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1. Vertical Geometry Commands

A. Vertical Geometry Main



i.

Ħ

Open Profile Model

- Opens a dynamic view of the selected element in profile.
- Enables the use of the Vertical Geometry Tools on the selected • feature
- Vertical exaggeration can be set •
- In order to see the existing ground, the existing ground terrain • model must be set active

🔄 🚰 🌐 👭 🖘 😂 🥓 🍕 🏏 占	⊨ @ ×
Open Profile Model On the Context Sensitive Menu	View Number: 2 - Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q
	5 10 59 20 50 58 100

🔀 Settings	
Job: 875 Q	K Value Table: Kvalues_1990english.kvl)
Operator Code: MC PGL Chain: P24 Location and Scales Horizontal Scale: 100.000000 Vertical Scale: 10.000000 Vertical Scale: 10.000000 Reference Station: 310+04.10 Reference Elevation: 2850.000000 X 4623.377005 Y: 1635998.8354	Station Off ▼ Elevation: Off ▼ << Insert Dynamic Delete Insert >>
Profile Cell Draw Cell at XY Identify Cell OK Cancel	

Criteria Profile Generator



ii.

Set Profile Active

Designates which profile element is used in the creation of the 3D
 element





iii.

Profile From Surface

- Generates a profile by draping the horizontal alignment onto a surface (terrain model, mesh, or mesh solid)
- Can be used on multiple elements at a time



iv. <u>Project Profile To Element</u>

• Shows an element's profile in the Profile View of another element



F



٧.

Project Profile Range To Element

• Shows part of an element's profile in the Profile View of another element



μ

vi.

Profile Intersection Point

- Constructs a graphic point in an element's profile view at the station and elevation of a crossing element
- If the crossing element does not have an active profile, the point will be placed at elevation 0



Exercise 1: Draping Utilities For Cross Section Annotation

- 1. Start OpenRoads using the Enhanced Workspace
- 2. Open file 4855001RDEFF001.dgn



- 3. Select all elements
- 4. Select the MicroStation Drop Element command to drop any complex chains.



5. Check the Complex box. (When complex survey chains are featurized, they connect lines that shouldn't be connected.)

🚯 Drop Element	
 ✓ Complex ○ Dimensions ○ Line Strings/Sh 	To Geometry ▼ apes
Multi-lines <u>Shared Cells</u> <u>T</u> ext	To Geometry
Application Eler	nents

- 6. Data point to accept
- 7. Open the Select By Attributes command: Edit > Select By Attributes

Select By Attributes			x
Loois Settings		T	
Levels		Types	
Name	*	Arc	-
Default	=	B-spline	
E_Barrier_Fence_Fence		B-spline Surface	
E_Barrier_Fence_Gate		Cell	Ξ
E_Barrier_Rail_Guardrail		Complex Shape	
E_Barrier_Rail_JerseyRail		Complex Chain	
E_Drainage_Culvert_Culver		Cone	
E_Drainage_Culvert_Culver		Curve	
E_Drainage_Imigation_Imiga		Dimension	
E_Drainage_Water_InletR		Ellipse	
	T	Line	
< <u> </u>		Line String	-
Symbology <u>Color:</u> 4 Style: E_BARRIER_G <u>W</u> eight: (1) B <u>Execute</u> Pr	- - - - -	Mode Inclusive Selection On Tags	

8. Select level E_Barrier_Fence_Fence



9. Click Execute



10. Select Set Feature Definition



11. Select *MDT_Survey* > *Barriers* > *EFL_Fence*



12. Data point to accept the selected elements.



13. Repeat for the remaining levels using the following feature definitions:

LEVEL	FEATURE DEFINITION
E_Barrier_Fence_Gate	EFL_GATE
E_Barrier_Rail_Guardrail	EFL_GRRL
E_Barrier_Rail_JerseyRail	EFL_JRRL
E_Drainage_Culvert_CulvertInvert	EFL_CULVI
E_Utility_Communication_CableTVOverhead	EFL_TVX
E_Utility_Communication_FiberOpticCableUnderground	EFL_FIBERU
E_Utility_Communication_TelephoneOverhead	EFL_TELX
E_Utility_Communication_TelephoneUnderground	EFL_TELU
E_Utility_Drainage_SanitarySewer	EFL_SANSEW
E_Utility_Drainage_StormDrain	EFL_STRMDR
E_Gas_GasUndeground	EFL_GAS
E_Utility_Power_PowerOverhead	EFL_PWRX
E_Utility_Power_PowerUnderground	EFL_PWRU
E_Utility_Water_WaterUnderground	EFL_WATER

