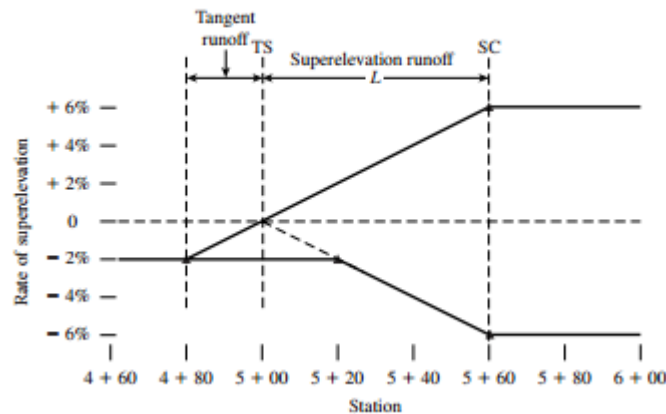


Superelevation Diagrams

Overview

Superelevation transitions involve modification of the roadway cross section from normal crown to full superelevation, at which point the entire roadway width has a cross-slope of e . The manner in which this transition is accomplished is expressed by a superelevation diagram, which is a graph of superelevation (cross-slope) versus distance measured in stations.

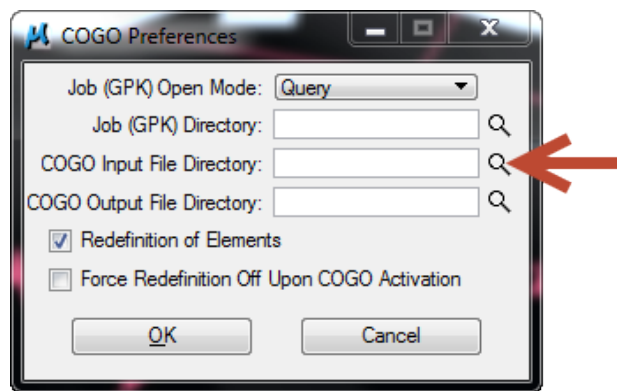


Creating the diagram will be a two phase process. The first phase will be creating and importing profiles from the superelevation input file and the second phase will be drawing and annotating the diagram.

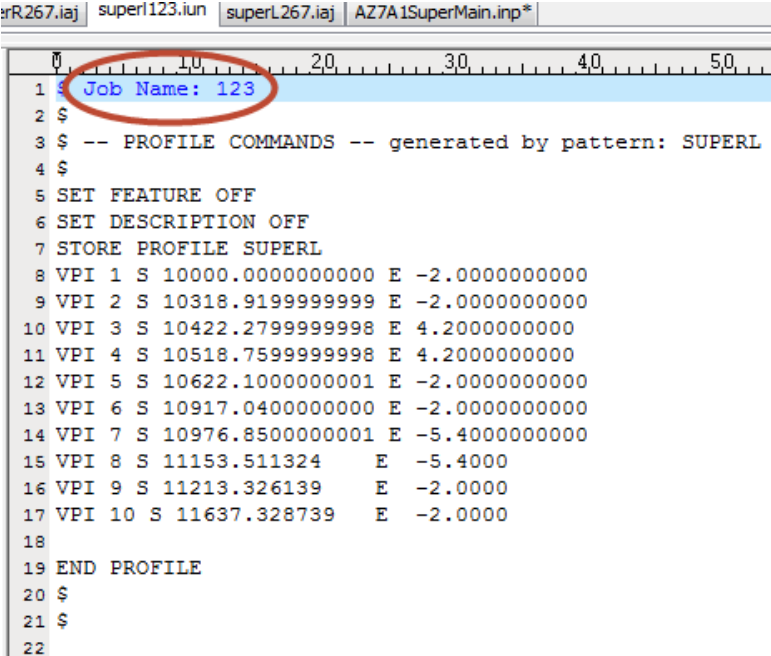
Workflow

Phase 1 – Create and import input files

1. Download the [superL123.iun](#) and [superR123.iun](#) input files and save them in the project's \Roadway\GEOPAK\ folder (or the same folder as the GPK) or in the defined COGO Input File Directory.



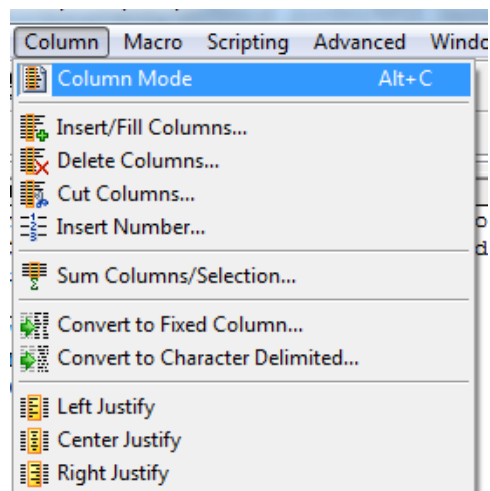
2. Rename files both files.
 - a. Change the numbers to the project GPK number.
superL123.iun -> superL206.iun and superR123.iun -> superR206.iun
 - b. Change the last to letters in the file extension to the GEOPAK user initials.
superL123.iun -> superL206.iaj and superR123.iun -> superR206.iaj
3. Open both files in UltraEdit or other text editing software.
 - a. Change job name to the project GPK number



```

rR267.iaj | superL123.iun | superL267.iaj | AZ7A1SuperMain.inp*
1 $ Job Name: 123
2 $
3 $ -- PROFILE COMMANDS -- generated by pattern: SUPERL
4 $
5 SET FEATURE OFF
6 SET DESCRIPTION OFF
7 STORE PROFILE SUPERL
8 VPI 1 S 10000.0000000000 E -2.0000000000
9 VPI 2 S 10318.9199999999 E -2.0000000000
10 VPI 3 S 10422.2799999998 E 4.2000000000
11 VPI 4 S 10518.7599999998 E 4.2000000000
12 VPI 5 S 10622.1000000001 E -2.0000000000
13 VPI 6 S 10917.0400000000 E -2.0000000000
14 VPI 7 S 10976.8500000001 E -5.4000000000
15 VPI 8 S 11153.511324 E -5.4000
16 VPI 9 S 11213.326139 E -2.0000
17 VPI 10 S 11637.328739 E -2.0000
18
19 END PROFILE
20 $
21 $
22
  
