

## Chapter-2 Working With Civil Geometry

### Project Overview

The design is a proposed Entrance and Exit ramps along an existing Interstate Hwy. Roundabouts have been planned to complete the intersection and to quickly move the traffic through the top of the ramps.

The project will consist of two-on off ramp exchanges, each with its own roundabout. Additionally the Hwy overpass will require a bridge and an extension of the SR Rt 63. This workshop does not address the compliance of the roadways with all AASHTO standards, nor is it intended to serve in any design aspect. It does attempt to create a realistic design situation and expose the user to a workflow combining Roundabouts, Civil Geometry, GEOPAK Site and Roadway Designer.



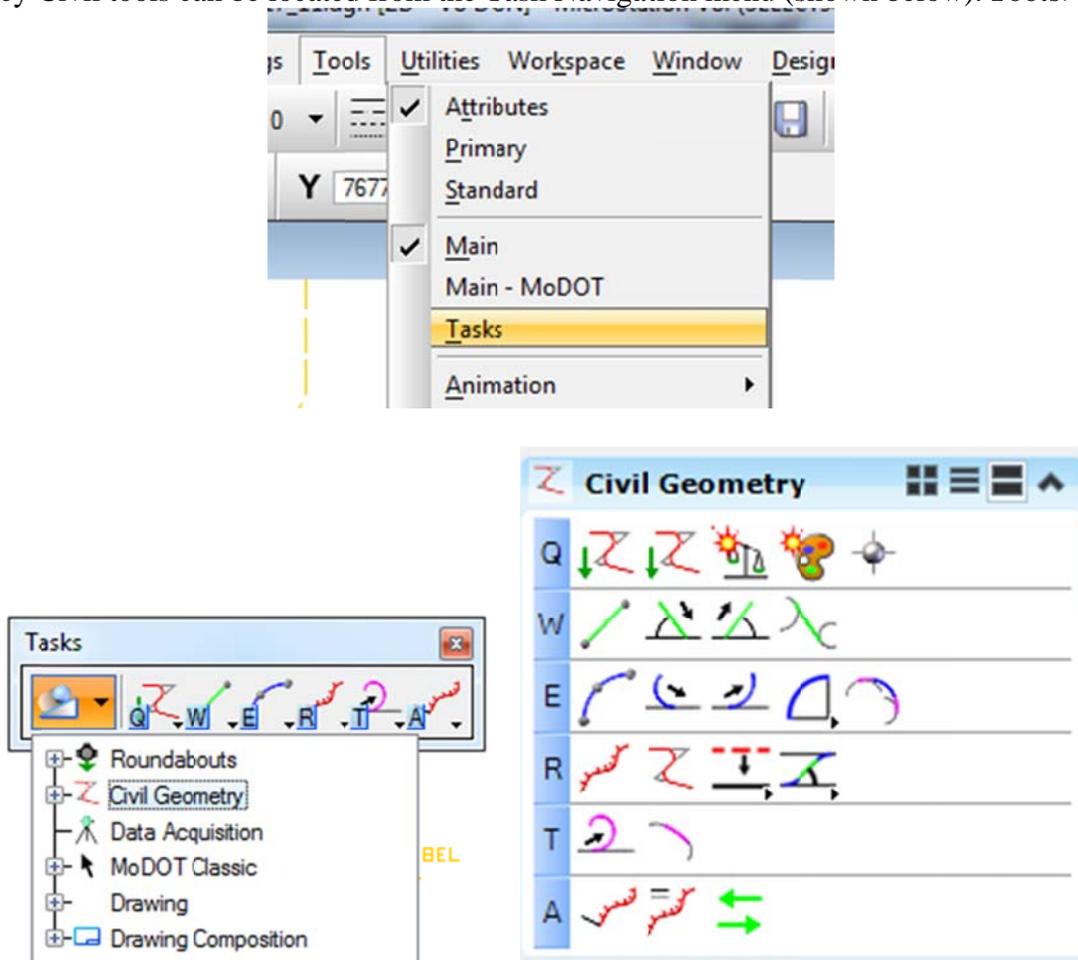
## Working with Alignments

As shown in the Diagram the designer will need to create a new alignment for the proposed road and modify the existing road to accommodate the RAB.

The Roundabout tool will work with graphics created from MicroStation, civil application GEOPAK or Bentley Civil Geometry. This workshop will use a combination of stored alignments and alignments created using civil platform geometry. The workflow will consist of the following:

- Import Stored alignments representing “best fit” existing roadway alignments
- Create a new Alignment on the south west side of the main route
- Modify an existing alignment of the road intersecting to the NE of the main route

Bentley Civil tools can be located from the Task Navigation menu (shown below). **Tools>Tasks**



Additional Tools used with the new Civil Geometry toolset include the message center, Item Browser and the Feature toolbar.

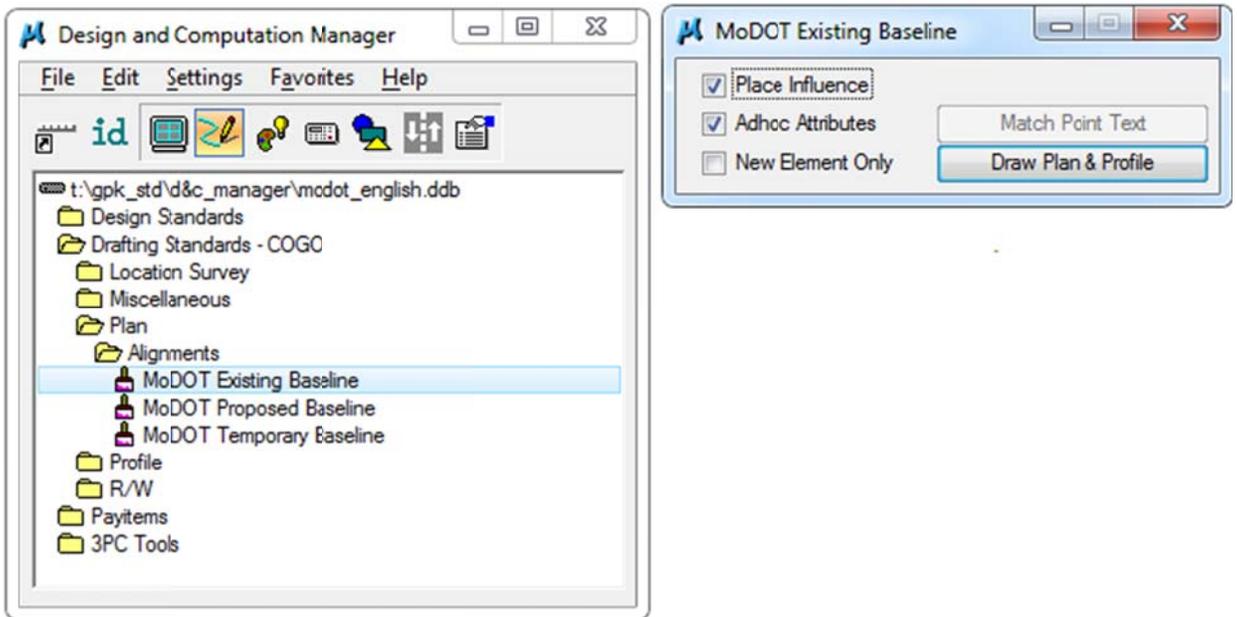
**Note** When using Civil Geometry, alignments may reside in a reference file.

### Import Existing Geometry

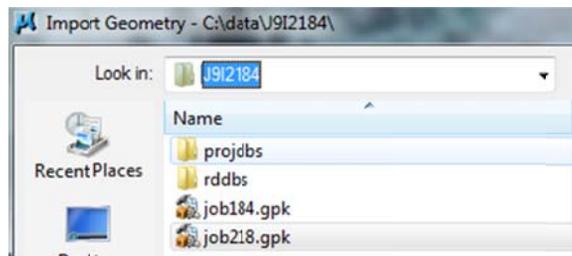
1. Open the file Geometry\_Training.dgn C:\Data\J9I2184. (file cannot currently reside in ProjectWise)  
The drawing will open with the geometry that makes up the ramps and mainline locations along with the background images to show overall location.
2. Locate the Civil Geometry Task bar shown on previous page.
3. Tag the Import Geometry command  .

*Note For The initial import Projectwise Integration can be used to Navigate to the GPK Located on PW CH2 folder- For subsequent Chapters in the workshop the COGO Preferences will need to be reset to point to the appropriate COGO folder*

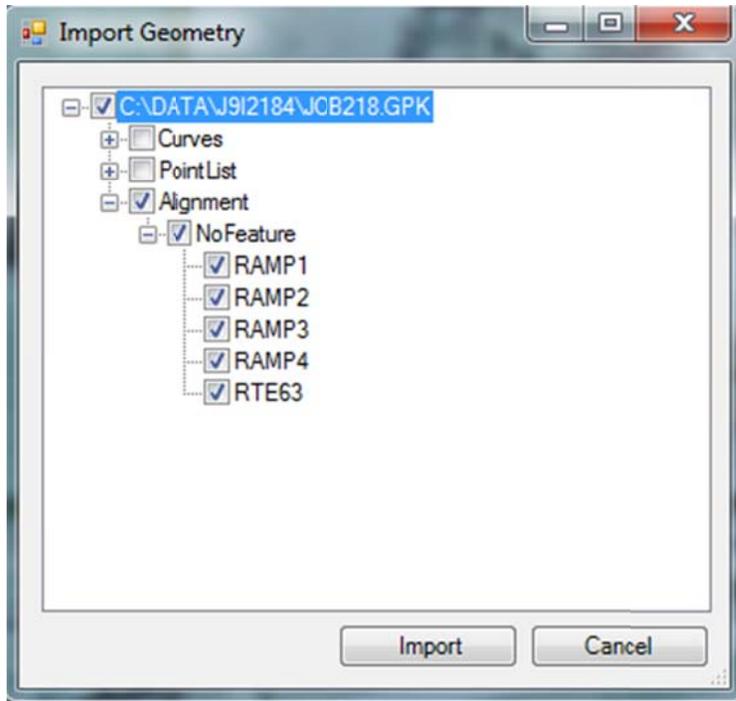
4. Set the Design and Computation Manager to MoDOT Existing Base Line, Place Influence.



5. Select the GPK. **Job218.gpk**



6. Toggle the Ramp1, Ramp2, Ramp 3, Ramp 4 and RTE63 alignments.



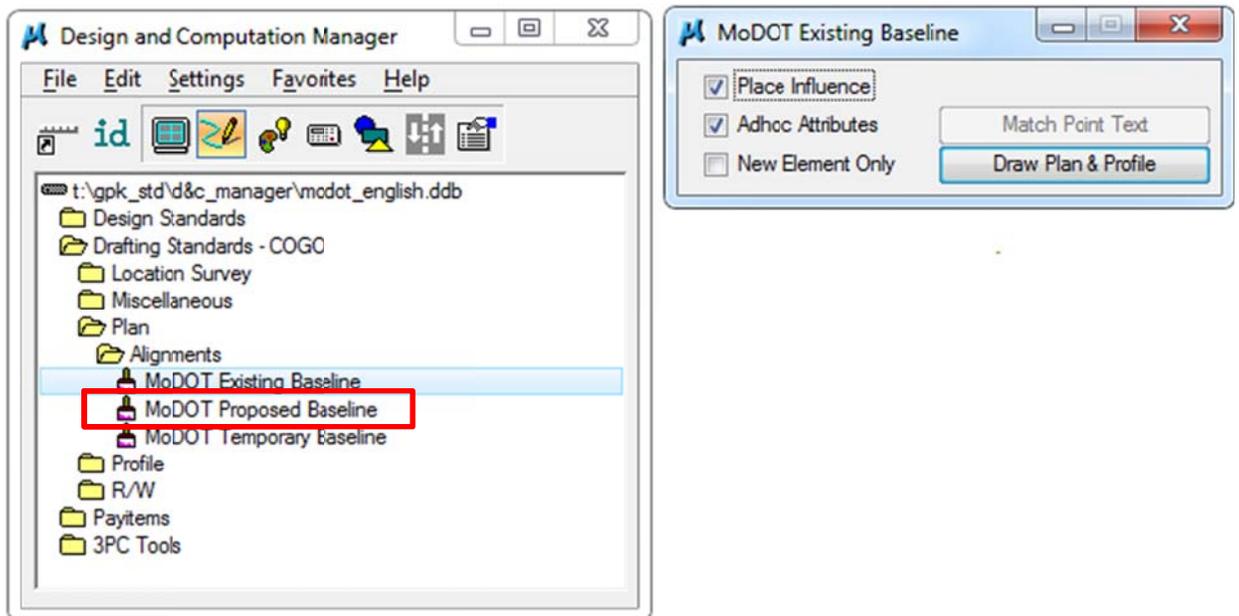
7. Click import from the dialog. This will draw the baseline information into the drawing file along with the correct symbology.
8. Save the drawing file.

