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Preliminary Drainage Report Guntzelman Porcelain Pines Subdivision

Subdivision: Guntzelman Porcelain Pines Subdivision

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Date Prepared: July 2022

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Include the following signature blocks after title page:

"Design 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 applicable 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.

[Name, P.E. #_____] Date

Owner/Developer's Statement:

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

[Name, Title] Date
[Business Name]
[Address]

El Paso County:

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

Joshua Palmer, P.E. Date

County Engineer / ECM Administrator

Conditions:

1. INTRODUCTION

The owners of parcel numbers 8322200018 & 8322200017 have asked SMH Consultants, P.A. (SMH) to conduct a preliminary stormwater drainage analysis for the proposed Guntzelman Porcelain Pines Subdivision to satisfy the El Paso County drainage criteria manual requirements. This analysis will determine potential impacts resulting from subdividing 40.16-acres into 7 single-family residential lots.

2. GENERAL LOCATION

The property is located in the NW ¼ of Section 22, Township 13 South, Range 68 West of the Sixth Principal Meridian in Cascade, El Paso County, Colorado. Major streets adjacent to the subdivision include Kulsa Road, Mountain Road, Ute Road, Nampa Road, and Pikes Peak Highway. There are no major drainage ways or existing facilities on the property, however, there are two unnamed intermittent streams that run through the property. Runoff from the site generally flows into Fountain Creek to the northeast. The site is generally bordered by the Ute Pass Summer Colorado Subdivision #1 to the north, the Pikes Peak Mountain Estates & Azco Properties LLC to the east. The Pike National Forest borders the subdivision to the south and west. The subject property is to be platted as seven lots and be developed into The Guntzelman Porcelain Pines Subdivision.

3. DESCRIPTION OF PROPERTY

The property is approximately 40.16 acres and consists of a single-family residence. The site is generally heavily forested, and has slopes that vary from approximately 20% to 50% to the northeast. The primary soils on the property include Legault-Rock outcrop complex and Tecolote very gravelly sandy loam. The Legault Rock outcrop complex is classified as Hydrologic soil group D, while the Tecolote very gravelly sandy loam is classified as Hydrologic soil group B. The nearest major drainageway is Fountain Creek. Fountain Creek flows southeast eventually flowing into the Arkansas River. There are no irrigation facilities on the site. There are currently no existing utilities on the site, however, water and electric services are located on Kulsa Road.

4. MAJOR BASIN DESCRIPTIONS

The subject site is located entirely within the Upper Fountain Drainage Basin. This is an unstudied basin. The entirety of the site will flow northeast at varying slopes and eventually meet Fountain Creek. The existing site is generally covered in forest. There are no nearby irrigation facilities.

Floodplain Statement:

No portion of the site is located within a 100-year floodplain as determined by the Flood Insurance Rate Map (FIRM) number 08041C0486G effective date, December 7, 2018.

5. SUB-BASIN DESCRIPTIONS

Runoff from the site is discharged into three unnamed tributaries to Fountain Creek which flows southeast out of Cascade, eventually making its way east to the Arkansas River, near Pueblo, Colorado. The historic drainage pattern is to remain after the site is developed. On the southwest side of the project site there is an existing ridge, which has a higher elevation than the entirety of the development. There is an additional 56.6 acres of runoff that will flow through the project site. However, this area is part of the Pike National Forest and will not be developed further. The off-site drainage is further detailed in the Drainage Facility design portion of this report.

6. DRAINAGE DESIGN CRITERIA

Pre- and post-development drainage characteristics were reviewed, studied and analyzed using the *El Paso County Drainage Criteria Manual*, City of Colorado Springs Drainage Criteria Manual Vols. 1 and 2, Federal Emergency Management Agency's Flood Insurance Rate Map and USDA NRCS Web Soil Survey.

There are no previous drainage studies for this site.

7. FOUR-STEP PROCESS

El Paso County requires a four-step process for stormwater quality management: reducing runoff volumes, treating the water quality capture volume, stabilizing streams and implementing long-term source controls. These steps are further outlined in Volumes 1 and 2 of the County's Drainage Criteria Manual. The total disturbed area will be less than 1 acre. The road construction and individual residence construction will occur at separate times.

