



Walden Preserve 2 – Filing 5 Amendment & Filing 6

Preliminary Drainage Report

PCD File No:

All Terrain Engineering Project No: 25016

September 2026

Prepared for:

Walden Corporation

Attn: Matt Dunston

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Prepared by:

All Terrain Engineering LLC

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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:



Table of Contents

I. General Purpose, Location & Description	2
II. Drainage Basins	2
III. Drainage Design Criteria	4
IV. Drainage Facility Design.....	6
V. Summary.....	7
VI. References	8

Appendices

- A. Vicinity Map, FEMA Map & NRCS Soil Survey
- B. Hydrologic Analysis
- C. Hydraulic Analysis
- D. Water Quality & Detention
- E. Drainage Maps

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.

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.

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-YR}	Q _{100-YR}	PR. DP	Q _{5-YR}	Q _{100-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.

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.

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.

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.

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.

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

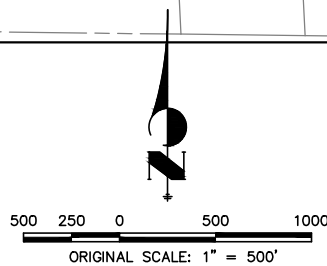
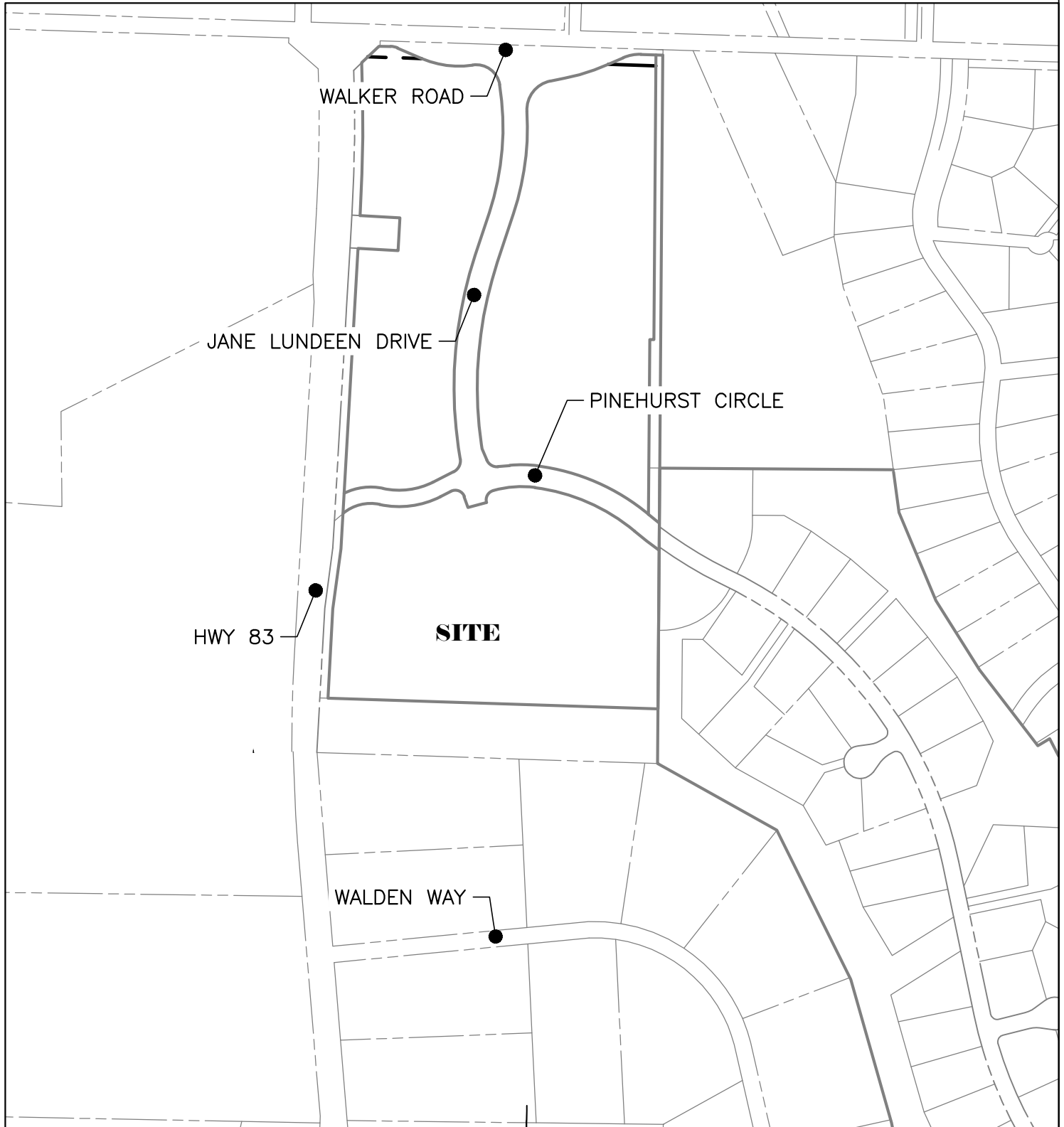
1. El Paso County – Drainage Criteria Manual, 2018 as amended.
2. Urban Storm Drainage Criteria Manual, Mile High Flood District, March 2024.
3. Federal Emergency Management Agency, Flood Map Service Center - <https://msc.fema.gov/portal/home>, September 2024.
4. Web Soil Survey, Natural Resources Conservation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



