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Date: 03-09-2026

Job number: 2025-6-10-Varko

DRAINAGE REPORT

for
SITE DEVELOPMENT PLAN
Located at
1185 N CURTIS ROAD
COLORADO SPRINGS, CO 80930
(PARCEL NUMBER: 4410000052)

PCD File
PPR2527

Drainage 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.

_____ 04/27/2026

Milan Jankovic, M.S., P.E #44321 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.

_____ 04/27/2026

Andrii Varko, Owner Date
1185 N Curtis Road
Colorado Springs, CO 80930

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.

_____ _____

County Engineer / ECM Administrator Date Date

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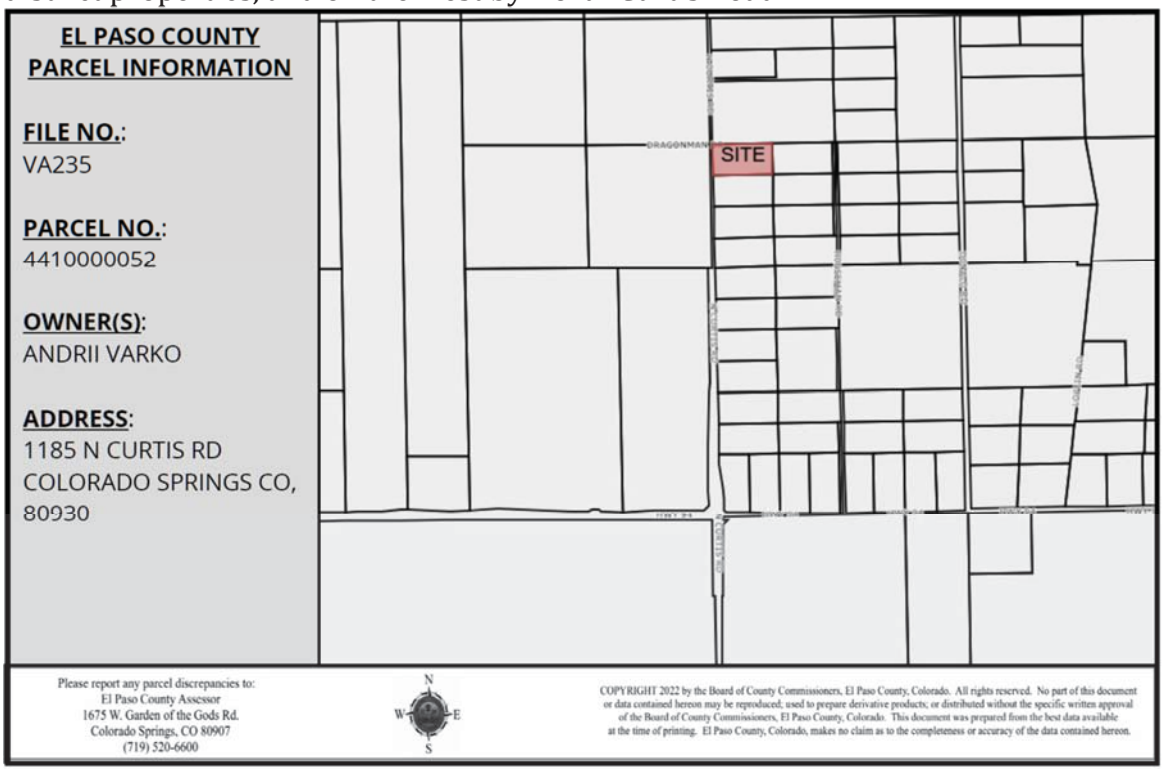
1. Location

1. The proposed RV and mixed storage development (herein known as the Site) is located at 1185 North Curtis Road, at the intersection of Dragonman Drive and North Curtis Road. (Parcel No. 4410000052, Commissioner District No. 2). The legal description of the property is the north one-half of the northwest quarter of the southwest quarter of the northwest quarter of section 10, township 14 south, range 64 west of the 6th principal meridian, excepting therefrom the westerly 30 feet for Curtis Road, in El Paso County, Colorado.
2. The site is bounded on the north, east, and south by RR-5 Residential Rural zoning district properties, and on the west by North Curtis Road.

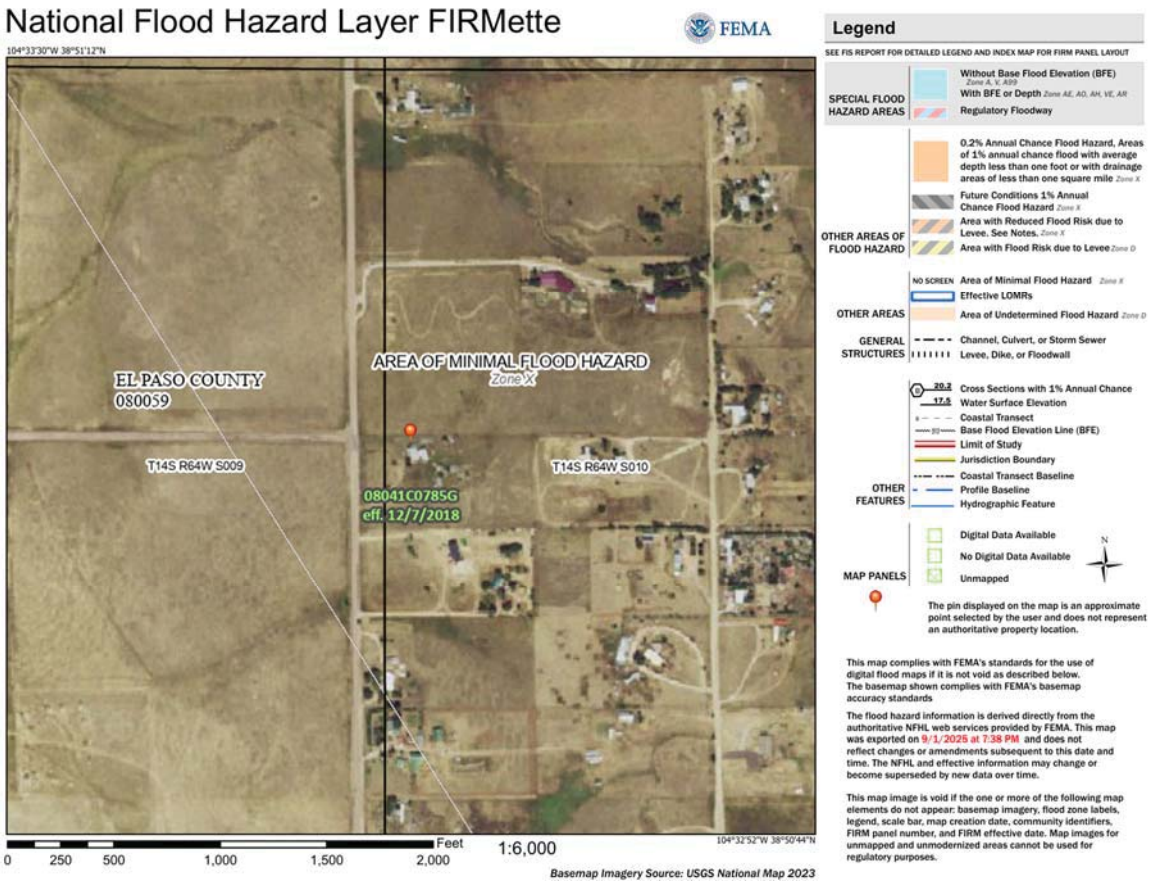


2. Description of Property

1. Total Project Area is approximately 4.789 acres (208,617 sq-ft)).
2. The existing ground cover consists of grassy meadow covering the entire lot. The existing topography for the site ranges from 6408 ft on the northwest corner of the Site to 6388 ft at the northeast and southeast ends. Slopes within the area of development range from 0.4% to 9%. There are no known significant geologic features within the project area.
3. According to the Soil Survey of the area, the project area consists of soil types that are well drained and primarily Hydrologic Soil Type A&B. The soil on the site is mostly Bresser sandy loam, cool, and tassel fine sandy loam. The subsurface materials encountered in the test borings consist of vegetated organic topsoil, sandy loam, and

loamy sand overlying sedimentary bedrock (weathered sandstone and siltstone). The water table in this area is about 22 feet.

4. The existing percent impervious is 1%.
5. The proposed percent impervious for the development is 48%.
6. There is no floodplain affecting the property based on FEMA Firm Map 08041C0785G revised December 7, 2018.



7. No major drainage way exists on the proposed development site.
8. No irrigation facilities exist on the site.
9. The proposed land use will be a RV and mixed storage use.
10. Detention or infiltration storage of storm water runoff is necessary per DCM, since the lot area is larger than 1 acre, to attenuate peak flood flows.

3. Drainage Design Criteria

3.1. Regulations

Calculation methods used follow the provisions set forth in the El Paso County Engineering Criteria Manual (ECM), Drainage Criteria Manual (DCM), MS4 Permit CDPHE Requirements, and FEMA. Infiltration and water quality facilities have been

designed to ensure that post-development peak flows do not exceed pre-development conditions.

3.2. Hydrologic Criteria

The property lies in El Paso County, Colorado Springs. Design point rainfall depths and intensity–duration–frequency (IDF) values are taken from the El Paso County Drainage Criteria Manual (DCM). Rainfall intensities for each sub-basin are obtained from the adopted IDF curves using the computed Time of Concentration (Tc). Rainfall-Intensity Curves were used to determine specific Rainfall Intensity from corresponding Time of Concentrations.

The Rational Method was used to determine developed flow volumes for developed conditions.

Design storm recurrence intervals of 5- and 100-year events were examined in this study. The minor storm event is the 5-yr frequency event and the major storm is the 100-yr event.

3.3. Hydraulic Criteria

Hydraulic calculations were performed in accordance with the DCM and the District Manual.

4. Methods Overview

This drainage report is made for the proposed site development plan located at 1185 N Curtis Road, Colorado Springs, CO 80930.

The site is not located on the FEMA 100-year flood hazard areas as presented in ***Appendix A***.

The Drainage Criteria Manual, County of El Paso, Colorado Volume 1 and 2 (DCM) [1] are used as reference documents for runoff calculations in this report.

The Rational Method was used in estimating storm water runoff for this project since the drainage basins are 100 acres or less. The Rational Method is an empirical runoff formula which has gained wide acceptance because of its simple, intuitive treatment of estimating peak storm runoff. This method relates peak runoff to drainage area, rainfall intensity, and basin surface characteristics by the formula:

$$Q = C\ i\ A$$

where:

Q = peak runoff rate, in cubic feet per second (cfs);

C = Runoff coefficient representing a ratio of peak runoff rate to average rainfall intensity for a duration equal to the runoff time of concentration;

i = average rainfall intensity in inches per hour; and,
A = drainage area in acres.

The Rational Method is based on the following assumptions:

1. The peak rate of runoff at any point is a direct function of the average uniform rainfall intensity for the estimated runoff time of concentration to the point.
2. The frequency of the peak discharge is the same as the frequency of the average rainfall intensity.
3. The runoff time of concentration is the time required for the runoff to become established and flow from the most hydraulically remote part of the drainage area to the design point under consideration. This assumption applies to the runoff most remote in time, not necessarily in distance.
4. The peak discharge per unit area generally decreases as the drainage area increases, and the intensity of rain-fall decreases as its duration increases.

The runoff coefficient, C, is a variable of the Rational Method which is least susceptible to precise determination and provides the designer with a degree of latitude to exercise his independent judgment based upon known effecting parameters. The following discussion is intended to provide a guide to promote the uniform selection and application of runoff coefficients. The runoff coefficient accounts for abstractions for losses between rainfall and runoff which may vary with time for a given drainage area. These losses are caused by intercepting vegetation, infiltration into soils, retention in surface depressions, evaporation and transpiration. In determining this coefficient, different climatological and seasonal conditions, antecedent moisture conditions, and the intensity and frequency characteristics of the design storm should be considered.

Appendix B of this document provides runoff coefficients that vary with recurrence frequency. The coefficients were developed using the available rainfall and runoff information in the Denver region and have been adjusted to work in conjunction with the Colorado Springs/El Paso County area. Use of these coefficients and procedures in other than semi-arid climates may not be valid. However, because the coefficients vary with frequency, no further adjustments are needed for large storms. Adjustments should be made for level of development, surface type, soil type, and surface slope. It is often desirable to develop a composite runoff coefficient based in part on the percentage of different types of surfaces in the drainage area. This procedure can be applied to typical "sample" areas as a guide to the selection of usual values of the coefficient for the entire area.

Hydrologic Soil Group for the site area is defined as A&B, where:

- Group A is sand, loamy sand or sandy loam types of soils. It has low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission.

- Group B is silt loam or loam. It has a moderate infiltration rate when thoroughly wetted and consists chiefly or moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures.

These hydrologic soil groups were confirmed by the *Geologic and Geotechnical Report for Curtis Road Storage Development* [4] that classified the top 18-24 inches of soil to be of hydrologic soil group A and B as sandy loam. This was classified by standard sieve analysis and hydrometer analysis of the soil during the geotechnical study. See *Geologic and Geotechnical Report for Curtis Road Storage Development* [4] for more detailed information.

A composite runoff coefficient is calculated using the relationship:

$$C = \frac{\sum_{i=1}^{n} C_i A_i}{A_t}$$

where:

Ci = individual runoff coefficient corresponding to surface type;
Ai = area of surface type corresponding to Ci;
At = total drainage area for which composite runoff coefficient is applicable;
n = total number of surface types in drainage areas; and,
C = the composite runoff coefficient.

These coefficients, however, are based on the assumption that the design storm does not occur when the ground surface is frozen or covered by melting snow. The designer must exercise good judgement in estimating runoff coefficients for these conditions, if necessary.

Rainfall intensity, i, is the average rate of rainfall, in inches per hour, for a storm of a given duration equal to the estimated runoff time of concentration. Intensity is selected on the basis of design frequency of exceedance, a statistical parameter established by design criteria, and the storm rainfall duration. For the Rational Method, the critical rainfall intensity is the rainfall having a duration equal to the estimated runoff time of concentration for the drainage basin. For the City/County, rainfall intensity for Tc values ranging from 0 to 60 minutes can be determined for the 5-year and 100-year return periods from Figure 5-1 presented in ***Appendix C***.

One of the basic assumptions underlying the Rational Method analysis is that runoff flows from the most hydraulically remote point of the drainage basin to the design point under consideration. Runoff time of concentration is usually estimated by calculating travel time through the basin. Overland flow, storm sewer and/or road gutter flow, and channel flow are typical phases of direct flow commonly used in calculating travel time. The travel time for overland flow is the estimate in time required for flow to travel from the uppermost part of a drainage basin to a defined channel or inlet of a local storm sewer system. Overland flow can be significant in small basins because a significant portion of time of

concentration is due to overland flow. The velocity of overland flow can vary greatly with the surface cover and tillage characteristics. If the slope and land use of the overland flow reach are known, the travel time can be using the following equation:

$$Tc = 1.87\ (1.1 - C_{10})\ L^{0.5}\ S^{-0.33}$$

where:

C_{10} = adjusted runoff coefficient for ten-year flow;
L = length of overland flow in feet;
S = slope of flow path in percent; and,
Tc = travel time in minutes

Times of concentration calculated for fully developed land use should not be less than five (5) minutes to avoid the oversizing of inlets, storm drains and open channels. Overland flow lengths should not exceed 300 feet for developed areas or 1,000 feet for undeveloped areas before being intercepted by a channel or storm sewer inlet.

The rational method runoff is calculated for both the existing and proposed conditions and then the flows are compared. If the flow is larger in the proposed condition, mitigation strategies are implemented to reduce the flow to below historic conditions.

To determine flows out of the infiltration areas for the proposed condition, a Stage-Storage Curve is created by plotting the storage capacity at each stage of the infiltration area and then deriving an equation of the line connecting the points. This equation is then used to calculate stage based on cumulative inflow (volume of water in infiltration area).

A Stage-Area curve is created in a similar manner that provides an equation for infiltration area available based on the stage height.

Geotechnical field testing was performed on the site to obtain the hydraulic conductivity of the infiltration area soil as presented on page 9 and 10 in the *Geologic and Geotechnical Report for Curtis Road Storage Development [4]*. Hydraulic conductivity testing was performed in situ for both the north and south infiltration areas in their respective locations, at the depth of the bottom of the infiltration area. The soil was observed to be uniform in type and consistency from 18 to 48 inches, with more sandy soil with even higher hydraulic conductivity being present at deeper depths. To be conservative, the lower hydraulic conductivity values recorded at the infiltration area bottom depth were averaged to obtain a k_{sat} of 8.60 in/hr. The hydraulic conductivity values for Infiltration Area N ranged from 8.64 to 15.55 in/hr. The hydraulic conductivity values for Infiltration Area S ranged from 8.64 to 14.26 in/hr. Since the top 48" soil layer is most restrictive, the hydraulic conductivity from this layer is used in drain time and infiltration calculations. The final design values are 7.78, 4.40, and 6.91in/hr for infiltration areas N, N2, and S respectively.

Finally, a Stage-Infiltration curve is created that utilizes the Stage-Area equation obtained from the Stage-Area curve and plots infiltrate flow into the soil by stage height. The Stage-Infiltration curve is built by using Darcy's law and hydraulic conductivity (k_{sat}) obtained from field infiltration testing at the depth of the infiltration area. Additionally, i is the change in head over the flow path (9ft depth to rock layer for this project)

$$Q_{infiltration} = k_{sat} * A * i$$

$$i = \frac{\Delta h}{L}$$

The flow through the gabion structure is also calculated using composite Darcy's law, where the least conductive layer governs the maximum flow rate. For the infiltration areas in this project, the gabions have a layer of 3:1 sloped soil through which the water must percolate though before flowing through the gabion. Thus, a Stage-Percolation curve created using the length of the seepage flow line from a point (elevation) through soil medium against the gabion as the path length and the k_{sat} values obtained from field testing of the soil. Embankment shall be compacted using light compaction equipment and inspected by EOR during placement and compaction. Compaction shall achieve stable slopes without over compacting past 90% proctor.

The maximum stage height can be obtained from an Infiltration Flow table that iterates through time steps of 1 minute for the duration of the runoff event. The inflow into the infiltration area is first calculated for each time step using the Modified Rational equation:

$$Inflow\ Q(t) = \begin{cases} Q_p * \frac{t}{T_c}, & 0 \le t \le Tc \\ Q_p * \left(2 - \frac{t}{T_c}\right), & T_c < t \le 2T_c \\ 0, & t > 2T_c \end{cases}$$

Graphing this function over the design storm provides the triangular Modified Rational inflow hydrograph for the runoff entering the drainage structure. For each time step, the gabion outflow and infiltration rate from the previous time step is subtracted from the inflow of the current time step. The volume per time step is given by the equation:

$$V(t) = (Q_{inflow} - Q_{outGabion} - Q_{infiltration}) * 60$$

The cumulative volume is obtained by adding this calculated flow per time step to the running total volume. The total volume at each time step is then used in the equation from the Stage-Storage curve to determine the stage height. The maximum stage height is noted for the storm event.

Drain time is determined by running the time-step table until the infiltration area is drained completely from the maximum stage to zero.

5. Drainage Basins and Sub-Basins

5.1. Major Basin Description

The subject property, located at 1185 N Curtis Road in Colorado Springs, El Paso County, Colorado, is located on Livestock Company Basin within the Black Squirrel Creek watershed, a major tributary of Chico Creek (major receiving waters), which ultimately flows southward into the Arkansas River. Black Squirrel Creek originated in the rolling terrain east of Colorado Springs and conveys stormwater through a combination of natural channels and constructed conveyance systems before joining Chico Creek. The overall watershed is characterized by a mix of rural residential development, agricultural lands, open prairie, and localized commercial development along transportation corridors.

Topographically, the project exhibits a gentle slope descending from the northwest to the southeast. Site elevations range from 6408 ft on the northwest corner of the site to a low point of 6388 ft at the northeast and southeast ends, where all site flows drain out off of the property. This topography facilitates overland sheet flow toward the southeast.

This sub-basin is generally characterized by gentle slopes, permeable soils with moderate infiltration capacity, and limited storm sewer infrastructure. As a result, localized stormwater runoff is primarily managed through open channel and roadside conveyance features. Downstream facilities are designed to accept stormwater from surrounding low-density development and convey flows safely to Black Squirrel Creek feeding into Chico Creek without causing adverse impacts.

The site design incorporates low-impact development (LID) strategies, including areas of pervious crushed granite surfacing, landscaping, and infiltration facilities sized to capture stormwater. These measures are intended to reduce peak flow rates, promote infiltration, and mitigate potential downstream impacts to the Black Squirrel Creek watershed and the major receiving water, Chico Creek.

Summary:

1. The site drains via overland sheet flow into tributary conveyances of Black Squirrel Creek, which ultimately flows into Chico Creek and Arkansas River.
2. The existing land use is RR-5 residential rural. The proposed land use is RV and mixed storage.
3. There are no irrigation facilities or agricultural laterals that will influence or be influenced by the local drainage.
4.

5.2. Existing Sub-Basin Description

Three existing sub-basins, A, B, and C, have been identified. The calculated runoff coefficients (C) for these sub-basins are summarized in the table below:

Design Area		5 - Year	10 - Year	25 - Year	50 - Year	100 - Year
	Area	Runoff	Runoff	Runoff	Runoff	Runoff
	(sq-ft)	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
A	49,767	0.08	0.15	0.25	0.3	0.35
A avg		**0.08**	**0.15**	**0.25**	**0.3**	**0.35**
B	37,945	0.08	0.15	0.25	0.3	0.35
B avg		**0.08**	**0.15**	**0.25**	**0.3**	**0.35**
C mead	118,330	0.08	0.15	0.25	0.3	0.35
C roof	2,576	0.73	0.75	0.78	0.8	0.81
C avg		**0.09**	**0.16**	**0.26**	**0.31**	**0.36**

Existing Sub-Basin A encompasses 1.142 acres and consists of a grassy meadow. The time of concentration (Tc) calculated for the 5-year and 100-year storms is shown in the table below:

Design Area	5 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
A	(sq-ft)	(feet)	(%)	Coefficient	(min)	Coefficient	(min)	(min)
Meadow	49,767	440	3.6%	0.08	20.8	2.5	4.9	25.7
SUM	49,767			**0.08**	**20.8**	**2.5**	**4.9**	**25.7**

Design Area	100 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
A	(sq-ft)	(feet)	(%)	Coefficient	(min)	Coefficient	(min)	(min)
Meadow	49,767	440	3.6%	0.35	15.3	2.5	4.9	20.2
SUM	49,767			**0.35**	**15.3**	**2.5**	**4.9**	**20.2**

Existing Sub-Basin B encompasses 0.871 acres and consists of a grassy meadow. The calculated Tc for the 5-year and 100-year storms is shown in the table below:

Design Area	5 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
B	(sq-ft)	(feet)	(%)	Coefficient	(min)	Coefficient	(min)	(min)
Meadow	37,945	154	4.5%	0.08	13.9	2.5	0.0	13.9
SUM	37,945			**0.08**	**13.9**	**2.5**	**0.0**	**13.9**

Design Area	100 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
B	(sq-ft)	(feet)	(%)	Coefficient	(min)	Coefficient	(min)	(min)
Meadow	37,945	154	4.5%	0.35	10.2	2.5	0.0	10.2
SUM	37,945			**0.35**	**10.2**	**2.5**	**0.0**	**10.2**

Existing Sub-Basin C encompasses 2.776 acres and includes a grassy meadow and roof area. The calculated Tc for the 5-year and 100-year storm events is summarized in the table below:

Design	5 - Year							
Area	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
C	(sq-ft)	(feet)	(%)	Coefficient	(min)	Coefficient	(min)	(min)
Meadow	118,330	468	4.1%	0.08	20.1	2.5	5.6	25.6
Roofs	2,576	15	33%	0.73	0.8	15	0.0	0.8
SUM	120,906			**0.09**	**20.9**	**2.8**	**5.6**	**26.5**

Design	100 - Year							
Area	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
C	(sq-ft)	(feet)	(%)	Coefficient	(min)	Coefficient	(min)	(min)
Meadow	118,330	468	4.1%	0.35	14.8	2.5	5.6	20.3
Roofs	2,576	15	33%	0.81	0.7	15	0.0	0.7
SUM	120,906			**0.36**	**15.4**	**2.8**	**5.6**	**21.0**

A summary of the existing runoff generated on the site for the 5-year and 100-year storm events is provided in the table below. Total 5-year runoff is 0.50 cfs flowing south and 0.69 cfs flowing north, while total 100-year runoff is 4.16 cfs flowing south and 5.06 cfs flowing north. The existing condition drainage plan and calculation results are included in ***Appendix D***.

				5 - Year				**100 - Year**			
							Total Runoff				Total Runoff
Design	**Area**	Area	Area	Runoff	Tc	I	**Q**	Runoff	Tc	I	**Q**
Point	**Design.**	(sq-ft)	(ac)	Coeffic.	(min)	(in/hr)	**(cfs)**	Coeffic.	(min)	(in/hr)	**(cfs)**
1	**A**	49,767	1.142	0.08	25.7	2.71	**0.25**	0.35	20.2	5.2	**2.06**
2	**B**	37,945	0.871	0.08	13.9	3.64	**0.25**	0.35	10.2	6.9	**2.10**
3	**C**	120,906	2.776	0.09	26.5	2.67	**0.69**	0.36	21.0	5.1	**5.06**

6. Proposed Drainage Facility Design

6.1. General Concept

The proposed development will have three infiltration areas (rain gardens) one on the south side (PCM identifier S) and two on the north side (PCM identifiers N and N2) of the property to attenuate the runoff peak to be the same or below the existing condition. Drainage area A in proposed conditions is similar to drainage area A in existing conditions, therefore, most of the flow from area A remains the same as existing condition and is not routed through the infiltration structure. Proposed sub-basin C is routed through Infiltration Area S. The outlet from Infiltration Area S plus the runoff from sub-basin B is compared to the existing runoff from sub-basin B. Runoff from proposed sub-basins D and E is routed the same as existing condition and sub-basin F is routed through Infiltration Area N, who's runoff is compared to the

existing sub-basin C runoff. To further reduce small 5-year runoff from sub-basin D, a small depression, infiltration area N2, was created following design recommendations provided in the MHFD SCM Design workbook 4.02 and SDI Form & MHFD Calcs [5].

Inflow to the infiltration areas will be infiltrated into the ground or through the gabion structure. The outflows from the infiltration areas are due to seepage of water through the gabion wall which ensures sheet flow by spreading the low-flow outflow over the length of the wall (60ft) uniformly. This design ensures no concentrated flows exit the site. There are no other known drainage issues on the site that need to be addressed with the proposed development. All drainage flows overland, same as in the historic condition.

Refer to **Appendix J** for the water quality summery table, where treatment or exclusion of all basins is documented.

6.2. Proposed Sub-Basin Description and Calculations

The proposed site drains to the north and south. Six proposed sub-basins are identified: A, B, C, D, E, and F.

The calculated runoff coefficients (C) for the proposed sub-basins are shown in the table below:

Design Area		**5 - Year**	**10 - Year**	**25 - Year**	**50 - Year**	**100 - Year**
	Area	Runoff	Runoff	Runoff	Runoff	Runoff
	(sq-ft)	Coeffic.	Coeffic.	Coeffic.	Coeffic.	Coeffic.
A paved	2,613	0.90	0.92	0.94	0.95	0.96
A gravel	1,941	0.59	0.63	0.66	0.68	0.7
A mead	37,245	0.08	0.15	0.25	0.30	0.35
A avg	**41,799**	**0.15**	**0.22**	**0.31**	**0.36**	**0.40**
B	5,252	0.08	0.15	0.25	0.30	0.35
B avg	**5,252**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**
C gravel	55,247	0.59	0.63	0.66	0.68	0.7
C avg	**55,247**	**0.59**	**0.63**	**0.66**	**0.68**	**0.70**
D gravel	11,016	0.59	0.63	0.66	0.68	0.7
D roof	2,576	0.73	0.75	0.78	0.80	0.81
D mead	49,925	0.08	0.15	0.25	0.30	0.35
D avg	**63,517**	**0.19**	**0.26**	**0.34**	**0.39**	**0.43**
E mead	7,879	0.08	0.15	0.25	0.30	0.35
E avg	**7,879**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**
F gravel	34,996	0.59	0.63	0.66	0.68	0.70
F avg	**34,996**	**0.59**	**0.63**	**0.66**	**0.68**	**0.70**

Proposed Sub-Basin A is 1.026 acres in area and contains a meadow, gravel access road, and concrete paved area.

