

OpenRoads – Ruled Geometry and Civil Cells

March 4, 2019

Overview

- Ruled Geometry
- Civil Cells

Ruled Geometry

Ruled Geometry

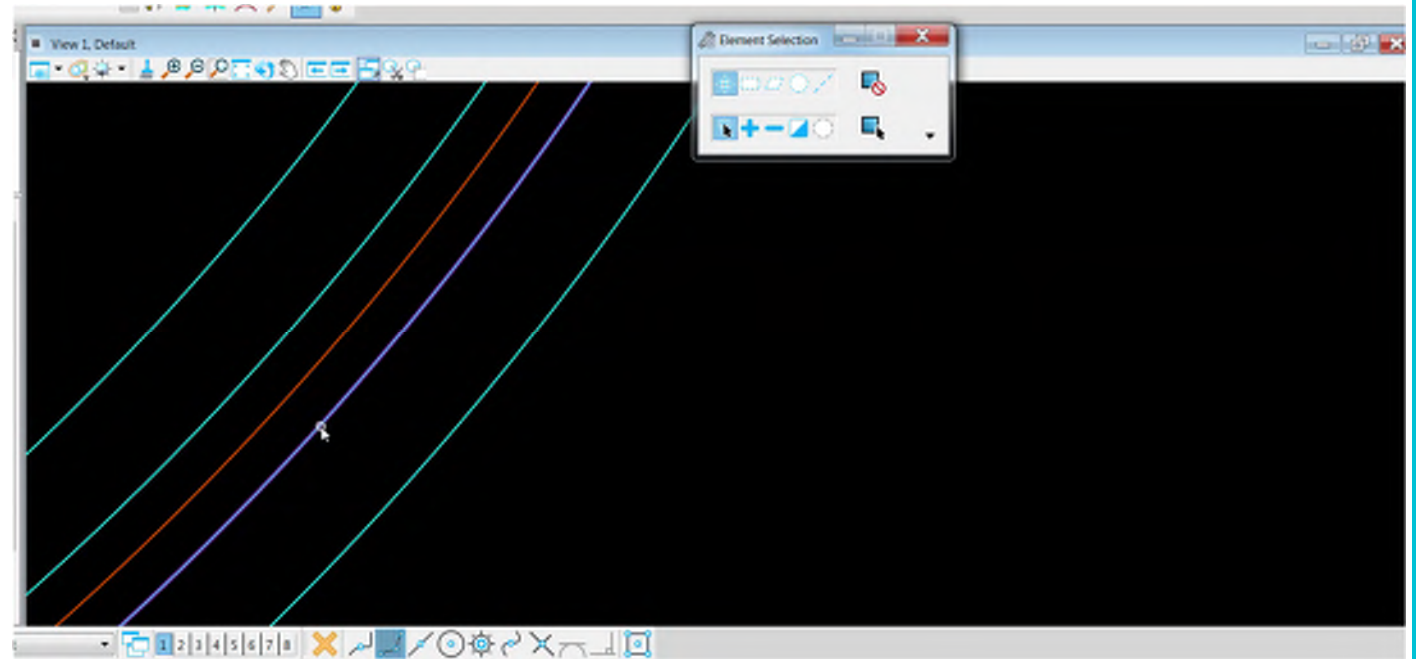
- What is Ruled Geometry?
 - Within OpenRoads we can active the create rules that are defined by the user to always set something persistent to a reference.
 - These rules can be applied both horizontally and vertically
- How do we apply these rules?
 - Offsetting the reference element under the geometry command
 - Setting a persistent snap
 - Using AccuDraw commands

Example of Rules

- Offset from the reference element
 - Example would edges of pavement, shoulders, sidewalk
- Also setting something perpendicular from an element
 - Driveway centerlines
 - Side road centerlines
- Setting a constant station along the reference element
 - Driveway centerlines
 - Side road centerlines
 - Drainage structures

Offset from Centerline

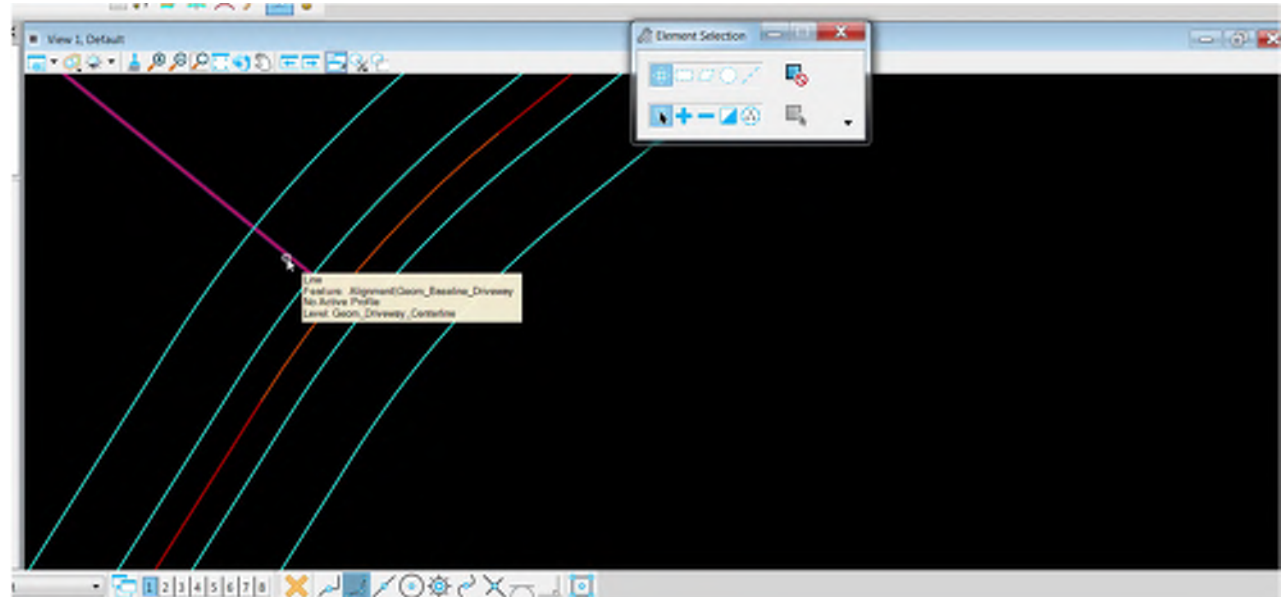
Showing the rules changing offset commands from a centerline



Inside edge of pavement is offset 5 feet from centerline at the start. The outside edge of pavement is offset 24 feet from the inside edge of pavement

Persistent Snap

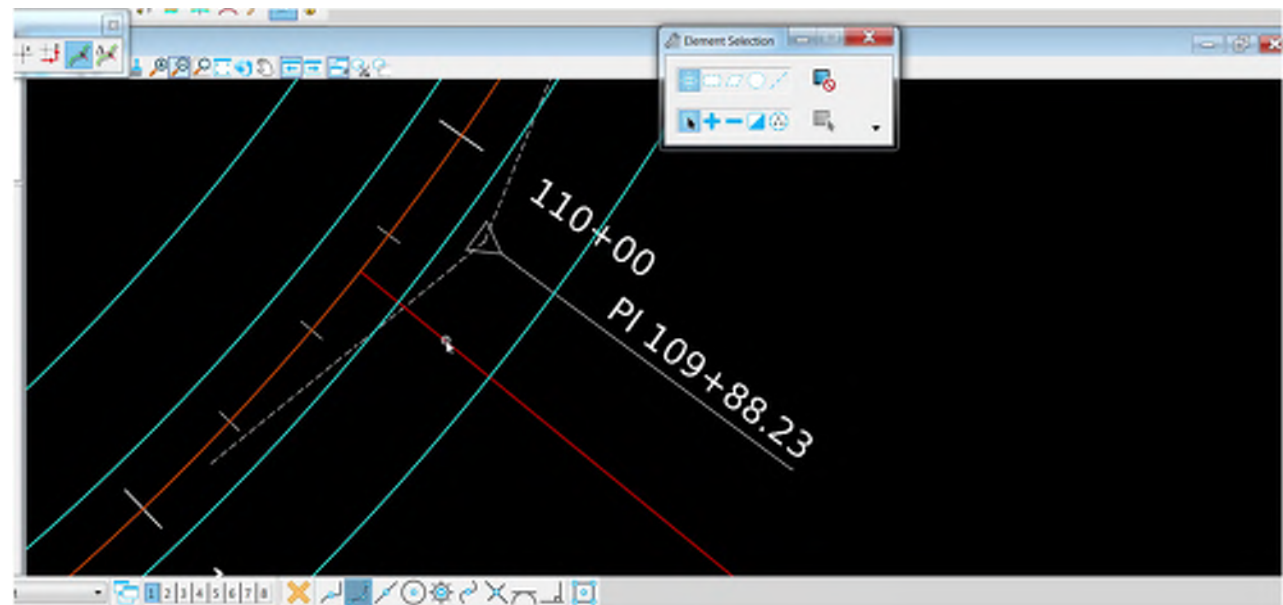
Maintaining a perpendicular line from a reference from a reference



Using a perpendicular snap from the centerline we can modify the radius of the curve and the perpendicular line will remain perpendicular at all times. Also noting that the edges of pavement modify to maintain previous offsets from centerline

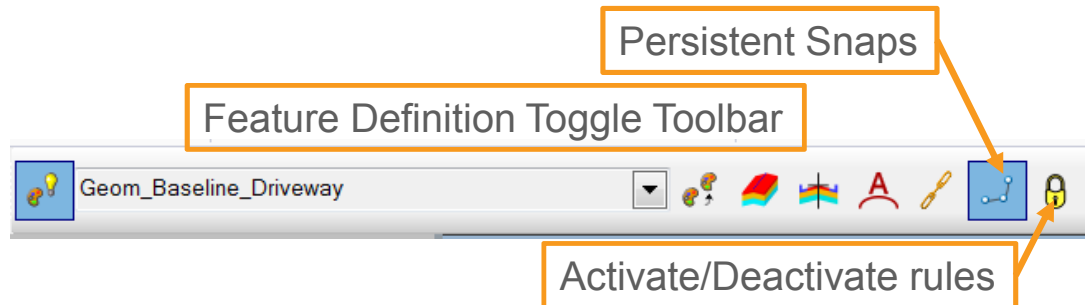
Maintain station

Setting a station along alignment for a side road centerline

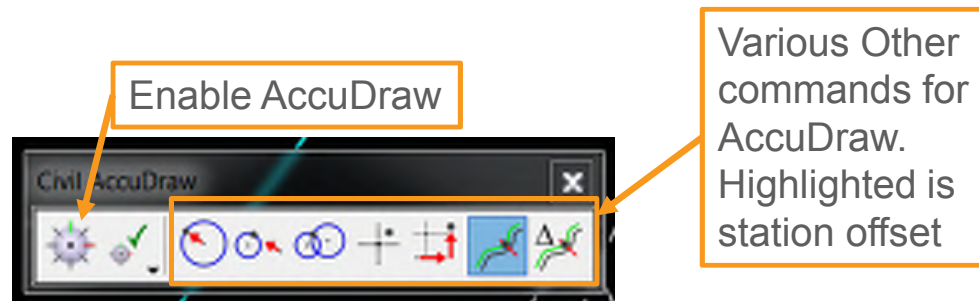


Station is maintaining 109+65.65 throughout the changes to the curve

Helpful tips



- Make sure that the generate rules button is not clicked on
- Make sure persistent snaps is on
- Be patient with accudraw and press "O" to select the alignment.
 - Sometimes the station doesn't show as a ruled element unless there is a change to the alignment.



Questions?

Civil Cells

What are Civil Cells

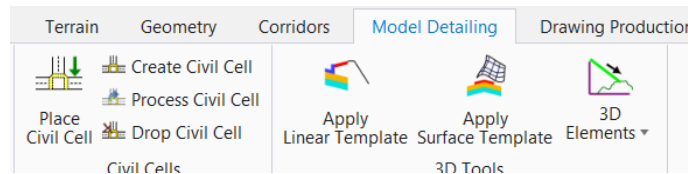
- They are just more than cells we are used to using
- They are something we have been missing for years
- They are set of rules that we define to repeat again and again due to use of SS4
 - FDOT has an extensive library
 - NCDOT has an extensive library?
- They interact with corridors, and react to changes within the corridors and alignments
- Civil Cells started in SS2. SS3 was an official “roll out.”
- Be patient building a Civil Cell and build with care

What defines a Civil Cell(s)

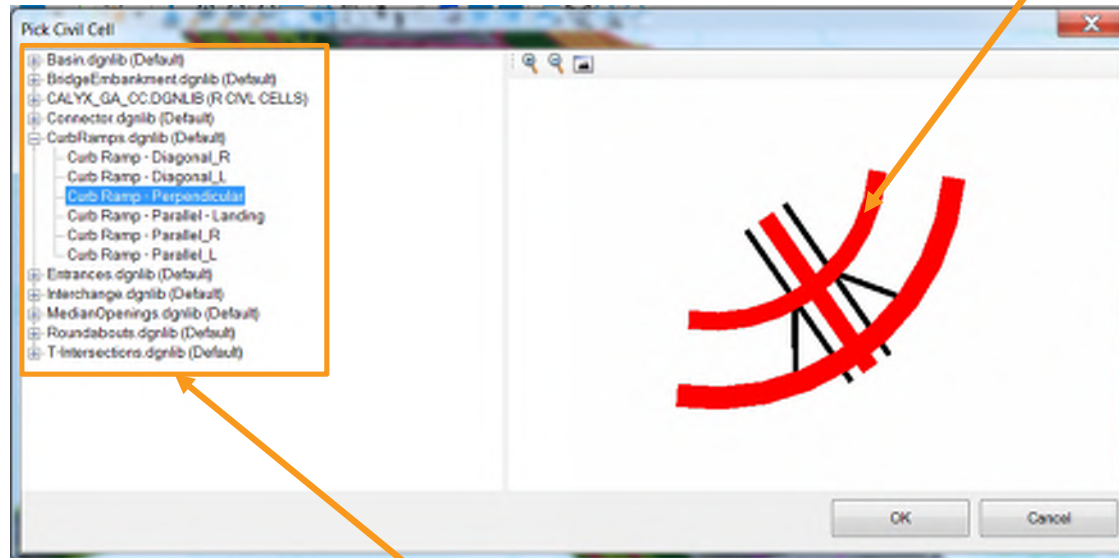
- What do Civil Cells require
 - A ruled set of geometry generically built
 - Do not set hard stations
 - Use known/hard points to reference
 - Reference element or elements (horizontal and vertical if needed)
- What can Civil Cells contain
 - Surface templates
 - Corridors (will not match Centerline stationing)
 - End conditions
 - Linear Templates

Where do we find these Civil Cells

- Look Under Modeling Detail and Place Civil cells



Redlines showing reference elements



DGN Libraries with some default Civil Cell Libraries from Bentley (CALYX_GA_CC is a self built Library)

Examples

Intersections

- Intersection approaches
- Roundabout(s)
- Roundabout Approaches

Unique Situations

- Ditches between two corridors
- Stormwater management BMPs
- Wall/Bridge End roll
- ADA Ramps

Roundabout“ SS2” Grading

- a. Create alignments and profiles for Mainline and Side Roads
- b. Create corridors for Mainline and Side Roads
- c. Apply S.E. Corridors as needed
- d. Create Surfaces for each corridor
- e. Create 3D file to import 3D lines from surfaces
- f. Create Blank surface for “connected 3D lines”
- g. Connect 3D lines using InRoads Tools
- h. Import 3D lines into a blank surface
- i. View Contours
- j. Clean up contours by correcting G/H, or through microstation commands
- k. Label Contours
- l. Create plan drawing
- m. Submit for QC

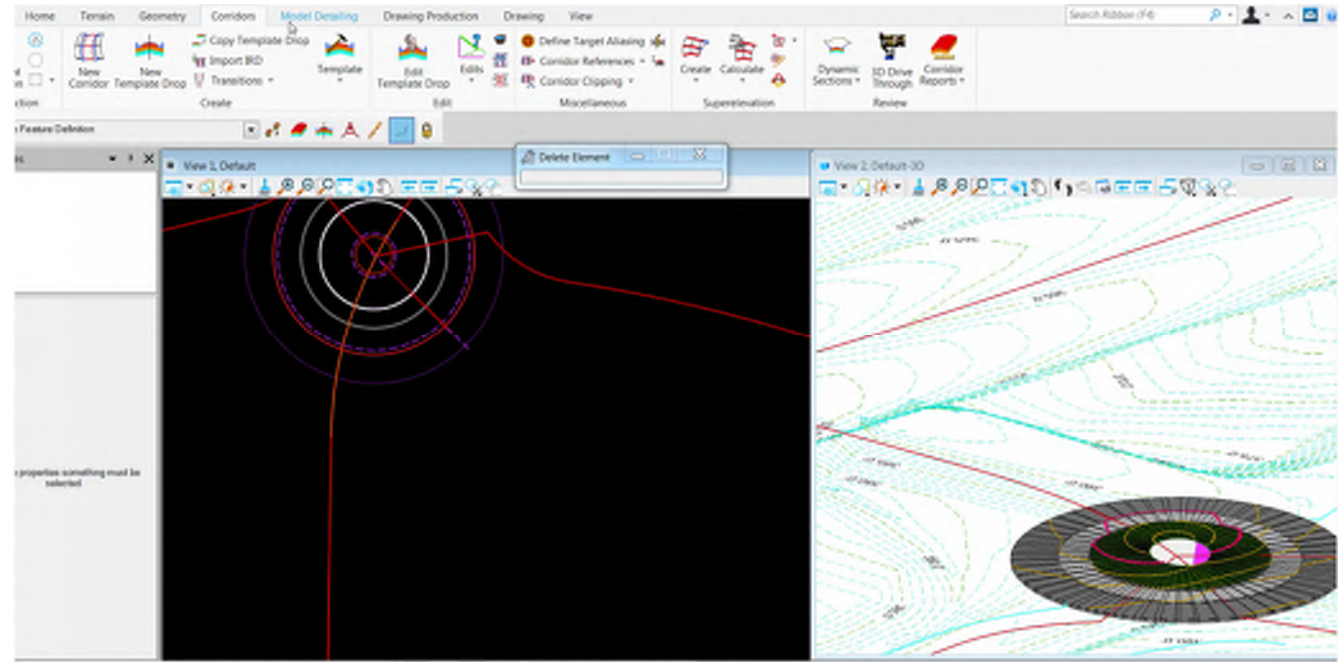
Roughly 13 Steps to complete

Roundabout“ ORD“ Grading

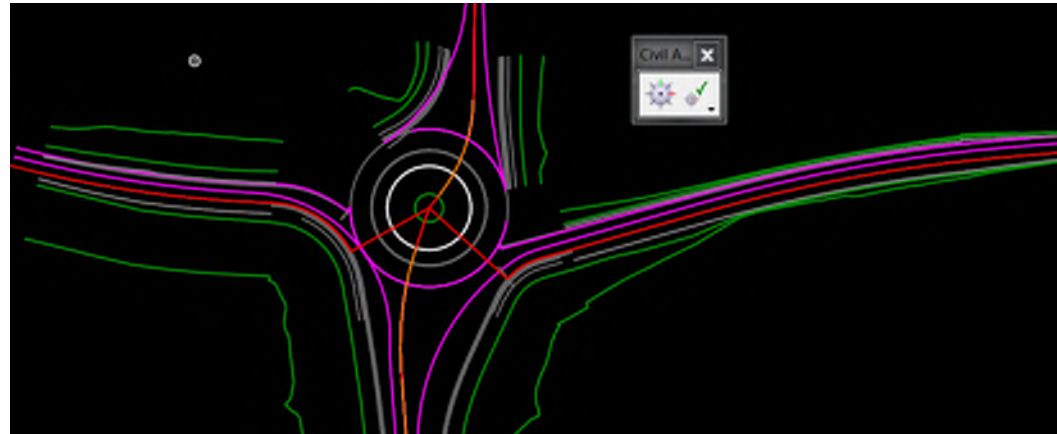
- a. Create alignments and profiles for Mainline and Side Roads
- b. Create corridors for entrance and exit of the roundabout. Stopping short of the actual entrances
- c. Apply Civil Cells to Roundabout and approaches.
- d. Modify/adjust template, radii, point controls with in civil cells as needed.
- e. Apply S.E., Point control, or template changes to corridors as needed.
- f. Create plan drawing.
- g. Submit for QC.

Roughly 7 Steps to complete

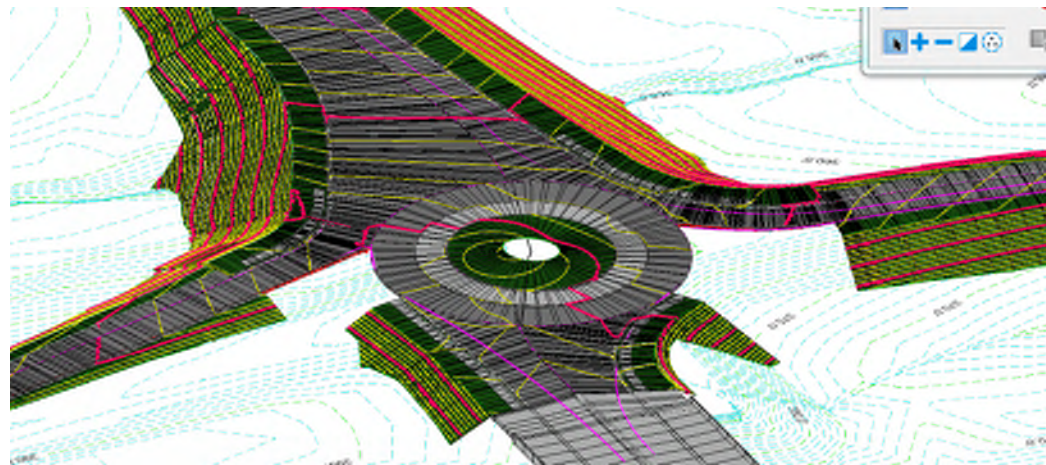
Using Civil cells/3D Modeling



Using Civil Cells



Applied Civil Cells to a Roundabout project for learning.



Using a Roundabout Civil Cell and approach cells

Questions?