VICINITY MAP

WALDEN PRESERVE 2 F5A

JOB NO. 25016

LOCATION: EPC

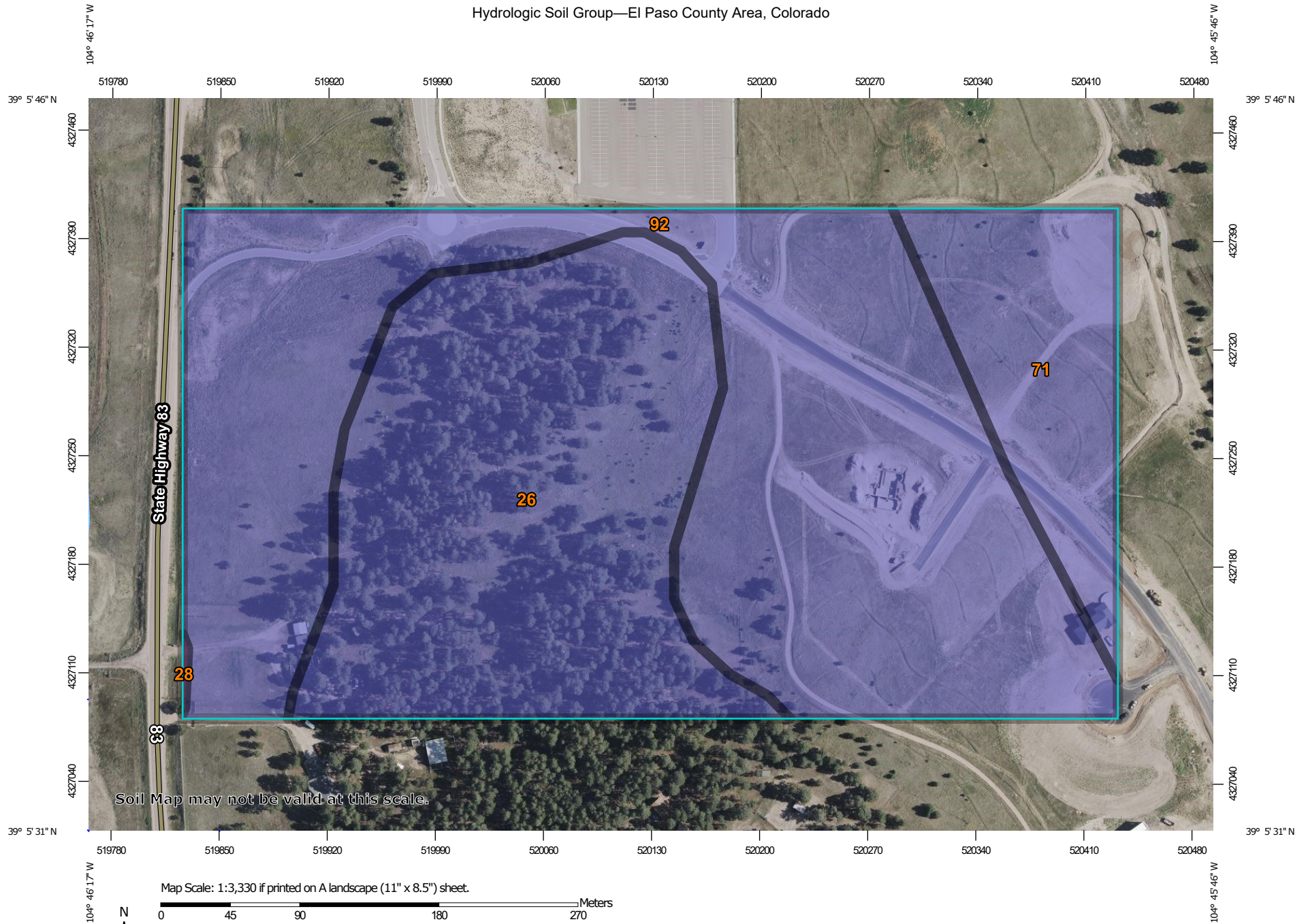
09/08/2026

SHEET



1004 WEST VAN BUREN STREET
COLORADO SPRINGS, CO 80907

Hydrologic Soil Group—El Paso County Area, Colorado



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



104°46'31"W 39°5'53"N



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

1:6,000

104°45'54"W 39°5'25"N

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 Cross Sections with 1% Annual Chance Water Surface Elevation
		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
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



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, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

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)

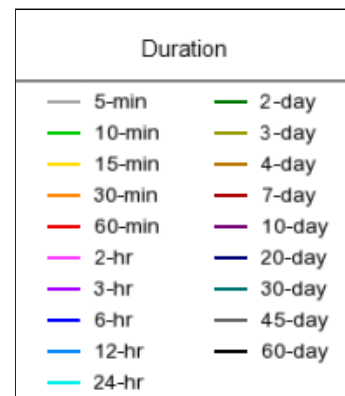
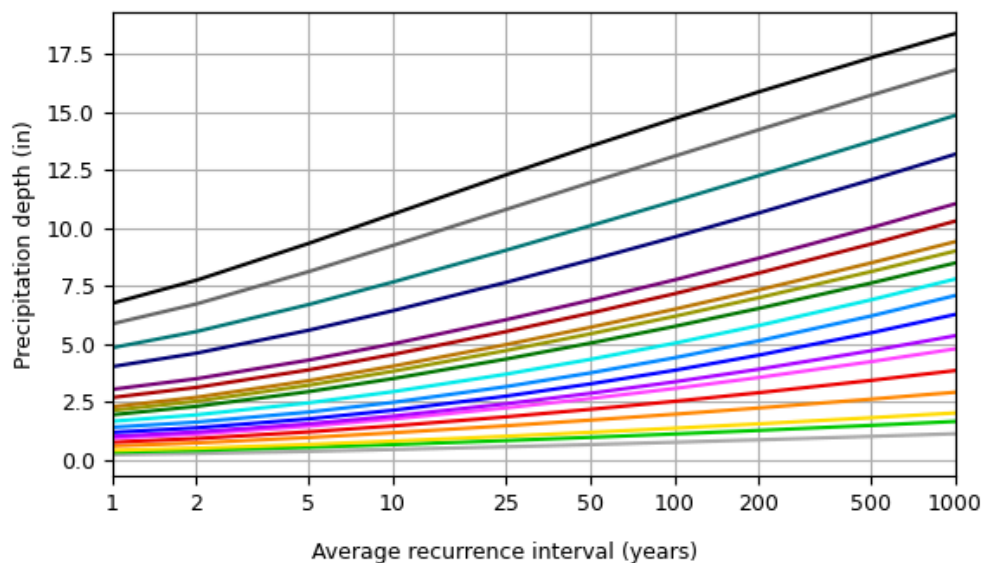
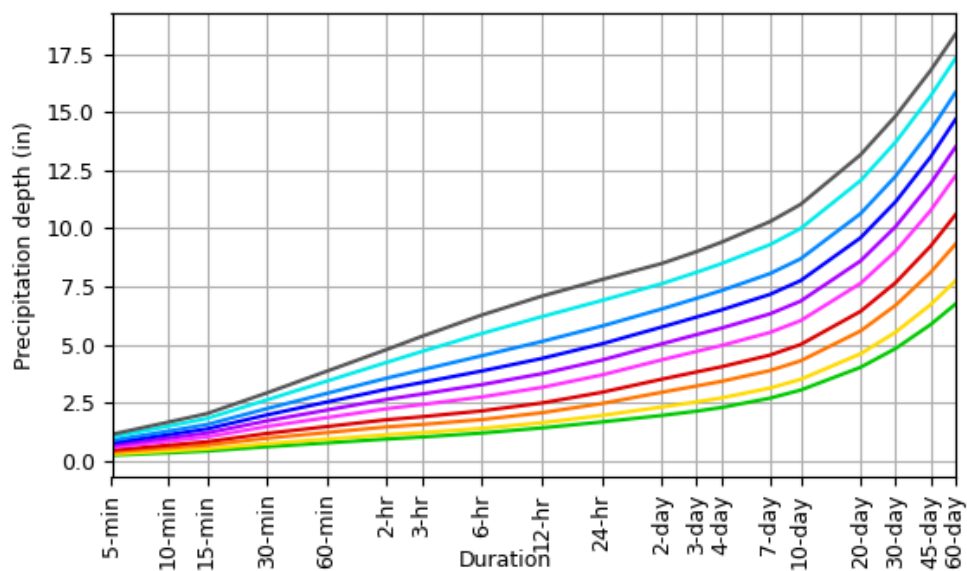
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average 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.

[Back to Top](#)

PF graphical

PDS-based depth-duration-frequency (DDF) curves

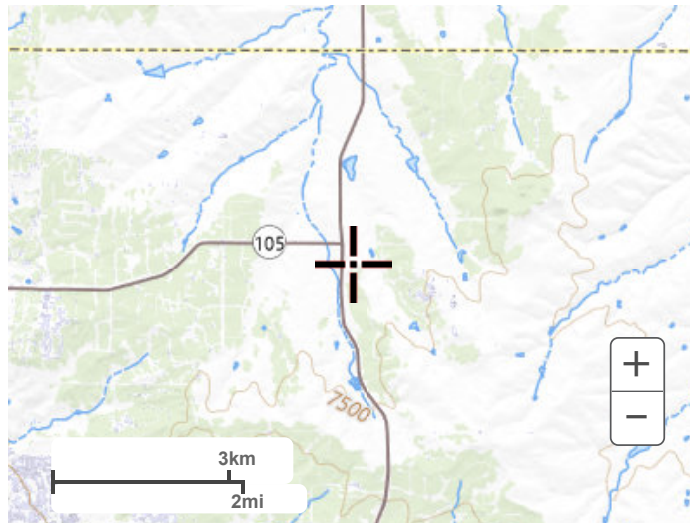
Latitude: 39.0967°, Longitude: -104.7682°



NOAA Atlas 14, Volume 8, Version 2

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[Back to Top](#)**Maps & aerials****Small scale terrain**



Large scale terrain



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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-YR} (cfs)	Q _{100-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-YR}	Q _{100-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: NOJ
Checked By: REB
Date: 9/8/26

Basin ID	Total Area (ac)	Gravel				Paved				1 Acre Lots				Roofs				Undeveloped				Weighted C _s & C ₁₀₀		Basins Total Weighted % Imp.
		C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	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						INITIAL/OVERLAND			TRAVEL TIME					t _c CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
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).

