

FINAL DRAINAGE REPORT
for
LOT 1, SPACE VILLAGE SUBDIVISION FILING NO. 1

6895 Space Village Avenue
Colorado Springs, Colorado 80915

May 2021

PCD File No. SF2025

Prepared for:

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Prepared by:

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1.0 CERTIFICATION STATEMENTS

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 El Paso 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 omission on my part in preparing this report.




Tim D. McConnell, P.E.
Colorado P.E. License No. 33797
For and on Behalf of Drexel, Barrell & Co.

Date

Developer's Statement

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



Authorized Signatures
Elite Property Group, LLC – Scott Berkman, Manager

4-6-2021

Date

El Paso County

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

Jennifer Irvine, PE
County Engineer/ECM Administrator
Conditions:

Date

FINAL DRAINAGE REPORT
for
LOT 1, SPACE VILLAGE SUBDIVISION FILING NO. 1

2.0 PURPOSE

The purpose of this report is to identify the existing and proposed runoff patterns and drainage facilities required for Lot 1, Space Village Subdivision Filing No. 1 development, and to present the ability to safely route developed storm water to adequate outfalls.

3.0 GENERAL SITE DESCRIPTION

Location

Lot 1, Space Village Subdivision Filing No. 1 is a 0.63 acre site located in Section 17, Township 14 South, Range 65 West of the 6th Principal Meridian in the County of El Paso, State of Colorado. The site is bounded to the west and south by Hem Hotels, LLC, to the east by Lot 1 Cowperwood SAIC, and to the north by Space Village Avenue.

The site contains an existing 2 story motel with associated parking and landscaping. The proposed improvement includes converting the building into an apartment building. The total area of earth disturbance associated with the proposed project is negligible as there are minimal proposed improvements to include approx. 120' of sidewalk on Space Village Ave. The proposed project is not part of a larger common plan of development, so no water quality or full spectrum detention is required.

Soils

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Natural Resources Conservation Service (NCRS), the site is underlain by predominantly truckton sandy loam as well as blakeland loamy sand. These soils are classified as hydrological soil group A, and are considered to be well drained with low runoff potential. Runoff coefficients corresponding to group A were used for the purposes of the site drainage analysis.

Climate

This area of El Paso County can be described as the foothills, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry, and summers relatively warm and dry. Precipitation ranges from 12 to 14 inches per year, with the majority of this moisture occurring in the spring and summer in the form of rainfall. Thunderstorms are common during the summer months.

Floodplain Statement

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel 08041C0754G (12/7/2018), no portion of the site lies within a designated 100-year floodplain.

4.0 DRAINAGE CRITERIA

The drainage analysis has been prepared in accordance with the current El Paso County Drainage Criteria Manual. Calculations were performed to determine runoff quantities during the 5 year and 100 year frequency storms for historic and developed conditions using the Rational Method as required for basins containing less than 100 acres.

5.0 EXISTING / DEVELOPED CONDITION

Lot 1, Space Village Subdivision Filing No. 1 is located within the Sand Creek Drainage Basin. The existing site has a two story motel complex with a 8,420 sf building footprint, surrounding paved parking area, and landscaping in the northeast corner adjacent to the building, and along the eastern property line. The entire site sheet flows across the site in a southwesterly direction, where they are captured by an existing inlet in the southwest corner of the parking lot of the adjacent hotel. A site visit verified that from there a 12" pipe carries the flows to the west to an existing detention pond on the west end of the Colorado Military Academy property. This site is being treated as one drainage basin for purposes of this report, as drainage patterns are proposed to remain the same. The existing 5-year runoff rate is 2.2 cfs and the existing 100-year runoff rate is 4.6 cfs.

There are no off-site flows currently or proposed to enter the site.

See appendix for existing condition map.

6.0 DRAINAGE & BRIDGE FEES

The project site is located within the Sand Creek Drainage Basin. The 2020 El Paso County Drainage Fees and Bridge fees for this basin are shown in the following table:

		2020 Drainage Fees	2020 Bridge Fees
Total Acres:	0.628	\$19,698 per imp ac.	\$8,057 per imp ac.
% Impervious:	73.3%	\$9,067.46	\$3,708.83
		TOTAL FEES:	\$12,776.29

See appendix for impervious acre calculations.

