



DAVID E. ARCHER & ASSOCIATES, INC.
PROFESSIONAL LAND SURVEYORS & ENGINEERS

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July 16, 2025
Job No. 20-0420

Designs by Sundown
6875 S Santa Fe Dr.
Littleton, CO 80120

RE: No-Rise Certification for 4480 South Holly Street.

Designs by Sundown,

The purpose of this letter is to demonstrate that the proposed improvements at 4480 S. Holly Street within the Blackmer Gulch floodplain will not cause a rise in the 100-year and 500-year floodplain elevation. This project requires the modification of the existing inlet in the floodplain and excavation along the southern boundary of the site to increase the allowable stormwater volume within the Blackmer Gulch floodplain and floodway. The intent of the project is to direct more flows to the existing inlet while maintaining the existing Base Flood Elevations in the area and improving the water quality.

The Blackmer Gulch Floodplain crosses the southern third of the lot. The floodplain and flood way in this area runs through fully developed residential properties with fencing and landscaping including large trees within the floodway and floodplain. El Camino Drive runs within the floodplain and floodway as well. The floodplain is shown on FIRM Panel 08005C0168K, that became effective 12/17/2010. This area is further detailed in the FIS Report 08005C001-005E.

The FIS profile shows an approximate 10' drop in existing grade just before South Holly Street. It appears that South Holly was raised after the study was completed. A search through the LOMA's in the area did not show any updates in this area.

The latest available hydraulic modeling of the Little Dry Creek basin, which includes the Blackmer Gulch, does not provide any existing cross sections within the subject site. The nearest cross section lies approximately 850 feet west of the site. The flowrate at this downstream cross section was determined to be 397 cfs for the 100-yr event and 671 cfs for the 500-yr event. An excerpt from the model is attached to this certification.

Using the downstream flowrates, two cross sections from the existing and proposed improvements were used to compare base flood elevations. Both existing cross sections showed that the 100-yr and 500-yr events overtopped the crown of El Camino Drive. The cross sections for the proposed improvements show that the flows from both the 100-yr and 500-yr events will remain within the roadside swale and do not raise the base flood elevations within the site. The cross sections and hydraulic modeling information is attached to this certificate.

The following work will be completed in the floodplain:

- 1) The existing roadside swale along the eastern portion of South Holly Street will be widened near the intersection of South Holly Street and El Camino Dr. The widened swale will increase the allowable volume within the floodplain and help direct flows to the existing inlet. The proposed side slopes will not exceed 25% with a longitudinal flowline slope of less than 10%.
- 2) The existing roadside swale along the northern portion of El Camino Dr. will be widened and lowered to increase the volume within this portion of the floodplain. The proposed side slopes will not exceed 25% with a longitudinal flowline slope of 2%. The grading within the floodplain will increase the available volume within the floodplain to approximately 16,300 ft³ prior to the existing inlet and storm sewer system.
- 3) Riprap erosion protection will be added along the western bank of the swales near the existing inlet to mitigate future erosion during larger storm events.
- 4) The existing inlet near the northwest corner of the intersection of South Holly Street and El Camino Dr. will be modified. The proposed modifications will add an orifice plate and weir to the existing inlet. The modifications will increase the inflow into the inlet during the 100-year event while also providing full spectrum detention and water quality. The existing storm sewer pipes will not be modified with the proposed modifications.
- 5) There will be about 18 trees planted in the floodplain. The trees will not be in groupings and they will not be clumped together. Separation between trees will be a minimum of 20' per the landscaping plan. The trees will also be planted parallel to the flow path. The trees along S. Holly Street will be planted on the existing berm well above the floodplain elevation. The trees along El Camino Drive will be planted above the floodway. The proposed trees will not have a measurable effect on the flow depth.

As indicated above all work proposed within the Blackmer Gulch Floodplain for the 4480 South Holly Street project will not result in a rise in the base flood elevation within the floodplain.

Please feel free to contact me if you need any additional information.

Engineers Certification:

This report for the no-rise floodplain analysis of 4480 S. Holly Street was prepared by me (or under my direct supervision) in accordance with the provisions of the City of Cherry Hills Village Municipal Code and the Arapahoe County Standards and Specifications and was analyzed to comply with the provisions thereof.

Respectfully,

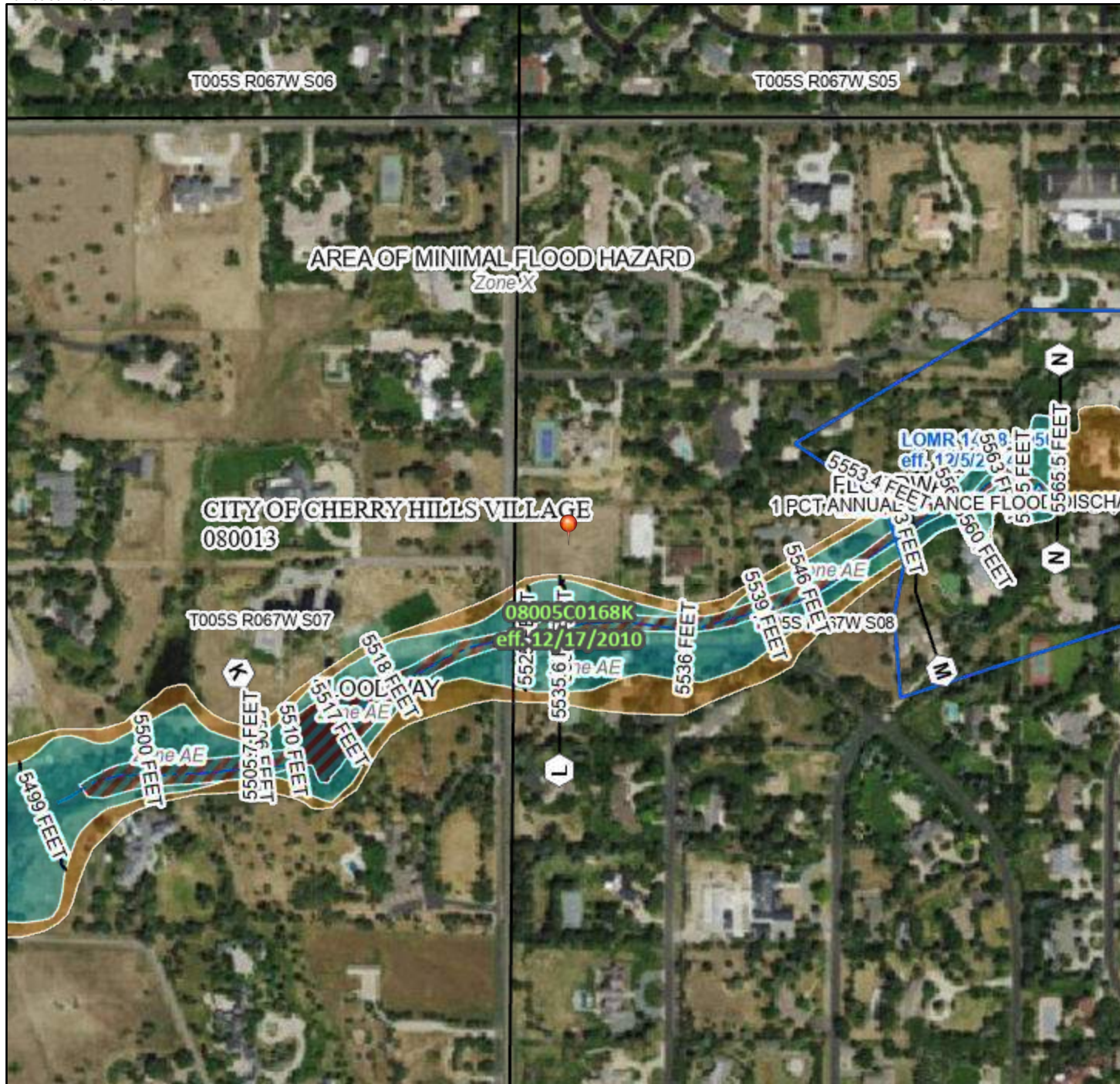
Zachary E. Thatcher, PE



National Flood Hazard Layer FIRMette



104°55'38"W 39°38'22"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

104°55'1"W 39°37'54"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/19/2025 at 7:42 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

HEC-RAS Version 3.1.1 May 2003
 U.S. Army Corp of Engineers
 Hydrologic Engineering Center
 609 Second Street, Suite D
 Davis, California 95616-4687
 (916) 756-1104

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X      X XXXXXX      XXXX      XXXX      XX      XXXX
X      X X          X X      X X      X X      X
X      X X          X X      X X      X X      X
XXXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
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X      X XXXXXX      XXXX      X      X      X      X      XXXXX

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PROJECT DATA

Project Title: Little Dry Creek Steady Flow Model
 Project File : LDC2099.prj
 Run Date and Time: 8/7/2003 11:32:36 AM

Project in English units

Project Description:

Little Dry Creek & its tributaries U.S. of Clarkson & D.S. of Holly & Englewood Dam.

PLAN DATA

Plan Title: Plan 01
 Plan File : L:\2099\UDFCD CD\HECRAS\LDC\Phase B\Existing\LDC2099.p01

Geometry Title: LDC system with overflows
 Geometry File : L:\2099\UDFCD CD\HECRAS\LDC\Phase B\Existing\LDC2099.g02

Flow Title : steady
 Flow File : L:\2099\UDFCD CD\HECRAS\LDC\Phase B\Existing\LDC2099.f05

Plan Description:

Little Dry Creek Steady Flow Run

Plan Summary Information:

Number of:	Cross Sections =	309	Multiple Openings =	0
	Culverts =	14	Inline Structures =	0
	Bridges =	23	Lateral Structures =	1

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculaton tolerance =	0.01
Maximum number of interations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: steady
 Flow File : L:\2099\UDFCD CD\HECRAS\LDC\Phase B\Existing\LDC2099.f05

Flow Data (cfs)

* River	Reach	RS	* 100-Yr.	10-Yr.	50-Yr.	500-Yr. *
* LDC	Prentice	2734.212*	811	377	712	1163 *

* LDC	Greenwood_upper	25528.11*	2112	1058	1842	3225 *
* LDC	Greenwood	21914.89*	2922	1435	2553	4389 *
* LDC	Greenwood	17979.27*	2640	1156	2191	3959 *
* LDC	Quincy gulch	5222.497*	642	280	538	986 *
* LDC	Blackmer	6803.225*	397	204	381	671 *
* LDC	Blackmer	5294.539*	945	437	839	1505 *
* LDC	Blackmer	3160.530*	985	437	839	1523 *
* LDC	Blackmer_lower	484.393 *	1587	644	1307	2442 *
* LDC	LDC_upper	44367.41*	240	160	170	600 *
* LDC	Willow_creek	4091.633*	560	410	560	780 *
* LDC	Willow_creek	122.892 *	752	476	773	1193 *
* LDC	Greenwood_lower	11642.10*	3291	1256	2557	5014 *
* LDC	Greenwood_lower	5931.511*	2813	1034	2164	4308 *
* LDC	LDC	43477.75*	874	531	874	1316 *
* LDC	LDC	42142.68*	1682	942	1572	2558 *
* LDC	LDC	37135.86*	2109	998	1758	3058 *
* LDC	LDC	29809.75*	2308	1007	1881	3368 *
* LDC	LDC	15179.18*	1934	943	1577	2832 *
* LDC	LDC_lower	9673.015*	3146	1323	2452	4822 *
* LDC	LDC_lower	9161.924*	4581	1845	3633	6855 *

Boundary Conditions

* River	Reach	Profile	*	Upstream	Downstream	*
* LDC	LDC_lower	100-Yr.	*		Known WS = 5335.4	*
* LDC	LDC_lower	10-Yr.	*		Known WS = 5332.1	*
* LDC	LDC_lower	50-Yr.	*		Known WS = 5334	*
* LDC	LDC_lower	500-Yr.	*		Known WS = 5339.4	*

GEOMETRY DATA

Geometry Title: LDC_system with overflows

Geometry File : L:\2099\UDFCD CD\HECRAS\LDC\Phase B\Existing\LDC2099.g02

Reach Connection Table

* River	Reach	*	Upstream Boundary	* Downstream Boundary	*
* LDC	Prentice	*		gwg_prentice	*
* LDC	Greenwood_upper	*		gwg_prentice	*
* LDC	Greenwood	*	gwg_prentice	gwg_blkmr	*
* LDC	Quincy gulch	*		blkmr_quincy	*
* LDC	Blackmer	*		blkmr_quincy	*
* LDC	Blackmer_lower	*	blkmr_quincy	gwg_blkmr	*
* LDC	LDC_upper	*		ldc_willow	*
* LDC	Willow_creek	*		ldc_willow	*
* LDC	Greenwood_lower	*	gwg_blkmr	LDC-GWG	*
* LDC	LDC	*	ldc_willow	LDC-GWG	*
* LDC	LDC_lower	*	LDC-GWG		*

JUNCTION INFORMATION

Name: LDC-GWG

Description: Greenwood Gulch Confluence w/ Little Dry Creek

Energy computation Method

Length across Junction		Tributary		Reach	Length	Angle
River	Reach	River	Reach			
LDC	LDC	to LDC	LDC_lower		688.4	
LDC	Greenwood_lower	to LDC	LDC_lower		1225.88	

Name: blkmr_quincy

Description: Quincy Gulch confluence w/ Blackmer Gulch

Energy computation Method

Length across Junction		Tributary		Reach	Length	Angle
River	Reach	River	Reach			
LDC	Blackmer	to LDC	Blackmer_lower		439.16	
LDC	Quincy_gulch	to LDC	Blackmer_lower		789	

Name: gwg_blkmr

Description: Blackmer Confluence w/ Greenwood Gulch

Energy computation Method

Length across Junction		Tributary	
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Worksheet for Developed Section "A"-100-yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.020 ft/ft
Discharge	397.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+05	5,535.00
0+33	5,529.40
0+43	5,529.40
0+57	5,533.00
0+63	5,534.10
0+75	5,534.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+05, 5,535.00)	(0+33, 5,529.40)	0.035
(0+33, 5,529.40)	(0+43, 5,529.40)	0.030
(0+43, 5,529.40)	(0+63, 5,534.10)	0.035
(0+63, 5,534.10)	(0+75, 5,534.33)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	28.5 in
Roughness Coefficient	0.034
Elevation	5,531.78 ft
Elevation Range	5,529.4 to 5,535.0 ft
Flow Area	47.8 ft ²
Wetted Perimeter	31.3 ft
Hydraulic Radius	18.3 in
Top Width	30.74 ft
Normal Depth	28.5 in
Critical Depth	31.0 in
Critical Slope	0.014 ft/ft
Velocity	8.31 ft/s

Worksheet for Developed Section "A"-100-yr

Results

Velocity Head	1.07 ft
Specific Energy	3.45 ft
Froude Number	1.175
Flow Type	Supercritical

GVF Input Data

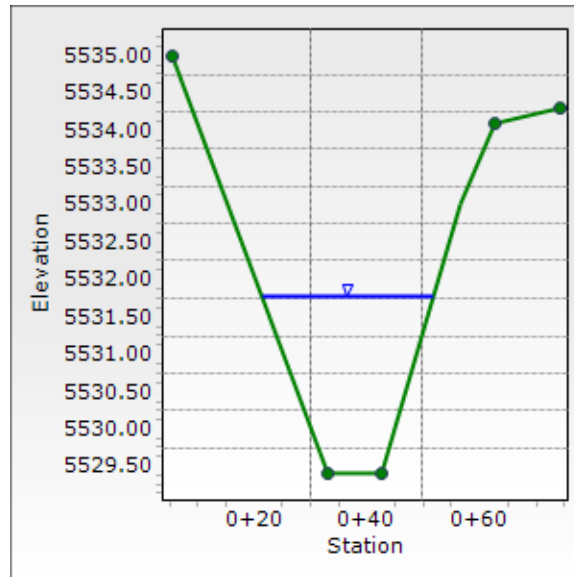
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	28.5 in
Critical Depth	31.0 in
Channel Slope	0.020 ft/ft
Critical Slope	0.014 ft/ft

Cross Section for Developed Section "A"-100-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.020 ft/ft
Normal Depth	28.5 in
Discharge	397.00 cfs



Worksheet for Developed Section "A"-500-yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.020 ft/ft
Discharge	671.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+05	5,535.00
0+33	5,529.40
0+43	5,529.40
0+57	5,533.00
0+63	5,534.10
0+75	5,534.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+05, 5,535.00)	(0+33, 5,529.40)	0.035
(0+33, 5,529.40)	(0+43, 5,529.40)	0.030
(0+43, 5,529.40)	(0+63, 5,534.10)	0.035
(0+63, 5,534.10)	(0+75, 5,534.33)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	36.7 in
Roughness Coefficient	0.034
Elevation	5,532.45 ft
Elevation Range	5,529.4 to 5,535.0 ft
Flow Area	70.7 ft ²
Wetted Perimeter	37.5 ft
Hydraulic Radius	22.6 in
Top Width	36.82 ft
Normal Depth	36.7 in
Critical Depth	40.2 in
Critical Slope	0.013 ft/ft
Velocity	9.49 ft/s

Worksheet for Developed Section "A"-500-yr

Results

Velocity Head	1.40 ft
Specific Energy	4.45 ft
Froude Number	1.207
Flow Type	Supercritical

GVF Input Data

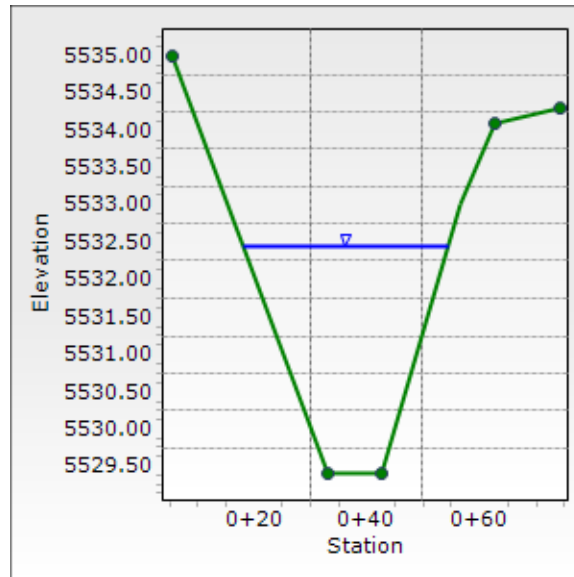
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	36.7 in
Critical Depth	40.2 in
Channel Slope	0.020 ft/ft
Critical Slope	0.013 ft/ft

Cross Section for Developed Section "A"-500-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.020 ft/ft
Normal Depth	36.7 in
Discharge	671.00 cfs



Worksheet for Existing Section "A"-100-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.006 ft/ft
Discharge	397.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+05	5,535.02
0+19	5,537.33
0+36	5,532.79
0+45	5,531.99
0+57	5,533.00
0+63	5,533.93
0+75	5,534.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+05, 5,535.02)	(0+36, 5,532.79)	0.035
(0+36, 5,532.79)	(0+57, 5,533.00)	0.030
(0+57, 5,533.00)	(0+63, 5,533.93)	0.035
(0+63, 5,533.93)	(0+75, 5,534.33)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	34.1 in
Roughness Coefficient	0.029
Elevation	5,534.83 ft
Elevation Range	5,532.0 to 5,537.3 ft
Flow Area	73.8 ft ²
Wetted Perimeter	47.3 ft
Hydraulic Radius	18.7 in
Top Width	46.37 ft
Normal Depth	34.1 in
Critical Depth	30.6 in
Critical Slope	0.011 ft/ft

Worksheet for Existing Section "A"-100-yr

Results

Velocity	5.38 ft/s
Velocity Head	0.45 ft
Specific Energy	3.29 ft
Froude Number	0.752
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	34.1 in
Critical Depth	30.6 in
Channel Slope	0.006 ft/ft
Critical Slope	0.011 ft/ft

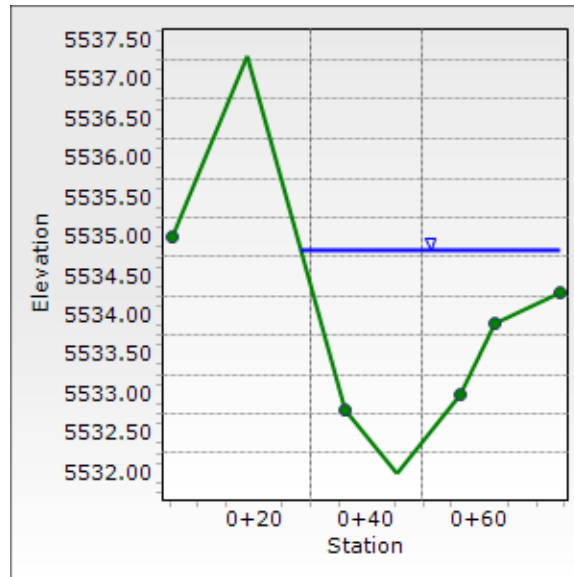
Worksheet for Existing Section "A"-100-yr

Messages:

Water Surface Elevation exceeds lowest end station by 0.499964556447594ft.

Cross Section for Existing Section "A"-100-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	34.1 in
Discharge	397.00 cfs



Worksheet for Existing Section "A"-500-yr

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	0.006 ft/ft
Discharge	671.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+05	5,535.02
0+19	5,537.33
0+36	5,532.79
0+45	5,531.99
0+57	5,533.00
0+63	5,533.93
0+75	5,534.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+05, 5,535.02)	(0+36, 5,532.79)	0.035
(0+36, 5,532.79)	(0+57, 5,533.00)	0.030
(0+57, 5,533.00)	(0+63, 5,533.93)	0.035
(0+63, 5,533.93)	(0+75, 5,534.33)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	42.6 in
Roughness Coefficient	0.029
Elevation	5,535.54 ft
Elevation Range	5,532.0 to 5,537.3 ft
Flow Area	108.4 ft ²
Wetted Perimeter	54.4 ft
Hydraulic Radius	23.9 in
Top Width	52.14 ft
Normal Depth	42.6 in
Critical Depth	37.6 in
Critical Slope	0.011 ft/ft

Worksheet for Existing Section "A"-500-yr

Results

Velocity	6.19 ft/s
Velocity Head	0.60 ft
Specific Energy	4.14 ft
Froude Number	0.757
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	42.6 in
Critical Depth	37.6 in
Channel Slope	0.006 ft/ft
Critical Slope	0.011 ft/ft

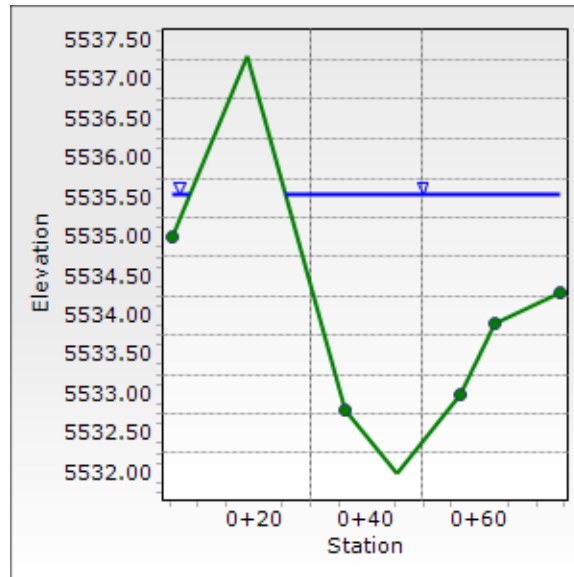
Worksheet for Existing Section "A"-500-yr

Messages:

Water Surface Elevation exceeds lowest end station by 1.20924330688558ft. Flow is divided.

Cross Section for Existing Section "A"-500-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	42.6 in
Discharge	671.00 cfs



Worksheet for Developed Section "B"-100-yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.020 ft/ft
Discharge	397.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+02	5,534.57
0+33	5,528.21
0+40	5,528.21
0+59	5,532.86
0+63	5,533.37
0+75	5,533.55

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+02, 5,534.57)	(0+33, 5,528.21)	0.035
(0+33, 5,528.21)	(0+40, 5,528.21)	0.030
(0+40, 5,528.21)	(0+63, 5,533.37)	0.035
(0+63, 5,533.37)	(0+75, 5,533.55)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	31.1 in
Roughness Coefficient	0.034
Elevation	5,530.80 ft
Elevation Range	5,528.2 to 5,534.6 ft
Flow Area	47.7 ft ²
Wetted Perimeter	30.6 ft
Hydraulic Radius	18.7 in
Top Width	30.02 ft
Normal Depth	31.1 in
Critical Depth	33.4 in
Critical Slope	0.014 ft/ft
Velocity	8.32 ft/s

Worksheet for Developed Section "B"-100-yr

Results

Velocity Head	1.08 ft
Specific Energy	3.67 ft
Froude Number	1.164
Flow Type	Supercritical

GVF Input Data

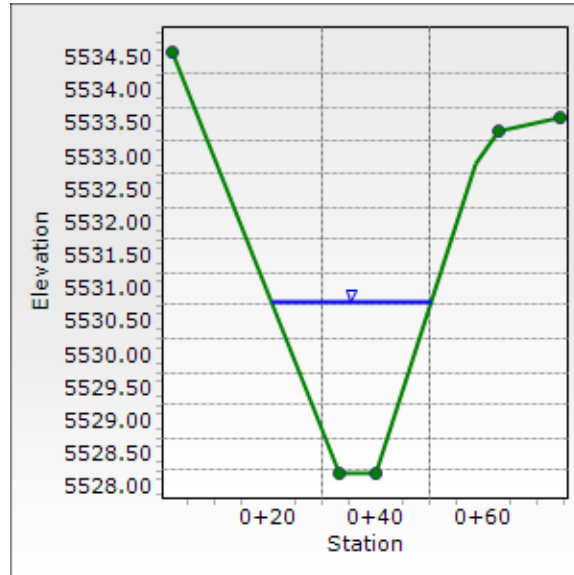
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	31.1 in
Critical Depth	33.4 in
Channel Slope	0.020 ft/ft
Critical Slope	0.014 ft/ft

Cross Section for Developed Section "B"-100-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.020 ft/ft
Normal Depth	31.1 in
Discharge	397.00 cfs



Worksheet for Developed Section "B"-500-yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.020 ft/ft
Discharge	671.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+02	5,534.57
0+33	5,528.21
0+40	5,528.21
0+59	5,532.86
0+63	5,533.37
0+75	5,533.55

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+02, 5,534.57)	(0+33, 5,528.21)	0.035
(0+33, 5,528.21)	(0+40, 5,528.21)	0.030
(0+40, 5,528.21)	(0+63, 5,533.37)	0.035
(0+63, 5,533.37)	(0+75, 5,533.55)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

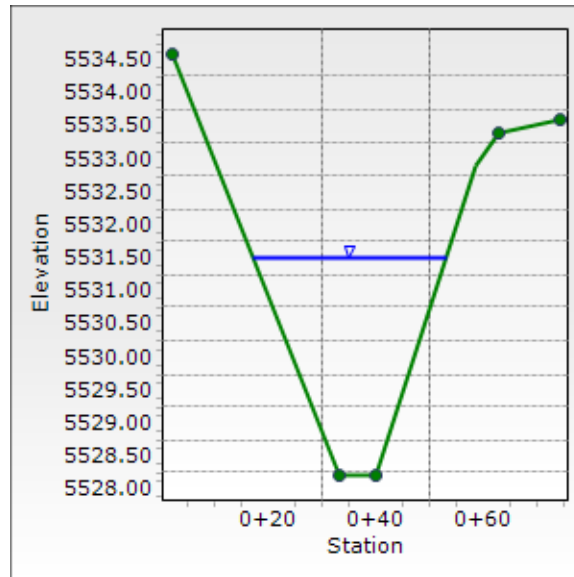
Results	
Normal Depth	39.4 in
Roughness Coefficient	0.034
Elevation	5,531.49 ft
Elevation Range	5,528.2 to 5,534.6 ft
Flow Area	70.7 ft ²
Wetted Perimeter	37.0 ft
Hydraulic Radius	23.0 in
Top Width	36.24 ft
Normal Depth	39.4 in
Critical Depth	42.9 in
Critical Slope	0.014 ft/ft
Velocity	9.49 ft/s

Worksheet for Developed Section "B"-500-yr

Results	
Velocity Head	1.40 ft
Specific Energy	4.68 ft
Froude Number	1.197
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	39.4 in
Critical Depth	42.9 in
Channel Slope	0.020 ft/ft
Critical Slope	0.014 ft/ft

Cross Section for Developed Section "B"-500-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.020 ft/ft
Normal Depth	39.4 in
Discharge	671.00 cfs



Worksheet for Existing Section "B"-100-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.006 ft/ft
Discharge	397.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+02	5,534.57
0+20	5,536.92
0+36	5,532.76
0+46	5,532.27
0+59	5,532.86
0+63	5,533.37
0+75	5,533.55

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+02, 5,534.57)	(0+36, 5,532.76)	0.035
(0+36, 5,532.76)	(0+59, 5,532.86)	0.030
(0+59, 5,532.86)	(0+63, 5,533.37)	0.035
(0+63, 5,533.37)	(0+75, 5,533.55)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	28.2 in
Roughness Coefficient	0.029
Elevation	5,534.62 ft
Elevation Range	5,532.3 to 5,536.9 ft
Flow Area	73.6 ft ²
Wetted Perimeter	47.6 ft
Hydraulic Radius	18.5 in
Top Width	46.24 ft
Normal Depth	28.2 in
Critical Depth	24.6 in
Critical Slope	0.011 ft/ft

Worksheet for Existing Section "B"-100-yr

Results

Velocity	5.39 ft/s
Velocity Head	0.45 ft
Specific Energy	2.80 ft
Froude Number	0.753
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	28.2 in
Critical Depth	24.6 in
Channel Slope	0.006 ft/ft
Critical Slope	0.011 ft/ft

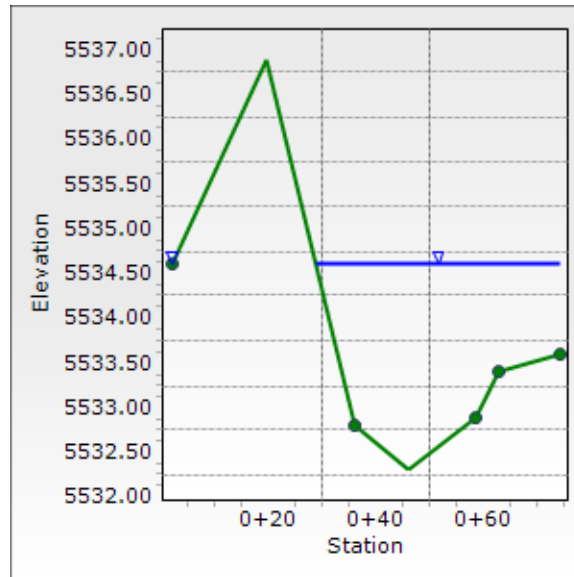
Worksheet for Existing Section "B"-100-yr

Messages:

Water Surface Elevation exceeds lowest end station by 1.06749398983902ft. Flow is divided.

Cross Section for Existing Section "B"-100-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	28.2 in
Discharge	397.00 cfs



Worksheet for Existing Section "B"-500-yr

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	0.006 ft/ft
Discharge	671.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+02	5,534.57
0+20	5,536.92
0+36	5,532.76
0+46	5,532.27
0+59	5,532.86
0+63	5,533.37
0+75	5,533.55

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+02, 5,534.57)	(0+36, 5,532.76)	0.035
(0+36, 5,532.76)	(0+59, 5,532.86)	0.030
(0+59, 5,532.86)	(0+63, 5,533.37)	0.035
(0+63, 5,533.37)	(0+75, 5,533.55)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	37.2 in
Roughness Coefficient	0.030
Elevation	5,535.37 ft
Elevation Range	5,532.3 to 5,536.9 ft
Flow Area	111.5 ft ²
Wetted Perimeter	58.0 ft
Hydraulic Radius	23.1 in
Top Width	54.91 ft
Normal Depth	37.2 in
Critical Depth	31.9 in
Critical Slope	0.011 ft/ft

Worksheet for Existing Section "B"-500-yr

Results

Velocity	6.02 ft/s
Velocity Head	0.56 ft
Specific Energy	3.66 ft
Froude Number	0.745
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	37.2 in
Critical Depth	31.9 in
Channel Slope	0.006 ft/ft
Critical Slope	0.011 ft/ft

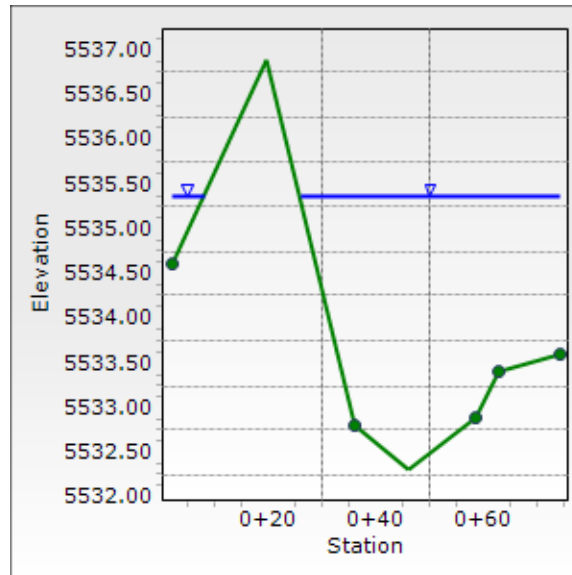
Worksheet for Existing Section "B"-500-yr

Messages:

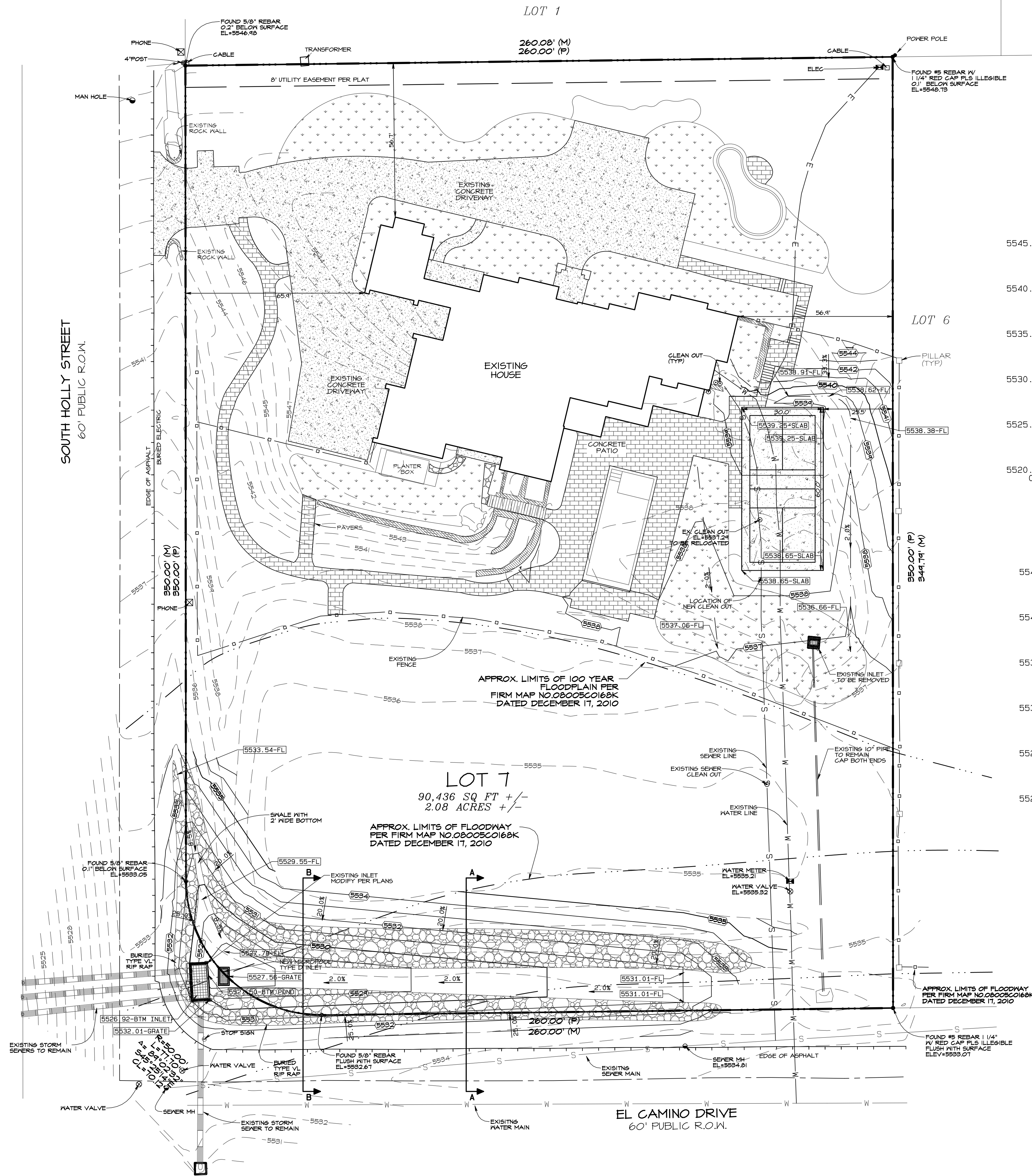
Water Surface Elevation exceeds lowest end station by 1.81592398680641ft. Flow is divided.

Cross Section for Existing Section "B"-500-yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	37.2 in
Discharge	671.00 cfs

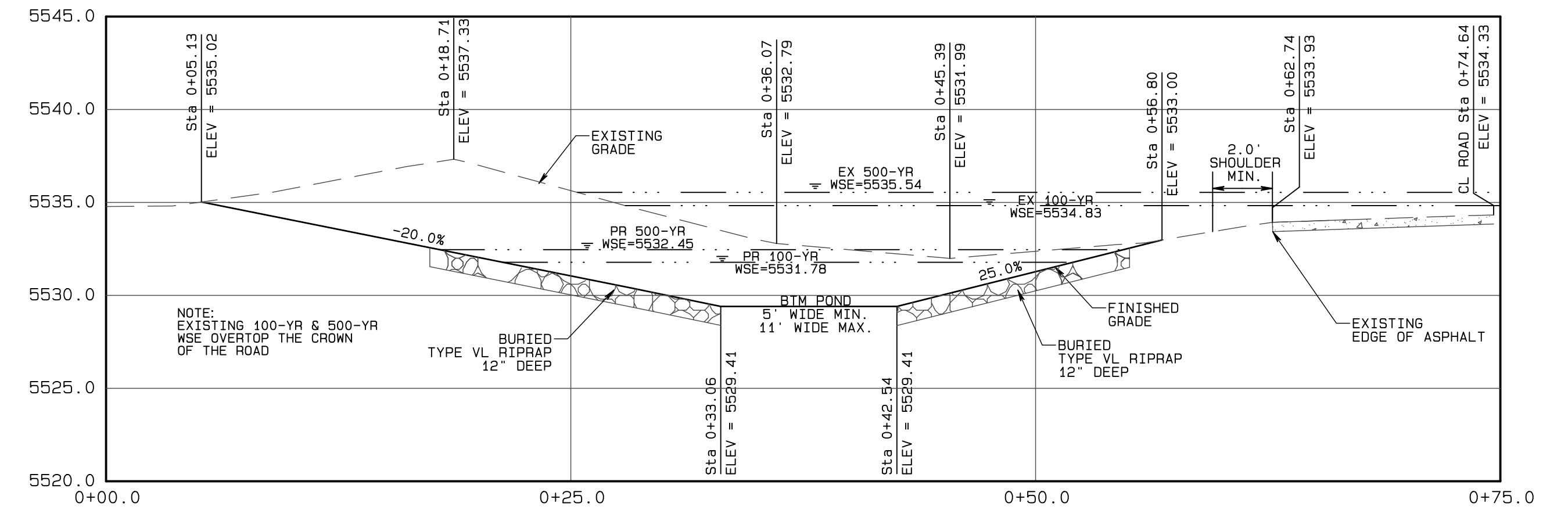


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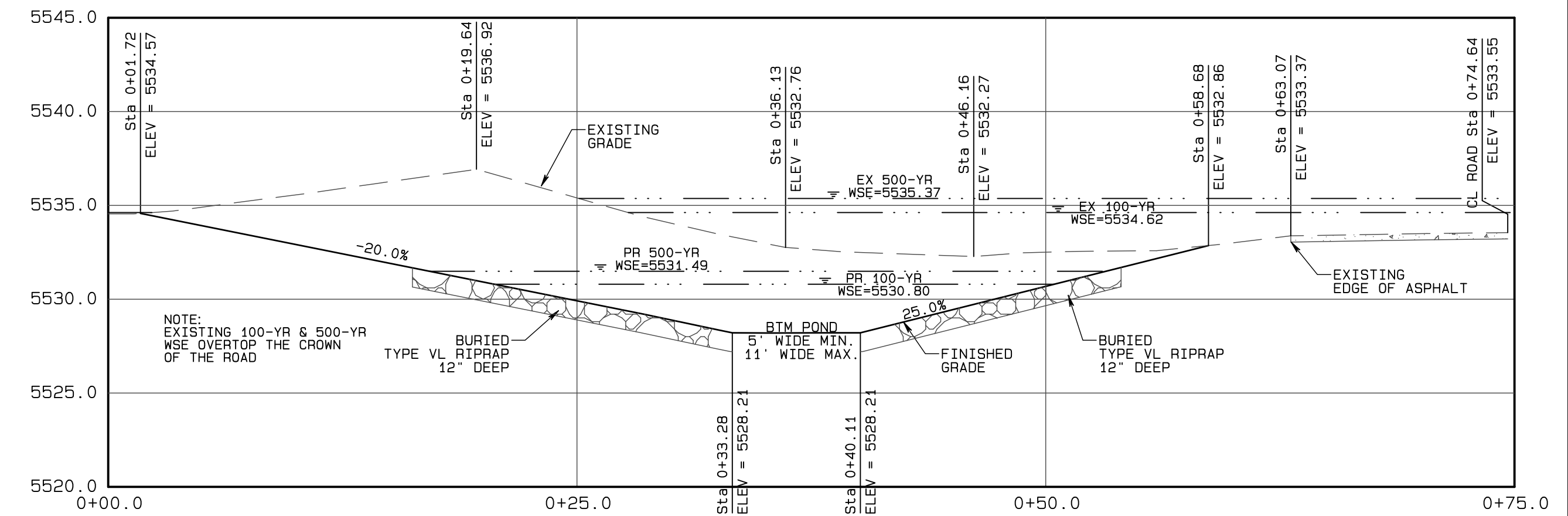
LEGEND

- = EXISTING CONTOUR (1' INTERVAL)
- = PROPOSED CONTOUR (1' INTERVAL)



CROSS SECTION 'A'

SCALE: 1"= 6'V & 6'H

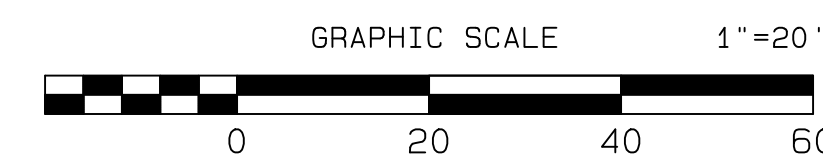


CROSS SECTION 'B'

SCALE: 1"= 6'V & 6'H

DEVELOPED SECTION MAP

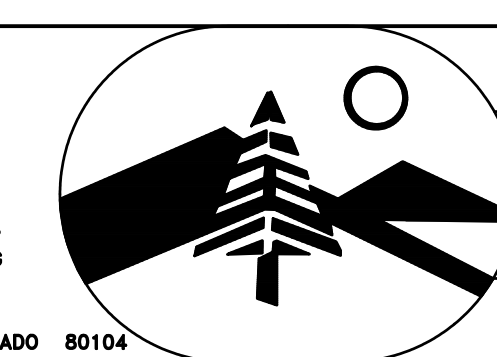
SCALE: 1"=20'



REVISIONS

NO.	DATE	DESCRIPTION

DAVID E. ARCHER & ASSOCIATES, INC.
LAND DEVELOPMENT CONSULTING
SURVEYING & ENGINEERING
PHONE (303) 688-4642
105 WILCOX ST. CASTLE ROCK, COLORADO 80104



SECTION MAP
4480 South Holly
In Sec. 8, Township 5 South, Range 67 West,
6th P.M., Arapahoe County, Colorado.
DATE 04/03/25
BY JET
APVD.
CLIENT Designs By Sundown
JOB NUMBER
Sheet 1 of 1 20-0420