The calculated time of concentration (Tc) for the 5-year and 100-year storm events for proposed Sub-Basin A is summarized in the table below:

Design Area	5 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
A	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Paved	2,613	71	4.9%	0.90	1.8	20	0.0	1.8
Gravel	1,941	20	5.0%	0.59	2.4	10	0.0	2.4
Meadow	37,245	403	3.0%	0.08	18.6	2.5	7.5	26.1
SUM	41,799	495		**0.15**	**22.8**	**5.3**	**7.5**	**30.3**

Design Area	100 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
A	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Paved	2,613	71	4.9%	0.96	1.3	20	0.0	1.3
Gravel	1,941	20	5.0%	0.70	1.9	10	0.0	1.9
Meadow	37,245	403	3.0%	0.35	13.7	2.5	7.5	21.2
SUM	41,799	495		**0.40**	**16.8**	**5.3**	**7.5**	**24.3**

Proposed Sub-Basin B is 0.121 acres in area and contains a meadow area.

The calculated time of concentration (Tc) for the 5-year and 100-year storm events for proposed Sub-Basin B is summarized in the table below:

Design Area	5 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
B	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Meadow	5,252	163	4.3%	0.08	14.5	2.5	0.0	14.5
SUM	5,252			**0.08**	**14.5**	**2.5**	**0.0**	**14.5**

Design Area	100 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
B	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Meadow	5,252	163	4.3%	0.35	10.7	2.5	0.0	10.7
SUM	5,252			**0.35**	**10.7**	**2.5**	**0.0**	**10.7**

Proposed Sub-Basin C is 1.268 acres in area and contains a gravel area.

The calculated time of concentration (Tc) for the 5-year and 100-year storm events for proposed Sub-Basin C is summarized in the table below:

Design Area	5 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
C	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)

Gravel	55,247	472	2.5%	0.59	11.7	10	1.8	13.5
SUM	55,247			**0.59**	**11.7**	**10**	**1.8**	**13.5**

Design	100 - Year							
Area	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
C	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Gravel	55,247	472	2.5%	0.70	9.2	10	1.8	11.0
SUM	55,247			**0.70**	**9.2**	**10**	**1.8**	**11.0**

Proposed Sub-Basin D is 1.458 acres and contains gravel, roof, and meadow areas.

The calculated time of concentration (Tc) for the 5-year and 100-year storm events for proposed Sub-Basin D is summarized in the table below:

Design	5 - Year							
Area	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
D	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Gravel	11,016	58	4.7%	0.59	4.2	10	0.0	4.2
Roofs	2,576	15	33%	0.73	0.8	20	0.0	0.8
Meadow	49,925	384	4.7%	0.08	16.7	2.5	4.8	21.5
SUM	63,517	457		**0.17**	**21.7**	**4.0**	**0.0**	**26.5**

Design	100 - Year							
Area	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
D	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Gravel	11,016	58	4.7%	0.70	3.3	10	0.0	3.3
Roofs	2,576	15	33%	0.81	0.6	20	0.0	0.6
Meadow	49,925	384	4.7%	0.35	12.3	2.5	4.8	17.1
SUM	63,517	457		**0.41**	**16.2**	**4.0**	**0.0**	**21.0**

Proposed Sub-Basin E is 0.181 acres in area and contains a meadow area.

The calculated time of concentration (Tc) for the 5-year and 100-year storm events for proposed Sub-Basin E is summarized in the table below:

Design	5 - Year							
Area	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
E	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Meadow	7,879	200	3.0%	0.08	18.1	2.5	0.0	18.1
SUM	7,879			**0.08**	**18.1**	**2.5**	**0.0**	**18.1**

Design Area	100 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
E	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Meadow	7,879	200	3.0%	0.35	13.3	2.5	0.0	13.3
SUM	7,879			**0.35**	**13.3**	**2.5**	**0.0**	**13.3**

Proposed Sub-Basin F is 0.803 acres in area and contains a gravel area.

The calculated time of concentration (Tc) for the 5-year and 100-year storm events for proposed Sub-Basin F is summarized in the table below:

Design Area	5 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
F	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Gravel	34,996	204	2.4%	0.59	9.8	10	0.0	9.8
SUM	34,996			**0.59**	**9.8**	**10**	**0.0**	**9.8**

Design Area	100 - Year							
	Area	Distance	Slope	Runoff	Ti	Conv.	Tt	Tc
F	(sq-ft)	(feet)	(%)	Coeffic.	(min)	Coeffic.	(min)	(min)
Gravel	34,996	204	2.4%	0.70	7.7	10	0.0	7.7
SUM	34,996			**0.70**	**7.7**	**10**	**0.0**	**7.7**

Infiltration Area S volume and calculation results are included in ***Appendix E***.

The drain time for Infiltration Area S is about 44 hours when completely full, considering Flow through the Gabion wall. The maximum stage during the 5-year storm is 1.72 ft which produces a peak outflow through the gabion wall of 0.0541 cfs, 0.0069 cfs infiltration, with a drain time of about 38 hours. For the 100-year storm, the maximum stage is 2.60 ft with a peak outflow through the gabion wall of 0.1603 cfs, 0.0145 cfs infiltration, with a drain time of about 43 hours.

Infiltration Area N volume and calculation results are included in ***Appendix F***.

The drain time for Infiltration Area N is about 40 hours when completely full, considering outflow through the Gabion wall. The maximum stage during the 5-year storm is 0.98 ft which produces a peak outflow through the gabion wall of 0.0230 cfs, 0.0039 cfs infiltration, with a drain time of about 28 hours. For the 100-year storm, the maximum stage is 1.55 ft with a peak outflow through the gabion wall of 0.0652 cfs, 0.0081 cfs infiltration, with a drain time of about 36 hours.

A summary of the proposed runoff generated on the site for the 5-year and 100-year storm events is provided in the table below. Total 5-year runoff is 0.46 cfs flowing

south and 2.27 cfs flowing north, while total 100-year runoff is 0.82 cfs flowing south and 3.60 cfs flowing north. The proposed condition drainage plan and calculation results are included in ***Appendix G***.

It is important to note that infiltration areas N and S are designed to completely contain and fully infiltrate all flows up to 100-year assuming no flow through the gabions. Flow through the gabions was only analyzed additionally to confirm that potential flow through would remain below existing condition flows to satisfy peak flow attenuation requirements. The infiltration areas meet the standards for full infiltration based on the MHFD SCM-Design-v4.02 [5].

				5 - Year					100 - Year				
								Total Runoff					Total Runoff
Design	**Area**	Area	Area	Runoff	Tc	I	**Qin**	**Qout**	Runoff	Tc	I	**Qin**	**Qout**
Point	**Design.**	(sq-ft)	(ac)	Coeffic.	(min)	(in/hr)	**(cfs)**	**(cfs)**	Coeffic.	(min)	(in/hr)	**(cfs)**	**(cfs)**
1	**A**	41,799	0.960	0.15	30.3	2.47	**0.37**	**0.37**	0.40	24.3	4.7	**1.82**	**1.82**
2	**B**	5,252	0.121	0.08	14.5	3.57	**0.03**	**0.03**	0.35	10.7	6.8	**0.29**	**0.29**
3	**C**	55,247	1.268	0.59	13.5	3.68	**2.75**	**0.05**	0.70	11.0	6.7	**5.94**	**0.16**
4	**D**	63,517	1.458	0.19	26.5	2.67	**0.76**	**0.76**	0.43	21.0	5.1	**3.17**	**3.17**
5	**E**	7,879	0.181	0.08	18.1	3.24	**0.05**	**0.05**	0.35	13.3	6.2	**0.39**	**0.39**
6	**F**	34,996	0.803	0.59	9.8	4.16	**1.97**	**0.02**	0.70	7.7	7.6	**4.27**	**0.04**

Four-Step Process (ECM Appendix I.7.2.A)

In accordance with the El Paso County Engineering Criteria Manual (ECM), Appendix I.7.2.A, a four-step process was used to guide selection of post-construction stormwater controls for this development:

1. Runoff Reduction (MDCIA / LID First): The site plan incorporates runoff-reduction measures including pervious crushed granite surfacing, landscaped areas, and routing of runoff to infiltration features, reducing directly connected impervious area and promoting infiltration.
2. Stabilize Drainageways: The development maintains historic overland drainage patterns and prevents concentrated discharge by providing controlled sheet flow release through gabion outlet structures. Proposed conveyance and discharge points include erosion-resistant surfaces and outlet protection as needed to prevent channelization and downstream erosion.
3. Water Quality Capture Volume (WQCV) Treatment: Water quality treatment is provided through distributed infiltration areas (rain gardens) that capture and treat runoff prior to discharge from the site. These facilities provide filtration through soil media and infiltration into native soils consistent with DCM/ECM objectives.
4. Industrial/Commercial BMP Considerations: Because the proposed land use includes RV and mixed storage, source control BMPs will be implemented as applicable to prevent pollutant exposure (e.g., good housekeeping, spill response materials, and avoidance of outdoor storage of potential pollutant-generating materials). These measures support compliance with County MS4 water quality requirements.

Based on the above, the proposed stormwater management system follows the ECM four-step BMP selection process and provides both runoff quantity mitigation and water quality benefits without adverse impacts to adjacent or downstream properties.

7. Conclusions

No "Basin Fees" nor "Bridge Fees" are applicable because this site development plan is "NOT plating".

7.1. Drainage Results

The proposed Sub-Basins A and B drain toward the south property line. Runoff from proposed Sub-Basin C is routed to Infiltration Area S, located near the southeast property line, where it is retained until it evaporates, infiltrates into the ground, and/or is released through the gabion outlet structure. The discharge released through the gabion structure to the south property line is minimal and significantly less than the existing condition.

For the south property line, the total existing runoff for the 5-year and 100-year storm events is $EX_5\ Q_A + EX_5\ Q_B = 0.5$ cfs and $EX_{100}\ Q_A + EX_{100}\ Q_B = 4.16$ cfs, respectively. The corresponding proposed runoff is $PR_5\ Q_A + PR_5\ Q_B + PR_5\ Q_C = 0.46$ cfs and $PR_{100}\ Q_A + PR_{100}\ Q_B + PR_{100}\ Q_C = 2.27$ cfs, respectively. A comparison is provided in the table below.

Storm Event	Existing Outflow South (cfs)	Proposed Outflow South (cfs)
5-Year	0.50	0.46
100-Year	4.16	2.27

The proposed Sub-Basins D and E drain toward the north property line. Runoff from proposed Sub-Basin F is routed to Infiltration Area N, located near the northeast property line, where it is retained until it evaporates, infiltrates into the ground, and/or is released through a gabion structure. The discharge released through the gabion structure to the north property line is minimal and significantly less than the existing condition.

For the north property line, the total existing runoff for the 5-year and 100-year storm events is $EX_5\ Q_C = 0.69$ cfs and $EX_{100}\ Q_C = 5.06$ cfs, respectively. The proposed runoff is $PR_5\ Q_D + PR_5\ Q_E + PR_5\ Q_F = 0.82$ cfs and $PR_{100}\ Q_D + PR_{100}\ Q_E + PR_{100}\ Q_F = 3.60$ cfs, respectively. A comparison is provided in the table below.

Storm Event	Existing Outflow North (cfs)	Proposed Outflow North (cfs)
5-Year	0.69	0.82
100-Year	5.06	3.60

A slight increase (approximately 18 percent) is observed in the proposed 5-year north outflow, 0.82 cfs compared to the existing 0.69 cfs, primarily due to increased runoff from Sub-Basin D. This increase does not occur for the 100-year event. To

mitigate the small-storm increase, a shallow Infiltration Area N2 was added. Calculations show that Area N2 fully neutralizes the 5-year discharge, as documented in ***Appendix H*** and summarized below.

Storm Event	Existing Outflow North (cfs)	Proposed Outflow North with N2 (cfs)
5-Year	0.69	0
100-Year	5.06	3.6

The drain time for Infiltration Area N2 is about 30 hours when completely full. The maximum stage during the 5-year storm is about 0.70 ft, with a drain time of about 20 hours. For the 100-year storm, the maximum stage is 1.0 ft, with a drain time of about 30 hours.

Therefore, the proposed stormwater management system will not cause adverse impacts to downstream or adjacent properties, as all proposed flows are equal to or less than existing flows.

The infiltration areas are to be constructed of 3:1 sloped soil with native grass vegetation and a gabion retaining wall as engineered in ***Appendix I***.

The total runoffs from the proposed site development are attenuated by the infiltration structures and outflows do not exceed the historic conditions for both the minor storm event and the major storm event.

Water quality reference tables in ***Appendix J*** show that the drainage plan meets water quality treatment requirements.

Drainage Facility Estimate Form is provided in ***Appendix K***.

The MHFD SCM design workbook is provided in ***Appendix L***.

This Final Drainage Report for the proposed RV and mixed storage development demonstrates that the project complies with all applicable drainage design criteria set forth by El Paso County. The drainage analysis confirms that the proposed conditions will result in smaller discharges to the existing condition and corresponding decreases in peak runoff rates for both the 5-year and 100-year storm events.

The drainage concept preserves the historical drainage patterns by continuing to convey stormwater overland. The use of pervious crushed granite areas, landscaped zones, and gabion structure infiltration areas, ensures that the outflows are spread out into sheet flow and provide effective infiltration and filtration of runoff prior to leaving the site. These low-impact development (LID) features serve as passive stormwater treatment mechanisms that mitigate both runoff quantity and quality.

In summary, the proposed development results in similar hydrologic performance relative to existing conditions, supports water quality objectives, and will have a positive influence on the downstream Livestock Company basin. The design

presented in this report is consistent with regulatory requirements and sound engineering practice.

Stormwater runoff will not cause adverse effects to downstream or adjacent properties.

8. References

1. “Drainage Criteria Manual Volume 2.” (n.d.). El Paso County Public Works, <https://epc-assets.elpasoco.com/wp-content/uploads/sites/13/ENGINEERING/county-engineer/docs/epc-drainage-criteria-manual-v2.pdf> (Sep. 8, 2025).

2. “El Paso County Engineering Criteria Manual.” (n.d.). Municode Library, <https://library.municode.com/co/el_paso_county/codes/engineering_criteria_manual_?nodeId=ENCRMA_CH1GEPR_1.2AU> (Sep. 8, 2025).

3. Urban Storm Drainage Criteria Manual, Volumes 1, 2 and 3; Mile High Flood District, Denver, CO. November 2010

4. Geologic and Geotechnical Report for Curtis Road Storage Development, Colorado Springs, Colorado

5. SDI Form & MHFD calcs

APPENDIX A

FEMA 100-Year Flood Insurance Rate Map (FIRM)

FIGURES

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 (NAVD88). 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, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones 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 (NAVD88)**. 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, N/NGS12
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 El Paso County, Colorado Springs Utilities, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** 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. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

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 **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 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 MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

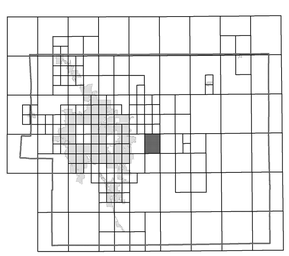
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

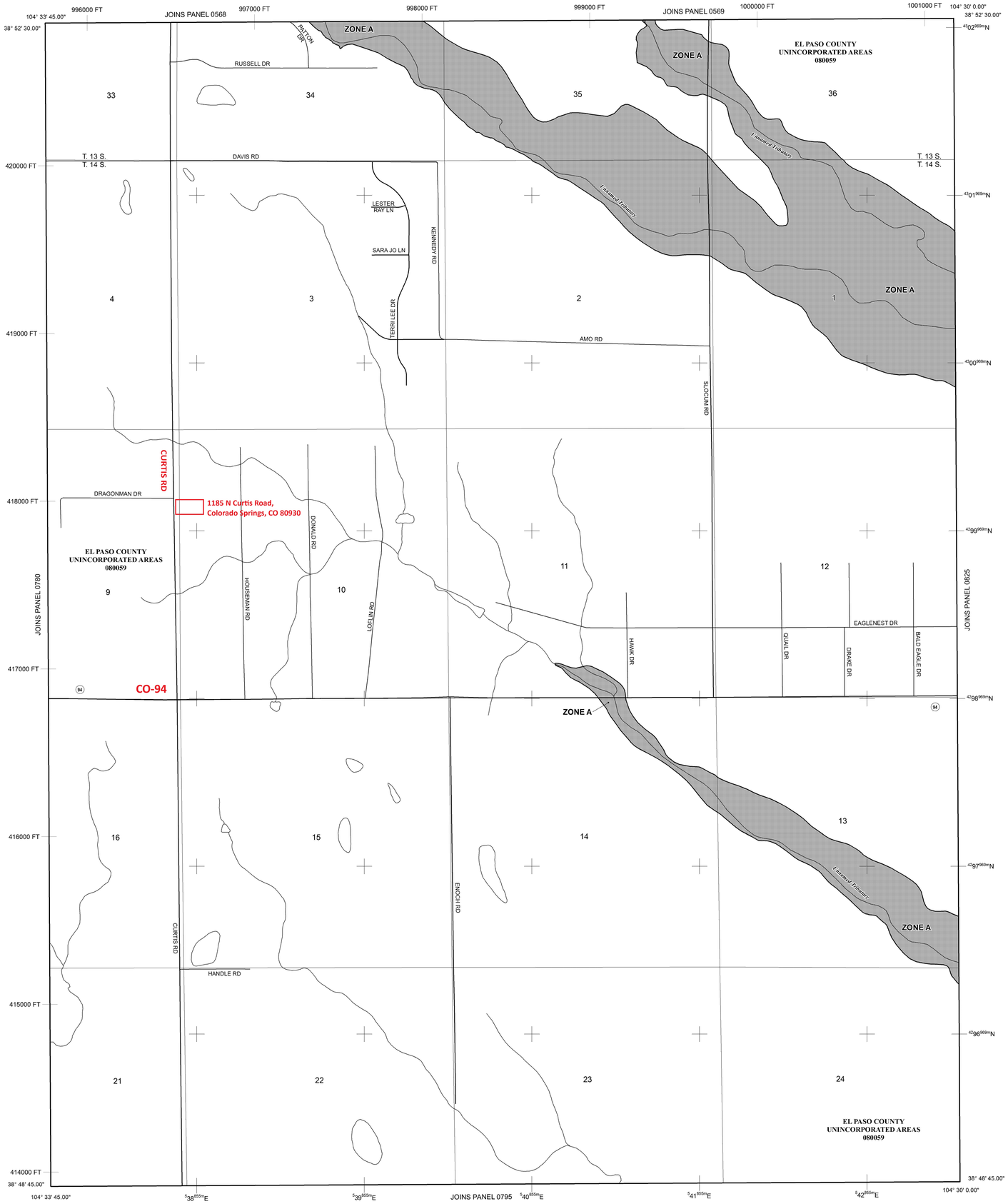
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 64 WEST, AND TOWNSHIP 14 SOUTH, RANGE 64 WEST.

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.

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.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

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

A — A — Cross section line
23 — 23 — Transect line
97° 07' 30.00" / 32° 22' 30.00" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT — 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

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 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000
FEET
METERS
300 0 300 600

NFIP

PANEL 0785G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 785 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0785	G

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
08041C0785G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

National Flood Hazard Layer FIRMette

FEMA

104°33'30"W 38°51'12"N

104°32'52"W 38°50'44"N

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

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
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 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

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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 9/1/2025 at 7:38 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

Table 6-6. Runoff Coefficient for Rational Method

TABLE

Table 6-6. Runoff Coefficients for Rational Method

(Source: UDFCD 2001)

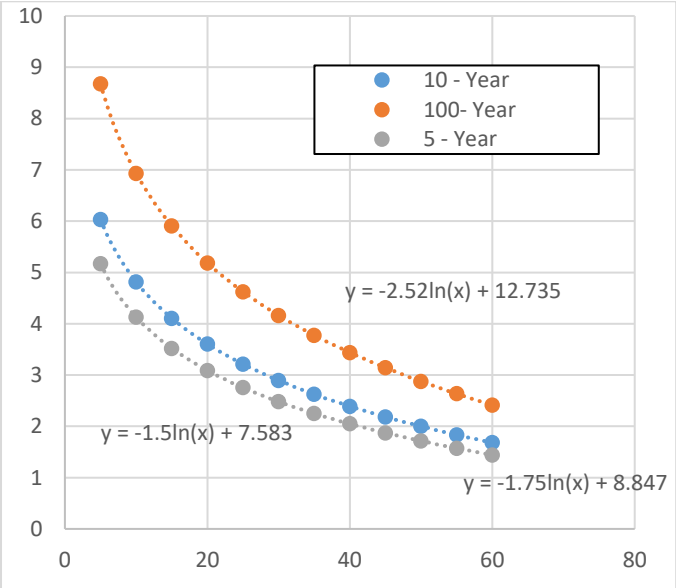
Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	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
Residential													
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
Industrial													
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
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
Undeveloped Areas													
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
Streets													
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
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
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
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

APPENDIX C

Figure 5-1. Storm Rainfall Time Intensity-Frequency Curves

TABLE & FIGURE

Tc	5 - Year	10 - Year	100-Year
	Intensity	Intensity	Intensity
min	in/hr	in/hr	in/hr
5	5.168843	6.030484	8.679216
10	4.129122	4.817476	6.932486
15	3.520925	4.107912	5.910713
20	3.089402	3.604469	5.185755
25	2.754686	3.213967	4.623433
30	2.481204	2.894905	4.163983
35	2.249978	2.625141	3.775523
40	2.049681	2.391461	3.439024
45	1.873006	2.185341	3.142211
50	1.714965	2.00096	2.876702
55	1.572	1.834167	2.63652
60	1.441483	1.681897	2.417252



APPENDIX D

Existing Condition Drainage Plan

FIGURE

Design Area	5 - Year							
A	Area (sq-ft)	Distance (feet)	Slope (%)	Runoff Coeffic.	Ti (min)	Conv. Coeffic.	Tt (min)	Tc (min)
Meadow	49,767	440	3.6%	0.08	20.8	2.5	4.9	25.7
SUM	49,767			**0.08**	**20.8**	**2.5**	**4.9**	**25.7**

Design Area	100 - Year							
A	Area (sq-ft)	Distance (feet)	Slope (%)	Runoff Coeffic.	Ti (min)	Conv. Coeffic.	Tt (min)	Tc (min)
Meadow	49,767	440	3.6%	0.35	15.3	2.5	4.9	20.2
SUM	49,767			**0.35**	**15.3**	**2.5**	**4.9**	**20.2**

Design Area	5 - Year							
B	Area (sq-ft)	Distance (feet)	Slope (%)	Runoff Coeffic.	Ti (min)	Conv. Coeffic.	Tt (min)	Tc (min)
Meadow	37,945	154	4.5%	0.08	13.9	2.5	0.0	13.9
SUM	37,945			**0.08**	**13.9**	**2.5**	**0.0**	**13.9**

Design Area	100 - Year							
B	Area (sq-ft)	Distance (feet)	Slope (%)	Runoff Coeffic.	Ti (min)	Conv. Coeffic.	Tt (min)	Tc (min)
Meadow	37,945	154	4.5%	0.35	10.2	2.5	0.0	10.2
SUM	37,945			**0.35**	**10.2**	**2.5**	**0.0**	**10.2**

Design Area	5 - Year							
C	Area (sq-ft)	Distance (feet)	Slope (%)	Runoff Coeffic.	Ti (min)	Conv. Coeffic.	Tt (min)	Tc (min)
Meadow	118,330	468	4.1%	0.08	20.1	2.5	5.6	25.6
Roofs	2,576	15	33%	0.73	0.8	15	0.0	0.8
SUM	120,906			**0.09**	**20.9**	**2.8**	**5.6**	**26.5**

Design Area	100 - Year							
C	Area (sq-ft)	Distance (feet)	Slope (%)	Runoff Coeffic.	Ti (min)	Conv. Coeffic.	Tt (min)	Tc (min)
Meadow	118,330	468	4.1%	0.35	14.8	2.5	5.6	20.3
Roofs	2,576	15	33%	0.81	0.7	15	0.0	0.7
SUM	120,906			**0.36**	**15.4**	**2.8**	**5.6**	**21.0**

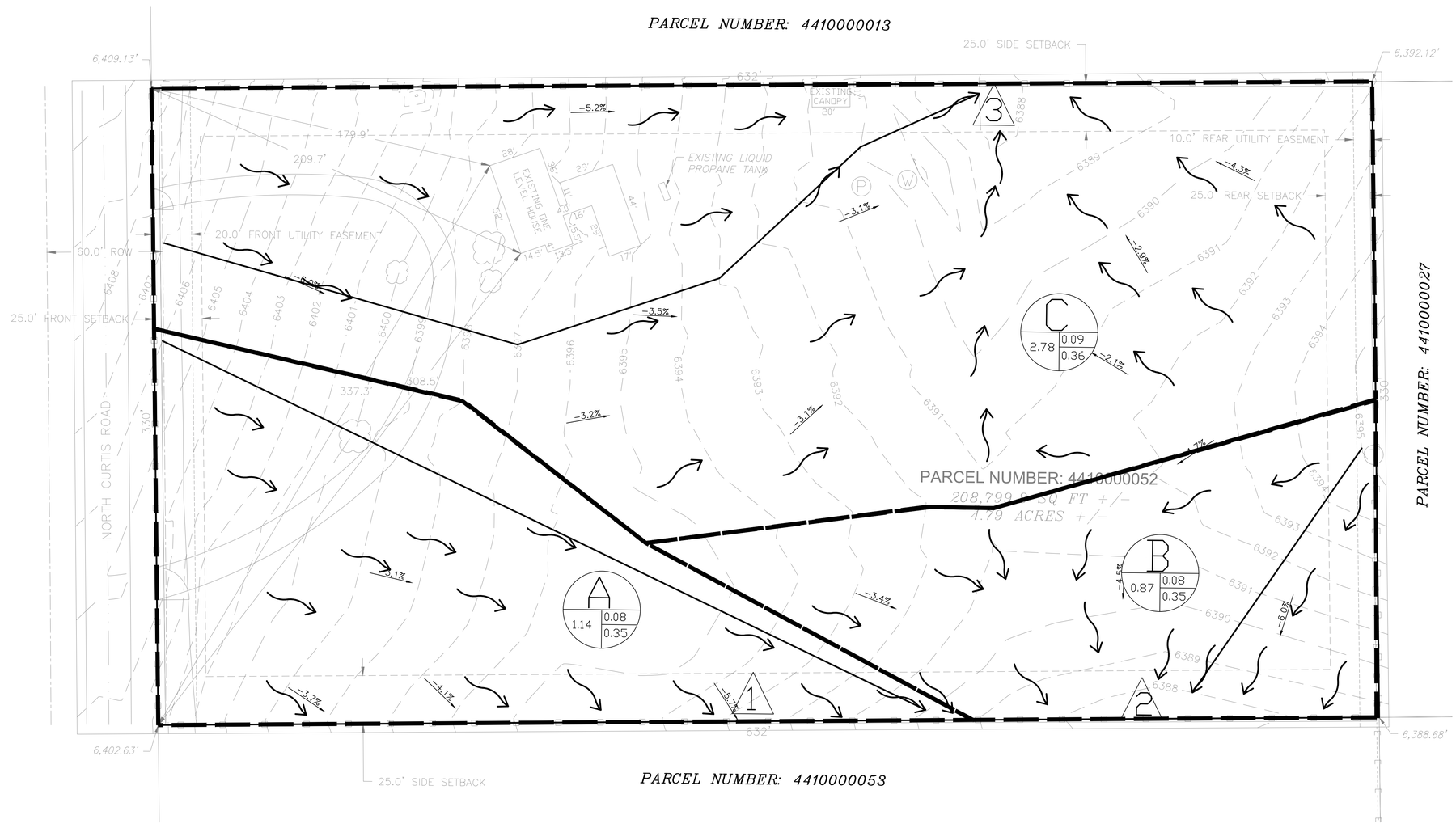
CALCULATED RUNOFF SUMMARY (Rational Method, Q=CIA)
- EXISTING CONDITIONS -

Design Point	Area Design.	Area (sq-ft)	Area (ac)	5 - Year Runoff Coeffic.	5 - Year Tc (min)	5 - Year I (in/hr)	5 - Year Total Runoff Q (cfs)	100 - Year Runoff Coeffic.	100 - Year Tc (min)	100 - Year I (in/hr)	100 - Year Total Runoff Q (cfs)
1	**A**	49,767	1.142	0.08	25.7	2.71	**0.25**	0.35	20.2	5.2	**2.06**
2	**B**	37,945	0.871	0.08	13.9	3.64	**0.25**	0.35	10.2	6.9	**2.10**
3	**C**	120,906	2.776	0.09	26.5	2.67	**0.69**	0.36	21.0	5.1	**5.06**

0 60 120 Feet

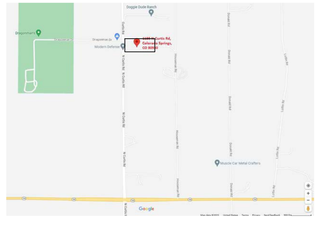
1 inch = 30 feet
Contour Interval = 1 ft

Design Area	Area (sq-ft)	5 - Year Runoff Coeffic.	10 - Year Runoff Coeffic.	25 - Year Runoff Coeffic.	50 - Year Runoff Coeffic.	100 - Year Runoff Coeffic.
A	49,767	0.08	0.15	0.25	0.3	0.35
A avg		**0.08**	**0.15**	**0.25**	**0.3**	**0.35**
B	37,945	0.08	0.15	0.25	0.3	0.35
B avg		**0.08**	**0.15**	**0.25**	**0.3**	**0.35**
C mead	118,330	0.08	0.15	0.25	0.3	0.35
C roof	2,576	0.73	0.75	0.78	0.8	0.81
C avg		**0.09**	**0.16**	**0.26**	**0.31**	**0.36**



LEGEND

- PROPERTY LINE
- NEIGHBORING PROPERTY LINE
- SETBACK
- UTILITY EASEMENT
- EXISTING FENCE
- EXISTING GATE
- EXISTING FIBER OPTIC LINE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING ELECTRIC TRANSFORMER
- EXISTING LIQUID PROPANE TANK
- EXISTING WATER WELL
- EXISTING MANHOLE TO WATER PRESSURE TANK
- EXISTING TREE
- 6390 EXISTING MAJOR CONTOUR
- 6391 EXISTING MINOR CONTOUR
- -2.0% EXISTING SLOPE



LOCATION MAP

DETAILED DRAINAGE CONSTRUCTION PLANS AND SPECIFICATIONS ENGINEER'S STATEMENT:

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION. SAID DETAILED PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE EL PASO COUNTY FOR DETAILED DRAINAGE PLANS AND SPECIFICATIONS, AND SAID DETAILED PLANS AND SPECIFICATIONS ARE IN CONFORMITY WITH THE MASTER PLAN OF THE DRAINAGE BASIN. SAID DETAILED DRAINAGE PLANS AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE PARTICULAR DRAINAGE FACILITY(S) IS DESIGNED. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARATION OF THE DETAILED DRAINAGE PLANS AND SPECIFICATIONS.

