Horizontal Curve Layout - Total Station

Monday, March 2, 2020 9:39 AM

Learning Objectives

1. Demonstrate how to layout the control points (i.e., PI, PC and PT) for a horizontal curve using AutoCad and an air photo.
2. Create an horizontal alignment and curve from the photo for on the drawing a create horizontal stations a 5-m intervals.
3. Create a Stake Out Report for the alignment and curve at 5-m intervals.
4. Use the total station and layout the curve in the field near the IGC auditorium.
5. Reconcile the AutoCAD Stake Out Report with the field measurements.

Individual Assignment

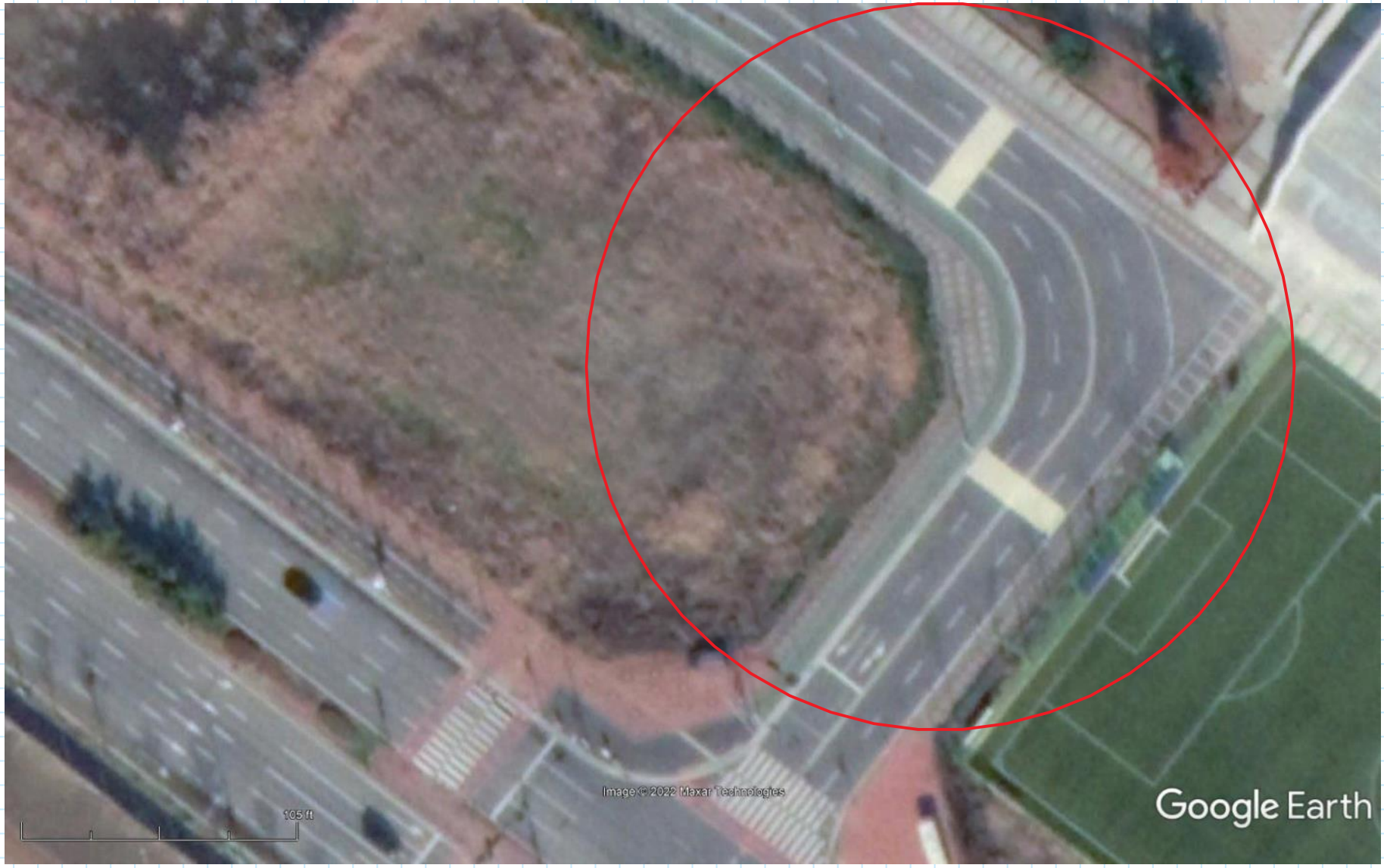
1. Submit the AutoCad drawing with the layout
2. Submit the AutoCad Stake Out Report

