Filing No. 1 and 2

IRON RIDGE ~~SUBDIVISION NO. 1~~

FINAL DRAINAGE REPORT

PCD FILE NO: ~~SP253~~ SF2612 & SF2613
ALL TERRAIN ENGINEERING PROJECT NO: 25009
JUNE 2026

PREPARED FOR:
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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 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.

05/28/2026

Ryan E. Burns, 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.

Jake DeCoto, Manager Date

Atticus Land, LLC

PO Box 88010, Colorado Springs, CO 80908

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 Palmer, P.E. Date

County Engineer/ECM Administrator

Conditions:

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Appendices

I. General Purpose, Location & Description

a. Purpose

The purpose of this Final Drainage Report (FDR) for IRON RIDGE SUBDIVISION NO. 1 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. Iron

b. Location

IRON RIDGE SUBDIVISION NO. 1, referred to as 'the site' herein, is in a portion of southeast quarter of Section 13, Township 11 South, Range 66 West of the 6th P.m., County of El Paso, State of Colorado. The site is bound by Walker Road to the north, Equine Meadows Subdivision to the east and undeveloped parcels to the west and south. A vicinity map is presented in Appendix A.

c. Description of Property

The site is comprised of (3) existing Parcels, Parcel 1 is ~~43.68~~ acres, Parcel 2 is ~~35.14~~ acres and Parcel 3 is ~~42.52~~ acres for a total of approximately ~~121.34~~ acres of undeveloped land. The development of Iron Ridge Subdivision will occur on Parcel 1 and 2. Parcel 3 will remain undeveloped. Existing vegetation consists of prairie grasses based upon aerial imagery. The approximate disturbed area is 9.2 acres. The development will plat (28) 2.5 acre+ "Large Lot single family residential lots" & public R.O.W. for an extension of Colt Court and proposed Brown Road, both Rural Local EPC cross sections with a 60' R.O.W.

Proposed improvements include Rural Local Roadways, associated road-side swales, culverts, (2) full spectrum extended detention basins, and grading. The residential lots will be served by private wells and OWTS.

In general, Parcel 1 slopes southeasterly towards an unnamed tributary of East Cherry Creek. East Cherry Creek is the ultimate receiving water for the site. The confluence of the unnamed tributary and East Cherry Creek is approximately 3.2 miles northeast of the site. Parcel 2 drains northwesterly towards the same tributary. Onsite elevations range from 7,450' – 7,560' with slopes ranging 1 – 80%. Per a NRCS soil survey, the site is made up of Type B Peyton sandy loam, Type B Peyton-Pring complex, Type B Tomah-Crowfoot loamy sands. The NRCS soil survey is presented in Appendix A.

An unnamed tributary of East Cherry Creek bisects the site and flows northeasterly. This tributary will be referred to as Tributary #1 from herein. There are no existing utilities located on site. An existing drainage map is presented in Appendix F.

d. Floodplain Statement

Based on FEMA Firm map 08041C0305Gdated 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 East Cherry Creek Drainage Basin. There is not a Drainage Basin Planning Study available for the East Cherry Creek Drainage Basin.

b. Existing Subbasin Description

The existing site's drainage patterns are relatively uniform. Tributary #1 bisects the site and conveys stormwater northeasterly towards Walker Road. An existing impoundment structure, The "Franktown Parker Reservoir FPE-5" is located approximately 850' upstream of Walker Road. The proposed development will

not have impacts on the impoundment structure. A portion of the site in the southeast area drains easterly to a separate tributary. An existing drainage map is presented in Appendix F.

Basin OS1 is 723.2 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS1 hydrologic parameters. Existing stormwater from this basin (Q_5 = 33.9 cfs Q_{100} = 199 cfs) is collected offsite in Tributary #1 and flows onsite at DPOS1 (Q_5 = 34.6 cfs Q_{100} = 202.5 cfs) where it combines with flows from DPOS2. Flows from DPOS1 continue through the site via Tributary 1 to DP5 (Q_5 = 48.6 cfs Q_{100} = 291.2 cfs)at Walker Road.

Basin OS2 is 38.4 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS2 hydrologic parameters. Existing stormwater from this basin (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs) is collected offsite in Tributary #2 and flows onsite at DPOS2 (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs) and continues across Basin EX1 and off-site again, where it joins Tributary 1 at DPOS1 (Q_5 = 34.6 cfs Q_{100} = 202.5 cfs).

Basin OS3 is 53.9 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS3 hydrologic parameters. Existing stormwater from this basin (Q_5 = 4.3 cfs Q_{100} = 20.4 cfs) is collected offsite in Tributary #3 and flows onsite at DPOS3 (Q_5 = 4.3 cfs Q_{100} = 20.4 cfs). Flows continue through the SE corner of basin EX9 and flow off-site in Tributary 3 to DP7 (Q_5 = 7.7 cfs Q_{100} = 42.0 cfs).

Basin EX1 is 14.49 acres of undeveloped land and Walker Road. Existing stormwater from this basin (Q_5 = 3.4 cfs Q_{100} = 20.7 cfs) is collected in Tributary#1 at DP1 (Q_5 = 3.4 cfs Q_{100} = 20.7 cfs) and continue in Tributary 1, see Basin OS1 description above.

Basin EX2 is 6.91 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 1.9 cfs Q_{100} = 12.6 cfs) is collected in Tributary#1 at DP2 (Q_5 = 3.8 cfs Q_{100} = 20.4 cfs). Flows continue NE in Tributary 1 to DP3. See Basin EX4 description below.

Basin EX3 is 17.98 acres of undeveloped land and Walker Road. Existing stormwater from this basin (Q_5 = 4.5 cfs Q_{100} = 27.4 cfs) is collected in Tributary#1 at DP3 (Q_5 = 11.5 cfs Q_{100} = 74.0 cfs). Flows at DP3 continue in Tributary 1 to DP4, see basin EX4 description below.

Basin EX4 is 6.94 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 2.0 cfs Q_{100} = 13.1 cfs) is collected in Tributary#1 at DP4 (Q_5 = 12.5 cfs Q_{100} = 80.5 cfs) where it combines with flows from DP3 and basin EX5. Flows at DP4, pass through the “Franktown Parker Reservoir FPE-5” via a concrete outlet structure and outfall pipe and continue in Tributary 1 to DP5. See basin EX7 description below. It is assumed flows pass through the reservoir unrestricted for the purposes of hydrologic routing.

Basin EX5 is 39.65 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 9.1 cfs Q_{100} = 61.2 cfs) is collected in Tributary#1 at DP4 (Q_5 = 12.5 cfs Q_{100} = 80.5 cfs) where they combine with flows from DP3 and Basin EX4. Flows at DP4, pass through the “Franktown Parker Reservoir FPE-5” via a concrete outlet structure and outfall pipe and continue in Tributary 1 to DP5. See basin EX6, EX7, & EX8 descriptions below. It is assumed flows pass through the reservoir unrestricted for the purposes of hydrologic routing.

Basin EX6 is 1.43 acres of undeveloped land and Walker Road. Existing stormwater from this basin (Q_5 = 1.2 cfs Q_{100} = 4.3 cfs) is collected in a swale along Walker Road before discharging into Tributary#1 at DP5 (Q_5 = 14.0 cfs Q_{100} = 88.7 cfs, excludes off-site flows for comparison purposes) where they combine with flows from DP4 and basins EX7 & EX8, see description below.

Basin EX7 is 3.54 acres of undeveloped land adjacent to Walker Road. Existing stormwater from this basin (Q_5 = 0.9 cfs Q_{100} = 6.3 cfs) is collected in Tributary#1 at DP5 (Q_5 = 14.0 cfs Q_{100} = 88.7 cfs, excludes off-site flows for comparison purposes) where they combine with flows from DP4 and basins EX6 & EX8, see description below.

Basin EX8 is 26.55 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 5.5 cfs Q_{100} = 34.7 cfs) is collected in Tributary#1 at DP5 (Q_5 = 14.0 cfs Q_{100} = 88.7 cfs, excludes off-site flows for comparison purposes) where they combine with flows from DP4 and basins EX6 & EX7.

The total flow at DP5 including the off-site flow from basin's OS1 and OS2 is (Q_5 = 48.6 cfs Q_{100} = 291.2 cfs).

Basin EX9 is 12.23 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 2.8 cfs Q_{100} = 18.9 cfs) flows offsite and is collected in Tributary#3 at DP6 (Q_5 = 2.8 cfs Q_{100} = 18.9 cfs). Flows at DP6 continue in Tributary 3 to DP7 where they combine with flows from basins EX10 and EX11, see description below.

Basin EX10 is 2.15 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 0.7 cfs Q_{100} = 4.5 cfs) flows offsite and is collected in Tributary#3 at DP7 (Q_5 = 3.4 cfs Q_{100} = 21.6 cfs, excludes off-site flows for comparison purposed) where they combine with flows from DP6 and basin EX11.

Basin EX11 is 2.85 acres of undeveloped land and Colt Court. Existing stormwater from this basin (Q_5 = 1.2 cfs Q_{100} = 6.3 cfs) flows offsite and is collected in Tributary#3 at DP7 (Q_5 = 3.4 cfs Q_{100} = 21.6 cfs, excludes off-site flows for comparison purposed) where they combine with flows from DP6 and basin EX10.

The total flow at DP5 including the off-site flow from basin OS3 is (Q_5 = 7.7cfs Q_{100} = 42.0 cfs).

c. Proposed Subbasin Description

The proposed site has been divided into 24 subbasins for analysis. Areas designated 'no-build' have been analyzed as 'historic' in the proposed condition. Basin OS1 – OS3 are excluded from the design point flows presented in Basin A – Basin V descriptions. However, Basin OS1 - OS3 flows will be included in the stability analysis of Tributary #1 - #3. The offsite flows are analyzed separately to accurately quantify the change in onsite flow from the existing to proposed condition.

In general, the site was designed to preserve existing drainage patterns to the extent possible and minimize the disturbance area to allow for the lots to remain in a natural condition. Developed stormwater from the proposed roadways will be captured in road-side swales and conveyed to full-spectrum detention pond 1 or 2. The proposed lots are considered "large lot single family" sites which do not require water quality per Appendix I.7.1.B.5. Lot areas that are tributary to the proposed roads or ponds, will be treated and detained, however, lots that are not tributary to the roadways or ponds will flow off-site unretained per the existing drainage patterns.

Basin OS1 is 723.2 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS1 hydrologic parameters. Existing stormwater from this basin (Q_5 = 33.9 cfs Q_{100} = 199 cfs) is collected offsite in Tributary #1 and flows onsite at DPOS1 (Q_5 = 34.6 cfs Q_{100} = 202.5 cfs) where it combines with flows from DPOS2. Flows from DPOS1 continue through the site via Tributary 1 to DP15 (Q_5 = 45.2 cfs Q_{100} = 279.5 cfs) a 72" CMP culvert at Walker Road.

specify whether private or public (typical)

Basin OS2 is 38.4 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS2 hydrologic parameters. Existing stormwater from this basin (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs) is collected offsite in Tributary #2 and flows onsite at DPOS2 (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs). There will be no development or disturbance occurring in Basin OS2.

Basin OS2 is 38.4 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS2 hydrologic parameters. Existing stormwater from this basin (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs) is collected offsite in Tributary #2 and flows onsite at DPOS2 (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs) and continues across Basin A and off-site again, where it joins Tributary 1 at DPOS1 (Q_5 = 34.6 cfs Q_{100} = 202.5 cfs). Flows from

DPOS1 continue through the site via Tributary 1 to DP15 (Q_5 = 45.2 cfs Q_{100} = 279.5 cfs) a 72" CMP culvert at Walker Road.

Basin OS3 is 53.9 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS3 hydrologic parameters. Existing stormwater from this basin (Q_5 = 4.3 cfs Q_{100} = 20.4 cfs) is collected offsite in Tributary #3 and flows onsite at DPOS3 (Q_5 = 4.3 cfs Q_{100} = 20.4 cfs). Flows continue through the SE corner of basin L and flow off-site in Tributary 3 to DP11 (Q_5 = 8.9 cfs Q_{100} = 43.3 cfs).

Basin A is 18.32 acres of proposed 2.5+ acre lots and a portion of existing Walker Road. Basin A stormwater (Q_5 = 5.1 cfs Q_{100} = 28.5 cfs) follows historic drainage patterns and is collected in Tributary #2 at DP1 (Q_5 = 5.1 cfs Q_{100} = 28.5 cfs). Flow at DP1 continue via Tributary 2 to DPOS1, where they flow back- onsite via Tributary 1 and continue to DP5, see Basins B-G descriptions below. Basin A will not be detained in Pond 1. Basin A is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin B1 is 6.83 acres of proposed 2.5+ acres lots, a small portion of proposed Brown Road & associated roadside swale B and a portion of existing Walker Road. Basin B1 stormwater (Q_5 = 3.0 cfs Q_{100} = 14.2 cfs) is captured in Roadside Swale B @ DP2 (Q_5 = 5.9 cfs Q_{100} = 23.7 cfs) where it combines with flows from Basin B2 & C and enter a 30" RCP culvert (public) and is piped under Brown Road to DP3, see Basin description below. Basin B1 will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin B2 is 1.13 acres of a small portion of proposed 2.5+ acres lots, proposed Brown Road & associated roadside swale B. Basin B2 stormwater (Q_5 = 1.3 cfs Q_{100} = 3.6 cfs) is captured in Roadside Swale B and is conveyed to DP2 (Q_5 = 5.9 cfs Q_{100} = 23.7 cfs) where it combines with flows from Basin B1 & C and enter a 30" RCP culvert (public) and is piped under Brown Road to DP3, see Basin description below. Basin B2 will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin C is 2.84 acres of proposed 2.5+ acres lots, a portion of proposed Brown Road and associated roadside swale C and Walker Road. Basin C stormwater (Q_5 = 1.9 cfs Q_{100} = 7.2 cfs) is captured in Roadside Swale C and conveyed to DP2 (Q_5 = 5.9 cfs Q_{100} = 23.7 cfs) where it combines with flows from Basin B1 & B2 and enter a 30" RCP culvert (public) and is piped under Brown Road to DP3, see Basin description below. Basin C will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin D is 0.86 acres of proposed Brown Road and associated roadside swale D. Basin D stormwater (Q_5 = 1.3 cfs Q_{100} = 3.1 cfs) is captured in Roadside Swale D and conveyed to DP3.1 (Q_5 = 7.4 cfs Q_{100} = 27.2 cfs) via an 18" RCP culvert (private) underneath the proposed Pond 1 maintenance access road where it combines with flows from DP3 in proposed "DP3.1 - DP4" Swale. Basin D will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin E is 0.47 acres of proposed Brown Road and associated roadside swale E. Basin E stormwater (Q_5 = 0.8 cfs Q_{100} = 2.0 cfs) is captured in Roadside Swale E and conveyed to DP3 (Q_5 = 6.4 cfs Q_{100} = 25.1 cfs) where it combines with flows from DP2 in swale "DP3 - DP3.1) and contiunues in the swale to DP3.1 ((Q_5 = 7.4 cfs Q_{100} = 27.2 cfs). DP3 is conveyed to Pond 1 in swale "DP3.1 – DP4". Basin E will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin F is 2.77 acres of proposed 2.5+ acres lots and Pond 1. Basin F stormwater (Q_5 = 1.2 cfs Q_{100} = 5.8 cfs) overland flows to Pond 1 at DP4 (Q_5 = 8.4 cfs Q_{100} = 32.1 cfs) and combines in the pond with flows from DP3.1. Basin F will be captured and detained in Pond 1 for full spectrum water quality and detention. Detained flows at DP4 are released via a full-spectrum outlet structure and 24" RCP pipe (private) and low tail-water basin at DP4.1 (Q_5 = 0.1 cfs Q_{100} =23.9 cfs). Released flows are conveyed to Tributary 1 via "DP4.1

outfall swale" at DP5 (Q_5 = 4.2 cfs Q_{100} =38.9 cfs) where they combine with flows from Basins A, G, and K and continue to DP6, see basin descriptions below.

Basin G is 3.91 acres of proposed 2.5+ acres lots and undevelopable land within Tributary #1. Basin G stormwater (Q_5 = 1.2 cfs Q_{100} = 7.0 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP5 (Q_5 = 4.2 cfs Q_{100} =38.9 cfs) where it combines with flows from Basins A, K, and DP4.1. Basin G will not be detained in Pond 1. Basin G is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin H is 9.28 acres of 2.5+ acre lots and undevelopable land within Tributary #1. Basin H stormwater (Q_5 = 3.0 cfs Q_{100} = 17.7cfs) follows historic drainage patterns and is collected in Tributary #1 at DP6 (Q_5 = 8.6 cfs Q_{100} = 69.3 cfs) where it combines with flows from DP5, DP14.1, and basin U. Flows at DP6, pass through the "Franktown Parker Reservoir FPE-5" via an existing, concrete outlet structure and outfall pipe and continue to DP15, a 72" CMP culvert at Walker Road. It is assumed flows pass through the reservoir unrestricted for the purposes of hydrologic routing. Basin H will not be detained in Pond 1. Basin H is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin I is 3.54 acres of undevelopable land within Tributary #1. Basin I stormwater (Q_5 = 0.9 cfs Q_{100} = 6.3 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP15 (Q_5 = 10.5 cfs Q_{100} = 77.1 cfs), a 72" CMP culvert at Walker Road where it combines with flows from DP6, basin J and basin V. Basin I will remain undeveloped and will not be detained in Pond 1.

Basin J is 1.35 acres of existing Walker Road and undevelopable land within Tributary #1. Basin J stormwater (Q_5 = 1.4 cfs Q_{100} = 4.1 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP15 (Q_5 = 10.5 cfs Q_{100} = 77.1 cfs), a 72" CMP culvert at Walker Road where it combines with flows from DP6, basin H and basin V. Basin I will remain undeveloped and will not be detained in Pond 1.

Basin K is 0.89 acres of proposed 2.5+ acres lots. Basin K stormwater (Q_5 = 0.4 cfs Q_{100} = 2.4 cfs) flows offsite and is captured in Tributary #1 and conveyed to DP5 (Q_5 = 4.2 cfs Q_{100} = 38.9 cfs) where it combines with flows from DP4.1 and basins A & G. Basin K will not be detained in Pond 1. Basin K is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin L is 11.99 acres of proposed 2.5+ acres lots. Basin L stormwater (Q_5 = 3.5 cfs Q_{100} = 20.0 cfs) follows historic drainage patterns and is collected in Tributary #3 at DP7 (Q_5 = 3.5 cfs Q_{100} = 20 cfs) Flows continue in Tributary 3 to DP11, see basin descriptions below. Basin L will not be detained in Pond 2. Basin L is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin M is 2.06 acres of proposed 2.5+ acres lots. Basin M stormwater (Q_5 = 0.8 cfs Q_{100} = 4.8 cfs) follows historic drainage patterns to the east and offsite at DP8 (Q_5 = 0.8 cfs Q_{100} = 4.8 cfs) and continue into Tirbutary 3 where it continues to DP11, see basin descriptions below. Basin M will not be detained in Pond 2. Basin M is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin N1 is 1.18 acres of existing residential area and Colt Court. Basin N stormwater (Q_5 = 1.3 cfs Q_{100} = 3.9 cfs) is collected in roadside swale N1 and is transported to DP9 (Q_5 = 2.3 cfs Q_{100} = 7.7 cfs) where it combines with flows from Basin N2 and enters an 18" RCP culvert (public). Flows are piped under Colt Court and continue to DP10 per Basin O drainage patterns described below. There is no proposed development within Basin N1, however; Colt Court will be extended to Iron Ridge from its current terminus. Per EPC ECM Section I.7.1.C.1.A, the developed area within Basin N will be excluded from permanent water quality management. The total excluded area is 0.24 acres encompassing the paved portion of Colt Court. Colt Court is within the Equine Meadows subdivision and the existing topography directs stormwater away from Iron Ridge Pond 2. Water quality for the remaining 0.94 acres is excluded under EPC ECM Section 1.7.1.B.5. Coordination is ongoing with the property owners along Colt Court to facilitate the improvements required within the basin.

Basin N2 is 1.25 acres of existing residential area and Colt Court. Basin N stormwater (Q_5 = 1.1 cfs Q_{100} = 3.8 cfs) is collected in roadside swale N2 and is transported to DP9 (Q_5 = 2.3 cfs Q_{100} = 7.7 cfs) where it combines with flows from Basin N1 and enters an 18" RCP culvert (public). Flows are piped under Colt Court and continue to DP10 per Basin O drainage patterns described below. There is no proposed development within Basin N2, however; Colt Court will be extended to Iron Ridge from its current terminus. Per EPC ECM Section I.7.1.C.1.A, the developed area within Basin N will be excluded from permanent water quality management. The total excluded area is 0.15 acres encompassing the paved portion of Colt Court. Colt Court is within the Equine Meadows subdivision and the existing topography directs stormwater away from Iron Ridge Pond 2. Water quality for the remaining 1.1 acres is excluded under EPC ECM Section 1.7.1.B.5. Coordination is ongoing with the property owners along Colt Court to facilitate the improvements required within the basin.

Basin O is 0.60 acres of existing Colt Court. Basin O stormwater (Q_5 = 0.6 cfs Q_{100} =2.0 cfs) follows historic drainage patterns to DP10 (Q_5 = 2.9 cfs Q_{100} = 9.6 cfs) where flows combine in the DP10 EX Swale with piped flows from DP9. There is no proposed development within Basin O, however; Colt Court will be extended through Basin O to Iron Ridge. Stormwater continues per existing drainage patterns to the historic outfall within Tributary #3 at DP11 (Q_5 = 4.6 cfs Q_{100} = 22.9 cfs) where flows combine with flow from DP7 (basin L) and DP8 (basin M). Per EPC ECM Section I.7.1.C.1.A, the developed area within Basin O will be excluded from permanent water quality management. The total excluded area is 0.11 acres encompassing the paved portion of Colt Court. Water quality for the remaining .49 acres is excluded under EPC ECM Section 1.7.1.B.5. Colt Court is within the Equine Meadows subdivision and the existing topography directs stormwater away from Iron Ridge Pond 2. Coordination is ongoing with the property owners along Colt Court to facilitate the improvements within this basin.

Basin P is 5.00 acres of proposed 2.5+ acres lots, Colt Court and associated roadside swale P. Basin P stormwater (Q_5 = 2.9 cfs Q_{100} = 11.7 cfs) is captured in Roadside Swale P and conveyed to DP12 (Q_5 = 2.9 cfs Q_{100} = 14.9 cfs) where it combines with flows from basin Q and enters a 24" RCP culvert (public) which transports flows under Colt Court to DP13, see basin descriptions below. Basin P will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin Q is 1.21 acres of proposed 2.5+ acres lots, Colt Court and associated roadside swale Q. Basin Q stormwater (Q_5 = 1.1 cfs Q_{100} = 3.8 cfs) is captured in Roadside Swale Q and conveyed to DP12 (Q_5 = 2.9 cfs Q_{100} = 14.9 cfs). where it combines with flows from basin P and enters a 24" RCP culvert (public) which transports flows under Colt Court to DP13, see basin descriptions below. Basin Q will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin R is 1.82 acres of proposed 2.5+ acres lots, Colt Court and associated roadside swale R. Basin R stormwater (Q_5 = 1.8 cfs Q_{100} = 5.5 cfs) is captured in Roadside Swale R and conveyed to DP13 (Q_5 = 4.7 cfs Q_{100} = 21.5 cfs) where flows combine with piped flows from DP12 and basin S flows. DP13 flow is conveyed to Pond 2 at DP14 in "swale DP13 – DP14". Basin R will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin S is 0.57 acres of proposed 2.5+ acres lots, Colt Court and roadside swale S. Basin R stormwater (Q_5 = 0.9 cfs Q_{100} = 2.2 cfs) is captured in Roadside Swale S and conveyed to DP13 (Q_5 = 4.7 cfs Q_{100} = 21.5 cfs) where flows combine with piped flows from DP12 and basin R flows. DP13 flow is conveyed to Pond 2 at DP14 in "swale DP13 – DP14". Basin S will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin T is 0.87 acres of proposed 2.5+ acres lots, "Swale DP13-14" and Pond 2. Basin F stormwater (Q_5 = 0.5 cfs Q_{100} = 2.3 cfs) overland flows to Pond 2 at DP14 (Q_5 = 4.8 cfs Q_{100} = 22.5 cfs) where it combines with flows transported in the swale from DP13. Basin T will be captured and detained in Pond 2 for full spectrum water quality and detention. Pond 2 will release flows through a full-spectrum outlet structure via a 24" RCP storm sewer (private) into a low-tailwater basin and connected "DP14.1 outfall swale" @ DP14.1 (Q_5 = 0.1 cfs Q_{100} = 14.4 cfs). "DP14.1 outfall swale" transports flows through basin U to Tributary 1 @ DP6 (Q_5 = 8.6 cfs Q_{100} = 69.3 cfs), where flows combine with flows from basin U, H, and DP5.

Basin U is 31.9 acres of proposed 2.5+ acres lots, offsite area, "DP14.1 outfall swale", and undevelopable land within Tributary #1. Basin U stormwater (Q_5 = 7.8 cfs Q_{100} = 47.0 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP6 (Q_5 = 8.6 cfs Q_{100} = 69.3 cfs), where flows combine with flows from basin H, and DP5, & DP14.1. Basin U will not be detained in Pond 1. Basin U is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin V is 24.97 acres of proposed 2.5+ acres lots, offsite 2.5+ acre lots and undevelopable land within Tributary #1. Basin V stormwater (Q_5 = 6.1 cfs Q_{100} = 37.7 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP15 (Q_5 = 10.5 cfs Q_{100} = 77.1 cfs), a 72" CMP culvert at Walker Road where it combines with flows from DP6, basin I, & J. Basin V will not be detained in Pond 1. Basin U is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

EXISTING V. PROPOSED DESIGN POINT COMPARISON

Ex/Pr DP	Ex Q_5 (cfs)	Ex Q_{100} (cfs)	Pr Q_5 (cfs)	Pr Q_{100} (cfs)	Q_5 Change	Q_{100} Change
5/15	14.0	88.7	10.5	77.1	-24.9%	-13.1%
7/11	3.4	21.6	4.6	22.9	37.0%	6.1%

Existing Design Point 5 and Proposed Design Point 15 represent the site's outfall within Tributary #1. Existing Design Point 7 and Proposed Design Point 11 represent the site's outfall within Tributary #3. See below for flow change descriptions. It should be noted while some onsite basins demonstrate a peak flow increase in the proposed condition, the site's overall peak discharge is less than historic at DP15.

- The decrease in 5-year flow at DP5/15 can be attributed to the decrease in 5-year discharge occurring at Pond 1 and Pond 2 as well as an increase in the time of concentration for the developed condition. The 5-year discharge is 0.1 cfs, which is less than historic. The decrease in the 5-yr storm was necessary to achieve the required pond drain times.
- The decrease in 100-year flow at DP5/15 can be attributed to the increased time of concentration for the site in the developed condition. The flow after development is reduced at the existing 72" CMP culvert at DP5/15 and it conveys the 100-yr flows within El Paso County criteria. Culvert analysis is included in Appendix C. Additionally, the total flow within the existing Tributary's 1 and 2, has remained unchanged or decreased as a result of this project.

- The increase in 5-year and 100-year at DP7/11 can be attributed to the extension of Colt Court. The flow increase is less than 1.3 cfs in both scenarios and is negligible. A stability analysis of the DP10 outfall and Tributary #3 is provided within appendix C.

III. 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

Hydrologic criteria and runoff calculations are per the "Drainage Criteria Manual County of El Paso, Colorado Volume 1 Update" – Chapter 6 Hydrology. Onsite drainage improvements are designed for the 5-year storm (minor event) and 100-year storm (major event). 1-hr duration rainfall depths from NOAA Atlas 14 are utilized for pond sizing. Private, full spectrum pond design was completed using the latest version of Mile High Flood District's (MHFD) UD-Detention. The detention pond allowable release rates will be limited to historic rates.

c.

d. Hydraulic Criteria

Hydraulic criteria for storm sewer and open channel sizing were obtained from the "Drainage Criteria Manual County of El Paso, Colorado" Chapter 9 Culvert Design and Chapter 10 Open Channels and Structures. Culvert and swale calculations were performed using Hydraflow Express AutoCAD extension.

IV. Drainage Facility Design

a. General Concept

Proposed roadway stormwater will be captured and conveyed with roadside swales to onsite, full spectrum water quality and detention ponds (Pond and Pond 2). In areas where existing topography makes it feasible, 2.5+ acre lots are captured and detained in Pond 1 and Pond 2. Pond 1 and Pond 2 will discharge at less than historic rates to Tributary #1.

Swales:

Roadside swales will convey stormwater to proposed culverts and ponds. Roadside swales match the County typical section for a rural local roadway, consisting of a 2.5' deep v shaped swale with 4:1 and 3:1 side slopes with the exception of roadside swales N1 and N2. These swales have a reduced depth in order to fit within the existing R.O.W. as no easement exists in this area. Swale N1 and N2 remain stable while conveying the 100-yr design flow with adequate freeboard. Swales will remain stable while conveying the 100-yr design flow. Swales with velocities of 5fps or less will be grass lined, while swales exceeding 5 fps will be armored with Turf Reinforcement Mat SC250 or approved equal. Swales will also convey stormwater from the roadside swales to Ponds 1 and 2 and from ponds 1 and 2 to Tributary 1. See appendix C for hydraulic calcs.

Culverts:

Culverts will convey stormwater underneath roadways and future driveways. All future driveways shall use an 18" culvert. All culverts have been sized to convey the 100-yr flow without over-topping and with a HW-D ration of less than 1.5. Culvert inlets and outlets are stabilized with riprap pads where necessary. All culverts include FES's or headwalls at each end.

b. Water Quality & Detention

Pond 1

Water quality and detention for Basins B-F is provided in Pond 1: a private, full spectrum detention pond south of Brown Road along Tributary #1. A total of 14.89 acres at 15.8% imperviousness will be detained in Pond 1. The WQCV is 0.121 ac-ft, the EURV is 0.229 ac-ft, and the 100-year volume is 0.675 ac-ft. The WQCV, EURV and 100-year storms are released in 40, 59 and 62 hours, respectively. A concrete bottom forebay will be located at the swale outfall into Pond 1. A 2.0' concrete trickle channel conveys flow towards the outlet structure. A 10' access and maintenance road is provided to the bottom of the pond to facilitate future maintenance of the pond facilities. The pond and its components are located in a permanent easement. A 16' riprap lined, emergency overflow spillway is provided that conveys the developed, peak 100-yr flow rate with 1.0'+ of freeboard towards Tributary #1.

Pond 2

Water quality and detention for Basins P-T is provided in Pond 2: a private, full spectrum detention pond north of Colt Court. A total of 9.48 acres at 17.3% imperviousness will be detained in Pond 2. The WQCV is 0.082 ac-ft, the EURV is 0.161 ac-ft, and the 100-year volume is 0.450 ac-ft. The WQCV, EURV and 100-year storms are released in 40, 61 and 61 hours, respectively. A concrete bottom forebay will be located at the swale outfall into Pond 2. A 2.0' concrete trickle channel conveys flow towards the outlet structure. A 10' access and maintenance road is provided to the bottom of the pond to facilitate future maintenance of the pond facilities. The pond and its components are located in a permanent easement. A 10' riprap lined, emergency overflow spillway is provided that conveys the developed, peak 100-yr flow rate with 1.0' of freeboard towards Tributary #1.

Revise criteria references for updated appendix I (5/2026).

I.6.1.B.5 - large lot exclusion
I.6.3.A.1 - WQCV design standard

WATER QUALITY SUMMARY TABLE

Sub-basin	Area (acres)	WQ Source: Pond	Exclusion I.7.1.		Undeveloped
A	18.32		B.5		
B1	6.23	Pond 1			
B2	1.13	Pond 1			
C	2.84	Pond 1			
D	0.86	Pond 1			
E	0.47	Pond 1			
F	2.77	Pond 1			
G	3.91		B.5		
H	9.28		B.5		
I	3.54				X
J	1.35				X
K	0.89		B.5		
L	11.99		B.5		
M	2.06		B.5		
N1	1.18		B.5	C.1.A	
N2	1.25		B.5	C.1.A	
O	0.60		B.5	C.1.A	
P	5.00	Pond 2			
Q	1.21	Pond 2			
R	1.82	Pond 2			
S	0.57	Pond 2			
T	0.87	Pond 2			
U	31.90		B.5		X
V	24.97		B.5		X
TOTAL	**135.61**	**24.37**	**73.87**	**0.50**	**36.87**

The reinforced swale area in Basin U doesn't fall under the large lot exclusion or undeveloped area . Please use an applicable exclusion for this area (I.6.1.B.7 may apply).

c. Major Drainageways

Tributary #1, an unnamed tributary to East Cherry Creek, bisects the site and conveys stormwater. Tributary # 2 is located in the southwest corner of the site and conveys stormwater to Tributary # 1. Tributary 3 crosses the southeast corner of the site and is the outfall for basin L-O. A stability analysis of Tributary #1-3 is included in appendix C.

d. Operations & Maintenance

An Operations and Maintenance Manual for Pond 1 and Pond 2 is provided with the this project. All drainage facilities including ponds, swales, and culverts will be located within Public R.O.W. or permanent easements. See the drainage map and final plat for easement and R.O.W. locations. Facilities within the Public R.O.W. will be maintained by El Paso County and facilities outside of the R.O.W. will be maintained by the HOA.

e. Grading & Erosion Control Plan

Due to the project disturbance area, a separate Grading and Erosion Control plan is included with this project.

f. Four Step Method

Step 1 – Reducing Runoff Volumes: Roof drains will route across landscape areas whenever possible to promote infiltration. In addition, grass lined drainage swales are used as the primary stormwater conveyance. The site disturbance was minimized to the extent possible to preserve vegetation which helps to slow runoff and promotes infiltration.

Step 2 – Treat and slowly release the WQCV: Onsite, private full spectrum detention ponds provide water quality treatment for the site. The WQCV is released over a period of 40 hours.

Step 3 – Stabilize stream channels: 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. Drainage channels will be lined with non-erosive soils and permanently seeded to provide stabilization. Where required due to erosive velocities, turf reinforcement mat will provide stabilization. Stormwater discharge points will be adequately stabilized with riprap pads and low-tailwater basins.

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

g. Drainage Basin & Bridge Fees

The site is located within the East Cherry Creek Drainage Basin. There is not an established basin and bridge fee for East Cherry Creek.

h. Engineer's Opinion of Probable Cost

An engineer's opinion of probable costs is provided within appendix E.

V. Summary

IRON RIDGE SUBDIVISION NO. 1 remains consistent with pre-development drainage conditions with the construction of the recommended drainage improvements. The proposed development will not adversely affect downstream stormwater infrastructure or surrounding developments. This report meets the latest EL Paso County criteria.

Include a cost estimate for each PCM with line items for all components (ex: riprap, road base, forebay, trickle channel, outlet structure, outlet pipe, spillway, etc). Input the total value into the FAE form under "Permanent Pond/BMP (provide engineer's estimate)" in Section 1. The total should not include grading, which is a separate line item in Section 1: "Earthwork." The cost estimate should include labor costs (as a separate line item or added into the cost of each component).

VI. References

I. El Paso County – Drainage Criteria Manual, 2018 as amended.

II. Urban Storm Drainage Criteria Manual, Mile High Flood District, March 2024.

III. USGS - Colorado StreamStats, https://www.usgs.gov/streamstats/colorado-streamstats.

IV. TopoZone – Topo Map of Stream in El Paso County, Colorado, https://www.topozone.com/colorado/el-paso-co/stream.

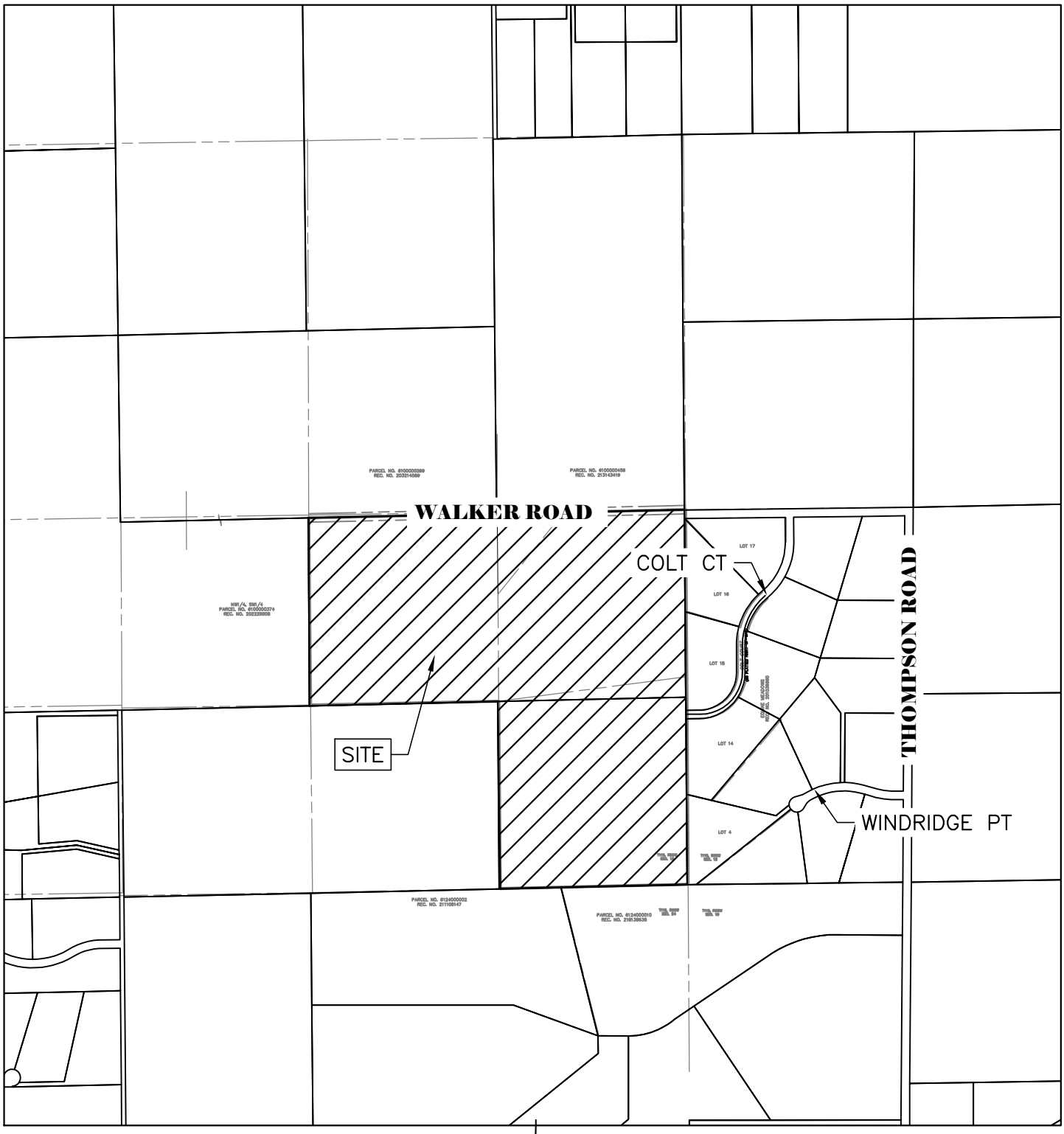
V. Federal Emergency Management Agency, Flood Map Service Center - https://msc.fema.gov/portal/home, September 2024.

VI. 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 & NOAA ATLAS 14

IRON RIDGE SUBDIVISION

VICINITY MAP



N

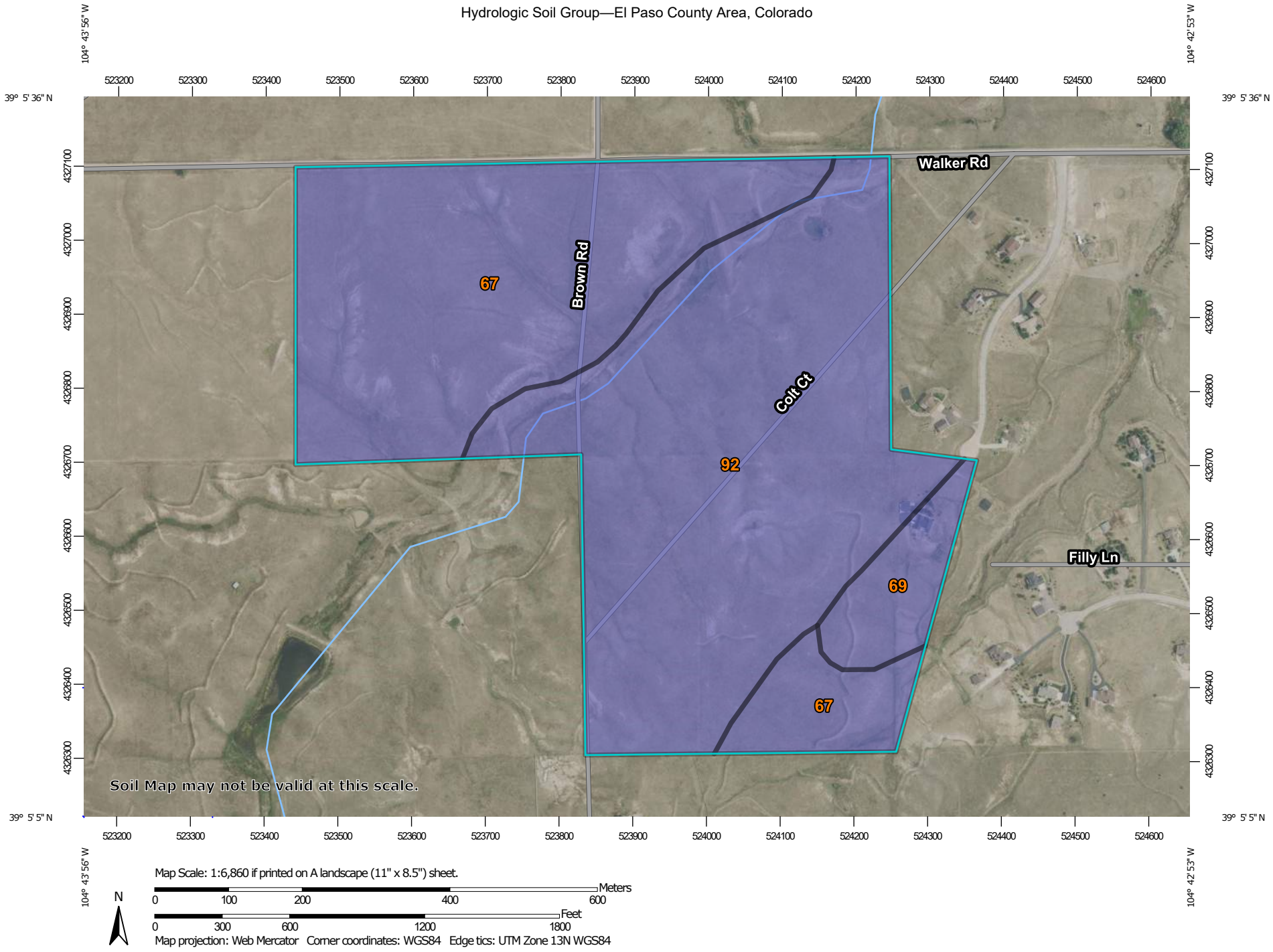
1000 500 0 1000 2000

ORIGINAL SCALE: 1" = 1000'

VICINITY MAP	
IRON RIDGE SUB.	
JOB NO. 25009	
LOCATION: EPC	SHEET
09/17/2025	
SHEET: 1	

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

Hydrologic Soil Group—El Paso County Area, Colorado



Map Scale: 1:6,860 if printed on A landscape (11" x 8.5") sheet.