14. Using the Element Selection dialog, select all levels in the file

15. Select Profile From Surface from the Vertical Geometry tools



- 16. Data point to accept the 128 objects
- 17. Select terrain 4855001RDDTME01
- 18. Set Point Selection to All
- 19. Leave Profile Adjustment set to None
- 20. Set Draping Option to Triangles
- 21. Lock Horizontal and Vertical Offsets to 0



- 22. Element Template will default to None and Name will be blank
- 23. Data point through the prompts. Once the Vertical Offset value is accepted, the profiles will be created
- 24. Open the Default-3D model

Pr Name	Model
Default	Default
er 🗗 Default-3D Views	Default-3D
ED Default-3D Views	- 🔁 12345678 🔆



25. Profiles were created anywhere the linestrings were within the terrain boundaries.

These featurized, 3D linestrings will create cross section annotation cells automatically when OpenRoads cross sections are run.

B. Vertical Geometry Line



* Vertical Geometry Line tools are similar to the <u>Horizontal Geometry Line</u> tools and fundamentally work the same.

7

i.

Profile Line Between Points Constructs a line between user-defined points

ii. Profile Line To/From Element



🚯 Tangent Profile	e Li 🗆 🗉 💌 🗙
Slope	-3.23%
Trim/Extend	None 💌
Feature	^
Name	
Element Template	•

🚯 Tangent Profile	e Li	x
Length	1614.660	
Trim/Extend	None	
Feature		^
Name		
Element Template		•

Vertical Geo	metr	· 🖾
	~	
	\sim	1 Tangent Profile Line From Element
	~	2 Profile Line From Element
	_	Open as ToolBox
-		

N.

iii.

Profile Line Between Elements

Constructs a line between two previously created curves



Exercise 2: Offset Bridge Profile

- 1. Start OpenRoads using the Enhanced Workspace
- 2. Open file 8875000RDALN001.dgn
- 3. Turn off Drawing Scale (Annotation + Modeling = Bad)



4. Turn off <u>MicroStation</u> AccuDraw & Toggle on <u>Civil</u> AccuDraw (MicroStation AccuDraw + Civil AccuDraw = Bad)





5. Import Alignment P24 from JOB875.GPK without the profile



Import Geometry
Image: Struc_WallBottom Image: Struc_WallBottom
Create Civil Rules
Import Cancel

6. Open the Multi-Model View Group so you can see plan and profile side-by-side



7. Select the Open Profile Model command



8. Select alignment P24 and data point in View 2



9. Set terrain model 8875000DIDTM001 active to see the existing ground profile



*Terrain model can be set active even though it is in reference file 8875000RDETR001.dgn



The new bridge needs to be at minimum of 1.5' higher than the existing bridge, with a downgrade between 1.0 - 2.0%.

10. Select the Profile Line Between Points command to create the proposed bridge profile using Civil AccuDraw



11. Activate View 2



12. Select dZ (change in elevation) from the Civil AccuDraw Toolbar



13. In the plan view, hover the mouse over the alignment intersection with the left centerline of bearing. Type <Enter> to lock 337+48.50 in the Station input. Do <u>not</u> data point.



14. Turn off snaps (This will avoid the nuisance of having the profile line creating snaps where the user doesn't want them.)

15. In the profile view type 'o'. (dZ input box must be active.) Then place crosshairs at the intersection with existing ground. (Snaps don't work, but you can get close by zooming in.) Data point to accept.



16. Type 1.5 in the dZ input and hit <Enter> to lock the value. Data point.

- 17. Turn snaps back on.
- 18. In plan view, hover the mouse over the right centerline of bearing intersection. Hit <Enter> to lock Station 339+09.00



- **19. Turn off snaps.** (Again, this will avoid the nuisance of having the profile line creating snaps where the user doesn't want them.)
- 20. In the profile view type 'O'. (dZ input box must be active.) Then place crosshairs at the intersection with existing ground. (Snaps do not work, but you can get close by zooming in.) Data point to accept.
- 21. Type 1.5 in the dZ input and hit <Enter> to lock the value. Data point.



