



April 9, 2026

Town of Grand Lake  
Grand County, Colorado

**RE: Preliminary Drainage Analysis  
Ruger Subdivision  
Part of Gov't Lot 3  
section 5, Township 3 North  
Range 75 West of the 6<sup>th</sup> PM  
2N Project No. 26003**

Dear Engineering,

This letter serves to address the stormwater drainage impact of the proposed Ruger Subdivision. The 5-acre site is located on either side of County Road 663 and north of West Portal Road. The subject parcel is Part of section 5, Township 3 North Range 75 West of the 6<sup>th</sup> PM, Town of Grand Lake, Grand County, Colorado. A Vicinity Map is included in Appendix A.

Existing Drainage Characteristics

The area was divided into two existing drainage basins that convey runoff from north to south across steep natural terrain. The existing basins EX-1 have an area of 5.54 acres with composite imperviousness of 5.3% and basin EX-2 has an area of 10.70 acres with composite imperviousness of 11.3%. These basins drain to design points 1 and 2, which are near to West Portal Road and continue offsite to North Inlet Creek. This creek serves as the receiving water body for the site's historic drainage before eventually entering Grand Lake. The drainage patterns were delineated using publicly available contour data.

The existing property is composed of prominent rocky outcroppings, native grasses, and existing county road 663. The soil types present onsite are 23.7% Scout cobbly sandy loam [6-15% slopes], 76.3% Scout cobbly sandy loam [15-65% slopes], as designated by the Natural Resources Conservation Services (see Appendix A). The site is within Hydrologic Group A. Soil classified as Hydraulic Group A exhibits a high rate of infiltration when thoroughly wet. The site is located within a Zone X flood hazard area shown on the FEMA Map titled "National Flood Hazard Layer FIRMette", located in Grand County, Colorado and Incorporated Areas, Community 080280, Panel 0314, Map Number 08049C0314C, Dated January 2, 2008." (See Appendix A). Zone X areas are areas unmapped with an area of minimal flood hazard.

Runoff from the existing drainage basins was calculated using the Rational Method to determine runoff for the 100-year storm since the basins are smaller than 90-acres as recommended by Mile High Flood District.

#### Proposed Development and Drainage Characteristics

The proposed development for the site includes subdividing the property into nine lots, with eight of them being approximately 0.45-acre single family residential parcels and one with 0.88-acre parcel. Lots will be accessed from County Road 663 and West Portal Road.

Proposed flow calculations were performed using the Rational Method to calculate the additional runoff generated from the development of driveways and buildings, since the basins are smaller than 90-acres as recommended by Mile High Flood District. The proposed basins PR-1 has an area of 5.54 acres with composite imperviousness of 9.0% and basin PR-2 has an area of 10.70 acres with composite imperviousness of 17.0%. The proposed basin delineation for this study is consistent with the existing basin delineation; the proposed basins drain to design points 1 and 2. Refer to the attached Existing and Proposed Drainage Plans included in the Appendix.

Below is a summary table comparing the existing and proposed basin runoff flows in the 10-yr and 100-yr storm event using the criteria discussed above and below. Runoff calculations can be found in Appendix B.

<b>Basin</b>	<b>Design Point</b>	<b>Existing Q<sub>10-yr</sub></b>	<b>Existing Q<sub>100-yr</sub></b>	<b>Proposed Q<sub>10-yr</sub></b>	<b>Proposed Q<sub>100-yr</sub></b>
EX-1/PR-1	DP 1	0.24	2.68	0.55	3.22
EX-2/PR-2	DP 2	1.25	6.01	2.10	7.46

A small portion of the property is located offsite. This area has been disregarded from the analysis. The site to be developed consists of nine lots with each having the building of 2100 SF area, a garage of 528 SF area and driveways.

#### Existing Road-side Ditch

If required, the ditch will be regraded or improved to carry the major storm. Driveway Culvert has been sized to carry the major storm. A 15" CMP will pass the proposed major flow. Based on the provided hydraulic analysis, the 15-inch CMP driveway culvert possesses sufficient capacity to convey the 100-year peak design flow of 7.46 cfs without overtopping the driveway surface. The Corrugate Metal Pipe is appropriate for this site's shallow cover requirements under the driveway.

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Conclusion

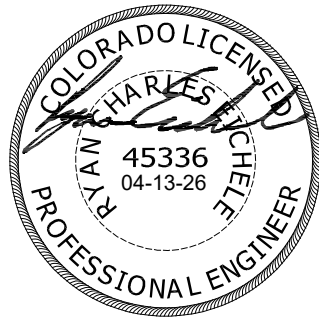
In conclusion, the proposed buildings and driveways for the site have been designed to ensure all stormwater runoff is directed away from the structures and toward the existing drainage system.

Thank you for taking the time to review this letter. If you have any questions or require additional information, please let us know.