```

- b. Open project superelevation input file.
- c. Turn on column mode (for UltraEdit only)

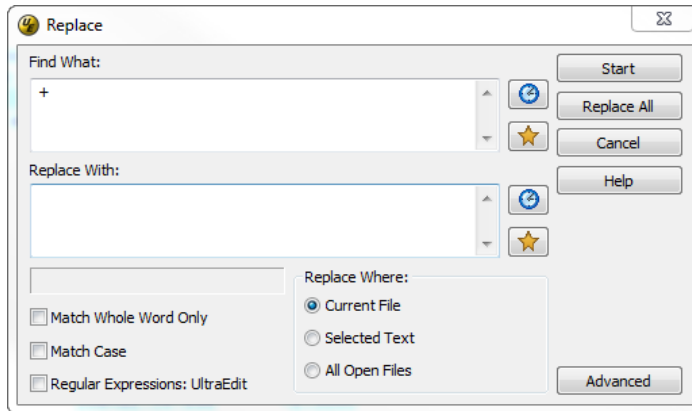


- d. Find and replace all "+" in the station ranges with a null space (just leave the replace box in UltraEdit blank).

```

auto shape
job number = 123

auto shape set
  shape cluster baseline = MAIN
  shape cluster profile = MAIN
  shape cluster tie = 0.0000
  dependent shape
  chain / offset
    MAIN -10.0000
    MAIN -0.0000
  filler line station / slope
    100+00.000000 -2.0000
    103+18.946603 -2.0000
    104+22.279936 4.2000 /* Curve MAIN-1 */
    105+18.764505 4.2000 /* Curve MAIN-1 */
    106+22.097838 -2.0000
    109+17.038119 -2.0000
    109+76.852934 -5.4000 /* Curve MAIN-2 */
    111+53.511324 -5.4000 /* Curve MAIN-2 */
    112+13.326139 -2.0000
    116+37.328739 -2.0000
    
```



```

auto shape
job number = 123

auto shape set
  shape cluster baseline = MAIN
  shape cluster profile = MAIN
  shape cluster tie = 0.0000
  dependent shape
  chain / offset
    MAIN -10.0000
    MAIN -0.0000
  filler line station / slope
    10000.000000 -2.0000
    10318.946603 -2.0000
    10422.279936 4.2000 /* Curve MAIN-1 */
    10518.764505 4.2000 /* Curve MAIN-1 */
    10622.097838 -2.0000
    10917.038119 -2.0000
    10976.852934 -5.4000 /* Curve MAIN-2 */
    11153.511324 -5.4000 /* Curve MAIN-2 */
    11213.326139 -2.0000
    11637.328739 -2.0000
    
```



Delete any warning messages before copying stationing to the input file.

```

y+U6.53UUUU -5.83UU
/* Warning: Curve ALI123-1 Radius of 518.6326 is less than the minimum radius of 833.0000
for the given Design Speed of 50.00 */
    
```

- e. Copy all stations from the superelevation input file for the left side of the roadway and paste in the superL123.iun file to the right of the "VPI and S". If necessary add additional VPIs. The "END PROFILE" and two dollar signs must be at the bottom of the input file.

```

auto shape
job number = 123

auto shape set
  shape cluster baseline = MAIN
  shape cluster profile = MAIN
  shape cluster tie = 0.0000
  dependent shape
  chain / offset
    MAIN -10.0000
    MAIN -0.0000
  filler line station / slope
    10000.000000 -2.0000
    10318.946603 -2.0000
    10422.279936 4.2000 /* Curve MAIN-1 */
    10518.764505 4.2000 /* Curve MAIN-1 */
    10622.097838 -2.0000
    10917.038119 -2.0000
    10976.852934 -5.4000 /* Curve MAIN-2 */
    11153.511324 -5.4000 /* Curve MAIN-2 */
    11213.326139 -2.0000
    11637.328739 -2.0000
  