N

0 100 200 400 600 Meters

0 300 600 1200 1800 Feet

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 22, Sep 3, 2024

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
67	Peyton sandy loam, 5 to 9 percent slopes	B	54.2	42.4%
69	Peyton-Pring complex, 8 to 15 percent slopes	B	6.8	5.3%
92	Tomah-Crowfoot loamy sands, 3 to 8 percent slopes	B	67.0	52.3%
Totals for Area of Interest			**127.9**	**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.

NOAA Atlas 14, Volume 8, Version 2
Location name: Colorado Springs, Colorado, USA*
Latitude: 39.0884°, Longitude: -104.7191°
Elevation: 7510 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	**0.237** (0.195-0.291)	**0.286** (0.235-0.351)	**0.372** (0.304-0.457)	**0.448** (0.364-0.553)	**0.560** (0.442-0.722)	**0.653** (0.502-0.849)	**0.750** (0.556-0.999)	**0.855** (0.606-1.17)	**1.00** (0.680-1.40)	**1.12** (0.737-1.58)
10-min	**0.347** (0.285-0.425)	**0.419** (0.344-0.514)	**0.544** (0.445-0.669)	**0.656** (0.533-0.809)	**0.820** (0.648-1.06)	**0.956** (0.735-1.24)	**1.10** (0.814-1.46)	**1.25** (0.887-1.71)	**1.47** (0.996-2.05)	**1.64** (1.08-2.31)
15-min	**0.423** (0.348-0.519)	**0.511** (0.420-0.627)	**0.664** (0.543-0.816)	**0.800** (0.650-0.987)	**1.00** (0.790-1.29)	**1.16** (0.896-1.52)	**1.34** (0.993-1.78)	**1.53** (1.08-2.08)	**1.79** (1.22-2.50)	**2.00** (1.32-2.82)
30-min	**0.609** (0.501-0.746)	**0.734** (0.603-0.900)	**0.952** (0.779-1.17)	**1.15** (0.932-1.41)	**1.43** (1.13-1.85)	**1.67** (1.28-2.17)	**1.92** (1.42-2.55)	**2.19** (1.55-2.98)	**2.56** (1.74-3.58)	**2.86** (1.88-4.04)
60-min	**0.772** (0.635-0.946)	**0.923** (0.758-1.13)	**1.20** (0.978-1.47)	**1.44** (1.17-1.78)	**1.82** (1.44-2.35)	**2.13** (1.64-2.79)	**2.47** (1.84-3.30)	**2.84** (2.02-3.89)	**3.36** (2.29-4.72)	**3.78** (2.50-5.34)
2-hr	**0.935** (0.773-1.14)	**1.11** (0.919-1.36)	**1.44** (1.18-1.76)	**1.74** (1.42-2.13)	**2.20** (1.76-2.84)	**2.60** (2.02-3.38)	**3.03** (2.26-4.02)	**3.49** (2.50-4.76)	**4.16** (2.86-5.81)	**4.71** (3.13-6.61)
3-hr	**1.02** (0.844-1.24)	**1.20** (0.996-1.46)	**1.55** (1.28-1.88)	**1.88** (1.54-2.29)	**2.39** (1.92-3.09)	**2.84** (2.21-3.69)	**3.33** (2.50-4.42)	**3.86** (2.78-5.26)	**4.64** (3.20-6.47)	**5.28** (3.52-7.38)
6-hr	**1.18** (0.985-1.42)	**1.38** (1.15-1.66)	**1.76** (1.46-2.12)	**2.13** (1.75-2.58)	**2.72** (2.21-3.50)	**3.24** (2.55-4.20)	**3.82** (2.89-5.06)	**4.47** (3.24-6.06)	**5.42** (3.76-7.51)	**6.20** (4.16-8.61)
12-hr	**1.39** (1.16-1.66)	**1.61** (1.34-1.92)	**2.02** (1.69-2.43)	**2.44** (2.02-2.94)	**3.10** (2.52-3.96)	**3.68** (2.91-4.73)	**4.33** (3.30-5.68)	**5.05** (3.68-6.79)	**6.11** (4.27-8.41)	**6.98** (4.72-9.63)
24-hr	**1.63** (1.37-1.94)	**1.90** (1.60-2.26)	**2.40** (2.01-2.86)	**2.86** (2.39-3.43)	**3.60** (2.94-4.54)	**4.23** (3.35-5.37)	**4.92** (3.76-6.39)	**5.67** (4.15-7.55)	**6.77** (4.76-9.23)	**7.66** (5.21-10.5)
2-day	**1.90** (1.60-2.24)	**2.25** (1.90-2.66)	**2.87** (2.42-3.40)	**3.42** (2.86-4.06)	**4.24** (3.45-5.26)	**4.91** (3.90-6.16)	**5.63** (4.31-7.22)	**6.39** (4.69-8.41)	**7.47** (5.27-10.1)	**8.33** (5.70-11.3)
3-day	**2.09** (1.77-2.45)	**2.47** (2.09-2.90)	**3.14** (2.65-3.70)	**3.73** (3.13-4.41)	**4.59** (3.75-5.66)	**5.30** (4.22-6.60)	**6.04** (4.64-7.71)	**6.84** (5.03-8.94)	**7.94** (5.62-10.7)	**8.82** (6.06-12.0)
4-day	**2.24** (1.91-2.63)	**2.64** (2.24-3.10)	**3.33** (2.82-3.92)	**3.94** (3.32-4.65)	**4.83** (3.96-5.94)	**5.57** (4.44-6.92)	**6.34** (4.88-8.06)	**7.16** (5.28-9.34)	**8.30** (5.89-11.1)	**9.21** (6.35-12.5)
7-day	**2.64** (2.26-3.08)	**3.06** (2.61-3.57)	**3.79** (3.22-4.43)	**4.44** (3.75-5.21)	**5.39** (4.43-6.58)	**6.17** (4.94-7.62)	**6.99** (5.41-8.83)	**7.86** (5.84-10.2)	**9.08** (6.48-12.1)	**10.0** (6.97-13.5)
10-day	**2.98** (2.55-3.46)	**3.43** (2.94-3.99)	**4.21** (3.59-4.90)	**4.90** (4.15-5.72)	**5.90** (4.86-7.17)	**6.72** (5.40-8.26)	**7.58** (5.88-9.54)	**8.49** (6.32-11.0)	**9.76** (6.99-12.9)	**10.8** (7.50-14.4)
20-day	**3.94** (3.39-4.54)	**4.52** (3.88-5.21)	**5.48** (4.69-6.34)	**6.30** (5.37-7.32)	**7.48** (6.18-8.99)	**8.42** (6.80-10.2)	**9.39** (7.32-11.7)	**10.4** (7.78-13.3)	**11.8** (8.48-15.5)	**12.9** (9.01-17.1)
30-day	**4.74** (4.09-5.44)	**5.43** (4.68-6.23)	**6.56** (5.64-7.56)	**7.52** (6.42-8.69)	**8.84** (7.31-10.5)	**9.87** (7.98-11.9)	**10.9** (8.53-13.5)	**12.0** (8.99-15.2)	**13.4** (9.68-17.5)	**14.5** (10.2-19.2)
45-day	**5.74** (4.97-6.56)	**6.59** (5.70-7.54)	**7.95** (6.85-9.11)	**9.06** (7.77-10.4)	**10.6** (8.73-12.5)	**11.7** (9.46-14.0)	**12.8** (10.0-15.7)	**13.9** (10.5-17.6)	**15.4** (11.1-19.9)	**16.4** (11.6-21.7)
60-day	**6.61** (5.73-7.53)	**7.58** (6.57-8.65)	**9.13** (7.89-10.4)	**10.4** (8.91-11.9)	**12.0** (9.94-14.1)	**13.2** (10.7-15.8)	**14.4** (11.3-17.6)	**15.5** (11.7-19.5)	**16.9** (12.3-21.8)	**18.0** (12.7-23.6)

[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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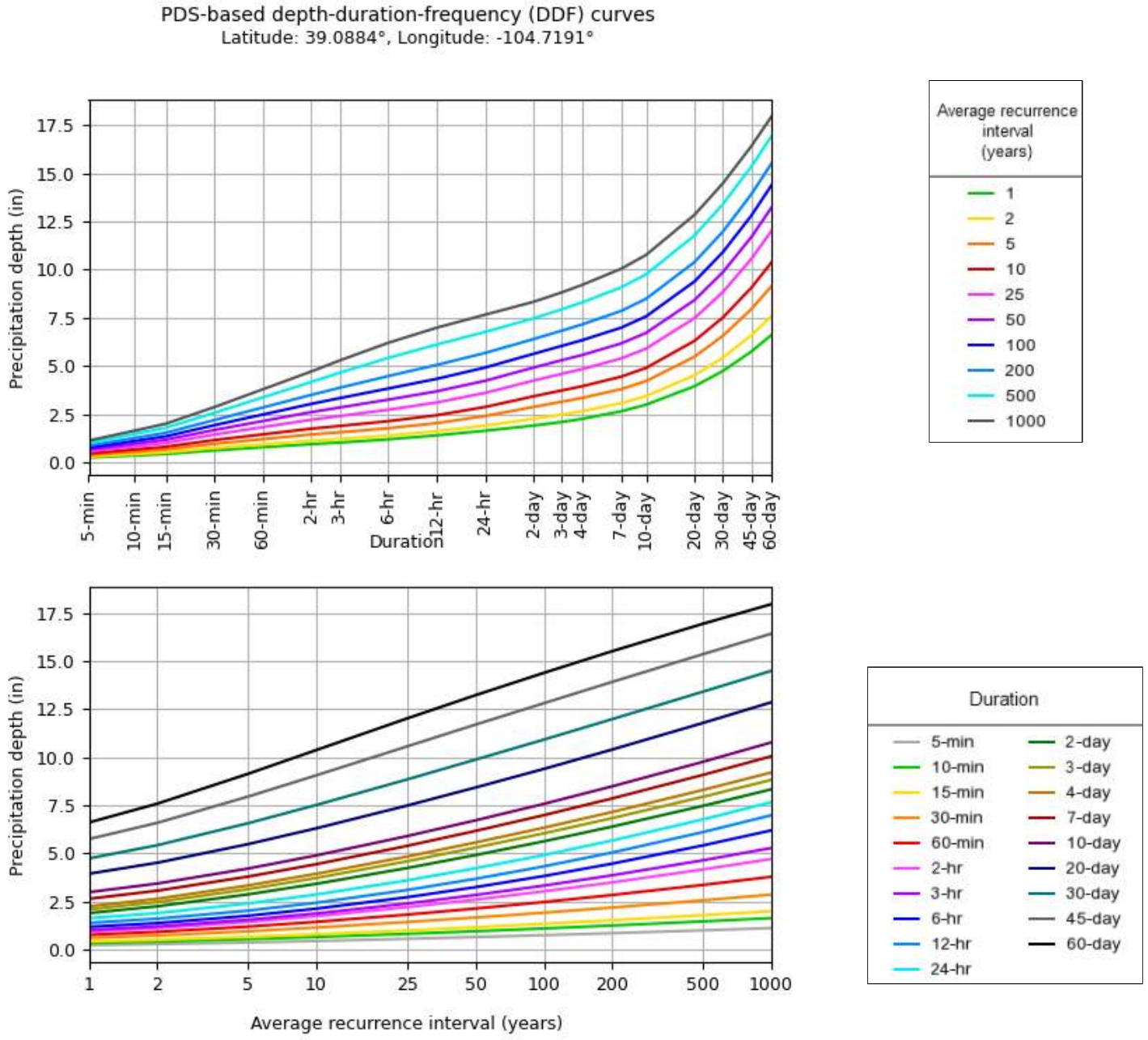
PF graphical



NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Thu Jun 19 01:06:57 2025

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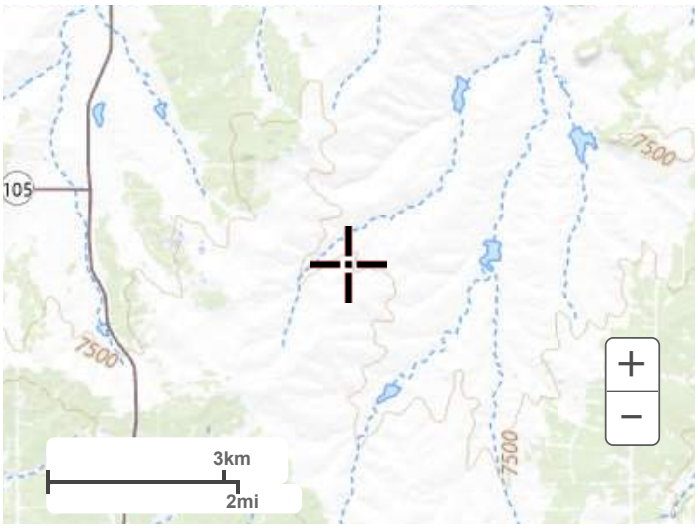
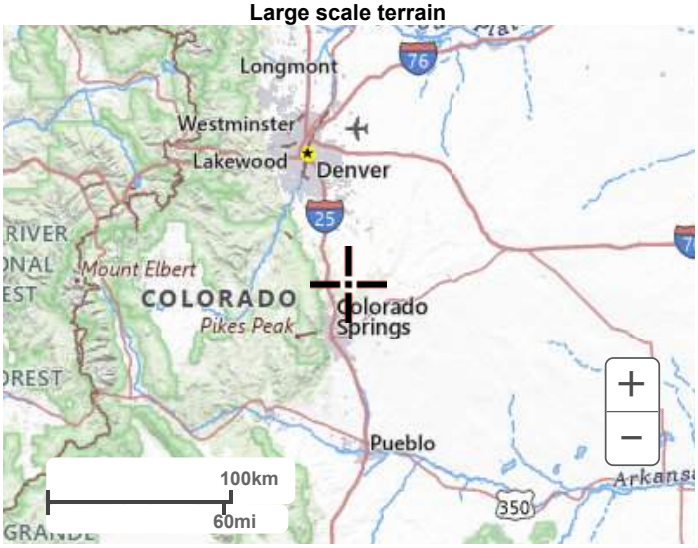
Maps & aerials

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

NOTES TO USERS

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

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

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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

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

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

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

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

Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

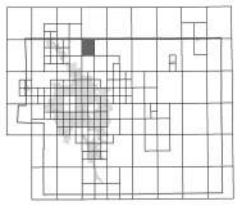
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

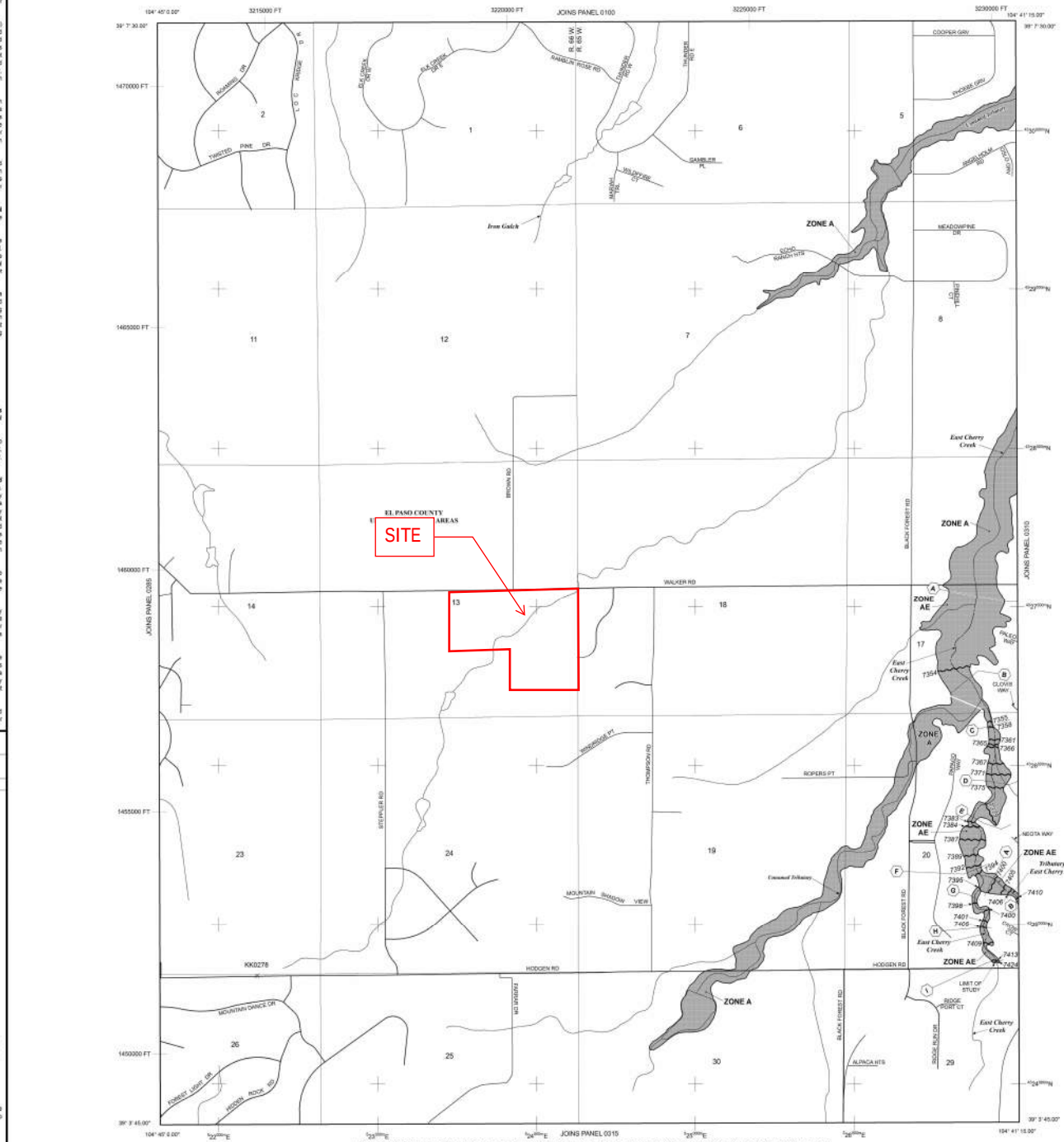
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

Panel Location Map



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

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



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 11 SOUTH, RANGE 65 WEST, AND TOWNSHIP 11 SOUTH, RANGE 66 WEST.

LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

Floodplain boundary
Floodway boundary
Zone D Boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 (EL 987) Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988 (NAVD 88)
A — A Cross section line
23 — 23 Transect line
97° 07' 30.00" / 32° 22' 30.00" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN 1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

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

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0305G

FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 305 OF 1300
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0305	G

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

MAP NUMBER
08041C0305G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX B – HYDROLOGIC CALCULATIONS

Subdivision:	Iron Ridge Subdivision
Location:	El Paso County
Project Name:	Iron Ridge Subdivision
Project Number:	25009
Calculated By:	NQJ
Checked By:	REB
Date:	5/19/2026

EXISTING CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4
EX1	14.49	3.5%	0.10	0.37	33.7	3.4	20.7
EX2	6.91	2.0%	0.09	0.36	21.1	1.9	12.6
EX3	17.98	3.4%	0.10	0.37	30.3	4.5	27.4
EX4	6.94	2.0%	0.09	0.36	19.5	2.0	13.1
EX5	39.65	2.0%	0.09	0.36	28.5	9.1	61.2
EX6	1.43	22.2%	0.22	0.45	11.1	1.2	4.3
EX7	3.54	2.0%	0.09	0.36	21.7	0.9	6.3
EX8	26.55	3.4%	0.10	0.37	38.3	5.5	34.7
EX9	12.23	2.0%	0.09	0.36	28.5	2.8	18.9
EX10	2.15	2.0%	0.09	0.36	15.9	0.7	4.5
EX11	2.85	6.6%	0.12	0.38	16.2	1.2	6.3
EX12	0.89	16.7%	0.20	0.44	15.2	0.6	2.3

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.6	202.5
OS2	3.5	16.4
OS3	4.3	20.4
1	3.4	20.7
2	3.8	24.0
3	11.5	73.8
4	12.4	80.2
5 (ONSITE)	14.0	88.4
5 (TOTAL)	51.4	300.8
6	2.8	18.9
7 (ONSITE)	3.4	21.6
7 (TOTAL)	7.7	42.0

COMPOSITE % IMPERVIOUS CALCULATIONS - EXISTING CONDITIONS

Subdivision: Iron Ridge Subdivision
Location: El Paso County

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/19/26

		Gravel Drives				Paved				2.5+ Acre Lots				Historic				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}	
OS1	723.20	See Basin OS1 Streamstats data in Appendix B																		-
OS2	38.40	See Basin OS2 Streamstats data in Appendix B																		-
OS3	53.90	See Basin OS3 Streamstats data in Appendix B																		-
EX1	14.49	0.59	0.70	0.00	80.0%	0.90	0.96	0.22	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	14.27	2.0%	0.10	0.37	3.5%
EX2	6.91	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	6.91	2.0%	0.09	0.36	2.0%
EX3	17.98	0.59	0.70	0.00	80.0%	0.90	0.96	0.25	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	17.73	2.0%	0.10	0.37	3.4%
EX4	6.94	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	6.94	2.0%	0.09	0.36	2.0%
EX5	39.65	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	39.65	2.0%	0.09	0.36	2.0%
EX6	1.43	0.59	0.70	0.37	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	1.06	2.0%	0.22	0.45	22.2%
EX7	3.54	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	3.54	2.0%	0.09	0.36	2.0%
EX8	26.55	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	7.18	7.0%	0.09	0.36	19.36	2.0%	0.10	0.37	3.4%
EX9	12.23	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	12.23	2.0%	0.09	0.36	2.0%
EX10	2.15	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	2.15	2.0%	0.09	0.36	2.0%
EX11	2.85	0.59	0.70	0.08	80.0%	0.90	0.96	0.07	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	2.70	2.0%	0.12	0.38	6.6%
EX12	0.89	0.59	0.70	0.08	80.0%	0.90	0.96	0.07	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	0.74	2.0%	0.20	0.44	16.7%
EX1-EX9	**135.61**																			**2.9%**

STANDARD FORM SF-2 - EXISTING CONDITIONS
TIME OF CONCENTRATION

Subdivision: Iron Ridge Subdivision
Location: El Paso County

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/19/26

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					*tc* CHECK (NON-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)
OS1	723.20	See Basin OS1 Streamstats data in Appendix B															129.0
OS2	38.40	See Basin OS2 Streamstats data in Appendix B															62.4
OS3	53.90	See Basin OS3 Streamstats data in Appendix B															41.4
EX1	14.49	B	0.10	0.37	3.5%	300	6.6%	16.7	1490	4.4%	7.0	1.5	16.9	33.7	1790.0	37.9	33.7
EX2	6.91	B	0.09	0.36	2.0%	300	10.0%	14.8	1142	4.0%	15.0	3.0	6.3	21.1	1442.0	35.9	21.1
EX3	17.98	B	0.10	0.37	3.4%	300	8.3%	15.5	1390	5.0%	7.0	1.6	14.8	30.3	1690.0	36.4	30.3
EX4	6.94	B	0.09	0.36	2.0%	300	10.0%	14.8	520	6.9%	7.0	1.8	4.7	19.5	820.0	29.2	19.5
EX5	39.65	B	0.09	0.36	2.0%	300	5.0%	18.6	2064	5.3%	15.0	3.5	10.0	28.5	2364.0	41.8	28.5
EX6	1.43	B	0.22	0.45	22.2%	20	2.0%	5.7	1388	7.9%	15.0	4.2	5.5	11.1	1408.0	29.0	11.1
EX7	3.54	B	0.09	0.36	2.0%	200	10.0%	12.1	870	1.0%	15.0	1.5	9.7	21.7	1070.0	41.3	21.7
EX8	26.55	B	0.10	0.37	3.4%	300	2.7%	22.6	1600	4.8%	7.0	1.5	17.4	40.0	1900.0	38.3	38.3
EX9	12.23	B	0.09	0.36	2.0%	265	3.8%	19.1	890	5.1%	7.0	1.6	9.4	28.5	1155.0	32.7	28.5
EX10	2.15	B	0.09	0.36	2.0%	155	4.9%	13.4	254	5.9%	7.0	1.7	2.5	15.9	409.0	27.5	15.9
EX11	2.85	B	0.12	0.38	6.6%	205	7.3%	13.1	257	3.9%	7.0	1.4	3.1	16.2	462.0	27.1	16.2
EX12	0.89	B	0.20	0.44	16.7%	205	7.3%	12.1	257	3.9%	7.0	1.4	3.1	15.2	462.0	25.1	15.2

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

:

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: Iron Ridge Subdivision
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/19/26

		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)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS1	OS1	723.20	-	129.0	115.59	0.29	33.9															BASIN OS1 @ DPOS1
	OS2	OS2	38.40	-	62.4	2.53	1.38	3.5					3.5	2.53	3					661	1.2	9.1	BASIN OS1 @ DPOS2
	OS1								129.0	118.12	0.29	34.6	34.6	118.12	0.8					2300	0.6	61.2	COMBINED 0S1 AND 0S2 FLOW @ DP0S1, CONTINUES TO DP5
	1	EX1	14.49	0.10	33.7	1.48	2.31	3.4	33.7	1.48	2.31	3.4	3.4	1.48	2.8					905	1.2	12.9	BASIN EX1 @ DP1, DRAINAGEWAY FLOW TO DP2
		EX2	6.91	0.09	21.1	0.62	3.01	1.9															BASIN EX2 @ DP2
	2								46.5	2.10	1.82	3.8	3.8	2.10	2.2					610	1.0	9.8	DP1 & BASIN EX2 COMBINED @ DP2, DRAINAGEWAY TO DP3
		EX3	17.98	0.10	30.3	1.82	2.46	4.5															BASIN EX3 @ DP3
		EX5	39.65	0.09	28.5	3.57	2.56	9.1															BASIN EX5 @ DP3
	3								56.3	7.49	1.54	11.5	11.5	7.49	0.9					476	0.7	11.9	DP2, BASIN EX3 & EX5 COMBINED @ DP3, DRAINAGEWAY FLOW TO DP4
		EX4	6.94	0.09	19.5	0.62	3.13	2.0															BASIN EX4 @ DP4
	4								56.3	8.12	1.54	12.5	12.5	8.12	2					750	1.0	12.6	DP3 & BASIN EX4 COMBINED @ DP4, DRAINAGEWAY FLOW TO DP5
		EX6	1.43	0.22	11.1	0.31	3.97	1.2															BASIN EX6 @ DP5
		EX7	3.54	0.09	21.7	0.32	2.97	0.9															BASIN EX7 @ DP5
		EX8	26.55	0.10	38.3	2.60	2.12	5.5															BASIN EX8 @ DP5
	5								68.9	11.35	1.23	14.0											TOTAL SITE FLOW @ DP5 (EXLUDES BASIN OS1 & OS2)
	5											48.6											TOTAL SITE & OFFSITE FLOW @ DP5 (INCLUDES BASIN OS1 & OS2)

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge Subdivision
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/19/26

		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)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS3	OS3	53.90	-	41.4	2.15	2.00	4.3															BASIN OS3 FLOW @ DPOS3
	6	EX9	12.23	0.09	28.5	1.10	2.56	2.8					2.8	1.10	4.4					1010	1.5	11.5	BASIN EX9 FLOW @ DP6, DRAINAGEWAY FLOW TO DP5
		EX10	2.15	0.09	15.9	0.19	3.43	0.7															BASIN EX10 @ DP7
		EX11	2.85	0.12	16.2	0.35	3.41	1.2															BASIN EX11 @ DP7
		EX12	0.89	0.20	15.2	0.18	3.50	0.6															BASIN EX12 (Flows off-site)
	7								40.0	1.65	2.05	3.4											DP6, BASIN EX10 & EX11 @ DP7, HISTORIC DRAINAGE EAST IN DRAINAGEWAY (EXCLUDES BASIN OS3)
	7											7.7											DP6, BASIN EX10 & EX11 @ DP7, HISTORIC DRAINAGE EAST IN DRAINAGEWAY (INCLUDES BASIN OS3)

Notes:
Street, Pipe, & OS Basin 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: Iron Ridge Subdivision
Location: El Paso County
Design Storm: 100-Year

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/19/26

		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_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_T (min)	REMARKS
	OS1	OS1	723.20	-	129.0	407.6	0.49	199.0															BASIN OS1 @ DPOS1
	OS2	OS2	38.40	-	62.4	7.07	2.32	16.4					3.5	7.07	3					661	1.2	9.1	BASIN OS1 @ DPOS2
	OS1								129.0	414.63	0.49	202.5											COMBINED 0S1 AND 0S2 FLOW @ DP0S1, CONTINUES TO DP5
	1	EX1	14.49	0.37	33.7	5.35	3.87	20.7	33.7	5.35	3.87	20.7	20.7	5.35	2.8					905	1.2	12.9	BASIN EX1 @ DP1, DRAINAGEWAY FLOW TO DP2
		EX2	6.91	0.36	21.1	2.49	5.05	12.6															BASIN EX2 @ DP2
	2								46.5	7.84	3.06	24.0	24.0	7.84	2.2					610	1.0	9.8	DP1 & BASIN EX2 COMBINED @ DP2, DRAINAGEWAY TO DP3
		EX3	17.98	0.37	30.3	6.62	4.14	27.4															BASIN EX3 @ DP3
		EX5	39.65	0.36	28.5	14.27	4.29	61.2															BASIN EX5 @ DP3
	3								56.3	28.73	2.58	74.0	74.0	28.73	0.9					476	0.7	11.9	DP2, BASIN EX3 & EX5 COMBINED @ DP3, DRAINAGEWAY FLOW TO DP4
		EX4	6.94	0.36	19.5	2.50	5.25	13.1															BASIN EX4 @ DP4
	4								56.3	31.23	2.58	80.5	80.5	31.23	2					750	1.0	12.6	DP3 & BASIN EX4 COMBINED @ DP4, DRAINAGEWAY FLOW TO DP5
		EX6	1.43	0.45	11.1	0.64	6.66	4.3															BASIN EX6 @ DP5
		EX7	3.54	0.36	21.7	1.27	4.98	6.3															BASIN EX7 @ DP5
		EX8	26.55	0.37	38.3	9.77	3.55	34.7															BASIN EX8 @ DP5
	5								68.9	42.92	2.07	88.7											TOTAL SITE FLOW @ DP5 (EXLUDES BASIN OS1 & OS2)
	5											291.2											TOTAL SITE & OFFSITE FLOW @ DP5 (INCLUDES BASIN OS1 & OS2)

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge Subdivision
Location: El Paso County
Design Storm: 100-Year

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/19/26

		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)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_T (min)	REMARKS
	OS3	OS3	53.90	-	41.4	6.09	3.35	20.4															BASIN OS3 FLOW @ DPOS3
	6	EX9	12.23	0.36	28.5	4.40	4.29	18.9					18.9	4.40	4.4					1010	1.5	11.5	BASIN EX9 FLOW @ DP6, DRAINAGEWAY FLOW TO DP5
		EX10	2.15	0.36	15.9	0.77	5.76	4.5															BASIN EX10 @ DP7
		EX11	2.85	0.38	16.2	1.10	5.72	6.3															BASIN EX11 @ DP7
		EX12	0.89	0.44	15.2	0.39	5.88	2.3															BASIN EX12 (Flows off-site)
	7								40.0	6.27	3.44	21.6											DP6, BASIN EX10 & EX11 @ DP7, HISTORIC DRAINAGE EAST IN DRAINAGEWAY (EXCLUDES BASIN OS3)
	7											42.0											DP6, BASIN EX10 & EX11 @ DP7, HISTORIC DRAINAGE EAST IN DRAINAGEWAY (INCLUDES BASIN OS3)

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

Subdivision:	Iron Ridge
Location:	El Paso County
Project Name:	Iron Ridge
Project Number:	25009
Calculated By:	NQJ
Checked By:	REB
Date:	5/15/2026

PROPOSED CALCS - BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A	18.32	5.5%	0.11	0.38	31.1	5.1	28.5
B1	6.83	9.9%	0.14	0.41	20.7	3.0	14.2
B2	1.13	32.3%	0.34	0.55	15.9	1.3	3.6
C	2.84	16.2%	0.20	0.45	16.4	1.9	7.2
D	0.86	41.9%	0.42	0.60	14.6	1.3	3.1
E	0.47	42.7%	0.43	0.60	9.5	0.8	2.0
F	2.77	4.3%	0.14	0.41	20.4	1.2	5.8
G	3.91	3.9%	0.11	0.37	23.3	1.2	7.0
H	9.28	3.1%	0.10	0.37	19.9	3.0	17.7
I	3.54	2.0%	0.09	0.36	21.8	0.9	6.3
J	1.35	27.1%	0.30	0.51	14.9	1.4	4.1
K	0.89	7.0%	0.12	0.39	9.6	0.4	2.4
L	11.99	4.9%	0.11	0.38	27.2	3.5	20.0
M	2.06	4.9%	0.11	0.38	13.4	0.8	4.8
N1	1.18	25.7%	0.27	0.50	11.3	1.3	3.9
N2	1.25	18.2%	0.21	0.46	11.2	1.1	3.8
O	0.60	22.4%	0.24	0.47	10.1	0.6	2.0
P	5.00	13.4%	0.18	0.43	17.8	2.9	11.7
Q	1.21	21.2%	0.24	0.47	11.7	1.1	3.8
R	1.82	24.8%	0.27	0.50	14.3	1.8	5.5
S	0.57	36.8%	0.37	0.57	9.8	0.9	2.2
T	0.87	5.8%	0.13	0.38	9.5	0.5	2.3
U	31.90	4.4%	0.10	0.37	32.8	7.8	47.0
V	24.97	3.9%	0.10	0.37	31.2	6.1	37.7
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4

DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.6	202.5
OS2	3.5	16.4
OS3	4.3	20.4
1	5.1	28.5
2	5.9	23.7
3	6.4	25.1
3.1	7.4	27.2
4	8.4	32.1
4.1	0.1	23.9
5	4.2	38.9
6	8.6	62.3
7	3.5	20.0
8	0.8	4.8
9	2.3	7.7
10	2.9	9.6
11 (ONSITE)	4.6	22.9
11 (TOTAL)	8.9	43.3
12	2.9	14.9
13	4.7	21.5
14	4.8	22.5
14.1	0.1	14.4
15 (ONSITE)	10.5	77.1
15 (TOTAL)	45.2	279.5

EXISTING V. PROPOSED DESIGN POINT COMPARISON

Ex/Pr DP	Ex Q_5 (cfs)	Ex Q_{100} (cfs)	Pr Q_5 (cfs)	Pr Q_{100} (cfs)	Q_5 Change	Q_{100} Change
5/15	14.0	88.7	10.5	77.1	-24.9%	-13.1%
7/11	3.4	21.6	4.6	22.9	37.0%	6.1%

COMPOSITE % IMPERVIOUS CALCULATIONS - PROPOSED CONDITIONS

Subdivision: Iron Ridge
Location: El Paso County

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: NQJ
Date: 5/15/26

		Gravel				Paved				Pasture/Meadow				2.5+ Large Lots				Historic				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}	
OS1	723.20	See Basin OS1 Streamstats data in Appendix B																						-
OS2	38.40	See Basin OS2 Streamstats data in Appendix B																						-
OS3	53.90	See Basin OS3 Streamstats data in Appendix B																						-
A	18.32	0.59	0.70	0.00	80.0%	0.90	0.96	0.06	100.0%	0.09	0.35	4.85	0.0%	0.12	0.39	13.41	7.0%	0.09	0.36	0.00	2.0%	0.11	0.38	5.5%
B1	6.83	0.59	0.70	0.04	80.0%	0.90	0.96	0.18	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	6.60	7.0%	0.09	0.36	0.00	2.0%	0.14	0.41	9.9%
B2	1.13	0.59	0.70	0.00	80.0%	0.90	0.96	0.33	100.0%	0.09	0.35	0.37	0.0%	0.12	0.39	0.42	7.0%	0.09	0.36	0.00	2.0%	0.34	0.55	32.3%
C	2.84	0.59	0.70	0.02	80.0%	0.90	0.96	0.28	100.0%	0.09	0.35	0.22	0.0%	0.12	0.39	2.31	7.0%	0.09	0.36	0.00	2.0%	0.20	0.45	16.2%
D	0.86	0.59	0.70	0.04	80.0%	0.90	0.96	0.32	100.0%	0.09	0.35	0.33	0.0%	0.12	0.39	0.17	7.0%	0.09	0.36	0.00	2.0%	0.42	0.60	41.9%
E	0.47	0.59	0.70	0.03	80.0%	0.90	0.96	0.18	100.0%	0.09	0.35	0.24	0.0%	0.12	0.39	0.02	7.0%	0.09	0.36	0.00	2.0%	0.43	0.60	42.7%
F	2.77	0.59	0.70	0.09	80.0%	0.90	0.96	0.03	100.0%	0.09	0.35	0.03	0.0%	0.12	0.39	2.61	7.0%	0.09	0.36	0.00	2.0%	0.14	0.41	10.4%
G	3.91	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	1.71	0.0%	0.12	0.39	2.20	7.0%	0.09	0.36	0.00	2.0%	0.11	0.37	3.9%
H	9.28	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	5.18	0.0%	0.12	0.39	4.10	7.0%	0.09	0.36	0.00	2.0%	0.10	0.37	3.1%
I	3.54	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	0.00	7.0%	0.09	0.36	3.54	2.0%	0.09	0.36	2.0%
J	1.35	0.59	0.70	0.00	80.0%	0.90	0.96	0.34	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	0.10	7.0%	0.09	0.36	0.91	2.0%	0.30	0.51	27.1%
K	0.89	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	0.89	7.0%	0.09	0.36	0.00	2.0%	0.12	0.39	7.0%
L	11.99	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	3.60	0.0%	0.12	0.39	8.40	7.0%	0.09	0.36	0.00	2.0%	0.11	0.38	4.9%
M	2.06	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.62	0.0%	0.12	0.39	1.44	7.0%	0.09	0.36	0.00	2.0%	0.11	0.38	4.9%
N1	1.18	0.59	0.70	0.03	80.0%	0.90	0.96	0.22	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	0.94	7.0%	0.09	0.36	0.00	2.0%	0.27	0.50	25.7%
N2	1.25	0.59	0.70	0.01	80.0%	0.90	0.96	0.14	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	1.09	7.0%	0.09	0.36	0.00	2.0%	0.21	0.46	18.2%
O	0.60	0.59	0.70	0.04	80.0%	0.90	0.96	0.07	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	0.49	7.0%	0.09	0.36	0.00	2.0%	0.24	0.47	22.4%
P	5.00	0.59	0.70	0.04	80.0%	0.90	0.96	0.34	100.0%	0.09	0.35	0.37	0.0%	0.12	0.39	4.24	7.0%	0.09	0.36	0.00	2.0%	0.18	0.43	13.4%
Q	1.21	0.59	0.70	0.03	80.0%	0.90	0.96	0.18	100.0%	0.09	0.35	0.23	0.0%	0.12	0.39	0.77	7.0%	0.09	0.36	0.00	2.0%	0.24	0.47	21.2%
R	1.82	0.59	0.70	0.04	80.0%	0.90	0.96	0.35	100.0%	0.09	0.35	0.39	0.0%	0.12	0.39	1.04	7.0%	0.09	0.36	0.00	2.0%	0.27	0.50	24.8%
S	0.57	0.59	0.70	0.03	80.0%	0.90	0.96	0.17	100.0%	0.09	0.35	0.24	0.0%	0.12	0.39	0.12	7.0%	0.09	0.36	0.00	2.0%	0.37	0.57	36.8%
T	0.87	0.59	0.70	0.05	80.0%	0.90	0.96	0.01	100.0%	0.09	0.35	0.81	0.0%	0.12	0.39	0.00	7.0%	0.09	0.36	0.00	2.0%	0.13	0.38	5.8%
U	31.90	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	15.31	7.0%	0.09	0.36	16.59	2.0%	0.10	0.37	4.4%
V	24.97	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.00	0.0%	0.12	0.39	9.58	7.0%	0.09	0.36	15.39	2.0%	0.10	0.37	3.9%
A-V TOTAL	**135.61**																							**7.1%**
Pond 1 (B-F)	**14.89**																							**15.8%**
Pond 2 (P-T)	**9.48**																							**17.3%**

STANDARD FORM SF-2 - PROPOSED CONDITIONS
TIME OF CONCENTRATION

Subdivision: Iron Ridge
Location: El Paso County

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: NQJ
Date: 5/15/26

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	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)
OS1	723.20	B	See Basin OS1 Streamstats data in Appendix B													129.0
OS2	38.40	B	See Basin OS2 Streamstats data in Appendix B													62.4
OS3	53.90	B	See Basin OS3 Streamstats data in Appendix B													41.4
A	18.32	B	0.11	5.5%	300	9.0%	14.9	1439	4.5%	7.0	1.5	16.2	31.1	1739.0	36.7	31.1
B1	6.83	B	0.14	9.9%	300	5.7%	16.8	832	5.6%	15.0	3.5	3.9	20.7	1132.0	30.0	20.7
B2	1.13	B	0.34	32.3%	134	2.0%	12.6	693	5.6%	15.0	3.5	3.3	15.9	827.0	24.1	15.9
C	2.84	B	0.20	16.2%	250	5.6%	14.6	413	6.0%	15.0	3.7	1.9	16.4	663.0	25.7	16.4
D	0.86	B	0.42	41.9%	127	1.7%	11.6	631	5.8%	15.0	3.6	2.9	14.6	758.0	21.8	14.6
E	0.47	B	0.43	42.7%	65	3.8%	6.3	530	3.4%	15.0	2.8	3.2	9.5	595.0	21.9	9.5
F	2.77	B	0.14	4.3%	240	4.1%	16.8	507	11.0%	7.0	2.3	3.6	20.4	747.0	27.9	20.4
G	3.91	B	0.11	3.9%	300	7.3%	16.1	704	5.4%	7.0	1.6	7.2	23.3	1004.0	30.6	23.3
H	9.28	B	0.10	3.1%	205	7.1%	13.5	658	5.9%	7.0	1.7	6.4	19.9	863.0	30.3	19.9
I	3.54	B	0.09	2.0%	300	10.8%	14.4	665	1.0%	15.0	1.5	7.4	21.8	965.0	37.6	21.8
J	1.35	B	0.30	27.1%	99	6.0%	8.0	1257	4.1%	15.0	3.0	6.9	14.9	1356.0	29.5	14.9
K	0.89	B	0.12	7.0%	60	8.3%	6.8	270	5.5%	7.0	1.6	2.7	9.6	330.0	26.7	9.6
L	11.99	B	0.11	4.9%	264	3.8%	18.7	865	5.8%	7.0	1.7	8.6	27.2	1129.0	31.3	27.2
M	2.06	B	0.11	4.9%	125	8.0%	10.1	272	3.7%	7.0	1.3	3.4	13.4	397.0	27.6	13.4
N1	1.18	B	0.27	25.7%	175	7.0%	10.4	152	3.4%	15.0	2.8	0.9	11.3	327.0	22.7	11.3
N2	1.25	B	0.21	18.2%	200	8.7%	11.1	30	5.0%	15.0	3.4	0.1	11.2	230.0	23.1	11.2
O	0.60	B	0.24	22.4%	150	9.0%	9.2	80	1.0%	15.0	1.5	0.9	10.1	230.0	23.3	10.1
P	5.00	B	0.18	13.4%	300	6.6%	15.5	448	4.7%	15.0	3.3	2.3	17.8	748.0	26.9	17.8
Q	1.21	B	0.24	21.2%	132	8.3%	8.9	375	2.2%	15.0	2.2	2.8	11.7	507.0	25.9	11.7
R	1.82	B	0.27	24.8%	112	3.5%	10.5	794	5.3%	15.0	3.5	3.8	14.3	906.0	26.4	14.3
S	0.57	B	0.37	36.8%	30	2.0%	5.7	543	2.2%	15.0	2.2	4.1	9.8	573.0	24.1	9.8
T	0.87	B	0.13	5.8%	50	5.0%	7.3	244	6.9%	7.0	1.8	2.2	9.5	294.0	26.6	9.5
U	31.90	B	0.10	4.4%	300	8.3%	15.5	1630	5.0%	7.0	1.6	17.4	32.8	1930.0	37.9	32.8
V	24.97	B	0.10	3.9%	300	10.0%	14.6	1379	3.9%	7.0	1.4	16.6	31.2	1679.0	37.5	31.2

STANDARD FORM SF-2 - PROPOSED CONDITIONS
TIME OF CONCENTRATION

Subdivision: Iron Ridge
Location: El Paso County

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: NQJ
Date: 5/15/26

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	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)

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 $t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{.033}}$ Equation 6-3

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 $t_t = \frac{L_t}{60(14i + 9)\sqrt{S_t}}$ Equation 6-5

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).