Sincerely,

2N CIVIL, LLC

Ryan Eichele, P.E.  
Project Manager

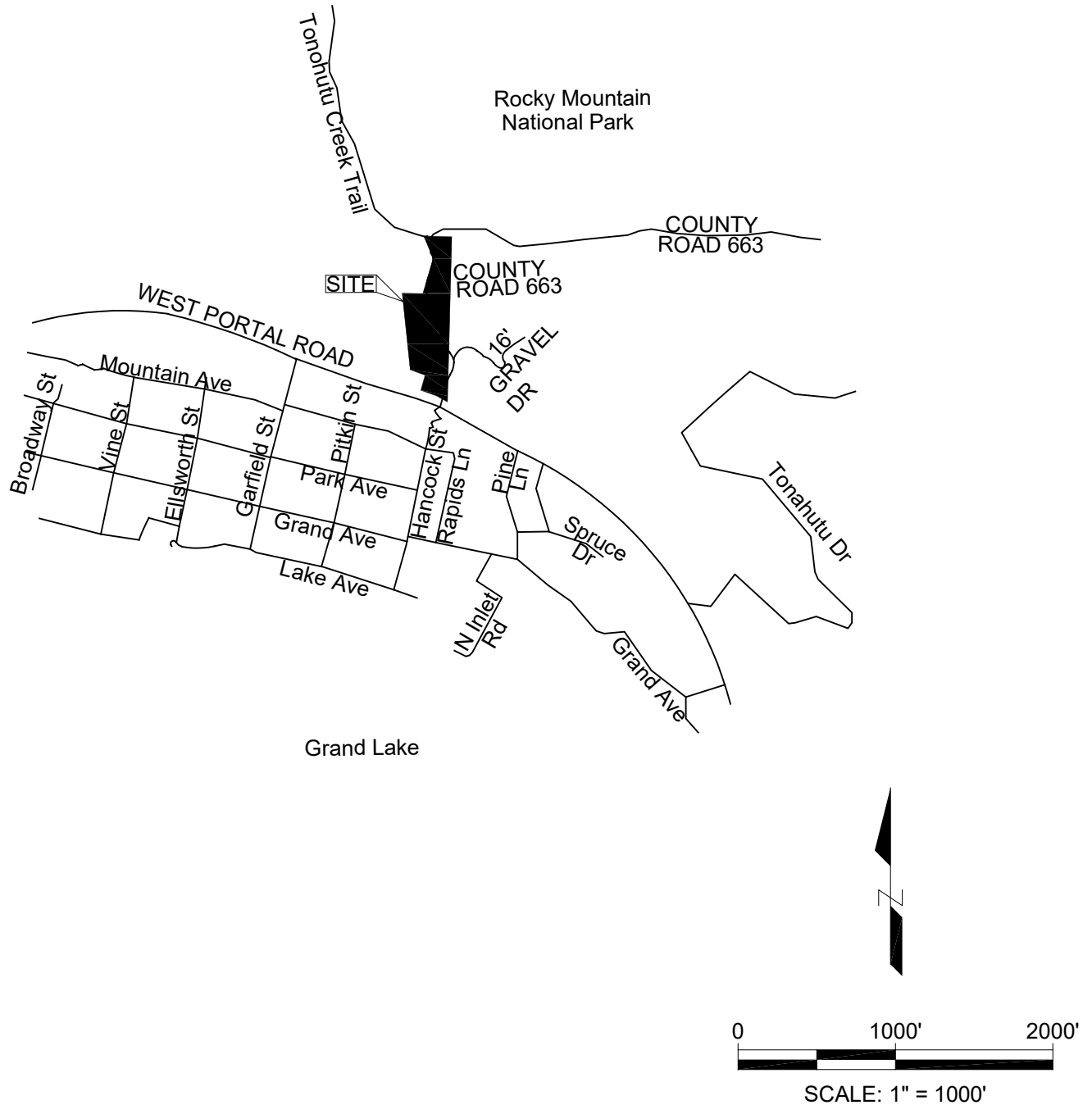


Enc.

APPENDIX A

Vicinity Map  
Soils Map  
FEMA Map

# VICINITY MAP



Project Number: 26003

J:\Projects\26\26003\3rd Party\Vicinity Map.dwg

## 2N Civil, LLC

6 Inverness Ct. E., Suite 125  
Englewood, CO 80112

Phone 303-925-0544 Fax 303-925-0547  
www.2NCivil.com

## VICINITY MAP RUGER SUBDIVISION

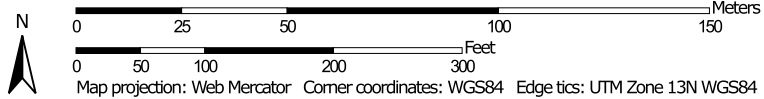
Drawn By: DR  
Checked By: RCE  
Revisions:



Hydrologic Soil Group—Grand County Area, Colorado  
(ruger subdivision)



Map Scale: 1:1,790 if printed on A portrait (8.5" x 11") sheet.



Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey








4/8/2026  
Page 1 of 4

## 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 

## 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: Grand County Area, Colorado  
 Survey Area Data: Version 19, Aug 29, 2025

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

Date(s) aerial images were photographed: Aug 29, 2023—Sep 8, 2023

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
75	Scout cobbly sandy loam, 6 to 15 percent slopes	A	1.6	23.7%
76	Scout cobbly sandy loam, 15 to 65 percent slopes	A	5.0	76.3%
<b>Totals for Area of Interest</b>			<b>6.6</b>	<b>100.0%</b>

### 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*



**NOTES TO USERS**

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

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

**Coastal Base Flood Elevations** shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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

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

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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

NGS Information Services  
NOAA, NNGS12  
National Geodetic Survey  
SSMC-3, #9202  
1315 East-West Highway  
Silver Spring, MD 20910-3282

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

**Base map** information shown on this FIRM was provided in digital format by the United States Department of Agriculture/ Service Center Agencies; produced from Digital Orthophoto Quadrangles at a scale of 1:12,000, dated 2005 or later as a part of the National Agricultural Imagery Program.

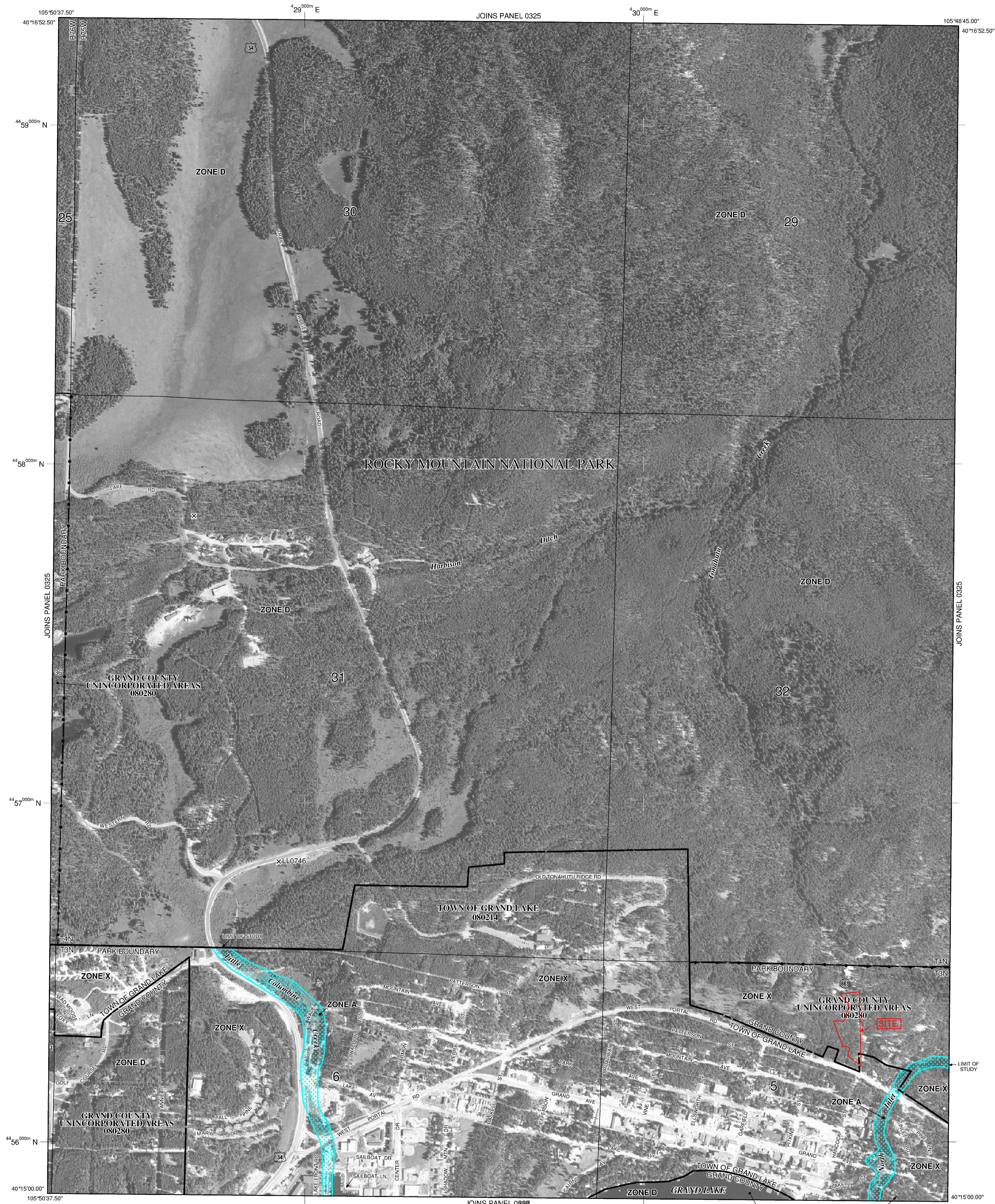
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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

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

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

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



**LEGEND**

**SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

**FLOODWAY AREAS IN ZONE AE**

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

**OTHER FLOOD AREAS**

- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

**OTHER AREAS**

- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.

**COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**

**OTHERWISE PROTECTED AREAS (OPAs)**

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Base Flood Elevation line and value; elevation in feet\* (EL 987)

\* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

Transsect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

1000-meter Universal Transverse Mercator grid ticks, zone 13

5000-foot grid ticks: New York State Plane coordinate system, east zone (FIPSZONE 3101), Transverse Mercator

Bench mark (see explanation in Notes to Users section of this FIRM panel)

River Mile

MAP REPOSITORIES

Refer to Map Repositories list on Map Index

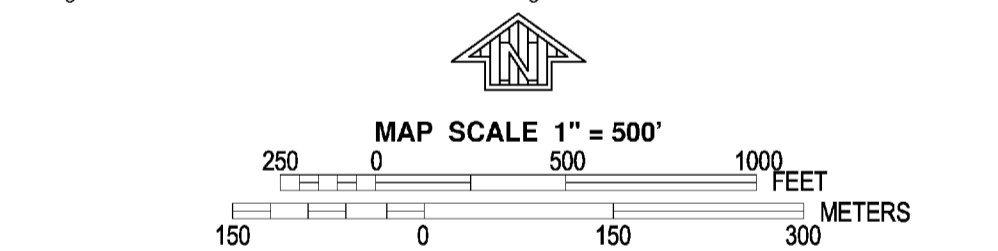
EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

January 2, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-438-6620.



**NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0314C**

**FIRM FLOOD INSURANCE RATE MAP**

**GRAND COUNTY, COLORADO AND INCORPORATED AREAS**

**PANEL 314 OF 1200**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

**CONTAINS:**

COMMUNITY	NUMBER	PANEL	SUFFIX
GRAND COUNTY	080280	0314	C
GRAND LAKE, TOWN OF	080214	0314	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
**08049C0314C**

**EFFECTIVE DATE**  
**JANUARY 2, 2008**

**Federal Emergency Management Agency**

Calculation of Peak Runoff using Rational Method

Designer: DR  
 Company: 2N CIVIL  
 Date: 4/10/2026  
 Project: RUGER SUBDIVISION  
 Location: GRAND COUNTY, CO

MHFD-Rational, Version 3.00 (August 2025)

Cells of this color are for required user-input  
 Cells of this color are for optional override values

$$t_1 = \frac{0.395(1.1 - C_2)\sqrt{L_1}}{S^{0.33}}$$

Computed  $t_c = t_1 + t_2$

$$t_1 = \frac{L_1}{60K\sqrt{S_1}} = \frac{L_1}{60V_1}$$

$$\text{Regional } t_c = (26 - 17i) + \frac{L_1}{60(141 + 9)\sqrt{S_1}}$$

$t_c$  minimum = 5 (urban)  
 $t_c$  minimum = 10 (non-urban)

Selected  $t_c = \max(t_{\text{minimum}}, \min(\text{Computed } t_c, \text{Regional } t_c))$

Calculation of Peak Runoff using Rational Method

Calculation of Peak Runoff using Rational Method

Select MHFD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
0.60	0.52	0.67	0.82	1.06	1.27	1.51	2.17

1-hour rainfall depth, P1 (in) =  $\frac{a}{b + t_c^c}$

Rainfall Intensity Equation Coefficients = a: 28.50, b: 10.00, c: 0.786

$Q(cfs) = CIA$

Provide input for area, soil type, and imperviousness on the Runoff Coeffs worksheet.

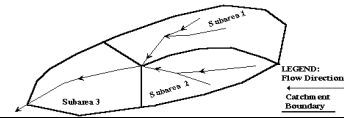
Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group(s)	Imperviousness	Runoff Coefficient, C								Overland (Initial) Flow Time								Channelized (Travel) Flow Time								Time of Concentration				Rainfall Intensity, I (in/hr)								Peak Flow, Q (cfs)							
				WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L <sub>1</sub> (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S <sub>1</sub> (ft/ft)	Overland Flow Time t <sub>1</sub> (min)	Channelized Flow Length L <sub>1</sub> (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S <sub>1</sub> (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V <sub>1</sub> (ft/sec)	Channelized Flow Time t <sub>1</sub> (min)	Computed t <sub>c</sub> (min)	Regional t <sub>c</sub> (min)	Selected t <sub>c</sub> (min)	(Optional) Override t <sub>c</sub> (min)	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr					
EX-1	5.54	A	5.3%	0.02	0.02	0.02	0.03	0.07	0.15	0.29	300.00	8566.53	8522.86	0.146	13.93	713.61	8522.86	8437.36	0.120	10	3.46	3.44	17.37	28.62	17.37		1.27	1.10	1.42	1.73	2.24	2.68	3.19	4.59	0.14	0.12	0.17	0.24	0.41	1.05	2.68	7.33					
EX-2	10.70	A	11.3%	0.07	0.07	0.08	0.09	0.12	0.20	0.33	300.00	8654.00	8602.19	0.173	12.56	1715.81	8602.19	8438.30	0.096	10	3.09	9.25	21.81	32.82	21.81		1.13	0.98	1.26	1.53	1.99	2.39	2.84	4.08	0.83	0.72	0.97	1.25	1.83	3.10	6.01	14.26					
PR-1	5.54	A	9.0%	0.05	0.05	0.06	0.07	0.10	0.18	0.31	300.00	8566.53	8522.86	0.146	13.52	713.61	8522.86	8437.36	0.120	10	3.46	3.44	16.96	27.83	16.96		1.28	1.11	1.43	1.75	2.27	2.72	3.23	4.64	0.36	0.31	0.43	0.55	0.83	1.53	3.22	8.03					
PR-2	10.70	A	17.0%	0.12	0.12	0.13	0.14	0.17	0.24	0.36	300.00	8654.00	8602.19	0.173	11.95	1715.81	8602.19	8438.30	0.096	10	3.09	9.25	21.20	31.25	21.20		1.14	0.99	1.28	1.56	2.02	2.42	2.88	4.14	1.43	1.24	1.66	2.10	2.95	4.40	7.46	16.10					

