



LSC TRANSPORTATION CONSULTANTS, INC.
2504 East Pikes Peak Avenue, Suite 304
Colorado Springs, CO 80909
(719) 633-2868
FAX (719) 633-5430
E-mail: lsc@lsctrans.com
Website: <http://www.lsctrans.com>

MEMORANDUM

DATE: June 8, 2021

TO: Arthur Gonzales – CDOT R2 Access Manager

FROM: Jeff Hodsdon – LSC Transportation Consultants, Inc.

SUBJECT: Grandview Reserve
US Highway 24 Access Permit Application
Letter of Intent
LSC #184840

Grandview Reserve development in El Paso County, Colorado is a 768-acre master-planned development located west of the intersection of US Highway 24 (US Hwy 24) and Elbert Road in El Paso County, Colorado.

The Sketch Plan shows approximately 3,260 residential units at varying densities (low, medium, medium-high, and high), commercial uses near US Hwy 24, a community park, institutional uses (i.e., potential school and church site), and smaller neighborhood parks connected by an expansive network of trails and open space. The community will have a minimum of 127.1 acres (over 16.5% of the site area) in open space consisting of the community park, pocket parks, trail corridors, existing drainage ways, detention areas, and buffers.

Grandview Reserve is located in the Falcon/Peyton area of El Paso County and is bounded along the north by 4 Way Ranch, along the south by Waterbury, on the east by US Hwy 24, and along the west by Eastonville Road. There are no existing structures, roads or other infrastructure on the site. The property is located approximately 4.14 miles southwest of Peyton, 4.16 miles northeast of Falcon, and 4.66 miles south of Eastonville Road, in El Paso County, Colorado. The property is generally located within the south half of Section 21, south half of Section 22, the north half of Section 27, and the north half of Section 28, Township 12 South, Range 64 West, in El Paso County, Colorado. The center of Grandview Reserve is situated at approximately Latitude 38.98541389 north, -104.55472222 east.

The primary access to the development is planned to Eastonville Road and the planned Rex Road, which is proposed to be extended southeast from Eastonville Road through the Grandview Reserve development to intersect US Hwy 24 at a full-movement, future signalized intersection on the north side of US Hwy 24 at MP 325.

The latest version of the *Grandview Reserve Master Traffic Impact Analysis* by LSC Transportation Consultants, Inc. is dated December 15, 2020. This report contains analysis of the proposed US Hwy 24/Rex intersection.

Also, a memo *Request for Amendment to the US Highway 24 Access Control Plan Modification to the Rex Road Intersection Location with Grandview Estates*, dated August 28, 2020, was submitted to CDOT. This memo submittal included:

- Description of change requested of the *Access Control Plan* (ACP) with exhibits;
- Ultimate buildout exhibits for the new Rex Road and the improvements to the roadway;
- Justification for the amendment;
- Traffic impact study; and
- Drainage study with all documents and exhibits needed for review.

El Paso County staff wants the proposed Rex Road connected through Grandview to an intersection with US Hwy 24 between Elbert and Stapleton.

El Paso County and CDOT staff indicated support for the proposed Rex Road location and the process for requesting the change to the ACP was discussed at meetings with the applicant. Based on those meetings and support, the applicant updated the Grandview Reserve Sketch Plan and the TIS report and submitted the ACP change request memo.

COLORADO DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ACCESS PERMIT APPLICATION

Issuing authority application
acceptance date:

- Instructions:
- Contact the Colorado Department of Transportation (CDOT) or your local government to determine your issuing authority.
 - Contact the issuing authority to determine what plans and other documents are required to be submitted with your application.
 - Complete this form (some questions may not apply to you) and attach all necessary documents and Submit it to the issuing authority.
 - Submit an application for each access affected.
 - If you have any questions contact the issuing authority.
 - For additional information see CDOT's Access Management website at <http://www.dot.state.co.us/AccessPermits/index.htm>
- Please print or type**

1) Property owner (Permittee) 4 Site Investments LLC		2) Applicant or Agent for permittee (if different from property owner)	
Street address 1271 Kelly Johnson Boulevard, Suite 100		Mailing address	
City, state & zip Colo Springs, CO 80920	Phone # 719-447-8773	City, state & zip	Phone # (required)
E-mail address paulinfinity1@msn.com		E-mail address if available	
3) Address of property to be served by permit (required) 0 Eastonville Road			
4) Legal description of property: If within jurisdictional limits of Municipality, city and/or County, which one? county El Paso subdivision See Attached block lot section township range			
5) What State Highway are you requesting access from? 24G		6) What side of the highway? <input checked="" type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> W	
7) How many feet is the proposed access from the nearest mile post? 185 feet <input type="checkbox"/> N <input type="checkbox"/> S <input checked="" type="checkbox"/> E <input type="checkbox"/> W from: 325		How many feet is the proposed access from the nearest cross street? 4,250 feet <input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> E <input checked="" type="checkbox"/> W from: Elbert Road	
8) What is the approximate date you intend to begin construction? 5/1/2020			
9) Check here if you are requesting a: <input checked="" type="checkbox"/> new access <input type="checkbox"/> temporary access (duration anticipated:) <input type="checkbox"/> improvement to existing access <input type="checkbox"/> change in access use <input type="checkbox"/> removal of access <input type="checkbox"/> relocation of an existing access (provide detail)			
10) Provide existing property use Vacant Land			
11) Do you have knowledge of any State Highway access permits serving this property, or adjacent properties in which you have a property interest? <input checked="" type="checkbox"/> no <input type="checkbox"/> yes, if yes - what are the permit number(s) and provide copies: and/or, permit date:			
12) Does the property owner own or have any interests in any adjacent property? <input checked="" type="checkbox"/> no <input type="checkbox"/> yes, if yes - please describe:			
13) Are there other existing or dedicated public streets, roads, highways or access easements bordering or within the property? <input type="checkbox"/> no <input checked="" type="checkbox"/> yes, if yes - list them on your plans and indicate the proposed and existing access points.			
14) If you are requesting agricultural field access - how many acres will the access serve? n/a			
15) If you are requesting commercial or industrial access please indicate the types and number of businesses and provide the floor area square footage of each.			
business/land use	square footage	business	square footage
16) If you are requesting residential development access, what is the type (single family, apartment, townhouse) and number of units?			
type	number of units	type	number of units
Single Family Detached	184		
17) Provide the following vehicle count estimates for vehicles that will use the access. Leaving the property then returning is two counts.			
Indicate if your counts are <input checked="" type="checkbox"/> peak hour volumes or <input type="checkbox"/> average daily volumes.	# of passenger cars and light trucks at peak hour volumes 305	# of multi unit trucks at peak hour volumes 2	
# of single unit vehicles in excess of 30 ft. 10	# of farm vehicles (field equipment) 0	Total count of all vehicles 317	

18) Check with the issuing authority to determine which of the following documents are required to complete the review of your application.

- | | |
|--|---|
| a) Property map indicating other access, bordering roads and streets. | e) Subdivision, zoning, or development plan. |
| b) Highway and driveway plan profile. | f) Proposed access design. |
| c) Drainage plan showing impact to the highway right-of-way. | g) Parcel and ownership maps including easements. |
| d) Map and letters detailing utility locations before and after development in and along the right-of-way. | h) Traffic studies. |
| | i) Proof of ownership. |

1- It is the applicant's responsibility to contact appropriate agencies and obtain all environmental clearances that apply to their activities. Such clearances may include Corps of Engineers 404 Permits or Colorado Discharge Permit System permits, or ecological, archeological, historical or cultural resource clearances. The CDOT Environmental Clearances Information Summary presents contact information for agencies administering certain clearances, information about prohibited discharges, and may be obtained from Regional CDOT Utility/Special Use Permit offices or accessed via the CDOT Planning/Construction-Environmental-Guidance webpage <http://www.dot.state.co.us/environmental/Forms.asp>.

2- All workers within the State Highway right of way shall comply with their employer's safety and health policies/procedures, and all applicable U.S. Occupational Safety and Health Administration (OSHA) regulations - including, but not limited to the applicable sections of 29 CFR Part 1910 - Occupational Safety and Health Standards and 29 CFR Part 1926 - Safety and Health Regulations for Construction.

Personal protective equipment (e.g. head protection, footwear, high visibility apparel, safety glasses, hearing protection, respirators, gloves, etc.) shall be worn as appropriate for the work being performed, and as specified in regulation. At a minimum, all workers in the State Highway right of way, except when in their vehicles, shall wear the following personal protective equipment: High visibility apparel as specified in the Traffic Control provisions of the documentation accompanying the Notice to Proceed related to this permit (at a minimum, ANSI/ISEA 107-1999, class 2); head protection that complies with the ANSI Z89.1-1997 standard; and at all construction sites or whenever there is danger of injury to feet, workers shall comply with OSHA's PPE requirements for foot protection per 29 CFR 1910.136, 1926.95, and 1926.96. If required, such footwear shall meet the requirements of ANSI Z41-1999.

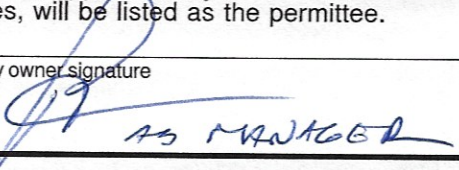
Where any of the above-referenced ANSI standards have been revised, the most recent version of the standard shall apply.

3- The Permittee is responsible for complying with the Revised Guidelines that have been adopted by the Access Board under the American Disabilities Act (ADA). These guidelines define traversable slope requirements and prescribe the use of a defined pattern of truncated domes as detectable warnings at street crossings. The new Standards Plans and can be found on the Design and Construction Project Support web page at: <http://www.dot.state.co.us/DesignSupport/>, then click on *Design Bulletins*.

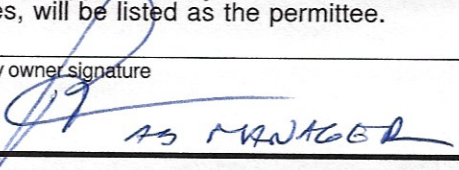
If an access permit is issued to you, it will state the terms and conditions for its use. Any changes in the use of the permitted access not consistent with the terms and conditions listed on the permit may be considered a violation of the permit.

The applicant declares under penalty of perjury in the second degree, and any other applicable state or federal laws, that all information provided on this form and submitted attachments are to the best of their knowledge true and complete.

I understand receipt of an access permit does not constitute permission to start access construction work.

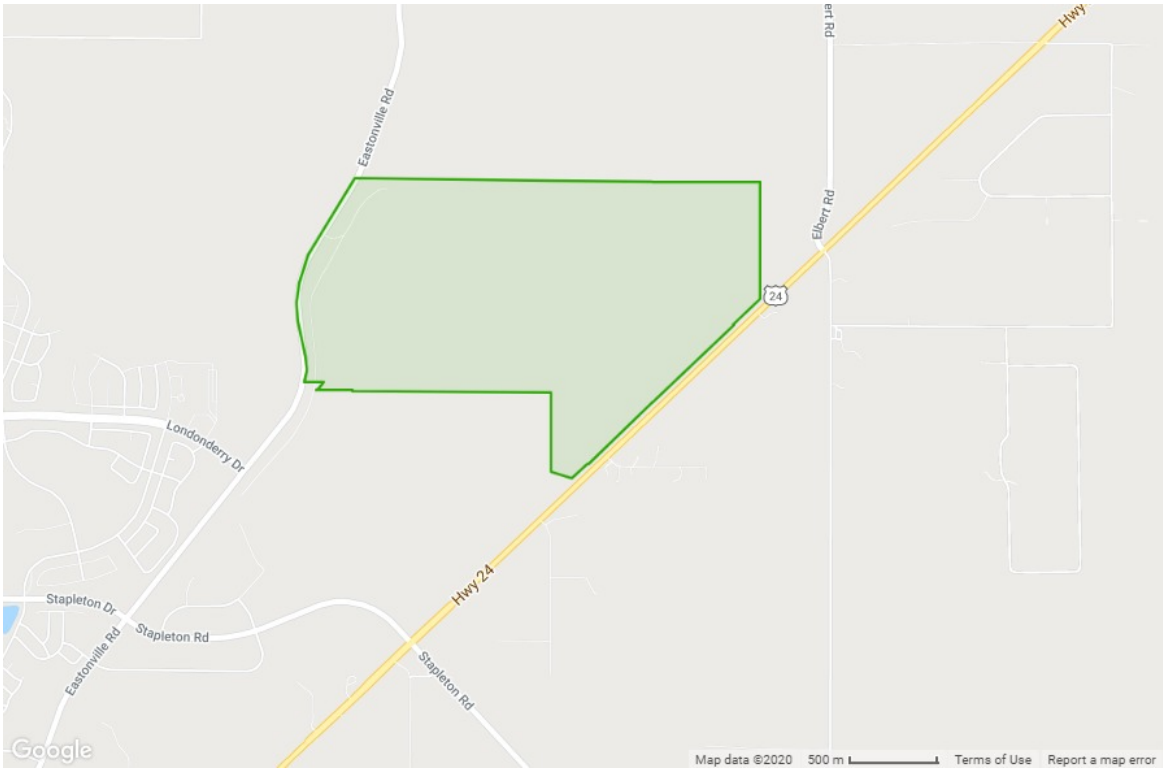
Applicant or Agent for Permittee signature	Print name	Date
	PAUL J. HOWARD	01/16/2020

If the applicant is not the owner of the property, we require this application also to be signed by the property owner or their legally authorized representative (or other acceptable written evidence). This signature shall constitute agreement with this application by all owners-of-interest unless stated in writing. If a permit is issued, the property owner, in most cases, will be listed as the permittee.

Property owner signature	Print name	Date
	PAUL J. HOWARD	01/16/2020

El Paso County - Community: Property Search

Schedule Number: 4200000396



Schedule Number: 4200000396

Ownership and Property Location

Owner(s)

4 SITE INVESTMENTS LLC ▼

Property Location

EASTONVILLE RD ▼

Land Details

Sequence #	Land Use	Assessment Rate	Area
1	AG. GRAZING LAND	29.000	765 Acres

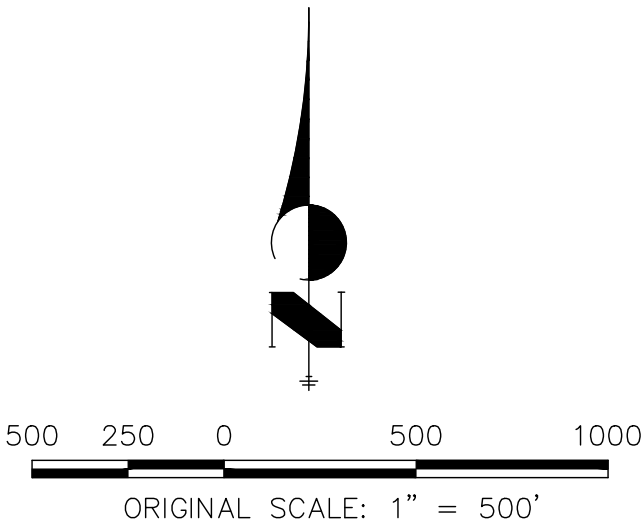
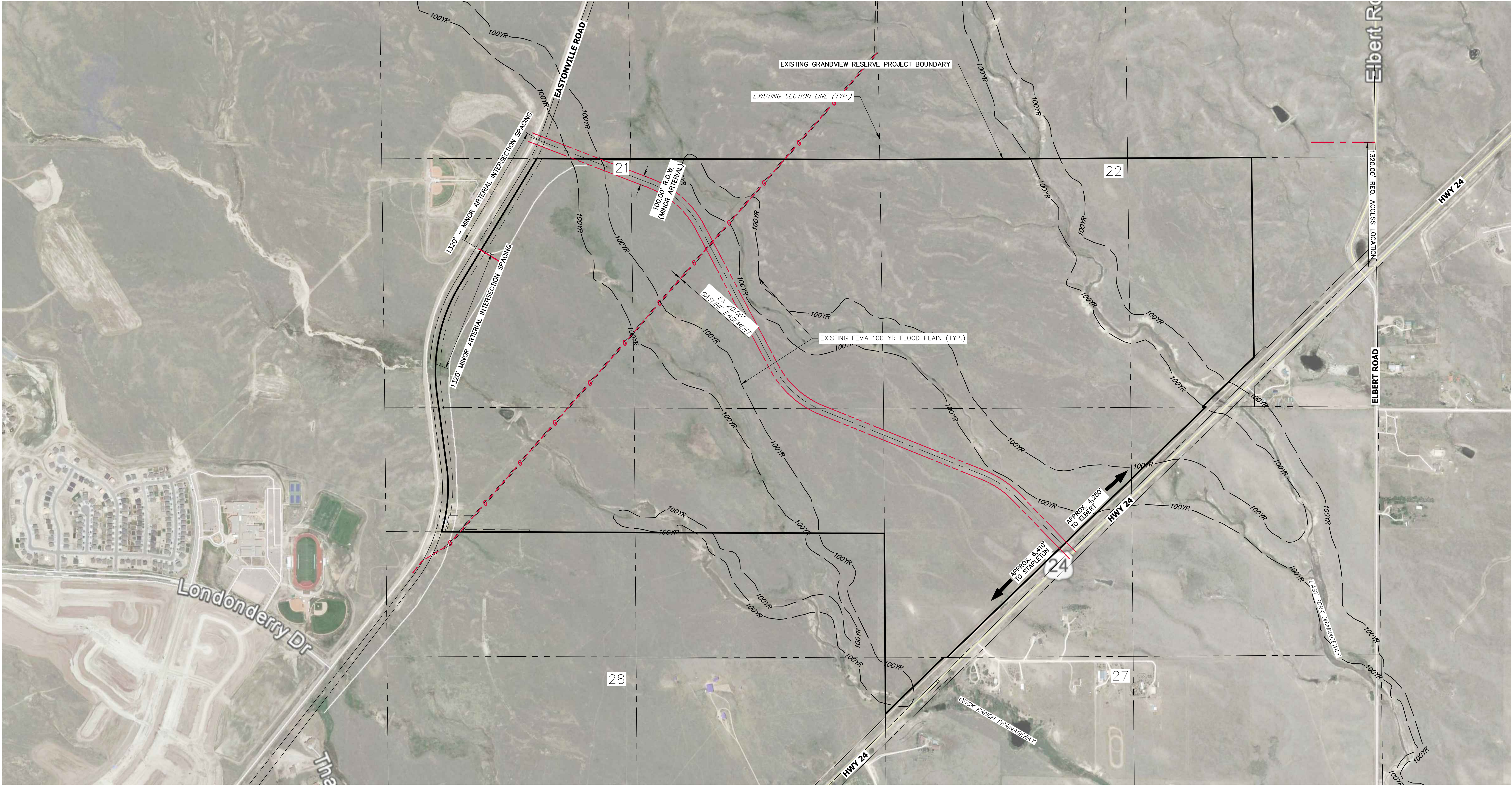
Sales History

Sale Date	Sale Price	Sale Type
Aug-08-2018	\$1,900,000	Good sale; Vacant land
Mar-22-2013	\$0	-

Current Property Appraisal

Building Value	\$0
Land Value	\$32,084
Total	\$32,084

GRANDVIEW RESERVE
FUTURE REX ROAD PRELIMINARY ALIGNMENT EXHIBIT



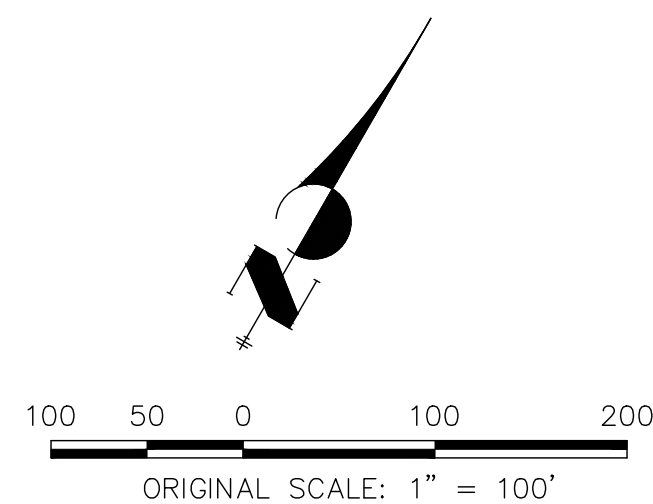
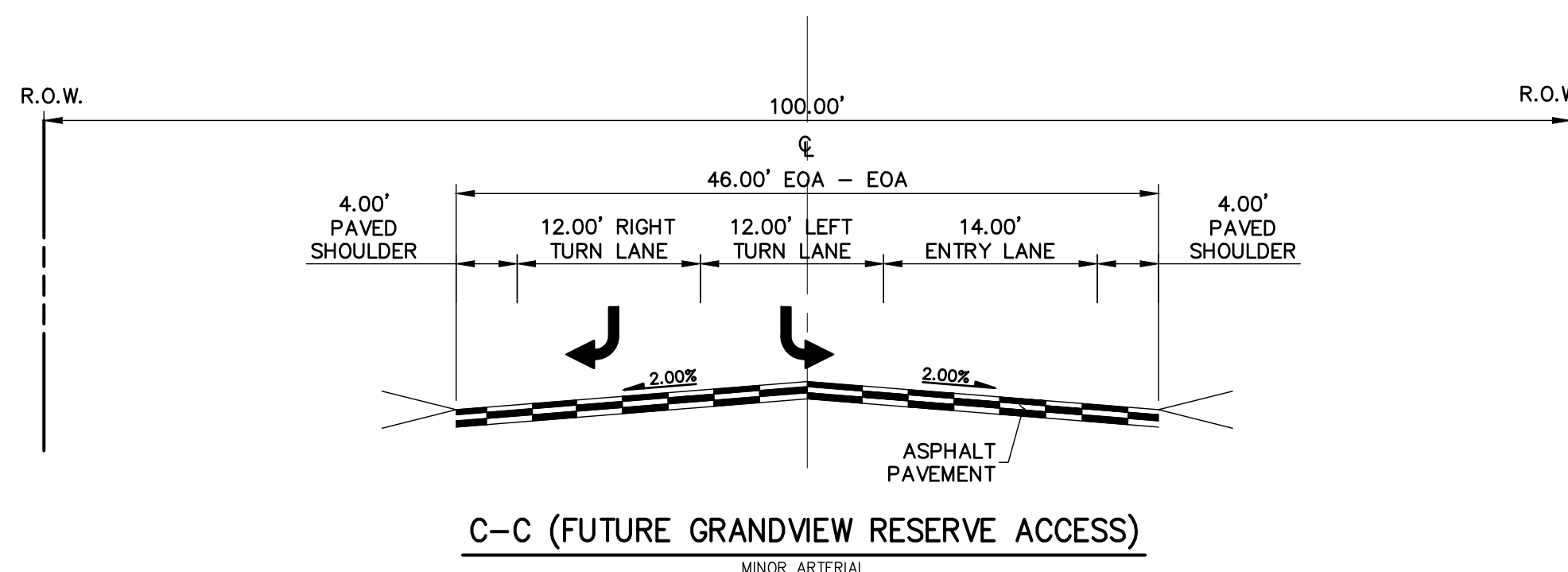
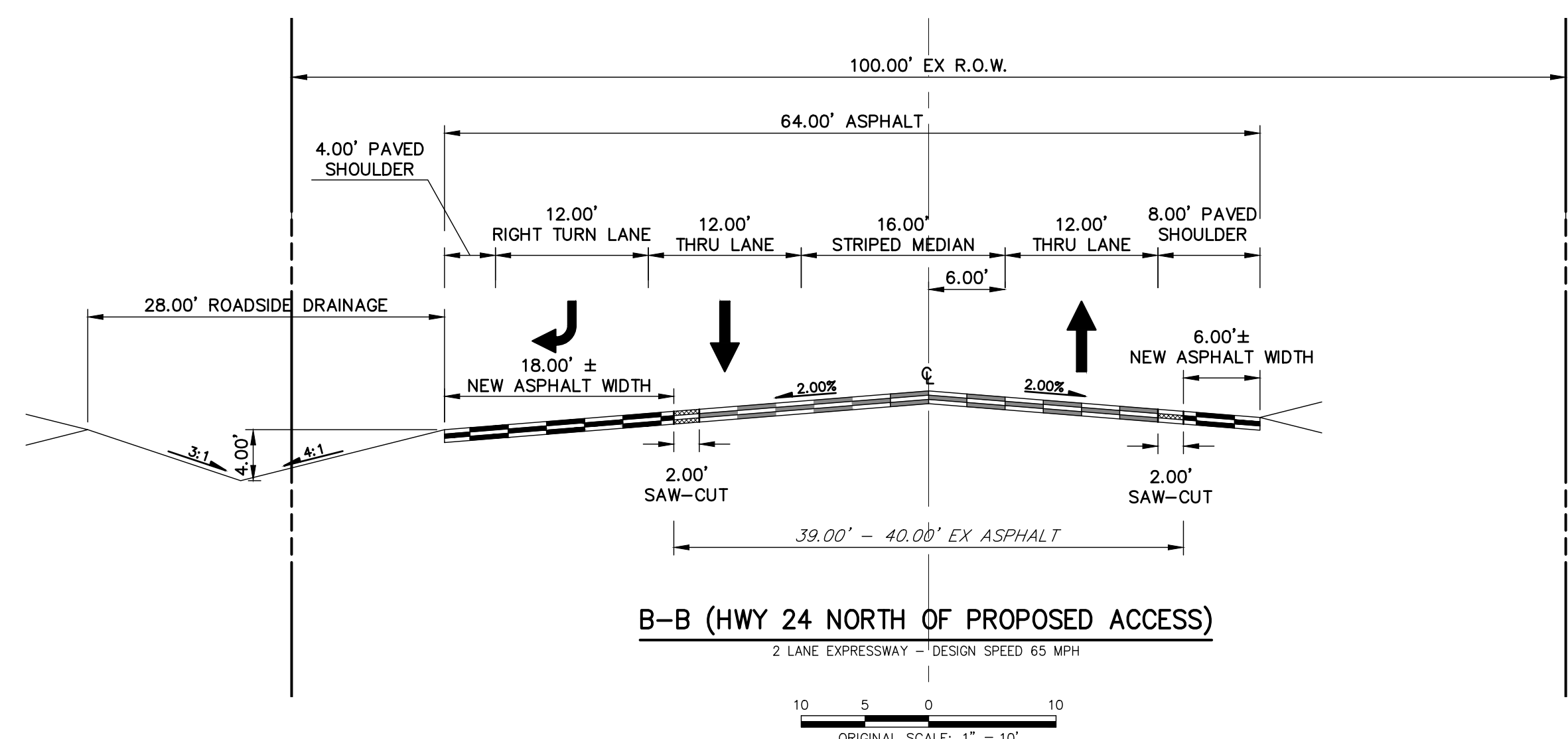
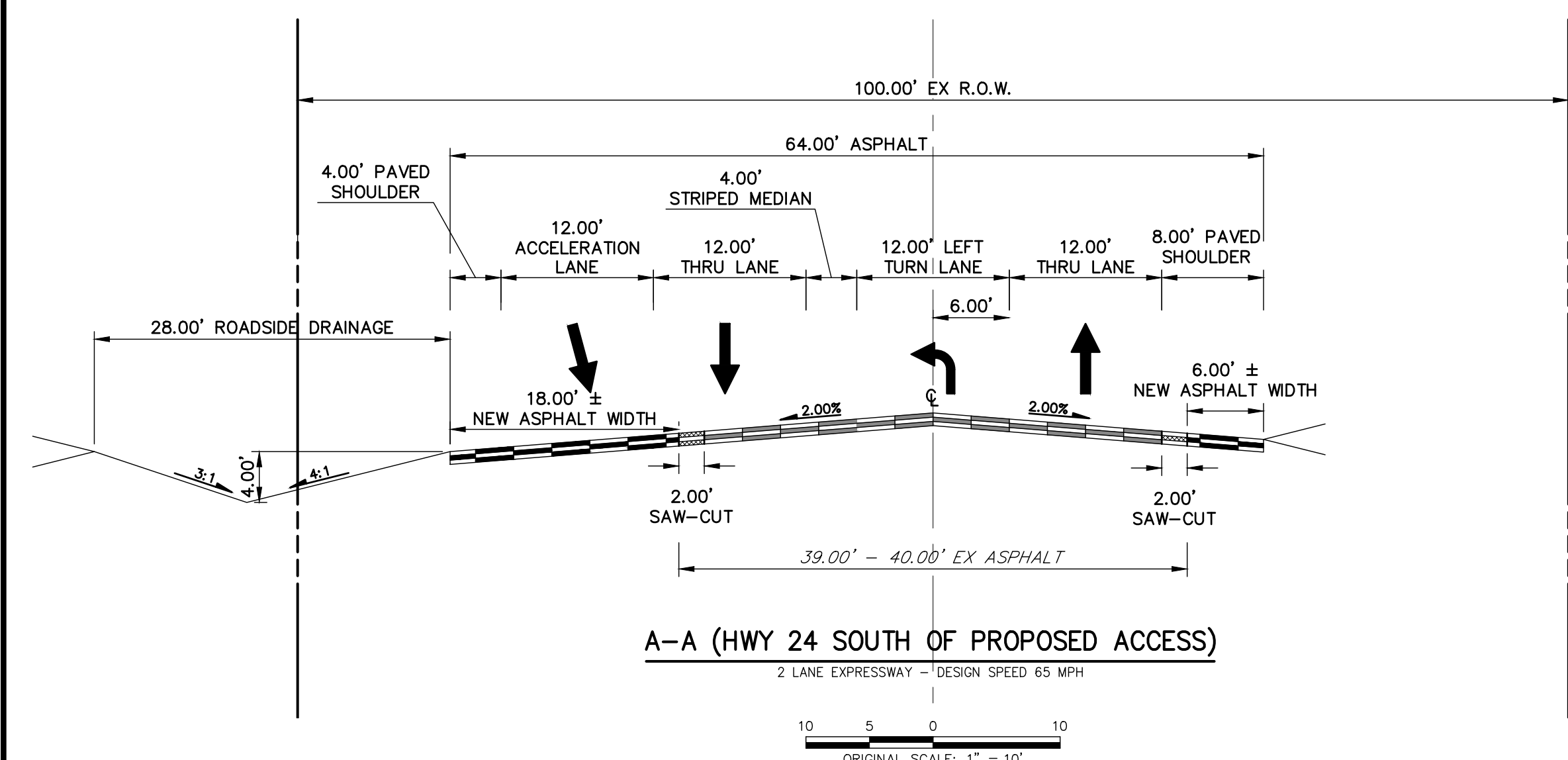
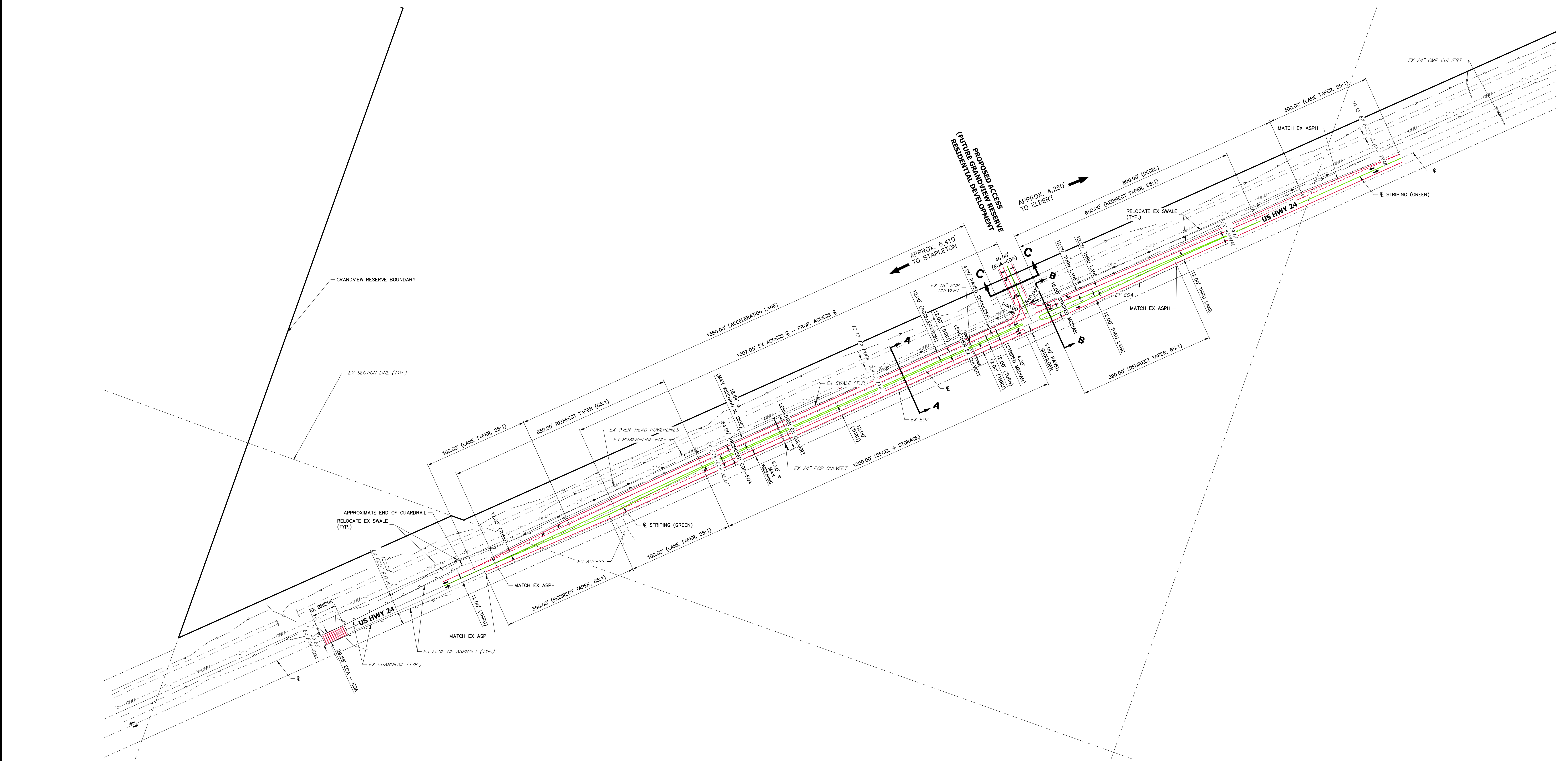
2000-9931.26
GRANDVIEW RESERVE
REX ROAD PRELIMINARY ALIGNMENT
2020-01-16
SHEET 1 OF 1



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

GRANDVIEW RESERVE - HWY 24 ACCESS

PRELIMINARY DESIGN EXHIBIT



2000-9931.26
GRANDVIEW - HWY 24 ACCESS
PRELIMINARY DESIGN
2020-01-09
SHEET 1 OF 2

J-R ENGINEERING
A Westman Company

Central 303-740-9303 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com



El Paso County, Colorado

MARK LOWDERMAN, TREASURER

DATE January 12, 2019

PROPERTY TAX STATEMENT
TAXES FOR 2018 DUE 2019

TYPE OF PROPERTY
REAL PROPERTY

78358

SCHEDULE (ACCOUNT) NUMBER
42000-00-396

PROPERTY LOCATION
0 EASTONVILLE RD

PROPERTY DESCRIPTION

TR OF LAND BEING A POR OF THE S2
OF SEC 21, S2 SEC 22, N2 OF SEC
28 & 27-12-64 DESC AS FOLS:COM
AT SE COR OF SD SEC 21, TH N
00<52'26" W ON THE E LN OF SD
SEC 2645.09 FT TO THE NE COR OF
THE SE4 OF SD SEC 21 FOR POB, TH
N 89<41'03" E ON THE N LN OF THE
S2 OF SD SEC 22 3938.18 FT, S
*** DESCRIPTION INCOMPLETE ***

42000-00-396
4 SITE INVESTMENTS LLC
1271 KELLY JOHNSON BLVD #100
COLORADO SPRINGS CO 80920-3951

TAX DISTRICT	MCA	ACTUAL VALUE	\$	30,638	ASSESSED VALUE	\$	8,890
TAX RATE	TAX AUTHORITY	TAX AMOUNT					
0.007738	EL PASO COUNTY	68.79					
0.000330	EPC ROAD & BRIDGE (UNSHARED)	2.93					
0.025819	PEYTON SCHOOL NO 23 - GEN	229.53					
0.004650	PEYTON SCHOOL NO 23 - BOND	41.34					
0.004000	* PIKES PEAK LIBRARY	35.56					
0.014886	FALCON FIRE PROTECTION	132.34					
0.001082	UPPER BLK SQUIRREL CRK GROUND WATER	9.62					
		*TEMPORARY TAX RATE REDUCTION/TAX CREDIT					
0.058505	TOTAL TAX RATE	TOTAL TAXES PAYABLE		\$ 520.11			

201942000003960100000000000000000260059

NOTE: Tax bills must be mailed to the property owner. If you have a mortgage, check with them before paying your taxes.

TO PAY ON-LINE OR VIEW YOUR ACCOUNT:
HTTP://TREASURER.ELPASOCO.COM

MAKE CHECKS PAYABLE TO:
EL PASO COUNTY TREASURER

MAIL PAYMENT TO:
EL PASO COUNTY TREASURER
P.O. BOX 2018
COLO. SPGS., CO 80901-2018

TELEPHONE 719-520-7900
e-mail: trsweb@elpasoco.com

Office Location:

1675 Garden of the Gods Rd,
Suite 2100, Colo. Spgs., CO 80907

YOUR SCHOOL DISTRICT GENERAL FUND

TAX RATE IS 0.025819

ABSENT STATE AID, IT WOULD HAVE
BEEN 0.137163

ADDRESS CHANGE INFORMATION-
SEE REVERSE SIDE

PAYMENT
COUPON 2

EL PASO COUNTY, COLORADO

2ND HALF - DUE JUNE 15, 2019

NO SECOND HALF STATEMENT WILL BE MAILED

SCHEDULE NUMBER 42000-00-396

OWNER'S NAME 4 SITE INVESTMENTS LLC

SECOND HALF AMOUNT DUE BY 6-15-2019 \$ 260.05

Do you have a mortgage? Check with them before paying your taxes.

Include a stamped, self-addressed envelope for a printed receipt.

20194200000396010000002600600000520111

PAYMENT
COUPON 1

EL PASO COUNTY, COLORADO

1ST HALF - DUE FEBRUARY 28, 2019 OR

FULL TAX - DUE APRIL 30, 2019

SCHEDULE NUMBER 42000-00-396

OWNER'S NAME 4 SITE INVESTMENTS LLC

FIRST HALF AMOUNT DUE BY 2-28-2019 \$ 260.06

FULL AMOUNT DUE BY 4-30-2019 \$ 520.11

Do you have a mortgage? Check with them before paying your taxes.

Include a stamped, self-addressed envelope for a printed receipt.

DRAINAGE MEMORANDUM



To: CDOT – Region 2 Arthur Gonzales

From: Mike Bramlett

Date: January, 09th 2020

Subject: Grandview Reserve – Proposed Hwy 24 Access Drainage Letter

INTRODUCTION

JR Engineering has proposed a preliminary design to provide access to the proposed Grandview Reserve residential development from the north side of Highway 24. The proposed access location is between the existing intersections of Stapleton Road and Elbert Road along Highway 24, or approximately CDOT mile marker 324.5. The existing and proposed drainage conditions have been analyzed per the latest El Paso County criteria and methods and our findings are presented in the subsequent text and attachments.

CRITERIA

All hydrologic data was obtained from the “City of Colorado Springs Drainage Criteria Manual” Volumes 1 and 2, and the “Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual” Volumes 1, 2, and 3. Onsite drainage improvements were designed based on the 5 year (minor) storm event and the 100-year (major) storm event. Runoff was calculated using the Rational Method, and rainfall intensities for the 5-year and the 100-year storm return frequencies were obtained from Table 6-2 of the Colorado Springs Criteria. One hour point rainfall data for the storm events is identified in the chart below. Runoff coefficients were determined based on proposed land use and from data in Table 6-6 from the DCM. Time of concentrations were developed using equations from the DCM. All runoff calculations and applicable charts and graphs are attached. Please note that El Paso County has adopted the Hydrology and Storage chapters of the City of Colorado Springs DCM’s.

Table 2 - 1-hr Point Rainfall Data

Storm	Rainfall (in.)
5-year	1.50
100-year	2.52

METHODOLOGY

This drainage analysis was limited to the area of proposed improvements and the existing basins in which the improvements lie. The analysis shows the changes proposed to land cover and basin imperviousness and the resulting changes in flows for each basin. Historic or existing drainage patterns are generally conserved.

Based on the FEMA FIRM Map number 08041C0556G, dated December 7, 2018, the proposed improvements, near their northeastern limits, cross the Zone A flood plain of the East Fork Tributary 1 Drainageway. However, it should be noted, it is anticipated that a CLOMR submittal will be made prior to construction of the Grandview Reserve residential

development, which may affect the existing mapped floodplain. The FIRM Map can be referenced in the attached Appendices.

The existing and proposed analysis area consists of three main land coverage types, grass and native vegetation, asphalt roadway, and compacted gravel. A composite percent imperviousness was calculated for each basin in its existing and proposed state. All soil was assumed to be of hydrologic type B as a mix of type A and B soils is shown on the attached NRCS Soil map.

BASIN DESCRIPTIONS

The project site was broken into seven basins for both the existing and proposed conditions analysis. The general historic flow path for the area is from the North West towards the South East. However, the highway creates a barrier to the historic flow pattern and a bridge and three culverts were installed to allow water to pass from the northern side of the roadway to the southern side of the roadway. An existing swale on the Northside of the roadway is used to transport water to the culvert locations and the bridge location where water can then pass under the roadway to the southern side. This swale is contained on the north side by the Rock Island Trail which is generally a minimum of 4' above the adjacent swale flowline. The southern side of the swale is contained by the Highway 24 roadway section. The edge of the roadway is generally 4 feet above the flowline of the swale. Once water is on the southern side of the road it follows existing drainageways until it reaches Black Squirrel Creek. The proposed design will maintain the existing swale geometry and slopes. Existing and proposed condition drainage maps are attached to this memo.

Basin A:

Existing Condition – Basin A is 1.02 acres and consists of the northern half of Highway 24, an existing swale on the north side of the roadway, and the existing Rock Island gravel Trail. Water from the roadway and trail sheet flows into the existing swale between them. The swale then carries water southwest to the existing Geick Ranch Tributary 1 Drainageway where it then crosses under the existing bridge and continues in the drainageway to the south. Flows at design point 1 are 1.3 cfs for the 5 year and 3.5 cfs for the 100 year.

Proposed Condition – Basin A is 1.02 acres, encompasses the same area as the existing condition Basin A and generally follows the same drainage paths as the existing condition. However, the road will be widened so the proposed basin includes more impervious area. The existing swale also will be re-aligned to accommodate the wider roadway. The flows at design point 1 are 1.3 cfs for the 5 year and 3.5 cfs for the 100 year. Rational calculations and swale calculations are attached to this memo.

Basin B:

Existing Condition – Basin B is 0.21 acres and includes the south half of Hwy 24 and a small area of native vegetation. This basin generally sheet flows off the roadway to the south, and then continues to the south until it reaches the existing Geick Ranch Tributary 1 Drainageway. Flows at Design Point 2 are 0.9 cfs for the 5 year and 1.6 cfs for the 100 year.

Proposed Condition – Basin B is 0.21 acres and encompasses the same area as the existing Basin B and generally follows the same drainage paths. The only changes in the proposed condition are that the roadway is to be widened. The percent imperviousness of the basin was updated accordingly. Flows at design point 2 are 1.0 cfs for the 5 year and 1.7 cfs for the 100 year. Rational calculations are attached to this memo.

Basin C:

Existing Condition – Basin C is 1.69 acres and includes the northern half of Highway 24, an existing swale on the north side of the roadway, and the existing Rock Island gravel Trail. Water from the roadway and trail sheet flow into the existing swale and are then transported northeast to an existing 24 inch RCP culvert at design point 3 where water is transported to the south side of the road and outfalls at design point 4, where flows combine with Basin D overland runoff. Water then continues south away from the road in undefined and unnamed drainage paths. Flows at design point 3 are 1.9 cfs for the 5 year and 5.4 cfs for the 100 year.

Proposed Condition – Basin C is 1.69 acres and encompasses the same area as the existing Basin C and generally follows the same drainage paths. The only changes in the proposed condition are that the roadway is to be widened, the swale re-aligned and the existing culvert extended to accommodate the wider road. The basins percent imperviousness was updated accordingly. Flows at design point 3 are 2.6 cfs for the 5 year and 6.2 for the 100 year. Rational, swale, and culvert calculations are attached to this memo.

Basin D:

Existing Condition – Basin D is 0.40 acres and includes the south half of Hwy 24 and a small area of native vegetation. This basin generally sheet flows off the roadway to the south, and then continues to the south until it reaches the undefined and unnamed existing drainageway adjacent to design point 4 where flows combine with the piped flows from design point 3, of Basin C. Flow at design point 4 is 2.9 cfs for the 5 year and 7.4 cfs for the 100 year.

Proposed Condition – Basin D is 0.40 acres and encompasses the same area as the existing Basin D and generally follows the same drainage paths. The only changes in the proposed condition are that the roadway is to be widened and the culvert lengthened to accommodate the roadway widening. The percent imperviousness of the basin was updated accordingly. Flows at design point 4 are 3.9 cfs for the 5 year and 8.4 cfs for the 100 year. Rational calculations are attached to this memo.

Basin E:

Existing Condition – Basin E is 3.03 acres and includes the northern half of Highway 24, an existing swale on the north side of the roadway, and the existing Rock Island gravel Trail. Water from the roadway and trail sheet flow into the existing swale and are then transported northeast or southwest to an existing 18 inch culvert at design point 5 where water is transported to the south side of the road and outfalls at design point 6, where flows combine with overland runoff from basin F. Water then continues south away from the road in undefined and unnamed drainage paths. Flows at design point 5 are 3.2 cfs for the 5 year and 9.6 cfs for the 100 year.

Proposed condition – Basin E is 3.03 acres, encompasses the same area as the existing conditions Basin E, and follows the same drainage paths as described in the existing conditions above. However, the road will be widened so the proposed basin includes more impervious area. This basin also includes the proposed access on the north side of Highway 24 to the future Grandview Reserve residential development. The existing swale will be re-aligned and the existing culvert lengthened to accommodate the wider roadway but existing flow patterns are maintained. An 18" RCP culvert will also be added underneath the proposed access to transport water from the northeast to southwest side of the proposed access. Flows at design point 5 are 5.0 cfs for the 5 year and 11.7 cfs for the 100 year. Flows at design point 5 are piped via the 18 inch RCP culvert to design point 6, where they combine with runoff from basin F. Rational, swale, and culvert calculations are attached to this memo.

Basin F:

Existing Condition – Basin F is 0.73 acres and includes the south half of Hwy 24 and a small area of native vegetation. This basin generally sheet flows off the roadway to the south, and then continues to the south until it reaches the undefined and unnamed existing drainageway at design point 6 where flows combine with the piped flows from design point 5, of Basin E. Flow at design point 6 is 5.3 cfs for the 5 year and 13.5 cfs for the 100 year.

Proposed Condition – Basin F is 0.73 acres and encompasses the same area as the existing Basin F. The only change in the proposed condition was that the roadway was widened and the culvert was lengthened to accommodate the roadway widening. The percent imperviousness of the basin was updated accordingly. Flows at design point 6 are 7.5 cfs for the 5 year and 16.1 cfs for the 100 year. Rational calculations are attached to this memo.

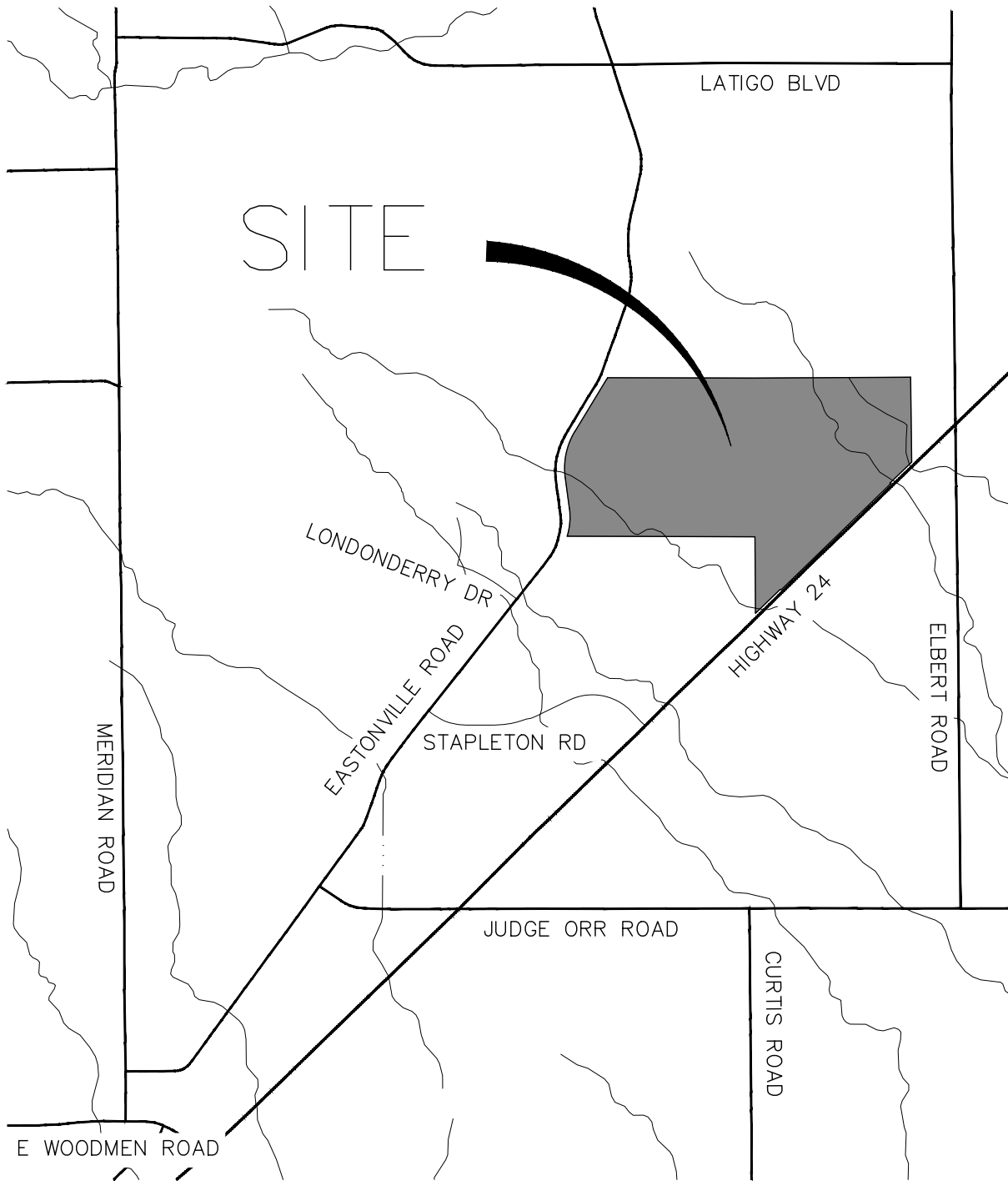
Basin G:

Existing Condition – Basin G is 3.42 acres and includes the northern half of Highway 24, an existing swale on the north side of the roadway, and the existing Rock Island gravel Trail. Water from the roadway and trail sheet flow into the existing swale and are then transported northeast to an existing 24 inch corrugated metal pipe culvert at design point 7 where water is transported to the south side of the road and outfalls to the existing East Fork Tributary 1 Drainageway and continues south along the drainageway until reaching the Black Squirrel Creek. Flows at design point 7 are 3.3 cfs for the 5 year and 9.7 cfs for the 100 year.

Proposed condition – Basin G is 3.42 acres, encompasses the same area as the existing conditions Basin G, and follows the same drainage paths as described in the existing conditions above. However, the road will be widened so the proposed basin includes more impervious area. The existing swale will be re-aligned to accommodate the wider roadway but existing flow patterns are maintained. Flows at design point 7 are 3.5 cfs for the 5 year and 9.9 cfs for the 100 year.

CONCLUSION

In general the proposed modifications to Highway 24 have little impact on the existing drainage patterns, infrastructure, and drainage function within the proposed project area. The increases in flows due to the proposed increase in impervious area are considered to be negligible with regards to the infrastructure serving this basin. All swales and culverts are shown to have adequate capacity. No adverse effects are expected on-site or downstream due to the proposed improvements.



4000 2000 0 4000



ORIGINAL SCALE: 1" = 4000'

VICINITY MAP
GRANDVIEW RESERVE
JOB NO. 29931.26
01/22/19
SHEET 1 OF 1

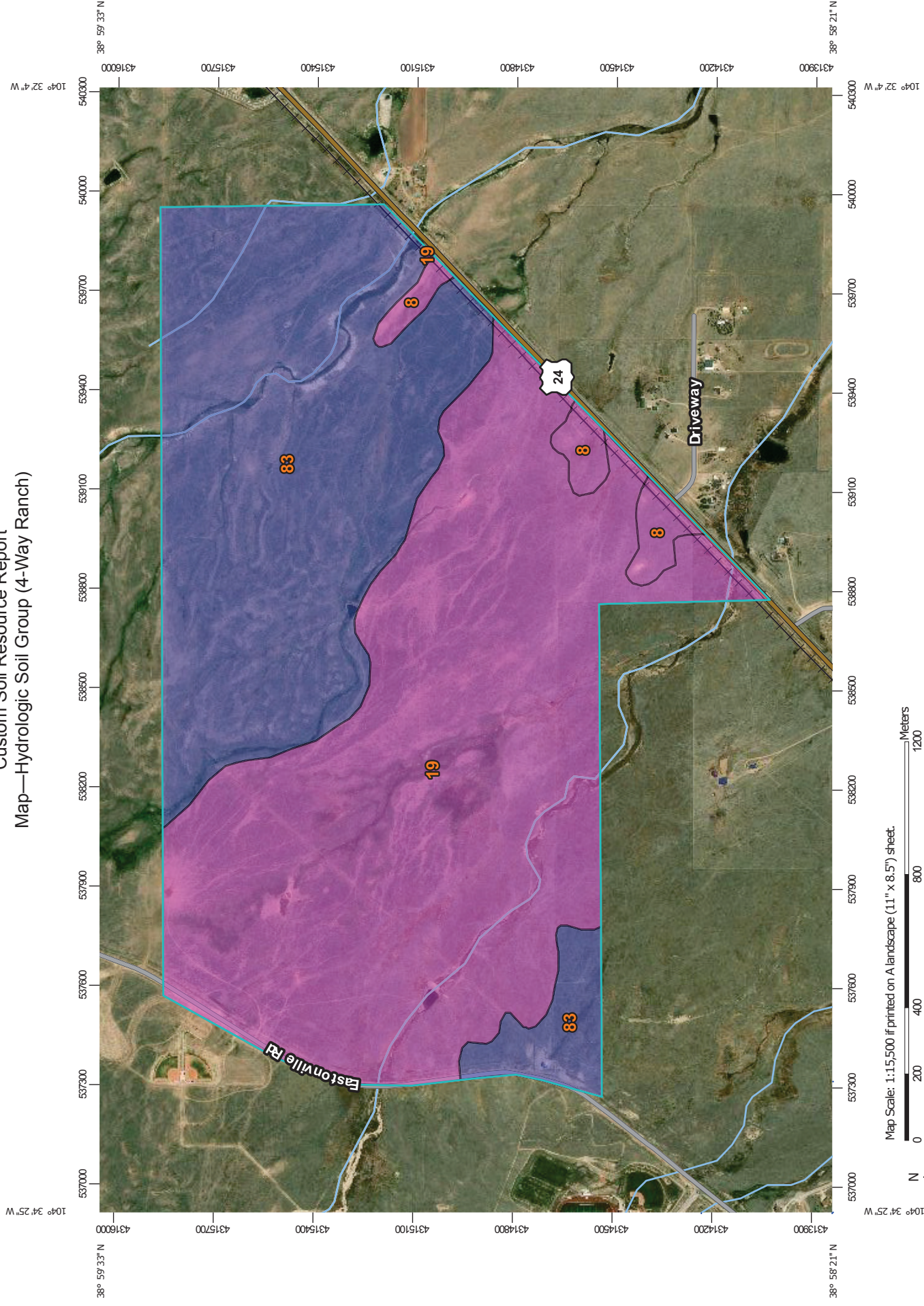


J·R ENGINEERING

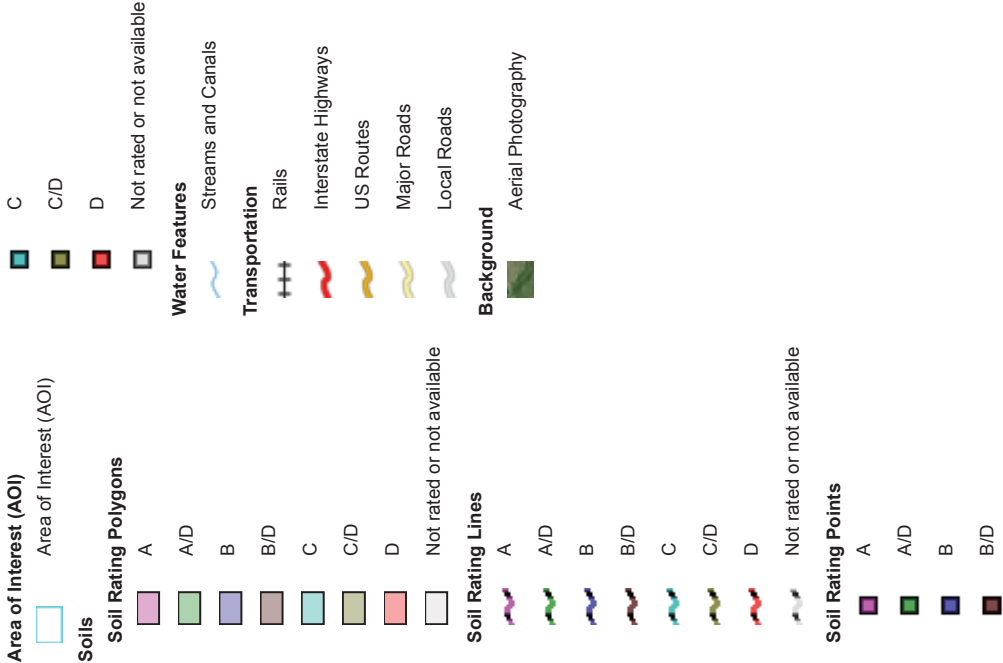
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

Custom Soil Resource Report Map—Hydrologic Soil Group (4-Way Ranch)



MAP LEGEND



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 16, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2016—Aug 17, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (4-Way Ranch)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	22.1	2.7%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	470.5	56.5%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	339.9	40.8%
Totals for Area of Interest			832.5	100.0%

Rating Options—Hydrologic Soil Group (4-Way Ranch)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NINGS12
National Geodetic Survey
SSM-C-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at <http://www.ngs.noaa.gov/>.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact **FEMA Map Service Center (MSC)** via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/nfp>.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map

This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Area of Interest

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.

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COMPOSITE % IMPERVIOUS CALCULATIONS

Subdivision: Grandview Reserve - Hwy 24 Access

Location: El Paso County

Project Name: Grandview Reserve - Hwy 24 Ex Conditions

Project No.: 29931.26

Calculated By: REB

Checked By: _____

Date: 1/8/20

Basin ID	Total Area (ac)	Paved Roads			Gravel			Lawns			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A	1.02	100%	0.22	21.2%	80%	0.11	8.8%	2%	0.69	1.4%	31.4%
B	0.21	100%	0.19	92.4%	80%	0.00	0.0%	2%	0.02	0.2%	92.6%
C	1.69	100%	0.33	19.4%	80%	0.19	8.8%	2%	1.18	1.4%	29.6%
D	0.40	100%	0.30	74.0%	80%	0.00	0.0%	2%	0.10	0.5%	74.5%
E	3.03	100%	0.55	18.2%	80%	0.32	8.5%	2%	2.16	1.4%	28.2%
F	0.73	100%	0.60	82.1%	80%	0.00	0.0%	2%	0.13	0.4%	82.4%
G	3.42	100%	0.62	18.1%	80%	0.35	8.3%	2%	2.45	1.4%	27.8%
TOTAL	10.50										35.4%

STANDARD FORM SF-2 TIME OF CONCENTRATION

Subdivision: Grandview Reserve - Hwy 24 Access
Location: El Paso County

Project Name: Grandview Reserve - Hwy 24 Ex Conditions
Project No.: 29931.26
Calculated By: REB
Checked By:
Date: 1/8/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					tc CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C _s	C ₁₀₀	L (ft)	S _o (%)	t _i (min)	L _t (ft)	S _t (%)	K	VEL. (ft/s)	t _t (min)	COMP. t _c (min)	TOTAL LENGTH (ft)	Urbanized t _c (min)	t _c (min)
A	1.02	B	31%	0.31	0.52	25	2.0%	5.7	425	0.7%	15.0	1.2	5.7	11.4	450.0	27.0	11.4
B	0.21	B	93%	0.84	0.91	25	2.0%	1.9	10	5.0%	7.0	1.6	0.1	2.0	35.0	10.3	5.0
C	1.69	B	30%	0.30	0.51	25	2.0%	5.8	635	1.0%	15.0	1.5	7.0	12.7	660.0	28.9	12.7
D	0.40	B	74%	0.69	0.80	25	2.0%	3.0	10	5.0%	7.0	1.6	0.1	3.1	35.0	13.4	5.0
E	3.03	B	28%	0.28	0.50	25	2.0%	5.9	535	0.8%	15.0	1.3	6.8	12.6	560.0	29.1	12.6
F	0.73	B	82%	0.75	0.85	25	2.0%	2.5	10	5.0%	7.0	1.6	0.1	2.6	35.0	12.0	5.0
G	3.42	B	28%	0.28	0.50	25	2.0%	5.9	900	1.0%	15.0	1.5	10.2	16.1	925.0	33.1	16.1

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

$$t_t = \frac{L_t}{60K\sqrt{S_a}} = \frac{L_t}{60V_t}$$

Where:

t_t = channelized flow time (travel time, min)

L_t = waterway length (ft)

S_a = waterway slope (ft/ft)

V_t = travel time velocity (ft/sec) = $K\sqrt{S_a}$

K = NRCS conveyance factor (see Table 6-2).

$$\text{Equation 6-2} \quad t_i = \frac{0.395(1.1 - C_s)\sqrt{L}}{S_a^{0.33}}$$

Where:

t_i = overland (initial) flow time (minutes)

C_s = runoff coefficient for 5-year frequency (from Table 6-4)

L = length of overland flow (ft)

S_a = average slope along the overland flow path (ft/ft).

$$\text{Equation 6-4} \quad t_t = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_a}}$$

Where:

t_t = minimum time of concentration for first design point when less than t_i from Equation 6-1.

L_t = length of channelized flow path (ft)

i = imperviousness (expressed as a decimal)

S_a = slope of the channelized flow path (ft/ft).

Equation 6-3

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

Equation 6-5

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Grandview Reserve - Hwy 24 Access
 Location: El Paso County
 Design Storm: 5-Year

Project Name: Grandview Reserve - Hwy 24 Ex Conditions

Project No.: 29931.26

Calculated By: REB

Checked By: _____
Date: 1/8/20

[illegible]

Notes:

Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Grandview Reserve - Hwy 24 Access
Location: El Paso County
Design Storm: 100-Year

Project Name: Grandview Reserve - Hwy 24 Ex Conditions

Project No.: 29931.26

Calculated By: REB

Checked By: _____
Date: 1/8/20

[illegible]

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

COMPOSITE % IMPERVIOUS CALCULATIONS

Subdivision: Grandview Reserve - Hwy 24 Access

Location: El Paso County

Project Name: Grandview Reserve - Hwy 24 Prop. Conditions

Project No.: 29931.26

Calculated By: REB

Checked By: _____

Date: 1/8/20

Basin ID	Total Area (ac)	Paved Roads			Gravel			Lawns			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A	1.02	100%	0.26	25.4%	80%	0.11	8.8%	2%	0.65	1.3%	35.5%
B	0.21	100%	0.21	99.9%	80%	0.00	0.0%	2%	0.00	0.0%	99.9%
C	1.69	100%	0.60	35.4%	80%	0.19	8.8%	2%	0.91	1.1%	45.3%
D	0.40	100%	0.40	99.3%	80%	0.00	0.0%	2%	0.00	0.0%	99.3%
E	3.03	100%	1.14	37.6%	80%	0.32	8.5%	2%	1.57	1.0%	47.2%
F	0.73	100%	0.73	100.2%	80%	0.00	0.0%	2%	0.00	0.0%	100.2%
G	3.42	100%	0.71	20.6%	80%	0.35	8.3%	2%	2.36	1.4%	30.3%
TOTAL	10.50										47.0%

STANDARD FORM SF-2 TIME OF CONCENTRATION

Subdivision: Grandview Reserve - Hwy 24 Access
Location: El Paso County

Project Name: Grandview Reserve - Hwy 24 Prop. Conditions
Project No.: 29931.26
Calculated By: REB
Checked By:
Date: 1/8/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					tc CHECK			FINAL	
DATA						(T _i)			(T _t)					(URBANIZED BASINS)				
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C _s	C ₁₀₀	L (ft)	S _o (%)	t _i (min)	L _t (ft)	S _t (%)	K	VEL. (ft/s)	t _t (min)	COMP. t _c (min)	TOTAL LENGTH (ft)	Urbanized t _c (min)		t _c (min)
A	1.02	B	35%	0.34	0.54	45	2.0%	7.3	405	0.7%	15.0	1.2	5.5	12.7	450.0	25.8	12.7	
B	0.21	B	100%	0.90	0.96	30	2.0%	1.6	5	5.0%	7.0	1.6	0.1	1.6	35.0	9.0	5.0	
C	1.69	B	45%	0.43	0.60	45	2.0%	6.5	615	0.8%	15.0	1.4	7.6	14.1	660.0	25.7	14.1	
D	0.40	B	99%	0.89	0.96	30	2.0%	1.6	5	5.0%	7.0	1.6	0.1	1.7	35.0	9.1	5.0	
E	3.03	B	47%	0.44	0.62	45	2.0%	6.3	515	0.8%	15.0	1.3	6.6	12.9	560.0	24.3	12.9	
F	0.73	B	100%	0.90	0.96	30	2.0%	1.6	5	5.0%	7.0	1.6	0.1	1.6	35.0	9.0	5.0	
G	3.42	B	30%	0.30	0.51	45	2.0%	7.7	880	1.2%	15.0	1.6	8.9	16.6	925.0	31.0	16.6	

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

$$t_t = \frac{L_t}{60K\sqrt{S_a}} = \frac{L_t}{60V_t}$$

Where:

t_t = channelized flow time (travel time, min)

L_t = waterway length (ft)

S_a = waterway slope (ft/ft)

V_t = travel time velocity (ft/sec) = $K\sqrt{S_a}$

K = NRCS conveyance factor (see Table 6-2).

$$\text{Equation 6-2} \quad t_i = \frac{0.395(1.1 - C_s)\sqrt{L}}{S_a^{0.33}}$$

Where:

t_i = overland (initial) flow time (minutes)

C_s = runoff coefficient for 5-year frequency (from Table 6-4)

L = length of overland flow (ft)

S_a = average slope along the overland flow path (ft/ft).

$$\text{Equation 6-4} \quad t_t = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_a}}$$

Where:

t_t = minimum time of concentration for first design point when less than t_c from Equation 6-1.

L_t = length of channelized flow path (ft)

i = imperviousness (expressed as a decimal)

S_a = slope of the channelized flow path (ft/ft).

Equation 6-3

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

Equation 6-5

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Grandview Reserve - Hwy 24 Access
 Location: El Paso County
 Design Storm: 5-Year

Project Name: Grandview Reserve - Hwy 24 Prop. Conditions

Project No.: 29931.26

Calculated By: REB

Checked By: _____
Date: 1/10/20

Date: 1/8/20

[illegible]

Notes:

Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Grandview Reserve - Hwy 24 Access
Location: El Paso County
Design Storm: 100-Year

Project Name: Grandview Reserve - Hwy 24 Prop. Conditions
Project No.: 29931.26
Calculated By: REB
Checked By: _____
Date: 1/8/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	η (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	η (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	A	1.02	0.54	12.7	0.55	6.32	3.5															Runoff from Basin A, outfalls to existing grass swale @ DP-1
	2	B	0.21	0.96	5.0	0.20	8.68	1.7															Runoff from Basin B, sheet flows off-site into field @ DP-2
	3	C	1.69	0.60	14.1	1.02	6.07	6.2							6.2	1.0	0.1	18	52	3.5	0.2		Runoff from Basin C, outfalls to ex 18" RCP culvert @ DP-3 via grass swale, piped to DP-4
	4	D	0.40	0.96	5.0	0.38	8.68	3.3	14.3	1.40	6.03	8.4											Combined flow @ DP-4 from Basins C and D runoff.
	5	E	3.03	0.62	12.9	1.87	6.28	11.7							11.7	1.9	1.3	18	49	7.7	0.1		Runoff from Basin E, outfalls to ex 18" culvert @ DP-5 via grass swale, piped to DP-6
	6	F	0.73	0.96	5.0	0.70	8.68	6.1	13.0	2.57	6.26	16.1											Combined flow @ DP-6 from Basins D and E runoff.
	7	G	3.42	0.51	16.6	1.75	5.65	9.9															Runoff from Basin G, outfalls to ex 24" CMP culvert @ DP-7

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Thursday, Jan 9 2020

Design Point 1 - Proposed Swale 100 Yr

Triangular

Side Slopes (z:1) = 4.00, 3.00
Total Depth (ft) = 4.00

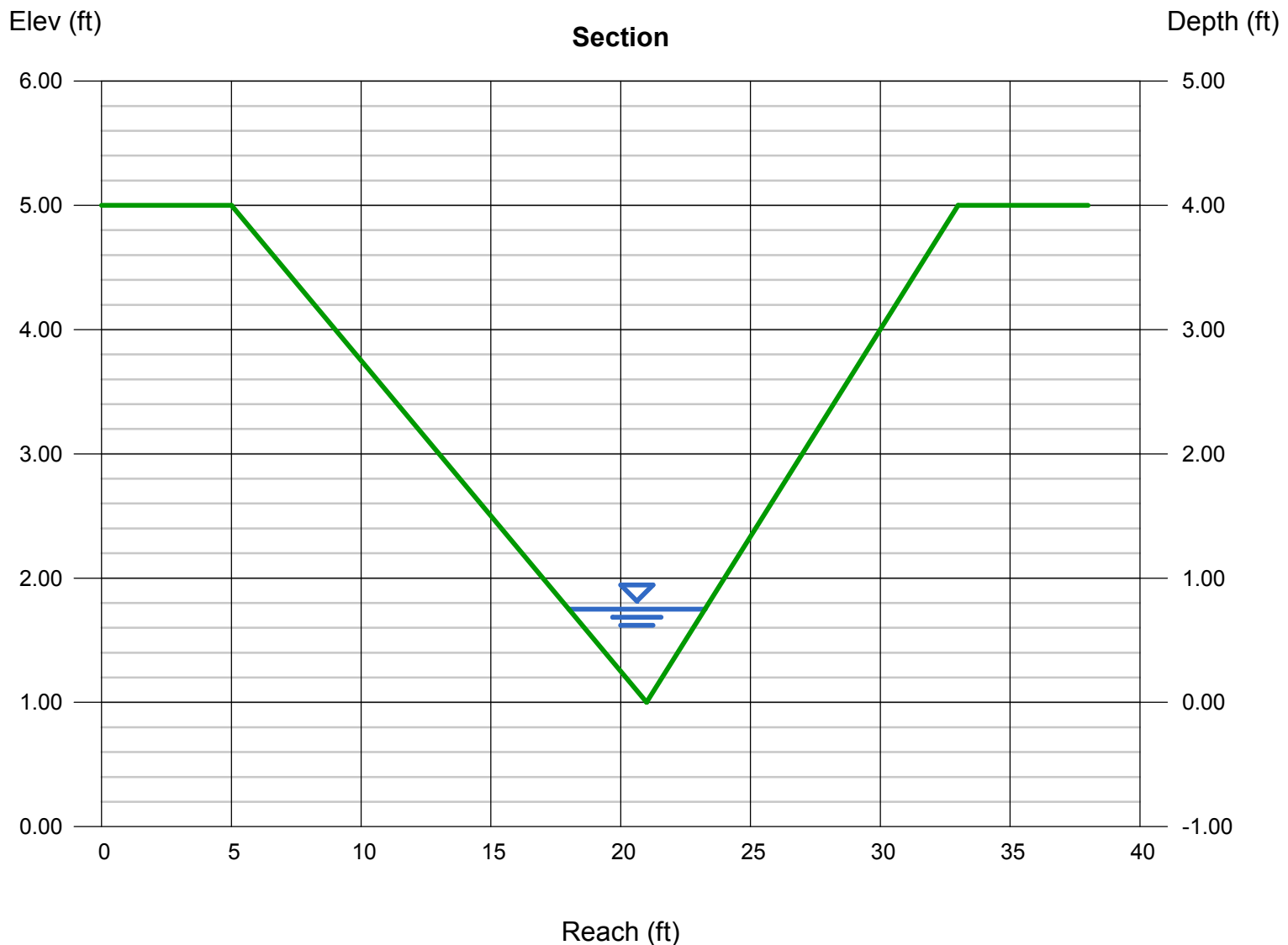
Invert Elev (ft) = 1.00
Slope (%) = 0.70
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 3.50

Highlighted

Depth (ft) = 0.75
Q (cfs) = 3.500
Area (sqft) = 1.97
Velocity (ft/s) = 1.78
Wetted Perim (ft) = 5.46
Crit Depth, Yc (ft) = 0.58
Top Width (ft) = 5.25
EGL (ft) = 0.80



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Thursday, Jan 9 2020

Design Point 3 - Proposed Swale 100 Yr

Triangular

Side Slopes (z:1) = 4.00, 3.00
Total Depth (ft) = 4.00

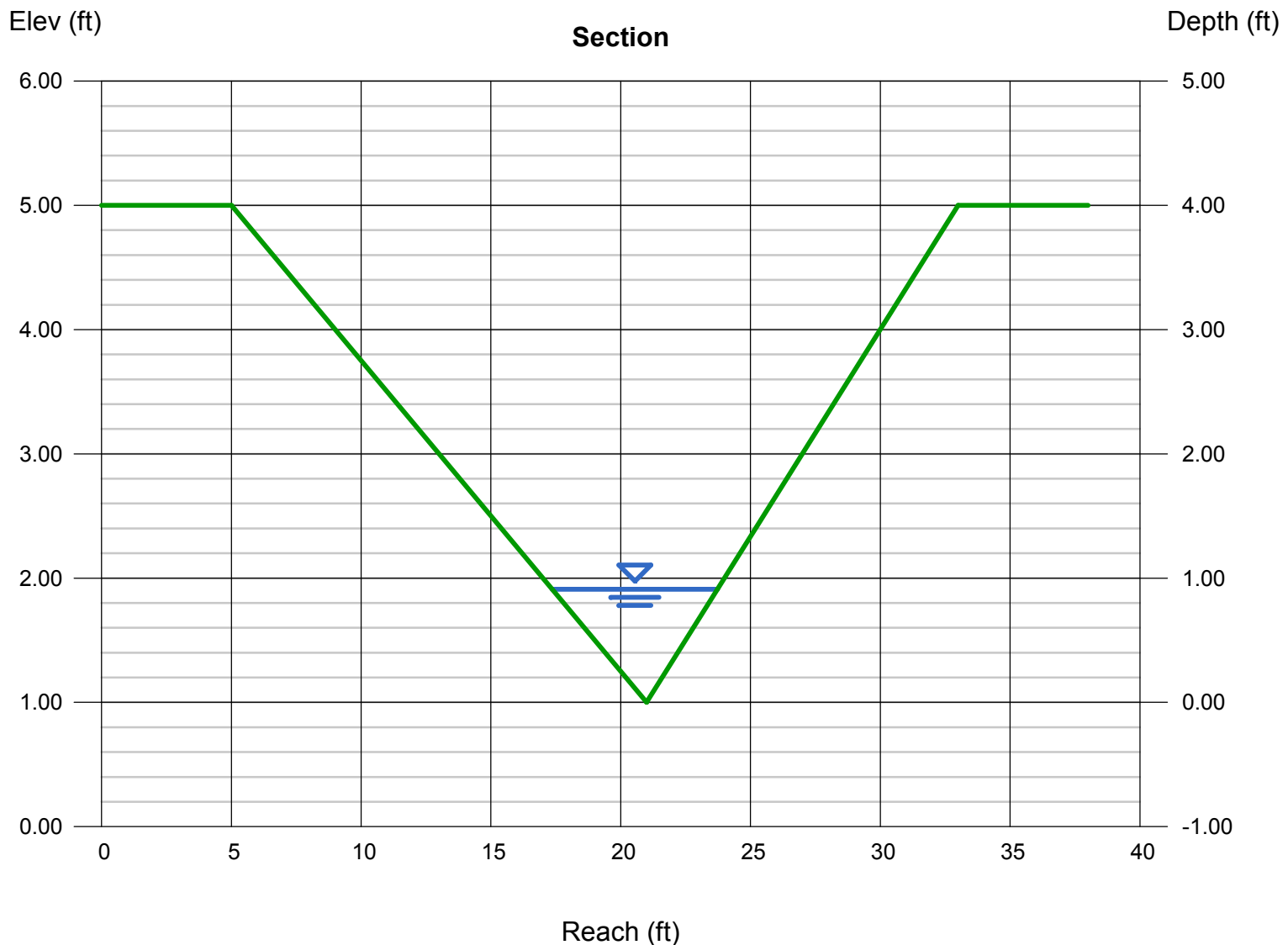
Invert Elev (ft) = 1.00
Slope (%) = 0.80
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 6.20

Highlighted

Depth (ft) = 0.91
Q (cfs) = 6.200
Area (sqft) = 2.90
Velocity (ft/s) = 2.14
Wetted Perim (ft) = 6.63
Crit Depth, Yc (ft) = 0.73
Top Width (ft) = 6.37
EGL (ft) = 0.98



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Thursday, Jan 9 2020

Design Point 5 - Proposed Swale 100 Yr

Triangular

Side Slopes (z:1) = 4.00, 3.00
Total Depth (ft) = 4.00

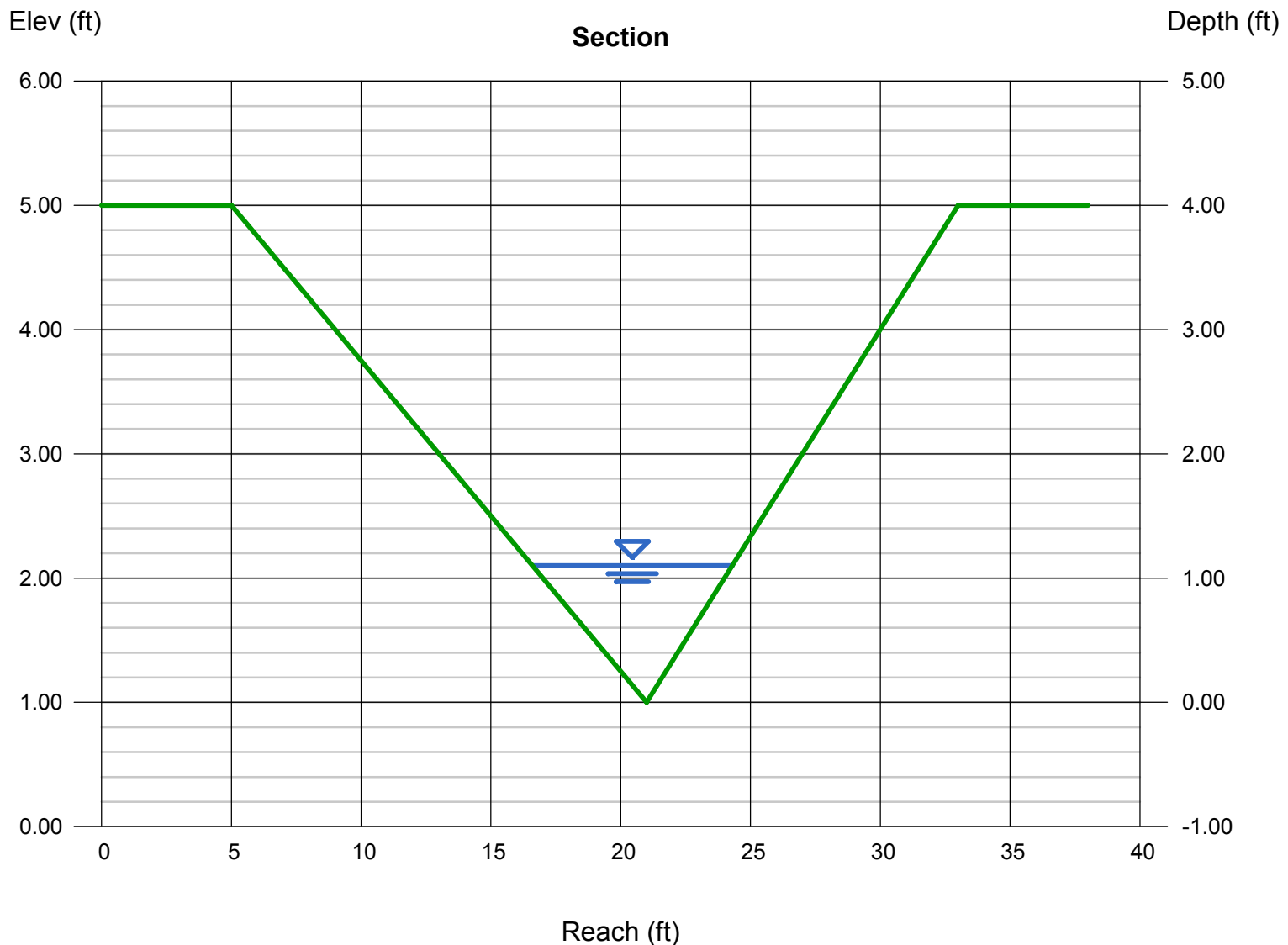
Invert Elev (ft) = 1.00
Slope (%) = 1.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 11.70

Highlighted

Depth (ft) = 1.10
Q (cfs) = 11.70
Area (sqft) = 4.23
Velocity (ft/s) = 2.76
Wetted Perim (ft) = 8.01
Crit Depth, Yc (ft) = 0.93
Top Width (ft) = 7.70
EGL (ft) = 1.22



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Thursday, Jan 9 2020

Design Point 7 - Proposed Swale 100 Yr

Triangular

Side Slopes (z:1) = 4.00, 3.00
Total Depth (ft) = 4.00

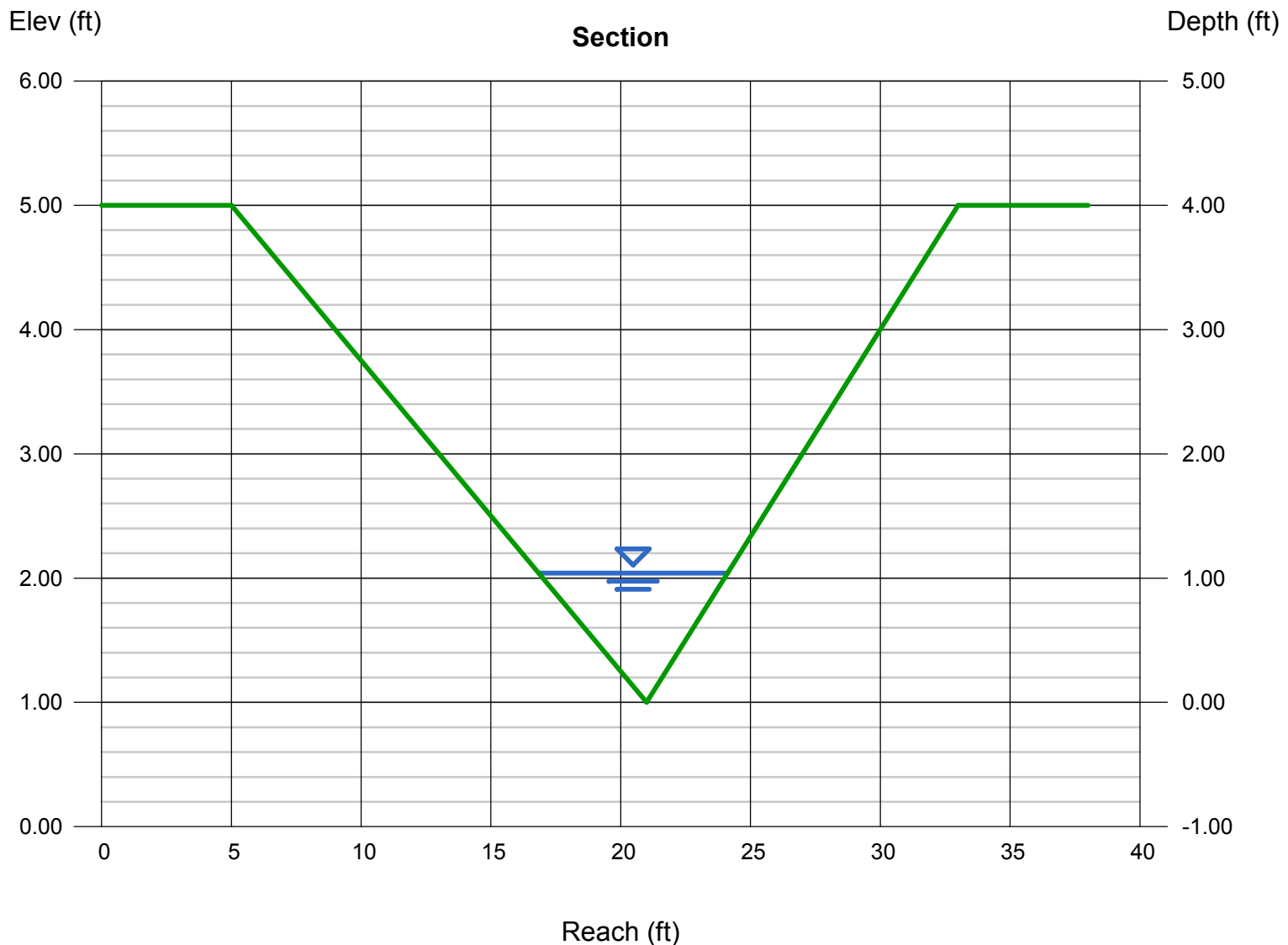
Invert Elev (ft) = 1.00
Slope (%) = 1.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 9.90

Highlighted

Depth (ft) = 1.04
Q (cfs) = 9.900
Area (sqft) = 3.79
Velocity (ft/s) = 2.62
Wetted Perim (ft) = 7.58
Crit Depth, Yc (ft) = 0.87
Top Width (ft) = 7.28
EGL (ft) = 1.15



HY-8 Analysis Results

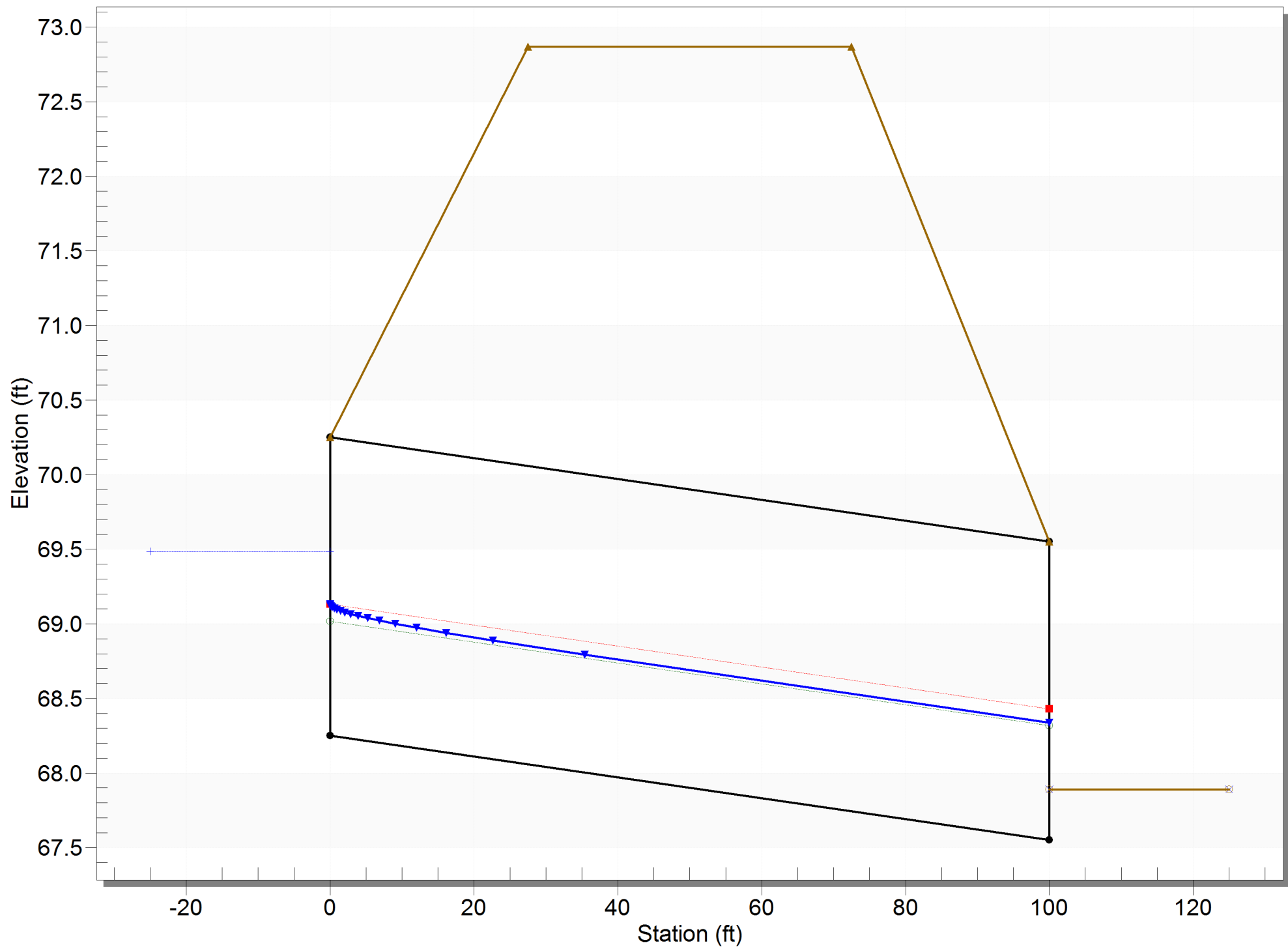
Culvert Summary Table - Culvert 1

Culvert Crossing: Design Point 3 - Proposed

Discharge Names	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)
Q5	2.60	2.60	69.01	0.76	-0.36	1-S2n	0.49	0.56	0.49	0.00	4.25	0.00
Q100	6.20	6.20	69.48	1.23	-0.36	1-S2n	0.77	0.88	0.79	0.00	5.22	0.00

Crossing - Design Point 3 - Proposed, Design Discharge - 6.2 cfs

Culvert - Culvert 1, Culvert Discharge - 6.2 cfs



HY-8 Analysis Results

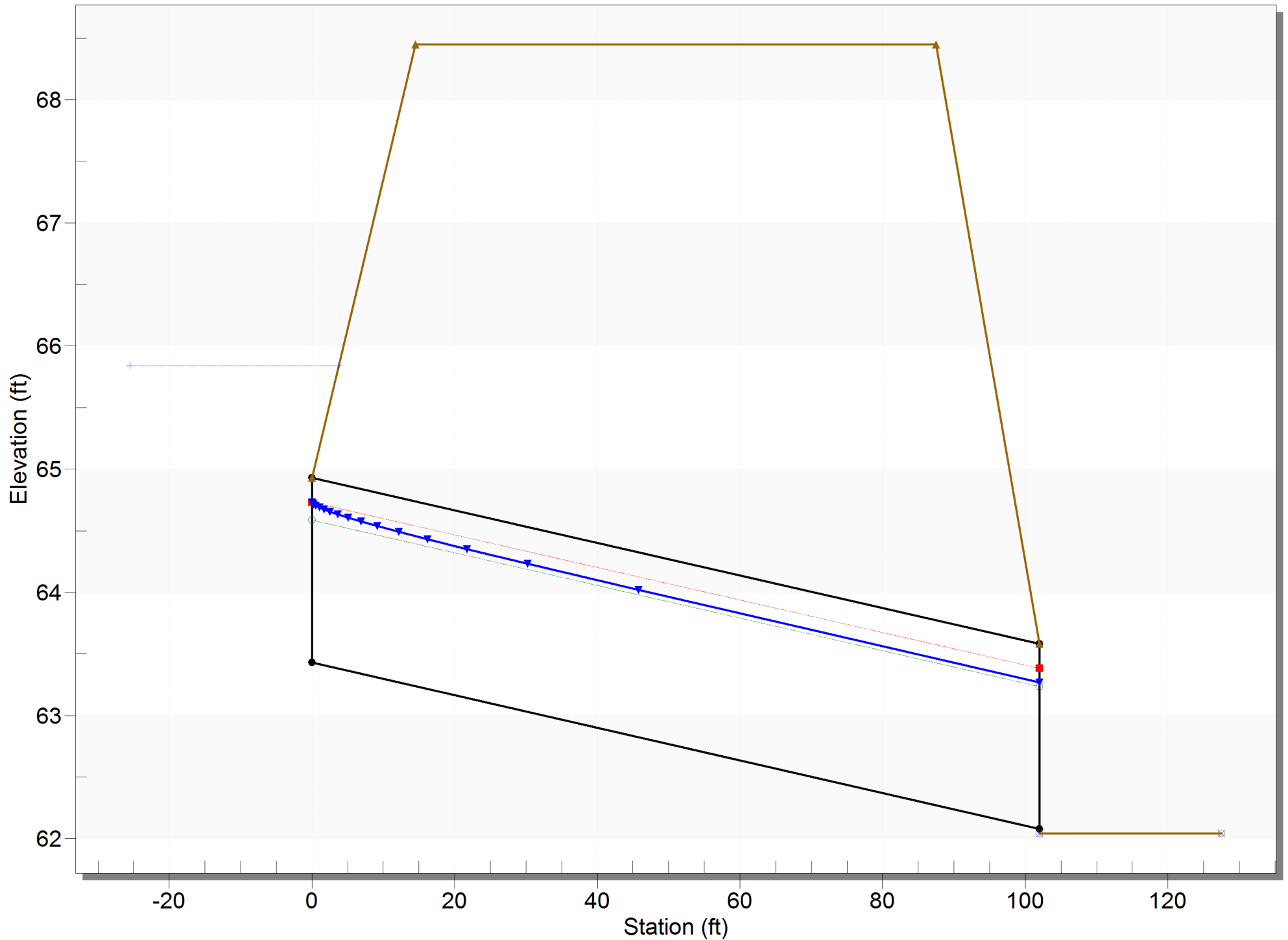
Culvert Summary Table - Culvert 1

Culvert Crossing: Design Point 5 - Proposed

Discharge Names	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)
Q5	5.00	5.00	64.67	1.24	-1.39	1-S2n	0.65	0.86	0.67	0.00	6.27	0.00
Q100	11.70	11.70	65.84	2.41	-1.39	5-S2n	1.16	1.30	1.19	0.00	7.60	0.00

Crossing - Design Point 5 - Proposed, Design Discharge - 11.7 cfs

Culvert - Culvert 1, Culvert Discharge - 11.7 cfs



HY-8 Analysis Results

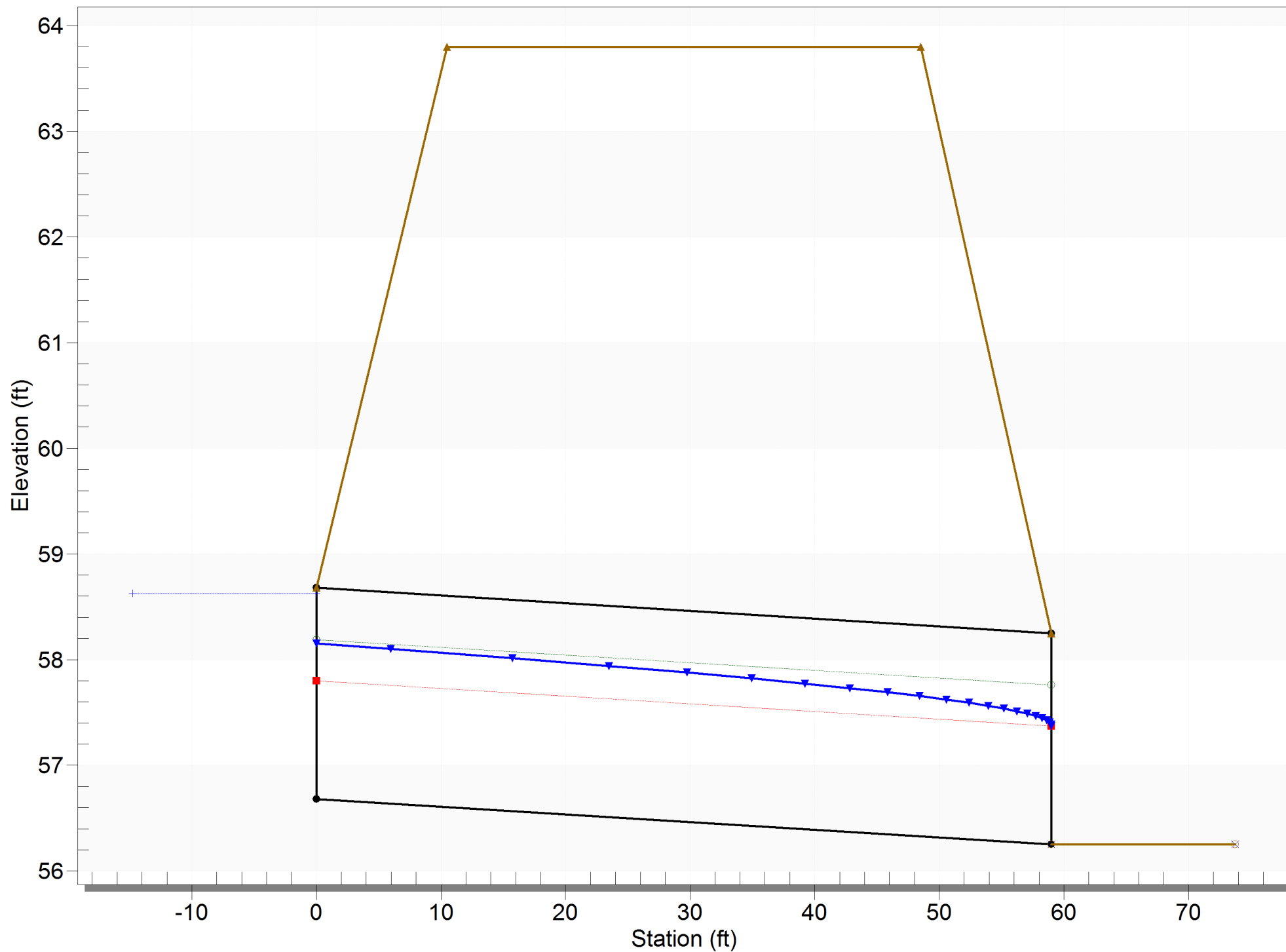
Culvert Summary Table - Culvert 1

Culvert Crossing: Design Point 7 - Proposed

Discharge Names	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)
Q5	3.50	3.50	57.74	0.97	1.06	2-M2c	0.78	0.65	0.65	0.00	3.96	0.00
Q100	9.90	9.90	58.62	1.81	1.94	2-M2c	1.51	1.12	1.12	0.00	5.47	0.00

Crossing - Design Point 7 - Proposed, Design Discharge - 9.9 cfs

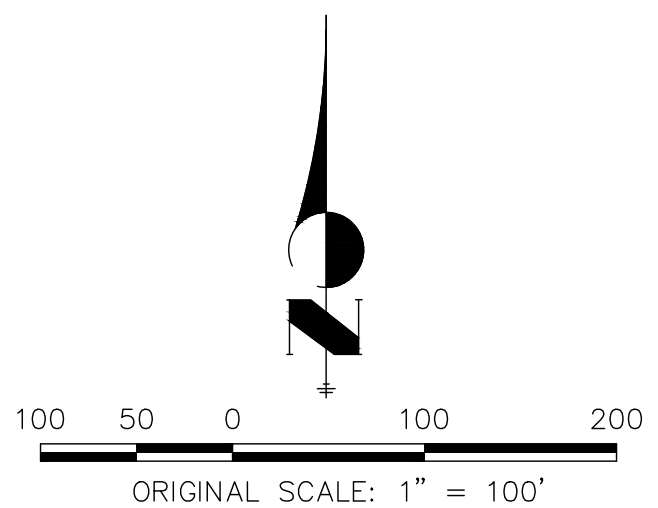
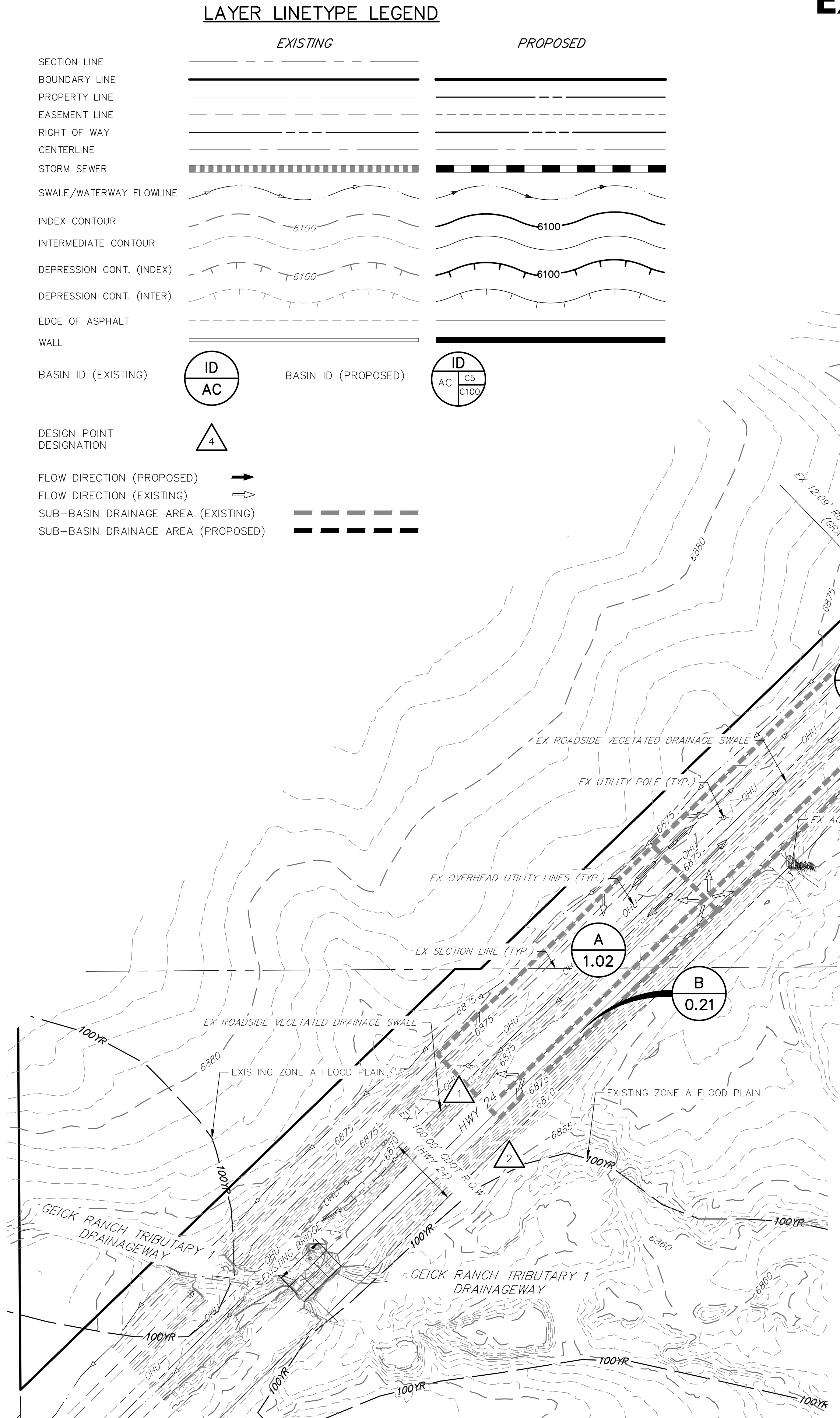
Culvert - Culvert 1, Culvert Discharge - 9.9 cfs



4 WAY RANCH - HWY 24 ACCESS
A PARCEL OF LAND BEING PORTIONS OF SECTIONS 28, 29, 32, & 33
TOWNSHIP 12 SOUTH, RANGE 64 WEST OF THE SIXTH PRINCIPAL MERIDIAN
TOWN OF PEYTON, COUNTY OF EL PASO, STATE OF COLORADO
EXISTING CONDITIONS DRAINAGE MAP

BASIN SUMMARY TABLE							
Tributary	Area	Percent			t _c	Q _s	Q ₁₀₀
Sub-basin	(acres)	Impervious	C _s	C ₁₀₀	(min)	(cfs)	(cfs)
A	1.02	31%	0.31	0.52	11.4	1.3	3.5
B	0.21	93%	0.84	0.91	5.0	0.9	1.6
C	1.69	30%	0.30	0.51	12.7	1.9	5.4
D	0.40	74%	0.69	0.80	5.0	1.4	2.8
E	3.03	28%	0.28	0.50	12.6	3.2	9.6
F	0.73	82%	0.75	0.85	5.0	2.8	5.4
G	3.42	28%	0.28	0.50	16.1	3.3	9.7

DESIGN POINT SUMMARY		
DESIGN POINT	Q _s (cfs)	Q ₁₀₀ (cfs)
1	1.3	3.5
2	0.9	1.6
3	1.9	5.4
4	2.9	7.4
5	3.2	9.6
6	5.3	13.5
7	3.3	9.7



2000-9931.26
4 WAY RANCH - HWY 24 ACCESS
EXISTING CONDITIONS DRAINAGE MAP
2020-01-08
SHEET 1 OF 2

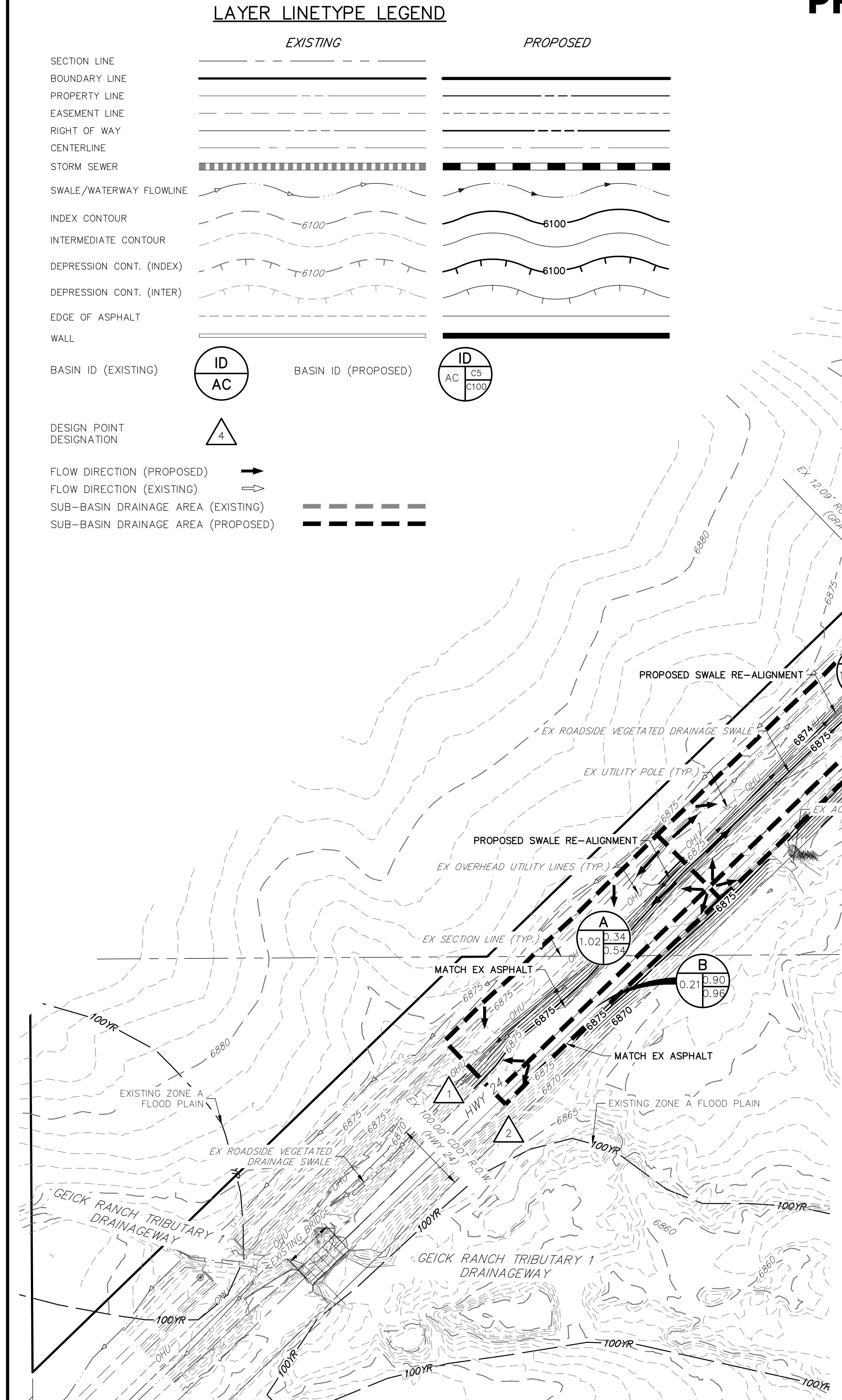


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4 WAY RANCH - HWY 24 ACCESS
A PARCEL OF LAND BEING PORTIONS OF SECTIONS 28, 29, 32, & 33
TOWNSHIP 12 SOUTH, RANGE 64 WEST OF THE SIXTH PRINCIPAL MERIDIAN
TOWN OF PEYTON, COUNTY OF EL PASO, STATE OF COLORADO
PROPOSED CONDITIONS DRAINAGE MAP

BASIN SUMMARY TABLE							
Tributary	Area	Percent			t _c	Q _s	Q ₁₀₀
Sub-basin	(acres)	Impervious	C _s	C ₁₀₀	(min)	(cfs)	(cfs)
A	1.02	35%	0.34	0.54	12.7	1.3	3.5
B	0.21	100%	0.90	0.96	5.0	1.0	1.7
C	1.69	45%	0.43	0.60	14.1	2.6	6.2
D	0.40	99%	0.89	0.96	5.0	1.9	3.3
E	3.03	47%	0.44	0.62	12.9	5.0	11.7
F	0.73	100%	0.90	0.96	5.0	3.4	6.1
G	3.42	30%	0.30	0.51	16.6	3.5	9.9

DESIGN POINT SUMMARY		
DESIGN POINT	Q _s (cfs)	Q ₁₀₀ (cfs)
1	1.3	3.5
2	1.0	1.7
3	2.6	6.2
4	3.9	8.4
5	5.0	11.7
6	7.5	16.1
7	3.5	9.9



2000-9931.26
4 WAY RANCH - HWY 24 ACCESS
PROPOSED CONDITIONS DRAINAGE MAP
2020-01-08
SHEET 1 OF 2



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Fort Collins 970-491-9888 • www.jrengineering.com



TIS Included w/
Original Application
(This cover page is for
Reference)

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Colorado Springs, CO 80903

(719) 633-2868

FAX (719) 633-5430

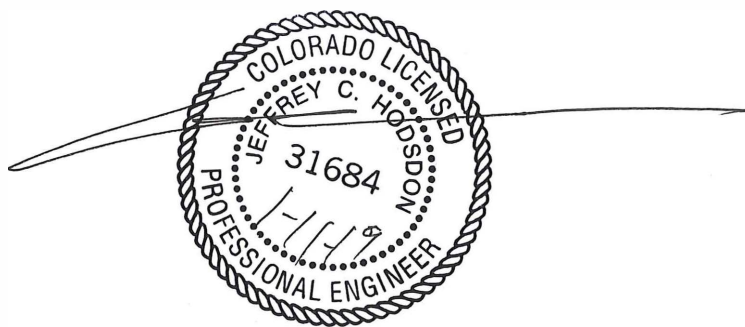
E-mail: lsc@lsctrans.com

Website: <http://www.lsctrans.com>

Grandview Reserve
Traffic Impact Analysis
(LSC #184840)
January 11, 2019

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

Adam R. Martz

1/11/19
Date