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

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: Iron Ridge
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/15/26

		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_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS1	OS1	723.20	-	129.0	115.59	0.29	33.9															BASIN OS1 FLOW @ DPOS1,CONTINUES TO DP15
	OS2	OS2	38.40	-	62.4	2.53	1.38	3.5					3.5	2.53	3					661	1.2	9.1	BASIN OS2 FLOW @ DPOS2, CONTINUES TO DPOS1
	OS1								129.0	118.12	0.29	34.6	34.6	118.12	0.8					2300	0.6	61.2	COMBINED 0S1 AND 0S2 FLOW @ DP0S1, CONTINUES TO DP15
	1	A	18.32	0.11	31.1	2.10	2.43	5.1	31.1	2.10	2.43	5.1	5.1	2.10	1.8					1369	0.9	24.3	BASIN A FLOW @ DP1, DRAINAGEWAY FLOW TO DP5
		B1	6.83	0.14	20.7	0.98	3.03	3.0															BASIN B1 FLOW @ DP2
		B2	1.13	0.34	15.9	0.39	3.44	1.3															BASIN B2 FLOW @ DP2
		C	2.84	0.20	16.4	0.56	3.38	1.9															BASIN C FLOW @ DP2
	2								20.7	1.93	3.03	5.9				5.9	1.93	1.0	18	65	6.1	0.2	BASIN B1, B2, & C COMBINED FLOW @ DP2, ENTERS 30" RCP CULVERT, PIPED TO DP3
		D	0.86	0.42	14.6	0.36	3.57	1.3								1.3	0.36	1.0	18	40	3.9	0.2	BASIN D FLOW IN ROADSIDE SWALE D, ENTERS 18" RCP CULVERT, PIPED TO DP3.1
		E	0.47	0.43	9.5	0.20	4.20	0.8															BASIN E FLOW, COMBINES IN SWALE @ DP3 WITH PIPED FLOWS FROM DP2, CONTINUES IN SWALE TO DP 3.1
	3								20.9	2.13	3.02	6.4	6.4	2.13	1.25					80	1.7	0.8	DP2, BASIN E & D @ DP3, SWALE FLOW TO DP4 (POND 1)
	3.1								21.7	2.49	2.97	7.4	7.4	2.49	6.4					240	3.8	1.1	DP2, BASIN E & D @ DP3, SWALE FLOW TO DP4 (POND 1)
		F	2.77	0.14	20.4	0.40	3.06	1.2															BASIN F FLOW ENTERS POND @ DP4
	4								22.8	2.89	2.89	8.4											COMBINED DP3.1 & BASIN F FLOWS @ DP4 (POND 1)
	4.1								27.8	0.04	2.60	0.1											CONTROLLED RELASE FROM POND 1, TRAVELS OVERLAND TO DP5

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/15/26

		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_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
		G	3.91	0.11	23.3	0.42	2.86	1.2															BASIN G FLOW @ DP5
		H	9.28	0.10	19.9	0.96	3.09	3.0															BASIN H FLOW @ DP6
		I	3.54	0.09	21.8	0.32	2.96	0.9															BASIN I FLOW @ DP15
		J	1.35	0.30	14.9	0.40	3.53	1.4															BASIN J FLOW @ DP15
		K	0.89	0.12	9.6	0.11	4.20	0.4					0.4	0.11	5.7					1902	1.7	19.0	BASIN K @ DP5
		U	31.90	0.10	32.8	3.33	2.35	7.8															BASIN U FLOW @ DP6
	5								55.4	2.66	1.56	4.2	4.2	2.66	1					576	0.7	13.7	DP1, BASIN G, BASIN K & POND 1 CONTROLLED RELEASE (DP4.1) FLOWS @ DP5, DRAINAGEWAY FLOW TO DP6
	6								69.1	6.95	1.23	8.6	8.6	6.95	2					600	1.0	10.1	DP5, BASIN H, BASIN U & POND 2 DISCHARGE @ DP6, DRAINAGEWAY FLOW TO DP15
	OS3	OS3	53.90	-	41.4	2.15	2.00	4.3															BASIN OS3 @ DPOS3, DRAINAGEWAY TO DP11
	7	L	11.99	0.11	27.2	1.33	2.63	3.5					3.5	1.33	2.5					900	1.1	13.6	BASIN L @ DP7, OFFSITE FLOW EAST TO DP11
	8	M	2.06	0.11	13.4	0.23	3.69	0.8					0.8	0.23	6					715	1.7	6.9	BASIN M @ DP8, OFFSITE FLOW EAST TO DP11
		N1	1.18	0.27	11.3	0.32	3.94	1.3															BASIN N1 FLOW IN SWALE @ DP9
		N2	1.25	0.21	11.2	0.27	3.95	1.1															BASIN N2 FLOW IN SWALE @ DP9
	9								11.3	0.59	3.94	2.3				2.3	0.59	1.0	18	40	4.8	0.1	COMBINED FLOW IN SWALE @ DP9, ENTERS 18" RCP CULVERT, PIPED TO BASIN O, CONTINUES OVERLAND TO DP10
		O	0.60	0.24	10.1	0.14	4.11	0.6															BASIN O @ DP10
	10								11.4	0.73	3.93	2.9	2.9	0.73	10					350	2.2	2.6	DP9 & BASIN O @ DP10, OVERLAND FLOW TO DP11
	11								40.8	2.29	2.02	4.6											DP7, DP8 & DP10 COMBINED @ DP11 (EXCLUDES BASIN OS3)
	11											8.9											DP7, DP8, DP10 & DPOS3 COMBINED @ DP11 (INCLUDES BASIN OS3)
		P	5.00	0.18	17.8	0.87	3.26	2.9															BASIN P FLOW @ DP12
		Q	1.21	0.24	11.7	0.29	3.90	1.1															BASIN Q FLOW @ DP12
	12								29.5	1.17	2.51	2.9				2.9	1.17	1.0	18	65	5.0	0.2	COMBINED BASIN P & Q FLOW @ DP12, ENTERS 24" RCP CULVERT, PIPED TO DP 13

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/15/26

		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_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
		R	1.82	0.27	14.3	0.50	3.59	1.8															BASIN R FLOW @ DP13
		S	0.57	0.37	9.8	0.21	4.16	0.9															BASIN S FLOW @ DP13
	13								29.7	1.88	2.50	4.7	4.7	1.88	10					185	2.2	1.4	DP12, BASIN R & S COMBINED FLOW @ DP13 IN SWALE T, CONTINUE IN SWALE TO DP14 (POND 2)
		T	0.87	0.13	9.5	0.11	4.21	0.5															BASIN T FLOW @ DP14
	14								31.1	1.99	2.43	4.8											COMBINED DP13 & BASIN T FLOW @ DP14 (POND 2)
	14.1								36.1	0.05	2.20	0.1											CONTROLLED RELASE FROM POND 1 @ DP14.1, TRAVELS OVERLAND TO DP5
		V	24.97	0.10	31.2	2.54	2.42	6.1															BASIN V @ DP15
	15								79.2	10.25	1.03	10.5											TOTAL SITE FLOW @ DP15 (EXCLUDES BASIN OS1 & OS2)
	15											45.2											TOTAL SITE & OFFSITE FLOW @ DP15 (INCLUDES BASIN OS1 & OS2)

Notes:
Street, Pipe, & OS Basin 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)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 100-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/15/26

		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)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS1	OS1	723.20	-	129.0	407.6	0.49	199.0															BASIN OS1 FLOW @ DPOS1,CONTINUES TO DP15
	OS2	OS2	38.40	-	62.4	7.07	2.32	16.4					3.5	7.07	3					661	1.2	9.1	BASIN OS2 FLOW @ DPOS2, CONTINUES TO DP15
	OS1								129.0	414.63	0.49	202.5											COMBINED 0S1 AND 0S2 FLOW @ DP0S1, CONTINUES TO DP15
	1	A	18.32	0.38	31.1	6.99	4.08	28.5	31.1	6.99	4.08	28.5	28.5	6.99	1.8					1369	0.9	24.3	BASIN A FLOW @ DP1, DRAINAGEWAY FLOW TO DP5
		B1	6.83	0.41	20.7	2.78	5.09	14.2															BASIN B1 FLOW @ DP2
		B2	1.13	0.55	15.9	0.62	5.77	3.6															BASIN B2 FLOW @ DP2
		C	2.84	0.45	16.4	1.26	5.68	7.2															BASIN C FLOW @ DP2
	2								20.7	4.66	5.09	23.7				23.7	4.66	1.0	18	65	13.4	0.1	BASIN B & C COMBINED FLOW @ DP2, ENTERS 30" RCP CULVERT, PIPED TO DP3
		D	0.86	0.60	14.6	0.51	5.99	3.1								3.1	0.51	1.0	18	40	5.1	0.1	BASIN D FLOW IN ROADSIDE SWALE D, ENTERS 18" RCP CULVERT, PIPED TO DP3.1
		E	0.47	0.60	9.5	0.28	7.05	2.0															BASIN E FLOW, COMBINES IN SWALE @ DP3 WITH PIPED FLOWS FROM DP2, CONTINUES IN SWALE TO DP 3.1
	3								20.8	4.94	5.08	25.1	25.1	4.94	1.25					80	1.7	0.8	DP2, BASIN E & D @ DP3, SWALE FLOW TO DP4 (POND 1)
	3.1								21.6	5.46	4.99	27.2	27.2	5.46	6.4					240	3.8	1.1	DP2, BASIN E & D @ DP3, SWALE FLOW TO DP4 (POND 1)
		F	2.77	0.41	20.4	1.13	5.13	5.8															BASIN F FLOW ENTERS POND @ DP4
	4								22.7	6.58	4.87	32.1											COMBINED DP3.1 & BASIN F FLOWS @ DP4 (POND 1)
	4.1								32.7	6.05	3.95	23.9											CONTROLLED RELASE FROM POND 1, TRAVELS OVERLAND TO DP5

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 100-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/15/26

		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)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
		G	3.91	0.37	23.3	1.46	4.80	7.0															BASIN G FLOW @ DP5
		H	9.28	0.37	19.9	3.41	5.19	17.7															BASIN H FLOW @ DP6
		I	3.54	0.36	21.8	1.27	4.97	6.3															BASIN I FLOW @ DP15
		J	1.35	0.51	14.9	0.69	5.93	4.1															BASIN J FLOW @ DP15
		K	0.89	0.39	9.6	0.35	7.05	2.4					2.4	0.35	5.7					1902	1.7	19.0	BASIN K @ DP5
		U	31.90	0.37	32.8	11.94	3.94	47.0															BASIN U FLOW @ DP6
	5								55.4	14.84	2.62	38.9	38.9	14.84	1					576	0.7	13.7	DP1, BASIN G, BASIN K & POND 1 CONTROLLED RELEASE (DP4.1) FLOWS @ DP5, DRAINAGEWAY FLOW TO DP6
	6								69.1	30.20	2.06	62.3	62.3	30.20	2					600	1.0	10.1	DP5, BASIN H, BASIN U & POND 2 DISCHARGE @ DP6, DRAINAGEWAY FLOW TO DP15
	OS3	OS3	53.90	-	41.4	6.09	3.35	20.4															BASIN OS3 @ DPOS3, DRAINAGEWAY TO DP11
	7	L	11.99	0.38	27.2	4.53	4.41	20.0					20.0	4.53	2.5					900	1.1	13.6	BASIN L @ DP7, OFFSITE FLOW EAST TO DP11
	8	M	2.06	0.38	13.4	0.78	6.19	4.8					4.8	0.78	6					715	1.7	6.9	BASIN M @ DP8, OFFSITE FLOW EAST TO DP11
		N1	1.18	0.50	11.3	0.59	6.62	3.9															BASIN N1 FLOW IN SWALE @ DP9
		N2	1.25	0.46	11.2	0.57	6.64	3.8															BASIN N2 FLOW IN SWALE @ DP9
	9								11.3	1.16	6.62	7.7				7.7	1.16	1.0	18	40	6.5	0.1	COMBINED FLOW IN SWALE @ DP9, ENTERS 18" RCP CULVERT, PIPED TO BASIN O, CONTINUES OVERLAND TO DP10
		O	0.60	0.47	10.1	0.28	6.91	2.0															BASIN O @ DP10
	10								11.4	1.45	6.60	9.6	9.6	1.45	10					350	2.2	2.6	DP9 & BASIN O @ DP10, OVERLAND FLOW TO DP11
	11								40.8	6.76	3.39	22.9											DP7, DP8 & DP10 COMBINED @ DP11 (EXCLUDES BASIN OS3)
	11											43.3											DP7, DP8, DP10 & DPOS3 COMBINED @ DP11 (INCLUDES BASIN OS3)
		P	5.00	0.43	17.8	2.14	5.48	11.7															BASIN P FLOW @ DP12

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 100-Year

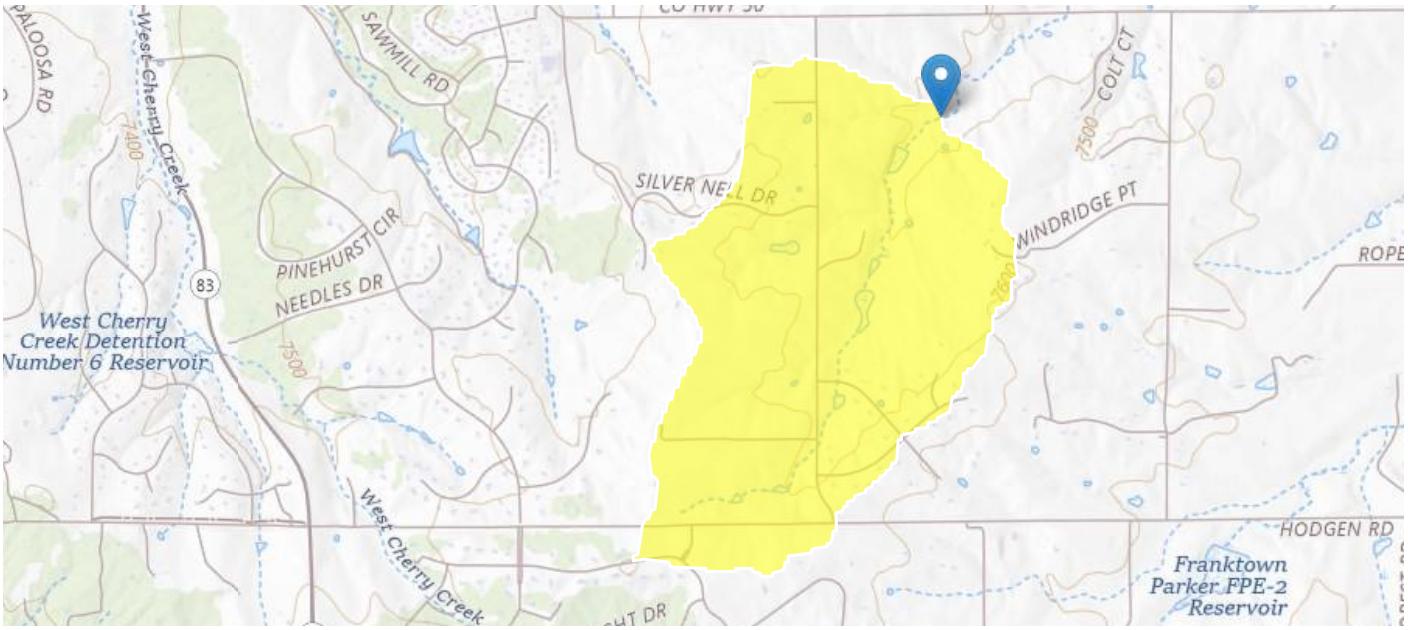
Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 5/15/26

		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)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
		Q	1.21	0.47	11.7	0.58	6.54	3.8															BASIN Q FLOW @ DP12
	12								17.8	2.72	5.48	14.9				14.9	2.72	1.0	18	65	8.4	0.1	COMBINED BASIN P & Q FLOW @ DP12, ENTERS 24" RCP CULVERT, PIPED TO DP 13
		R	1.82	0.50	14.3	0.91	6.03	5.5															BASIN R FLOW @ DP13
		S	0.57	0.57	9.8	0.32	6.99	2.2															BASIN S FLOW @ DP13
	13								17.9	3.95	5.46	21.5	21.5	3.95	10					185	2.2	1.4	DP12, BASIN R & S COMBINED FLOW @ DP13 IN SWALE T, CONTINUE IN SWALE TO DP14 (POND 2)
		T	0.87	0.38	9.5	0.33	7.06	2.3															BASIN T FLOW @ DP14
	14								19.3	4.28	5.27	22.5											COMBINED DP13 & BASIN T FLOW @ DP14 (POND 2)
	14.1								29.3	3.41	4.22	14.4											CONTROLLED RELASE FROM POND 1 @ DP14.1, TRAVELS OVERLAND TO DP5
		V	24.97	0.37	31.2	9.28	4.06	37.7															BASIN V @ DP15
	15								79.2	44.85	1.72	77.1											TOTAL SITE FLOW @ DP15 (EXCLUDES BASIN OS1 & OS2)
	15											279.5											TOTAL SITE & OFFSITE FLOW @ DP15 (INCLUDES BASIN OS1 & OS2)

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

Iron Ridge Subdivision - DPOS1 - Offsite Drainage Basin South

Region ID: CO
Workspace ID: CO20250911180450987000
Clicked Point (Latitude, Longitude): 39.08832, -104.72674
Time: 2025-09-11 12:05:15 -0600



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM10M	Mean basin slope computed from 10 m DEM	7	percent
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	99.4	feet per mi
DRNAREA	Area that drains to a point on a stream	1.13	square miles
EL7500	Percent of area above 7500 ft	97	percent
ELEV	Mean Basin Elevation	7588	feet
ELEVMAX	Maximum basin elevation	7700	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	4.96	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	1.92	inches
I6H100Y	6-hour precipitation that is expected to occur on average once in 100 years	3.83	inches
I6H2Y	Maximum 6-hour precipitation that occurs on average once in 2 years	1.38	inches
LAT_OUT	Latitude of Basin Outlet	39.088337	degrees
LC11BARE	Percentage of barren from NLCD 2011 class 31	0	percent
LC11CRPHAY	Percentage of cultivated crops and hay, classes 81 and 82, from NLCD 2011	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	3.9	percent

Parameter Code	Parameter Description	Value	Unit
LC11FOREST	Percentage of forest from NLCD 2011 classes 41-43	0.6	percent
LC11GRASS	Percent of area covered by grassland/herbaceous using 2011 NLCD	69	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	4	percent
LC11SHRUB	Percent of area covered by shrubland using 2011 NLCD	26.5	percent
LC11SNOIC	Percent snow and ice from NLCD 2011 class 12	0	percent
LC11WATER	Percent of open water, class 11, from NLCD 2011	0	percent
LC11WETLND	Percentage of wetlands, classes 90 and 95, from NLCD 2011	0	percent
LFPLENGTH	Length of longest flow path	1.96	miles
LONG_OUT	Longitude of Basin Outlet	-104.726713	degrees
MINBELEV	Minimum basin elevation	7470	feet
OUTLETELEV	Elevation of the stream outlet in feet above NAVD88	7474	feet
PRECIP	Mean Annual Precipitation	21.75	inches
RCN	Runoff-curve number as defined by NRCS (http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba)	61.76	dimensionless
RUNCO_CO	Soil runoff coefficient as defined by Verdin and Gross (2017)	0.25	dimensionless
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	100	percent
SSURGOC	Percentage of area of Hydrologic Soil Type C from SSURGO	0	percent
SSURGOD	Percentage of area of Hydrologic Soil Type D from SSURGO	0	percent
STATSCLAY	Percentage of clay soils from STATSGO	16.3	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	1.1	percent
TOC	Time of concentration in hours	2.15	hours

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Foothills Region Peak Flow 2016 5099]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.13	square miles	0.6	2850
I6H100Y	6 Hour 100 Year Precipitation	3.83	inches	2.38	4.89
OUTLETELEV	Elevation of Gage	7474	feet	4290	8270
STATSCLAY	STATSGO Percentage of Clay Soils	16.3	percent	9.87	37.5

Peak-Flow Statistics Flow Report [Foothills Region Peak Flow 2016 5099]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	ASEp
50-percent AEP flood	11.8	ft^3/s	117
20-percent AEP flood	33.9	ft^3/s	87

Statistic	Value	Unit	ASEp
10-percent AEP flood	57.6	ft^3/s	80
4-percent AEP flood	100	ft^3/s	80
2-percent AEP flood	143	ft^3/s	83
1-percent AEP flood	199	ft^3/s	88
0.5-percent AEP flood	263	ft^3/s	94
0.2-percent AEP flood	368	ft^3/s	104

Peak-Flow Statistics Citations

Kohn, M.S., Stevens, M.R., Harden, T.M., Godaire, J.E., Klinger, R.E., and Mommandi, A.,2016, Paleoflood investigations to improve peak-streamflow regional-regression equations for natural streamflow in eastern Colorado, 2015: U.S. Geological Survey Scientific Investigations Report 2016–5099, 58 p. (http://dx.doi.org/10.3133/sir20165099)

Application Version: 4.29.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Iron Ridge Subdivision - DPOS2 - Offsite Drainage Basin West

Region ID: CO
Workspace ID: CO20250911180928394000
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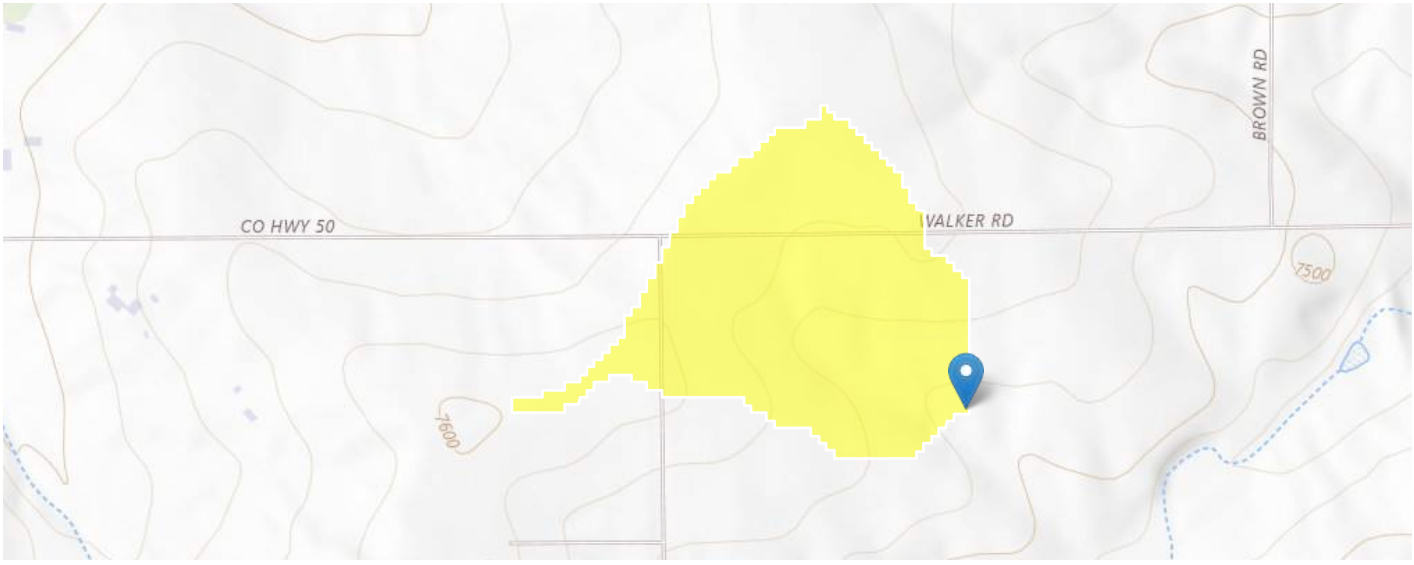

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Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM10M	Mean basin slope computed from 10 m DEM	5	percent
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	146.3	feet per mi
DRNAREA	Area that drains to a point on a stream	0.0576	square miles
EL7500	Percent of area above 7500 ft	100	percent
ELEV	Mean Basin Elevation	7556	feet
ELEVMAX	Maximum basin elevation	7600	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	4.93	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	1.91	inches
I6H100Y	6-hour precipitation that is expected to occur on average once in 100 years	3	inches
I6H2Y	Maximum 6-hour precipitation that occurs on average once in 2 years	1.38	inches
LAT_OUT	Latitude of Basin Outlet	39.090594	degrees
LC11BARE	Percentage of barren from NLCD 2011 class 31	0	percent
LC11CRPHAY	Percentage of cultivated crops and hay, classes 81 and 82, from NLCD 2011	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	10.2	percent
LC11FOREST	Percentage of forest from NLCD 2011 classes 41-43	0	percent
LC11GRASS	Percent of area covered by grassland/herbaceous using 2011 NLCD	78.1	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	10.3	percent
LC11SHRUB	Percent of area covered by shrubland using 2011 NLCD	11.7	percent
LC11SNOIC	Percent snow and ice from NLCD 2011 class 12	0	percent

Parameter Code	Parameter Description	Value	Unit
LC11WATER	Percent of open water, class 11, from NLCD 2011	0	percent
LC11WETLND	Percentage of wetlands, classes 90 and 95, from NLCD 2011	0	percent
LFPLENGTH	Length of longest flow path	0.61	miles
LONG_OUT	Longitude of Basin Outlet	-104.728901	degrees
MINBELEV	Minimum basin elevation	7500	feet
OUTLETELEV	Elevation of the stream outlet in feet above NAVD88	7504	feet
PRECIP	Mean Annual Precipitation	21.86	inches
RCN	Runoff-curve number as defined by NRCS (http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba)	60.17	dimensionless
RUNCO_CO	Soil runoff coefficient as defined by Verdin and Gross (2017)	0.25	dimensionless
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	100	percent
SSURGOC	Percentage of area of Hydrologic Soil Type C from SSURGO	0	percent
SSURGOD	Percentage of area of Hydrologic Soil Type D from SSURGO	0	percent
STATSCLAY	Percentage of clay soils from STATSGO	16.3	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	0	percent
TOC	Time of concentration in hours	1.04	hours

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Foothills Region Peak Flow 2016 5099]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0576	square miles	0.6	2850
I6H100Y	6 Hour 100 Year Precipitation	3	inches	2.38	4.89
OUTLETELEV	Elevation of Gage	7504	feet	4290	8270
STATSCLAY	STATSGO Percentage of Clay Soils	16.3	percent	9.87	37.5

Peak-Flow Statistics Disclaimers [Foothills Region Peak Flow 2016 5099]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [Foothills Region Peak Flow 2016 5099]

Statistic	Value	Unit
50-percent AEP flood	1.28	ft^3/s
20-percent AEP flood	3.46	ft^3/s
10-percent AEP flood	5.6	ft^3/s
4-percent AEP flood	9.1	ft^3/s
2-percent AEP flood	12.3	ft^3/s
1-percent AEP flood	16.4	ft^3/s
0.5-percent AEP flood	20.8	ft^3/s
0.2-percent AEP flood	27.8	ft^3/s

Peak-Flow Statistics Citations

Kohn, M.S., Stevens, M.R., Harden, T.M., Godaire, J.E., Klinger, R.E., and Mommandi, A.,2016, Paleoflood investigations to improve peak-streamflow regional-regression equations for natural streamflow in eastern Colorado, 2015: U.S. Geological Survey Scientific Investigations Report 2016–5099, 58 p. (http://dx.doi.org/10.3133/sir20165099)

Application Version: 4.29.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Iron Ridge Subdivision - DPOS3 - Offsite Drainage Basin South

Region ID: CO
Workspace ID: CO20250916210122474000
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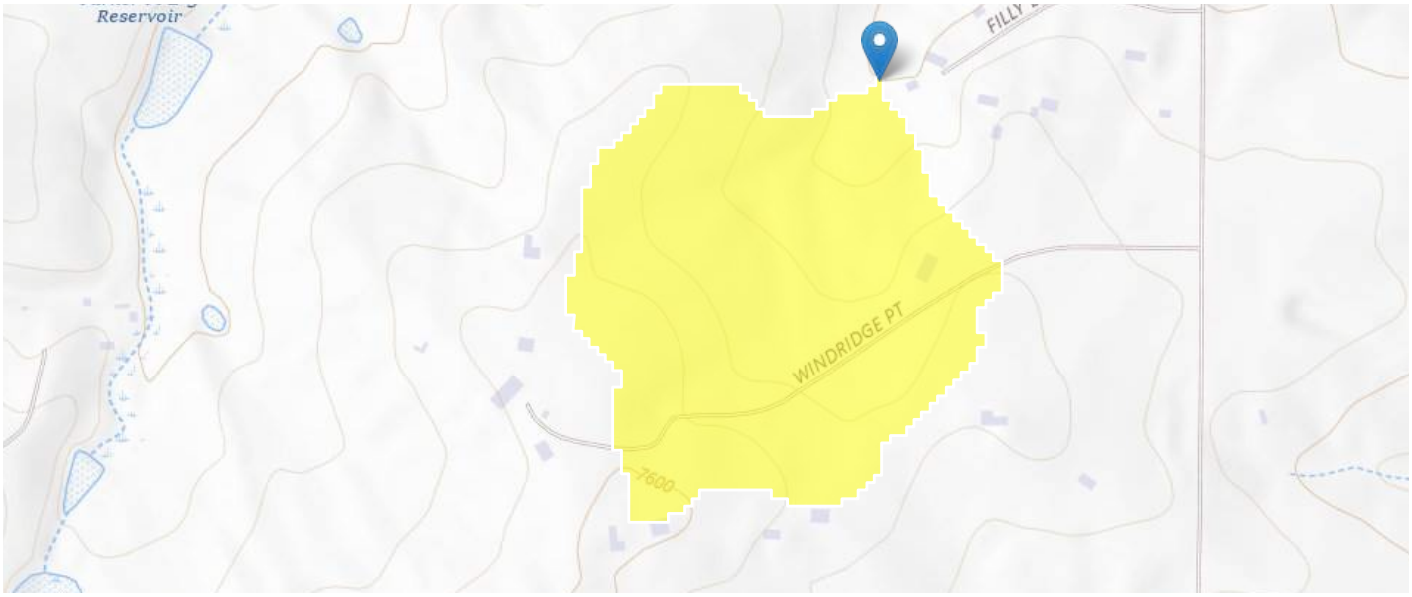
Time: 2025-09-16 15:01:34 -0600



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Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM10M	Mean basin slope computed from 10 m DEM	6	percent
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	268.2	feet per mi
DRNAREA	Area that drains to a point on a stream	0.0843	square miles
EL7500	Percent of area above 7500 ft	100	percent
ELEV	Mean Basin Elevation	7557	feet
ELEVMAX	Maximum basin elevation	7610	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	4.93	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	1.9	inches
I6H100Y	6-hour precipitation that is expected to occur on average once in 100 years	3	inches
I6H2Y	Maximum 6-hour precipitation that occurs on average once in 2 years	1.38	inches
LAT_OUT	Latitude of Basin Outlet	39.086515	degrees
LC11BARE	Percentage of barren from NLCD 2011 class 31	0	percent
LC11CRPHAY	Percentage of cultivated crops and hay, classes 81 and 82, from NLCD 2011	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	0	percent
LC11FOREST	Percentage of forest from NLCD 2011 classes 41-43	0	percent
LC11GRASS	Percent of area covered by grassland/herbaceous using 2011 NLCD	70	percent

Parameter Code	Parameter Description	Value	Unit
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0	percent
LC11SHRUB	Percent of area covered by shrubland using 2011 NLCD	30	percent
LC11SNOIC	Percent snow and ice from NLCD 2011 class 12	0	percent
LC11WATER	Percent of open water, class 11, from NLCD 2011	0	percent
LC11WETLND	Percentage of wetlands, classes 90 and 95, from NLCD 2011	0	percent
LFPLENGTH	Length of longest flow path	0.43	miles
LONG_OUT	Longitude of Basin Outlet	-104.718741	degrees
MINBELEV	Minimum basin elevation	7500	feet
OUTLETELEV	Elevation of the stream outlet in feet above NAVD88	7501	feet
PRECIP	Mean Annual Precipitation	21.46	inches
RCN	Runoff-curve number as defined by NRCS (http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba)	61.66	dimensionless
RUNCO_CO	Soil runoff coefficient as defined by Verdin and Gross (2017)	0.24	dimensionless
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	100	percent
SSURGOC	Percentage of area of Hydrologic Soil Type C from SSURGO	0	percent
SSURGOD	Percentage of area of Hydrologic Soil Type D from SSURGO	0	percent
STATSCLAY	Percentage of clay soils from STATSGO	16.3	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	0	percent
TOC	Time of concentration in hours	0.69	hours

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Foothills Region Peak Flow 2016 5099]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0843	square miles	0.6	2850
I6H100Y	6 Hour 100 Year Precipitation	3	inches	2.38	4.89
OUTLETELEV	Elevation of Gage	7501	feet	4290	8270
STATSCLAY	STATSGO Percentage of Clay Soils	16.3	percent	9.87	37.5

Peak-Flow Statistics Disclaimers [Foothills Region Peak Flow 2016 5099]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [Foothills Region Peak Flow 2016 5099]

Statistic	Value	Unit
50-percent AEP flood	1.63	ft^3/s
20-percent AEP flood	4.34	ft^3/s
10-percent AEP flood	7	ft^3/s
4-percent AEP flood	11.4	ft^3/s

Statistic	Value	Unit
2-percent AEP flood	15.4	ft^3/s
1-percent AEP flood	20.4	ft^3/s
0.5-percent AEP flood	25.9	ft^3/s
0.2-percent AEP flood	34.5	ft^3/s

Peak-Flow Statistics Citations

Kohn, M.S., Stevens, M.R., Harden, T.M., Godaire, J.E., Klinger, R.E., and Mommandi, A.,2016, Paleoflood investigations to improve peak-streamflow regional-regression equations for natural streamflow in eastern Colorado, 2015: U.S. Geological Survey Scientific Investigations Report 2016–5099, 58 p. (http://dx.doi.org/10.3133/sir20165099)

Application Version: 4.29.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

APPENDIX C – HYDRAULIC CALCULATIONS

Subdivision:	Iron Ridge
Location:	El Paso County
Project Name:	Iron Ridge
Project Number:	25009
Calculated By:	REB
Checked By:	NQJ
Date:	5/28/2026

Analyze all open conveyance systems during the minor storm event (5-year) in addition to the major storm event (100-year).

Proposed Conditions - Drainageway/Swale Summary Table

Swale Section	Section Slope, ft/ft	100-year Depth, ft	100-year Velocity, ft/s	100-year Hydraulic Radius, ft	Froude, 100-yr	Shear Stress, 100-yr
B	0.0990	0.46	4.86	0.22	1.26	1.4
C	0.0371	0.72	3.97	0.34	0.82	0.8
D	0.0990	0.44	4.57	0.21	1.21	1.3
E	0.0371	0.45	2.82	0.22	0.74	0.5
N1	0.0655	0.49	4.06	0.24	1.02	1.0
N2	0.0135	0.65	2.25	0.32	0.49	0.3
P	0.0800	0.71	5.80	0.35	1.21	1.7
Q	0.0200	0.61	2.55	0.30	0.58	0.4
R	0.0800	0.54	4.72	0.26	1.13	1.3
S	0.0200	0.49	2.29	0.24	0.58	0.3
3-3.1	0.0125	1.41	3.61	0.68	0.54	0.5
3.1-4	0.0633	1.08	6.88	0.52	1.17	2.1
4.1	0.0400	0.66	4.96	0.45	1.08	1.1
9-10	0.1550	0.28	4.39	0.14	1.46	1.3
13-14 (1)	0.1000	0.87	7.43	0.42	1.40	2.6
13-14 (2)	0.0170	1.21	3.84	0.59	0.62	0.6
14.1 S1	0.0590	0.43	4.98	0.34	1.34	1.2
14.1 S2	0.0752	0.41	5.29	0.32	1.46	1.5
14.1 S3	0.0411	0.48	4.34	0.37	1.10	1.0

add units

The flow is supercritical (F > 1) for the highlighted swale sections in the table above. Per DCM Vol. I, Sec. III, Ch. 10, §10.7, channels should be designed for a Froude number under 0.9 to minimize the potential for unstable flow. Please update the channel design.

