



April 29, 2019

Keith Curtis, PE, CFM
Floodplain Administrator, PPRBD
2880 International Circle
Colorado Springs, CO 80910

Re: Engineer's Certification of No Impact
Case No. :

Dear Mr. Curtis,

This letter serves as Certification of No Impact to the Floodplain for the project entitled "Saddlehorn Ranch – Filing 1." The project is located in the unincorporated El Paso County and involves a proposed rural 2.5 acre lot subdivision.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) shows the project area located on Panel No. 08041C0558G for El Paso County, Colorado dated December 7, 2018. The project area is located along Haegler Ranch Tributary 6 and is within a designated Zone AE Special Flood Hazard Area (SFHA).

JR Engineering has evaluated the effects of the proposed development on the Haegler Ranch floodplain using the effective modeling as a baseline. The HEC-RAS modeling was obtained in PDF format from the "*Sante Fe Springs – Haegler Ranch Drainage Basin Letter of Map Revision (LOMR)*" by Tri-Core Engineering, dated October 20, 2004, from the Federal Emergency Management Agency (FEMA). The effective model is the "*Sante Fe Springs – Haegler DB. – Letter of Map Revision*" prepared for FEMA by Tri-Core Engineering. The effective model was pared down to the stretch between Cross Sections 38 and 42 along Reach H-9 (Haegler Ranch Tributary 4) for purposes of analysis within the context of this project.

JR Engineering utilized the calculated 100-year water surface from the aforementioned model to establish the existing 100-year floodplain. Proposed channel and culvert improvements were modeled utilizing the 100-year flow of 130 cfs established in the "*Sante Fe Springs – Haegler Ranch Drainage Basin Letter of Map Revision (LOMR)*". Cross sections 38, 39, 40, 41, and 42 were modeled using AutoCAD Hydraflow Express, Version 10.5. Cross Section 39.5 aligns with the front of the project's proposed 84" CMP culvert. Therefore, the Federal Highway Authority's HY-8, Version 7.50, was used for modeling the backwater effect to establish an accurate base flood elevation. The computed water surface elevation at each cross section was compared to the effective model to ensure a no rise scenario.

Select results of the analysis are presented in Table 1, on the following page:

Table 1: Base Flood Elevation Comparison

Cross Section	Base Flood Elevation (ft)	
	Ex. 100-Year	Pr. 100-Year
38	6724.2	6720.53
39	6720.67	6715.53
39.5	6715.06	6714.83
40	6710.63	6707.6
41	6702.02	6700.54
42	6693.91	6693.54

Based on the results of the proposed cross section modeling and HY-8 culvert analysis, no increase to either the floodplain width or water surface elevation will result from the proposed site development.