Step 1: Employ Runoff Reduction Practices. The site will be designed so that all runoff runs over native vegetation and undisturbed earth before leaving the site and entering downstream receiving waters. The proposed driveways will be constructed of gravel, which has a greater infiltration rate than that of typical pavement. Runoff from the proposed road serving the development will be allowed to leave the right-of-way via overland flow and infiltrate, prior to leaving the site. These factors will contribute to less runoff leaving the site.

Step 2: Stabilize Drainageways. The existing natural channels will remain in place and undisturbed. Leaving the existing native vegetation will provide established vegetation to help prevent erosion once runoff leaves the site. Once runoff leaves the site, it will travel approximately 2,800 feet through natural channels, before it enters Fountain Creek. Because of the path the runoff takes from the subject site, before it enters the first receiving waters, no downstream improvements are needed.

Step 3: Implement BMPs that Provide Water Quality Capture Volume (WQCV) with Slow Release. Per the County's Post Construction Stormwater Management Applicability (PBMP) Evaluation Form, permanent BMPs are not required as the project is considered a Large Lot

Single-Family site with greater than 2.5 acres per dwelling and less than 10% impervious area for each lot and more than an acre of paved road per mile is not being constructed. Total site disturbance, with the road and individual residences being constructed at separate times will be less than an acre.

Step 4: Implement Site Specific and Other Source Control BMPs. Soil erosion control measures will be implemented during construction of the individual homes and the proposed driveways and road. Some of the measures to be implemented during construction include: silt fence, temporary construction entrance, permanent/temporary seeding, etc. The full soil erosion control measures to be utilized during construction on the homes will be further outlined at the time of building permit application for the respective home.

8. HYDROLOGIC CRITERIA

Hydrology calculations were performed following the methodologies outlined in the *El Paso County Engineering Criteria Manual* and the *City of Colorado Springs' Drainage Criteria Manual (DCM) Volumes 1 & 2*. Drainage characteristics were delineated based on existing topographic information from Lidar and USGS topographical maps. In the appendix Figures 1 & 2 show the site drainage information.

Since the watershed area encompassing the development site is less than 100 acres, the rational method was used to determine peak flows for the 5-year and 100-year storm events. Weighted C values were determined for each drainage area within the proposed site based on the cover type. A runoff coefficient (C) was chosen from table 6-6 of the *City of Colorado Springs' Drainage Criteria Manual, Volume 1 Update*. As mentioned earlier, the site consists of Hydrological Soil Groups B & D. For the purposes of this study Hydrological Soil Group D will be used, to perform more conservative calculations.

The time of concentration was calculated for each drainage area based off methods found in Chapter 6, Section 3.2 of the *City of Colorado Springs' Drainage Criteria Manual, Volume 1 Update*. The first 300 feet of unconcentrated overland flow time were calculated and added to the subsequent channelized flow times. Channelized flow times were calculated using the channel flow time equation.

The design rainfall intensity was determined using the equations in Figure 6-5 of the *City of Colorado Springs' Drainage Criteria Manual, Volume 1 Update*.

Detention discharge and storage calculation methods are not needed for this site. Full Spectrum Detention is also not needed for this site. See Step 3 of the four-step process above.

9. DRAINAGE FACILITY DESIGN – GENERAL CONCEPT

The site can be split into three smaller sub-basin drainage areas based on where flows leave the site. All runoff from the site flows offsite to the northeast into two unnamed tributaries which flow into Fountain Creek, and eventually the Arkansas River. The drainage patterns for the proposed development will remain unchanged. There are four off-site drainage areas which run

through the site as well. Existing and Proposed Drainage maps, as well as additional calculations can be found in the Appendix.

10. DRAINAGE FACILITY DESIGN – SPECIFIC DETAILS

Descriptions and flow rates of each drainage area are shown below. Further calculations can be seen in the appendix.

Drainage Area 1 is approximately 4.23 acres located on the northwest side of the site. Drainage area 1 is currently forested, with one single family residence located in the area. As part of the planned improvements, a proposed street and gravel drive will be built to serve the proposed single-family residences. The remaining area will remain unchanged. The overall flow pattern for Drainage Area 1 will remain unchanged from existing conditions. The drainage area has existing 5-year and 100-year flows of 1.82 cfs and 9.85 cfs, respectively. The drainage area has proposed 5-year and 100-year flows of 2.34 cfs and 10.37 cfs, respectively.