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE B - MAX SLOPE (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Triangular

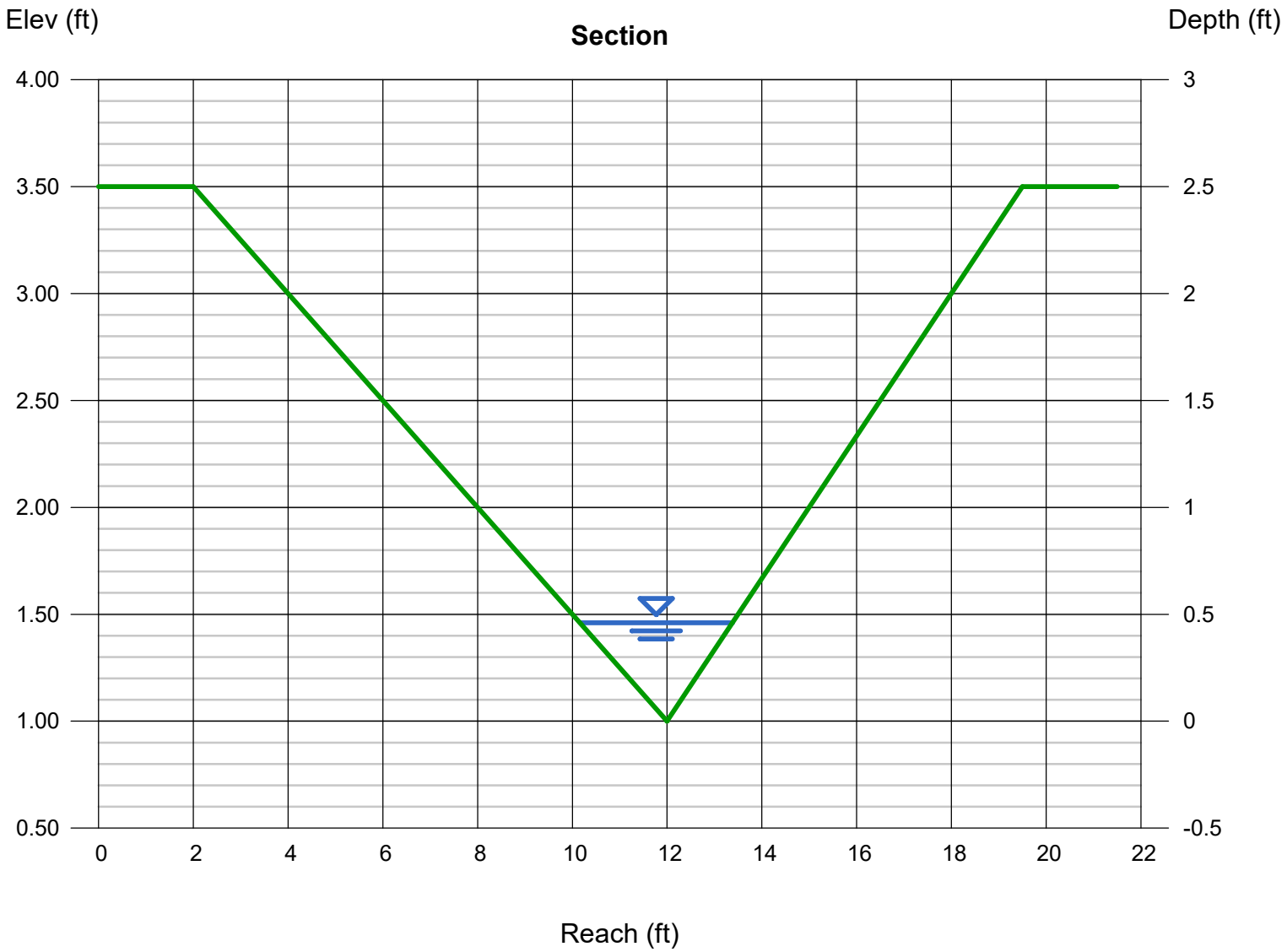
Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 9.99
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.60

Highlighted

Depth (ft)	= 0.46
Q (cfs)	= 3.600
Area (sqft)	= 0.74
Velocity (ft/s)	= 4.86
Wetted Perim (ft)	= 3.35
Crit Depth, Yc (ft)	= 0.59
Top Width (ft)	= 3.22
EGL (ft)	= 0.83



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE C - MAX SLOPE (Q100) GRASS LINED

Triangular

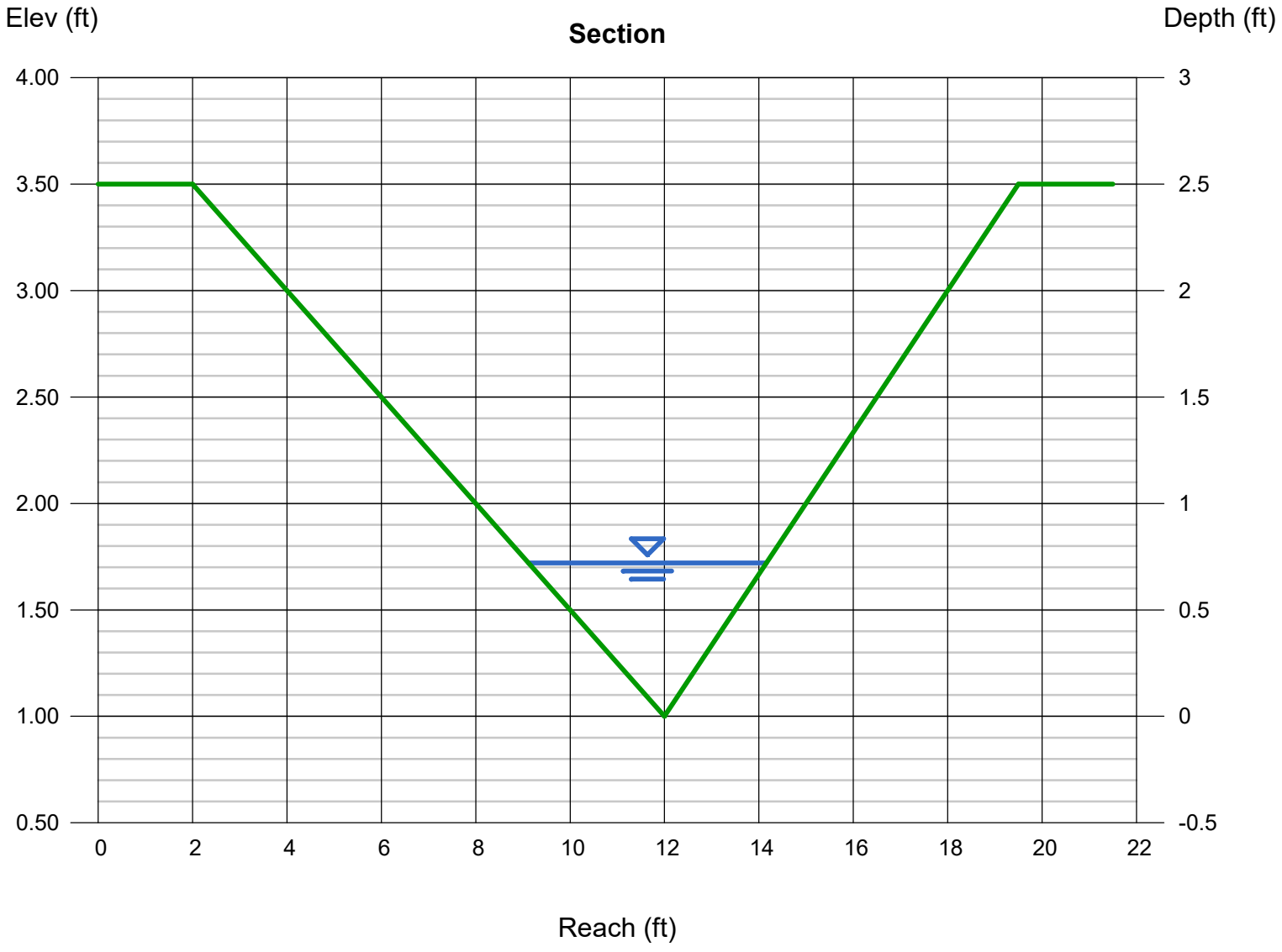
Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 3.71
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 7.20

Highlighted

Depth (ft)	= 0.72
Q (cfs)	= 7.200
Area (sqft)	= 1.81
Velocity (ft/s)	= 3.97
Wetted Perim (ft)	= 5.25
Crit Depth, Yc (ft)	= 0.77
Top Width (ft)	= 5.04
EGL (ft)	= 0.96



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE D - MAX SLOPE (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Triangular

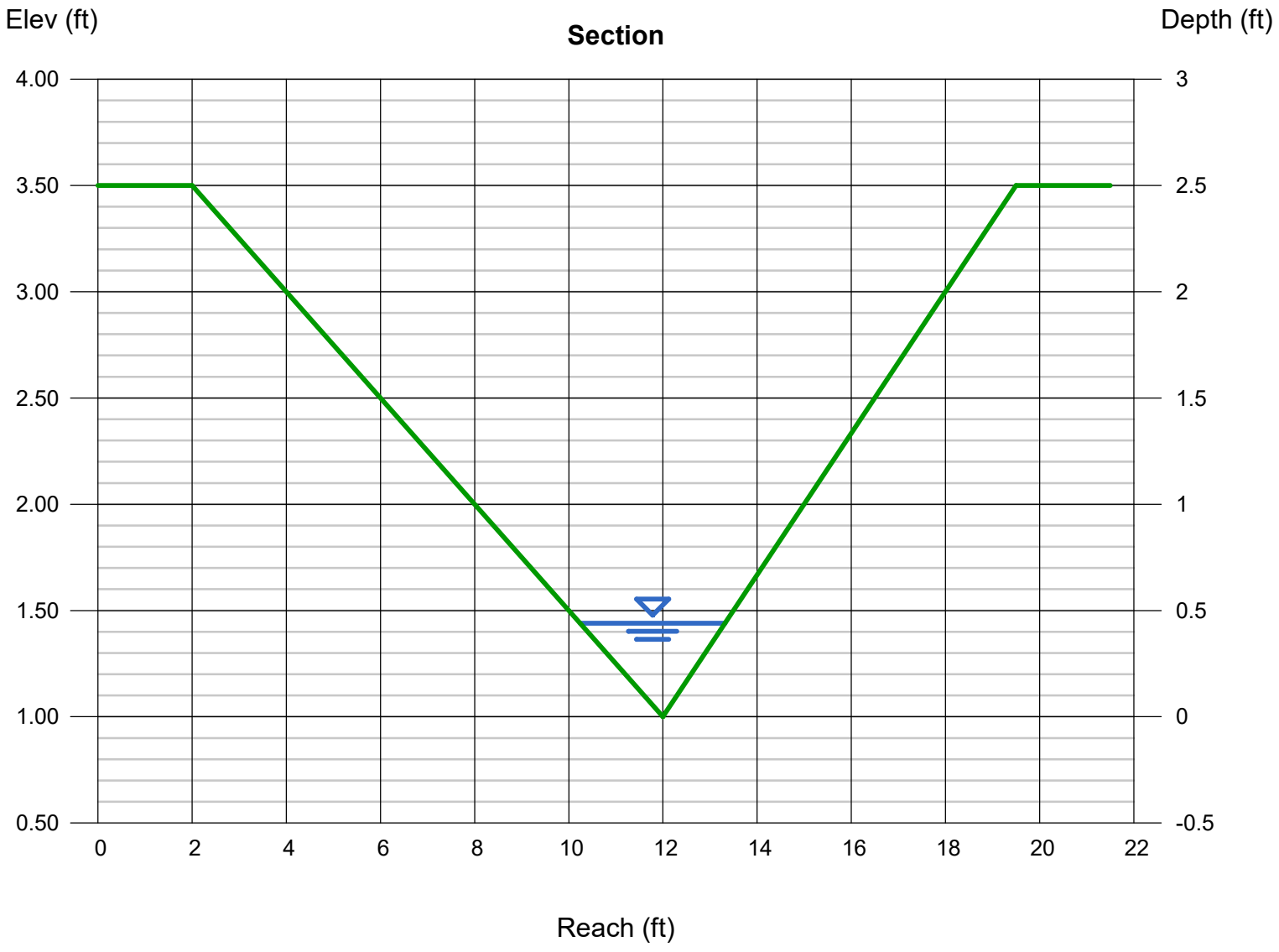
Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 9.99
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.10

Highlighted

Depth (ft)	= 0.44
Q (cfs)	= 3.100
Area (sqft)	= 0.68
Velocity (ft/s)	= 4.57
Wetted Perim (ft)	= 3.21
Crit Depth, Yc (ft)	= 0.55
Top Width (ft)	= 3.08
EGL (ft)	= 0.77



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE E - MAX SLOPE (Q100) GRASS LINED

Triangular

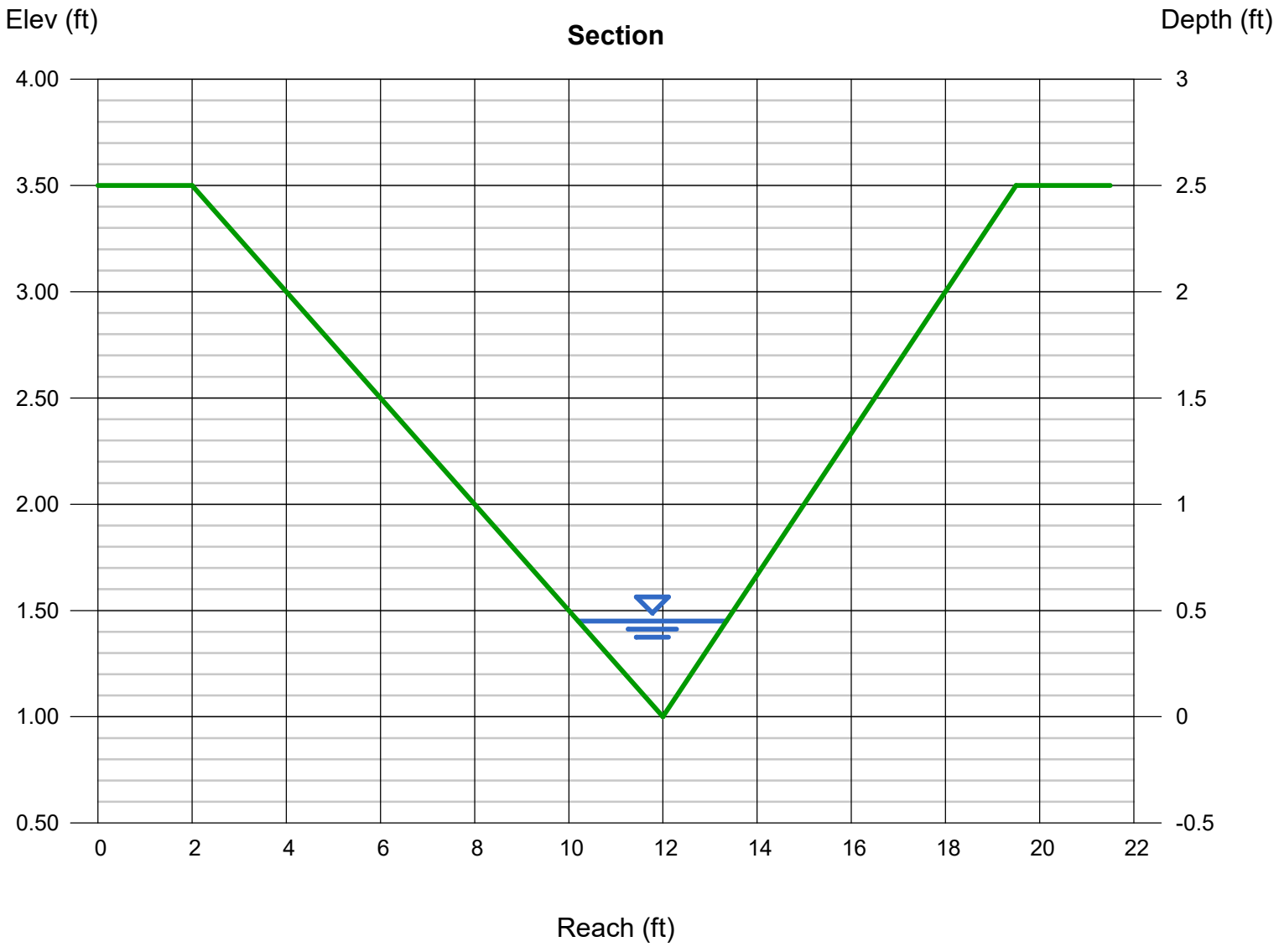
Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 3.71
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.00

Highlighted

Depth (ft)	= 0.45
Q (cfs)	= 2.000
Area (sqft)	= 0.71
Velocity (ft/s)	= 2.82
Wetted Perim (ft)	= 3.28
Crit Depth, Yc (ft)	= 0.46
Top Width (ft)	= 3.15
EGL (ft)	= 0.57



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE N1 - MAX SLOPE (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Triangular

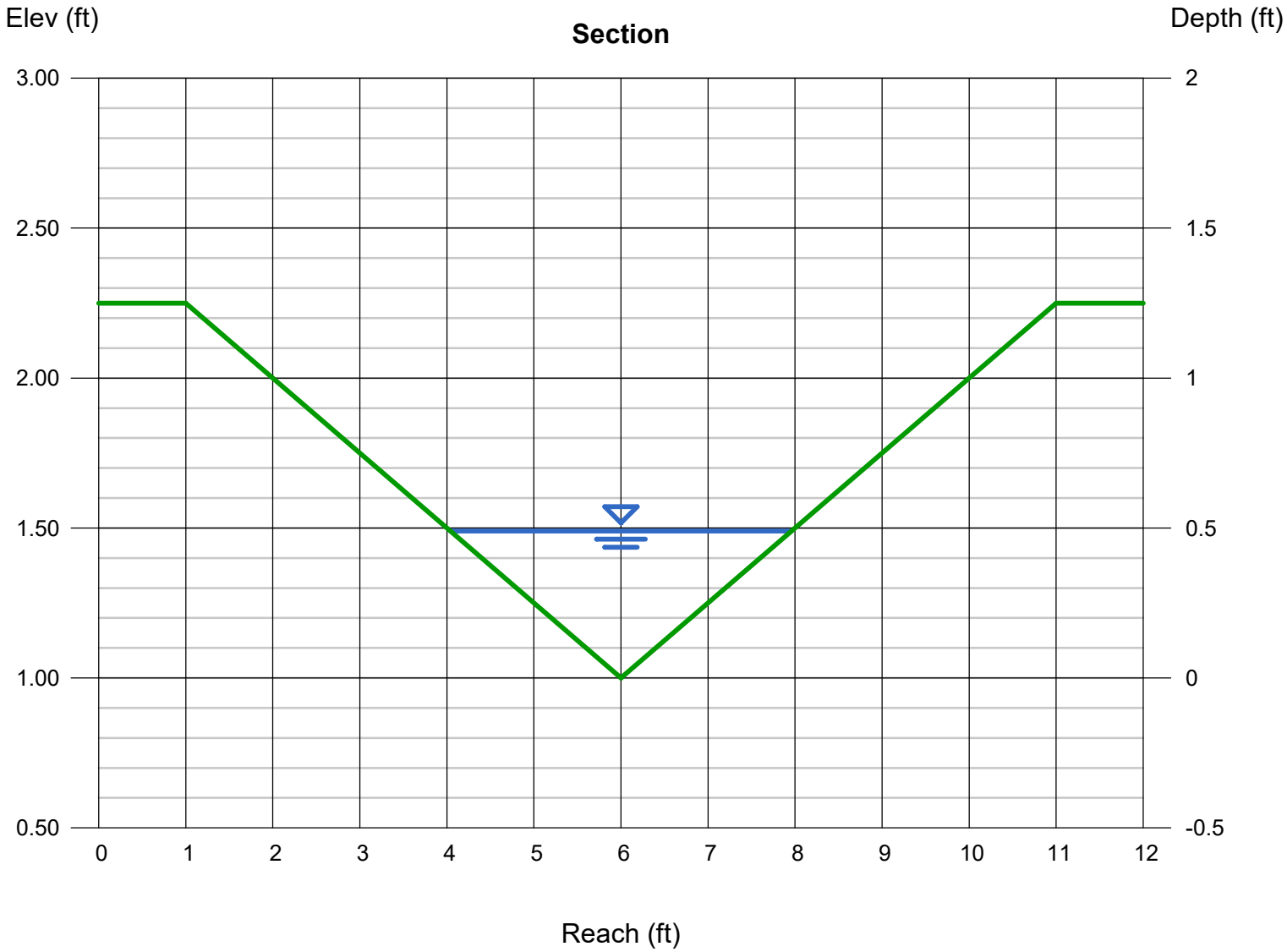
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.25
Invert Elev (ft)	= 1.00
Slope (%)	= 6.55
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.90

Highlighted

Depth (ft)	= 0.49
Q (cfs)	= 3.900
Area (sqft)	= 0.96
Velocity (ft/s)	= 4.06
Wetted Perim (ft)	= 4.04
Crit Depth, Yc (ft)	= 0.57
Top Width (ft)	= 3.92
EGL (ft)	= 0.75



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE N2 - MAX SLOPE (Q100) GRASS LINED

Triangular

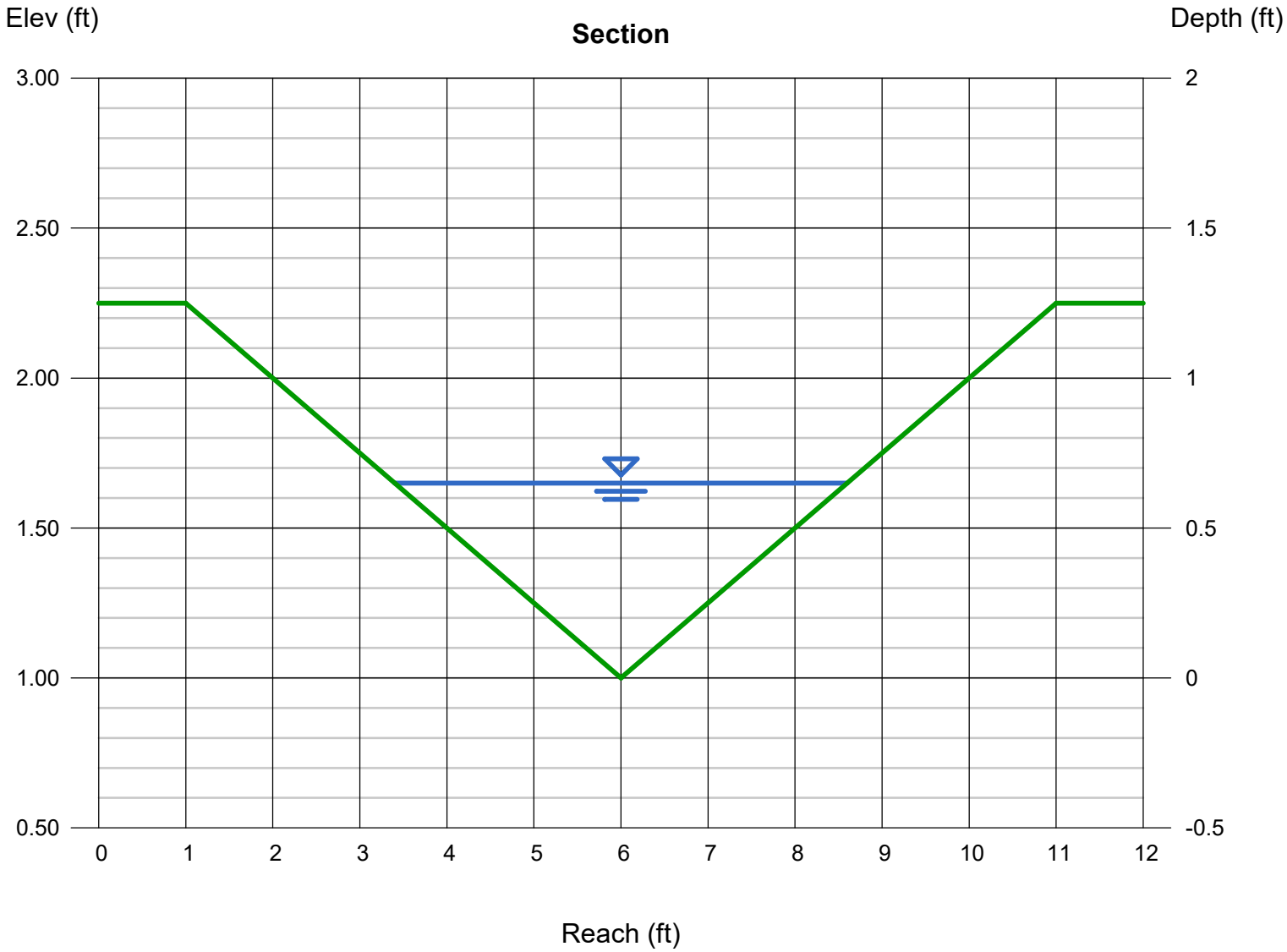
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.25
Invert Elev (ft)	= 1.00
Slope (%)	= 1.35
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.80

Highlighted

Depth (ft)	= 0.65
Q (cfs)	= 3.800
Area (sqft)	= 1.69
Velocity (ft/s)	= 2.25
Wetted Perim (ft)	= 5.36
Crit Depth, Yc (ft)	= 0.57
Top Width (ft)	= 5.20
EGL (ft)	= 0.73



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE P - MAX SLOPE (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Triangular

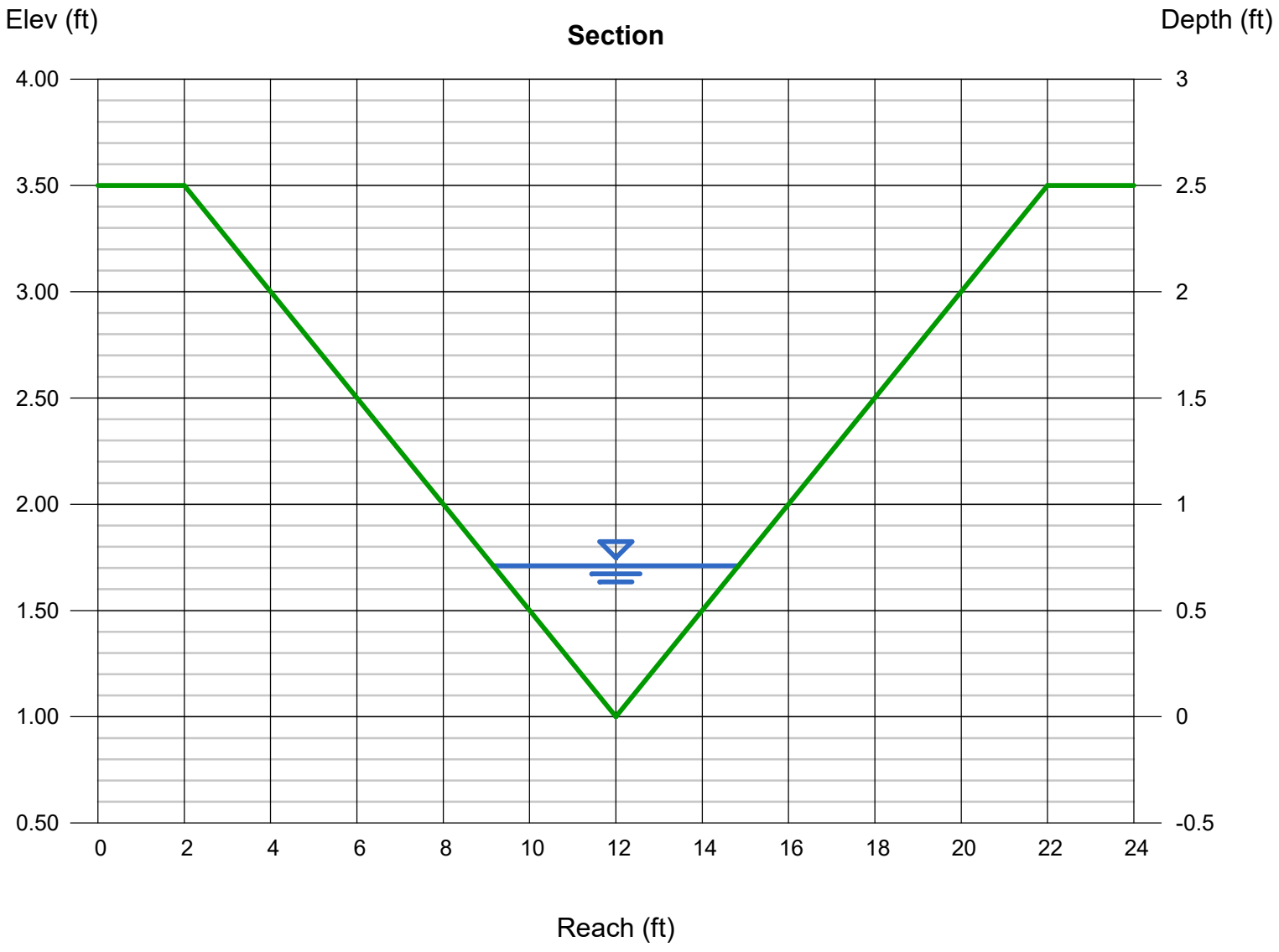
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 8.00
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 11.70

Highlighted

Depth (ft)	= 0.71
Q (cfs)	= 11.70
Area (sqft)	= 2.02
Velocity (ft/s)	= 5.80
Wetted Perim (ft)	= 5.85
Crit Depth, Yc (ft)	= 0.89
Top Width (ft)	= 5.68
EGL (ft)	= 1.23



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE Q - MAX SLOPE (Q100) GRASS LINED

Triangular

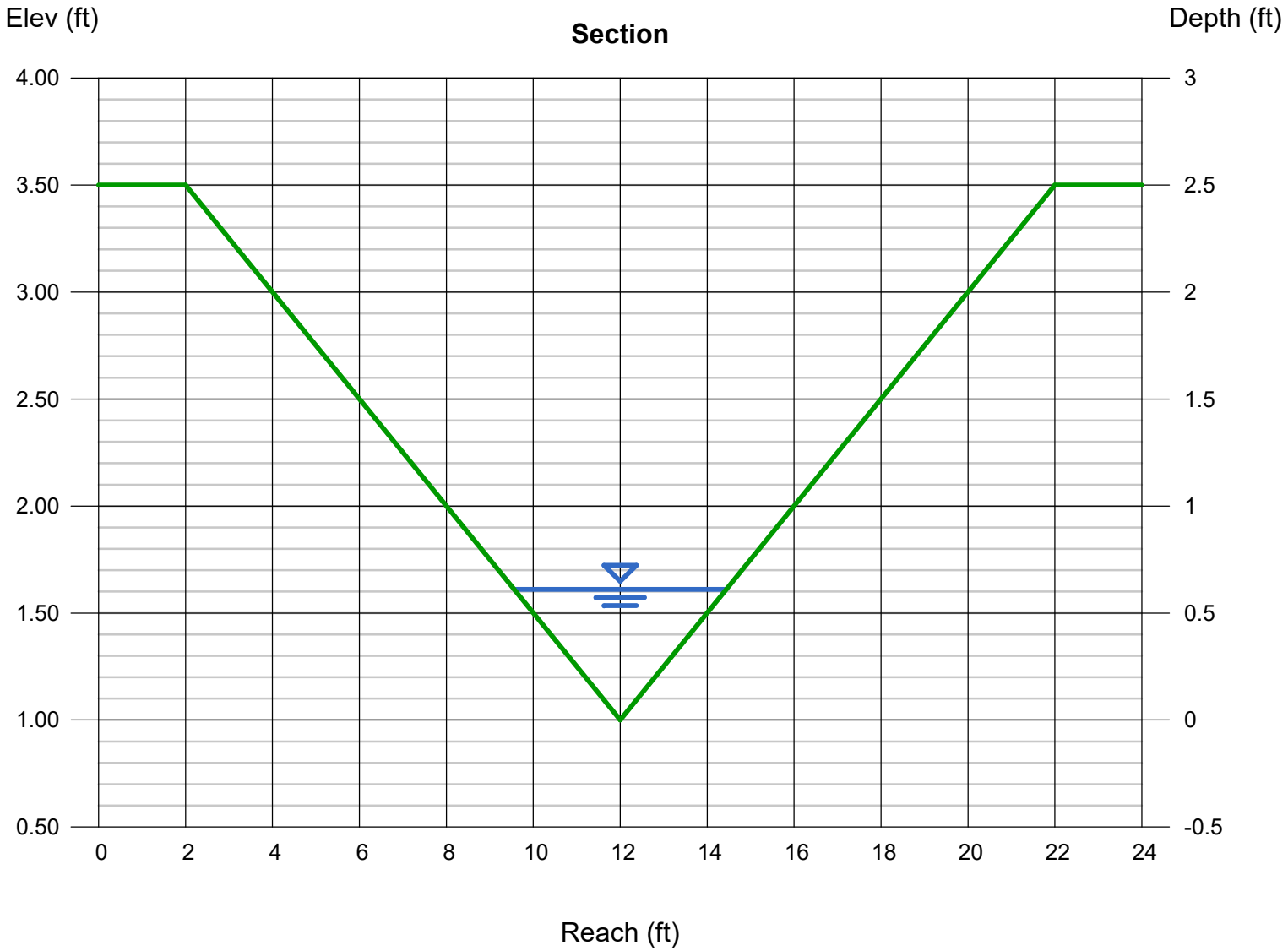
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 2.00
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.80

Highlighted

Depth (ft)	= 0.61
Q (cfs)	= 3.800
Area (sqft)	= 1.49
Velocity (ft/s)	= 2.55
Wetted Perim (ft)	= 5.03
Crit Depth, Yc (ft)	= 0.57
Top Width (ft)	= 4.88
EGL (ft)	= 0.71



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE R - MAX SLOPE (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Triangular

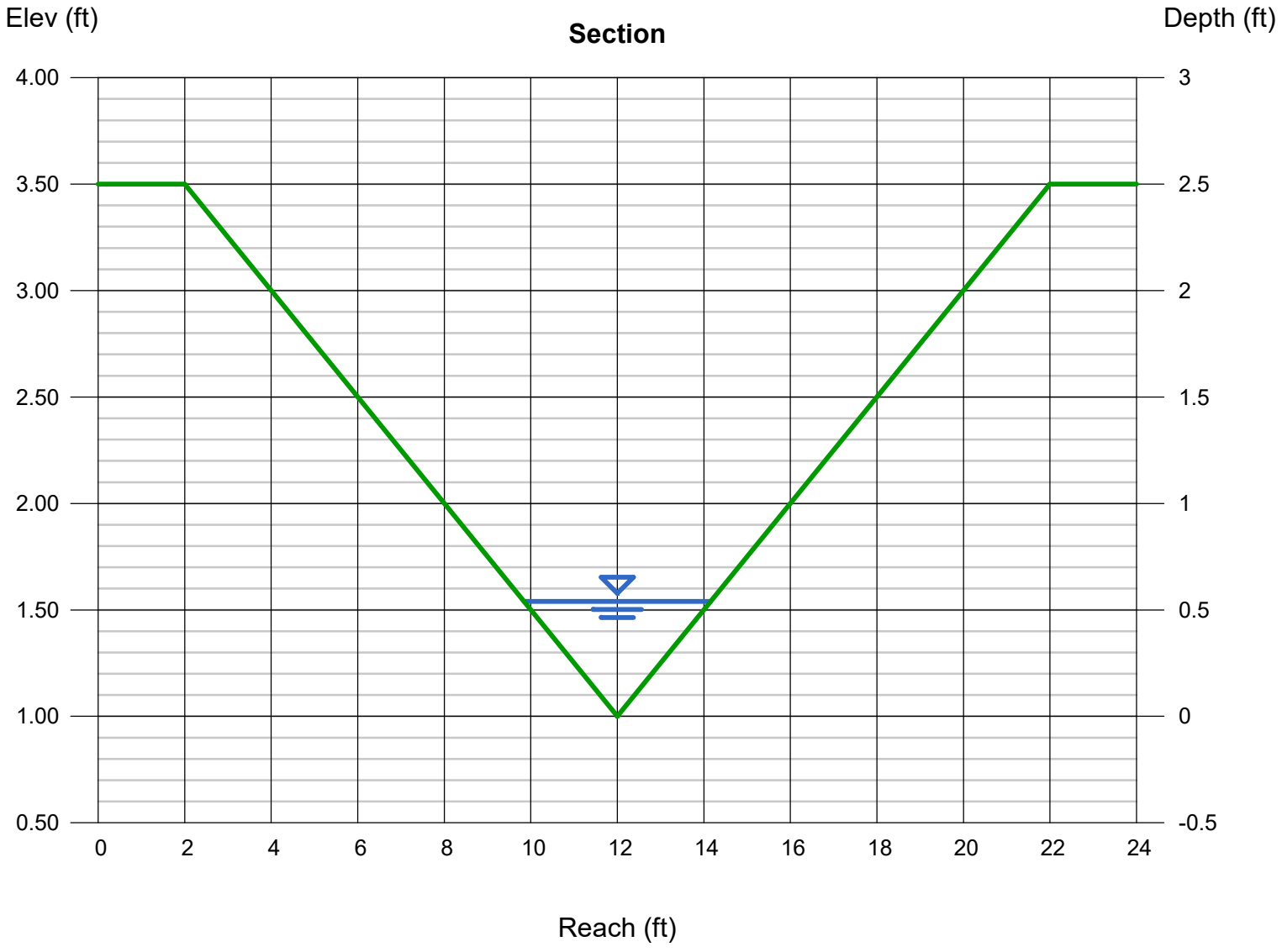
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 8.00
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.50

Highlighted

Depth (ft)	= 0.54
Q (cfs)	= 5.500
Area (sqft)	= 1.17
Velocity (ft/s)	= 4.72
Wetted Perim (ft)	= 4.45
Crit Depth, Yc (ft)	= 0.66
Top Width (ft)	= 4.32
EGL (ft)	= 0.89



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

ROADSIDE SWALE S - MAX SLOPE (Q100) GRASS LINED

Triangular

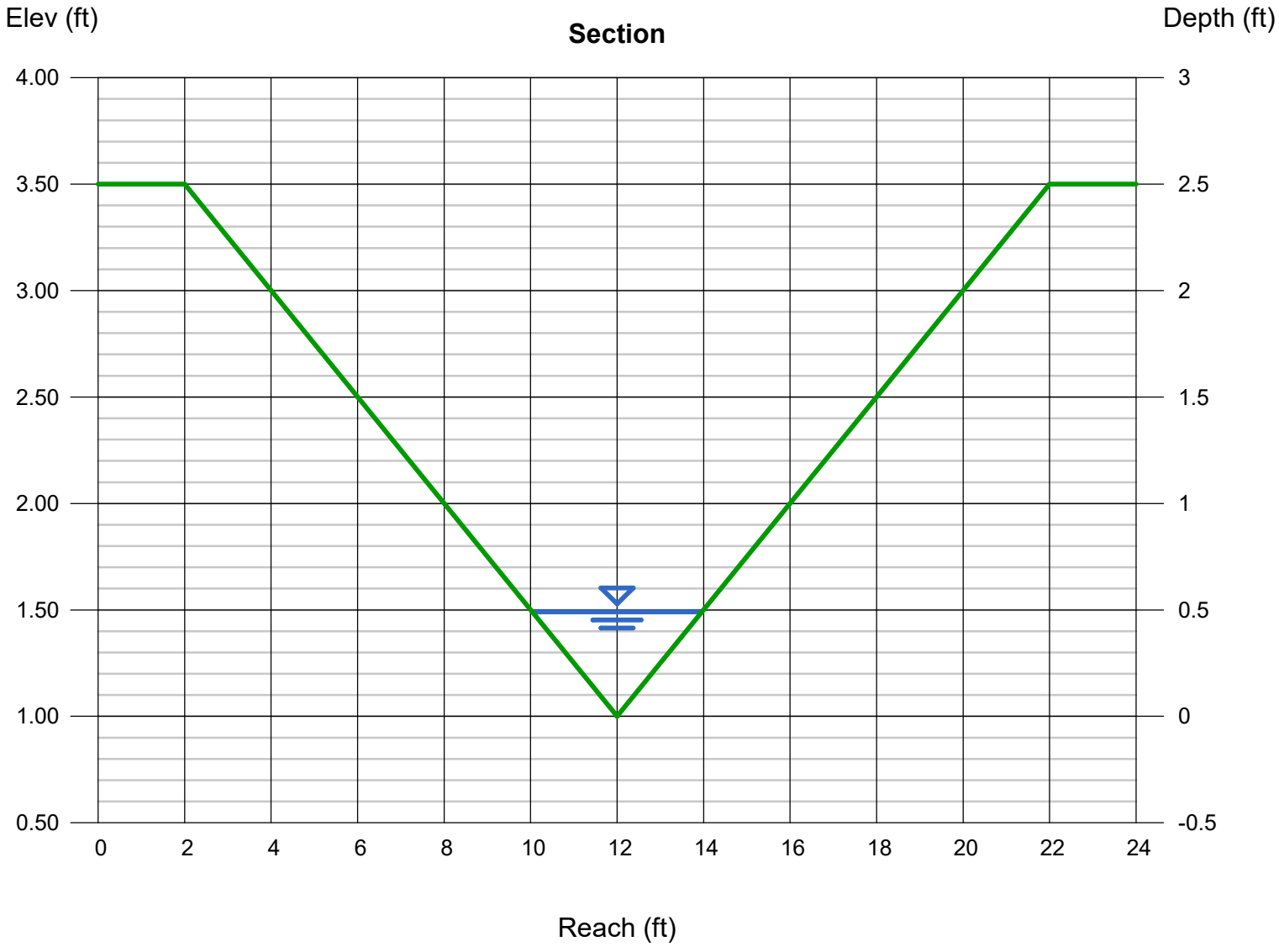
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 2.00
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.20

Highlighted

Depth (ft)	= 0.49
Q (cfs)	= 2.200
Area (sqft)	= 0.96
Velocity (ft/s)	= 2.29
Wetted Perim (ft)	= 4.04
Crit Depth, Yc (ft)	= 0.46
Top Width (ft)	= 3.92
EGL (ft)	= 0.57