Sincerely,

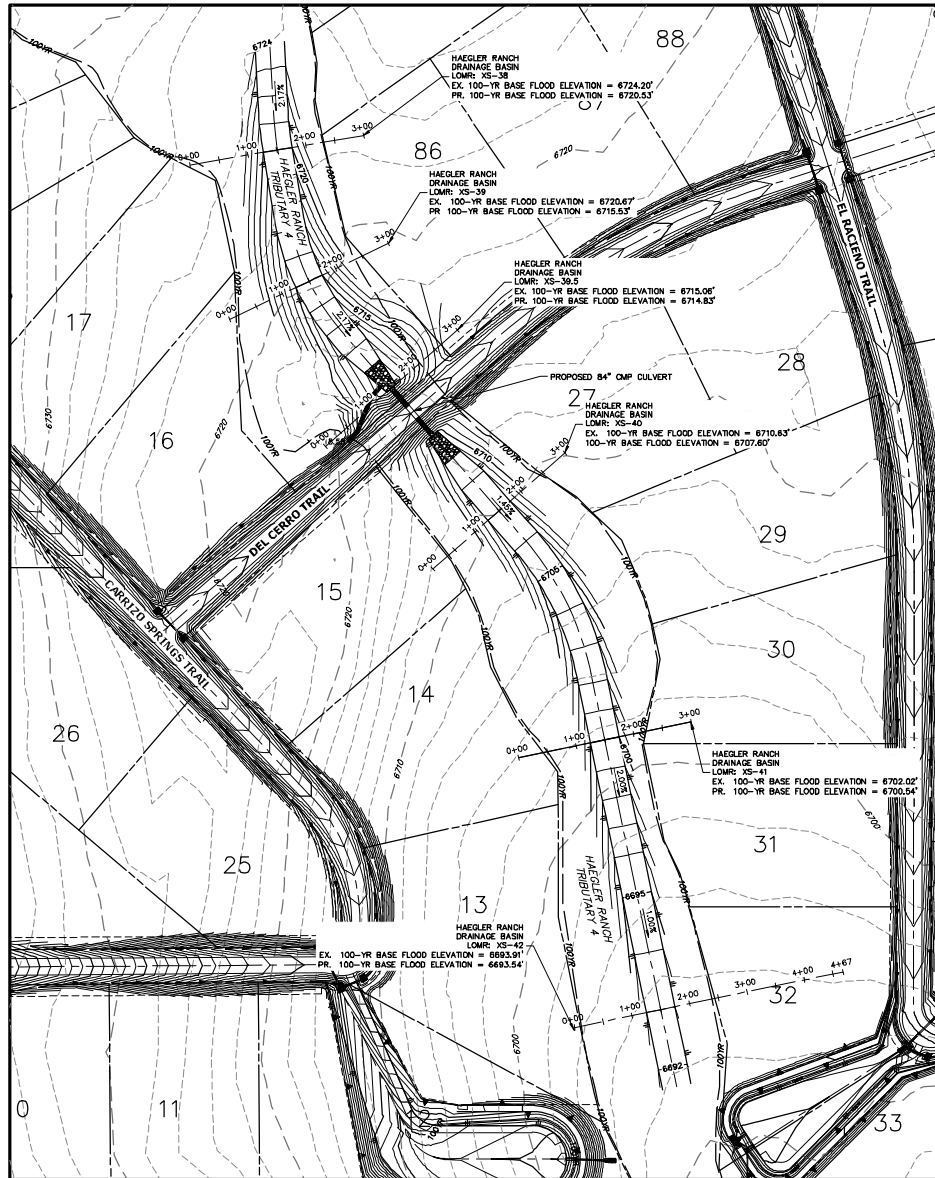
Mike Bramlett PE
Colorado P.E. #32314



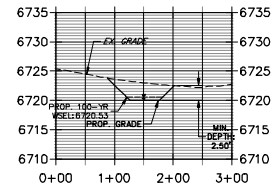
SADDLEHORN RANCH - FILING 1

NO RISE CERTIFICATION

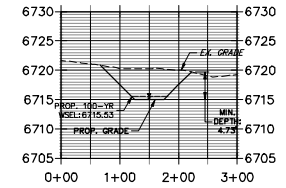
DRAINAGEWAY T-6 CROSS SECTIONS



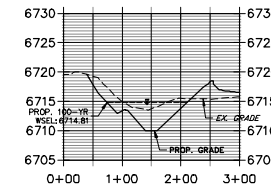
CROSS SECTION 38 PROFILE
STA 0+00.00 TO 3+00.00



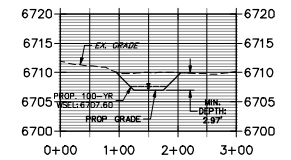
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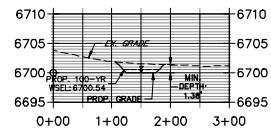
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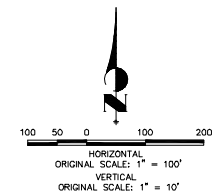
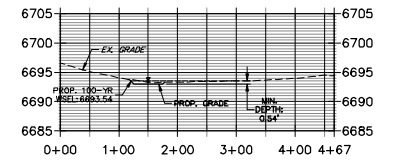
CROSS SECTION 40 PROFILE
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CROSS SECTION 41 PROFILE
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CROSS SECTION 42 PROFILE
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SADDLEHORN RANCH - FILING 1
NO RISE CERTIFICATION
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04/29/19
SHEET 1 OF 1



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HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 100 cfs

Design Flow: 130 cfs

Maximum Flow: 150 cfs

Table 1 - Summary of Culvert Flows at Crossing: Drainageway T6: Onsite Culvert

Headwater Elevation (ft)	Total Discharge (cfs)	Del Cerro Trail Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6714.16	100.00	100.00	0.00	1
6714.27	105.00	105.00	0.00	1
6714.38	110.00	110.00	0.00	1
6714.49	115.00	115.00	0.00	1
6714.60	120.00	120.00	0.00	1
6714.71	125.00	125.00	0.00	1
6714.81	130.00	130.00	0.00	1
6714.92	135.00	135.00	0.00	1
6715.02	140.00	140.00	0.00	1
6715.12	145.00	145.00	0.00	1
6715.22	150.00	150.00	0.00	1
6721.06	409.08	409.08	0.00	Overtopping

Rating Curve Plot for Crossing: Drainageway T6: Onsite Culvert

Total Rating Curve
Crossing: Drainageway T6: Onsite Culvert

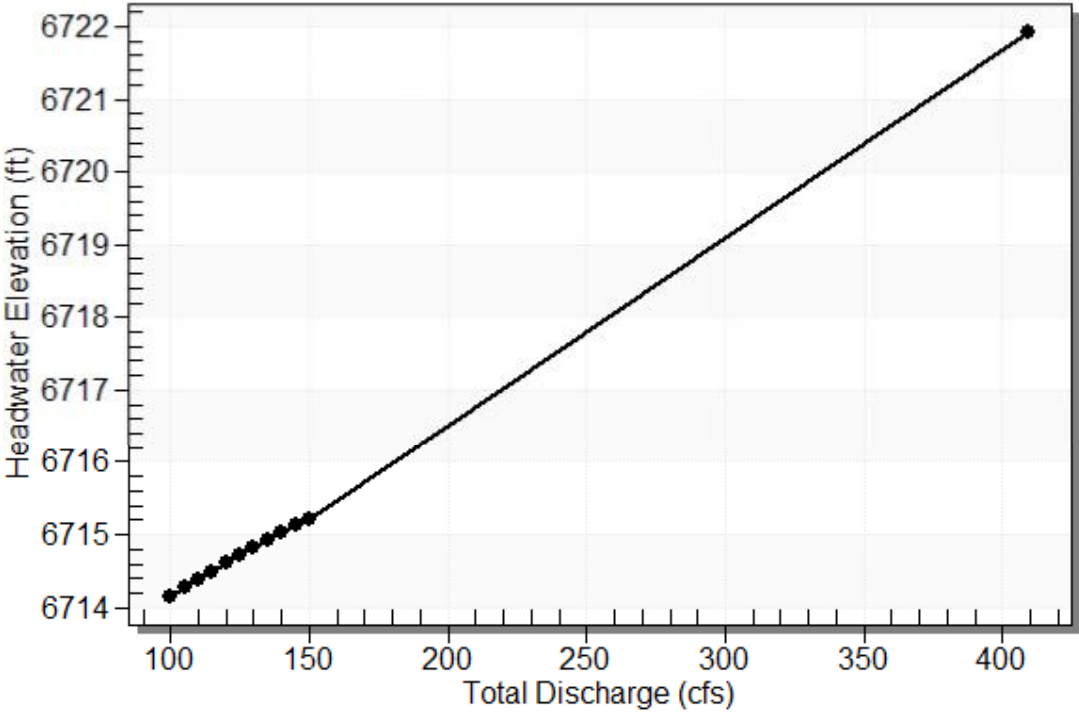


Table 2 - Culvert Summary Table: Del Cerro Trail Culvert

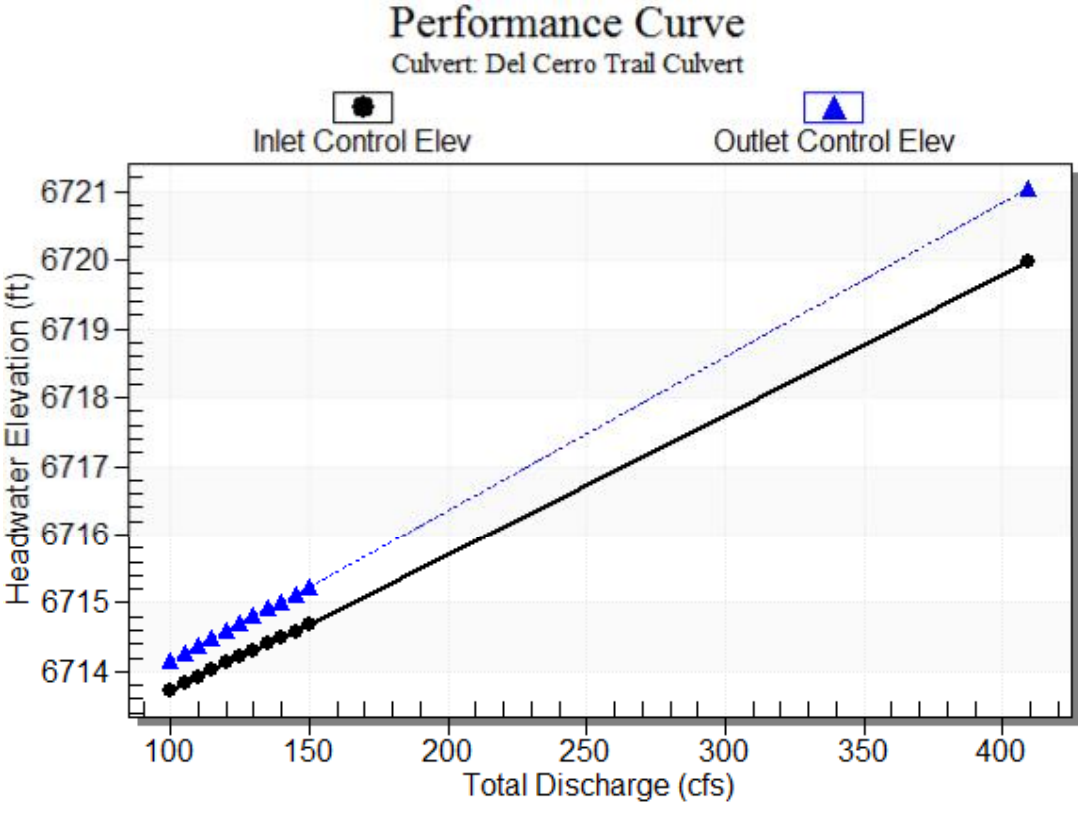
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
100.00	100.00	6714.16	3.719	4.160	2-M2c	3.517	2.564	2.564	1.554	7.830	3.969
105.00	105.00	6714.27	3.823	4.273	2-M2c	3.622	2.631	2.631	1.593	7.942	4.025
110.00	110.00	6714.38	3.925	4.384	2-M2c	3.727	2.696	2.696	1.632	8.051	4.078
115.00	115.00	6714.49	4.025	4.494	2-M2c	3.831	2.756	2.756	1.670	8.172	4.129
120.00	120.00	6714.60	4.123	4.602	2-M2c	3.935	2.819	2.819	1.707	8.272	4.179
125.00	125.00	6714.71	4.218	4.708	2-M2c	4.040	2.881	2.881	1.743	8.372	4.227
130.00	130.00	6714.81	4.312	4.813	2-M2c	4.144	2.941	2.941	1.778	8.470	4.273
135.00	135.00	6714.92	4.404	4.917	2-M2c	4.250	2.998	2.998	1.812	8.577	4.318
140.00	140.00	6715.02	4.495	5.020	2-M2c	4.357	3.057	3.057	1.846	8.668	4.362
145.00	145.00	6715.12	4.584	5.122	2-M2c	4.464	3.115	3.115	1.879	8.759	4.405
150.00	150.00	6715.22	4.672	5.222	2-M2c	4.574	3.172	3.172	1.912	8.850	4.446

