Walden Preserve 2 – Filing 5 Amendment & Filing 6

Preliminary Drainage Report

PCD File No: PUD263

All Terrain Engineering Project No: 25016

September 2026

Prepared for:

Walden Corporation

Attn: Matt Dunston

Contact: (719) 559-2229

mattdunston@hotmail.com

Prepared by:

All Terrain Engineering LLC

Contact: Nicholas Q. Jokerst

njokerst@allterraineng.com

(530) 391-7635

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.

Signatures will be provided once comments resolved.

Nicholas Q. Jokerst, PE Date

State of Colorado No. 59273

For and on behalf of All Terrain Engineering LLC

DEVELOPER'S STATEMENT

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

Signatures will be provided once comments resolved.

Matt Dunston Date

Walden Corporation

EL PASO COUNTY ONLY

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

Joshua J. Palmer, P.E. Date
County Engineer/ECM Administrator

Conditions:

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I. General Purpose, Location & Description

a. Purpose & Project Description

The purpose of the Preliminary Drainage Report (PDR) for the Walden Preserve 2 – Filing 5 Amendment & Filing 6 is to describe the site's onsite and offsite drainage patterns, existing and proposed storm infrastructure, and to safely route developed stormwater to adequate outfalls. This PDR supports the Walden Preserve 2 – Filing 5 Amendment & Filing 6 Major PUD. The drainage analysis here in is limited to the disturbed areas associated with the PUD. Refer to the Walden Preserve 2 Filing 5 FDR for drainage patterns of undisturbed tracts included in the PUD major amendment.

Tract A,

b. Location

Walden Preserve 2 – Filing 5 Amendment & Filing 6, referred to as 'the site' herein, encompasses Tract B of Monument Academy subdivision and Tract B, Tract C and Tract D of Walden Preserve 2 Filing 5. The site is in the east half of the northwest quarter and the east half of Section 15, and the southwest quarter of Section 14, Township 11 South, Range 66 West of the 6th P.M. The site is bound by Pinehurst Circle to the north, Highway 83 to the west, Walden Preserve 2 Filing 5 to the east and an unplatted parcel to the south. Surrounding platted developments include Walden Preserve 2 Filing 5, Walden III and Monument Academy. A vicinity map is presented in Appendix A.

c. Description of Property

The site encompasses 37.62 acres in El Paso County, CO. The project will subdivide 18.45 acres into (29) 0.5 acre lots. The remaining site area will be dedicated right of way and open space/drainage tracts. The subdivision will include public, rural residential roads to provide access from Pinehurst Circle. The existing condition of the property is undeveloped.

The portion of the site south of Pinehurst Circle slopes west towards Highway 83. The portion of the site north of Pinehurst Circle drains north and east to an unnamed tributary of West Cherry Creek that runs along the eastern boundary of Walden Preserve 2 Filing 5. Onsite elevations range from 7,364' – 7,434' with slopes approximately ranging 1 – 33%. Per an NRCS soil survey, the site is made up of Type B Elbeth sandy loam, Type B Pring coarse sandy loam, Type B Tomah-Crowfoot loamy sands and Type A Ellicott loamy coarse sand. On-site, existing utilities include water, sewer, and overhead electric.

The ultimate receiving waters for the site are West Cherry Creek.

d. Floodplain Statement

Based on FEMA Firm map 08041C0285G dated December 7, 2018, the site is Zone X, which are areas determined to be outside the 0.2% annual chance flood.

II. Drainage Basins

a. Major Basin Description

The site is located within the West Cherry Creek Drainage Basin. At the time of this FDR, West Cherry Creek does not have a published Drainage Basin Planning Study.

b. Existing Subbasin Description

Basin EXA is 11.89 acres of undeveloped area and Pinehurst Circle. Basin EXA stormwater (Q_5 = 4.6 cfs Q_{100} = 24.8 cfs) is conveyed in multiple minor drainages to DP1 (Q_5 = 4.6 cfs Q_{100} = 24.8 cfs). At DP1, stormwater continues into Basin EXB and south in the Highway 83 swale to DP2 (Q_5 = 6.0 cfs Q_{100} = 26.7 cfs).

Basin EXB is 1.78 acres of undeveloped area, Pinehurst Circle and Highway 83. Basin EXB stormwater (Q_5 = 2.2 cfs Q_{100} = 5.5 cfs) is conveyed in the Highway 83 swale to DP2 (Q_5 = 6.0 cfs Q_{100} = 26.7 cfs) and combines with DP1. At DP2, an existing 24" CMP culvert conveys the flow west and under Highway 83. According to the Monument Academy MDDP & FDR, a temporary water quality pond was proposed to capture the flow from Highway 83 & Pinehurst Circle. Based upon field survey provided to All Terrain Engineering, this water quality pond was not constructed.

Basin EXC is 17.61 acres of undeveloped area, Walden III and Walden Preserve 2 Filing 5. Basin EXC stormwater (Q_5 = 5.2 cfs Q_{100} = 26.7 cfs) is captured in a grass lined drainage swale that conveys the flow west to DP3 (Q_5 = 5.2 cfs Q_{100} = 26.7 cfs). At DP3, an existing 24" CMP culvert conveys the flow under a gravel driveway and continues south along Highway 83.

Basin EXD is 0.50 acres of undeveloped area, Pinehurst Circle and Walden Preserve 2 Filing 5. Basin EXD stormwater (Q_5 = 0.7 cfs Q_{100} = 1.8 cfs) is conveyed in multiple minor drainages to DP5 (Q_5 = 28.6 cfs Q_{100} = 64.2 cfs) where it combines with Walden Preserve 2 Filing 5 FDR Basin C11 & C12. Refer to Appendix E for Walden Preserve 2 Filing 5 FDR excerpts. At DP5, stormwater is captured and treated in Rain Garden C12 that was constructed with Walden Preserve 2 Filing 5.

Basin C11, from the Walden Preserve 2 Filing 5 FDR, is 8.63 acres of offsite lots and undeveloped onsite area. Per the Walden Preserve 2 Filing 5 FDR, Basin C11 stormwater (Q_5 = 10.4 cfs Q_{100} = 24.7 cfs) is conveyed overland to Rain Garden C12.

Basin C12, from the Walden Preserve 2 Filing 5 FDR, is 17.77 acres of offsite lots and undeveloped onsite area. Per the Walden Preserve 2 Filing 5 FDR, Basin C12 stormwater (Q_5 = 18.5 cfs Q_{100} = 43.9 cfs) is conveyed overland to Rain Garden C12.

c. Proposed Subbasin Description

Basin A is 2.15 acres of proposed ½ acre lots and roadway. Basin A stormwater (Q_5 = 2.3 cfs Q_{100} = 7.2 cfs) is conveyed west in a roadside swale to DP1 (Q_5 = 2.3 cfs Q_{100} = 7.2 cfs). At DP1, an 18" RCP culvert conveys the flow west towards DP2 (Q_5 = 5.8 cfs Q_{100} = 14.9 cfs). Basin A will be detained in Pond 1 for full spectrum water quality and detention.

Basin B is 1.23 acres of roadway and undeveloped area. Basin B stormwater (Q_5 = 3.1 cfs Q_{100} = 6.5 cfs) is conveyed southwest in curb & gutter and a roadside swale to DP2 (Q_5 = 5.8 cfs Q_{100} = 14.9 cfs). Basin B will be detained in Pond 1 for full spectrum water quality and detention.

Basin C is 1.03 acres of roadway and ½ acre lots. Basin C stormwater (Q_5 = 1.6 cfs Q_{100} = 4.1 cfs) is conveyed west in a roadside swale to DP2 (Q_5 = 5.8 cfs Q_{100} = 14.9 cfs). At DP2, a Type D inlet captures the swale flow and a 24" RCP conveys flow to DP7/Pond 1 (Q_5 = 14.4 cfs Q_{100} = 47.5 cfs). Basin C will be detained in Pond 1 for full spectrum water quality and detention.

Q_5=1.4 cfs

Basin D is 1.66 acres of undeveloped area and ½ acre lots. Basin D stormwater (Q_5 = 1.4 cfs Q_{100} = 4.6 cfs) is conveyed southwest in a swale to DP3 (~~Q_5 = 1.8 cfs~~ Q_{100} = 4.6 cfs). DP3 continues south to DP7/Pond 1 (Q_5 = 14.4 cfs Q_{100} = 47.5 cfs). Basin D will be detained in Pond 1 for full spectrum water quality and detention.

Basin E is 0.32 acres of proposed ½ acre lots and roadway. Basin E stormwater (Q_5 = 0.5 cfs Q_{100} = 1.4 cfs) is conveyed southwest in a roadside swale to DP4 (Q_5 = 0.5 cfs Q_{100} = 1.4 cfs). At DP4, an 18" RCP culvert conveys the flow southwest towards DP5 (Q_5 = 3.3 cfs Q_{100} = 8.5 cfs). Basin E will be detained in Pond 1 for full spectrum water quality and detention.

Basin F is 0.89 acres of roadway and swale. Basin F stormwater (Q_5 = 1.5 cfs Q_{100} = 3.6 cfs) is conveyed southwest in a roadside swale to DP5 (Q_5 = 3.3 cfs Q_{100} = 8.5 cfs). Basin F will be detained in Pond 1 for full spectrum water quality and detention.

Basin G is 1.12 acres of roadway and ½ acre lots. Basin G stormwater (Q_5 = 1.6 cfs Q_{100} = 4.4 cfs) is conveyed southwest in a roadside swale to DP5 (Q_5 = 3.3 cfs Q_{100} = 8.5 cfs). At DP5, a Type D inlet captures the swale flow and a 24" RCP conveys flow to DP7/Pond 1 (Q_5 = 14.4 cfs Q_{100} = 47.5 cfs). Basin G will be detained in Pond 1 for full spectrum water quality and detention.

Basin H is 11.83 acres of ½ to 1+ acre lots and undeveloped area. Basin H stormwater (Q_5 = 5.8 cfs Q_{100} = 24.6 cfs) is conveyed northwest in a swale to DP6 (Q_5 = 5.8 cfs Q_{100} = 24.6 cfs). DP6 continues north to DP7/Pond 1 (Q_5 = 14.4 cfs Q_{100} = 47.5 cfs). Basin H will be detained in Pond 1 for full spectrum water quality and detention.

Basin I is 5.02 acres of ½ acre lots, Pond 1 and undeveloped area. Basin I stormwater (Q_5 = 3.5 cfs Q_{100} = 12.8 cfs) is conveyed west to DP7/Pond 1 (Q_5 = 14.4 cfs Q_{100} = 47.5 cfs). Basin I will be detained in Pond 1 for full spectrum water quality and detention.

Basin J is 1.57 acres of undeveloped area. Basin J stormwater (Q_5 = 0.6 cfs Q_{100} = 4.0 cfs) follows historic drainage patterns in a swale along Highway 83 to DP8 (Q_5 = 2.8 cfs Q_{100} = 24.6 cfs. No development or disturbance is proposed within Basin J. Basin J will not be detained in Pond 1.

Basin K is 0.94 acre acres of proposed ½ acre lots, undeveloped area and roadway. Basin K stormwater (Q_5 = 1.1 cfs Q_{100} = 3.2 cfs) is conveyed north in a roadside swale to DP9 (Q_5 = 1.1 cfs Q_{100} = 3.2 cfs). DP9 flows east to DP11/ Rain Garden C12 (Q_5 = 23.9 cfs Q_{100} = 56.6 cfs). Basin K will be captured in Rain Garden C12 for water quality.

Basin L is 0.77 acre acres of proposed ½ acre lots and undeveloped area. Basin L stormwater (Q_5 = 0.4 cfs Q_{100} = 1.9 cfs) is conveyed south along Pinehurst Circle to DP10 (Q_5 = 0.4 cfs Q_{100} = 1.9 cfs). DP10 continues southeast through Walden Preserve 2 Filing 5 Basin C11 to DP11/ Rain Garden C12 (Q_5 = 23.9 cfs Q_{100} = 56.6 cfs). Basin L will be captured in Rain Garden C12 for water quality.

Basin M is 2.31 acre acres of proposed ½ acre lots, undeveloped area and roadway. Basin M stormwater (Q_5 = 2.1 cfs Q_{100} = 7.8 cfs) is conveyed northeast in a swale to DP11/ Rain Garden C12 (Q_5 = 23.9 cfs Q_{100} = 56.6 cfs). Basin M will be captured in Rain Garden C12 for water quality.

Basin C11, from the Walden Preserve 2 Filing 5 FDR, was originally 8.63 acres. However, it encompasses proposed Basin L and has been reduced by an equal area. Proposed Basin C11 is 7.86 acres. Revised runoff from Basin C11 (Q_5 = 9.6 cfs Q_{100} = 21.4 cfs) was calculated less the area of Basin L. The remainder of Basin C11 will follow historic drainage patterns.

Basin C12, from the Walden Preserve 2 Filing 5 FDR, was originally 17.77 acres. However, it encompasses proposed Basins K and M. Basin C12 has been reduced by an equal area. Proposed Basin C12 is 14.52 acres. Revised runoff from Basin C12 (Q_5 = 15.4 cfs Q_{100} = 34.4 cfs) was calculated less the area of Basins K and M. The remainder of Basin C12 will follow historic drainage patterns.

EXISTING V. PROPOSED DESIGN POINT COMARISON					
EX. DP	**$Q_{5\text{-YR}}$**	**$Q_{100\text{-YR}}$**	**PR. DP**	**$Q_{5\text{-YR}}$**	**$Q_{100\text{-YR}}$**
2	6.0	26.7	**8**	2.8	24.6
3	5.2	26.7	**NA**	-	-
5	28.6	64.2	**11**	23.9	56.6

At Existing DP2/Proposed DP8, onsite stormwater is reduced via the detention provided at Pond 1.

At Existing DP3, there is no corresponding proposed design point. Existing DP3 flows are captured on site and routed through Pond 1. A portion of existing DP3 flow is still present. However, those flows are generated offsite and do not affect the proposed development. Therefore, they are not calculated as part of this analysis.

At Existing DP5/Proposed DP11, flows are reduced due to the conservative C-Value assumptions made with the Walden Preserve 2 Filing 5 FDR for Basin C11 and C12. Proposed Basins K-M, which are within the original limits of C11 and C12, have a lower C-value and therefore reduced stormwater flows.

Drainage Design Criteria

a. Development Criteria Reference

The drainage analysis follows the criteria from the "Drainage Criteria Manual County of El Paso, Colorado" Volumes 1 and 2," as amended.

b. Hydrologic Criteria

Onsite drainage analysis included the 5-year storm (minor event) and 100-year storm (major event). Runoff is calculated per EPCDCM Chapter 5 – Storm Runoff Method of Analysis.

c.

d. Hydraulic Criteria

Hydraulic criteria for channel analysis are obtained from EPCDCM Chapter 10 - Open Channels and Structures.

III. Drainage Facility Design

a. General Concept

For the site south of Pinehurst Circle, stormwater is collected via roadside swales and conveyed to Type D inlets. Captured stormwater will be piped to Pond 1. Pond 1 provides water quality & detention will for Basins A-I. The site north of Pinehurst Circle is collected via roadside swales and discharge to the existing Rain Garden C12 for water quality. 5-year and 100-year stormwater discharges from the site have been reduced to below historic levels for both site areas. All proposed storm sewer and appurtenances will be privately owned and maintained.

Hydraulic calculations for swales, storm sewer, riprap sizing, etc. will be provided with the Final Drainage Report.

Provide an analysis demonstrating that the roadside ditch has sufficient capacity to convey the spillway flows. If the pond were to overtop, it must also be shown that the resulting flows would not overtop Highway 83.

b. Water Quality & Detention

Water quality and detention for Basins A-I is provided in Pond 1. Pond 1 is an onsite, private, full spectrum detention pond located adjacent to Highway 83. A total of 25.25 acres at 23.6% composite imperviousness will be detained. The WQCV is 0.273 ac-ft, the EURV is 0.327 ac-ft, and the 100-year volume is 0.859 ac-ft. The WQCV, EURV and 100-year storms are released in 40, 59 and 55 hours, respectively. Concrete forebays are located at the piped outfalls into the pond. A riprap rundown and forebay are located at the overland outfall to the pond. A 2.0' concrete trickle channel conveys flow towards the private outlet structure. A 10' access and maintenance road is provided to the bottom of the pond from Pinehurst Circle. A 20' emergency overflow spillway is provided that conveys the developed, peak 100-yr flow rate with 1.0' of freeboard towards Sand Creek. The pond outlet structure discharges into private 24" RCP storm sewer that discharges to the site's existing outfall, a 24" CMP culvert under Highway 83. Pond design calculations are presented in Appendix D.

roadside ditch along Hwy 83.

please state if the rain garden is public or private

Rain Garden C12 was designed and constructed with the Walden Preserve 2 Filing 5 project. Rain Garden C12 captured and detained Basins C10 – C12 for a total area of 29.26 acres at 18.1% impervious. Proposed Basins K-M are located within the original limits of Basins C10 – C12. However, the imperviousness of Basin K-M has been increased to 20.1% for their corresponding area of 4.02 acres. The total area discharging to C12 is unchanged. Accounting for the impervious increase of Basins K-M, the revised composite impervious Rain Garden C12 is 18.37% for the total area of 29.26 acres. The revised Rain Garden C12 UD-BMP spreadsheet confirms the existing underdrains and orifice diameter (2-3/16") is adequate for the increased WQCV. A proposed riprap rundown and low tail water basin will be constructed in Rain Garden C12 for the discharge at DP11. Otherwise, Rain Garden C12 will remain in its existing condition. An updated UD-BMP is provided in Appendix D to verify Rain Garden C12 can accommodate the additional impervious.

please include analysis of the area downstream of the culvert to determine if any improvements are required to handle the new flows

c. Inspections & Maintenance

An Inspection and Maintenance Manual for Pond 1 will be provided with the Final Drainage Report. Rain Garden C12 has an Inspection & Maintenance manual with El Paso County from its approval process with Walden Preserve 2 Filing 5.

d. Grading & Erosion Control Plan

A Grading & Erosion Control Plan will be provided with the Final Drainage Report.

e. Four Step Method

Step 1 – Employ Runoff Reduction Practices: Roof drains will discharge to landscaped areas. Implementation of landscaping and open space throughout the site will help slow runoff and increase infiltration. Where viable, the site will be left in its native condition to maintain historic drainage patterns through the grasslands and forested areas present onsite. Additionally, grass-lined swales are used as the primary stormwater conveyance method. Grass-lined swales allow for infiltration and reduce runoff velocities compared to storm sewer.

Step 2 – Stabilize Drainageways: All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization with the drainage basin. Refer to Section F below.

Step 3 – Provide WQCV: Water quality treatment is provided for Basin A-I in Pond 1. The water quality volume will be released over a period of 40 hours. Water quality treatment is provided for Basin K-M in existing Rain Garden C12.

Step 4 – Consider the need for source controls: No industrial uses are proposed within this development and therefore no source controls are proposed.

f. Drainage Basin & Bridge Fees

The site is within the West Cherry Creek Drainage Basin. Based upon the 2026 El Paso County Drainage Basin Fee schedule, West Cherry Creek does not have an associated drainage or bridge fee.

g. Engineer's Opinion of Probable Cost

An El Paso County 2026 Financial Assurance estimate is included in Appendix E.

This opinion of probable cost is not included and would not be an FAE form, it would include costs associated to build the drainage improvements only

IV. Summary

Walden Preserve 2 – Filing 5 Amendment & Filing 6 remains consistent with pre-development drainage conditions. The proposed development will not adversely affect downstream stormwater infrastructure or surrounding developments. This report is in accordance with the latest El Paso County Drainage criteria.