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

DP3 - DP3.1 SWALE - MAX SLOPE (Q100) GRASS LINED

Triangular

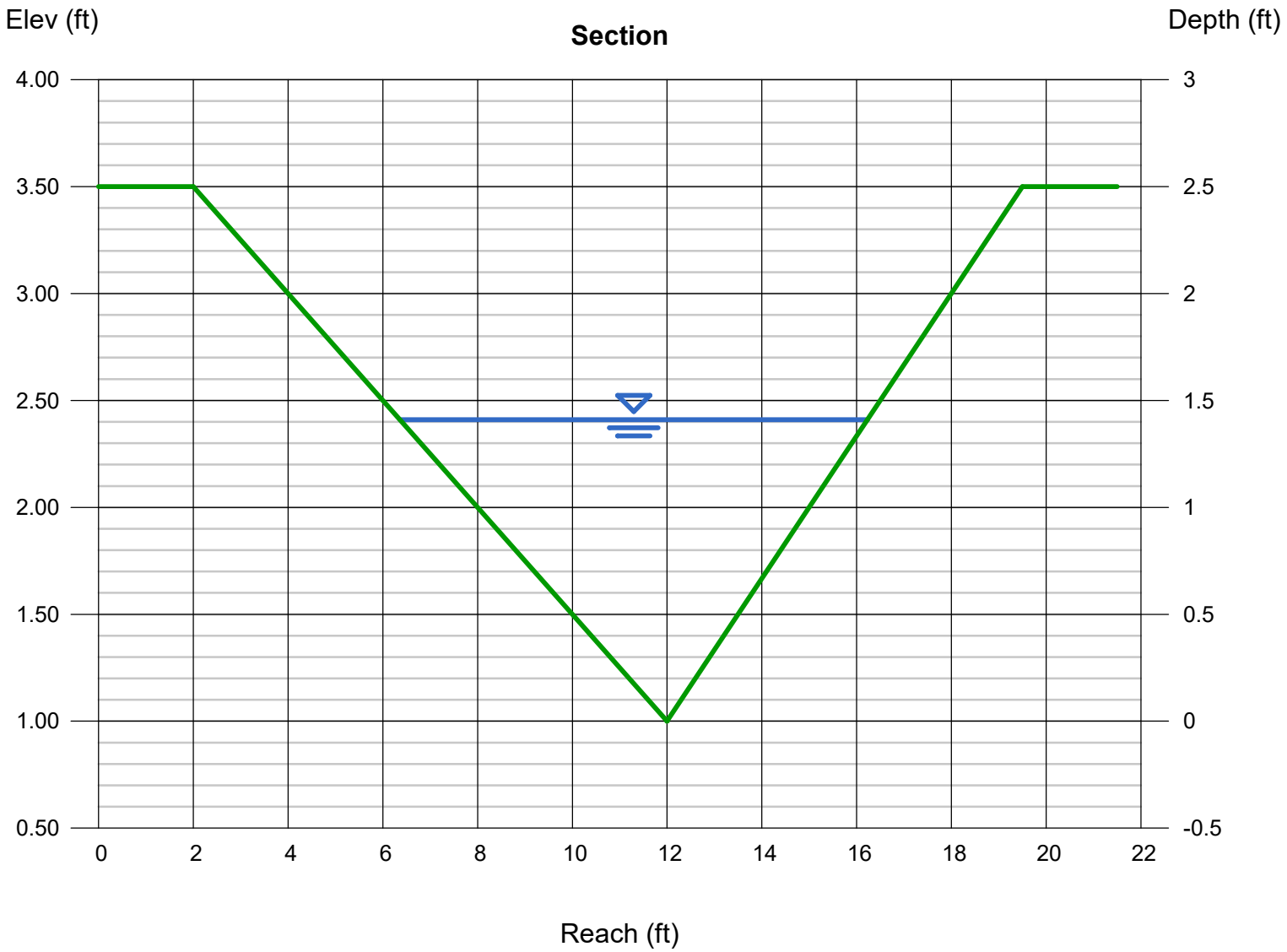
Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 1.25
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 25.10

Highlighted

Depth (ft)	= 1.41
Q (cfs)	= 25.10
Area (sqft)	= 6.96
Velocity (ft/s)	= 3.61
Wetted Perim (ft)	= 10.27
Crit Depth, Yc (ft)	= 1.27
Top Width (ft)	= 9.87
EGL (ft)	= 1.61



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

DP3.1 - DP4 SWALE - MAX SLOPE (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Triangular

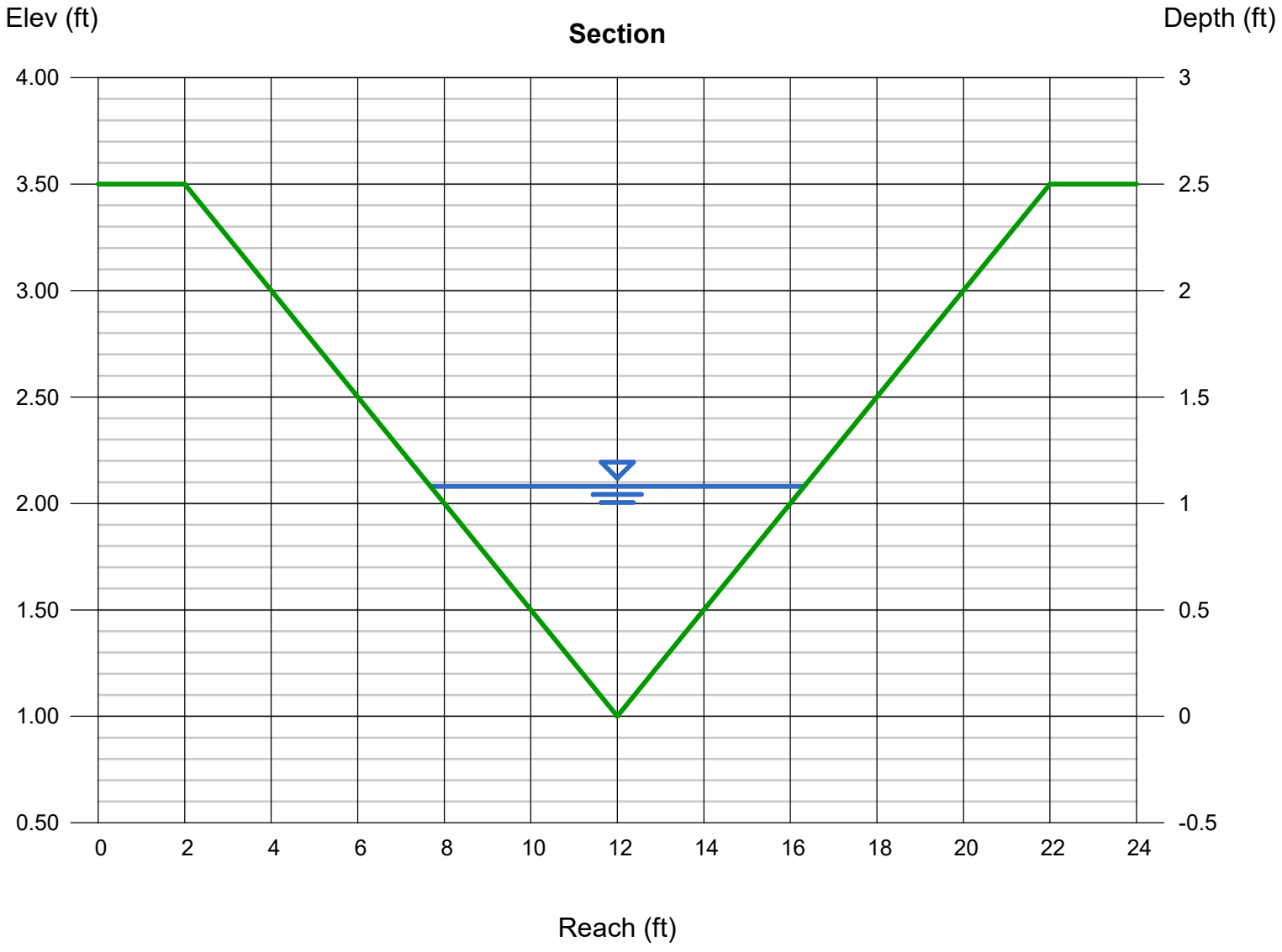
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 6.33
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 32.10

Highlighted

Depth (ft)	= 1.08
Q (cfs)	= 32.10
Area (sqft)	= 4.67
Velocity (ft/s)	= 6.88
Wetted Perim (ft)	= 8.91
Crit Depth, Yc (ft)	= 1.32
Top Width (ft)	= 8.64
EGL (ft)	= 1.82



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, 00 29 2026

DP4.1 - POND 1 OUTFALL SWALE (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Trapezoidal

Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 5.00, 5.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 1.00
Slope (%)	= 4.00
N-Value	= 0.035

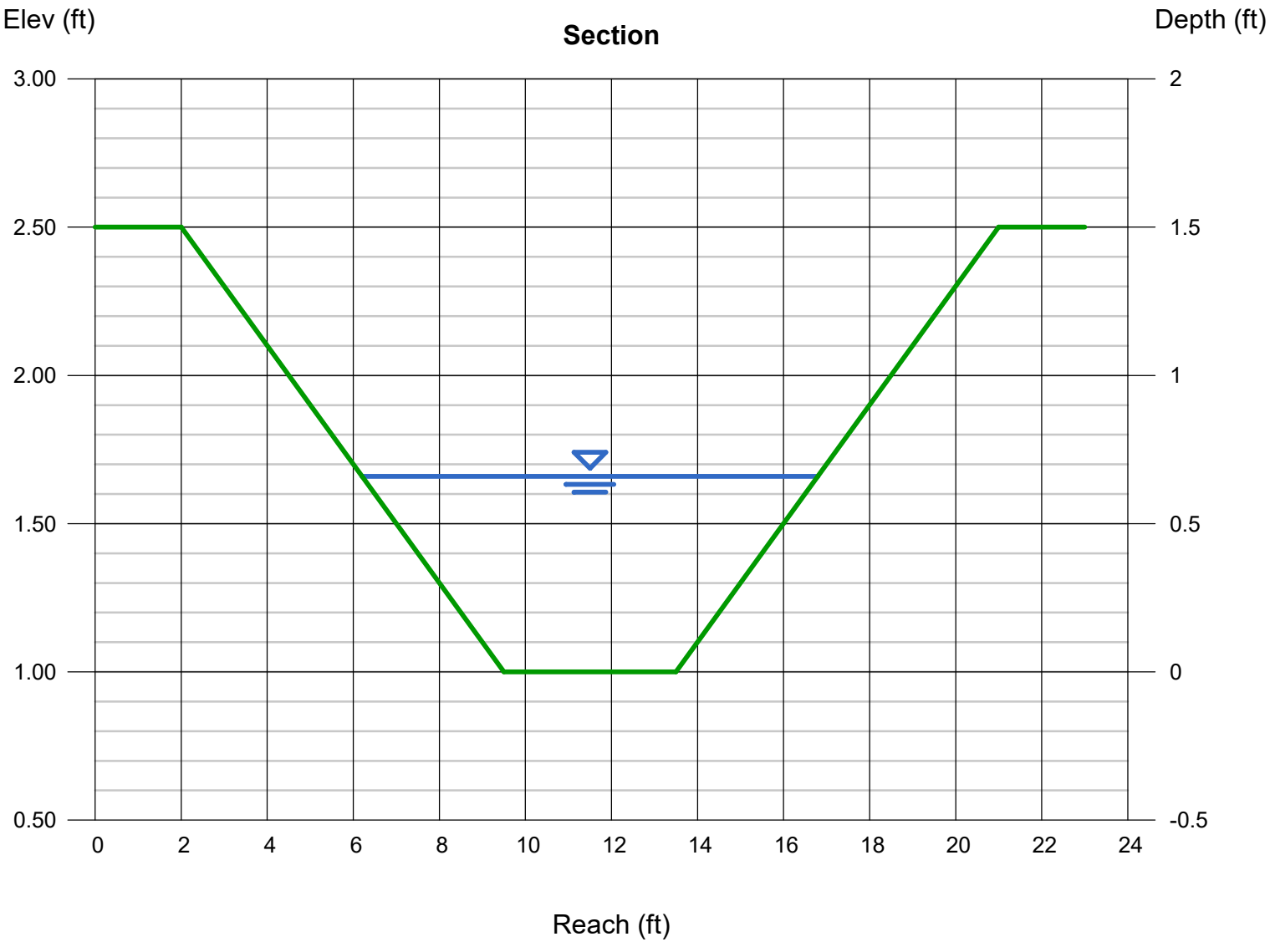
Calculations

Compute by:	Known Q
Known Q (cfs)	= 23.90

Highlighted

Depth (ft)	= 0.66
Q (cfs)	= 23.90
Area (sqft)	= 4.82
Velocity (ft/s)	= 4.96
Wetted Perim (ft)	= 10.73
Crit Depth, Yc (ft)	= 0.76
Top Width (ft)	= 10.60
EGL (ft)	= 1.04

Swale depth on the Sheet 3 section detail for the Pond 1 Outfall Swale is 1.25 feet. Please revise calculation.



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, 00 20 2026

DP9 - DP10 Ex Swale

GRASS LINED W/ TURF REINFORCEMENT MAT

User-defined

Invert Elev (ft)	= 7495.54
Slope (%)	= 15.50
N-Value	= 0.035

Calculations

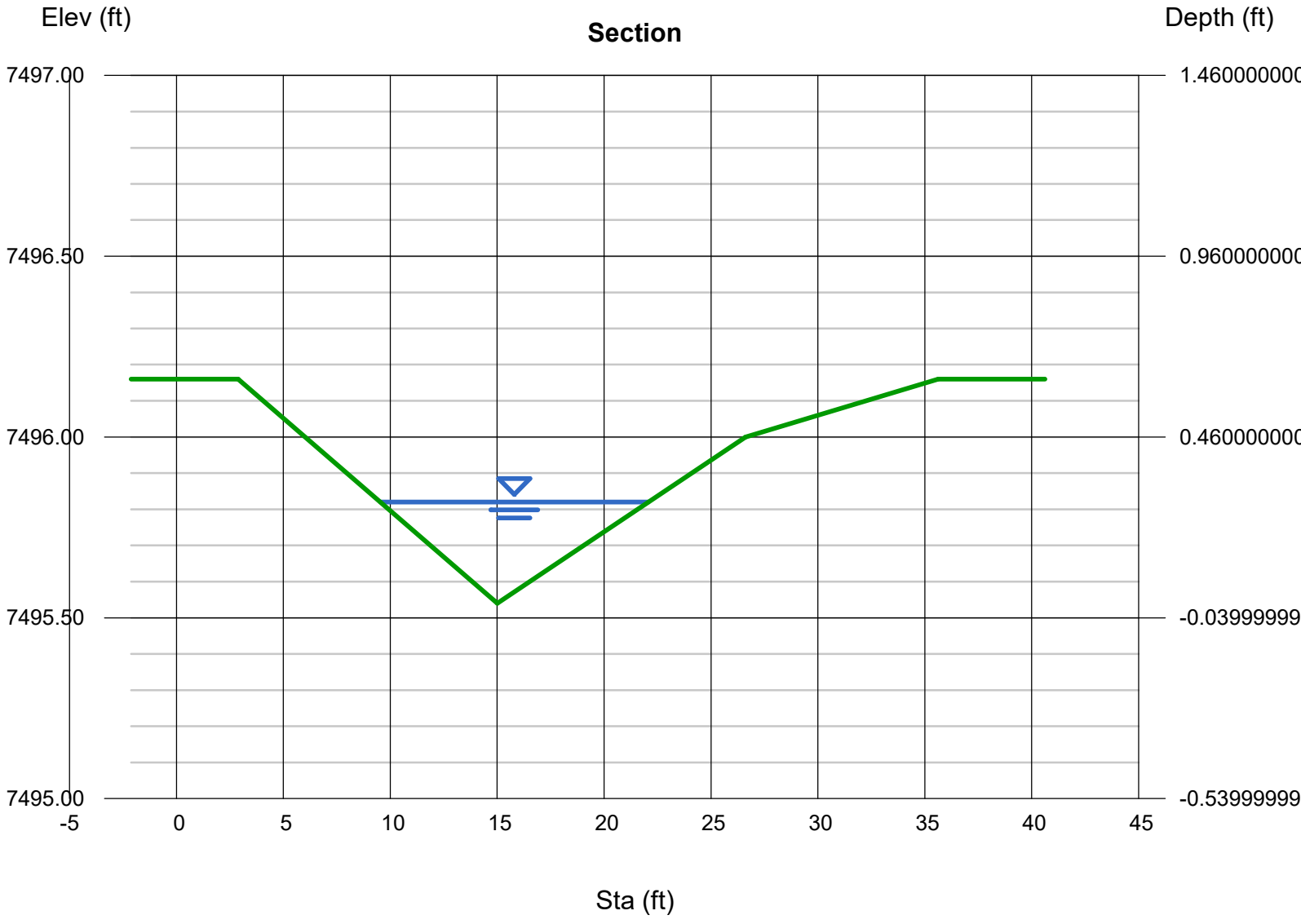
Compute by:	Known Q
Known Q (cfs)	= 7.70

Highlighted

Depth (ft)	= 0.28
Q (cfs)	= 7.700
Area (sqft)	= 1.75
Velocity (ft/s)	= 4.39
Wetted Perim (ft)	= 12.55
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 12.53
EGL (ft)	= 0.58

(Sta, El, n)-(Sta, El, n)...

(2.88, 7496.16)-(15.01, 7495.54, 0.035)-(26.62, 7496.00, 0.035)-(35.62, 7496.16, 0.035)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, 00 20 2026

DP13 - DP14 Min. Slope (Q100) GRASS LINED

Triangular

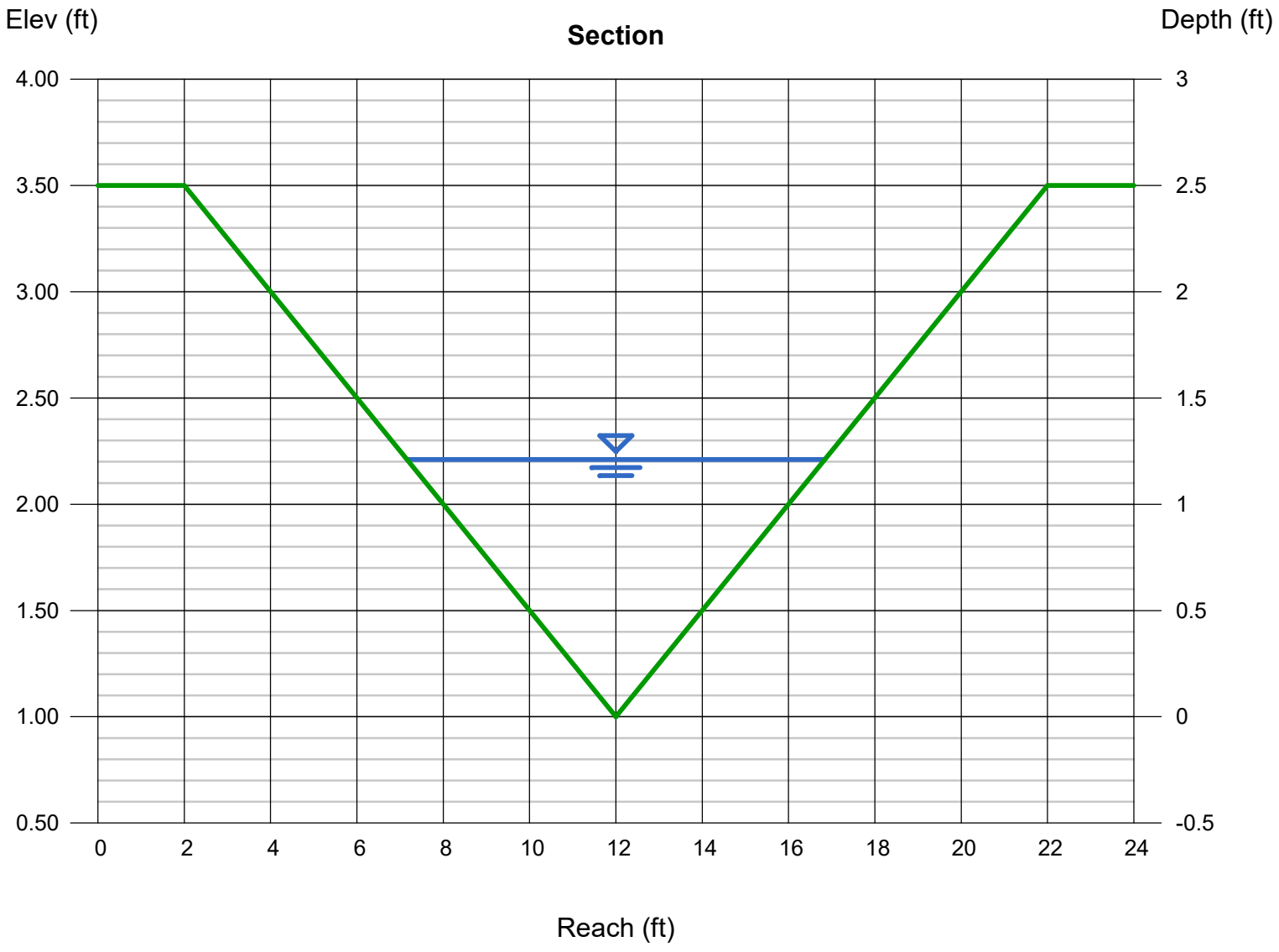
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 1.70
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 22.50

Highlighted

Depth (ft)	= 1.21
Q (cfs)	= 22.50
Area (sqft)	= 5.86
Velocity (ft/s)	= 3.84
Wetted Perim (ft)	= 9.98
Crit Depth, Yc (ft)	= 1.15
Top Width (ft)	= 9.68
EGL (ft)	= 1.44



Channel Report

DP13 - DP14 Max. Slope (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Triangular

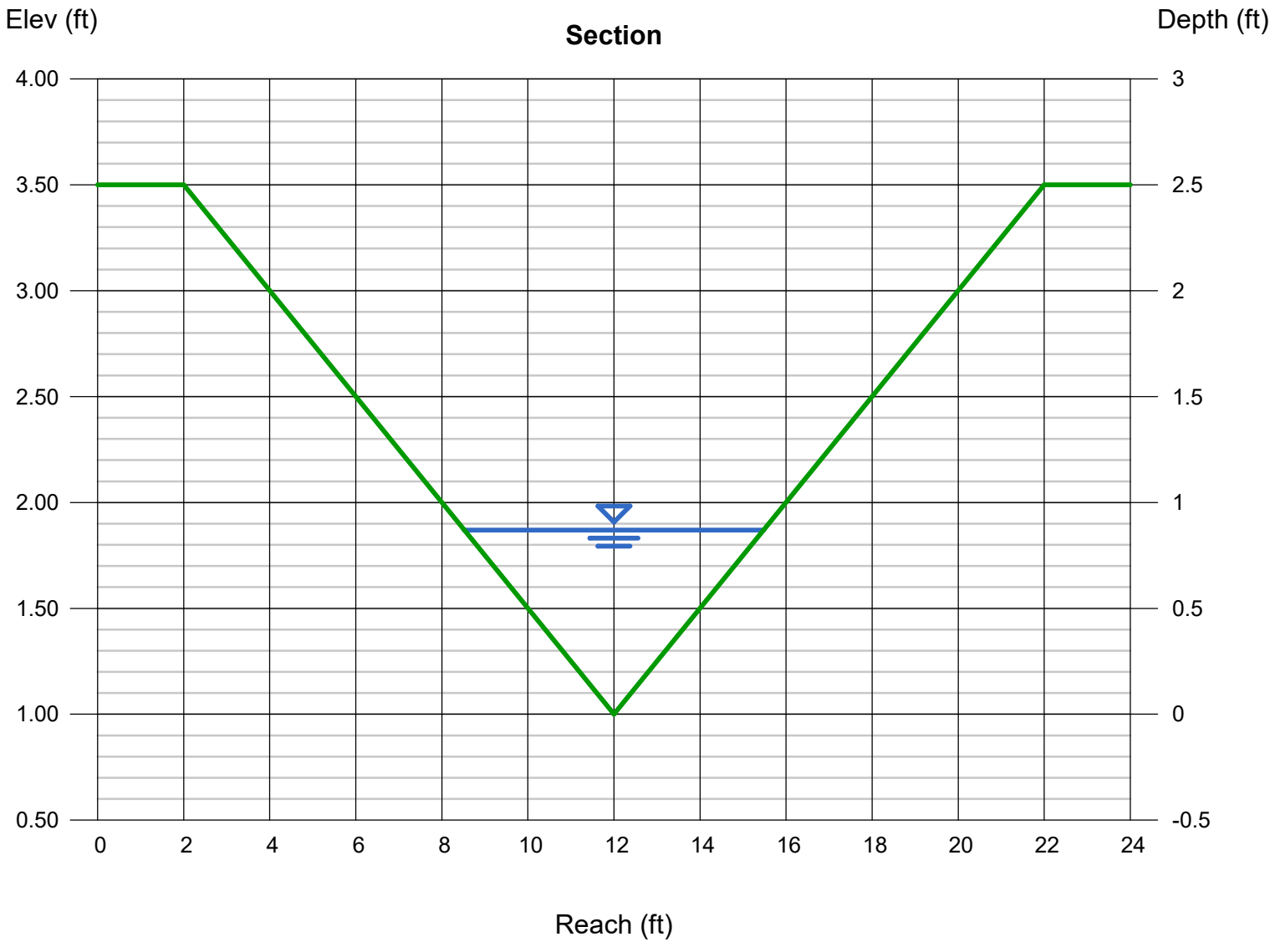
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 10.00
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 22.50

Highlighted

Depth (ft)	= 0.87
Q (cfs)	= 22.50
Area (sqft)	= 3.03
Velocity (ft/s)	= 7.43
Wetted Perim (ft)	= 7.17
Crit Depth, Yc (ft)	= 1.15
Top Width (ft)	= 6.96
EGL (ft)	= 1.73



Channel Report

DP14.1 OUTFALL SEC. 1 (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Trapezoidal

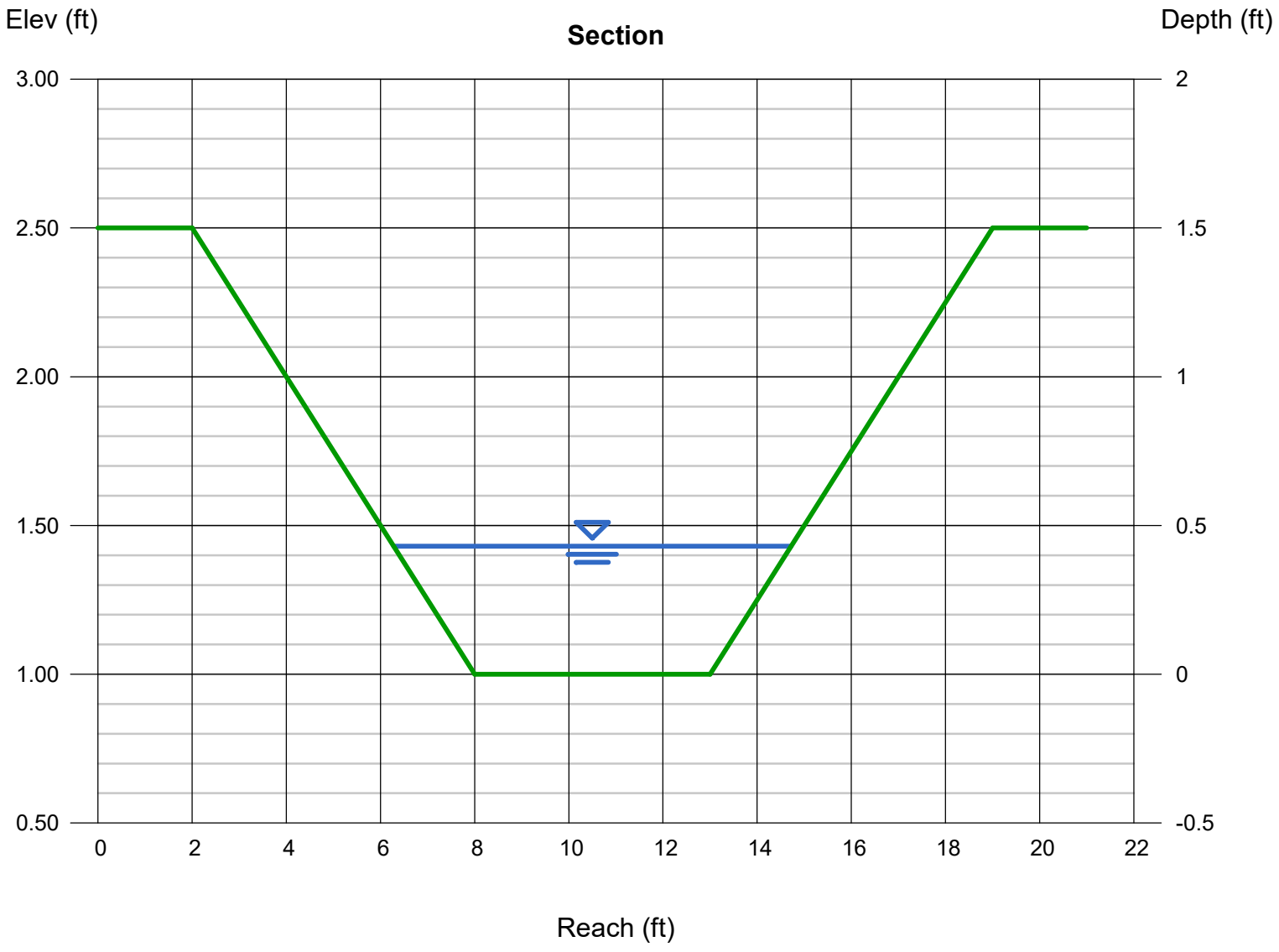
Bottom Width (ft)	= 5.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 1.00
Slope (%)	= 5.90
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 14.40

Highlighted

Depth (ft)	= 0.43
Q (cfs)	= 14.40
Area (sqft)	= 2.89
Velocity (ft/s)	= 4.98
Wetted Perim (ft)	= 8.55
Crit Depth, Yc (ft)	= 0.55
Top Width (ft)	= 8.44
EGL (ft)	= 0.82



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, 00 28 2026

DP14.1 OUTFALL SEC. 2 (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Trapezoidal

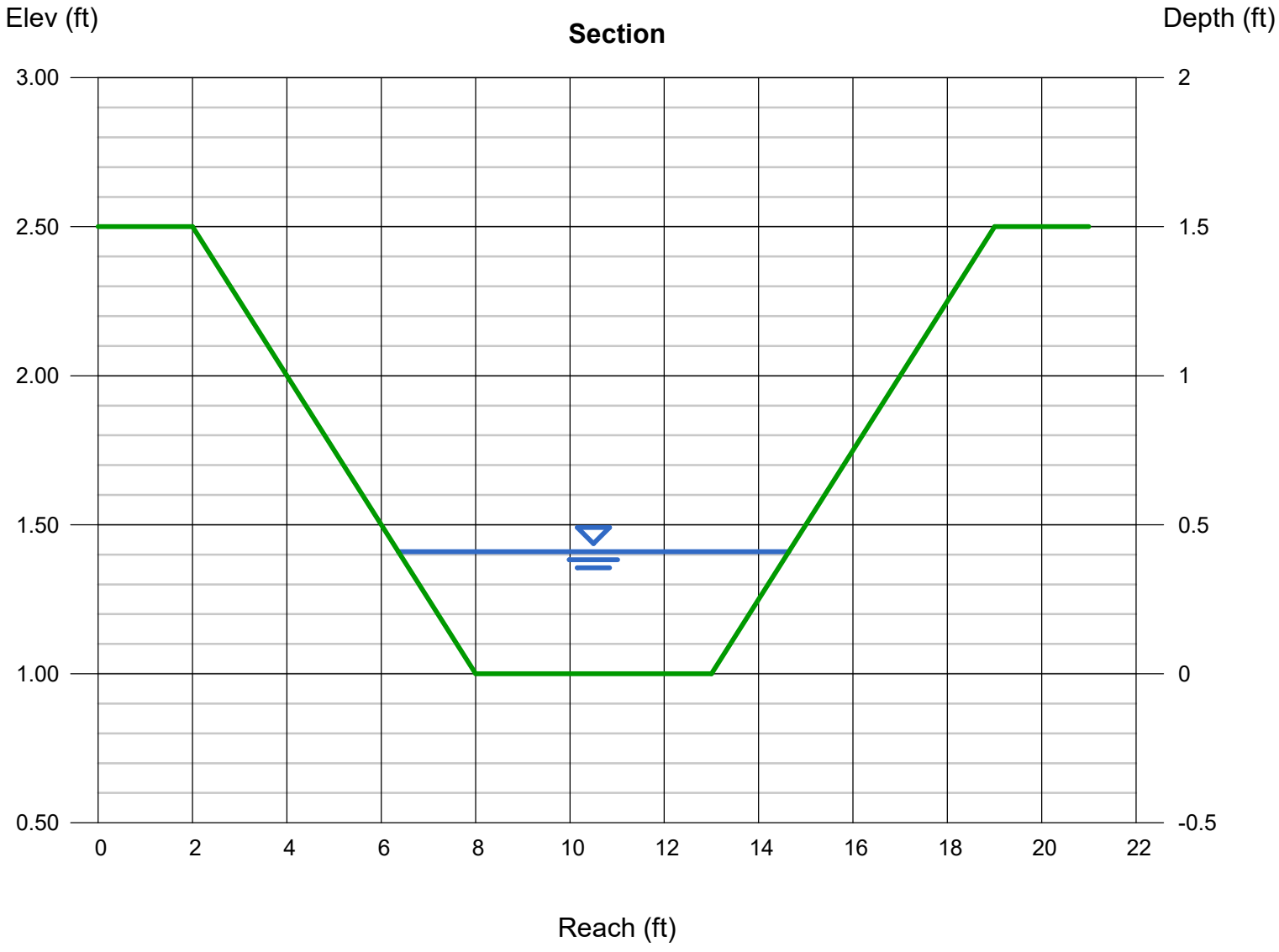
Bottom Width (ft)	= 5.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 1.00
Slope (%)	= 7.52
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 14.40

Highlighted

Depth (ft)	= 0.41
Q (cfs)	= 14.40
Area (sqft)	= 2.72
Velocity (ft/s)	= 5.29
Wetted Perim (ft)	= 8.38
Crit Depth, Yc (ft)	= 0.55
Top Width (ft)	= 8.28
EGL (ft)	= 0.84



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, 00 28 2026

DP14.1 OUTFALL SEC. 3 (Q100)

GRASS LINED W/ TURF REINFORCEMENT MAT

Trapezoidal

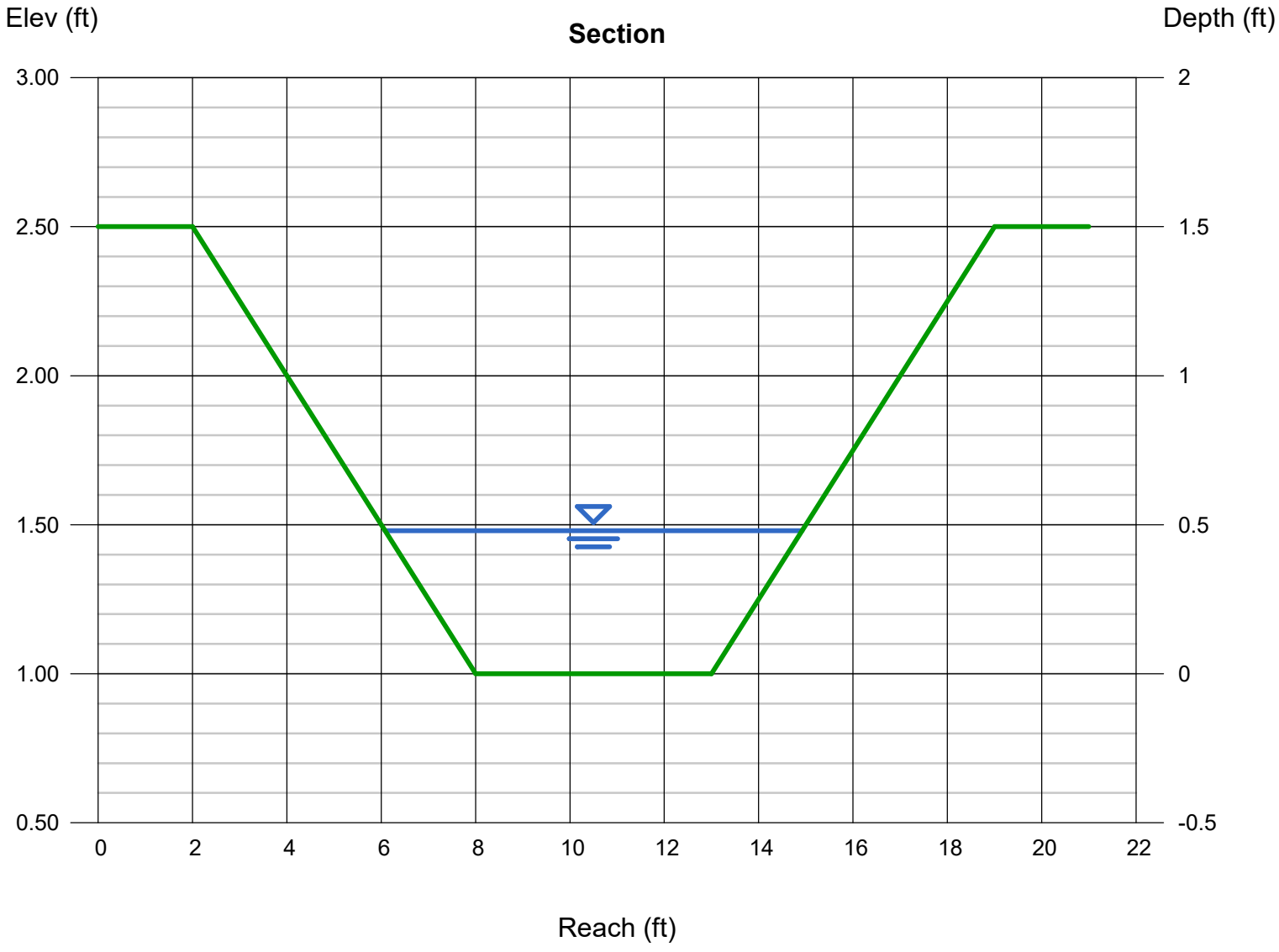
Bottom Width (ft)	= 5.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 1.00
Slope (%)	= 4.11
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 14.40

Highlighted

Depth (ft)	= 0.48
Q (cfs)	= 14.40
Area (sqft)	= 3.32
Velocity (ft/s)	= 4.34
Wetted Perim (ft)	= 8.96
Crit Depth, Yc (ft)	= 0.55
Top Width (ft)	= 8.84
EGL (ft)	= 0.77



MATERIAL PROPERTY DATA SHEET

WESTERN GREEN

VMax® SC250™

Permanent • Triple Net • Organic Fiber Matrix • Turf Reinforcement Mat

DESCRIPTION

SC250 Turf Reinforcement Mat (TRM) is composed of 70% straw and 30% coconut fibers mechanically (stitch) bound between a three-dimensional UV stabilized, synthetic net structure. Stitching is secured on two-inch centers using UV stabilized, synthetic thread. SC250 is a permanent, three-dimensional TRM that provides immediate erosion protection and long-term turf reinforcement and is intended for applications requiring erosion protection for greater than thirty-six months.

Each roll of SC250 is made in the USA and manufactured under Western Green's Quality Assurance Program to ensure a continuous distribution of fibers and consistent thickness.

Material Content	
Matrix	Straw/Coconut
Netting	Top Net: Mediumweight, UV stable Middle Net: Corrugated Ultra-Heavyweight, UV stable Bottom Net: Mediumweight, UV stable
Thread	Synthetic, UV Stable

Standard Roll Sizes				
Width	8 ft	(2.4 m)	6.5 ft	(2.0 m)
Length	90 ft	(27.4 m)	55.5 ft	(17.0 m)
Weight ± 10%	70 lb	(32.0 kg)	34 lb	(15.5 kg)
Area	80 sy	(66.9 m^2)	40 sy	(33.4 m^2)

Material available in custom roll sizes

Approvals & Classification	
Classification	FHWA: Type 5.C / ECTC: Type 5.C
TTI Approvals	Class 2 Type H
NTPEP Number	ECP-2019-03-014

Index Property	Test Method	Typical	
Thickness	ASTM D6525	0.58 in.	(15 mm)
Mass/Unit Area	ASTM D6566	15.0 oz/sy	(500 g/sm)
Tensile Strength – MD	ASTM D6818	700 lbs/ft	(10.2 kN/m)
Tensile Strength – TD	ASTM D6818	675 lbs/ft	(9.9 kN/m)
Elongation - MD	ASTM D6818	30%	
Elongation – TD	ASTM D6818	20%	
UV Stability	ASTM D4355	80% @1000 hr	
Light Penetration	ASTM D6567	5%	
Biomass Improvement	ASTM D7322	400%	
Specific Gravity	ASTM D792	57.4 lb/ft^3	(0.92 g/cm^3)
Porosity	ECTC	N/A	

Design Parameters		
Property	**Unvegetated**	**Vegetated[3]**
RUSLE C Factor[2]	0.05	N/A
Slope Maximum Gradient[1]	0.5H:1V	0.5H:1V
Permissible Shear Stress[2]	3.0 psf (145 Pa)	10.0 psf (480 Pa)
Permissible Velocity[2]	9.5 fps (2.9 m/s)	15 fps (4.6 m/s)
τ_{veg} / τ_{TRM} (HEC-15)	N/A	0.67

Manning's n Roughness (HEC-15)		
τ_{lower}	τ_{mid}	τ_{upper}
0.038	0.032	0.027

1 Maximum Gradient a recomendation for typical installations.
2 Hydraulic thresholds compliant with ASTM D6459/D6460 but generalized for typical applications.
3 Vegetated values dependent on established stand of vegetation

NORTH AMERICAN GREEN®

Rev. 4.2023
Scan for additional and updated product information, or click here.