```

ip* superL123.iun* superR123.iun

```

1 $ Job Name: 123
2 $
3 $ -- PROFILE COMMANDS -- generated by pattern: SUPERL
4 $
5 SET FEATURE OFF
6 SET DESCRIPTION OFF
7 STORE PROFILE SUPERL
8 VPI 1 S 10000.000000 E -2.0000000000
9 VPI 2 S 10318.946603 E -2.0000000000
.0 VPI 3 S 10422.279936 E 4.2000000000
.1 VPI 4 S 10518.764505 E 4.2000000000
.2 VPI 5 S 10622.097838 E -2.0000000000
.3 VPI 6 S 10917.038119 E -2.0000000000
.4 VPI 7 S 10976.852934 E -5.4000000000
.5 VPI 8 S 11153.511324 E -5.4000
.6 VPI 9 S 11213.326139 E -2.0000
.7 VPI 10 S 11637.328739 E -2.0000
.8
.9 END PROFILE
:0 $
:1 $
  
```

- g. Copy the slope information for from the superelevation input file for the left side of the roadway and paste in the superL123.iun file to the right of the "E".


```

auto shape
job number = 123

auto shape set
  shape cluster baseline = MAIN
  shape cluster profile = MAIN
  shape cluster tie      = 0.0000
dependent shape
chain / offset
  MAIN -10.0000
  MAIN -0.0000
  filler line station / slope
    10000.000000 -2.0000
    10318.946603 -2.0000
    10422.279936  4.2000 /* Curve MAIN-1 */
    10518.764505  4.2000 /* Curve MAIN-1 */
    10622.097838 -2.0000
    10917.038119 -2.0000
    10976.852934 -5.4000 /* Curve MAIN-2 */
    11153.511324 -5.4000 /* Curve MAIN-2 */
    11213.326139 -2.0000
    11637.328739 -2.0000

```

inp* superL123.iun* superR123.iun



```

1 $ Job Name: 123
2 $
3 $ -- PROFILE COMMANDS -- generated by pattern: SUPERL
4 $
5 SET FEATURE OFF
6 SET DESCRIPTION OFF
7 STORE PROFILE SUPERL
8 VPI 1 S 10000.000000 E -2.0000
9 VPI 2 S 10318.946603 E -2.0000
10 VPI 3 S 10422.279936 E 4.2000
11 VPI 4 S 10518.764505 E 4.2000
12 VPI 5 S 10622.097838 E -2.0000
13 VPI 6 S 10917.038119 E -2.0000
14 VPI 7 S 10976.852934 E -5.4000
15 VPI 8 S 11153.511324 E -5.4000
16 VPI 9 S 11213.326139 E -2.0000
17 VPI 10 S 11637.328739 E -2.0000
18
19 END PROFILE
20 $
21 $
22

```

- i. Copy all stations from the superelevation input file for the right side of the roadway and paste in the superR123.iun file to the right of the "VPI and S". If necessary add additional VPIs. The "END PROFILE" and two dollar signs must be at the bottom of the input file.

```

auto shape set
  shape cluster baseline = MAIN
  shape cluster profile  = MAIN
  shape cluster tie      = 0.0000
independent shape
chain / offset
  MAIN      0.0000
  MAIN      10.0000
filler line station / slope
10000.000000 -2.0000
10385.613270 -2.0000
10422.279936 -4.2000 /* Curve MAIN-1 */
10518.764505 -4.2000 /* Curve MAIN-1 */
10555.431172 -2.0000
10846.667749 -2.0000
10976.852934  5.4000 /* Curve MAIN-2 */
11153.511324  5.4000 /* Curve MAIN-2 */
11283.696509 -2.0000
11637.328739 -2.0000

```

```

np* | superL123.iun* | superR123.iun |
-----
0 10 20 30 40 50
1 $ Job Name: 123
2 $
3 $ -- PROFILE COMMANDS -- generated by pattern: SUPERR
4 $
5 SET FEATURE OFF
6 SET DESCRIPTION OFF
7 STORE PROFILE SUPERR
8 VPI 1 S 10000.000000 E -2.0000
9 VPI 2 S 10385.613270 E -2.0000
10 VPI 3 S 10422.279936 E -4.2000
11 VPI 4 S 10518.764505 E -4.2000
12 VPI 5 S 10555.431172 E -2.0000
13 VPI 6 S 10846.667749 E -2.0000
14 VPI 7 S 10976.852934 E 5.4000
15 VPI 8 S 11153.511324 E 5.4000
16 VPI 9 S 11283.696509 E -2.0000
17 VPI 10 S 11637.328739 E -2.0000
18
19 END PROFILE
20 $
21 $

```

- k. Copy the slope information from the superelevation input file for the right side of the roadway and paste in the superR123.iun file to the right of the "E".

```

auto shape set
  shape cluster baseline = MAIN
  shape cluster profile = MAIN
  shape cluster tie      = 0.0000
independent shape
chain / offset
  MAIN      0.0000
  MAIN      10.0000
filler line station / slope
10000.000000 -2.0000
10385.613270 -2.0000
10422.279936 -4.2000 /* Curve MAIN-1 */
10518.764505 -4.2000 /* Curve MAIN-1 */
10555.431172 -2.0000
10846.667749 -2.0000
10976.852934  5.4000 /* Curve MAIN-2 */
11153.511324  5.4000 /* Curve MAIN-2 */
11283.696509 -2.0000
11637.328739 -2.0000