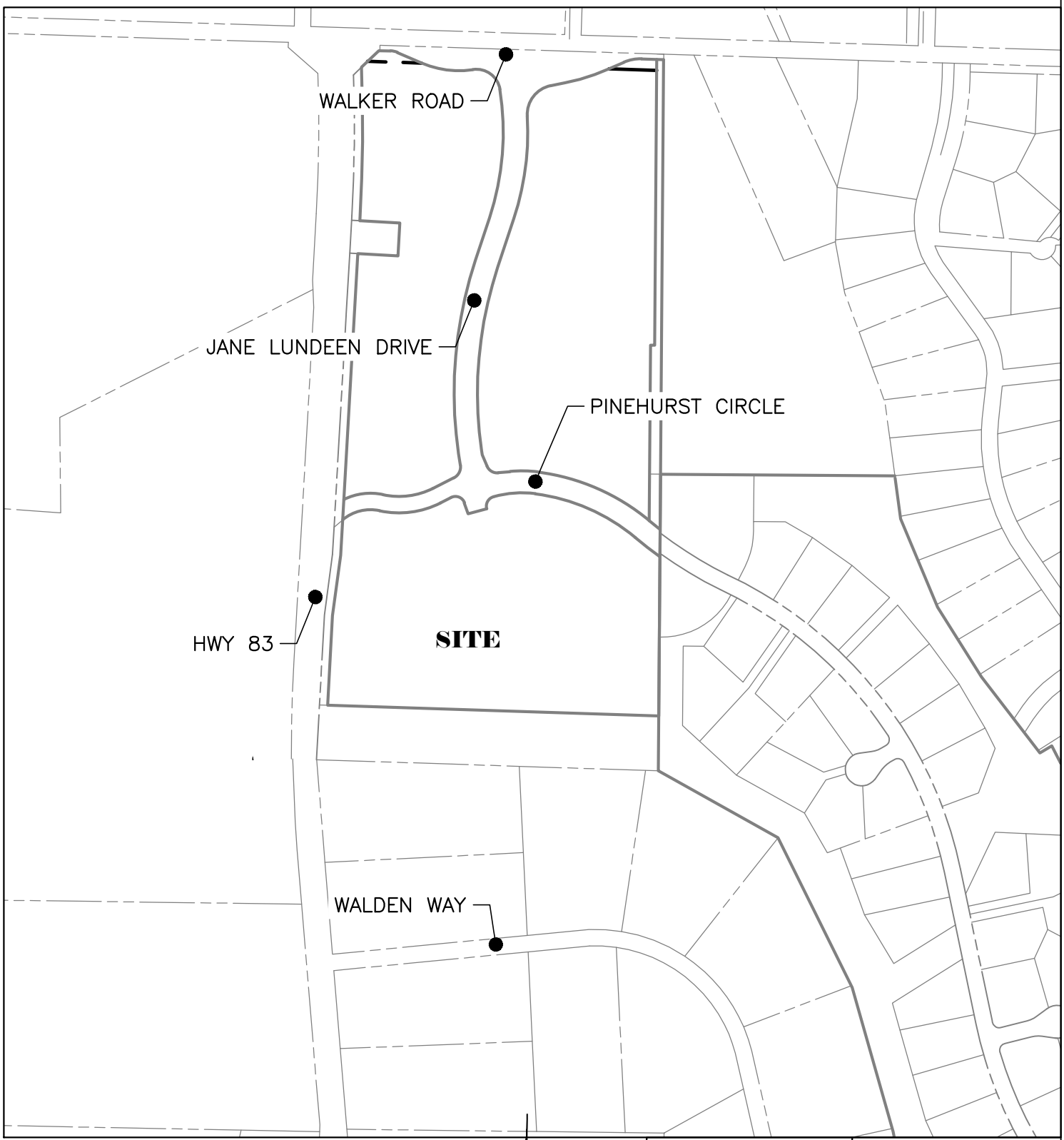
V. References

1. El Paso County – Drainage Criteria Manual, 2018 as amended.
2. Urban Storm Drainage Criteria Manual, Mile High Flood District, March 2024.
3. Federal Emergency Management Agency, Flood Map Service Center - https://msc.fema.gov/portal/home, September 2024.
4. Web Soil Survey, Natural Resources Conservation Service - https://websoilsurvey.nrcs.usda.gov/app/, September 2024.

APPENDIX A – VICINITY MAP, FEMA MAP, NRCS WEB SOIL SURVEY

WALDEN PRESERVE 2 - FILING 5 AMENDMENT

VICINITY MAP



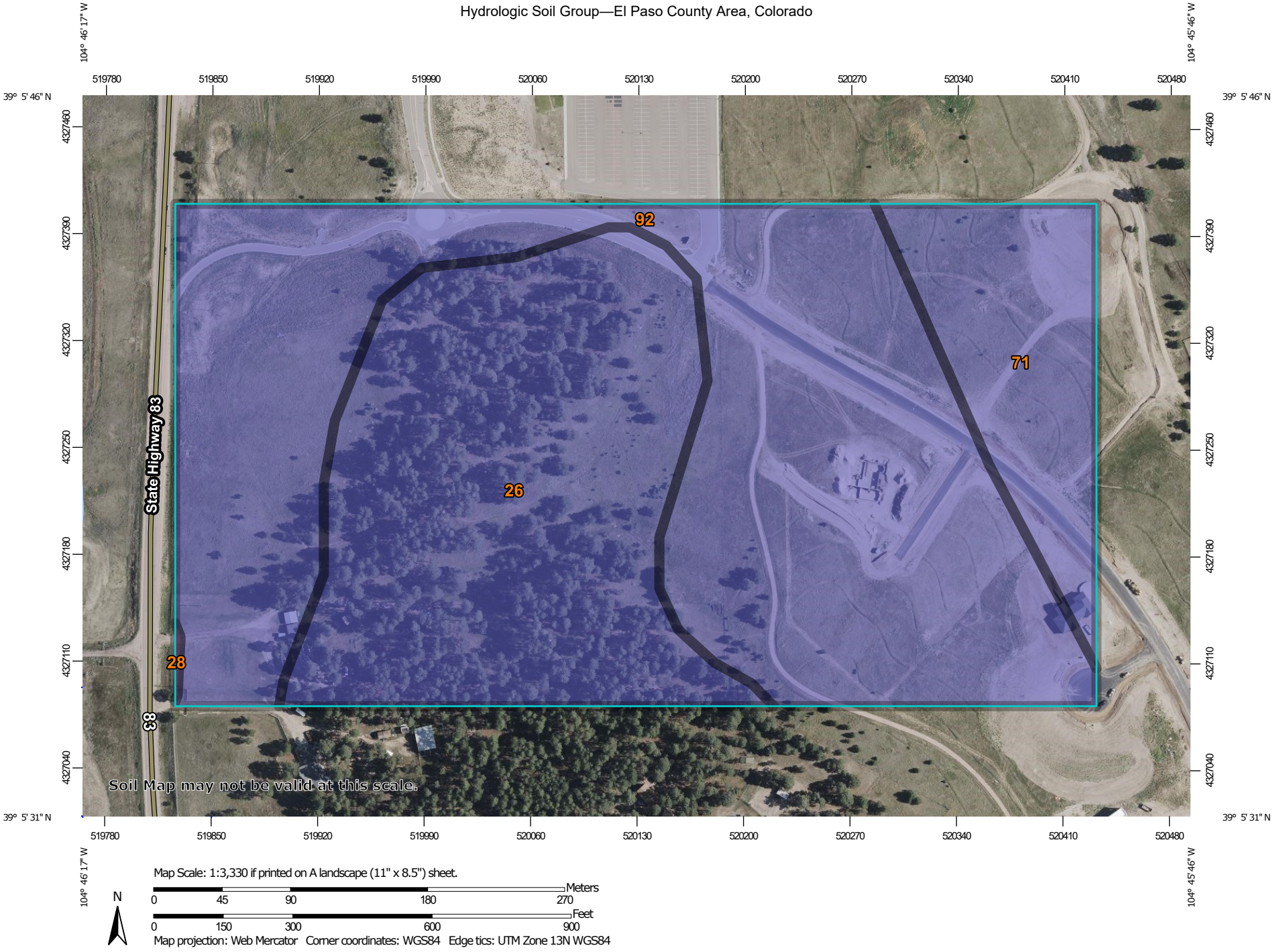
N

500 250 0 500 1000

ORIGINAL SCALE: 1" = 500'

VICINITY MAP	
WALDEN PRESERVE 2 F5A	
JOB NO. 25016	
LOCATION: EPC	SHEET
09/08/2026	

ALL TERRAIN ENGINEERING
1004 WEST VAN BUREN STREET
COLORADO SPRINGS, CO 80907



Map Scale: 1:3,330 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 23, Aug 29, 2025

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

Date(s) aerial images were photographed: Jul 23, 2024—Aug 4, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
26	Elbeth sandy loam, 8 to 15 percent slopes	B	17.3	35.1%
28	Ellicott loamy coarse sand, 0 to 5 percent slopes	A	0.0	0.1%
71	Pring coarse sandy loam, 3 to 8 percent slopes	B	5.8	11.6%
92	Tomah-Crowfoot loamy sands, 3 to 8 percent slopes	B	26.3	53.2%
Totals for Area of Interest			**49.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

FEMA

104°46'31"W 39°5'53"N



104°45'54"W 39°5'25"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 9/8/2026 at 7:33 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.

NOAA Atlas 14, Volume 8, Version 2
Location name: Colorado Springs, Colorado, USA*
Latitude: 39.0967°, Longitude: -104.7682°
Elevation: 7421 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.235** (0.193-0.286)	**0.287** (0.236-0.351)	**0.378** (0.310-0.463)	**0.458** (0.374-0.563)	**0.575** (0.454-0.734)	**0.670** (0.515-0.864)	**0.770** (0.571-1.01)	**0.875** (0.621-1.18)	**1.02** (0.696-1.41)	**1.14** (0.752-1.58)
10-min	**0.343** (0.283-0.419)	**0.421** (0.346-0.514)	**0.554** (0.454-0.678)	**0.671** (0.547-0.824)	**0.842** (0.665-1.08)	**0.981** (0.755-1.26)	**1.13** (0.836-1.48)	**1.28** (0.909-1.73)	**1.50** (1.02-2.06)	**1.67** (1.10-2.32)
15-min	**0.419** (0.345-0.511)	**0.513** (0.422-0.626)	**0.676** (0.554-0.827)	**0.819** (0.667-1.00)	**1.03** (0.811-1.31)	**1.20** (0.920-1.54)	**1.37** (1.02-1.81)	**1.56** (1.11-2.11)	**1.82** (1.24-2.52)	**2.03** (1.34-2.83)
30-min	**0.606** (0.499-0.739)	**0.741** (0.610-0.904)	**0.974** (0.799-1.19)	**1.18** (0.960-1.45)	**1.48** (1.17-1.89)	**1.72** (1.32-2.22)	**1.98** (1.47-2.60)	**2.25** (1.60-3.03)	**2.62** (1.79-3.62)	**2.92** (1.93-4.07)
60-min	**0.771** (0.636-0.941)	**0.931** (0.766-1.14)	**1.22** (0.997-1.49)	**1.47** (1.20-1.81)	**1.86** (1.48-2.39)	**2.18** (1.68-2.83)	**2.53** (1.88-3.34)	**2.90** (2.06-3.92)	**3.43** (2.34-4.75)	**3.86** (2.55-5.37)
2-hr	**0.937** (0.776-1.13)	**1.12** (0.928-1.36)	**1.46** (1.20-1.77)	**1.77** (1.45-2.16)	**2.24** (1.80-2.87)	**2.65** (2.06-3.41)	**3.08** (2.31-4.06)	**3.56** (2.55-4.79)	**4.24** (2.91-5.84)	**4.79** (3.19-6.63)
3-hr	**1.02** (0.849-1.23)	**1.21** (1.00-1.46)	**1.56** (1.29-1.89)	**1.90** (1.56-2.30)	**2.42** (1.95-3.10)	**2.87** (2.24-3.70)	**3.37** (2.54-4.43)	**3.92** (2.82-5.26)	**4.71** (3.25-6.47)	**5.36** (3.58-7.38)
6-hr	**1.20** (0.997-1.43)	**1.39** (1.16-1.67)	**1.77** (1.47-2.13)	**2.15** (1.77-2.59)	**2.75** (2.23-3.51)	**3.28** (2.58-4.21)	**3.86** (2.93-5.06)	**4.52** (3.28-6.05)	**5.48** (3.81-7.50)	**6.27** (4.22-8.59)
12-hr	**1.42** (1.19-1.68)	**1.64** (1.37-1.95)	**2.07** (1.73-2.46)	**2.49** (2.06-2.98)	**3.16** (2.58-4.00)	**3.75** (2.97-4.77)	**4.40** (3.36-5.72)	**5.13** (3.75-6.82)	**6.20** (4.34-8.43)	**7.09** (4.79-9.64)
24-hr	**1.67** (1.41-1.97)	**1.95** (1.64-2.30)	**2.46** (2.07-2.92)	**2.95** (2.46-3.50)	**3.69** (3.02-4.61)	**4.33** (3.44-5.45)	**5.03** (3.85-6.46)	**5.80** (4.25-7.62)	**6.90** (4.85-9.28)	**7.80** (5.31-10.5)
2-day	**1.95** (1.66-2.29)	**2.31** (1.96-2.71)	**2.95** (2.49-3.46)	**3.51** (2.95-4.14)	**4.34** (3.55-5.34)	**5.03** (4.00-6.24)	**5.76** (4.42-7.30)	**6.53** (4.80-8.49)	**7.62** (5.38-10.1)	**8.49** (5.82-11.4)
3-day	**2.14** (1.82-2.49)	**2.53** (2.15-2.96)	**3.22** (2.73-3.77)	**3.82** (3.22-4.49)	**4.71** (3.85-5.75)	**5.43** (4.33-6.70)	**6.19** (4.76-7.81)	**6.99** (5.16-9.04)	**8.11** (5.75-10.7)	**9.00** (6.19-12.0)
4-day	**2.29** (1.96-2.67)	**2.71** (2.30-3.15)	**3.42** (2.90-3.99)	**4.05** (3.41-4.74)	**4.96** (4.07-6.04)	**5.71** (4.56-7.02)	**6.49** (5.01-8.17)	**7.33** (5.42-9.44)	**8.49** (6.03-11.2)	**9.41** (6.49-12.5)
7-day	**2.69** (2.31-3.11)	**3.13** (2.68-3.62)	**3.88** (3.31-4.50)	**4.55** (3.85-5.29)	**5.52** (4.55-6.68)	**6.32** (5.08-7.73)	**7.16** (5.55-8.95)	**8.05** (5.99-10.3)	**9.30** (6.64-12.2)	**10.3** (7.14-13.6)
10-day	**3.04** (2.61-3.51)	**3.50** (3.01-4.04)	**4.30** (3.68-4.97)	**5.00** (4.25-5.81)	**6.03** (4.98-7.26)	**6.87** (5.54-8.37)	**7.76** (6.03-9.66)	**8.69** (6.48-11.1)	**10.0** (7.17-13.1)	**11.0** (7.68-14.6)
20-day	**4.02** (3.47-4.60)	**4.60** (3.97-5.27)	**5.59** (4.80-6.41)	**6.43** (5.50-7.40)	**7.64** (6.33-9.09)	**8.60** (6.96-10.4)	**9.60** (7.50-11.8)	**10.6** (7.97-13.4)	**12.1** (8.69-15.6)	**13.2** (9.23-17.3)
30-day	**4.83** (4.18-5.50)	**5.53** (4.79-6.30)	**6.69** (5.77-7.64)	**7.67** (6.57-8.79)	**9.02** (7.48-10.6)	**10.1** (8.16-12.1)	**11.1** (8.73-13.6)	**12.2** (9.20-15.4)	**13.7** (9.90-17.7)	**14.8** (10.4-19.4)
45-day	**5.86** (5.09-6.64)	**6.72** (5.83-7.62)	**8.11** (7.01-9.22)	**9.24** (7.95-10.5)	**10.8** (8.94-12.6)	**11.9** (9.68-14.2)	**13.1** (10.3-15.9)	**14.2** (10.7-17.7)	**15.7** (11.4-20.1)	**16.8** (11.9-21.9)
60-day	**6.75** (5.87-7.62)	**7.74** (6.73-8.75)	**9.32** (8.08-10.6)	**10.6** (9.12-12.0)	**12.3** (10.2-14.3)	**13.5** (11.0-15.9)	**14.7** (11.5-17.7)	**15.9** (11.9-19.6)	**17.3** (12.6-22.0)	**18.4** (13.0-23.9)

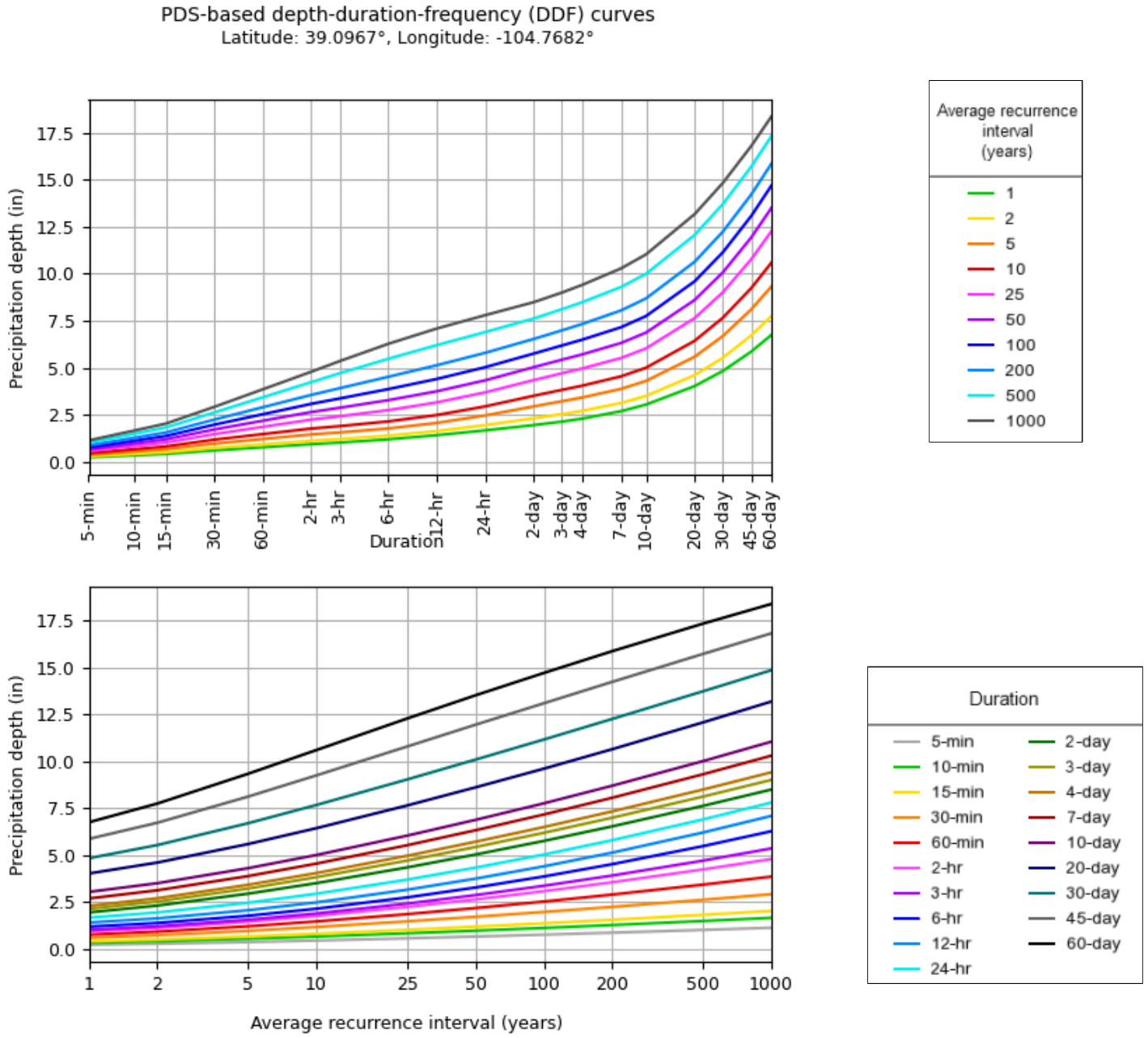
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



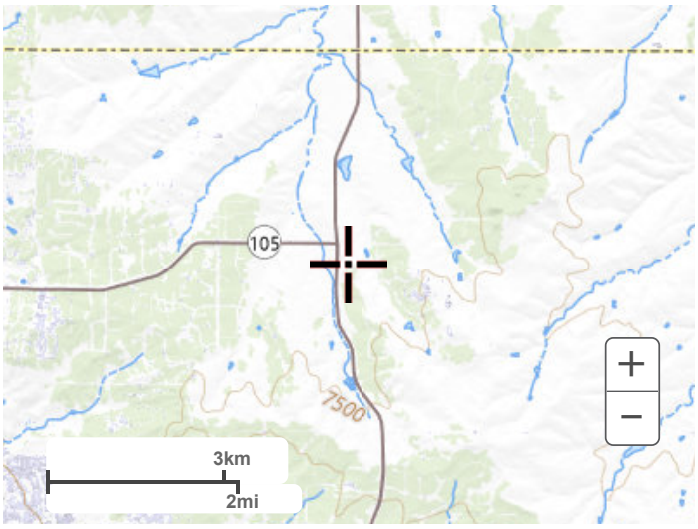
NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Tue Oct 21 17:26:28 2025