ASP Enterprises | Bowman Construction Supply Inc. | Quick Supply Co. | Cascade GEOSYNTHETICS

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971.339.1020

SOLUTIONS WE SUPPLY

GEOSYNTHETICS
Filter Fabrics
Stabilization Fabrics
Geogrids
- Road Grids
- Wall Grids
- Slope Stabilization

Specialty Fabrics
Composite Geomembranes
- GCLs, PVC, HDPE, LLDPE, EPDM, Granular Bentonite

SEDIMENT CONTROL
Inlet Protection
- Grated Inlet, Curb Inlet, Area Inlet Protection

Ditch Checks
- Triangle Silt Dike
- GeoRidge

Perimeter Protection
- High and Low-Porosity Silt Fence, Straw Wattles, Silt Socks
- Safety Fence

Flocculants & Water Treatment
- Polymer-Based & Natural Flocculants

Sediment Basin Skimmers
Dewatering Bags
Trackout Control
- FODS
- Rumble Grates

Turbidity Curtains

EROSION CONTROL
Basic Hydraulically Applied Mulches
- Wood
- Paper
- Blends
- Straw

High-Performance Hydraulically Applied Products
- BFM
- FGM
- Additives & Tackifiers

Temporary Erosion Control Blankets
- Coir & Jute Mat/Nettings
- Short-Term ECBs
- Extended-Term ECBs

Permanent Erosion Control Blankets
- Turf Reinforcement Mats
- HP-TRMs
- Anchor Reinforced Vegetation System

Structural BMPs
- Transition Mats
- Geoweb Cellular Confinement
- Composite Vegetated Armor System
- Flex MSE Vegetated Wall System
- Articulated Concrete Block
- Gabions
- Grout-Filled Geotextile Mats

Vegetation Establishment
- Native Seed & Turf Seed
- Fertilizers
- Organic Soil Additives
- Stratavault Soil Cells

STORMWATER MANAGEMENT
Water Quality
- Inlet Filter Boxes
- Pre-Treatment Chamber
- Nutrient Separating Baffle Boxes
- High-Flow Biofiltration Media
- Hydrodynamic Separators
- Stratavault

Water Quantity
- Modular Underground Storage Systems
- Chamber Detention Systems

Drainage
- HDPE Swale Liner
- Pipe & Fittings
- Drainage Composites
- Strip Drain

Inlet Structures
- PVC
- Drain Basins, In-Line Drains
- Landscape

Permeable Pavers
- Permeable Articulating Concrete Block
- Grass Pavers
- Gravel Pavers
- Concrete Pavers

SPECIALTY
Natural & Synthetic Coir Fiber Logs
Vegetated Reinforced Soil Slopes
Soil Anchors
Root Barrier System
AquaBlok
Muscle Wall

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GEOSYNTHETICS | EROSION CONTROL | STORMWATER MANAGEMENT
SEDIMENT CONTROL | REVEGETATION & SOIL AMENDMENTS

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk,

Invert elevations in the culvert analysis do not match the Basin D culvert invert elevations shown on Sheet 9 of the construction drawings. Please revise the calculation

BASIN D - CULVERT (Q100)

Invert Elev Dn (ft)	=	7477.25
Pipe Length (ft)	=	40.20
Slope (%)	=	3.05965282022953
Invert Elev Up (ft)	=	7478.48
Rise (in)	=	18.0
Shape	=	Circular
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

7478.77

7480.00

Embankment

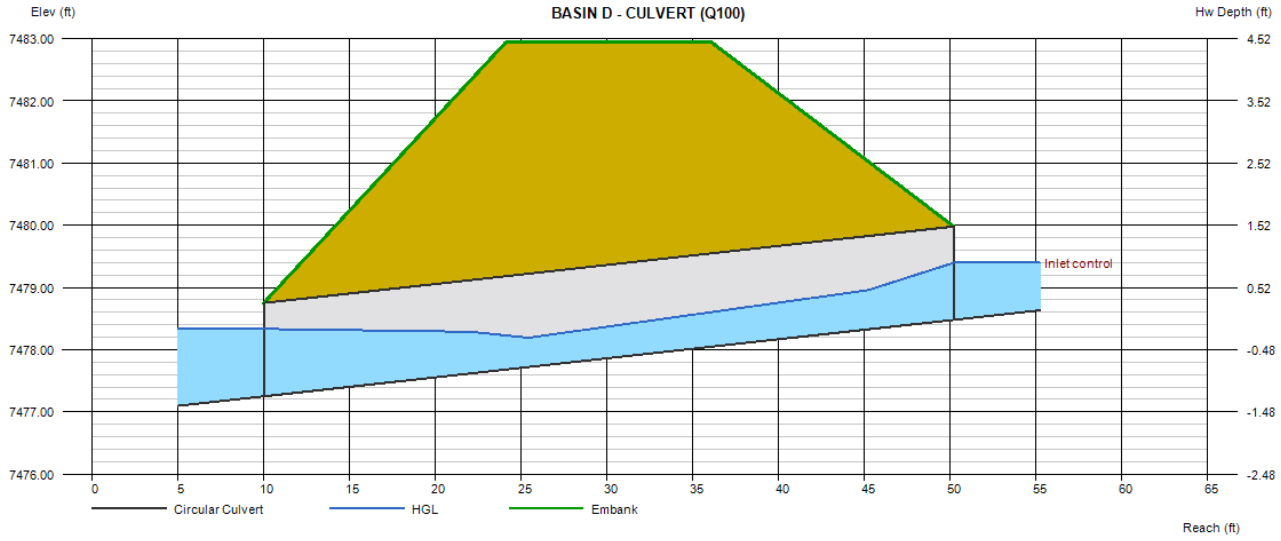
Top Elevation (ft)	=	7482.94
Top Width (ft)	=	12.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	3.10
Qmax (cfs)	=	3.10
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	3.10
Qpipe (cfs)	=	3.10
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.27
Veloc Up (ft/s)	=	4.06
HGL Dn (ft)	=	7478.33
HGL Up (ft)	=	7479.15
Hw Elev (ft)	=	7479.40
Hw/D (ft)	=	0.61
Flow Regime	=	Inlet Control



Analyze all culverts during the minor storm event (5-year) in addition to the major storm event (100-year)

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, I

Invert elevation (up) and slope in the culvert analysis do not match the Basin S culvert invert elevation (up) and slope shown on Sheet 10 of the construction drawings. Please revise the calculation

BASIN S CULVERT (Q100)

Invert Elev Dn (ft)	=	7502.55
Pipe Length (ft)	=	31.39
Slope (%)	=	0.987762305885553
Invert Elev Up (ft)	=	7502.86
Rise (in)	=	18.0
Shape	=	Circular
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

1.99%

7503.17

Embankment

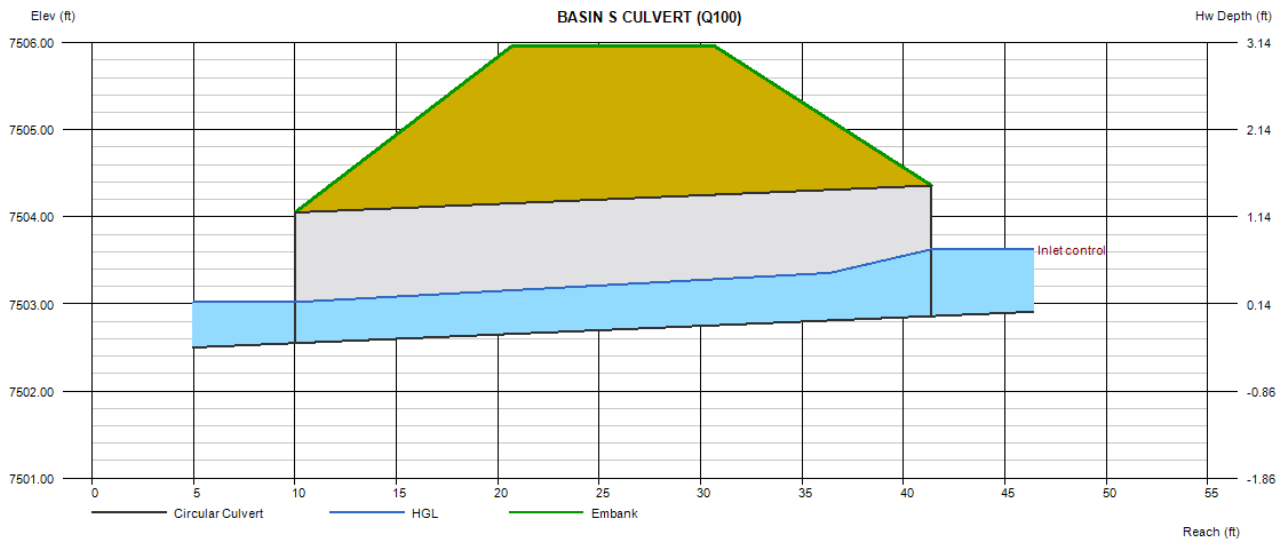
Top Elevation (ft)	=	7505.96
Top Width (ft)	=	10.00
Crest Width (ft)	=	15.00

Calculations

Qmin (cfs)	=	2.20
Qmax (cfs)	=	2.20
Tailwater Elev (ft)	=	Normal

Highlighted

Qtotal (cfs)	=	2.20
Qpipe (cfs)	=	2.20
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.63
Veloc Up (ft/s)	=	3.66
HGL Dn (ft)	=	7503.02
HGL Up (ft)	=	7503.42
Hw Elev (ft)	=	7503.63
Hw/D (ft)	=	0.51
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

DP2 - CULVERT (Q100)

Invert Elev Dn (ft)	=	7477.25
Pipe Length (ft)	=	77.76
Slope (%)	=	0.964506156742573
Invert Elev Up (ft)	=	7478.00
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

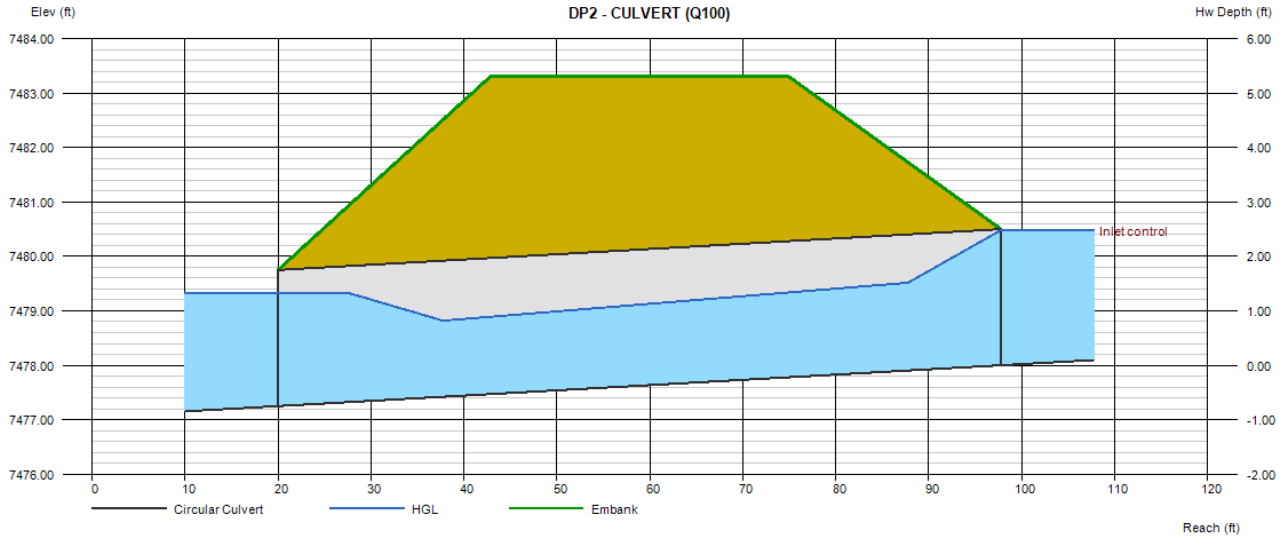
Top Elevation (ft)	=	7483.31
Top Width (ft)	=	32.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	23.70
Qmax (cfs)	=	23.70
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	23.70
Qpipe (cfs)	=	23.70
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.43
Veloc Up (ft/s)	=	6.87
HGL Dn (ft)	=	7479.33
HGL Up (ft)	=	7479.66
Hw Elev (ft)	=	7480.48
Hw/D (ft)	=	0.99
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Sunday, 00 17 2026

DP9 - CULVERT (Q100)

Invert Elev Dn (ft)	=	7498.50
Pipe Length (ft)	=	41.50
Slope (%)	=	1.20481923222542
Invert Elev Up (ft)	=	7499.00
Rise (in)	=	18.0
Shape	=	Circular
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

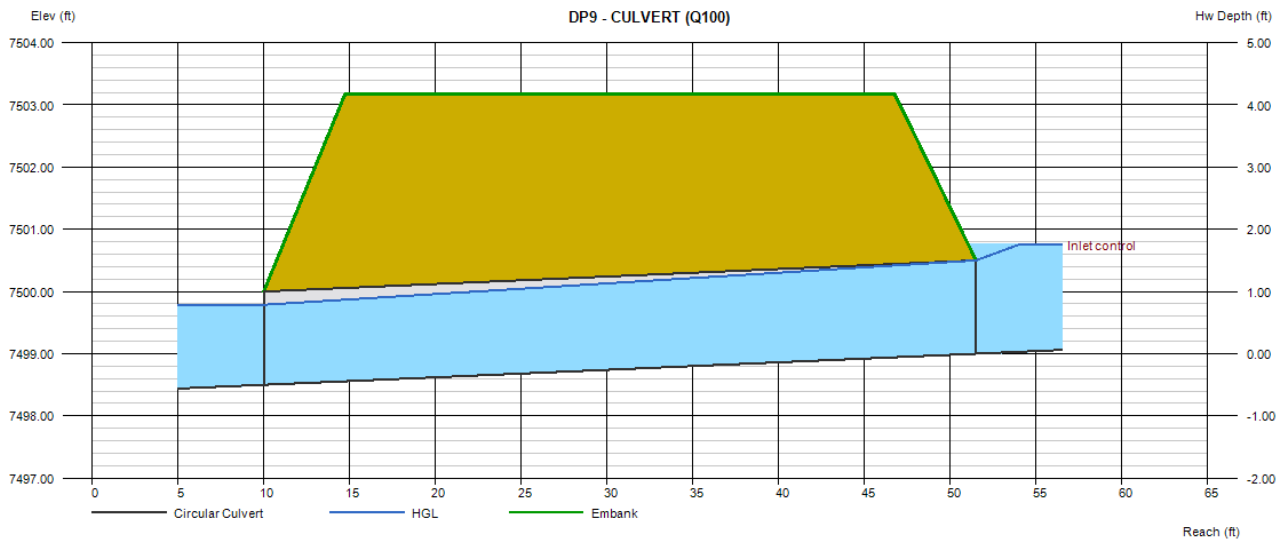
Top Elevation (ft)	=	7503.18
Top Width (ft)	=	32.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	7.70
Qmax (cfs)	=	7.70
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	7.70
Qpipe (cfs)	=	7.70
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.77
Veloc Up (ft/s)	=	4.36
HGL Dn (ft)	=	7499.79
HGL Up (ft)	=	7500.50
Hw Elev (ft)	=	7500.75
Hw/D (ft)	=	1.17
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, 00 19 2026

DP12 CULVERT (Q100)

Invert Elev Dn (ft)	=	7500.32
Pipe Length (ft)	=	68.20
Slope (%)	=	0.997325219213963
Invert Elev Up (ft)	=	7501.00
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

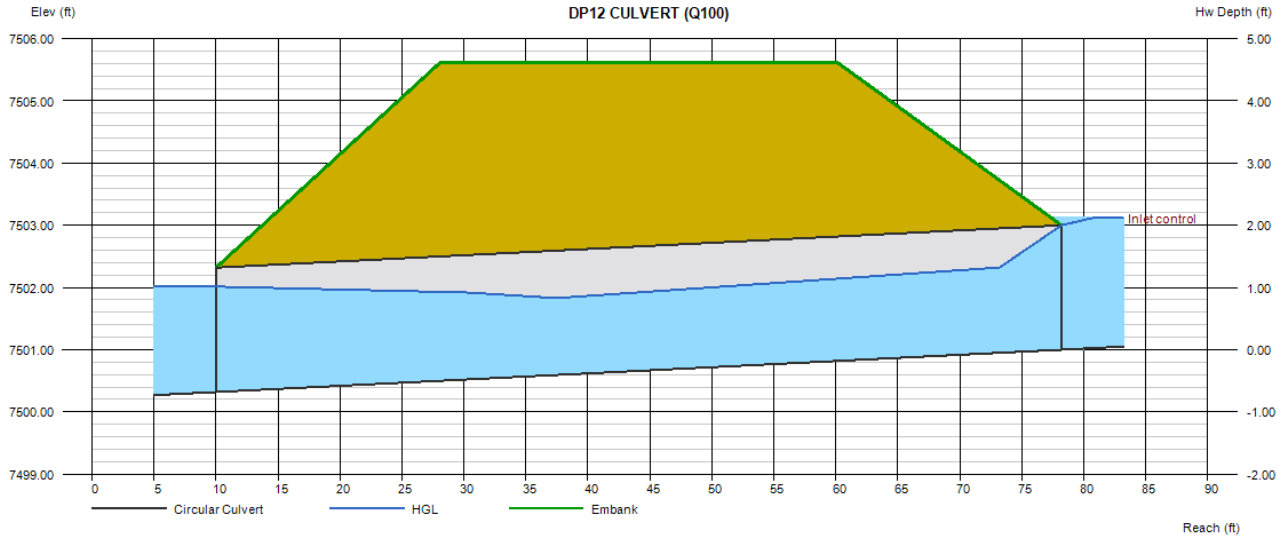
Top Elevation (ft)	=	7505.62
Top Width (ft)	=	32.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	14.90
Qmax (cfs)	=	14.90
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	14.90
Qpipe (cfs)	=	14.90
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.25
Veloc Up (ft/s)	=	6.39
HGL Dn (ft)	=	7502.02
HGL Up (ft)	=	7502.39
Hw Elev (ft)	=	7503.12
Hw/D (ft)	=	1.06
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Saturday, 00 30 2026

EX 72 INCH CMP CULVERT (DP15) WALKER ROAD

Invert Elev Dn (ft)	=	7429.42
Pipe Length (ft)	=	55.38
Slope (%)	=	1.6073253005743
Invert Elev Up (ft)	=	7430.31
Rise (in)	=	72.0
Shape	=	Circular
Span (in)	=	72.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

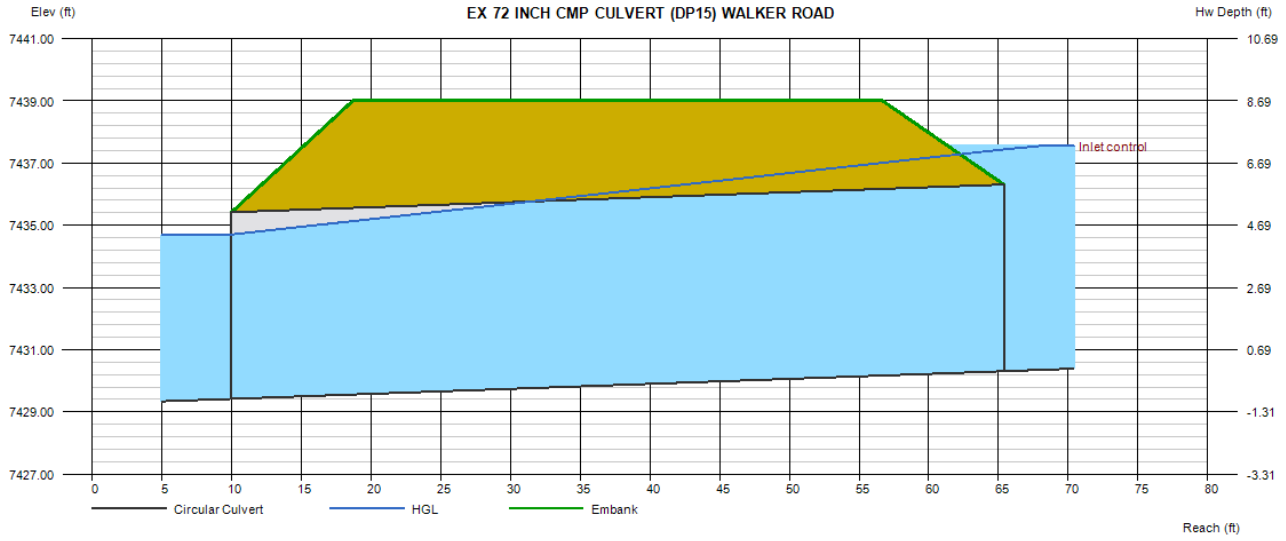
Top Elevation (ft)	=	7439.00
Top Width (ft)	=	38.00
Crest Width (ft)	=	100.00

Calculations

Qmin (cfs)	=	279.50
Qmax (cfs)	=	279.50
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	279.50
Qpipe (cfs)	=	279.50
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	10.60
Veloc Up (ft/s)	=	9.89
HGL Dn (ft)	=	7434.71
HGL Up (ft)	=	7437.44
Hw Elev (ft)	=	7437.55
Hw/D (ft)	=	1.21
Flow Regime	=	Inlet Control



PIPE OUTFALL RIPRAP SIZING CALCULATIONS

Subdivision: Iron Ridge Subdivision
Location: El Paso County

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: REB
Checked By:
Date: 5/15/26

	STORM DRAIN SYSTEM			
	DP2	**Basin D**	**DP4.1**	**Notes**
Q_{100} (cfs):	23.7	3.1	23.9	Flows are the greater of proposed vs. future
Conduit	Pipe	Pipe	Pipe	
D_c, Pipe Diameter (in):	30	18	24	
W, Box Width (ft):	N/A	N/A	N/A	
H, Box Height (ft):	N/A	N/A	N/A	
Y_t, Tailwater Depth (ft):	1.41	0.60	0.80	If unknown, use Y_t/D_c (or H)=0.4
Y_t/Dc or Y_t/H	0.56	0.40	0.40	***Use Low-tailwater basin for 4.1
$Q/D^{2.5}$ or $Q/(WH^{3/2})$	2.40	1.12	4.22	
Supercritical?	No	No	No	
Y_n, Normal Depth (ft) [Supercritical]:				
D_a, H_a (in) [Supercritical]:	N/A	N/A	N/A	$D_a=(D_c+Y_n)/2$
Riprap d_{50} (in) [Supercritical]:	N/A	N/A	N/A	
Riprap d_{50} (in) [Subcritical]:	3.29	1.40	7.00	
Required Riprap Size:	**L**	**L**	**L**	**Fig. 9-38 or Fig. 9-36**
d_{50} (in):	**9**	**9**	**9**	
Expansion Factor, $1/(2\tan\theta)$:	6.60	6.50	3.40	Read from Fig. 9-35 or 9-36
θ:	0.08	0.08	0.15	
Erosive Soils?	No	No	No	
Area of Flow, A_t (ft^2):	3.39	0.44	3.41	$A_t=Q/V$
Length of Protection, L_p (ft):	-0.7	-5.0	7.7	L=(1/(2 tan θ))(At/Yt - D)
Min Length (ft)	7.5	4.5	6.0	Min L=3D or 3H
Max Length (ft)	25.0	15.0	20.0	Max L=10D or 10H
Min Bottom Width, T (ft):	2.4	0.7	4.3	$T=2*(L_p*\tan\theta)+W$
Design Length (ft)	**7.5**	**4.5**	**8.0**	
Design Width (ft)	**2.4**	**0.7**	**4.3**	
Riprap Depth (in)	**18**	**18**	**18**	Depth=2(d_{50})
Type II Bedding Depth (in)*	6	6	6	*Not used if Soil Riprap
Cutoff Wall	No	No	No	
Cutoff Wall Depth (ft)				Depth of Riprap and Base
Cutoff Wall Width (ft)				

Note: No Type II Base to be used if Soil Riprap is specified within the plans

* For use when the flow in the culvert is supercritical (and less than full).

PIPE OUTFALL RIPRAP SIZING CALCULATIONS

Subdivision: Iron Ridge Subdivision
Location: El Paso County

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: REB
Checked By:
Date: 5/15/26

	STORM DRAIN SYSTEM			
	DP9	**Basin S**	**DP12**	**Notes**
Q_{100} (cfs):	7.7	2.2	14.9	Flows are the greater of proposed vs. future
Conduit	Pipe	Pipe	Pipe	
D_c, Pipe Diameter (in):	18	18	24	
W, Box Width (ft):	N/A	N/A	N/A	
H, Box Height (ft):	N/A	N/A	N/A	
Y_t, Tailwater Depth (ft):	0.60	0.60	0.87	If unknown, use Y_t/D_c (or H)=0.4
Y_t/Dc or Y_t/H	0.40	0.40	0.44	~~***Use Low-tailwater basin for 4.1~~
$Q/D^{2.5}$ or $Q/(WH^{3/2})$	2.79	0.80	2.63	
Supercritical?	No	No	No	
Y_n, Normal Depth (ft) [Supercritical]:				
D_a, H_a (in) [Supercritical]:	N/A	N/A	N/A	$D_a=(D_c+Y_n)/2$
Riprap d_{50} (in) [Supercritical]:	N/A	N/A	N/A	
Riprap d_{50} (in) [Subcritical]:	3.47	0.99	3.95	
Required Riprap Size:	**L**	**L**	**L**	**Fig. 9-38 or Fig. 9-36**
d_{50} (in):	**9**	**9**	**9**	
Expansion Factor, $1/(2\tan\theta)$:	5.00	6.60	5.00	Read from Fig. 9-35 or 9-36
θ:	0.10	0.08	0.10	
Erosive Soils?	No	No	No	
Area of Flow, A_t (ft^2):	1.10	0.31	2.13	$A_t=Q/V$
Length of Protection, L_p (ft):	1.7	-6.4	2.2	L=(1/(2 tan θ))(At/Yt - D)
Min Length (ft)	4.5	4.5	6.0	Min L=3D or 3H
Max Length (ft)	15.0	15.0	20.0	Max L=10D or 10H
Min Bottom Width, T (ft):	1.8	0.5	2.4	$T=2*(L_p*\tan\theta)+W$
Design Length (ft)	**4.5**	**4.5**	**6.0**	
Design Width (ft)	**1.8**	**0.5**	**2.4**	
Riprap Depth (in)	**18**	**18**	**18**	Depth=2(d_{50})
Type II Bedding Depth (in)*	6	6	6	*Not used if Soil Riprap
Cutoff Wall	No	No	No	
Cutoff Wall Depth (ft)				Depth of Riprap and Base
Cutoff Wall Width (ft)				

Note: No Type II Base to be used if Soil Riprap is specified within the plans

* For use when the flow in the culvert is supercritical (and less than full).

PIPE OUTFALL RIPRAP SIZING CALCULATIONS

Subdivision: Iron Ridge Subdivision
Location: El Paso County

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: REB
Checked By:
Date: 5/15/26

	STORM DRAIN SYSTEM			
	DP14.1			**Notes**
Q_{100} (cfs):	14.4			Flows are the greater of proposed vs. future
Conduit	Pipe	Pipe	Pipe	
D_c, Pipe Diameter (in):	24	18	24	
W, Box Width (ft):	N/A	N/A	N/A	
H, Box Height (ft):	N/A	N/A	N/A	
Y_t, Tailwater Depth (ft):	0.80			If unknown, use Y_t/D_c (or H)=0.4
Y_t/Dc or Y_t/H	0.40			***Use Low-tailwater basin for ~~4.1~~ 14.1
$Q/D^{2.5}$ or $Q/(WH^{3/2})$	2.55			
Supercritical?	No	No	No	
Y_n, Normal Depth (ft) [Supercritical]:				
D_a, H_a (in) [Supercritical]:	N/A			$D_a=(D_c+Y_n)/2$
Riprap d_{50} (in) [Supercritical]:	N/A			
Riprap d_{50} (in) [Subcritical]:	4.22			
Required Riprap Size:	**L**			**Fig. 9-38 or Fig. 9-36**
d_{50} (in):	**9**			
Expansion Factor, $1/(2\tan\theta)$:	4.90			Read from Fig. 9-35 or 9-36
θ:	0.10			
Erosive Soils?	No	No	No	
Area of Flow, A_t (ft^2):	2.06			$A_t=Q/V$
Length of Protection, L_p (ft):	2.8			L=(1/(2 tan θ))(At/Yt - D)
Min Length (ft)	6.0			Min L=3D or 3H
Max Length (ft)	20.0			Max L=10D or 10H
Min Bottom Width, T (ft):	2.6			$T=2*(L_p*\tan\theta)+W$
Design Length (ft)	**6.0**			
Design Width (ft)	**2.6**			
Riprap Depth (in)	**18**			Depth=2(d_{50})
Type II Bedding Depth (in)*	6			*Not used if Soil Riprap
Cutoff Wall	No	No	No	
Cutoff Wall Depth (ft)				Depth of Riprap and Base
Cutoff Wall Width (ft)				

Note: No Type II Base to be used if Soil Riprap is specified within the plans

* For use when the flow in the culvert is supercritical (and less than full).

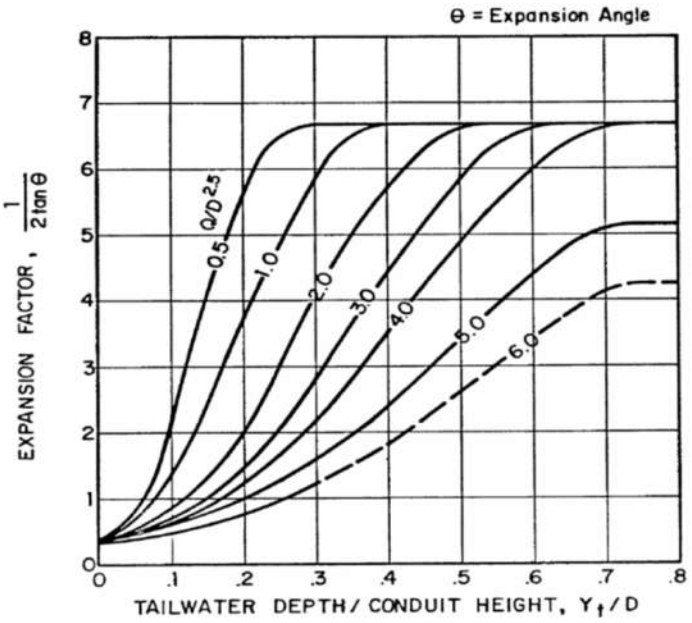


Figure 9-35. Expansion factor for circular conduits

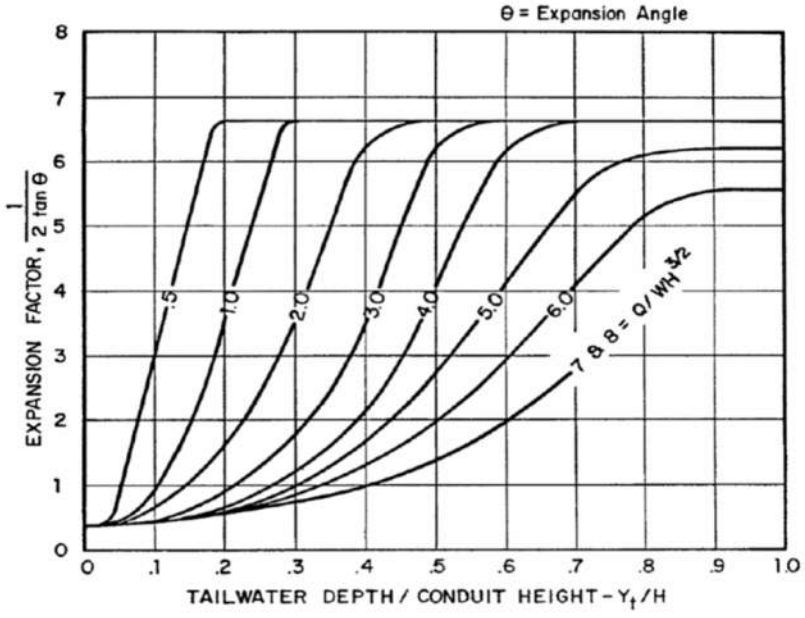


Figure 9-36. Expansion factor for rectangular conduits

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Saturday, 00 30 2026

DP15 - TRIBUTARY 1 Q100

User-defined

Invert Elev (ft)	= 7437.00
Slope (%)	= 1.60
N-Value	= 0.035

Calculations

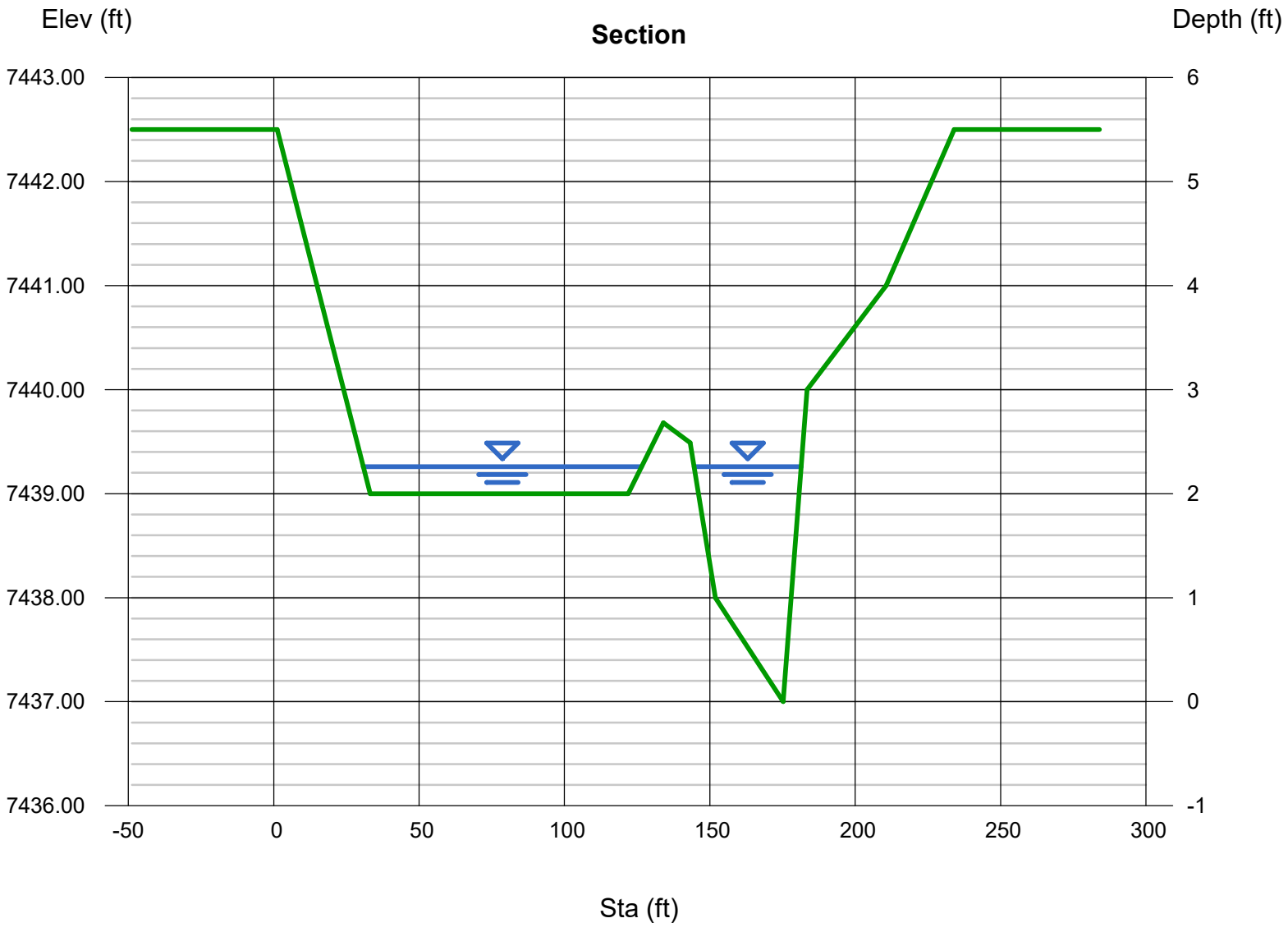
Compute by:	Known Q
Known Q (cfs)	= 279.50

Highlighted

Depth (ft)	= 2.26
Q (cfs)	= 279.50
Area (sqft)	= 76.63
Velocity (ft/s)	= 3.65
Wetted Perim (ft)	= 133.19
Crit Depth, Yc (ft)	= 2.20
Top Width (ft)	= 132.65
EGL (ft)	= 2.47

(Sta, El, n)-(Sta, El, n)...

(1.23, 7442.50)-(33.14, 7439.00, 0.035)-(121.92, 7439.00, 0.035)-(134.06, 7439.68, 0.035)-(143.24, 7439.49, 0.035)-(151.90, 7438.00, 0.035)-(175.19, 7437.00, 0.0
-(183.49, 7440.00, 0.035)-(210.68, 7441.00, 0.035)-(234.03, 7442.50, 0.035)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Saturday, 00 30 2026

DP1 - TRIBUTARY 2 Q100

User-defined

Invert Elev (ft)	= 7471.00
Slope (%)	= 3.50
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 28.50

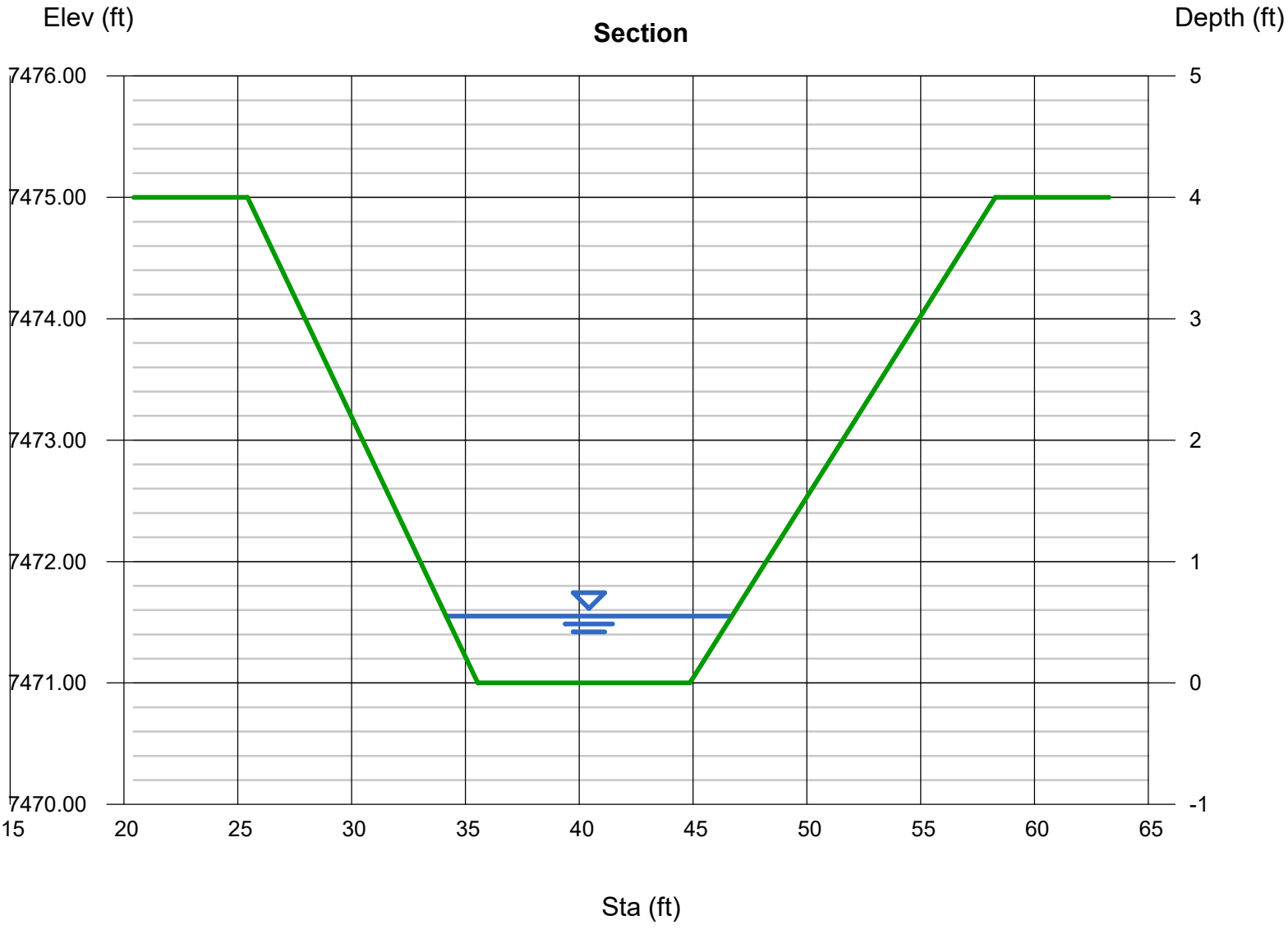
Highlighted

Depth (ft)	= 0.55
Q (cfs)	= 28.50
Area (sqft)	= 6.01
Velocity (ft/s)	= 4.74
Wetted Perim (ft)	= 12.74
Crit Depth, Yc (ft)	= 0.62
Top Width (ft)	= 12.55
EGL (ft)	= 0.90

(Sta, El, n)-(Sta, El, n)...