Drainage Area 2 is approximately 24.29 acres located on the north side of the site. Drainage Area 2 is currently forested. As part of the planned improvements, six single family residences, a proposed street and gravel drives will be built on the site. The overall flow pattern for Drainage Area 2 will remain unchanged from existing conditions. The drainage area has existing 5-year and 100-year flows of 8.84 cfs and 49.47 cfs, respectively. The drainage area has proposed 5-year and 100-year flows of 10.77 and 51.21 cfs, respectively.

Drainage Area 3 is approximately 11.94 acres located on the south side of the site. Drainage Area 3 is forested, and will remain unchanged. The overall flow pattern for Drainage Area 2 will remain unchanged from existing conditions. The drainage area has existing and proposed 5-year and 100-year flows of 4.32 cfs and 24.16 cfs, respectively.

Offsite Drainage Area OS-1 is approximately 15.79 acres and is located south of the site. Offsite Drainage Area OS-1 is forested, and will remain unchanged. The overall flow pattern for Offsite Drainage Area OS-1 will remain unchanged from existing conditions. The drainage area has existing and proposed 5-year and 100-year flows of 9.01 and 50.42 cfs, respectively.

Offsite Drainage Area OS-2 is approximately 9.23 acres and is located west of the site. Offsite Drainage Area OS-2 is forested, and will remain unchanged. The overall flow pattern for Offsite Drainage Area OS-2 will remain unchanged from existing conditions. The drainage area has existing and proposed 5-year and 100-year flows of 5.10 and 28.55 cfs, respectively.

Offsite Drainage Area OS-3 is approximately 27.10 acres and is located southwest of the site. Offsite Drainage Area OS-3 is forested, and will remain unchanged. The overall flow pattern for Offsite Drainage Area OS-3 will remain unchanged from existing conditions. The drainage area has existing and proposed 5-year and 100-year flows of 13.74 and 76.89 cfs, respectively.

Offsite Drainage Area OS-4 is approximately 4.47 acres and is located north of the site. Offsite Drainage Area OS-4 is forested with three existing buildings and will remain unchanged. The overall flow pattern for Offsite Drainage Area OS-4 will remain unchanged from existing

conditions. The drainage area has existing and proposed 5-year and 100-year flows of 2.61 and 14.09 cfs, respectively.

To accommodate runoff from the proposed street addition, open ditches will be constructed on both sides. These ditches will then release runoff to the east of the roadway, where the runoff will be allowed to become overland flow and infiltrate into the ground. Minimal impact on existing facilities is expected due to the nominal increase in runoff from the development.

The major site constraints include the existing streets adjacent to the property, including Kulsa Road, Mountain Road, Ute Road, Nampa Road and Pikes Peak Highway. The proposed street improvement is planned off of Kulsa Road & Mountain Road. The six proposed residences will also be constructed so the site disturbance is kept to a minimum. There are no known conflicts with existing utilities or existing structures.

The primary environmental features that will affect this project include the heavy forested & steep nature of the site. A portion of the existing trees will be removed during construction, which will increase the runoff for the site, however most of the trees will remain. The steep slopes will generally remain untouched throughout construction.

In general, stormwater maintenance for this project will be minimal, as only one structure is proposed. Maintenance access for the proposed structure will be provided along the proposed street via public right-of-way.

Based on this preliminary analysis, the 5-year & 100-year post-development stormwater peak flow rates will be slightly higher than the pre-developed stormwater peak flow rates. Subdividing the site and developing six additional residential lots should not adversely impact surrounding or downstream properties.

11. SUMMARY

A preliminary drainage analysis was conducted for a 40.16-acre property to be subdivided into seven single family residential lots and will be known as Guntzelman Porcelain Pines Subdivision. Runoff will follow existing drainage patterns and flow into Fountain Creek. Based on the findings presented in this report, no adverse drainage impacts are expected from this development. A final drainage study will be required at the time of a development application.

Provide calculations for runoff that include time of concentration, runoff coefficients, etc. Place that in an appendix before the drainage maps. Show existing and proposed conditions.

In the discussion include where the runoff outfalls to. Discuss whether the outfall has the capacity and is adequate to receive the increase in runoff. Will there be any damage to the downstream facilities?