LEGEND

- -4.2% FLOW ARROW
- DRAINAGE SLOPE
- OVERLAND FLOW LENGTH
- BASIN BOUNDARY
- 1 DRAINAGE DESIGN POINT
- BASIN DESIGNATION
- 5-YEAR RUNOFF COEFF.
- BASIN AREA (ACRES)
- 100-YEAR RUNOFF COEFF.

REQUIRED NOTES:

CITY/COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH CITY/COUNTY DESIGN CRITERIA. THE CITY/COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE CITY/COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

PCD File # PPR2527

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JOB NUMBER: 2025-6-10-Var

PRINTED DATE: 02/10/2026

No.	Date	Revision Table Revised By	City Comments
1	10/16/25	EL PASSO	M.Lancito & E.Schoenheit

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TITLE: DRAINAGE PLAN (EXISTING CONDITIONS)

PROJECT NAME: GRADING & EROSION CONTROL PLAN

PROJECT ADDRESS: 1185 N Curtis Rd, Colorado Springs, CO 80930

PARCEL NUMBER: 4410000052

SHEET NUMBER: D-1

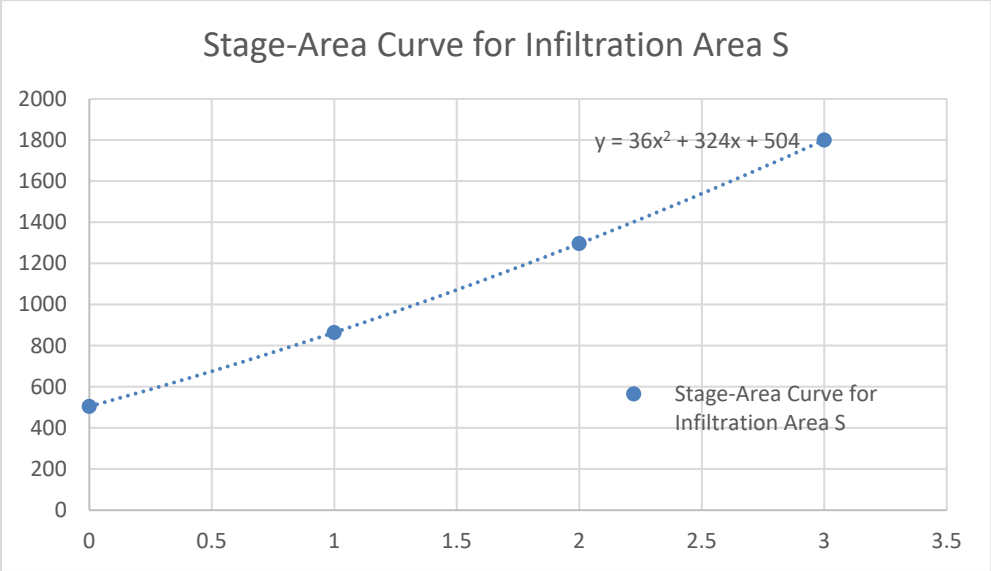
APPENDIX E

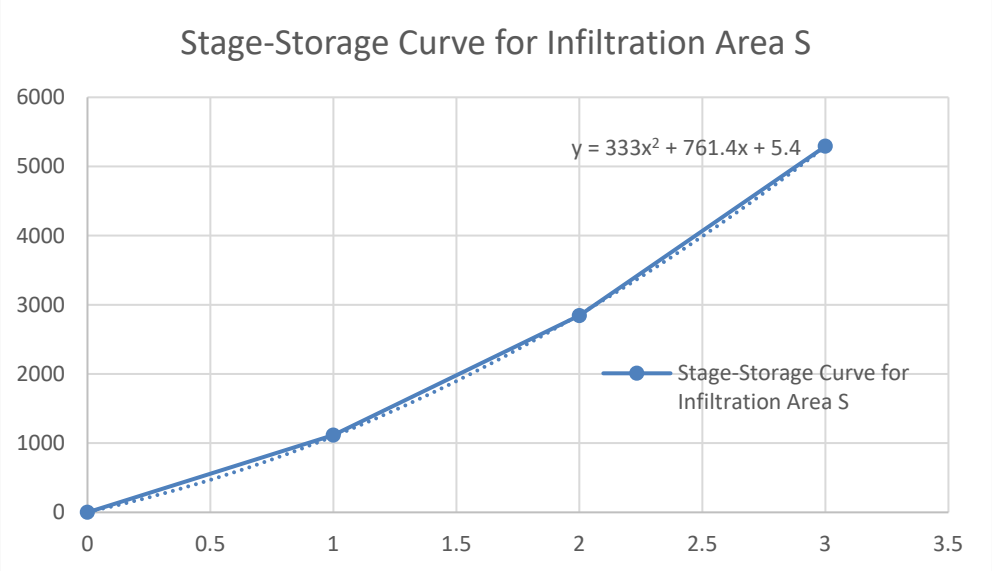
Infiltration Area S Calculations

TABLES & FIGURES

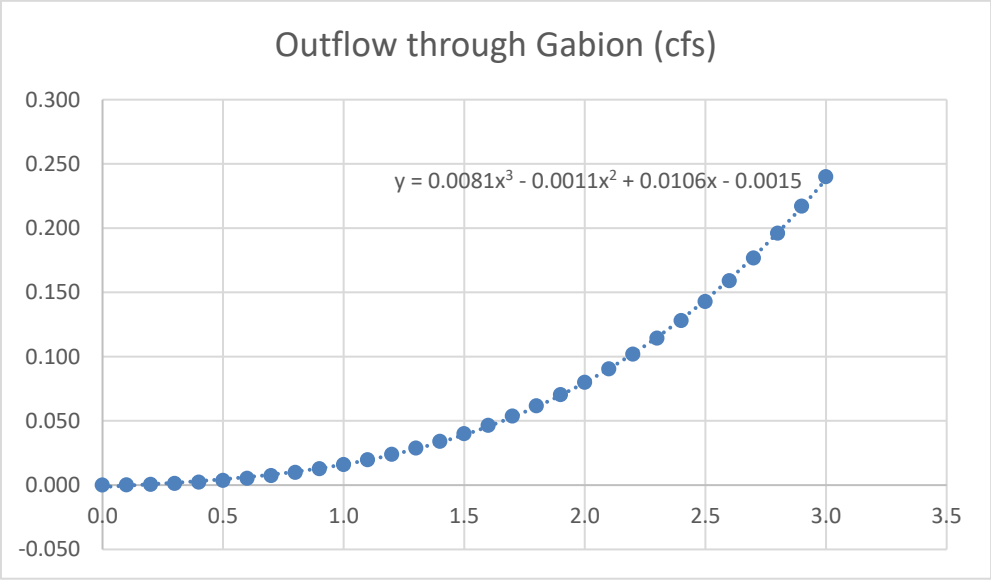
Stage-Area-Storage Curve for Infiltration Area S

Stage (ft)	Area (sq-ft)	Volume (cu-ft)
0	504	0
1	864	1116
2	1296	2844
3	1800	5292

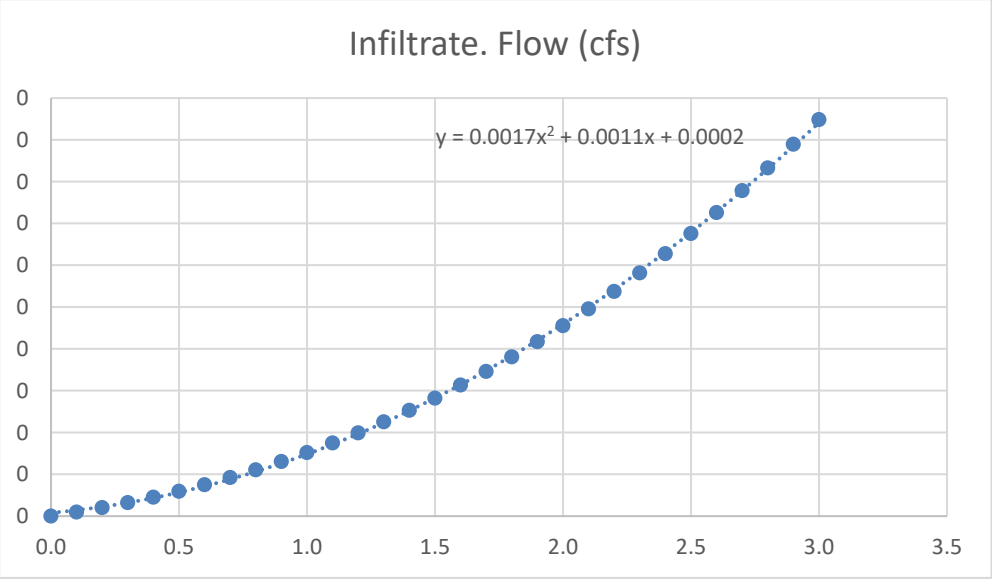




Flow through Gabion for Infiltration Area S									
Stage (ft)	Qumulat. Volume (cu-ft)	Volume per Stage (cu-ft)	Length (ft)	Ksat (ft/s)	Area (sq-ft)	Outflow through Gabion (cfs)	Outflow through Gabion (cfh)	Detent. Time per Stage (hr)	Qumulate Detent. Time (hr)
0.0	5.4		9	0.002	0	0.000	0.0		
0.1	84.9	79.5	8.85	0.002	6	0.000	0.5	162.80	
0.2	171.0	86.1	8.7	0.002	12	0.001	2.0	43.36	
0.3	263.8	92.8	8.55	0.002	18	0.001	4.5	20.41	
0.4	363.2	99.5	8.4	0.002	24	0.002	8.2	12.09	
0.5	469.4	106.1	8.25	0.002	30	0.004	13.1	8.11	8.11
0.6	582.1	112.8	8.1	0.002	36	0.005	19.2	5.87	13.98
0.7	701.6	119.4	7.95	0.002	42	0.007	26.6	4.49	18.46
0.8	827.6	126.1	7.8	0.002	48	0.010	35.4	3.56	22.02
0.9	960.4	132.8	7.65	0.002	54	0.013	45.7	2.90	24.92
1.0	1099.8	139.4	7.5	0.002	60	0.016	57.6	2.42	27.34
1.1	1245.9	146.1	7.35	0.002	66	0.020	71.1	2.05	29.40
1.2	1398.6	152.7	7.2	0.002	72	0.024	86.4	1.77	31.17
1.3	1558.0	159.4	7.05	0.002	78	0.029	103.6	1.54	32.70
1.4	1724.0	166.1	6.9	0.002	84	0.034	122.7	1.35	34.06
1.5	1896.8	172.7	6.75	0.002	90	0.040	144.0	1.20	35.26
1.6	2076.1	179.4	6.6	0.002	96	0.047	167.6	1.07	36.33
1.7	2262.2	186.0	6.45	0.002	102	0.054	193.6	0.96	37.29
1.8	2454.8	192.7	6.3	0.002	108	0.062	222.2	0.87	38.16
1.9	2654.2	199.4	6.15	0.002	114	0.070	253.6	0.79	38.94
2.0	2860.2	206.0	6	0.002	120	0.080	288.0	0.72	39.66
2.1	3072.9	212.7	5.85	0.002	126	0.090	325.7	0.65	40.31
2.2	3292.2	219.3	5.7	0.002	132	0.102	366.8	0.60	40.91
2.3	3518.2	226.0	5.55	0.002	138	0.114	411.8	0.55	41.46
2.4	3750.8	232.7	5.4	0.002	144	0.128	460.8	0.50	41.96
2.5	3990.2	239.3	5.25	0.002	150	0.143	514.3	0.47	42.43
2.6	4236.1	246.0	5.1	0.002	156	0.159	572.6	0.43	42.86
2.7	4488.8	252.6	4.95	0.002	162	0.177	636.2	0.40	43.25
2.8	4748.0	259.3	4.8	0.002	168	0.196	705.6	0.37	43.62
2.9	5014.0	266.0	4.65	0.002	174	0.217	781.3	0.34	43.96
3.0	5286.6	272.6	4.5	0.002	180	0.240	864.0	0.32	44.28



Infiltration for Infiltration Area S							
Stage (ft)	Volume per Stage (cu-ft)	Ksoil (ft/s)	Area (sq-ft)	Infiltrate. Flow (cfs)	Outflow through Gabion (cfh)	Detent. Time per Stage (hr)	Qumulate. Detent. Time (hr)
0.0		0.000032	504	0	0.0		
0.1	79.5	0.000032	537	0.0002	0.7	117.10	
0.2	86.1	0.000032	570	0.0004	1.4	59.73	
0.3	92.8	0.000032	604	0.0006	2.3	40.47	
0.4	99.5	0.000032	639	0.0009	3.2	30.76	
0.5	106.1	0.000032	675	0.0012	4.3	24.87	24.87
0.6	112.8	0.000032	711	0.0015	5.4	20.90	45.76
0.7	119.4	0.000032	748	0.0018	6.6	18.03	63.79
0.8	126.1	0.000032	786	0.0022	8.0	15.85	79.65
0.9	132.8	0.000032	825	0.0026	9.4	14.14	93.79
1.0	139.4	0.000032	864	0.0030	10.9	12.76	106.55
1.1	146.1	0.000032	904	0.0035	12.6	11.62	118.17
1.2	152.7	0.000032	945	0.0040	14.3	10.66	128.83
1.3	159.4	0.000032	986	0.0045	16.2	9.83	138.66
1.4	166.1	0.000032	1028	0.0051	18.2	9.12	147.79
1.5	172.7	0.000032	1071	0.0056	20.3	8.50	156.29
1.6	179.4	0.000032	1115	0.0063	22.5	7.96	164.24
1.7	186.0	0.000032	1159	0.0069	24.9	7.47	171.71
1.8	192.7	0.000032	1204	0.0076	27.4	7.03	178.75
1.9	199.4	0.000032	1250	0.0083	30.0	6.64	185.39
2.0	206.0	0.000032	1296	0.0091	32.8	6.29	191.67
2.1	212.7	0.000032	1343	0.0099	35.7	5.96	197.64
2.2	219.3	0.000032	1391	0.0107	38.7	5.67	203.30
2.3	226.0	0.000032	1440	0.0116	41.9	5.40	208.70
2.4	232.7	0.000032	1489	0.0126	45.2	5.15	213.85
2.5	239.3	0.000032	1539	0.0135	48.6	4.92	218.77
2.6	246.0	0.000032	1590	0.0145	52.3	4.71	223.48
2.7	252.6	0.000032	1641	0.0156	56.0	4.51	227.99
2.8	259.3	0.000032	1693	0.0167	60.0	4.32	232.31
2.9	266.0	0.000032	1746	0.0178	64.0	4.15	236.47
3.0	272.6	0.000032	1800	0.0190	68.3	3.99	240.46



Infiltration Flow for Infiltration Area S (5-Year)							
Time (min)	Inflow C (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Outflow through Gabion (cfs)	Infiltrate Flow (cfs)
0	0		0	0	0	0.00	0.0002
1	0.20	0.2054	12	12	0.04	0.00	0.0002
2	0.41	0.4087	25	37	0.06	0.00	0.0003
3	0.61	0.6119	37	74	0.10	0.00	0.0003
4	0.81	0.8149	49	122	0.14	0.00	0.0004
5	1.02	1.0178	61	184	0.19	0.00	0.0005
6	1.22	1.2205	73	257	0.26	0.0008	0.0006
7	1.42	1.4231	85	342	0.33	0.0018	0.0008
8	1.63	1.6254	98	440	0.41	0.0030	0.0009
9	1.83	1.8275	110	549	0.51	0.0045	0.0012
10	2.04	2.0293	122	671	0.61	0.0063	0.0015
11	2.24	2.2307	134	805	0.72	0.0085	0.0019
12	2.44	2.4316	146	951	0.83	0.0113	0.0023
13	2.65	2.6319	158	1109	0.95	0.0148	0.0028
14	2.65	2.6360	158	1267	1.07	0.0188	0.0033
15	2.45	2.4280	146	1413	1.18	0.0229	0.0039
16	2.25	2.2198	133	1546	1.28	0.0272	0.0044
17	2.04	2.0115	121	1666	1.36	0.0315	0.0049
18	1.84	1.8033	108	1775	1.44	0.0356	0.0053
19	1.64	1.5952	96	1870	1.50	0.0394	0.0057
20	1.43	1.3874	83	1954	1.56	0.0430	0.0061
21	1.23	1.1800	71	2024	1.61	0.0461	0.0064
22	1.03	0.9731	58	2083	1.64	0.0488	0.0066
23	0.82	0.7666	46	2129	1.67	0.0510	0.0068
24	0.62	0.5607	34	2162	1.70	0.0526	0.0070
25	0.42	0.3555	21	2184	1.71	0.0537	0.0070
26	0.21	0.1508	9	2193	1.72	0.0541	0.0071
27	0.01	-0.0532	-3	2190	1.71	0.0540	0.0071
28	0.00	-0.0611	-4	2186	1.71	0.0538	0.0071
29	0.00	-0.0609	-4	2182	1.71	0.0536	0.0070
30	0.00	-0.0607	-4	2179	1.71	0.0534	0.0070
31	0.00	-0.0605	-4	2175	1.70	0.0533	0.0070
32	0.00	-0.0603	-4	2171	1.70	0.0531	0.0070
33	0.00	-0.0601	-4	2168	1.70	0.0529	0.0070
34	0.00	-0.0599	-4	2164	1.70	0.0527	0.0070
35	0.00	-0.0597	-4	2161	1.69	0.0526	0.0069
36	0.00	-0.0595	-4	2157	1.69	0.0524	0.0069
37	0.00	-0.0593	-4	2154	1.69	0.0522	0.0069
38	0.00	-0.0591	-4	2150	1.69	0.0520	0.0069
39	0.00	-0.0589	-4	2146	1.69	0.0519	0.0069
40	0.00	-0.0588	-4	2143	1.68	0.0517	0.0069

Infiltration Flow for Infiltration Area S (5-Year)							
Time (min)	Inflow C (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Outflow through Gabion (cfs)	Infiltrate Flow (cfs)
41	0.00	-0.0586	-4	2139	1.68	0.0515	0.0069
42	0.00	-0.0584	-4	2136	1.68	0.0514	0.0068
43	0.00	-0.0582	-3	2132	1.68	0.0512	0.0068
44	0.00	-0.0580	-3	2129	1.67	0.0510	0.0068
45	0.00	-0.0578	-3	2125	1.67	0.0509	0.0068
46	0.00	-0.0577	-3	2122	1.67	0.0507	0.0068
47	0.00	-0.0575	-3	2119	1.67	0.0505	0.0068
48	0.00	-0.0573	-3	2115	1.67	0.0504	0.0067
49	0.00	-0.0571	-3	2112	1.66	0.0502	0.0067
50	0.00	-0.0569	-3	2108	1.66	0.0500	0.0067
51	0.00	-0.0568	-3	2105	1.66	0.0499	0.0067
52	0.00	-0.0566	-3	2101	1.66	0.0497	0.0067
53	0.00	-0.0564	-3	2098	1.65	0.0496	0.0067
54	0.00	-0.0562	-3	2095	1.65	0.0494	0.0067
55	0.00	-0.0561	-3	2091	1.65	0.0492	0.0066
56	0.00	-0.0559	-3	2088	1.65	0.0491	0.0066
57	0.00	-0.0557	-3	2085	1.65	0.0489	0.0066
58	0.00	-0.0555	-3	2081	1.64	0.0488	0.0066
59	0.00	-0.0554	-3	2078	1.64	0.0486	0.0066
60	0.00	-0.0552	-3	2075	1.64	0.0485	0.0066

Infiltration Flow for Infiltration Area S (100-Year)							
Time (min)	Inflow C (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Outflow through Gabion (cfs)	Infiltrate Flow (cfs)
0	0		0	0	0	0.00	0.0002
1	0.54	0.54	33	33	0.06	0.00	0.0003
2	1.08	1.08	65	98	0.12	0.00	0.0004
3	1.62	1.62	97	195	0.20	0.00	0.0005
4	2.16	2.16	130	325	0.32	0.00	0.0007
5	2.70	2.70	162	487	0.45	0.00	0.0011
6	3.24	3.24	194	681	0.62	0.0065	0.0015
7	3.78	3.78	227	908	0.80	0.0104	0.0022
8	4.33	4.31	259	1166	1.00	0.0162	0.0030
9	4.87	4.85	291	1457	1.21	0.0243	0.0040
10	5.41	5.38	323	1780	1.44	0.0358	0.0053
11	5.94	5.90	354	2134	1.68	0.0513	0.0068
12	5.40	5.34	320	2454	1.88	0.0678	0.0083
13	4.86	4.78	287	2741	2.05	0.0846	0.0096
14	4.32	4.22	253	2994	2.19	0.1007	0.0107
15	3.78	3.66	220	3214	2.30	0.1155	0.0118
16	3.24	3.11	186	3401	2.40	0.1285	0.0126
17	2.69	2.55	153	3554	2.47	0.1395	0.0133
18	2.15	2.00	120	3674	2.53	0.1483	0.0138
19	1.61	1.45	87	3761	2.57	0.1547	0.0142
20	1.07	0.90	54	3815	2.59	0.1587	0.0145
21	0.53	0.36	22	3837	2.60	0.1603	0.0146
22	0.00	-0.17	-10	3826	2.60	0.1595	0.0145
23	0.00	-0.17	-10	3816	2.59	0.1588	0.0145
24	0.00	-0.17	-10	3805	2.59	0.1580	0.0144
25	0.00	-0.17	-10	3795	2.58	0.1572	0.0144
26	0.00	-0.17	-10	3785	2.58	0.1565	0.0143
27	0.00	-0.17	-10	3775	2.57	0.1557	0.0143
28	0.00	-0.17	-10	3764	2.57	0.1549	0.0142
29	0.00	-0.17	-10	3754	2.56	0.1542	0.0142
30	0.00	-0.17	-10	3744	2.56	0.1535	0.0141
31	0.00	-0.17	-10	3734	2.55	0.1527	0.0141
32	0.00	-0.17	-10	3724	2.55	0.1520	0.0141
33	0.00	-0.17	-10	3714	2.55	0.1512	0.0140
34	0.00	-0.17	-10	3704	2.54	0.1505	0.0140
35	0.00	-0.16	-10	3694	2.54	0.1498	0.0139
36	0.00	-0.16	-10	3684	2.53	0.1491	0.0139
37	0.00	-0.16	-10	3675	2.53	0.1483	0.0138
38	0.00	-0.16	-10	3665	2.52	0.1476	0.0138
39	0.00	-0.16	-10	3655	2.52	0.1469	0.0138
40	0.00	-0.16	-10	3646	2.51	0.1462	0.0137

Infiltration Flow for Infiltration Area S (100-Year)							
Time (min)	Inflow C (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Outflow through Gabion (cfs)	Infiltrate Flow (cfs)
41	0.00	-0.16	-10	3636	2.51	0.1455	0.0137
42	0.00	-0.16	-10	3627	2.51	0.1448	0.0136
43	0.00	-0.16	-10	3617	2.50	0.1441	0.0136
44	0.00	-0.16	-9	3608	2.50	0.1434	0.0135
45	0.00	-0.16	-9	3598	2.49	0.1427	0.0135
46	0.00	-0.16	-9	3589	2.49	0.1421	0.0135
47	0.00	-0.16	-9	3579	2.48	0.1414	0.0134
48	0.00	-0.15	-9	3570	2.48	0.1407	0.0134
49	0.00	-0.15	-9	3561	2.47	0.1400	0.0133
50	0.00	-0.15	-9	3552	2.47	0.1394	0.0133
51	0.00	-0.15	-9	3543	2.47	0.1387	0.0132
52	0.00	-0.15	-9	3533	2.46	0.1380	0.0132
53	0.00	-0.15	-9	3524	2.46	0.1374	0.0132
54	0.00	-0.15	-9	3515	2.45	0.1367	0.0131
55	0.00	-0.15	-9	3506	2.45	0.1361	0.0131
56	0.00	-0.15	-9	3497	2.44	0.1354	0.0130
57	0.00	-0.15	-9	3488	2.44	0.1348	0.0130
58	0.00	-0.15	-9	3480	2.44	0.1342	0.0130
59	0.00	-0.15	-9	3471	2.43	0.1335	0.0129
60	0.00	-0.15	-9	3462	2.43	0.1329	0.0129