Group Assignment

1. Complete a control point survey on the IGC campus.
2. Complete a curve layout survey on the IGC campus
3. Fill out an attendance sheet to verify your participation in both field surveys.

Importing and Scaling Photos in AutoCad

Thursday, April 14, 2022 9:39 AM



Study Area - ICG Entrance Road.jpg (see Folders File in Canvas)

Importing and Scaling Photos in AutoCad (cont.)

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Scaling photo in Autocad

1. Find the file photo file (i.e., *.dwg).
2. **Open** a blank drawing file (e.g., Tutorial-mArch.dwt)
3. Save this file as IGC road.dwg using the file **save as option**.
4. Use the Units command to change the type to DECIMAL, the precision to 0.0000
5. Using the **coordinates** display in the tool bar of AutoCad, check the horizontal (i.e., long) dimension of the drawing. Note that the longest dimension will not be insufficient for our drawing. Therefore we need to scale the drawing space to be about 500 m wide to accommodate our drawing.
6. Use the **Annotation-Primary Units menu** to change the unit format to Engineering.
7. Use the **output menu - Page Setup Manager** to change the drawing to E size and scale the drawing. Use the Plot Scale to scale the drawing to resize the drawing space to accommodate at least 500 m in the horizontal direction.
8. Reposition (i.e., center) the title block on the drawing space using the **move command**.
9. Reposition the coordinate system to the lower left-hand corner of the paper using the **UCS command**.
10. Using the coordinates, recheck the width of the drawing. You should have about 500 m of drawing space available, which is sufficient for this exercise.
11. Resave this file as IGC road scaled.dwg

Importing and Scaling Photos in AutoCad (cont.)

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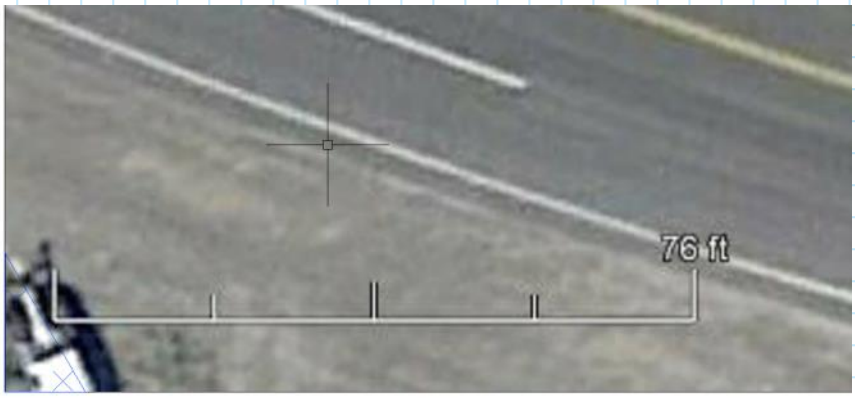
Scaling the Image