If the line moves: rules are removed.

22. Close the file

C. Vertical Geometry Curves



* Vertical Geometry Curve tools are similar to the <u>Horizontal Geometry Curve</u> tools and fundamentally work the same.

ile <u>T</u> ools							
	VPI 1			VPI 2		VPI	3
Station:	327+50.82		Station:	329+59.08	Off 🔻	Station: 336	+35.95
Elevation:	2911.79		Elevation:	2910.99	Off ▼	Elevation: 289	0.69
ack Grade:	-0.3804	Off	(head)	Delete		Fwd Grade: -3.0	000 Off
Length:	208.26				insent >>	Length: 676	.87
			Symm	netrical Vertical Curve	-		
		Speed	: 45 🔻	L:	325.00		
Station:	327+96.58	HP Station	: 327+96.58	K:	124.0663	Station	: 331+21.58
Elevation:	2911.61	HP Elevation	: 2911.61	SSD:	574.40	Elevation	: 2906.12

Criteria Vertical Curve Design

_

i.

Profile Curve Between Points

Constructs a curve between user-defined points

ii. Profile Curve To/From Element



🚯 Parabola From Element		x	Vertical Geo	metr	🖾
Vertical Curve Parameter	136.000			æ,	
Length	350.000			æ	1 Parabola From Element 🗡
Trim/Extend	Back	•		⁄⇒	2 Circular Curve From Element
Feature		^		∕-	3 Profile Curve From Element
Name				=	Open as ToolBox
Element Template		•	-		

iii. <u>Profile Curve Between Elements</u>

Constructs a curve between two previously created elements





1. **Parabola Between Elements** – Constructs a parabola between two elements

🚯 Parabola Between Elemen	ts 🗆 🗆 🗙
 Vertical Curve Parameter Length 	6.273 600.000
Trim/Extend	Both 💌
Feature	^
Name	
Element Template	



2. **Asymmetric Parabola** – Constructs an asymmetric parabola between two elements

🚯 Asymmetric Para 🗖 🗖 💌					
Length 1	500.000				
Length 2	1000.000				
Trim/Extend	None 💌				
Feature	~				
Name					
Element Template	•				

D. Vertical Geometry Complex





i. <u>Profile Complex By Element</u>

Constructs a complex vertical alignment from previously placed elements

🚯 Create Comple	ex Element
Method	Manual 🗨
Maximum Gap	Manual Automatic
Feature	*
Feature Definition	HA DESIGN CENTER LINE
Name	Proposed

- 3. <u>Manual</u>
 - a. Select elements in order one at a time
 - b. Note directional arrow when selecting
 - c. Once all elements are selected data point in a blank area to accept
- 4. Automatic
 - a. Select the first element with the directional arrow in the desired direction
 - b. Complex will be highlighted. Data point in a blank area to accept

*This tool is similar to the <u>Horizontal Geometry Complex By Element</u> tool and fundamentally works the same.



 \aleph

ii. <u>Profile Complex By VPI</u>

Constructs a complex vertical alignment defined by vertical points of intersection (VPI)

- Curves can include transitions
- Zero radius curves can be used to create angle points

*This tool is similar to the <u>Horizontal Geometry Complex By PI</u> tool and fundamentally works the same.

2

iii. Profile Insert Curve

Inserts a vertical curve into a vertical alignment

- Works similar to the MicroStation Modify > Insert Vertex tool
- Rules
 - c. Length
 - d. Vertical Curve
 - Parameter
 - e. Slope In
 - f. Slope Out



*This tool is similar to the <u>Horizontal Geometry Horizontal Insert Fillet</u> tool and fundamentally works the same.



iv. Append Profile Element

Adds elements to the end of an existing complex element

 In order for the tool to work properly, additional elements must be added <u>at the end</u> of the established complex element

*This tool is similar to the <u>Horizontal Geometry Append Element</u> tool and fundamentally works the same.

v. Profile Offset Transition

Constructs a profile element at an offset from a base profile element

• Base element may be a line, vertical curve, or complex element

·	Profile Offset Placement Method Offset:	Single Offset	Same Options as the Horizontal Offsets & Tapers Toolset
	Mirror	Offset And Ratio	
	Distance	*	
	Lock To Start		
For Partial	Start Distance	0.000	
Olisets	Lock To End		
	End Distance	0.000	
	Length	0.000	

*This tool is similar to the <u>Horizontal Geometry Offsets & Tapers</u> toolset and fundamentally works the same.

Exercise 3: Creating a Complex Vertical Alignment

- 1. Start OpenRoads using the Enhanced Workspace
- 2. Open file 8875000RDALN002.dgn
- 3. Make sure Snaps are toggled on



4. Activate the profile view by data pointing in it

5. Select the Parabola From Element command to create a vertical curve from the already-drawn bridge profile. (Using 'From Element' is a good way to avoid having the vertical curve encroach on the bridge.)



6. Select the existing line segment as the Reference Profile



7. Snap to the left end point as the Start Point.



8. Set Vertical Curve Parameter to 136, and Length to 350.



- 9. Set Trim/Extend to Back (This would trim the 'from' element if the start point weren't starting the end point of the line segment)
- 10. Data point to accept
- 11. Select the Profile Line Between Points command to create a tangent back from the new vertical curve



12. Select the left end of the previously created parabola as a start point



13. Use the <Right> arrow key to change the input prompt to Slope. Type -3.91 (from Step 7) and lock



14. Using the length dynamic label, data point to end the line with an approximate length of 100'



15. Select the Parabola Between Elements command



16. Select the first tangent and the tangent just created. Set Vertical Curve Parameter to 136



- 17. Data point to accept the lower quadrant solution
- 18. Data point to accept Trim/Extend:Both
- 19. Click on the parabola and change the length to 500



20. Select the Parabola Between Elements command to create a vertical curve between the bridge profile and the last tangent



21. Select the last two tangent sections. Set Vertical Curve Parameter to 136



- 22. Data point to accept the upper quadrant solution
- 23. Data point to accept Trim/Extend:Both

24. Click on the parabola and change the length to 200 (round to an even increment)



- 25. Select the Profile Complex By Element command
- **26.** Set Method to Automatic
- **27.** Name the profile P24
- **28. Set Element Template to** MDT Roadway\Profile\Profiles\VP DESIGN CENTERLINE

S Complex Eleme	ent		
Method	Automatic		
Maximum Gap	0.033]
Feature		*	
Name	P24		
Element Template	MDT Roadway\Profile	\Profiles\VP DESIGN CENTERLINE	

29. Select the first segment. The rest will auto-select





31. Apply the Rural 2-Lane, 60 MPH design standard to the profile

 (Rural 2-Lane) (MDT Super Elevation Design Standards 201	
30 MPH (MDT Super Elevation Design Standards 2018	
35 MPH (MDT Super Elevation Design Standards 2018	
40 MPH (MDT Super Elevation Design Standards 2018	
45 MPH (MDT Super Elevation Design Standards 2018	
50 MPH (MDT Super Elevation Design Standards 2018	MDT Super Elevation
55 MPH (MDT Super Elevation Design Standards 2018	
60 MPH (MDT Super Elevation Design Standards 2018	Set Design Standard
- 70 MPH (MDT Super Elevation Design Standards 2018	Set Design Standard

32. Open the Civil Message Center to check for errors

	3	
Civil Message	Center	
Hide All 🛛 🖊	50 MicroStation	rror 🔒 4 Warnings 👔 0 Messages
Comonic	Mooogo	Bocolption
S Error	Crest is less than minimum	Design Standard Value = 151.000 Actual Value = 143.101

33. Click on the vertical alignment and change the Vertical Curve Parameter to 151





34. Round the curve length from 527 up to 550 (Round to an even increment)

35. Close the file

E. Define Element Profiles





- i. <u>Quick Profile Transition</u> Defines an element's profile by matching the slope and elevation of adjoining elements
 - Adjoining elements must have an active profile
 - Transition can be a linear or parabolic curve

Profile created for this element based on the adjacent profiles



Approach and Mainline Corridor Template Edge of Pavement Breaklines

Quick Profile Transition					
Quick Transition Method					
Feature	Parabolic				
Name					
Element Template	None 💌				



ii.