(25.43, 7475.00)-(35.54, 7471.00, 0.035)-(44.86, 7471.00, 0.035)-(58.28, 7475.00, 0.035)

The flow is currently supercritical (F > 1). According to DCM Vol. I, Sec. III, Ch. 10, §10.7, channels should be designed with a Froude number below 0.9 to reduce the risk of unstable flow. Please implement appropriate mitigation measures to maintain channel stability and prevent excessive erosion.



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Saturday, 00 30 2026

DP11 - TRIBUTARY 3 Q100

User-defined

Invert Elev (ft)	= 7458.80
Slope (%)	= 2.00
N-Value	= 0.035

Calculations

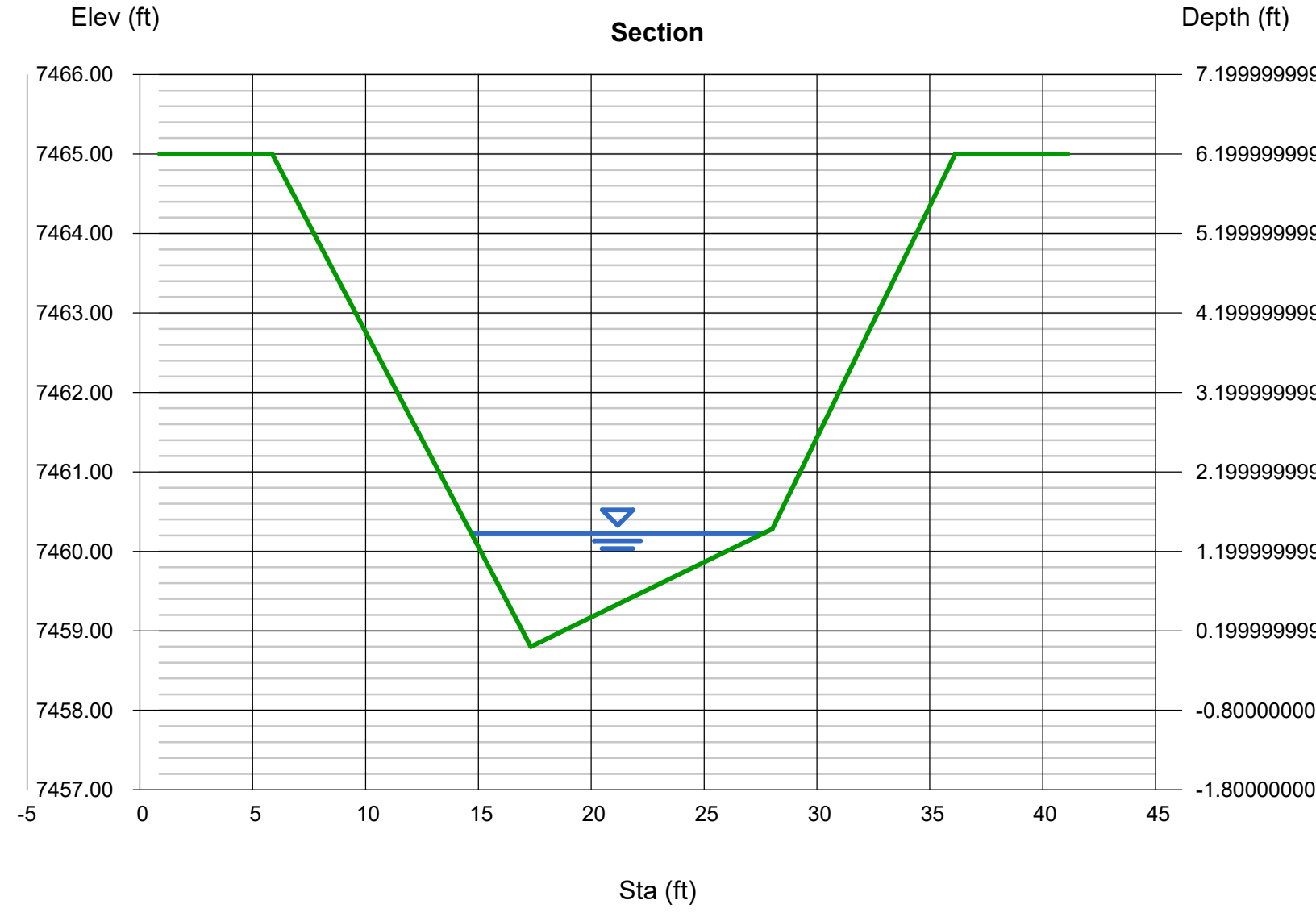
Compute by:	Known Q
Known Q (cfs)	= 43.30

Highlighted

Depth (ft)	= 1.43
Q (cfs)	= 43.30
Area (sqft)	= 9.28
Velocity (ft/s)	= 4.66
Wetted Perim (ft)	= 13.44
Crit Depth, Yc (ft)	= 1.42
Top Width (ft)	= 12.98
EGL (ft)	= 1.77

(Sta, El, n)-(Sta, El, n)...

(5.87, 7465.00)-(17.32, 7458.80, 0.035)-(28.02, 7460.28, 0.035)-(36.13, 7465.00, 0.035)



APPENDIX D – WATER QUALITY & DETENTION

Provide calculations for the trickle channel

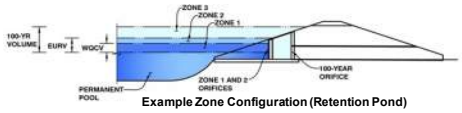
Per DCMv2 – Chap 4.2, trickle channel should at a minimum provide capacity equal to twice the release capacity at the upstream forebay outlet.

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Iron Ridge Subdivision

Basin ID: Pond 1



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	14.89	acres
Watershed Length =	1,200	ft
Watershed Length to Centroid =	415	ft
Watershed Slope =	0.060	ft/ft
Watershed Imperviousness =	1.80%	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) =	0.121	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.229	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.92 in.) =	0.123	acre-feet	0.92 inches
5-yr Runoff Volume (P1 = 1.2 in.) =	0.249	acre-feet	1.20 inches
10-yr Runoff Volume (P1 = 1.44 in.) =	0.439	acre-feet	1.44 inches
25-yr Runoff Volume (P1 = 1.82 in.) =	0.970	acre-feet	1.82 inches
50-yr Runoff Volume (P1 = 2.13 in.) =	1.323	acre-feet	2.13 inches
100-yr Runoff Volume (P1 = 2.47 in.) =	1.812	acre-feet	2.47 inches
500-yr Runoff Volume (P1 = 3.36 in.) =	2.900	acre-feet	3.36 inches
Approximate 2-yr Detention Volume =	0.119	acre-feet	
Approximate 5-yr Detention Volume =	0.185	acre-feet	
Approximate 10-yr Detention Volume =	0.332	acre-feet	
Approximate 25-yr Detention Volume =	0.474	acre-feet	
Approximate 50-yr Detention Volume =	0.520	acre-feet	
Approximate 100-yr Detention Volume =	0.675	acre-feet	

Define Zones and Basin Geometry

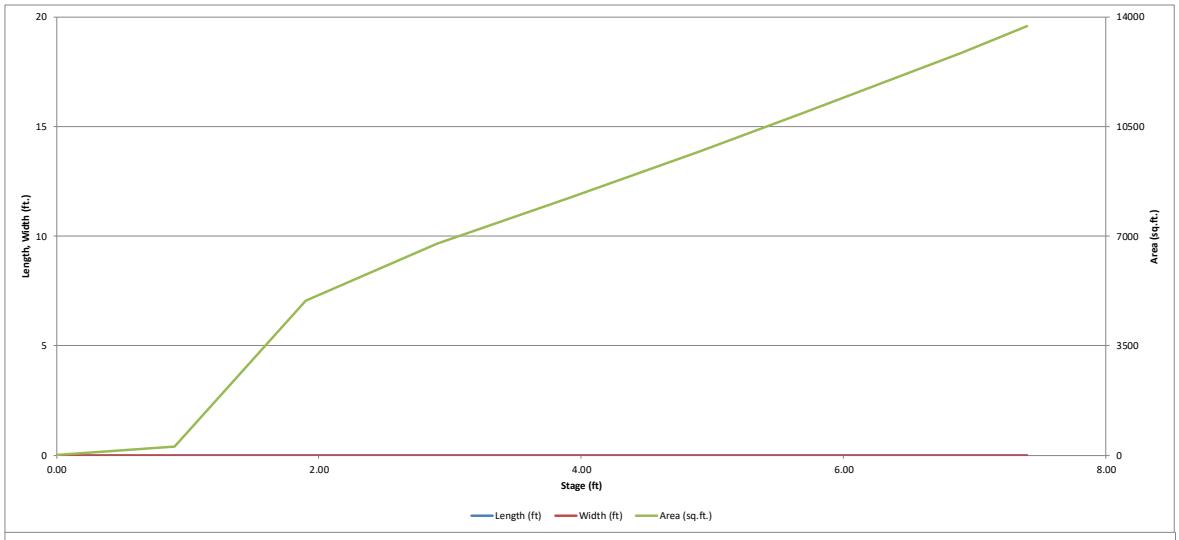
Zone 1 Volume (WQCV) =	0.121	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.109	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.445	acre-feet
Total Detention Basin Volume =	0.675	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (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

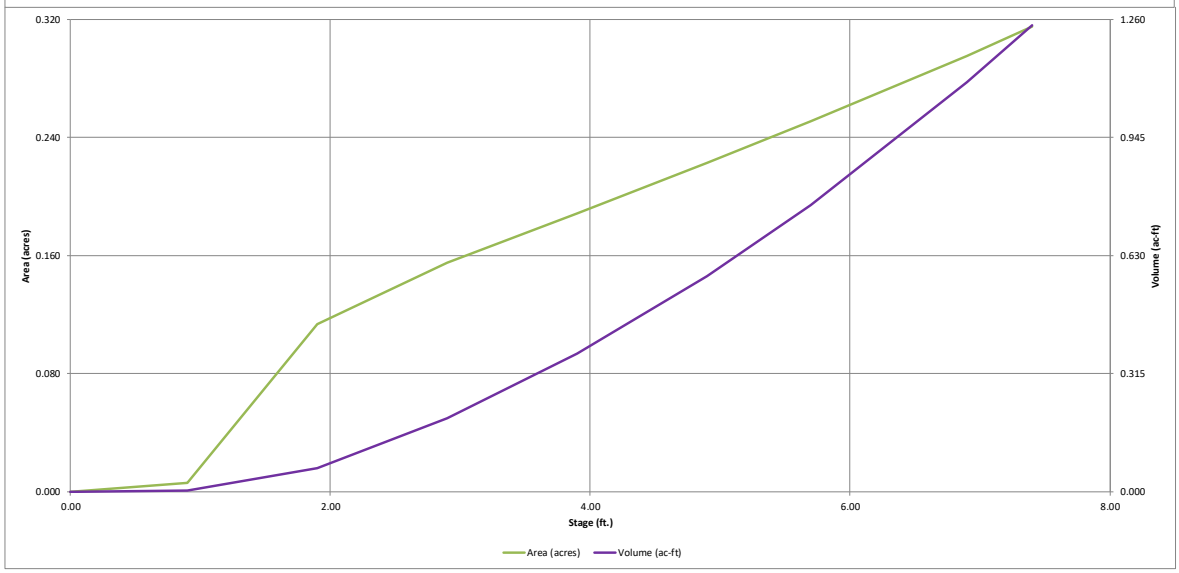
Depth Increment = ft

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)
7457.1 **Top of Micropool**	--	0.00	--	--	--	10	0.000		
7458	--	0.90	--	--	--	265	0.006	124	0.003
7459	--	1.90	--	--	--	4,943	0.113	2,728	0.063
7460	--	2.90	--	--	--	6,758	0.155	8,578	0.197
7461	--	3.90	--	--	--	8,210	0.188	16,062	0.369
7462	--	4.90	--	--	--	9,701	0.223	25,018	0.574
7462.8	--	5.70	--	--	--	10,940	0.251	33,274	0.764
7464	--	6.90	--	--	--	12,858	0.295	47,553	1.092
7464.5	--	7.40	--	--	--	13,728	0.315	54,199	1.244

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



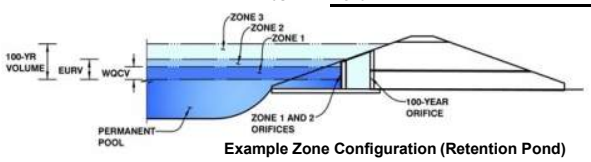


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Iron Ridge Subdivision**

Basin ID: **Pond 1**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.37	0.121	Orifice Plate
Zone 2 (EURV)	3.11	0.109	Circular Orifice
Zone 3 (100-year)	5.34	0.445	Weir&Pipe (Restrict)
Total (all zones)		0.675	

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 =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	2.60	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 =	N/A	sq. 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	1.60						
Orifice Area (sq. inches)	0.60	0.79						

	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)								

The vertical orifice section is intended for orifices off of the orifice plate. For clarity please input the values into the section above.

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	3.00	N/A	ft (relative to basin bot
Depth at top of Zone using Vertical Orifice =	3.07	N/A	ft (relative to basin bot
Vertical Orifice Diameter =	0.38	N/A	inches

Calculated Parameters for Vertical Orifice

	Zone 2 Circular	Not Selected	
a =	0.00	N/A	ft^2
d =	0.02	N/A	feet

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				
Overflow Weir Front Edge Height, Ho =	3.83	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.83	N/A	feet
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	5.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	6.74	N/A	
Horiz. Length of Weir Sides =	5.00	N/A	feet	Overflow Grate Open Area w/o Debris =	13.92	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	6.96	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

CDs show 2 ft

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

	Zone 3 Restrictor	Not Selected				
Depth to Invert of Outlet Pipe =	1.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	2.07	N/A	ft^2
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.71	N/A	feet
Restrictor Plate Height Above Pipe Invert =	15.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.82	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	5.70	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.63	feet
Spillway Crest Length =	16.00	feet	Stage at Top of Freeboard =	7.33	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.31	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	1.22	acre-ft

Calculated Parameters for Spillway

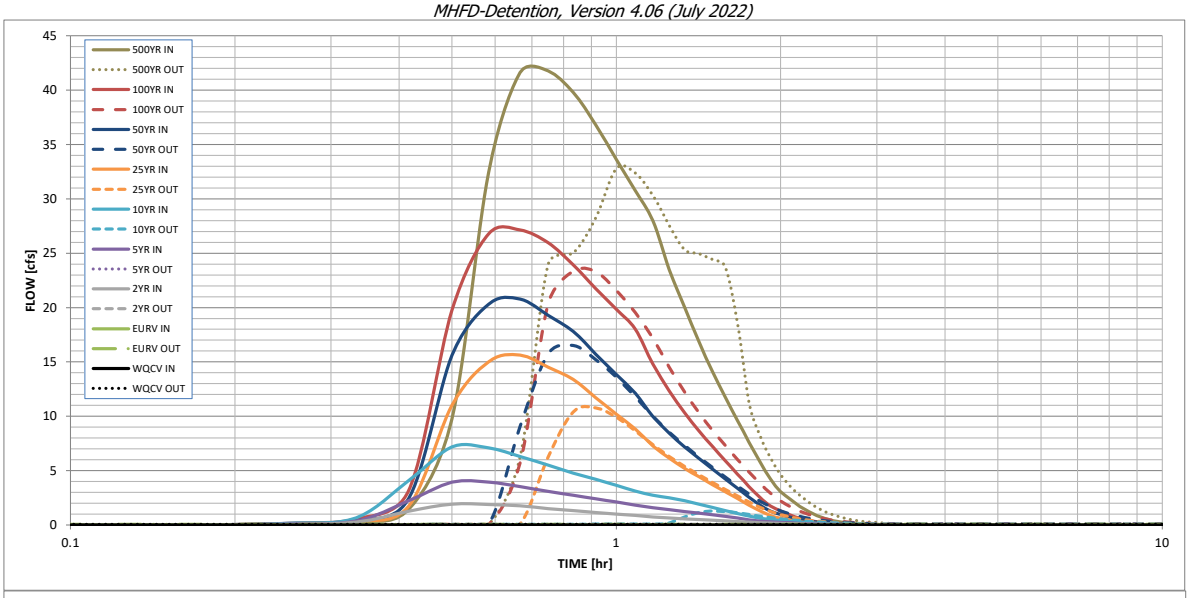
Routed Hydrograph Results

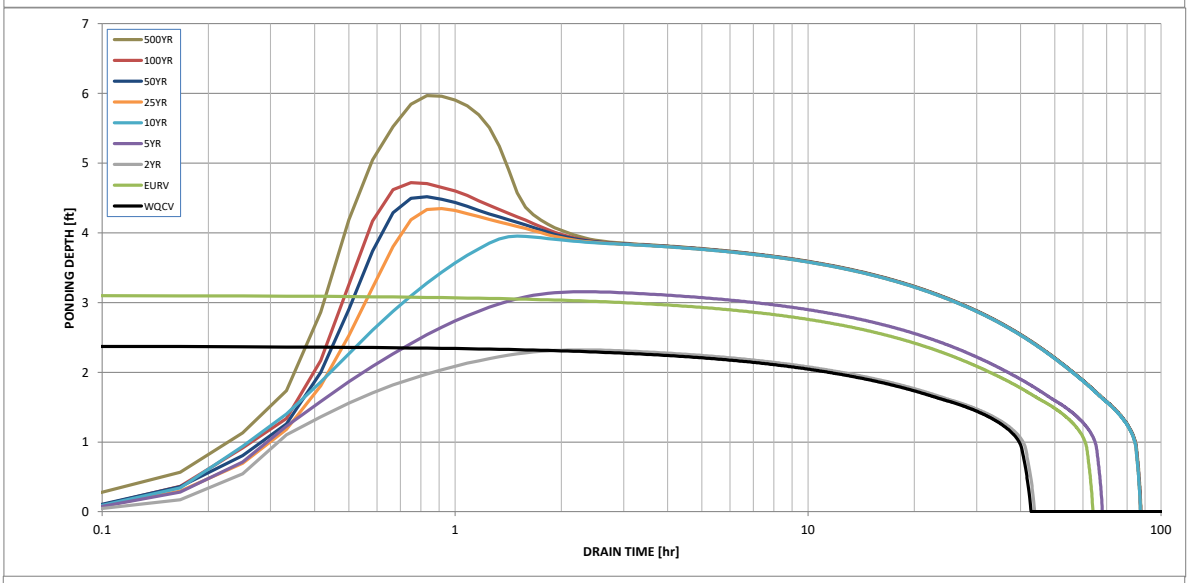
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

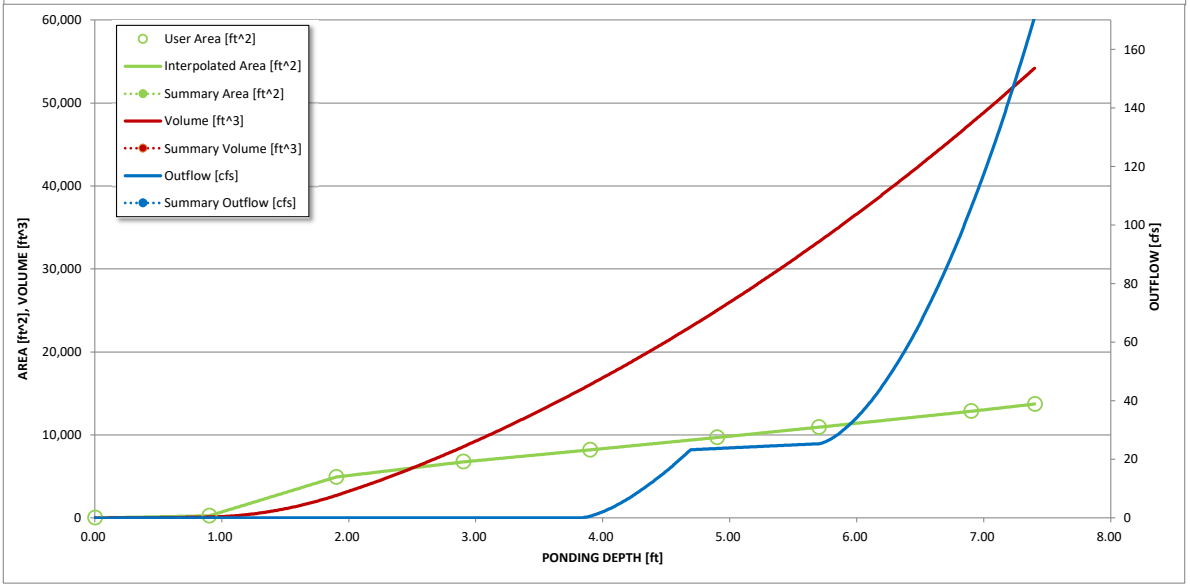
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.92	1.20	1.44	1.82	2.13	2.47	3.36
CUHP Runoff Volume (acre-ft) =	0.121	0.229	0.123	0.249	0.439	0.970	1.323	1.812	2.900
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.123	0.249	0.439	0.970	1.323	1.812	2.900
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.2	1.7	4.8	13.4	18.4	24.7	39.1
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.12	0.32	0.90	1.24	1.66	2.63
Peak Inflow Q (cfs) =	N/A	N/A	1.9	4.0	7.2	15.6	20.8	27.1	41.8
Peak Outflow Q (cfs) =	0.1	0.1	0.1	0.1	1.3	10.8	16.5	23.3	32.8
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.0	0.3	0.8	0.9	0.9	0.8
Structure Controlling Flow =	Plate	Vertical Orifice 1	Plate	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.1	0.8	1.2	1.7	1.9
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) =	40	59	41	63	79	71	67	62	53
Time to Drain 99% of Inflow Volume (hours) =	**42**	62	43	66	84	81	79	77	72
Maximum Ponding Depth (ft) =	2.38	3.11	2.32	3.15	3.95	4.34	4.51	4.72	5.97
Area at Maximum Ponding Depth (acres) =	0.13	0.16	0.13	0.16	0.19	0.20	0.21	0.22	0.26
Maximum Volume Stored (acre-ft) =	0.122	0.230	0.113	0.237	0.376	0.455	0.490	0.533	0.830

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	0.00	0.00	0.05
	0:15:00	0.00	0.00	0.05	0.10	0.14	0.11	0.16	0.16	0.27
	0:20:00	0.00	0.00	0.25	0.36	0.66	0.31	0.39	0.57	1.46
	0:25:00	0.00	0.00	1.27	2.23	4.08	1.74	2.44	3.17	9.74
	0:30:00	0.00	0.00	1.92	3.93	7.17	11.00	15.59	19.74	32.48
	0:35:00	0.00	0.00	1.89	3.95	7.08	15.02	20.32	26.80	41.62
	0:40:00	0.00	0.00	1.76	3.52	6.31	15.63	20.77	27.13	41.75
	0:45:00	0.00	0.00	1.51	3.08	5.51	14.51	19.28	25.97	39.80
	0:50:00	0.00	0.00	1.31	2.73	4.77	13.39	17.80	23.93	36.83
	0:55:00	0.00	0.00	1.15	2.41	4.20	11.71	15.73	21.75	33.62
	1:00:00	0.00	0.00	1.01	2.11	3.65	10.19	13.84	19.84	30.75
	1:05:00	0.00	0.00	0.87	1.82	3.13	8.84	12.12	18.02	28.00
	1:10:00	0.00	0.00	0.74	1.60	2.73	7.28	9.99	14.81	23.50
	1:15:00	0.00	0.00	0.64	1.42	2.49	6.14	8.46	12.34	20.05
	1:20:00	0.00	0.00	0.57	1.24	2.23	5.21	7.19	10.35	16.86
	1:25:00	0.00	0.00	0.50	1.08	1.91	4.44	6.13	8.66	14.12
	1:30:00	0.00	0.00	0.43	0.94	1.62	3.71	5.14	7.23	11.77
	1:35:00	0.00	0.00	0.37	0.79	1.34	3.06	4.23	5.91	9.62
	1:40:00	0.00	0.00	0.31	0.64	1.07	2.43	3.38	4.69	7.64
	1:45:00	0.00	0.00	0.25	0.49	0.82	1.84	2.57	3.55	5.79
	1:50:00	0.00	0.00	0.20	0.36	0.62	1.28	1.82	2.52	4.20
	1:55:00	0.00	0.00	0.17	0.29	0.49	0.86	1.27	1.75	3.06
	2:00:00	0.00	0.00	0.14	0.25	0.41	0.62	0.96	1.29	2.36
	2:05:00	0.00	0.00	0.12	0.20	0.33	0.44	0.69	0.91	1.72
	2:10:00	0.00	0.00	0.09	0.15	0.26	0.31	0.50	0.63	1.23
	2:15:00	0.00	0.00	0.07	0.12	0.20	0.22	0.36	0.43	0.86
	2:20:00	0.00	0.00	0.06	0.09	0.15	0.16	0.26	0.28	0.59
	2:25:00	0.00	0.00	0.05	0.07	0.12	0.12	0.19	0.18	0.39
	2:30:00	0.00	0.00	0.04	0.05	0.09	0.08	0.14	0.13	0.27
	2:35:00	0.00	0.00	0.03	0.04	0.06	0.06	0.10	0.09	0.20
	2:40:00	0.00	0.00	0.02	0.03	0.05	0.04	0.08	0.07	0.15
	2:45:00	0.00	0.00	0.02	0.02	0.04	0.03	0.06	0.06	0.12
	2:50:00	0.00	0.00	0.01	0.02	0.03	0.02	0.04	0.04	0.09
	2:55:00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.07
	3:00:00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.05
	3:05:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.03
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	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
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	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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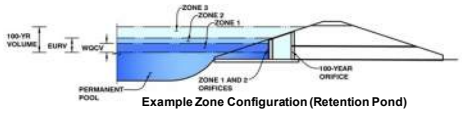
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: IRON RIDGE SUBDIVISION

Basin ID: POND 2



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	9.48	acres
Watershed Length =	1,093	ft
Watershed Length to Centroid =	250	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	17.5%	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) =	0.082	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.161	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.92 in.) =	0.087	acre-feet	0.92 inches
5-yr Runoff Volume (P1 = 1.2 in.) =	0.170	acre-feet	1.20 inches
10-yr Runoff Volume (P1 = 1.44 in.) =	0.293	acre-feet	1.44 inches
25-yr Runoff Volume (P1 = 1.82 in.) =	0.628	acre-feet	1.82 inches
50-yr Runoff Volume (P1 = 2.13 in.) =	0.853	acre-feet	2.13 inches
100-yr Runoff Volume (P1 = 2.47 in.) =	1.162	acre-feet	2.47 inches
500-yr Runoff Volume (P1 = 3.36 in.) =	1.852	acre-feet	3.36 inches
Approximate 2-yr Detention Volume =	0.084	acre-feet	
Approximate 5-yr Detention Volume =	0.130	acre-feet	
Approximate 10-yr Detention Volume =	0.227	acre-feet	
Approximate 25-yr Detention Volume =	0.318	acre-feet	
Approximate 50-yr Detention Volume =	0.350	acre-feet	
Approximate 100-yr Detention Volume =	0.450	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.082	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.079	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.289	acre-feet
Total Detention Basin Volume =	0.450	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	

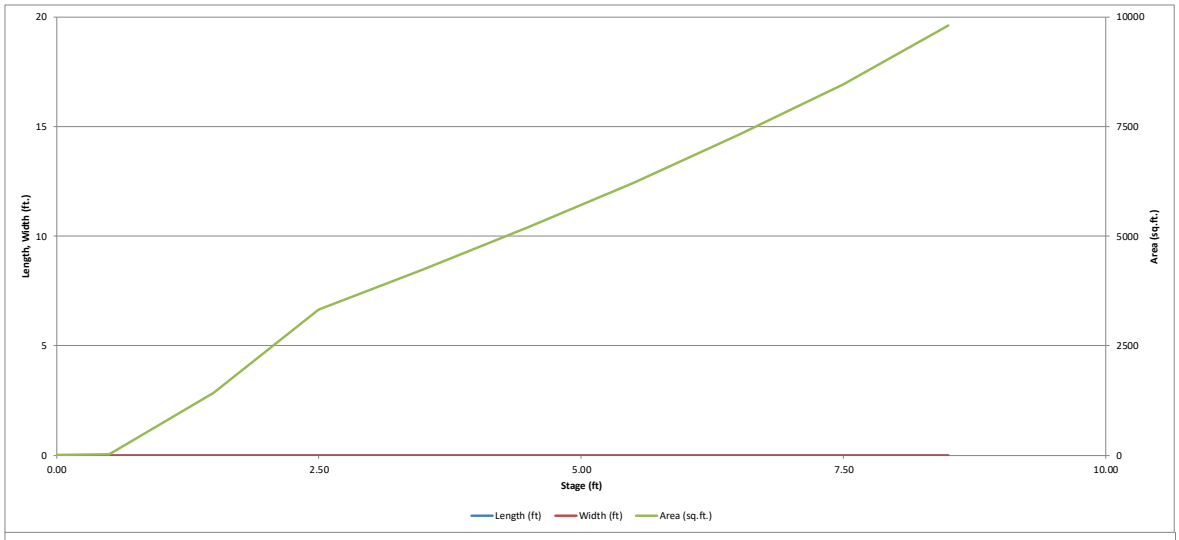
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	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

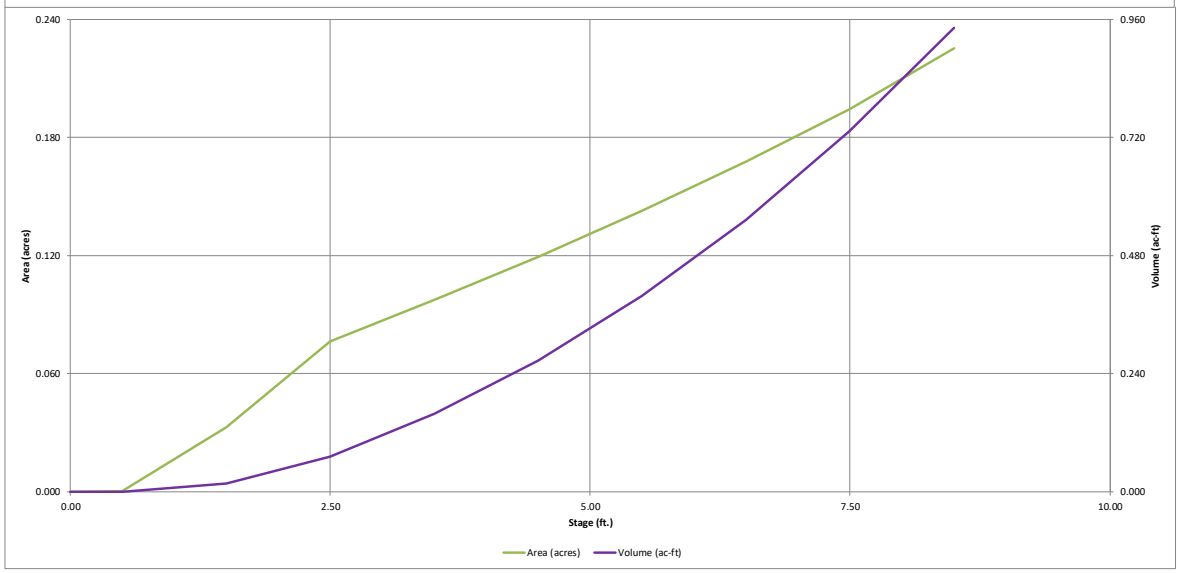
Depth Increment = ft

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)
7485.5 **Top of Micropool**	--	0.00	--	--	--	10	0.000		
7486	--	0.50	--	--	--	15	0.000	6	0.000
7487	--	1.50	--	--	--	1,422	0.033	725	0.017
7488	--	2.50	--	--	--	3,325	0.076	3,098	0.071
7489	--	3.50	--	--	--	4,245	0.097	6,883	0.158
7490	--	4.50	--	--	--	5,202	0.119	11,607	0.266
7491	--	5.50	--	--	--	6,219	0.143	17,317	0.398
7492	--	6.50	--	--	--	7,304	0.168	24,079	0.553
7493	--	7.50	--	--	--	8,469	0.194	31,965	0.734
7494	--	8.50	--	--	--	9,814	0.225	41,107	0.944

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



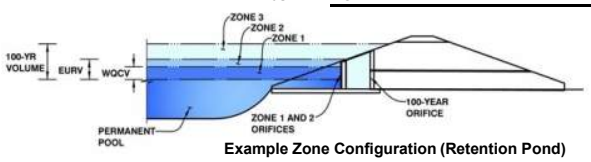


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: IRON RIDGE SUBDIVISION

Basin ID: POND 2



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.65	0.082	Orifice Plate
Zone 2 (EURV)	3.54	0.079	Circular Orifice
Zone 3 (100-year)	5.86	0.289	Weir&Pipe (Restrict)
Total (all zones)		0.450	

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 =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	2.65	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 =	N/A	sq. 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						
Orifice Area (sq. inches)	0.44	0.44						

	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)								

The vertical orifice section is intended for orifices off of the orifice plate. For clarity please input the values into the section above.

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Circular	Not Selected			Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	2.65	N/A	ft (relative to basin bot	a =	0.00	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	3.54	N/A	ft (relative to basin bot	d =	0.02	N/A	feet
Vertical Orifice Diameter =	0.38	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 =	3.75	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.75	N/A	feet
Overflow Weir Front Edge Length =	3.00	N/A	feet	Overflow Weir Slope Length =	3.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	5.06	N/A	
Horiz. Length of Weir Sides =	3.00	N/A	feet	Overflow Grate Open Area w/o Debris =	6.26	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	3.13	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 =	1.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	1.24	N/A	ft^2
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.48	N/A	feet
Restrictor Plate Height Above Pipe Invert =	10.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.40	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.75	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.62	feet
Spillway Crest Length =	10.00	feet	Stage at Top of Freeboard =	8.37	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.22	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	0.91	acre-ft

Calculated Parameters for Spillway

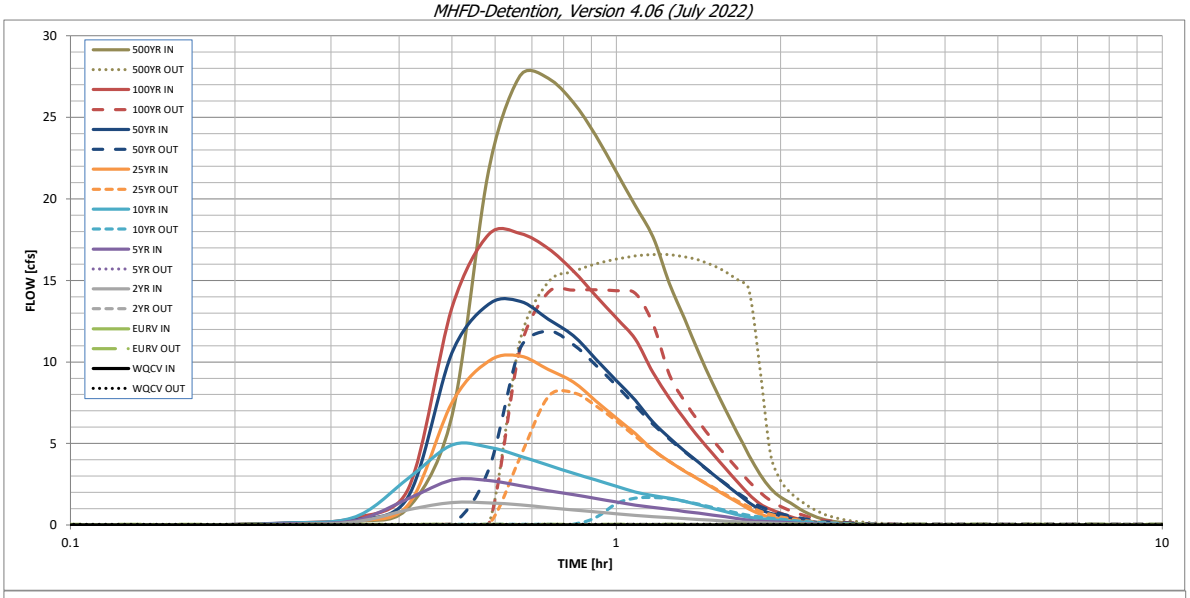
Routed Hydrograph Results

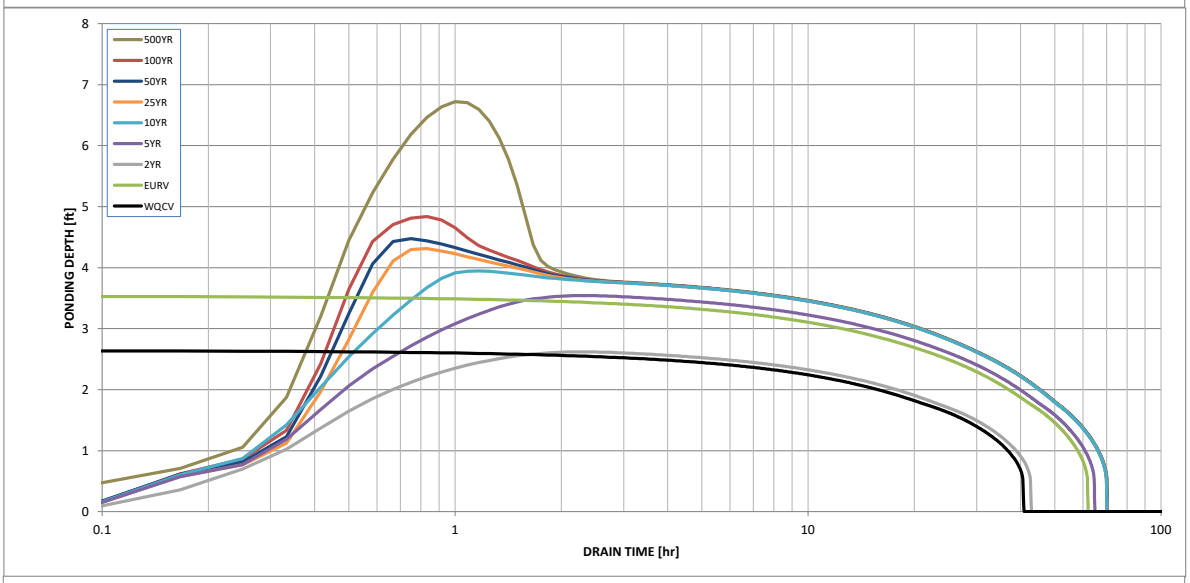
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

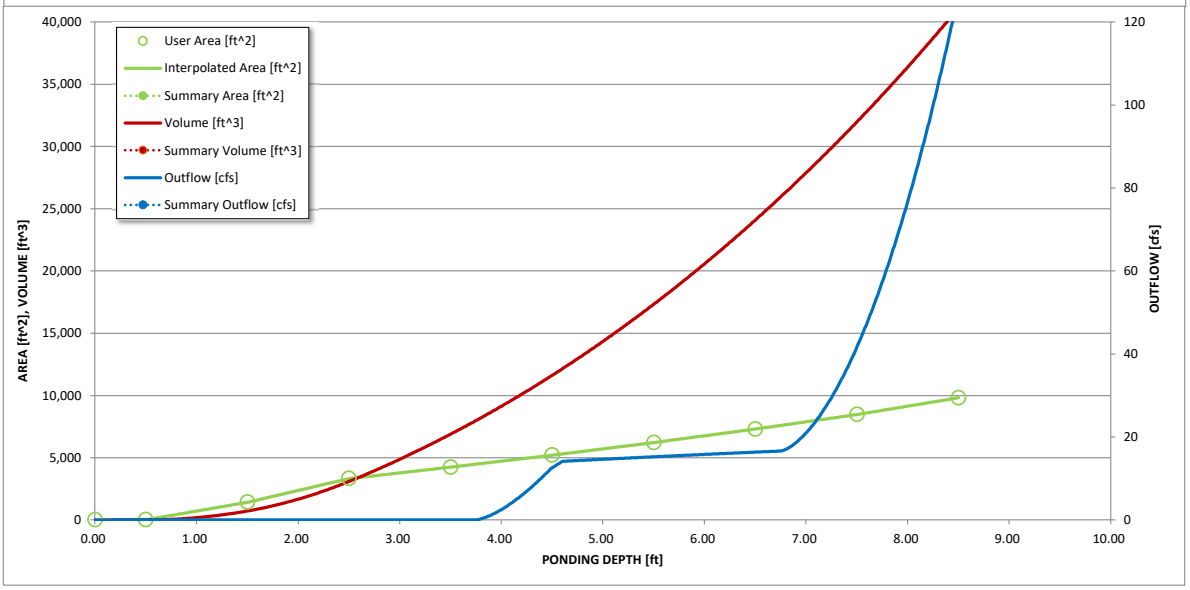
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.92	1.20	1.44	1.82	2.13	2.47	3.36
CUHP Runoff Volume (acre-ft) =	0.082	0.161	0.087	0.170	0.293	0.628	0.853	1.162	1.852
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.087	0.170	0.293	0.628	0.853	1.162	1.852
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.1	1.1	3.1	8.6	11.9	15.9	25.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.12	0.33	0.91	1.25	1.68	2.66
Peak Inflow Q (cfs) =	N/A	N/A	1.4	2.8	4.9	10.4	13.7	17.9	27.6
Peak Outflow Q (cfs) =	0.0	0.1	0.0	0.1	1.7	8.1	11.9	14.4	16.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.0	0.5	0.9	1.0	0.9	0.7
Structure Controlling Flow =	Plate	Vertical Orifice 1	Plate	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.3	1.3	1.9	2.3	2.6
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	58	40	60	63	56	52	47	39
Time to Drain 99% of Inflow Volume (hours) =	**40**	61	42	63	67	65	63	61	56
Maximum Ponding Depth (ft) =	2.64	3.54	2.62	3.54	3.94	4.31	4.47	4.83	6.72
Area at Maximum Ponding Depth (acres) =	0.08	0.10	0.08	0.10	0.11	0.12	0.12	0.13	0.17
Maximum Volume Stored (acre-ft) =	0.082	0.162	0.080	0.161	0.203	0.243	0.263	0.307	0.589

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	0.00	0.00	0.04
	0:15:00	0.00	0.00	0.04	0.08	0.11	0.09	0.13	0.13	0.22
	0:20:00	0.00	0.00	0.20	0.29	0.52	0.25	0.31	0.46	1.09
	0:25:00	0.00	0.00	0.94	1.63	2.89	1.29	1.79	2.29	6.68
	0:30:00	0.00	0.00	1.39	2.76	4.91	7.50	10.57	13.33	21.77
	0:35:00	0.00	0.00	1.35	2.74	4.78	10.06	13.54	17.81	27.55
	0:40:00	0.00	0.00	1.25	2.42	4.23	10.37	13.73	17.88	27.40
	0:45:00	0.00	0.00	1.07	2.11	3.68	9.53	12.62	16.96	25.92
	0:50:00	0.00	0.00	0.92	1.87	3.18	8.78	11.63	15.59	23.90
	0:55:00	0.00	0.00	0.81	1.64	2.76	7.62	10.19	14.06	21.64
	1:00:00	0.00	0.00	0.70	1.41	2.37	6.56	8.86	12.70	19.58
	1:05:00	0.00	0.00	0.60	1.21	2.03	5.61	7.66	11.41	17.68
	1:10:00	0.00	0.00	0.51	1.08	1.80	4.62	6.32	9.35	14.83
	1:15:00	0.00	0.00	0.45	0.96	1.65	3.91	5.37	7.80	12.65
	1:20:00	0.00	0.00	0.39	0.84	1.46	3.31	4.54	6.49	10.54
	1:25:00	0.00	0.00	0.34	0.72	1.24	2.79	3.83	5.37	8.71
	1:30:00	0.00	0.00	0.29	0.61	1.03	2.29	3.15	4.39	7.11
	1:35:00	0.00	0.00	0.24	0.51	0.82	1.83	2.52	3.49	5.64
	1:40:00	0.00	0.00	0.20	0.39	0.64	1.39	1.93	2.65	4.29
	1:45:00	0.00	0.00	0.16	0.29	0.48	0.99	1.38	1.88	3.10
	1:50:00	0.00	0.00	0.14	0.23	0.39	0.66	0.96	1.30	2.24
	1:55:00	0.00	0.00	0.12	0.20	0.33	0.48	0.72	0.96	1.71
	2:00:00	0.00	0.00	0.10	0.18	0.28	0.37	0.57	0.73	1.36
	2:05:00	0.00	0.00	0.08	0.14	0.23	0.27	0.42	0.52	0.98
	2:10:00	0.00	0.00	0.07	0.11	0.18	0.19	0.31	0.36	0.70
	2:15:00	0.00	0.00	0.05	0.08	0.14	0.14	0.23	0.24	0.48
	2:20:00	0.00	0.00	0.04	0.06	0.10	0.10	0.16	0.16	0.33
	2:25:00	0.00	0.00	0.03	0.05	0.08	0.07	0.12	0.11	0.23
	2:30:00	0.00	0.00	0.02	0.04	0.06	0.05	0.09	0.08	0.17
	2:35:00	0.00	0.00	0.02	0.03	0.04	0.04	0.07	0.06	0.12
	2:40:00	0.00	0.00	0.01	0.02	0.03	0.03	0.05	0.05	0.09
	2:45:00	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.04	0.07
	2:50:00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.05
	2:55:00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.04
	3:00:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	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

POND 1 - FOREBAY SIZING

$w = 9.23\ (A_{FB} / t)\ (1 / \sqrt{h_{max}})$ **Equation 4-1**

Where:

w = width of the rectangular vertical notch (inches)

A_{FB} = surface area of the forebay (square feet)

t = emptying time of the brim-full forebay (seconds)

h_{max} = maximum depth of the forebay (feet)

TABLE 4-12. FOREBAY SIZING CRITERIA

FOREBAY SIZING CRITERIA	WATERSHED IMPERVIOUS AREA (IA)				
	IA UP TO 2 ACRES	IA 2 UP TO 5 ACRES	IA 5 UP TO 10 ACRES	IA 10 UP TO 20 ACRES	IA GREATER THAN 20 ACRES
Forebay Release Rate and Configuration	Concrete sediment pad with dense grasses surrounding, concrete pad with slotted metal edge, or similar design	Size to drain in 4 to 5 minutes using Equation 4-1			
Minimum Forebay Volume [1]		1% of WQCV			
Forebay Depth [1]		12 to 15 inches	15 to 18 inches	18 to 24 inches	24 to 30 inches

[1] Appropriate volume and depth should consider maintenance and access needs. The values provided are approximate and provide a starting point for design.