Tuesday, January 29, 2019 1:48 PM

1. Zoom in on the scale found in the lower left corner of the photo.



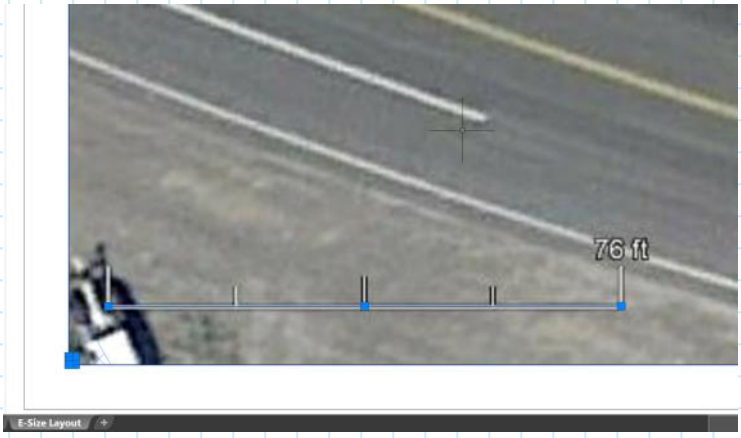
2. In the Layer box, select layer 0
3. Use the line command to draw a line atop this scale that matches the length of the scale.
4. Use the line command to draw a line on the scale that matches the length of this scale
5. Select the line you have placed on the scale
6. Select the image (both line and image should now be selected as indicated by blue corners)

Scaling the Image (continued)

Tuesday, January 29, 2019 1:48 PM

(THIS EXAMPLE OF SCALING THE IMAGE IS FROM CVEEN 1400)

1. Zoom and pan to the scale and line so they are enlarged.



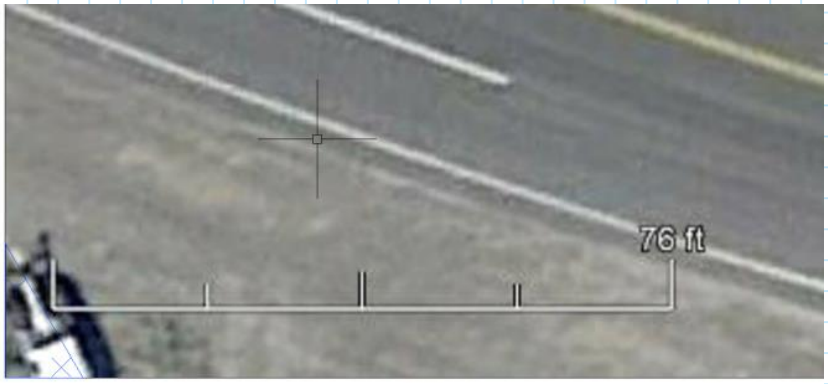
1. Make sure that the End Point box in the OSNAP menu is checked.
2. Select the left end of the line and make it a hot grip (red box).
3. The STRETCH command will be issued by AUTOCAD
4. Strike your SPACE bar because we do not want to stretch it
   Strike your SPACE bar because we do not want to move it
   Strike your SPACE bar because we do not want to rotate it
5. In the command line type R because we want to reference the scale
6. Select the beginning of the scale line.
7. Select the end of the scale line
8. Type in length of scale as 76.
9. Move the coordinate system to the beginning of the scaled line using the UCS command
10. Verify that the end of the line and the photo scale is 76' using the coordinates.

11. Save the drawing as house scaled with photo scaled.dwg

Scaling the Image (continued)

Tuesday, January 29, 2019 1:48 PM

1. Zoom in on the scale found in the lower left corner of the photo.



2. In the Layer box, select layer 0
3. Use the line command to draw a line atop this scale that matches the length of the scale.
4. Use the line command to draw a line on the scale that matches the length of this scale
5. Select the line you have placed on the scale
6. Select the image (both line and image should now be selected as indicated by blue corners)

Turing the background photo on and off in AutoCad

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Study Area - ICG Entrance Road.jpg (see Folders File in Canvas)

Turning the background photo on and off in AutoCAD C3D

1. Select the border of the image
2. It will turn blue with blue squares in the corner
3. Right click the mouse
4. Select image from the drop down box
5. Check and uncheck the show image box

