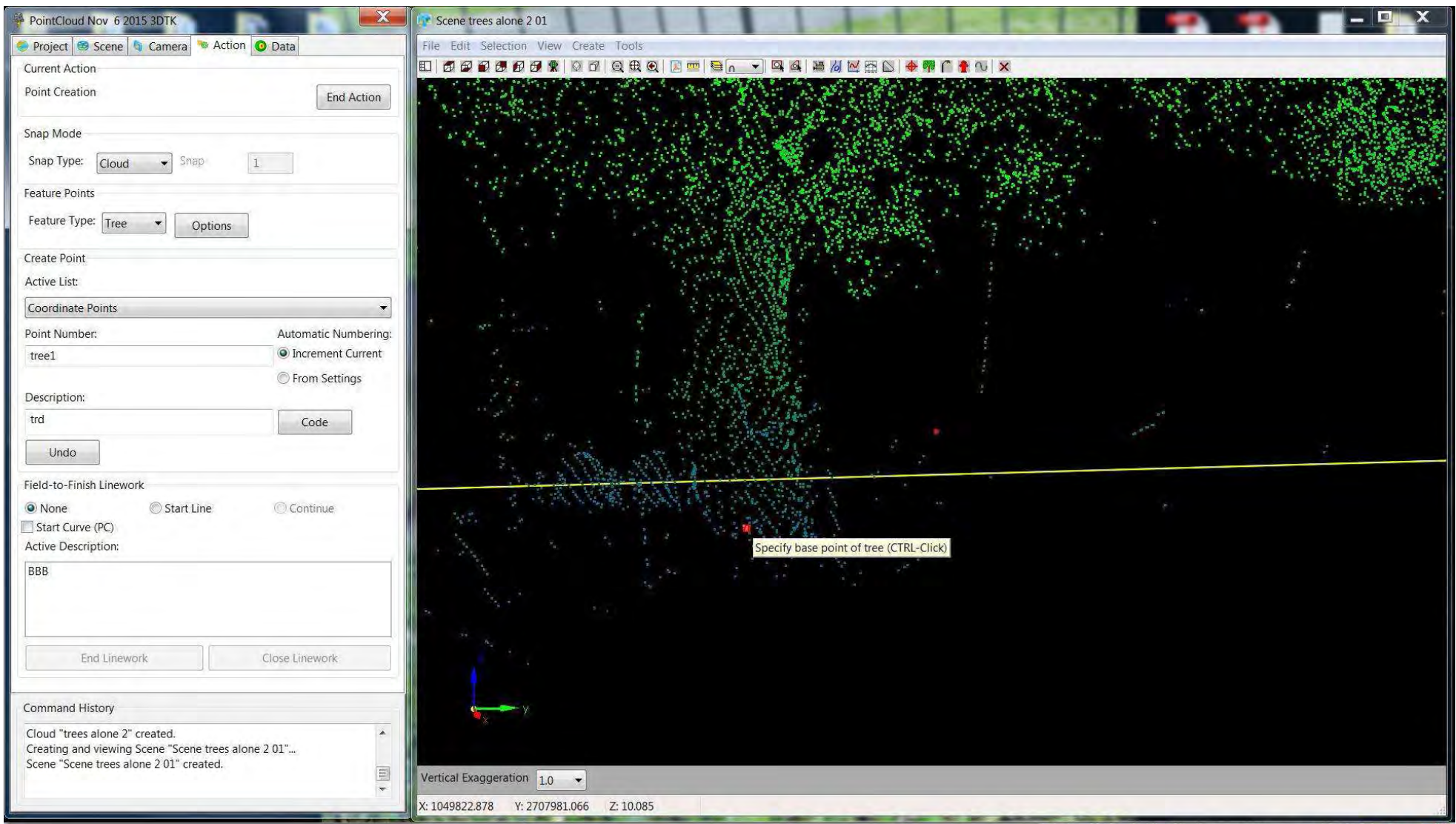


We now have a pretty clean cloud. We could do more to reduce the rogue points, but this is good enough for some tree extractions.

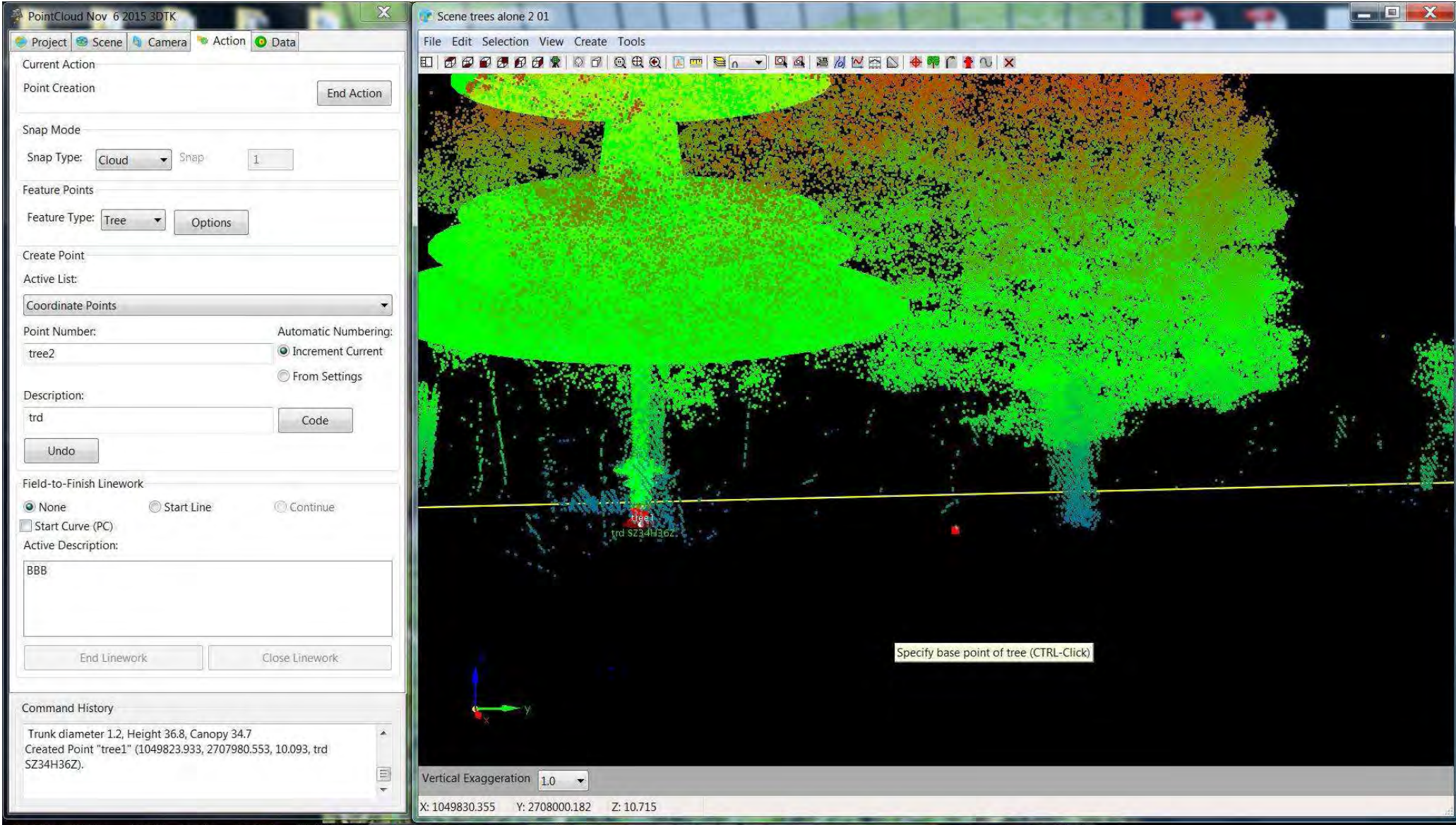


ACTION->POINTS

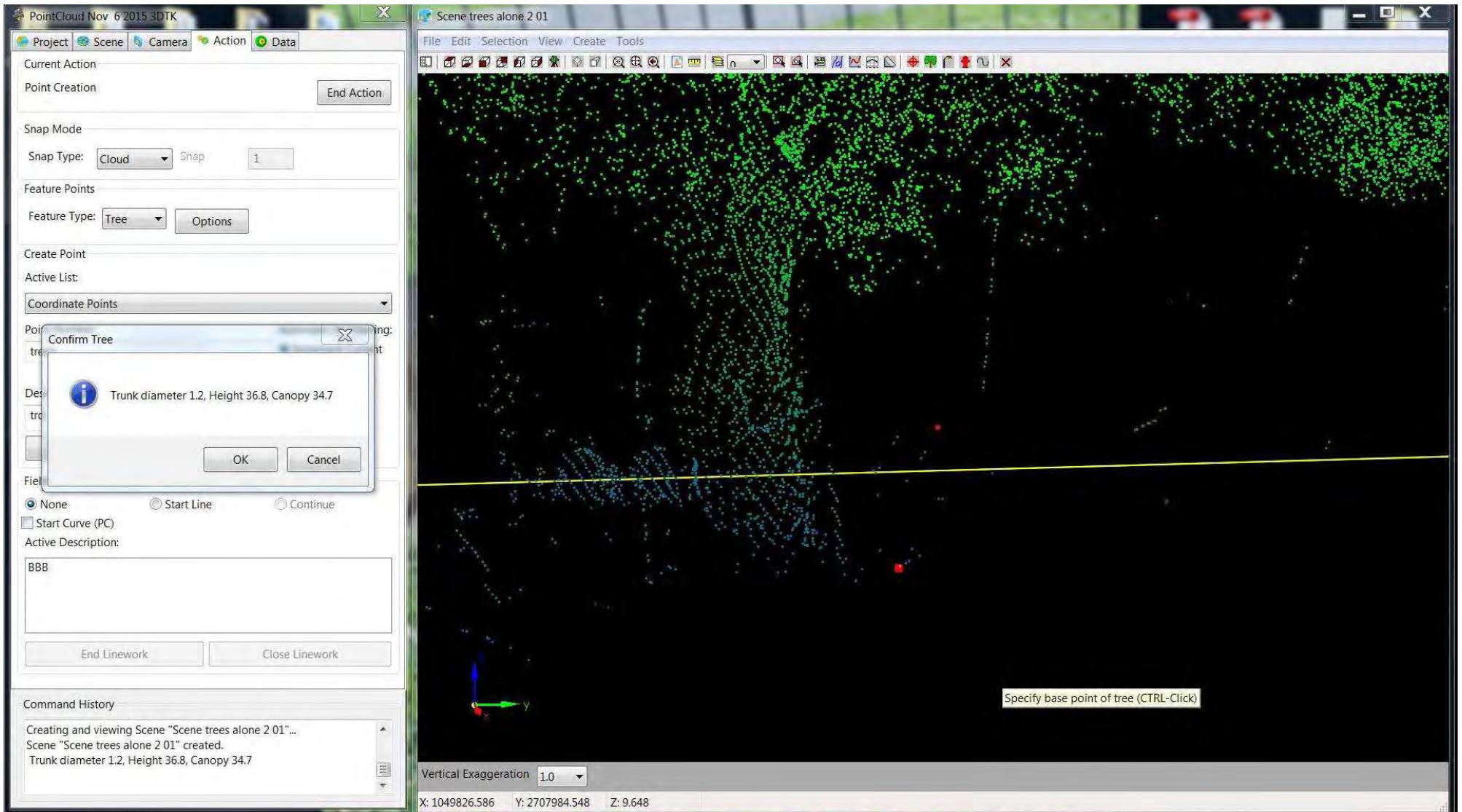
There are some Feature Types: Poles, Hydrants and Trees. We expect more in the future like Signs and I hope for Cars. Why Cars? Because if I can make little clouds from cars, I could subtract those from my main cloud.



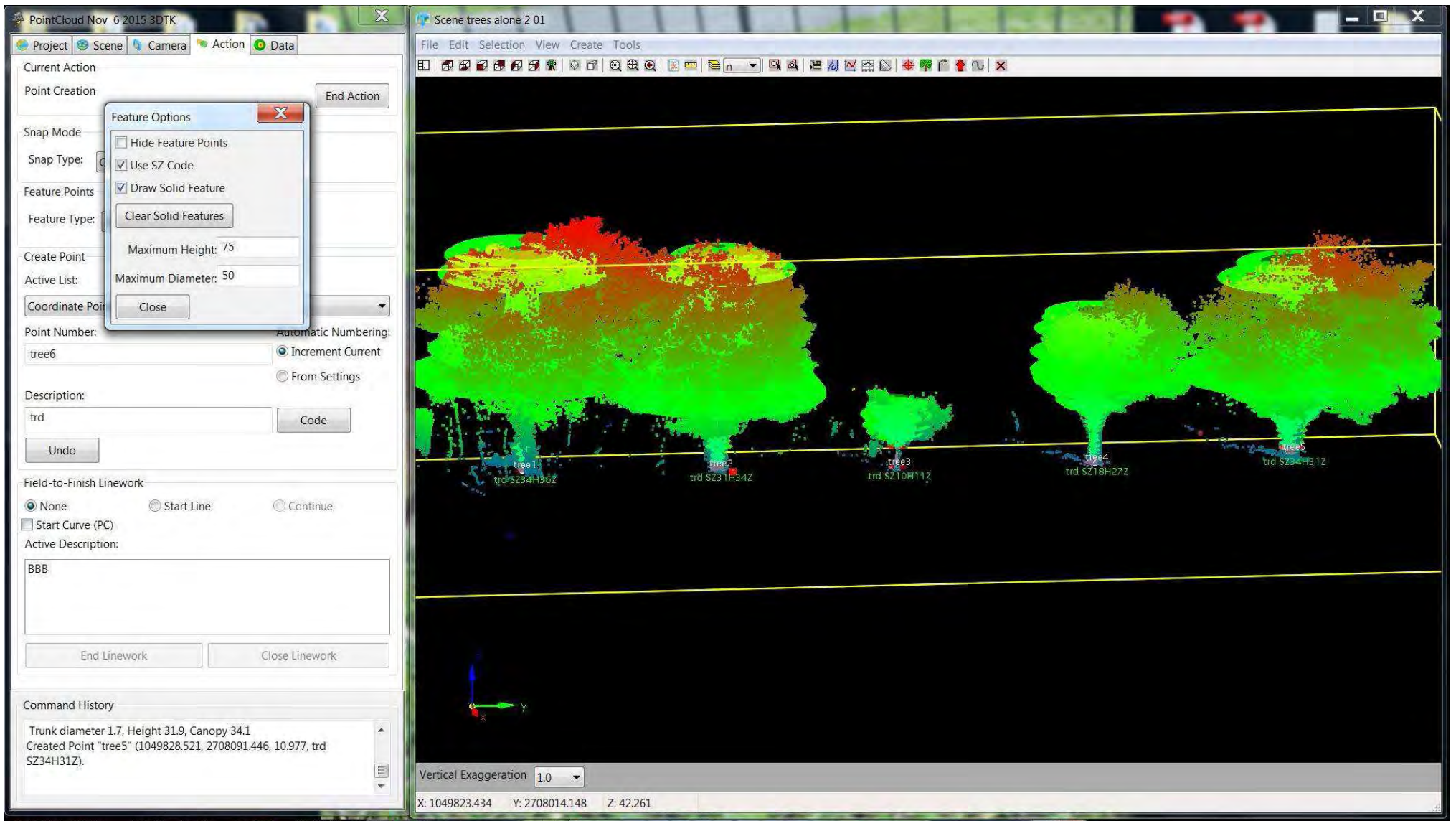
We use CTRL + LEFT CLICK to select a point or perform an action.



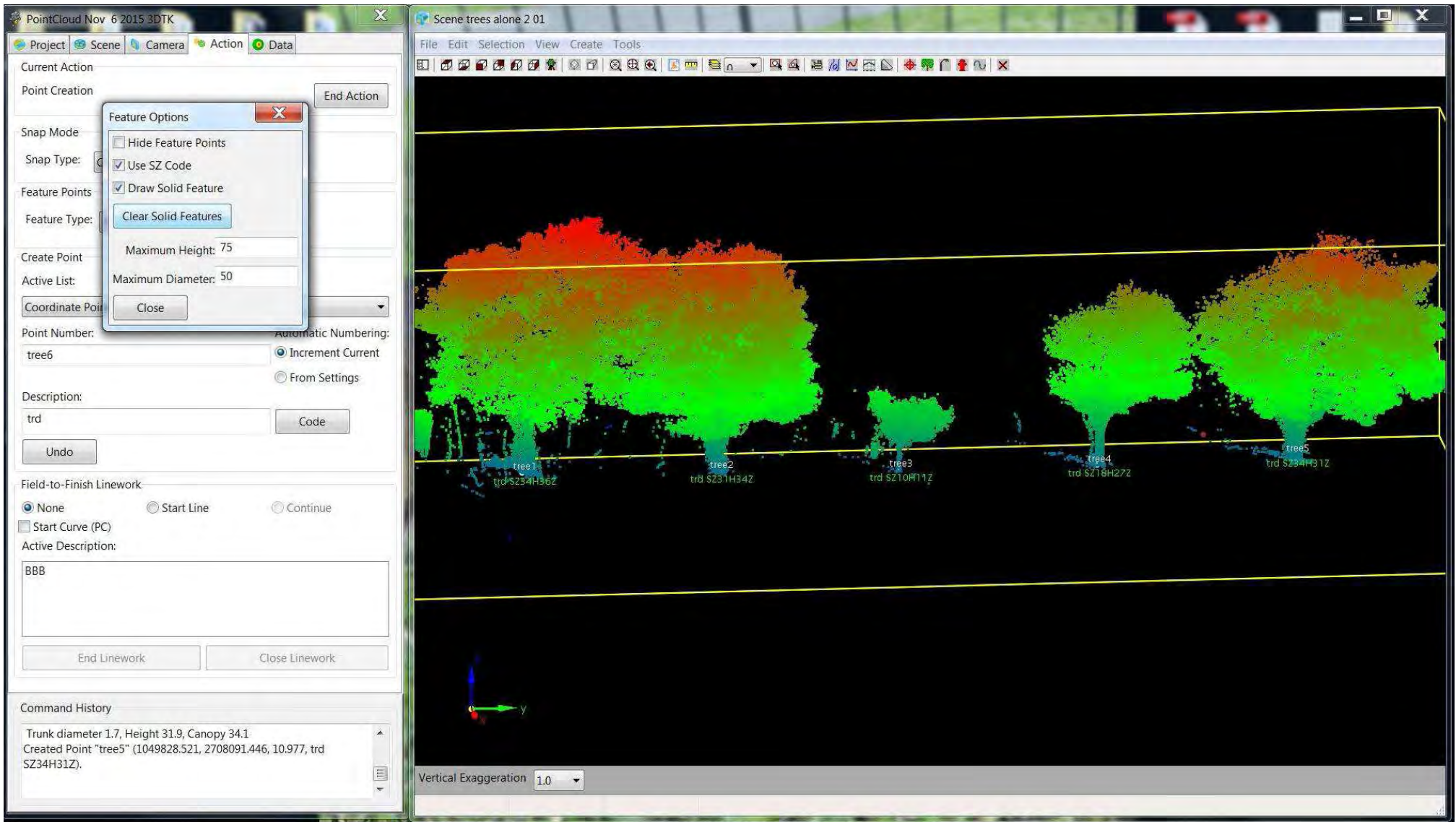
Huh, what is that? The program determines a Trunk Diameter, Height and Canopy of the Tree. Then it adds a weird solid feature based on those numbers.



When you extract the tree, it pops up with the data. The descriptor can be augmented to include sizes.



This is why we spent a few moments cleaning out the cloud. We want the sampling to be quick and we want the program to avoid the confusion: Oh I thought that those points way over there were part of this tree.



And poof! We can eliminate the weird solids. The points still show up.

Coordinate Points

Name	X	Y	Z	Description
road001	1049604.04621000010	2707931.76805000010	5.46250900000	bbb B
road3	1049605.96484400010	2707927.04834000020	5.32300000000	BBB
road4	1049608.41796900010	2707922.81835900010	5.23900000000	BBB
road5	1049611.41406299990	2707918.75830100010	5.10900000000	BBB
road6	1049616.89843799990	2707912.06738300020	4.86100000000	BBB
road8	1049620.54687500000	2707908.41259799990	4.64300000000	BBB
road9	1049624.06640599990	2707905.27734400010	4.58700000000	BBB
road10	1049627.81250000000	2707902.20752000020	4.50400000000	BBB
road11	1049634.29296900010	2707898.06445300020	4.34100000000	BBB E E
stripe1	1049776.77734400010	2708037.32128900010	8.07300000000	
stripe2	1049777.41406299990	2708054.94433599990	7.86700000000	
stripe3	1049777.84765599990	2708073.39257800020	7.86000000000	
stripe4	1049768.83593799990	2708073.46533200010	7.84100000000	
stripe5	1049768.45312500000	2708055.32665999980	7.84900000000	
stripe6	1049767.88281299990	2708037.46142600010	8.08800000000	
stripe7	1049758.89453099990	2708037.69628900010	8.12300000000	
stripe8	1049759.40625000000	2708055.50439500020	7.94400000000	
stripe9	1049759.83984400010	2708074.06543000000	7.89400000000	
stripe10	1049750.99218799990	2708073.47168000000	8.53100000000	STW
stripe11	1049750.57421900010	2708055.92431600020	7.99400000000	STW
stripe12	1049749.92578099990	2708038.06250000000	8.13000000000	STW E
stripe13	1049741.02343799990	2708038.29540999980	8.12000000000	STW B
stripe14	1049741.54687500000	2708056.16650399980	8.01900000000	STW
stripe15	1049741.87109400010	2708074.84863300020	7.91800000000	STW E
tree1	1049823.93313000000	2707980.55342700010	10.09300000000	rdNE SZ34H36Z
tree2	1049826.68414700010	2708008.71397700020	10.30700000000	trd SZ31H34Z
tree3	1049826.44462900000	2708034.51215199990	9.77400000000	trd SZ10H11Z
tree4	1049827.53215299990	2708063.05048500000	10.00100000000	trd SZ18H27Z
tree5	1049828.52131300000	2708091.44579199980	10.97700000000	trd SZ34H31Z

Edit Coordinate Point

Coordinate Point

Name:
tree1

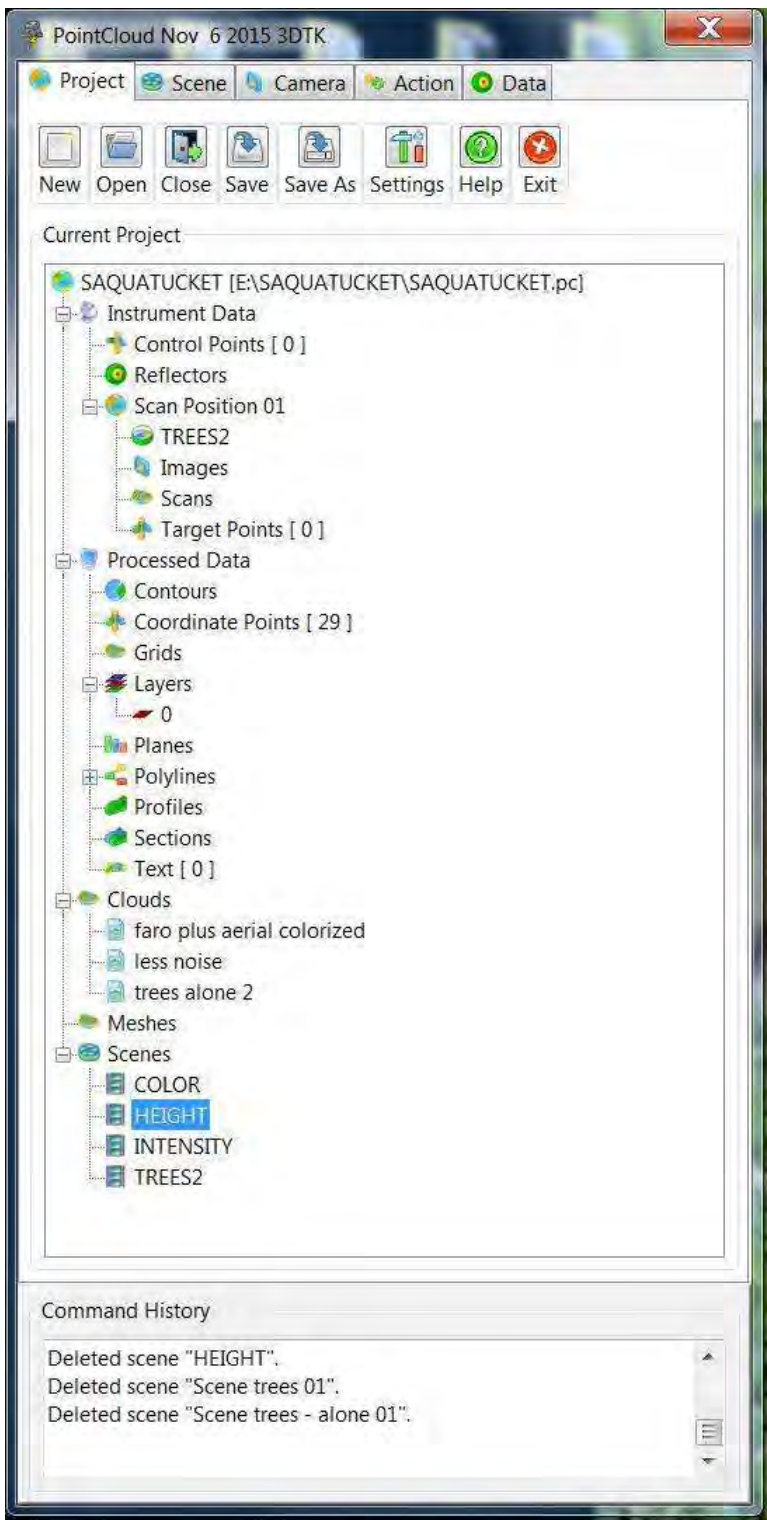
X: 1049823.933 Y: 2707980.553 Z: 10.093

Description:
trdNE|SZ34H36Z

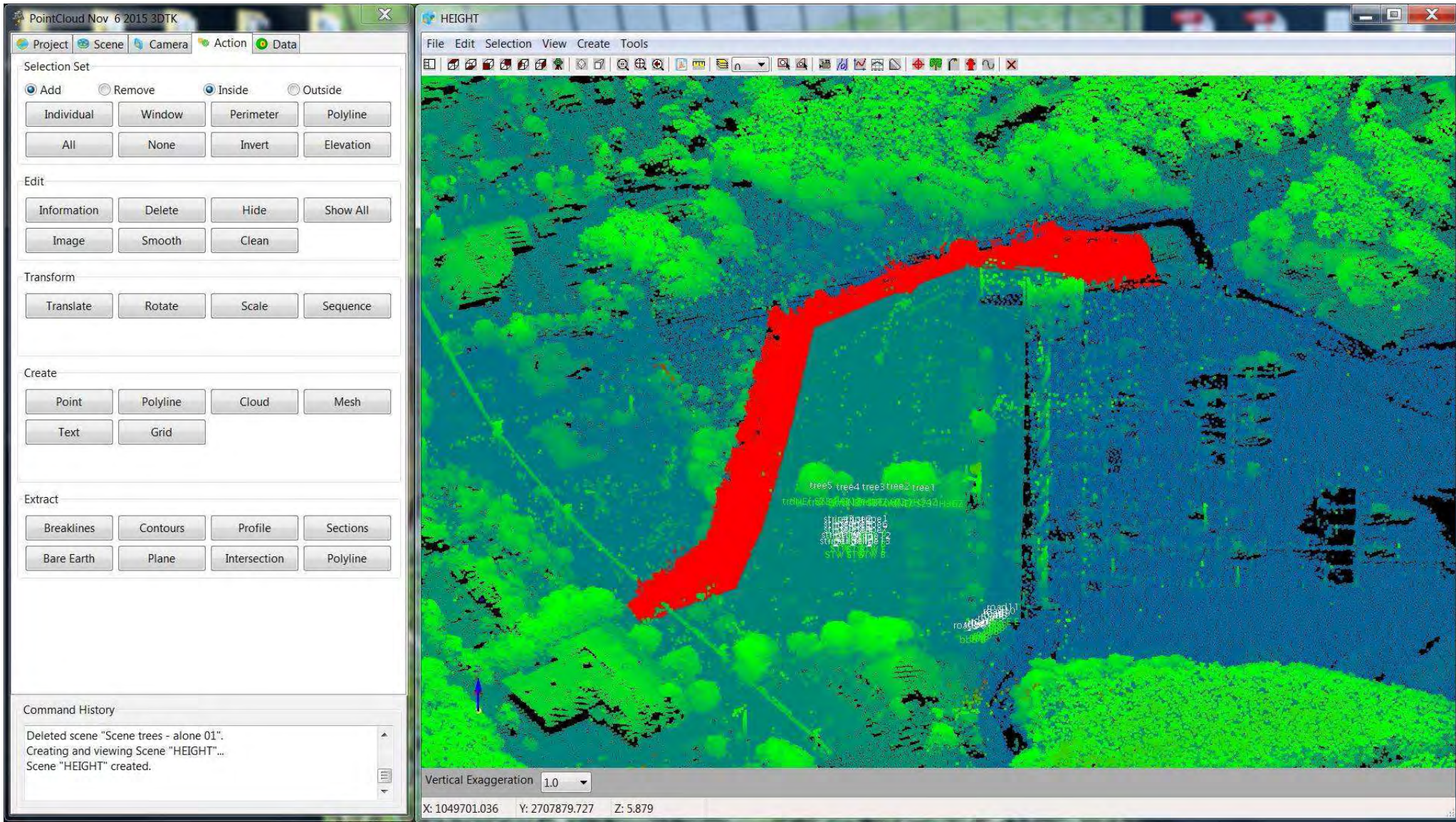
✓ ✗ ?

29 Coordinate Points, 1 Selected

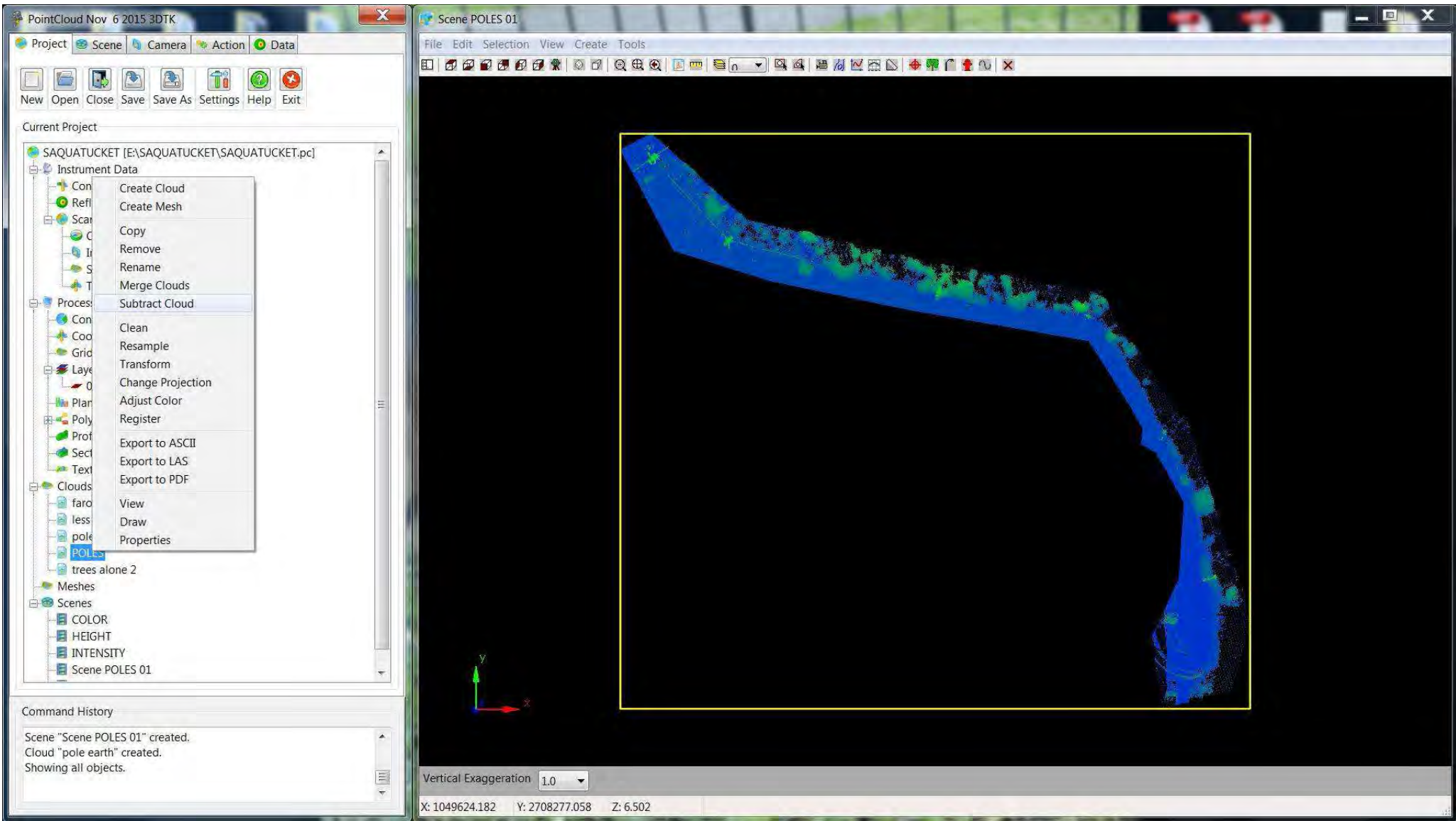
Your F2F codes can be augmented to eliminate points from surfaces. I doubled all my codes by adding an NE suffix, so TRD = Tree Deciduous topo point and TRDNE = Tree Deciduous non topo point. I send them to different layers so I can freeze the non topo points and create a surface.



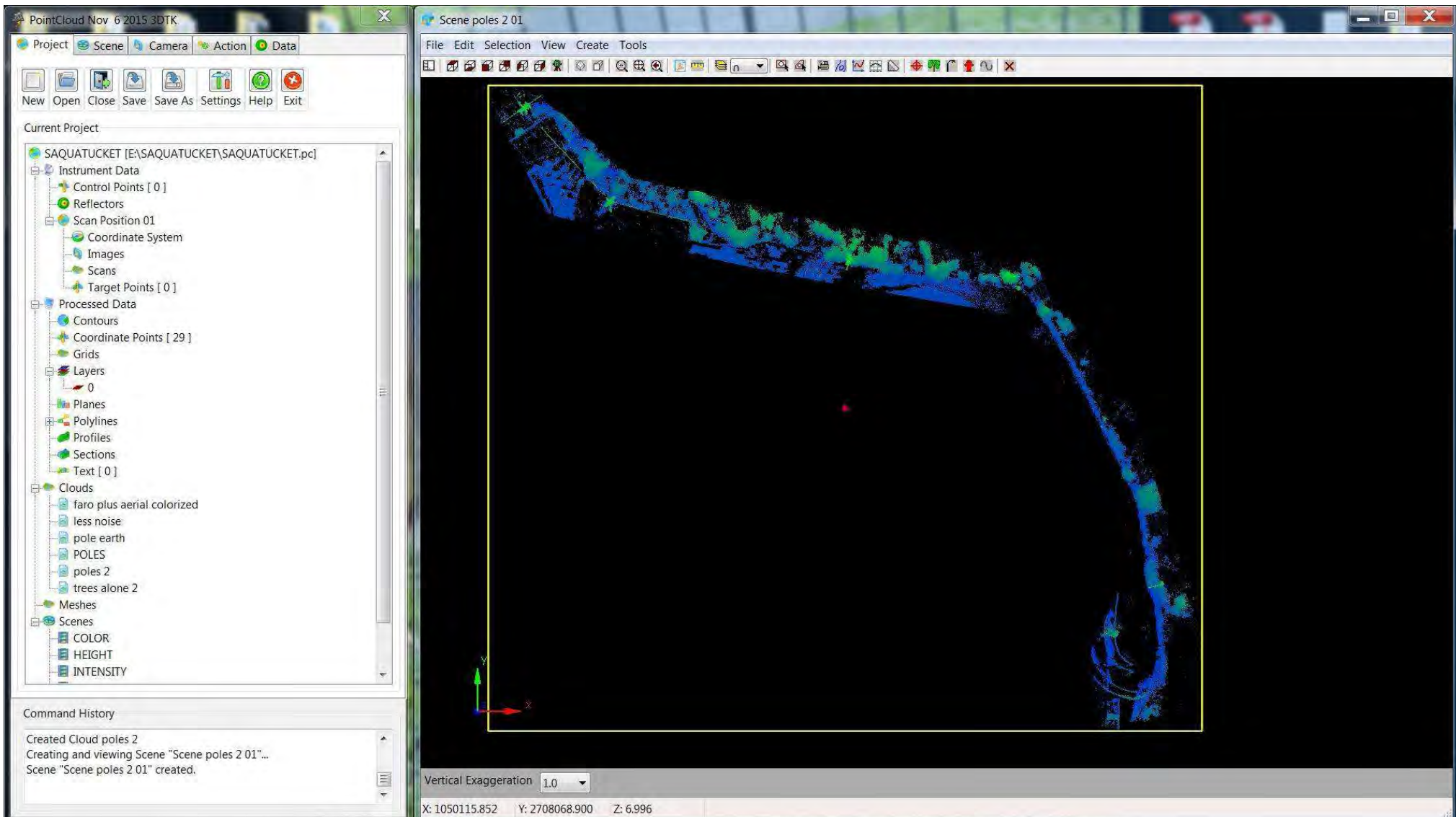
This is a good time to clean up the project. Eliminate the unnecessary clouds. Rename Clouds and Scenes you want to keep.



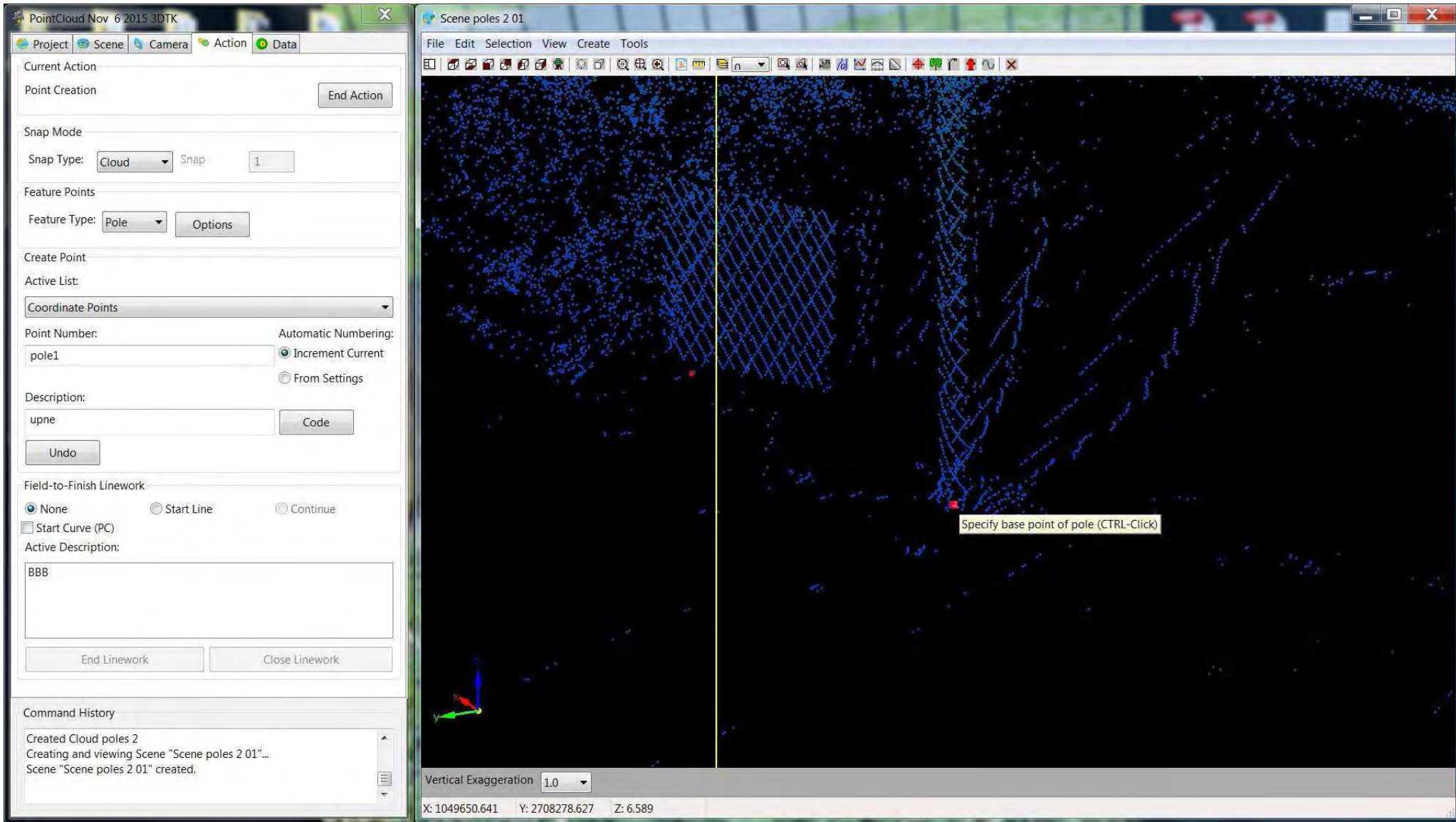
There are utility poles running in the red area. I selected an area that gets them all and some extra stuff.



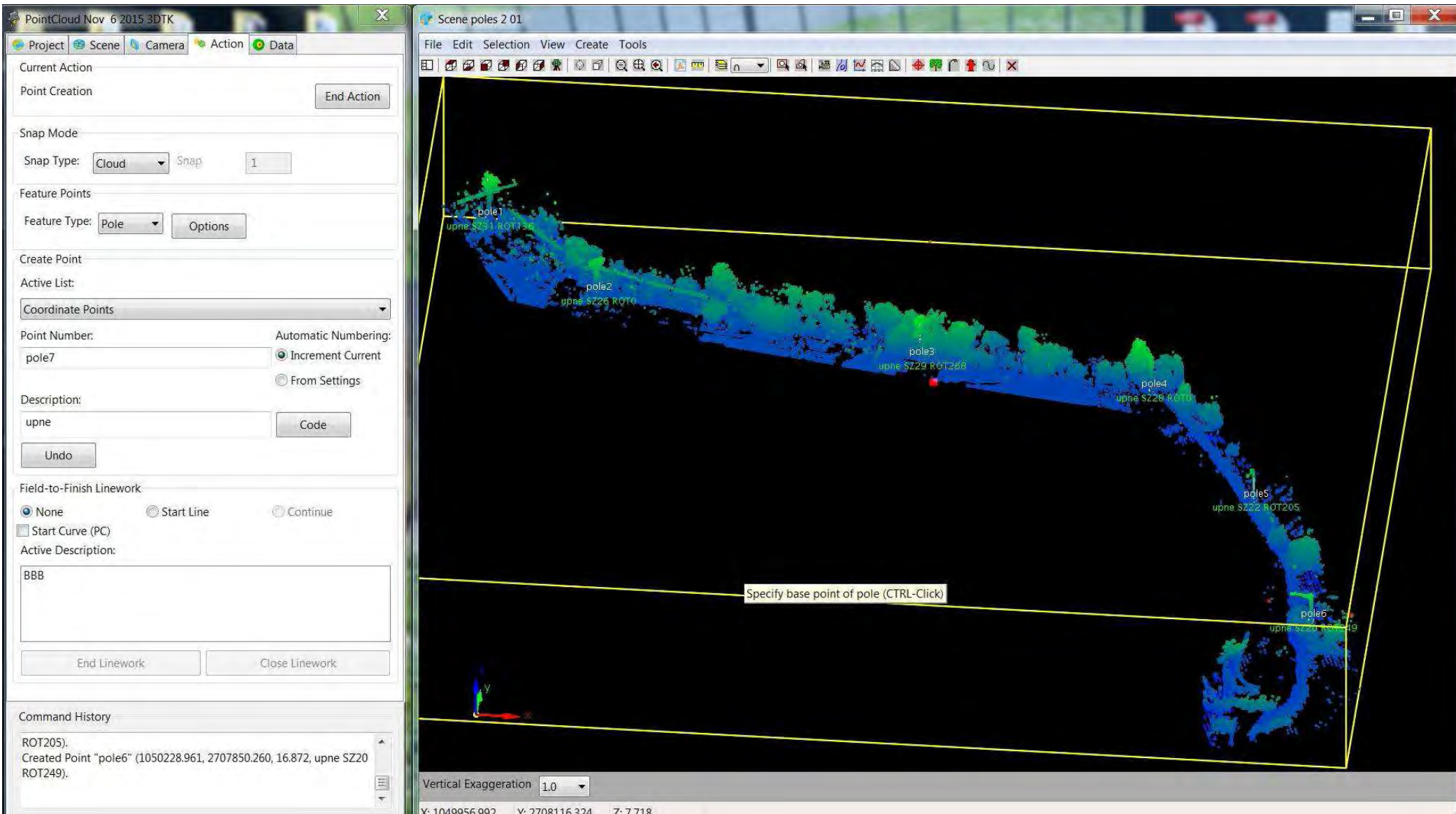
I can start a similar cloud cleaning frenzy.



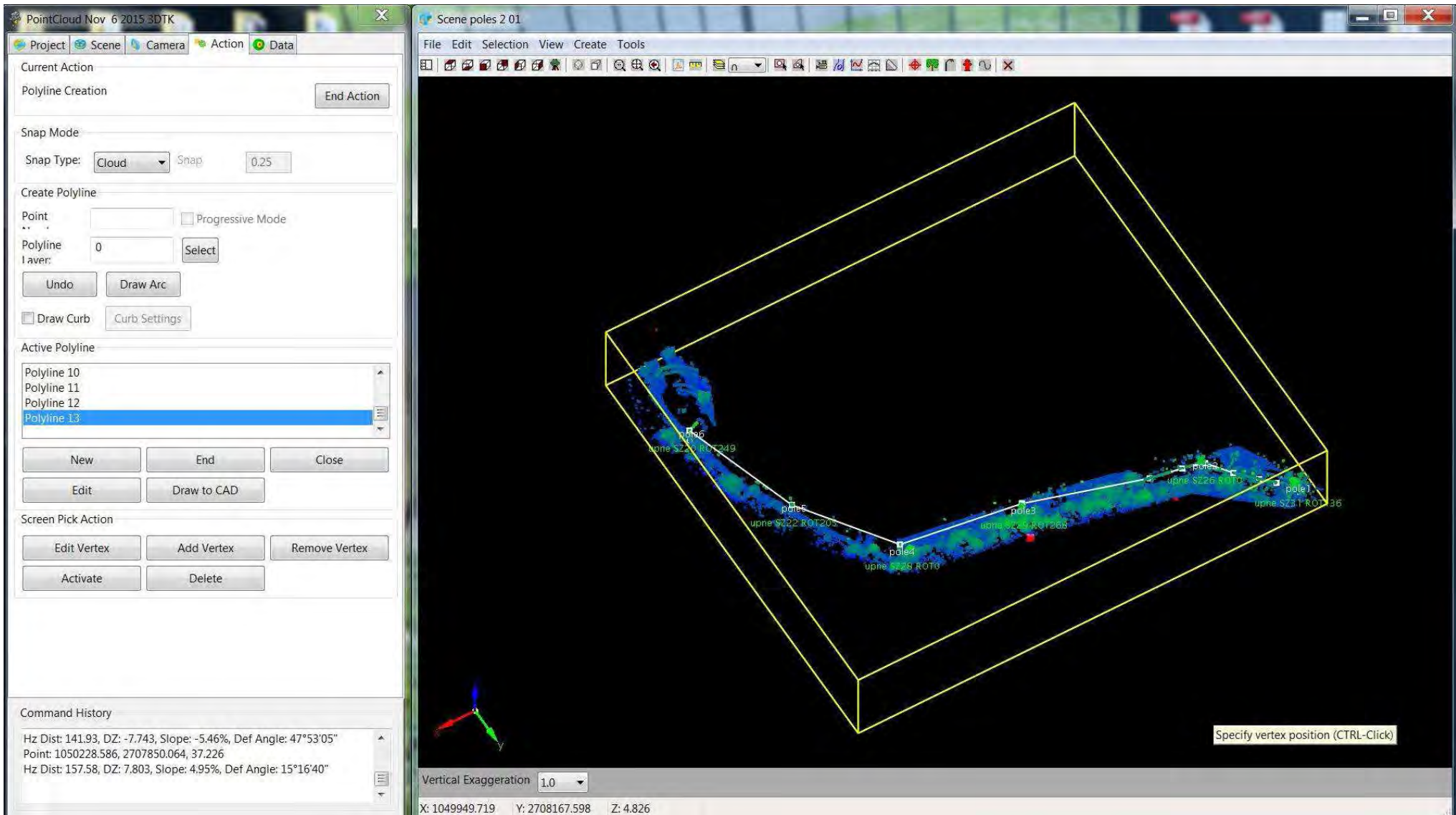
I extracted the Bare Earth and subtracted it from the cloud.



I have selected the Feature Type to be Pole and my code to be UPNE.



This feature creates some weird solids too. If nothing else, they let us see the poles pretty clearly.



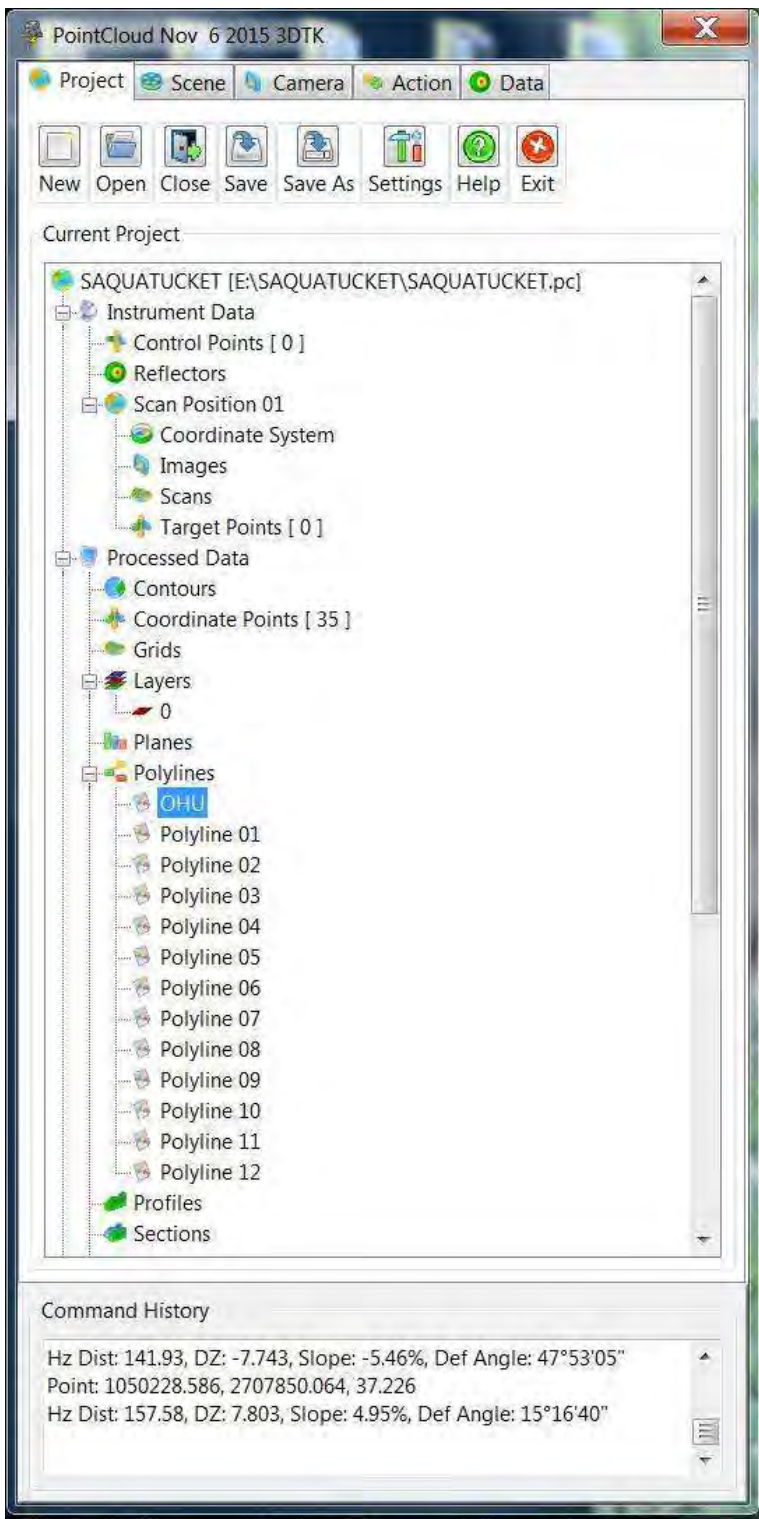
I hastily only included the FARO data in this scan. After cleaning and with some noise and the aerials, we have 35 million points. As the Velodyne sees more of the sky, I would add that data to extract the overhead wires. For now, I used the bits of visible wire to figure out the line and added a Polyline.

The screenshot displays the PointCloud software interface. A 'Polyline 13' window is open, showing a table of 10 vertices. Below the table is a summary panel with the following information:

- Number of Vertices: 10
- Length: 769.228
- Layer: 0
- 10 Vertices, 0 Selected
- Point: 1050228.586, 2707850.064, 37.226
- Hz Dist: 157.58, DZ: 7.803, Slope: 4.95%, Def Angle: 15°16'40"
- Vertical Exaggeration: 1.0
- X: 1050152.105 Y: 2708073.130 Z: 0.953

	Type	X	Y	Z	Referen	Referen	Delta X	Delta Y	Delta Z	Delta
1	Basic	1049667.96875000000	2708261.34960900010	25.33900100000			14.35546900000	-15.54980500000	-1.51200100000	21.21702300000
2	Basic	1049682.32421900010	2708245.79980500000	23.82700000000			21.50781300000	-22.95019500000	0.29600000000	31.45449200000
3	Basic	1049703.83203099990	2708222.84960900010	24.12299900000			23.41406300000	-25.41992200000	5.71400100000	35.02913900000
4	Basic	1049727.24609400010	2708197.42968800010	29.83700000000			26.10937500000	-8.76025400000	-2.01899900000	27.61372600000
5	Basic	1049753.35546900010	2708188.66943399980	27.81800100000			39.40625000000	-9.88085900000	-3.68300100000	40.79275000000
6	Basic	1049792.76171900010	2708178.78857399990	24.13500000000			153.28906300000	-37.25830100000	14.42299800000	158.41003900000
7	Basic	1049946.05078099990	2708141.53027299980	38.55799900000			152.92187500000	-23.94580100000	-1.39199800000	154.79159800000
8	Basic	1050098.97265599990	2708117.58447299990	37.16600000000			77.83593800000	-118.68798800000	-7.74300000000	142.14508700000
9	Basic	1050176.80859400010	2707998.89648400010	29.42300000000			51.77734400000	-148.83203100000	7.80300100000	157.77437600000
10	Basic	1050228.58593799990	2707850.06445300020	37.22600200000						

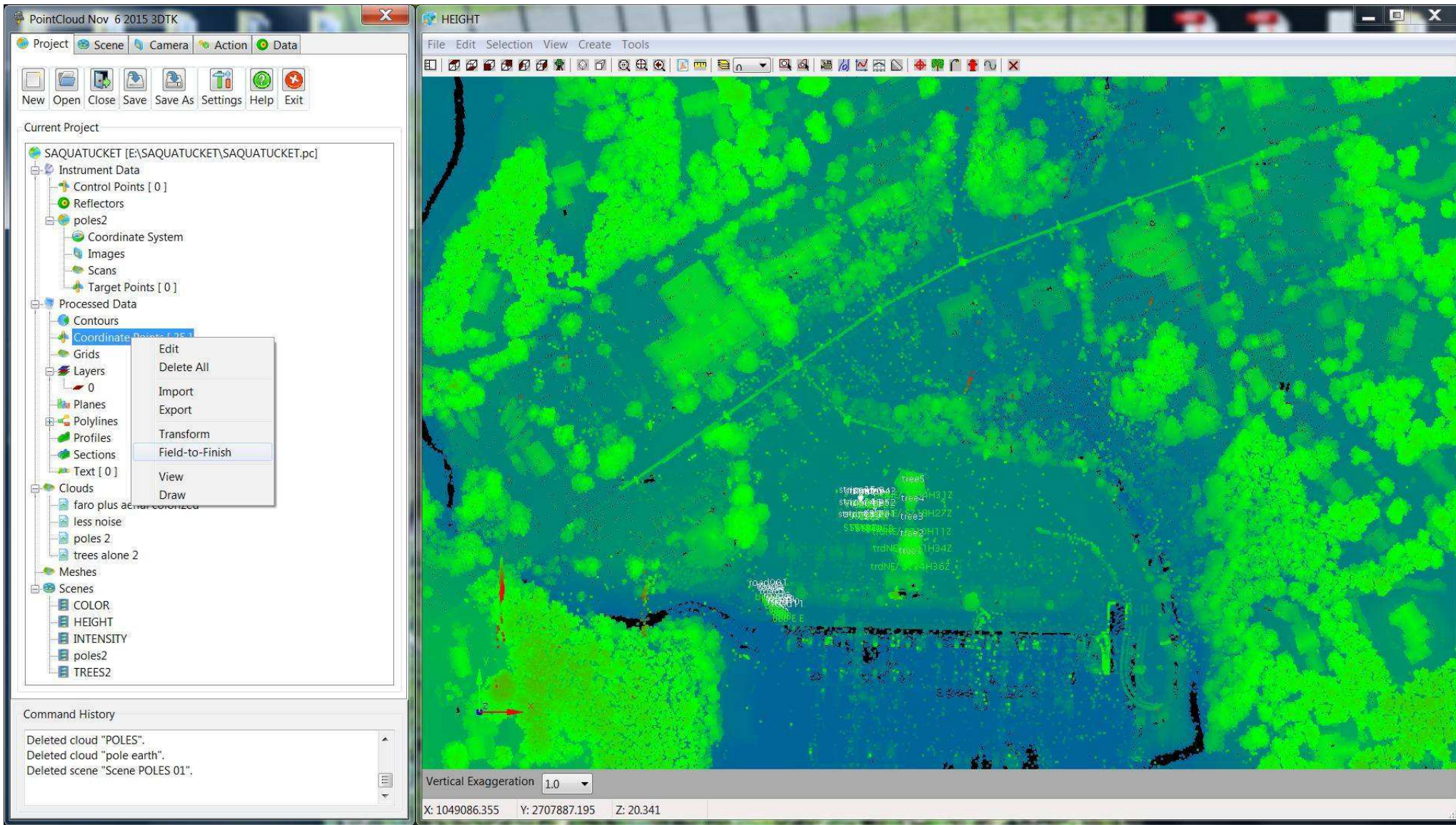
These are 3d polylines and you can get more data bout them than you ever wanted.



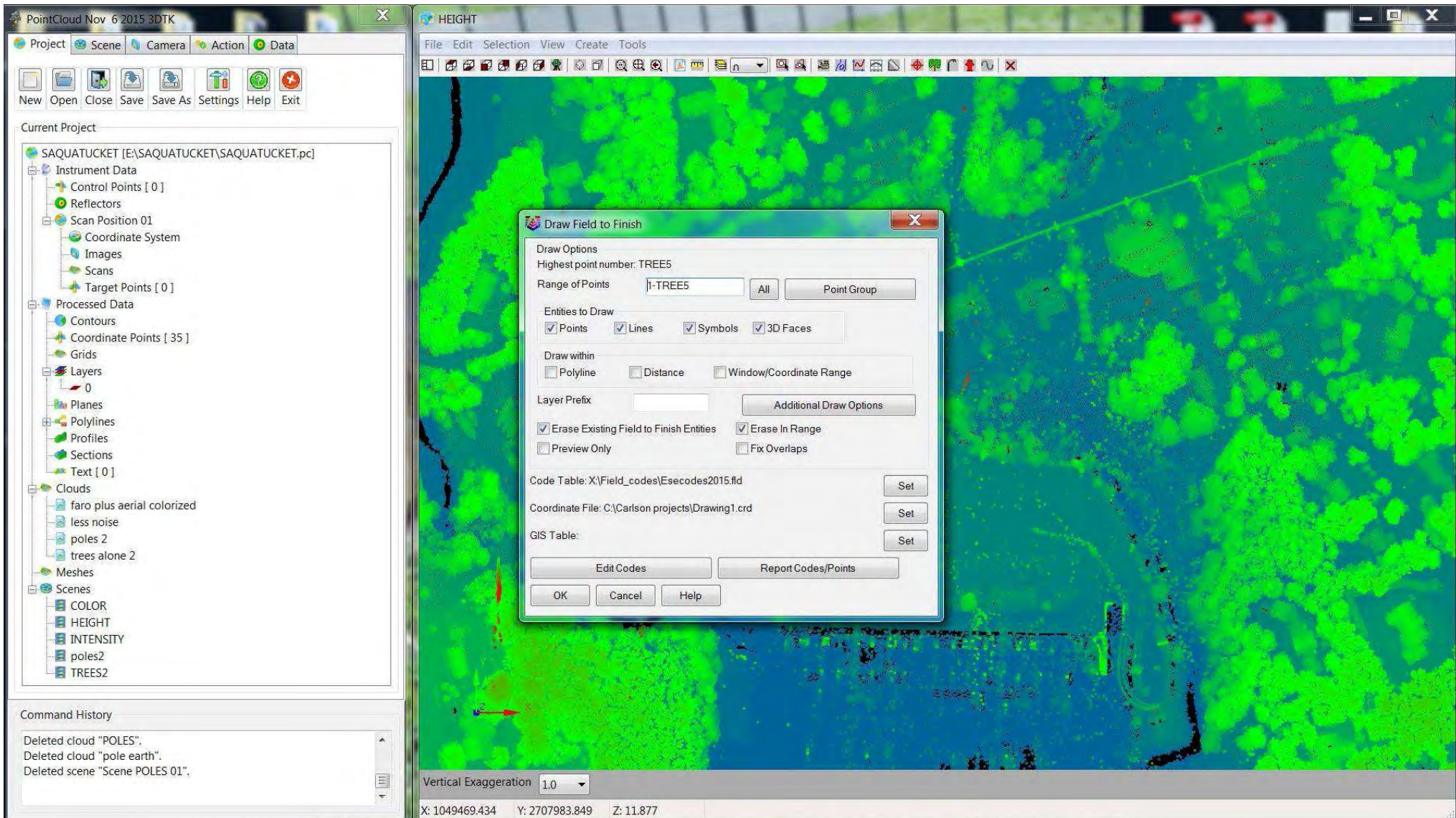
Housekeeping.

I renamed the wire polyline to OHU.

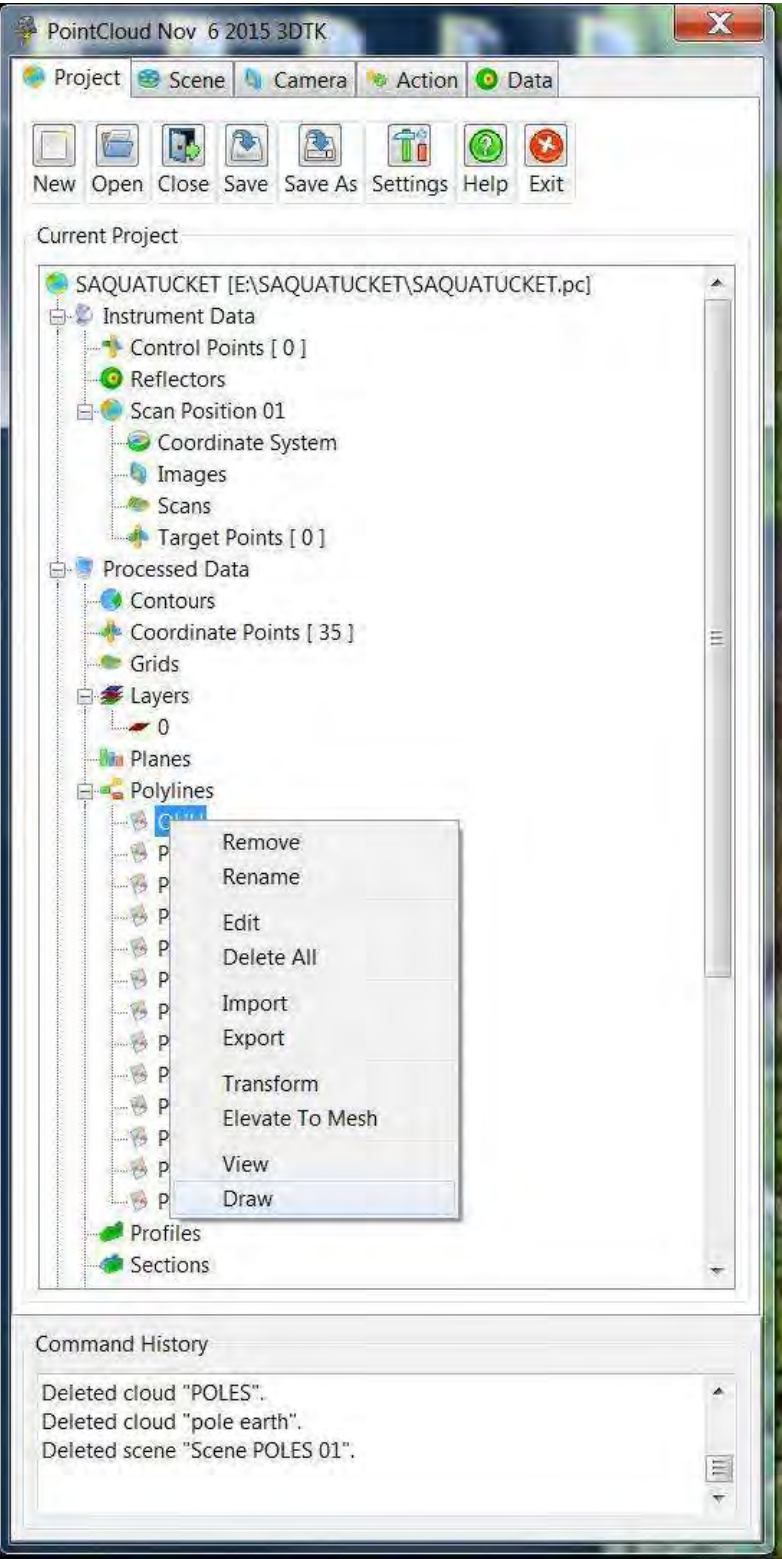
I have other polylines. I wonder what those are... One was a centerline. Some are remnants from the point creation. I could sort it out or remove them. Using my field codes means I do not need all these polylines.



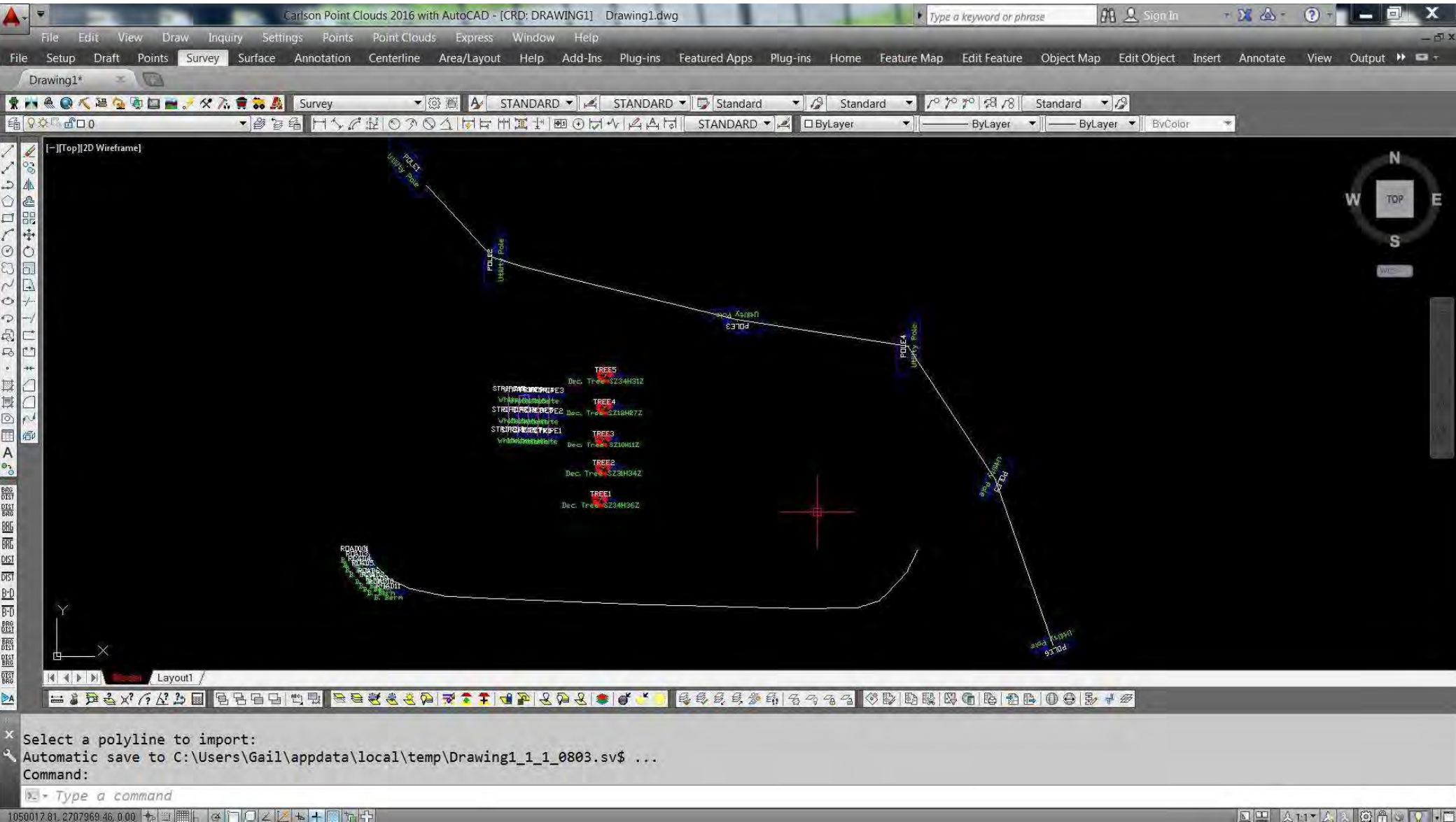
A Field to Finish option is right in the Manager. You can also export the points to edit them or just draw them in CAD.



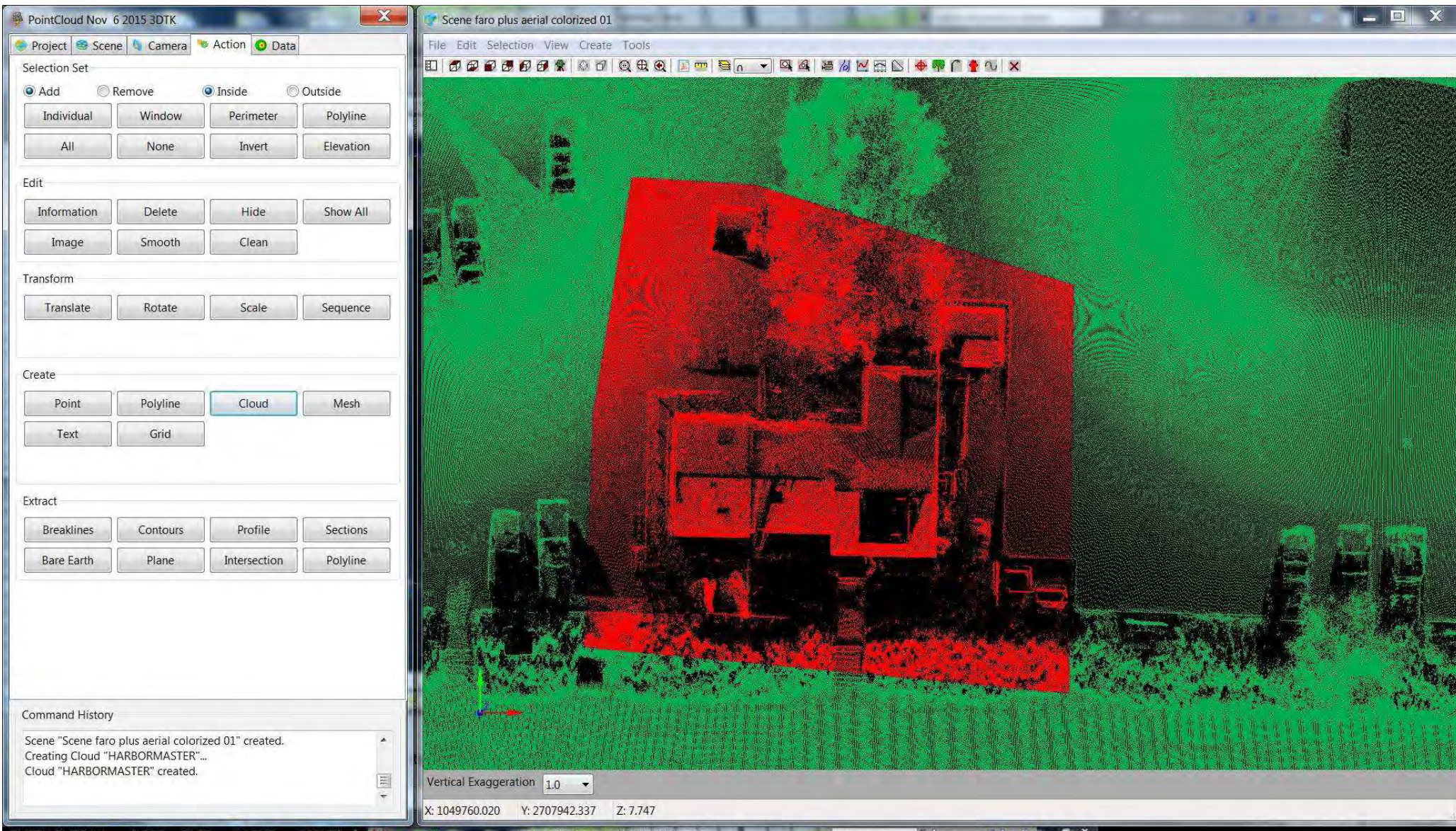
Alright! A familiar screen! (For the Carlson users in the group)



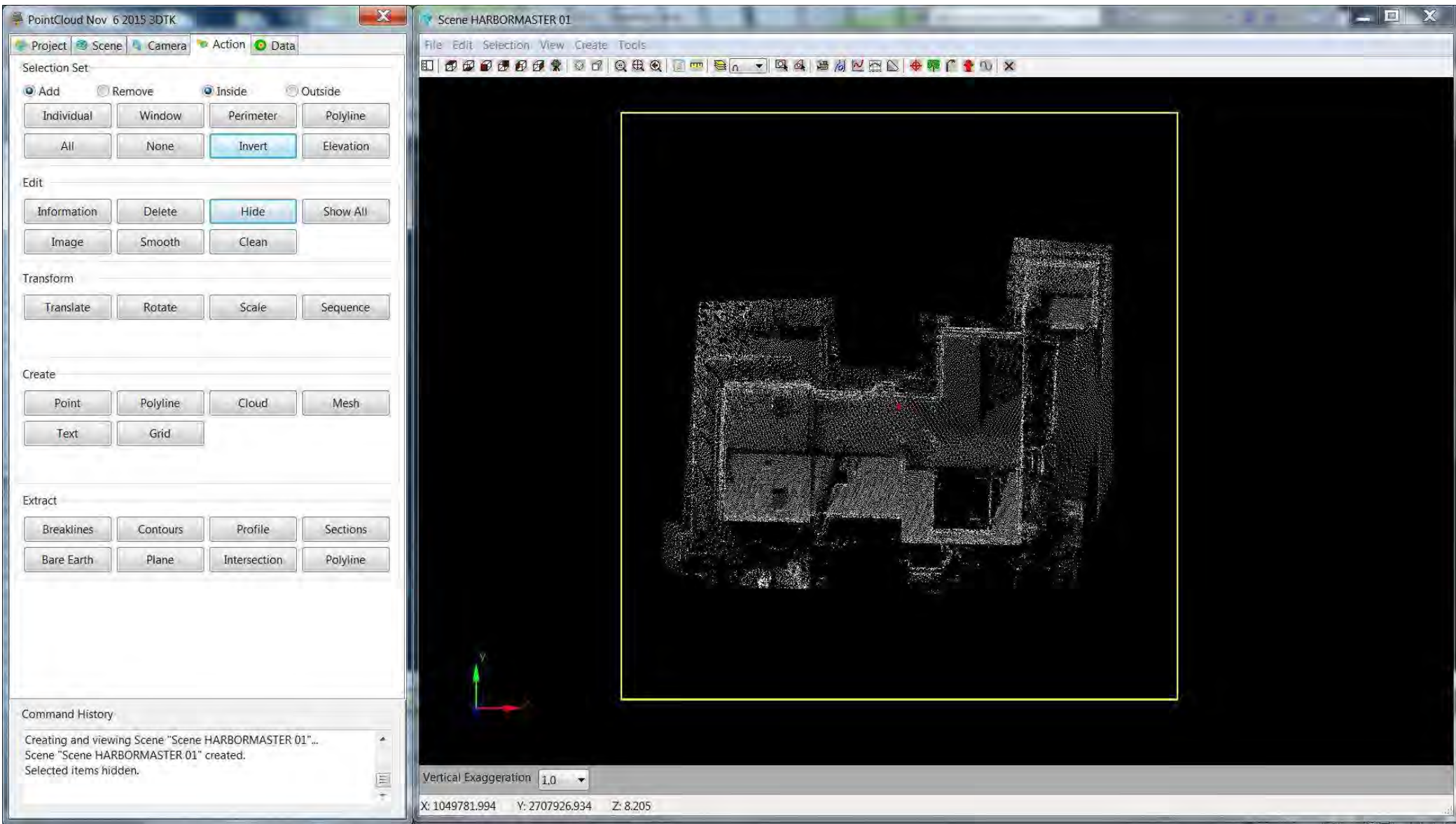
And if you were so bold as to draw polylines without points, you need to bring those into CAD as well.



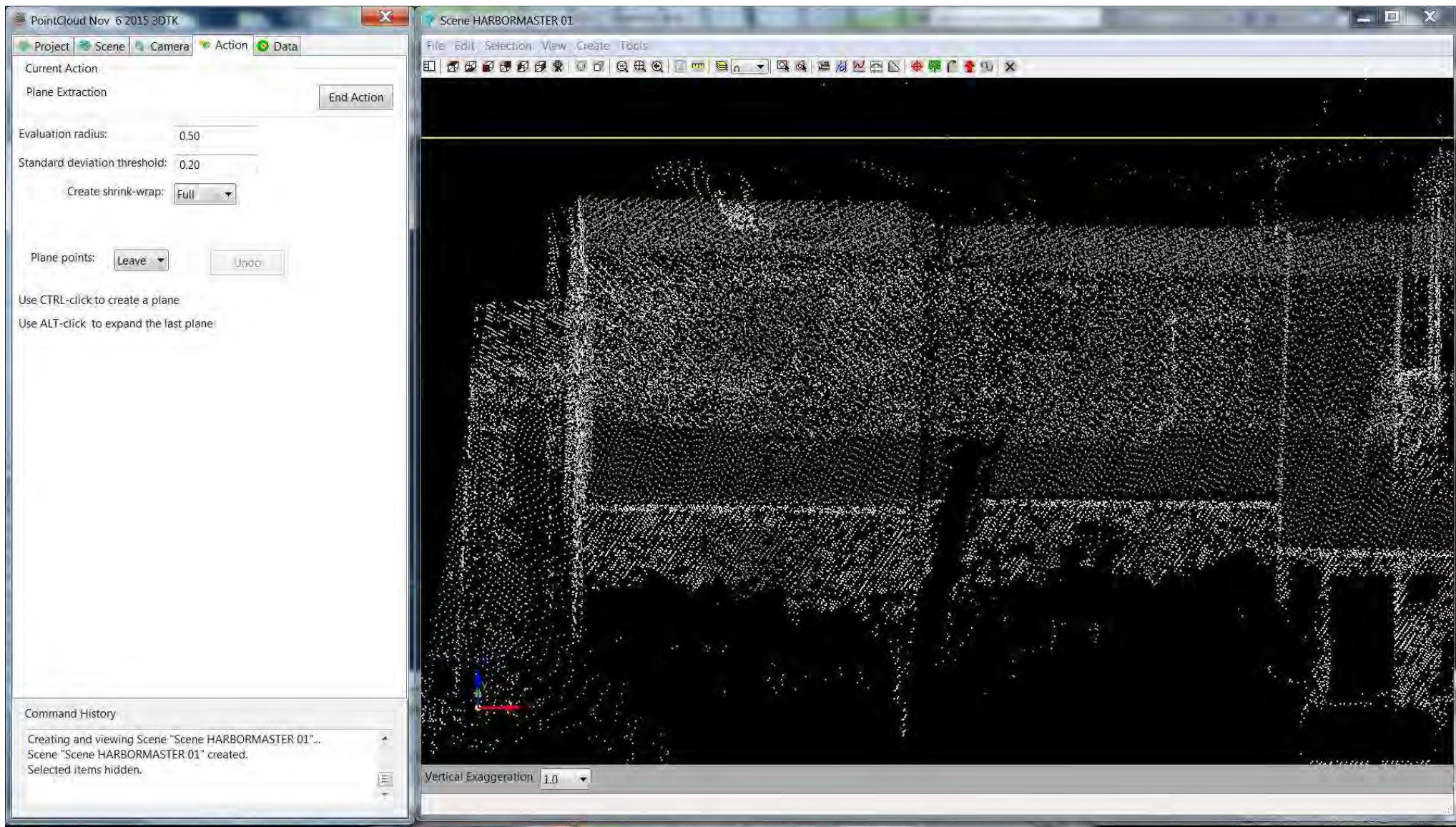
Here we are in CAD. I still have the rough CL of the road. We only extracted a handful of features but they are all here.



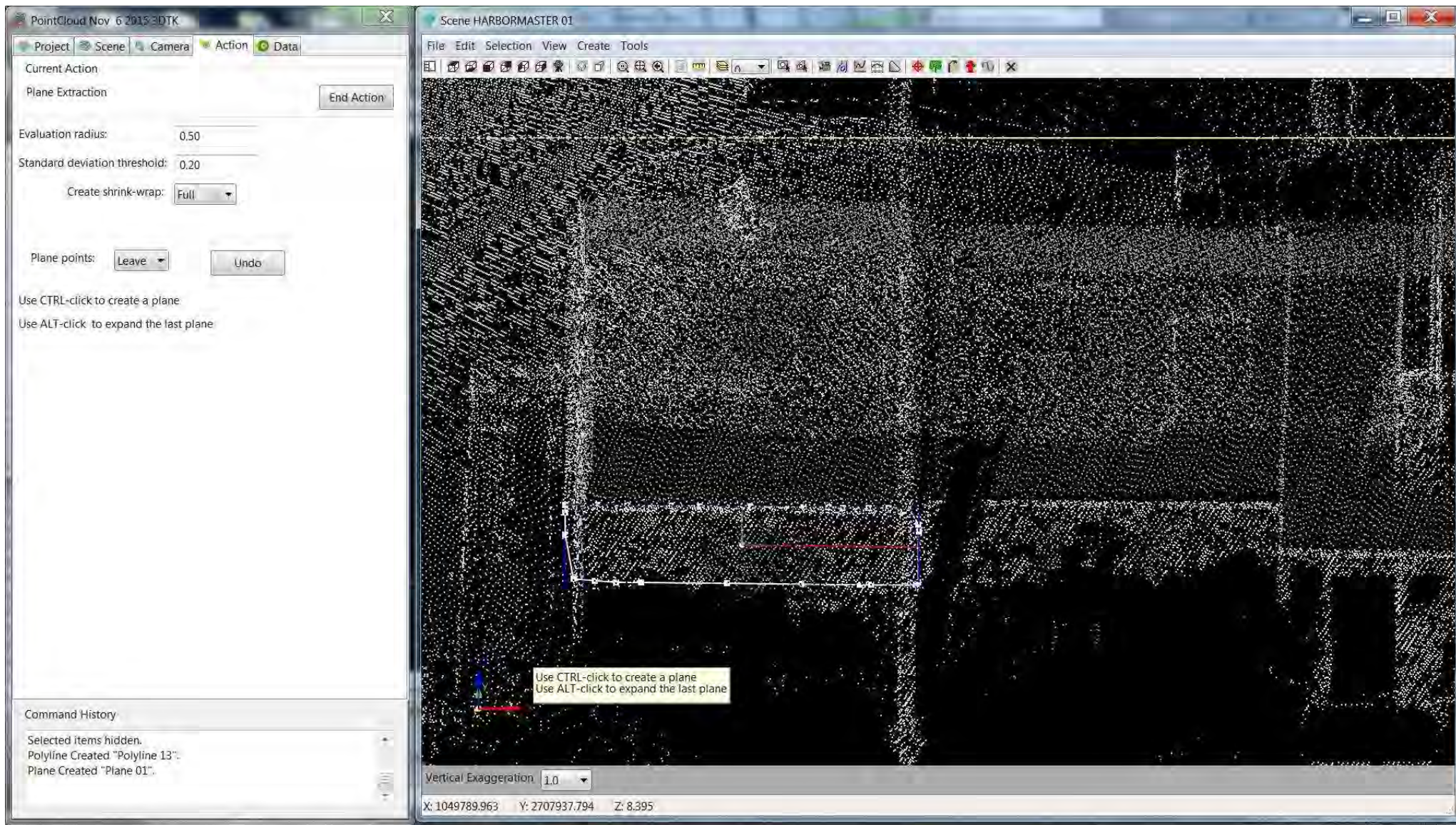
Back to Cloud for a moment. There was a building. The harbormaster's office. Let's see some ways to pull that from the cloud.



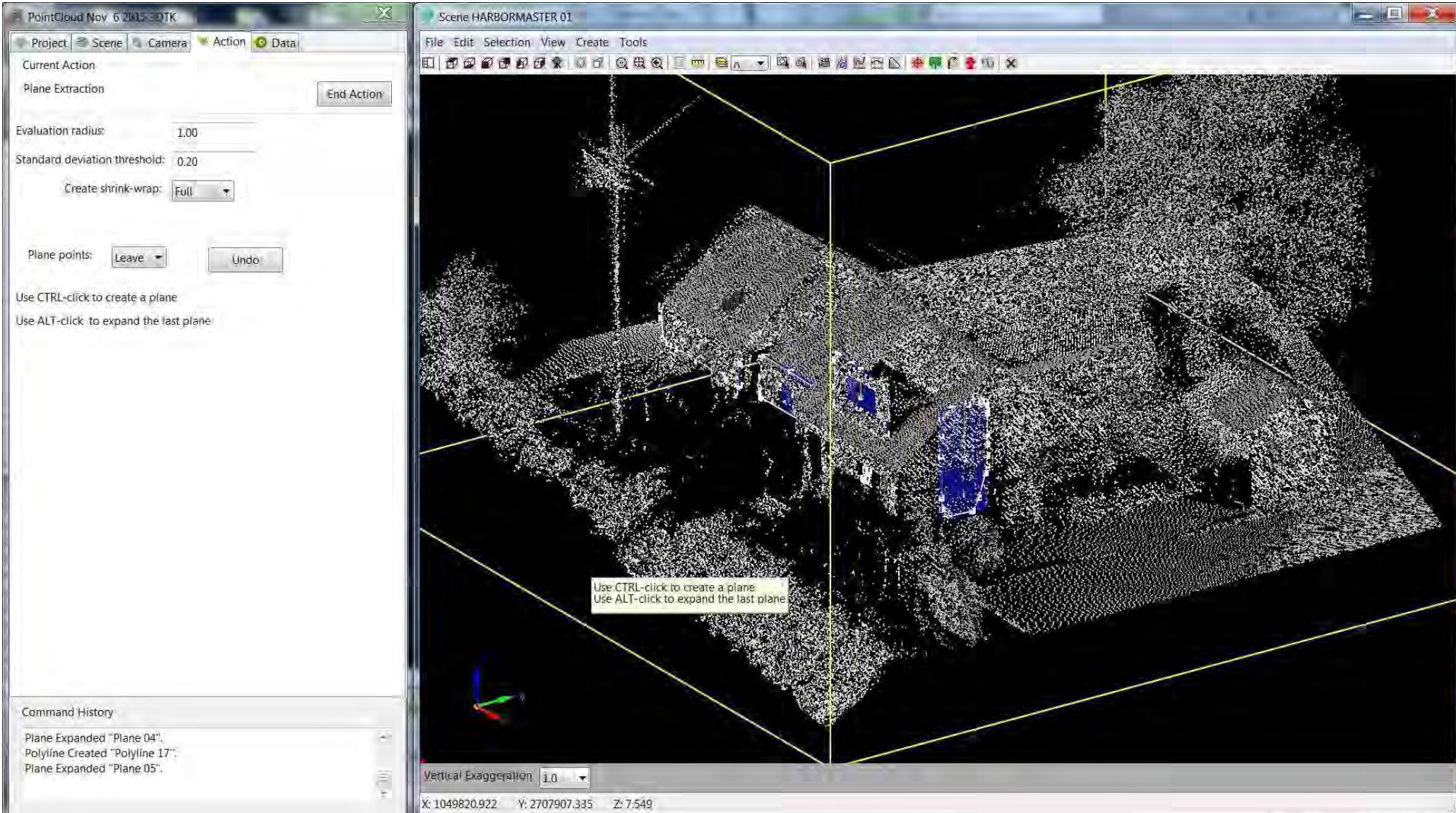
Yes, I created a new cloud of the building alone. I am looking by intensity. The color will not help here because I colored from the aerials.



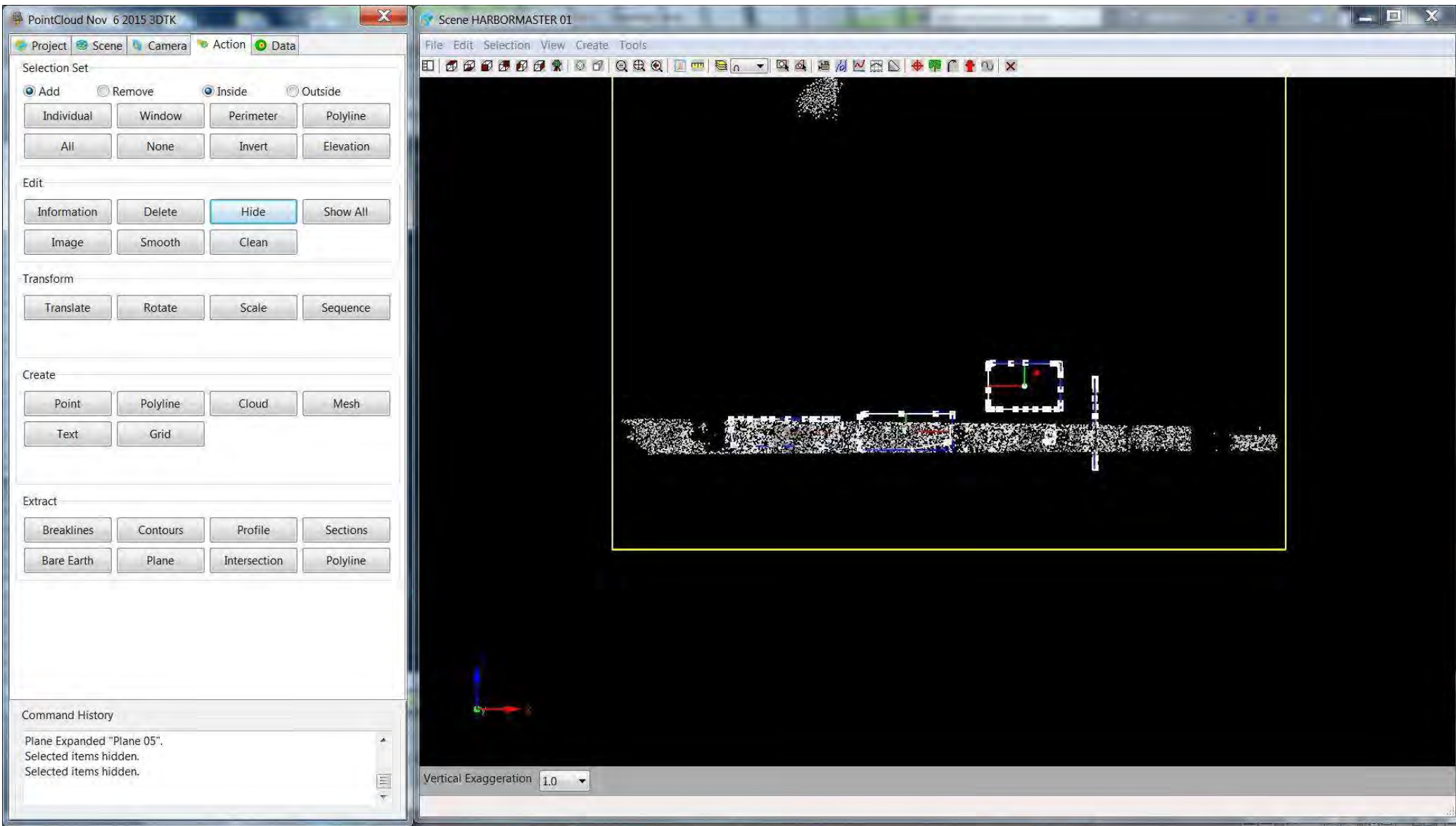
Carlson has included many of the rudimentary extractions: Planes being one of them. As we have cedar shakes on the side of the building, we can set a tolerance for the plane.



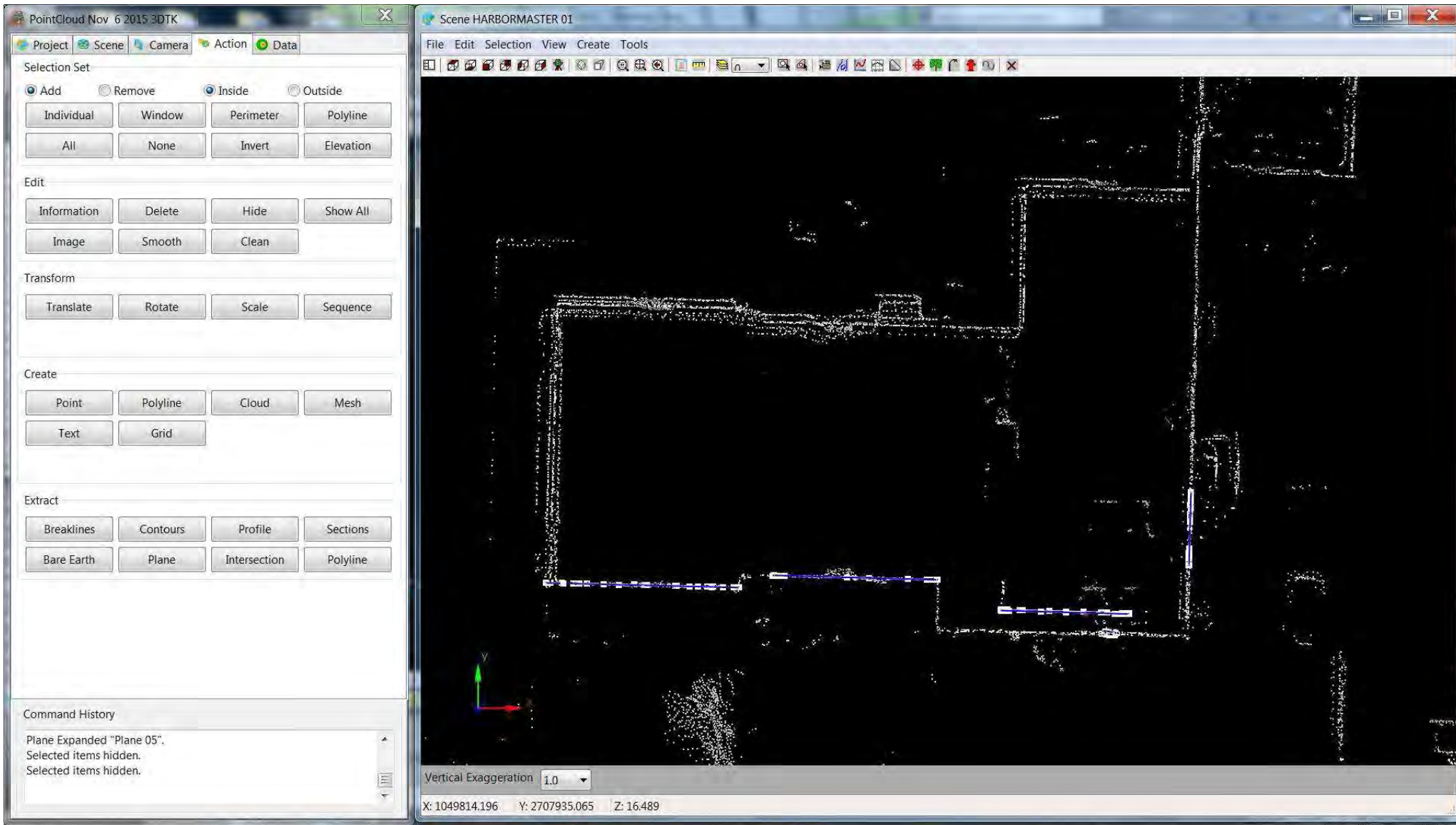
And Viola (or whatever her name was)! We have a plane. This will appear in the list as a Polyline and as a Plane. Either can be imported into CAD.



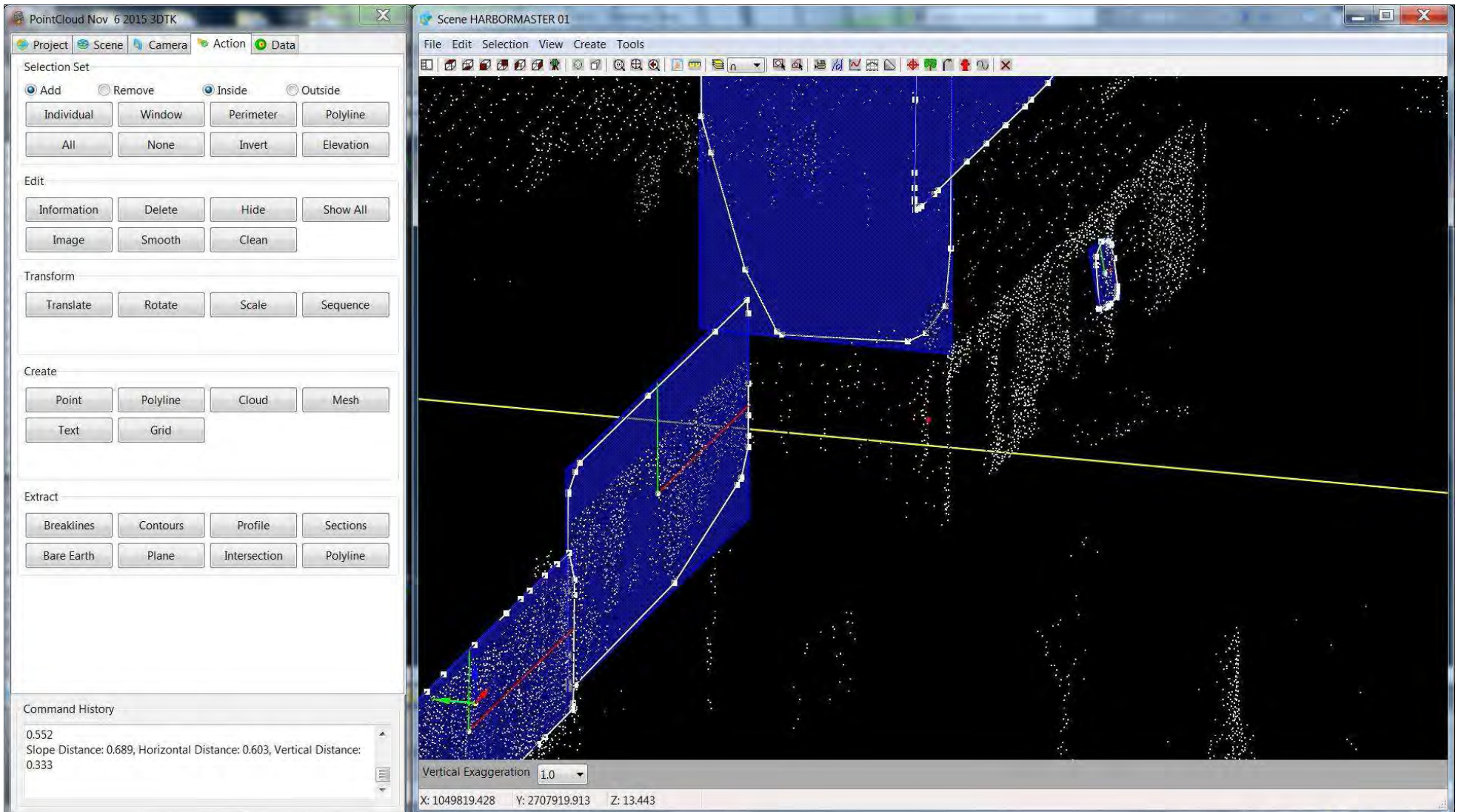
So, we can grab some planes here and others there. There is an intersect command to find corners.



We can also isolate a section of the building.



Then we look at it from the top. I see some faces for snapping.



We can view this from other perspectives.

FIELD TO FINISH

Some code lists are better than others...

Here are some ideas:

Short and sweet: 2 or 3 digits are easy

Change that +7 and -7 stuff to B and E

Double your codes:

I suffix all of mine with NE to put these points on a non-topo layer (location, loc)

EP = Edge of Pavement, PNTS-TOPO

EPNE = Edge of Pavement, PNTS-LOC

FIELD TO FINISH

While EP is a bad example because you usually can get an elevation on the edge of pavement, there are some other codes that are important:

FENCES

We can pick out the front of a fence, but picking the front of the fence at the ground is usually a challenge. Some extractions include the fence at the top of the fence.

And a bunch of other stuff.

WHERE DO YOU STAND?

Questions?