



# TREASURED ACRES SUBDIVISION

## DRAINAGE LETTER



### PREPARED BY

Michael A. Bartusek

### RESPEC

121 S Tejon St., Suite 1110  
Colorado Springs, CO 80903  
719-283-7671

### PREPARED FOR

Jerry Lomax  
11750 Green Acres Ln.  
Colorado Springs, CO 80908  
719-331-3958

**OCTOBER 26, 2021**

Project Number 03925.5

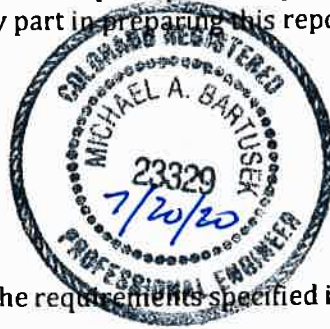
**PDC FILE NO. MS-21-009**




**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 City/County for drainage reports, and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

  
Michael A. Bartusek, P.E. #23329

**DEVELOPER'S STATEMENT:**

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

By:   
Jerry Lomax  
Title: Owner

Address: 11750 Green Acres Ln.  
Colorado Springs, CO 80908

**EL PASO COUNTY:**

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

\_\_\_\_\_  
Jennifer Irvine, COUNTY ENGINEER/ECM Administrator

\_\_\_\_\_  
Date

Conditions:

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# TREASURED ACRES SUBDIVISION

## DRAINAGE LETTER

### PURPOSE

This drainage letter is for the platting of an existing 15.18 acre parcel into three (3) lots.

### GENERAL DESCRIPTION

This is a drainage letter for Treasured Acres Subdivision which is a 15.18 acre site located along Green Acres Ln. approximately 1300 ft from Burges Rd. in northern El Paso County. It is further described as a portion of Section 15, Township 12 South, Range 64 West of the 6<sup>th</sup> PM in El Paso County, Colorado. See *Appendix A* for a vicinity map. The project is located adjacent to the West Tributary of the Black Squirrel Creek within the Upper Black Squirrel Drainage Basin.

### SOIL CONDITIONS

According to the El Paso County Area Soil Survey, the soil on the site is classified as follows:

- 41 Kettle gravelly sandy loam K=0.15 T=2 Hydrologic Soil Group A

This soil can be described as having a rapid permeability, medium-surface runoff, and moderate hazard of erosion.

### DRAINAGE CRITERIA

The methodology utilized for this report is in accordance with the *El Paso County Drainage Criteria Manual* for hydrologic and hydraulic design. The Rational Method for computation of runoff was used.

Q =  $ci a$

Where

- Q = maximum rate of runoff in cubic feet per second
- c = runoff coefficient representing drainage area characteristics
- i = average rainfall intensity, in inches per hour, for the duration required for the runoff to become established
- a = drainage basin size in acres

### EXISTING DRAINAGE CONDITIONS

The existing parcel contains an existing ranch with a house and several outbuildings. Most of the existing parcel is undeveloped and covered with rangeland grasses. Some minor, undeveloped flows enter the site from the adjacent parcel to the west. The site drains into three (3) different drainage basins:

- Basin A drains to the southeast into the Falcon Drainage Basin and contains 1.69 acres.
- Basin B drains to the southwest into the Sand Creek Drainage Basin and contains 3.29 acres.
- Basin C drains to the east and north into the Black Squirrel Creek and contains 10.20 acres.

Sub-basin Aex contains 1.69 acres and drains a large portion of the existing Treasured Acres ranch including the gravel driveway, a 1,650 sf garage and a 1,200 sf shed. It produces flows of

1.0 cfs for the 5-year storm and 4.6 cfs for the 100-year storm. These flows travel in a southeastern direction onto the adjacent parcel to the south within the Falcon Drainage Basin.

Sub-basin Bex contains 3.29 acres and drains the remainder of the existing developed farm and includes a portion of the gravel driveway, the 1,150 sf house and two (2) outbuildings totaling 1,800 sf. It produces flows of 1.3 cfs for the 5-year storm and 8.0 cfs for the 100-year storm. These flows will combine with the flows from Sub-basin OS1 at DP1 to produce flows of 1.7 cfs for the 5-year storm and 12.7 cfs for the 100-year storm. It flows to the west and southwest and into the Sand Creek Drainage Basin.

Sub-basin Cex is divided into two (2) Sub-basins. Sub-basin C1ex contains 6.50 acres and drains the northeast part of the undeveloped site. It produces flows of 1.6 cfs for the 5-year storm and 8.0 cfs for the 100-year storm. It flows to the east onto the adjacent property and into the Black Squirrel Drainage Basin.

Sub-basin C2ex contains 3.70 acres and drains the northwestern part of the undeveloped site. It produces flows of 1.1 cfs for the 5-year storm and 8.2 cfs for the 100-year storm. These flows will combine with the flows from Sub-basin C1ex at DP1 to produce flows of 2.5 cfs for the 5-year storm and 19.0 cfs for the 100-year storm. These flows make their way into the Black Squirrel Creek within the Upper Black Squirrel Drainage Basin.

#### **PROPOSED DRAINAGE CONDITIONS**

The proposed lot 15.18 acre subdivision will contain three (3) lots, each containing 5.06 acres. No change to the drainage pattern will occur. The existing ranch development will be contained within Lot 1. Lots 2 and 3 will encompass the northeast portion of the site. Although no development is proposed for these lots at this time it was assumed that these lots will contain a 2,500 sf house and a 500 lf gravel driveway.

The Sub-basin A1 will remain the same as existing except for the removal of one of the buildings and contains 1.69 acres and drains a large portion of the existing Treasured Acres ranch including the gravel driveway and a 1,650 sf garage. It produces flows of 0.9 cfs for the 5-year storm and 4.5 cfs for the 100-year storm. These flows travel in a southeastern direction onto the adjacent parcel to the south within the Falcon Drainage Basin. The imperviousness of this area will lower to 8.70% with the removal of the 1200 sf out building.

Sub-basin B1 will also remain the same and contains 3.29 acres and drains the remainder of the existing developed ranch and includes a portion of the gravel driveway, the 1,150 sf house and two (2) outbuildings totaling 1,800 sf. It produces flows of 1.3 cfs for the 5-year storm and 8.0 cfs for the 100-year storm. These flows will combine with the flows from Sub-basin OS1 at DP1 to produce flows of 1.7 cfs for the 5-year storm and 12.7 cfs for the 100-year storm. It flows to the west and southwest and into the Sand Creek Drainage Basin. The imperviousness of this area will remain at 2.67%.

Sub-basin C1 is located in the northeastern portion of the contains 6.50 acres and contains a portion of Lots 2 and 3. It drains the northeast part of the subdivision and produces flows of 2.0 cfs for the 5-year storm and 12.6 cfs for the 100-year storm. It flows to the east onto the adjacent property and into the Upper Black Squirrel Drainage Basin. The imperviousness of this area will be at 2.49%.

Sub-basin C2 will contain the northeastern portion of lots 2 and 3 and contains 3.70 acres and drains the northwestern part of the undeveloped site. It produces flows of 1.5 cfs for the 5-year

storm and 8.7 cfs for the 100-year storm. These flows will combine with the flows from Sub-basin C1ex at DP1 to produce flows of 3.3 cfs for the 5-year storm and 19.9 cfs for the 100-year storm. These flows make their way into the into the Black Squirrel Creek within the Upper Black Squirrel Drainage Basin. The imperviousness of this area will be at 4.37% with the total imperviousness of Sub-basin C of 3.12%. The imperviousness of the total project will increase from 1.71% to 3.68%.

## **FLOODPLAIN STATEMENT**

No portion of the site is within a designated FEMA 100-year floodplain as designated on Map No. 08041C0320G, dated December 7, 2018.

## **DRAINAGE AND BRIDGE FEES**

The project is located within three (3) drainage basins:

- Falcon Drainage Basin
- Sand Creek Drainage Basin
- Upper Black Squirrel Drainage Basin

The estimated Basin Fees are as follows:

### Falcon Drainage Basin

Impervious Coverage	=	8.70%
Area Subject to Fee	=	0.087 x 1.69 acres = 0.147 acre
Falcon Basin Fee	=	\$31,885/acre
Drainage Basin Fee	=	\$31,885 x 0.147 = \$4,687

### Falcon Bridge Fee

Impervious Coverage	=	8.70%
Area Subject to Fee	=	0.087 x 1.69 acres = 0.147 acre
Falcon Basin Fee	=	\$4,380/acre
Bridge Fee	=	\$4,380 x 0.147 = \$644

### Sand Creek Drainage Basin

Impervious Coverage	=	2.67%
Area Subject to Fee	=	0.0267 x 3.29 acres = 0.088 acre
Falcon Basin Fee	=	\$20,387/acre
Drainage Basin Fee	=	\$20,387 x 0.088 = \$1,794

### Sand Creek Bridge Fee

Impervious Coverage	=	2.67%
Area Subject to Fee	=	0.0267 x 3.29 acres = 0.088 acre
Falcon Basin Fee	=	\$8,339/acre
Bridge Fee	=	\$8,339 x 0.088 = \$744

The Upper Black Squirrel drainage basin has no El Paso County Drainage Basin fees associated with it; therefore, no fees are required at this time.

The total estimated Basin Fees are as follows:

Falcon Drainage Basin Fees = \$4,687

Falcon Bridge Basin Fees = \$644

Sand Creek Drainage Basin Fees = \$1,794

Sand Creek Basin Fees = \$734

**Total Fees = \$7,859**

## **SUMMARY**

Site runoff associated with the development of the Treasured Acres Subdivision will not adversely affect the downstream and surrounding developments. The overall drainage pattern and quantity will not be significantly changed from the existing conditions. No additional drainage improvements will be required due to this project. All areas disturbed by construction will be reseeded, and erosion control measures will be installed during construction of the proposed site. This drainage report is in general conformance with the previously approved drainage reports/studies for this site which include the Falcon and Sand Creek Drainage Basin Studies.

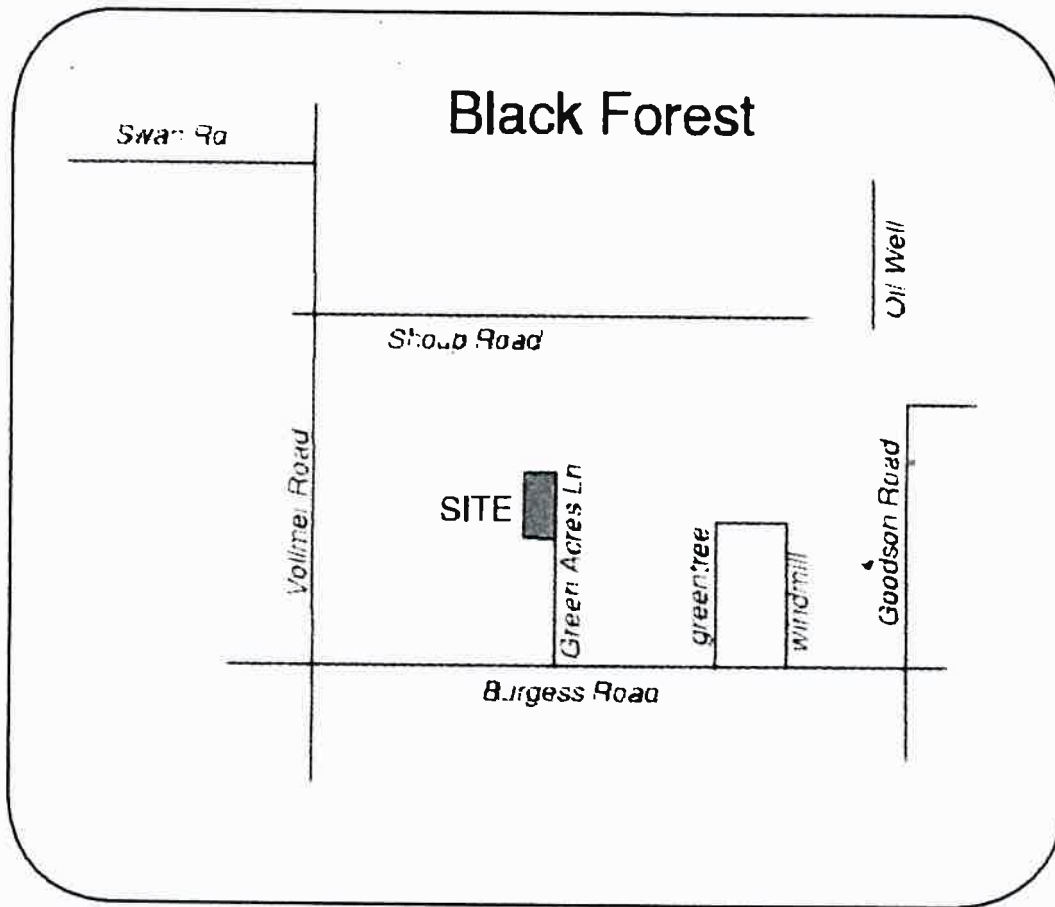
## **REFERENCES**

1. City of Colorado Springs and El Paso County (1994). ***Drainage Criteria Manual Volume 1, Chapter 6*** (DCM)
2. City of Colorado Springs and El Paso County (1994). ***Drainage Criteria Manual Volume II*** (DCM)
3. Soil Survey of El Paso County Area, Colorado by USDA, NRCS.
4. ***El Paso County (January 2006) Engineering Criteria Manual.***
5. ***FEMA*** 100-year floodplain Map No. 08041C0320G, dated December 7, 2018.
6. ***Sand Creek Drainage Basin Planning Study by Stantec, HDR and Dewberry Dated January 2021.***
7. ***Falcon Drainage Basin Planning Study by Matrix Engineering Dated 2015.***

## **APPENDIX A**

### **MAPS**



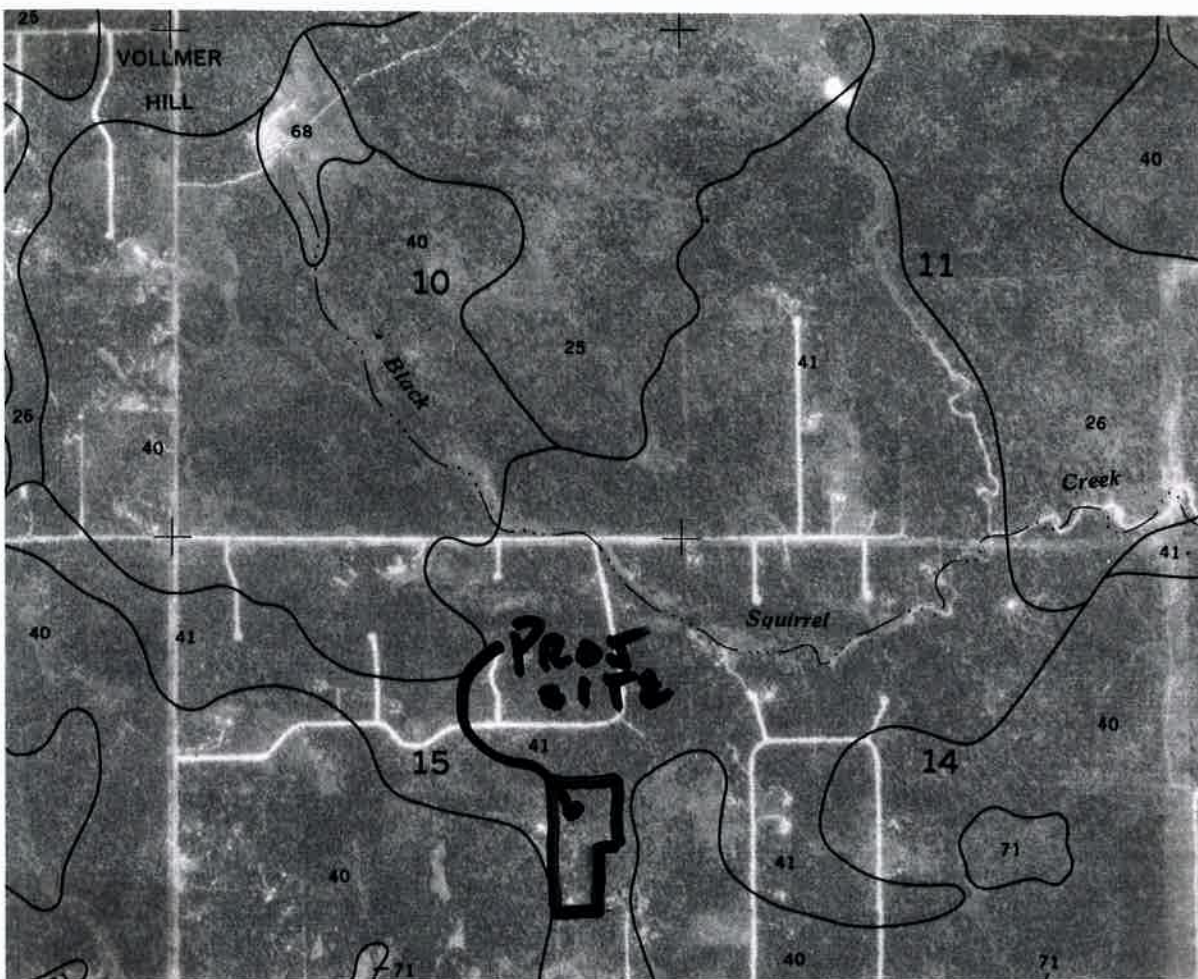


## VICINITY MAP

N.T.S.



121 S Tejon St., Suite 1110 Colorado Springs, CO 80903  
Phone: (719) 283-7671



## SOILS MAP

N.T.S.



121 S Tejon St., Suite 1110 Colorado Springs, CO 80903  
Phone: (719) 283-7671

# National Flood Hazard Layer FIRMette



39°0'24.28"N

104°39'13.86"W

104°38'36.40"W

38°59'56.32"N

1:6,000

Feet



USGS The National Map: Orthorectified, Data refreshed April, 2016.

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## Legend

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

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, AE, AR	With BFE or Depth Zone AE, AO, AH, VZ, AR	Regulatory Floodway

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X	
Future Conditions 1% Annual Chance Flood Hazard Zone X	
Area with Reduced Flood Risk due to Levee, See Notes, Zone X	
Area with Flood Risk due to Levee Zone D	

## OTHER AREAS OF FLOOD HAZARD

Area of Minimal Flood Hazard Zone X	
Effective LOMRs	
Area of Undetermined Flood Hazard Zone D	
Channel, Culvert, or Storm Sewer	
Levee, Dike, or Floodwall	

## OTHER AREAS

## GENERAL STRUCTURES

Cross Sections with 1% Annual Chance Water Surface Elevation	
Coastal Transect	
Base Flood Elevation Line (BFE)	
Limit of Study	
Jurisdiction Boundary	
Coastal Transect Baseline	
Profile Baseline	
Hydrographic Feature	

## OTHER FEATURES

Digital Data Available	
No Digital Data Available	
Unmapped	

## MAP PANELS



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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/2/2020 at 1:35:29 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

**APPENDIX B**

**DRAINAGE CALCULATIONS**



TREASURED ACRES RANCH SUBDIVISION																	
PROJ. #03925.6																	
DRAINAGE CALCULATION SHEET																	
file: Treasured Acres dr																	
05/22/20																	
AREA DESIG.	AREA (acre)	C5 (5 yr)	C100 (100 yr)	C5 X A	C100 X A	L (ft)	Slope (%)	Initial Tci ti (min)	L (ft)	Slope (%)	V (fps)	Tt (min)	TC (min)	I5 (in/hr)	Q5 (cfs)	Q100 (cfs)	AREA DESIG.
EXISTING CONDITIONS																	
Aex	1.69	0.15	0.40	0.25	0.68	60	5.00	8.09	450	6.50	2.50	3.00	11.09	3.88	0.98	4.58	Aex
Bex	3.29	0.10	0.36	0.33	1.18	100	7.00	9.84	240	8.00	2.80	1.43	11.27	3.85	1.27	7.96	Bex
C1ex	6.50	0.08	0.35	0.52	2.28	100	4.00	12.07	750	4.00	2.00	6.25	18.32	3.05	1.59	12.12	C1ex
C2ex	3.70	0.08	0.35	0.30	1.30	100	7.00	10.04	400	5.20	2.20	3.03	13.07	3.60	1.07	8.15	C2ex
DP1	10.20			0.82	3.57								18.32	3.05	2.49	19.03	DP1
DEVELOPED CONDITIONS																	
A	1.69	0.14	0.39	0.24	0.66	60	5.00	8.18	450	6.50	2.50	3.00	11.18	3.86	0.91	4.45	A
B	3.29	0.10	0.36	0.33	1.18	100	7.00	9.84	240	8.00	2.80	1.43	11.27	3.85	1.27	7.96	B
C1	6.50	0.10	0.36	0.65	2.34	100	4.00	11.83	750	4.00	2.00	6.25	18.08	3.07	2.00	12.55	C1
C2	3.70	0.11	0.37	0.41	1.37	100	7.00	9.74	400	5.20	2.20	3.03	12.77	3.64	1.48	8.70	C2
DP1	10.20			1.06	3.71								18.08	3.07	3.25	19.90	DP1

**APPENDIX C**

**DESIGN CHARTS**



**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
<b>Business</b>													
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
<b>Residential</b>													
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
<b>Industrial</b>													
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
<b>Parks and Cemeteries</b>													
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
<b>Undeveloped Areas</b>													
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
<b>Streets</b>													
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
<b>Drive and Walks</b>													
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
<b>Roofs</b>													
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
<b>Lawns</b>													
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



Figure 6-25. Estimate of Average Concentrated Shallow Flow

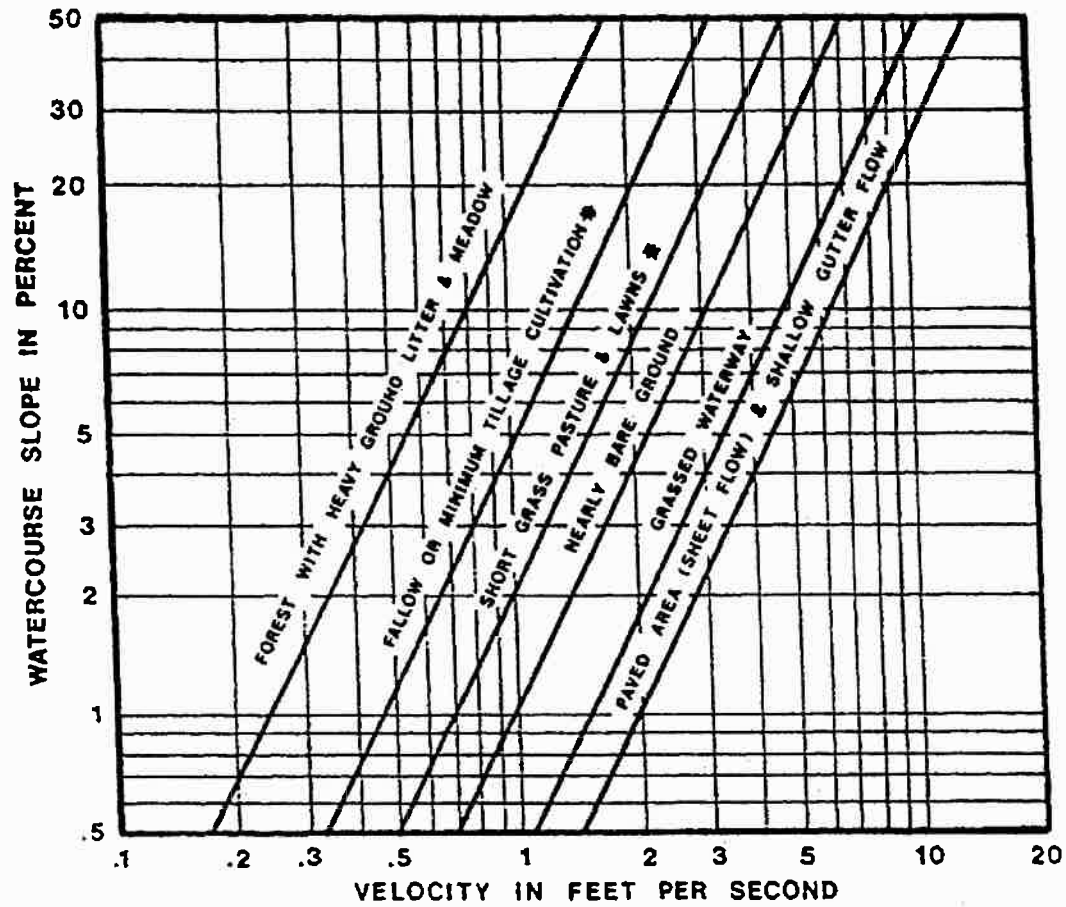
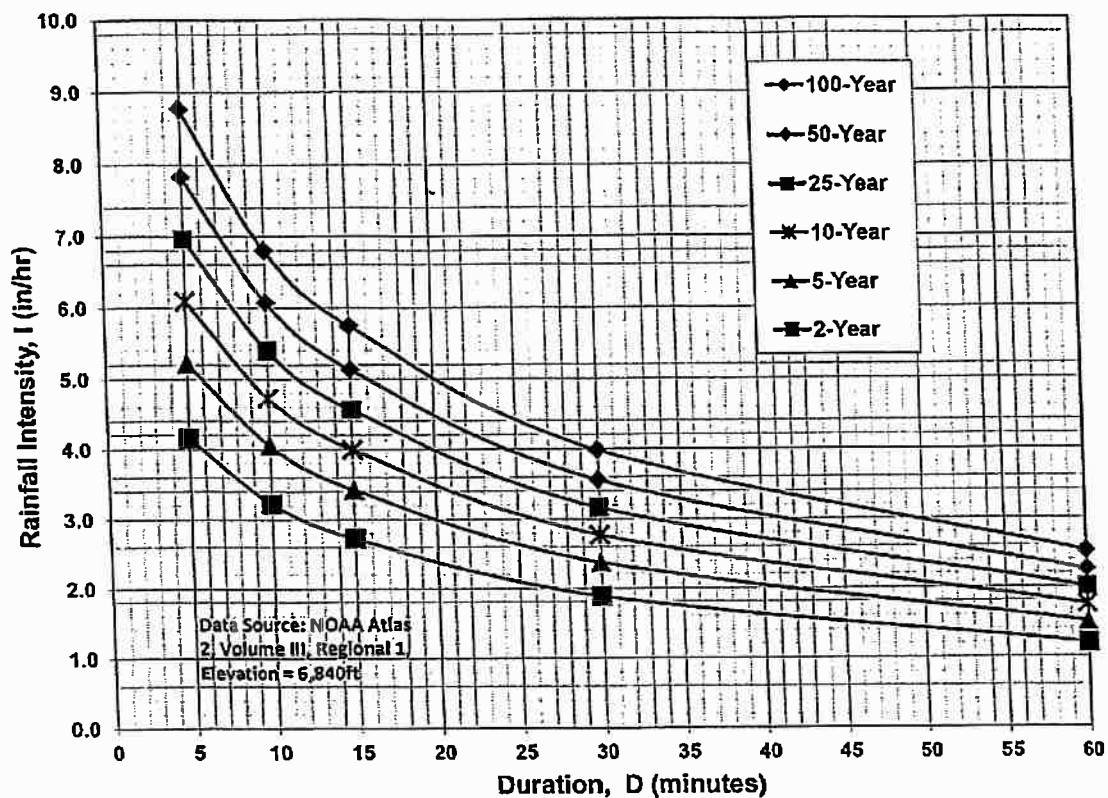


Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



## IDF Equations

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

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

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

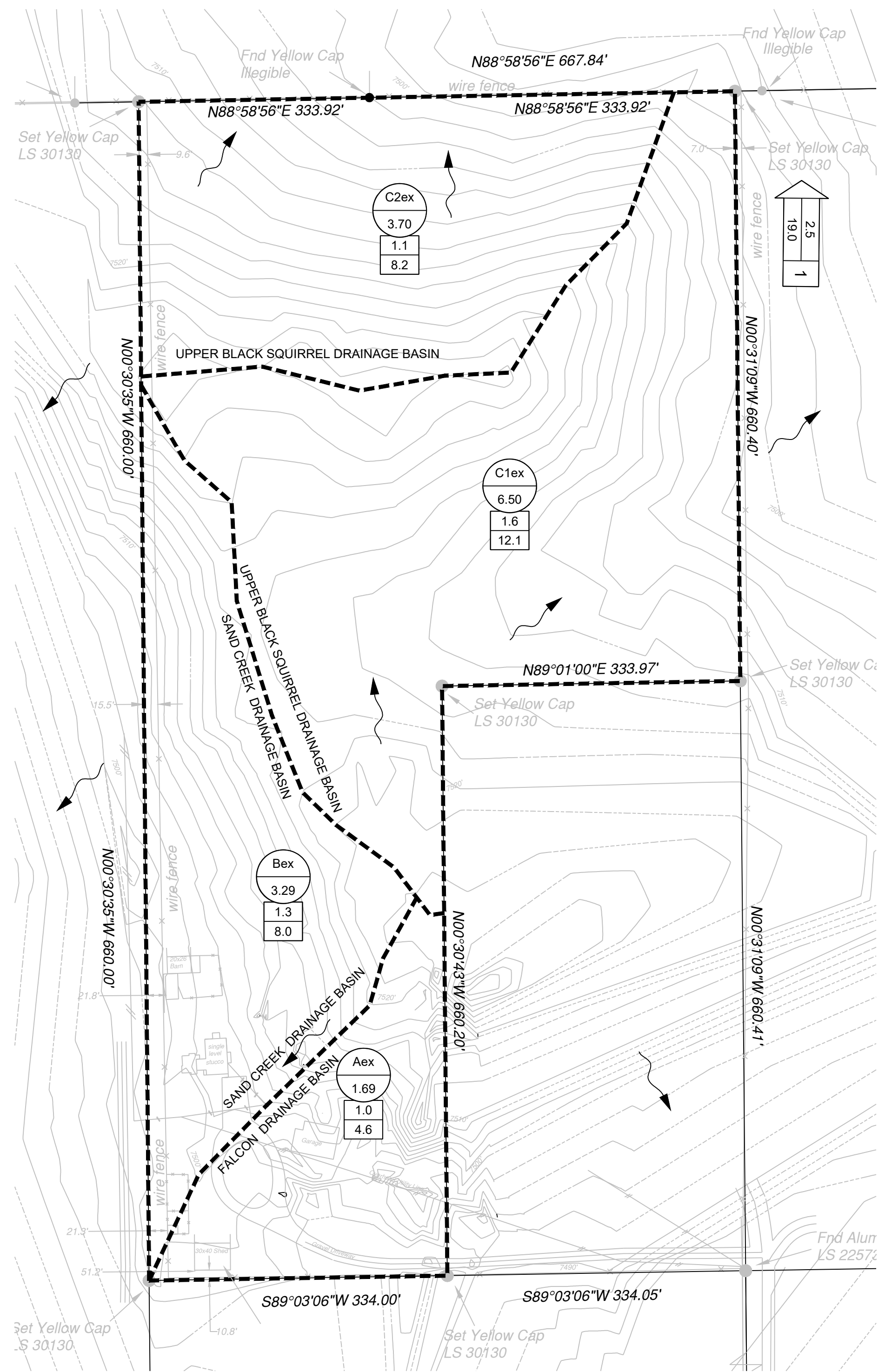
$$I_{10} = -1.75 \ln(D) + 8.847$$

$$I_5 = -1.50 \ln(D) + 7.583$$

$$I_2 = -1.19 \ln(D) + 6.035$$

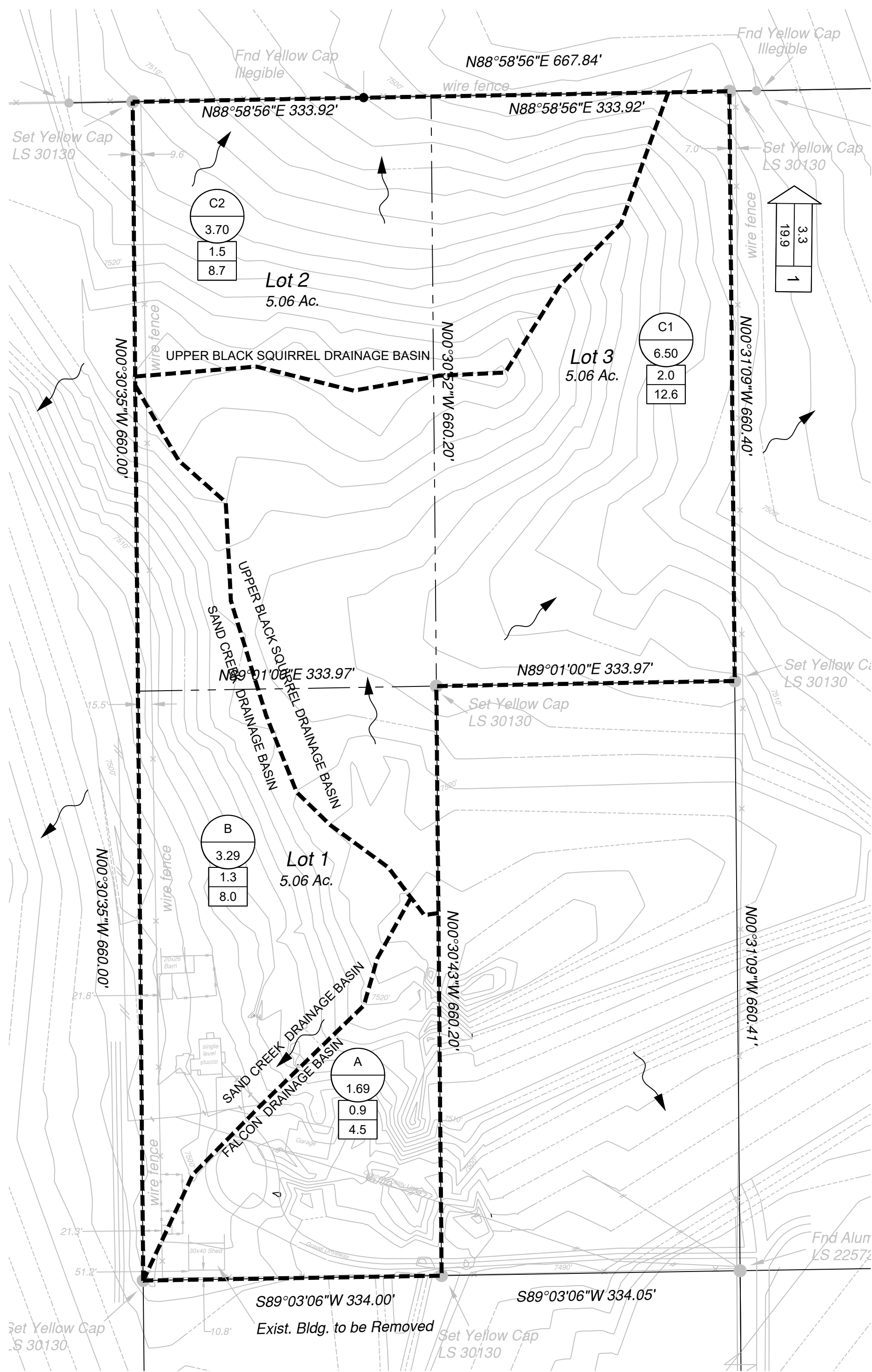
Note: Values calculated by equations may not precisely duplicate values read from figure.

NAME: N:\PROJECTS\03925.5 - TREASURED ACRES\3. DWG\SHEETS\03925.5-DRAINAGE PLAN.DWG  
PLOT DATE: October 18, 2021 12:10 PM, BY: REBECCA MCCONNELL



EXISTING DRAINAGE PLAN

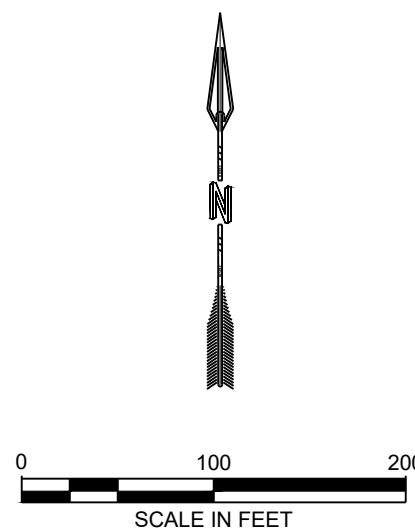
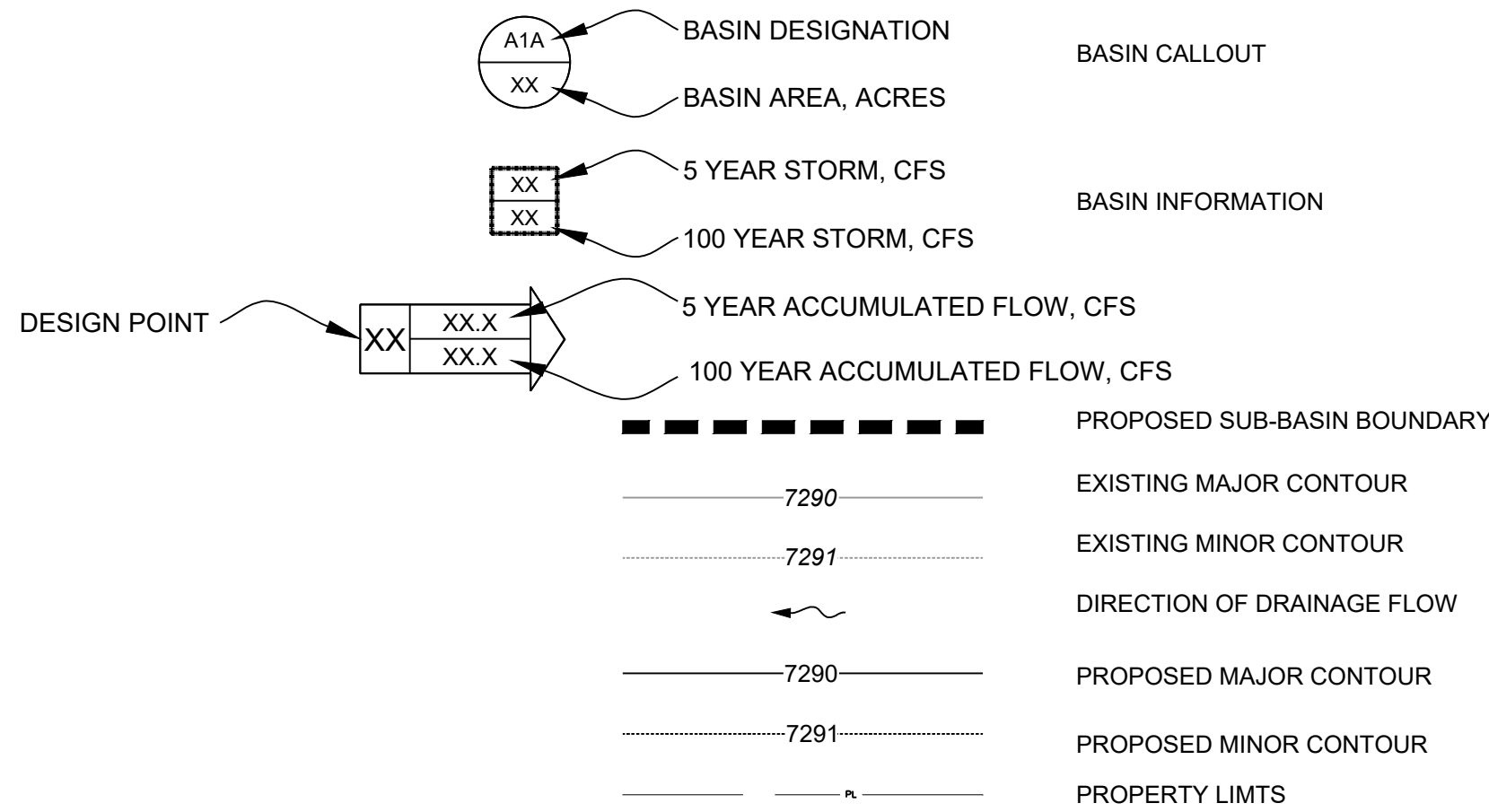
EXISTING CONDITIONS			
AREA DESIGNATION	Q5 (CFS)	Q100 (CFS)	ACRES
Aex	1.0	4.6	1.69
Bex	1.3	8.0	3.29
C1ex	1.6	12.1	6.50
C2ex	1.1	8.2	3.70
DP1	2.5	19.0	10.20



PROPOSED DRAINAGE PLAN

PROPOSED CONDITIONS			
AREA DESIGNATION	Q5 (CFS)	Q100 (CFS)	ACRES
A	0.9	4.5	1.69
B	1.3	8.0	3.29
C1	2.0	12.6	6.50
C2	1.5	8.7	3.70
DP1	3.3	19.9	10.20

SYMBOL LEGEND



PDC FILE No. MS-21-009

DESIGNED  
DRAWN  
CHECKED  
DATE

MAB  
MDF  
MAB  
05/21/2020

RESPEC  
121 S. TEJON ST  
SUITE 1110  
COLORADO SPRINGS, CO 80903  
PHONE (719) 283-7671

STAMP

811  
Know what's below.  
Call before you dig.

JERRY LOMAX  
11750 GREEN ACRES LN.  
COLORADO SPRINGS, CO 80908

TREASURED ACRES

EXISTING AND PROPOSED  
DRAINAGE PLAN

DRAWING NUMBER:  
C  
SHEET 1

REVISION