```

p* superL123.iun* superR123.iun

```

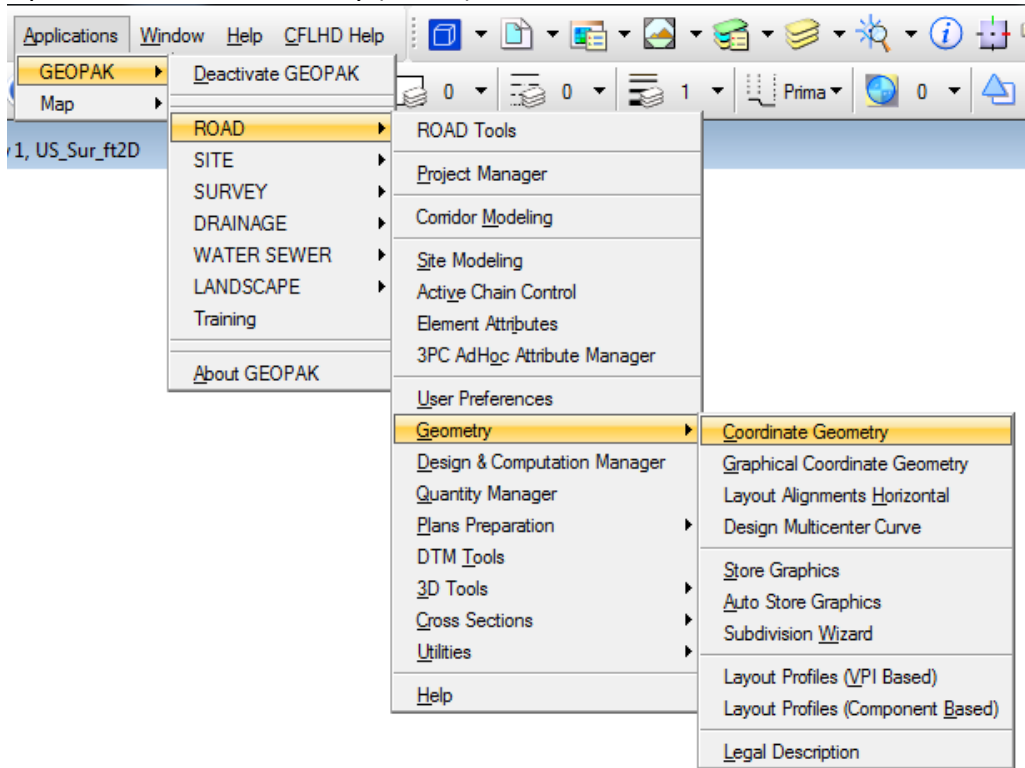
0 10 20 30 40 50
1 $ Job Name: 123
2 $
3 $ -- PROFILE COMMANDS -- generated by pattern: SUPERR
4 $
5 SET FEATURE OFF
6 SET DESCRIPTION OFF
7 STORE PROFILE SUPERR
8 VPI 1 S 10000.000000 E -2.0000
9 VPI 2 S 10385.613270 E -2.0000
0 VPI 3 S 10422.279936 E -4.2000
1 VPI 4 S 10518.764505 E -4.2000
2 VPI 5 S 10555.431172 E -2.0000
3 VPI 6 S 10846.667749 E -2.0000
4 VPI 7 S 10976.852934 E 5.4000
5 VPI 8 S 11153.511324 E 5.4000
6 VPI 9 S 11283.696509 E -2.0000
7 VPI 10 S 11637.328739 E -2.0000
8
9 END PROFILE
0 $
1 $

```

- l. Save the new input files. **Do not** save the superelevation input file.

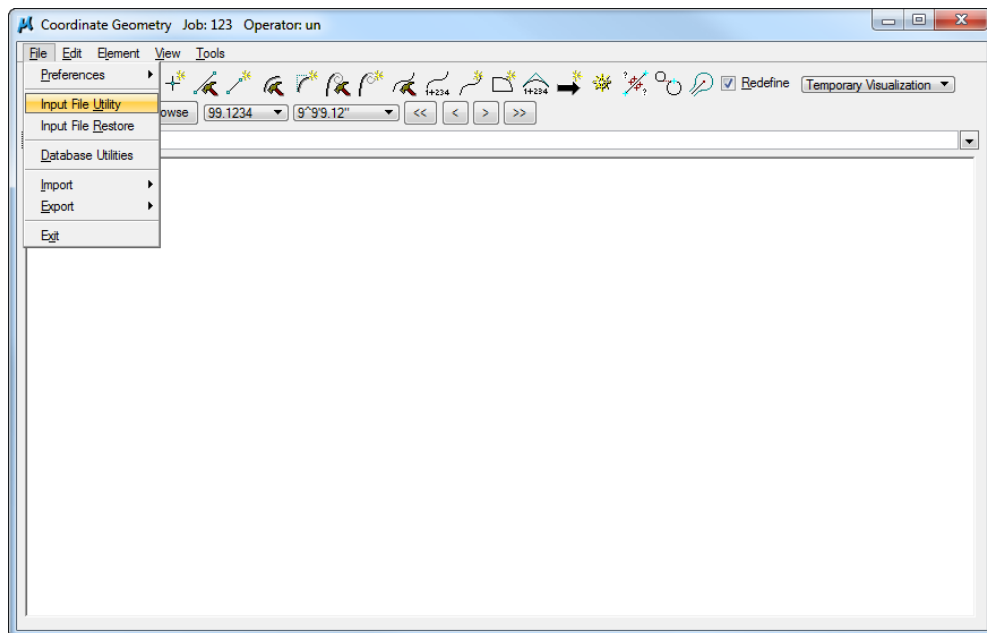
4. Create a MicroStation file named PROxxxx_super.dgn