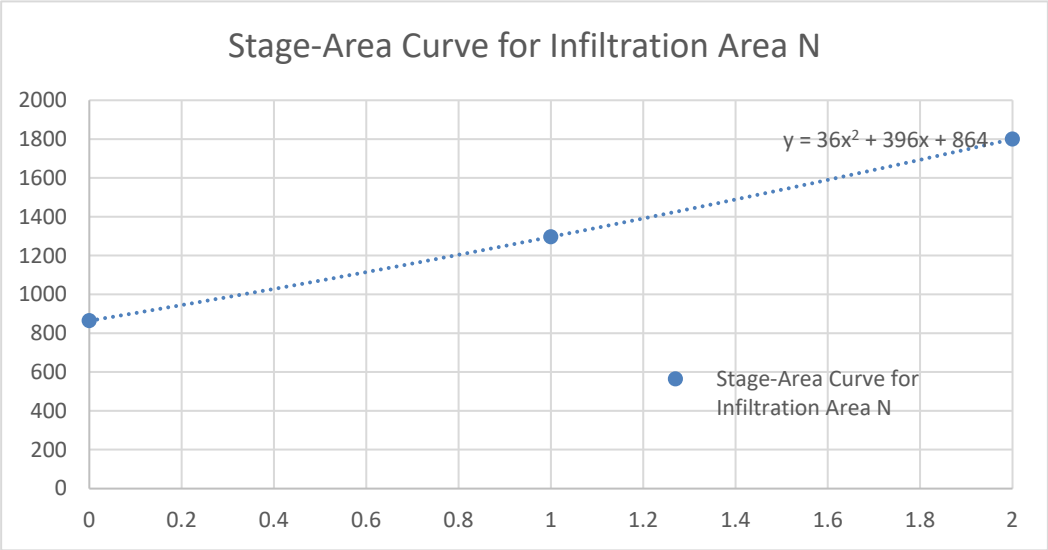
APPENDIX F

Infiltration Area N Calculations

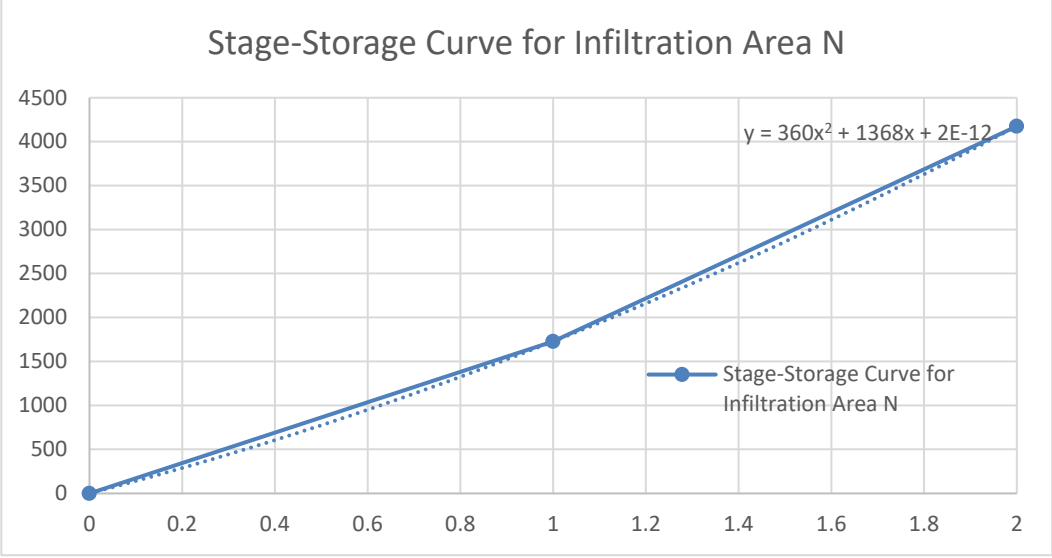
TABLES & FIGURES

Stage-Area-Storage Curve for Infiltration Area N

Stage (ft)	Area (sq-ft)	Volume (cu-ft)
0	864	0
1	1296	1728
2	1800	4176

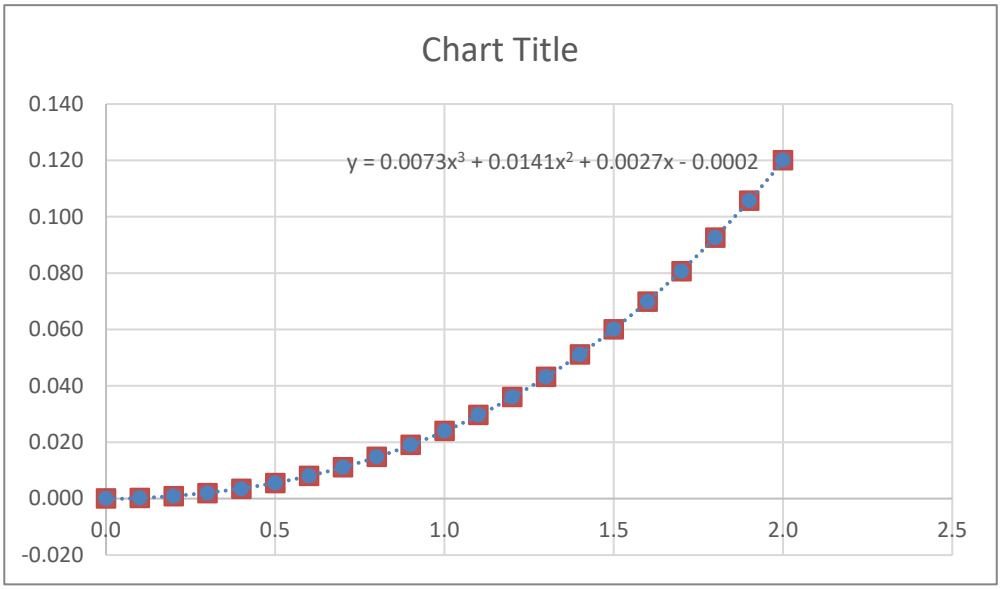


$y = 36x^2 + 396x + 864$

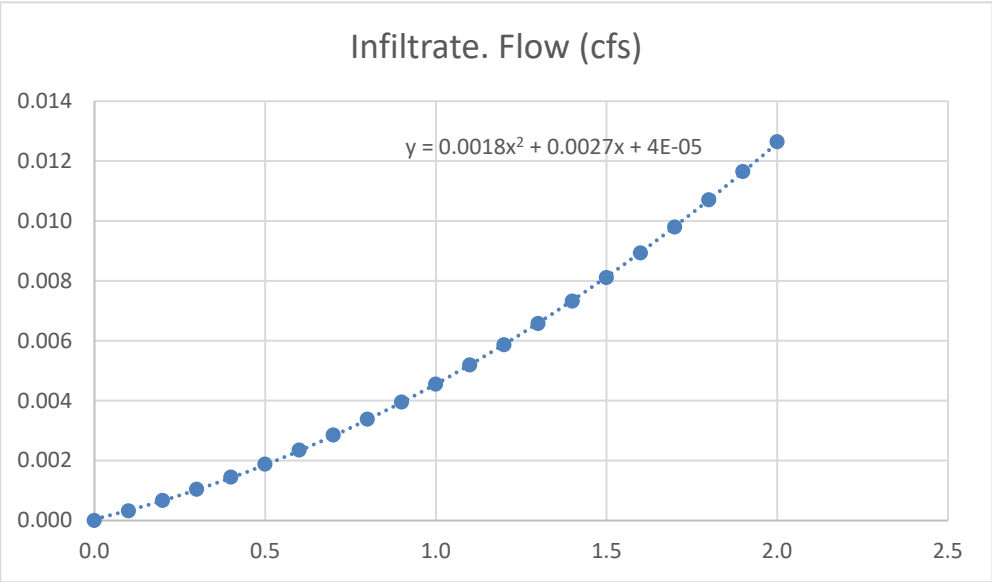


$y = 360x^2 + 1368x + 2E\text{-}12$

Flow through Gabion for Infiltration Area N									
Stage (ft)	Qumulat. Volume (cu-ft)	Volume per Stage (cu-ft)	Length (ft)	Ksat (ft/s)	Area (sq-ft)	Outflow through Gabion (cfs)	Outflow through Gabion (cfh)	Detent. Time per Stage (hr)	Qumulat. Detent. Time (hr)
0.0	0.0		6	0.002	0	0.000	0.0		
0.1	140.4	140.4	5.9	0.002	6	0.000	0.7	191.75	
0.2	288.0	147.6	5.8	0.002	12	0.001	3.0	49.54	
0.3	442.8	154.8	5.7	0.002	18	0.002	6.8	22.69	
0.4	604.8	162.0	5.6	0.002	24	0.003	12.3	13.13	
0.5	774.0	169.2	5.5	0.002	30	0.005	19.6	8.62	8.62
0.6	950.4	176.4	5.4	0.002	36	0.008	28.8	6.13	14.74
0.7	1134.0	183.6	5.3	0.002	42	0.011	39.9	4.60	19.34
0.8	1324.8	190.8	5.2	0.002	48	0.015	53.2	3.59	22.93
0.9	1522.8	198.0	5.1	0.002	54	0.019	68.6	2.89	25.81
1.0	1728.0	205.2	5	0.002	60	0.024	86.4	2.38	28.19
1.1	1940.4	212.4	4.9	0.002	66	0.030	106.7	1.99	30.18
1.2	2160.0	219.6	4.8	0.002	72	0.036	129.6	1.69	31.87
1.3	2386.8	226.8	4.7	0.002	78	0.043	155.3	1.46	33.33
1.4	2620.8	234.0	4.6	0.002	84	0.051	184.1	1.27	34.60
1.5	2862.0	241.2	4.5	0.002	90	0.060	216.0	1.12	35.72
1.6	3110.4	248.4	4.4	0.002	96	0.070	251.3	0.99	36.71
1.7	3366.0	255.6	4.3	0.002	102	0.081	290.3	0.88	37.59
1.8	3628.8	262.8	4.2	0.002	108	0.093	333.3	0.79	38.38
1.9	3898.8	270.0	4.1	0.002	114	0.106	380.4	0.71	39.09
2.0	4176.0	277.2	4	0.002	120	0.120	432.0	0.64	39.73



Infiltration for Infiltration Area N							
Stage (ft)	Volume per Stage (cu-ft)	Ksoil (ft/s)	Area (sq-ft)	Infiltrate. Flow (cfs)	Outflow through Gabion (cfh)	Detent. Time per Stage (hr)	Qumulat. Detent. Time (hr)
0.0		0.000032	864	0	0.0		
0.1	140.4	0.000032	904	0.0003	1.1	122.84	
0.2	147.6	0.000032	945	0.0007	2.4	61.79	
0.3	154.8	0.000032	986	0.0010	3.7	41.39	
0.4	162.0	0.000032	1028	0.0014	5.2	31.15	
0.5	169.2	0.000032	1071	0.0019	6.8	24.99	24.99
0.6	176.4	0.000032	1115	0.0023	8.5	20.86	45.85
0.7	183.6	0.000032	1159	0.0028	10.3	17.90	63.75
0.8	190.8	0.000032	1204	0.0034	12.2	15.67	79.42
0.9	198.0	0.000032	1250	0.0039	14.2	13.92	93.35
1.0	205.2	0.000032	1296	0.0046	16.4	12.52	105.87
1.1	212.4	0.000032	1343	0.0052	18.7	11.37	117.24
1.2	219.6	0.000032	1391	0.0059	21.1	10.40	127.65
1.3	226.8	0.000032	1440	0.0066	23.7	9.58	137.23
1.4	234.0	0.000032	1489	0.0073	26.4	8.88	146.11
1.5	241.2	0.000032	1539	0.0081	29.2	8.26	154.37
1.6	248.4	0.000032	1590	0.0089	32.2	7.72	162.10
1.7	255.6	0.000032	1641	0.0098	35.3	7.25	169.34
1.8	262.8	0.000032	1693	0.0107	38.5	6.82	176.16
1.9	270.0	0.000032	1746	0.0117	42.0	6.44	182.60
2.0	277.2	0.000032	1800	0.0126	45.5	6.09	188.69



Infiltration Flow for Infiltration Area N (5-Year)							
Time (min)	Inflow F (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Outflow through Gabion (cfs)	Infiltrate Flow (cfs)
0	0		0	0	0	0.00	0.0001
1	0.20	0.2011	12	12	0.04	0.00	0.0002
2	0.40	0.4022	24	36	0.06	0.0000	0.0002
3	0.60	0.6032	36	72	0.10	0.0002	0.0003
4	0.80	0.8040	48	121	0.14	0.0005	0.0004
5	1.01	1.0048	60	181	0.19	0.0009	0.0006
6	1.21	1.2053	72	253	0.25	0.0015	0.0008
7	1.41	1.4056	84	338	0.33	0.0025	0.0011
8	1.61	1.6055	96	434	0.41	0.0038	0.0014
9	1.81	1.8050	108	542	0.50	0.0056	0.0018
10	1.93	1.9241	115	658	0.60	0.0080	0.0023
11	1.73	1.7202	103	761	0.68	0.0105	0.0027
12	1.53	1.5161	91	852	0.75	0.0130	0.0031
13	1.33	1.3121	79	931	0.82	0.0154	0.0034
14	1.13	1.1082	66	997	0.87	0.0175	0.0037
15	0.93	0.9046	54	1051	0.91	0.0194	0.0040
16	0.72	0.7013	42	1093	0.94	0.0210	0.0042
17	0.52	0.4985	30	1123	0.97	0.0221	0.0043
18	0.32	0.2960	18	1141	0.98	0.0228	0.0044
19	0.12	0.0941	6	1147	0.98	0.0230	0.0044
20	0.00	-0.0275	-2	1145	0.98	0.0230	0.0044
21	0.00	-0.0274	-2	1143	0.98	0.0229	0.0044
22	0.00	-0.0273	-2	1142	0.98	0.0228	0.0044
23	0.00	-0.0273	-2	1140	0.98	0.0228	0.0044
24	0.00	-0.0272	-2	1139	0.98	0.0227	0.0044
25	0.00	-0.0271	-2	1137	0.98	0.0227	0.0044
26	0.00	-0.0270	-2	1135	0.97	0.0226	0.0044
27	0.00	-0.0270	-2	1134	0.97	0.0225	0.0044
28	0.00	-0.0269	-2	1132	0.97	0.0225	0.0044
29	0.00	-0.0268	-2	1130	0.97	0.0224	0.0044
30	0.00	-0.0268	-2	1129	0.97	0.0223	0.0044
31	0.00	-0.0267	-2	1127	0.97	0.0223	0.0043
32	0.00	-0.0266	-2	1126	0.97	0.0222	0.0043
33	0.00	-0.0266	-2	1124	0.97	0.0222	0.0043
34	0.00	-0.0265	-2	1122	0.96	0.0221	0.0043
35	0.00	-0.0264	-2	1121	0.96	0.0220	0.0043
36	0.00	-0.0263	-2	1119	0.96	0.0220	0.0043
37	0.00	-0.0263	-2	1118	0.96	0.0219	0.0043
38	0.00	-0.0262	-2	1116	0.96	0.0219	0.0043
39	0.00	-0.0261	-2	1115	0.96	0.0218	0.0043
40	0.00	-0.0261	-2	1113	0.96	0.0217	0.0043

Infiltration Flow for Infiltration Area N (5-Year)							
Time (min)	Inflow F (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Outflow through Gabion (cfs)	Infiltrate Flow (cfs)
41	0.00	-0.0260	-2	1111	0.96	0.0217	0.0043
42	0.00	-0.0259	-2	1110	0.96	0.0216	0.0043
43	0.00	-0.0259	-2	1108	0.95	0.0216	0.0043
44	0.00	-0.0258	-2	1107	0.95	0.0215	0.0042
45	0.00	-0.0257	-2	1105	0.95	0.0214	0.0042
46	0.00	-0.0257	-2	1104	0.95	0.0214	0.0042
47	0.00	-0.0256	-2	1102	0.95	0.0213	0.0042
48	0.00	-0.0255	-2	1101	0.95	0.0213	0.0042
49	0.00	-0.0255	-2	1099	0.95	0.0212	0.0042
50	0.00	-0.0254	-2	1098	0.95	0.0211	0.0042
51	0.00	-0.0254	-2	1096	0.94	0.0211	0.0042
52	0.00	-0.0253	-2	1095	0.94	0.0210	0.0042
53	0.00	-0.0252	-2	1093	0.94	0.0210	0.0042
54	0.00	-0.0252	-2	1091	0.94	0.0209	0.0042
55	0.00	-0.0251	-2	1090	0.94	0.0209	0.0042
56	0.00	-0.0250	-2	1088	0.94	0.0208	0.0042
57	0.00	-0.0250	-1	1087	0.94	0.0208	0.0042
58	0.00	-0.0249	-1	1085	0.94	0.0207	0.0041
59	0.00	-0.0248	-1	1084	0.94	0.0206	0.0041
60	0.00	-0.0248	-1	1083	0.93	0.0206	0.0041

Infiltration Flow for Infiltration Area N (100-Year)							
Time (min)	Inflow F (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Outflow through Gabion (cfs)	Infiltrate Flow (cfs)
0	0		0	0	0	0.00	0.0001
1	0.56	0.56	33	33	0.06	0.0000	0.0002
2	1.11	1.11	67	100	0.12	0.0003	0.0004
3	1.67	1.67	100	200	0.21	0.0010	0.0007
4	2.22	2.22	133	333	0.32	0.0024	0.0011
5	2.78	2.77	166	500	0.47	0.0048	0.0017
6	3.33	3.33	200	699	0.63	0.0089	0.0025
7	3.89	3.88	233	932	0.82	0.0154	0.0034
8	4.10	4.08	245	1177	1.01	0.0242	0.0046
9	3.54	3.51	211	1388	1.16	0.0335	0.0056
10	2.99	2.95	177	1564	1.29	0.0425	0.0065
11	2.43	2.38	143	1707	1.39	0.0506	0.0073
12	1.88	1.82	109	1816	1.47	0.0572	0.0079
13	1.32	1.25	75	1892	1.52	0.0619	0.0083
14	0.76	0.69	42	1933	1.55	0.0647	0.0085
15	0.21	0.14	8	1941	1.55	0.0652	0.0086
16	0.00	-0.07	-4	1937	1.55	0.0649	0.0085
17	0.00	-0.07	-4	1933	1.55	0.0646	0.0085
18	0.00	-0.07	-4	1928	1.54	0.0643	0.0085
19	0.00	-0.07	-4	1924	1.54	0.0640	0.0085
20	0.00	-0.07	-4	1919	1.54	0.0637	0.0084
21	0.00	-0.07	-4	1915	1.53	0.0635	0.0084
22	0.00	-0.07	-4	1911	1.53	0.0632	0.0084
23	0.00	-0.07	-4	1906	1.53	0.0629	0.0084
24	0.00	-0.07	-4	1902	1.53	0.0626	0.0083
25	0.00	-0.07	-4	1898	1.52	0.0623	0.0083
26	0.00	-0.07	-4	1894	1.52	0.0621	0.0083
27	0.00	-0.07	-4	1889	1.52	0.0618	0.0083
28	0.00	-0.07	-4	1885	1.51	0.0615	0.0083
29	0.00	-0.07	-4	1881	1.51	0.0613	0.0082
30	0.00	-0.07	-4	1877	1.51	0.0610	0.0082
31	0.00	-0.07	-4	1873	1.51	0.0607	0.0082
32	0.00	-0.07	-4	1869	1.50	0.0605	0.0082
33	0.00	-0.07	-4	1865	1.50	0.0602	0.0081
34	0.00	-0.07	-4	1860	1.50	0.0599	0.0081
35	0.00	-0.07	-4	1856	1.49	0.0597	0.0081
36	0.00	-0.07	-4	1852	1.49	0.0594	0.0081
37	0.00	-0.07	-4	1848	1.49	0.0592	0.0080
38	0.00	-0.07	-4	1844	1.49	0.0589	0.0080
39	0.00	-0.07	-4	1840	1.48	0.0587	0.0080
40	0.00	-0.07	-4	1836	1.48	0.0584	0.0080

Infiltration Flow for Infiltration Area N (100-Year)							
Time (min)	Inflow F (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Outflow through Gabion (cfs)	Infiltrate Flow (cfs)
41	0.00	-0.07	-4	1832	1.48	0.0582	0.0080
42	0.00	-0.07	-4	1828	1.48	0.0579	0.0079
43	0.00	-0.07	-4	1824	1.47	0.0577	0.0079
44	0.00	-0.07	-4	1820	1.47	0.0574	0.0079
45	0.00	-0.07	-4	1816	1.47	0.0572	0.0079
46	0.00	-0.07	-4	1813	1.46	0.0569	0.0079
47	0.00	-0.06	-4	1809	1.46	0.0567	0.0078
48	0.00	-0.06	-4	1805	1.46	0.0564	0.0078
49	0.00	-0.06	-4	1801	1.46	0.0562	0.0078
50	0.00	-0.06	-4	1797	1.45	0.0560	0.0078
51	0.00	-0.06	-4	1793	1.45	0.0557	0.0078
52	0.00	-0.06	-4	1789	1.45	0.0555	0.0077
53	0.00	-0.06	-4	1786	1.45	0.0553	0.0077
54	0.00	-0.06	-4	1782	1.44	0.0550	0.0077
55	0.00	-0.06	-4	1778	1.44	0.0548	0.0077
56	0.00	-0.06	-4	1774	1.44	0.0546	0.0076
57	0.00	-0.06	-4	1771	1.44	0.0544	0.0076
58	0.00	-0.06	-4	1767	1.43	0.0541	0.0076
59	0.00	-0.06	-4	1763	1.43	0.0539	0.0076
60	0.00	-0.06	-4	1759	1.43	0.0537	0.0076

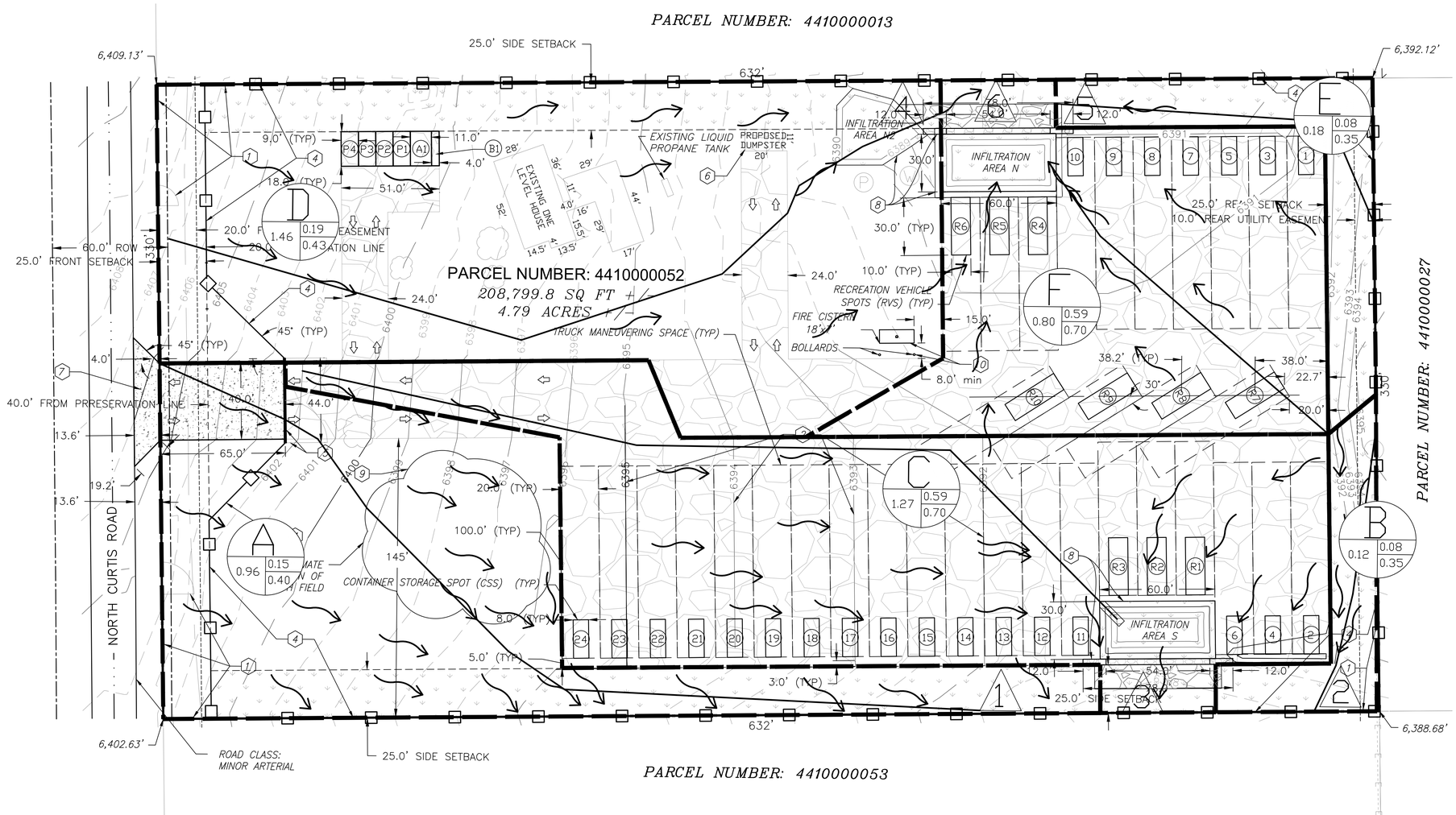
APPENDIX G

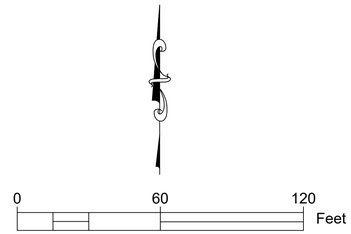
Proposed Condition Drainage Plan

FIGURE

Design Point	Design Area	Area (sq-ft)	Area (ac)	5 - Year Runoff Coeffic.	5 - Year Tc (min)	5 - Year I (in/hr)	5 - Year Qin (cfs)	5 - Year Total Runoff Qout (cfs)	100 - Year Runoff Coeffic.	100 - Year Tc (min)	100 - Year I (in/hr)	100 - Year Qin (cfs)	100 - Year Total Runoff Qout (cfs)
1	**A**	41,799	0.960	0.15	30.3	2.47	**0.37**	**0.37**	0.40	24.3	4.7	**1.82**	**1.82**
2	**B**	5,252	0.121	0.08	14.5	3.57	**0.03**	**0.03**	0.35	10.7	6.8	**0.29**	**0.29**
3	**C**	55,247	1.268	0.59	13.5	3.68	**2.75**	**0.05**	0.70	11.0	6.7	**5.94**	**0.16**
4	**D**	63,517	1.458	0.19	26.5	2.67	**0.76**	**0.60**	0.43	21.0	5.1	**3.17**	**3.17**
5	**E**	7,879	0.181	0.08	18.1	3.24	**0.05**	**0.05**	0.35	13.3	6.2	**0.39**	**0.39**
6	**F**	34,996	0.803	0.59	9.8	4.16	**1.97**	**0.02**	0.70	7.7	7.6	**4.27**	**0.04**

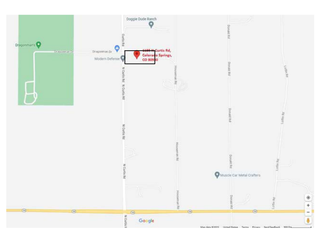
Design		5 - Year Runoff Coeffic.	10 - Year Runoff Coeffic.	25 - Year Runoff Coeffic.	50 - Year Runoff Coeffic.	100 - Year Runoff Coeffic.
	Area (sq-ft)					
A paved	2,613	0.90	0.92	0.94	0.95	0.96
A gravel	1,941	0.59	0.63	0.66	0.68	0.7
A mead	37,245	0.08	0.15	0.25	0.30	0.35
A avg	**41,799**	**0.15**	**0.22**	**0.31**	**0.36**	**0.40**
B	5,252	0.08	0.15	0.25	0.30	0.35
B avg	**5,252**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**
C gravel	55,247	0.59	0.63	0.66	0.68	0.7
C avg	**55,247**	**0.59**	**0.63**	**0.66**	**0.68**	**0.70**
D gravel	11,016	0.59	0.63	0.66	0.68	0.7
D roof	2,576	0.73	0.75	0.78	0.80	0.81
D mead	49,925	0.08	0.15	0.25	0.30	0.35
D avg	**63,517**	**0.19**	**0.26**	**0.34**	**0.39**	**0.43**
E mead	7,879	0.08	0.15	0.25	0.30	0.35
E avg	**7,879**	**0.08**	**0.15**	**0.25**	**0.30**	**0.35**
F gravel	34,996	0.59	0.63	0.66	0.68	0.70
F avg	**34,996**	**0.59**	**0.63**	**0.66**	**0.68**	**0.70**





LEGEND

- PROPERTY LINE
- NEIGHBORING PROPERTY LINE
- SETBACK
- UTILITY EASEMENT
- EXISTING FENCE
- EXISTING GATE
- EXISTING FIBER OPTIC LINE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING ELECTRIC TRANSFORMER
- EXISTING LIQUID PROPANE TANK
- EXISTING WATER WELL
- EXISTING MANHOLE TO WATER PRESSURE TANK
- EXISTING TREE
- 6390 EXISTING MAJOR CONTOUR
- 6391 EXISTING MINOR CONTOUR
- 6395 PROPOSED MAJOR CONTOUR
- 6394 PROPOSED MINOR CONTOUR
- PROPOSED FENCE
- PROPOSED GATE
- PROPOSED GRAVEL COVER (ROAD BASE)
- PROPOSED GABION RETAINING WALL
- PROPOSED LANDSCAPING AREA
- PROPOSED CONCRETE OR ASPHALT DRIVEWAY
- INFILTRATION AREA — PROPOSED INFILTRATION AREA
- RIP RAP (D50 = 6")



LOCATION MAP

DETAILED DRAINAGE CONSTRUCTION PLANS AND SPECIFICATIONS ENGINEER'S STATEMENT:

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION. SAID DETAILED PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE EL PASO COUNTY FOR DETAILED DRAINAGE PLANS AND SPECIFICATIONS, AND SAID DETAILED PLANS AND SPECIFICATIONS ARE IN CONFORMITY WITH THE MASTER PLAN OF THE DRAINAGE BASIN. SAID DETAILED DRAINAGE PLANS AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE PARTICULAR DRAINAGE FACILITY(S) IS DESIGNED. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARATION OF THE DETAILED DRAINAGE PLANS AND SPECIFICATIONS.

LEGEND

- FLOW ARROW
- -4.2% DRAINAGE SLOPE
- OVERLAND FLOW LENGTH
- BASIN BOUNDARY
- 1 DRAINAGE DESIGN POINT
- BASIN DESIGNATION
- 5-YEAR RUNOFF COEFF.
- BASIN AREA (ACRES)
- 100-YEAR RUNOFF COEFF.

REQUIRED NOTES:

CITY/COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH CITY/COUNTY DESIGN CRITERIA. THE CITY/COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE CITY/COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

PCD File # PPR2527

COLORADO LICENSED
MILAN JANKOVIC
44321
PROFESSIONAL ENGINEER

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FILE NUMBER: 2319

JOB NUMBER: 2025-6-10-Var

PRINTED DATE: 02/10/2026

Revision Table		
No.	Date	Revised By
1	10/16/25	EL PASSO
		City Comments
		M.Lancito & E.Schoenheit

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TITLE:
DRAINAGE PLAN (PROPOSED CONDITIONS)

PROJECT NAME:
GRADING & EROSION CONTROL PLAN

PROJECT ADDRESS:
1185 N Curtis Rd, Colorado Springs, CO 80930

PARCEL NUMBER:
4410000052

SHEET NUMBER:
D-2

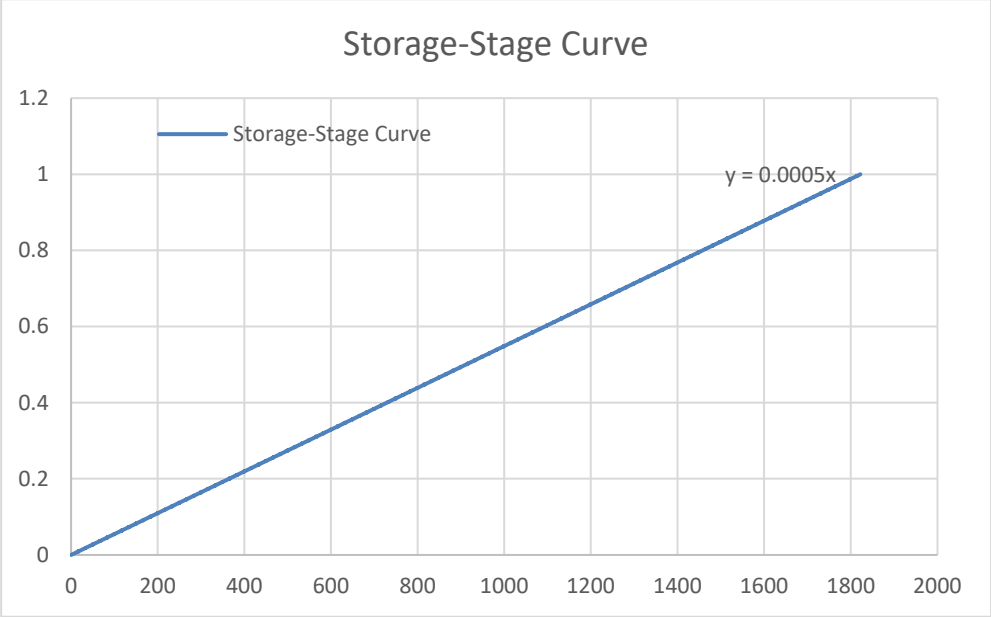
APPENDIX H

Infiltration Area N2 Calculations

FIGURE

Stage-Area-Storage Curve for Infiltration Area N2

Stage (ft)	Area (sq-ft)	Volume (cu-ft)
0	951	0
1	1346	1822



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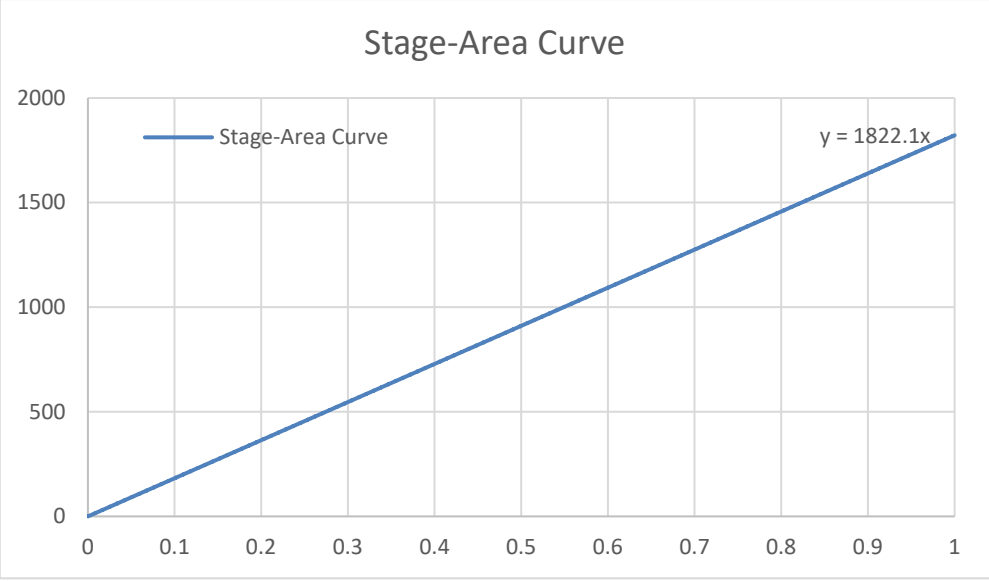
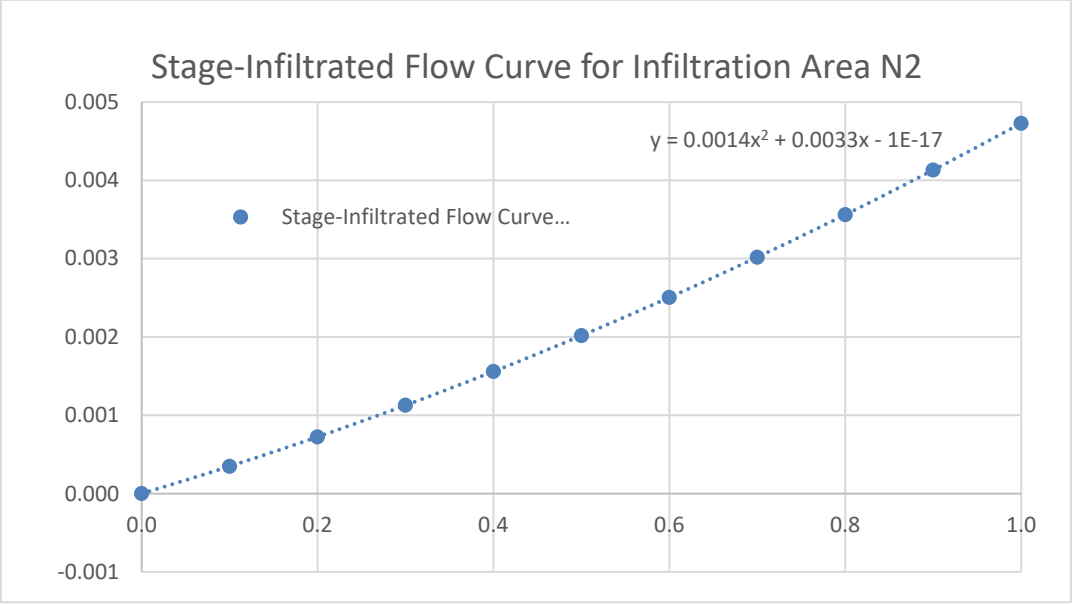


y = 1822.1x

Stage-Infiltration Flow Curve for Infiltration Area N2

Infiltration Area N2				
Stage (ft)	Volume per Stage (cu-ft)	Ksoil (ft/s)	Area (sq-ft)	Infiltrate. Flow (cfs)
0.0	0.0	0.000032	951	0
0.1	182.2	0.000032	991	0.000348
0.2	364.4	0.000032	1030	0.000724
0.3	546.6	0.000032	1070	0.001127
0.4	728.8	0.000032	1109	0.001558
0.5	911.1	0.000032	1149	0.002018
0.6	1093.3	0.000032	1188	0.002504
0.7	1275.5	0.000032	1228	0.003019
0.8	1457.7	0.000032	1267	0.003561
0.9	1639.9	0.000032	1307	0.004131
1.0	1822.1	0.000032	1346	0.004729



$y = 0.0014x^2 + 0.0033x - 1E-17$

Infiltration Flow for Infiltration Area N2

Infiltration Area N2 (5-Year)						
Time (min)	Inflow D (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Infiltrate Flow (cfs)
0	0		0	0	0	0.0001
1	0.03	0.0285	2	2	0.00	0.0000
2	0.06	0.0571	3	5	0.00	0.0000
3	0.09	0.0857	5	10	0.01	0.0000
4	0.11	0.1142	7	17	0.01	0.0000
5	0.14	0.1428	9	26	0.01	0.0000
6	0.17	0.1713	10	36	0.02	0.0001
7	0.20	0.1999	12	48	0.02	0.0001
8	0.23	0.2284	14	62	0.03	0.0001
9	0.26	0.2570	15	77	0.04	0.0001
10	0.29	0.2855	17	94	0.05	0.0002
11	0.31	0.3140	19	113	0.06	0.0002
12	0.34	0.3425	21	134	0.07	0.0002
13	0.37	0.3711	22	156	0.08	0.0003
14	0.40	0.3996	24	180	0.09	0.0003
15	0.43	0.4281	26	206	0.10	0.0004
16	0.46	0.4566	27	233	0.12	0.0004
17	0.49	0.4851	29	262	0.13	0.0005
18	0.51	0.5137	31	293	0.15	0.0005
19	0.54	0.5422	33	325	0.16	0.0006
20	0.57	0.5707	34	360	0.18	0.0006
21	0.60	0.5992	36	396	0.20	0.0007
22	0.63	0.6276	38	433	0.22	0.0008
23	0.66	0.6561	39	473	0.24	0.0009
24	0.69	0.6846	41	514	0.26	0.0009
25	0.71	0.7131	43	556	0.28	0.0010
26	0.74	0.7416	44	601	0.30	0.0011
27	0.74	0.7425	45	646	0.32	0.0012
28	0.72	0.7139	43	688	0.34	0.0013
29	0.69	0.6852	41	729	0.36	0.0014
30	0.66	0.6566	39	769	0.38	0.0015
31	0.63	0.6279	38	807	0.40	0.0016
32	0.60	0.5993	36	842	0.42	0.0016
33	0.57	0.5706	34	877	0.44	0.0017
34	0.54	0.5420	33	909	0.45	0.0018
35	0.52	0.5134	31	940	0.47	0.0019
36	0.49	0.4847	29	969	0.48	0.0019
37	0.46	0.4561	27	997	0.50	0.0020

Infiltration Flow for Infiltration Area N2

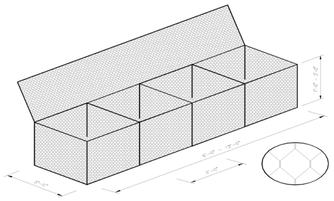
Infiltration Area N2 (5-Year)						
Time (min)	Inflow D (cfs)	Inflow - Outflow - Infiltrate (cfs)	Volume per Stage (cu-ft)	Qumulat. Volume (cu-ft)	Stage (ft)	Infiltrate Flow (cfs)
38	0.43	0.4275	26	1022	0.51	0.0021
39	0.40	0.3989	24	1046	0.52	0.0021
40	0.37	0.3702	22	1068	0.53	0.0022
41	0.34	0.3416	20	1089	0.54	0.0022
42	0.32	0.3130	19	1108	0.55	0.0023
43	0.29	0.2844	17	1125	0.56	0.0023
44	0.26	0.2558	15	1140	0.57	0.0023
45	0.23	0.2272	14	1154	0.58	0.0024
46	0.20	0.1986	12	1166	0.58	0.0024
47	0.17	0.1700	10	1176	0.59	0.0024
48	0.14	0.1414	8	1184	0.59	0.0024
49	0.12	0.1128	7	1191	0.60	0.0025
50	0.09	0.0843	5	1196	0.60	0.0025
51	0.06	0.0557	3	1199	0.60	0.0025
52	0.03	0.0271	2	1201	0.60	0.0025
53	0.00	-0.0014	0	1201	0.60	0.0025
54	0.00	-0.0025	0	1201	0.60	0.0025
55	0.00	-0.0025	0	1201	0.60	0.0025
56	0.00	-0.0025	0	1200	0.60	0.0025
57	0.00	-0.0025	0	1200	0.60	0.0025
58	0.00	-0.0025	0	1200	0.60	0.0025
59	0.00	-0.0025	0	1200	0.60	0.0025
60	0.00	-0.0025	0	1200	0.60	0.0025

APPENDIX I

Gabion Wall Construction Plan

GENERAL NOTES - GABION WALL DETENTION POND:

1. PURPOSE:
   A. THIS POND IS A PERMANENT DETENTION FACILITY DESIGNED TO ATTENUATE POST DEVELOPMENT PEAK FLOWS IN ACCORDANCE WITH EL PASO COUNTY DRAINAGE CRITERIA.
2. DIMENSIONS:
   A. THE POND HAS A MAXIMUM STORAGE DEPTH OF 3.0 FEET DEFINED BY GABION WALL BOUNDARIES.
   B. THE FACILITY IS DESIGNED TO CONTROL RUNOFF FROM 5-, 10-, 25-, 50-, AND 100-YEAR STORM EVENTS
   C. PEAK DISCHARGE SHALL NOT EXCEED PRE-DEVELOPMENT PEAK FLOWS FOR EACH EVENT
3. OUTLET STRUCTURE:
   A. AN EMERGENCY OVERFLOW IS PROVIDED TO SAFELY BYPASS LARGER THAN 100-YEAR STORM EVENTS.
   B. THE OUTLET IS FORMED BY A DEPRESSED ROW OF GABIONS THAT IS 54 FT LONG.
   C. OUTLET SHALL BE CONSTRUCTED TO THE DIMENSIONS AND ELEVATIONS SHOWN ON THE PLAN AND IN THE DESIGN CALCULATIONS IN THE DRAINAGE REPORT.
4. GABION CONSTRUCTION
   A. GABION BASKETS SHALL BE FABRICATED FROM DOUBLE-TWISTED, ZINC-COATED WIRE MESH, MEETING ASTM A975.
   B. ROCK FILL SHALL BE ANGULAR, CLEAN, AND HARD, BETWEEN 4" AND 8" IN DIAMETER.
   C. GABIONS SHALL BE ASSEMBLED, PLACED, AND FILLED PER MANUFACTURER'S SPACIFICATIONS.
   D. BASKETS SHALL BE SECURELY TIED TOGETHER AT ALL CONTACT SURFACES USING LACING WIRE OR SPIRAL BINDERS.
   E. UNIAXIAL GEOGRID SHALL BE PLACED PER PLANS IN BETWEEN ROWS OF GABIONS.
5. MATERIALS
   A. GABION BASKETS
      a. TYPE: DOUBLE TWISTED HEXAGONAL WOVEN WIRE MESH.
      b. STANDARD: ASTM A975-97, STYLE 1 (ZINC-COATED), OR STYLE 3 (PVC-COATED).
      c. WIRE GAUGE: 11 GA MINIMUM CORE WIRE.
   B. STONE FILL
      a. 4" TO 8" ANGULAR HARD ROCK, CLEAN, DURABLE, AND FREE FROM CLAY, FRIABLE PARTICLES, OR ORGANIC MATTER.
      b. GRADATION: NO MORE THAN 10% PASSING THE 4" SIEVE; NO NORE THAN 10% RETAINED ON 8" SIEVE.
   C. FASTNERS
      a. TIE WIRE: 13 GA GALVANIZED STEEL OR SPIRAL BINDERS.
      b. INTERNAL DIAPHRAGMS: AT 1' INTERVALS TO PREVENT BULGING.
   D. CONCRETE
      a. DESIGN COMPRESSIVE STRENGTH SHALL BE MINIMUM 4,500 PSI
      b. AIR ENTRAINMENT SHALL BE 5 TO 8%
      c. MAXIMUM WATER TO CEMENT RATIO (W/C) SHALL BE 0.45
      d. CONCRETE SHALL BE MODIFIED WITH SYNTHETIC FIBERS CONFORMING TO ASTM C1116 WITH A DOSAGE OF 1.5 TO 3.0 LB PER CUBIC YARD, AS PER MANUFACTURER'S RECOMMENDATION.
      e. COARSE AND FINE AGGREGATES SHALL CONFORM TO ASTM C33
      f. NOMINAL MAXIMUM AGGREGATE SIZE SHALL BE 3/4 INCH
      g. ALL CHEMICAL ADMIXTURES MUST BE APPROVED AND CONFORM TO:
         - WATER REDUCER: ASTM C494, TYPE A OR F
         - SET RETARDER (IF NEEDED): ASTM C494, TYPE B OR D
         - AIR ENTRAINERl ASTM C260
      h. SLUMP AT PLACEMENT SHALL BE 3-5 INCHES, UNLESS WATER-REDUCING ADMIXTURE IS USED, IN WHICH CASE SLUMP MAY INCREASE UP TO 7 INCHES.
   E. GEOTEXTILE
      a. CLASS 1 NON-WOVEN GEOTEXTILE (ACF N035N) FOR DRAINAGE SEPARATION
      b. TRIAXIAL GEOGRID (TENSAR InterAx NX750 GEOGRID)
      c. UNIAXIAL GEOGRID (TENSAR UX1100MSE)
6. FOUNDATION PREPARATION:
   A. ALL VEGETATION, DEBRIS, SOFT SOILS, AND UNSUITIBLE MATERIAL SHALL BE REMOVED BELOW THE POND AND WALL FOUNDATION FOOTPRINT.
   B. NATIVE SUBGRADE SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY (ASTM D698).
   C. AT LEAST 6" OF 3/4" CRUSHED GRANITE BEDDING MATERIAL SHALL BE PLACED AND COMPACTED OVER THE COMPACTED NATIVE SUBGRADE UNDER THE FOOTPRINT OF ALL GABION STRUCTURES.
   D. A CLASS 1 NONWOVEN GEOTEXTILE SHALL BE PLACED INBETWEEN THE NATIVE SOIL AND THE BEDDING MATERIAL.
   E. A CLASS 1 NONWOVEN OR HYBRID GEOTEXTILE SHALL BE PLACED IN BETWEEN THE NATIVE SOIL AND THE VERICAL FACE OF THE GABIONS IN CONTACT WITH THE GROUND.
7. MAINTENANCE:
   A. THE DETENTION FACILITY MUST BE CHECKED PERIODICALLY AND AFTER STORM EVENTS TO ENSURE NO SEDIMENT BUILDUP OCCURS INSIDE THE POND OR OUTLET STRUCTURES.
   B. ANY SEDIMENT OR OBSTRUCTIONS SHALL BE REMOVED IMMEDIATELY.
8. ERROSION PROTECTION:
   A. ALL DISTURBED AREAS AROUND THE POND SHALL BE STABILIZED WITH NATIVE SEED AND EROSION CONTROL BLANKET OR TURF REINFORCEMENT MAT (TRM) PER LANDSCAPE PLAN.
9. INSPECTION AND CERTIFICATION
   A. THE GABION STRUCTURE AND OUTLET CONFIGURATION SHALL BE INSPECTED AND CERTIFIED BY MILOSH ENG LISCENCED PROFESIONAL ENGINEER PRIOR TO FINAL ACCEPTANCE.
   B. THE SUBGRADE, BEDDING, GABION PLACEMENT, AND POND CONSTRUCTION MUST BE INSPECTED AND MANAGED DURING CONSTRUCTION BY MILOSH ENG.
10. USE ONLY PROVIDED DIMENSIONS, DO NOT SCALE DRAWING TO OBTAIN DIMENSIONS. IF CONFLICTS OR QUESTIONS ARISE, IMMEDIATELY CONTACT THE ENGINEER OF RECORD AND MILOSH ENG.



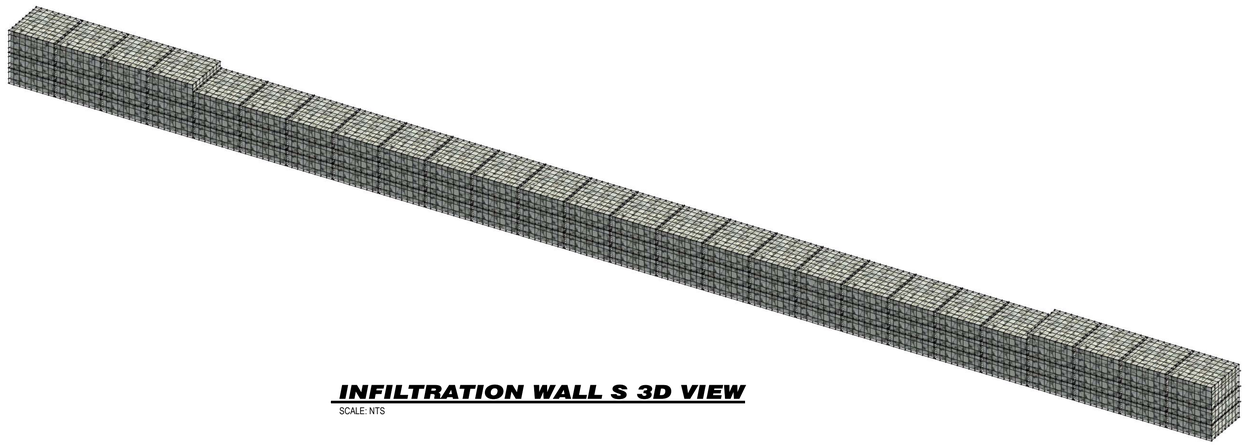
Terra Aqua Gabion Unit Standard Sizes: Custom Jumbo Sizes Available

Gabion unit siz	*Capacity Cubic Yards*	*No. of Internal Cells*
6x3x3	2	2
9x3x3	3	3
12x3x3	4	4
6x3x1.5	1	2
9x3x1.5	1.5	3
12x3x1.5	2	4
6x3x1	.666	2
9x3x1	1	3
12x3x1	1.33	4

TOLERANCES: All gabion dimensions shall be within a tolerance limit of plus or minus 5% of the manufacturers stated dimensions.

Minimum Strength requirements of Terra Aqua Double Twisted Mesh Gabions

Test Description	*Galvanized/Galfan Gabion*	*Pvc Coated Gabion*
Tensile strength of wire mesh parallel to twist	3500 lbs/ft	2900 lbs/ft
Tensile strength of wire mesh perpendicular to twist	1800 lbs/ft	1400 lbs/ft
Connection to selvedges	1400 lbs/ft	1200 lbs/ft
Panel to Panel	1400 lbs/ft	1200 lbs/ft
Punch strength of mesh	6000 lbs/ft	5300 lbs/ft



INFILTRATION WALL S 3D VIEW

SCALE: NTS

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FILE NUMBER: PPR2527

JOB NUMBER: 2025-6-10-VAR

PRINTED DATE: 04/24/26

Revision Table

No.	Date	Revised By	City Comments

CLIENT: ANDRII VARKO
1185 N CURTIS RD
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(786) 394-0094
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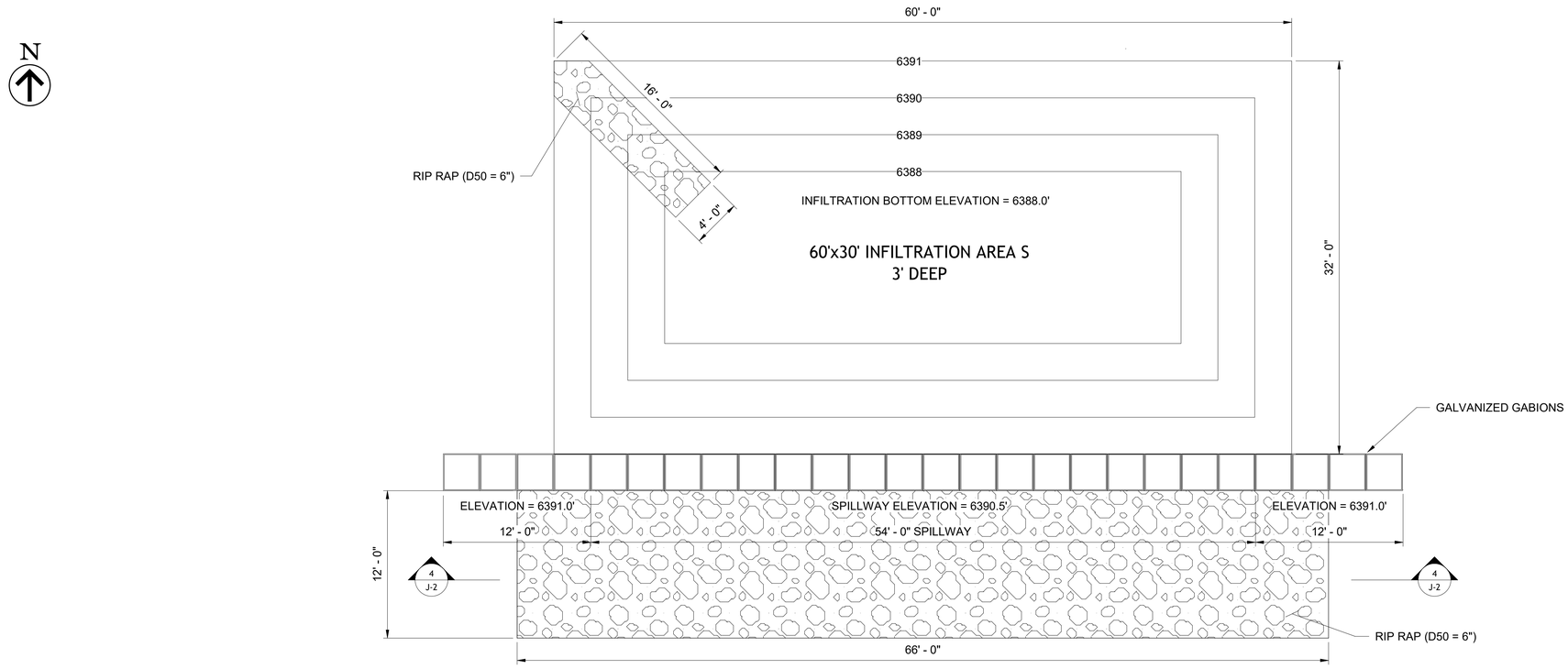
TITLE: POND S CONSTR. 3D & NOTES

PROJECT NAME: SITE DEVELOPMENT PLAN

PROJECT ADRESS: 1185 N CURTIS RD, COLORADO SPRINGS, CO 80930

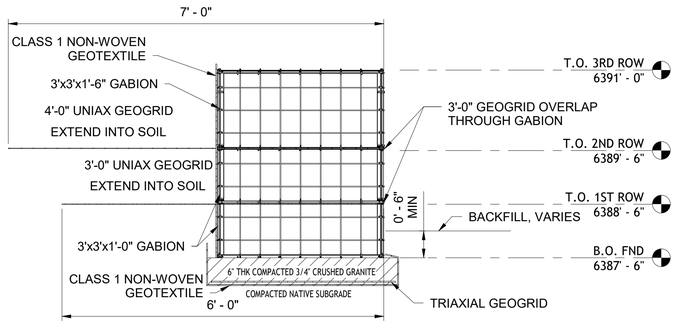
RECEPTION NUMBER: 4410000052

SHEET NUMBER: J-1



INFILTRATION AREA S PLAN

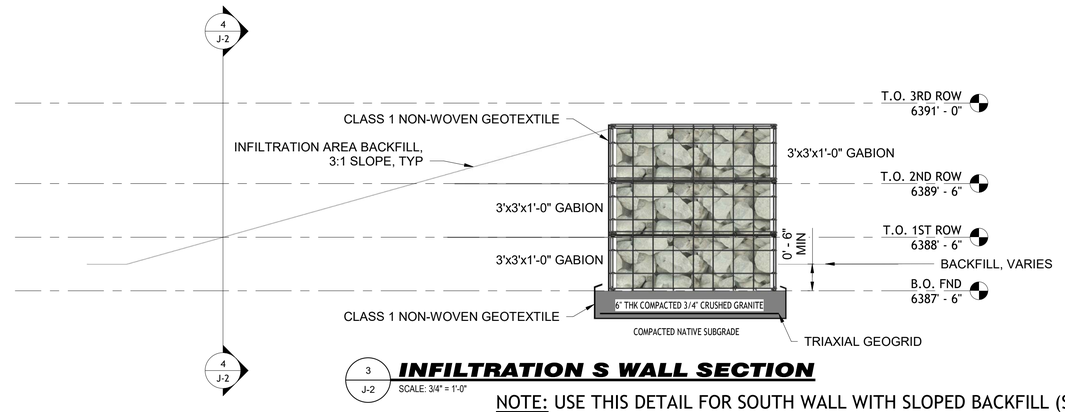
SCALE: 3/16" = 1'-0"



2 **S SOIL WALL SECTION**

SCALE: 3/4" = 1'-0"

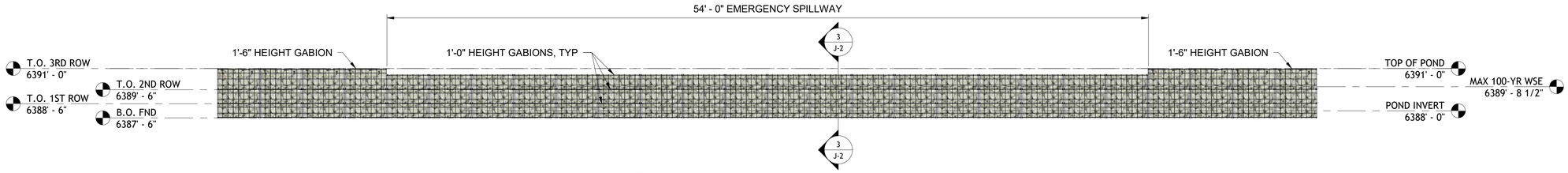
NOTE: USE THIS DETAIL FOR TYPICAL SOUTH WALL



3 J-2 **INFILTRATION S WALL SECTION**

SCALE: 3/4" = 1'-0"

NOTE: USE THIS DETAIL FOR SOUTH WALL WITH SLOPED BACKFILL (SPILLWAY)



4 J-2 **INFILTRATION WALL S ELEVATION**

SCALE: 1/4" = 1'-0"

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FILE NUMBER: PPR2527

JOB NUMBER: 2025-6-10-VAR

PRINTED DATE: 04/24/26

Revision Table

No.	Date	Revised By:	City Comments

CLIENT: ANDRII VARKO
1185 N CURTIS RD
COLORADO SPRINGS, CO 80930
(786) 394-0094
ANDRIIVARKO@GMAIL.COM

TITLE: POND S CONSTR. PLAN, ELEVATION, & SECTIONS

PROJECT NAME: SITE DEVELOPMENT PLAN

PROJECT ADRESS: 1185 N CURTIS RD, COLORADO SPRINGS, CO 80930

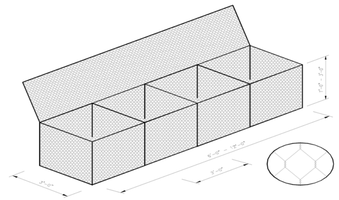
RECEPTION NUMBER: 4410000052

SHEET NUMBER: J-2

GENERAL NOTES - GABION WALL DETENTION POND:

1. PURPOSE:
   A. THIS POND IS A PERMANENT DETENTION FACILITY DESIGNED TO ATTENUATE POST DEVELOPMENT PEAK FLOWS IN ACCORDANCE WITH EL PASO COUNTY DRAINAGE CRITERIA.
2. DIMENSIONS:
   A. THE POND HAS A MAXIMUM STORAGE DEPTH OF 2.0 FEET DEFINED BY GABION WALL BOUNDARIES.
   B. THE FACILITY IS DESIGNED TO CONTROL RUNOFF FROM 5-, 10-, 25-, 50-, AND 100-YEAR STORM EVENTS
   C. PEAK DISCHARGE SHALL NOT EXCEED PRE-DEVELOPMENT PEAK FLOWS FOR EACH EVENT
3. OUTLET STRUCTURE:
   A. AN EMERGENCY OVERFLOW IS PROVIDED TO SAFELY BYPASS LARGER THAN 100-YEAR STORM EVENTS THROUGH THE EXTENSION OF THE STAGE 2 SPILLWAY AND FLOW OVER THE GABION WALLS.
   B. THE OUTLET IS FORMED BY A DEPRESSED ROW OF GABIONS THAT IS 54 FT LONG.
   C. THE OUTLET SHALL BE CONSTRUCTED TO THE DIMENSIONS AND ELEVATIONS SHOWN ON THE PLAN AND IN THE DESIGN CALCULATIONS IN THE DRAINAGE REPORT.
   D. CONCRETE FILL MAY BE USED TO ACHIEVE EXACT SPILLWAY DIMENSIONS WHEN NECESSARY.
4. GABION CONSTRUCTION
   A. GABION BASKETS SHALL BE FABRICATED FROM DOUBLE-TWISTED, ZINC-COATED WIRE MESH, MEETING ASTM A975.
   B. ROCK FILL SHALL BE ANGULAR, CLEAN, AND HARD, BETWEEN 4" AND 8" IN DIAMETER.
   C. GABIONS SHALL BE ASSEMBLED, PLACED, AND FILLED PER MANUFACTURER'S SPACIFICATIONS.
   D. BASKETS SHALL BE SECURELY TIED TOGETHER AT ALL CONTACT SURFACES USING LACING WIRE OR SPIRAL BINDERS.
   E. UNIAXIAL GEOGRID SHALL BE PLACED PER PLANS IN BETWEEN ROWS OF GABIONS.
5. MATERIALS
   A. GABION BASKETS
      a. TYPE: DOUBLE TWISTED HEXAGONAL WOVEN WIRE MESH.
      b. STANDARD: ASTM A975-97, STYLE 1 (ZINC-COATED), OR STYLE 3 (PVC-COATED).
      c. WIRE GAUGE: 11 GA MINIMUM CORE WIRE.
   B. STONE FILL
      a. 4" TO 8" ANGULAR HARD ROCK, CLEAN, DURABLE, AND FREE FROM CLAY, FRIABLE PARTICLES, OR ORGANIC MATTER.
      b. GRADATION: NO MORE THAN 10% PASSING THE 4" SIEVE; NO NORE THAN 10% RETAINED ON 8" SIEVE.
   C. FASTNERS
      a. TIE WIRE: 13 GA GALVANIZED STEEL OR SPIRAL BINDERS.
      b. INTERNAL DIAPHRAGMS: AT 1' INTERVALS TO PREVENT BULGING.
   D. CONCRETE
      a. DESIGN COMPRESSIVE STRENGTH SHALL BE MINIMUM 4,500 PSI
      b. AIR ENTRAINMENT SHALL BE 5 TO 8%
      c. MAXIMUM WATER TO CEMENT RATIO (W/C) SHALL BE 0.45
      d. CONCRETE SHALL BE MODIFIED WITH SYNTHETIC FIBERS CONFORMING TO ASTM C1116 WITH A DOSAGE OF 1.5 TO 3.0 LB PER CUBIC YARD, AS PER MANUFACTURER'S RECOMMENDATION.
      e. COARSE AND FINE AGGREGATES SHALL CONFORM TO ASTM C33
      f. NOMINAL MAXIMUM AGGREGATE SIZE SHALL BE 3/4 INCH
      g. ALL CHEMICAL ADMIXTURES MUST BE APPROVED AND CONFORM TO:
         - WATER REDUCER: ASTM C494, TYPE A OR F
         - SET RETARDER (IF NEEDED): ASTM C494, TYPE B OR D
         - AIR ENTRAINERl ASTM C260
      h. SLUMP AT PLACEMENT SHALL BE 3-5 INCHES, UNLESS WATER-REDUCING ADMIXTURE IS USED, IN WHICH CASE SLUMP MAY INCREASE UP TO 7 INCHES.
   E. GEOTEXTILE
      a. CLASS 1 NON-WOVEN GEOTEXTILE (ACF N035N) FOR DRAINAGE SEPARATION
      b. TRIAXIAL GEOGRID (TENSAR InterAx NX750 GEOGRID)
      c. UNIAXIAL GEOGRID (TENSAR UX1100MSE)

6. FOUNDATION PREPARATION:
   A. ALL VEGETATION, DEBRIS, SOFT SOILS, AND UNSUITIBLE MATERIAL SHALL BE REMOVED BELOW THE POND AND WALL FOUNDATION FOOTPRINT.
   B. NATIVE SUBGRADE SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY (ASTM D698).
   C. AT LEAST 6" OF 3/4" CRUSHED GRANITE BEDDING MATERIAL SHALL BE PLACED AND COMPACTED OVER THE COMPACTED NATIVE SUBGRADE UNDER THE FOOTPRINT OF ALL GABION STRUCTURES.
   D. A CLASS 1 NONWOVEN GEOTEXTILE SHALL BE PLACED INBETWEEN THE NATIVE SOIL AND THE BEDDING MATERIAL.
   E. A CLASS 1 NONWOVEN OR HYBRID GEOTEXTILE SHALL BE PLACED IN BETWEEN THE NATIVE SOIL AND THE VERICAL FACE OF THE GABIONS IN CONTACT WITH THE GROUND.
7. MAINTENANCE:
   A. THE DETENTION FACILITY MUST BE CHECKED PERIODICALLY AND AFTER STORM EVENTS TO ENSURE NO SEDIMENT BUILDUP OCCURS INSIDE THE POND OR OUTLET STRUCTURES.
   B. ANY SEDIMENT OR OBSTRUCTIONS SHALL BE REMOVED IMMEDIATELY.
8. ERROSION PROTECTION:
   A. ALL DISTURBED AREAS AROUND THE POND SHALL BE STABILIZED WITH NATIVE SEED AND EROSION CONTROL BLANKET OR TURF REINFORCEMENT MAT (TRM) PER LANDSCAPE PLAN.
9. INSPECTION, TESTING, AND CERTIFICATION
   A. THE GABION STRUCTURE AND OUTLET CONFIGURATION SHALL BE INSPECTED AND CERTIFIED BY A MILOSH ENG LISCENCED PROFESIONAL ENGINEER PRIOR TO FINAL ACCEPTANCE.
   B. THE SUBGRADE, BEDDING, GABION PLACEMENT, AND POND MUST BE INSPECTED AND MANAGED DURING CONSTRUCTION BY MILOSH ENG.
10. USE ONLY PROVIDED DIMENSIONS, DO NOT SCALE DRAWING TO OBTAIN DIMENSIONS. IF CONFLICTS OR QUESTIONS ARISE, IMMEDIATELY CONTACT THE ENGINEER OF RECORD AND MILOSH ENG.



Terra Aqua Gabion Unit Standard Sizes: Custom Jumbo Sizes Available

Gabion unit siz	*Capacity Cubic Yards*	*No. of Internal Cells*
6x3x3	2	2
9x3x3	3	3
12x3x3	4	4
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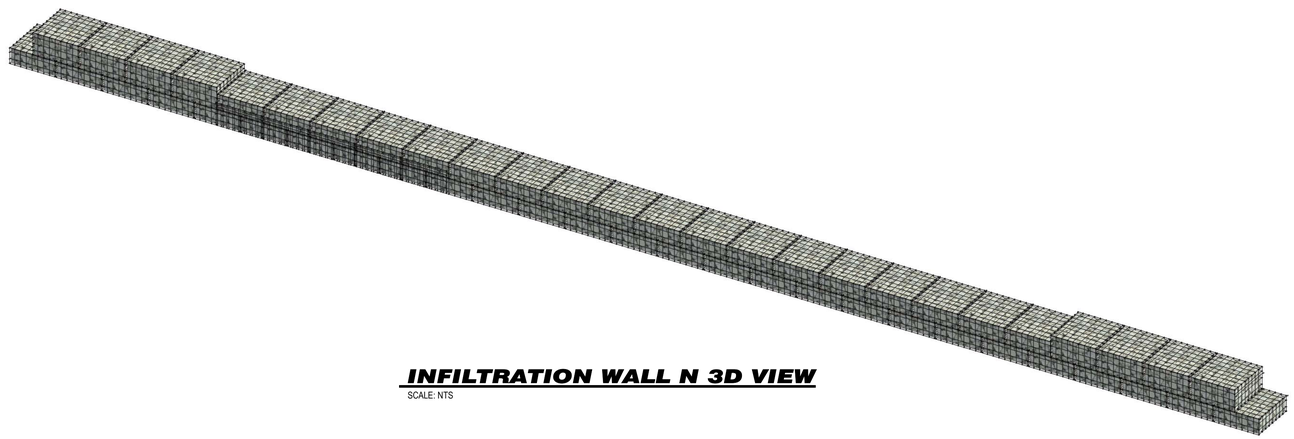
12x3x1.5	2	4
6x3x1	.666	2
9x3x1	1	3
12x3x1	1.33	4

TOLERANCES: All gabion dimensions shall be within a tolerance limit of plus or minus 5% of the manufacturers stated dimensions.

Minimum Strength requirements of Terra Aqua Double Twisted Mesh Gabions

Test Description	*Galvanized/Galfan Gabion*	*Pvc Coated Gabion*
Tensile strength of wire mesh parallel to twist	3500 lbs/ft	2900 lbs/ft
Tensile strength of wire mesh perpendicular to twist	1800 lbs/ft	1400 lbs/ft
Connection to selvedges	1400 lbs/ft	1200 lbs/ft
Panel to Panel	1400 lbs/ft	1200 lbs/ft
Punch strength of mesh	6000 lbs/ft	5300 lbs/ft



INFILTRATION WALL N 3D VIEW

SCALE: NTS

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FILE NUMBER: PPR2527

JOB NUMBER: 2025-6-10-VAR

PRINTED DATE: 04/24/26

Revision Table

No.	Date	Revised By	City Comments

CLIENT: ANDRII VARKO
1185 N CURTIS RD
COLORADO SPRINGS, CO 80930
(786) 394-0094
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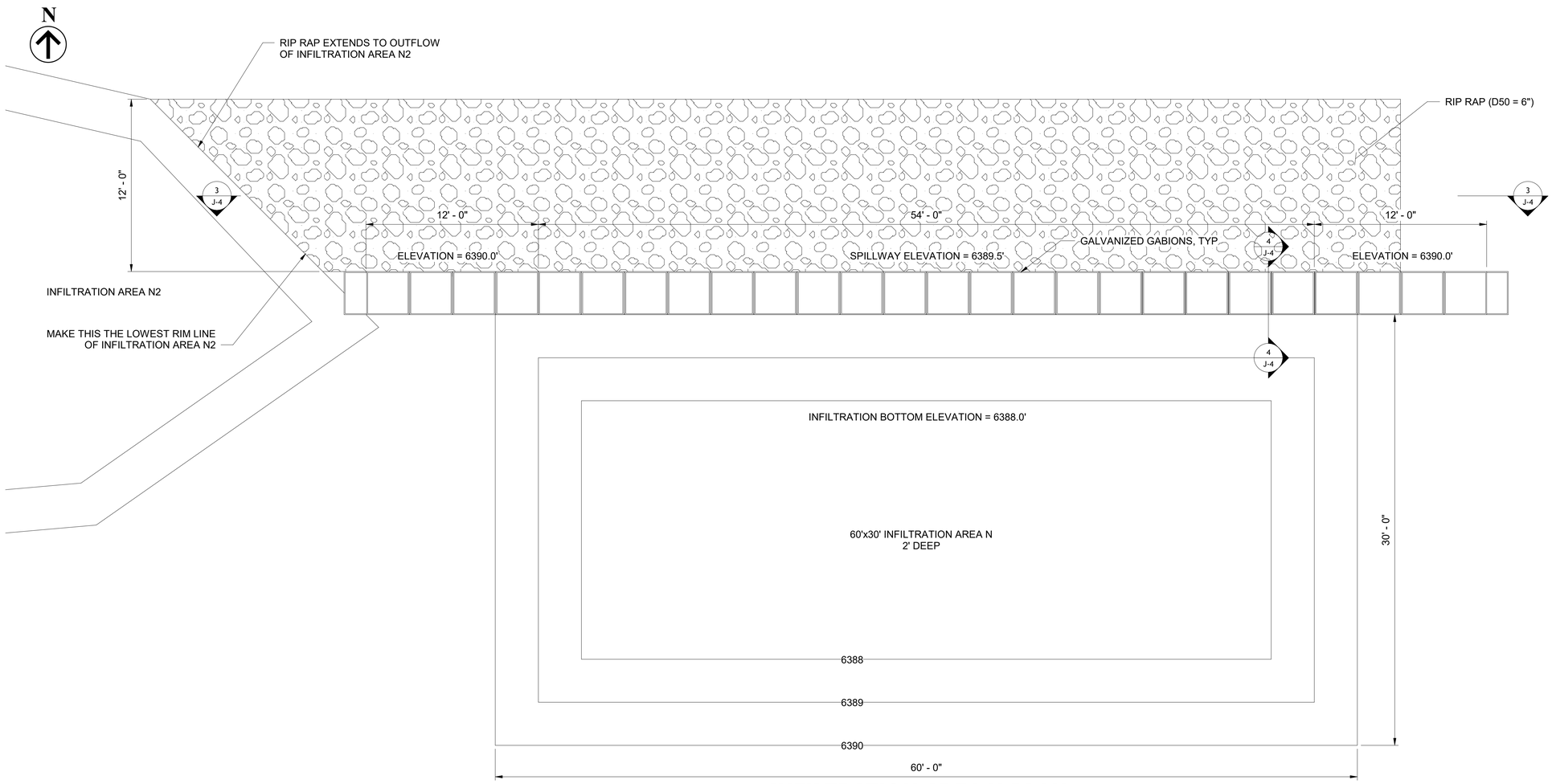
TITLE: POND N CONSTR. 3D & NOTES

PROJECT NAME: SITE DEVELOPMENT PLAN

PROJECT ADRESS: 1185 N CURTIS RD, COLORADO SPRINGS, CO 80930

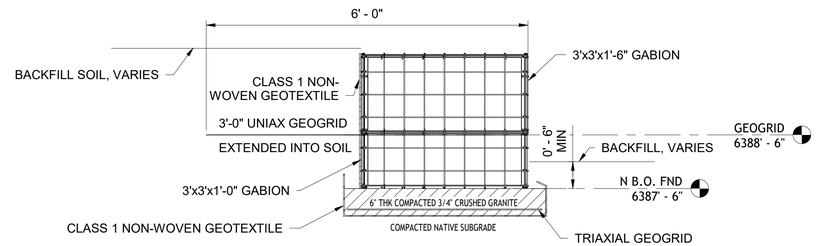
RECEPTION NUMBER: 4410000052

SHEET NUMBER: J-3



INFILTRATION AREA N PLAN

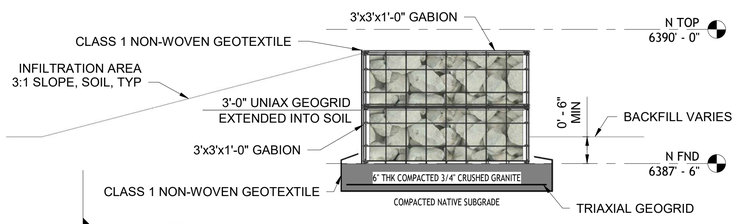
SCALE: 1/4" = 1'-0"



2 **N SOIL WALL SECTION**

SCALE: 3/4" = 1'-0"

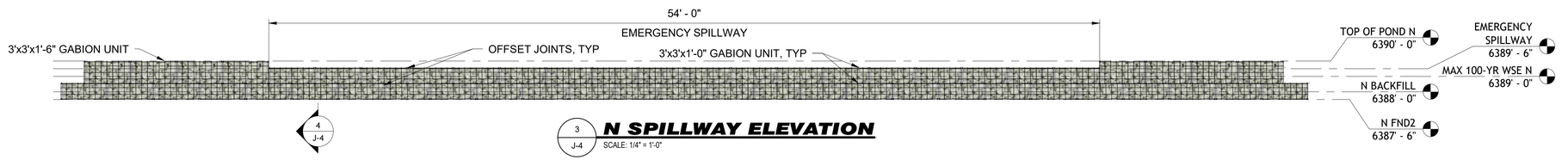
NOTE: USE THIS DETAIL FOR FLAT BACKFILL WALL



3 J-4 4 J-4 **N INFILTRATION WALL SECTION**

SCALE: 3/4" = 1'-0"

NOTE: USE THIS DETAIL FOR NORTH WALL WITH SLOPED BACKFILL (SPILLWAY)



4 J-4

3 J-4 **N SPILLWAY ELEVATION**

SCALE: 1/4" = 1'-0"

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CLIENT: ANDRII VARKO

1185 N CURTIS RD
COLORADO SPRINGS, CO 80930
(786) 394-0094
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TITLE:

POND N CONSTR. PLAN, ELEVATION, & SECTIONS

PROJECT NAME: SITE DEVELOPMENT PLAN

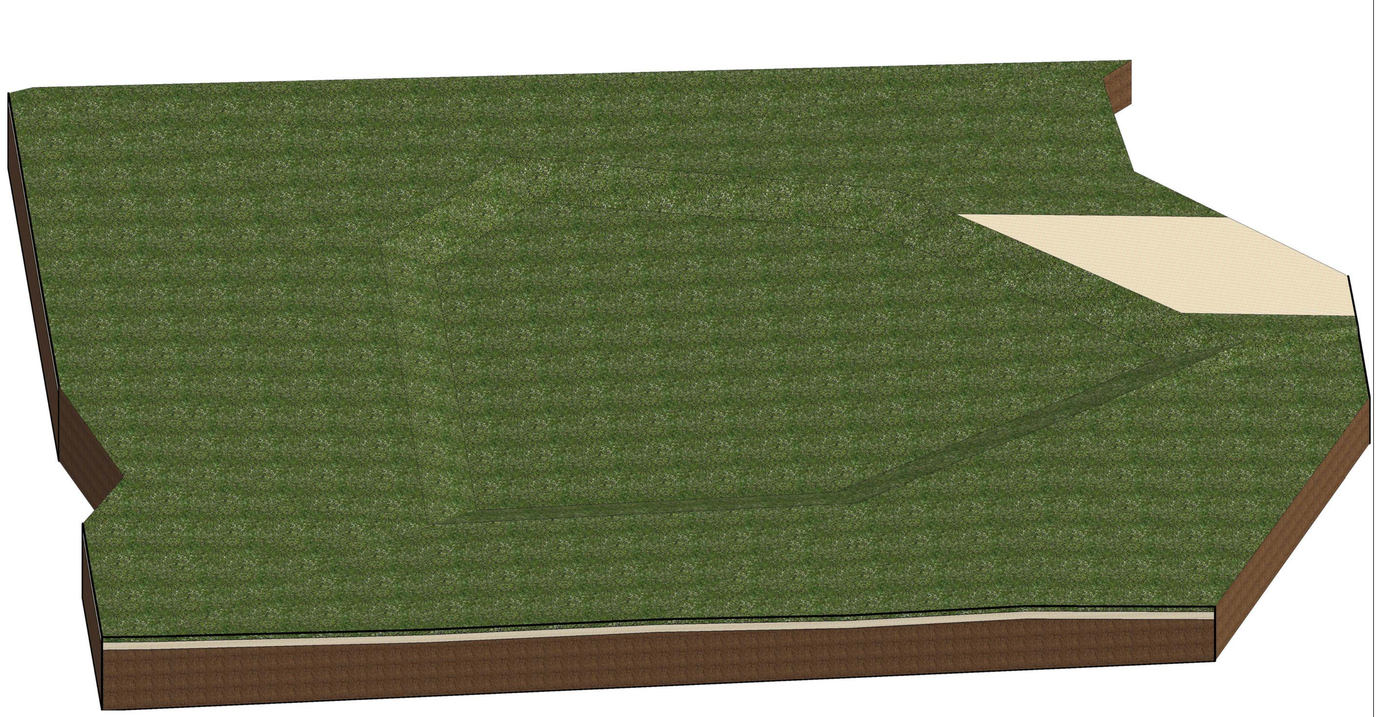
PROJECT ADRESS: 1185 N CURTIS RD, COLORADO SPRINGS, CO 80930

RECEPTION NUMBER: 4410000052

SHEET NUMBER: J-4

GENERAL NOTES - GABION WALL DETENTION POND:

1. PURPOSE:
   A. THIS POND IS A SHALLOW INFILTRATION FACILITY DESIGNED TO PROMOTE ON-SITE STORMWATER INFILTRATION AND REDUCE RUNOFF IN ACCORDANCE WITH THE FINAL DRAINAGE REPORT AND APPLICABLE CRITERIA.
2. DIMENSIONS:
   A. THE POND SHALL BE CONSTRUCTED AS A 1.0-FOOT DEEP DEPRESSION RELATIVE TO SURROUNDING GRADES.
   B. THE LIMITS OF THE INFILTRATION AREA ARE DEFINED BY THE GRADING EXTENTS SHOWN ON THE PLAN.
   C. SIDE SLOPES SHALL BE CONSTRUCTED AT 3H:1V OR FLATTER.
   D. THE POND IS INTENDED FOR TEMPORARY PONDING AND INFILTRATION; NO PERMANENT POOL IS INTENDED.
   E. THE FACILITY IS DESIGNED TO CONTROL RUNOFF FROM 5-, 10-, 25-, 50-, AND 100-YEAR STORM EVENTS
   F. PEAK DISCHARGE SHALL NOT EXCEED PRE-DEVELOPMENT PEAK FLOWS FOR EACH EVENT
3. GRADING AND EARTHWORK:
   A. THE INFILTRATION AREA SHALL BE CONSTRUCTED BY CUTTING NATIVE SOILS ONLY; NO FILL PLACEMENT IS PERMITTED UNLESS OTHERWISE APPROVED.
   B. GRADING SHALL CONFORM TO THE LINES AND ELEVATIONS SHOWN ON THE PLAN.
   C. CARE SHALL BE TAKEN TO MAINTAIN SMOOTH TRANSITIONS BETWEEN SLOPES AND POND BOTTOM.
   D. OVER-EXCAVATION SHALL BE AVOIDED. ANY OVER-EXCAVATED AREAS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CORRECTION.
4. EQUIPMENT RESTRICTIONS
   A. ONLY LIGHT GRADING EQUIPMENT SHALL BE USED WITHIN THE INFILTRATION AREA.
   B. ACCEPTABLE EQUIPMENT INCLUDES COMPACT TRACK LOADERS WITH GRADING ATTACHMENTS AND MINI-EXCAVATORS.
   C. USE OF HEAVY EQUIPMENT THAT MAY COMPACT SUBGRADE SOILS IS STRICTLY PROHIBITED WITHIN THE INFILTRATION LIMITS.
5. SOIL TREATMENT AND SUBGRADE PREPARATION
   A. The infiltration area shall be left in a non-compacted condition to preserve native infiltration capacity.
   B. Native soils shall not be compacted within the pond footprint.
   C. If compaction occurs, the affected area shall be scarified to a minimum depth of 6 inches and reworked to restore permeability.
   D. Smearing of soils during grading operations shall be avoided.
   E. Final subgrade shall be loosened prior to stabilization.
6. MATERIALS
   A. NO IMPORTED STRUCTURAL FILL OR AGGREGATE IS PERMITTED WITHIN THE INFILTRATION AREA UNLESS OTHERWISE APPROVED BY THE ENGINEER.
   B. NATIVE SOILS SHALL SERVE AS THE INFILTRATION MEDIUM.
7. EROSION AND SEDIMENT CONTROL
   A. ACCUMULATED SEDIMENT SHALL BE REMOVED PRIOR TO FINAL ACCEPTANCE.
8. SEEDING AND STABILIZATION
   A. THE ENTIRE POND AREA, INCLUDING BOTTOM AND SIDE SLOPES, SHALL BE SEEDED WITH THE NATIVE SEED MIX SPECIFIED IN THE LANDSCAPE PLANS.
   B. SEEDING SHALL OCCUR IMMEDIATELY FOLLOWING FINAL GRADING.
   C. STABILIZATION SHALL COMPLY WITH PROJECT EROSION CONTROL AND LANDSCAPE REQUIREMENTS.
9. CONSTRUCTION SEQUENCE
   A. THE INFILTRATION AREA SHALL BE CONSTRUCTED AFTER MAJOR SITE GRADING IS COMPLETE.
   B. FINAL GRADING AND STABILIZATION SHALL OCCUR ONCE CONTRIBUTING DRAINAGE AREAS ARE STABILIZED.
10. MAINTENANCE
   A. THE INFILTRATION FACILITY SHALL BE INSPECTED PERIODICALLY AND AFTER STORM EVENTS.
   B. SEDIMENT, DEBRIS, AND OBSTRUCTIONS SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY.
   C. VEGETATION SHALL BE MAINTAINED TO ENSURE ADEQUATE COVERAGE AND PREVENT EROSION.
11. INSPECTION AND ACCEPTANCE
   A. THE INFILTRATION AREA SHALL BE INSPECTED BY THE ENGINEER OR OWNER'S REPRESENTATIVE PRIOR TO FINAL ACCEPTANCE.
   B. THE CONTRACTOR SHALL NOTIFY THE ENGINEER UPON COMPLETION OF GRADING AND PRIOR TO SEEDING.
12. GENERAL
   A. DO NOT SCALE DRAWINGS; USE ONLY PROVIDED DIMENSIONS.
   B. IF CONFLICTS OR DISCREPANCIES ARISE, CONTACT THE ENGINEER OF RECORD PRIOR TO PROCEEDING.



INFILTRATION AREA N2 3D VIEW

SCALE: NTS

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1185 N CURTIS RD
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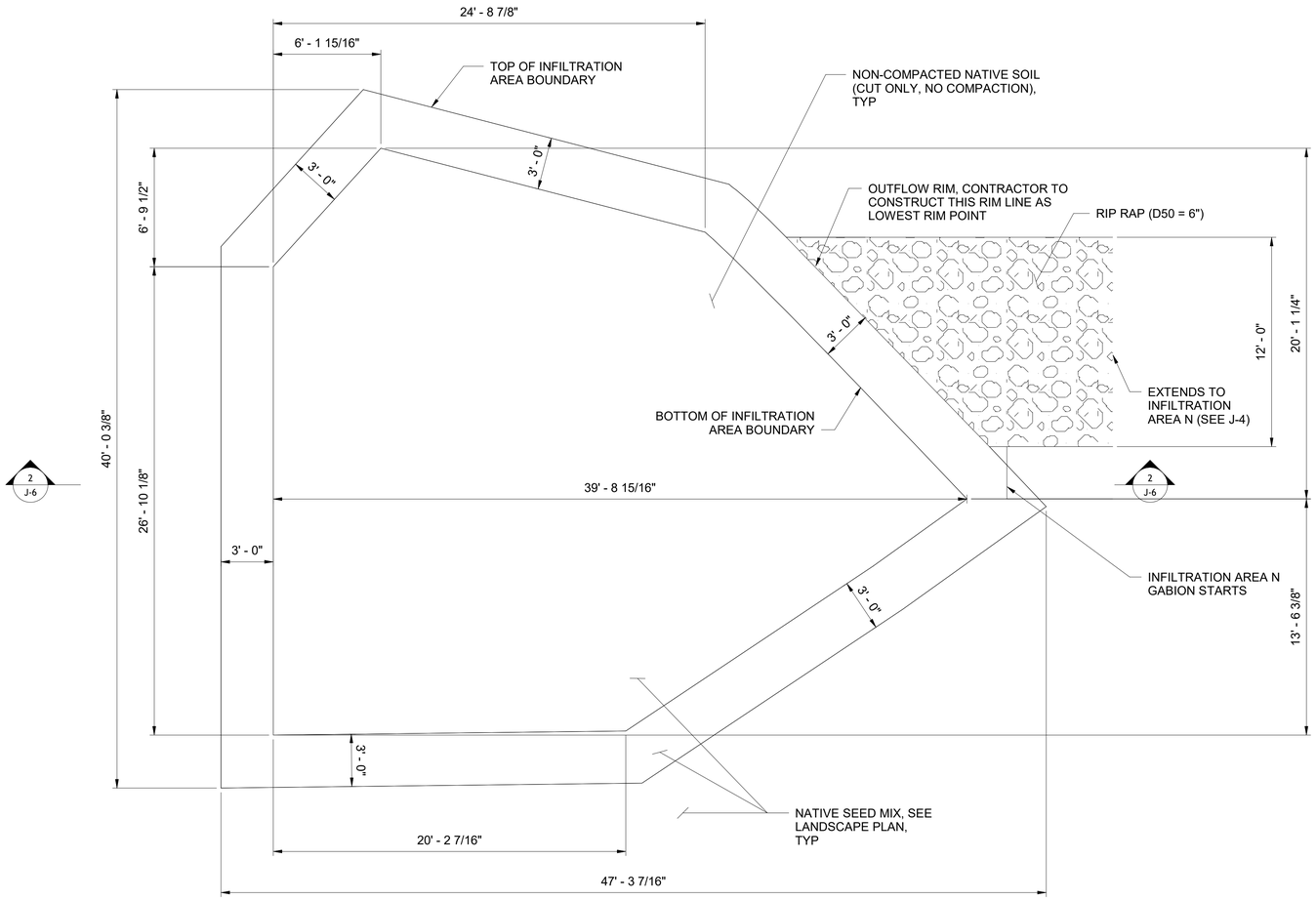
TITLE: POND N2 CONSTR. 3D & NOTES

PROJECT NAME: SITE DEVELOPMENT PLAN

PROJECT ADRESS: 1185 N CURTIS RD, COLORADO SPRINGS, CO 80930

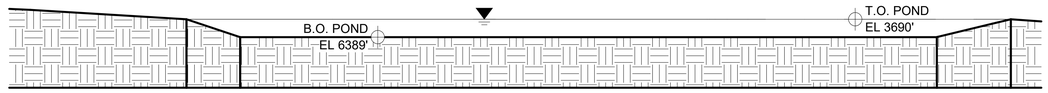
RECEPTION NUMBER: 4410000052

SHEET NUMBER: J-5



INFILTRATION ARE N2 PLAN

SCALE: 1/4" = 1'-0"



2
J-6

INFILTRATION AREA N2 SECTION

SCALE: 1/4" = 1'-0"

COLORADO LICENSED
MILAN JANKOVIC
44321
PROFESSIONAL ENGINEER

DESIGNED BY:
engineering
9235 W EUCLID AVE
LITTLETON, CO 80123
(720) 325-6876
MJ@MILOSHENG.COM

FILE NUMBER:
PPR2527

JOB NUMBER:
2025-6-10-VAR

PRINTED DATE:
04/24/2026

Revision Table

No.	Date	Revised By	City Comments

CLIENT:
ANDRII VARKO
1185 N CURTIS RD
COLORADO SPRINGS, CO 80930
(786) 394-0094
ANDRIIVARKO@GMAIL.COM

TITLE:
POND N2 CONSTR. PLAN, ELEVATION, & SECTIONS

PROJECT NAME:
SITE DEVELOPMENT PLAN

PROJECT ADRESS:
1185 N CURTIS RD, COLORADO SPRINGS, CO 80930

RECEPTION NUMBER:
4410000052

SHEET NUMBER:
J-6

APPENDIX J

Water Quality Reference Tables

Water Quality Reference Tables - Introduction Sheet

Current Version: 3/31/2025

Notice:	This workbook is provided for general reference and guidance for calculating and tracking WQ treatment to assist applicants. None of the tables included in this workbook are required. Select and complete any tables that you would like to use and include them in the Drainage Report and/or as attachments to the PCM Applicability Form.
Abbreviations:	AC = Acres, PCM = Permanent Control Measure, WQ = Water Quality
Overview:	WQ Summary - Blank: Utilize this table to document WQ treatment and WQ exclusions for medium to large sites. WQ Summary - Example: The previous blank table filled out for a hypothetical site. Simplified Table for Small Site: Utilize this table to document WQ treatment and WQ exclusions for small and simple sites. PCM Utilization: Utilize this additional table for sites that will receieve treatment from multiple PCM(s) that include several of the following: existing, proposed, offsite, and/or onsite.

Water Quality Treatment Summary Table									
Basin ID	Total Area (ac)	Total Proposed Disturbed Area (ac)	WQ Treatment				WQ Exclusions		Applicable WQ Exclusions (App I.7.1.B)
			Area Trib to Infiltration Area S (ac)	Area Trib to Infiltration Area N (ac)	Area Trib to Infiltration Area N2 (ac)	Disturbed Area Treated via Runoff Reduction (ac)	Disturbed Area Excluded from WQ per ECM App I.7.1.C.1 (ac)	Disturbed Area Excluded from WQ per ECM App I.7.1.B (ac)	
A	0.96	0.96	0.00	0.00	0.00		0.10	0.86	ECM App I.7.1.B.7
B	0.12	0.12	0.00	0.00	0.00			0.12	ECM App I.7.1.B.7
C	1.27	1.27	1.27	0.00	0.00				
D	1.46	0.34	0.00	0.00	1.30			0.16	ECM App I.7.1.B.7
E	0.18	0.18	0.00	0.00	0.00			0.18	ECM App I.7.1.B.7
F	0.80	0.80	0.00	0.80	0.00				
Total	4.79	3.67	1.27	0.80	1.30	0.00	0.10	1.32	

Min Required Area to Receive WQ (ac)	Total Proposed Disturbed Area (ac)	Total Proposed Treated Area (ac)	Total Proposed Disturbed Area Excluded from WQ (ac)	Net Treatment (ac)
2.35	3.67	3.47	1.32	1.12

Water Quality Treatment Summary Table		
Basin ID(s)	**PCM Tributary Area (ac)**	**PCM ID**
C	1.27	Infiltration S
F	0.8	Infiltration N
D	1.3	Infiltration N2
A, B, E	1.42	Excluded*

* Excluded based on ECM App I.7.1.B.7 (0.10 ac from A excluded baded on ECM App I.7.1.C.1)

Summary of the PCM(s) that the Site is Utilizing to Meet WQ Treatment and/or Detention Requirements					
Questions (about the PCM(s) that the site is tributary to)	**Yes**	**No**	**PCM Identifier(s)**	**EDARP File # That The Existing or Proposed PCM(s) Was/Were Designed/Built With:**	**Comments**
Existing on or offsite PCM(s) that will not be modified with this project?		X			
Existing on or offsite PCM(s), but will be modified with this project?		X			
Proposed on or offsite PCM(s) to be built with this project?	X		Infiltration Area S, Infiltration Area N, Infiltration Area N2		
Proposed on or offsite PCM(s) to be built with a future project?		X			

APPENDIX K

Drainage Facility Estimate Form
TABLE

2026 Drainage Facility Estimate Form
(with pre-plat construction)

Updated: 2/2026

PROJECT INFORMATION

Project Name:	1185 N CURTIS RD - RV/Mixed Storage Park SDP	**Date:**	3/9/2026	**PCD File No.**	PPR2527

Description	Quantity	Units	Unit Cost		Total	(with Pre-Plat Construction) % Complete	Remaining	
Drainage Facilities (Permanent BMPs)								
Infiltration Area S								*
Excavation	209.	CY	$ 10.00	=	$ 5,300.00		$ 5,300.00	*
Gabion Retaining Wall	78.	LF	$ 250.00	=	$ 19,500.00		$ 19,500.00	*
Non-woven Geotextile	3600.	SF	$ 0.75	=	$ 2,700.00		$ 2,700.00	*
Uniaxial Geogrid	234.	LF	$ 2.00	=	$ 468.00		$ 468.00	*
Final Grading	1800.	SF	$ 2.00	=	$ 3,600.00		$ 3,600.00	*
Native Grass Seeding	3600.	SF	$ 0.15	=	$ 540.00		$ 540.00	*
Infiltration Area N								*
Excavation	170.	CY	$ 10.00	=	$ 1,700.00		$ 1,700.00	*
Gabion Retaining Wall	78.	LF	$ 200.00	=	$ 15,600.00		$ 15,600.00	*
Non-woven Geotextile	3600.	SF	$ 0.75	=	$ 2,700.00		$ 2,700.00	*
Uniaxial Geogrid	156.	LF	$ 2.00	=	$ 312.00		$ 312.00	*
Final Grading	1800.	SF	$ 2.00	=	$ 3,600.00		$ 3,600.00	*
Native Grass Seeding	3600.	SF	$ 0.15	=	$ 540.00		$ 540.00	
Infiltration Area N2								
Excavation	130.	CY	$ 10.00	=	$ 1,300.00		$ 1,300.00	
Final Grading	180.	SF	$ 2.00	=	$ 360.00		$ 360.00	
Native Grass Seeding	2.	SF	$ 0.15	=	$ 0.30		$ 0.30	
			$ -	=	$ -		$ -	
				=	$ -		$ -	
				=	$ -		$ -	
				=	$ -		$ -	
[insert items not listed but part of construction plans]				=	$ -		$ -	
MAINTENANCE (35% of Construction BMPs)				=	$ 20,377.11		$ 20,377.11	
			Subtotal	**=**	**$ 78,597.41**		**$ 78,597.41**	
AS-BUILT PLANS (Public Improvements inc. Permanent WQCV BMPs)	1	LS	$ 3,000.00	=	$ 3,000.00		$ 3,000.00	
POND/BMP CERTIFICATION (inc. elevations and volume calculations)		LS	$ 2,000.00	=	$ 2,000.00		$ 2,000.00	

* - Subject to defect warranty financial assurance. A minimum of 20% shall be retained until final acceptance (MAXIMUM OF 80% COMPLETE ALLOWED)

Total Construction Financial Assurance **$ 83,597.41**
(Sum of all section subtotals plus as-builts and pond/BMP certification)

Total Remaining Construction Financial Assurance (with Pre-Plat Construction) **$ 83,597.41**
(Sum of all section totals less credit for items complete plus as-builts and pond/BMP certification)

Approvals

I hereby certify that this is an accurate and complete estimate of costs for the work as shown on the Grading and Erosion Control Plan and Construction Drawings associated with the Project.

Milan Jankovic
Engineer (P.E. Seal Required)

COLORADO LICENSED MILAN JANKOVIC 44321 PROFESSIONAL ENGINEER

Andrii Varko
Approved by Owner / Applicant

03/09/2026
Date

Approved by El Paso County Engineer / ECM Administrator

Date

APPENDIX L

MHFD SCM Design Workbook

MILE HIGH FLOOD DISTRICT

STORMWATER CONTROL MEASURE (SCM) DESIGN WORKBOOK

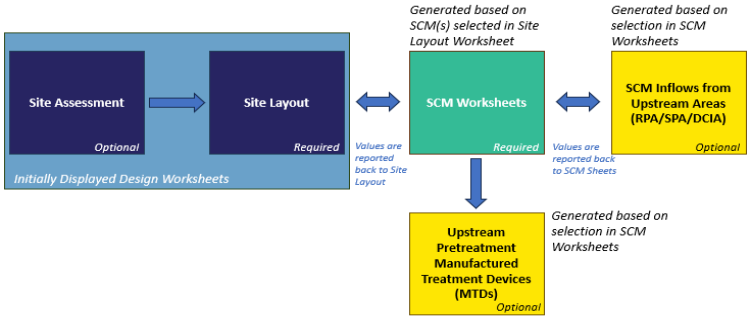
SCM Design, Version 4.02 (June 2025)
Mile High Flood District
Denver, Colorado
www.mhfd.org

Purpose: This workbook is used as a preliminary SCM site design aid and a tool to demonstrate the proper use of MHFD critiera and the achievement of specific treatment thresholds as laid out in the design standards of the MS4 permit. This workbook is not intended to determine compliance with MS4 design standards and exclusions, that is the responsiblity of the Engineer and Reviewing Permittee.

Function: This workbook provides the designer with tools to incorporate MHFD Volume 3 Chapter 4 SCM criteria and sizing into the site assessment, site layout, and preliminary design; and to calculate the downstream benefits of runoff reduction on WQCV requirements.

Compatibility: This SCM Design workbook is intended to be compatible with MHFD-Detention, which allows the user to develop SCM basin geometries (depth, area, and volume), calculate orifice opening dimensions and other outlet structure components for the WQCV event and larger storms, and route storm hydrographs through SCMs. User input cells are provided in this workbook for areas, volumes, and outlet dimensions when incorporation of MHFD-Detention results is appropriate.

Content: **The workbook consists of the following worksheets (see flow chart below which describes worksheet interaction):**



Site Assessment The Site Assessment worksheet (optional) evaluates an entire site with respect to physical characteristics, opportunities for runoff reduction,and suitability for infiltration-based SCMs.

Site Layout The Site Layout worksheet (required) is the primary hub for evaluating a site and serves as the gateway to all other SCM worksheets listed below. The user can define multiple outfalls from the site and then evaluate different MS4 Standards and SCM Types for each outfall. When a user selects an SCM type, a new worksheet of that type will be created with the corresponding Outfall ID (***ID#***). Water quality results from the SCM worksheet will then be carried back to the Site Layout worksheet for that Outfall ID column. At the bottom of the Site Layout worksheet, all outfalls will be summed to provide water quality results for the entire site.

SCM Worksheets New SCM worksheets (**SCM_ID#**), generated from the Site Layout worksheet, allow the user to develop a preliminary design in accordance with MHFD criteria provided in Chapter 4 of the USDCM. Two additional worksheets can be generated from within most SCM worksheets to design and account for runoff reduction through RPA treatment upstream of the SCM and/or a pretreatment Sedimentation MTD.

Example Site The Example Site worksheet includes a demonstration of how the Site Layout worksheet can be applied to a project site. The example includes 10 different outfalls with various paired SCM worksheets including RPA, Rooftop Systems, BR, SF, and EDB. The example further demonstrates how the RPA worksheet can be paired with an EDB worksheet to define upstream runoff reduction for inflows to the EDB.

Worksheet Naming Convention	SCM Worksheet Title	Fact Sheet
	Upstream Treatment SCMs	
SCM_ ID# **_Inflows**	SCM Inflows from Upstream Receiving Pervious Areas (RPA) Including Grass Buffers and Grass Swales	T-1
SCM_ID# **_HDS_*Inflow#***	Sedimentation Manufactured Treatment Device (Sedimentation MTD) - Hydrodynamic Separator (HDS)	T-8
	SCMs	
RPA_*ID#*	Receiving Pervious Areas (RPA) Including Grass Buffers and Grass Swales	T-1
GreenRoof_*ID#*	Green Roof Systems (GreenRoof)	T-2
BlueRoof_*ID#*	Blue Roof Systems (BlueRoof)	T-2
BR_*ID#*	Bioretention Systems (BR)	T-3
SF_*ID#*	Sand Filters (SF)	T-4
PPS_*ID#*	Permeable Pavement Systems (PPS)	T-5
EDB_*ID#*	Extended Detention Basins (EDB)	T-6
RP_*ID#*	Retention Ponds (RP)	T-7
CWP_ID#	Constructed Wetland Ponds (CWP)	T-7
HRMF_*ID#*	Filtration Manufactured Treatment Device (Filtration MTD) - High Rate Media Filtration (HRMF)	T-8
HRBF_*ID#*	Filtration Manufactured Treatment Device (Filtration MTD) - High Rate Biofiltration (HRBF)	T-8

Acknowledgements: ***Spreadsheet Development Team:***
Derek N. Rapp, P.E.
Peak Stormwater Engineering, LLC

Candice Owen, P.E.
Cerulean Consulting, LLC

Holly Piza, P.E. and Brik Zivkovich, P.E.
Mile High Flood District

Comments? Direct all comments regarding this spreadsheet workbook to: MHFD email
Revisions? Check for revised versions of this or any other workbook at: Downloads

Site Assessment

SCM Design, Version 4.02 (June 2025)

Designer: Milan Jankovic
Company: Milosh Engineering
Date: April 2, 2026
Project: PPR2527
Location: 1185 N Curtis Road, Colorado Springs, CO 80930

1. Physical Site Characteristics

A) Total Site Area	Area = 4.79 acres 208,609 ft^2
B) Describe any upstream offsite areas that drain onto site and downstream conveyance systems or overland flow paths.	None, all flows drain away from site
C) Describe any floodplain/floodway mapping, fluvial hazard zones, or geomorphic/geotechnical instabilites that may impact the site.	Not in flood plain, no geotechnical hazards, Hydrologic Soil Group A & B
D) Is the watershed anticipated to be in a phased development state for a number of years moving forward or are highly erosive soils present? Explain.	NO Site is not expected to be in a phased development state, as construction is anticipated to be finished within 6 months or less. Loamy sand soils exist, moderate errosion potential at concentrated flows. Low errosion potential due to low site slopes and sheet flow
E) List any vegetation assessments that have been conducted including wetland and aquatic resources delineations.	There are no wetlands on the site. Site is agricultural pasture/meadow with native grass
F) List any assessments of habitat for threatened or endangered species and other regulated species.	No threatened or endangered species were observed durring ecological site assesment and site walkthrouth.
G) Describe any existing and/or proposed utility mapping for subsurface and/or above-ground utilities that may impact SCMs.	There is a well on the site that shall be left undisturbed. There is a leach field for single family home domestic sewer treatment that shall be located exactly by the contractor performing excavation and grading, and be relocated if within the traffic area or SCM areas.
H) Are there receiving water quality concerns such as TMDLs, 303(d) listings, or other pollutant reduction targets? Explain.	NO None
I) Describe how community values including context, scale, materials, and user experience will be incorporated on site. See Chapter 4 for additional gudance.	The materials used in construction of the SCMs are chosen to blend well with the existing environment, for this reason concrete and manufactured materials are avoided. Natural gravel, riprap, and gabion structures are used for stabilization and structure where required.
J) Will attenuation of the EURV and/or flood storage (e.g. FSD) be provided onsite?	YES Attenuation will be provided to meet runoff and WQCV requirements by the bioretention areas (Infiltration Areas)

Site Assessment

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**

2. Opportunities for Step 1: Runoff Reduction

A) Describe opportunities for runoff reduction measures that can be used on this site to potentially reduce WQCV requirements?

Conserve Existing Amenities: Identify portions of site that should be protected including mature trees, stream corridors, wetlands, and Type A/B soils with high infiltration potential.

Minimize Impacts: Creative site layout and constructing to minimum widths can reduce the extent of paved areas. Concentrate new impervious areas over Type C/D soils. Maintain natural drainage patterns and promote sheet flow.

Minimize Directly Connected Impervious Areas (MDCIA): Allow runoff from impervious areas to sheet flow through vegetation which slows runoff, promotes infiltration, reduces pollutant loads and helps mimic predevelopment hydrology.

The entire disturbed area that has an increase in % imperviousness (UIA) is enclosed by native grass and landscape areas (SPA and RPA) on all sides. This presents the oportunity to infiltrate, filter, and treat the flows with RPAs as the flows flow through the vegetated buffers prior to exiting the site. The site contains Type A/B soils with high infiltration potential that shall be protected in the non-traffic native grass areas and the infiltration zones. There are no trees on the site to be protected. The infiltration zones and native seed areas not part of the storage and trafic area shall be avoided by heavy equipment during construction and any grading done on these portions of the site shall be performed with compact track loaders with wide tracks that have low ground pressure. The infiltration and bioretention areas shall be created with minimum compaction in the top 18 inches of soil. Though the design is based on compacted soil infiltration rates to be conservative.

3. Suitability for Infiltration-Based SCMs

A) What are the dominant Hydrologic Soil Groups (HSG) for the site?

Type A and B Soils — ***Soils suitable for full infiltration***

B) Provide a description of topsoil texture, agronomic properties, and geotechnical soil characterizations.

Loamy sand (SP/SW), Good infiltration, organic material good for vegetation, well draining, non-expansive soils, Ground water level >9ft. Depth to bedrock >12 ft

C) Identify Site Constraints

i) Is subgrade depth to bedrock < 3 feet? — NO

ii) Is subgrade depth to seasonal high groundwater table < 3 feet? — NO

D) Identify Site Risks

i) Are expansive/collapsible soils present? — NO

ii) Are highly concentrated pollutant sources present (hotspot)? — NO

iii) Is site located above contaminated soils or groundwater? — NO

iv) Are steep slopes present in proposed SCM locations? (> 3H:1V) — NO

v) Are there other concerns that indicate high risk for infiltration? — NO

E) Describe Exploratory Borings/Pits and Laboratory Tests (Sec. 4.2)

i) How many borings/pits were drilled/excavated? $N_{Borings/Pits}$ = 4

ii) Depth of borings/pits below SCM (or proposed grade) surface? $D_{Borings/Pits}$ = 16.00 ft

iii) Describe laboratory tests performed on soil samples:

Atterberg Limmits, Sieve Analysis, Standard Proctor, Infiltration, Unit Weight,

F) Preliminary Infiltration System Recommendation

Full Infiltration — **Suitable Soils and Low Risk, must verify adequate subgrade infiltration rates.**

This is a preliminary recommendation. Consult with a qualified geotechnical engineer when planning an infiltration-based SCM.

Site Layout

SCM Design, Version 4.02 (June 2025)

Designer: Milan Jankovic
Company: Milosh Engineering
Date: April 2, 2026
Project: PPR2527
Location: 1185 N Curtis Road, Colorado Springs, CO 80930

SITE LAYOUT INFO (User Input in Blue Cells)

Water Quality Event (WQE): 0.60 inches

Outfall ID	IAS	IAN	IAN2	1	2	5						
Total Tributary Area (ft^2)	55,247	34,996	63,517	41,799	5,252	7,879						
Total Tributary Area (ac)	1.27	0.80	1.46	0.96	0.12	0.18						
Imperviousness (%)	58.1%	57.1%	17.7%	13.2%	5.0%	5.0%						
MS4 Design Standard	WQCV	WQCV	WQCV	Runoff	None	None						
SCM Type	BR	BR	BR	RPA								

Notes:

OUTFALL RESULTS

SCM Worksheet Name	BR_IAS	BR_IAN	BR_IAN2	RPA_1								
Untreated Area (ft^3)	0	0	0	0								
Default WQCV (ft^3)	847	529	448	293								
Optional Override WQCV (ft^3)												
WQCV Reduction (ft^3)	0	0	0	293								
Remaining WQCV (ft^3)	847	529	448	0								
WQCV Reduction (%)	0%	0%	0%	100%								
Design WQCV of SCM (ft^3)	2,088	2,088	1,672	0								
Pollutant Removal (ft^3)	0	0	0	0								
Untreated WQCV (ft^3)	0	0	0	0								

TOTAL SITE RESULTS (Sums results from all Outfalls)

Total Site Area	208,690	ft^2	4.79	acres
Treated Area	208,690	ft^2	4.79	acres
Untreated Area	0	ft^2	0.00	acres
Total Site Imperviousness	33.3%	%		
Default (or Override) WQCV	2,117	ft^3	0.049	acre-feet
Remaining WQCV	1,824	ft^3	0.042	acre-feet
WQCV Reduction	14%	%		
Design WQCV	5,848	ft^3	0.134	acre-feet
Untreated WQCV	0	ft^3	0.000	acre-feet

Confirm with local jurisdiction whether design meets Runoff Reduction Standard

Receiving Pervious Areas (Including Grass Buffers and Grass Swales)

SCM Design, Version 4.02 (June 2025)

Designer: Milan Jankovic
Company: Milosh Engineering
Date: April 2, 2026
Project: PPR2527
Location: 1185 N Curtis Road, Colorado Springs, CO 80930
Outfall ID: 1

DESIGN PROCEDURE AND CRITERIA FOR ALL RPAs (User Input in Blue Cells)

1. Apply Four-Cover Land Use Model to Site Layout

Design Point ID	1	A_conc	A_mead								
Area Type	RPA	UIA	RPA_Buffer								
Downstream Design Point ID	--	A_mead	1								
DCIA (ft^2)	--	--	--								
UIA (ft^2)	--	4,563	--								
RPA (ft^2)	--	--	38,199								
SPA (ft^2)	--	--	--								

2. Protect the RPA from Traffic

RPA Protection Type	--	--	Markers								

3. Characterize On-site Topsoil and Determine Suitability for the RPA

HSG A (%)	--	--	95.0%								
HSG B (%)	--	--	5.0%								
HSG C/D (%)	--	--	0.0%								

4. Select Appropriate Vegetation

RPA Vegetation Type	--	--	Seed								
Irrigation Type	--	--	Temporary								

Notes:

GRASS BUFFER ADDITIONAL DESIGN PROCEDURE AND CRITERIA (User Input in Blue Cells)

1. Define the UIA:RPA pair, Ratio, and Interface Width

Sheet Flow Inflow Feature	--	--	Curbless								
Is Concrete Edger used?	--	--	NO								
Spacing between slots (ft)	--	--	--								
Slot Opening Length (in)	--	--	--								
Blind Swale Type	--	--	--								
Spreader Energy Dissipation	--	--	--								
Total Area of UIA:RPA (ft^2)	--	--	42,762								
UIA:RPA Ratio	--	--	0.1								
UIA:RPA Interface Width (ft)	--	--	180								
L / W Ratio of UIA:RPA	--	--	1.32								

2. Buffer Length

Average Buffer Length (ft)	--	--	212								

3. Buffer Slope

Average Buffer Slope (ft/ft)	--	--	0.050								
Effective Distance (ft)	--	--	50								
Number of Level Spreaders	--	--	5								

4. Provide a Vertical Drop

Vertical Drop (in)	--	--	3.00								
Mowing Strip Provided?	--	--	NO								

5. Calculate Runoff for UIA and RPA Pair

Imperviousness (%)	--	--	10.7%								
UIA:RPA Runoff (in)	--	--	0.00								
UIA:RPA Runoff (ft^3)	--	--	0								

6. Compare Runoff from UIA:RPA Pair to Runoff from UIA Only

UIA Runoff (ft^3)	--	--	190								
Runoff Reduction (ft^3)	--	--	190								
Runoff Reduction (%)	--	--	100.0%								

Notes:

GRASS SWALE ADDITIONAL DESIGN PROCEDURE AND CRITERIA (User Input in Blue Cells)

1. Delineate Areas Tributary to Swale											
Total Tributary Area (ft^2)	--	--	--								
Imperviousness (%)	--	--	--								
2. Swale Inflows											
Concentrated Flow Type	--	--	--								
Blind Swale Type	--	--	--								
Spreader Energy Dissipation	--	--	--								
Vertical Drop (in)	--	--	--								
Gutter Depression (in)	--	--	--								
Curb Opening Length (ft)	--	--	--								
Concrete Sediment Pad	--	--	--								
Min. Forebay Volume (ft^3)	--	--	--								
Design Forebay Volume (ft^3)	--	--	--								
Max. Forebay Depth (in)	--	--	--								
Design Forebay Depth (in)	--	--	--								
Calculated Notch Width (in)	--	--	--								
Design Notch Width (in)	--	--	--								
Drain Time (minutes)	--	--	--								
Energy Dissipation Type	--	--	--								
3. Swale Cross Section											
Length of Swale (ft)	--	--	--								
Bottom Width (ft)	--	--	--								
Bottom Area (ft^2)	--	--	--								
Side Slopes (horiz/vert)	--	--	--								
4. Longitudinal Slope											
Available Slope (ft/ft)	--	--	--								
Design Slope (ft/ft)	--	--	--								
Total Drop Height (ft)	--	--	--								
Underdrains Provided?	--	--	--								
5. Calculate Runoff from Tributary Area											
Tributary Runoff (ft^3)	--	--	--								
Reduced Trib. Runoff (ft^3)	--	--	--								
6. Calculate Runoff Reduction through Swale Bottom											
Volume Infiltrated (ft^3)	--	--	--								
Swale Discharge (ft^3)	--	--	--								
Runoff Reduction (%)	--	--	--								
7. Design Discharge											
2-year Discharge, Q2 (cfs)	--	--	--								
8. Design Velocity											
Vegetal Retardance Curve	--	--	--								
Velocity, V2 (fps)	--	--	--								
9. Design Flow Depth											
Flow Depth, D2 (ft)	--	--	--								
Flow Area, A (ft^2)	--	--	--								
Wetted Perimeter, P (ft)	--	--	--								
Top Width, T (ft)	--	--	--								
Hydraulic Radius, Rh (ft)	--	--	--								
VR Product (ft^2/sec)	--	--	--								
Manning's n value	--	--	--								
Hydraulic Depth, Dh (ft)	--	--	--								
Froude Number	--	--	--								
10. Swale Outflows											
Outflows Considered?	--	--	--								

Notes:

DESIGN POINT RESULT (Sums results for current column and all upstream design point columns.)

Design Point ID	1	A_conc	A_mead								
Area Type	RPA	UIA	RPA_Buffer								
Total Area (ft^2)	42,762	4,563	42,762								
Imperviousness (%)		100.0%	10.7%								
Tributary Runoff (ft^3)		190	190								
Runoff Reduction (ft^3)	190	0	190								
Runoff Remaining (ft^3)	0	190	0								

Total Tributary Area entered on Site Layout Worksheet is: 41,799 square feet

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAS**

1. Subsurface Exploration and Infiltration System Selection

A) Identify Site Constraints

i) Is subgrade depth to bedrock < 3 feet?	NO
ii) Is subgrade depth to seasonal high groundwater table < 3 feet?	NO

B) Identify Site Risks

i) Are expansive/collapsible soils present?	NO
ii) Are highly concentrated pollutant sources present (hotspot)?	NO
iii) Is site located above contaminated soils or groundwater?	NO
iv) Is SCM located at top of steep slope? (> 3H:1V)	NO
v) Is SCM located adjacent to building, hardscape, or pavement?	NO
vi) Is SCM located above building foundation wall backfill?	NO
vii) Are there other concerns that indicate high risk for infiltration?	NO

C) Preliminary Infiltration/Percolation Tests of underlying soils

i) Were preliminary infiltration/percolation tests conducted? YES *Please describe below*

ii) Preliminary estimate of infiltration rate F_{prelim} = 8.64 in/hr

D) Final Design Infiltrometer Test

i) Were infiltrometer tests conducted? YES *Please describe below*

ii) Select type of infiltrometer test performed: Modified Philip Dunne (ASTM D815)

iii) How many locations were tested? N_{Tests} = 6

iv) Describe test locations relative to borings/pits

Infiltrometer tests were conducted at and below the bottom of the BR basin level The test locations were around the test boring and were in the test pits for each infiltration area at the BR location.

v) What was the maximum infiltration rate tested? F_{Max} = 14.26 in/hr

vi) What was the minimum infiltration rate tested? F_{Min} = 6.91 in/hr

vii) Design Infiltration Rate F_{Design} = 8.64 in/hr

E) Recommended Infiltration System: Full Infiltration **Suitable Soils and Low Risk, must verify adequate subgrade infiltration rates.**

F) Select Infiltration System to use for Design: Full Infiltration

A/B sandy soils on site are suitible for full infiltration.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAS**

2. Inlet Design and Pretreatment

A) Is RPA (GB/GS) used for Runoff Reduction upstream of SCM? NO

Define inflow points for all areas tributary to the SCM below.

B) Inflow Points contributing to SCM (max 8)

Inflow Design Point ID	C							
Tributary Area to Inflow Point (ft^2)	53,447							
Imperviousness above Inflow Point (%)	60.0%							
Default WQCV for Inflow Point (ft^3)	841							
Optional Override WQCV for Inflow Point (ft^3)								
WQCV Reduction above Inflow Point (ft^3)	0							
Remaining WQCV at Inflow Point (ft^3)	841							
Will pretreatment be provided with a Sedimentation MTD (HDS)	NO							
Paired Pretreatment HDS Worksheet Name	--							
Sheet or Concentrated Flow	Sheet							

C) Sheet Flow

Select sheet flow inflow feature	Curbless							
Is Concrete Edger used?	NO							
Spacing between slots, recommend ≤ 2 ft on center (ft)	--							
Slot Opening Length, recommend 1.5 (in)	--							
Select type of blind swale used to distribute flow	--							
Select energy dissipation method for level spreader	--							
Height of drop, recommend 2 to 3 (in)	2.00							
Is concrete mowing strip provided to facilitate maintenance?	--							

D) Concentrated Flow

Select concentrated flow inflow feature	--							
Is downspout extension needed to bridge backfill zone?	--							
Depth of gutter flow line depression for curb opening, recommend 3 (in)	--							
Curb opening inlet width (ft)	--							
Height of drop to sediment pad/forebay, recommend ≥ 1 (in)	--							
Select energy dissipation method for downspouts and/or curb openings.	--							
Select energy dissipation method for swales, channels, and piped outfalls	--							

v) Forebay

Impervious area tributary to concentrated inflow location (ft^2)	--							
Forebay Type (Concrete Sediment Pad sufficient for Imp Area ≤ 2 acre)	--							
Minimum Forebay Volume (ft^3)	--							
Design Forebay Volume (ft^3)	--							
Maximum Forebay Depth (in)	--							
Design Forebay Depth (in)	--							
Rectangular Weir Notch Width to Empty Forebay in 5-minutes (in)	--							
Design Notch Width (in)	--							
Forebay Drain Time (minutes)	--							

Provide pretreatment to remove coarse sediment, trash and debris. This is especially critical for roadway runoff to bioretention systems.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAS**

3. Design Storage Volume

Inflow Points above should be fully defined before proceeding below

A) Contributing Watershed Area (including bioretention area)

Area = 55,247 ft²
Area = 1.27 ac

Total Tributary Inflow Area (ft²) = 53,447
BR Footprint Area (ft²) = 1,800

B) Imperviousness of Tributary Area

i = 58.1%

C) Default WQCV (or optional Override WQCV)

$V_{WQCV\ Default}$ = 847 ft³
$V_{WQCV\ Override}$ = ft³

D) WQCV Reduction resulting from Upstream RPA (GB/GS)

WQCV Reduction = 0 ft³

E) Remaining WQCV

$V_{WQCV\ Remaining}$ = 847 ft³

4. Bioretention System Basin Geometry

A) Mimimum Filter Media Surface Area

$A_{F\ Min}$ = 642 ft²

B) Design Filter Media Surface Area

$A_{F\ Design}$ = 1,800 ft²

C) WQCV Ponding Depth (recommend max. 12-inch)

D_{WQCV} = 12.00 in

D) Media Surface Slope (typically flat or mild slope < 0.01 ft/ft)

$S_{Surface}$ = 0.000 ft / ft

E) Max. Side Slope (Z = 4:1 or flatter, horiz. dist per unit vertical)
(Use "0" if bioretention has vertical walls)

Z = 3.00 ft / ft **Steeper than 4:1**

F) Media Surface Length-to-Width Ratio

$R_{L/W}$ = 2

G) Calculated WQCV (based on $A_{F\ Design}$, D_{WQCV}, and Z)

$V_{WQCV\ Calculated}$ = 2,088 ft³

H) Design WQCV (based on actual design geometry)

$V_{WQCV\ Design}$ = 2,088 ft³

I) If basin geometry is irregular, design volume differs, or media pore space is being utilized, please provide description.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAS**

5. Underdrain System, Impermeable Liner, and Geotextile

A) Are underdrains provided? NO

B) Is a Drain Trench provided consistent with Figure 4-2?
- Trench Bottom Width ≥ 12 inches, Trench Depth ≥ 15 inches
- Drain gravel satisfies gradation specifications for AASHTO M 43 No. 8 coarse aggregate
- Filter sand above drain gravel satisfies gradation specifications for AASHTO M 43 fine aggregate
- Filter sand depth above drain trench ≥ 6 inches
- Filter sand extends ≥ 12 inches beyond trench top width

C) Select Factory-Slotted Pipe Size and Material

D) Does the specified pipe material meet the specifications for slot configurations shown in Table 4-6 and Figure 4-3.

E) Are cleanouts provided for inspection and maintenance?

F) Is an impermeable geomembrane liner provided?

G) Are details provided regarding sealing at underdrain penetrations similar to Figure 4-6?

H) Are geomembrane connections to vertical concrete surfaces consistent with Figure 4-7?

I) Do the plans specify thermal welding and air lance testing of joints?

6. Bioretention Media

A) Depth of Media (18-inch minimum, 36-inch when trees planted) D_{Media} = 24.00 in

B) Do construction documents specify media testing requirements? YES

Analyze gradation and nutrient content of media after delivery to the site and preferably, prior to placement.

The on site soil is suitible for infiltration and vegetation growth. EOR or site engineer must visually inspect soils in the BR construction process and perform infiltration or nutrient tests if conditions/soil differs from soils observed in test pits.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer: Milan Jankovic
Company: Milosh Engineering
Date: April 2, 2026
Project: PPR2527
Location: 1185 N Curtis Road, Colorado Springs, CO 80930
Outfall ID: IAS

7. Vegetation

A) Select the method of vegetation planting (pulldown list). Consult with vegetation specialist to consider shade, heat island effects, application of deicers in the watershed, and other site-specific factors.

Table BR-4 provides suggested Native Seed Mix

Sod-forming native grasses from seed

Typically costs less than container grown plants but more susceptible to being washed away during establishment.

Native Seed Mix is provided in SWMP Report

B) Has a landscape/vegetation management plan been developed?

YES

C) Describe vegetation/landscaping considerations:
- Stability issues (steep slopes, high erosion potential)?
- Topsoil management (assessment, stockpiling, and placement)?
- Community benefits with place-making approach?
- Biodiversity of the site including pollinator species?
- Environmental stewardship through conservation?
- Inundation frequency and depth impacts on vegetation?
- Required maintenance activities and intervals?

Native grass will stabilize the embankments and slopes. Straw or hydromulch shall be used to stabilize disturbed areas untill permanent vegetation is established through temporary watering using the well water on site The seeded areas will biodiversify and return to the natural state through ecological succession after a few years and will support native polinator species. See maintenance agreement for more information.

8. Irrigation

A) How will irrigation be provided for vegetation establishment?

Place temporary irrigation on top of the bioretention media surface. Remove irrigation pipes once vegetation is established to avoid it being buried over time.

Temporary

9. Outlet

A) Underdrain Orifice Diameter for 12-hour drain time

i) Underdrain Orifice Invert Depth (distance from filter media surface to orifice invert)

$y =$ in

ii) Calculated Underdrain Orifice Diameter
Simplified Equation (when not using MHFD-Detention)
MHFD-Detention Calculation (if used)

$Dia._{Simplified} =$ in
$Dia._{MHFD\text{-}Detention} =$ in

iii) Underdrain Orifice Diameter specified on construction plans

$Orifice\ Dia._{Design} =$ in

B) Describe Underdrain Orifice Outlet Configuration.

C) Describe Outlet Structure(s) for events larger than WQCV. (full-spectrum detention, overflow spillway, etc.)

10. Maintenance

A) Has a maintenance plan that includes the following been developed?
- access for restorative and routine maintenance
- access to forebay/concrete sediment pads
- types of equipment required
- plant debris removal
- do not use for snow storage

YES

See maintenance agreement.

Notes:

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAN**

1. Subsurface Exploration and Infiltration System Selection

A) Identify Site Constraints

i) Is subgrade depth to bedrock < 3 feet?	NO
ii) Is subgrade depth to seasonal high groundwater table < 3 feet?	NO

B) Identify Site Risks

i) Are expansive/collapsible soils present?	NO
ii) Are highly concentrated pollutant sources present (hotspot)?	NO
iii) Is site located above contaminated soils or groundwater?	NO
iv) Is SCM located at top of steep slope? (> 3H:1V)	NO
v) Is SCM located adjacent to building, hardscape, or pavement?	NO
vi) Is SCM located above building foundation wall backfill?	NO
vii) Are there other concerns that indicate high risk for infiltration?	NO

C) Preliminary Infiltration/Percolation Tests of underlying soils

i) Were preliminary infiltration/percolation tests conducted? YES *Please describe below*

ii) Preliminary estimate of infiltration rate F_{prelim} = 8.60 in/hr

D) Final Design Infiltrometer Test

i) Were infiltrometer tests conducted? YES *Please describe below*

ii) Select type of infiltrometer test performed: Modified Philip Dunne (ASTM D815)

iii) How many locations were tested? N_{Tests} = 6

iv) Describe test locations relative to borings/pits

v) What was the maximum infiltration rate tested? F_{Max} = 15.55 in/hr

vi) What was the minimum infiltration rate tested? F_{Min} = 7.78 in/hr

vii) Design Infiltration Rate F_{Design} = 8.64 in/hr

E) Recommended Infiltration System: Full Infiltration — **Suitable Soils and Low Risk, must verify adequate subgrade infiltration rates.**

F) Select Infiltration System to use for Design: Full Infiltration

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAN**

2. Inlet Design and Pretreatment

A) Is RPA (GB/GS) used for Runoff Reduction upstream of SCM? NO

Define inflow points for all areas tributary to the SCM below.

B) Inflow Points contributing to SCM (max 8)

Inflow Design Point ID	F							
Tributary Area to Inflow Point (ft^2)	33,196							
Imperviousness above Inflow Point (%)	60.0%							
Default WQCV for Inflow Point (ft^3)	523							
Optional Override WQCV for Inflow Point (ft^3)								
WQCV Reduction above Inflow Point (ft^3)	0							
Remaining WQCV at Inflow Point (ft^3)	523							
Will pretreatment be provided with a Sedimentation MTD (HDS)	NO							
Paired Pretreatment HDS Worksheet Name	--							
Sheet or Concentrated Flow	Sheet							

C) Sheet Flow

Select sheet flow inflow feature	Curbless							
Is Concrete Edger used?	NO							
Spacing between slots, recommend ≤ 2 ft on center (ft)	--							
Slot Opening Length, recommend 1.5 (in)	--							
Select type of blind swale used to distribute flow	--							
Select energy dissipation method for level spreader	--							
Height of drop, recommend 2 to 3 (in)	2.00							
Is concrete mowing strip provided to facilitate maintenance?	--							

D) Concentrated Flow

Select concentrated flow inflow feature	--							
Is downspout extension needed to bridge backfill zone?	--							
Depth of gutter flow line depression for curb opening, recommend 3 (in)	--							
Curb opening inlet width (ft)	--							
Height of drop to sediment pad/forebay, recommend ≥ 1 (in)	--							
Select energy dissipation method for downspouts and/or curb openings.	--							
Select energy dissipation method for swales, channels, and piped outfalls	--							

v) Forebay

Impervious area tributary to concentrated inflow location (ft^2)	--							
Forebay Type (Concrete Sediment Pad sufficient for Imp Area ≤ 2 acre)	--							
Minimum Forebay Volume (ft^3)	--							
Design Forebay Volume (ft^3)	--							
Maximum Forebay Depth (in)	--							
Design Forebay Depth (in)	--							
Rectangular Weir Notch Width to Empty Forebay in 5-minutes (in)	--							
Design Notch Width (in)	--							
Forebay Drain Time (minutes)	--							

Provide pretreatment to remove coarse sediment, trash and debris. This is especially critical for roadway runoff to bioretention systems.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAN**

3. Design Storage Volume

Inflow Points above should be fully defined before proceeding below

A) Contributing Watershed Area (including bioretention area)

Area = 34,996 ft²
Area = 0.80 ac

Total Tributary Inflow Area (ft²) = 33,196
BR Footprint Area (ft²) = 1,800

B) Imperviousness of Tributary Area

i = 57.1%

C) Default WQCV (or optional Override WQCV)

$V_{WQCV\ Default}$ = 529 ft³
$V_{WQCV\ Override}$ = ft³

D) WQCV Reduction resulting from Upstream RPA (GB/GS)

WQCV Reduction = 0 ft³

E) Remaining WQCV

$V_{WQCV\ Remaining}$ = 529 ft³

4. Bioretention System Basin Geometry

A) Mimimum Filter Media Surface Area

$A_{F\ Min}$ = 399 ft²

B) Design Filter Media Surface Area

$A_{F\ Design}$ = 1,800 ft²

C) WQCV Ponding Depth (recommend max. 12-inch)

D_{WQCV} = 12.00 in

D) Media Surface Slope (typically flat or mild slope < 0.01 ft/ft)

$S_{Surface}$ = 0.000 ft / ft

E) Max. Side Slope (Z = 4:1 or flatter, horiz. dist per unit vertical)
(Use "0" if bioretention has vertical walls)

Z = 3.00 ft / ft **Steeper than 4:1**

F) Media Surface Length-to-Width Ratio

$R_{L/W}$ = 2

G) Calculated WQCV (based on $A_{F\ Design}$, D_{WQCV}, and Z)

$V_{WQCV\ Calculated}$ = 2,088 ft³

H) Design WQCV (based on actual design geometry)

$V_{WQCV\ Design}$ = 2,088 ft³

I) If basin geometry is irregular, design volume differs, or media pore space is being utilized, please provide description.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAN**

5. Underdrain System, Impermeable Liner, and Geotextile

A) Are underdrains provided? NO

B) Is a Drain Trench provided consistent with Figure 4-2?
- Trench Bottom Width ≥ 12 inches, Trench Depth ≥ 15 inches
- Drain gravel satisfies gradation specifications for AASHTO M 43 No. 8 coarse aggregate
- Filter sand above drain gravel satisfies gradation specifications for AASHTO M 43 fine aggregate
- Filter sand depth above drain trench ≥ 6 inches
- Filter sand extends ≥ 12 inches beyond trench top width

C) Select Factory-Slotted Pipe Size and Material

D) Does the specified pipe material meet the specifications for slot configurations shown in Table 4-6 and Figure 4-3.

E) Are cleanouts provided for inspection and maintenance?

F) Is an impermeable geomembrane liner provided?

G) Are details provided regarding sealing at underdrain penetrations similar to Figure 4-6?

H) Are geomembrane connections to vertical concrete surfaces consistent with Figure 4-7?

I) Do the plans specify thermal welding and air lance testing of joints?

6. Bioretention Media

A) Depth of Media (18-inch minimum, 36-inch when trees planted) D_{Media} = 24.00 in

B) Do construction documents specify media testing requirements? YES

Analyze gradation and nutrient content of media after delivery to the site and preferably, prior to placement.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer: Milan Jankovic
Company: Milosh Engineering
Date: April 2, 2026
Project: PPR2527
Location: 1185 N Curtis Road, Colorado Springs, CO 80930
Outfall ID: IAN

7. Vegetation

A) Select the method of vegetation planting (pulldown list). Consult with vegetation specialist to consider shade, heat island effects, application of deicers in the watershed, and other site-specific factors.

Table BR-4 provides suggested Native Seed Mix

Sod-forming native grasses from seed

Typically costs less than container grown plants but more susceptible to being washed away during establishment.

B) Has a landscape/vegetation management plan been developed? YES

C) Describe vegetation/landscaping considerations:
- Stability issues (steep slopes, high erosion potential)?
- Topsoil management (assessment, stockpiling, and placement)?
- Community benefits with place-making approach?
- Biodiversity of the site including pollinator species?
- Environmental stewardship through conservation?
- Inundation frequency and depth impacts on vegetation?
- Required maintenance activities and intervals?

8. Irrigation

A) How will irrigation be provided for vegetation establishment? Temporary

Place temporary irrigation on top of the bioretention media surface. Remove irrigation pipes once vegetation is established to avoid it being buried over time.

9. Outlet

A) Underdrain Orifice Diameter for 12-hour drain time

i) Underdrain Orifice Invert Depth (distance from filter media surface to orifice invert)

y = in

ii) Calculated Underdrain Orifice Diameter
Simplified Equation (when not using MHFD-Detention)
MHFD-Detention Calculation (if used)

$Dia._{Simplified}$ = in
$Dia._{MHFD\text{-}Detention}$ = in

iii) Underdrain Orifice Diameter specified on construction plans

$Orifice\ Dia._{Design}$ = in

B) Describe Underdrain Orifice Outlet Configuration.

C) Describe Outlet Structure(s) for events larger than WQCV. (full-spectrum detention, overflow spillway, etc.)

10. Maintenance

A) Has a maintenance plan that includes the following been developed? YES
- access for restorative and routine maintenance
- access to forebay/concrete sediment pads
- types of equipment required
- plant debris removal
- do not use for snow storage

Notes:

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAN2**

1. Subsurface Exploration and Infiltration System Selection

A) Identify Site Constraints

i) Is subgrade depth to bedrock < 3 feet?	NO
ii) Is subgrade depth to seasonal high groundwater table < 3 feet?	NO

B) Identify Site Risks

i) Are expansive/collapsible soils present?	NO
ii) Are highly concentrated pollutant sources present (hotspot)?	NO
iii) Is site located above contaminated soils or groundwater?	NO
iv) Is SCM located at top of steep slope? (> 3H:1V)	NO
v) Is SCM located adjacent to building, hardscape, or pavement?	NO
vi) Is SCM located above building foundation wall backfill?	NO
vii) Are there other concerns that indicate high risk for infiltration?	NO

C) Preliminary Infiltration/Percolation Tests of underlying soils

i) Were preliminary infiltration/percolation tests conducted? YES *Please describe below*

ii) Preliminary estimate of infiltration rate F_{prelim} = 8.64 in/hr

D) Final Design Infiltrometer Test

i) Were infiltrometer tests conducted? YES *Please describe below*

ii) Select type of infiltrometer test performed: Modified Philip Dunne (ASTM D815)

iii) How many locations were tested? N_{Tests} = 3

iv) Describe test locations relative to borings/pits

v) What was the maximum infiltration rate tested? F_{Max} = 8.30 in/hr

vi) What was the minimum infiltration rate tested? F_{Min} = 4.40 in/hr

vii) Design Infiltration Rate F_{Design} = 6.30 in/hr

E) Recommended Infiltration System: Full Infiltration **Suitable Soils and Low Risk, must verify adequate subgrade infiltration rates.**

F) Select Infiltration System to use for Design: Full Infiltration

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAN2**

2. Inlet Design and Pretreatment

A) Is RPA (GB/GS) used for Runoff Reduction upstream of SCM? NO

Define inflow points for all areas tributary to the SCM below.

B) Inflow Points contributing to SCM (max 8)

Inflow Design Point ID	D
Tributary Area to Inflow Point (ft^2)	62,171
Imperviousness above Inflow Point (%)	21.9%
Default WQCV for Inflow Point (ft^3)	511
Optional Override WQCV for Inflow Point (ft^3)	
WQCV Reduction above Inflow Point (ft^3)	0
Remaining WQCV at Inflow Point (ft^3)	511
Will pretreatment be provided with a Sedimentation MTD (HDS)	NO
Paired Pretreatment HDS Worksheet Name	--
Sheet or Concentrated Flow	Sheet

C) Sheet Flow

Select sheet flow inflow feature	Curbless
Is Concrete Edger used?	NO
Spacing between slots, recommend ≤ 2 ft on center (ft)	--
Slot Opening Length, recommend 1.5 (in)	--
Select type of blind swale used to distribute flow	--
Select energy dissipation method for level spreader	--
Height of drop, recommend 2 to 3 (in)	3.00
Is concrete mowing strip provided to facilitate maintenance?	--

D) Concentrated Flow

Select concentrated flow inflow feature	--
Is downspout extension needed to bridge backfill zone?	--
Depth of gutter flow line depression for curb opening, recommend 3 (in)	--
Curb opening inlet width (ft)	--
Height of drop to sediment pad/forebay, recommend ≥ 1 (in)	--
Select energy dissipation method for downspouts and/or curb openings.	--
Select energy dissipation method for swales, channels, and piped outfalls	--

v) Forebay

Impervious area tributary to concentrated inflow location (ft^2)	--
Forebay Type (Concrete Sediment Pad sufficient for Imp Area ≤ 2 acre)	--
Minimum Forebay Volume (ft^3)	--
Design Forebay Volume (ft^3)	--
Maximum Forebay Depth (in)	--
Design Forebay Depth (in)	--
Rectangular Weir Notch Width to Empty Forebay in 5-minutes (in)	--
Design Notch Width (in)	--
Forebay Drain Time (minutes)	--

Provide pretreatment to remove coarse sediment, trash and debris. This is especially critical for roadway runoff to bioretention systems.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAN2**

3. Design Storage Volume

Inflow Points above should be fully defined before proceeding below

A) Contributing Watershed Area (including bioretention area)

Area = 63,517 ft²
Area = 1.46 ac

Total Tributary Inflow Area (ft²) = 62,171
BR Footprint Area (ft²) = 1,346

B) Imperviousness of Tributary Area

i = 17.7% %

C) Default WQCV (or optional Override WQCV)

$V_{WQCV\ Default}$ = 448 ft³
$V_{WQCV\ Override}$ = ft³

D) WQCV Reduction resulting from Upstream RPA (GB/GS)

WQCV Reduction = 0 ft³

E) Remaining WQCV

$V_{WQCV\ Remaining}$ = 448 ft³

4. Bioretention System Basin Geometry

A) Mimimum Filter Media Surface Area

$A_{F\ Min}$ = 225 ft²

B) Design Filter Media Surface Area

$A_{F\ Design}$ = 1,346 ft²

C) WQCV Ponding Depth (recommend max. 12-inch)

D_{WQCV} = 12.00 in

D) Media Surface Slope (typically flat or mild slope < 0.01 ft/ft)

$S_{Surface}$ = 0.000 ft / ft

E) Max. Side Slope (Z = 4:1 or flatter, horiz. dist per unit vertical)
(Use "0" if bioretention has vertical walls)

Z = 4.00 ft / ft

F) Media Surface Length-to-Width Ratio

$R_{L/W}$ = 1

G) Calculated WQCV (based on $A_{F\ Design}$, D_{WQCV}, and Z)

$V_{WQCV\ Calculated}$ = 1,672 ft³

H) Design WQCV (based on actual design geometry)

$V_{WQCV\ Design}$ = 1,672 ft³

I) If basin geometry is irregular, design volume differs, or media pore space is being utilized, please provide description.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
Company:	**Milosh Engineering**
Date:	**April 2, 2026**
Project:	**PPR2527**
Location:	**1185 N Curtis Road, Colorado Springs, CO 80930**
Outfall ID:	**IAN2**

5. Underdrain System, Impermeable Liner, and Geotextile

A) Are underdrains provided? NO

B) Is a Drain Trench provided consistent with Figure 4-2?
- Trench Bottom Width ≥ 12 inches, Trench Depth ≥ 15 inches
- Drain gravel satisfies gradation specifications for AASHTO M 43 No. 8 coarse aggregate
- Filter sand above drain gravel satisfies gradation specifications for AASHTO M 43 fine aggregate
- Filter sand depth above drain trench ≥ 6 inches
- Filter sand extends ≥ 12 inches beyond trench top width

C) Select Factory-Slotted Pipe Size and Material

D) Does the specified pipe material meet the specifications for slot configurations shown in Table 4-6 and Figure 4-3.

E) Are cleanouts provided for inspection and maintenance?

F) Is an impermeable geomembrane liner provided?

G) Are details provided regarding sealing at underdrain penetrations similar to Figure 4-6?

H) Are geomembrane connections to vertical concrete surfaces consistent with Figure 4-7?

I) Do the plans specify thermal welding and air lance testing of joints?

6. Bioretention Media

A) Depth of Media (18-inch minimum, 36-inch when trees planted) D_{Media} = 18.00 in

B) Do construction documents specify media testing requirements? YES

Analyze gradation and nutrient content of media after delivery to the site and preferably, prior to placement.

Bioretention System (BR)

SCM Design, Version 4.02 (June 2025)

Designer:	**Milan Jankovic**
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Outfall ID:	**IAN2**

7. Vegetation

A) Select the method of vegetation planting (pulldown list). Consult with vegetation specialist to consider shade, heat island effects, application of deicers in the watershed, and other site-specific factors.

Table BR-4 provides suggested Native Seed Mix

Sod-forming native grasses from seed

Typically costs less than container grown plants but more susceptible to being washed away during establishment.

B) Has a landscape/vegetation management plan been developed?

YES

C) Describe vegetation/landscaping considerations:
- Stability issues (steep slopes, high erosion potential)?
- Topsoil management (assessment, stockpiling, and placement)?
- Community benefits with place-making approach?
- Biodiversity of the site including pollinator species?
- Environmental stewardship through conservation?
- Inundation frequency and depth impacts on vegetation?
- Required maintenance activities and intervals?

8. Irrigation

A) How will irrigation be provided for vegetation establishment?

Temporary

Place temporary irrigation on top of the bioretention media surface. Remove irrigation pipes once vegetation is established to avoid it being buried over time.

9. Outlet

A) Underdrain Orifice Diameter for 12-hour drain time

i) Underdrain Orifice Invert Depth (distance from filter media surface to orifice invert)

y = in

ii) Calculated Underdrain Orifice Diameter
Simplified Equation (when not using MHFD-Detention)
MHFD-Detention Calculation (if used)

$Dia._{Simplified}$ = in
$Dia._{MHFD\text{-}Detention}$ = in

iii) Underdrain Orifice Diameter specified on construction plans

$Orifice\ Dia._{Design}$ = in

B) Describe Underdrain Orifice Outlet Configuration.

C) Describe Outlet Structure(s) for events larger than WQCV. (full-spectrum detention, overflow spillway, etc.)

10. Maintenance

A) Has a maintenance plan that includes the following been developed?
- access for restorative and routine maintenance
- access to forebay/concrete sediment pads
- types of equipment required
- plant debris removal
- do not use for snow storage

YES

Notes: