SHORT SHARP MANUALS

1508 Roading

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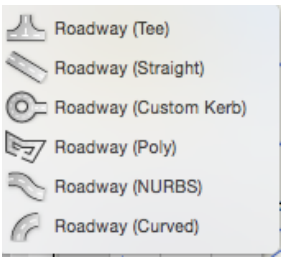
Introduction

There are six different roadway tools.



Three of these tools date back several years:

- Roadway (Tee)
- Roadway (Straight)
- Roadway (Curved)

These tools have limited functionality (in other words the uses limited) and as you will see from the likes of tools, the use can be replaced by some of the other tools. We will cover these tools briefly just so you can see what they will do.

The Roadway (NURBS) tool is more recent than the three above, but even its use has probably been replaced by the two new Roadway tools:

- Roadway (Custom Kerb)
- Roadway (Poly)

These two recent tools are very powerful and most of the manual will focus on those.

The roading tools in Vectorworks are not designed to let you to become a road designer. They are there to allow you to add writing to your concept drawings, but they do not have sophisticated roading controls such as camber, tilt, roundabouts, etc.

The roading tools will allow you to draw a large range of road designs, and the road objects can be site modifies. If you need a refresher on-site modifiers for networks, look at the manual 1507 Site Modifiers. You do not need to use a site model if you want to draw a road, you can draw roads without it.

To refresh your memory, there are normally two parts a site modifier and a grade limits. When you create a road, you have the choice to Use Site Modifiers and a separate choice to Use Grade Limits.

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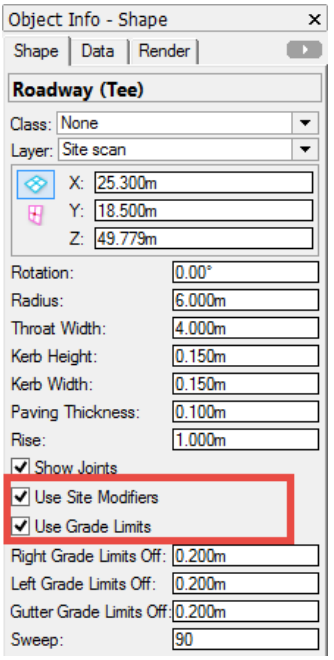
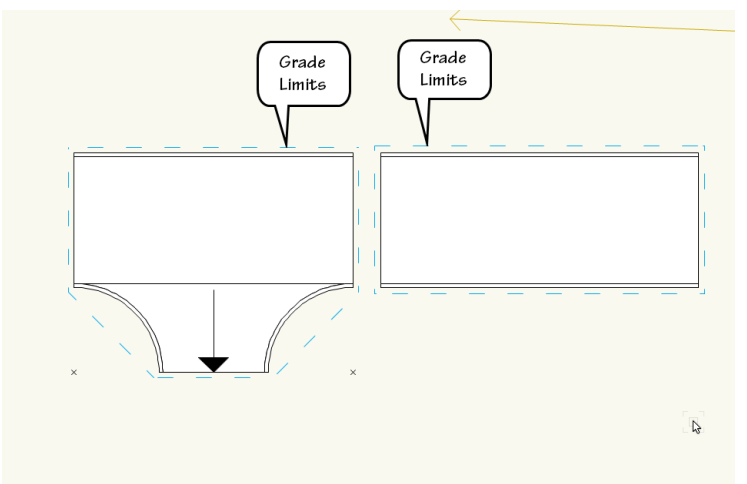


When you turn on the Site Modifiers and Grade limits, each road object has its own site modifier and its own grade limits.



This means that if you turn on the grade limits for two road objects and then try to place them next to each other, the grade limits will overlap and it will create a site model error.

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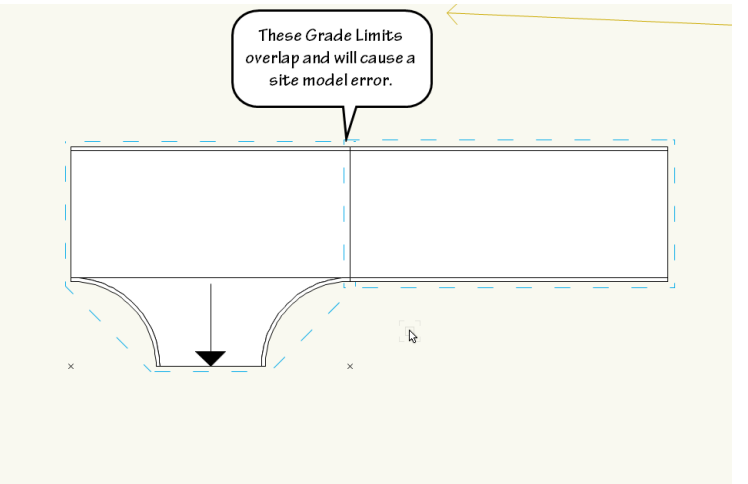
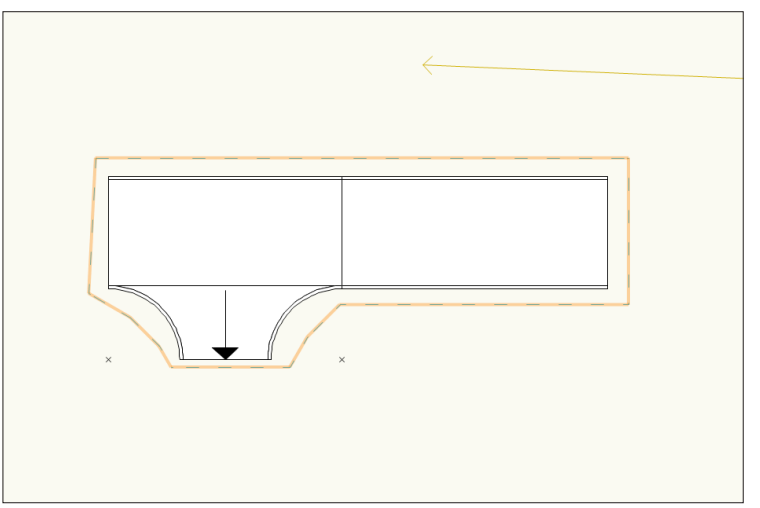


If you want to use two roads object next to each other for site modification , you should turn off the grade limits and create a grade limits that goes around all the roads.



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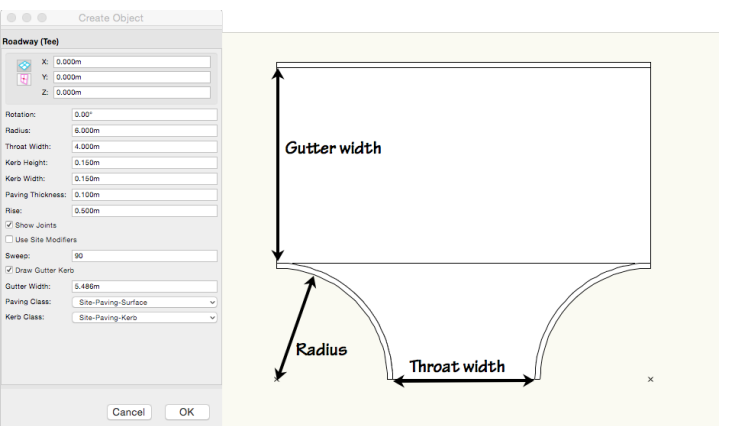
Roadway (Tee)

The Roadway (Tee) is used to used to create a tee intersection. This is one of the older tools but it is still important to cover it. It does make it easy to create a tee intersection, but it has limitations; it is always limited to 90° and the slope is limited to just one part of the road.

- Go to the **Site Planning** tool set.
- Click on the **Roadway (Tee)** tool.

- Go the **Tool** bar.
- Click on the **Preferences** button.
- Fill in the preferences to suit your situation.



- Move your cursor into the drawing area.
- Click once to start the placement of the Roadway (Tee).
- The insertion point for the roadway is the bottom left-hand corner of the throat (the bottom part of the tee).

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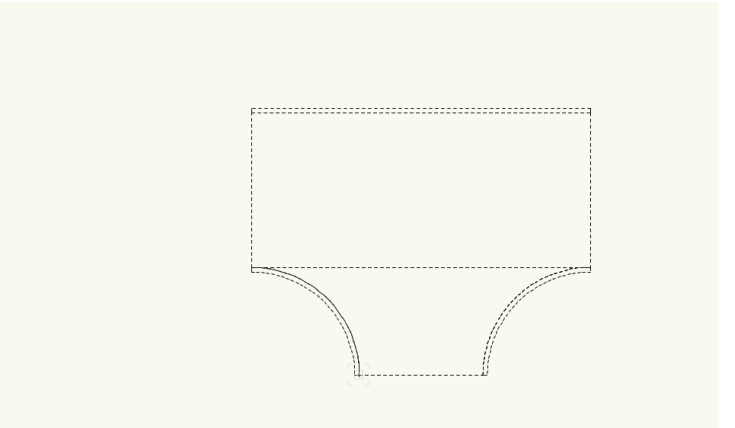
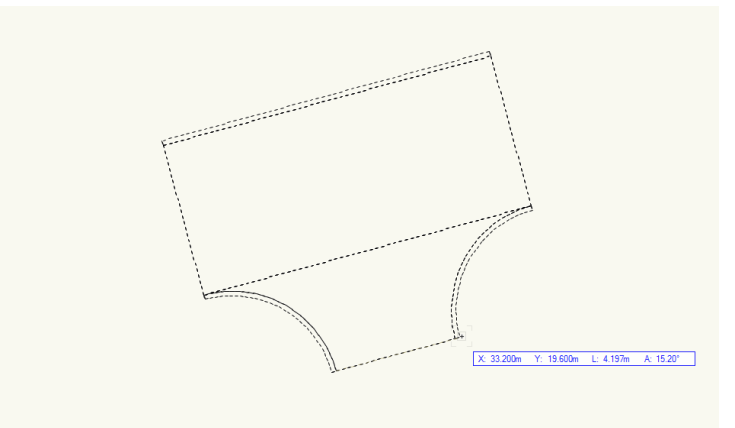
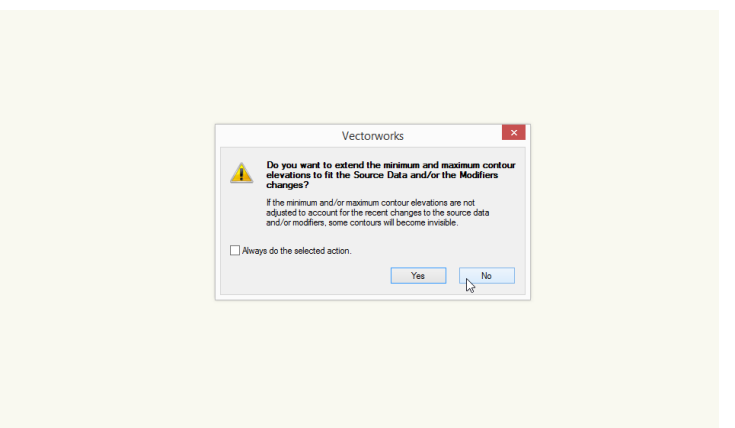


- Move your cursor to set the rotation of the tee intersection.
- Click once again to finish placing the tee intersection.



- In the first instance, the tee intersection will be placed at the bottom of the design layer (Z = zero), which may cause this dialog box to be presented.
- Click on the **No** button.



- If you know the elevation of the road, you can type it into the **Object Info** palette.

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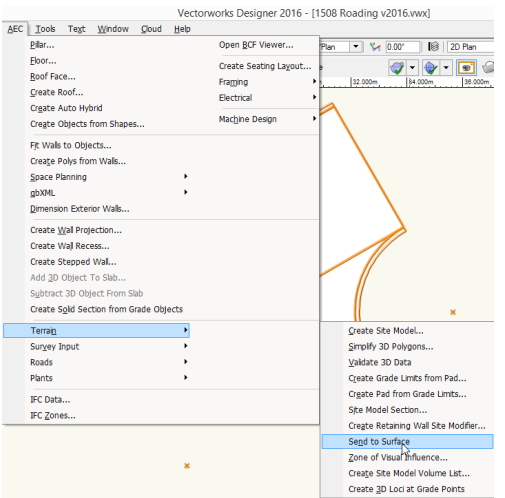
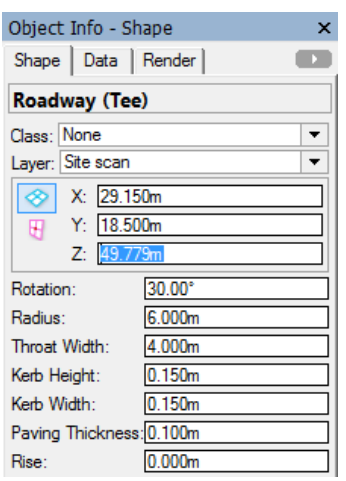
- If you do not know the elevation of the road, you can send the elevation to the surface of the site model using the **Send to Surface** command.
- If you are using Vectorworks Architect, go to the Menu bar, choose **AEC > Terrain> Send to Surface**.
- If you are using Vectorworks Landmark, go to the Menu bar, choose **Landmark > Send to Surface**.



- You will notice that the elevation (**Z**) has been adjusted to suit the site model.



- You can adjust the **Rise** (slope) of the tee intersection, but this will only adjust one part of the tee intersection, the throat.

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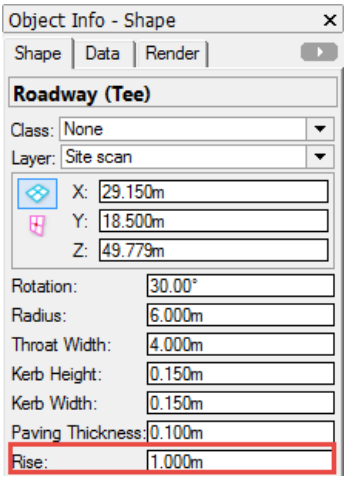
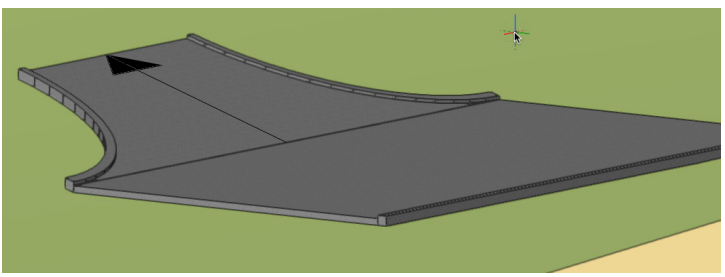


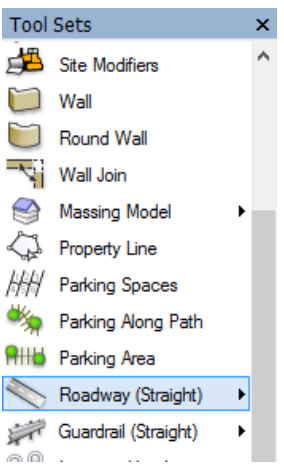
- In this image you can see an arrow on the part of the intersection that has been adjusted.



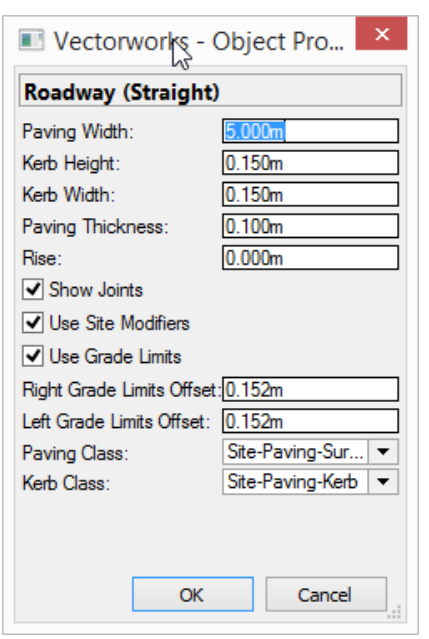
Roadway (Straight)

The Roadway (Straight) is used to used to create a straight section of road with a single slope. This is one of the older tools but it is still important to to cover it. It has limitations; it is always limited to a straight line and the slope is limited to the entire road.

- Go to the **Site Planning** tool set.
- Click on the **Roadway (Straight)** tool.



- Go the **Tool** bar.
- Click on the **Preferences** button.
- Fill in the preferences to suit your situation.



- Move your cursor into the drawing area.

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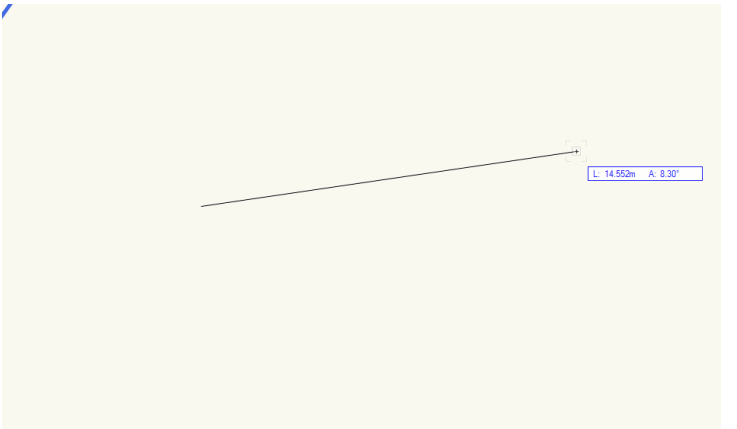
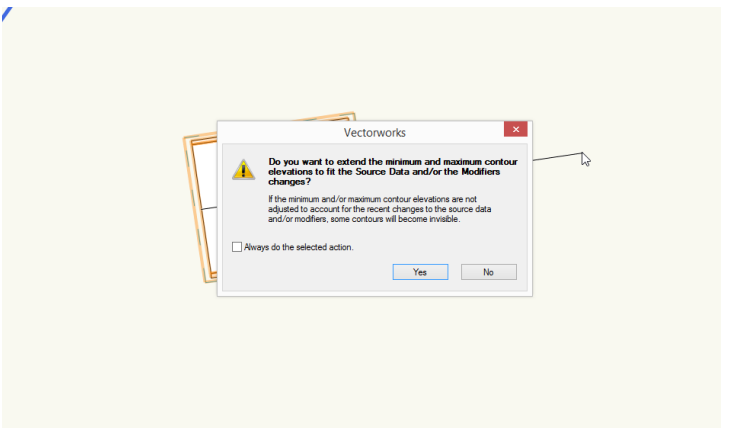
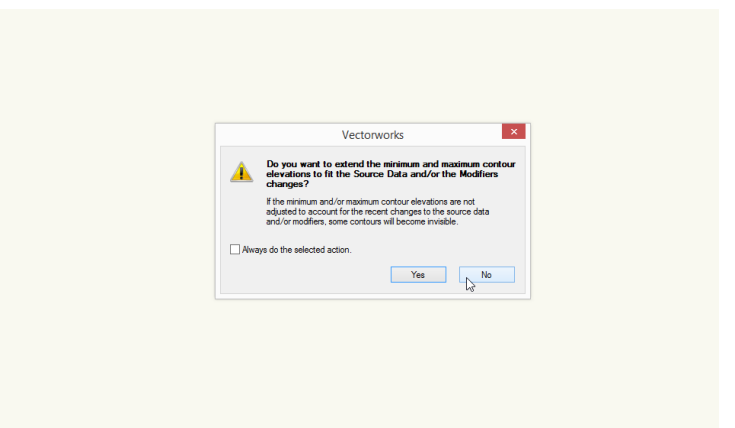
- Click once to start the placement of the Roadway (Straight).
- The insertion point for the roadway is the centre of the road.



- Move your cursor to set the rotation and length of the road.
- In the first instance, the road will be placed at the bottom of the design layer (Z = zero), which may cause this dialog box to be presented.



- Click on the **No** button.



- If you know the elevation of the road, you can type it into the **Object**

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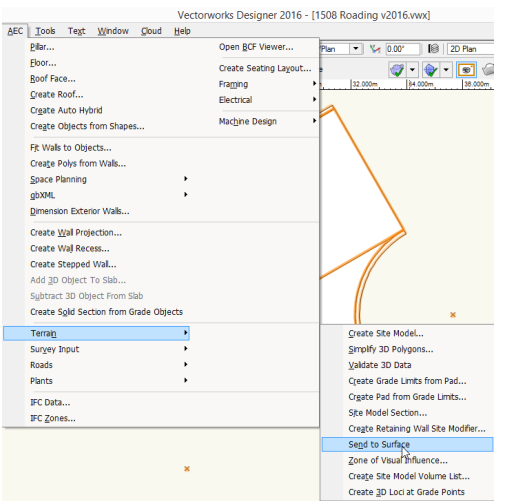
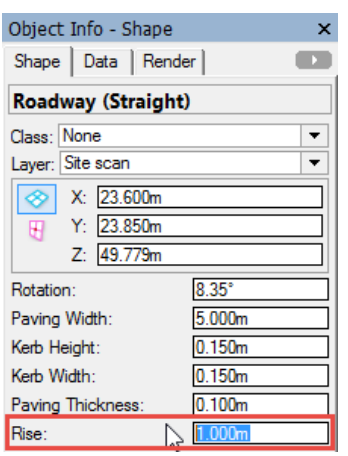
Info palette.

- If you do not know the elevation of the road, you can send the elevation to the surface of the site model using the **Send to Surface** command.
- If you are using Vectorworks Architect, go to the Menu bar, choose **AEC > Terrain> Send to Surface**.
- If you are using Vectorworks Landmark, go to the Menu bar, choose **Landmark > Send to Surface**.

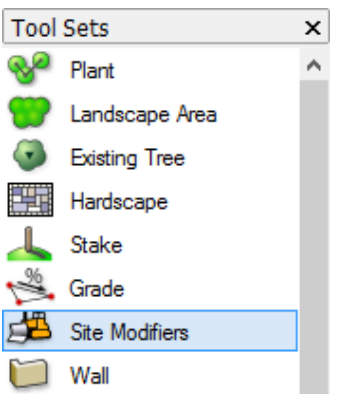


- You will notice that the elevation (Z) has been adjusted to suit the site model.
- You can adjust the **Rise** (slope) of the road, by entering in the required rise, you cannot enter the rise as an angle or percentage (1:10)

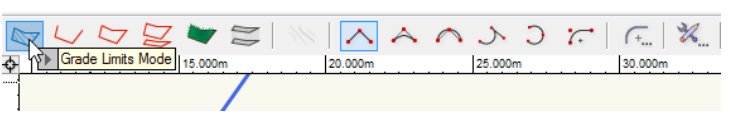


- Notice that the road has a constant slope.

- Go to the **Site Modeling tool** set.
- Click on the **Site Modifiers** tool.



- Go to the **Tool** bar.
- Click on the **first** mode, **Grade Limits Mode**.



- Draw the grade limits around all of the road objects and then update the site model.
- In this image you can see that there are errors where two road objects touch.

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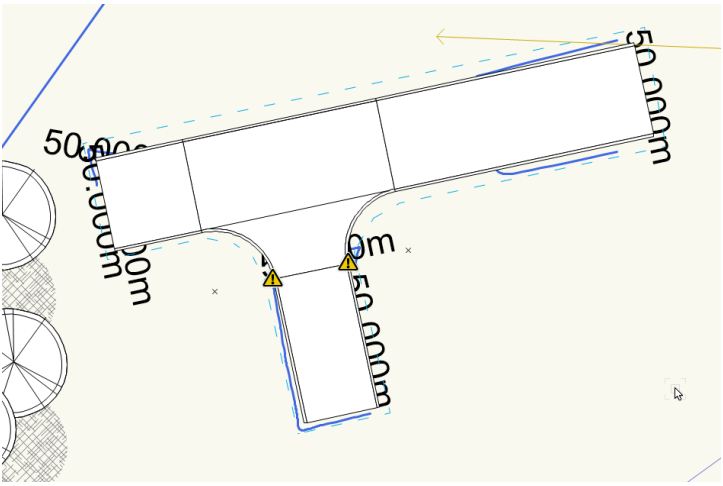

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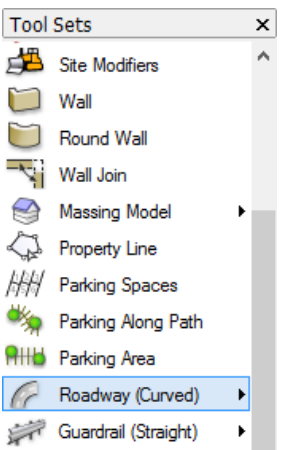
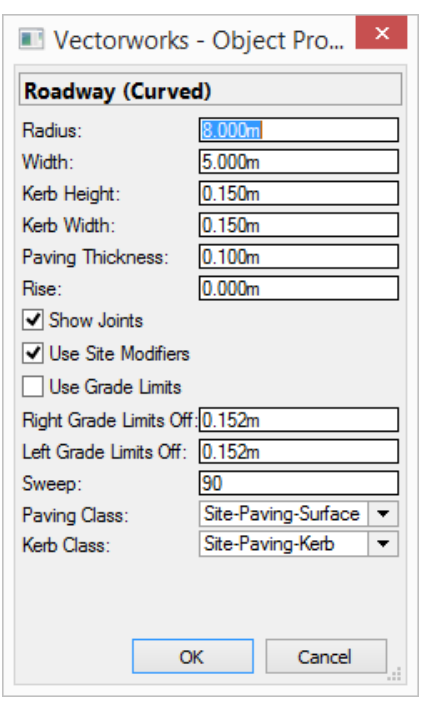
Roadway (Curved)

The Roadway (Curved) is used to used to create a straight section of road with a single slope. This is one of the older tools but it is still important to to cover it. It has limitations; it is always limited to a straight line and the slope is limited to the entire road.

- Go to the **Site Planning** tool set.
- Click on the **Roadway (Curved)** tool.



- Go the **Tool** bar.
- Click on the **Preferences** button.
- Fill in the preferences to suit your situation.



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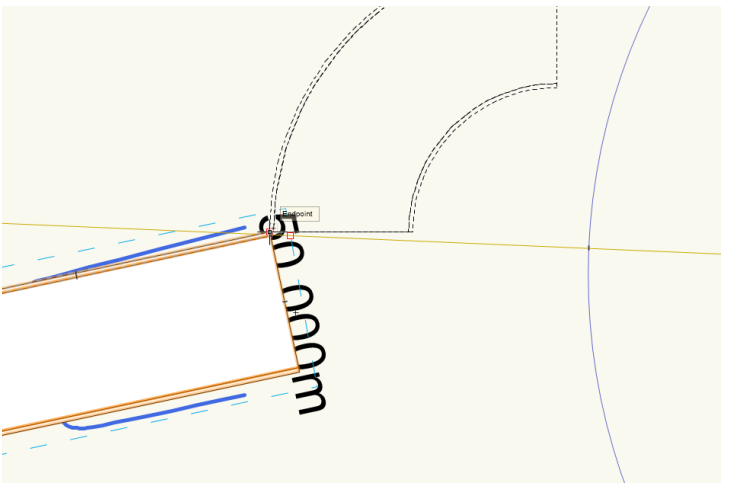
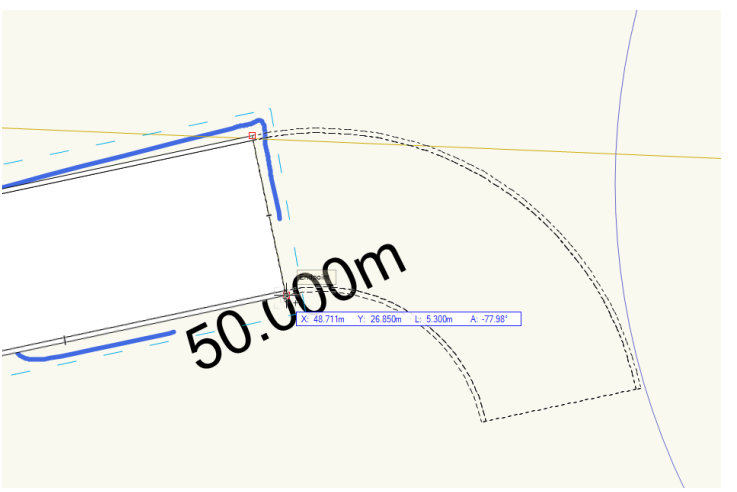
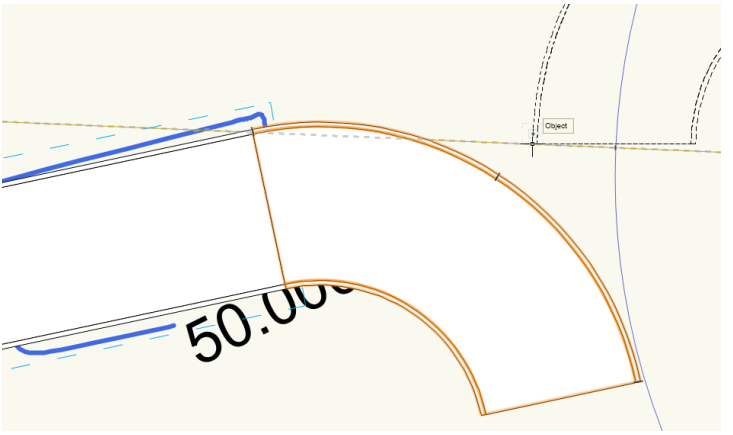
- Move your cursor into the drawing area.
- Click once to start the placement of the Roadway (Straight).
- The insertion point for the roadway is the centre of the road.



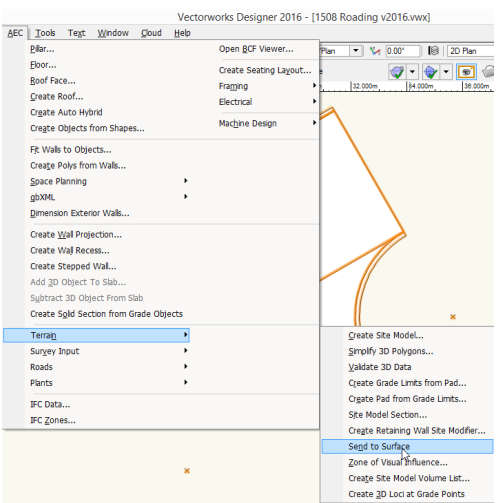
- Move your cursor to set the rotation of the road.



- In the first instance, the road will be placed at the bottom of the design layer (Z = zero), which may cause the Maximum/Minimum dialog box to be presented.
- Click on the **No** button.



- If you know the elevation of the road, you can type it into the **Object Info** palette.
- If you do not know the elevation of the road, you can send the elevation to the surface of the site model using the **Send to Surface** command.
- If you are using Vectorworks Architect, go to the Menu bar, choose **AEC > Terrain> Send to Surface**.
- If you are using Vectorworks Landmark, go to the Menu bar, choose **Landmark > Send to Surface**.



- You will notice that the elevation (Z) has been adjusted to suit the site model.
- You can adjust the **Rise** (slope) of the road, by entering in the required rise, you cannot enter the rise as an angle or percentage (1:10)

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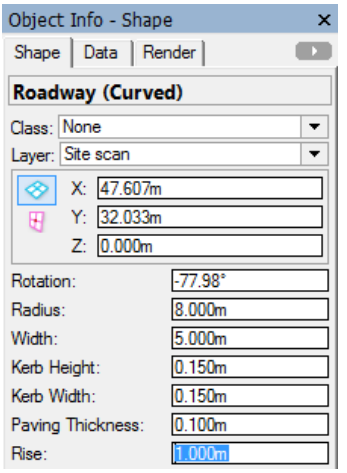
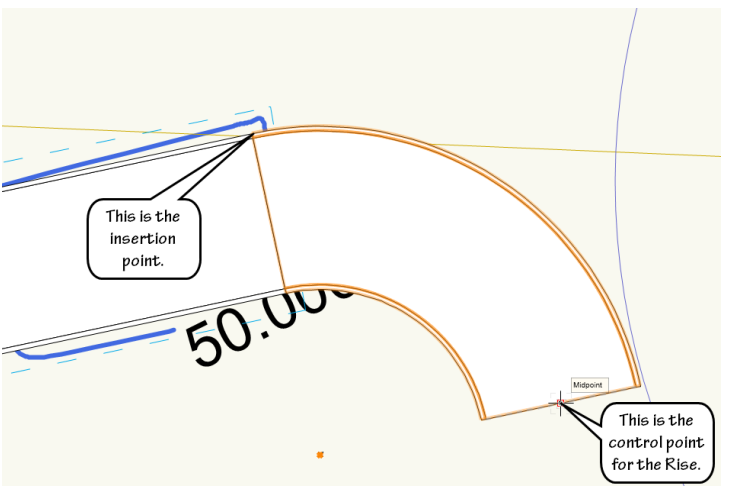


- The end that controls the rise is the opposite end to the insertion point.



- If you want to use site modifiers, extend the grade limits from the toer road objects.

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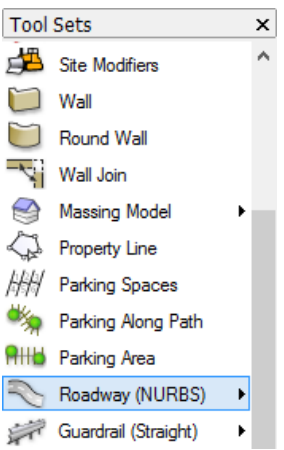
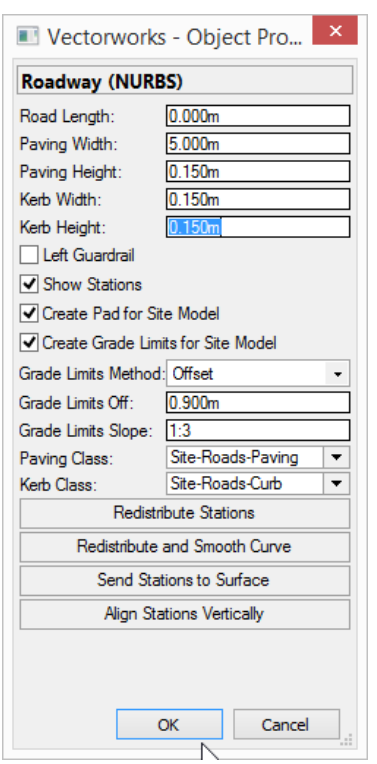
Roadway (NURBS)

The Roadway (NURBS) is used to used to create a a long section of curving road with a varying slopes. This is a powerful rood tool , it can fit to site model, it can have a varying or constant slope, and you can edit individual points along the road.

- Go to the **Site Planning** tool set.
- Click on the **Roadway (NURBS)** tool.



- Go the **Tool** bar.
- Click on the **Preferences** button.
- Fill in the preferences to suit your situation.



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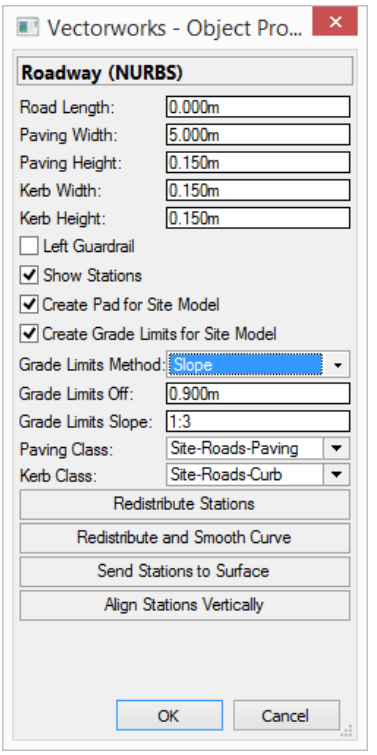
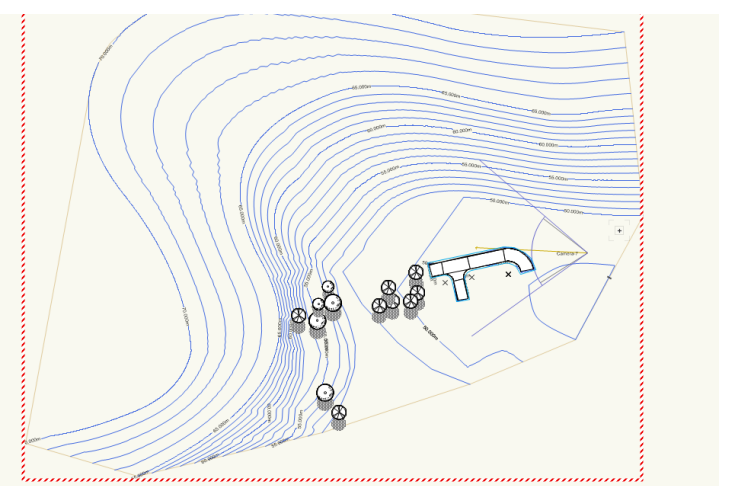
- If you choose site modifiers, you can choose to have the grade limits a constant distance away form the road, or it can be calculated based on the slope required to get back to the site.



- Move your cursor into the drawing area.
- Click once to start the placement of the Roadway (NURBS).
- The insertion point for the roadway is the centre of the road.



- Each click is a vertex on the road. Each vertex is the center of a curve (cubic spline vertex).
- Place several clicks to define the road.

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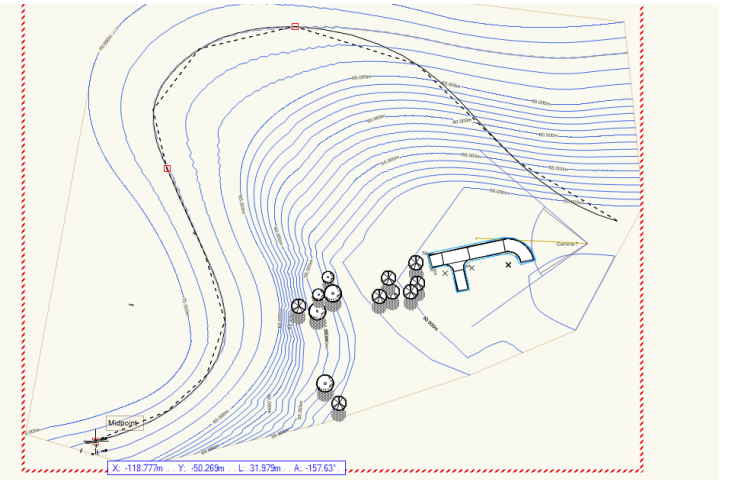
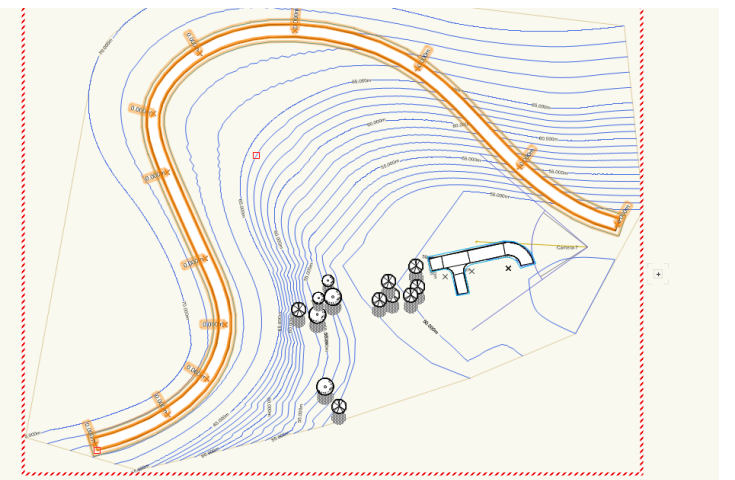
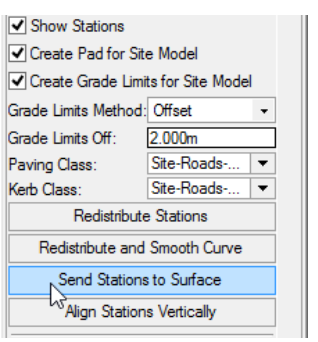


- Double click to finish.
- In the first instance, the road will be placed at the bottom of the design layer (Z = zero), which may cause the Maximum/Minimum dialog box to be presented.
- Click on the **No** button.





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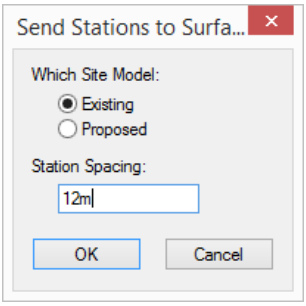

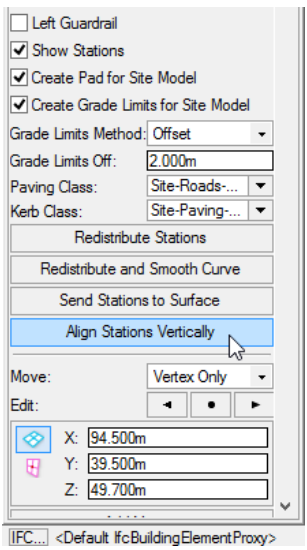

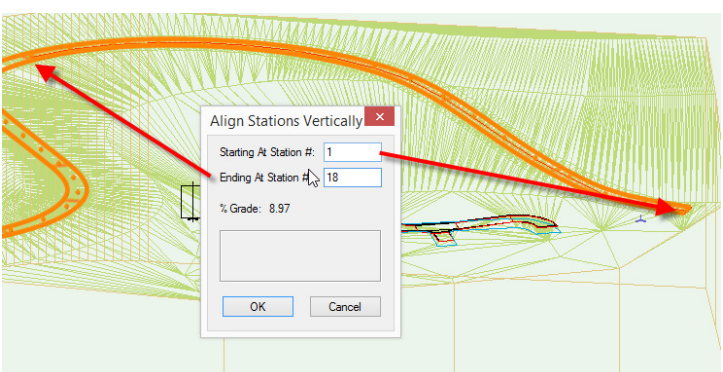

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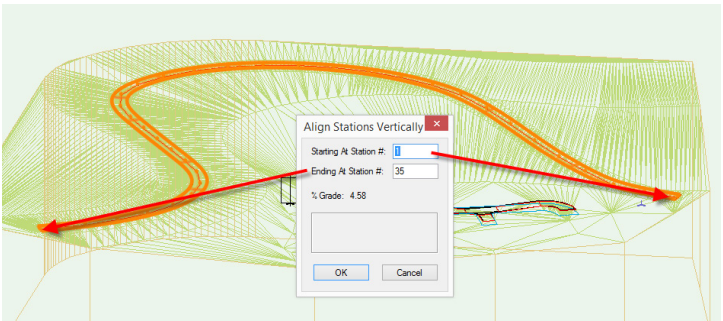

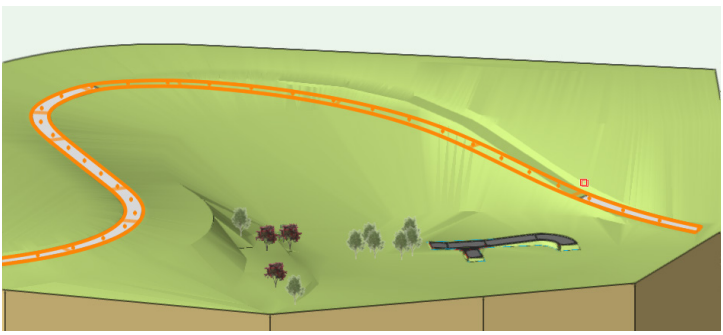

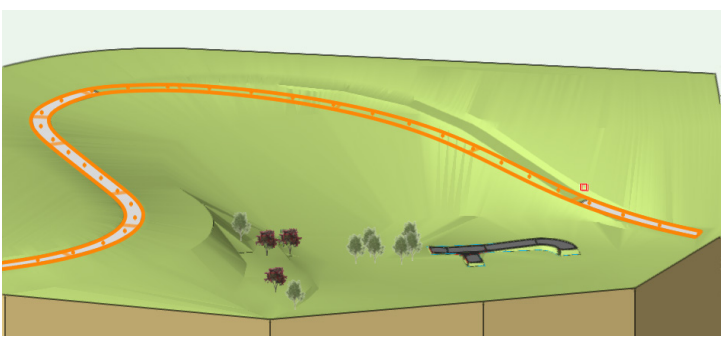

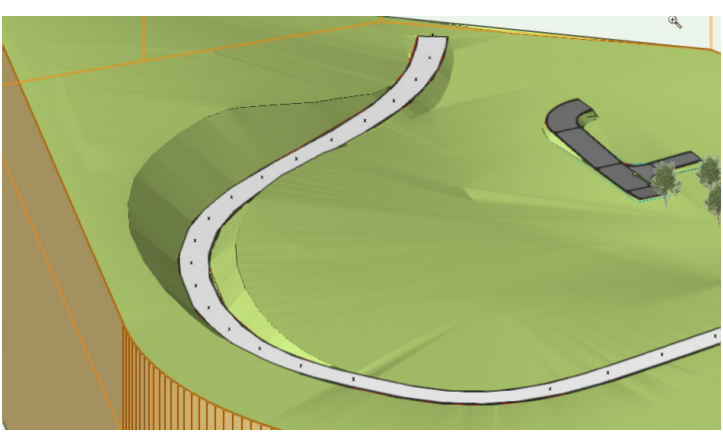

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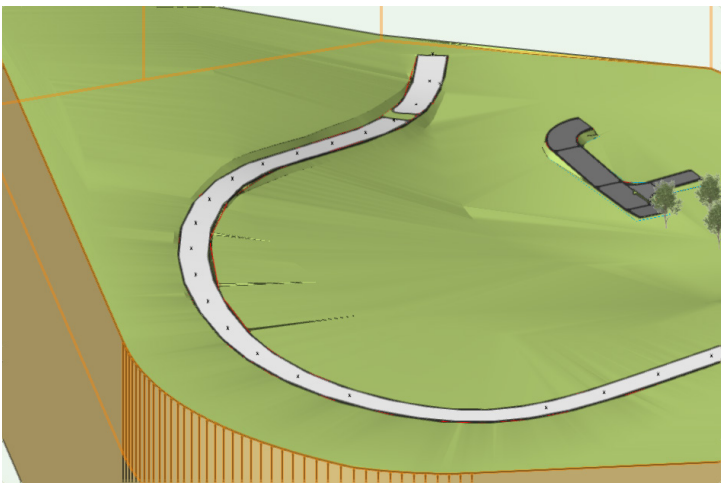
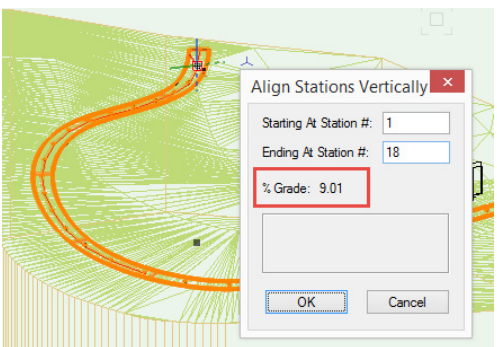
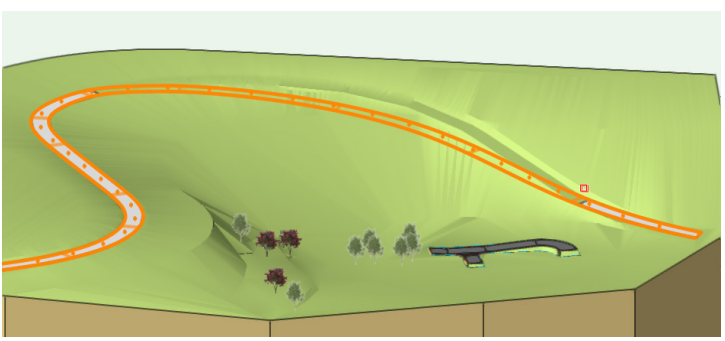


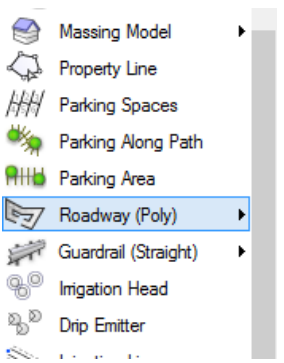

Align Stations Vertically
Starting At Station #: 1
Ending At Station #: 18
% Grade: 9.01
OK
Cancel



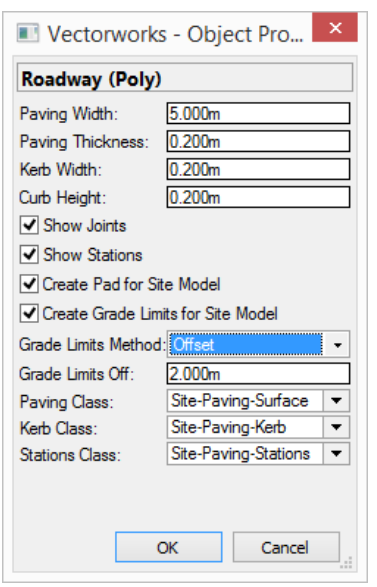
Roadway (Poly)

The Roadway (Poly) is used to used to create a a long section of road with straight and curved sections with a varying slopes. This is a powerful road tool , it can fit to site model, it can have a varying or constant slope, it can have straight sections, curved sections, and you can edit individual points along the road. It does not look like a great rad when you first place it, but when you combine this road with the Reshape tool, it becomes a very powerful roading tool.

- Go to the **Site Planning** tool set.
- Click on the **Roadway (Poly)** tool.



- Go the **Tool** bar.
- Click on the **Preferences** button.
- Fill in the preferences to suit your situation.



- If you choose site modifiers, you can choose to have the grade limits a constant distance away form the road, or it can be calculated based on

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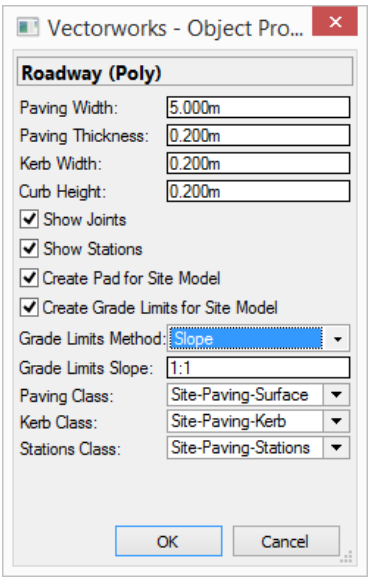
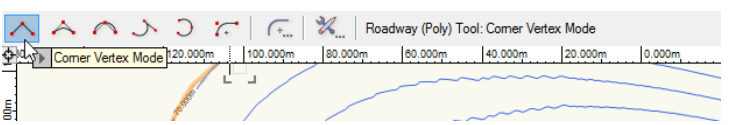
the slope required to get back to the site.



- Go to the Tool bar.
- Because this roadway is created from a polygon, you have a choice for the vertices. If you choose the first mode (Corner Vertex Mode) the road will look like it has pointy corners (these are the corner vertices), which you can edit later with the Reshape tool.
- If you choose the second mode (Bezier Vertex Mode), you will be drawing a road very much like the NURBS Road.I find this road easier to draw iif you use the first mode, then reshape it with the reshape tool to change the location of the vertices and the radius of the corners.



- Move your cursor into the drawing area.
- Click once to start the placement of the **Roadway (Poly)**.
- The insertion point for the roadway is the centre of the road.
- Each click is a vertex on the road. Each vertex is the center of a curve (cubic spline vertex).
- Place several clicks to define the road.

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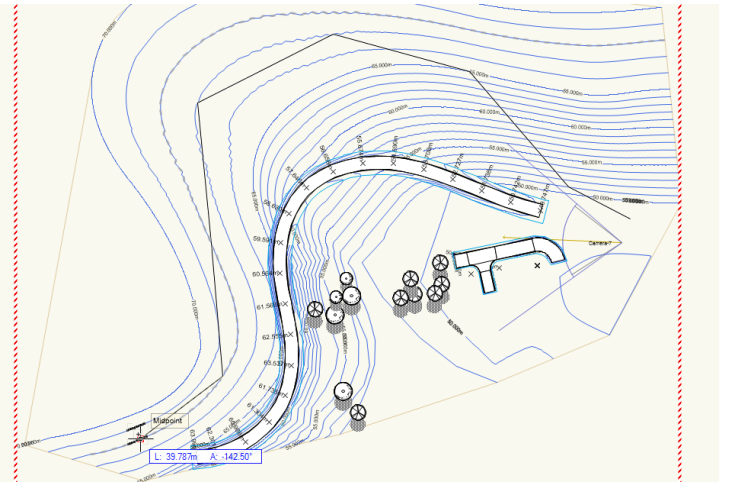
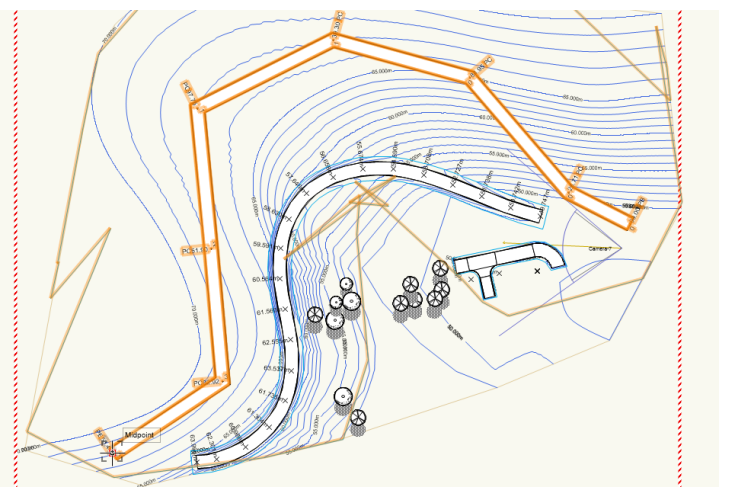


- Double-click to finish the road.
- You can see from this image that my Roadway (Poly) has corner vertices and at the moment doesn't look very much like a smooth road.



- When you first place the road it does not follow the site. You can send this road to the surface of the site model by using the **Object Info** palette. Like the Roadway (NURBS)there is an option to send the stations to the surface of the site model.
- Click on the **Send Stations To Surface…** button on the Object Info palette. this will open a dialog box where you can choose the distance between the station points (the points along the road where you want to control the height relative to the site model).
- Enter the horizontal distance between the station points. In this case I have used 12 m (about 40 feet).

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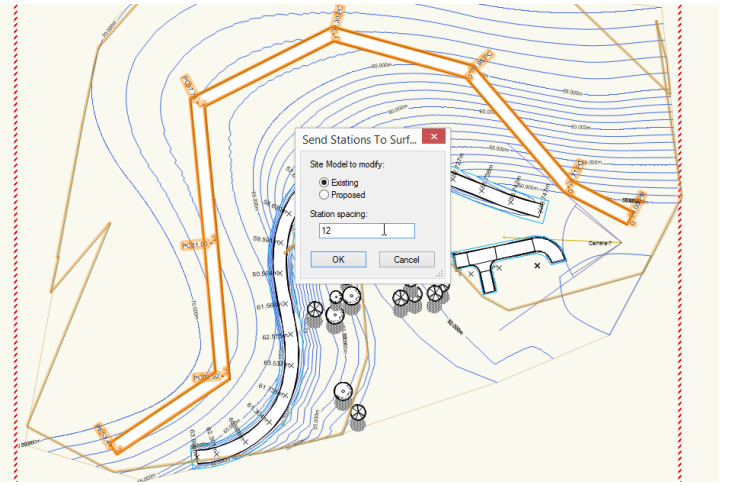
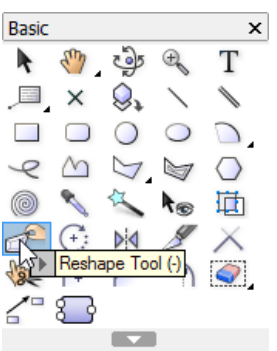


- When you click on the OK button,Vectorworks will lift the road to match the site. You will also see several points along the road (12m or 40' apart).
- You might notice on this image, that there is an outline a long way from the edge of the road. This is the grade limits set to a slope value of 1:1. When you use the slope offset for the grade limits, Vectorworks recalculates the offset each time you move the road or change a vertex. While you are designing the road (moving it around) it is quicker if you change the grade limits to offset. You can do this on the Object Info palette.
- An easy way to change the Roadway (poly) is to use the Reshape tool.
- Go to the Basic toolset and select the Reshape tool.



- When you select the roadway with the Reshape tool, you will see a handle at each vertex.

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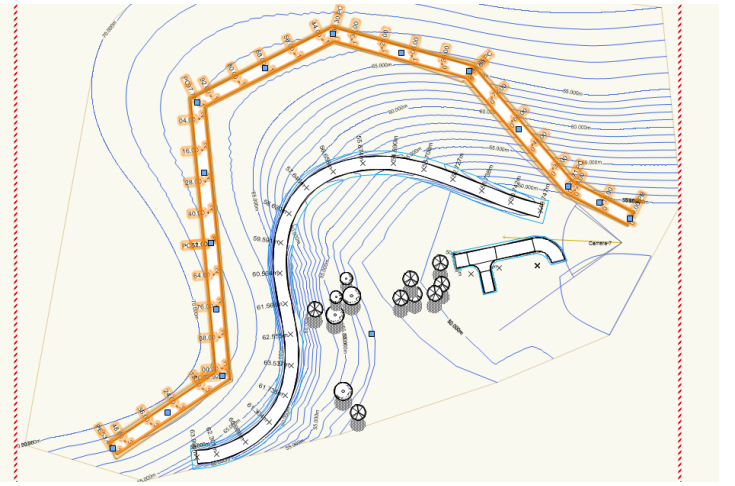
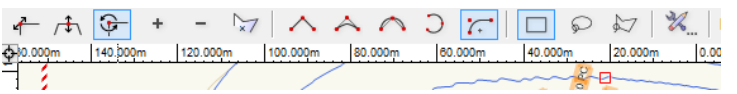
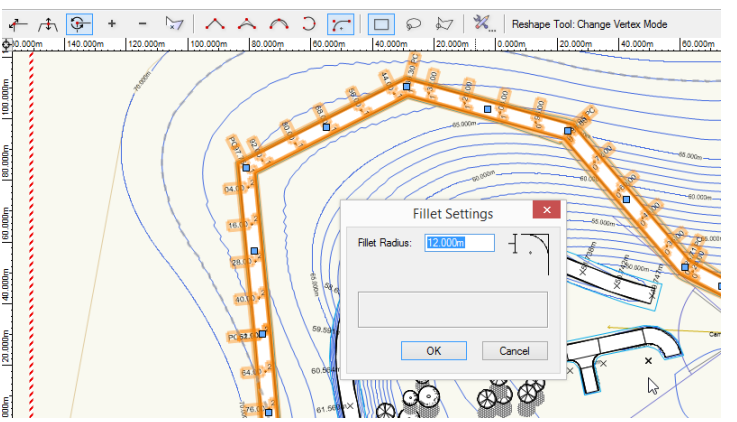


- Go to the **Menu** bar.
- Choose the option to change the vertex type. In this case, I have selected the option to change the vertex type to arc corners.



- Click on the preferences button, the last button on the **Tool** bar.
- Enter the required radius.



- Move to the first vertex that you want to change, notice that the cursor changes shape.
- Click once to change the vertex type.

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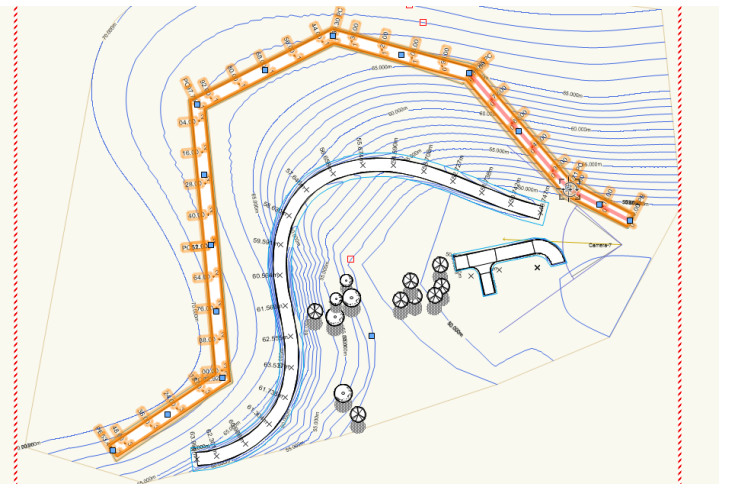
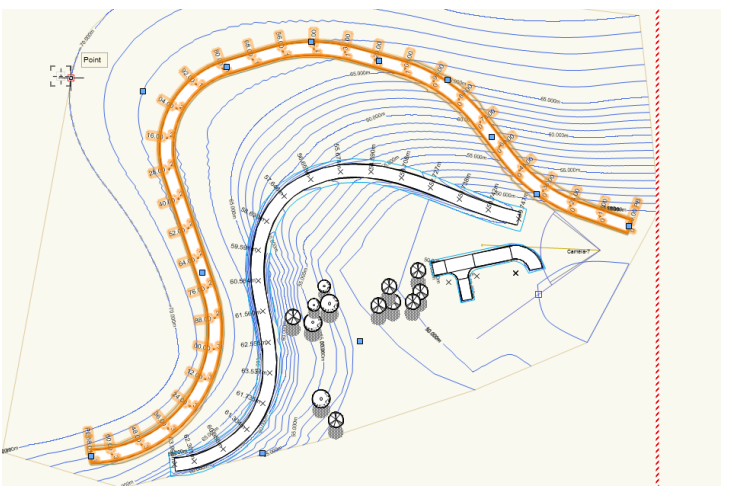
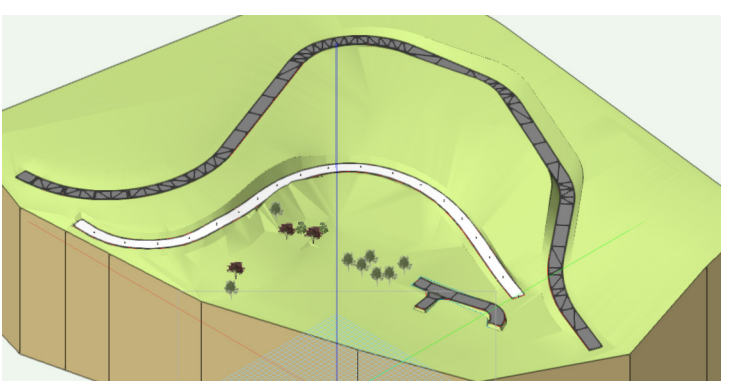


- Change the vertex type of all the required vertices.



Like the Roadway (NURBS), you can align stations vertically to control the slope of the road.



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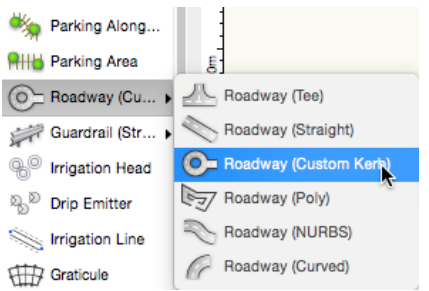
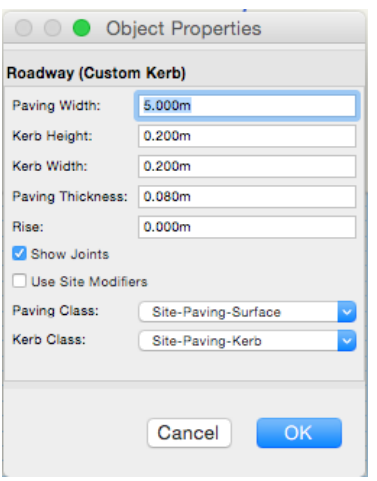
Roadway (Custom Kerb)

The Roadway (Custom Kerb) is used to used to create a long section of road with straight and curved sections with a varying slopes. This is a powerful road tool , but it can't fit to site model and it has constant slope. It can have straight sections, curved sections, and you can edit the plan shape of the road. It looks very plan when you first place it, but when you combine this road with the Reshape tool, it becomes very powerful.

- Go to the **Site Planning** tool set.
- Click on the **Roadway (Custom Kerb)** tool.



- Go the **Tool** bar.
- Click on the **Preferences** button.
- Fill in the preferences to suit your situation.



- If you choose site modifiers, you can choose to have the grade limits a constant distance away form the road, or it can be calculated based on the slope required to get back to the site.
- Move your cursor into the drawing area.
- Click once to start the placement of the **Roadway (Custom Kerb)**.
- The insertion point for the roadway is the centre of the road. Not only is this the start point for the road, but this is also the point that Vectorworks

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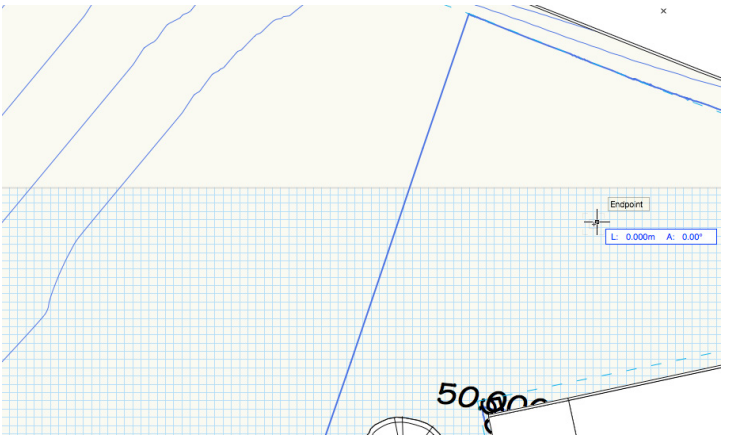
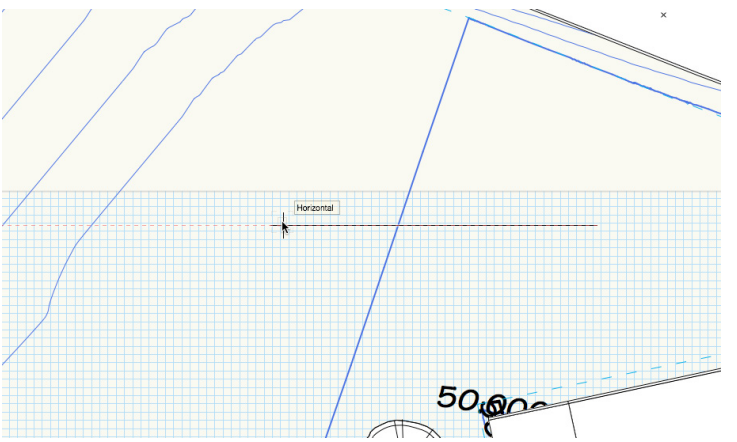
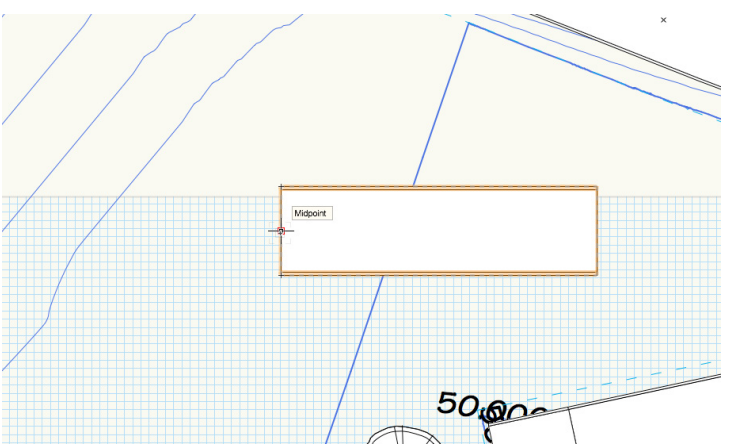
will use on the Object Info palette for the elevation.



- Move the cursor to define the length and angle of the road.



- Click once again to finish placing the roadway.



- Initially, this looks like a very simple road, but this is a very flexible piece of road. In order to unlock the flexibility of this road you need to use the Reshape tool.
- Go to the Basic toolset.

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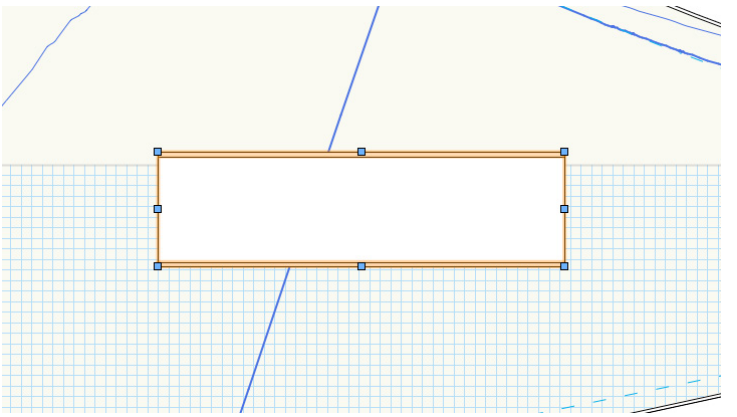
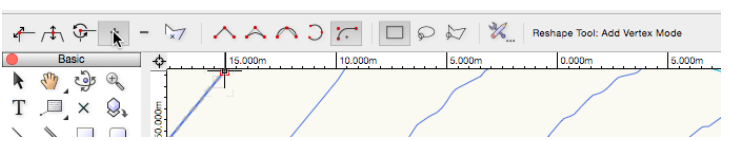
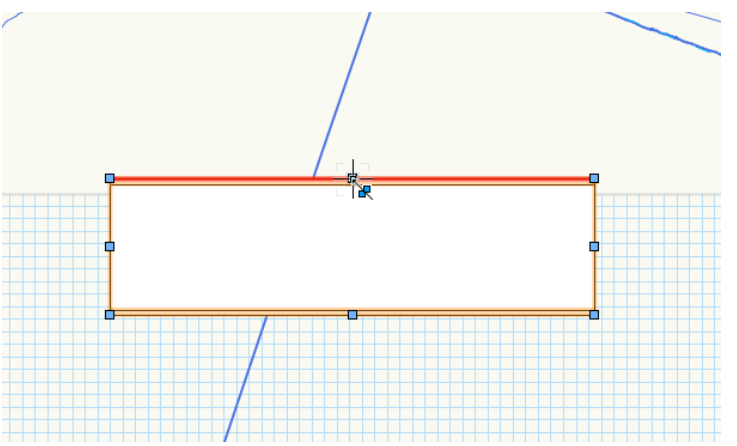
- Click on the Reshape tool. You will notice that the handles change from the centreline of the road to each corner.



- Go to the Tool bar.
- The Tool bar for the Reshape tool has several modes. If you want to add additional vertices to this road, then click on the +.
- After choosing this mode, choose the type of vertex that you want to add. In this case I have chosen the Arc vertex. This will add curving vertices to my road.



- Move your cursor to one of the midpoints along the road edge.wwhen the cursor changes to a double diamond shape, click once.



- move your cursor away from the road if you want to have the arc outside the road, or move your cursor into the road if you want to have the arc inside the road.

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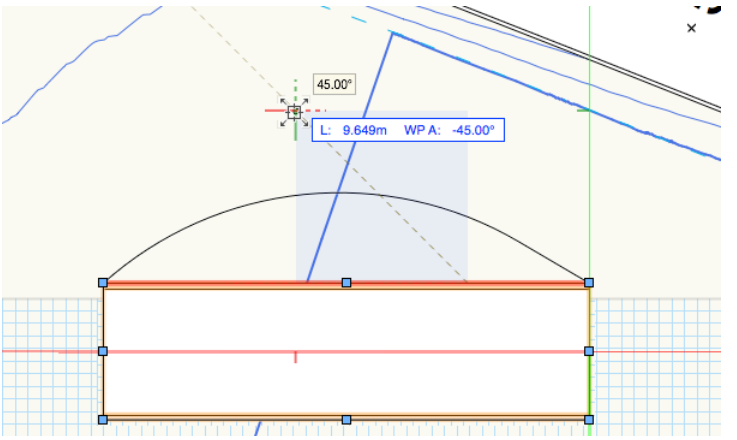
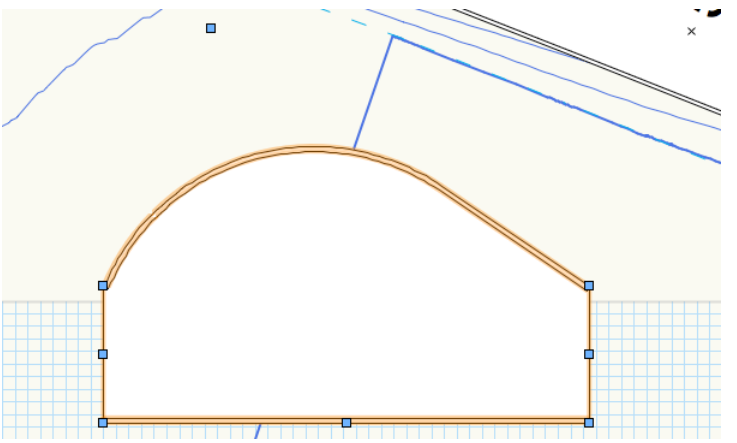


- When you have reached the required location, click once again to finish.



- Carry on editing the road to add or subtract vertices as required.
- The Tool bar for the Reshape tool has several modes. The last mode on the Tool bar is to hide or show edges. This mode will turn on or turn off the curbs on the road.

- Move to an edge that you want to a edit, and move your cursor directly on top of the blue handle.

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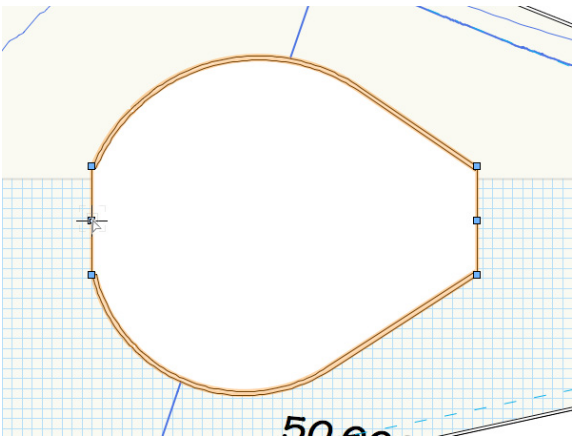
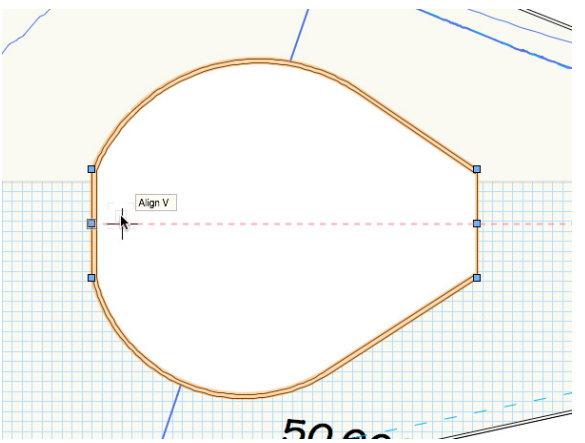


- When the cursor changes shape, click once.
- If the road has a kerb on its edge, this mode will remove the kerb. If this edge does not have a kerb, this mode will add the kerb.



This roadway is extremely powerful. It can be used to replace tee intersections, and it can even be used to create a four way intersection. In this example I'm going to start with a straight section of road.

- I have set my preferences so that my custom kerb roadway will be the same width as the existing straight roadway.
- By clicking on the centre of the existing roadway, I can ensure that the two roads will line up.
- Using Angle Snaps, I can find the perpendicular line to my existing road.

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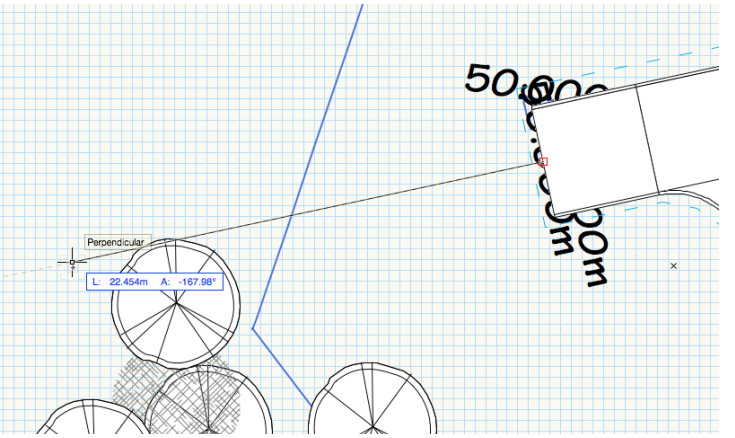
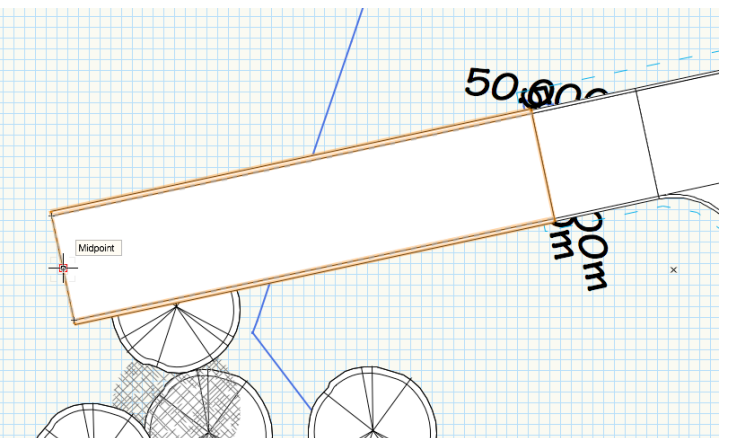
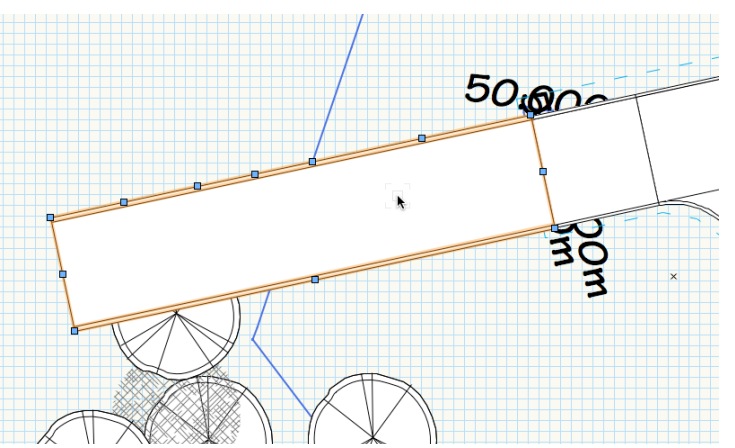


- When I have the road the required length, I can click once to finish the road.



- When I change to the Reshape Tool, I can add additional vertices along the edge of the road to create a location for my tee intersection.
- In this case I have added corner vertices. Later, I will change these two arc vertices.



- Still using the Reshape tool,I can add the required vertices.

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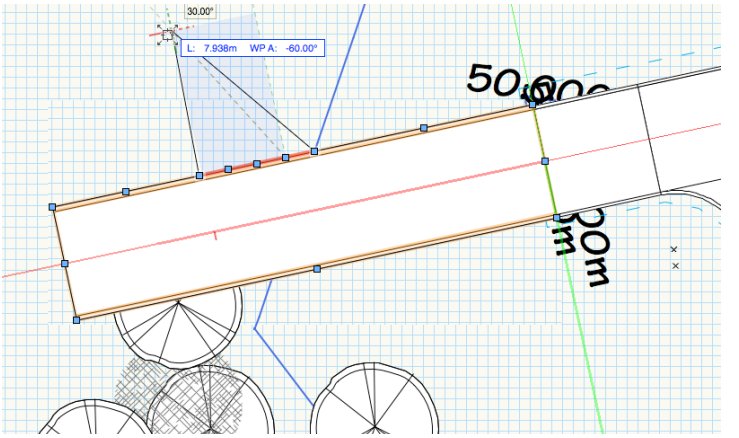
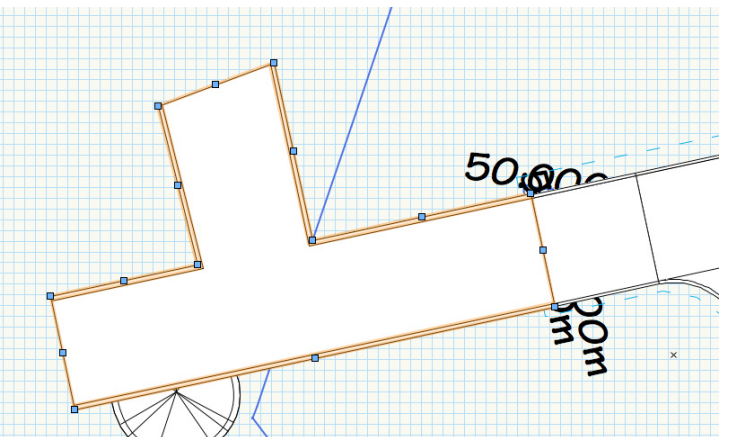
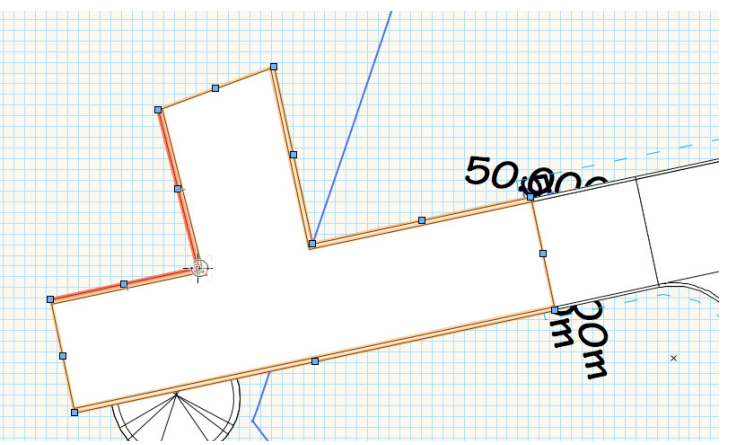


- Keep adding vertices until you have the required intersection.



- Changing the modes on the Reshape tool, allows you to change the vertex type.



- In this case the corner vertices are being altered to become arc vertices.

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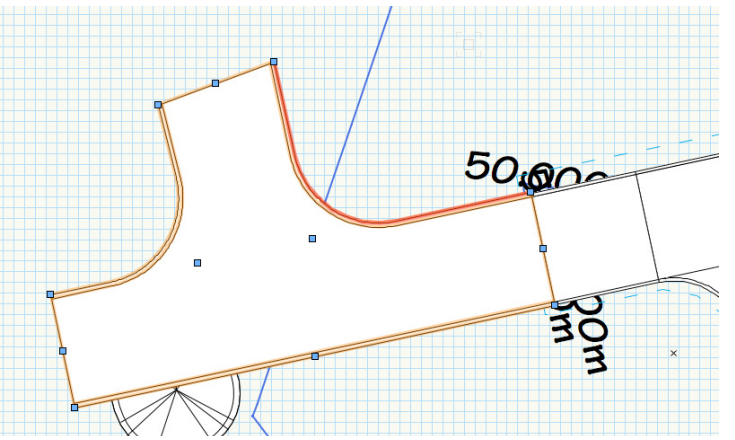

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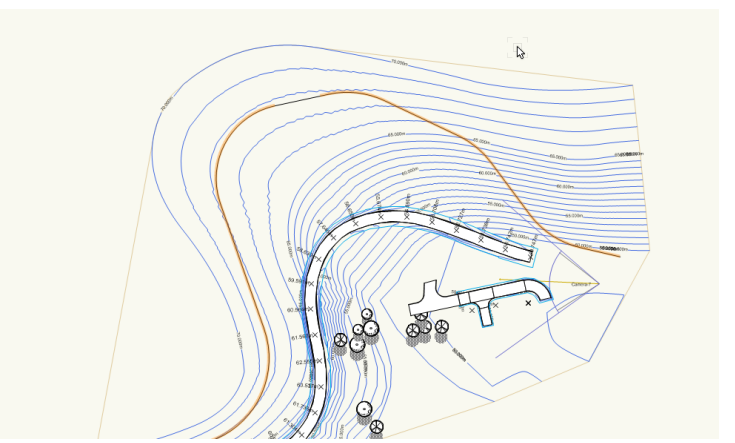
Combining Roads

One of the best ways to look at these roading tools is not to look for a single tool that will satisfy all of your requirements, it's best to look for a series of tools and combine them together. In this example I'm going to combine a Roadway (Poly) with a Roadway (custom kerb).

This will allow me to create a curving road that follows the terrain, but insert into that road a four-way intersection

- To start with,draw the centreline of the road that you require using the 2D Polygon tool.
- Use the Reshape tool to edit the road vertices to give you the curves that you require.
- When the road reaches the top of the hill, there is a small segment of straight road.
- In this case, I have used the split tool to split a small section of the polygon. the small section of straight polygon will become my intersection.
- The two sections of polygon that I want to convert to a Roadway (Poly) have been selected.



- From the AEC or Landmark menu choose the command **Create Objects from Shapes…**

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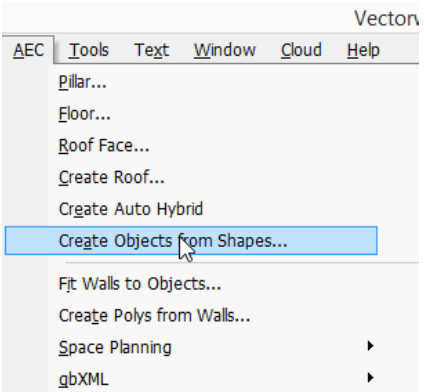
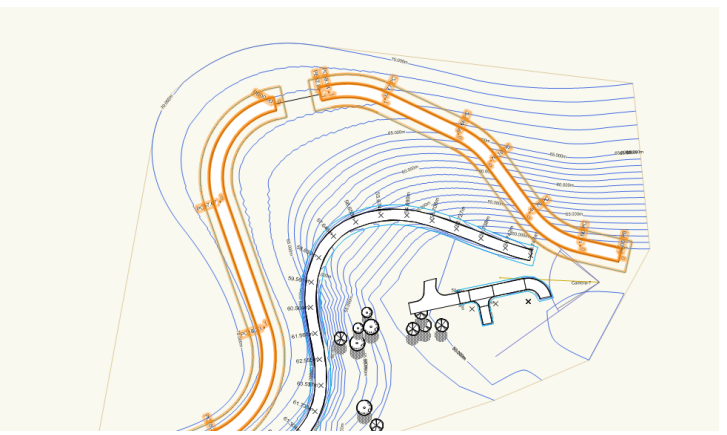
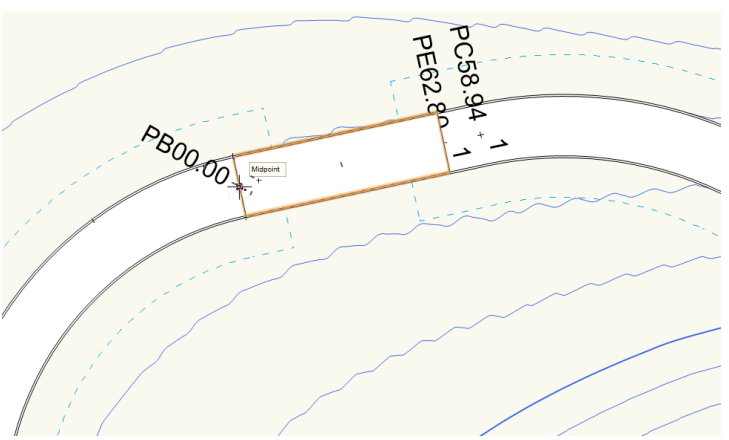


- This command will convert the polygons into the required objects. A dialog box will open for you to choose the type of object. In this case I have chosen to create Roadway (Poly).
- You will notice that the two roads have been created. At the moment the roads are using site modifiers, and the grade limits is currently turned on. While the roads are selected I will turn off the grade limits.



- In between the two road sections I have drawn a Roadway (custom kerb).



- by using the Reshape Tool I can add additional vertices so that I have a

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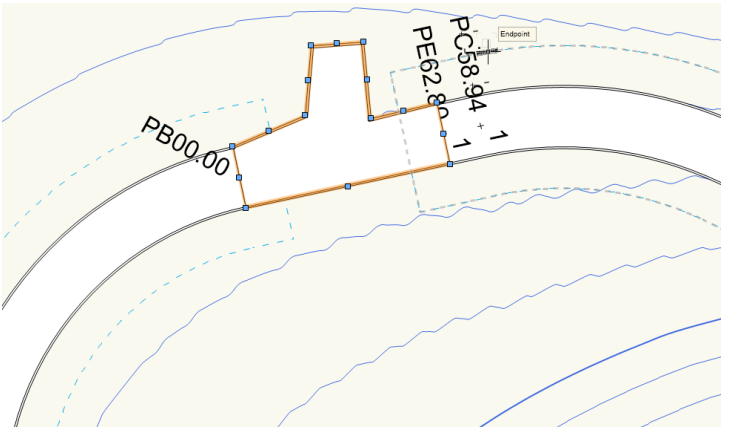
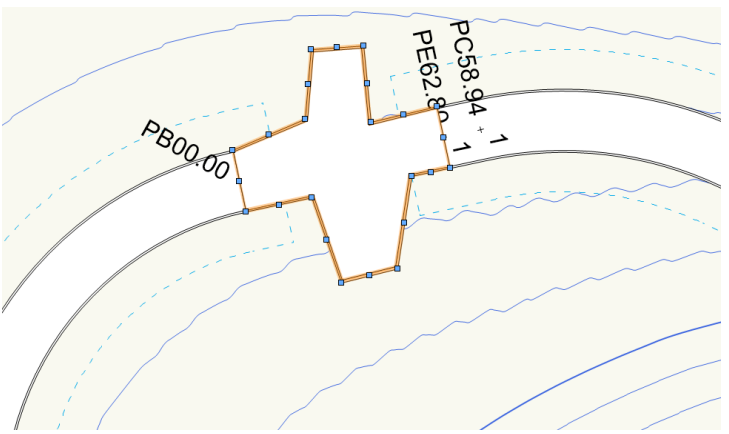
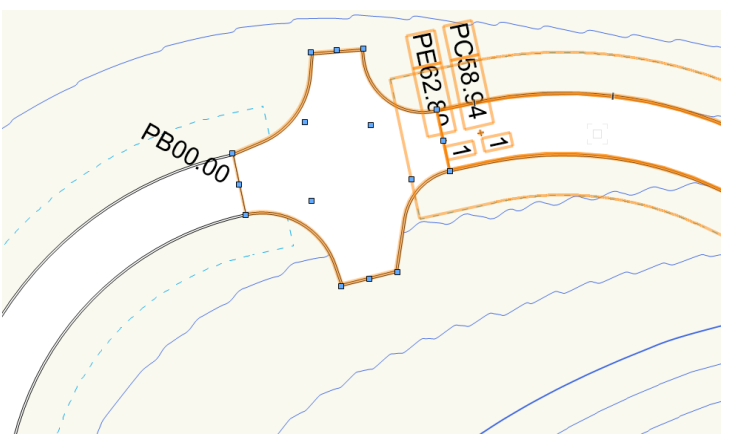
road junction.



- I can continue to advert a sees to give me another road junction, making a four way intersection.



- Using the Reshape Tool I can change some of the vertices to arc vertices, giving a more road like appearance.



- Still using the Reshape tool, I can move the vertices around to change the shape of my intersection.

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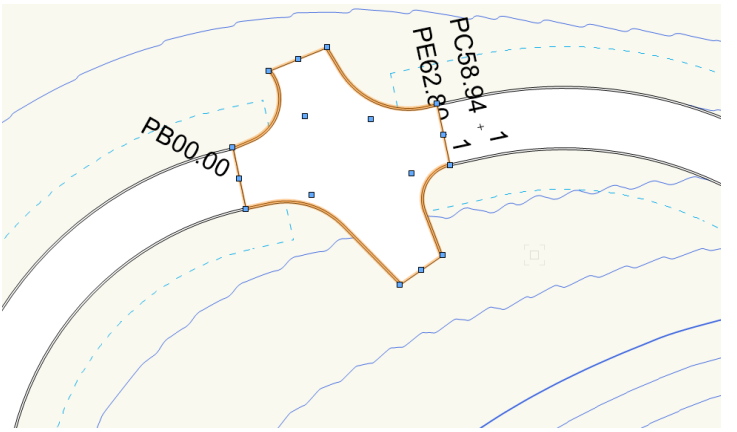
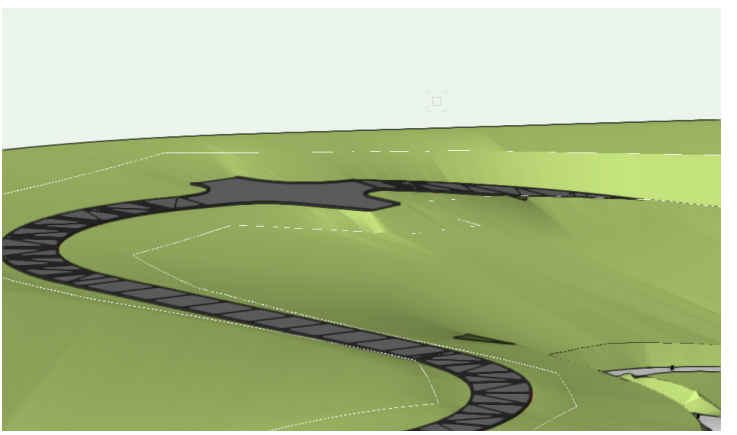


- Now all I need to do is to create a grade limits around the entire road network, and check the heights of my roads relative to the site and the height of my roadway (custom kerb) relative to the adjacent roads



Thank you

We trust that you have enjoyed working through this manual and that it has been informative and constructive.

For more information, please visit: http://learn.archoncad.com. If you just want someone to help you learn Vectorworks, to carry out some Vectorworks contract work, or you want someone to make Vectorworks easier, contact us, as this is a service that we also offer:
jon@archoncad.com.

Thank you again,
Jonathan Pickup
June 2015

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