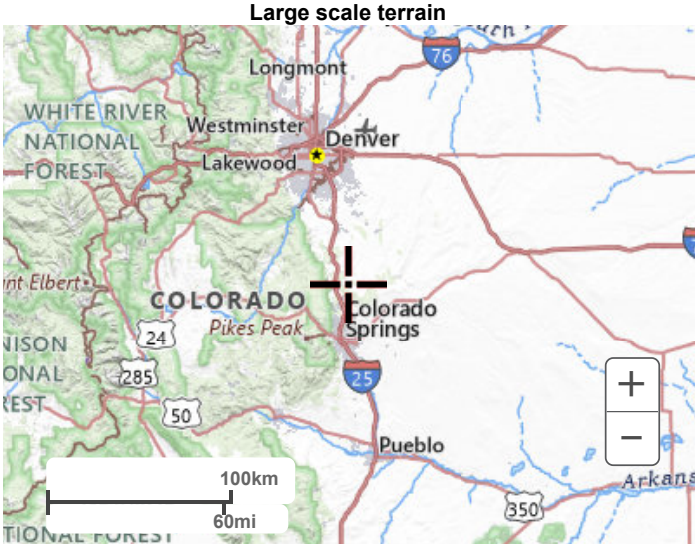
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Maps & aerials

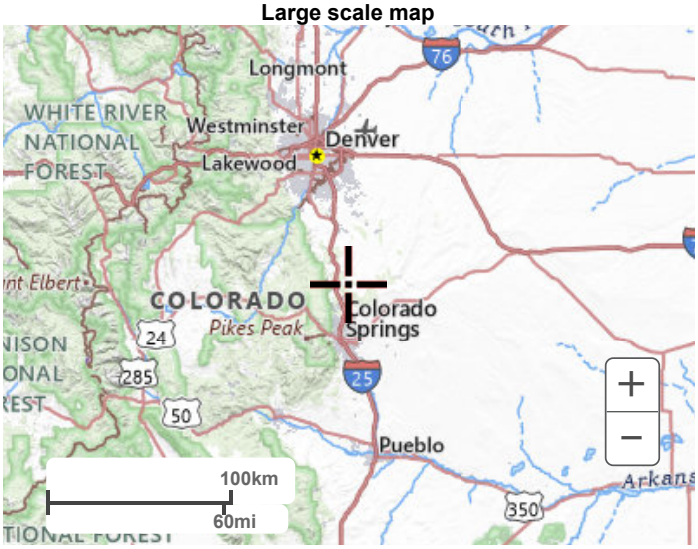
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX B – HYDROLOGIC CALCULATIONS

Subdivision:	Walden Preserve 2 - F5 Amend.
Location:	El Paso County
Project Name:	Walden Preserve 2 - F5 Amend.
Project Number:	25016
Calculated By:	NQJ
Checked By:	REB
Date:	9/8/2026

EXISTING CONDITIONS - BASIN SUMMARY TABLE

Basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
EXA	11.89	5.5%	0.12	0.38	17.9	4.6	24.8
EXB	1.78	37.8%	0.39	0.58	18.6	2.2	5.5
EXC	17.61	7.2%	0.13	0.39	33.0	5.2	26.7
EXD	0.50	34.5%	0.35	0.55	11.3	0.7	1.8

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	4.6	24.8
2	6.0	26.7
3	5.2	26.7
4	0.7	1.8
5	28.6	64.2

COMPOSITE % IMPERVIOUS CALCULATIONS - EXISTING CONDITIONS

Subdivision: Walden Preserve 2 - F5 Amend.
Location: El Paso County

Project Name: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Calculated By: NQJ
Checked By: REB
Date: 9/8/26

		Gravel				Paved				1 Acre Lots				Roofs				Undeveloped				Weighted C_5 & C_{100}		Basins Total Weighted % Imp.
Basin ID	Total Area (ac)	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	
EXA	11.89	0.59	0.70	0.00	80.0%	0.90	0.96	0.43	100.0%	0.20	0.44	0.00	20.0%	0.73	0.81	0.00	90.0%	0.09	0.36	11.46	2.0%	0.12	0.38	5.5%
EXB	1.78	0.59	0.70	0.00	80.0%	0.90	0.96	0.65	100.0%	0.20	0.44	0.00	20.0%	0.73	0.81	0.00	90.0%	0.09	0.36	1.13	2.0%	0.39	0.58	37.8%
EXC	17.61	0.59	0.70	0.30	80.0%	0.90	0.96	0.00	100.0%	0.20	0.44	0.50	20.0%	0.73	0.81	0.68	90.0%	0.09	0.36	16.13	2.0%	0.13	0.39	7.2%
EXD	0.50	0.59	0.70	0.02	80.0%	0.90	0.96	0.15	100.0%	0.20	0.44	0.00	20.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.33	2.0%	0.35	0.55	34.5%
Total	**31.78**																							**8.7%**

STANDARD FORM SF-2 - EXISTING CONDITIONS
TIME OF CONCENTRATION

Subdivision: Walden Preserve 2 - F5 Amend.
Location: El Paso County

Project Name: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Calculated By: NQJ
Checked By: REB
Date: 9/8/26

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Weighted C_5	Weighted C_{100}	Impervious (%)	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
EXA	11.89	B	0.12	0.38	5.5%	35	2.0%	8.3	1120	3.8%	10.0	1.9	9.6	17.9	1155.0	34.9	17.9
EXB	1.78	B	0.39	0.58	37.8%	300	12.0%	9.8	815	4.9%	7.0	1.5	8.8	18.6	1115.0	23.9	18.6
EXC	17.61	B	0.13	0.39	7.2%	300	6.0%	16.9	1557	5.3%	7.0	1.6	16.1	33.0	1857.0	36.0	33.0
EXD	0.50	B	0.35	0.55	34.5%	90	2.0%	10.2	150	5.3%	10.0	2.3	1.1	11.3	240.0	20.9	11.3

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

Eq
$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}}$$

Where:

t_i = overland (initial) flow time (minutes)
C_5 = runoff coefficient for 5-year frequency (from Table 6-4)
L_i = length of overland flow (ft)
S_o = average slope along the overland flow path (ft/ft).

Equation 6-3

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

Where:

t_t = channelized flow time (travel time, min)
L_t = waterway length (ft)
S_o = waterway slope (ft/ft)
V_t = travel time velocity (ft/sec) = $K\sqrt{S_o}$
K = NRCS conveyance factor (see Table 6-2).

Equation 6-4
$$t_c = \frac{(26 - 17i) + L_t}{60(14i + 9)\sqrt{S_t}}$$

Where:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.
L_t = length of channelized flow path (ft)
i = imperviousness (expressed as a decimal)
S_t = slope of the channelized flow path (ft/ft).

Equation 6-5

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Walden Preserve 2 - F5 Amend.
Location: El Paso County
Design Storm: 5-Year

Project Name: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Calculated By: NQJ
Checked By: REB
Date: 9/8/26

DESCRIPTION	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C* A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C* A (ac)	I (in/hr)	Q (cfs)	$Q_{overland}$ (cfs)	C* A (ac)	Slope (%)	Q_{pipe} (cfs)	C* A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	EXA	11.89	0.12	17.9	1.42	3.26	4.6					4.6	1.42	1.7					300	0.9	5.5	BASIN EXA @ DP1, SWALE ALONG HIGHWAY 82 TO DP2
		EXB	1.78	0.39	18.6	0.69	3.20	2.2															BASIN EXB @ DP2
	2								23.4	2.11	2.85	6.0											COMBINED DP1 & BASIN EXB @ DP2, EX 24" CMP CULVERT UNDER HIGHWAY 24
	3	EXC	17.61	0.13	33.0	2.23	2.34	5.2															BASIN EXC @ DP3, EX 24" CULVERT UNDER EX DRIVEWAY TO SOUTH
	4	EXD	0.50	0.35	11.3	0.18	3.95	0.7															BASIN EXD @ DP4, HISTORIC DRAINAGE PATTERNS TO DP5 (EX RAIN GARDEN C12)
		C11	8.63	0.30	10.5	2.59	4.03	10.4															WALDEN PRESERVE 2 - F5 BASIN C11 @ DP5 (INCLUDED FOR TOTAL FLOW CALC @ DP5)
		C12	17.77	0.30	14.9	5.33	3.47	18.5															WALDEN PRESERVE 2 - F5 BASIN C12 @ DP5 (INCLUDED FOR TOTAL FLOW CALC @ DP5)
	5								14.9	8.10	3.53	28.6											COMBINED DP4, BASIN C11 & C12 @ DP5 (EX RAIN GARDEN C12)

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Project Name: Walden Preserve 2 - F5 Amend.
Subdivision: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Location: El Paso County
Calculated By: NQJ
Design Storm: 100-Year
Checked By: REB
Date: 9/8/26

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	$Q_{OVERLAND}$ (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	EXA	11.89	0.38	17.9	4.54	5.46	24.8					24.8	4.54	1.7					300	0.9	5.5	BASIN EXA @ DP1, SWALE ALONG HIGHWAY 82 TO DP2
		EXB	1.78	0.58	18.6	1.03	5.37	5.5															BASIN EXB @ DP2
	2								23.4	5.57	4.79	26.7											COMBINED DP1 & BASIN EXB @ DP2, EX 24" CMP CULVERT UNDER HIGHWAY 24
	3	EXC	17.61	0.39	33.0	6.79	3.93	26.7															BASIN EXC @ DP3, EX 24" CULVERT UNDER EX DRIVEWAY TO SOUTH
	4	EXD	0.50	0.55	11.3	0.28	6.63	1.8															BASIN EXD @ DP4, HISTORIC DRAINAGE PATTERNS TO DP5 (EX RAIN GARDEN C12)
		C11	8.63	0.40	10.5	3.45	7.16	24.7															WALDEN PRESERVE 2 - F5 BASIN C11 @ DP5 (INCLUDED FOR TOTAL FLOW CALC @ DP5)
		C12	17.77	0.40	14.9	7.11	6.18	43.9															WALDEN PRESERVE 2 - F5 BASIN C12 @ DP5 (INCLUDED FOR TOTAL FLOW CALC @ DP5)
	5								14.9	10.84	5.93	64.2											COMBINED DP4, BASIN C11 & C12 @ DP5 (EX RAIN GARDEN C12)

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

Subdivision:	Walden Preserve 2 - F5 Amend.
Location:	El Paso County
Project Name:	Walden Preserve 2 - F5 Amend.
Project Number:	25016
Calculated By:	NQJ
Checked By:	REB
Date:	9/8/2026

PROPOSED CONDITIONS - BASIN SUMMARY TABLE

Basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
EXB	1.78	37.8%	0.39	0.58	18.6	2.2	5.5
A	2.15	28.4%	0.26	0.49	10.4	2.3	7.2
B	1.23	62.5%	0.58	0.73	8.8	3.1	6.5
C	1.03	39.2%	0.37	0.57	9.8	1.6	4.1
D	1.66	26.5%	0.23	0.47	14.5	1.4	4.6
E	0.32	35.9%	0.34	0.55	7.2	0.5	1.4
F	0.89	41.6%	0.41	0.59	10.2	1.5	3.6
G	1.12	35.0%	0.33	0.54	8.6	1.6	4.4
H	11.83	15.1%	0.17	0.42	21.7	5.8	24.6
I	5.02	21.3%	0.20	0.45	16.2	3.5	12.8
J	1.57	2.0%	0.09	0.36	9.3	0.6	4.0
K	0.94	29.7%	0.32	0.53	12.3	1.1	3.2
L	0.77	11.2%	0.14	0.40	13.6	0.4	1.9
M	2.31	19.2%	0.20	0.44	7.4	2.1	7.8

Please add Basin C11 and C12 to this table.

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	2.3	7.2
2	5.8	14.9
3	1.4 ~~1.8~~	4.6
4	0.5	1.4
5	3.3	8.5
6	5.8	24.6
7	14.4	47.5
8	2.8	24.6
9	1.1	3.2
10	0.4	1.9
11	23.9	56.6

COMPOSITE % IMPERVIOUS CALCULATIONS - PROPOSED CONDITIONS

Subdivision: Walden Preserve 2 - F5 Amend.
Location: El Paso County

Project Name: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Calculated By: NQJ
Checked By: REB
Date: 9/8/26

		Gravel				Paved				1 Acre Lots				0.5 Acre Lots				Undeveloped				Weighted C_5 & C_{100}		Basins Total Weighted % Imp.
Basin ID	Total Area (ac)	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	
EXB	1.78	0.59	0.70	0.00	80.0%	0.90	0.96	0.65	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.00	25.0%	0.09	0.36	1.13	2.0%	0.39	0.58	37.8%
A	2.15	0.59	0.70	0.02	80.0%	0.90	0.96	0.15	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	1.76	25.0%	0.09	0.36	0.22	2.0%	0.26	0.49	28.4%
B	1.23	0.59	0.70	0.05	80.0%	0.90	0.96	0.72	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.00	25.0%	0.09	0.36	0.46	2.0%	0.58	0.73	62.5%
C	1.03	0.59	0.70	0.04	80.0%	0.90	0.96	0.27	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.38	25.0%	0.09	0.36	0.34	2.0%	0.37	0.57	39.2%
D	1.66	0.59	0.70	0.08	80.0%	0.90	0.96	0.00	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	1.50	25.0%	0.09	0.36	0.08	2.0%	0.23	0.47	26.5%
E	0.32	0.59	0.70	0.01	80.0%	0.90	0.96	0.07	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.14	25.0%	0.09	0.36	0.10	2.0%	0.34	0.55	35.9%
F	0.89	0.59	0.70	0.05	80.0%	0.90	0.96	0.32	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.00	25.0%	0.09	0.36	0.52	2.0%	0.41	0.59	41.6%
G	1.12	0.59	0.70	0.03	80.0%	0.90	0.96	0.22	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.57	25.0%	0.09	0.36	0.30	2.0%	0.33	0.54	35.0%
H	11.83	0.59	0.70	0.15	80.0%	0.90	0.96	0.00	100.0%	0.20	0.44	0.61	20.0%	0.22	0.46	5.76	25.0%	0.09	0.36	5.31	2.0%	0.17	0.42	15.1%
I	5.02	0.59	0.70	0.14	80.0%	0.90	0.96	0.05	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	3.53	25.0%	0.09	0.36	1.30	2.0%	0.20	0.45	21.3%
J	1.57	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.00	25.0%	0.09	0.36	1.57	2.0%	0.09	0.36	2.0%
K	0.94	0.59	0.70	0.02	80.0%	0.90	0.96	0.25	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.00	25.0%	0.09	0.36	0.67	2.0%	0.32	0.53	29.7%
L	0.77	0.59	0.70	0.02	80.0%	0.90	0.96	0.00	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	0.24	25.0%	0.09	0.36	0.51	2.0%	0.14	0.40	11.2%
M	2.31	0.59	0.70	0.10	80.0%	0.90	0.96	0.09	100.0%	0.20	0.44	0.00	20.0%	0.22	0.46	1.00	25.0%	0.09	0.36	1.12	2.0%	0.20	0.44	19.2%
Pond 1 (A-I)	**25.25**																							**23.6%**
Rain Garden C12 (K-M)	**4.02**																							**20.1%**
Total	**32.62**																							**22.9%**

Please add Basin C11 and C12 to this table.

STANDARD FORM SF-2 - PROPOSED CONDITIONS
TIME OF CONCENTRATION

Subdivision: Walden Preserve 2 - F5 Amend.
Location: El Paso County

Project Name: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Calculated By: NQJ
Checked By: REB
Date: 9/8/26

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Weighted C_5	Weighted C_{100}	Impervious (%)	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
EXB	1.78	B	0.39	0.58	37.8%	300	12.0%	9.8	815	4.9%	7.0	1.5	8.8	18.6	1115.0	23.9	18.6
A	2.15	B	0.26	0.49	28.4%	140	10.0%	8.4	400	5.0%	15.0	3.4	2.0	10.4	540.0	23.5	10.4
B	1.23	B	0.58	0.73	62.5%	27	2.0%	3.8	1060	3.2%	20.0	3.6	4.9	8.8	1087.0	20.9	8.8
C	1.03	B	0.37	0.57	39.2%	50	5.0%	5.5	750	3.7%	15.0	2.9	4.3	9.8	800.0	23.8	9.8
D	1.66	B	0.23	0.47	26.5%	130	6.2%	9.8	644	2.3%	15.0	2.3	4.7	14.5	774.0	27.1	14.5
E	0.32	B	0.34	0.55	35.9%	100	10.0%	6.4	105	2.0%	15.0	2.1	0.8	7.2	205.0	20.8	7.2
F	0.89	B	0.41	0.59	41.6%	20	5.0%	3.3	1000	2.6%	15.0	2.4	6.9	10.2	1020.0	25.9	10.2
G	1.12	B	0.33	0.54	35.0%	20	5.0%	3.7	715	2.6%	15.0	2.4	4.9	8.6	735.0	25.4	8.6
H	11.83	B	0.17	0.42	15.1%	300	6.0%	16.2	1230	6.2%	15.0	3.7	5.5	21.7	1530.0	30.8	21.7
I	5.02	B	0.20	0.45	21.3%	180	11.0%	9.8	1063	3.4%	15.0	2.8	6.4	16.2	1243.0	30.4	16.2
J	1.57	B	0.09	0.36	2.0%	80	7.5%	8.4	150	7.5%	10.0	2.7	0.9	9.3	230.0	26.6	9.3
K	0.94	B	0.32	0.53	29.7%	85	2.0%	10.4	320	3.4%	15.0	2.8	1.9	12.3	405.0	23.1	12.3
L	0.77	B	0.14	0.40	11.2%	80	2.1%	12.1	200	2.1%	15.0	2.2	1.5	13.6	280.0	26.3	13.6
M	2.31	B	0.20	0.44	19.2%	20	5.0%	4.3	760	7.2%	15.0	4.0	3.1	7.4	780.0	26.8	7.4

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

Where:

t_t = channelized flow time (travel time, min)
L_t = waterway length (ft)
S_o = waterway slope (ft/ft)
V_t = travel time velocity (ft/sec) = $K\sqrt{S_o}$
K = NRCS conveyance factor (see Table 6-2).

Eq

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}}$$

Where:

t_i = overland (initial) flow time (minutes)
C_5 = runoff coefficient for 5-year frequency (from Table 6-4)
L_i = length of overland flow (ft)
S_o = average slope along the overland flow path (ft/ft).

Equation 6-4

$$t_t = \frac{(26 - 17i) + L_t}{60(14i + 9)\sqrt{S_t}}$$

:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.
L_t = length of channelized flow path (ft)
i = imperviousness (expressed as a decimal)
S_t = slope of the channelized flow path (ft/ft).

Equation 6-3

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

Equation 6-5

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

Please add Basin C11 and C12 to this table.