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TRACY J BOOK-MOHLER

PARCEL #832220218
ARLYN & RENEE ALGRIM

PARCEL #832220017
DARLENE Z JENSEN
LARRY LEE MANNING

PARCEL #832220016
DARLENE Z JENSEN

PARCEL #830000092
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CARL J JR & DONNA D
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PARCEL #8322201012
STEVE & ELAINE ONIEL

PARCEL #8322201011
ZACHARY MICHAEL &
NICOLE E DICKEY

PARCEL #8322201009
ACCELL PROPERTIES LLC

PARCEL #8322201005
KEITH LEONARD &
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PARCEL #8322204001
ERIC JAMES &
MEGAN ELIZABETH BARTLETT
KELLY

PARCEL #8322204002
MICHAEL T &
AMANDA WUPPER

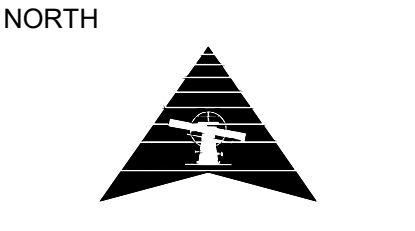
PARCEL #8322102024
BENJAMIN F &
SARAH A WUPPER

PARCEL #8322206002
ROBERT D & MARSHA D ROBERSON

PARCEL #8322200006
AZCO PROPERTIES LLC

PROJECT SITE

REVISION DATE	REVISION DESCRIPTION (DESCRIPTION)
00/00/00	



SCALE: 1" = 150'

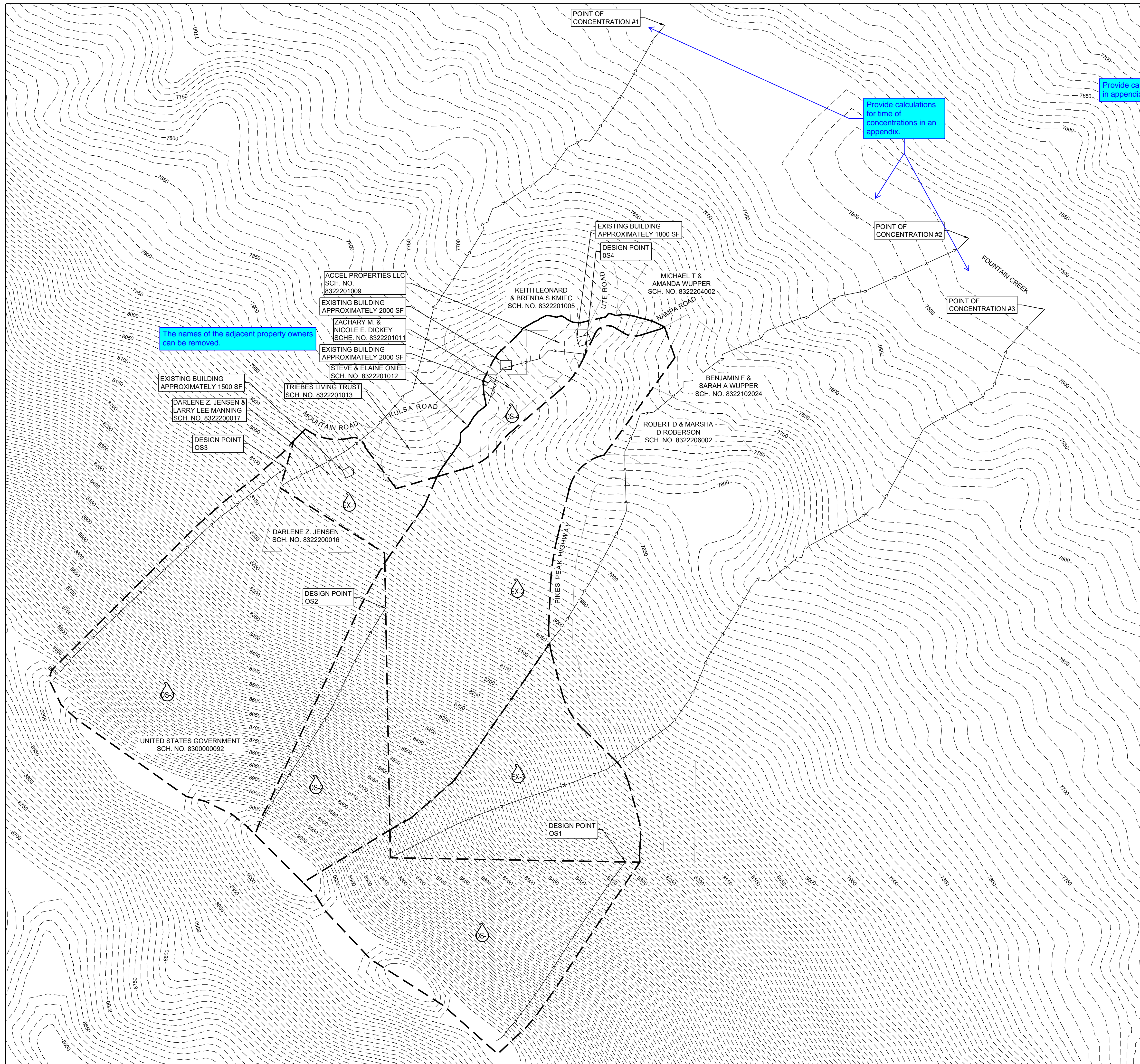
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CHECKED BY: BML
DRAWN BY: JMT

DATE: 07/08/2022

SHEET # **FIG. 1**

TOTAL SHEETS

VICINITY MAP

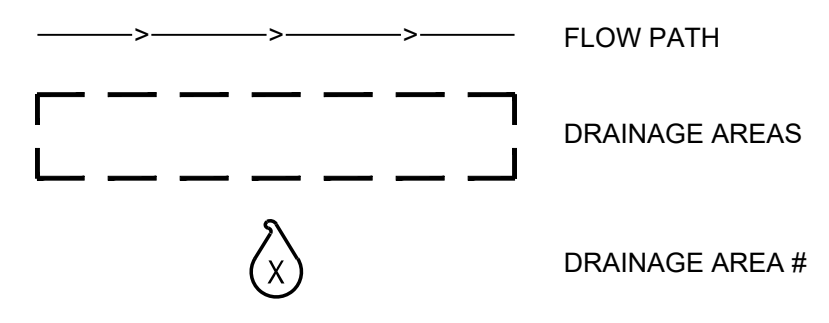


The names of the adjacent property owners can be removed.

Provide calculations for time of concentrations in an appendix.

Provide calculations in appendix.

LEGEND

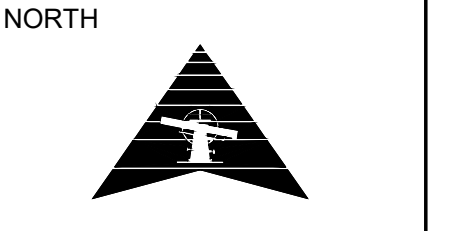


PRE-DEVELOPMENT SUMMARY TABLE						
DRAINAGE AREA	AREA (ACRE)	C5	C100	TIME OF CONCENTRATION (TC)	Q5 (CFS)	Q100 (CFS)
EX-1	4.23	0.16	0.50	24.97	1.82	9.85
EX-2	24.29	0.15	0.50	31.09	8.84	49.47
EX-3	11.94	0.15	0.50	31.41	4.32	24.16
OS-1	15.79	0.15	0.50	12.42	9.01	50.42
OS-2	9.23	0.15	0.50	13.45	5.10	28.55
OS-3	27.10	0.15	0.50	16.47	13.74	76.89
OS-4	4.47	0.16	0.50	13.07	2.61	14.09

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GUNTZELMAN PORCELAIN PINES SUBDIVISION
 DRAINAGE STUDY
 EL PASO COUNTY, COLORADO

REVISION DATE	REVISION DESCRIPTION (DESCRIPTION)
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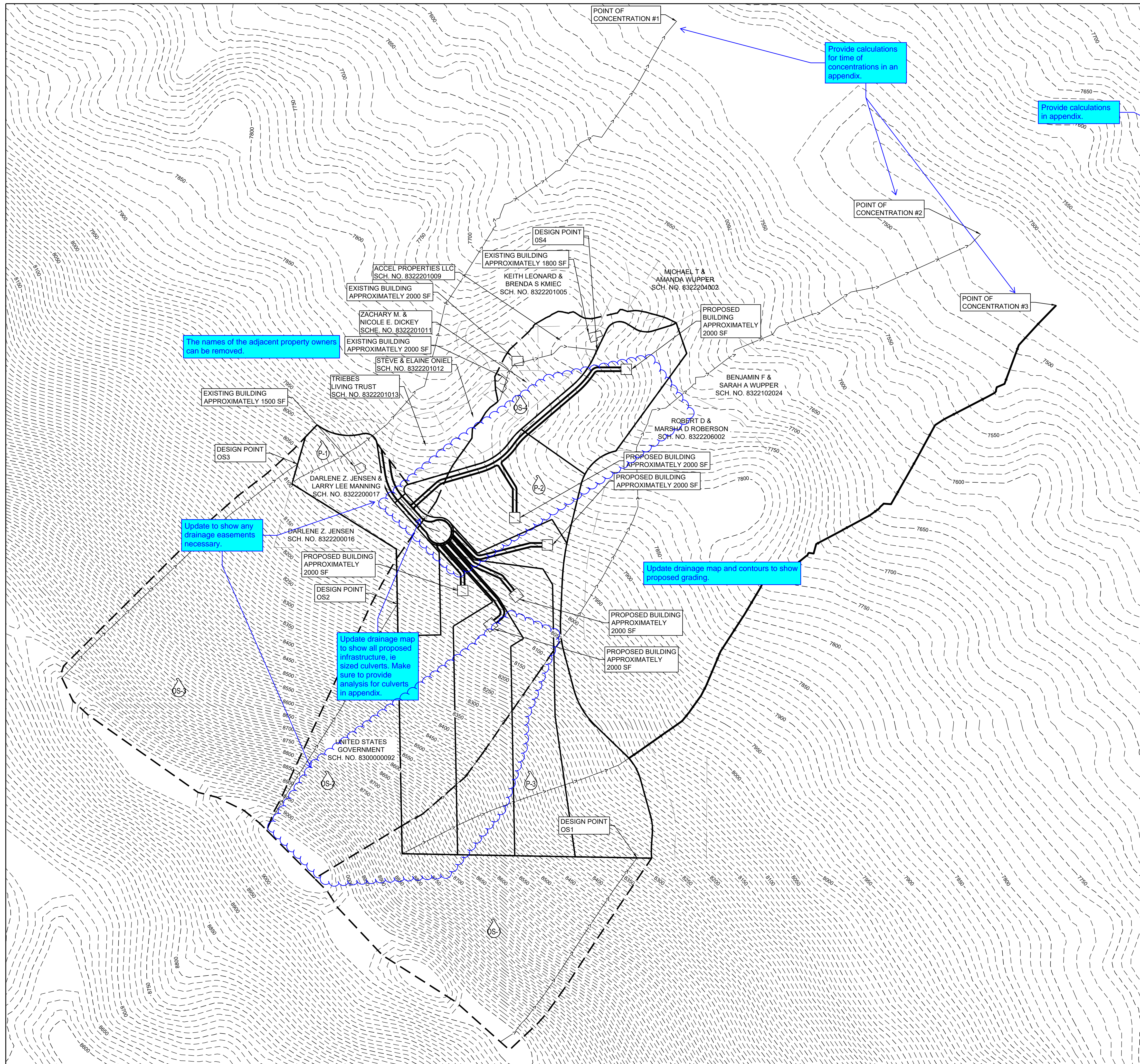
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SHEET # **FIG. 2**

TOTAL SHEETS



LEGEND

→ FLOW PATH

--- DRAINAGE AREAS

⊗ DRAINAGE AREA #

POST-DEVELOPMENT SUMMARY TABLE

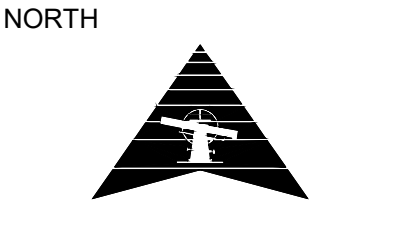
DRAINAGE AREA	AREA (ACRE)	C5	C100	TIME OF CONCENTRATION (TC)	Q5 (CFS)	Q100 (CFS)
P-1	4.23	0.20	0.53	24.97	2.34	10.37
P-2	24.29	0.18	0.52	31.09	10.77	51.21
P-3	11.94	0.15	0.50	31.41	4.32	24.16
OS-1	15.79	0.15	0.50	12.42	9.01	50.42
OS-2	9.23	0.15	0.50	13.45	5.10	28.55
OS-3	27.10	0.15	0.50	16.47	13.74	76.89
OS-4	4.47	0.16	0.50	13.07	2.61	14.09

Per ECM 3.3.4.A any areas with 15 cfs or larger require drainage easements. Show delineated drainage easements on drainage map and show easements on preliminary plan.

Provide drainage flow arrows.

REVISION DESCRIPTION (DESCRIPTION)

REVISION DATE	00/00/00
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SCALE: 1" = 200'

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SHEET # **FIG. 3**

TOTAL SHEETS