DRAINAGE REPORT

7051 COUNTY ROAD 335
NEW CASTLE, COLORADO 81647

Prepared For:

COAL SEAM LLC
110 SPUR DRIVE
GLENWOOD SPRINGS, CO 81601

Prepared By:

Hans E. Brucker, PE, PLS
Pinnacle Design Consulting Group, Inc.
805 Buck Point Road
Carbondale, Colorado 81623

October 29, 2025

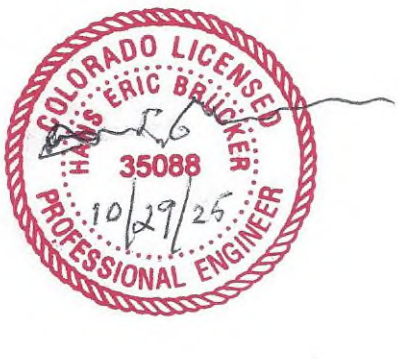

TABLE OF CONTENTS

Introduction / General Description

This drainage report has been prepared for the commercial development of a Lot located at 7051 County Road 335 in New Castle, Colorado. The Lot is located along the Colorado River just east of the I70 overpass that services New Castle.

The proposed parking area is mild sloping at approximately 2.5% grade, however, the buildings will be situated on slopes that approach 27% grade. The Lot includes vegetation consisting of native grasses, and Gamble Oak. An existing concrete building pad is located on the Lot, but will be removed as part of the new construction. All of the development and infrastructure will be beyond the 100-year flood plain line.

Preliminary soil investigations have been conducted and show suitable soils for construction. The soils are known to percolate at acceptable rates.

Project Description

The development plan for the site includes the construction of a 71-room hotel and a mixed-use commercial building with access from County Road 335. The development is within the Business P.U.D. Zone District.

Ultimately the site is tributary to the Colorado River Basin and there are no drainage channels that run across the property.

Stormwater from the steep slopes south of the county road is intercepted by the county road.

Drainage Analysis Methodology

As part of the development of this Lot, we have analyzed the entire development area as four separate drainage basins. The proposed grading will convey the storm water from the Lot via inlets into two separate dry detention basins that include sand filters. The Rational Method is used as the basis for determining the on-site peak 100-year storm water flow rates. Runoff coefficients have been selected based on the percent imperviousness of the site for Hydrologic Soil Group B.

Detention for the site is not required per our discussion with the Town Engineer given the proximity to the Colorado River. However we have elected to detain the 100-year storm for the parking areas in order to avoid the installation of outfall structures. We will calculate the Water Quality Control Volume (WQCV) for a Sand Filter in each case to size the sand filter areas required.

Peak Flow Rates –Rational Method:

Based on the Rational Methodology, the developed peak flow rate for each basin 100-year return period and can be calculated as follows:

Rational Method:

Given:

Q = CIA

Where:

Q = Peak Discharge, cfs for the return period
C = Runoff Coefficient
I = Rainfall Intensity, inches/hour
A = Drainage Area, acres

The intensity value is derived based on the time of concentration for the Lot from the ground cover, slope, and the degree to which the stormwater is channelized. Based past experience when analyzing smaller sized drainage basins by using the Rational Method, time-of-concentration values typically are less than 5-minutes, especially on steeper sloping sites. Therefore, we will use the minimum time-of-concentration value of 5-minutes for the analysis as it will yield more conservative peak flow rates in this instance.

Specific time-intensity-frequency curves for the New Castle can be derived from the latest NOAA Atlas 14 information.

For this particular Lot, the Drainage Basin characteristics and historic flow rates for the 100-year storms are as follows (See Appendix for Drainage Basin locations):

Based upon and intensity of 5.94 in/hr the developed 100-year runoff coefficients and peak flow rates are calculated as follows:

DEVELOPED DRAINAGE BASIN
PEAK RUNOFF FLOW DETERMINATION

DRAINAGE BASIN	TOTAL AREA ACRES	100-YEAR RUNOFF COEFFICIENT	100-YEAR INTENSITY in/hr	"Q" VALUE cfs
1	0.922	0.92	5.94	5.04
2	0.132	0.92	5.94	0.72
3	0.037	0.35	5.94	0.08
4	0.045	0.35	5.94	0.09

See Appendix for Drainage Basin information.

Water Quality:

Water quality for the project will be based upon treating all of the developed parking areas.

Given a tributary area of 40,167 ft^2 for the west parking lot area and 5,729 ft^2 for the east parking lot and an imperviousness of 100%, we determined that a total Water Quality Control Volume (WQCV) as follows: (see Appendix):

West Parking = 934 ft^3
East Parking = 133 ft^3

The Sand Filter Areas are as follows:

West Parking Sand Filter Area = 502 ft^2
East Parking Sand Filter Area = 72 ft^2

Detention:

No detention is required for the project, however we are providing 100% detention for the parking areas according to the following table.

DEVELOPED STORM WATER VOLUME

DRAINAGE BASIN	TOTAL AREA SQ. FT.	100-YEAR STORM DEPTH (IN)	VOLUME CU. FT.
1	40167	1.27	4251.0
2	5729	1.27	606.3

Pipe & Inlets:

In general Stormwater will be collected in CDOT Type 13 inlets and routed via 15" and 18" diameter HDPE pipes from which it will be conveyed to the dry detention basin and sand filters.

Project Design Principles:

The project, to the extent possible considering all of the input parameters, has been designed in concert with USDCM principals. Given the predetermined location of the commercial buildings and parking lot. We considered water quality early in the design process and have used major portions of the site to incorporate various BMP's including a sand filter. A treatment train approach has been utilized where feasible to provide water quality and flood controls. In addition, we have designed the new drainage facilities for maintenance access and have considered public safety.

Erosion Control:

Given the size of the project, disturbance to the site will be considerable. We are recommending that a silt fence be installed on the down-gradient side of the proposed improvements in order to eliminate sediment transfer and to mitigate concern for water quality impacts on the Colorado River Basin. Other BMP's are shown on the Grading and Drainage Plan. All excavations should be planned to minimize, to the extent possible, damage to surrounding vegetation.

Maintenance:

The dry detention basins and sand filters should be checked annually after construction to ensure that they are free of debris. If debris and silt are encountered, they should be removed via pumping or other mechanical means. Since maintenance will ultimately be facilitated by the HOA, a contact person will be provided once the HOA is formalized.

Temporary silt fence should remain in place until all areas on the Lot are revegetated.

Nearest Flood Zone:

Subject property is located within a major FIRM 100-year flood zone.

Conclusions:

The development of this Lot, from a drainage perspective, will utilize dry detention basins with sand filters to treat, detain and route stormwater through the site. To the extent possible, we have avoided unnecessary impervious areas and have designed the proposed plan in concert with the USDCM principles, the desires of the client, and long-term BMP maintenance concerns. The proposed design will improve the existing drainage conditions by increasing water quality treatment in areas not previously mitigated as such. Given the proximity to the river we do not anticipate and any flood impacts to adjacent property owners.

Recommendations:

1. Positive drainage should be constructed away from the building foundations in accordance with the grading and drainage plan (if proposed grades are shown) and to the extent possible, with the final soils report.

2. Stormwater should be conveyed to the dry detention basins via underground storm drain as shown on the Grading Plan.

3. Erosion control measures recommended above should be strictly followed.

4. Maintenance for drainage facilities should be in accordance with the aforementioned maintenance section.

References:

City of Aspen URMP (latest edition)
USDCM Vols. 1-3