Determination of Runoff Coefficients for Rational Method

MHFD-Rational, Version 3.00 (August 2025)

Designer: DR  
 Company: 2N CIVIL  
 Date: 4/10/2026  
 Project: RUGER SUBDIVISION  
 Location: GRAND COUNTY, CO

Cells of this color are for required user-input  
 Cells of this color are for optional override values



Provide subcatchment names on the Rational Calcs worksheet to open up the table below.

Subcatchment Name	# of Subareas	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness				Runoff Coefficient, C										Comments							
				Imperviousness Source	Imperviousness Category	Calculated Imperviousness	(Optional) Override Imperviousness	WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	(Optional) Override Runoff Coefficient, C	5-yr	10-yr		25-yr	50-yr	100-yr	500-yr			
EX-1	2	5.54	A	Land Use	Open Space, Undisturbed Native Grasses	5%	5.3%	0.02	0.02	0.02	0.03	0.07	0.15	0.29	0.02	0.02	0.02	0.03	0.07	0.15	0.29				
				Surface Type	Roofs	95%		0.79	0.81	0.82	0.83	0.84	0.85	0.87											
EX-2	3	10.70	A	Land Use	Open Space, Undisturbed Native Grasses	5%	11.3%	0.02	0.02	0.02	0.03	0.07	0.15	0.29	0.07	0.07	0.08	0.09	0.12	0.20	0.33				
				Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77											
				Surface Type	Roofs	95%		0.79	0.81	0.82	0.83	0.84	0.85	0.87											
				Surface Type	Concrete Driveways and Walks	95%		0.79	0.81	0.82	0.83	0.84	0.85	0.87											
PR-1	3	5.54	A	Land Use	Open Space, Undisturbed Native Grasses	5%	9.0%	0.02	0.02	0.02	0.03	0.07	0.15	0.29	0.05	0.05	0.06	0.07	0.10	0.18	0.31				
				Surface Type	Roofs	95%		0.79	0.81	0.82	0.83	0.84	0.85	0.87											
				Surface Type	Concrete Driveways and Walks	95%		0.79	0.81	0.82	0.83	0.84	0.85	0.87											
				Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77											
PR-2	4	10.70	A	Land Use	Open Space, Undisturbed Native Grasses	5%	17.0%	0.02	0.02	0.02	0.03	0.07	0.15	0.29	0.12	0.12	0.13	0.14	0.17	0.24	0.36				
				Surface Type	Roofs	95%		0.79	0.81	0.82	0.83	0.84	0.85	0.87											
				Surface Type	Concrete Driveways and Walks	95%		0.79	0.81	0.82	0.83	0.84	0.85	0.87											
				Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77											
				Surface Type	Concrete Driveways and Walks	95%		0.79	0.81	0.82	0.83	0.84	0.85	0.87											