### Create Hz Alignment using Civil Geometry Tools

With the existing Geometry in place the designer can begin creating new geometric alignments. We are going to put in the new outer road alignment using Civil Geometry Tools.

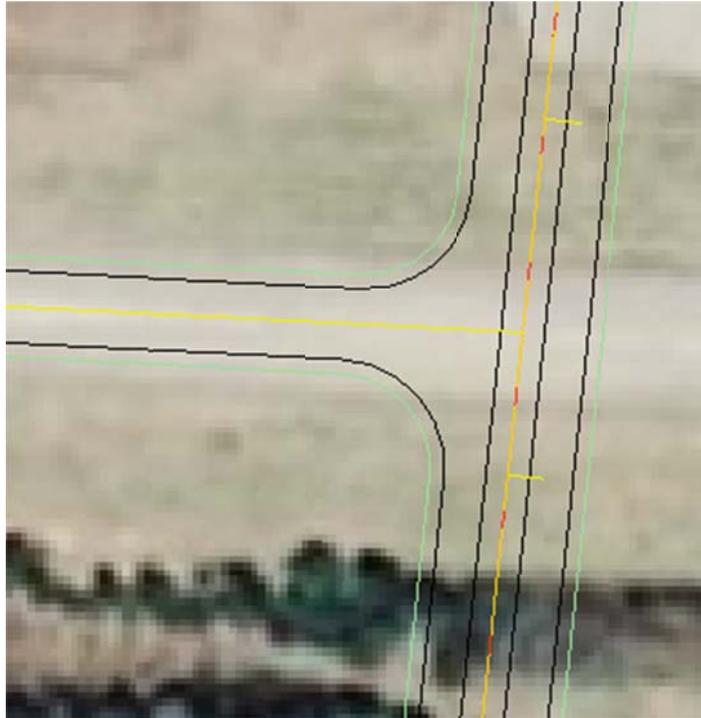


9. Open the Design and Computations Manager and place influence on MoDOT Proposed Baseline.

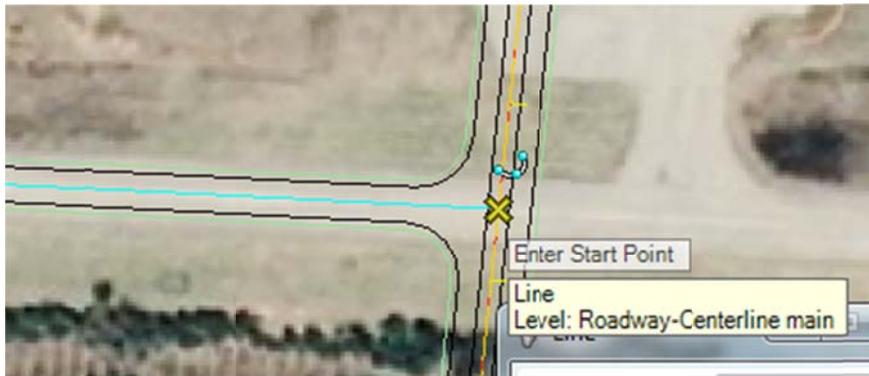


10. Locate and open the Civil Geometry Task menu.

11. Zoom to the intersection of the new outer road and Rte 63 south.

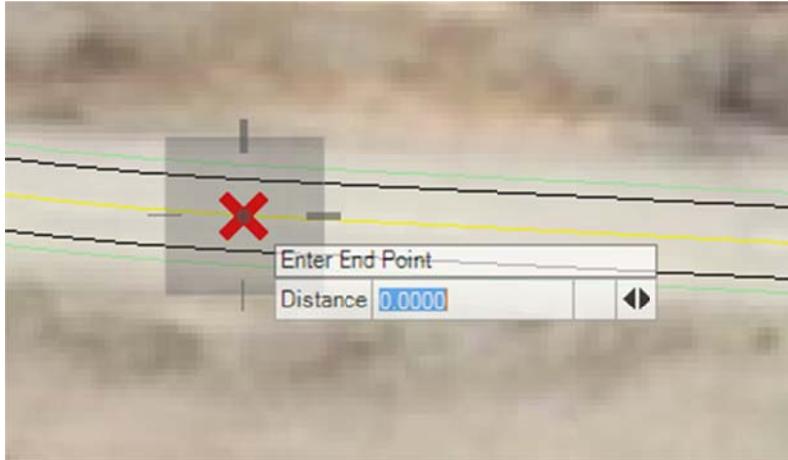


12. Click on the line between points tool  located in the Civil Geometry Toolbar.

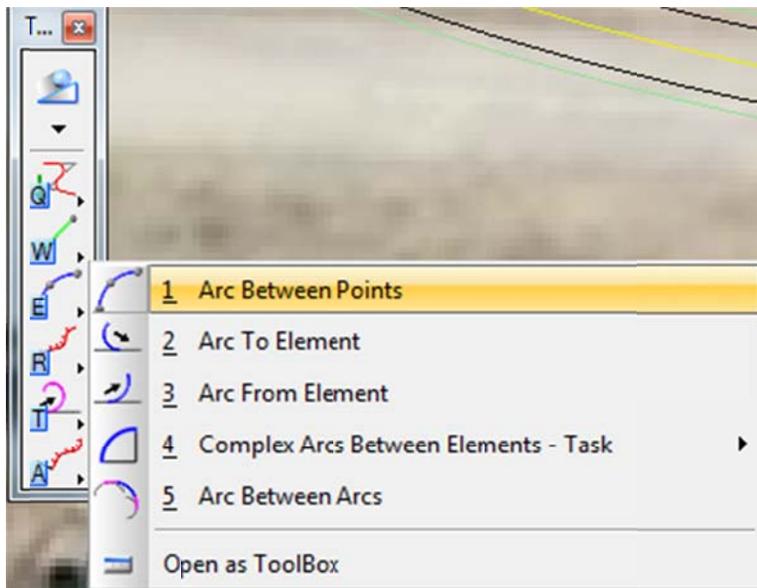


13. Begin with Outer Road start point where it intersects Rte 63 and click a start point shown above.

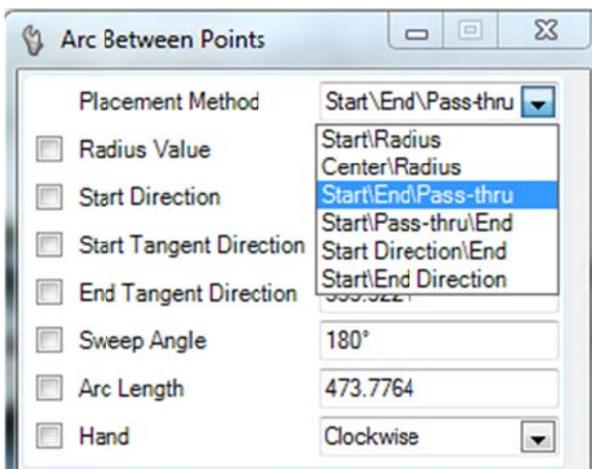
14. Follow the outer road to the west and click the next tangent point



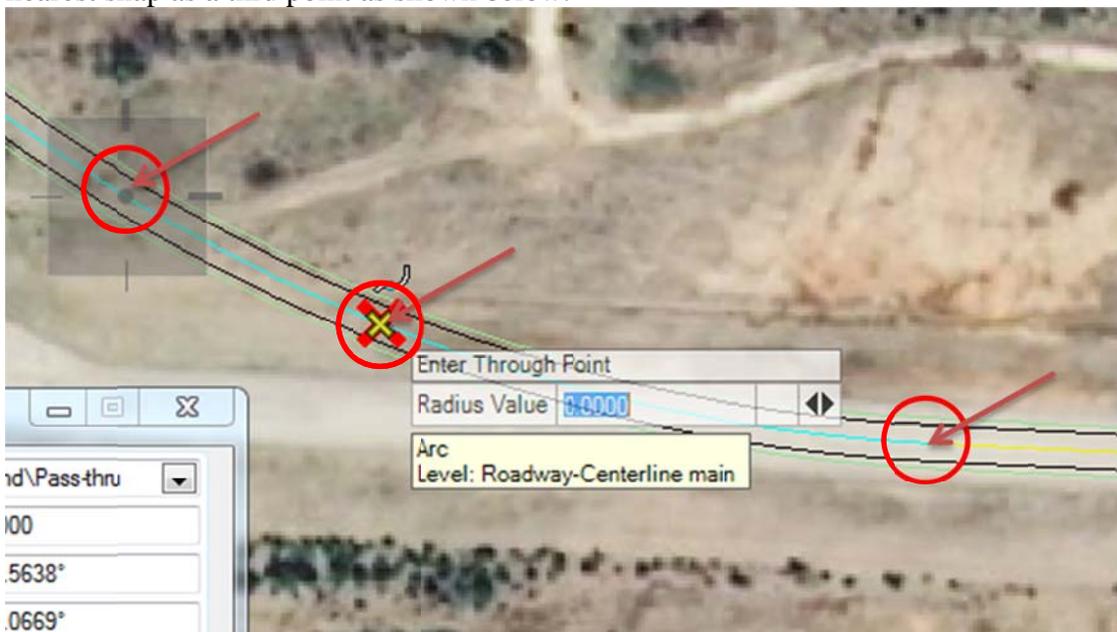
15. Click on the Arc Between Points.



16. Set the dialog Placement Method to Start\End\Pass-thru.



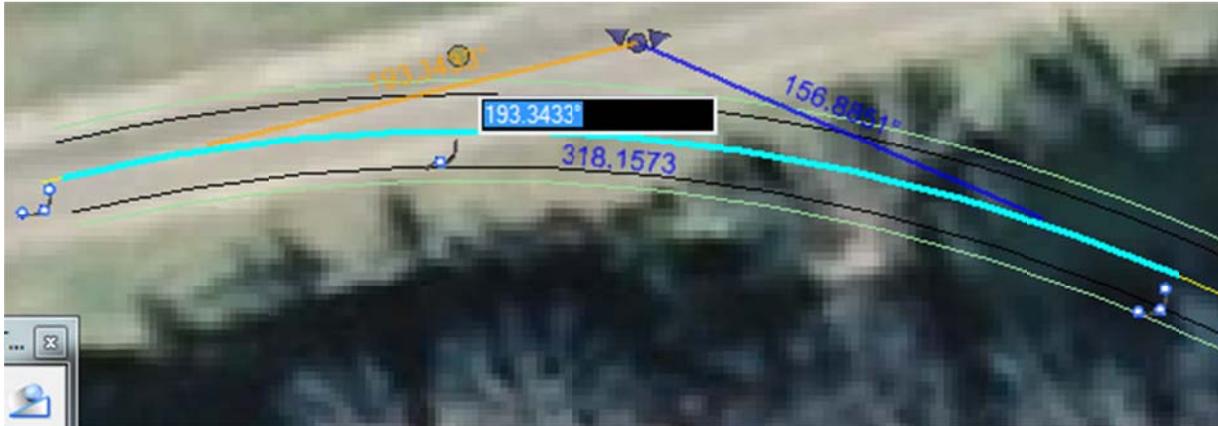
Construct the curve using the start point on the 1.east, the 2.end point on the 3. west using the nearest snap as a thru point as shown below.



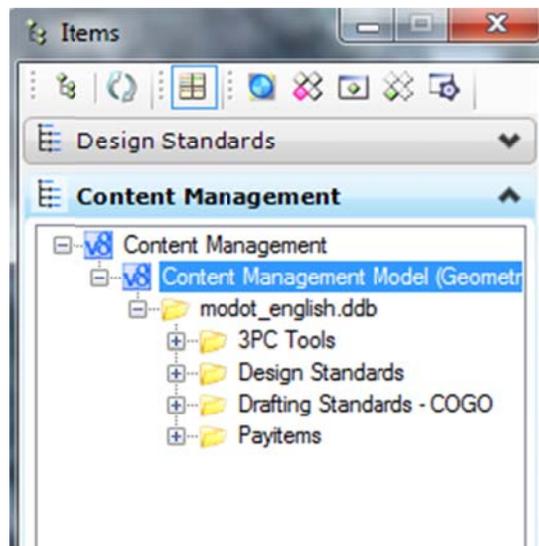
17. Using the above methods, complete the rest of the chain.

*Note Use the keyboard arrow keys to change the heads up display options if needed.*

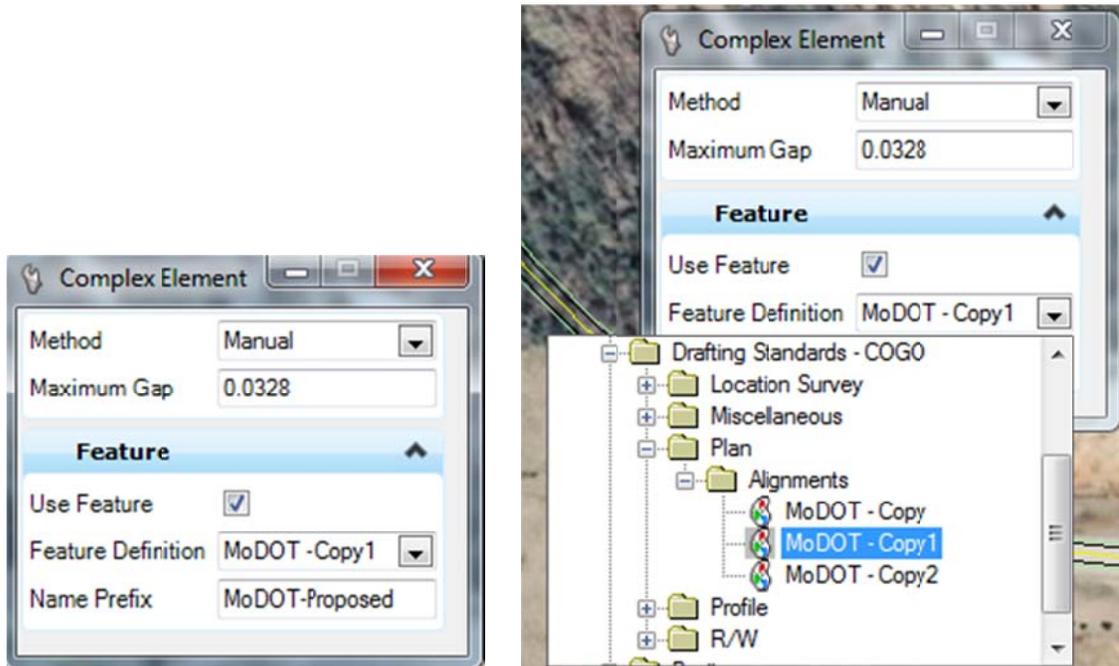
18. Select One of the Arcs created using the Civil Geometry Tools. You will notice that the dimensions show up and can be edited on the heads up display. It also displays where and what type of snap was used to create the arc.



19. Remove your selection and zoom out to where you can see the new alignment for the Outer Road.
20. Open the Items Browser and check that under Content Management, we are linked to the modot\_english.ddb file. If not, we need to right click on Content Management Model and Link Database.



21. Click on the Complex by Element tool  in the Civil Geometry Toolbar.
22. Set the method to Manual and Choose the Feature Definition. Set the Feature to “Drafting Standards - COGO>Plan>Alignments>MoDOT-Copy1” and change the Name Prefix to **MoDOT-Proposed**.



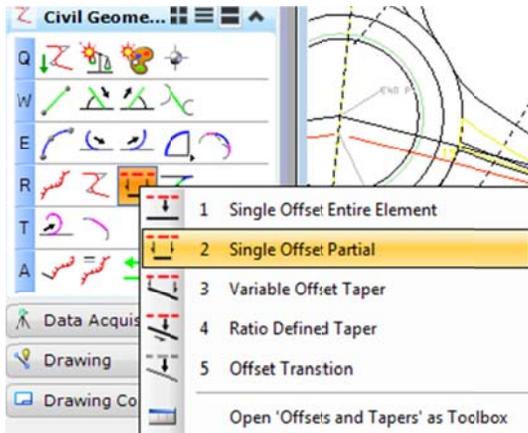
23. Select the east most tangent, be sure the direction of the chain (arrow) points left (west).



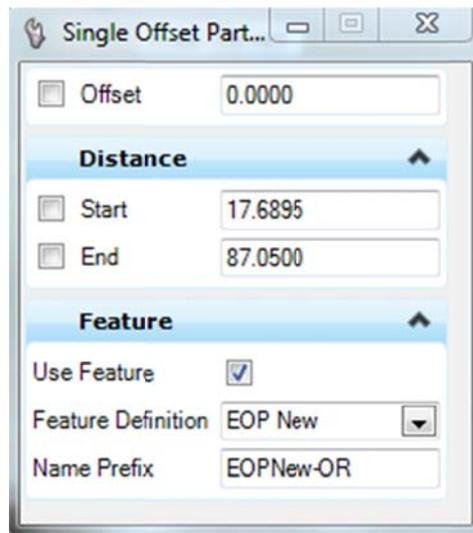
24. Select each remaining element in sequence – DP after all elements have been selected.
25. Once complete, use the element selection tool to highlight your newly created complex element.



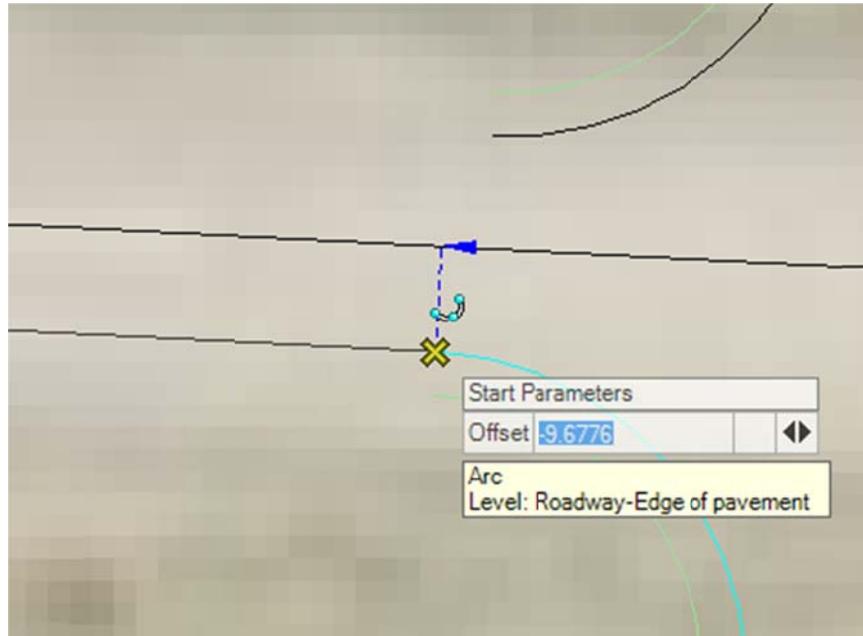
## Create the Edges of Pavement and Shoulder Using Civil Geometry



1. Create an offset alignment off the previously created Outer Road alignment from the radius returns on the east and the intersection at the west end to create an EOP see dialog box below for Name Prefix.



2. Click the new OR centerline and for offset, snap to the radius return in the file.



3. Zoom using the mouse wheel to the other end of the alignment and left click just beyond the end of the alignment. The offset will be created.
4. Repeat this step for the other side of the alignment.
5. Create the EOS on either side using the same process, select EOS New Asph for the Feature.
6. Save the file it will be used in later chapters.