5. Open Coordinate Geometry (COGO).

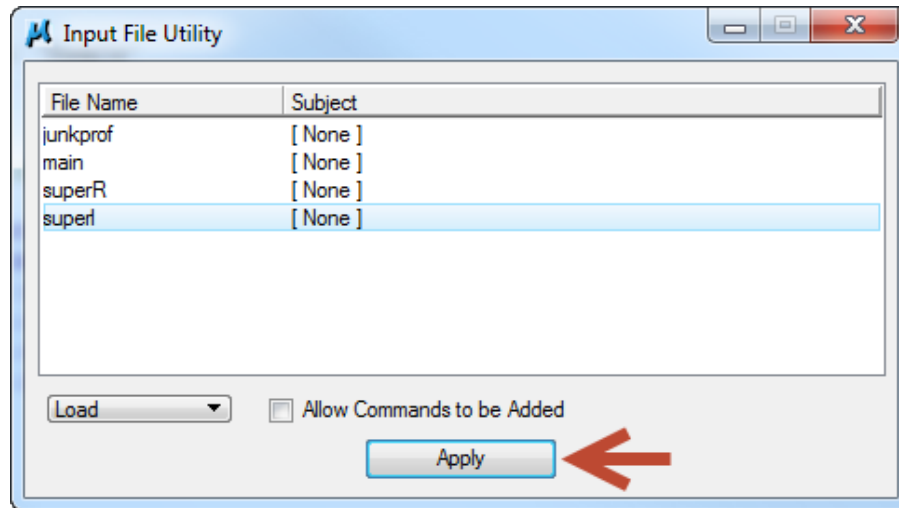


6. Import the superL.iun and superR.iun files.

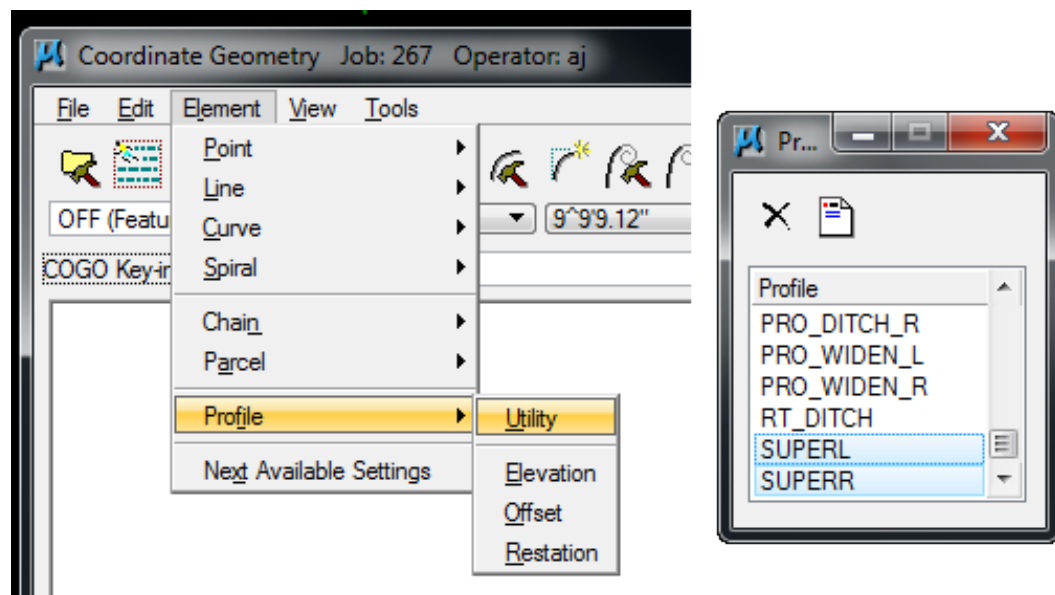
- a. From COGO open the *input File Utility*.



- e. Repeat steps c and d for the other input file.



- f. Verify that both profiles have been stored in the GPK using the profile utility tool.

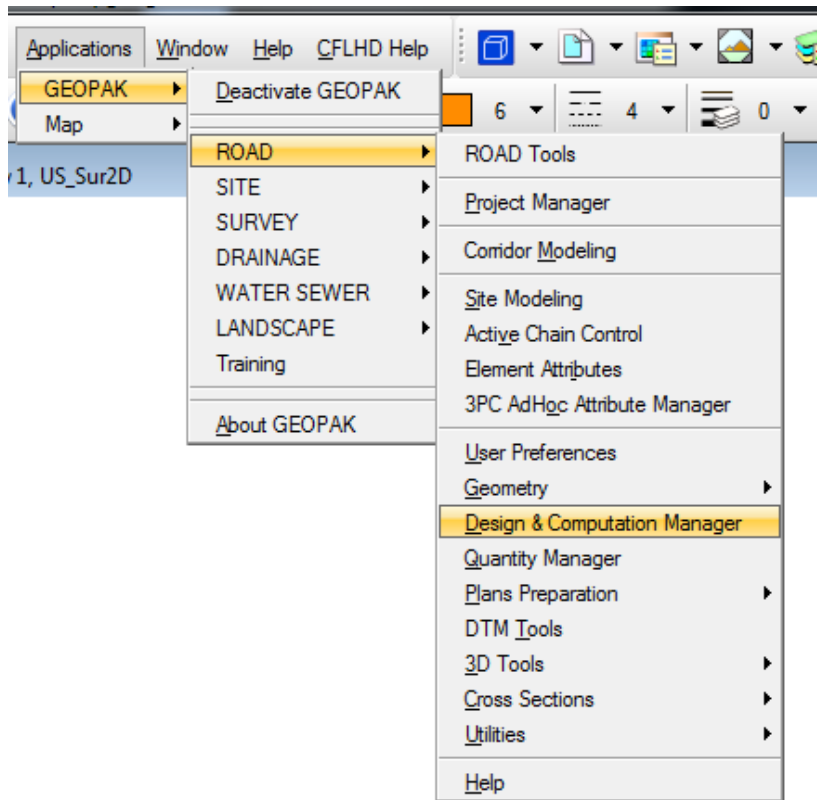


- g. Close Coordinate Geometry.

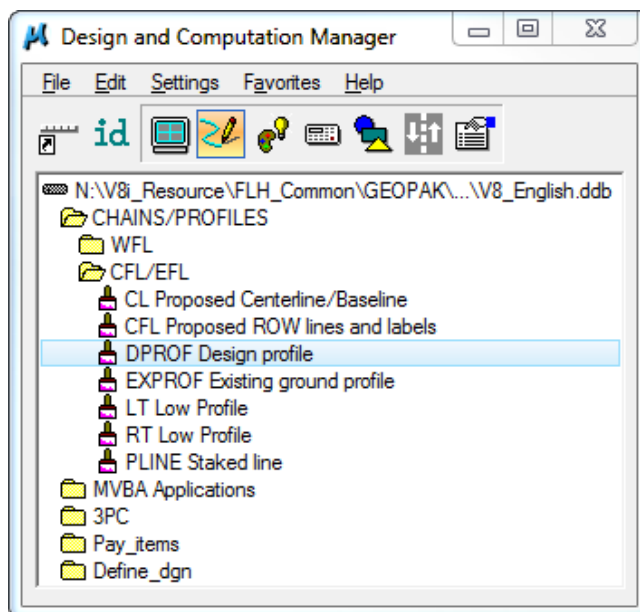
Phase 2 – Drawing and Annotating Diagram

1. Open the PROxxxx_super.dgn file.

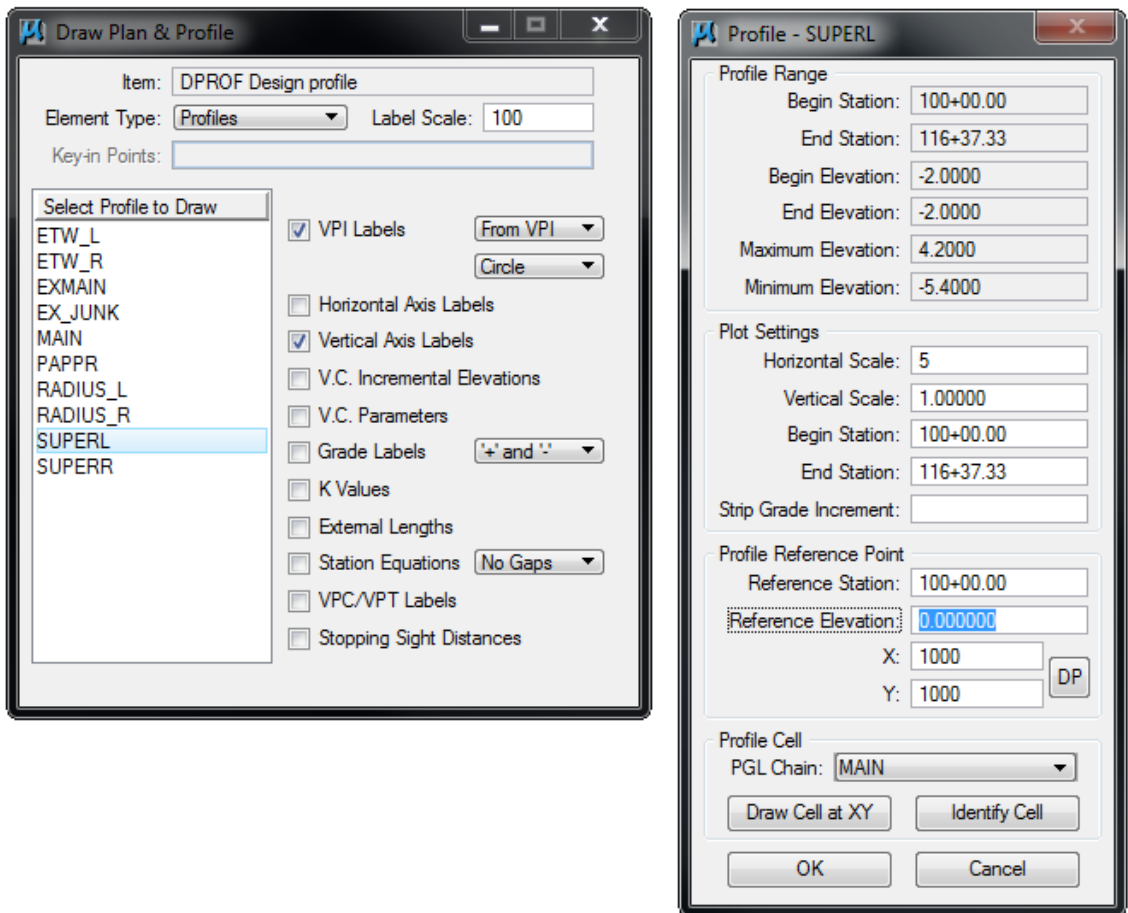
3. Open the Design and Computation (D&C) Manager.