# Culvert Report

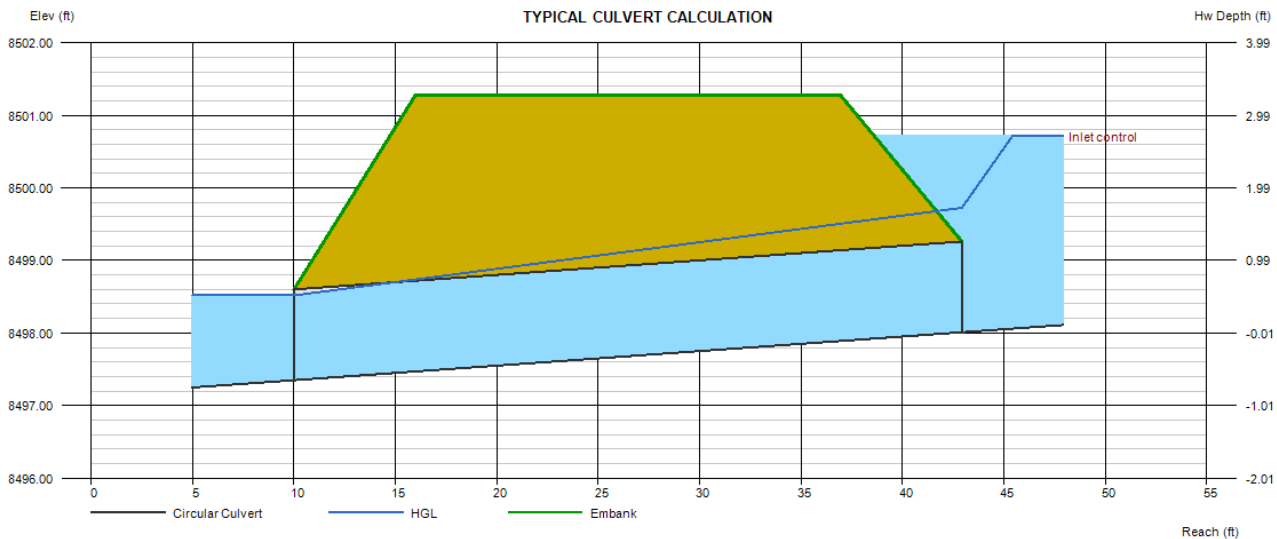
## TYPICAL CULVERT CALCULATION

Invert Elev Dn (ft)	= 8497.35
Pipe Length (ft)	= 32.93
Slope (%)	= 2.00
Invert Elev Up (ft)	= 8498.01
Rise (in)	= 15.0
Shape	= Circular
Span (in)	= 15.0
No. Barrels	= 1
n-Value	= 0.022
Culvert Type	= Circular Corrugate Metal Pipe
Culvert Entrance	= Projecting
Coeff. K,M,c,Y,k	= 0.034, 1.5, 0.0553, 0.54, 0.9

<b>Embankment</b>	
Top Elevation (ft)	= 8501.28
Top Width (ft)	= 20.93
Crest Width (ft)	= 10.00

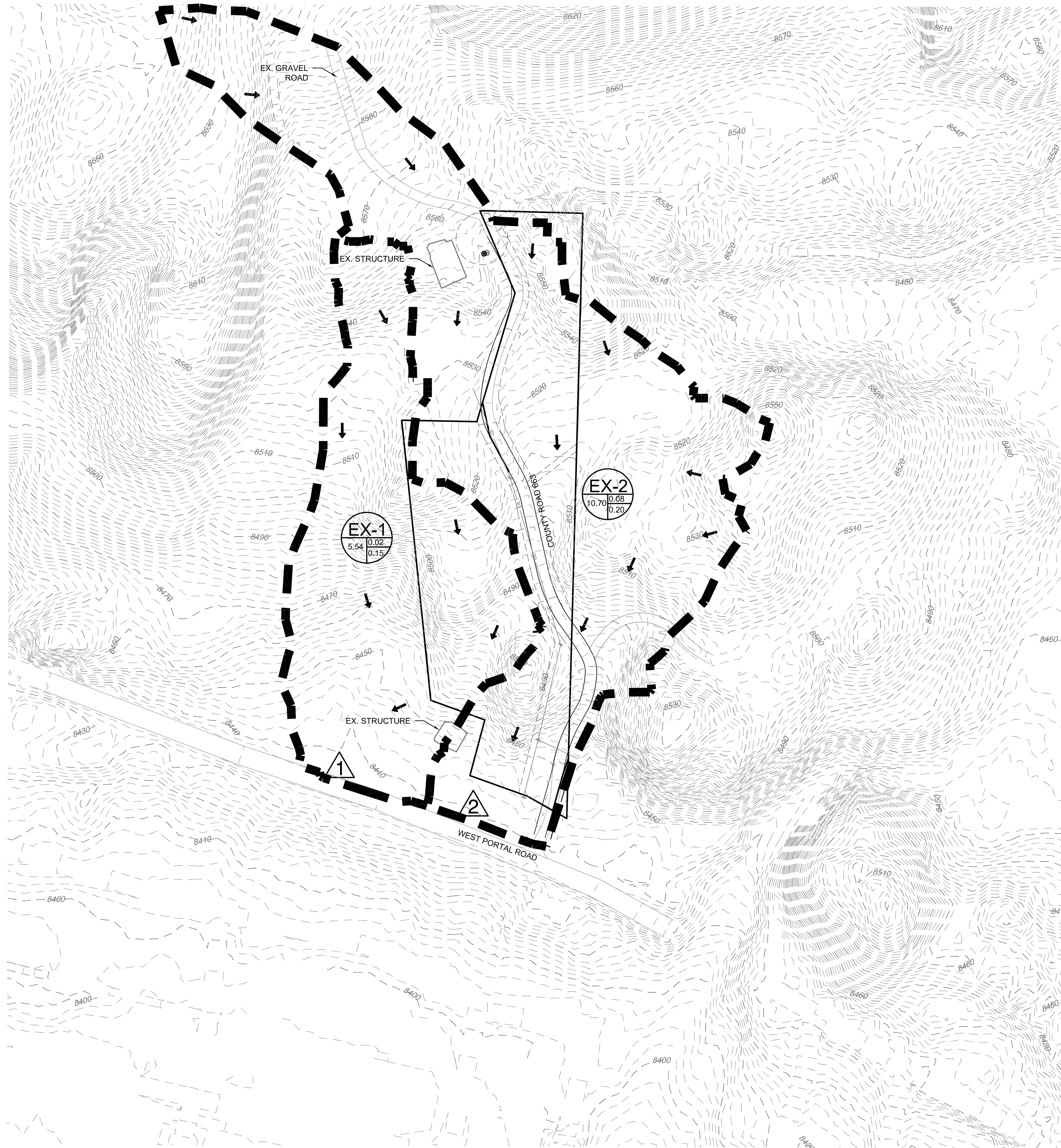
<b>Calculations</b>	
Qmin (cfs)	= 7.46
Qmax (cfs)	= 7.46
Tailwater Elev (ft)	= (dc+D)/2

<b>Highlighted</b>	
Qtotal (cfs)	= 7.46
Qpipe (cfs)	= 7.46
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 6.25
Veloc Up (ft/s)	= 6.08
HGL Dn (ft)	= 8498.52
HGL Up (ft)	= 8499.73
Hw Elev (ft)	= 8500.72
Hw/D (ft)	= 2.16
Flow Regime	= Inlet Control



# RUGER SUBDIVISION

## EXISTING DRAINAGE MAP



**DRAINAGE LEGEND**

BASIN NAME  
 10 YR RUNOFF COEFFICIENT  
 100 YR RUNOFF COEFFICIENT  
 BASIN AREA

EXISTING BASIN LIMIT

BASIN DESIGN POINT

FLOW DIRECTION

Design Point	Area (ac)	Contributing		
		Basins	Q <sub>10</sub> (cfs)	Q <sub>100</sub> (cfs)
1	5.54	EX-1	0.24	2.68
2	10.70	EX-2	1.25	6.01



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**NOT FOR CONSTRUCTION**

PREPARED FOR:  
CLIENT  
ADDRESS LINE 1  
ADDRESS LINE 2

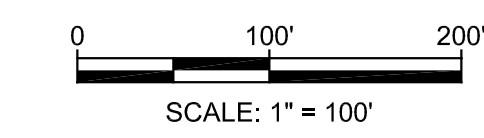
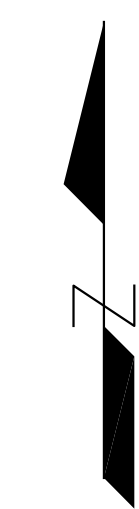
**EXISTING DRAINAGE MAP**  
TYPE OF SUBMITTAL  
RUGER SUBDIVISION  
LOCATION

BY: DATE:

REVISIONS:  
1.

PROJECT NUMBER: 26003  
ISSUED DATE: 04-13-26  
DESIGNED BY: DR  
REVIEWED BY: RCE

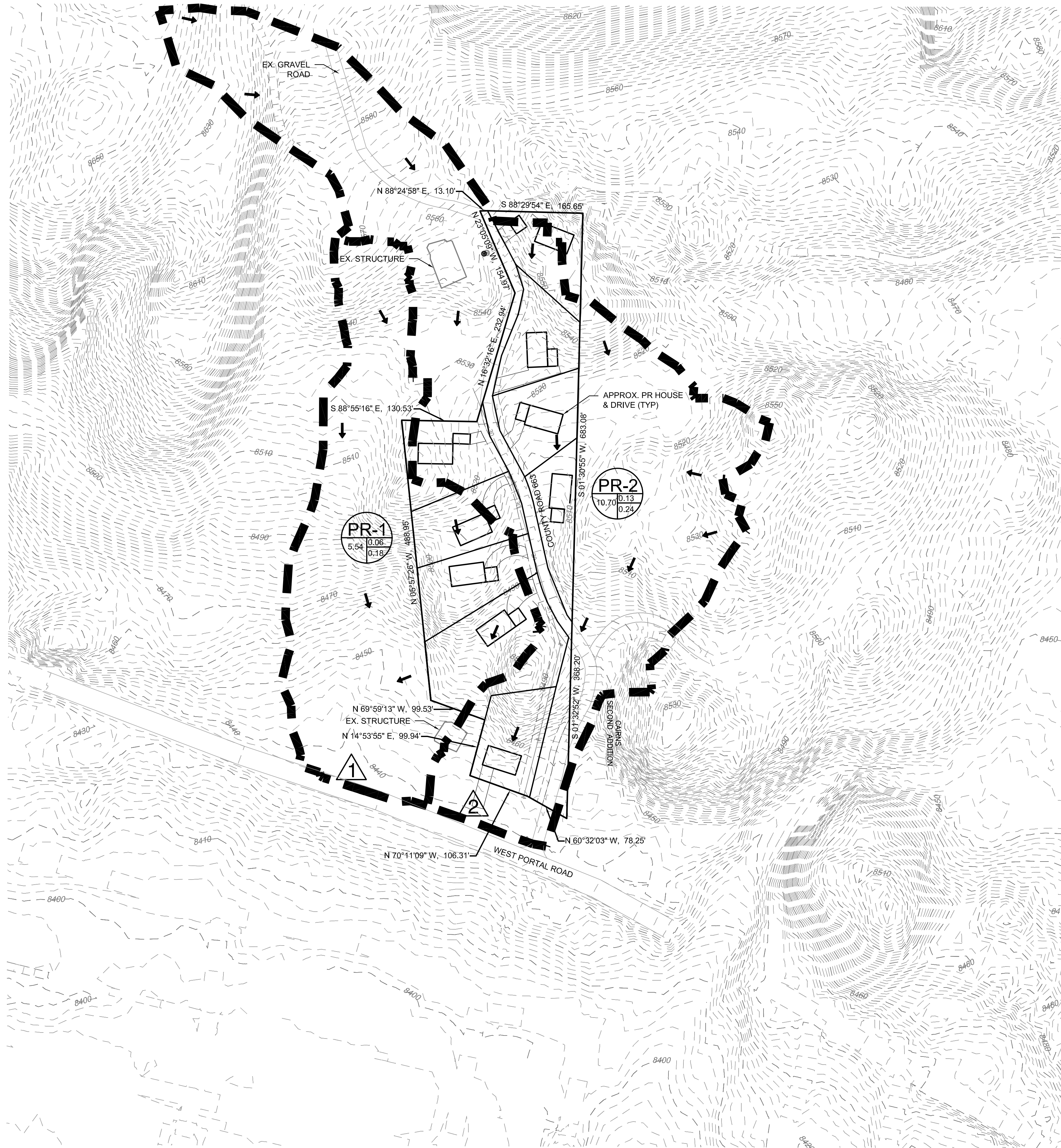
**EXISTING DRAINAGE MAP**



J:\Project\26003\Drawings\EX-BASIN MAP.dwg 4/13/26

# RUGER SUBDIVISION

## PROPOSED DRAINAGE MAP



**DRAINAGE LEGEND**

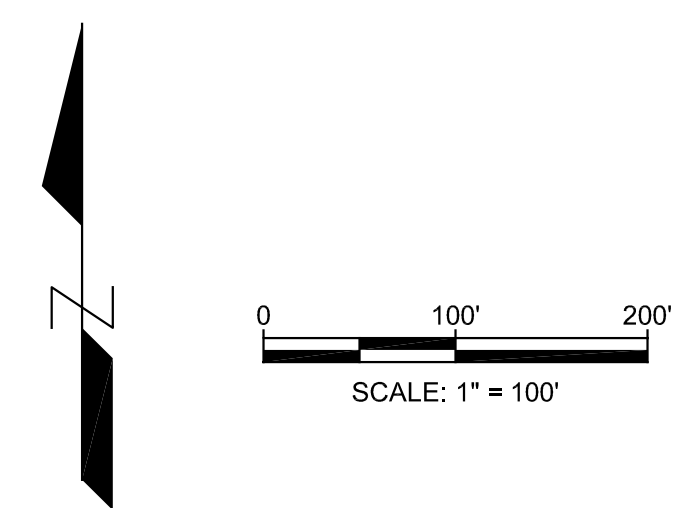
BASIN NAME  
 PR-1  
 0.0 ac  
 .00 10 YR RUNOFF COEFFICIENT  
 .00 100 YR RUNOFF COEFFICIENT  
 BASIN AREA

PROPOSED BASIN LIMIT

BASIN DESIGN POINT  
 1

FLOW DIRECTION

Design Point	Area (ac)	Contributing	
		Basins	Q <sub>10</sub> (cfs)
1	5.54	PR-1	0.55
2	10.70	PR-2	2.10
			Q <sub>100</sub> (cfs)
			3.22
			7.46



**NOT FOR CONSTRUCTION**

PREPARED FOR:  
 CLIENT  
 ADDRESS LINE 1  
 ADDRESS LINE 2

**PROPOSED DRAINAGE MAP**  
 TYPE OF SUBMITTAL  
 RUGER SUBDIVISION  
 LOCATION

BY: DATE:

REVISIONS:  
 1.

PROJECT NUMBER: 26003  
 ISSUED DATE: 04-13-26  
 DESIGNED BY: DR  
 REVIEWED BY: RCE

**PROPOSED DRAINAGE MAP**

J:\Projects\26003\26003.dwg\PR-BASIN MAP.dwg 4/13/26