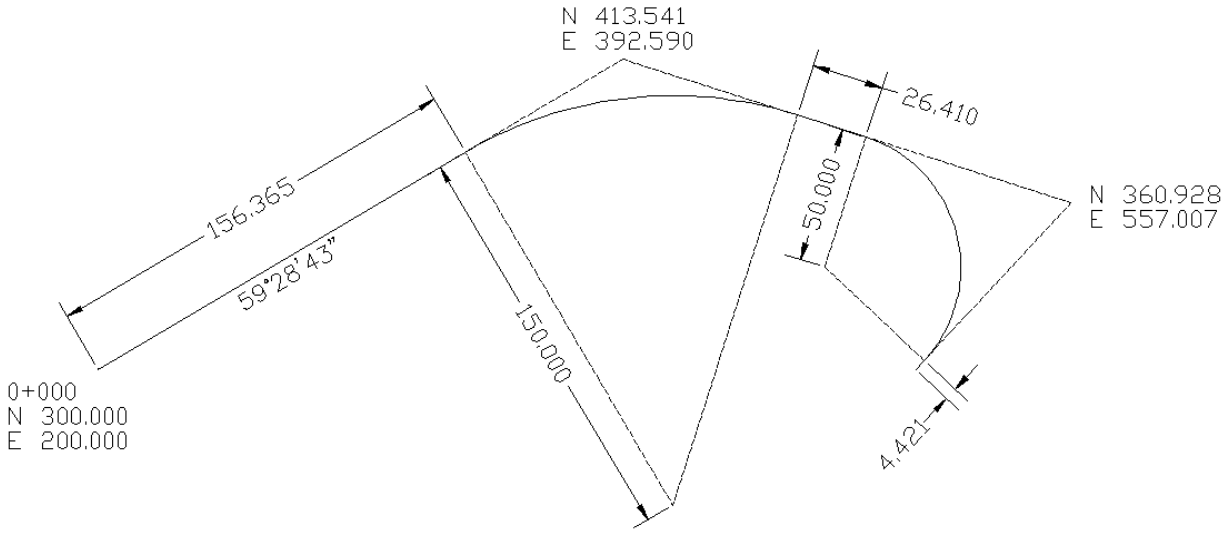
Road Alignments

Using COGO+ Pro by Simple Geospatial Solutions

The Alignments program in COGO+ Pro is found in the SURVeying menu. Alignments are defined horizontally and vertically and cross section templates assigned, then it is possible to generate 3D coordinates for any station and offsets, or create coordinates for the entire alignment at given intervals.

Example 1

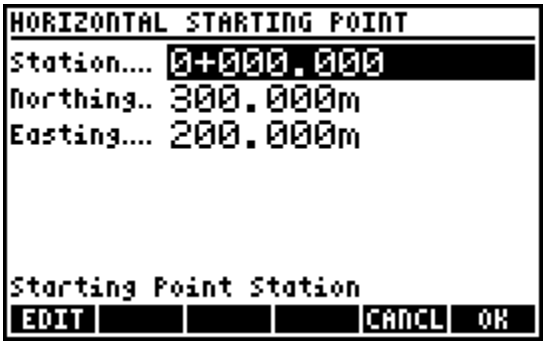
The sketch below outlines the parameters for the horizontal alignment. For this example the coordinates of the PI's are given, but any number of possible known curve parameters can be used to create the alignment.



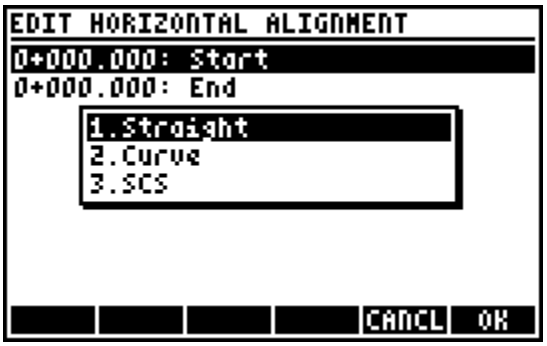
Step 1: Start the Alignments program and press F1 **[NEW]** to create a new alignment.

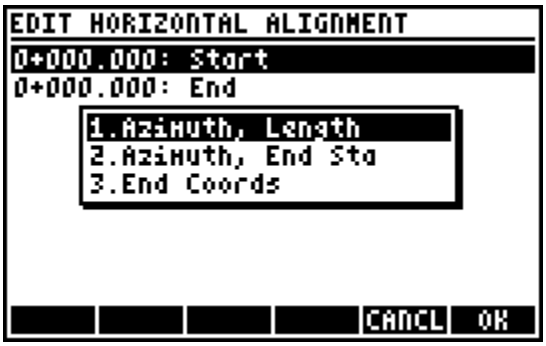
Step 2: Next press F3 **[EDIT]** to edit the newly created alignment. Note: The EDIT HORIZONTAL ALIGNMENT screen always starts by default, use F6 **[HzAL]** to toggle between horizontal/vertical/cross sections.

Step 3: Press F3 **[EDIT]** to edit the station and coordinates for the selected Start point. For this example the starting station is 0+000, and the coordinates are N=300, E=200.

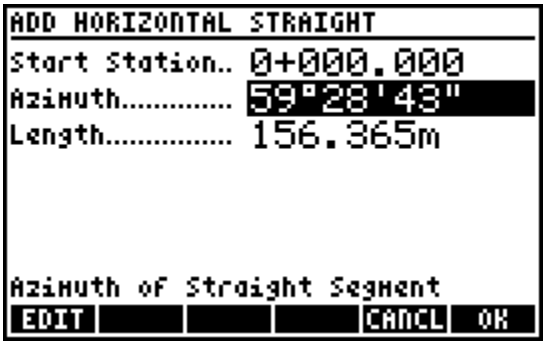


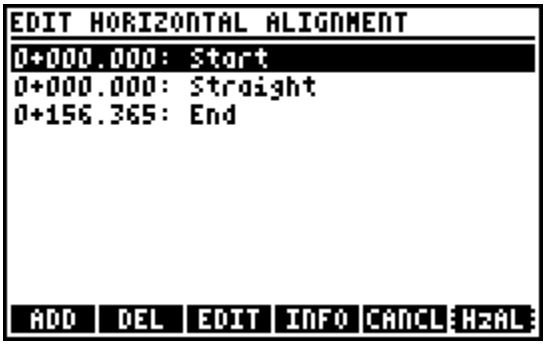
Step 4: Press F1 **[ADD]** to add a horizontal element, and select “1.Straight” to add a straight element. Next choose the known parameters for the straight element, choose “1.Azimuth, Length”.



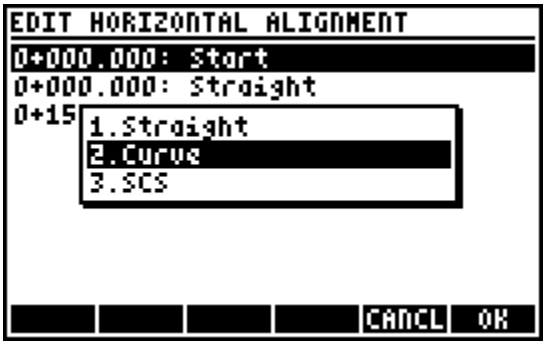


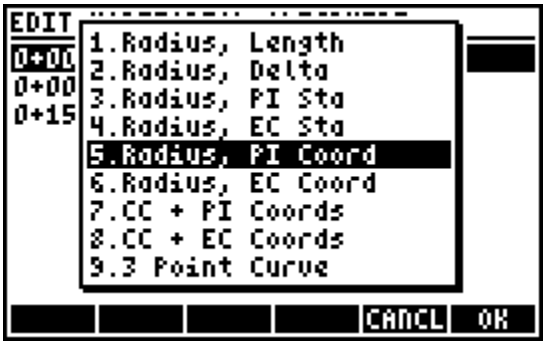
Step 5: Enter the azimuth and length. The screen updates to show the newly added element.



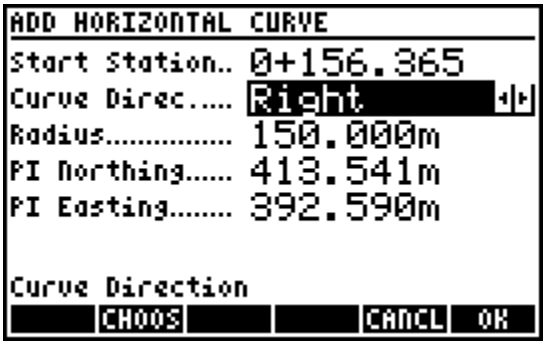


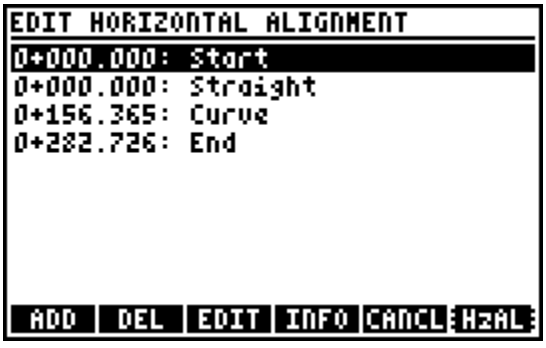
Step 6: Press F1 **[ADD]** to add the next element, a curve. Choose the known parameters "5.Radius, PI Coord".



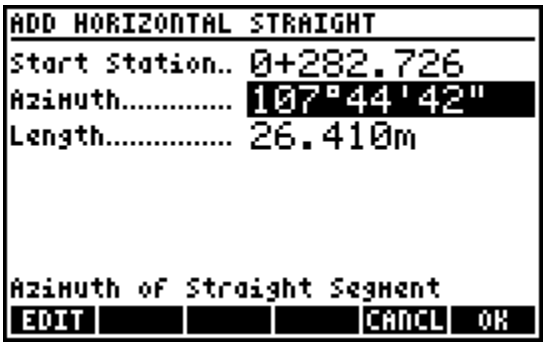


Step 7: Enter the parameters, and make sure you select the correct direction for the curve Right or Left. Again the screen updates to show the newly added element.

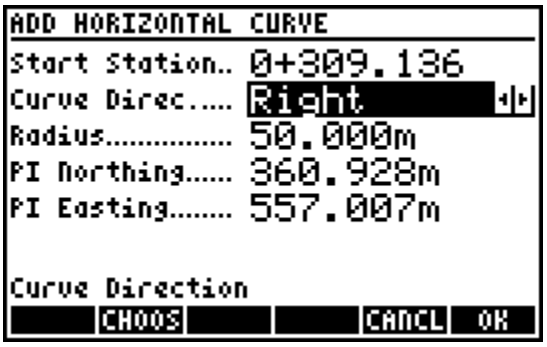




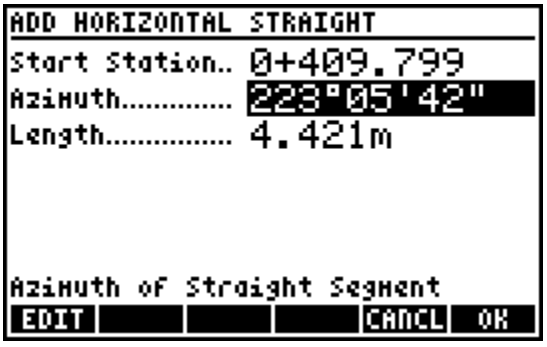
Step 8: Add the second straight element. The azimuth is automatically calculated from the last element.

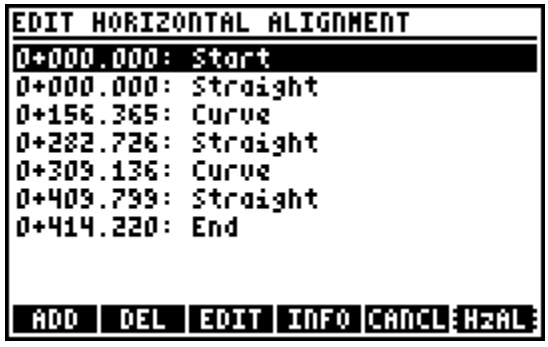


Step 9: Add the second curve.

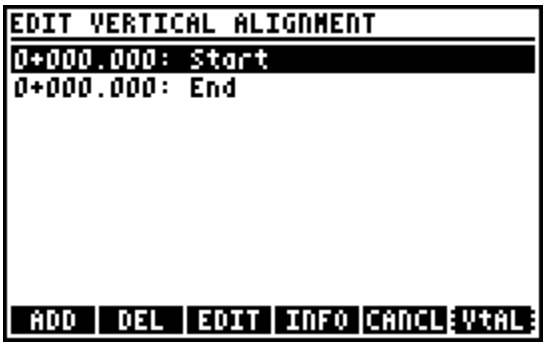


Step 10: Add the third and final straight element. All the elements of the horizontal alignment are now shown on the EDIT HORIZONTAL ALIGNMENT screen.

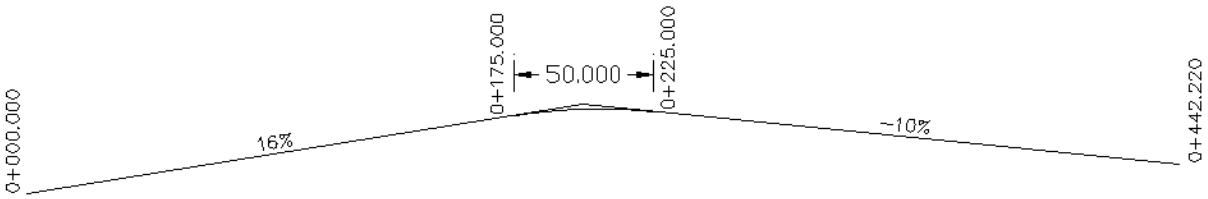




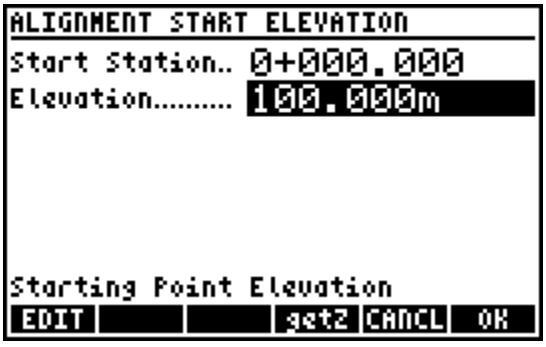
Step 11: Press F6 **[HzAL]** to switch to the EDIT VERTICAL ALIGNMENT screen.



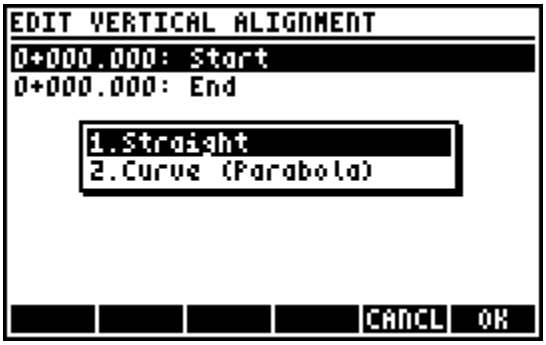
The sketch below outlines the parameters for the vertical alignment. For this example the elevation at station 0+000 is known to be 100.000m.

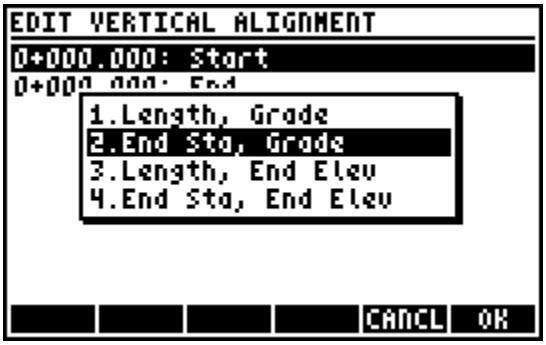


Step 12: Press F3 **[EDIT]** to edit the starting elevation.

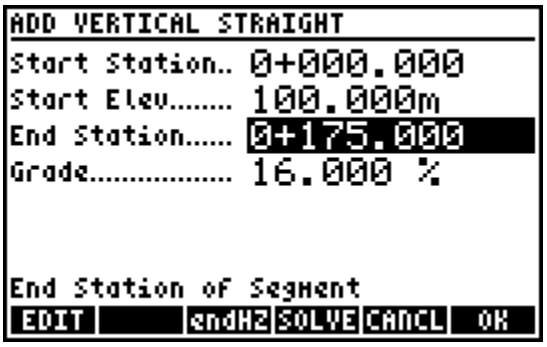


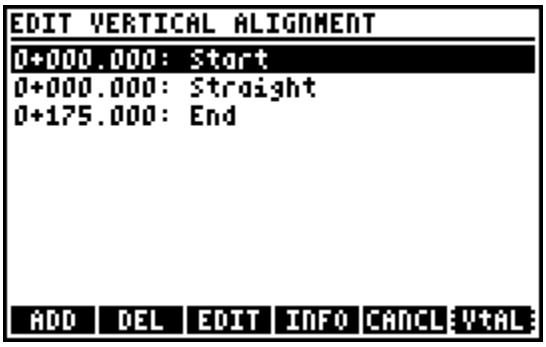
Step 13: Press A [ADD] to add the first straight element, and select “2.End Sta, Grade”.



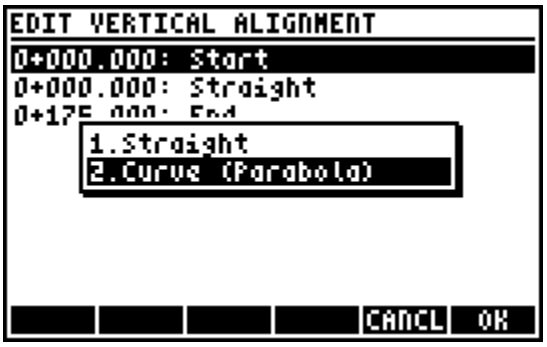


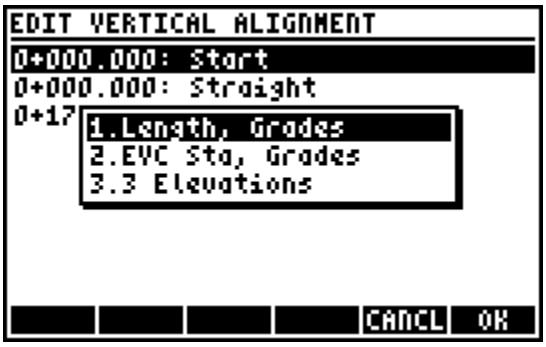
Step 14: Enter the known parameters for the straight element. The screen updates to show the newly added element.

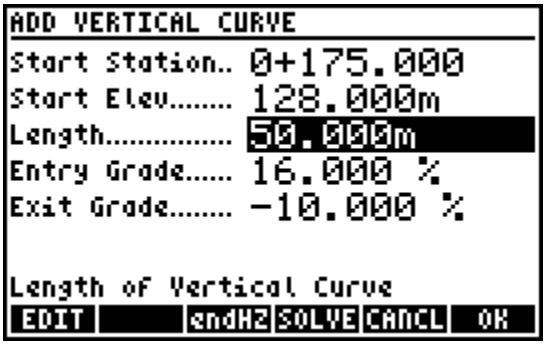


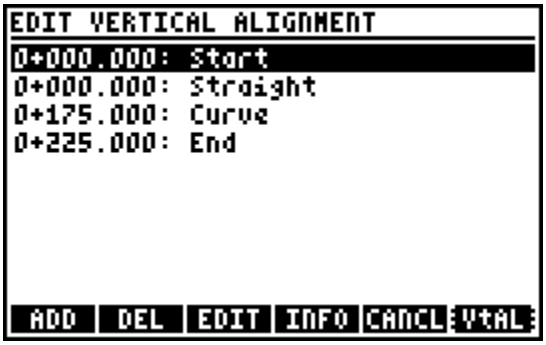


Step 15: Add the vertical curve.

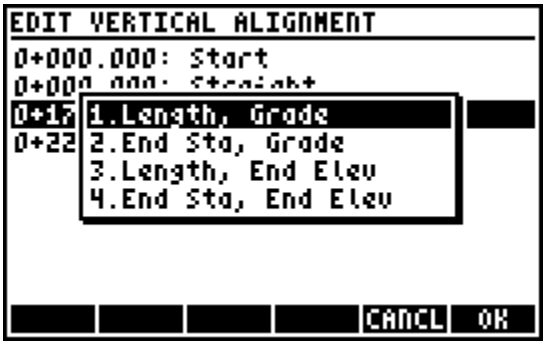


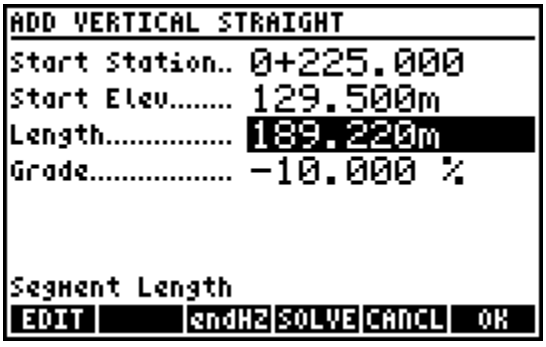






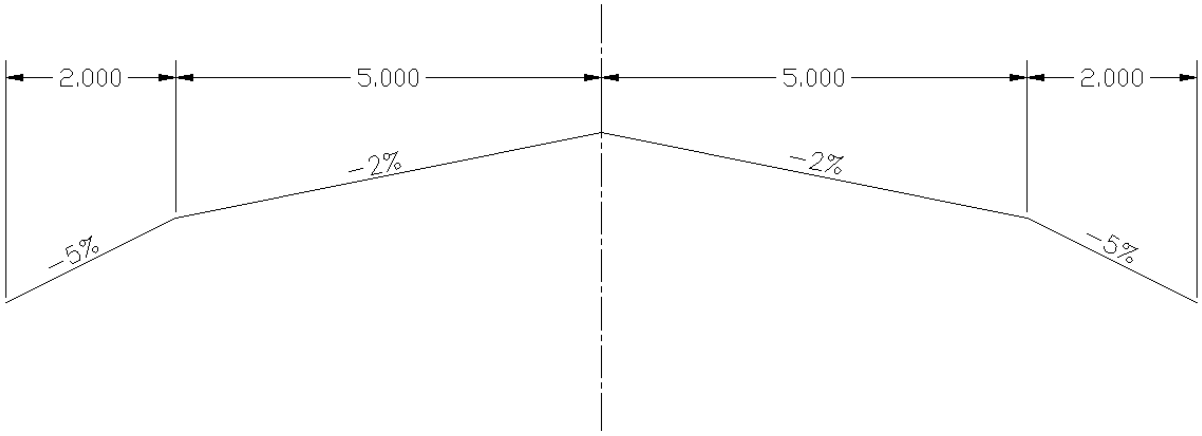
Step 16: Add the second and final straight element. Note: Press F3 **[endHZ]** to calculate the length to be the end of the horizontal alignment.



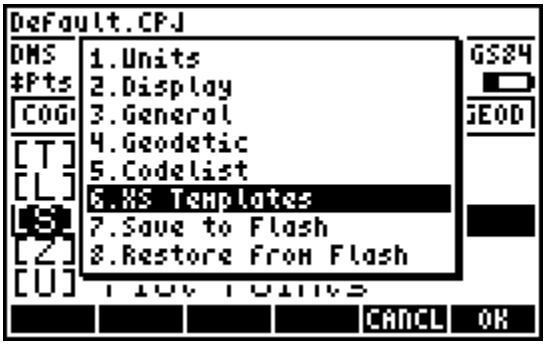


Step 17: Exit the Alignments program to create a new cross section template, return to the main menu.

The sketch below outlines the cross section template parameters.



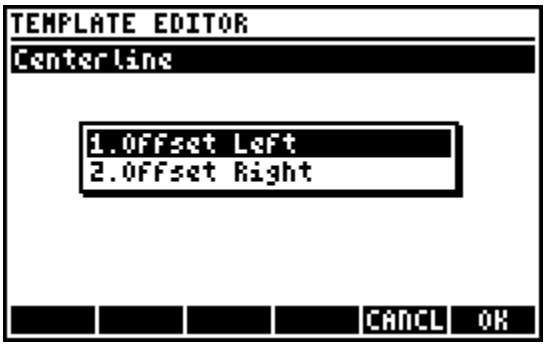
Step 18: Go to User Settings, and choose “6.XS Templates”.

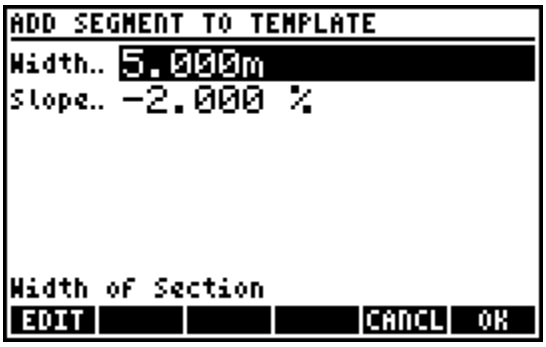


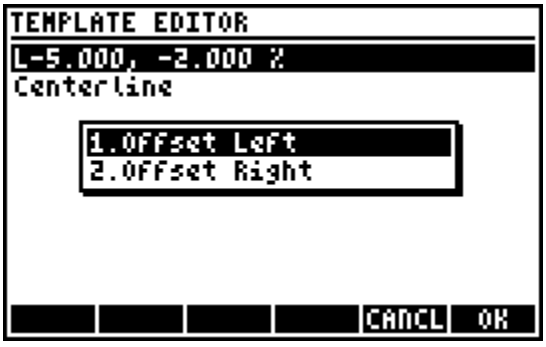
Step 19: Press F1 **[NEW]** to create the new template, then choose “1.Offsets, Slopes” as the type of template and provide a name for the template.

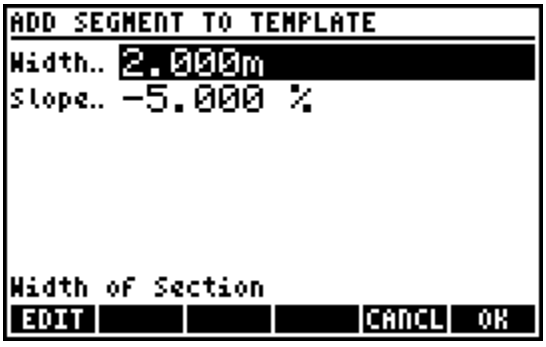
Step 20: Press F3 **[EDIT]** to edit the new template and define the offsets and slopes. The default template contains only the centerline.

Step 21: Press F1 **[ADD]** to add an offset, and then enter the width and slope of the offset. All offsets should be entered starting from the centerline and moving away from it. Enter the offsets left, and then right to complete the template.

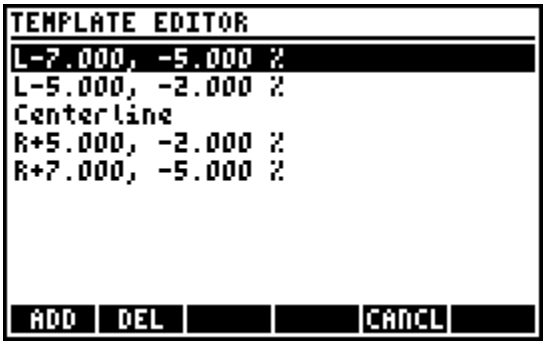




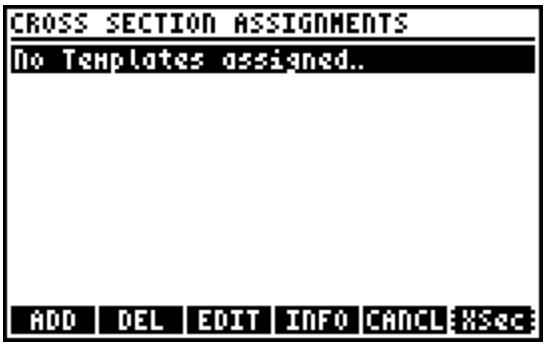




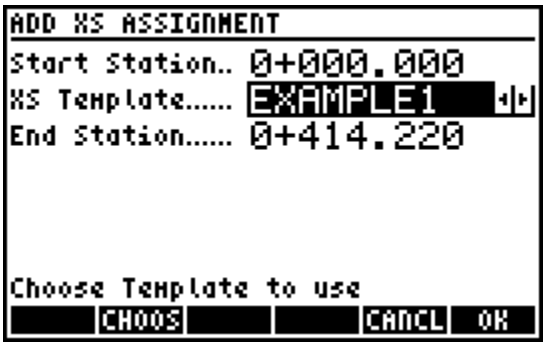
Step 22: Verify your final template looks as shown below.

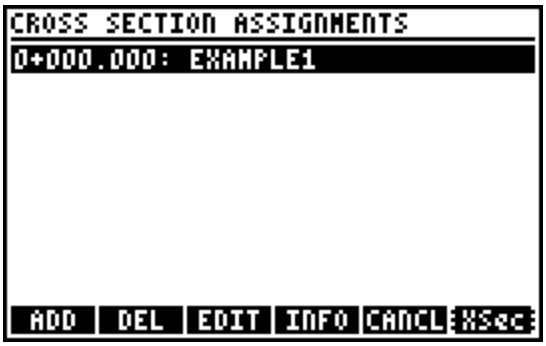


Step 23: Return to the Alignments program, and EDIT the EXAMPLE1.CPA alignment, and then press F6 **[HzAL]** / F6 **[VtAL]** until you are at the CROSS SECTION ASSIGNMENTS screen.



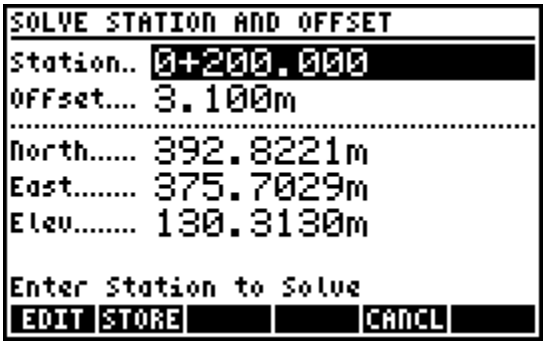
Step 24: Press F1 **[ADD]** to add a cross section assignment. For this example we will use only one template for the entire alignment.



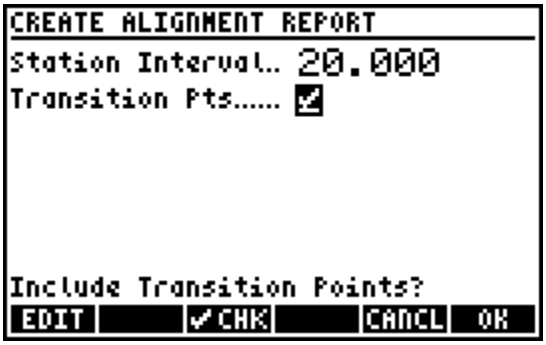


Once assigned, this completes the creation of the alignment. You can press F5 **[CANCL[** to return to the main ALIGNMENTS MANAGER screen.

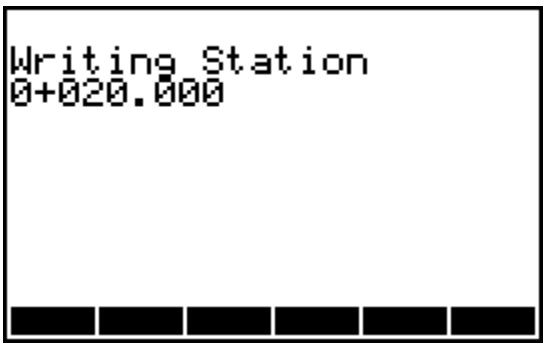
Option 1: Solve any station and offset. Press F6 **[LOAD]**, then select “1.Solve Sta, Offset”. Enter any station and offset to calculate the 3D coordinates.



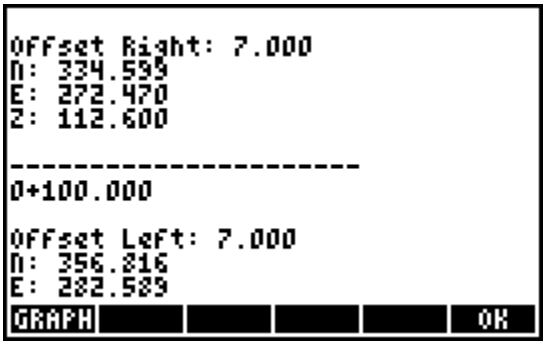
Option 2: Create a report of the entire alignment, at a given interval. For example at a 20m interval including all transition points.



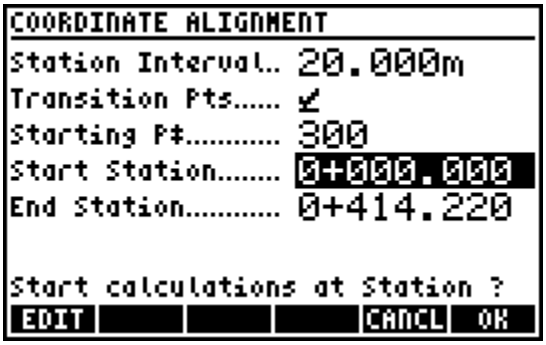
The data is written and you are given the option to save the file as an ASCII file or to review the data on the screen.

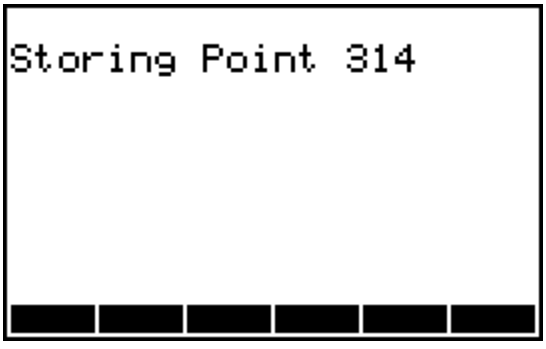


Coordinates at each station and each break point on the cross section are solved for.

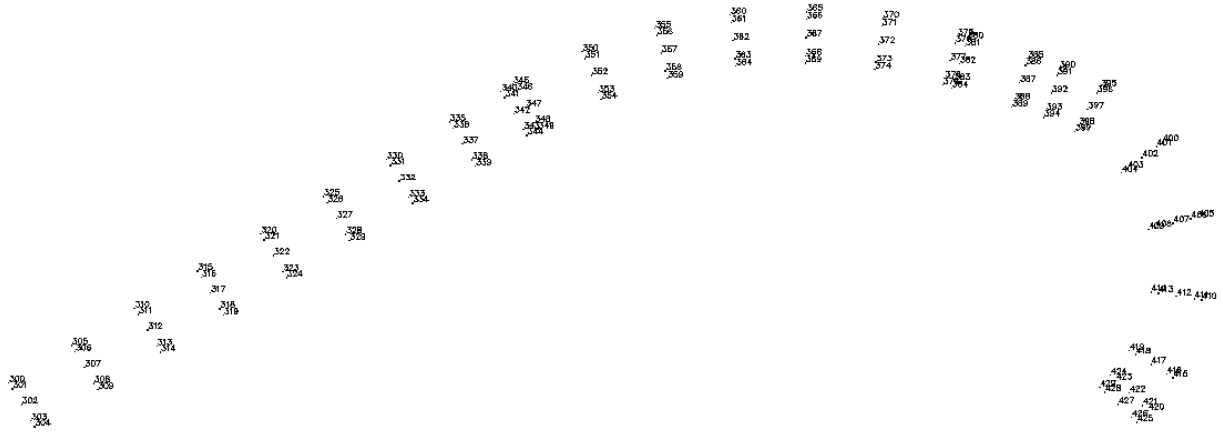


Option 3: Create coordinates of the entire alignment, or of a subset of the alignment. Again, using the 20m, but also creating transition points, and using a starting point number of 300, see below.





The points 300-429 are calculated left to right across each cross section and along the alignment from start to finish.



Now these points can be used further for any number of possible uses, including staking out, etc. from known control points within the project area.