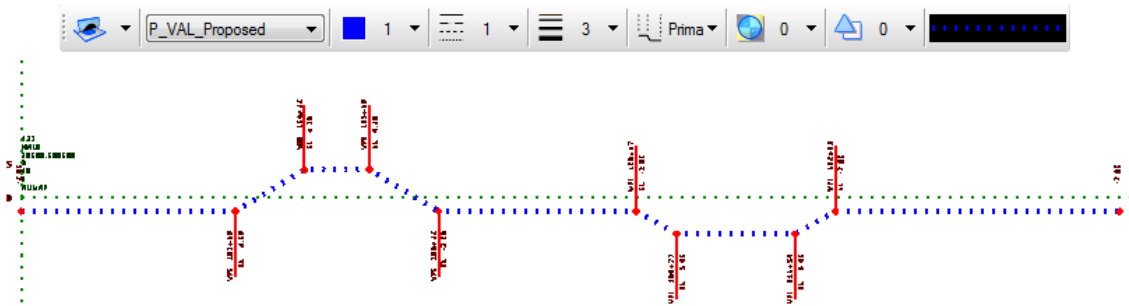
4. Select DPROF Design profile from the Chains/Profiles folder.



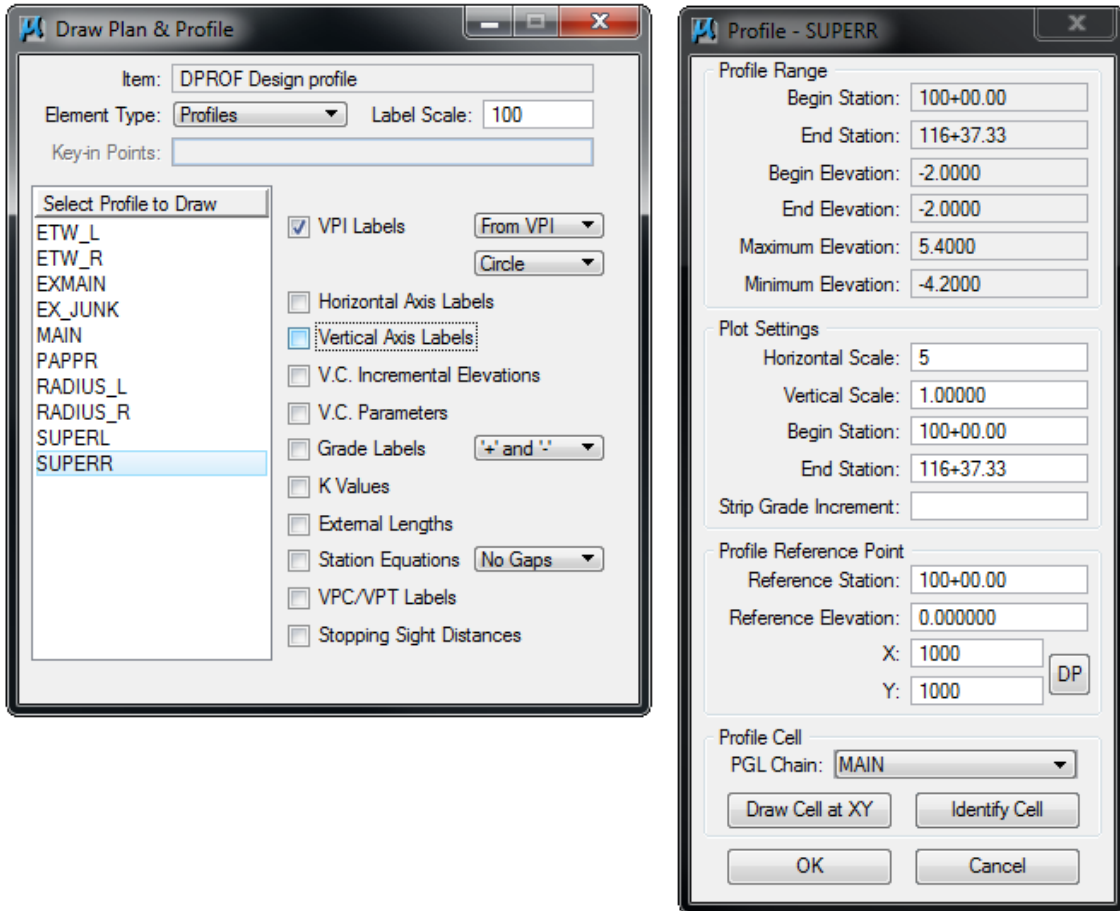
5. Select the left edge of pavement profile (superL). Change the settings as shown below. Select okay and the left edge profile will display in the design file.



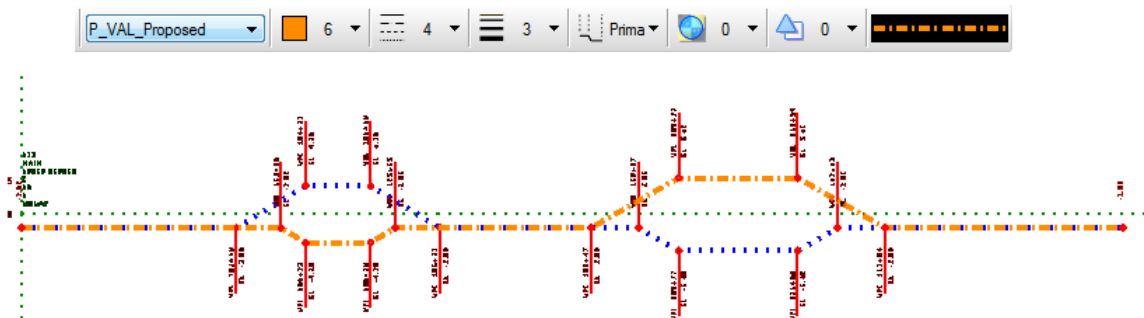
6. Select left edge of pavement profile and change the level symbology as shown below.



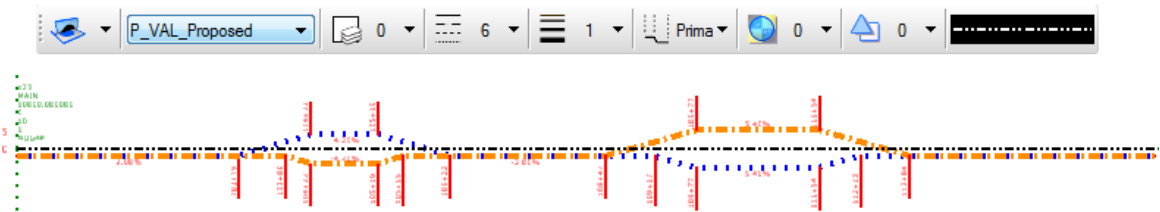
- Select the right edge of pavement profile (superR). Change the settings as shown below. Select okay and the right edge profile will display in the design file



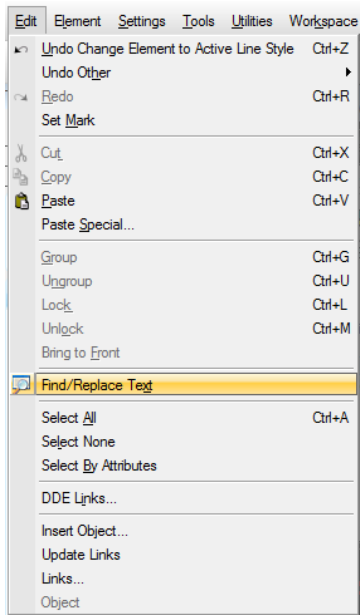
- Select right edge of pavement profile and change the level symbology as shown below.



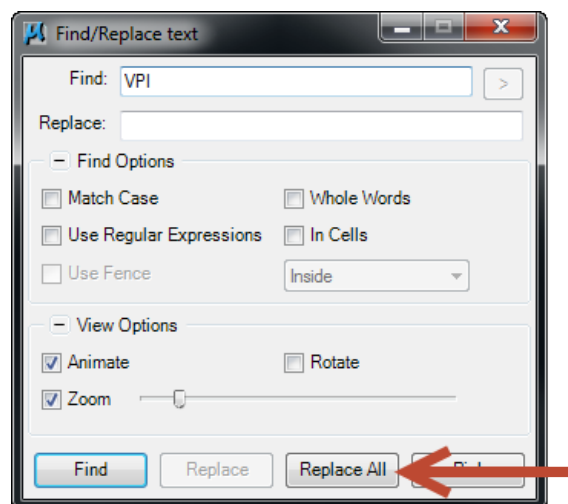
11. Draw a horizontal line along the 0 elevation to represent the Profile Grade Line and Axis of Rotation with the level symbology as shown below.



12. Use the find and replace text tool to delete "VPI"

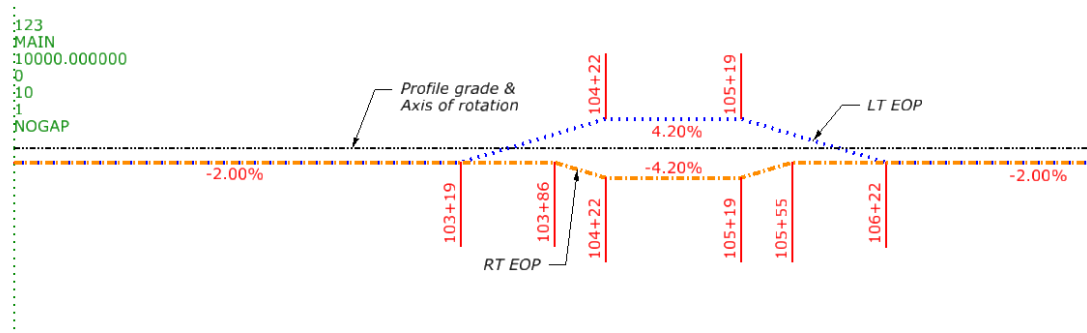


- a. Type VPI in the find box and leave the replace box blank. Choose replace all.



- b. Clean up labels as desired.

13. Label right and left edges of pavement, superelevation rates, and profile grade line and access of rotation and delete EL X.XX label.



14. Place on the pnp sheet similar to the mainline profile.

