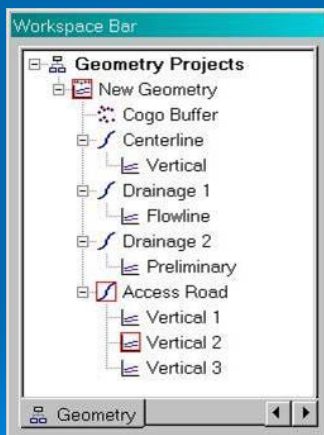




Geometry Intro - Objectives

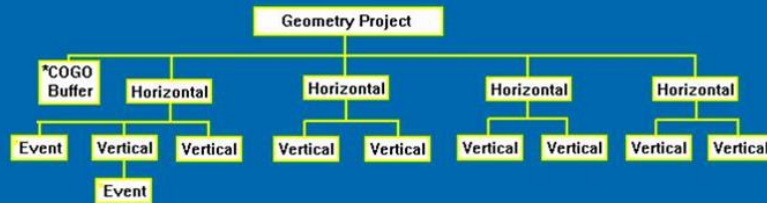
- An InRoads Geometry Project overview
- A look at the Geometry Project file Structure
- Opening and Creating Geometry Projects
- Horizontal Alignment layout tools and key-ins
- Viewing existing H. Alignments & Stationing
- Setting the start Station & Station Equations
- Saving the InRoads Geometry data
- Some other Geometry commands & tools

The Geometry Project



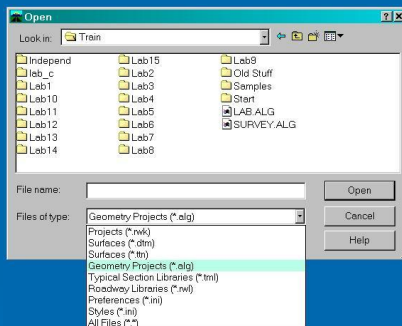
- The **Geometry Project** is where the COGO Point & Alignment information is stored and organized.
- It acts as a warehouse for all project geometry
- A single job may have more than one project associated with it

The Geometry Project Structure



- The overall Geometry Project contains:
 - The COGO Point Buffer
 - Horizontal Alignments
 - Vertical Alignments
 - Horizontal & Vertical Event Points

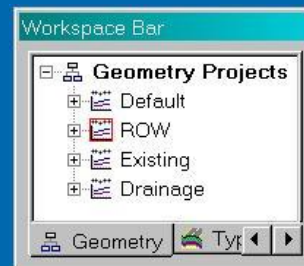
Loading a Geometry Project



- Use the *InRoads* > *File* > *Open* command to load an existing geometry file
- Always make sure that the *Files of Type* is set properly

Several Geometry Projects

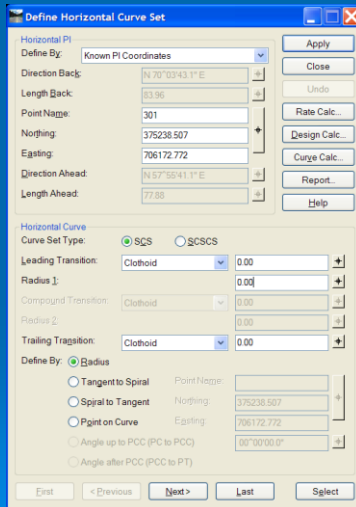
- Many Geometry Projects can be loaded in InRoads
- Each Geo Project has the complete Geometry file structure stored with it
- The 'active' Project defines the collection of Geometry that InRoads is actively working on
- Only the *active* geometry can receive input



Horizontal Alignments

- Create the 'slot' in the Geometry Project
- Layout the Horizontal Alignment via
 - Horizontal Curve Set method (PI's)
 - Horizontal Element method (Elements)
 - Simplified Horizontal Element method
 - Traverse tools (Direction, Angle/Deflection, Curve)
 - Create Alignment by COGO Points
 - Regression Analysis
 - Import from Graphics
 - Import from an ASCII or .ICS file

Defining Horizontal Curves



- **Define Curve** from the *Horizontal Curve Set* toolbar will define & edit the horizontal curves
 - ♣ Upper Portion Editor
 - ♣ Lower area Defines Curve
 - ♣ Spirals or not
 - ♣ Curve & Design Calcs
 - ♣ Undo (InRoads V8.3 only)

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Horizontal Element Tools



- **Horizontal Element** tools are another method for creating and editing horizontal alignments.
- These tools work with 'components' versus PIs
- **Discontinuities** refer to 'gaps' in a feature or alignment and are permissible in InRoads V8
- Layout the lab tangents using these tools if you feel like expanding your layout options.

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Precision Key-ins

- Precision Key-ins are available in addition to location by data points in the CAD file

- InRoads key-ins:

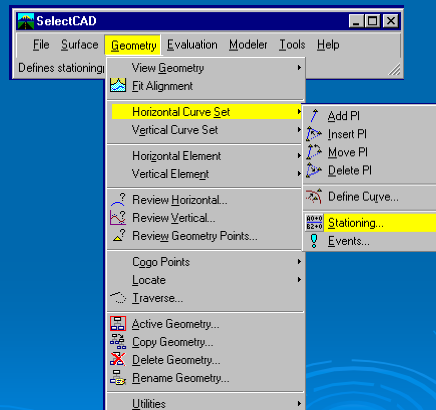
- NE=northing, easting, {elevation}
- DI=distance, direction [di=50.25,n90e]
- SO=sta, off, elev, horiz align name, geo proj name
- DO=easting offset, northing offset

- CAD key-ins

- XY=x-axis value, y-axis value, {z-axis value}
- DX=delta x, delta y, {delta z}

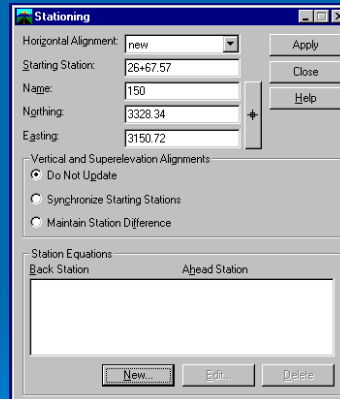
The Beginning Station

- The default start station is 0+00 for a new alignment
- Select *Geometry > Horizontal Curve Set > Stationing...* to access the Stationing dialog box

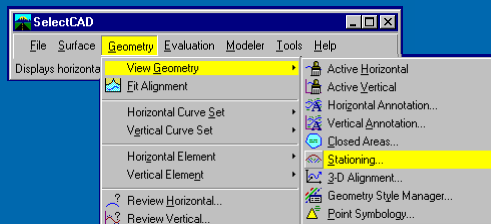


Defining the Beginning Station

- The upper portion of this dialog box enables you to define or redefine the **Starting Station**
- Consider the Vertical & Super Stationing if done
- Use the lower area to set any **Station Equations** along the alignment

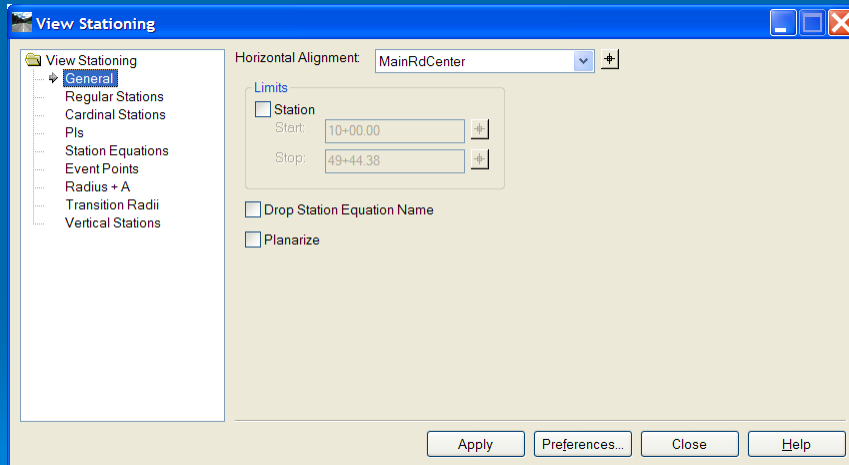


Display the Alignment Stationing



- Select **Geometry > View Geometry > Stationing...** to display the stationing along the horizontal alignment.

Display the Alignment Stationing



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Saving Your Data

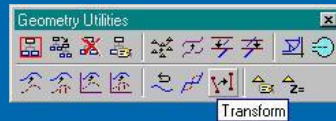
- Remember that while working in InRoads the Geometry Data is manipulated and stored in memory, not on the hard drive.
- Use the *File > Save > Geometry Project*, or *Save As* command to save your alignment data when it's appropriate



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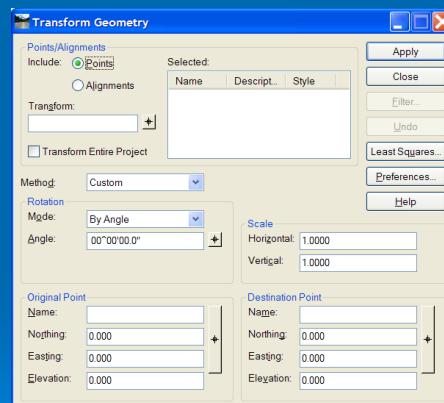
Transform



- Sometimes observations are collected and coordinates are processed using an assumed initial coordinate, you can translate the resultant points and alignments to the appropriate coordinate system by going to **Geometry > Utilities > Transform**

Transforming Geometry

- Identify the Geometry to transform
 - Choose the *Filter* to select a portion of the geometry project
- The *Methods* allow you to convert to Metric or Imperial
- The H & V Scale factors are rigid body scaling, not warping.



Horizontal Event Points



- Event Points: based on alignment data
- Points added as:
 - COGO
 - Station / Offset
 - Northing / Easting
- Single or Multiple points at a time

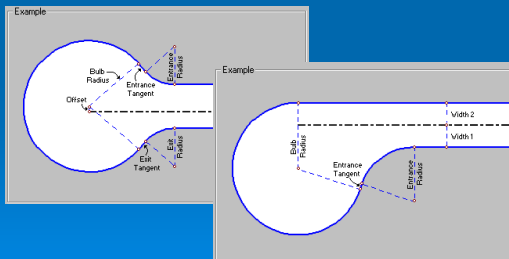
Horizontal Events dialog box configuration:

- Define By: Multiple Stations
- Add As: Station and Offset (selected)
- Locate By: Segment Distance (selected)
- Segment Distance: 50.0000
- Number of Segments: 1
- Seed Name: 5000
- Description: New ROW
- Style: property_line_d
- Station Start: 25+00.0000
- Station Stop: 43+00.0000
- Offsets First: 50.0000
- Offsets Second: 50.0000

Method	Station	Offset	Northing	Easting	Elevation	Style
S+O	36+00.0000	50.0000	3576.117590	3994.398323	0.0000	
S+O	36+50.0000	50.0000	3604.485151	4036.216705	0.0000	
N+E	36+50.0000	-16.0382	3681.681243	4031.201788	0.0000	
N+E	36+95.5482	16.0382	3658.880285	4054.415533	0.0000	
S+O	37+00.0000	50.0000	3633.956703	4077.944418	0.0000	
S+O	37+50.0000	50.0000	3664.378144	4119.021635	0.0000	

Laying Out Cul-de-sacs

- Cul-de-sacs are part of *Geometry Utilities*
 - Select the Type
 - Enter the dimensions
 - Follow the prompts



Place Cul-de-sac dialog box configuration:

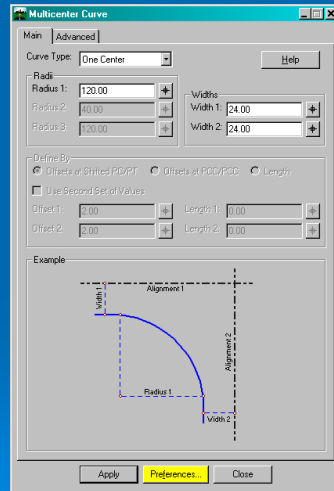
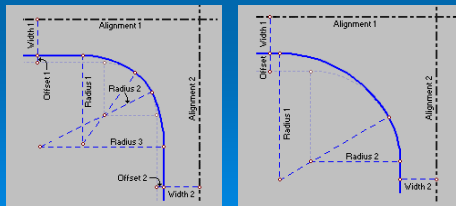
- Type: Knuckle
- Direction: Left (selected)
- Radii: Bulb: 50.00, Entrance: 50.00, Exit: 50.00
- Offset: 0.00
- Widths: Width 1: 12.00, Width 2: 12.00
- Tangents: Entrance: 0.00, Exit: 0.00

Placing Curb Returns

Geometry > Utilities > Multicentered Curve

- One Center
- Two Center
- Three Center

Enter Radius and Widths



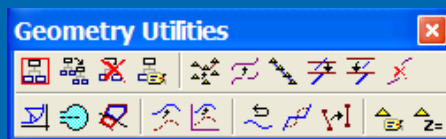
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Other Geometry Utilities

Other Geometry Utilities will help to construct and work with Horizontal Alignments

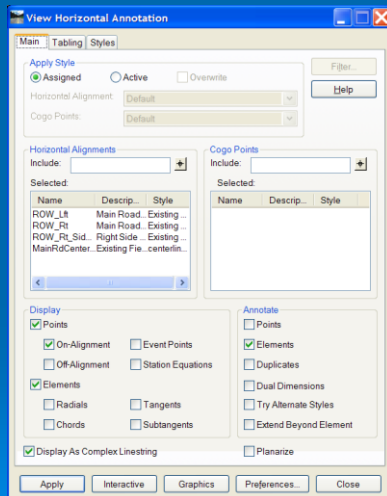
- Join
- Trim Alignment
- Extend Alignment
- Partial Delete
- Transpose
- Parallel Horizontal by Element
- Parallel Horizontal by Station
- Assign names



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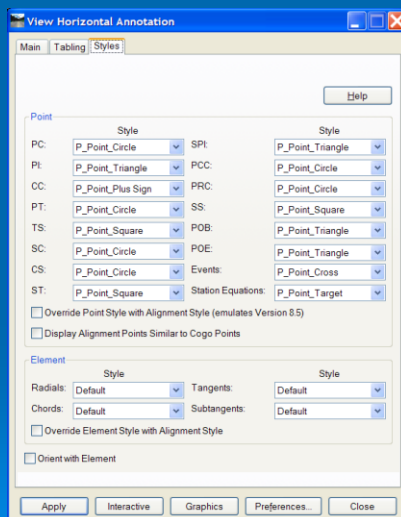
View Horiz. Annotation - Main



• The *View Horizontal Annotation* command displays Horizontal Geometry

- Style: Assigned or Active
- Cogo Points and / or
- Horizontal Alignments
- Identify items to *Annotate*
- Identify items to *Display*

View Horiz. Annotation – Styles



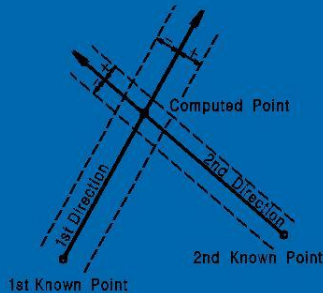
• The *View Horizontal Annotation* tool can display different Styles at the various horizontal key points

Intersection Commands

Geometry > Locate > Intersection commands

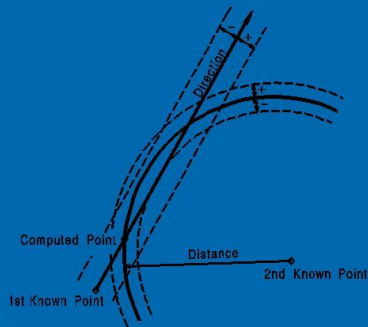
- Direction / Direction
- Direction / Distance
- Distance / Distance
- Direction / Alignment
- Distance / Alignment
- Alignment / Alignment
- Station / Alignment

Direction / Direction Intersect



Direction / Direction

Direction / Distance Intersect



Direction / Distance

Intersection

Type: Direction/Distance

Direction:

Name: 1000

Northing: 3339.58

Easting: 3225.24

Direction: N 82°23'28.57" E

Offset: 0.00

Distance:

Name: 253

Northing: 3359.39

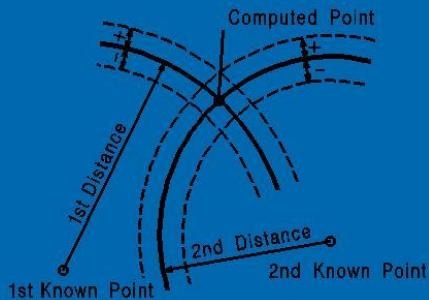
Easting: 3316.29

Distance: 0.00

Offset: 0.00

Apply Close Help

Distance / Distance Intersect



Distance / Distance

Intersection

Type: Distance/Distance

Distance 1:

Name: 1000

Northing: 3339.58

Easting: 3225.24

Distance: 100.00

Offset: 0.00

Distance 2:

Name: 253

Northing: 3359.39

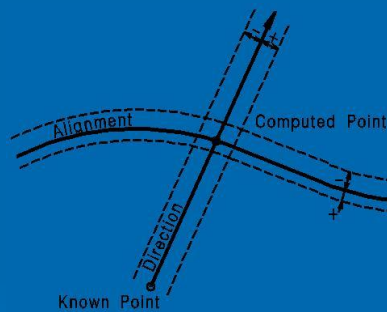
Easting: 3316.29

Distance: 250.00

Offset: 0.00

Apply Close Help

Direction / Alignment Intersect

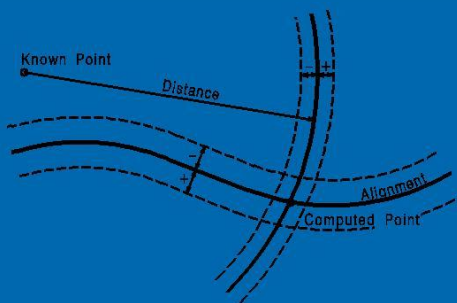


Direction / Alignment

The 'Intersection' dialog box is shown with the following settings:

- Type: Direction/Alignment
- Name: 1000
- Northing: 3339.5770
- Easting: 3225.2370
- Direction: N 0°00'00" E
- Offset: 0.0000
- Alignment Name: new
- Alignment Offset: 0.0000
- Extend to Intersection: ☐

Distance / Alignment Intersect

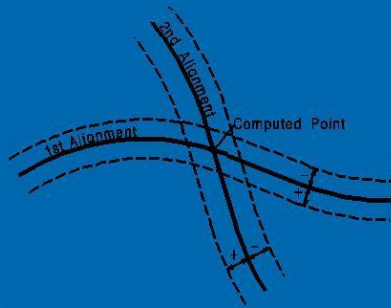


Distance / Alignment

The 'Intersection' dialog box is shown with the following settings:

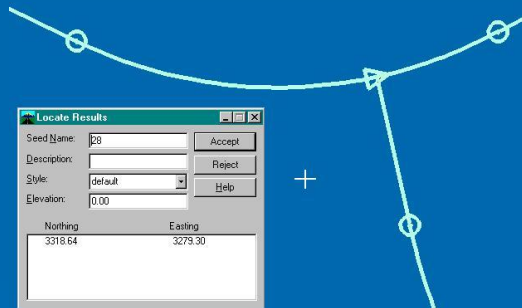
- Type: Distance/Alignment
- Name: 1000
- Northing: 3339.5770
- Easting: 3225.2370
- Distance: 125.0000
- Offset: 0.0000
- Alignment Name: new
- Alignment Offset: 0.0000
- Extend to Intersection: ☐

Alignment / Alignment Intersect

A screenshot of the 'Intersection' dialog box. It contains fields for 'Type' (set to 'Alignment/Alignment'), 'Alignment 1' (Name: 'new', Offset: '0.0000'), and 'Alignment 2' (Name: 'elm', Offset: '0.0000'). There are buttons for 'Apply', 'Close', and 'Help'. At the bottom, there is a checkbox labeled 'Extend to Intersection' which is currently unchecked.

Alignment / Alignment

Intersection Results



Temporary graphics are displayed showing the possible results prior to accepting the solution.

Geometry Intro - Summary

- InRoads Geometry is stored in a structured file
- All new components of the Geometry file are created under *File > New* (ie: G. Proj, H & V)
- **Horizontal PI's** can be set by precision key-in.
- Choose the appropriate geometry layout method, or use what you are comfortable with
- Once the Geometry is created you can:
 - **Display** the active alignment and its stationing
 - Reset the **beginning station** of the alignment
 - **Save** the alignment data to disk