- Profile By Constant Elevation Defines a flat profile at a given elevation
 - Creates civil rules that can be edited in the Profile View
 - Profiles for multiple elements can be created with one command
 - Cannot apply different elevations in one command

• Defines the <u>entire</u> element





iii. <u>Profile By Slope From Element</u> – Defines the profile of an element by projecting a fixed slope from another element with an active profile

- Multiple element profiles can be defined at once as long as they utilize the same parameters (Ex. Front and Back of Sidewalk based on Top Back of Curb @ 1.50%)
- Defines the <u>entire</u> element

Profile By Slope Fro	m 🖵 🗖 🗙	
Point Selection	Al	
Profile Adjustment	None 💌	Constant
Vertical Offset	0.00	Slope
Slope	10.00%	
Feature	*	
Name		
Element Template	None 💌	

- Profile is a locked civil element with no manipulators
- Parameters can be edited in the Element Information dialog

Element Information		-	ÞΧ
E···· ► Selection E···· ► Profile: Type:	Projected S	Slope - CURB_	2
Projection	Туре		
General			*
Extended	Extended 🗸		
Geometry 😽			*
Feature			*
Profile By Projec	ting Linl	nt3d Si	^
Slope Vertical Offset Profile Adjustment Point Selection On D	10.00% 0.00 None All		



iv. <u>Profile By Variable Slope From Element</u> – Defines the profile of an element based on slope(s) and range

Slope Style Slope Relative To Ta	arge Constant Linear	Multiple Slo
End Slope	Reverse Cubic Extension	Methods
Vertical Offset	0.45	
Range	^	
Lock To Start		
Start Distance	50.00	Danga
Lock To End		Range
End Distance	500.00	
Feature	~	
Name		
Element Template	None	



v. <u>Profile By Vertical Offset From Element</u> – Defines the profile of an element based on a vertical offset from another element with an active profile

 Results are similar to the <u>Profile By Variable Slope</u> tool, except that this tool employs offset transitions instead of slope transitions

ffset To 😐 😐 🗙
Linear 🗨
0.45
0.03
~
204.93
210.86

- Profile is a locked civil element, only the offset parameter can be edited in the Profile View
- Parameters can be edited in the Element Information dialog



Exercise 4: Approach Radii (Quick Profile Transitions)

Create Mainline Geometry

- 1. Start OpenRoads using the Enhanced Workspace
- 2. Open file 8875000RDALN003.dgn



- 3. Set the Active Feature Definition to Road_EdgeOfPavement and toggle on Use Active Feature Definition
- 4. Select the horizontal Single Offset Partial command to create the P24 (mainline) edges of pavement



5. Select alignment P24



6. Check the Lock To End box

🚯 Si	ingle Offset Pa	artial 😐 🗆 X
	Offset:	0.000
	Mirror	
	Distance	~
	Lock To Start	
7	Start Distance	334+00.65 R1
	Lock To End	
1	End Distance	344+72.65 R1
	Length	1072.001
	Feature	~
Feat	ure Definition	Road_EdgeOfPavemer
Nam	e	RdEOP

7. Set Offset to -16.0

Start Pa	rameters -	<alt> Lock T</alt>
Offset:	-16.000	

8. Set Start Distance to 334+00.65



- 9. Data point to accept
- 10. Data point to accept the End Distance
- 11. Set the Mirror option to No

Mirror		
Mirror	No	-

12. Data Point to accept

_	 		

13. Select the vertical Profile By Slope From Element command to create a profile based on normal crown cross slope



14. Select the left edge of pavement as the object to profile



- 15. Select the centerline alignment as the reference element. Then reset to accept
- **16.** Set the slope to 2.00%
- 17. Point Selection = All, Profile Adjustment = None, Vertical Offset = 0

Profile By Slope Fro	m 🗆 🗆 🖾
Point Selection	Al
Profile Adjustment	None 💌
Vertical Offset	0.000
Slope	2.00%
Feature	~
Name	
Element Template	None

18. Data point through the prompts to accept

19. Open the profile view of the left edge of pavement alignment in View 2





20. Select the Project Profile to Element command to compare the P24 profile to the profile-by-slope



21. Project the P24 profile onto the left edge of pavement



22. Select the edge of pavement profile open the Element Properties

23. Change the projected slope to -2.00% in its properties

Profile By Projecting Line	nt3d Simple Slope Rule
Slope	-2.00% 👞
Vertical Offset	0.000
Profile Adjustment	None
Point Selection On Depending	All

Create Cross Road Geometry

1. Select the horizontal Single Offset Partial command to create the county road edges of pavement



2. Select alignment CNTY_223



- 3. Set Start Distance to 16.0
- 4. Check the Lock To End box
- 5. Set Offset to 12.0

Start Pa	rameters -	<alt></alt>	Loc	kТ
Offset:	12.000		₿	•

- 6. Data point to accept
- 7. Data point to accept the End Distance
- 8. Set the Mirror option to Yes

Mirror		
Mirror	Yes	-

9. Data Point to accept



10. Select the vertical Profile By Slope From Element command to create profiles based on normal crown cross slope

⊺ 止 ≛ 🖾 🗖	🖻 🖻 党 🏏	
🍋 Terrain Model	Profile By Slope From Element	l

11. Select the left and right edge of pavement as the objects to profile



- 12. Select the CNTY_223 centerline alignment as the reference element
- **13.** Set the slope to -2.00%

🚯 Profile By Slope From 🗖 🖻 🔀	
Point Selection	All
Profile Adjustment	None
Vertical Offset	0.000
Slope	2.00%
Feature	^
Name	
Element Template	None

14. Point Selection = All, Profile Adjustment = None, Vertical Offset = 0

15. Data point through the prompts to accept



Create Approach Radii

1. Select the horizontal Arc Between Elements command to create the approach radii



2. Select the CNTY_223 left edge of pavement as the first element



3. Select the P24 left edge of pavement as the second element

4. Set all Taper and Transition options to None

Back Taper		*
Method	None	-
Back Transition		*
Туре	None	-
Ahead Tape	er	^
Method	None	-
Ahead Transition		^
Туре	None	-
Feature		^
Feature Definition	Road_EdgeOfPaveme	en 💌
Name	RdEOP	

5. Set the radius to 25



- 6. Select the top left Construction Sector
- 7. Set the Trim/Extend option to Back



8. Data point to accept



9. Repeat steps 1-8 using the CNTY_223 right edge of pavement



10. Open the Profile View of the left radius

11. Select the vertical Profile Intersection Point **command to place graphical** intersection points of the approach and mainline edge of pavement profiles



12. Select the left radii as the element to show intersection



13. Select both the P24 left edge of pavement and the CNTY_223 left edge of pavement as intersecting elements



Note: This is for visualization purposes only.

- 14. Reset to accept
- **15.** Select the vertical Quick Profile Transition command to create the radii profiles based on the adjacent edge of pavement profiles



16. Set Quick Transition Method to Linear



17. Select the left radius



18. Repeat steps 16-18 for the right radius



Note: The profiles are different because of the downgrade of the mainline adjacent to the approach.

20. Open the Default-3D model. There is an error in the CNTY_223 profile. It is not intersecting the edge of pavement



21. Return to the Multi-Model View

Name	Model
🔁 Default	Default
🔁 Default-3D Views	Default-3D
🖆 Multi-Model Views	
Default-3D Views	- 🔁 12345678

- 22. Open the CNTY_223 Profile View in View 2
- 23. Open View 3, set to the 3D model and zoom in to the approach geometry

View 3, Default	
🔁 🕶 🔅 🗸 🛔 🍳 🍳	8 🕀 😏 🕙 🖂 🕂
View Number: 3 👻 🖳 🖏	
Presentation	#≡ ^
Display Style: 🛷 Wireframe	- Q
😂 ACS Triad	Fast Cells
Background	😑 Fill
Boundary Display	I Grid
Camera	输 Level Overrides
Clip Back	Eine Styles
√ Clip Front	Line Weights
🕵 Clip Volume	🕥 Markers 👻
Constructions	Patterns
Default Lighting	🔯 Tags
H Dimensions	A Text
💴 Data Fields	l _∲ Text Nodes
Displayset	O Transparency
Global Brightness: 👾 ∢	÷ 4
🔄 View Setup	*
Saved Views: Select	- E - Q
Models: Model	Name
Defaul	t
🖸 🔍 Defaul	t-3D

- 24. Select the Profile Intersection Point command to find the intersection point with the edge of pavement
- **25.** *Project the* P24 *left edge of pavement intersection point onto the* CNTY_223 *profile*



26. Click on the CNTY_223 profile and move the first point to intersect with the projected intersection point



27. Zoom in to the first line segment and change the slope to -1.5%



Exercise 5: Offset Profiles

- 1. Start OpenRoads using the Enhanced Workspace
- 2. Open file 4855001RDALN001.dgn
- 3. Activate the profile view by data pointing in it. Part of the profile is already constructed



4. Select the Profile By Variable Slope From Element command to create a portion of the SW3 profile base on the CURB3_TBC profile



- 5. Set Slope Style to Constant
- 6. Select plan element SW3 to profile



7. Select plan element CURB3_TBC as the reference element



8. Using snaps, lock the start distance to the PI at the beginning of the sidewalk paralleling the curb



9. Check Lock To End to create a profile for the remainder of SW3

Range	*
Lock To Start	
Start Distance	37+15.16 R1
Lock To End	
End Distance	38+22.32 R1

10. Set Slope to 1.50%

11. Lock Vertical Offset to 0



12. Data point to accept



Profile By Projecting LinEnt3d Slope Rule	
Slope Style	Constant
Start Reference Distance	7+15.16
End Reference Distance	3+19.04
Slope	1.50%
Vertical Offset	0.00
Slope relative to target	False

13. Zoom to the left side of the profile view



14. Select the Profile Intersection Point command to create the intersection point with CURB3_TBC



15. Select the sidewalk centerline as the Element to Show Intersection



16. Select the top back of curb as the Intersecting Element



17. Reset to complete the command



18. Draw a profile line connecting the intersecting point to the next line segment using the Profile Line Between Points command



- **19.** Select the Profile Complex By Elements command to combine all of the element into one profile
- 20. Set the Method to Automatic
- 21. Name the vertical profile SW3. The element template will auto-populate based on the feature definition of the plan element
- 22. Select the first profile element, the rest will auto-select. Data point to accept the profile
- 23. Set profile SW3 active.



- 24. Select the Profile By Slope From Element to create projected profiles for the back of sidewalk alignments
- **25.** Select SWB_3, & SWB_4



26. Reset to accept

27. Select alignment SW3 as the reference element



- 28. Set Slope to 1.50%
- 29. Leave Point Selection set to All, and Profile Adjustment set to None
- 30. Set Vertical Offset to 0
- 31. Leave Name blank and Element Template set to None

- 32. Data point to accept
- 33. Open the profile view of SWB_3



34. Select the Project Profile To Element command to compare the back-of-walk profile to the sidewalk centerline profile



- 35. Select plan element SW3 to project
- **36.** Select plan element SWB_3 as the plan element to project onto
- 37. Zoom in to the profile view



2. Vertical Geometry Reports

File Tools Help
\\mdthq\mdtshares\Helena\CaddStdOR\OPENROADS\en\
CivilGeometry
AlignmentsToLandXML.xsl
HorizontalAlignmentControlLineDataTable xsl
HorizontalAlignmentCurveDataTable xsl
A: Horizontal Alignment Curve Set Review xsl
Horizontal Elements Table Simplified xsl
- A: HorizontalElementsXYZ.xsl
Traverse xsl
TraverseCurveASCIIxsl
TraverseCurveASCII2.xsl
TraverseCurveASCII3.xsl
Traverse EditASCII xsl
TraversePoints.xsl
VerticalAlignmentCheckIntegrity xsl
VerticalAlignmentIntervalStationElevationGrade xsl
Vertical Alignment Interval Station Elevation Grade ASCII xsl
VerticalAlignmentPointsXYxsl
VerticalAlignmentReviewASCIIxsl
VerticalAlignmentReviewXYxsl



