COLORADO DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ACCESS PERMIT APPLICATION

Issuing authority application acceptance date:

Instructions:

Please print or type

- 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**

1) Property owner (Permittee)		2) Applicant or Agent for permittee (if different from property owner)	
Ute Pass Rental, Inc.		Ute Pass Rental, Inc.	
Street address: 8775 W. Highway 24		Mailing address: 8775 W. Highway 24	
City, state & zip: Cascade, CO 80809-1335	Phone #: 719-687-6371	City, state & zip: Cascade, CO 80809-1335	Phone # (required): 719-687-6371
E-mail address:		E-mail address if available:	

3) Address of property to be served by permit (required)
8775 W. Highway 24, Cascade, CO 80809-1335 (County Parcel No. 8315300029)

4) Legal description of property: If within jurisdictional limits of Municipality, city and/or County, which one?

county	subdivision	block	lot	section	township	range
El Paso	See attached					

5) What State Highway are you requesting access from?
24A

6) What side of the highway?
☐ N ☒ S ☐ E ☐ W

7) How many feet is the proposed access from the nearest mile post?
94 feet (☐ N ☐ S ☐ E ☒ W) from: 292

How many feet is the proposed access from the nearest cross street?
750 feet (☐ N ☐ S ☒ E ☐ W) from: Wellington Rd

8) What is the approximate date you intend to begin construction?
10/1/2018

9) Check here if you are requesting a:
☐ new access ☐ temporary access (duration anticipated:) ☐ improvement to existing access
☒ change in access use ☐ removal of access ☒ relocation of an existing access (provide detail)

10) Provide existing property use
Retail Store

11) Do you have knowledge of any State Highway access permits serving this property, or adjacent properties in which you have a property interest?
☒ no ☐ 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?
☐ no ☒ yes, if yes - please describe:
Adjacent Property to the west. Parcel No. 8315300025

13) Are there other existing or dedicated public streets, roads, highways or access easements bordering or within the property?
☒ no ☐ 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
Mini warehouse storage	9,825		
Mini Whse. Business Office	565		

16) If you are requesting residential developement access, what is the type (single family, apartment, townhouse) and number of units?

type	number of units	type	number of units
n/a			

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 ☒ peak hour volumes or ☐ average daily volumes.	# of passenger cars and light trucks at peak hour volumes: 2	# of multi unit trucks at peak hour volumes: 0
# of single unit vehicles in excess of 30 ft.: 0	# of farm vehicles (field equipment): 0	**Total count of all vehicles**: 2

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.
b) Highway and driveway plan profile.
c) Drainage plan showing impact to the highway right-of-way.
d) Map and letters detailing utility locations before and after development in and along the right-of-way.
e) Subdivision, zoning, or development plan.
f) Proposed access design.
g) Parcel and ownership maps including easements.
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
	Michael Kratko	8/15/18

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
	Michael Kratko	8/15/18

Legal Description

TRACT IN NE4SW4 SEC 15-13-68 AS FOLS, BEG AT POI OF

INTSEC OF SWLY R/W LN OF US HWY 24 & S LN OF NE4SW4,

TH ALG SD R/W LN N 44<48' W 179.00 FT, TH ALG ARC OF

CUR TO R HAVING A RAD OF 5780.00 FT WHOSE CHORD BEARS

N 43<10' W 330.40 FT,, TH LEAVING SD R/W LN

S 50<17' W 351.60 FT M/L TO NELY R/W LN OF MIDLAND

TERMINAL RW CO, TH ALG SD RR R/W LN

S 45<27' E 197.80 FT M/L TO S LN OF NE4SW4, TH

E ALG SD S LN 481.60 FT M/L TO POB, EX TR DES IN

BK 3023-977

El Paso County, Colorado
Property Tax Details

Property Taxes for 2017 Due 2018

Display Tax Statement

This information reflects current year status of tax liability, assessments due, fees, interest, and current payments received. This information is not to be used in place of a certificate of taxes due.

Parcel Information

Schedule Number:	8315300029

Owner Information

Name:	UTE PASS RENTAL INC
Mailing Address:	8775 W US HIGHWAY 24 CASCADE CO 80809-1335

Property Information

Property Address:	8775 W HIGHWAY 24
Property Type:	Real

Legal Description

TRACT IN NE4SW4 SEC 15-13-68 AS FOLS, BEG AT POI OFINTSEC OF SWLY R/W LN OF US HWY 24 & S LN OF NE4SW4,TH ALG SD R/W LN N 44<48' W 179.00 FT, TH ALG ARC OFCUR TO R HAVING A RAD OF 5780.00 FT WHOSE CHORD BEARSN 43<10' W 330.40 FT,, TH LEAVING SD R/W LNS 50<17' W 351.60 FT M/L TO NELY R/W LN OF MIDLANDTERMINAL RW CO, TH ALG SD RR R/W LNS 45<27' E 197.80 FT M/L TO S LN OF NE4SW4, THE ALG SD S LN 481.60 FT M/L TO POB, EX TR DES INBK 3023-977

Alerts

N/A

Property Valuation

Total Assessed Land:	$26,540
Total Assessed Improvements:	$6,570
Total Assessed:	$33,110

Assessment questions? Click here

Value

Total Market Value:	$114,159

Taxes Billed

Base Tax Amount:	$2,672.87
Special Assessment Amount:	$0.00
Improvement District Amount:	$0.00
Total Current Year Taxes:	$2,672.87

Total Current Year Taxes do not reflect outstanding tax liens and delinquencies, if any.
See Alerts.

Current Year Payments Due as of 8/27/2018

Option 1:

Payment Type	Due Date	Taxes & Fees Due	Interest Due	Total Amount		
First Half:	February 28	$0.00	$0.00	$0.00	False	Pay
Second Half:	June 15	$0.00	$0.00	$0.00	False	Pay

OR

Option 2:

Payment Type	Due Date	Taxes & Fees Due	Interest Due	Total Amount		
Full Amount:	April 30	$0.00	$0.00	$0.00	False	Pay

Current Year Payments Received

Date	Amount
05/11/2018	$2,699.60

Prior Year(s) Transaction History

Date	Amount
08/28/2017	$2,449.17
05/03/2016	$2,351.75
04/13/2015	$2,195.07
07/16/2014	$2,249.85

Note: Prior years transaction history data is for a maximum of 4 years.

Print This Page

Please Note: This web page is best viewed in Compatability View.

Disclaimer: We have made a good-faith effort to provide you with the most recent and most accurate information available. However, if you need to use this information in any legal or official venue, you will need to obtain official copies from the Treasurer's Office. Do be aware that this data is subject to change on a daily basis. If you believe that any of this information is incorrect, please contact the Treasurer's office.

For any questions, please contact the Treasurer's Office at: **(719) 520-7900** or email to: **trsweb@elpasoco.com**

COLORADO
Department of Transportation
Region 2

Traffic & Safety - Permits
5615 Will Blvd.
Pueblo, CO 81008

August 2, 2018

SH 24A
El Paso County

Gabe Sevigny, Planner
El Paso County Planning & Community Development
2880 International Circle, Suite 110
Colorado Springs, CO 80910

RE: PPR1828/AL1810 – Ute Pass Mini Storage; Parcels; 8315300029 and 831530025

Dear Gabe:

I am in receipt of a referral request for comment of the subject planned development. The subject 1.79-acre lot parcel 8315300029 addressed as 8775 Hwy 24 West, in Chipita Park. I understand the property owner intends to construct 6 additional mini-storage buildings (total 9,825 square-foot) west of the existing 565 square-foot office building. The referral has been reviewed and our comments are as follows.

- The Department has concerns pertaining to drainage mitigation for off site flows that exists on the southern edge of the property. Currently, the northeast portion of parcel is eroding significantly. Please submit the following;
    - A Drainage Memorandum describing the drainage and erosion mitigation for the subject lot and area of concern should be submitted for review.
      LSC Response (8-27-18): Included with access permit application

- The Hammers Construction, Inc. site map/parking plan has been reviewed and the Department requests the following;
    - Define the property line in relation to State Highway right-of-way. Currently, the Hammers Construction Inc. plan depicts, "Hwy 24 R.O.W. Varies"
      LSC Response (8-27-18): Attached LSC Exhibit shows south ROW line and width of ROW (approx.).
    - State Highway law does not allow for vehicles to back into State Highway right-of-way, please provide a parking plan that depicts this.
      LSC Response (8-27-18): Attached LSC Exhibit includes a parking plan.

- The Department notes that the adjacent 0.9 acre lot, parcel # 831530025 west of the subject lot was not noted in this development. All of our comments regarding the access, property and traffic pertain to the entire ownership of both properties.
      LSC Response (8-27-18): Attached LSC Exhibit shows adjacent property and access.

A State Highway Access Permit Application will need to be submitted to document the change-in-use of the access. A CDOT State Highway Access Permit Application for the applicant is attached to this letter for the convenience of the applicant. The property owner may inquire with this office for additional information.
LSC Response (8-27-18): Completed Access Permit Application Form Attached

Furthermore,

- On-premise and off-premise signing shall comply with the current Colorado Outdoor Advertising Act, sections 43-1-401 to 421, C.R.S., and all rules and regulations pertaining to outdoor advertising. Please contact Mr. Todd Ausbun at (719) 696-1403 for any questions regarding advertising devices.
- Any utility work within the state highway right of way will require a utility permit from the CDOT. Information for obtaining a utility permit can also be obtained by contacting Mr. Ausbun.

Please contact me in Pueblo at (719) 562-5537 with any questions.

Sincerely,

Andrew Lewis
Asst. Access Manager

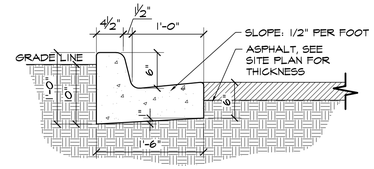
Xc: Shaine Kratko, Ute Pass Mini Storage
Andrew/Bauer
Nelson/Stecklein
Ausbun/Sword/Gonzales/file

BUILDING TABULATION

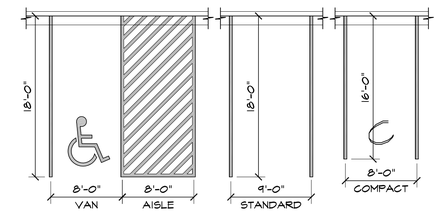
BLDG	BLDG OCCUP	5'-0" X 10'-0"	10'-0" X 10'-0"	10'-0" X 15'-0"	10'-0" X 20'-0"	15'-0" X 15'-0"	TOTAL SF OF BUILDING
A	S-1	-	-	-	17	-	3,400 SF
B	S-1	-	1	14	-	-	2,200 SF
C	S-1	3	-	-	4	-	950 SF
D	S-1	5	-	5	-	1	1,225 SF
E	S-1	-	15	-	-	-	1,500 SF
F	S-1	-	1	3	-	-	550 SF
TTL # OF UNITS		8	17	22	21	1	= 69 TOTAL UNITS
TOTAL SF		400	1,700	3,300	4,200	225	- 9,825 SF

TOTAL # OF 8'x7' DOORS = 61 TOTAL # OF 3'-8"x7' DOORS = 8

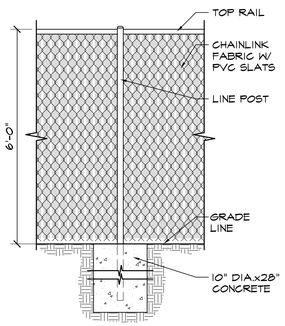
NOTE: ALL INTERNAL CURB THIS TYPE UNLESS NOTED OTHERWISE



3 EPC TYPE B CURB
SCALE: 1"=1'-0"



2 ADA / STANDARD PARKING
SCALE: 1/8"=1'-0"

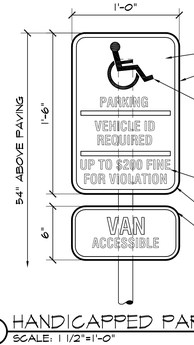


FENCE SPECS:
POSTS:
- ALL POSTS WILL BE SET IN CONC.
END & CORNER
- 2 3/8" T-40
LINE POSTS
- 2" T-40 @ 10'-0" OC
TOP RAIL:
- 1 5/8" T-20
CHAINLINK FABRIC:
- 2" MESH x 11 GA
- GALVANIZED AFTER WEAVING
- ATTACH W/ STL TIES
- START 1" A.F.F.
SLATS:
- DOUBLE WALL PVC PRIVACY FILLER STRIPS
- LOCKING TRACK ON BOTTOM
- START 2" A.F.F.
GATES:
- ROLLING GATES TO INCLUDE SAFETY POST INSIDE GATE ROLL AREAS

4 CHAINLINK FENCE DETAIL
SCALE: 1/2"=1'-0"

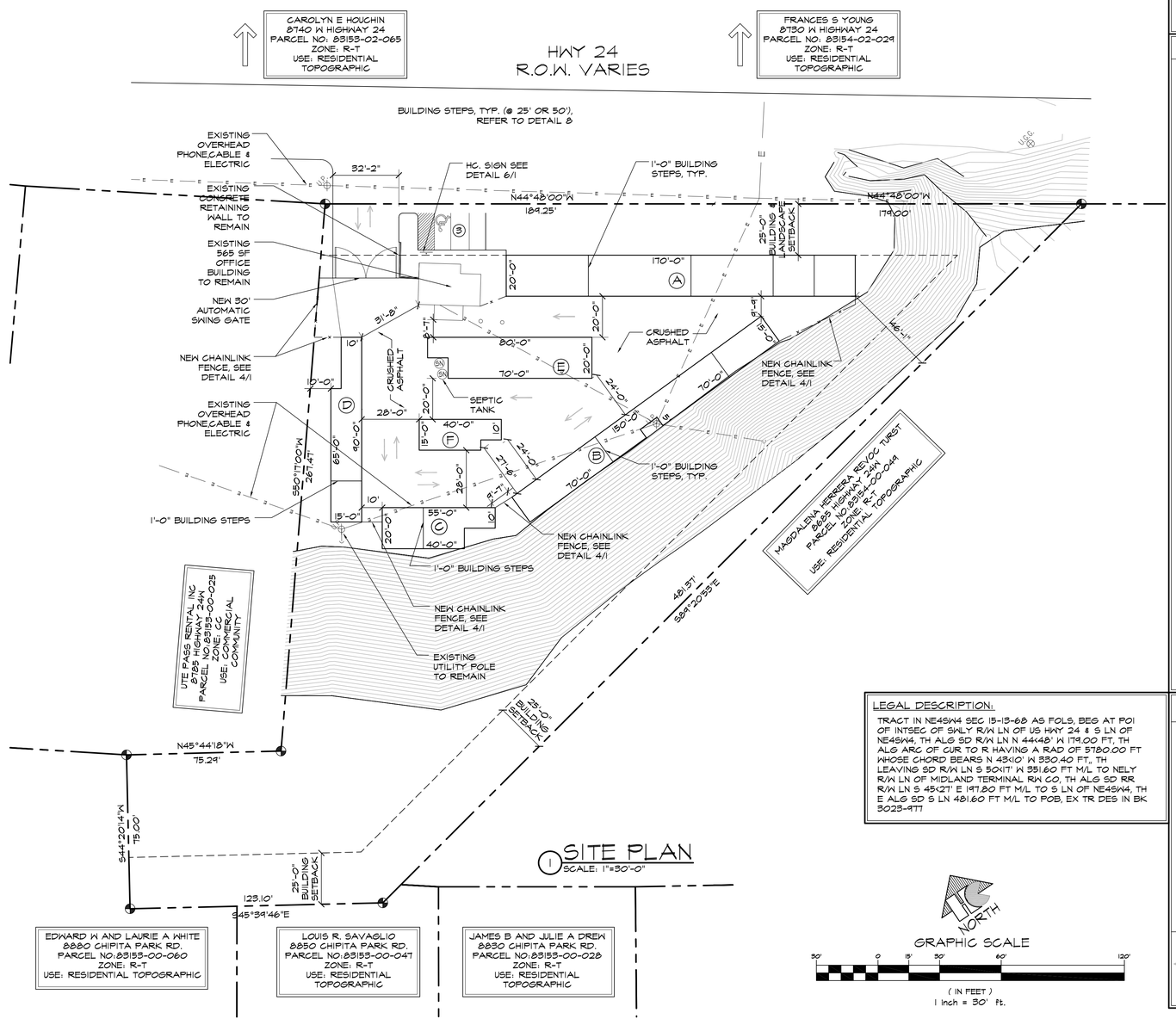
NOTE:
- QUANTITY & LOCATION BY FIRE MARSHALL.
- SIGN SHALL BE ENGINEER GRADE REFLECTIVE SHEETING ON 0.80 ALUMINUM WITH RED LETTERING ON WHITE BACKGROUND BOTTOM EDGE OF SIGN SHALL BE 7'-0" ABOVE SURFACE (SIDEWALK) AND POST SHALL BE PLACED 2'-0" FROM FLOW LINE (CURB).

5 FIRE LANE SIGN
SCALE: 1 1/2"=1'-0"



NOTE: PROVIDE "VAN" SIGN WHERE SHOWN ON SITE PLAN.

6 HANDICAPPED PARKING SIGN
SCALE: 1 1/2"=1'-0"



1 SITE PLAN
SCALE: 1"=30'-0"

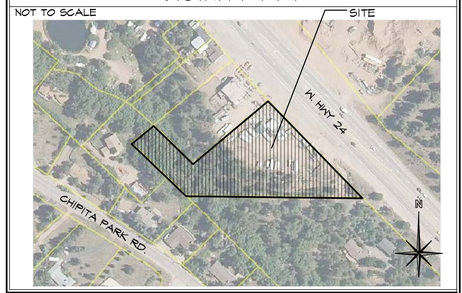
LEGAL DESCRIPTION:

TRACT IN NE4SW4 SEC 15-13-68 AS FOLS, BEG AT P01 OF INTSEC OF SWLY R/W LN OF US HWY 24 & S LN OF NE4SW4, TH ALG SD R/W LN N 44<48' W 179.00 FT, TH ALG ARC OF CUR TO R HAVING A RAD OF 5780.00 FT WHOSE CHORD BEARS N 43<10' W 330.40 FT., TH LEAVING SD R/W LN S 80<17' W 351.60 FT M/L TO NELY R/W LN OF MIDLAND TERMINAL RW CO, TH ALG SD RR R/W LN S 45<27' E 197.80 FT M/L TO S LN OF NE4SW4, TH E ALG SD S LN 481.60 FT M/L TO POB, EX TR DES IN BK 3023-977

DRAWING INDEX

VICINITY MAP

NOT TO SCALE



PROJECT INFORMATION

PROPERTY INFORMATION

OWNER NAME:	UTE PASS RENTAL, INC 8775 W. HIGHWAY 24 CASCADE, CO 80809
LEGAL DESCRIPTION:	DESCRIPTION ON THIS SHEET
PARCEL NUMBER LOT 10:	83153-02-029
ZONING:	CC R-T
LOT SIZE LOT:	77,560 SF (1.79 ACRES)
CURRENT USE:	MERCHANDISING
PROPOSED USE:	MINI STORAGE
FLOODPLAIN STATEMENT:	ZONE X (MAP NO: 08041C0490 F, DATED MARCH 17, 1997 & AS MODIFIED BY LOMR 17-08-1346A EFFECTIVE DATE OCTOBER 13, 2017)

BUILDING INFORMATION

EXISTING BUILDING AREA (OFFICE):	565 SF
NEW BUILDING AREA:	9,825 SF
BUILDING OCCUPANCY:	S-1
TYPE OF CONSTRUCTION:	II-B
FIRE SYSTEMS:	NONE
AREA SEPARATION WALLS:	NONE

ZONING CODE STUDY

PROPOSED PRINCIPAL USE:	MINI STORAGE
STRUCTURAL COVERAGE OF LOT:	13%
PAVEMENT COVERAGE:	17%
NEW BUILDING STRUCTURAL HEIGHT:	9'-6"
FRONT YARD SETBACK:	25'-0"
SIDE YARD SETBACK:	25'-0"
REAR YARD SETBACK:	25'-0"

REQUIRED PARKING SPACES:

MINI-STORAGE-(1 SPACE/100 UNITS). (69 UNITS / 100 UNITS)	1
MINI-STORAGE-(1 SPACE/EMPLOYEE) (1 EMPLOYEE)	1
H.C.-(1 SPACE/25 REQ'D)	1
TOTAL PARKING SPACES REQUIRED:	3
TOTAL PARKING PROVIDED:	3
STANDARD SPACES PROVIDED	2
H.C. SPACES PROVIDED	1

DEVELOPMENT SCHEDULE

CONSTRUCTION:	SPRING 2018
LANDSCAPING:	SPRING 2018

DEVELOPMENT APPLICANT

COMPANY:	HAMMERS CONSTRUCTION, INC. 1411 WOOLSEY HEIGHTS COLO. SPGS., CO 80915
PHONE NUMBER:	(719)-570-1599
FAX NUMBER:	(719)-570-1008
APPLICANT NAME:	LISA PETERSON
APPLICANT E-MAIL:	lpeterson@hammersconstruction.com

SITE LEGEND

- PROPERTY LINE
- RIGHT OF WAY
- BUILDING SETBACK
- LANDSCAPE SETBACK
- UTILITY/DRAINAGE EASEMENT
- ELECTRICAL EASEMENT
- ACCESS EASEMENT
- OPAQUE CHAINLINK FENCE
- 6' HIGH WROUGHT IRON FENCE
- GAS LINE
- WATER LINE
- ELECTRICAL LINE
- SANITARY SEWER LINE
- STORM SEWER LINE
- RETAINING WALL
- NEW SIDEWALK LOCATIONS W/ CONTROL JOINTS @ 5'-0" O.C.

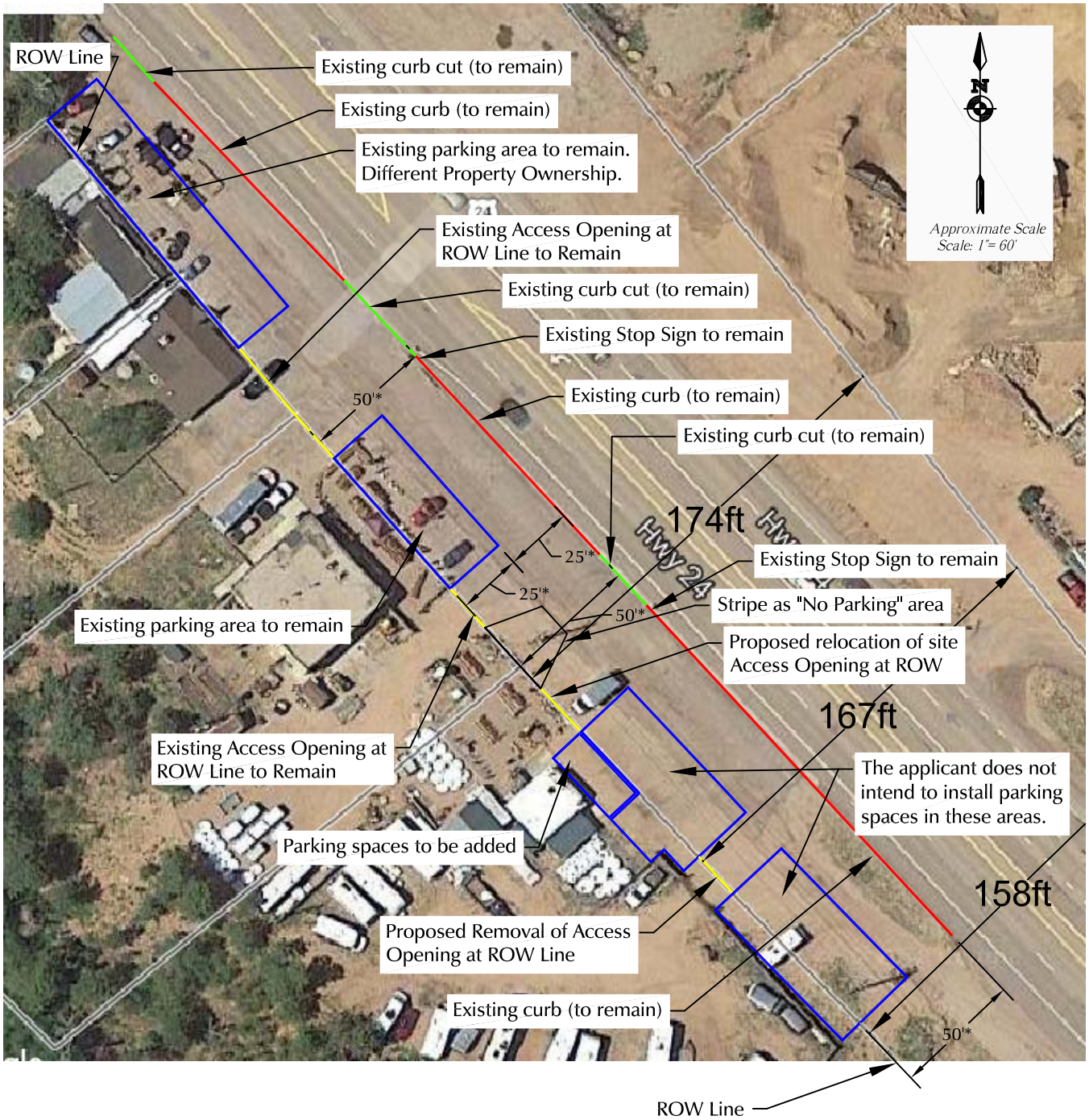
PROPERTY CORNER · SIGN · EXISTING FIRE HYDRANT · TRAFFIC FLOW · MH MANHOLE · PROPOSED FIRE HYDRANT · WALL PACK LIGHTING · T ELECTRICAL TRANSFORMER

HAMMERS CONSTRUCTION INC.
COMMERCIAL GENERAL CONTRACTORS SPECIALIZING IN DESIGN/BUILD
PRESIDENT: STEVE R. HAMMERS
VICE PRES: DAVID J. HAMMERS
1411 WOOLSEY HEIGHTS
COLORADO SPRINGS, CO 80915
(719) 570-1599 FAX (719) 570-7008
www.hammersconstruction.com

UTE PASS
STORAGE FACILITY
8775 W HIGHWAY 24
CASCASDE, CO 80809
EL PASO COUNTY, COLORADO

DATE: MAY 21, 2018
DRAWN BY: W. VENEROS
PROJ. MNGR: Y. DYACHENKO
SCALE: SEE PLAN
APPROVED BY:
JOB NO: 1064

RESUBMITTALS:



* - Note: dimensions shown are approximate as this exhibit is conceptual only

Figure 1

R.O.W., Access, Parking and Circulation Plan

Ute Pass Mini Storage (LSC #184110)

FINAL DRAINAGE REPORT

for

UTE PASS STORAGE
8775 W. HIGHWAY 24, CASCADE, CO

Prepared for:

Hammers Construction, Inc.
1141 Woolsey Heights
Colorado Springs, CO 80915

February 15, 2018

Prepared by:

19 E. Willamette Ave.
Colorado Springs, CO 80903
(719)-477-9429
(719)-471-0766 FAX
www.jpsengr.com

JPS Project No. 111704
PCD Project No. PPR-18-___

UTE PASS STORAGE – 8775 W. HIGHWAY 24, CASCADE, CO
FINAL DRAINAGE REPORT
TABLE OF CONTENTS

APPENDICES

DRAINAGE STATEMENT

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for liability caused by negligent acts, errors or omissions on my part in preparing this report.

_____

John P. Schwab, P.E. #29891

Developer's Statement:

I, the developer have read and will comply with all of the requirements specified in this drainage report and plan.

By:

_____

Date

El Paso County's Statement

Filed in accordance with the requirements of the El Paso County Land Development Code, Drainage Criteria Manual, Volumes 1 and 2, and Engineering Criteria Manual as amended.

_____

Jennifer Irvine, P.E. Date
County Engineer / ECM Administrator

Conditions:

I. INTRODUCTION

A. Property Location and Description

Ute Pass Rental Inc. (Owner) is planning to re-develop their existing open storage site to construct a new enclosed Storage Facility on a developed 1.8-acre property (El Paso County Assessor's Parcel No. 83153-00-029) located at 8775 W. Highway 24 (US24) in western El Paso County, Colorado. The site is zoned Community Commercial (CC). The property is an unplatted tract described as a Tract in the Northeast Quarter of the Southwest Quarter of Section 15, Township 13S, Range 68W of the 6th P.M., El Paso County, Colorado.

The north boundary of the property adjoins US Highway 24, and the west boundary of this site adjoins an existing commercial property owned by the same Owner. The southeast and southwest boundaries of the site adjoin unplatted residential properties, and the main channel of Upper Fountain Creek flows southeasterly across the southwest part of the property.

The proposed Site Development Plan consists of demolishing an existing barn building within the property and constructing six new storage buildings, with a total of 69 enclosed storage units, along with associated parking and site improvements. Access will continue to be provided by the existing private access drive connection to US Highway 24 at the northwest corner of the site.

The total disturbed area associated with this project is approximately 0.73 acres. Since the disturbed area is less than one acre and this project is not part of a larger common plan of development, no stormwater detention or water quality facilities are required.

B. Scope

In support of the Site Development Plan submittal to El Paso County, this report is intended to meet the requirements of a Final Drainage Report in accordance with El Paso County drainage criteria. This report will provide a summary of site drainage issues impacting the proposed development. The report will analyze impacts from upstream drainage patterns, site-specific developed drainage patterns, and impacts on downstream facilities. This report is based on the guidelines and criteria presented in the City of Colorado Springs and El Paso County "Drainage Criteria Manual."

C. References

City of Colorado Springs & El Paso County "Drainage Criteria Manual, Volumes 1 and 2," revised May, 2014.

El Paso County "Engineering Criteria Manual," January 9, 2006.

FEMA, Flood Insurance Rate Map (FIRM) Number 08041C0490F, March 17, 1997.

II. EXISTING DRAINAGE CONDITIONS

As shown on the enclosed Historic Drainage Plan (Sheet EX1, Appendix C), the site has been delineated as two on-site drainage basins. The developed area of higher ground in the northwest part of the property has been delineated as Basin A, and the remaining undeveloped area sloping downwards to the Upper Fountain Creek drainage channel has been delineated as Basin B. The site development area is not impacted by any off-site drainage basins.

The existing site topography within Basin A generally slopes downward to the southeast with grades in the range of 1-3 percent. The existing site topography within Basin B slopes downward to the south with grades in the range of 30-40 percent. According to the Natural Resources Conservation Service (NRCS) Soil Survey for this site, on-site soils are comprised of "Tecolote very gravelly sandy loam soils," and these well-drained soils are classified as hydrologic soils group "B" (see Appendix A).

Historic Basin A sheet flows southeasterly towards the existing drainage swale in the southeast part of the site. The existing site within Basin A is developed with two commercial buildings and the site is covered by compacted gravel. Historic drainage from Basin A flows to Design Point #1, with peak flows calculated as $Q_5 = 1.9$ cfs and $Q_{100} = 3.7$ cfs.

Historic Basin B generally sheet flows to the south. Historic drainage from Basin B flows to Design Point #2, with peak flows calculated as $Q_5 = 0.4$ cfs and $Q_{100} = 3.2$ cfs.

The FEMA Flood Insurance Study (FIS) identifies peak 100-year flows of approximately 8,880 cfs in the main channel of Upper Fountain Creek upstream of this site. As such, on-site flows are negligible in comparison to the flow in the main channel.

III. PROPOSED DRAINAGE CONDITIONS

As shown on the enclosed Drainage Plan (Figure D1, Appendix C), the developed site has been delineated as two on-site drainage basins, consistent with the historic drainage analysis. Developed flows have been calculated based on the impervious areas associated with the proposed re-development plan. The proposed building improvements will be limited to the existing compacted gravel storage area in the northeast part of the property (Basin A), and developed flows from the site will follow historic drainage patterns to the existing drainage swale at the southeast corner of the property.

Recognizing the historic commercial development of this site, the proposed storage buildings and related site improvements will not result in a significant developed drainage impact. The proposed site development will generally maintain historic drainage conditions.

Developed Basins A1 and A2 (northwest part of property) will continue to drain southeasterly to the existing drainage channel at the southeast corner of the site. The proposed grading plan for the Storage Site will provide positive drainage away from each building and direct surface flows to drainage swales between storage buildings, flowing southeasterly to a pair of private storm inlets near the southeast corner of Basin A1.

Private Storm Inlets A1.1 (Double Type 13) and A1.2 (Type 16) will intercept surface drainage from the parking area, and Private Storm Sewer A1.1-A1.2 (15") will flow southeasterly to daylight in the existing drainage channel at the toe of the existing embankment. A concrete energy dissipater will be provided at the storm drain outlet. In the event of clogging of Inlets A1.1 and A1.2, the drainage swale between storage buildings will provide an emergency overflow path to the southeasterly embankment. Developed peak flows at Design Point #A1 are calculated as Q_5 = 2.0 cfs and Q_{100} = 3.9 cfs.

Basin A2 comprises the frontage of the property, which sheet flows southeasterly to the existing drainage channel at the southeast corner of the property. Developed peak flows at Design Point #A2 are calculated as Q_5 = 0.7 cfs and Q_{100} = 1.2 cfs.

Developed flows from Basins A1 and A2 combine at Design Point #1, with peak flows calculated as Q_5 = 2.7 cfs and Q_{100} = 5.1 cfs, representing a negligible increase in comparison to historic conditions.

Developed Basin B (southeast part of property) will continue to sheet flow to the south, following historic drainage patterns. Developed peak flows at Design Point #2 are calculated as Q_5 = 0.4 cfs and Q_{100} = 3.2 cfs (no change in comparison to historic flows).

The proposed site improvements will involve less than one acre of site disturbance and the project is not part of a larger common plan of development, so there is no requirement for permanent stormwater quality measures. In addition, the total developed site is less than one acre in size, and therefore on-site detention is not required.

The contractor will be required to implement standard best management practices for erosion control during construction.

Hydrologic calculations for the site are detailed in the attached spreadsheets (Appendix A), and peak flows are identified on Figures EX1 and D1 (Appendix C).

IV. DRAINAGE PLANNING FOUR STEP PROCESS

El Paso County Drainage Criteria require drainage planning to include a Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainageways, and implementing long-term source controls.

As stated in DCM Volume 2, the Four Step Process is applicable to all new and re-development projects with construction activities that disturb 1 acre or greater or that disturb less than 1 acre but are part of a larger common plan of development. The Four Step Process has been implemented as follows in the planning of this project:

Step 1: Employ Runoff Reduction Practices

- Minimize Impacts: The proposed site re-development project will inherently minimize drainage impacts in comparison to development of a vacant site. Recognizing the existing compacted gravel covering the developed part of the site, the proposed re-development will result in a minimal net increase in impervious site development.
- Infill Development: The nature of this project, consisting of site improvements to a previously developed commercial property adjoining an improved public street, is an inherently low impact development.

Step 2: Stabilize Drainageways

- No direct impacts are proposed to the existing Fountain Creek channel flowing across the southwest corner of the property. This site is a re-development project, and the relatively small net increase in impervious area will minimize impacts to the existing drainage channel.

Step 3: Provide Water Quality Capture Volume (WQCV)

- WQCV BMPs are not required for this site since the disturbed areas is less than one acre and the project site is not part of a larger common plan of development.

Step 4: Consider Need for Industrial and Commercial BMPs

- The proposed commercial development project will implement a Stormwater Management Plan including proper housekeeping practices and spill containment procedures.

V. FLOODPLAIN IMPACTS

Floodplain limits in vicinity of this site are delineated in the applicable Flood Insurance Rate Map, FIRM Panel No. 08041C0490F dated March 17, 1997.

As depicted in the FIRM exhibit enclosed in Appendix C, while the 100-year floodplain along Fountain Creek impacts Basin B, the developed part of the site (Basin A), is not impacted by any delineated 100-year FEMA floodplains.

VI. STORMWATER DETENTION AND WATER QUALITY

The total disturbed area associated with this project is approximately 0.73 acres. Since the disturbed area is less than one acre and the project site is not part of a larger common plan of development, no stormwater detention or water quality facilities are required.

VII. DRAINAGE BASIN FEES

Re-development of this commercial site will include construction of private storm sewer improvements within the property. No public drainage improvements are required.

The site lies entirely within the Fountain Creek Drainage Basin. According to the published table of "El Paso County Drainage Basin Fees," the Fountain Creek basin is not subject to drainage or bridge fees. As such, no drainage or bridge fees are required.

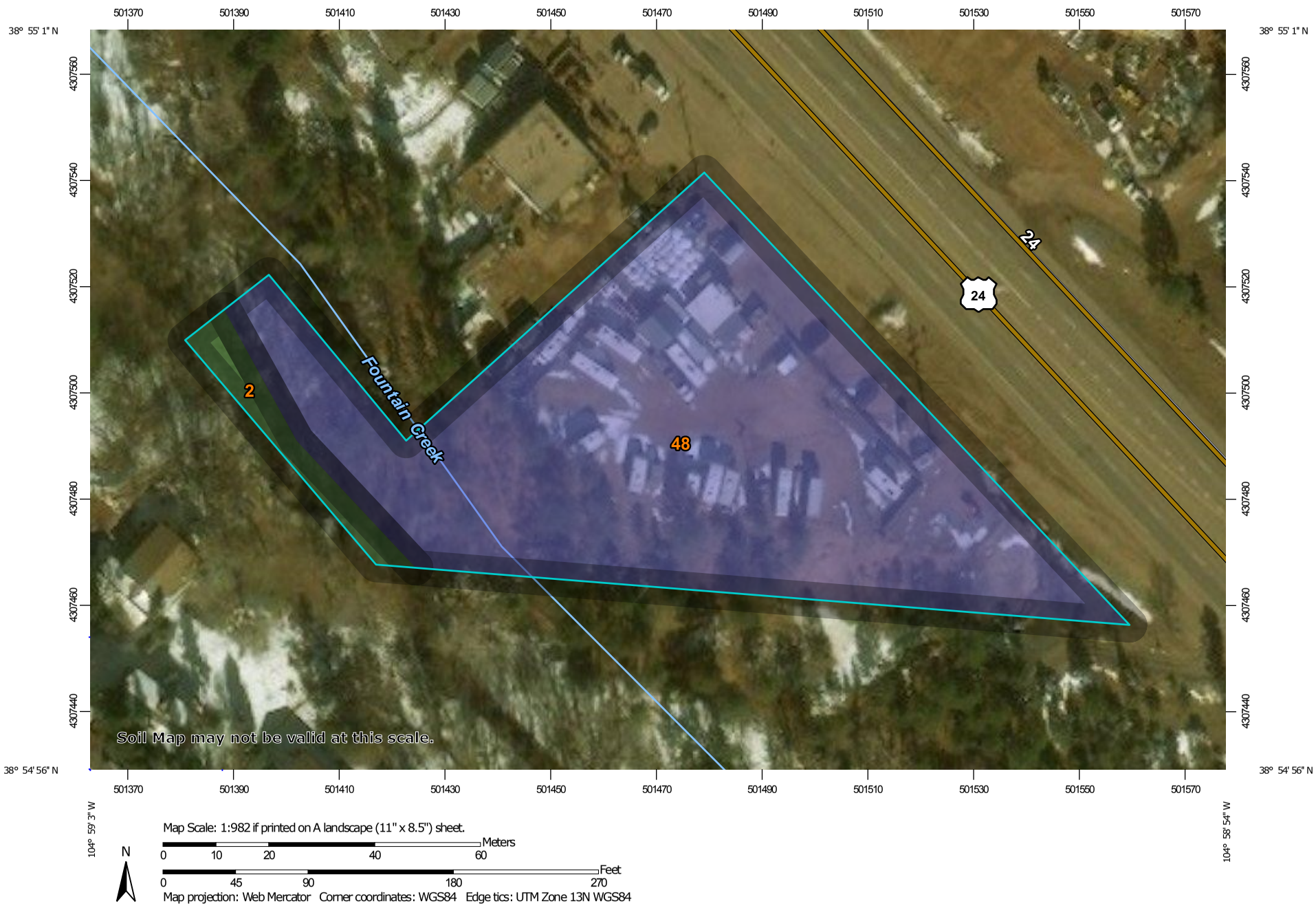
VIII. SUMMARY

The developed drainage patterns associated with the proposed Ute Pass Storage site re-development project at 8775 W. Highway 24 will remain consistent with historic conditions and the overall drainage plan for this area. The proposed site improvements will involve less than one acre of site disturbance and the project is not part of a larger common plan of development, so there is no requirement for permanent stormwater quality measures or stormwater detention. The minimal increase in developed flow is negligible in comparison to the flow in the Upper Fountain Creek channel. Construction and proper maintenance of the proposed on-site drainage facilities, in conjunction with proper erosion control practices, will ensure that the proposed site development has no significant adverse drainage impact on downstream or surrounding areas.

APPENDIX A

HYDROLOGIC CALCULATIONS

Hydrologic Soil Group—Pike National Forest, Eastern Part, Colorado, Parts of Douglas, El Paso, Jefferson, and Teller Counties
(Ute Pass Storage)



Map Scale: 1:982 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 45 90 180 270

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Pike National Forest, Eastern Part, Colorado, Parts of Douglas, El Paso, Jefferson, and Teller Counties
Survey Area Data: Version 4, Oct 12, 2017

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

Date(s) aerial images were photographed: Feb 22, 2014—Mar 9, 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Aquolls, 1 to 10 percent slopes	A/D	0.1	4.5%
48	Tecolote very gravelly sandy loam, 15 to 40 percent slopes, very stony	B	1.7	95.5%
Totals for Area of Interest			**1.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 6-6. Runoff Coefficients for Rational Method
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis-- Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

3.2 Time of Concentration

One of the basic assumptions underlying the Rational Method is that runoff is a function of the average rainfall rate during the time required for water to flow from the hydraulically most remote part of the drainage area under consideration to the design point. However, in practice, the time of concentration can be an empirical value that results in reasonable and acceptable peak flow calculations.

For urban areas, the time of concentration (t_c) consists of an initial time or overland flow time (t_i) plus the travel time (t_t) in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time (t_i) plus the time of travel in a concentrated form, such as a swale or drainageway. The travel portion (t_t) of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or drainageway. Initial time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. The time of concentration is represented by Equation 6-7 for both urban and non-urban areas.

$$t_c = t_i + t_t \qquad \text{(Eq. 6-7)}$$

Where:

t_c = time of concentration (min)

t_i = overland (initial) flow time (min)

t_t = travel time in the ditch, channel, gutter, storm sewer, etc. (min)

3.2.1 Overland (Initial) Flow Time

The overland flow time, t_i, may be calculated using Equation 6-8.

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \qquad \text{(Eq. 6-8)}$$

Where:

t_i = overland (initial) flow time (min)
C_5 = runoff coefficient for 5-year frequency (see Table 6-6)
L = length of overland flow (300 ft <u>maximum</u> for non-urban land uses, 100 ft <u>maximum</u> for urban land uses)
S = average basin slope (ft/ft)

Note that in some urban watersheds, the overland flow time may be very small because flows quickly concentrate and channelize.

3.2.2 Travel Time

For catchments with overland and channelized flow, the time of concentration needs to be considered in combination with the travel time, t_t, which is calculated using the hydraulic properties of the swale, ditch, or channel. For preliminary work, the overland travel time, t_t, can be estimated with the help of Figure 6-25 or Equation 6-9 (Guo 1999).

$$V = C_v S_w^{0.5} \qquad \text{(Eq. 6-9)}$$

Where:

V = velocity (ft/s)

C_v = conveyance coefficient (from Table 6-7)

S_w = watercourse slope (ft/ft)

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

* For buried riprap, select C_v value based on type of vegetative cover.

The travel time is calculated by dividing the flow distance (in feet) by the velocity calculated using Equation 6-9 and converting units to minutes.

The time of concentration (t_c) is then the sum of the overland flow time (t_i) and the travel time (t_t) per Equation 6-7.

3.2.3 First Design Point Time of Concentration in Urban Catchments

Using this procedure, the time of concentration at the first design point (typically the first inlet in the system) in an urbanized catchment should not exceed the time of concentration calculated using Equation 6-10. The first design point is defined as the point where runoff first enters the storm sewer system.

$$t_c = \frac{L}{180} + 10 \qquad \text{(Eq. 6-10)}$$

Where:

t_c = maximum time of concentration at the first design point in an urban watershed (min)

L = waterway length (ft)

Equation 6-10 was developed using the rainfall-runoff data collected in the Denver region and, in essence, represents regional "calibration" of the Rational Method. Normally, Equation 6-10 will result in a lesser time of concentration at the first design point and will govern in an urbanized watershed. For subsequent design points, the time of concentration is calculated by accumulating the travel times in downstream drainageway reaches.

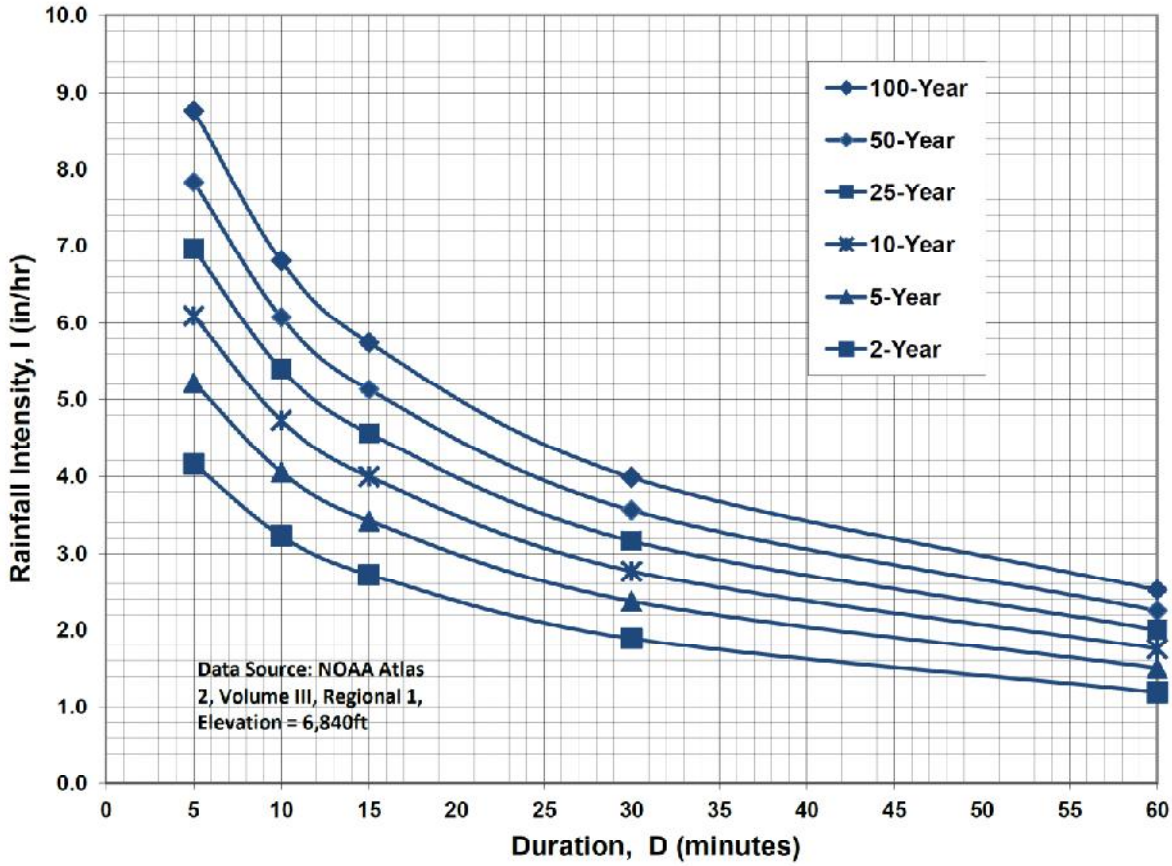
3.2.4 Minimum Time of Concentration

If the calculations result in a t_c of less than 10 minutes for undeveloped conditions, it is recommended that a minimum value of 10 minutes be used. The minimum t_c for urbanized areas is 5 minutes.

3.2.5 Post-Development Time of Concentration

As Equation 6-8 indicates, the time of concentration is a function of the 5-year runoff coefficient for a drainage basin. Typically, higher levels of imperviousness (higher 5-year runoff coefficients) correspond to shorter times of concentration, and lower levels of imperviousness correspond to longer times of

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

$I_{100} = -2.52 \ln(D) + 12.735$

$I_{50} = -2.25 \ln(D) + 11.375$

$I_{25} = -2.00 \ln(D) + 10.111$

$I_{10} = -1.75 \ln(D) + 8.847$

$I_{5} = -1.50 \ln(D) + 7.583$

$I_{2} = -1.19 \ln(D) + 6.035$

Note: Values calculated by equations may not precisely duplicate values read from figure.

UTE PASS STORAGE
COMPOSITE RUNOFF COEFFICIENTS

HISTORIC CONDITIONS

5-YEAR C VALUES

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
A	0.71	0.039	BUILDING / ASPHALT	0.9	0.671	GRAVEL	0.59				0.607
B	1.06	1.060	FOREST	0.08							0.080

100-YEAR C VALUES

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
A	0.71	0.039	BUILDING / ASPHALT	0.96	0.671	GRAVEL	0.7				0.714
B	1.06	1.060	FOREST	0.35							0.350

IMPERVIOUS AREAS

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	WEIGHTED % IMP
A	0.71	0.039	BUILDING / ASPHALT	100	0.671	GRAVEL	80				81.099
B	1.06	1.060	FOREST	0							0.000

DEVELOPED CONDITIONS

5-YEAR C VALUES

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
A	0.76	0.254	BUILDING / ASPHALT	0.9	0.506	GRAVEL	0.59				0.694
B	1.02	1.020	FOREST	0.08							0.080

100-YEAR C VALUES

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
A	0.76	0.254	BUILDING / ASPHALT	0.96	0.506	GRAVEL	0.7				0.787
B	1.02	1.020	FOREST	0.35							0.350

IMPERVIOUS AREAS

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	WEIGHTED % IMP
A	0.76	0.254	BUILDING / ASPHALT	100	0.506	GRAVEL	80				86.684
B	1.02	1.020	FOREST	0							0.000

UTE PASS STORAGE
RATIONAL METHOD

HISTORIC FLOWS

					Overland Flow			Channel flow										
BASIN	DESIGN POINT	AREA (AC)	C 5-YEAR(7)	C 100-YEAR (7)	LENGTH (FT)	SLOPE (FT/FT)	Tco (1) (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT C	SLOPE (FT/FT)	SCS (2) VELOCITY (FT/S)	Tt (3) (MIN)	TOTAL Tc (4) (MIN)	TOTAL Tc (4) (MIN)	INTENSITY (5) 5-YR (IN/HR)	INTENSITY (5) 100-YR (IN/HR)	PEAK FLOW Q5 (6) (CFS)	PEAK FLOW Q100 (6) (CFS)
A	1	0.71	0.607	0.714	100	0.020	7.2	230	20.00	0.0261	3.23	1.2	8.4	8.4	4.40	7.39	1.90	3.74
B	2	1.06	0.080	0.350	65	0.339	4.7	0				0.0	4.7	5.0	5.17	8.68	0.44	3.22

DEVELOPED FLOWS

					Overland Flow			Channel flow										
BASIN	DESIGN POINT	AREA (AC)	C 5-YEAR(7)	C 100-YEAR (7)	LENGTH (FT)	SLOPE (FT/FT)	Tco (1) (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT C	SLOPE (FT/FT)	SCS (2) VELOCITY (FT/S)	Tt (3) (MIN)	TOTAL Tc (4) (MIN)	TOTAL Tc (4) (MIN)	INTENSITY (5) 5-YR (IN/HR)	INTENSITY (5) 100-YR (IN/HR)	PEAK FLOW Q5 (6) (CFS)	PEAK FLOW Q100 (6) (CFS)
A1	A1	0.58	0.694	0.787	50	0.020	4.2	205	20.00	0.0195	2.79	1.2	5.4	5.4	5.05	8.49	2.03	3.87
A2	A2	0.18	0.694	0.787	50	0.060	2.9	240	20.00	0.0208	2.88	1.4	4.3	5.0	5.17	8.68	0.65	1.23
A1,A2	1	0.76	0.694	0.787									5.4	5.4	5.05	8.49	2.67	5.08
B	2	1.02	0.080	0.350	65	0.339	4.7	0				0.0	4.7	5.0	5.17	8.68	0.42	3.10

1) OVERLAND FLOW Tco = (0.395*(1.1-RUNOFF COEFFICIENT)*(OVERLAND FLOW LENGTH^(0.5)/(SLOPE^(0.333))
2) SCS VELOCITY = C * ((SLOPE(FT/FT)^0.5)
C = 2.5 FOR HEAVY MEADOW
C = 5 FOR TILLAGE/FIELD
C = 7 FOR SHORT PASTURE AND LAWNS
C = 10 FOR NEARLY BARE GROUND
C = 15 FOR GRASSED WATERWAY
C = 20 FOR PAVED AREAS AND SHALLOW PAVED SWALES

3) MANNING'S CHANNEL TRAVEL TIME = L/V (WHEN CHANNEL VELOCITY IS KNOWN)
4) Tc = Tco + Tt
*** IF TOTAL TIME OF CONCENTRATION IS LESS THAN 5 MINUTES, THEN 5 MINUTES IS USED
5) INTENSITY BASED ON I-D-F EQUATIONS IN CITY OF COLORADO SPRINGS DRAINAGE CRITERIA MANUAL
I_5 = -1.5 * ln(Tc) + 7.583
I_{100} = -2.52 * ln(Tc) + 12.735
6) Q = CiA

APPENDIX B

HYDRAULIC CALCULATIONS

UTE PASS STORAGE
STORM INLET SIZING SUMMARY

	BASIN FLOW			INLET FLOW					
INLET	DP	Q5 FLOW (CFS)	Q100 FLOW (CFS)	INLET FLOW % OF BASIN	Q5 FLOW (CFS)	Q100 FLOW (CFS)	INLET CONDITION / TYPE	INLET SIZE	INLET CAPACITY (CFS)
A1.1	A1	2.0	3.9	90	1.8	3.5	SUMP TYPE 13	DOUBLE	3.6
A1.2	A1	2.0	3.9	10	0.2	0.4	SUMP TYPE 16	SINGLE	3.6

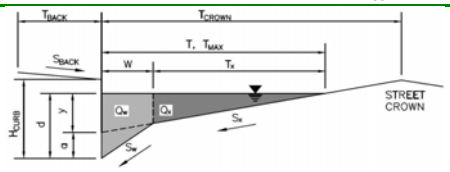
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Ute Pass Storage - Inlet A1.1**

Inlet ID: **Inlet A1.1**



Gutter Geometry (Enter data in the blue cells)

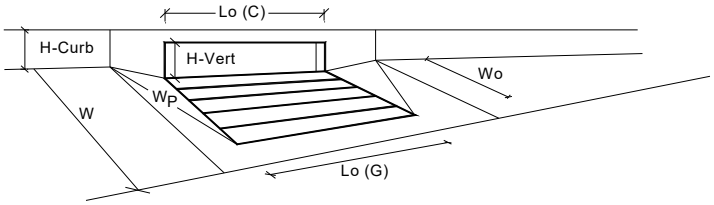
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.030	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	0.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.050	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) CDOT/Denver 13 Valley Grate				
Type of Inlet	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.523	0.523	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.71	0.71	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**3.6**	**3.6**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.8	3.5	cfs

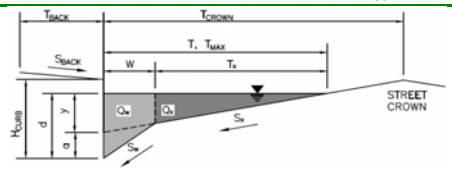
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Ute Pass Storage - Inlet A1.2

Inlet ID: Inlet A1.2



Gutter Geometry (Enter data in the blue cells)

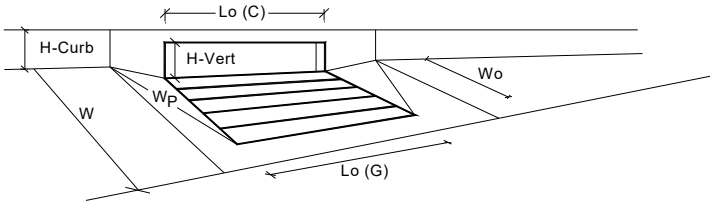
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	4.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input)				
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.8	5.8	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.509	0.509	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.32	0.32	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.91	0.91	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.91	0.91	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**3.6**	**3.6**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	0.2	0.4	cfs

UTE PASS STORAGE
STORM SEWER SIZING SUMMARY

	PIPE FLOW				PIPE CAPACITY		
PIPE	BASINS	Q5 FLOW (CFS)	Q100 FLOW (CFS)		PIPE SIZE	MIN. PIPE SLOPE	FULL PIPE CAPACITY (CFS)
A1.1	A1.1	1.8	3.5		15	2.0%	9.1
A1.2	A1.1,A1.2	2.0	3.9		15	2.0%	14.9

ASSUMPTIONS:
1. STORM DRAIN PIPE ASSUMED TO BE RCP OR HDPE

Hydraulic Analysis Report

Project Data

Project Title: Ute Pass Storage
Designer: JPS
Project Date: Saturday, February 10, 2018
Project Units: U.S. Customary Units
Notes:

Channel Analysis: SD-A1.1

Notes:

Input Parameters

Channel Type: Circular
Pipe Diameter: 1.2500 ft
Longitudinal Slope: 0.0200 ft/ft
Manning's n: 0.0130
Depth: 1.2500 ft

Result Parameters

Flow: 9.1355 cfs
Area of Flow: 1.2272 ft^2
Wetted Perimeter: 3.9270 ft
Hydraulic Radius: 0.3125 ft
Average Velocity: 7.4443 ft/s
Top Width: 0.0000 ft
Froude Number: 0.0000
Critical Depth: 1.1597 ft
Critical Velocity: 7.6924 ft/s
Critical Slope: 0.0173 ft/ft
Critical Top Width: 0.65 ft
Calculated Max Shear Stress: 1.5600 lb/ft^2
Calculated Avg Shear Stress: 0.3900 lb/ft^2

Channel Analysis: SD-A1.2

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.2500 ft

Longitudinal Slope: 0.0200 ft/ft

Manning's n: 0.0130

Depth: 1.2500 ft

Result Parameters

Flow: 9.1355 cfs

Area of Flow: 1.2272 ft^2

Wetted Perimeter: 3.9270 ft

Hydraulic Radius: 0.3125 ft

Average Velocity: 7.4443 ft/s

Top Width: 0.0000 ft

Froude Number: 0.0000

Critical Depth: 1.1597 ft

Critical Velocity: 7.6924 ft/s

Critical Slope: 0.0173 ft/ft

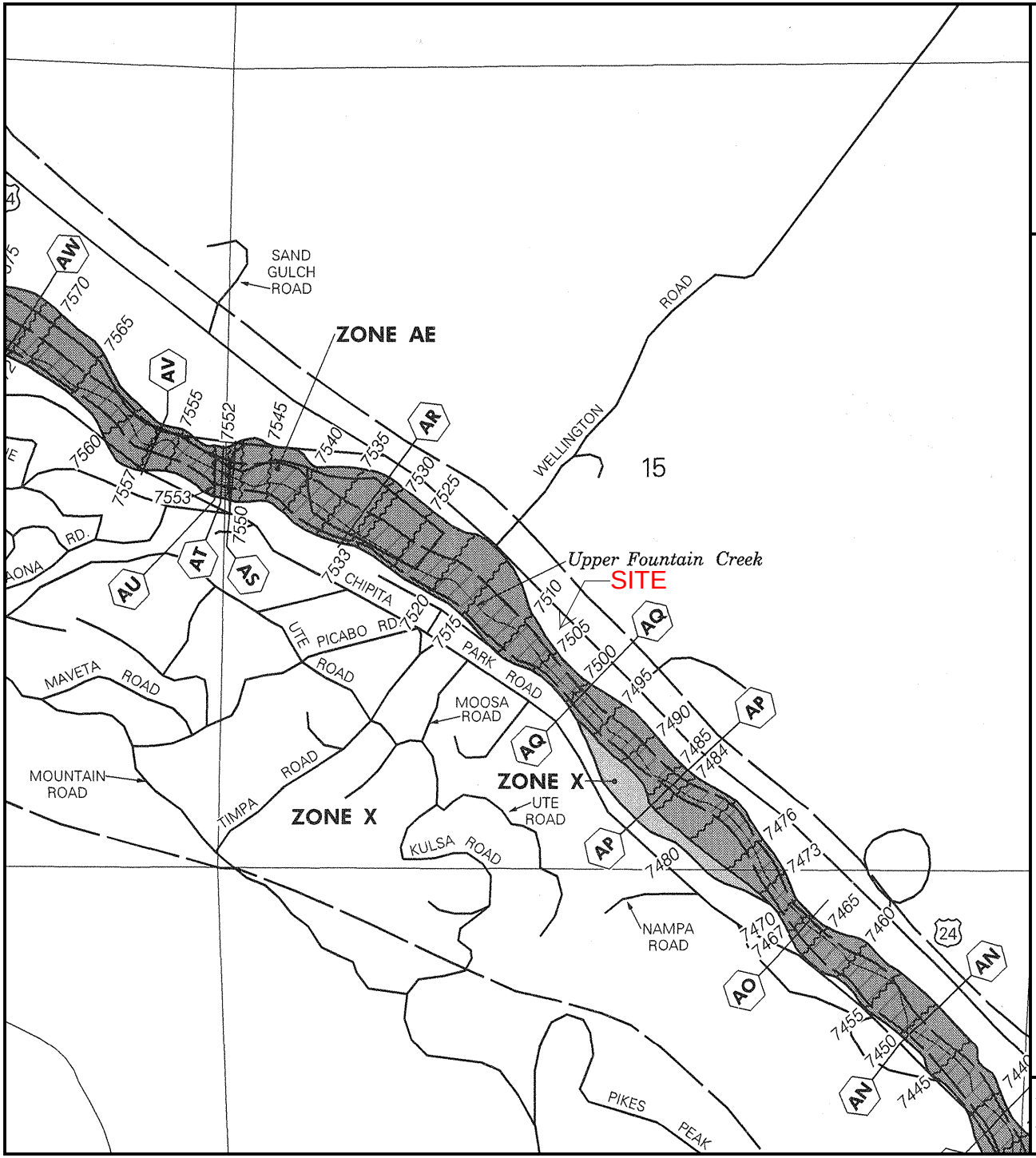
Critical Top Width: 0.65 ft

Calculated Max Shear Stress: 1.5600 lb/ft^2

Calculated Avg Shear Stress: 0.3900 lb/ft^2

APPENDIX C

FIGURES



APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 490 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0490	F

MAP NUMBER 08041C0490 F

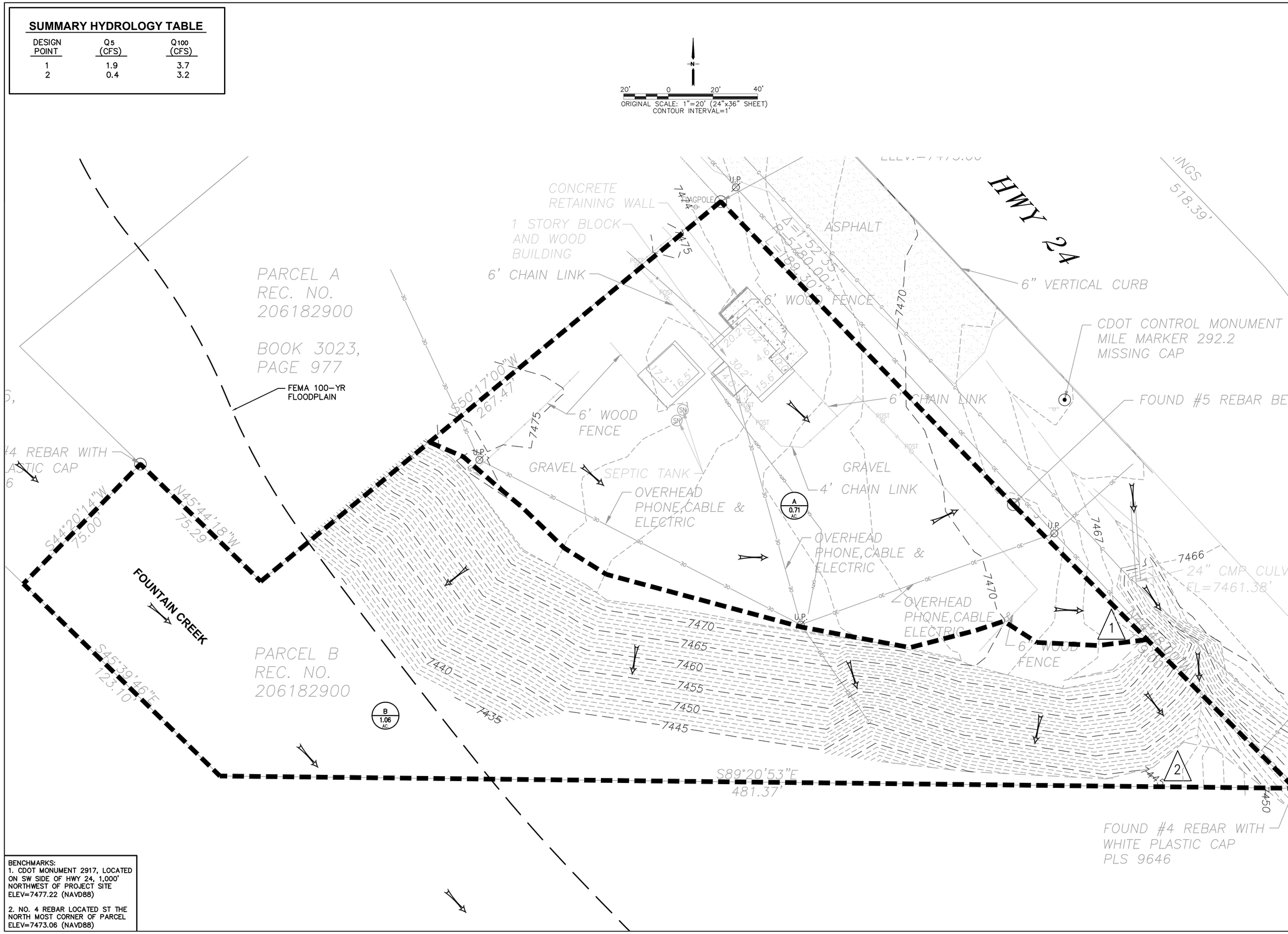
EFFECTIVE DATE: MARCH 17, 1997

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
1	1.9	3.7
2	0.4	3.2



BENCHMARKS:
1. CDOT MONUMENT 2917, LOCATED ON SW SIDE OF HWY 24, 1,000' NORTHWEST OF PROJECT SITE ELEV=7477.22 (NAVD88)

2. NO. 4 REBAR LOCATED ST THE NORTH MOST CORNER OF PARCEL ELEV=7473.06 (NAVD88)

UTE PASS STORAGE
8775 W. HWY 24, CASCADE, CO

HISTORIC DRAINAGE PLAN

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

No.	REVISION	BY	DATE

HORZ. SCALE: 1"=20'	DRAWN: BJJ
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: RIDGELINE	CHECKED: JPS
CREATED: 2/02/18	LAST MODIFIED: 2/14/18
PROJECT NO: 111704	MODIFIED BY: BJJ

SHEET: EX1

J:\jpsprojects\111704.hammers-ute-pass-storage\dwg\civil\EX1.dwg, 2/14/2018 2:36:51 PM

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
1	2.7	5.1
2	0.4	3.1

BENCHMARKS:
1. CDOT MONUMENT 2917, LOCATED ON SW SIDE OF HWY 24, 1,000' NORTHWEST OF PROJECT SITE ELEV=7477.22 (NAVD88)

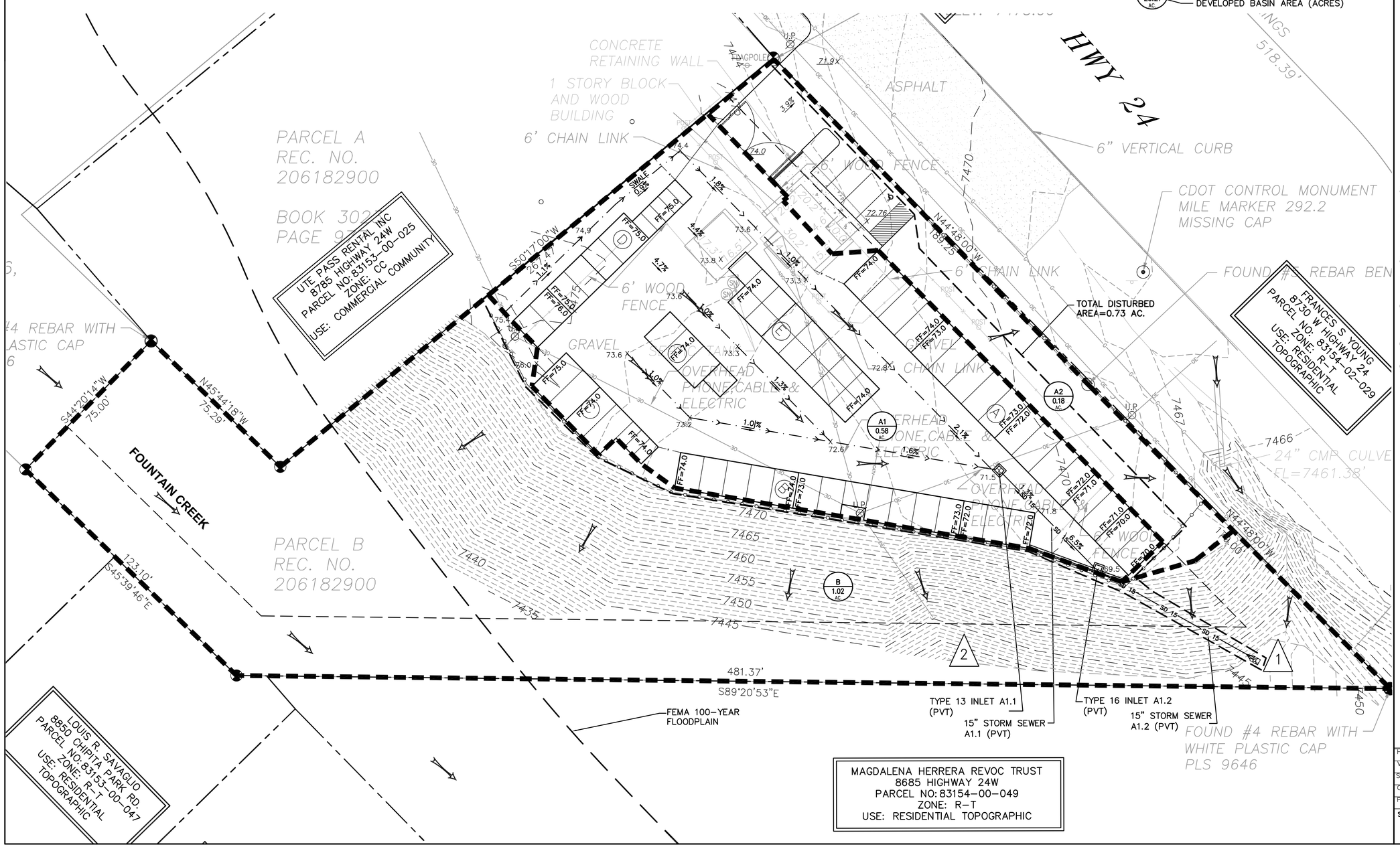
2. NO. 4 REBAR LOCATED ST THE NORTH MOST CORNER OF PARCEL ELEV=7473.06 (NAVD88)

N

20' 0 20' 40'
ORIGINAL SCALE: 1"=20' (24"x36" SHEET)
CONTOUR INTERVAL=1'

DRAINAGE LEGEND

- RIPRAP
- FLOW DIRECTION ARROW
- FLOWLINE
- MAJOR DRAINAGE BASIN BOUNDARY
- DESIGN POINT (5)
- DEVELOPED BASIN DESIGNATION (C14)
- DEVELOPED BASIN AREA (ACRES) (23.21 AC.)



JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO 80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

UTE PASS STORAGE
8775 W. HWY 24, CASCADE, CO

No.	REVISION	BY	DATE

DEVELOPED DRAINAGE PLAN

HORZ. SCALE: 1"=20'	DRAWN: BJJ
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: RIDGELINE	CHECKED: JPS
CREATED: 2/02/18	LAST MODIFIED: 2/14/18
PROJECT NO: 111704	MODIFIED BY: BJJ

SHEET: D1