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

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√S_o

K = NRCS conveyance factor (see Table 6-2).

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

Where:

t_i = overland (initial) flow time (minutes)

C₅ = 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).

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

∴

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.

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: NOJ

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)	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	0.12	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)

Subdivision: Walden Preserve 2 - F5 Amend.

Location: El Paso County

Design Storm: 100-Year

Project Name: Walden Preserve 2 - F5 Amend.

Project No.: 25016.00

Calculated By: NQJ

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-YR} (cfs)	Q _{100-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

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE		
DP#	Q _{5-YR}	Q _{100-YR}
1	2.3	7.2
2	5.8	14.9
3	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: NOJ
 Checked By: REB
 Date: 9/8/26

Basin ID	Total Area (ac)	Gravel				Paved				1 Acre Lots				0.5 Acre Lots				Undeveloped				Weighted C _s & C ₁₀₀		Basins Total Weighted % Imp.
		C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	C ₁₀₀	Area (ac)	% Imp.	C _s	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%

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						INITIAL/OVERLAND			TRAVEL TIME					t _c CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Weighted C _s	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).

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

Where:

t_i = overland (initial) flow time (minutes)

C₅ = 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).

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

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√S_o

K = NRCS conveyance factor (see Table 6-2).

$$\text{Equation 6-4 } t_c = 16 - 17i + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$

or

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.

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: NOJ

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)	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	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: NOJ

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)	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)	
		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.

Project No.: 25016.00

Calculated By: NQJ

Checked By: REB

Date: 9/8/26

Subdivision: Walden Preserve 2 - F5 Amend.

Location: El Paso County

Design Storm: 100-Year

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	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.

Project No.: 25016.00

Calculated By: NQJ

Checked By: REB

Date: 9/8/26

Subdivision: Walden Preserve 2 - F5 Amend.

Location: El Paso County

Design Storm: 100-Year

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)	
		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

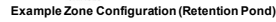
Per EPC PDR & FDR checklist, hydraulic calculations will be provided with the FDR.



APPENDIX D – WATER QUALITY & DETENTION

MHFD-Detention, Version 4.06 (July 2022)

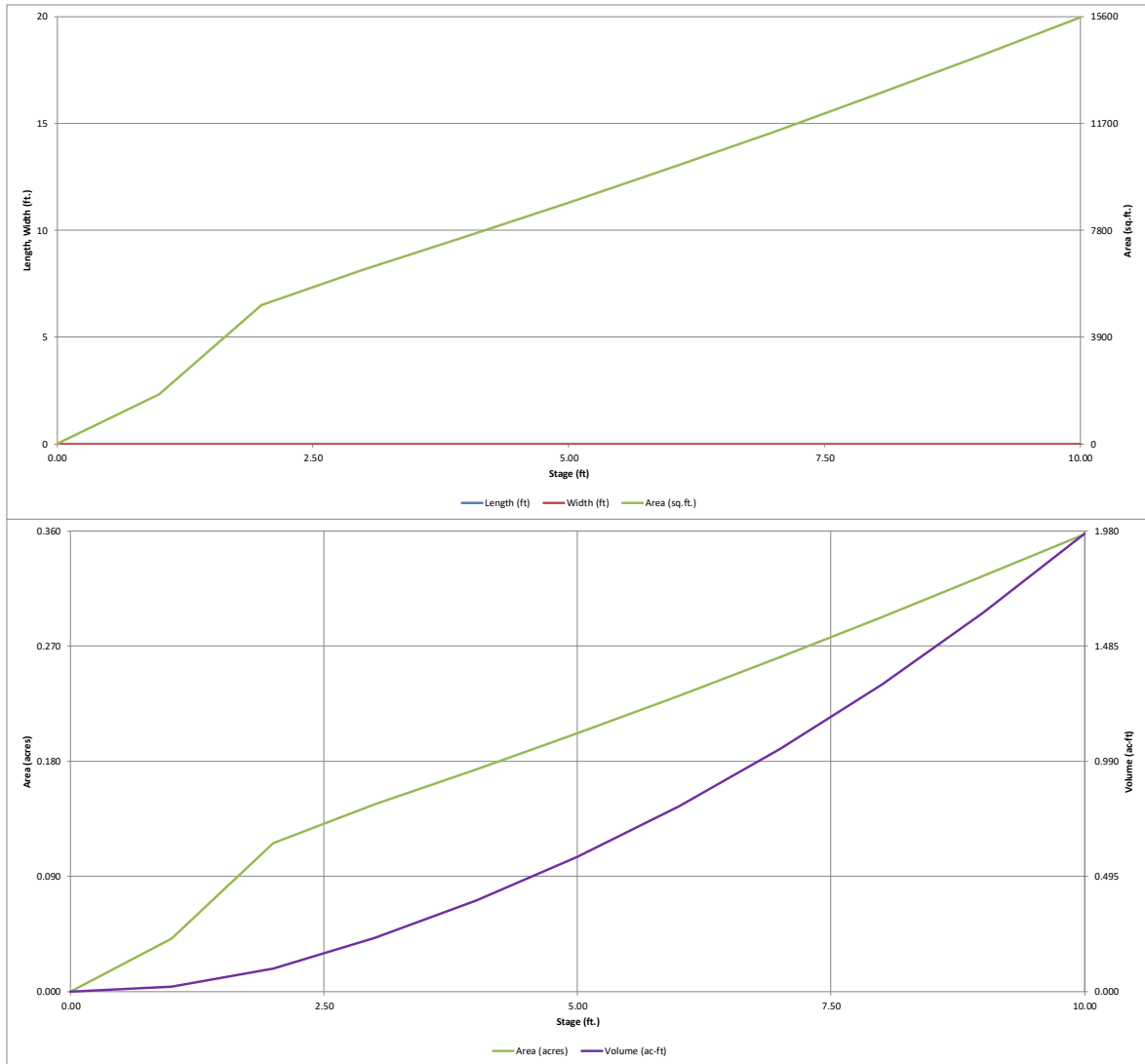
Basin ID: Pond 1 - Basin A-I



Depth Increment =			ft							
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)	
7370 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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	--		--	--	--					
rides	--		--	--	--					
feet	--		--	--	--					
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DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

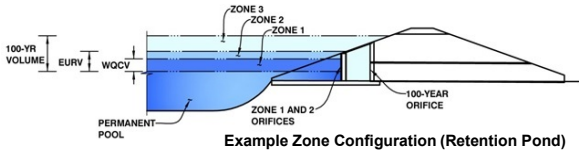


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Walden Preserve 2 F5 Amendment & F6

Basin ID: Pond 1 - Basin A-I



	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 Diameter = N/A inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = N/A ft²
Underdrain Orifice Centroid = N/A feet

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)
Depth at top of Zone using Orifice Plate = 5.11 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = 1.35 sq. inches (diameter = 1-5/16 inches)

Calculated Parameters for Plate
WQ Orifice Area per Row = 9.375E-03 ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

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)

Invert of Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = N/A inches

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = N/A ft²
Vertical Orifice Centroid = N/A feet

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

Overflow Weir Front Edge Height, H_o = 5.16 ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 6.00 feet
Overflow Weir Grate Slope = 0.00 H:V
Horiz. Length of Weir Sides = 6.00 feet
Overflow Grate Type = Type C Grate
Debris Clogging % = 50%

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H_u = 5.16 feet
Overflow Weir Slope Length = 6.00 feet
Grate Open Area / 100-yr Orifice Area = 11.68
Overflow Grate Open Area w/o Debris = 25.06 ft²
Overflow Grate Open Area w/ Debris = 12.53 ft²

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

Depth to Invert of Outlet Pipe = 2.50 ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = 24.00 inches
Restrictor Plate Height Above Pipe Invert = 15.50 inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = 2.15 ft²
Outlet Orifice Centroid = 0.73 feet
Half-Central Angle of Restrictor Plate on Pipe = 1.87 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = 8.10 ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 20.00 feet
Spillway End Slopes = 4.00 H:V
Freeboard above Max Water Surface = 1.00 feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = 0.90 feet
Stage at Top of Freeboard = 10.00 feet
Basin Area at Top of Freeboard = 0.36 acres
Basin Volume at Top of Freeboard = 1.97 acre-ft

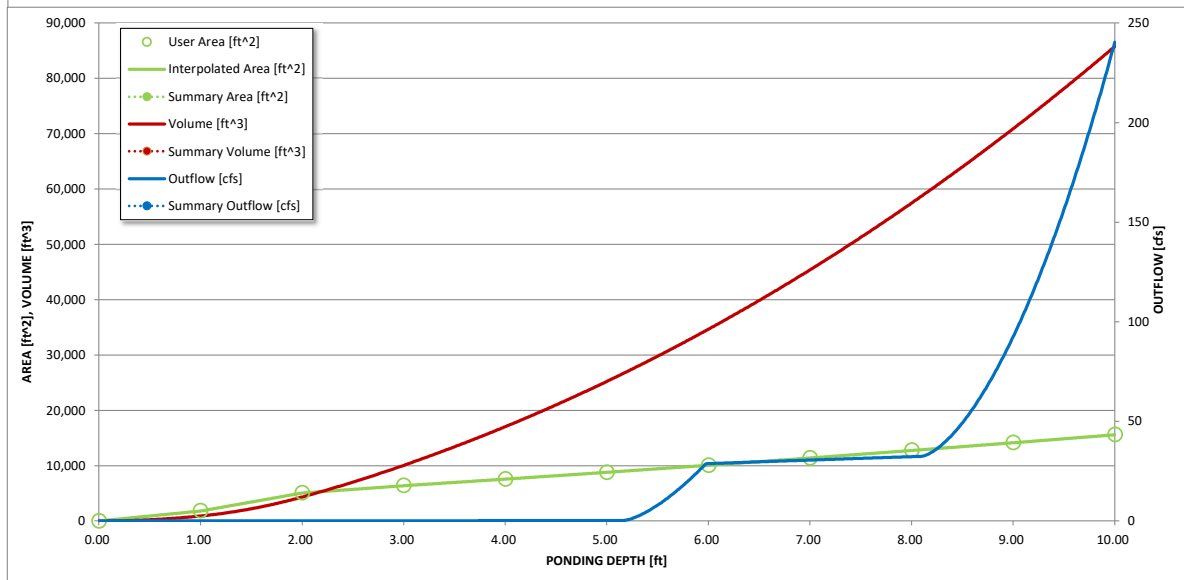
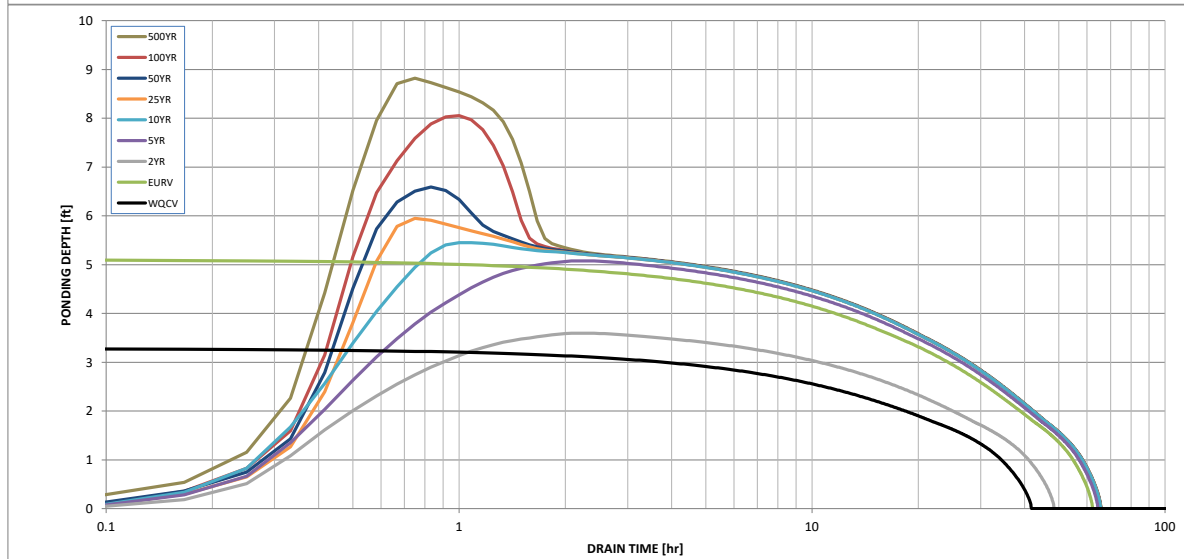
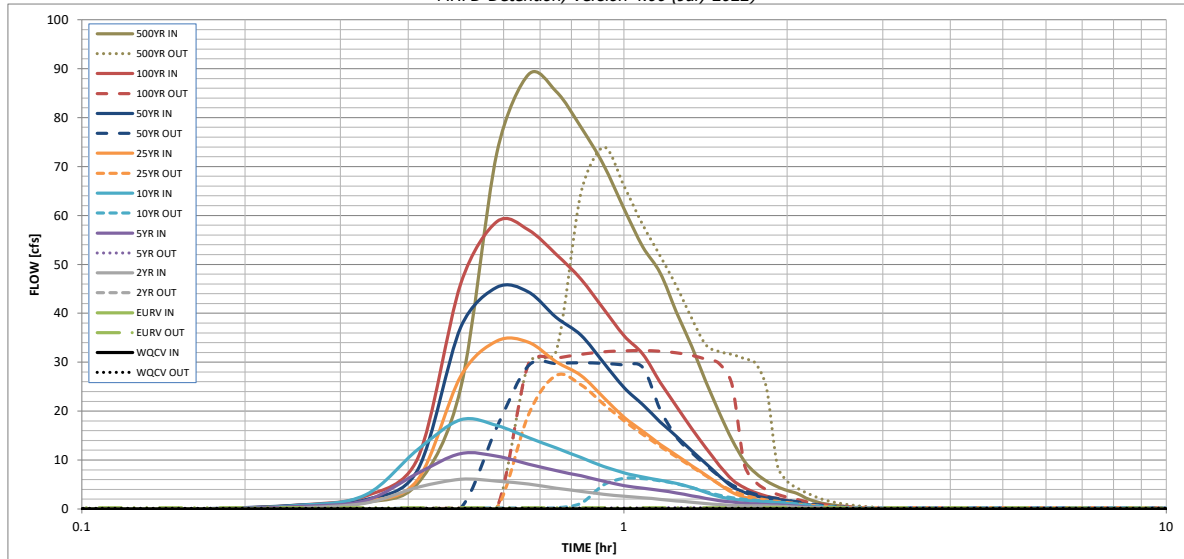
Routed Hydrograph Results

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

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	0.93	1.22	1.47	1.86	2.18	2.53	3.43
One-Hour Rainfall Depth (in) =	0.273	0.600	0.347	0.631	0.996	1.916	2.546	3.387	5.271
CUHP Runoff Volume (acre-ft) =	N/A	N/A	0.347	0.631	0.996	1.916	2.546	3.387	5.271
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.4	4.0	10.1	26.7	36.6	48.8	76.9
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A							
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
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	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.

[illegible]

Design Procedure Form: Rain Garden (RG)

UD-BMP (Version 3.07, March 2018)

Sheet 1 of 2

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)
- B) Tributary Area's Imperviousness Ratio ($i = I_a/100$)
- C) Water Quality Capture Volume (WQCV) for a 12-hour Drain Time
 (WQCV = $0.8 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i)$)
- D) Contributing Watershed Area (including rain garden area)
- E) Water Quality Capture Volume (WQCV) Design Volume
 Vol = (WQCV / 12) * Area
- F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm
- G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
- H) User Input of Water Quality Capture Volume (WQCV) Design Volume
 (Only if a different WQCV Design Volume is desired)

$I_a =$ %

$i =$

WQCV = watershed inches

Area = sq ft

$V_{WQCV} =$ cu ft

$d_e =$ in

$V_{WQCV \text{ OTHER}} =$ cu ft

$V_{WQCV \text{ USER}} =$ cu ft

2. Basin Geometry

- A) WQCV Depth (12-inch maximum)
- B) Rain Garden Side Slopes ($Z = 4$ min., horiz. dist per unit vertical)
 (Use "0" if rain garden has vertical walls)
- C) Minimum Flat Surface Area
- D) Actual Flat Surface Area
- E) Area at Design Depth (Top Surface Area)
- F) Rain Garden Total Volume
 ($V_T = ((A_{Top} + A_{Actual}) / 2) * \text{Depth}$)

$D_{WQCV} =$ in

$Z =$ ft / ft

$A_{Min} =$ sq ft

$A_{Actual} =$ sq ft

$A_{Top} =$ sq ft

$V_T =$ cu ft

3. Growing Media

Choose One _____
☒ 18" Rain Garden Growing Media
☐ Other (Explain): _____

4. Underdrain System

- A) Are underdrains provided?
- 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
- ii) Volume to Drain in 12 Hours
- iii) Orifice Diameter, 3/8" Minimum

Choose One _____
☒ YES
☐ NO

$y =$ ft

$Vol_{12} =$ cu ft

$D_o =$ in

Design Procedure Form: Rain Garden (RG)

Sheet 2 of 2

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

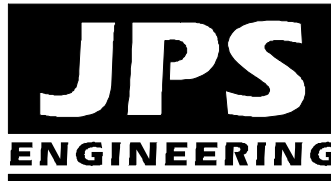
FINAL DRAINAGE REPORT
for
WALDEN PRESERVE 2 – FILING NO. 5

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

RATL.WALDEN.1121

BASIN	DESIGN POINT	AREA (AC)	C		OVERLAND LENGTH (FT)	SLOPE (%)	T _{co} ⁽¹⁾ (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT K	SLOPE (%)	SCS ⁽²⁾ VELOCITY (FT/S)	T _t ⁽³⁾ (MIN)	TOTAL	TOTAL	INTENSITY ⁽⁵⁾		PEAK FLOW	
			5-YEAR ⁽⁷⁾	100-YEAR ⁽⁷⁾									T _c ⁽⁴⁾ (MIN)	T _c ⁽⁴⁾ (MIN)	5-YR (IN/HR)	100-YR (IN/HR)	Q5 ⁽⁶⁾ (CFS)	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						
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	750		0.0		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													25.4	25.4				
OA1-OD1,A-D	4	885.28	0.297	0.397				2750	1.50	1.5	1.81	25.4	116.9	116.9	1.50	2.65	394.39	931.36

1) OVERLAND FLOW T_{co} = (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, T_t = (CHANNEL LENGTH/ SCS VELOCITY) / 60 SEC

4) T_c = T_{co} + T_t

*** 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 = C I A

7) WEIGHTED AVERAGE C VALUES FOR COMBINED BASINS

Design Procedure Form: Rain Garden (RG)

UD-BMP (Version 3.07, March 2018)

Sheet 1 of 2

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) B) Tributary Area's Imperviousness Ratio ($i = I_a/100$) C) Water Quality Capture Volume (WQCV) for a 12-hour Drain Time ($WQCV = 0.8 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i)$) D) Contributing Watershed Area (including rain garden area) E) Water Quality Capture Volume (WQCV) Design Volume $Vol = (WQCV / 12) * Area$ F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)	$I_a = 18.1$ % $i = 0.181$ WQCV = 0.09 watershed inches Area = 1,274,566 sq ft $V_{WQCV} = 9,123$ cu ft $d_6 =$ in $V_{WQCV \text{ OTHER}} =$ cu ft $V_{WQCV \text{ USER}} =$ cu ft
2. Basin Geometry A) WQCV Depth (12-inch maximum) B) Rain Garden Side Slopes ($Z = 4$ min., horiz. dist per unit vertical) (Use "0" if rain garden has vertical walls) C) Minimum Flat Surface Area D) Actual Flat Surface Area E) Area at Design Depth (Top Surface Area) F) Rain Garden Total Volume ($V_T = ((A_{Top} + A_{Actual}) / 2) * Depth$)	$D_{WQCV} = 12$ in $Z = 4.00$ ft / ft $A_{Min} = 4601$ sq ft $A_{Actual} = 8917$ sq ft $A_{Top} = 10390$ sq ft $V_T = 9,654$ cu ft
3. Growing Media	Choose One ☒ 18" Rain Garden Growing Media ☐ Other (Explain): _____ _____
4. Underdrain System A) Are underdrains provided? 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 ii) Volume to Drain in 12 Hours iii) Orifice Diameter, 3/8" Minimum	Choose One ☒ YES ☐ NO $y = 2.0$ ft $Vol_{12} = 9,123$ cu ft $D_o = 2 \frac{3}{16}$ in

Design Procedure Form: Rain Garden (RG)

Sheet 2 of 2

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

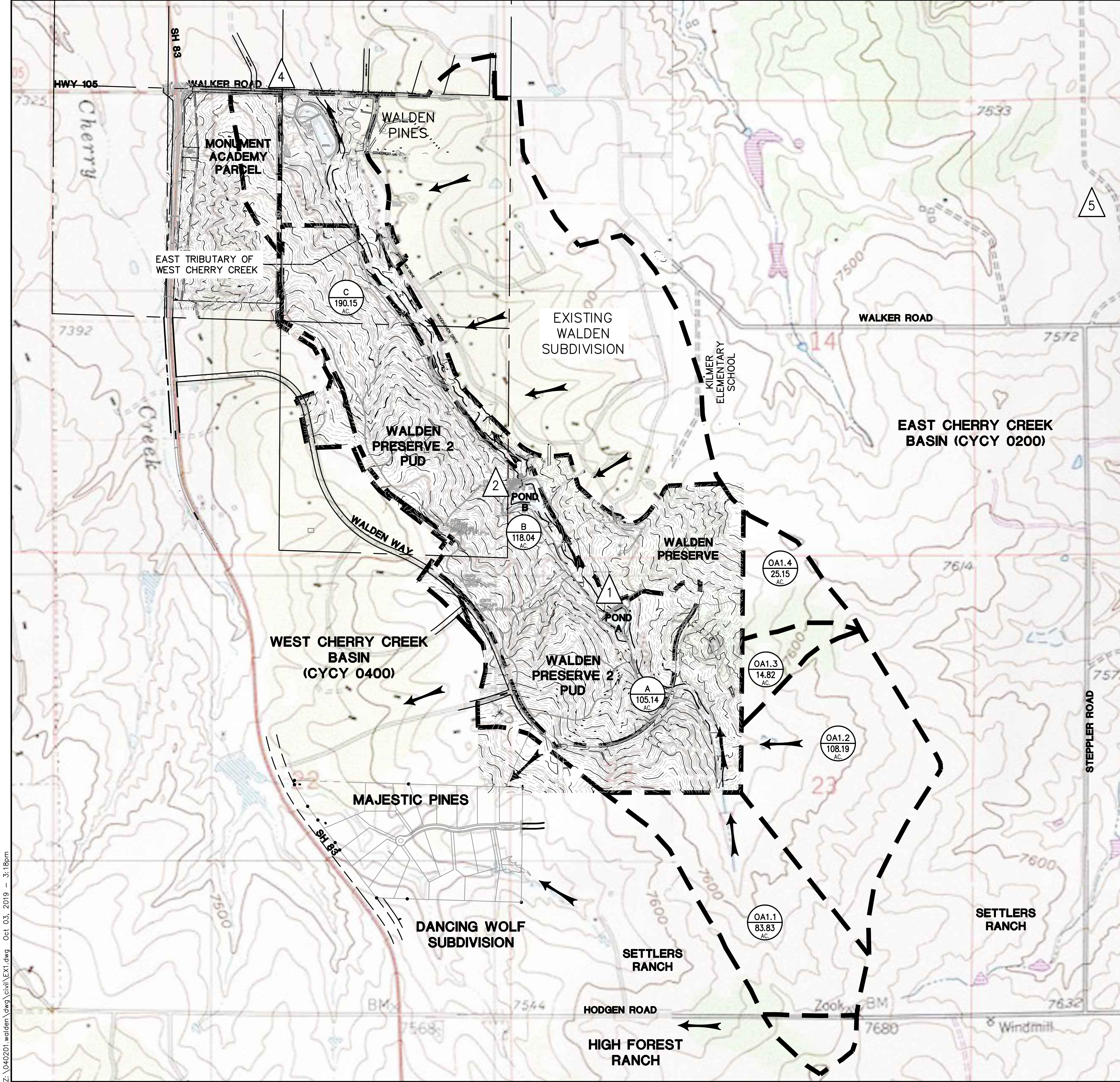
A) Will the rain garden be irrigated?

Choose One

☐ YES

☐ NO

Notes: _____



Z:\040201\walden\dwg\civil\EX1.dwg Oct 03, 2019 - 3:18pm

LEGEND

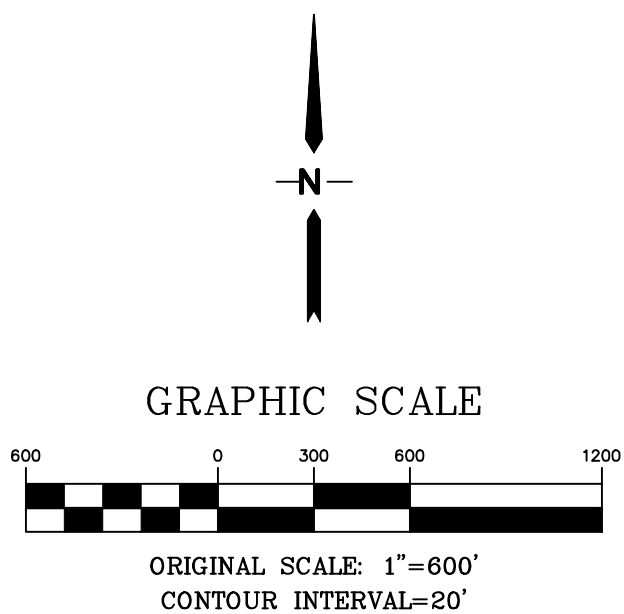
--- FILING LIMITS
--- MAJOR BASIN BOUNDARY
6520 --- EXISTING CONTOUR
--- FLOWLINE

DESIGN POINT (FROM "WALDEN PRESERVE MDDP")

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

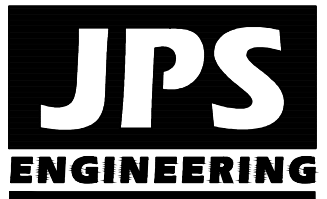


WALDEN PRESERVE SUBDIVISION

MAJOR BASIN / HISTORIC DRAINAGE PLAN

HORZ. SCALE: 1"=600'	DRAWN: MJP
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: PINNACLE	CHECKED: JPS
CREATED: 7/22/02	LAST MODIFIED: 07/03/19
PROJECT NO: 040201	MODIFIED BY: BJJ

SHEET: EX1

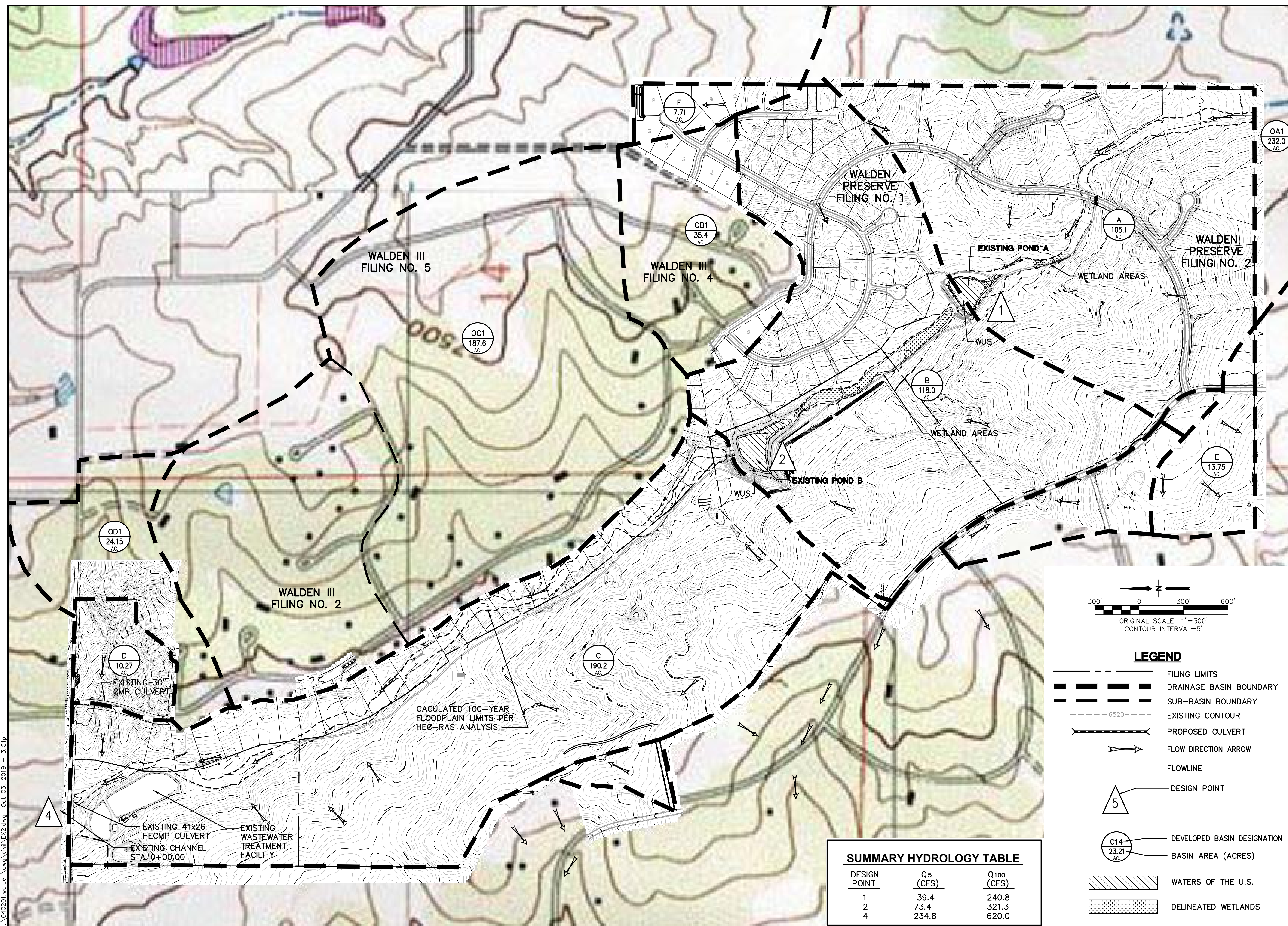


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FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

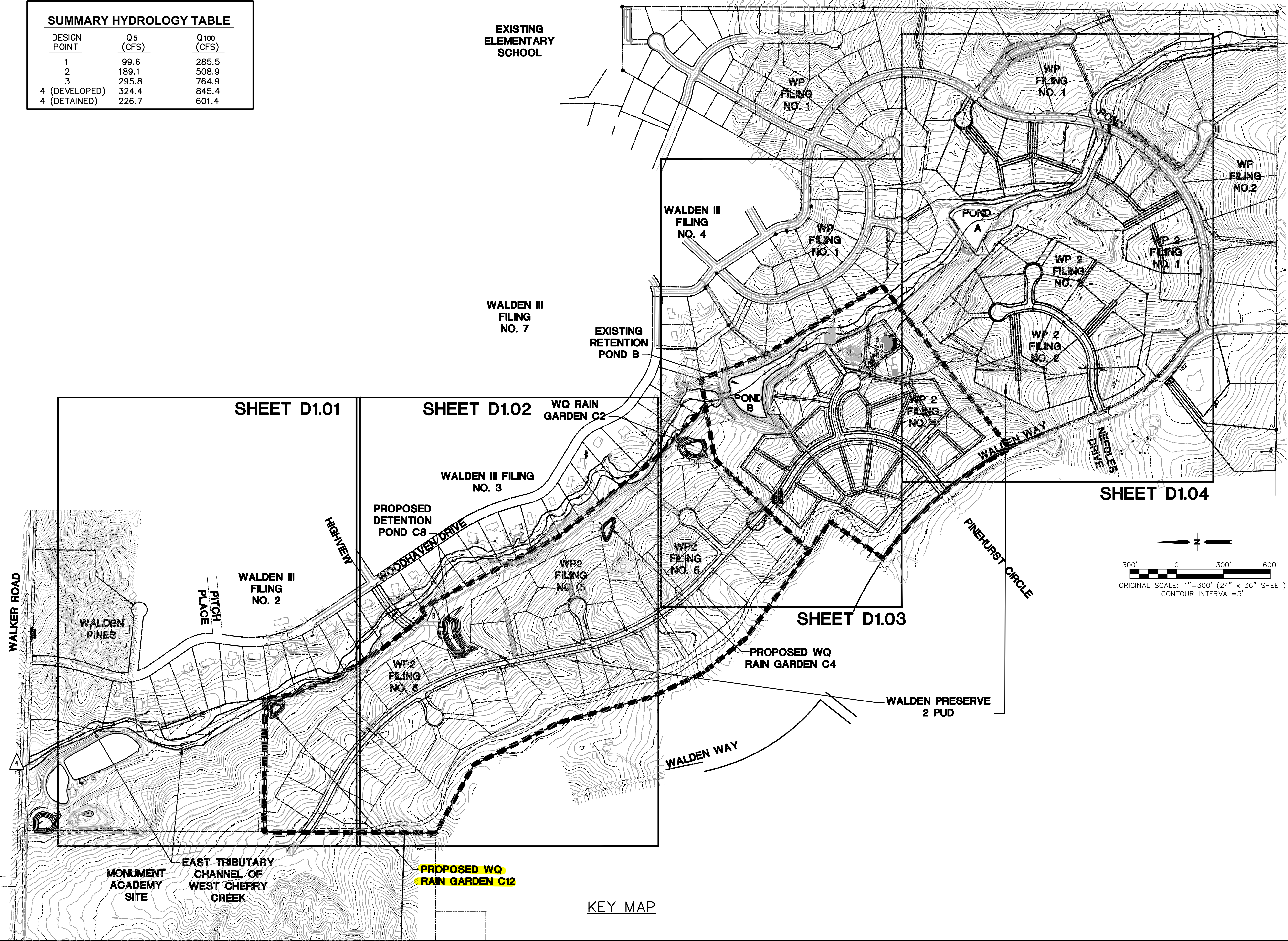
No.	REVISION	BY	DATE



EX2

C:\Users\Owner\Dropbox\jpsprojects\040201\walden\dwg\civil\D1.DWG Jan 12, 2022 -- 9:54am

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



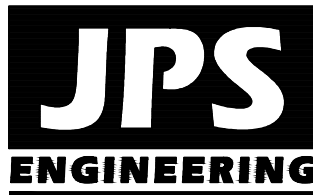
WALDEN PRESERVE

MASTER DEVELOPMENT DRAINAGE PLAN

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

SHEET:

D1



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No.	REVISION	BY	DATE

MATCH LINE - SEE SHEET D1.01

LEGEND

- PROPERTY LINES
- DRAINAGE BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- EXISTING CONTOUR
- PROPOSED CULVERT
- FLOW DIRECTION ARROW
- FLOWLINE
- DESIGN POINT
- DEVELOPED BASIN DESIGNATION
- BASIN AREA (ACRES)
- RIPRAP APRON
- GRASS BUFFER STRIP
- 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

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

EXISTING WALDEN III FILING NO. 3

WALDEN III FILING NO. 6 PHASE 1

EXISTING WALDEN SUBDIVISION ZONED RR-5

MATCH LINE - SEE SHEET D1.03

Annotations and Features:

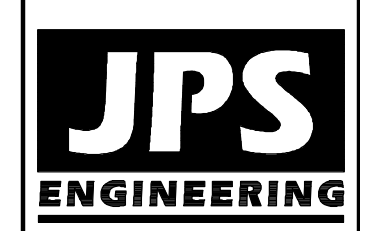
- Basins:** C1 (3.28 AC), C11 (8.63 AC), C10 (2.86 AC), C12 (17.77 AC), C9 (4.50 AC), C8 (12.77 AC), C6 (0.99 AC), C4 (15.59 AC), C5 (26.83 AC), C10.1 (121.6 AC), C14 (23.21 AC), C11.1 (12.3 AC), C4.1 (7.38 AC), C6.1 (1.3 AC).
- Culverts:** C11.1 (24"), C10 (18"), C10.1 (30"), C5 (30"), C6 (18").
- Channels:** C5.2, C9, C5.1 (0.5% MIN. SLOPE), C8.2 (1.2% SLOPE), C3, C4.1 (1.5% SLOPE).
- Other Features:** CUL-DE-SAC C, CUL-DE-SAC B, DIVERSION CHANNEL TO POND C8, PROPOSED BERM & DIVERSION CHANNEL NORTH TO POND C8, PROPOSED RAIN GARDEN C4, PROPOSED DITCH C8.1, PROPOSED DITCH C8.2, PROPOSED DRAINAGE EASEMENT, SUBDIVISION BOUNDARY, EXISTING TRAIL, EXISTING 60' ROW, RIPRAP APRON (RR), GRASS BUFFER STRIP (GB), RAIN GARDEN (RG).

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

PROPERTY LINES
DRAINAGE BASIN BOUNDARY
SUB-BASIN BOUNDARY
EXISTING CONTOUR
PROPOSED CULVERT
FLOW DIRECTION ARROW
FLOWLINE
DESIGN POINT
DEVELOPED BASIN DESIGNATION
BASIN AREA (ACRES)
RIPRAP APRON
GRASS BUFFER STRIP
RAIN GARDEN

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

WALDEN PRESERVE



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DEVELOPED DRAINAGE PLAN

HORIZ. 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**

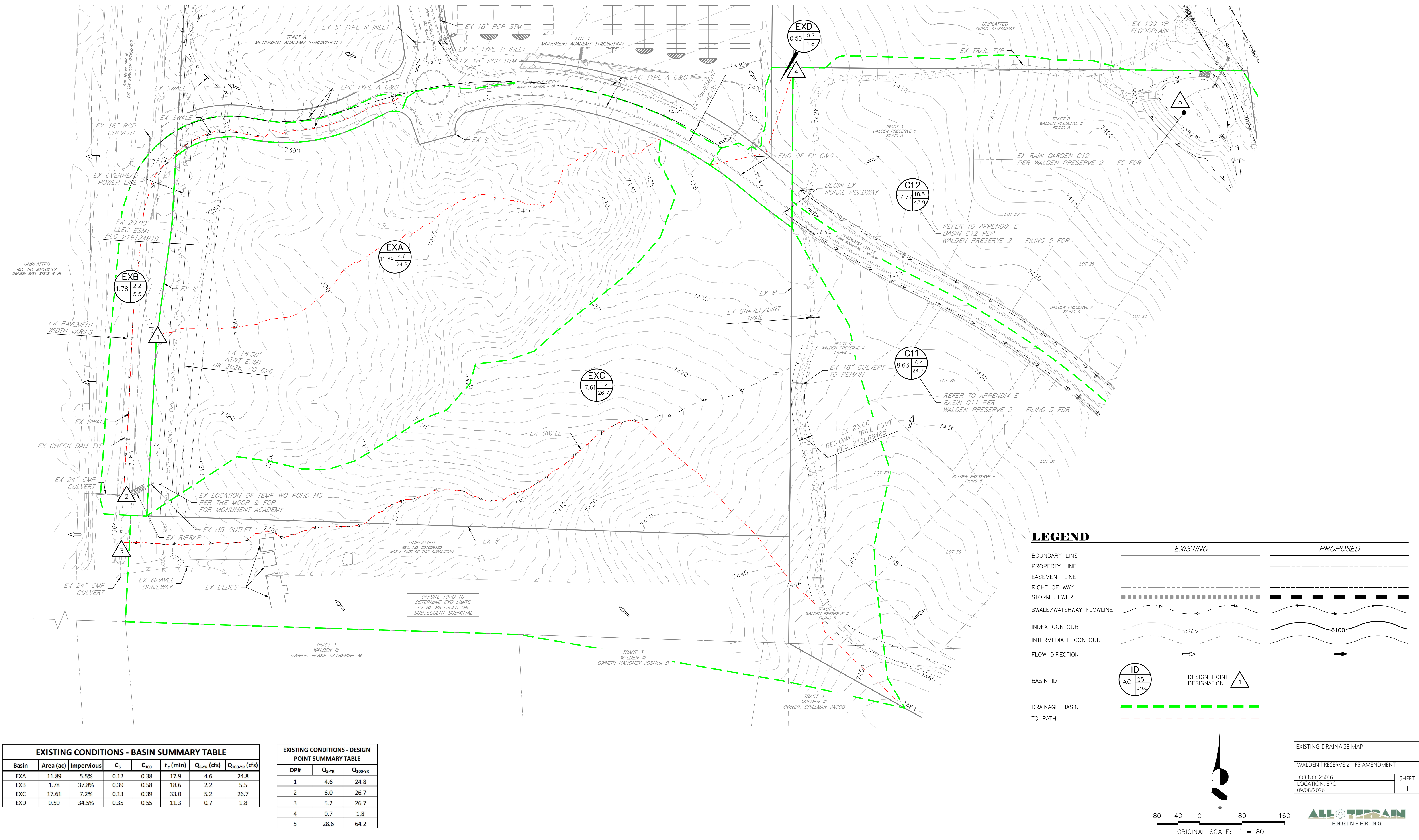
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APPENDIX F – DRAINAGE MAPS

WALDEN PRESERVE 2 - FILING 5 AMENDMENT

EXISTING DRAINAGE MAP



WALDEN PRESERVE 2 - FILING 5 AMENDMENT

PROPOSED DRAINAGE MAP

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	Q _s -yr	Q ₁₀₀ -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 _s	C ₁₀₀	t _c (min)	Q _s -yr (cfs)	Q ₁₀₀ -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

BOUNDARY LINE
PROPERTY LINE
EASEMENT LINE
RIGHT OF WAY
STORM SEWER
SWALE/WATERWAY FLOWLINE
INDEX CONTOUR
INTERMEDIATE CONTOUR
FLOW DIRECTION
BASIN ID
DRAINAGE BASIN
TC PATH

EXISTING
PROPOSED

OFFSITE TOPO TO DETERMINE EXB LIMITS TO BE PROVIDED ON SUBSEQUENT SUBMITTAL

TRACT 1 WALDEN III OWNER: BLAKE CATHERINE M
TRACT 3 WALDEN III OWNER: MAHONEY JOSHUA D
TRACT 4 WALDEN III OWNER: SPILLMAN JACOB

PROPOSED DRAINAGE MAP
WALDEN PRESERVE 2 - F5 AMENDMENT
JOB NO. 25016
LOCATION: EPC
09/08/2026
SHEET 1

ALL TERRAIN ENGINEERING

PROPOSED CONDITIONS - BASIN SUMMARY TABLE							
Basin	Area (ac)	Impervious	C _s	C ₁₀₀	t _c (min)	Q _{s-IR} (cfs)	Q _{100-IR} (cfs)
EXB	1.18	37.8%	0.39	0.58	18.6	2.2	5.5
A	2.75	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

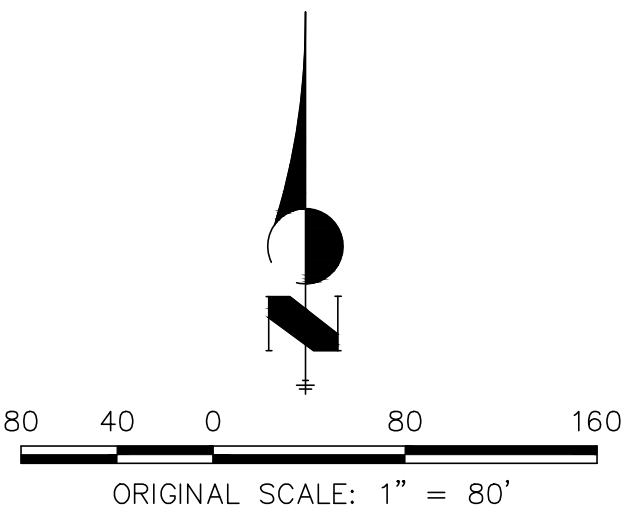
PROPOSED CONDITIONS - BASIN SUMMARY TABLE							
Basin	Area (ac)	Impervious	C _s	C ₁₀₀	t _c (min)	Q _{s-IR} (cfs)	Q _{100-IR} (cfs)
EXB	1.18	37.8%	0.39	0.58	18.6	2.2	5.5
A	2.75	28.4%	0.26	0.49	10.4	2.3	7.2
B	1.23	62.5%	0.58	0.73	8.8	3.1	6.5
C	1.03	39.2%	0.37	0.57	9.8	1.6	4.1
D	1.66	26.5%	0.23	0.47	14.5	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

Figure 1: Comparison of existing and proposed design standards for drainage basins. The figure shows two cross-sectional diagrams side-by-side, labeled 'EXISTING' and 'PROPOSED'. The 'EXISTING' diagram shows a drainage basin with a boundary line, property line, easement line, right of way, storm sewer, and swale/waterway flowline. It includes an index contour (6100) and an intermediate contour. The 'PROPOSED' diagram shows a similar setup but with a different flowline and contour configuration. Below the diagrams are symbols for basin ID (a circle divided into four quadrants labeled ID, AC, Q5, and Q100) and design point designation (a triangle labeled 1). The drainage basin is indicated by a green dashed line, and the TC path is indicated by a red dashed line.



DRAINAGE BASIN 

TC PATH



PROPOSED DRAINAGE MAP	
WALDEN PRESERVE 2 - F5 AMENDMENT	
JOB NO. 25016	SHEET 1
LOCATION: EPC	
09/08/2026	