7.0 CONSTRUCTION COST ESTIMATE

No storm sewer improvements are proposed.

8.0 SUMMARY

Site runoff associated with the proposed development of Lot 1, Space Village Subdivision Filing No. 1 will not adversely affect the surrounding or downstream developments. Developed runoff will be safely routed in historic patterns to the existing inlet in the southwest corner of the adjacent hotel site and piped to the existing extended detention basin on the west end of the Colorado Military Academy site as per matching existing flow conditions.

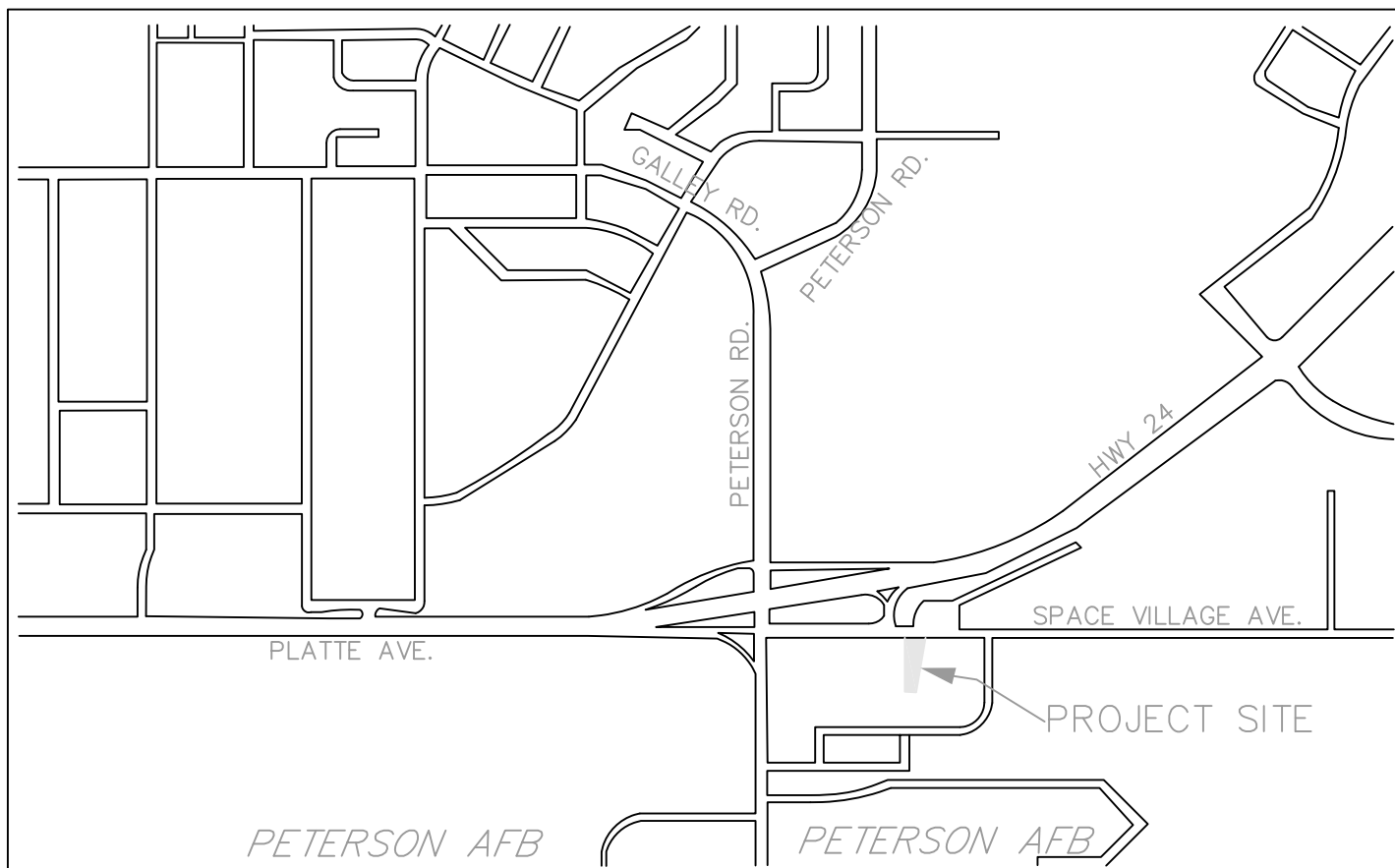
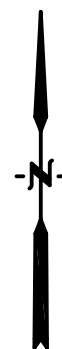
The findings of this drainage letter are in general conformance with other previously approved drainage studies or reports which included this site.

9.0 REFERENCES

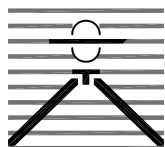
The sources of information used in the development of this study are listed below:

1. City of Colorado Springs/El Paso County Drainage Criteria Manual, May 2014.
2. Urban Storm Drainage Criteria Manuals, Urban Drainage and Flood Control District. June 2001, Revised April 2008.
3. Sand Creek Drainage Basin Planning Study, prepared by Kiowa Engineer Corporation, dated March 1996

APPENDIX



VICINITY MAP
NOT TO SCALE



SPACE VILLAGE APARTMENTS VICINITY MAP

Drexel, Barrell & Co.
Engineers • Surveyors

DATE:
01/21/2020

JOB NO:
21268-00CSCV

DWG. NO.

VM

SHEET 1 OF 1

Custom Soil Resource Report Soil Map



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

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: 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 3, 2014—Jun 17, 2014

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.

National Flood Hazard Layer FIRMette



Legend

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

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



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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **1/21/2020 at 12:03:49 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.

38°50'34.18"N



USGS The National Map: Orthoimagery. Data refreshed April, 2019.

0 250 500 1,000 1,500 2,000 Feet 1:6,000

38°50'6.15"N

104°41'35.40"W

PROJECT INFORMATION								
PROJECT:	Space Village							
PROJECT NO:	21268-00							
DESIGN BY:	CRS							
REV. BY:	TDM							
AGENCY:	El Paso County							
REPORT TYPE:	Final							
DATE:	3/4/2021							
Soil Type: C								
				C2*	C5*	C10*	C100*	% IMPERV
Pasture/Meadow					0.15		0.50	0
Roof					0.75		0.83	90
Asphalt/Sidewalk					0.90		0.96	100
*C-Values and Basin Imperviousness based on Table 6-6, City of Colorado Springs Drainage Criteria Manual Vol. 1								
PROPOSED								
SUB-BASIN	SURFACE DESIGNATION	AREA	COMPOSITE RUNOFF COEFFICIENTS				% IMPERV	
		ACRE	C2	C5	C10	C100		
P1	Pasture/Meadow	0.148		0.15		0.50	0	
	Roof	0.198		0.75		0.83	90	
	Asphalt/Sidewalk	0.282		0.90		0.96	100	
	WEIGHTED AVERAGE			0.68		0.81	73%	
TOTAL P1		0.628						
TOTAL SITE		0.628		0.68		0.81	73.3%	



Drexel, Barrell & Co.

PROJECT INFORMATION

PROJECT: Space Village
 PROJECT NO: 21268-00
 DESIGN BY: CRS
 REV. BY: TDM
 AGENCY: El Paso County
 REPORT TYPE: Final
 DATE: 3/4/2021



RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

PROPOSED TIME OF CONCENTRATION STANDARD FORM SF-2

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t _i)				TRAVEL TIME (t _t)					PIPE TRAVEL TIME (t _p)					TIME OF CONC. t _c		FINAL t _c
BASIN	DESIGN PT.	C _s	C ₁₀₀	AREA	LENGTH	HT	SLOPE	t _i	LENGTH	HT	SLOPE	VEL.	t _t	LENGTH	HT	SLOPE	VEL.	t _p	COMP.	MINIMUM	
				Ac	Ft	FT	%	Min	Ft	Ft	%	FPS	Min	Ft	Ft	%	FPS	Min	t _c	t _c	Min
P1	DP-1	0.68	0.81	0.63	100	3.5	3.5	1.1	248.82	3	1.2	2.2	1.9	0	0	#DIV/0!	2.8	0.0	3.0	5	5.0

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

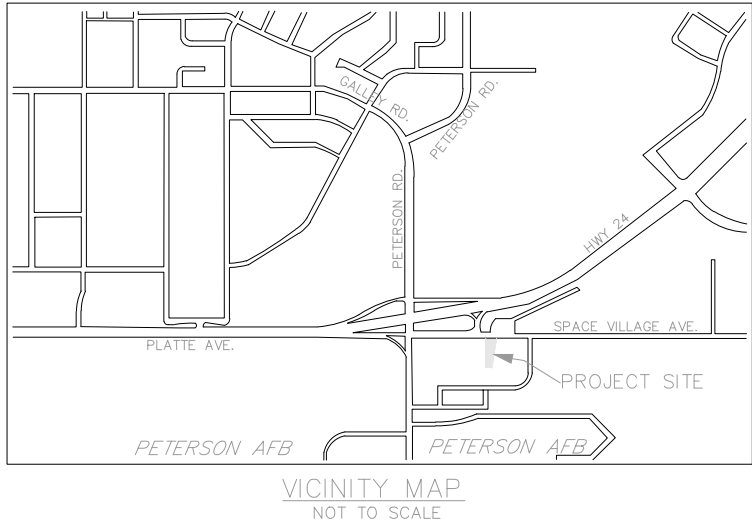
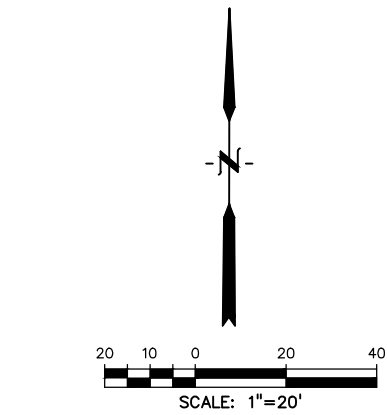
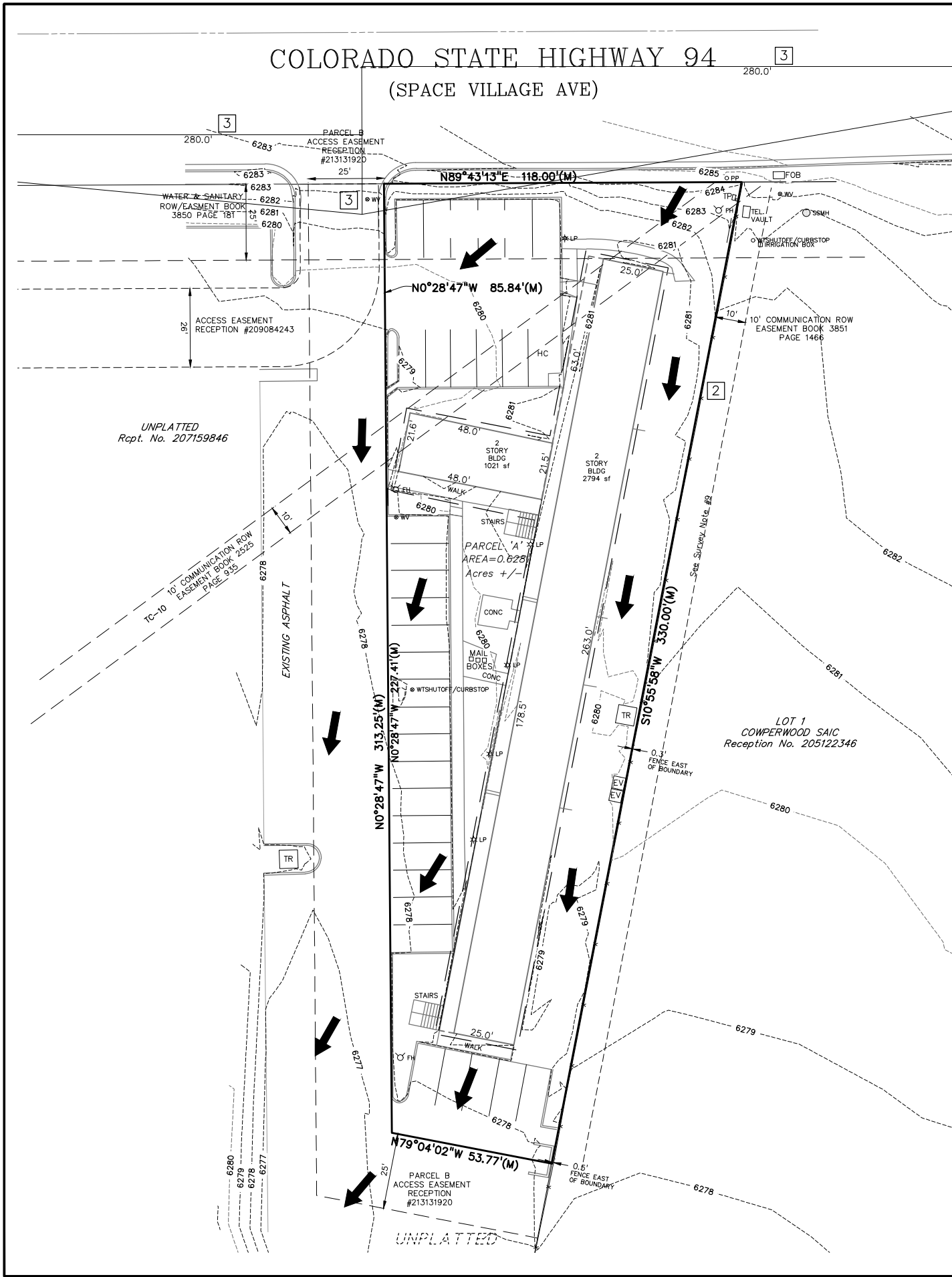
PROPOSED RUNOFF 5 YR STORM P1= 1.50

DIRECT RUNOFF								PIPE SIZING			
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t _c (MIN)	C * A	I (IN/HR)	Q (CFS)	n	Slope (ft/ft)	Calculate d Pipe Dia	Used Pipe
P1	DP-1	0.63	0.68	5.0	0.42	5.10	2.2				

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

PROPOSED RUNOFF 100 YR STORM P1= 2.67

DIRECT RUNOFF								PIPE SIZING			
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t _c (MIN)	C * A	I (IN/HR)	Q (CFS)	n	Slope (ft/ft)	Calculate d Pipe Dia	Used Pipe (in)
P1	DP-1	0.63	0.81	5.0	0.51	9.09	4.6				



Legend	
CONC	Miscellaneous concrete
R.O.W.	Right of Way
+/-	more or less
sf	square feet
ESMT	easement
RCPT. NO.	Reception Number
○ CO	Sanitary sewer cleanout
FOB	Fiber Optic Box
□ TP	Telephone Pedestal
○ SSMH	Sanitary Manhole
EV	Electric Vault
⊕ FH	Fire Hydrant
⊗ WV	Water Valve
CATV	Cable TV Vault
DOWNDRN	Roof drain pipe
⑩	Parking Stall Count
×	Chain link fence
64	PROPOSED INTERMEDIATE CONTOUR
65	PROPOSED INDEX CONTOUR

PREPARED BY:

DREXEL, BARRELL & CO.
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3 SOUTH 7TH STREET
COLORADO SPGS, COLORADO 80905
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BOULDER • COLORADO SPRINGS • GREELY

CLIENT:

107 N. NEVADA AVE. #300
COLORADO SPRINGS CO, 80903
(719)-385-5986
CONTACT: JOE CURRO
(719)-444-7430

CIVIL CONSTRUCTION PLANS

SPACE VILLAGE APARTMENTS

6895 SPACE VILLAGE AVE
COLORADO SPRINGS, COLORADO

ISSUE	DATE
INITIAL ISSUE	01-20-20
LATEST ISSUE	05-07-21
DESIGNED BY:	CRS
DRAWN BY:	CRS
CHECKED BY:	TDM
FILE NAME:	21268-00DR1

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF DREXEL, BARRELL & CO.

DRAWING SCALE:
HORIZONTAL: 1" = 40'
VERTICAL: N/A

SITE DRAINAGE PLAN

PROJECT NO. 21268-00CSV
DRAWING NO.

811 Know what's below.
Call before you dig.
CALL 3-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

DR1

SHEET: 1 OF 1