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Walden Preserve 2 - F5 Amend.
Location: El Paso County
Design Storm: 5-Year

Project Name: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Calculated By: NQJ
Checked By: REB
Date: 9/8/26

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
DESCRIPTION	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C* A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C* A (ac)	I (in/hr)	Q (cfs)	$Q_{overland}$ (cfs)	C* A (ac)	Slope (%)	Q_{pipe} (cfs)	C* A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	1	A	2.15	0.26	10.4	0.55	4.07	2.3					2.3	0.55	1.1					430	1.6	4.6	BASIN A @ DP1, 18" CULVERT WEST UNDER ROAD C, SWALE TO DP2
		B	1.23	0.58	8.8	0.72	4.32	3.1															BASIN B @ DP2
		C	1.03	0.37	9.8	0.38	4.16	1.6															BASIN C @ DP2
	2								15.0	1.65	3.52	5.8											COMBINED DP1, BASIN B & C @ DP2, TYPE D INLET & PIPE TO DP7 (POND 1)
	3	D	1.66	0.23	14.5	0.38	3.57	1.4															BASIN D @ DP3, CONTINUES TO DP7 (POND 1)
	4	E	0.32	0.34	7.2	0.11	4.61	0.5					0.5	0.11	2.8					700	2.5	4.6	BASIN E @ DP4, 18" CULVERT WEST UNDER ROAD B, SWALE TO DP5
		F	0.89	0.41	10.2	0.36	4.10	1.5															BASIN F @ DP5
		G	1.12	0.33	8.6	0.37	4.36	1.6															BASIN G @ DP5
	5								11.9	0.84	3.87	3.3											COMBINED DP4, BASIN F & G @ DP5, TYPE D INLET & PIPE TO DP7 (POND 1)
	6	H	11.83	0.17	21.7	1.96	2.97	5.8															BASIN H @ DP6, CONTINUES TO DP7 (POND 1)
		I	5.02	0.20	16.2	1.02	3.40	3.5															BASIN I @ DP7
	7								21.7	4.83	2.97	14.4											COMBINED DP2, DP3, DP5, DP6 & BASIN 1 @ DP7 (TOTAL FLOW TO POND 1)

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Walden Preserve 2 - F5 Amend.
Location: El Paso County
Design Storm: 5-Year

Project Name: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Calculated By: NQJ
Checked By: REB
Date: 9/8/26

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
DESCRIPTION	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C* A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C* A (ac)	I (in/hr)	Q (cfs)	$Q_{overland}$ (cfs)	C* A (ac)	Slope (%)	Q_{pipe} (cfs)	C* A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
		J	1.57	0.09	9.3	0.14	4.24	0.6					0.6	0.14	2					451	2.1	3.5	BASIN J @ DP8
		EXB	1.78	0.39	18.6	0.69	3.20	2.2															BASIN EXB @ DP8
	8								18.6	0.83	3.20	2.8											COMBINED BASIN J & BASIN EXB & POND 1 DISCHARGE @ DP8, EX 24" CMP CULVERT UNDER HWY 83
	9	K	0.94	0.32	12.3	0.30	3.82	1.1					1.1	0.30	6					460	3.7	2.1	BASIN K @ DP9, SWALE FLOW TO DP11 (RAIN GARDEN C12)
	10	L	0.77	0.14	13.6	0.11	3.67	0.4					0.4	0.11	4.2					1100	3.1	6.0	BASIN L @ DP10, SWALE/CULVERT FLOW TO DP11 (RAIN GARDEN C12)
		M	2.31	0.20	7.4	0.46	4.58	2.1															BASIN M @ DP11 (RAIN GARDEN C12)
		C11	7.86	0.30	10.5	2.36	4.06	9.6															BASIN C11 @ DP11 (FOLLOWS HISTORIC DRAINAGE PATTERNS)
		C12	14.52	0.30	14.9	4.36	3.53	15.4															BASIN C12 @ DP11 (FOLLOWS HISTORIC DRAINAGE PATTERNS)
	11								19.6	7.58	3.12	23.9											COMBINED DP9, DP10, BASIN M, C122 & C12 @ DP11 (TOTAL SITE FLOW ENTERING RAIN GARDEN C12)

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Project Name: Walden Preserve 2 - F5 Amend.
Subdivision: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Location: El Paso County
Calculated By: NQJ
Design Storm: 100-Year
Checked By: REB
Date: 9/8/26

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	$Q_{OVERLAND}$ (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	1	A	2.15	0.49	10.4	1.05	6.83	7.2					7.2	1.05	1.1					430	1.6	4.6	BASIN A @ DP1, 18" CULVERT WEST UNDER ROAD C, SWALE TO DP2
		B	1.23	0.73	8.8	0.89	7.26	6.5															BASIN B @ DP2
		C	1.03	0.57	9.8	0.58	6.98	4.1															BASIN C @ DP2
	2								15.0	2.52	5.92	14.9											COMBINED DP1, BASIN B & C @ DP2, TYPE D INLET & PIPE TO DP7 (POND 1)
	3	D	1.66	0.47	14.5	0.77	5.99	4.6															BASIN D @ DP3, CONTINUES TO DP7 (POND 1)
	4	E	0.32	0.55	7.2	0.17	7.74	1.4					1.4	0.17	2.8					700	2.5	4.6	BASIN E @ DP4, 18" CULVERT WEST UNDER ROAD B, SWALE TO DP5
		F	0.89	0.59	10.2	0.53	6.89	3.6															BASIN F @ DP5
		G	1.12	0.54	8.6	0.60	7.32	4.4															BASIN G @ DP5
	5								11.9	1.31	6.50	8.5											COMBINED DP4, BASIN F & G @ DP5, TYPE D INLET & PIPE TO DP7 (POND 1)
	6	H	11.83	0.42	21.7	4.93	4.98	24.6															BASIN H @ DP6, CONTINUES TO DP7 (POND 1)
		I	5.02	0.45	16.2	2.24	5.71	12.8															BASIN I @ DP7
	7								21.7	9.54	4.98	47.5											COMBINED DP2, DP3, DP5, DP6 & BASIN 1 @ DP7 (TOTAL FLOW TO POND 1)

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Project Name: Walden Preserve 2 - F5 Amend.
Subdivision: Walden Preserve 2 - F5 Amend.
Project No.: 25016.00
Location: El Paso County
Calculated By: NQJ
Design Storm: 100-Year
Checked By: REB
Date: 9/8/26

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	$Q_{OVERLAND}$ (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
		J	1.57	0.36	9.3	0.57	7.11	4.0					4.0	0.57	2					451	2.1	3.5	BASIN J @ DP8
		EXB	1.78	0.58	18.6	1.03	5.37	5.5															BASIN EXB @ DP8
	8								18.6	1.60	5.37	24.6											COMBINED BASIN J & BASIN EXB & POND 1 DISCHARGE @ DP8, EX 24" CMP CULVERT UNDER HWY 83
	9	K	0.94	0.53	12.3	0.50	6.41	3.2					3.2	0.50	6					460	3.7	2.1	BASIN K @ DP9, SWALE FLOW TO DP11 (RAIN GARDEN C12)
	10	L	0.77	0.40	13.6	0.31	6.15	1.9					1.9	0.31	4.2					1100	3.1	6.0	BASIN L @ DP10, SWALE/CULVERT FLOW TO DP11 (RAIN GARDEN C12)
		M	2.31	0.44	7.4	1.02	7.68	7.8															BASIN M @ DP11 (RAIN GARDEN C12)
		C11	7.86	0.40	10.5	3.14	6.81	21.4															BASIN C11 @ DP11 (FOLLOWS HISTORIC DRAINAGE PATTERNS)
		C12	14.52	0.40	14.9	5.81	5.93	34.4															BASIN C12 @ DP11 (FOLLOWS HISTORIC DRAINAGE PATTERNS)
	11								19.6	10.77	5.24	56.6											COMBINED DP9, DP10, BASIN M, C122 & C12 @ DP11 (TOTAL SITE FLOW ENTERING RAIN GARDEN C12)

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

APPENDIX C – HYDRAULIC CALCULATIONS

Per EPC PDR & FDR checklist, hydraulic calculations will be provided with the FDR.

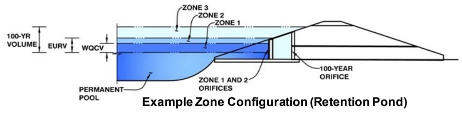
APPENDIX D – WATER QUALITY & DETENTION

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Walden Preserve 2 F5 Amendment & F6

Basin ID: Pond 1 - Basin A-I



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	25.25	acres
Watershed Length =	1,270	ft
Watershed Length to Centroid =	435	ft
Watershed Slope =	0.055	ft/ft
Watershed Imperviousness =	23.60%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.273	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.600	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.93 in.) =	0.347	acre-feet	0.93	inches
5-yr Runoff Volume (P1 = 1.22 in.) =	0.631	acre-feet	1.22	inches
10-yr Runoff Volume (P1 = 1.47 in.) =	0.996	acre-feet	1.47	inches
25-yr Runoff Volume (P1 = 1.86 in.) =	1.916	acre-feet	1.86	inches
50-yr Runoff Volume (P1 = 2.18 in.) =	2.546	acre-feet	2.18	inches
100-yr Runoff Volume (P1 = 2.53 in.) =	3.387	acre-feet	2.53	inches
500-yr Runoff Volume (P1 = 3.43 in.) =	5.271	acre-feet	3.43	inches
Approximate 2-yr Detention Volume =	0.327	acre-feet		
Approximate 5-yr Detention Volume =	0.497	acre-feet		
Approximate 10-yr Detention Volume =	0.793	acre-feet		
Approximate 25-yr Detention Volume =	1.057	acre-feet		
Approximate 50-yr Detention Volume =	1.163	acre-feet		
Approximate 100-yr Detention Volume =	1.459	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.273	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.327	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.859	acre-feet
Total Detention Basin Volume =	1.459	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

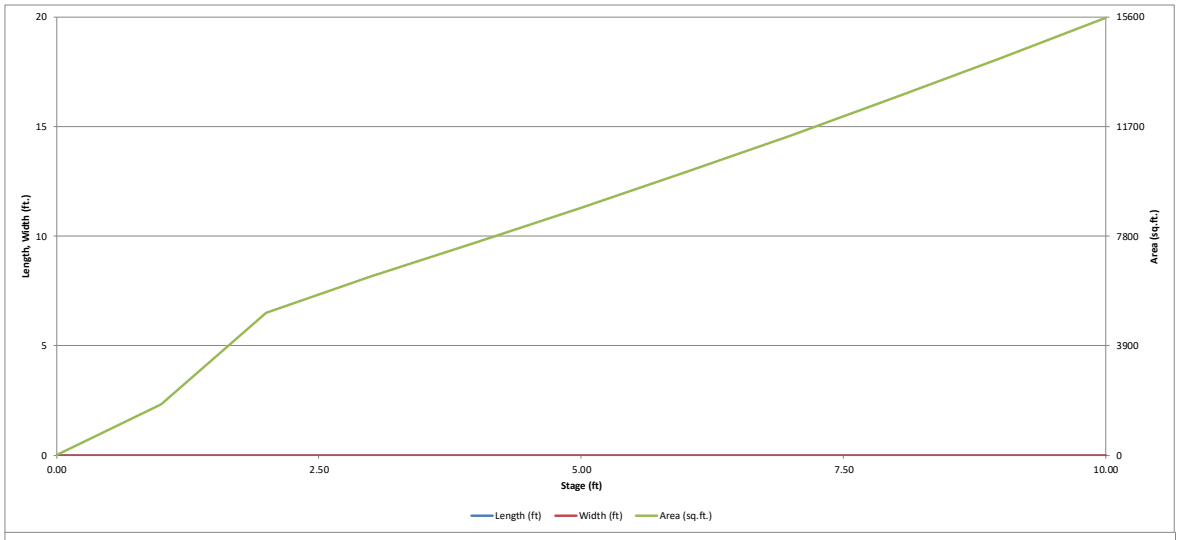
Depth Increement = ft

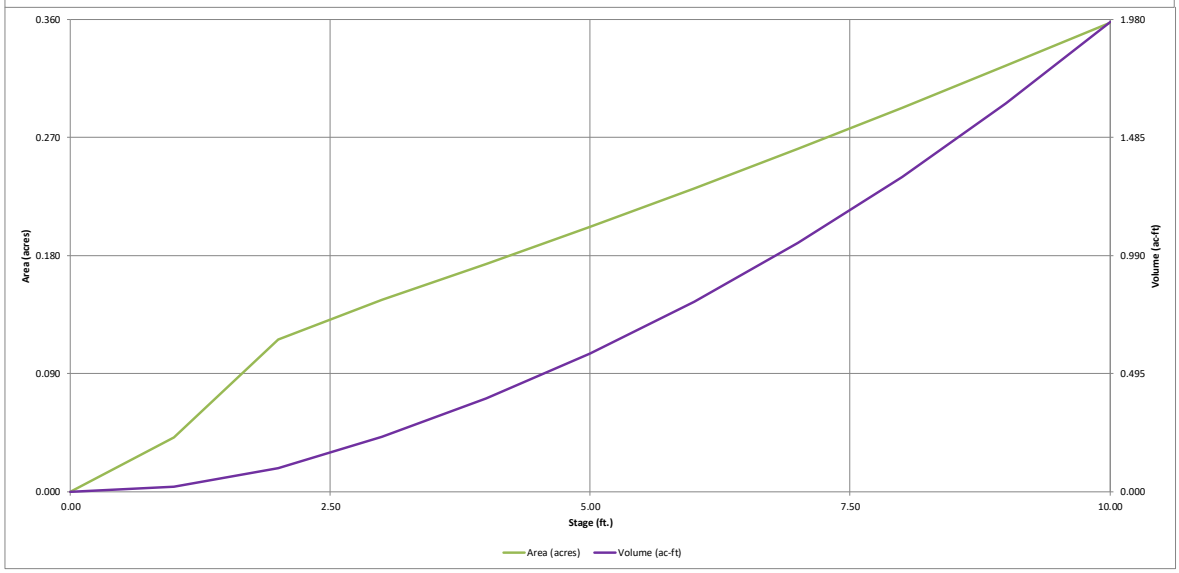
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Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	10	0.000		
	--	1.00	--	--	--	1,805	0.041	907	0.021
	--	2.00	--	--	--	5,062	0.116	4,341	0.100
	--	3.00	--	--	--	6,377	0.146	10,060	0.231
	--	4.00	--	--	--	7,568	0.174	17,033	0.391
	--	5.00	--	--	--	8,800	0.202	25,217	0.579
	--	6.00	--	--	--	10,074	0.231	34,654	0.796
	--	7.00	--	--	--	11,389	0.261	45,385	1.042
	--	8.00	--	--	--	12,746	0.293	57,453	1.319
	--	9.00	--	--	--	14,144	0.325	70,898	1.628
	--	10.00	--	--	--	15,583	0.358	85,761	1.969
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DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



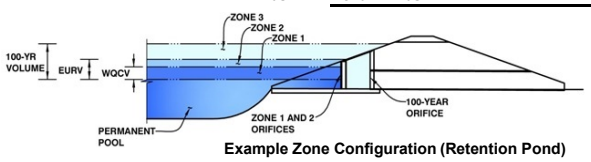


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Walden Preserve 2 F5 Amendment & F6**

Basin ID: **Pond 1 - Basin A-I**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.29	0.273	Orifice Plate
Zone 2 (EURV)	5.11	0.327	Orifice Plate
Zone 3 (100-year)	8.47	0.859	Weir&Pipe (Restrict)
Total (all zones)		1.459	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	9.375E-03	ft^2
Depth at top of Zone using Orifice Plate =	5.11	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	1.35	sq. inches (diameter = 1-5/16 inches)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.75	3.50					
Orifice Area (sq. inches)	1.35	1.35	1.35					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.16	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	5.16	N/A	feet
Overflow Weir Front Edge Length =	6.00	N/A	feet	Overflow Weir Slope Length =	6.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	11.68	N/A	
Horiz. Length of Weir Sides =	6.00	N/A	feet	Overflow Grate Open Area w/o Debris =	25.06	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	12.53	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	2.15	N/A	ft^2
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.73	N/A	feet
Restrictor Plate Height Above Pipe Invert =	15.50		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.87	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.10	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.90	feet
Spillway Crest Length =	20.00	feet	Stage at Top of Freeboard =	10.00	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.36	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	1.97	acre-ft

Calculated Parameters for Spillway

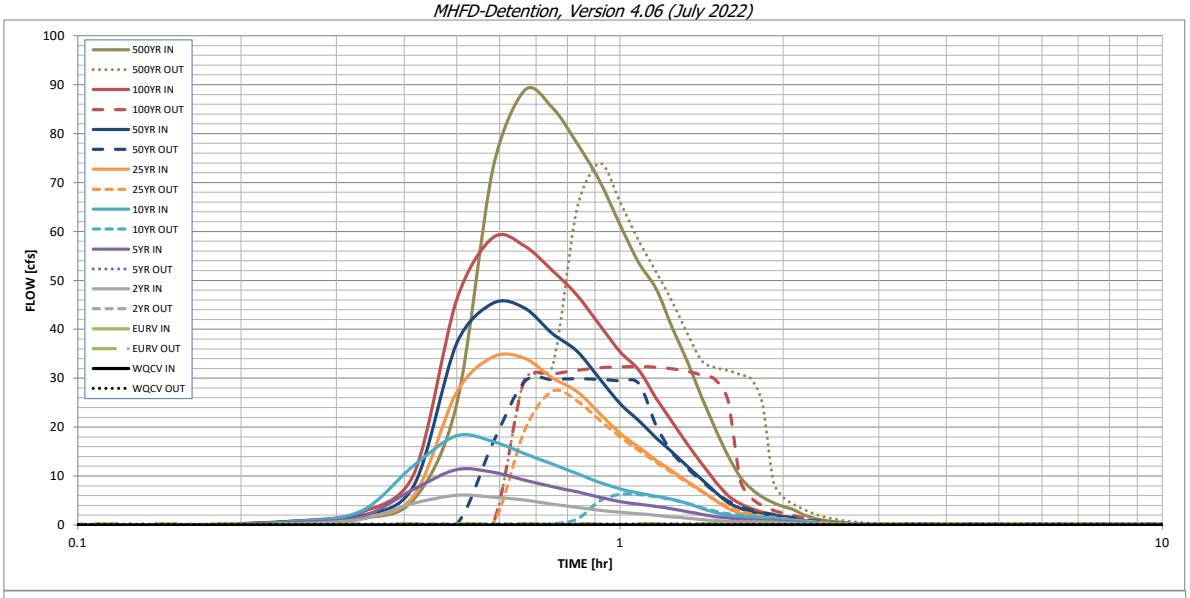
Routed Hydrograph Results

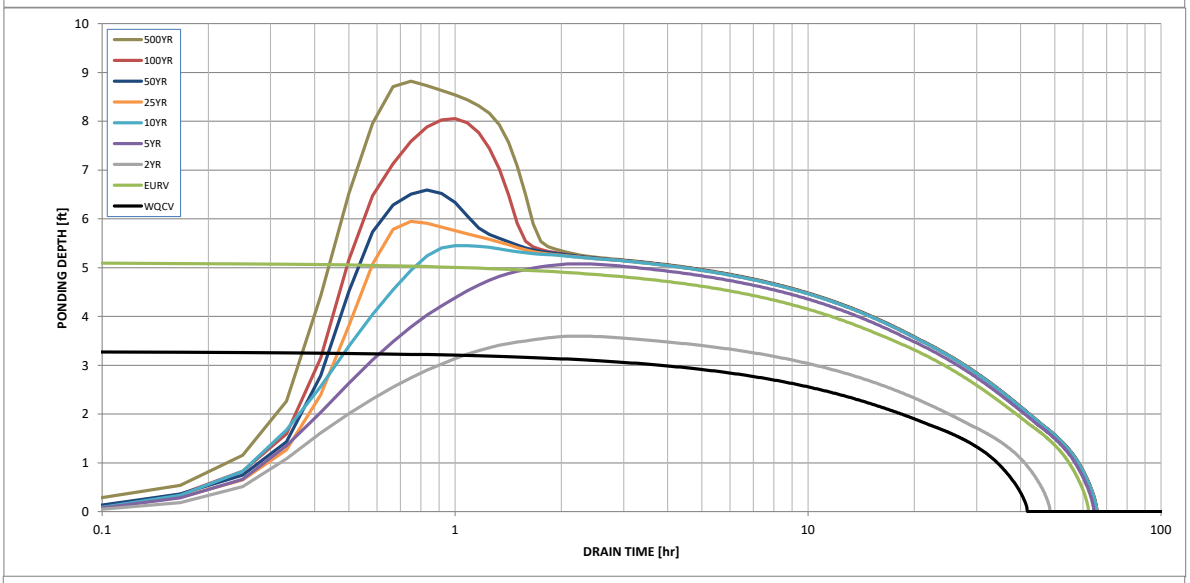
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

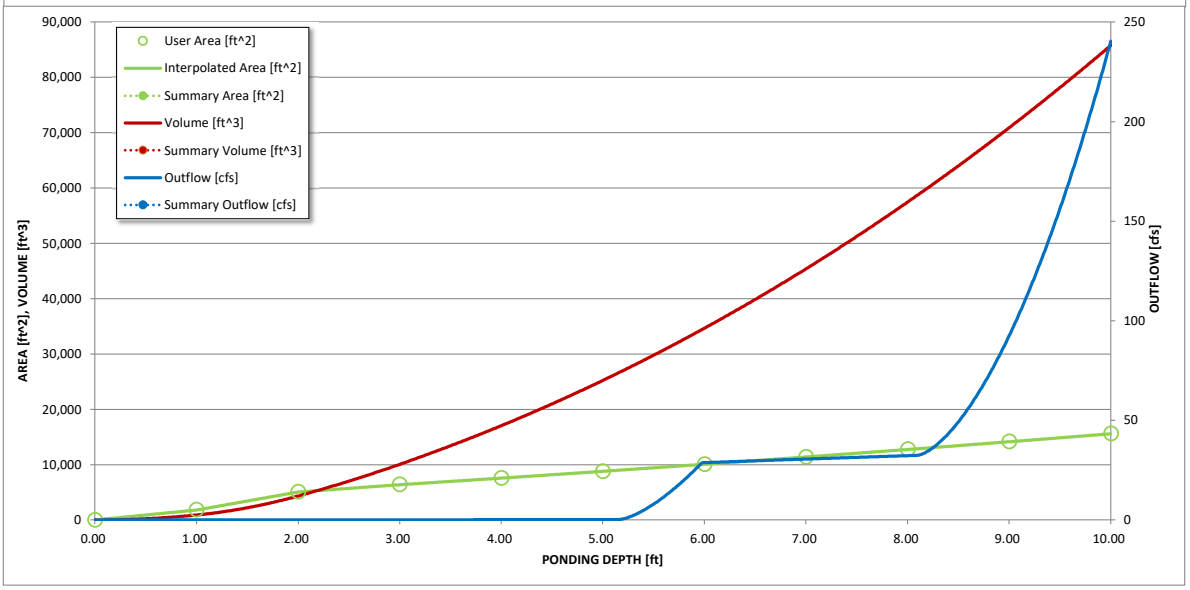
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.93	1.22	1.47	1.86	2.18	2.53	3.43
CUHP Runoff Volume (acre-ft) =	0.273	0.600	0.347	0.631	0.996	1.916	2.546	3.387	5.271
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.347	0.631	0.996	1.916	2.546	3.387	5.271
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.4	4.0	10.1	26.7	36.6	48.8	76.9
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.16	0.40	1.06	1.45	1.93	3.05
Peak Inflow Q (cfs) =	N/A	N/A	6.0	11.3	18.2	34.3	45.3	58.8	88.8
Peak Outflow Q (cfs) =	0.1	0.2	0.2	0.2	6.2	27.3	29.9	32.4	74.0
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.6	1.0	0.8	0.7	1.0
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.2	1.1	1.2	1.3	1.3
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	56	44	58	56	50	46	42	35
Time to Drain 99% of Inflow Volume (hours) =	**40**	59	47	62	61	59	57	55	51
Maximum Ponding Depth (ft) =	3.28	5.11	3.59	5.08	5.45	5.95	6.59	8.05	8.81
Area at Maximum Ponding Depth (acres) =	0.15	0.21	0.16	0.20	0.21	0.23	0.25	0.29	0.32
Maximum Volume Stored (acre-ft) =	0.273	0.601	0.322	0.593	0.671	0.782	0.935	1.331	1.566

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.26
	0:15:00	0.00	0.00	0.23	0.51	0.71	0.56	0.77	0.81	1.31
	0:20:00	0.00	0.00	1.20	1.71	2.84	1.51	1.86	2.61	5.22
	0:25:00	0.00	0.00	4.41	7.31	12.15	6.01	8.05	10.41	24.71
	0:30:00	0.00	0.00	6.04	11.34	18.23	27.10	37.14	46.03	72.82
	0:35:00	0.00	0.00	5.70	10.76	17.04	34.31	45.31	58.75	88.79
	0:40:00	0.00	0.00	5.08	9.17	14.57	34.08	44.34	57.00	85.36
	0:45:00	0.00	0.00	4.27	7.81	12.45	30.11	39.15	52.06	78.02
	0:50:00	0.00	0.00	3.60	6.77	10.50	27.28	35.52	46.98	70.40
	0:55:00	0.00	0.00	3.01	5.66	8.72	22.81	29.93	40.94	61.44
	1:00:00	0.00	0.00	2.58	4.79	7.38	18.78	24.85	35.43	53.57
	1:05:00	0.00	0.00	2.29	4.23	6.52	15.90	21.31	31.67	48.28
	1:10:00	0.00	0.00	1.95	3.81	5.85	13.21	17.78	25.91	40.21
	1:15:00	0.00	0.00	1.65	3.28	5.22	11.00	14.83	20.99	33.25
	1:20:00	0.00	0.00	1.37	2.70	4.38	8.84	11.89	16.43	26.00
	1:25:00	0.00	0.00	1.11	2.16	3.39	6.92	9.29	12.48	19.66
	1:30:00	0.00	0.00	0.87	1.69	2.52	5.00	6.72	8.91	14.10
	1:35:00	0.00	0.00	0.74	1.40	1.99	3.36	4.58	6.00	9.83
	1:40:00	0.00	0.00	0.67	1.17	1.73	2.44	3.40	4.35	7.31
	1:45:00	0.00	0.00	0.64	1.01	1.56	1.89	2.68	3.32	5.68
	1:50:00	0.00	0.00	0.62	0.90	1.44	1.55	2.22	2.61	4.56
	1:55:00	0.00	0.00	0.55	0.81	1.29	1.31	1.90	2.12	3.76
	2:00:00	0.00	0.00	0.48	0.72	1.12	1.18	1.71	1.77	3.18
	2:05:00	0.00	0.00	0.37	0.55	0.85	0.88	1.27	1.24	2.25
	2:10:00	0.00	0.00	0.28	0.41	0.62	0.63	0.91	0.86	1.56
	2:15:00	0.00	0.00	0.21	0.30	0.46	0.46	0.67	0.63	1.13
	2:20:00	0.00	0.00	0.16	0.22	0.33	0.34	0.49	0.47	0.83
	2:25:00	0.00	0.00	0.12	0.16	0.24	0.25	0.36	0.35	0.61
	2:30:00	0.00	0.00	0.09	0.11	0.17	0.17	0.26	0.25	0.44
	2:35:00	0.00	0.00	0.06	0.08	0.12	0.13	0.19	0.18	0.32
	2:40:00	0.00	0.00	0.04	0.05	0.09	0.09	0.13	0.13	0.23
	2:45:00	0.00	0.00	0.03	0.04	0.05	0.06	0.09	0.09	0.15
	2:50:00	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.05	0.09
	2:55:00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.02	0.04
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

Design Procedure Form: Rain Garden (RG)

UD-BMP (Version 3.07, March 2018)

Designer: All Terrain Engineering
Company: All Terrain Engineering
Date: September 9, 2026
Project: Walden Preserve 2 - F5 Amendment & F6
Location: Rain Garden C12 Update

1. Basin Storage Volume		
A) Effective Imperviousness of Tributary Area, I_a (100% if all paved and roofed areas upstream of rain garden)	I_a =	18.4 %
B) Tributary Area's Imperviousness Ratio (i = I_a/100)	i =	0.184
C) Water Quality Capture Volume (WQCV) for a 12-hour Drain Time (WQCV= 0.8 * (0.91* i^3 - 1.19 * i^2 + 0.78 * i)	WQCV =	0.09 watershed inches
D) Contributing Watershed Area (including rain garden area)	Area =	1,274,566 sq ft
E) Water Quality Capture Volume (WQCV) Design Volume Vol = (WQCV / 12) * Area	V_{WQCV} =	9,242 cu ft
F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm	d_6 =	in
G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume	$V_{WQCV\ OTHER}$ =	cu ft
H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)	$V_{WQCV\ USER}$ =	cu ft
2. Basin Geometry		
A) WQCV Depth (12-inch maximum)	D_{WQCV} =	12 in
B) Rain Garden Side Slopes (Z = 4 min., horiz. dist per unit vertical) (Use "0" if rain garden has vertical walls)	Z =	4.00 ft / ft
C) Mimimum Flat Surface Area	A_{Min} =	4683 sq ft
D) Actual Flat Surface Area	A_{Actual} =	8917 sq ft
E) Area at Design Depth (Top Surface Area)	A_{Top} =	10390 sq ft
F) Rain Garden Total Volume (V_T= ((A_{Top} + A_{Actual}) / 2) * Depth)	V_T=	9,654 cu ft
3. Growing Media	Choose One: (•) 18" Rain Garden Growing Media ( ) Other (Explain):	
4. Underdrain System		
A) Are underdrains provided?	Choose One: (•) YES ( ) NO	
B) Underdrain system orifice diameter for 12 hour drain time		
i) Distance From Lowest Elevation of the Storage Volume to the Center of the Orifice	y =	2.0 ft
ii) Volume to Drain in 12 Hours	Vol_{12} =	9,242 cu ft
iii) Orifice Diameter, 3/8" Minimum	D_O =	2 3/16 in

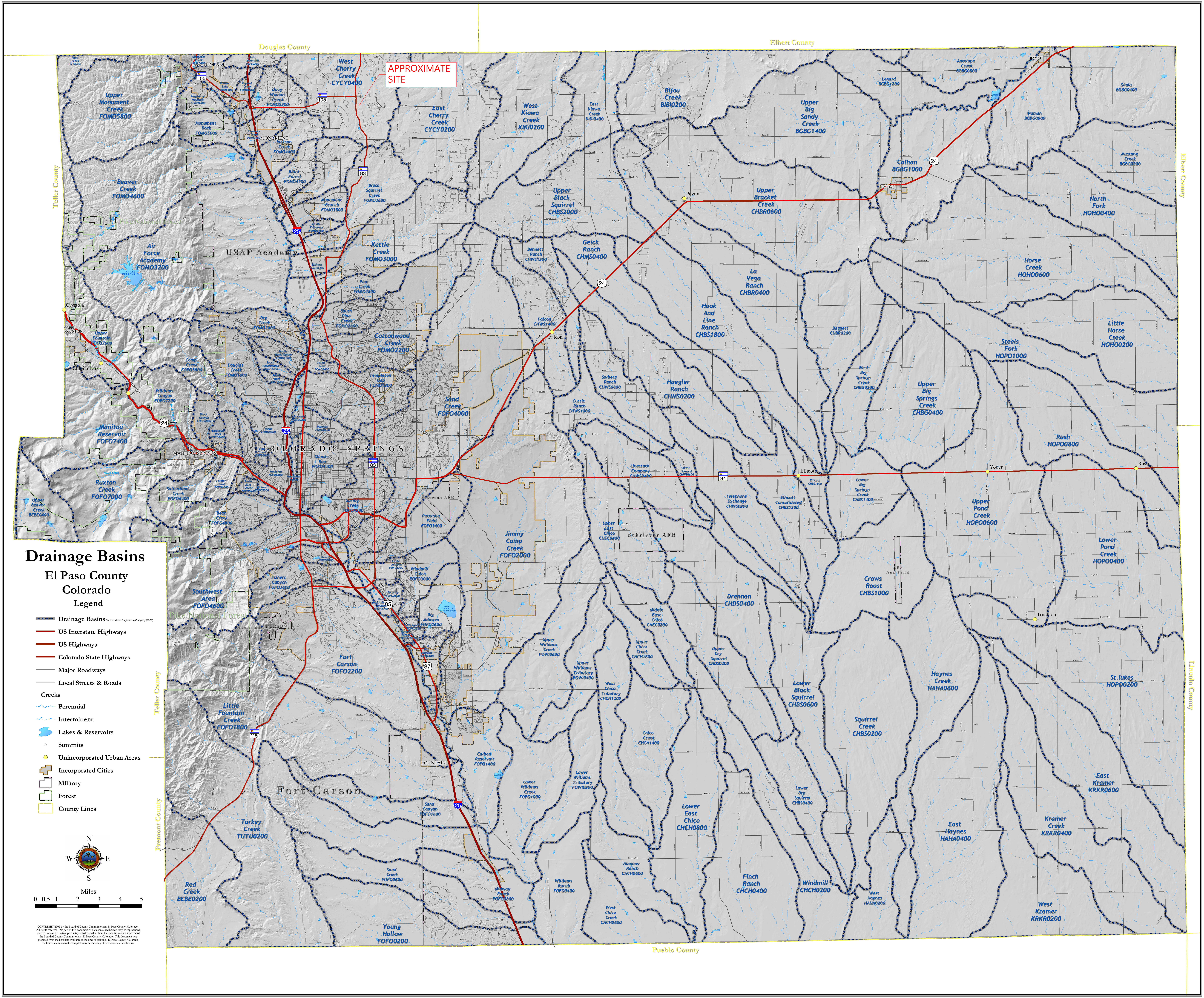
Design Procedure Form: Rain Garden (RG)

Designer: All Terrain Engineering
Company: All Terrain Engineering
Date: September 9, 2026
Project: Walden Preserve 2 - F5 Amendment & F6
Location: Rain Garden C12 Update

5. Impermeable Geomembrane Liner and Geotextile Separator Fabric A) Is an impermeable liner provided due to proximity of structures or groundwater contamination?	Choose One ○ YES ◉ NO
6. Inlet / Outlet Control A) Inlet Control	Choose One ○ Sheet Flow- No Energy Dissipation Required ◉ Concentrated Flow- Energy Dissipation Provided
7. Vegetation	Choose One ◉ Seed (Plan for frequent weed control) ○ Plantings ○ Sand Grown or Other High Infiltration Sod
8. Irrigation A) Will the rain garden be irrigated?	Choose One ○ YES ○ NO

Notes:

APPENDIX E – REFENCE MATERIAL


Drainage Basins
El Paso County
Colorado
Legend
Drainage Basins Source: Muller Engineering Company (1988)
US Interstate Highways
US Highways
Colorado State Highways
Major Roadways
Local Streets & Roads
Creeks
Perennial
Intermittent
Lakes & Reservoirs
Summits
Unincorporated Urban Areas
Incorporated Cities
Military
Forest
County Lines
N
W
E
S
Miles
0 0.5 1 2 3 4 5
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APPROXIMATE SITE
Douglas County
Elbert County
Teller County
Fremont County
Pueblo County
Lincoln County
Upper Monument Creek FOMO5800
Beaver Creek FOMO4600
Air Force Academy FOMO3200
Pike National Forest
USAF Academy
Upper Fountain FOFO7600
Camp Creek FOFO5800
Williams Canyon FOFO7200
Manitou Reservoir FOFO7400
Ruxton Creek FOFO7000
Upper Beaver Creek BEBE0400
Sutherland Creek FOFO6400
Bear Creek FOFO4800
Southwest Area FOFO4600
Little Fountain Creek FOFO1800
Turkey Creek TUTU0200
Red Creek BEBE0200
Fort Carson
Fort Carson FOFO2200
Fishers Canyon FOFO3600
Young Hollow FOFO0200
Sand Creek FOFO0600
Midway Ranch FOFO0800
Sand Canyon FOFO1600
Calhan Reservoir FOFO1400
Big Johnson FOFO2600
Windmill Gulch FOFO3000
Peterson Field FOFO3400
Jimmy Camp Creek FOFO2000
Sand Creek FOFO4000
COLORADO SPRINGS
Shooks Run FOFO4400
Spring Creek FOFO4200
Douglas Creek FOMO1000
Dry Creek FOMO2400
Cottonwood Creek FOMO2200
Templeton Gap FOMO1200
South Pine Creek FOMO2600
Pine Creek FOMO2800
Kettle Creek FOMO3000
Monument Branch FOMO3800
Black Forest FOMO4200
Jackson Creek FOMO4400
Monument Rock FOMO5000
Dirty Woman Creek FOMO5200
Black Squirrel Creek FOMO3600
West Cherry Creek CYCY0400
East Cherry Creek CYCY0200
West Kiowa Creek KIKI0200
East Kiowa Creek KIKI0400
Bijou Creek BIBI0200
Upper Big Sandy Creek BGBG1400
Lenard BGBG1200
Antelope Creek BGBG0800
Simla BGBG0400
Ramah BGBG0600
Calhan BGBG1000
Mustang Creek BGBG0200
North Fork HOHO0400
Horse Creek HOHO0600
Little Horse Creek HOHO0200
Steels Fork HOPO1000
Rush HOPO0800
Upper Pond Creek HOPO0600
Lower Pond Creek HOPO0400
St.lukes HOPO0200
East Kramer KRKR0600
Kramer Creek KRKR0400
West Kramer KRKR0200
East Haynes HAHA0400
Haynes Creek HAHA0600
West Haynes HAHA0200
Squirrel Creek CHBS0200
Crows Roost CHBS1000
Windmill CHCH0200
Finch Ranch CHCH0400
Lower Dry Squirrel CHBS0400
Lower Black Squirrel CHBS0600
Lower East Chico CHCH0800
Hammer Ranch CHCH0600
West Chico Creek CHCH0600
Williams Ranch FOFO0400
Chico Creek CHCH1400
Lower Williams Tributary FOWI0200
Lower Williams Creek FOFO1000
West Chico Tributary CHCH1200
Upper Williams Tributary FOWI0400
Upper Williams Creek FOWI0600
Upper Chico Creek CHCH1600
Middle East Chico CHEC0200
Upper Dry Squirrel CHDS0200
Drennan CHDS0400
Upper East Chico CHEC0400
Schriever AFB
Telephone Exchange CHWS0200
Ellicott Consolidated CHBS1200
Ellicott CHBS1600
Lower Big Springs Creek CHBS1400
Livestock Company CHWS0400
West Squirrel CHWS0600
Curtis Ranch CHWS1000
Solberg Ranch CHWS0800
Haegler Ranch CHMS0200
Falcon CHWS1400
Hook And Line Ranch CHBS1800
Baggett CHBR0200
West Big Springs Creek CHBG0200
Upper Big Springs Creek CHBG0400
La Vega Ranch CHBR0400
Geick Ranch CHMS0400
Bennett Ranch CHWS1200
Upper Black Squirrel CHBS2000
Upper Bracket Creek CHBR0600
Peyton
Falcon
Ellicott
Yoder
Rush
Truckton
Calhan
Ramah
Palmer Lake
Monument
Manitou Springs
Fountain
Crystola
Cascade
Chipita Park
Green Mountain Falls
Peterson AFB
NORAD
AFA Aux Field
24
25
83
85
87
94
105
115

FINAL DRAINAGE REPORT

for

WALDEN PRESERVE 2 – FILING NO. 5

Prepared for:

Walden Holdings I, LLC
1230 Scarsbrook Court
Monument, CO 80132

January 10, 2022
Revised July 7, 2022

Prepared by:

19 E. Willamette Avenue
Colorado Springs, CO 80903
(719)-477-9429
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JPS Project No. 040201
PCD File No. SF2211

Sub-basins C10-C12 include additional 1-acre lot areas to be developed in the northwest part of Walden Preserve, and Sub-basin C13 covers the existing Walden Wastewater Treatment Facility at the northwest corner of the Walden property. Water Quality Rain Garden C12 will be constructed in the northeast corner of the residential development area to mitigate developed flow impacts from Sub-Basins C10-C12.

Developed flows from Sub-basins C10-C13 will flow northeasterly, combining with flows in the main tributary channel, and ultimately reaching the existing culvert crossing Walker Road.

Flows from Basins OC1-OC2 on the east side of the channel, along with flows from Basins OD1 and D in vicinity of the Walden Pines Subdivision drain northwesterly across Woodhaven Drive, contributing to the total flow in the main channel. Flows from Basins OA1-OD1 and A1-D1 combine at Design Point #4, with total undetained developed flows calculated as Q_5 = 324.4 cfs and Q_{100} = 845.4 cfs (SCS Method; per Appendix B1).

As detailed in the previously approved "Final Drainage Report for Walden Preserve 2 Filing No. 4," SCS hydrologic models have been analyzed using the HEC-HMS software package to evaluate the comparison of historic and developed flow conditions, and confirm sizing of the existing and proposed stormwater detention ponds. The detained flow analysis shows that the combination of Pond B and Pond C8 results in detained flows at Design Point #4 calculated as Q_5 = 226.7 cfs and Q_{100} = 601.4 cfs, which achieves the goal of remaining below historic flows at the downstream boundary of the subdivision.

WP2 Filing No. 5 Drainage Plan

Walden Preserve 2 Filing No. 5 is located in Basins C1-C12 as depicted in the enclosed drainage plans (Sh. D1 and D1.01-D1.03, Appendix F).

Developed Sub-basin C1 comprises the area along the west side of the extension of Pinehurst Circle at the south end of Filing No. 5. Sub-basin C1 will generally flow southeasterly along the roadside ditch to Culvert C1 (Filing No. 4) at the low point in the road profile. Developed peak flows at Design Point #C1 are calculated as Q_5 = 9.7 cfs and Q_{100} = 23.0 cfs (Rational Method). Culvert C1 (24" RCP) will convey the flow from this basin easterly across Pinehurst Circle, draining through Channel C1 into Water Quality Rain Garden C2 (Filing No. 4).

Developed Sub-basin C2 comprises the area on the easterly downstream side of the extension of Pinehurst Circle at the south end of Filing No. 4, sheet flowing easterly to Water Quality Pond C2. Developed flows from Sub-basins C1-C2 combine at Design Point #C2.1, with peak flows calculated as Q_5 = 18.3 cfs and Q_{100} = 43.5 cfs (Rational Method). Water Quality Pond C2 (constructed with Filing No. 4) provides water quality enhancement for combined Basins C1 and C2.

Historic Flows:

Design Point	Peak Flow							
	Area (ac)	Q_2 (cfs)	Q_5 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)	
1	337.1	11.2	39.4	78.5	118.0	188.1	240.8	
2	490.5	39.3	73.4	121.5	169.9	256.2	321.3	
4	902.7	145.8	234.8	322.2	400.0	527.9	620.0	

[a] Note that Design Point #3 is an intermediate developed DP not included in the historic model

Developed Flows:

Design Point	Peak Flow							Comparison of Developed to Historic Flow (Q_{100}%)
	Area (ac)	Q_2 (cfs)	Q_5 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)	
1	342.0	59.8	99.6	139.8	176.3	238.7	285.5	119% (increase)
2	504.7	117.0	189.1	262.6	327.1	432.5	508.9	158% (increase)
3	737.8	187.7	295.8	404.7	501.4	656.3	764.9	
4	902.7	204.0	324.4	445.1	552.4	724.7	845.4	136% (increase)

As detailed in the "Final Drainage Report for Walden Preserve 2 Filing No. 4," Appendix B includes the HEC-HMS model for detained flows incorporating the calculated outflows from the upgrade of Pond B to full-spectrum detention. The resulting ultimate discharges at downstream Design Point #4 remain at or below historic levels for the full spectrum of design storms:

Detained Flows:

Design Point	Peak Flow Comparison						
	Area (ac)	Q_2 (cfs)	Q_5 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
4 (Historic)	902.7	145.8	234.8	322.2	400.0	527.9	620.0
4 (Detained)	902.7	139.0	226.7	314.1	391.5	515.3	601.4
Comparison [a]		95%	97%	97%	98%	98%	97%

[a] Comparison of Detained Flow / Historic Flow

D. Detention Ponds

The total developed storm runoff downstream of the proposed subdivision will be maintained at historic levels by routing flows through an existing detention pond (Pond B) located along the main tributary channel running through the property, along with ultimate construction of four additional ponds (Rain Gardens C2, C4, and C12, and Detention Pond C8) serving the northern parts of the

Walden 2 PUD area. Rain Gardens C4 and C12 have been designed as a stormwater quality facility in accordance with County and UDFCD criteria, and Detention Pond C8 has been designed as a "full-spectrum" detention pond.

Development of Walden Preserve 2 Filing No. 5 will include construction of Full-Spectrum Extended Detention Basin (EDB) C8. Final pond design calculations utilizing the Mile High Flood District (MHFD) "MH-Detention_v4.04" software package are enclosed in Appendix D1. Design parameters for Detention Pond C8 are summarized as follows:

Pond	Tributary Area (ac)	Percent Impervious (%)	Required 100-Yr FSD Volume (ac-ft)	Design Volume (ac-ft)
C8	40.6	17.7%	2.0	2.9

Walden Preserve 2 Filing No. 5 will also include construction of Water Quality Rain Gardens C4 and C12. Design calculations utilizing the MHFD "UD-BMP_v3.07" software package are enclosed in Appendix D2.

Design parameters for WQ Rain Gardens C4 and C12 are summarized as follows:

Pond	Tributary Area (ac)	Percent Impervious (%)	Required WQCV (ac-ft)	Design Volume (ac-ft)
C4	17.6	20.0%	0.14	0.14
C12	29.3	18.1%	0.21	0.22

The existing and proposed detention ponds will be owned and maintained by the Walden Property Owners Association or metropolitan district.

E. On-Site Drainage Facility Design

Developed sub-basins and proposed drainage improvements are depicted in the enclosed Drainage Plans (Sheets D1 and D1.01-D1.03). In accordance with El Paso County standards, new roadways will be graded with a minimum longitudinal slope of 1.0 percent. The typical local road section will consist of a 28-foot paved width with 2-foot gravel shoulders and 4:1 slopes to 2.5-foot deep ditches. On-site drainage facilities will consist of roadside ditches, grass-lined channels, and culverts. Hydraulic calculations for preliminary sizing of major on-site drainage facilities are enclosed in Appendix C, and design criteria are summarized as follows:

1. Culverts

The internal road system will be graded to drain roadside ditches to low points along the road profile, where cross-culverts will convey developed flows into grass-lined channels following

WALDEN PRESERVE

IMPERVIOUS AREA CALCULATIONS

BASIN	TOTAL AREA (AC)	SOIL TYPE	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	% IMP.	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	% IMP.	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	% IMP.	WEIGHTED PERCENT IMPERVIOUS
OA1,A1-A9	341.96	B										6.20
OB1,B1-B4	90.90	B										25.00
B5	4.78	B	4.78	2.5-AC. LOTS	11.0							11.00
B6	7.91	B	7.91	5-AC. LOTS	7.0							7.00
B5,B6	12.69	B										8.51
B7	3.24	B	3.24	1-AC LOTS	20.0							20.00
B8	28.74	B	28.74	1-AC LOTS	20.0							20.00
B5-B8	44.67	B										16.73
B9	10.23	B	10.23	1-AC LOTS	20.0							20.00
B10	16.90	B	71.17	1-AC LOTS	20.0							20.00
B5-B10	71.80	B										17.97
OB1,B1-B10	162.70	B										21.90
OA1,OB1,A,B	504.66	B										11.26
OC1	128.95	B	128.95	1/2-AC. LOTS	25.0							25.00
C1	10.14	B	5.0	1-AC. LOTS	20.0	5.1	5-AC. LOTS	7.0				13.41
C2	11.02	B	11.02	1-AC LOTS	20.0							20.00
C1-C2	**21.16**	**B**										**16.84**
C3	2.04	B	2.04	1-AC LOTS	20.0							20.00
C4	15.59	B	15.59	1-AC LOTS	20.0							20.00
C3-C4	**17.63**	**B**										**20.00**
C1-C4	38.79	B										18.28
C5	26.83	B	19.5	1-AC. LOTS	20.0	7.3	5-AC. LOTS	7.0				16.46
C6	0.99	B	0.99	1-AC LOTS	20.0							20.00
C8	12.77	B	12.77	1-AC LOTS	20.0							20.00
C5,C6,C8	**40.59**	**B**										**17.66**
C9	4.50	B	4.5	1-AC LOTS	20.0							20.00
OC1,C1-C9	212.83	B										22.27
OA1-OC1,A1-C9	717.49	B										14.53
OC2	81.72	B	81.72	1/2-AC. LOTS	25.0							25.00
C10	2.86	B	2.86	1-AC LOTS	20.0							20.00
C11	8.63	B	8.63	1-AC LOTS	20.0							20.00
C12	17.77	B	17.77	1-AC LOTS	20.0							20.00
C10-C12	**29.26**	**B**										**18.05**
C13	22.44	B	22.44	MEADOW	0.0							0.00
OC2,C11-C13	133.42	B										19.27
OD1	3.30	B	3.30	1-AC LOTS	20.0							20.00
OD2	4.50	B	4.50	FOREST	0.0							0.00
OD3	10.30	B	10.30	FOREST	0.0							0.00
OD4	6.00	B	6.00	FOREST	0.0							0.00
D	10.27	B	10.27	1-AC LOTS	20.0							20.00
OD1-OD4, D	34.37	B										7.90
OA1-OD1,A-D	885.28	B										14.98

BASIN	DESIGN POINT	AREA (AC)	C 5-YEAR[7]	C 100-YEAR[7]	OVERLAND LENGTH (FT)	SLOPE (%)	Tco[1] (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT K	SLOPE (%)	SCS[2] VELOCITY (FT/S)	Tt[3] (MIN)	TOTAL Tc[4] (MIN)	TOTAL Tc[4] (MIN)	INTENSITY[5] 5-YR (IN/HR)	INTENSITY[5] 100-YR (IN/HR)	PEAK FLOW Q5[6] (CFS)	PEAK FLOW Q100[6] (CFS)
OC2.1		62.48	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	77.02	176.26
OC2.2		19.24	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	23.72	54.28
OC2.1,OC2.2		81.72	0.350	0.450			0.0	2800	1.50	4.64	3.23	14.4	14.4	14.4	3.52	6.27	100.74	230.54
C10	C10	2.86	0.300	0.400	100	6.0	7.9	600	1.50	4.0	3.00	3.3	11.3	11.3	3.92	6.97	3.36	7.97
C11	C11	8.63	0.300	0.400	100	6.0	7.9	600	1.50	6.7	3.88	2.6	10.5	10.5	4.03	7.16	10.42	24.73
Tt from C10 to C11								400	1.50	2.5	2.37	2.8	2.8					
C10-C11	C11.1	11.49	0.300	0.400									14.1	14.1	3.56	6.34	12.28	29.15
C12	C12	17.77	0.300	0.400	100	10.0	6.7	1300	1.50	3.1	2.64	8.2	14.9	14.9	3.47	6.18	18.52	43.95
C10-C12	**C12.1**	**29.26**	**0.300**	**0.400**									**14.9**	**14.9**	**3.47**	**6.18**	**30.49**	**72.36**
C13	C13	22.44	0.250	0.350	300	7.3	13.7	430	1.50	8.6	4.40	1.6	15.3	15.3	3.43	6.11	19.25	47.97
OC1,OC2,C1-C13		850.91	0.323	0.423									106.5	106.5	1.50	2.65	412.27	953.83
OD1		3.30	0.300	0.400	370	5.4	15.8	450	1.50	4.4	3.15	2.4	18.2	18.2	3.16	5.63	3.13	7.43
OD2		4.50	0.100	0.150	525	8.2	20.5	0				0.0	20.5	20.5	2.98	5.30	1.34	3.58
OD3		10.30	0.100	0.150	700	5.7	26.7	580	1.50	3.1	2.64	3.7	30.3	30.3	2.41	4.28	2.48	6.62
OD4		6.00	0.100	0.150	630	5.6	25.5	340	1.50	0.9	1.42	4.0	29.4	29.4	2.45	4.36	1.47	3.92
OD1-OD4		**24.10**											30.3	30.3				
D		**10.27**	0.300	0.400			0.0	750	1.50	3.5	2.81	4.5	5.0	5.0	5.10	9.09	15.73	37.33
OD1-OD4, D	D	**34.37**	0.179	0.249									34.8	34.8	2.22	3.96	13.67	33.86
G1	G1	3.28	0.300	0.400	100	6.0	7.9	300	1.50	6.7	3.88	1.3	9.2	9.2	4.23	7.53	4.16	9.88
Tt from DP3 to DP4								2750	1.50	1.5	1.81	25.4	25.4					
OA1-OD1,A-D	**4**	**885.28**	**0.297**	**0.397**									**116.9**	**116.9**	1.50	2.65	**394.39**	**931.36**

1) OVERLAND FLOW Tco = (1.87*(1.1-RUNOFF COEFFICIENT)*(OVERLAND FLOW LENGTH^(0.5)/(SLOPE^(0.333))
2) SCS VELOCITY = K * ((SLOPE(%))^0.5)
K = 0.70 FOR MEADOW / FOREST
K = 1.0 FOR BARE SOIL
K = 1.5 FOR GRASS CHANNEL
K = 2.0 FOR PAVEMENT
3) GUTTER/SWALE FLOW, TRAVEL TIME, Tt = (CHANNEL LENGTH/ SCS VELOCITY) / 60 SEC
4) Tc = Tco + Tt
*** IF TOTAL TIME OF CONCENTRATION IS LESS THAN 5 MINUTES, THEN 5 MINUTES IS USED
5) INTENSITY BASED ON I-D-F CURVE IN EL PASO COUNTY DRAINAGE CRITERIA MANUAL, REVISED BY CITY OF COLORADO SPRINGS 1/1/03
I = (A * P) / B + Td)^C
5-YEAR VALUES: A = 26.65; P1 = 1.5 IN (1-HOUR DEPTH); B = 10.0; C = 0.76
100-YEAR VALUES: A = 26.65; P = 2.67 IN (1-HOUR DEPTH); B = 10.0; C = 0.76
6) Q = CiA
7) WEIGHTED AVERAGE C VALUES FOR COMBINED BASINS

Design Procedure Form: Rain Garden (RG)

UD-BMP (Version 3.07, March 2018)

Designer: JPS
Company: JPS
Date: January 7, 2022
Project: Walden WP2 Filing No. 5
Location: Rain Garden C12

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a (100% if all paved and roofed areas upstream of rain garden): I_a = 18.1 %

B) Tributary Area's Imperviousness Ratio ($i = I_a/100$): i = 0.181

C) Water Quality Capture Volume (WQCV) for a 12-hour Drain Time ($WQCV = 0.8 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i)$): WQCV = 0.09 watershed inches

D) Contributing Watershed Area (including rain garden area): Area = 1,274,566 sq ft

E) Water Quality Capture Volume (WQCV) Design Volume, Vol = (WQCV / 12) * Area: V_{WQCV} = 9,123 cu ft

F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm: d_6 = in

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume: $V_{WQCV\ OTHER}$ = cu ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired): $V_{WQCV\ USER}$ = cu ft

2. Basin Geometry

A) WQCV Depth (12-inch maximum): D_{WQCV} = 12 in

B) Rain Garden Side Slopes (Z = 4 min., horiz. dist per unit vertical) (Use "0" if rain garden has vertical walls): Z = 4.00 ft / ft

C) Mimimum Flat Surface Area: A_{Min} = 4601 sq ft

D) Actual Flat Surface Area: A_{Actual} = 8917 sq ft

E) Area at Design Depth (Top Surface Area): A_{Top} = 10390 sq ft

F) Rain Garden Total Volume ($V_T = ((A_{Top} + A_{Actual}) / 2) * Depth$): V_T = 9,654 cu ft

3. Growing Media

Choose One
- (•) 18" Rain Garden Growing Media
- ( ) Other (Explain):

4. Underdrain System

A) Are underdrains provided?

Choose One
- (•) YES
- ( ) NO

B) Underdrain system orifice diameter for 12 hour drain time

i) Distance From Lowest Elevation of the Storage Volume to the Center of the Orifice: y = 2.0 ft

ii) Volume to Drain in 12 Hours: Vol_{12} = 9,123 cu ft

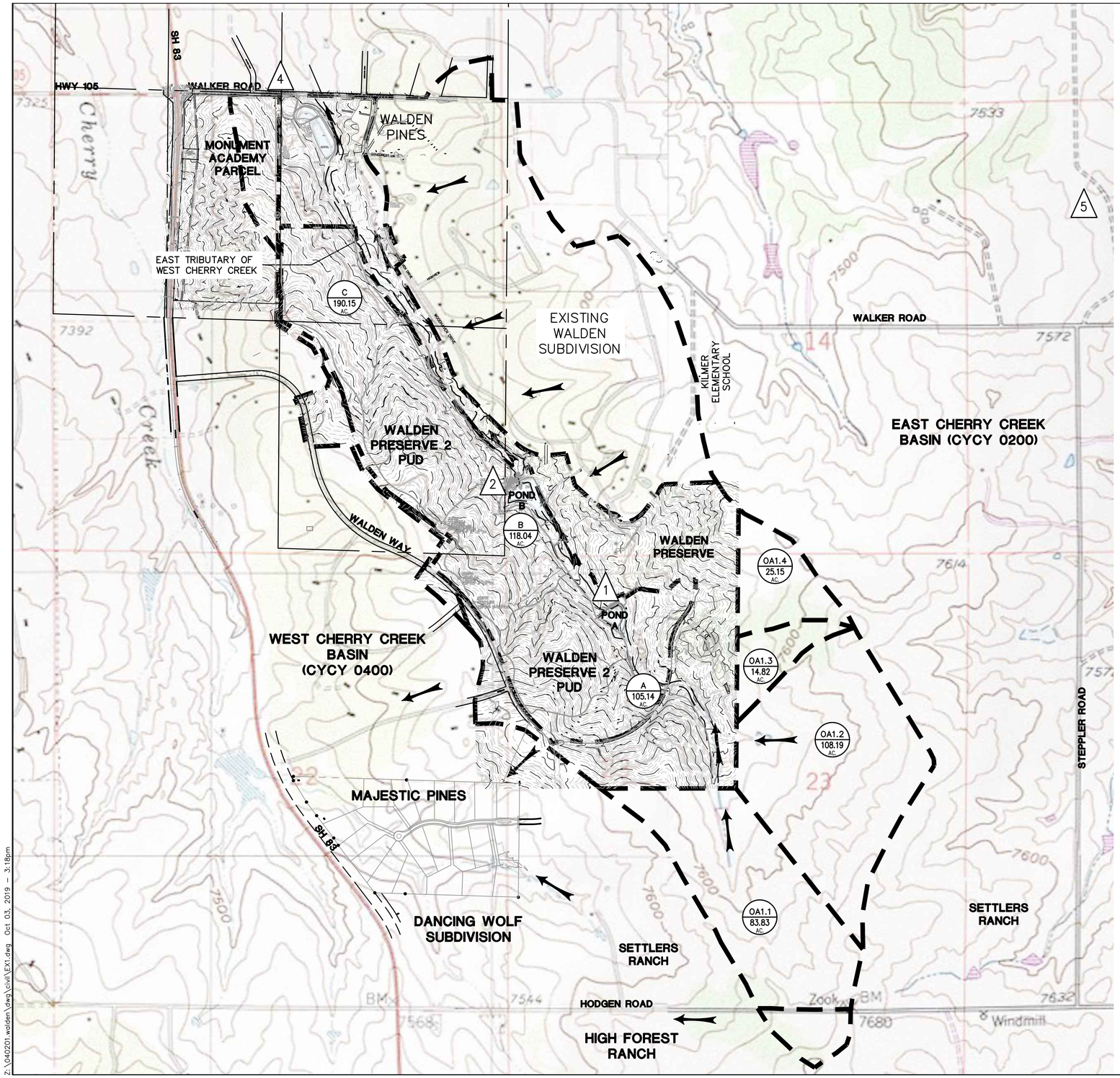
iii) Orifice Diameter, 3/8" Minimum: D_O = 2 3/16 in

Design Procedure Form: Rain Garden (RG)

Designer: JPS
Company: JPS
Date: January 7, 2022
Project: Walden WP2 Filing No. 5
Location: Rain Garden C12

5. Impermeable Geomembrane Liner and Geotextile Separator Fabric A) Is an impermeable liner provided due to proximity of structures or groundwater contamination?	Choose One ○ YES ◉ NO
6. Inlet / Outlet Control A) Inlet Control	Choose One ○ Sheet Flow- No Energy Dissipation Required ◉ Concentrated Flow- Energy Dissipation Provided
7. Vegetation	Choose One ◉ Seed (Plan for frequent weed control) ○ Plantings ○ Sand Grown or Other High Infiltration Sod
8. Irrigation A) Will the rain garden be irrigated?	Choose One ○ YES ○ NO

Notes:



LEGEND

- FILING LIMITS
- MAJOR BASIN BOUNDARY
- 6520 EXISTING CONTOUR
- FLOWLINE
- 5 DESIGN POINT (FROM "WALDEN PRESERVE MDDP")
- BD / 524 AC. BASIN DESIGNATION / BASIN AREA (ACRES)

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
1	39.4	240.8
2	73.4	321.3
4	234.8	620.0

N

GRAPHIC SCALE
600 0 300 600 1200
ORIGINAL SCALE: 1"=600'
CONTOUR INTERVAL=20'

WALDEN PRESERVE SUBDIVISION

MAJOR BASIN / HISTORIC DRAINAGE PLAN

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO 80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

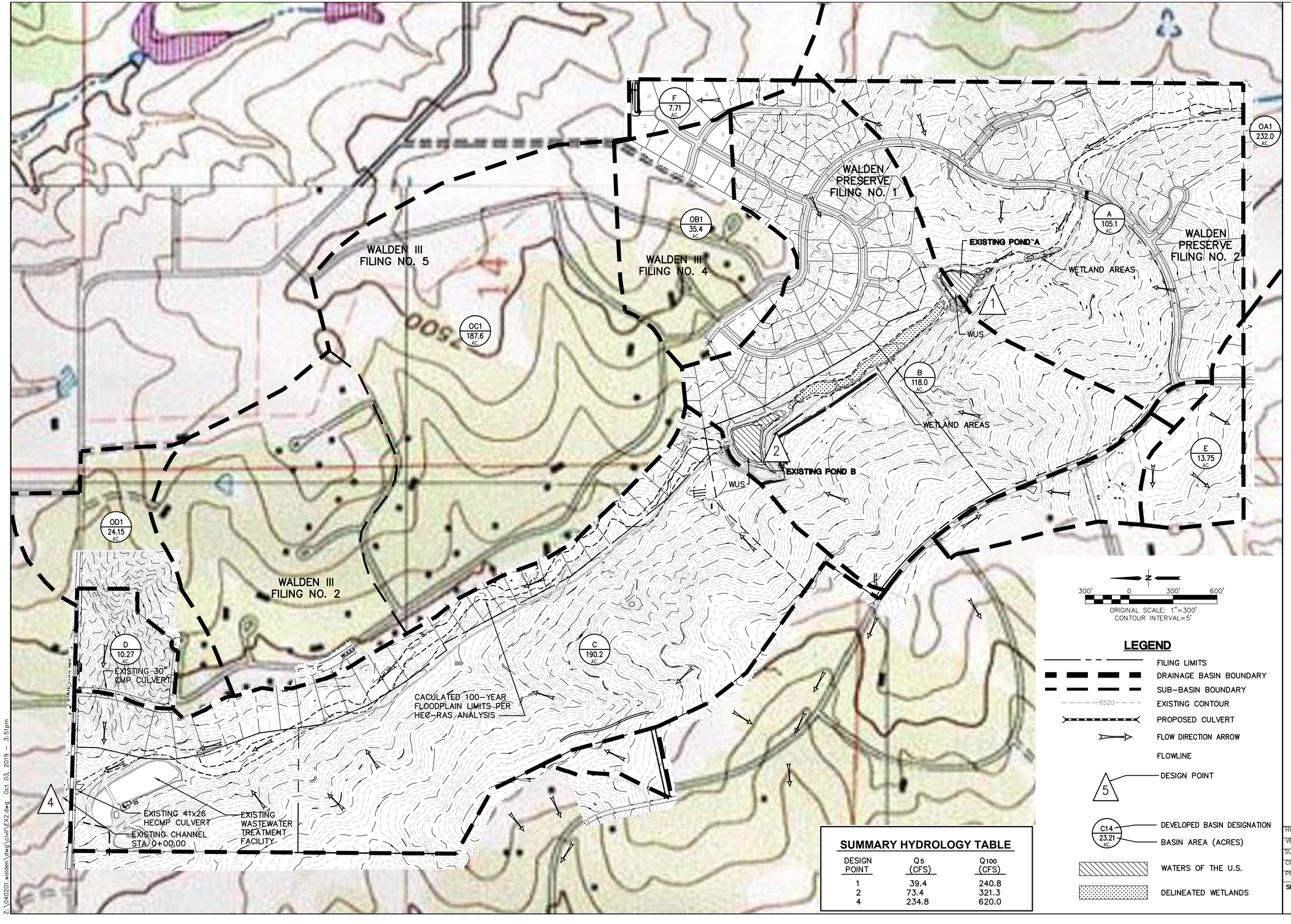
CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

No.	REVISION	BY	DATE

HORZ. SCALE:	1"=600'	DRAWN:	MJP
VERT. SCALE:	N/A	DESIGNED:	JPS
SURVEYED:	PINNACLE	CHECKED:	JPS
CREATED:	7/22/02	LAST MODIFIED:	10/03/19
PROJECT NO:	040201	MODIFIED BY:	BJJ

SHEET: EX1

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SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q_5 (CFS)	Q_{100} (CFS)
1	39.4	240.8
2	73.4	321.3
4	234.8	620.0

WALDEN PRESERVE

HISTORIC DRAINAGE PLAN

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

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1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

No.	REVISION	BY	DATE

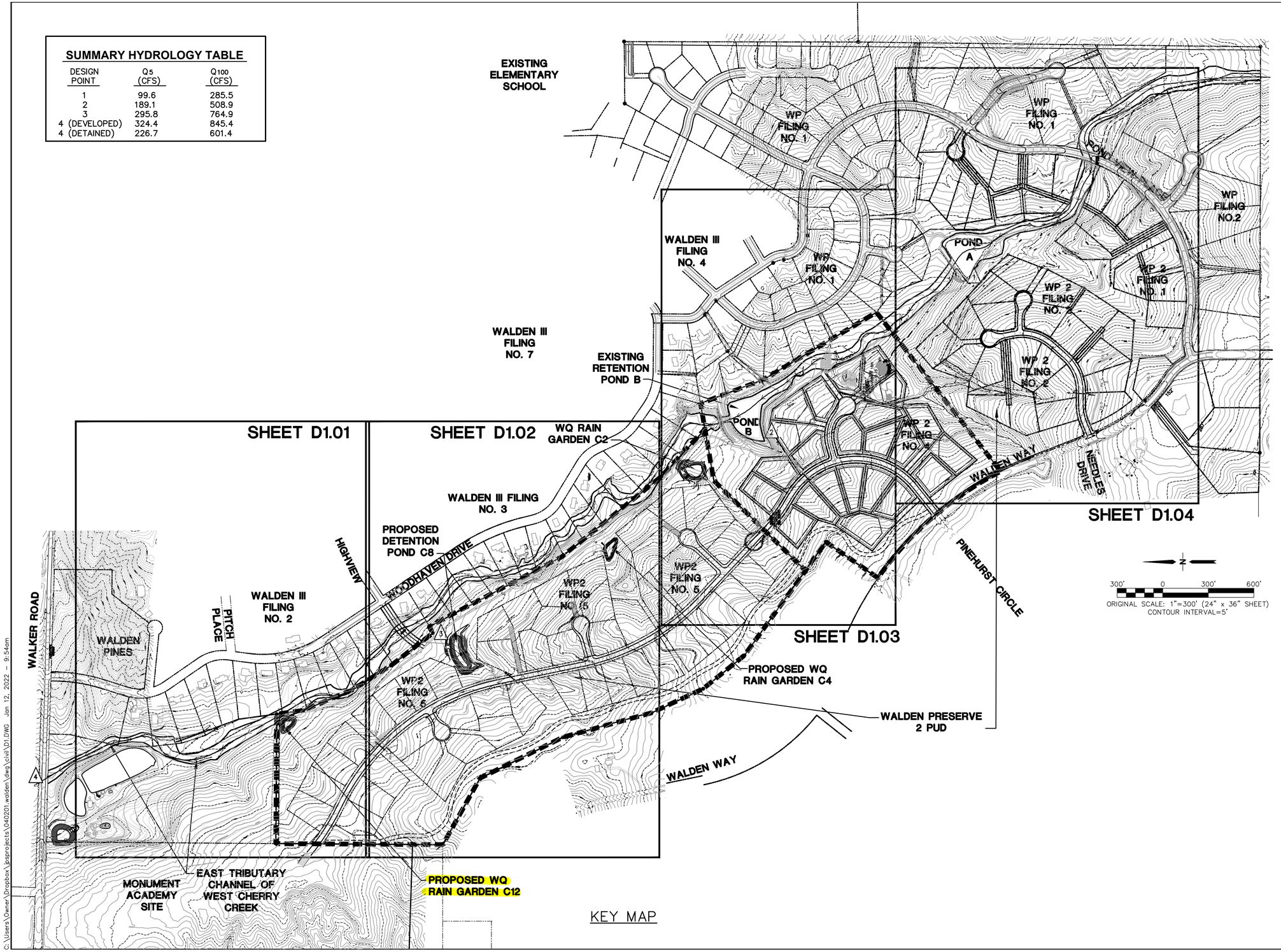
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VERT. SCALE:	N/A	DESIGNED:	JPS
SURVEYED:	PINNACLE	CHECKED:	JPS
CREATED:	9/30/11	LAST MODIFIED:	10/03/19
PROJECT NO:	040201	MODIFIED BY:	BJJ

SHEET: EX2

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SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
1	99.6	285.5
2	189.1	508.9
3	295.8	764.9
4 (DEVELOPED)	324.4	845.4
4 (DETAINED)	226.7	601.4



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WALDEN PRESERVE

MASTER DEVELOPMENT DRAINAGE PLAN

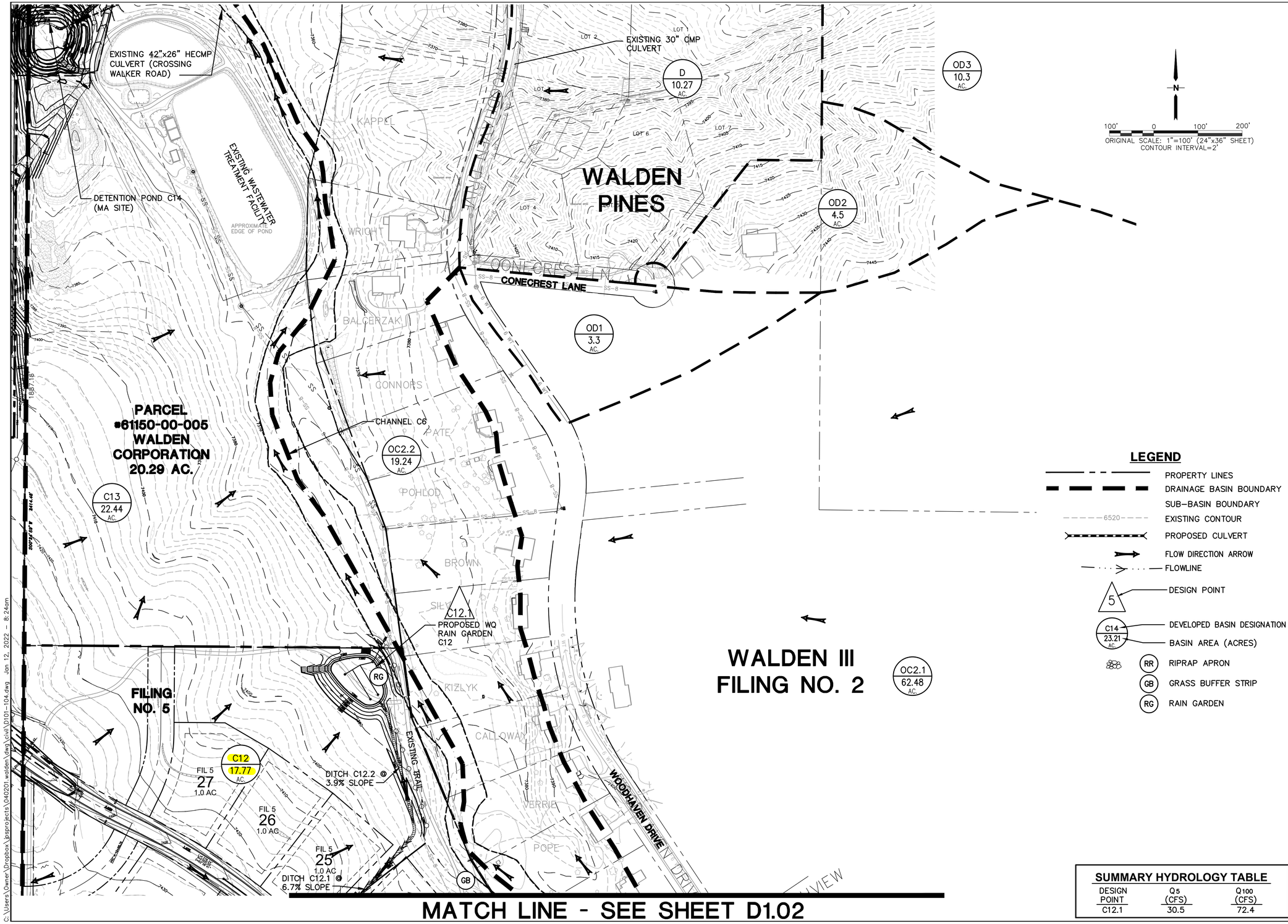
JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO 80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

No.	REVISION	BY	DATE

HORZ. SCALE: 1"=300'	DRAWN: MJP
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: RAMPART	CHECKED: JPS
CREATED: 10/04/11	LAST MODIFIED: 1/12/22
PROJECT NO: 040201	MODIFIED BY: BJJ

SHEET: D1



LEGEND

- PROPERTY LINES
- DRAINAGE BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- 6520 EXISTING CONTOUR
- PROPOSED CULVERT
- FLOW DIRECTION ARROW
- FLOWLINE
- 5 DESIGN POINT
- C14 / 23.21 AC. DEVELOPED BASIN DESIGNATION / BASIN AREA (ACRES)
- RR RIPRAP APRON
- GB GRASS BUFFER STRIP
- RG RAIN GARDEN

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
C12.1	30.5	72.4

MATCH LINE - SEE SHEET D1.02

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

No.	REVISION	BY	DATE

WALDEN PRESERVE

DEVELOPED DRAINAGE PLAN

HORZ. SCALE: 1"=100'	DRAWN: BJJ
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: RAMPART	CHECKED: JPS
CREATED: 10/03/11	LAST MODIFIED: 1/10/22
PROJECT NO: 040201	MODIFIED BY: BJJ
SHEET: D1.01	

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MATCH LINE - SEE SHEET D1.01

HIGHVIEW RD

WOODHAVEN DRIVE

EXISTING 60' ROW

FILING NO. 5

EXISTING WALDEN SUBDIVISION ZONED RR-5

EXISTING WALDEN III FILING NO. 3

WALDEN III FILING NO. 6 PHASE 1

FILING NO. 5

WALDEN WAY

CUL-DE-SAC C

CUL-DE-SAC B

SUBDIVISION BOUNDARY

PROPOSED FULL-SPECTRUM DETENTION POND C8
BOT EL=7404.0
100-YR WSL=7412.0
TOP EL=7414.0
VOL=2.9 AF

CULVERT C11 (24")

PROPOSED CULVERT C10 (18")

CULVERT C5 (30")

PROPOSED CULVERT C6 (18")

DIVERSION CHANNEL TO POND C8

CHANNEL C5.2

PROPOSED BERM & DIVERSION CHANNEL NORTH TO POND C8

CHANNEL C9

PROPOSED DITCH C8.2 @ 1.2% SLOPE

PROPOSED DITCH C8.1

PROPOSED CHANNEL C5.1 @ 0.5% MIN. SLOPE

PROPOSED DRAINAGE EASEMENT

PROPOSED RAIN GARDEN C4

PROPOSED DITCH @ 1.5% SLOPE

CHANNEL C3

SWALE

EXISTING TRAIL

G1 3.28 AC.

C11 8.63 AC.

C10 2.86 AC.

C12 17.77 AC.

C9 4.50 AC.

OC1.1 121.6 AC.

C5 26.83 AC.

C8 12.77 AC.

C6 0.99 AC.

C4 15.59 AC.

OC1.2 7.38 AC.

C11.1 12.3

C8.1 27.2

C4.1 18.2

C5 18.1

C6 1.3

C10 3.4

LOT 28 LOT 29 LOT 30 LOT 32 LOT 33 LOT 34 LOT 35 LOT 36 LOT 37 LOT 38 LOT 39 LOT 40 LOT 41 LOT 42 LOT 43 LOT 44 LOT 24 LOT 23 LOT 22 LOT 21 LOT 20 LOT 19 LOT 17 LOT 18 LOT 15 LOT 16 LOT 14 LOT 13 LOT 12 LOT 11 LOT 10 LOT 9 LOT 6 LOT 5

LEGEND

- PROPERTY LINES
- DRAINAGE BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- 6520 EXISTING CONTOUR
- PROPOSED CULVERT
- FLOW DIRECTION ARROW
- FLOWLINE
- 5 DESIGN POINT
- C14 / 23.21 AC. DEVELOPED BASIN DESIGNATION / BASIN AREA (ACRES)
- RR RIPRAP APRON
- GB GRASS BUFFER STRIP
- RG RAIN GARDEN

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
C4.1	18.2	43.2
C5	18.1	50.2
C6	1.3	3.0
C8.1	27.2	71.3
C10	3.4	8.0
C11.1	12.3	29.2

N

100' 0 100' 200'

ORIGINAL SCALE: 1"=100' (24" x 36" SHEET)
CONTOUR INTERVAL=2'

MATCH LINE - SEE SHEET D1.03

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JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO 80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

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WALDEN PRESERVE

No.	REVISION	BY	DATE

DEVELOPED DRAINAGE PLAN

HORZ. SCALE: 1"=100'	DRAWN: BJJ
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: RAMPART	CHECKED: JPS
CREATED: 10/03/11	LAST MODIFIED: 1/25/22
PROJECT NO: 040201	MODIFIED BY: BJJ

SHEET: D1.02

MATCH LINE - SEE SHEET D1.02

MATCH LINE - SEE SHEET D1.04

WQCV RAIN GARDEN C2
(FLG 4)
BOT EL=7440.0
MAX WSL=7441.0
TOP EL=7442.0
WQCV REQ'D=6,555 CF
DSN VOL=8,162 CF

LEGEND

- PROPERTY LINES
- DRAINAGE BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- 6520 EXISTING CONTOUR
- PROPOSED CULVERT
- FLOW DIRECTION ARROW
- FLOWLINE
- 5 DESIGN POINT
- C14 / 23.21 AC. DEVELOPED BASIN DESIGNATION
- BASIN AREA (ACRES)
- RR RIPRAP APRON

EXISTING WALDEN SUBDIVISION ZONED RR-5

FILING NO. 5

FILING NO. 4

EXISTING FILING NO. 1

WALDEN WAY

PINEHURST CIRCLE

DEBOODT CT

CABIN HILL LANE

EMERSON CLIFF CT

NOTE: CUL-DE-SAC IS IN FILL CONDITION SO THERE IS NO ROADSIDE DITCH

PROPOSED CULVERT C3-(18")

CULVERT C1 (24") (FLG 4)

PROPOSED CULVERT B9 (24")

PROPOSED CULVERT B8 (42")

EXISTING CULVERT B4 (42")

EXISTING STORM DRAIN B10 (48")

EXISTING CHANNEL

EXISTING CHANNEL OB1

EXISTING CHANNEL B10

CHANNEL C1

CHANNEL C2

CHANNEL C3

CHANNEL B8

CHANNEL B4B

EXISTING RETENTION POND B (13.6 AF)

EXISTING TRAIL

GRAVEL TRAIL

C1 10.14 AC.
C2 11.02 AC.
C3 2.04 AC.
C4 15.59 AC.
C5 26.83 AC.
OC1.2 7.38 AC.
B8 28.74 AC.
B9 10.23 AC.
B10 16.90 AC.
B4C 21.89 AC.

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
B8	32.4	84.9
B9	10.0	23.7
B10	53.5	126.9
C1	9.7	23.0
C2.1	18.3	43.6
C3	2.2	5.1

N

100' 0 100' 200'

ORIGINAL SCALE: 1"=100' (24"x36" SHEET)
CONTOUR INTERVAL=2'

PRESERVE

WALDEN

DEVELOPED DRAINAGE PLAN

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
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No.	REVISION	BY	DATE

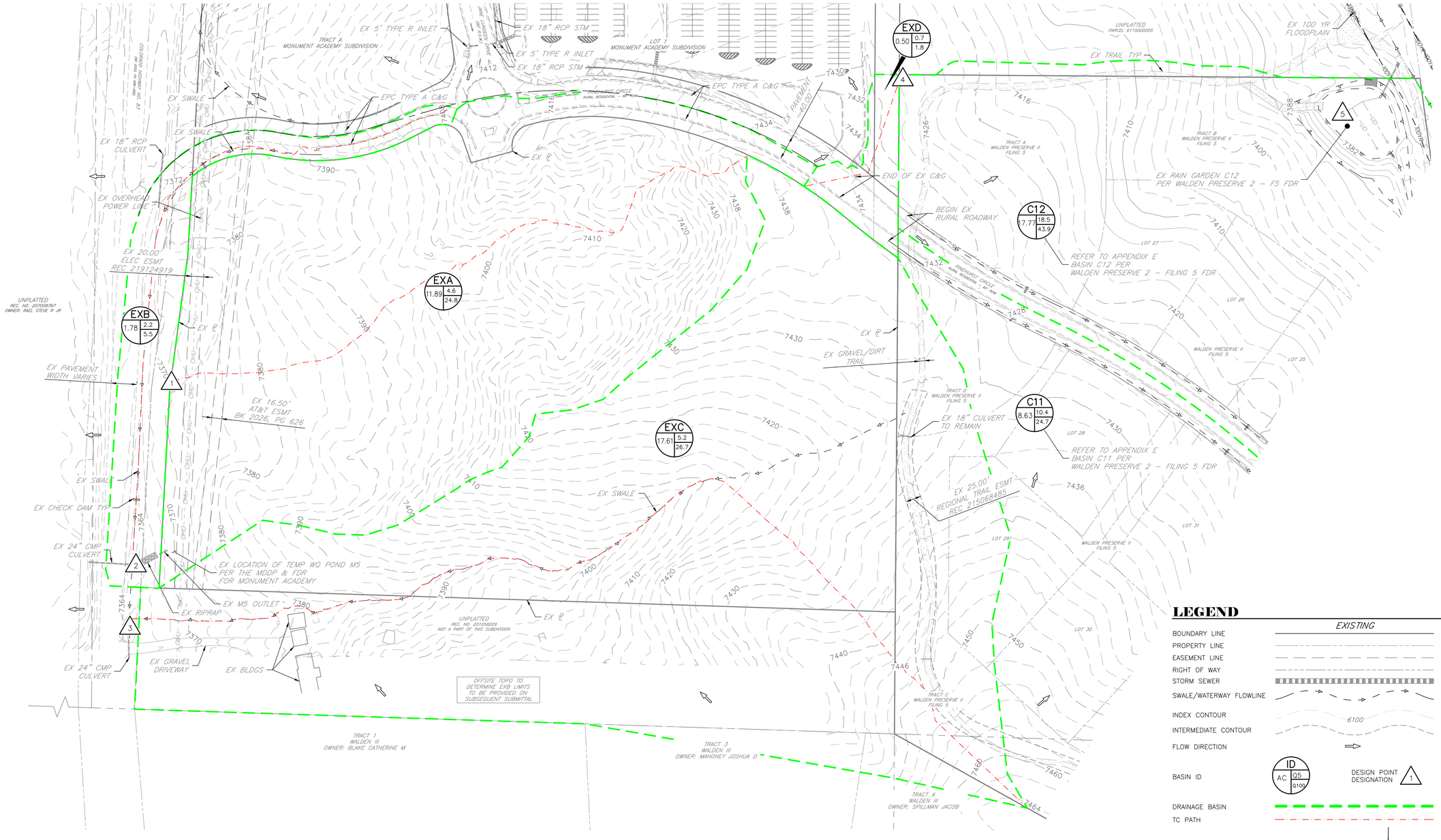
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VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: RAMPART	CHECKED: JPS
CREATED: 10/03/11	LAST MODIFIED: 7/7/22
PROJECT NO: 040201	MODIFIED BY: MSP
SHEET: D1.03	

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APPENDIX F – DRAINAGE MAPS

WALDEN PRESERVE 2 - FILING 5 AMENDMENT

EXISTING DRAINAGE MAP



LEGEND

	EXISTING	PROPOSED
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
STORM SEWER		
SWALE/WATERWAY FLOWLINE		
INDEX CONTOUR	6100	6100
INTERMEDIATE CONTOUR		
FLOW DIRECTION		
BASIN ID	ID / AC / Q5 / Q100	
DESIGN POINT DESIGNATION		1
DRAINAGE BASIN		
TC PATH		

EXISTING CONDITIONS - BASIN SUMMARY TABLE

Basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
EXA	11.89	5.5%	0.12	0.38	17.9	4.6	24.8
EXB	1.78	37.8%	0.39	0.58	18.6	2.2	5.5
EXC	17.61	7.2%	0.13	0.39	33.0	5.2	26.7
EXD	0.50	34.5%	0.35	0.55	11.3	0.7	1.8

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	4.6	24.8
2	6.0	26.7
3	5.2	26.7
4	0.7	1.8
5	28.6	64.2

80 40 0 80 160

ORIGINAL SCALE: 1" = 80'

EXISTING DRAINAGE MAP

WALDEN PRESERVE 2 - F5 AMENDMENT

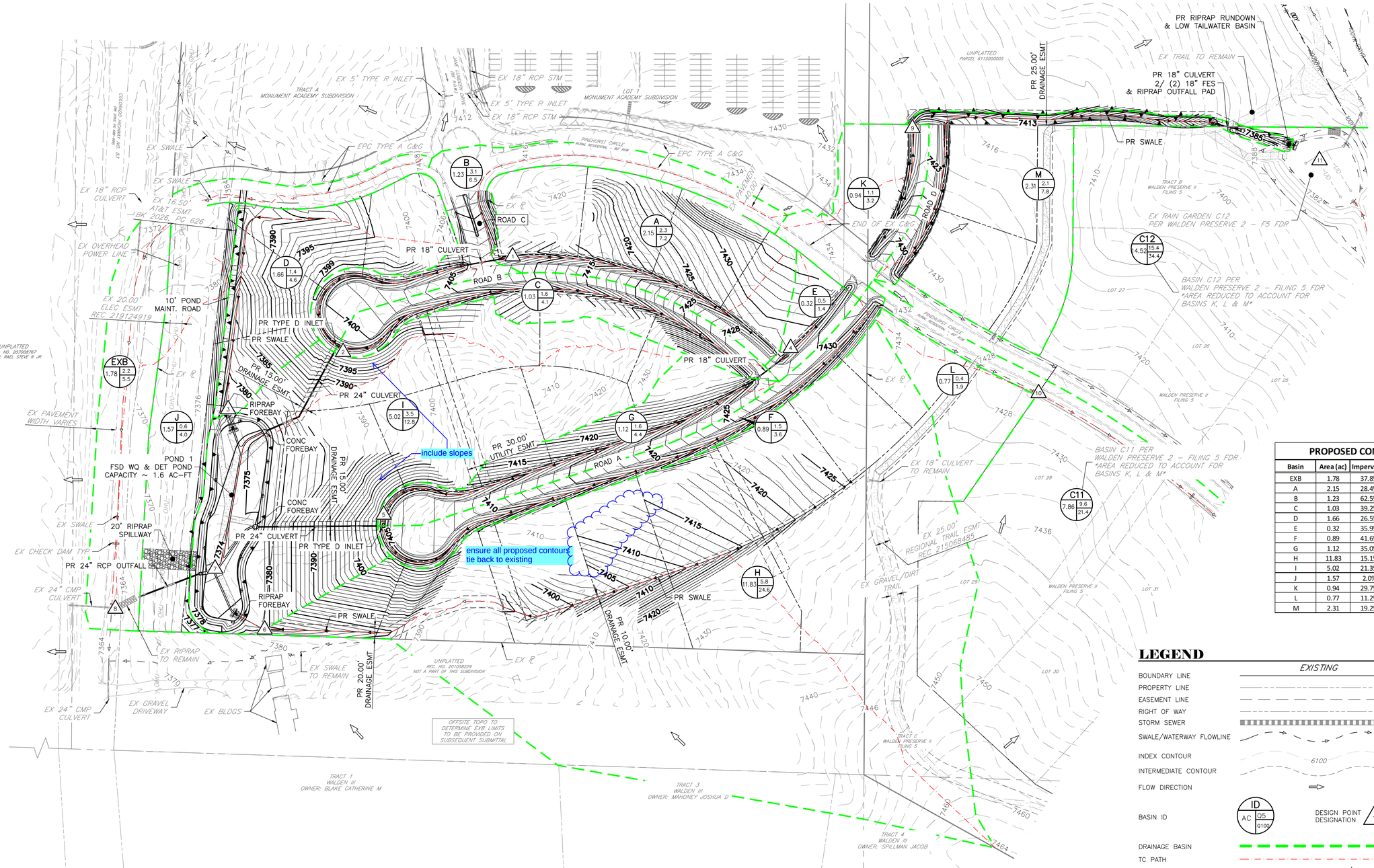
JOB NO. 25016
LOCATION: EPC
09/08/2026

SHEET 1

ALL TERRAIN ENGINEERING

WALDEN PRESERVE 2 - FILING 5 AMENDMENT

PROPOSED DRAINAGE MAP



PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE		
DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	2.3	7.2
2	5.8	14.9
3	2.8	4.6
4	0.5	1.4
5	3.3	8.5
6	5.8	24.6
7	14.4	47.5
8	2.8	8.8
9	1.1	3.2
10	0.4	1.9
11	23.9	56.6

PROPOSED CONDITIONS - BASIN SUMMARY TABLE

Basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
EXB	1.78	37.8%	0.39	0.58	18.6	2.2	5.5
A	2.15	28.4%	0.26	0.49	10.4	2.3	7.2
B	1.23	62.5%	0.58	0.73	8.8	3.1	6.5
C	1.03	39.2%	0.37	0.57	9.8	1.6	4.1
D	1.66	26.5%	0.23	0.47	14.5	1.4	4.6
E	0.32	35.9%	0.34	0.55	7.2	0.5	1.4
F	0.89	41.6%	0.41	0.59	10.2	1.5	3.6
G	1.12	35.0%	0.33	0.54	8.6	1.6	4.4
H	11.83	15.1%	0.17	0.42	21.7	5.8	24.6
I	5.02	21.3%	0.20	0.45	16.2	3.5	12.8
J	1.57	2.0%	0.09	0.36	9.3	0.6	4.0
K	0.94	29.7%	0.32	0.53	12.3	1.1	3.2
L	0.77	11.2%	0.14	0.40	13.6	0.4	1.9
M	2.31	19.2%	0.20	0.44	7.4	2.1	7.8

LEGEND

	EXISTING	PROPOSED
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
STORM SEWER		
SWALE/WATERWAY FLOWLINE		
INDEX CONTOUR	6100	6100
INTERMEDIATE CONTOUR		
FLOW DIRECTION		
BASIN ID	ID / AC / Q5 / Q100	
DESIGN POINT DESIGNATION		1
DRAINAGE BASIN		
TC PATH		

N

80 40 0 80 160

ORIGINAL SCALE: 1" = 80'

PROPOSED DRAINAGE MAP

WALDEN PRESERVE 2 - F5 AMENDMENT

JOB NO. 25016 | SHEET 1

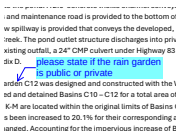
LOCATION: EPC

09/08/2026

ALL TERRAIN ENGINEERING

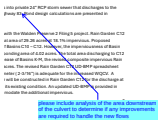
V1_Drainage Report - Preliminary.pdf Markup Summary

Bret Dilts - DPW Engineering (8)



Subject: Engineer
Page Label: 8
Author: Bret Dilts - DPW Engineering
Date: 10/8/2026 10:40:14 AM
Status:
Color:
Layer:
Space:

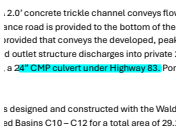
please state if the rain garden is public or private



Subject: Engineer
Page Label: 8
Author: Bret Dilts - DPW Engineering
Date: 10/8/2026 10:40:03 AM
Status:
Color:
Layer:
Space:

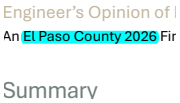
please include analysis of the area downstream of the culvert to determine if any improvements are required to handle the new flows

---



Subject: Engineer
Page Label: 8
Author: Bret Dilts - DPW Engineering
Date: 10/8/2026 10:40:19 AM
Status:
Color:
Layer:
Space:

4" CMP culvert under Highway 83.



Subject: Engineer
Page Label: 9
Author: Bret Dilts - DPW Engineering
Date: 10/8/2026 11:00:10 AM
Status:
Color:
Layer:
Space:

El Paso County 2026



Subject: Engineer
Page Label: 9
Author: Bret Dilts - DPW Engineering
Date: 10/8/2026 11:01:17 AM
Status:
Color:
Layer:
Space:

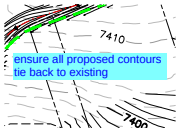
This opinion of probable cost is not included and would not be an FAE form, it would include costs associated to build the drainage improvements only

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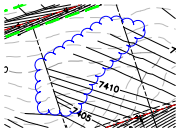
Subject: Engineer
Page Label: [1] Pr Drainage Map
Author: Bret Dilts - DPW Engineering
Date: 10/9/2026 12:46:43 PM
Status:
Color:
Layer:
Space:

include slopes



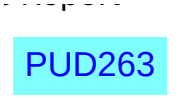
Subject: Engineer
Page Label: [1] Pr Drainage Map
Author: Bret Dilts - DPW Engineering
Date: 10/9/2026 12:48:10 PM
Status:
Color:
Layer:
Space:

ensure all proposed contours tie back to existing



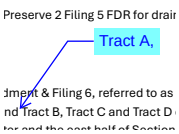
Subject: Engineer
Page Label: [1] Pr Drainage Map
Author: Bret Dilts - DPW Engineering
Date: 10/9/2026 12:48:27 PM
Status:
Color:
Layer:
Space:

Laura Besler (12)



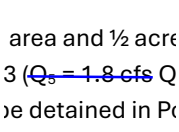
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Page Label: 1
Author: Laura Besler
Date: 10/7/2026 11:37:20 AM
Status:
Color:
Layer:
Space:

PUD263

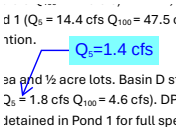


Subject: Callout
Page Label: 4
Author: Laura Besler
Date: 10/7/2026 11:46:59 AM
Status:
Color:
Layer:
Space:

Tract A,

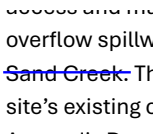


Subject: Line
Page Label: 6
Author: Laura Besler
Date: 10/7/2026 12:42:07 PM
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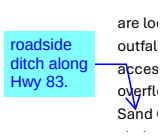


Subject: Callout
Page Label: 6
Author: Laura Besler
Date: 10/7/2026 12:42:30 PM
Status:
Color:
Layer:
Space:

Q5=1.4 cfs



Subject: Line
Page Label: 8
Author: Laura Besler
Date: 10/8/2026 9:21:01 AM
Status:
Color:
Layer:
Space:



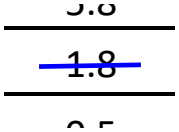
Subject: Callout
Page Label: 8
Author: Laura Besler
Date: 10/8/2026 9:27:55 AM
Status:
Color:
Layer:
Space:

roadside ditch along Hwy 83.

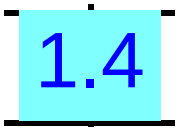


Subject: Callout
Page Label: 8
Author: Laura Besler
Date: 10/9/2026 10:54:29 AM
Status:
Color:
Layer:
Space:

Provide an analysis demonstrating that the roadside ditch has sufficient capacity to convey the spillway flows. If the pond were to overtop, it must also be shown that the resulting flows would not overtop Highway 83.

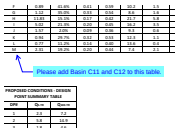


Subject: Line
Page Label: 19
Author: Laura Besler
Date: 10/8/2026 11:13:47 AM
Status:
Color:
Layer:
Space:



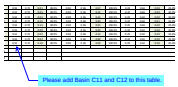
Subject: Callout
Page Label: 19
Author: Laura Besler
Date: 10/8/2026 11:14:12 AM
Status:
Color:
Layer:
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1.4



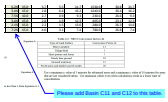
Subject: Callout
Page Label: 19
Author: Laura Besler
Date: 10/8/2026 11:31:59 AM
Status:
Color:
Layer:
Space:

Please add Basin C11 and C12 to this table.



Subject: Callout
Page Label: 20
Author: Laura Besler
Date: 10/8/2026 11:32:15 AM
Status:
Color:
Layer:
Space:

Please add Basin C11 and C12 to this table.

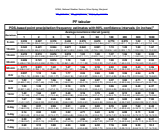


Subject: Callout
Page Label: 21
Author: Laura Besler
Date: 10/8/2026 11:32:27 AM
Status:
Color:
Layer:
Space:

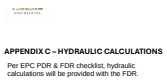
Please add Basin C11 and C12 to this table.

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njoke (21)

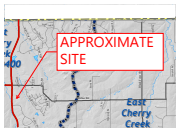


Subject: Rectangle
Page Label: 18
Author: njoke
Date: 9/10/2026 8:43:37 AM
Status:
Color:
Layer:
Space:



Subject: Text Box
Page Label: 26
Author: njoke
Date: 9/10/2026 8:45:27 AM
Status:
Color:
Layer:
Space:

Per EPC PDR & FDR checklist, hydraulic calculations will be provided with the FDR.

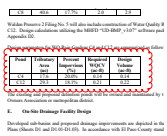


Subject: Callout
Page Label: 37
Author: njoke
Date: 9/8/2026 4:49:24 PM
Status:
Color:
Layer:
Space:

APPROXIMATE SITE



Subject: Cloud
Page Label: 14
Author: njoke
Date: 8/6/2026 11:42:45 AM
Status:
Color:
Layer:
Space:



Subject: Cloud
Page Label: 18
Author: njoke
Date: 9/8/2026 10:50:42 AM
Status:
Color:
Layer:
Space:



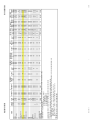
Subject: Highlight
Page Label: [1] D1.01 (3)
Author: njoke
Date: 9/9/2026 12:41:40 PM
Status:
Color:
Layer:
Space:

C10 C10 2.86 0.300 0.400 100 6.0 7.9 600 1.50 4.0 3.00 3.3 11.3 11.3 3.92 6.97 3.36 7.97



Subject: Highlight
Page Label: [1] D1.01 (3)
Author: njoke
Date: 9/9/2026 12:41:44 PM
Status:
Color:
Layer:
Space:

C11 C11 8.63 0.300 0.400 100 6.0 7.9 600 1.50 6.7 3.88 2.6 10.5 10.5 4.03 7.16 10.42 24.73



Subject: Highlight
Page Label: [1] D1.01 (3)
Author: njoke
Date: 9/9/2026 12:41:47 PM
Status:
Color:
Layer:
Space:

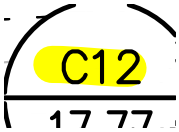
C12 C12 17.77 0.300 0.400 100 10.0 6.7 1300 1.50 3.1 2.64 8.2 14.9 14.9 3.47 6.18 18.52 43.95



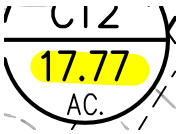
Subject: Highlight
Page Label: [1] D1.01 (3)
Author: njoke
Date: 9/8/2026 10:52:22 AM
Status:
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Layer:
Space:



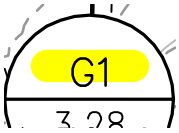
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Page Label: [1] D1.01 (3)
Author: njoke
Date: 9/8/2026 10:52:25 AM
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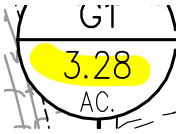
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Page Label: [1] D1.01 (3)
Author: njoke
Date: 9/8/2026 10:46:52 AM
Status:
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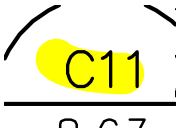
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Author: njoke
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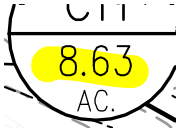
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Page Label: 127
Author: njoke
Date: 9/8/2026 10:46:01 AM
Status:
Color:
Layer:
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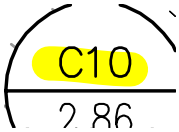
Subject: Highlight
Page Label: 127
Author: njoke
Date: 9/8/2026 10:46:02 AM
Status:
Color:
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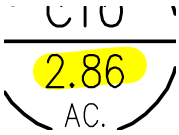
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Author: njoke
Date: 9/8/2026 10:53:42 AM
Status:
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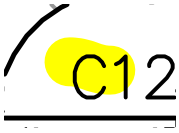
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Page Label: 127
Author: njoke
Date: 9/8/2026 10:53:43 AM
Status:
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Space:



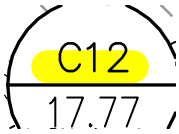
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Author: njoke
Date: 9/8/2026 10:53:45 AM
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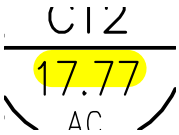
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Page Label: 127
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Date: 9/8/2026 10:53:46 AM
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Color:
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Space:



Subject: Highlight
Page Label: 127
Author: njoke
Date: 9/8/2026 10:53:48 AM
Status:
Color:
Layer:
Space:



Subject: Highlight
Page Label: 127
Author: njoke
Date: 9/8/2026 10:53:49 AM
Status:
Color:
Layer:
Space:



Subject: Highlight
Page Label: 127
Author: njoke
Date: 9/8/2026 10:53:50 AM
Status:
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Space: