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### E3-InRoads Geometry Update

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# **Coordinate Geometry**

Coordinate geometry enhancements



### **Cogo Audit Trail**

- Similar to the *Report Lock* for cogo commands, but *independent*!
  - Writes a .atf file to the same folder as the active geometry file.
- Cogo Audit Trail
  - Who?
  - When?
  - What?

		_						72
gleise_r	neu21.atf -	Notepad	1					
File Edit	Format	View	Help					
** ** Mod **	ified b	y Rich	iard.	Bradshaw on 10/1/20	009 10:48:05 AM			*
nverse LSW03	Direct	ion	-	5,0000	335271.791	449.072	198.548	
5	20/47	07.02	E	5.000 5.000 5.0002 -0.045	Accumulated Distance Slope Distance Vertical Distance			
LSW03 S	-01-33 20^55'	35.53"	Е	5.0000 10.0000	335267.116 Accumulated Distance	450.847	198.503	
LSW03	-01-34			5.0002 -0.045	Slope Distance Vertical Distance 335262.446	452.632	198.457	
S	21^05'	21.49"	E	5.0000 15.0000 5.0002 -0.045	Accumulated Distance Slope Distance Vertical Distance			
LSW03 S	-01-35 21^29'	11.52"	Е	14.9999 29.9999 15.0005	335257.781 Accumulated Distance Slope Distance	454.432	198.412	
LSW03	-01-38	ion		-0.136	Vertical Distance 335243.824	459.926	198.276	
LSW03	-01-47 24^43	13.03"	W	5.0000	335202.479	477.678	197.867	
LSW03	-01-46	F7 63"		5.0002	Slope Distance Vertical Distance 335207.021	475.587	197.913	
N	24^17	57.83	w	10.0000 5.0002 0.045	Accumulated Distance Slope Distance Vertical Distance			
LSW03 irectio	-01-45 on Trav dd to C	erse Jogo Bu	ffer		335211.578	473.530	197.958	
LSW03	-01-41 45^00'	00.00"	E	100.0000	335229.939	465.601	198.140	
1 2 N	60^00'	00.00"	Е	50.0000	335300.650	536.312	199.140	
N 3	30^00'	00.00"	E	50.0000	335368.951	604.613	201.140	
(							Þ	Ŧ
						Ln 1, Col 1		

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## **Inverse Direction**

- Wildcarding
- Ascending & descending numeric point name series
- Additional textual output
  - Accumulated distance
  - Vertical distance
- Dynamic graphics
  - Temporary

Results					
Inverse cl101	Direction	334967.424	1498.243	10.000	Close
1100	00 21 37.40 E	18.3459 Accumulated Distan 92.8309 Slope Distance 91.000 Vertical Distance		101 000	Save As
CIIU2 N	64^51'15.63" E	334974.190 18.3459 36.6918 Accumulated Distan 18.5896 Slope Distance 3.000 Vertical Distance	1515.296 Ce	101.000	Display
c1103 N	61^20'53.86" E	334981.985 18.3459 55.0377 Accumulated Distan 18.5896 Slope Distance -3.000 Vertical Distance	1531.903 ce	104.000	Help
c1104 N	57^50'32.09" E	334990.782 18.3459 73.3836 Accumulated Distan 18.5896 Slope Distance -3.000 Vertical Distance	1548.002 ce	101.000	
c1105		335000.546	1563.534	98.000	

nverse	Radial	Tangent Offset	Minimum	Annotate
Point:	Í			Interactive
				Reset
				Help

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## **Inverse Direction - Minimum**

• Minimum

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 $(\Omega)$ 

 $\leftarrow$ 

- Computes minimum distance from an element to another element
- Interactive



Inverse	Radial	Tangent Offset	Minimum	Annotate
				Interactive
				<b>E</b>

Inverse Minimum Distance		334827 313	2007 060	Clos
S 2^34'08.77" W	12.4601	334814 866	2006 502	Save
Inverse Minimum Distance		334014.000	2000.302	Appen
N 18^07'23.30" E	5.4894	334767.927	2192.931	Displ
Inverse Minimum Distance		334//3.144	2194.639	Drin
S 4^06'03.81" W	4.7499	334830.011	2043.299	
1123		334825.273	2042.959	Help

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## **Segment Alignment**

- Segment an alignment into multiple segments
  - In other words take a line with a length of 100' and replace that line with segments that are 25' in length!
  - Or across multiple elements!
- Create cogo points

Alignment:	LSW03-01 -	+ Apply
Station Li	mits	Close
Start	0+000.000	+ Unda
Stop:	0+328.544	+
lumber of Se	egments: 10	Heip
Coomont	Alianment	
Segment	, agains a	
Add as Co	ogo Points	
Add as Co Seed Nan	ogo Points ne: 1	
Add as Co Seed Nan Descriptio	ogo Points ne: 1 n:	



## **Extended Description**

- Adding non-graphical data to the design data
  - Digital images
    - External data storage
  - Textual
    - .alg data storage
- Reporting
- Annotation





# **Alignment / Design**

Horizontal and vertical alignment / design enhancements



## **Horizontal Design Criteria**

- Curve Set Based
  - Add PI & Insert PI
- Looks up radius based upon speed / maximum superelevation
  - ..\data\imperial\Horizontal Design Checks.txt

📓 Design Criteri	а	l					
Use Design Crit Table Name: oads Group V8.	teria 11\data\imperia	Norizontal Design Checks bt	Apply Close	* DESTON SPEED	MAYTMIM	MAYTMIM	
Speed:	65		Browse	*	04	17	127
	00		E .	30.	.04	.16	302.
Maximum e:	6.000	•	Preferences	40.	.04	.15	573.
a provincenza e provi				50.	.04	.14	955.
Minimum Hadius:		Ŧ	Help	55.	.04	.13	1186.
			18 - A	60.	.04	.12	1528.
				20.	.06	.17	116.
				30.	.06	.16	273.
				40.	.06	.15	509.
				50.	.06	.14	849.
				55.	.06	.13	1061.
				6U.	.06	.12	1627
				70	.00	10	2082

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20 30

40 50

55

60

65

## **Horizontal Table Editor**

- Invokes *Add*, *Insert*, *Move* and *Delete PI* commands
- Redesign All
  - Based up Horizontal Design Criteria
  - Either invoke the Horizontal Design Criteria command or <Ctrl> right click and change the speed and / or maximum superelevation

Curve Sets:				Undo	J 6 000
Northing	Easting	Leading Transition	Radius Trailing Transition		
2751.38	2693.34			Close	8.000
2906.13	5641.97	0.00	Tracking	Help	10.000
5101.59	7478.82	0.00		Пар	10.000
4037.71	11046.17	0.00	Curve Set Review		12.000
5188.63	12873.35	0.00	Element Review		
5101.59	14255.82				
			Add PI		
			Incont DI		
			Insert Pl		
			Move PL		
			Delete DI		
			Deleterin		
			Redecion All		

## **"Simplified" Horizontal Elements**

- Horizontal Elements without dialogs
  - Well, there is a Settings dialog, which defines the radius and optional spiral lengths!
    - This dialog is active even during graphics input
  - Add Fixed, Float and Free elements
  - Move
  - Edit

- Delete
- MicroStation only functionality!

Settings		
Leading Transition:	0.00	Close
Radius:	1206.00	Design Calc
Trailing Transition:	0.00	Help



## **Vertical Design Criteria**

- Curve Set Based
  - Add PI & Insert PI
- Looks up K based upon speed / lower or upper limits
  - ..\data\imperial\Vertical Design Checks.txt

✓ Use Desig Table Name	n Criteria :				Apply									
nRoads Gro	up V8.11\data\impe	erial\Vertical De	sign Checks	.bd	Cluse									
Speed:	70	•			Browse.									
Limits:	Lower	•			Preference	s								
					Help									
			* DESIG * SPEED * (mph)	۱ f	Crest  Stop  Dist	- Upper K Value	Crest Stop Dist	- Lower  K Value	Sag Stop Dist	- Upper  K   Value	Sag Stop Dist	- Lower  K Value	Passing Minimum Dist	Sight Di K Value
			20. 25. 30. 35. 40.	.40 .38 .35 .34 .32	125. 150. 200. 250. 325.	10. 20. 30. 50. 80.	125. 150. 200. 225 275.	10. 20. 30. 40. 60.	125. 150. 200. 250. 325.	20. 30. 40. 50. 70.	125. 150. 200. 250 275.	20. 30. 40. 50. 60.	800. 950. 1100. 1300. 1500.	210. 300. 400. 550. 730.
			45. 50. 55. 60.	.31 .30 .30 .29	400. 475. 550. 650.	120. 160. 220. 310.	325. 400. 450. 525.	80. 110. 150. 190.	400. 475. 550. 650.	90. 110. 130. 160.	325. 400. 450. 525.	70. 90. 100. 120.	1650. 1800. 1950. 2100.	890. 1050. 1230. 1430.

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## Short avi...

- Vertical Design Criteria
- Single dialog for Add, Insert, Move and Delete Vertical PI
- On the fly annotation



Undo Close Help

## **Vertical Table Editor**

- Two modes
  - Compute Interactively
  - Or wait and *Solve* for unknown values

Curve Sets:				Solvo
Station	Elevation	Ahead Slope	Length	Solve
100+00.00	921.10	2.000%		Undo
116+00.00	?	-2.000%	500.00	Class
133+00.00	?	2.500%	500.00	Close
146+00.00	?	-1.000%	500.00	Help
152+64.98	?			

Vertical Table Editor

Curve Sets:			
Station	Elevation	Ahead Slope	Length
100+00.00	921.10	2.000%	
116+00.00	953.10	-2.000%	500.00
133+00.00	919.10	2.500%	500.00
146+00.00	951.60	-1.000%	500.00
152+64.98	944.95		





## **Vertical Table Editor**

- Invokes *Add*, *Insert*, *Move* and *Delete PI* commands
- Redesign All
  - Based up Vertical Design Criteria
  - Either invoke the Vertical Design Criteria command or <Ctrl> right click and change the speed and limits

Station	Elevation	Ahead Slope	Length	Joive
100+00.00	921.10	2.000%	Congin	Undo
116+00.00	953.10	-1.500%	500.00	
133+00.00	927.60	2.000%	500.00	Close
146+00.00	953.60	0.000%	500.00	Help
152+64.98	953.60			



## **"Simplified" Vertical Elements**

- Vertical Elements without dialogs
  - Well, there is a Settings dialog, which defines the K or length of curve!
    - This dialog is active even during graphics input
  - Add Fixed, Float and Free elements
  - Move
  - Edit

Simplified Vertical Element

- Delete
- MicroStation only functionality!

Dynamics		Close
Station:	10.00	Help
Elevation:	0.00	
🗸 Grade:	0.200%	
Define Curve by		
K = I/(g2 - g1)	▼ 50.00	



## **Vertical Healing**

- Synchronize / update the vertical alignment when the horizontal alignment has changed
  - The coordinate position of vertical PI's will be held!
    - The user is responsible for potential overlaps
    - The user is responsible for resolving verticals that are beyond the limits of the horizontal
    - Set in *File > Project Options > Geometry*, but it is one of those settings that you should set and remain set!
  - This is one implementation, others would have been possible!



### **Curve Fitting**

- Fit an alignment through a series of points
  - Horizontal & Vertical
  - Horizontal only
  - Vertical only

Curve Fitting			
From Primary Control:	SV916 SV54	▼ <b>+</b> ▼ +	Apply Close Help
Create Horizontal			
Create Vertical			
Vertical Parent:	SV54	- +	
Alignment Name:	Existing Centerline		
Description:			
Style:	Default	•	
Horizontal Tolerance:	0.500		
Vertical Tolerance:	0.250		
Standard Lift:	0.000		
Vertical Alignment i	is Lines Only		



## **Rail Specific Transition Spirals**

- AREMA transition spiral
  - Chord definition alignment
  - US freight standard
  - Bentley Rail Track only!

Element: AREMA			
TS ( )	3+37.1050	10191.4712	10277.4501
SPI ( )	5+37.0953	10305.0631	10442.0496
SC ( ) Entrance Padiwa:	6+37.1050	10357.5103	10527.2682
Exit Radius:	2864 9344		
Length:	300.0000		
Angle:	3^00'00.0"	Right	
Constant: Long Tangant:	927.0816		
Short Tangent:	100.0646		
Long Chord:	299.9634		
Xs:	299.9177		
IS: P·	5.2370		
K.	149.9786		
Tangent Direction:	N 55^23'24.1" E		
Radial Direction:	S 34^36'35.9" E		
Radial Direction:	N 56 23 25.4 E S 31^36'35 9" F		
Tangent Direction:	N 58^23'24.1" E		
Elemento Cinenter			
Element: Circular	6+37 1050	10357 5103	10527 2682
Element: Circular SC ( ) PI ( )	6+37.1050 10+99.8233	10357.5103 10600.0368	10527.2682 10921.3357
Element: Circular SC ( ) PI ( ) CC ( )	6+37.1050 10+99.8233	10357.5103 10600.0368 7917.6297	10527.2682 10921.3357 12028.8778
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Radius;	6+37.1050 10+99.8233 15+54.5718 2864.9344	10357.5103 10600.0368 7917.6297 10706.1755	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) FI ( ) CC ( ) CS ( ) Radius: Design Speed(mph):	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000	10357.5103 10600.0368 7917.6297 10706.1755	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Radius: Design Speed(mph): Cant(inches):	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000	10357.5103 10600.0368 7917.6297 10706.1755	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Radius: Design Speed(mph): Cant(inches): Delta:	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 5 18^20'57.6"	10357.5103 10600.0368 7917.6297 10706.1755 Right	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Radius: Design Speed(mph): Cant(inches): Delta: Degree of Curvature(Chord): Length:	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 5 18^20'57.6" 2^00'00.0" 917.5133	10357.5103 10600.0368 7917.6297 10706.1755 Right	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Besign Speed(mph): Cant(inches): Delta: Degree of Curvature(Chord): Length: Length(Chorded):	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 5 18^20'57.6" 2^00'00.0" 917.5133 917.4667	10357.5103 10600.0368 7917.6297 10706.1755 Right	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Design Speed(mph): Cant(inches): Delta: Degree of Curvature(Chord): Length: Length(Chorded): Tangent:	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 5 18^20'57.6" 2^00'00.0" 917.5133 917.4667 462.7183	10357.5103 10600.0368 7917.6297 10706.1755 Right	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) FI ( ) CC ( ) CS ( ) Design Speed(mph): Cant(inches): Degree of Curvature(Chord): Length: Length(Chorded): Tangent: Chord:	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 518^220'57.6" 2^00'00.0" 917.5133 917.4667 462.7183 913.5973 26.671	10357.5103 10600.0368 7917.6297 10706.1755 Right	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Design Speed(mph): Cant(inches): Delta: Degree of Curvature(Chord): Length: Length(Chorded): Tangent: Chord: Middle Ordinate:	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 5 18^20'57.6" 2^00'00.0" 917.5133 917.4667 462.7183 913.5973 36.6515 37 1265	10357.5103 10600.0368 7917.6297 10706.1755 Right	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Easign Speed(mph): Cant(inches): Degree of Curvature(Chord): Length: Length(Chorded): Tangent: Chord: Middle Ordinate: External: Tangent Direction:	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 5 18^20'57.6" 2^00'00.0" 917.5133 917.4667 462.7183 913.5973 36.6515 37.1265 N 58^223'24.1" E	10357.5103 10600.0368 7917.6297 10706.1755 Right	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) Design Speed(mph): Cant(inches): Degree of Curvature(Chord): Length(Chorded): Length(Chorded): Chord: Middle Ordinate: External: Tangent Direction: Radial Direction:	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 5 18^20'57.6" 2^00'00.0" 917.4667 462.7183 913.5973 36.6515 37.1265 N 58^23'24.1" E 5 31^36'35.9" E	10357.5103 10600.0368 7917.6297 10706.1755 Right	10527.2682 10921.3357 12028.8778 11371.7164
Element: Circular SC ( ) PI ( ) CC ( ) CS ( ) CS ( ) Cant(inches): Degree of Curvature(Chord): Length(Chorded): Tangent: Chord: Middle Ordinate: External: Tangent Direction: Radial Direction: Radial Direction: Padial Direction:	6+37.1050 10+99.8233 15+54.5718 2864.9344 70.0000 518^20'57.6" 2^00'00.0" 917.4667 462.7183 913.5973 36.6515 37.1265 N 58^23'24.1" S 31^36'35.9" E N 67^33'52.9" E N 67^33'52.9" E	10357.5103 10600.0368 7917.6297 10706.1755	10527.2682 10921.3337 12028.8778 11371.7164

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## **Design Checking**

- Not just warnings!
  - Now it also indicates if the geometry is acceptable!
  - Good for QC

Conoral Roads		Transite			
deneral hudus	LEN Standard	\$	Austrian Hall		
Туре:	Horizontal Alignment		Apply		
Geometry Project:	Default	~	Browse		
Horizontal Alignmen	t Country Road 1534	Country Road 1534 🛛 👻 🛨			
Vertical Alignment:		-			
Include Children	Single Classification	() Molti			
✓ Include Children Definition: Classification:	O Single Classification	Multi	ple Classifications		
Include Children Definition: Classification: Terrain:	Single Classification GS-1M Freeway Level	⊙ Multi	ple Classifications		
✓ Include Children Definition: Classification: Terrain: Design Speed	Single Classification GS-1M Freeway Level	⊙ Multi	ple Classifications		
✓ Include Children Definition: Classification: Terrain: Design Speed Classification File:	<ul> <li>Single Classification</li> <li>GS-1M Freeway</li> <li>Level</li> <li>50</li> <li>d\data\design checking</li> </ul>	⊙ Multi	ple Classifications		

Checking stopping sight distances for alignment 'Default'

### 10+550.0000

Classification: GS-1M Freeway Terrain: Rolling Speed: 60 Warning: Desirable minimum stopping sight distance exceeded! Desirable minimum stopping sight distance: 205.0000 Desirable minimum length should be: 499.1020 Actual length: 300.0000

11+050.0000 Classification: GS-1M Freeway Terrain: Rolling Speed: 60 Acceptable: Actual length is greater than desirable minimum stopping sight distance. Desirable minimum stopping sight distance: 205.0000 Actual length: 300.0000

Alignment:	Default		-	→	OK
Start Station:	127+00.000	00		+	Cancel
Stop Station:	186+19.156	64		+	6dd
Classification:	GS-3M 150	I0 < ADT < 20	-		
Ferrain:	Bolling			~	Update
Desian Speed:	E0				Delete
			-	<u> </u>	Help
			-	2 2 Ur	
Alignment	Start St	Stop St	Classi	ication	Ture State
Default	100+00.00.	. 127+00.00	. GS-3M	1500 < 1	Hollin35
Country Roa Country Roa	10+00.000 10+00.000	. 26+86.823 . 37+65.007	. GS-4M . GS-4M	50 < AD1 50 < AD1	Rollin30 Rollin30



# **Annotation & Display**

Annotation and display enhancements



## **View Options**

- Update annotation as the geometry is created / edited
  - Based upon
    - Alignment's style
    - Persisted command's preferences
  - Allows different "type of alignments" to display differently
    - A road baseline would have:
      - Horizontal annotation
      - Stationing
      - Curve set annotation
    - A <u>right of way take</u> would have:
      - Horizontal annotation





## **Tree / Leaf User Interface**

- Converted most commands to tree / leaf
  - Allows greater consistency
  - Allows for potential enhancements
  - Allows for display / annotation during edits!
- You will need to look at preferences!

view Stationing	Data:											
General	Object	Placement	Prefix	Suffix	Precision	Format	Name					
Regular Stations	Station	In			0.123	S+SSS.SS						
	Northing		N=		0.123							
Pls	Easting		E=		0.123							
Station Equations												
Event Points												
Radius + A												
Vertical Charling												
vertical Stations	Omit POB and PO	E	Swa	ap Point	Abbreviation	and Station						
	Display Op: O Mu	tiolo Linco	Cine	la Lina								
		upie Lines	🐂 Ve	rtical Cl	hange In Pla	an						
	Leaders:						D .					
	Object Ler	igth Ang	<u>I</u> 🚍	Vertical (	Change In Pla	an	Data:	1	1.0.00	1	1	la.
	Leader Line			Gen	eral		Object	Prefix	Suffix	Precision	Format	Name
	Segment 1 0.1	000 90^		Symi	bol		lext	_				
	Segment 2 0.0	500 0^(	C	Verti	cal Pis		Alignment	0		0.400		
			-	Para	jerits boloo		X Station	Sta.		0.123	\$+\$\$\$.\$\$	
				Circu	ilar Curvee		K Elevation	H.		0.123		
				Circu			⊠ Sag	Sag	_			
							Crest	Crest				
						I						
							Drop Station Equation	n Name				

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## Just more examples...

Curve Set Annotation	Dat	ta:																	
General		Object	Column	Row	Prefix	Suffix	Precision	Format		Name									
Annotation	$\boxtimes$	Line								Prop H	orizontal								
	$\boxtimes$	Point																	
		Text			Illeran					Prop H	orizontal								
	$\boxtimes$	Curve Number	1	1	C#														
		Station	1	2	Sta=		0.123	S+SSS.	35										
	$\boxtimes$	Northing	1	5	N=		0.123					_							
		Easting	1	6	E=		0.123					_							
		Radius	1	9	R=	m	0.123												
		Degree of Curve	1	4	Dc=		0	ddd^m	m'ss.ss"										
		Delta Left	1	3	Delta=		0.1	ddd îm	m'ss.ss"										
		Delta Right			Delta=	2													
		Arc Length	1	8		m	0.123					_							
	님	Spiral Length	1	9	Ls=	m	0.12												
		Constant	Stati	ion Off	et Anno	tation									0		<u></u> ]		
		Superelevation						-											
	님	Speed	🔄 St	ation Of	iset Annot	tation	Data:		1		Q			1	1				
		Tangent Length		Gener	al		Obj	ect	Column	Row	Prefix	Suffix	Precision	Format	Name				
		External Distance		Annot	ation		Tex	đ		17.2									
								me	1	4			11						
							De	scription	1	5	_								
							L Sty	le	1	6	_		0.400	1					
							⊠ Sta	tion	1	1	07		0.123	\$+\$\$\$.\$\$					
							× Off	set Left	10	2	Off	L	0.123				-		
								set Right			UT	R	0.400						
								thing	1	0	N		0.123						
								sting	-	2	E		0.123	-					
								Valion	11	3	0		0.12						
							Leader	s:											
							Obj	ect	Length	Ang	le	Relat	ive To	Name					
							Lea	ader Line	ALC: NO	15- 0									
							Seg	gment 1	1.(	view C	osed Are	eas							
							Seg	gment 2	0.0	Now	Closed Ar		r	)ata:					
											ieneral	603		Object		Prefix	Suffix	Precision	Name
											nnotation			Text					Annotation-Pla
													l l l	Name					
									_				l i		n				
													l l i	Area in S	guare Meters		m2	0.12	
													l i	Area in H	ectares		ha	0.12	
													i I	Perimeter	in Meters		m	0.12	
													i	Area in S	guare Feet	Area	ft2	0	
													li	Area in A	cres		ас	0.12	
													ĺ		in Feet	Perimet	ft	0.123	
																	1.00		

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# **User Interface**

User interface enhancements that improve your productivity



## **User Interface Enhancements**

- Smaller dialogs
- Moved buttons to right-click popup menus
- And to avoid user panic, an Alert has been added!





## **Configurable List View & Dialog Resizing**

- Right click in title and select data of interest
  - Check Integrity
  - Review / Edit Regression Points

Type	Statio	Northin	Easting	Direction @	Northin	Easting	Direction	Length	Radius	Const	Integri	Integri	Eleme	Apply		
Linear	100+00	-841.41	1162.63	N 65^16'00" E	-324.34	2285.09	N 65^16'00".	. 1235.83				OK	OK	Close		
Clothoi	112+35	-324.34	2285.09	N 65^16'00" E	-234.70	2463.78	N 59^32'13" .	200.00		447.21	OK	OK	OK			
Circular	114+35	-234.70	2463.78	N 59^32'13" E	7.33	2741.45	N 38^18'41" .	370.46	-1000.00		OK	ок	ок	Help	3	
lothoi	118+06	7.33	2741.45	N 38^18'41" E	172.09	2854.65	N 32^34'55" .	200.00		447.21	OK	OK	OK	8		
linear	120+06	172.09	2854.65	N 32^34'55" E	337.56	2960.40	N 32^34'55" .	. 196.37			OK	OK	OK			
lothoi	122+02	337.56	2960.40	N 32^34'55" E	502.33	3073.61	N 38^18'41" .	200.00		447.21	OK	OK	OK			
Circular	124+02	502.33	3073.61	N 38^18'41" E	850.67	4108.14	S 75^31'46"	. 1154.70	1000.00		OK	OK	OK			
Clothoi	135+57	850.67	4108.14	S 75^31'46" E	787.93	4297.96	S 69^47'59" .	. 200.00		447.21	OK	ок	OK			
inear	137+57	787.93	4297.96	S 69^47'59" E	267.35	5712.85	S 69^47'59" .	. 1507.62			OK		OK			
									Check I	Horizontal	Integrity					
									Check I	Horizontal Station	Integrity Length	Radi	ıs İnte	grity Integrity.	Element	
				Select	First	< Prev	ous	ext >	Check I Type Linear	Horizontal Station 100+00.00	Integrity Length 1235.83	Radi	us Inte	grity Integrity . OK	Element OK	
				Select	First	<pre>&lt; Prev</pre>	ious Ne	ext >	Check I Type Linear Clothoid	Horizontal Station 100+00.00 112+35.83	Integrity Length 1235.83 200.00	Radi	us Inte OK	grity Integrity . OK OK	Element OK OK	
				Select	First	] [ < Prev	ious	ext >	Check I Type Linear Clothoid Circular	Horizontal Station 100+00.00 112+35.83 114+35.83	Integrity Length 1235.83 200.00 370.46	Radii -1000	us Inte OK 00 OK	grity Integrity . OK OK OK	Element OK OK OK	
				Select	First	] < Prev	ous Ne	ext >	Check I Type Linear Clothoid Circular Clothoid	Horizontal Station 100+00.00 112+35.83 114+35.83 118+06.29	Integrity Length 1235.83 200.00 370.46 200.00	Radii -1000	us Inte OK 00 OK OK	grity Integrity . OK OK OK OK	Bement           OK           OK           OK           OK           OK	
				Select	First	] < Prev	ous Ne	ext >	Check I Type Linear Clothoid Circular Clothoid Linear	Horizontal Station 100+00,00 112+35.83 114+35.83 118+06.29 120+06.29	Integrity Length 1235.83 200.00 370.46 200.00 196.37	Radii -1000	us Inte OK OC OK OK	grity Integrity . OK OK OK OK OK	Ветепт ОК ОК ОК ОК ОК	
				Select	First	] < Prev	ous Ne	ext >	Check I Type Linear Clothoid Circular Clothoid Linear Clothoid	Horizontal Station 100+00.00 112+35.83 114+35.83 118+06.29 120+06.29 122+02.66	Integrity Length 1235.83 200.00 370.46 200.00 196.37 200.00	Radii -1000	us Inte OK OK OK OK OK	grity Integrity . OK OK OK OK OK	Element ОК ОК ОК ОК ОК ОК	
				Select	First	] < Prev	ous Ne	xt >	Type Linear Clothoid Circular Clothoid Linear Clothoid Circular Clothoid Circular	Horizontal Station 100+00.00 112+35.83 114+35.83 118+06.29 120+06.29 122+02.66 124+02.66	Integrity Length 1235.83 200.00 370.46 200.00 196.37 200.00 1154.70	Radii -1000	us Inte OK OK OK OK OK OK OK	grity Integrity . OK OK OK OK OK OK OK	Еетент     ОК     ОК	
				Select	First	) < Prev	ious Ne	axt >	Check I Type Unear Clothoid Circular Clothoid Linear Clothoid Circular Clothoid	Horizontal Station 100+00,00 112+35.83 114+35.83 118+06.29 120+06.29 122+02.66 122+02.66 135+57.36	Integrity Length 1235.83 200.00 370.46 200.00 196.37 200.00 1154.70 200.00	Radii -1000	us Inte OK OK OK OK OK OK OK	grity Integrity . OK OK OK OK OK OK OK OK	Еветепт     ОК     О	



### **Less Clutter**

- Moved buttons to right click context sensitive pop-up menus
- Eliminated tabbed dialogs
  - Everything is together in one dialog but still without excess clutter!

Beginning Type Linear	Eleme	nt Free Le 284.90	ength 45	Direction N 69 <sup>^</sup> 15'50	).11" E	Select	Apply Close Save		
Connecting Type Clothold Circular Clothoid	Elemer Free	nt: Length 216.0000 1202.2129 216.0000	Free	Parameter 889/3475 -2200.0000 689.3475	Tar	Applied 90.0000	Save As Undo Report Help		Add Before Add After Edit Delete Import Free All Free Lengths Only Fix All
Ending El Type Linear	ement r	Free Le	ength 95	Direction N 32 <sup>^</sup> 19'43	3.10" E	Select		~	Gauss Jordan Singular Value Decompositio

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### **Metes & Bounds**

- Similar to *Traverse Edit*, but all editing is within the grid!
  - Workflow oriented
    - Metes & bounds
    - Simple unspiralized alignments

Name	Traverse	<b>-</b> +	-			Apply
Description	:		_			Close
ityle:	property_line	•				
Starting P	oint					Unac
Name:			Maintain Tangency			Help
Northing:	354781.5992	+	Angular Tolerance:	0^00'10.0"		
Easting:	320387.9686		Scale Factor:	1.000000		
ements:						
Туре	Direction	Angle	Distance	Radius	Length	
inear	N 37^56'51.0"	E -65^16'09.0"	71.0000			
linear	N 27^19'18.0"	W 14^30'56.0"	36.6000			
inear	N 12^48'22.0"	W -25^02'13.0"	90.1000			
	N 37^50'35.0"	W 21^40'30.0"	62.5000			
Linear	N 16^10'05.0"	W 55^30'18.0"	39.5000			
Linear Linear		E CC^10/52.0//	20.8000			
Linear Linear Linear	N 39^20'13.0"	E -66 18 33.0				
Linear Linear Linear Linear	N 39 <sup>^</sup> 20'13.0" N 26 <sup>^</sup> 58'40.0"	E -66 1853.0 W 47^33'22.0"	31.0000			



### **Traverse Adjustments**

- Again similar to *Traverse Edit*, but all editing is within the grid!
  - Workflow oriented
    - Data Entry > Adjustments > Transformations

Name:	Traverse	¥	+			Apply						
Description	1 <u></u>					· FFU						
Style:	( Instance of the second secon				Traverse	Adjustments						
Charling D	Liaveise		Charlese De	int.	Data Estas	Adjustmente T						
Starting P	OINT		Mama	arac -	Data Entry	-Aujustitionts Transit	mation	dat south state				
Name,			Name.		Adjust	Angles: 0^00'00.0"		Closure Results			A	ply
Northing:	0.000	-	Northing:	1050.976	Method	Compass		Northing Error:	-0.877			
Easting:	0.000		Easting:	-124.976				Easting Error:	-1.246			
						Crandall		Clasing Direction:	N 54^51/41 C" E		н	elp
Traverse:						Transit		closing Direction.	N 34 3141.0 E			198505
ind roleo.	1	1	S.	Terretori	- I	None		Closing Distance:	1.523			
Leg	Direction	Distance	Latitude	Departure				Closed Area:	0.0			
1	N 37"56'51,0" E	233.900	184.448	143.835				Destruction	1100.001			
2	N 27^19'18.0" W	118.290	105.094	-54.294				Penmeter:	1198.961			
3	N 12~48'22.0" W	288.740	281.557	-64.000				Precision:	786.997			
4	N 37"50"35.0" W	205.082	161.952	-125.818	Traverse:							
5	N 16~10'05.0" W	133.559	128.277	-37.190	Log	Dimetion	Distance	. It staudo	Doparture	Nothing	Engling	Ě
6	N 39"20"13.0" E	67.939	52.547	43.065	Leg	N 27^56'51 0" E	222 000	104 440	142 025	a aaa	a ana	
7	N 26"58'40.0" W	104.091	92.764	-47.220		N 37 30 31.0 E	0.000	0.000	0.000	0.000	0.000	
8	N 20 34 42.0" E	47.359	44.337	16.646	2	N 27^1918 0" W	118 290	105.094	-54 294	184 448	143 835	-1
					-	N 27^19'18 D" W	118 290	105.054	-54 294	181 118	143.035	
						1127 10 10.0 11	0.000	0.000	0,000	0.000	0.000	-11
		-	in in	1	3	N 12^48'22.0" W	288 740	281,557	-64,000	289.542	89.541	-11
			Undo	Close		N 12^48'22.0" W	288.740	281.557	-64.000	289.542	89.541	-11
			1.11	20			0.000	0.000	0.000	0.000	0.000	
					4	N 37^50'35.0" W	205.082	161,952	-125.818	571,100	25.541	
									105 010			

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## **Text Import Wizard**

- Removed classic support
  - Duplicate and redundant functionality
- Enhanced horizontal to read a multi-line element definition with
  - On alignment points (i.e. PC, PT, TS, SC, CS, ST)
  - <u>Off</u> alignment points (i.e. CC, SPI)

Apply Filter to  All Lines		Original Data Type Fixed Width - Fields are aligned in columns		
C Lines that Start With:	PNT	Delimited - Characters separate each field		
C Lines that Include:	CC	Defined Filters:		
Segments of Text		Name Description	Add	
Start:	Include Start in Import	Include PInclude lines that start with 'PNT' Include BInclude lines that include 'BC'	Delete	
			and the second second	
Exclude Filtered Lines	From Import	Include EInclude lines that include 'EC' Include CInclude lines that include 'CC'	Update	
Exclude Filtered Lines ProgramData\CalTrans   Pr14140 N 2020083.248 Distance CURVE CRV154	From Import Demo Data\Horizontal_Align ו ב ליזמצב.7850 ב 0.00 1124.347' Bearing א	Include EInclude lines that include 'EC' Include CInclude lines that include 'CC' ments-TXT\D1-HA.bt 10 9TA 142+36.02 58*07'56.9" E	Update	
Exclude Filtered Lines Conversion Notes Cal Trans NT14160 N 2020053.248 Distance CURVE CRV154 BC N 2020676. CC N 2019954.	Erom Import Demo Data \Horizontal_Alignm 1 E 6770325.7850 Z 0.00 1124.347' Bearing N 8551 E 6771280.6603 8442 E 6771729.2139	Include EInclude lines that include 'EC' Include CInclude lines that include 'CC' ments-TXT\D1-HA.bt 10 9TA 142+36.02 58*07*56.9** E 5TA 153+60.37	Update	
Exclude Filtered Lines ProgramData CalTrans I Distance Distance CURVE CRV154 BC N 2020676. CC N 2019954. PI N 2020763. TAN 1 TAN 1	From Import Demo Data\Horizontal_Alignn 1 E 6770325.7850 Z 0.00 1124.347' Bearing N a551 E 6771280.6603 8442 E 6771729.2139 3697 E 6771419.9179 6.9491	Include EInclude lines that include 'EC' Include CInclude lines that include 'CC' ments-TXT\D1-HA.bt 0 STA 142+36.02 56°07'56.9" E STA 153+60.37 STA 155+24.31	Update	