Straight Culvert

Inlet Elevation (invert): 6710.00 ft, Outlet Elevation (invert): 6709.46 ft

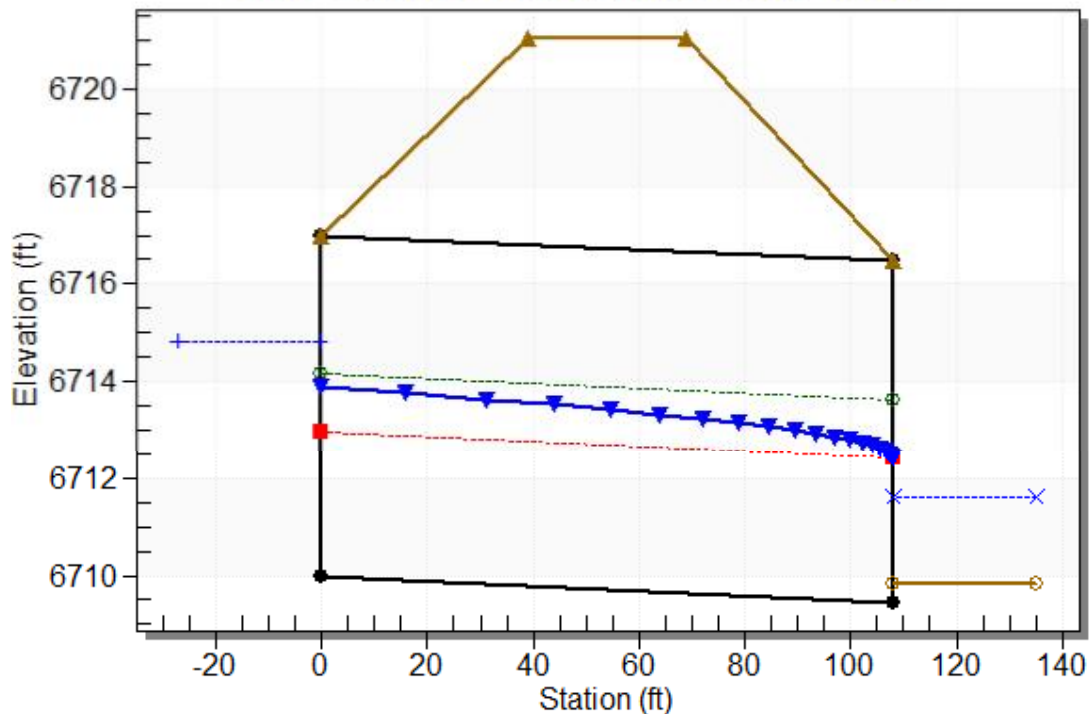
Culvert Length: 108.00 ft, Culvert Slope: 0.0050

Culvert Performance Curve Plot: Del Cerro Trail Culvert



Water Surface Profile Plot for Culvert: Del Cerro Trail Culvert

Crossing - Drainageway T6: Onsite Culvert, Design Discharge - 130.0 cfs
Culvert - Del Cerro Trail Culvert, Culvert Discharge - 130.0 cfs



Site Data - Del Cerro Trail Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6710.00 ft

Outlet Station: 108.00 ft

Outlet Elevation: 6709.46 ft

Number of Barrels: 1

Culvert Data Summary - Del Cerro Trail Culvert

Barrel Shape: Circular

Barrel Diameter: 7.00 ft

Barrel Material: Corrugated Aluminum

Embedment: 0.00 in

Barrel Manning's n: 0.0310

Culvert Type: Straight

Inlet Configuration: Mitered to Conform to Slope

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Drainageway T6: Onsite

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
100.00	6711.38	1.55	3.97	0.97	0.66
105.00	6711.42	1.59	4.02	0.99	0.66
110.00	6711.46	1.63	4.08	1.02	0.66
115.00	6711.50	1.67	4.13	1.04	0.67
120.00	6711.54	1.71	4.18	1.06	0.67
125.00	6711.57	1.74	4.23	1.09	0.67
130.00	6711.61	1.78	4.27	1.11	0.67
135.00	6711.64	1.81	4.32	1.13	0.67
140.00	6711.68	1.85	4.36	1.15	0.68
145.00	6711.71	1.88	4.40	1.17	0.68
150.00	6711.74	1.91	4.45	1.19	0.68

Tailwater Channel Data - Drainageway T6: Onsite Culvert

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 10.00 ft

Side Slope (H:V): 4.00 (1:1)

Channel Slope: 0.0100

Channel Manning's n: 0.0400

Channel Invert Elevation: 6709.83 ft

Roadway Data for Crossing: Drainageway T6: Onsite Culvert

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 163.00 ft

Crest Elevation: 6721.06 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

Channel Report

Cross Section 38 (Q₁₀₀ = 130 cfs)

Trapezoidal

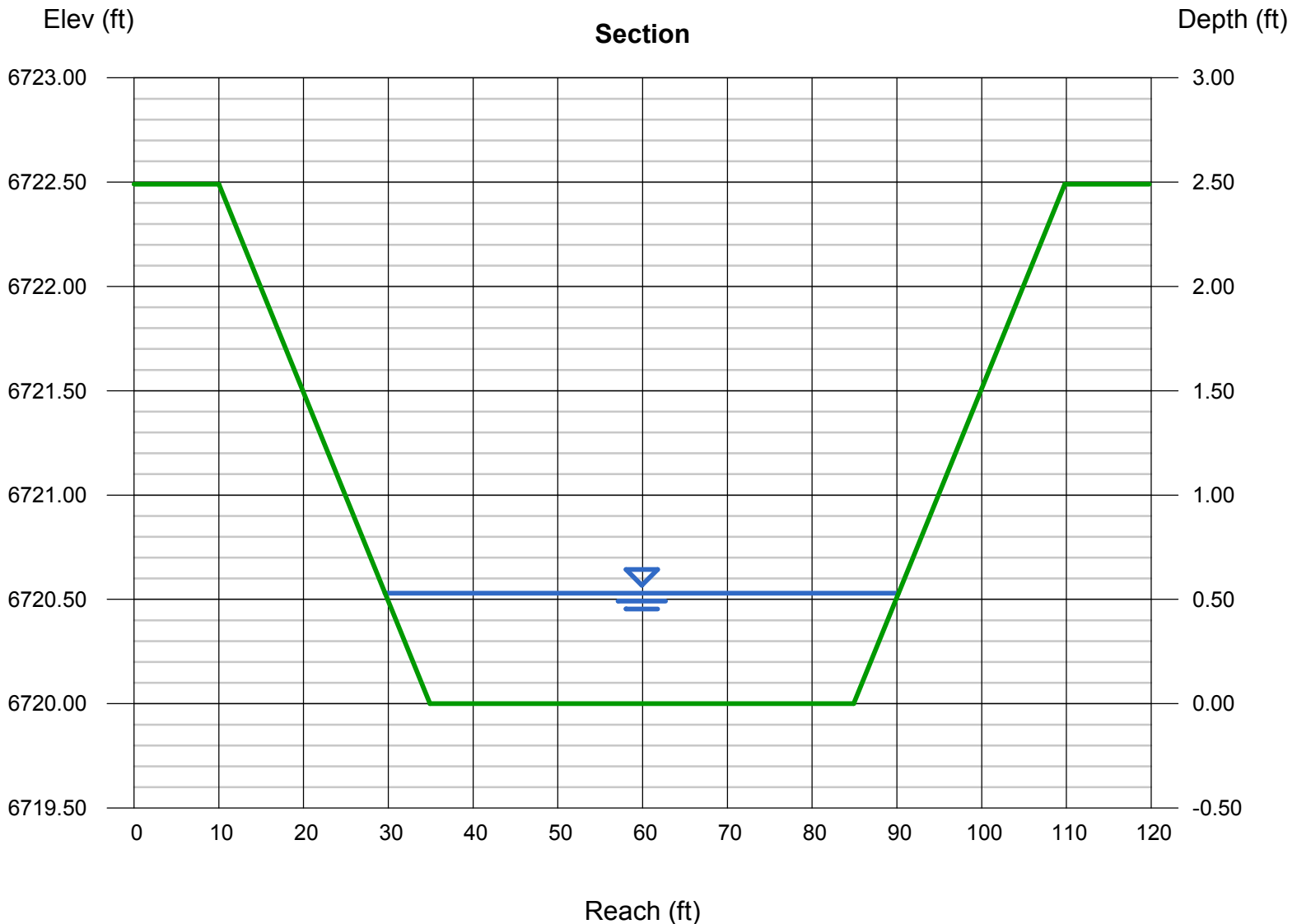
Bottom Width (ft) = 50.00
Side Slopes (z:1) = 10.00, 10.00
Total Depth (ft) = 2.49
Invert Elev (ft) = 6720.00
Slope (%) = 2.16
N-Value = 0.030

Highlighted

Depth (ft) = 0.53
Q (cfs) = 130.00
Area (sqft) = 29.31
Velocity (ft/s) = 4.44
Wetted Perim (ft) = 60.65
Crit Depth, Y_c (ft) = 0.58
Top Width (ft) = 60.60
EGL (ft) = 0.84

Calculations

Compute by: Known Q
Known Q (cfs) = 130.00



Channel Report

Cross Section 39 (Q₁₀₀ = 130 cfs)

Trapezoidal

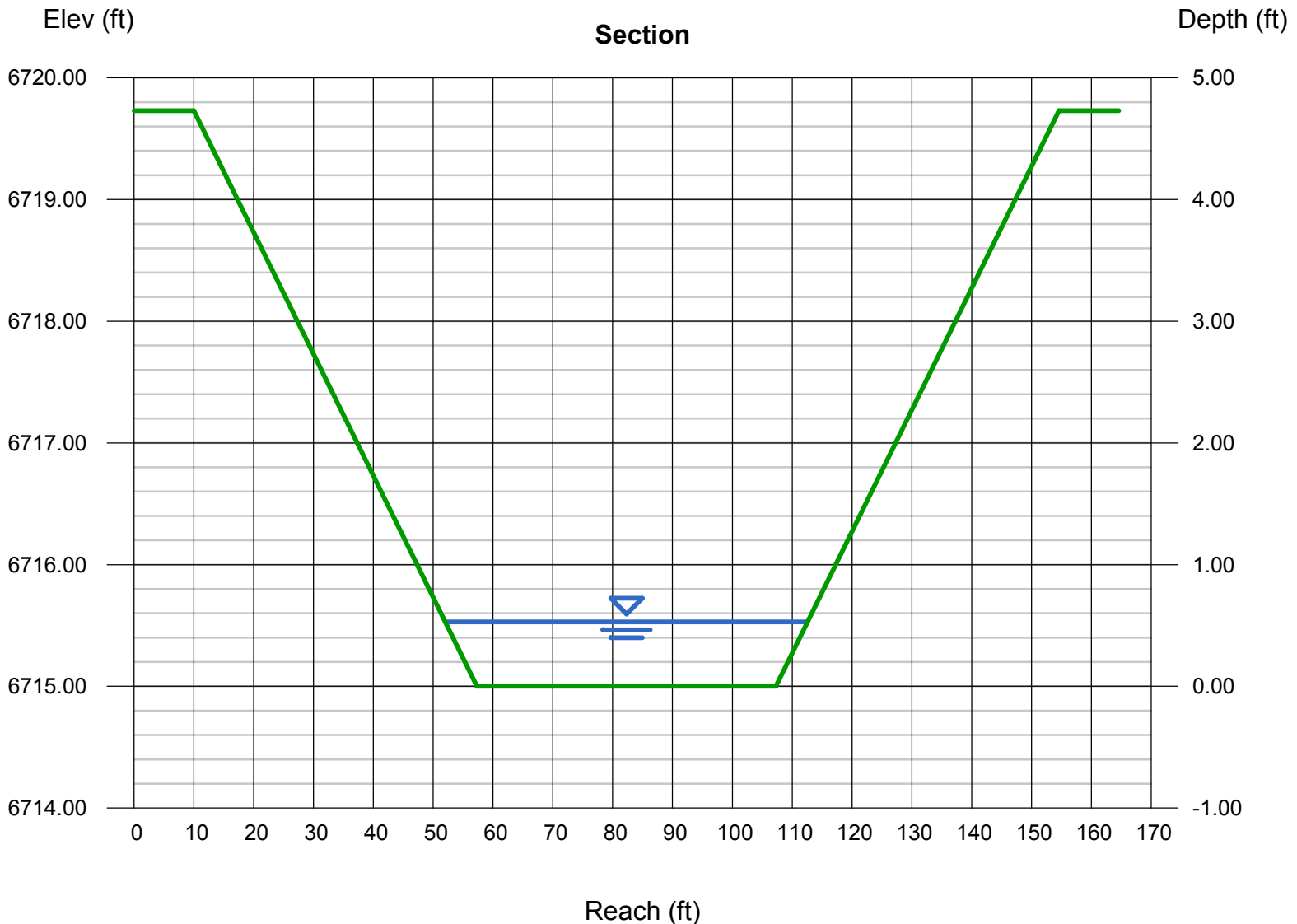
Bottom Width (ft) = 50.00
Side Slopes (z:1) = 10.00, 10.00
Total Depth (ft) = 4.73
Invert Elev (ft) = 6715.00
Slope (%) = 2.16
N-Value = 0.030

Highlighted

Depth (ft) = 0.53
Q (cfs) = 130.00
Area (sqft) = 29.31
Velocity (ft/s) = 4.44
Wetted Perim (ft) = 60.65
Crit Depth, Y_c (ft) = 0.58
Top Width (ft) = 60.60
EGL (ft) = 0.84

Calculations

Compute by: Known Q
Known Q (cfs) = 130.00



Channel Report

Cross Section 40 (Q₁₀₀ = 130 cfs)

Trapezoidal

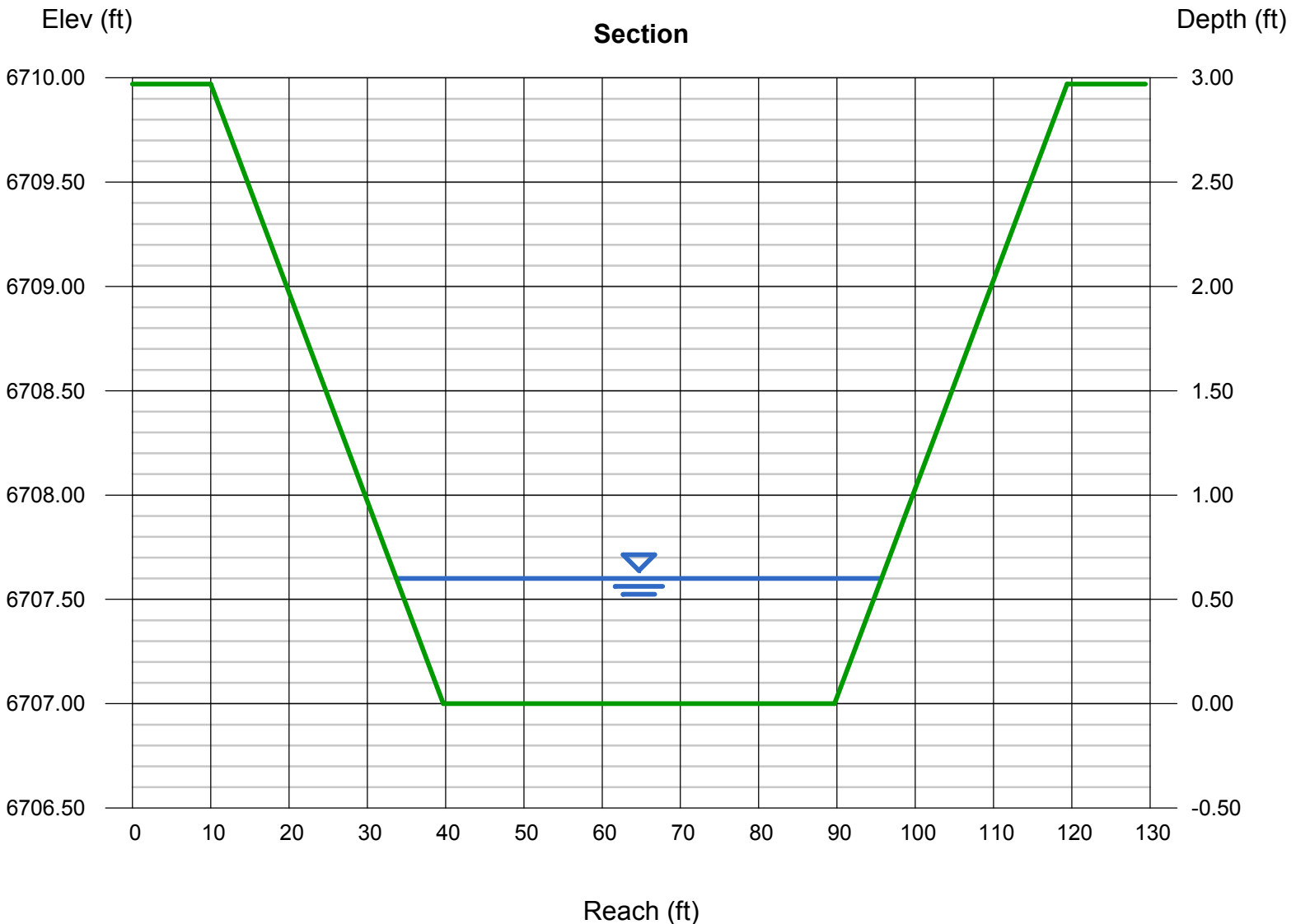
Bottom Width (ft) = 50.00
Side Slopes (z:1) = 10.00, 10.00
Total Depth (ft) = 2.97
Invert Elev (ft) = 6707.00
Slope (%) = 1.45
N-Value = 0.030

Highlighted

Depth (ft) = 0.60
Q (cfs) = 130.00
Area (sqft) = 33.60
Velocity (ft/s) = 3.87
Wetted Perim (ft) = 62.06
Crit Depth, Y_c (ft) = 0.58
Top Width (ft) = 62.00
EGL (ft) = 0.83

Calculations

Compute by: Known Q
Known Q (cfs) = 130.00



Channel Report

Cross Section 41 (Q_100 = 130 cfs)

Trapezoidal

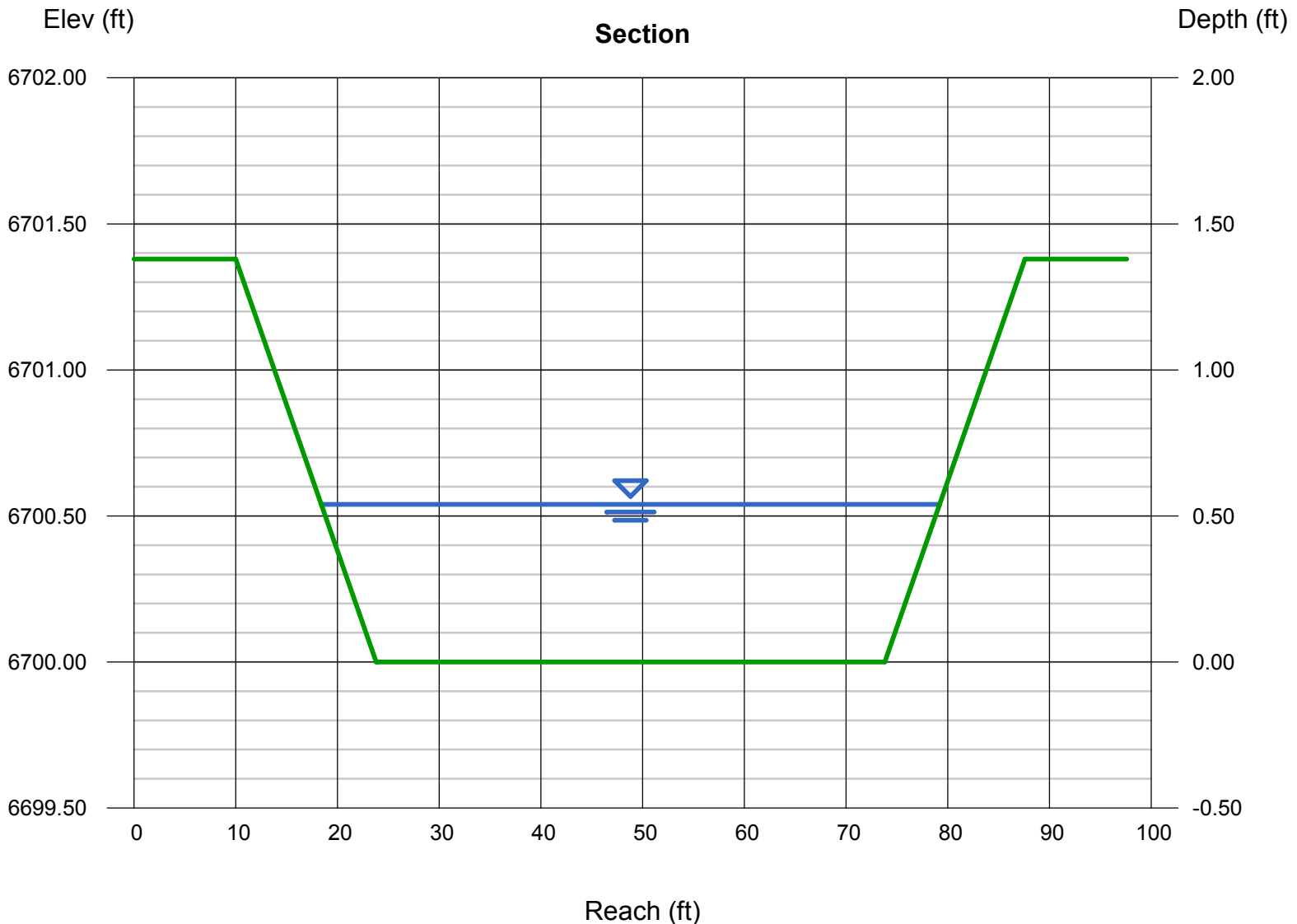
Bottom Width (ft) = 50.00
Side Slopes (z:1) = 10.00, 10.00
Total Depth (ft) = 1.38
Invert Elev (ft) = 6700.00
Slope (%) = 2.00
N-Value = 0.030

Highlighted

Depth (ft) = 0.54
Q (cfs) = 130.00
Area (sqft) = 29.92
Velocity (ft/s) = 4.35
Wetted Perim (ft) = 60.85
Crit Depth, Yc (ft) = 0.58
Top Width (ft) = 60.80
EGL (ft) = 0.83

Calculations

Compute by: Known Q
Known Q (cfs) = 130.00



Channel Report

Cross Section 42 (Q₁₀₀ = 130 cfs)

Trapezoidal

Bottom Width (ft) = 50.00
Side Slopes (z:1) = 10.00, 10.00
Total Depth (ft) = 0.78
Invert Elev (ft) = 6693.00
Slope (%) = 2.00
N-Value = 0.030

Highlighted

Depth (ft) = 0.54
Q (cfs) = 130.00
Area (sqft) = 29.92
Velocity (ft/s) = 4.35
Wetted Perim (ft) = 60.85
Crit Depth, Y_c (ft) = 0.58
Top Width (ft) = 60.80
EGL (ft) = 0.83

Calculations

Compute by: Known Q
Known Q (cfs) = 130.00