Creating Alignment and Curve

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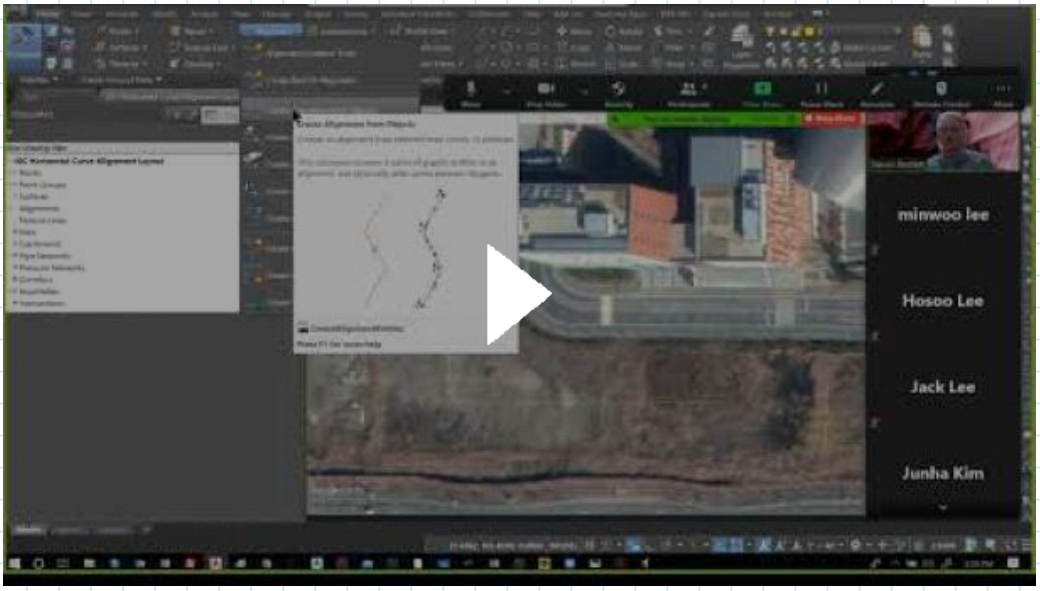
Creating a horizontal curve through the PC using the Alignment Control Stakeout

- Use the following video as an EXAMPLE of how do this. Also, see instructions on the following pages. The measured dimension from the field survey are given on the previous page.

  CVEEN 2410 IGC Curve Layout and Stakeout Report



Fitting a curve through the PC.

- Layout out the survey information using COGO points (red) and lines (yellow) as shown below (IGC Horizontal Curve Alignment Layout.dwg)

Creating Alignment and Curve (cont.)

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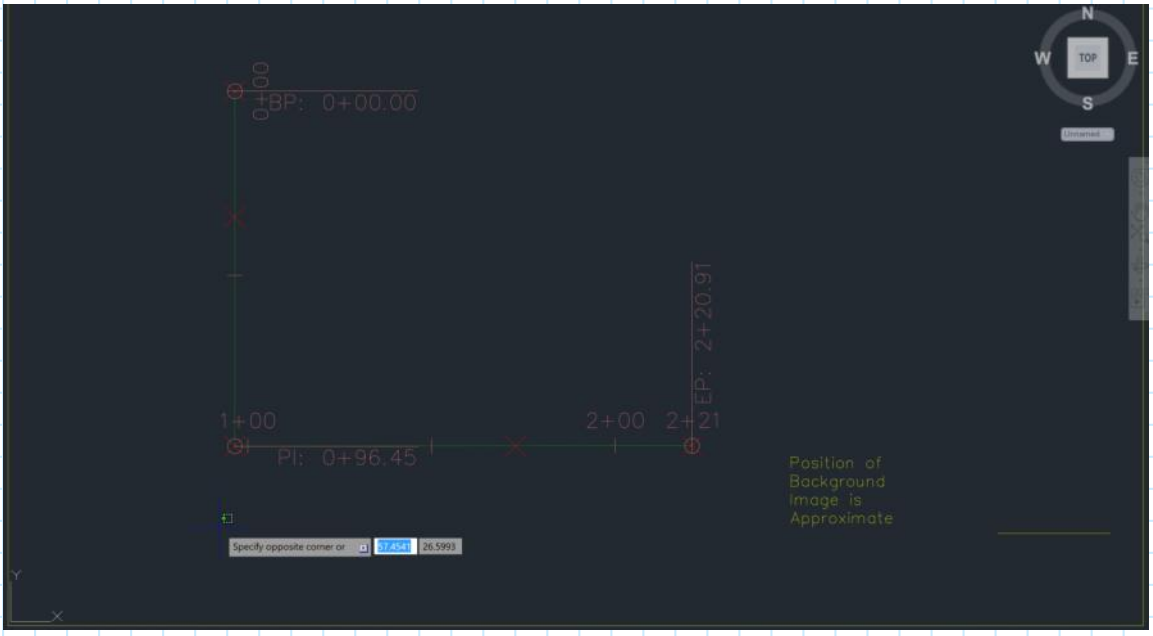
To create the alignment from the lines

- Home/Alignment/Create Alignment from Entities
  - Select from the drawing space the vertical line as first line
  - Select the horizontal line as the second line
  - Hit Enter
  - In the command box, type R for reverse
  - Hit Enter

- A Create Alignment from Object Dialog Box Appears
  - Name (use default)
  - Type = Centerline
  - Description (optional)
  - Site = None
  - Alignment Layer = C-ROAD
  - Alignment label set = Major Minor H+V
  - Conversion options
    - UNCHECK BOX TO ADD CURVES BETWEEN TANGENTS
  - Check box to erase existing entities
  - OK
  - Turn off background image



Creating Alignment and Curve (cont.)

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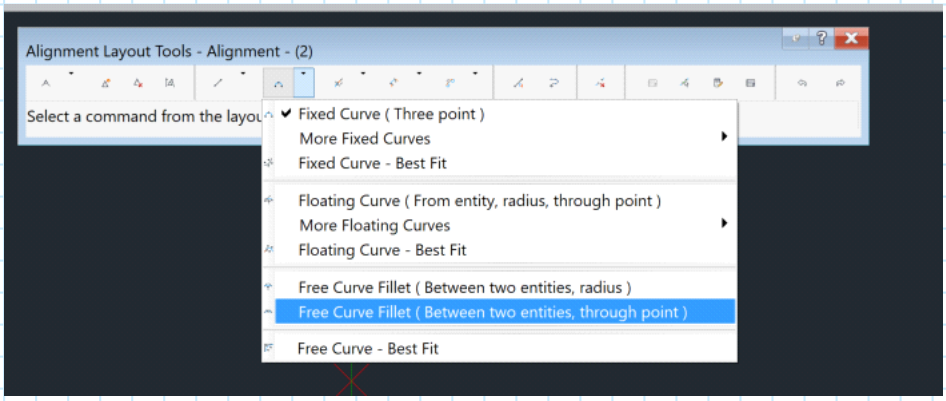
Creating Curve through the PC

- Home/Alignment/Alignment Creation Tools/
- A Create Alignment - Layout Dialog Box Appears
    - Name (use default)
    - Type = Centerline
    - Description = Optional
    - Starting station = 0+00
    - General Tab
        - Site = None
        - Alignment Style = Proposed
        - Layer = C-Road
        - Alignment label set = All labels
        - OK
    - Alignment Layout Tools - Alignment - (2) appears
    - Note that we have already created Alignment - (1) so select Alignment 1 from the Alignments/Centerline Alignments/Alignment - (1) from Prospector
    - Select Free Curve Fillet (Between two entities, through point)



    - Select vertical line above the PC as the first entity
    - Select horizontal line near sta. 2+00 as second entity
    - Specify a through point (Use the PC) (Make sure OSNAP is on)
    - Curve is created
    - Save files as IGC Horizontal Curve Layout with Curve

Creating Additional COGO points on the alignment

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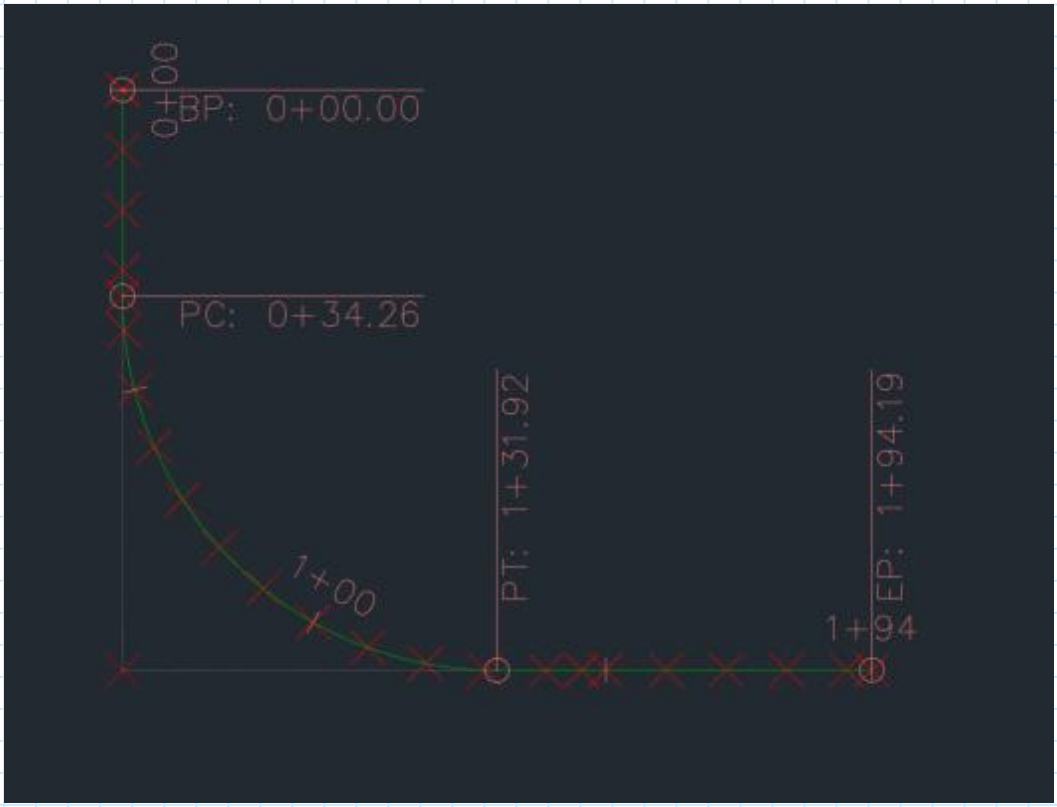
<u>Creating additional COGO Points on the alignment at 10 m station increments</u>

- Home/Points/Create Points - Alignment/Measure Alignment
- The Create Points Box Appears with Select Alignment in Command Box
- In the CREATE POINTS drop down box, Select the <Measure Alignment> drop down box
- Select Measure Alignment
- Select Alignment from the drawing
- Hit enter key in command line when prompted Starting station <0+00.00>
  Hit enter key in command line when prompted Ending station <1+94.19>
- Specify and offset: <0.000>
- Specify an interval <10.000>
- Enter a point description (leave blank)
- Specify a point elevation (0)
- Repeat this several times
- Cogo Points should be created on the alignment at 10-m intervals (see red X's)



Generating Stake Out Report

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Generating Survey Stake-out Report

- Home/Toolspace/ToolBox/Reports Manger/Alignment/Stakeout Alignment Report
- Dialog box appears
- Make sure that alignment is selected on list of alignments
- Select Angle type as Deflected + (+ = clockwise)
- Input in dialog box Point Occupied as the PI (Should be point 1) - Check this
- Input in dialog box Backsight Point as the PC (Should be point 2) - Check this
- Station Increment = 10
- Station offset = 0
- Create Report
- Save drawing as IGCcurve - As constructed.dwg

Blank

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