# **Localizations / Customizations**

Customer specific enhancements, that may work for other users!



## **Chain Points**

- Create a xyz horizontal alignment
- Or feature
  - Open or closed shape

🚔 Chain Po	oints 💷 🖾
Points:	Apply
Selected:	Close
Name	Description
158	Existing Point of Cur
160	Existing Point of Cur Help
161	Existing Point of Cur
171	Existing Point of Cur
172	Existing Point of Cur
170	Eviating Daint of Cur
Create:	V Horizontal
Name:	Chained centerline
Description:	
Style:	Existing Centerlines
Bandwidth:	10.000
🔲 Create a	s a Closed Alignment or Feature



## **Point Validation**

- Moved <u>obscure</u> functionality from *Review Point* to a new *XML Point Validation Report* 
  - Uses geometry selection filter
  - Works with alpha-numeric names as numeric
  - Checks for duplicates
  - Validates coordinates for liked named points

Horizontal / Include:	Alignments •		+	-Cogo Poir Include:	nts •			ъI	Apply
Selected:				Selected:				<u> </u>	Close
Name	Description	Style	-	Name		Description	Style	-	Filter
DE3	C/L PEQU	MAIN_P		1			PROP_E		Help
DE6	C/L GOLF	MAIN_P		2			PROP_E		
DE7	C/L US 78	MAIN_P		3			PROP_E		
DE8	C/L STOFF	MAIN_P		4			PROP_E		
DE19	C/L HWY 1	.MAIN_P		5			PROP_E		
DE20	LL - GOLF	MAIN_P		6			PROP_E		
DE21	LL - GOLF	MAIN_P	-	7			PROP_E	Ŧ	



## **Legal Description**

 Allows multiple reference alignments for a single parcel, which can be further refined by the user

Alignment:	DE100		+	Apply
Reference /	Aignments			Close
nclude:			+1	
				Filter.
Name	Descrip	tion Style		Help
DE19 DE3 DE3	C/L SK C/L HW C/L PEG	Y 100 MAIN_P_CO Y 100 MAIN_P_SI QUAN MAIN_P_SI		
Overrides:	Point Name	Defenses Missourt	Ĺ.	
Overrides: Point Type PC	Point Name	Reference Alignment		
Dverrides: Point Type PC PT	Point Name 569 308	Reference Alignment DE31 DE19		
Overrides: Point Type PC PT PI	Point Name 569 308 DE10238	Reference Alignment DE31 DE19 DE19		
Dverrides: Point Type PC PT PI PI	Point Name 569 308 DE10238 DE10243	Reference Alignment DE31 DE19 DE19 DE19 DE19		
Overrides: Point Type PC PT PI PI PC	Point Name 569 308 DE10238 DE10243 DE10244	Reference Alignment DE31 DE19 DE19 DE19 DE19 DE19		
Overrides: Point Type PC PT PI PI PC PT	Point Name 569 308 DE10238 DE10243 DE10244 DE10245	Reference Alignment DE31 DE19 DE19 DE19 DE19 DE19 DE19 DE19		
Overrides: Point Type PC PT PI PI PC PT PI	Point Name 569 308 DE10238 DE10243 DE10244 DE10245 DE10246	Reference Alignment DE31 DE19 DE19 DE19 DE19 DE19 DE19 DE19 DE1		
Overrides: Point Type PC PT PI PC PT PT PI PC	Point Name 569 308 DE10238 DE10243 DE10244 DE10245 DE10245 DE10246 DE10247	Reference Alignment DE31 DE19 DE19 DE19 DE19 DE19 DE19 DE19 DE31 DE31		

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## **Add Fixed Horizontal Element**

- Add lines, circular arcs and transitions from a single dialog
  - Radii of 0 is a line
  - Equal non-zero radii is a circular arc
  - Unequal radii is a clothoid

A A	dd Fixed H	orizontal Element		
- Poir	nt 1 Name:			Apply
	Northing:	1360189.238	+	Close
	Easting:	1959176.438		Undo
	Direction:	N 65^32'50.0" E	+	Help
	Radius:	1000.000	+	
Poi	nt 2			
	Name:			
	Northing:	0.000	+	
	Easting:	0.000		
	Direction:	N 0^00'00.0" E	+	
	Radius:	500.000	+	
<b>V</b>	Length:	200.000	+	
	Delta:	0^00'00.0''	+	



## **And Finally**

• Always working with customers to continually improve the product!



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