IA = 15.8% * 14.89 acres = 2.35 IA's
Design Depth = 15"

Minimum Volume = 1% of WQCV = 1% *
0.121 ac-ft * 43,560 = 52.7 CF

Provided Volume ~ 125 CF ✓

A_{fb} = 214 sf
t = 300 s
h_{max} = 1.25
w = 9.23 * (214/300)*(1/sqrt(1.25)) =
5.89" FOR A 5 MINUTE DRAIN TIME,
USE 6" ✓

Afb = 214 sf
t = 240 s
hmax = 1.25
w = 9.23 * (214/240)*(1/sqrt(1.25)) =
7.36" FOR A 4 MINUTE DRAIN TIME
USE 6" ✓

POND 2 - FOREBAY SIZING

$w = 9.23\ (A_{FB} / t)\ (1 / \sqrt{h_{max}})$ **Equation 4-1**

Where:

w = width of the rectangular vertical notch (inches)

A_{FB} = surface area of the forebay (square feet)

t = emptying time of the brim-full forebay (seconds)

h_{max} = maximum depth of the forebay (feet)

TABLE 4-12. FOREBAY SIZING CRITERIA

FOREBAY SIZING CRITERIA	WATERSHED IMPERVIOUS AREA (IA)				
	IA UP TO 2 ACRES	IA 2 UP TO 5 ACRES	IA 5 UP TO 10 ACRES	IA 10 UP TO 20 ACRES	IA GREATER THAN 20 ACRES
Forebay Release Rate and Configuration	Concrete sediment pad with dense grasses surrounding, concrete pad with slotted metal edge, or similar design	Size to drain in 4 to 5 minutes using Equation 4-1			
Minimum Forebay Volume [1]		1% of WQCV			
Forebay Depth [1]		12 to 15 inches	15 to 18 inches	18 to 24 inches	24 to 30 inches

[1] Appropriate volume and depth should consider maintenance and access needs. The values provided are approximate and provide a starting point for design.

IA = 17.3% * 9.48 acres = 1.64 IA's
Design Depth = 12"

Minimum Volume = 1% of WQCV = 1% *
0.082 ac-ft * 43,560 = 52.7 CF

Provided Volume ~ 60 CF ✓

A_{fb} = 101 sf
t = 300 s
h_{max} = 1.0
w = 9.23 * (101/300)*(1/sqrt(1.0)) = 3.1"
FOR A 5 MINUTE DRAIN TIME, USE
3.5" ✓

Afb = 101 sf
t = 240 s
hmax = 1.0
w = 9.23 * (101/240)*(1/sqrt(1.0)) = 3.9"
FOR A 4 MINUTE DRAIN TIME USE
3.5" ✓

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, 00 28 2026

DP4.1 - POND 1 OUTLET (Q100)

Circular

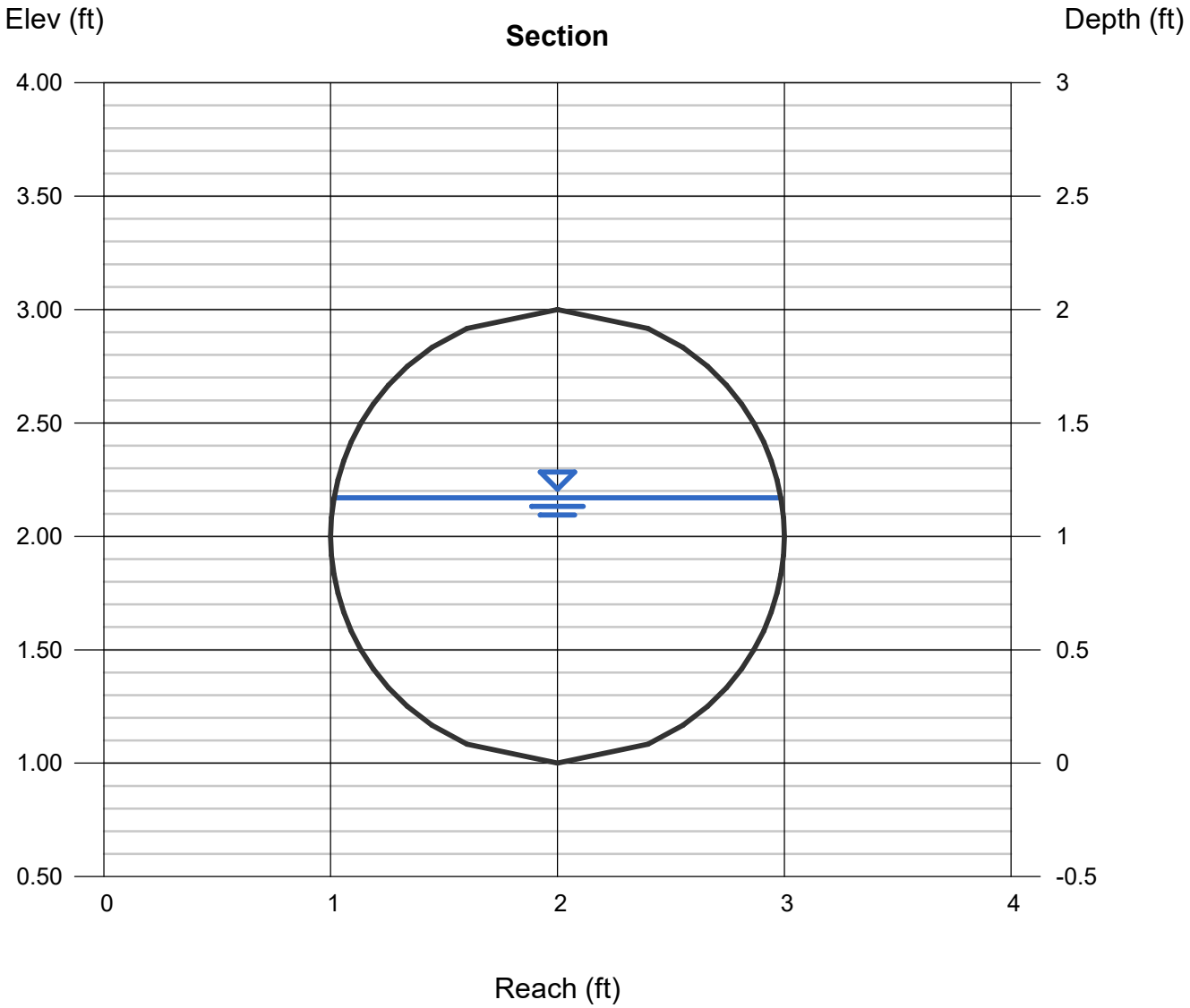
Diameter (ft)	= 2.00
Invert Elev (ft)	= 1.00
Slope (%)	= 2.69
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 23.90

Highlighted

Depth (ft)	= 1.17
Q (cfs)	= 23.90
Area (sqft)	= 1.92
Velocity (ft/s)	= 12.48
Wetted Perim (ft)	= 3.49
Crit Depth, Yc (ft)	= 1.74
Top Width (ft)	= 1.97
EGL (ft)	= 3.59



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, 00 19 2026

DP14.1 - POND 2 OUTFALL PIPE (Q100)

Circular

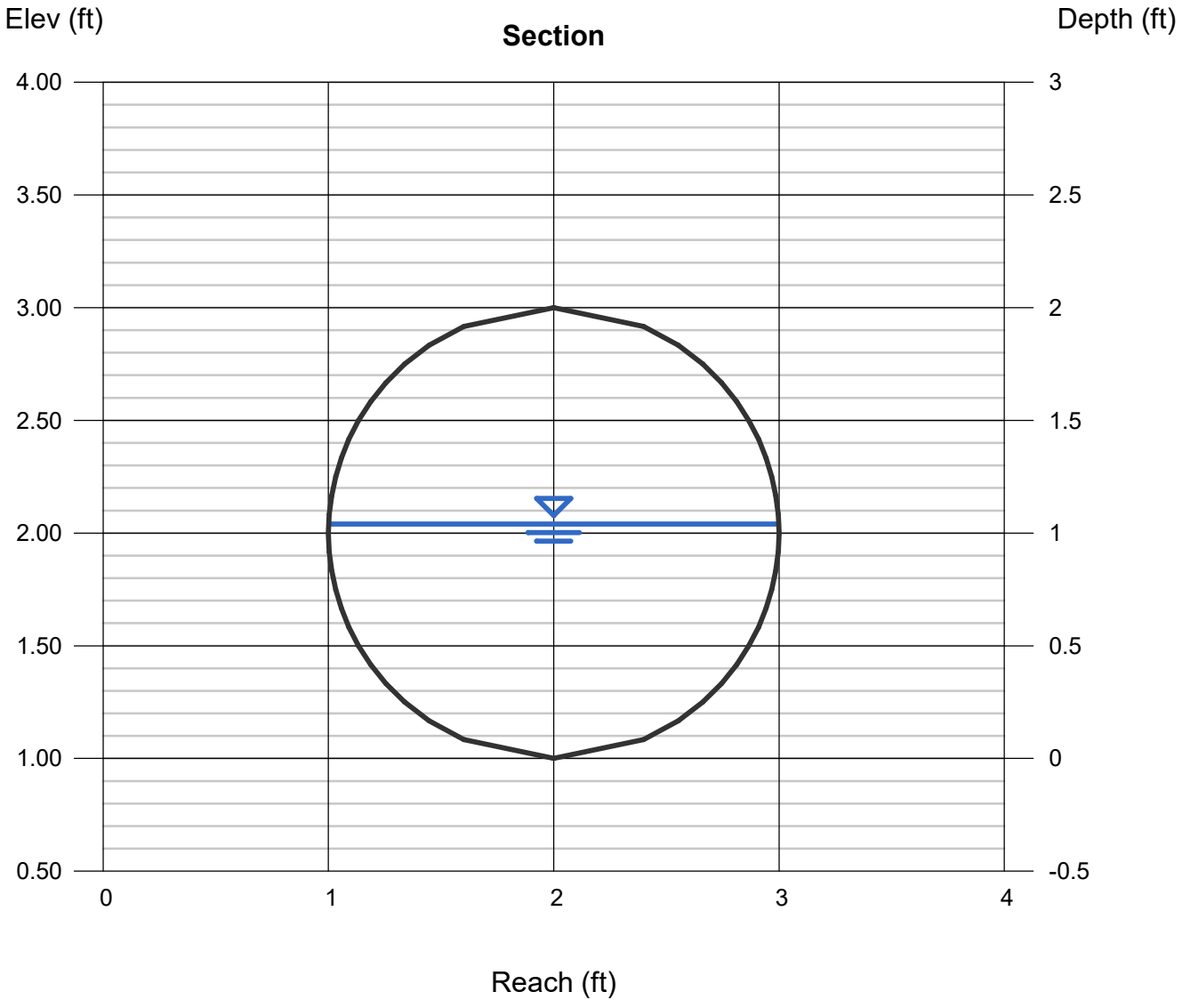
Diameter (ft)	= 2.00
Invert Elev (ft)	= 1.00
Slope (%)	= 1.40
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 14.30

Highlighted

Depth (ft)	= 1.04
Q (cfs)	= 14.30
Area (sqft)	= 1.66
Velocity (ft/s)	= 8.62
Wetted Perim (ft)	= 3.23
Crit Depth, Yc (ft)	= 1.37
Top Width (ft)	= 2.00
EGL (ft)	= 2.19



POND 2

Figure 13-12c. Emergency Spillway Protection

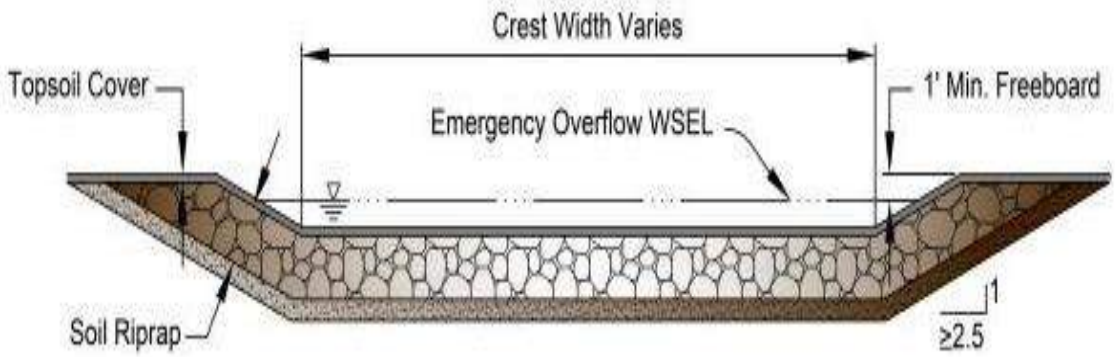
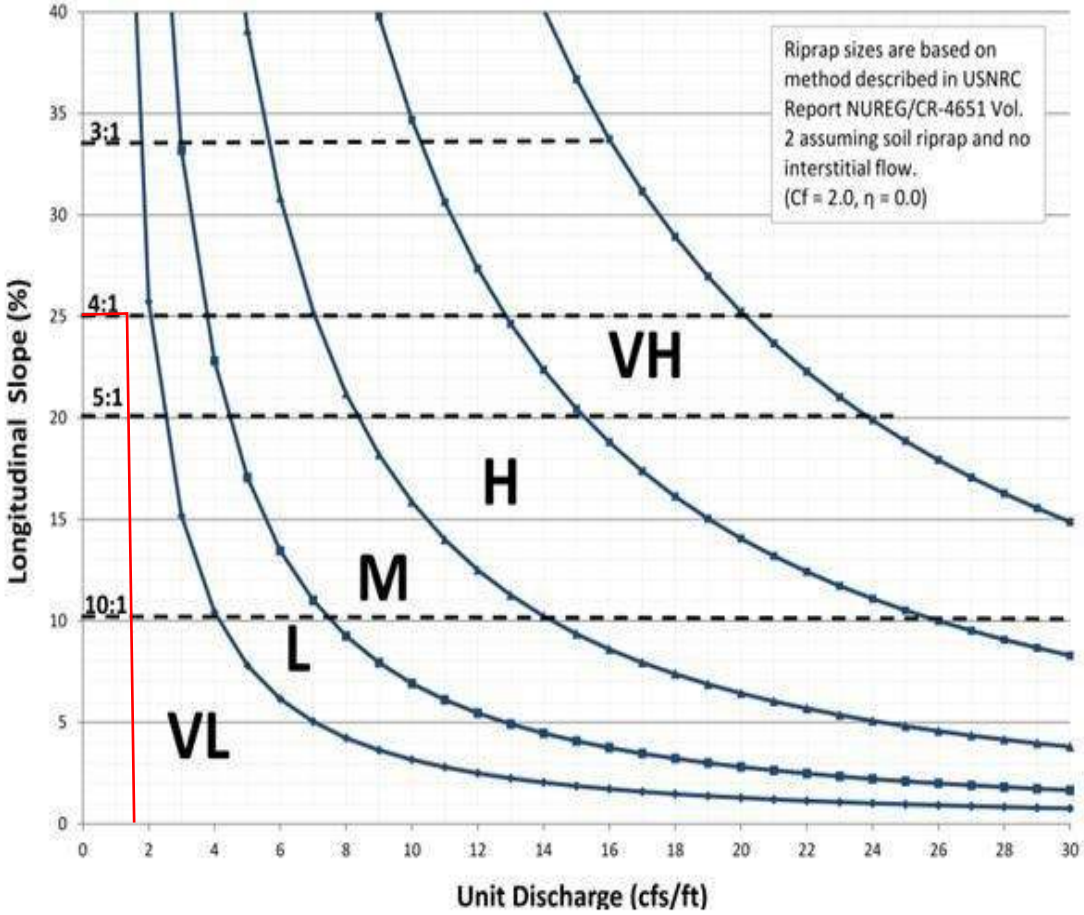


Figure 13-12d. Riprap Types for Emergency Spillway Protection



POND 1

Figure 13-12c. Emergency Spillway Protection

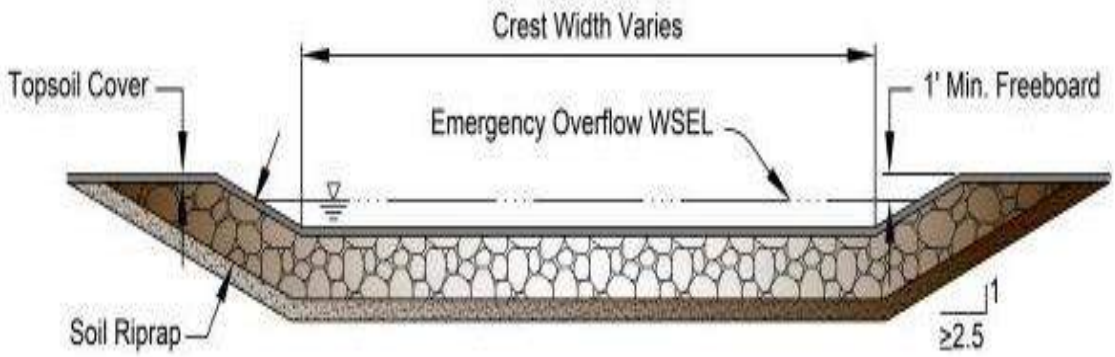
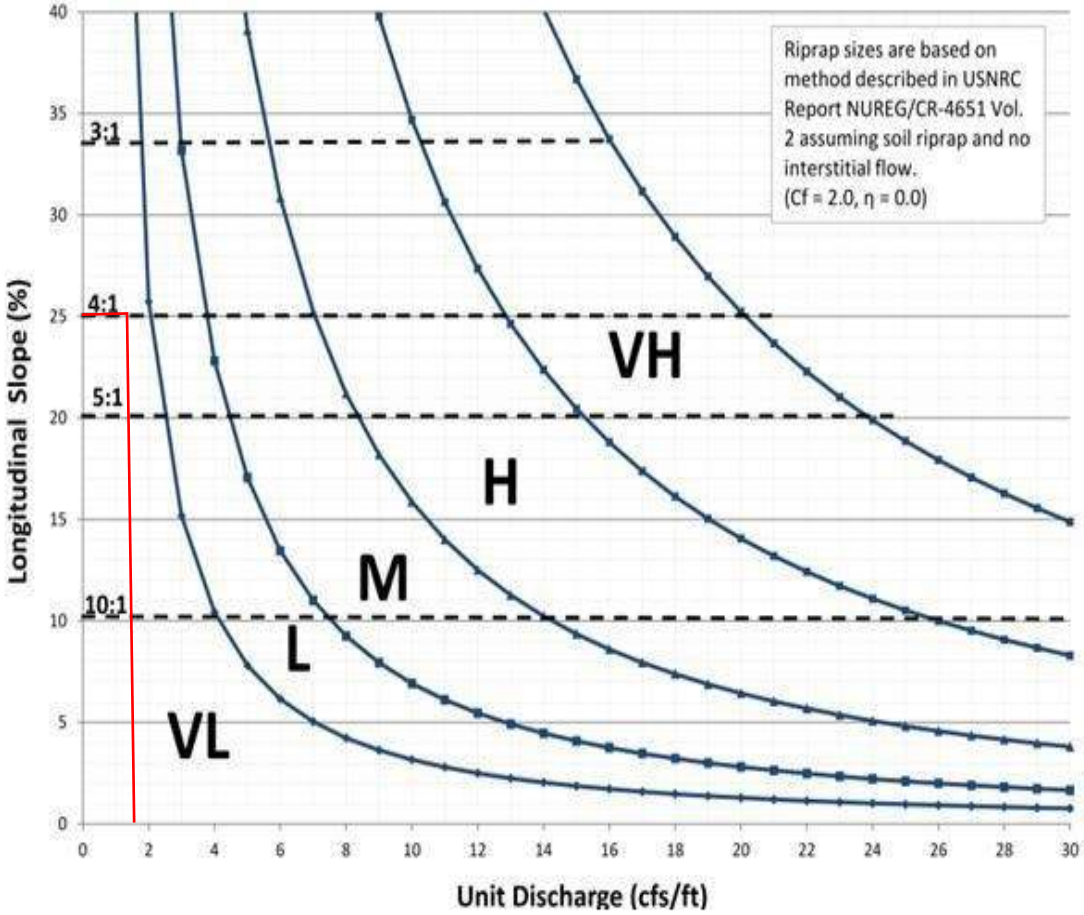
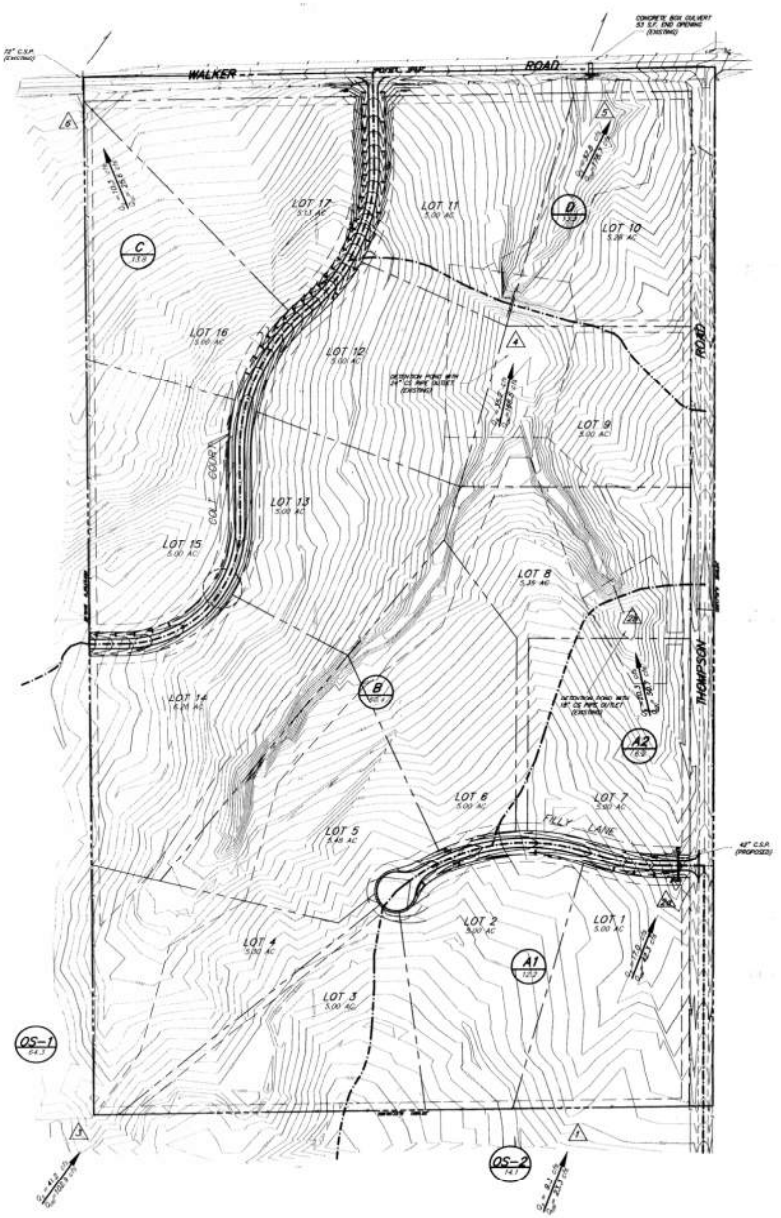


Figure 13-12d. Riprap Types for Emergency Spillway Protection



APPENDIX E – REFERENCE MATERIAL



TYPICAL ROAD SECTION

VICINITY MAP

LEGEND

- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- DRAINAGE BASIN BOUNDARY LINE
- DRAINAGE BASIN DESIGNATION / DRAINAGE BASIN AREA
- 18" CSP — PROPOSED CULVERT PIPE
- DESIGN POINT DESIGNATION
- FLOW DIRECTION ARROW
- $Q_5 = 10.8$ cfs, $Q_{100} = 21.9$ cfs — FLOW DIRECTION AND QUANTITIES

NORTH

NOTES

1. INDIVIDUAL LOT OWNERS WILL BE RESPONSIBLE FOR CONSTRUCTING POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES.
2. INDIVIDUAL LOT OWNERS WILL BE RESPONSIBLE FOR PLACING DRIVEWAY CULVERTS. EL PASO COUNTY D.O.T. SHOULD BE CONTACTED FOR CULVERT SIZING AND LOCATION. MINIMUM DRIVEWAY CULVERTS SIZE SHALL BE 18" DIAMETER.
3. PUBLIC UTILITY AND DRAINAGE EASEMENTS AS SHOWN ON THE SUBDIVISION PLAT FOR EQUINE MEADOWS ARE 20' WIDE ON ALL FRONT AND REAR LOT LINES, 10' WIDE ON ALL SIDE LOT LINES UNLESS OTHERWISE SHOWN.
4. SEE OFFSITE DRAINAGE BASIN MAP FOR OFFSITE BASINS (OS___).

SCALE

1" = 150' 1:1800

DEVELOPED HYDROLOGIC DATA TABLE

DESIGN POINT	INCL. BASINS	AREA (ac)	Q_5 (cfs)	Q_{100} (cfs)	STRUCTURE TYPE AND SIZE
1	OS-2	14.1	9.3	23.3	----
2	OS-2, A1	26.5	17.0	42.3	42"
2A	OS-2, A1, A2	32.7	20.3	50.7	----
3	OS-1	64.3	41.2	102.9	----
4	OS-1 & 2, A1 & 2, B	114.7	35.2	166.5	----
5	OS-1 & 2, A1 & 2, B, D	160.7	57.8	178.7	CBC 535' EXIST
6	C	15.8	10.3	25.6	72" -EXIST

PROJECT: EQUINE MEADOWS

TITLE: DEVELOPED DRAINAGE MAP

MONUMENT VALLEY ENGINEERS INC.
ENGINEERS • SURVEYORS
1911 ELARA STREET
COLORADO SPRINGS, COLO. 80909
PHONE (719) 635-5736

PROJ. NO. 60635
DRAWN: BDK
ENGINEER: DDC
CHECKED: DDC
SCALE: 1" = 150'
DATE: 11-11-00
REVISIONS:

NO.	DATE:	ITEM

SHEET 1 OF 1

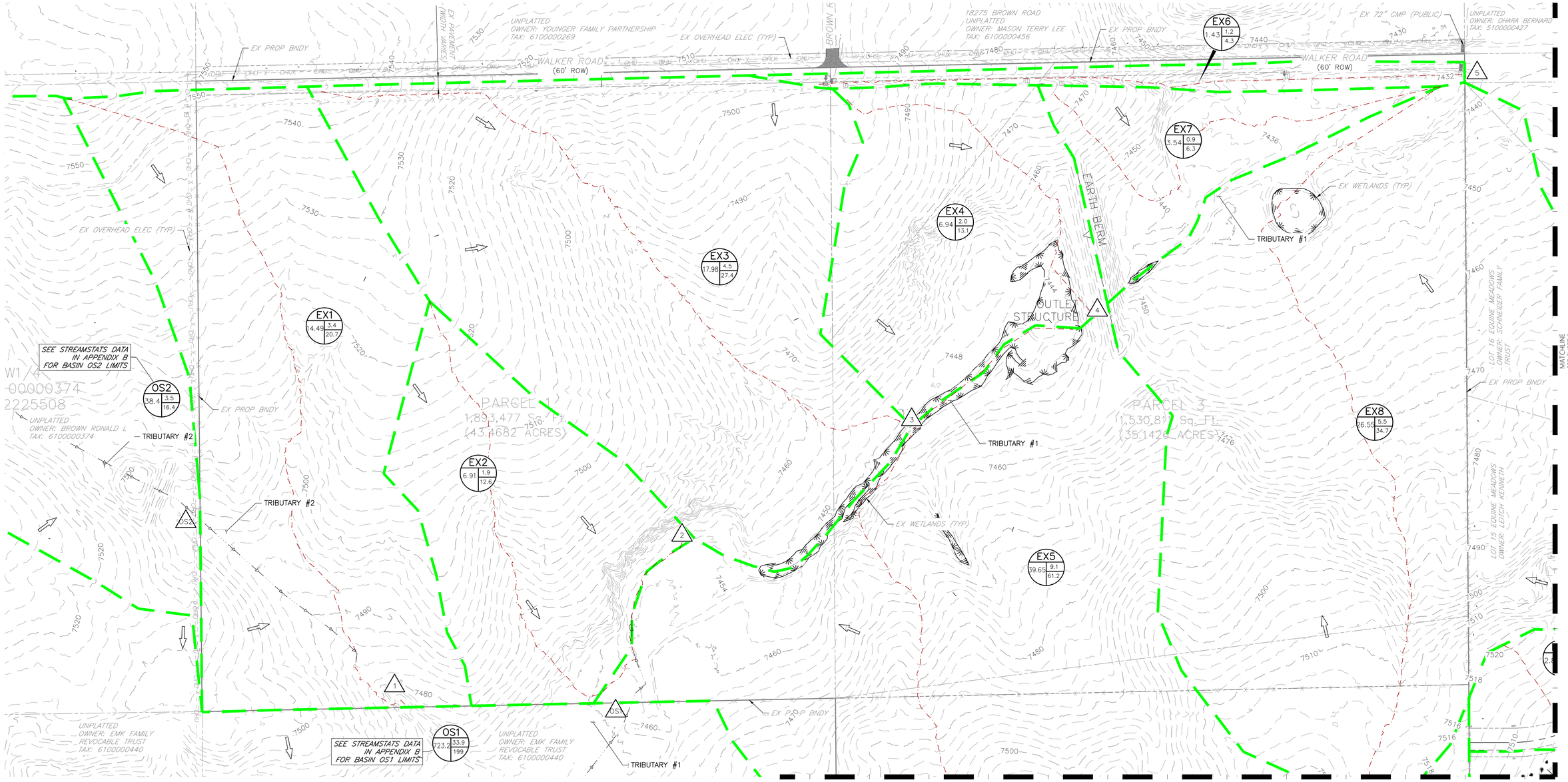
DRAWING NO. 60635002

DESK NO. 1836

APPENDIX F – DRAINAGE MAPS

IRON RIDGE SUBDIVISION

EXISTING DRAINAGE MAP



EXISTING CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4
EX1	14.49	3.5%	0.10	0.37	33.7	3.4	20.7
EX2	6.91	2.0%	0.09	0.36	21.1	1.9	12.6
EX3	17.98	3.4%	0.10	0.37	30.3	4.5	27.4
EX4	6.94	2.0%	0.09	0.36	19.5	2.0	13.1
EX5	39.65	2.0%	0.09	0.36	28.5	9.1	61.2
EX6	1.43	22.2%	0.22	0.45	11.1	1.2	4.3
EX7	3.54	2.0%	0.09	0.36	21.7	0.9	6.3
EX8	26.55	3.4%	0.10	0.37	38.3	5.5	34.7
EX9	12.23	2.0%	0.09	0.36	28.5	2.8	18.9
EX10	2.15	2.0%	0.09	0.36	15.9	0.7	4.5
EX11	2.85	6.6%	0.12	0.38	16.2	1.2	6.3
EX12	0.89	16.7%	0.20	0.44	15.2	0.6	2.3

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.6	202.5
OS2	3.5	16.4
OS3	4.3	20.4
1	3.4	20.7
2	3.8	24.0
3	11.5	74.0
4	12.5	80.5
5 (ONSITE)	14.0	88.7
5 (TOTAL)	48.6	291.2
6	2.8	18.9
7 (ONSITE)	3.4	21.6
7 (TOTAL)	7.7	42.0

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

100 50 0 100 200

ORIGINAL SCALE: 1" = 100'

EXISTING DRAINAGE MAP

IRON RIDGE SUBDIVISION

JOB NO. 25009 | SHEET 1

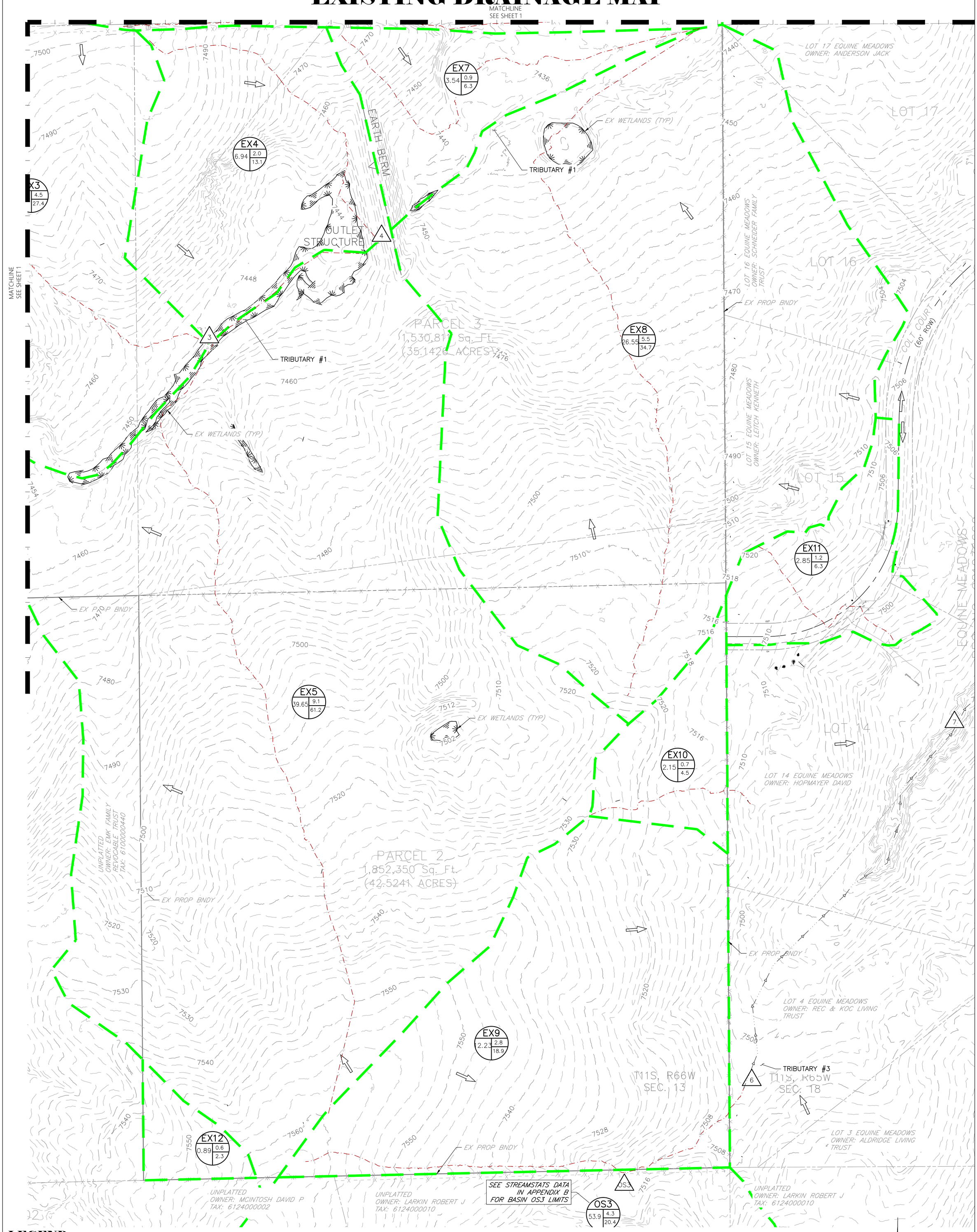
LOCATION: EPC

09/17/2025

ALL TERRAIN ENGINEERING

IRON RIDGE SUBDIVISION

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

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4
EX1	14.49	3.5%	0.10	0.37	33.7	3.4	20.7
EX2	6.91	2.0%	0.09	0.36	21.1	1.9	12.6
EX3	17.98	3.4%	0.10	0.37	30.3	4.5	27.4
EX4	6.94	2.0%	0.09	0.36	19.5	2.0	13.1
EX5	39.65	2.0%	0.09	0.36	28.5	9.1	61.2
EX6	1.43	22.2%	0.22	0.45	11.1	1.2	4.3
EX7	3.54	2.0%	0.09	0.36	21.7	0.9	6.3
EX8	26.55	3.4%	0.10	0.37	38.3	5.5	34.7
EX9	12.23	2.0%	0.09	0.36	28.5	2.8	18.9
EX10	2.15	2.0%	0.09	0.36	15.9	0.7	4.5
EX11	2.85	6.6%	0.12	0.38	16.2	1.2	6.3
EX12	0.89	16.7%	0.20	0.44	15.2	0.6	2.3

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.6	202.5
OS2	3.5	16.4
OS3	4.3	20.4
1	3.4	20.7
2	3.8	24.0
3	11.5	74.0
4	12.5	80.5
5 (ONSITE)	14.0	88.7
5 (TOTAL)	48.6	291.2
6	2.8	18.9
7 (ONSITE)	3.4	21.6
7 (TOTAL)	7.7	42.0

N

100 50 0 100 200

ORIGINAL SCALE: 1" = 100'

EXISTING DRAINAGE MAP

IRON RIDGE SUBDIVISION

JOB NO. 25009 | SHEET 2

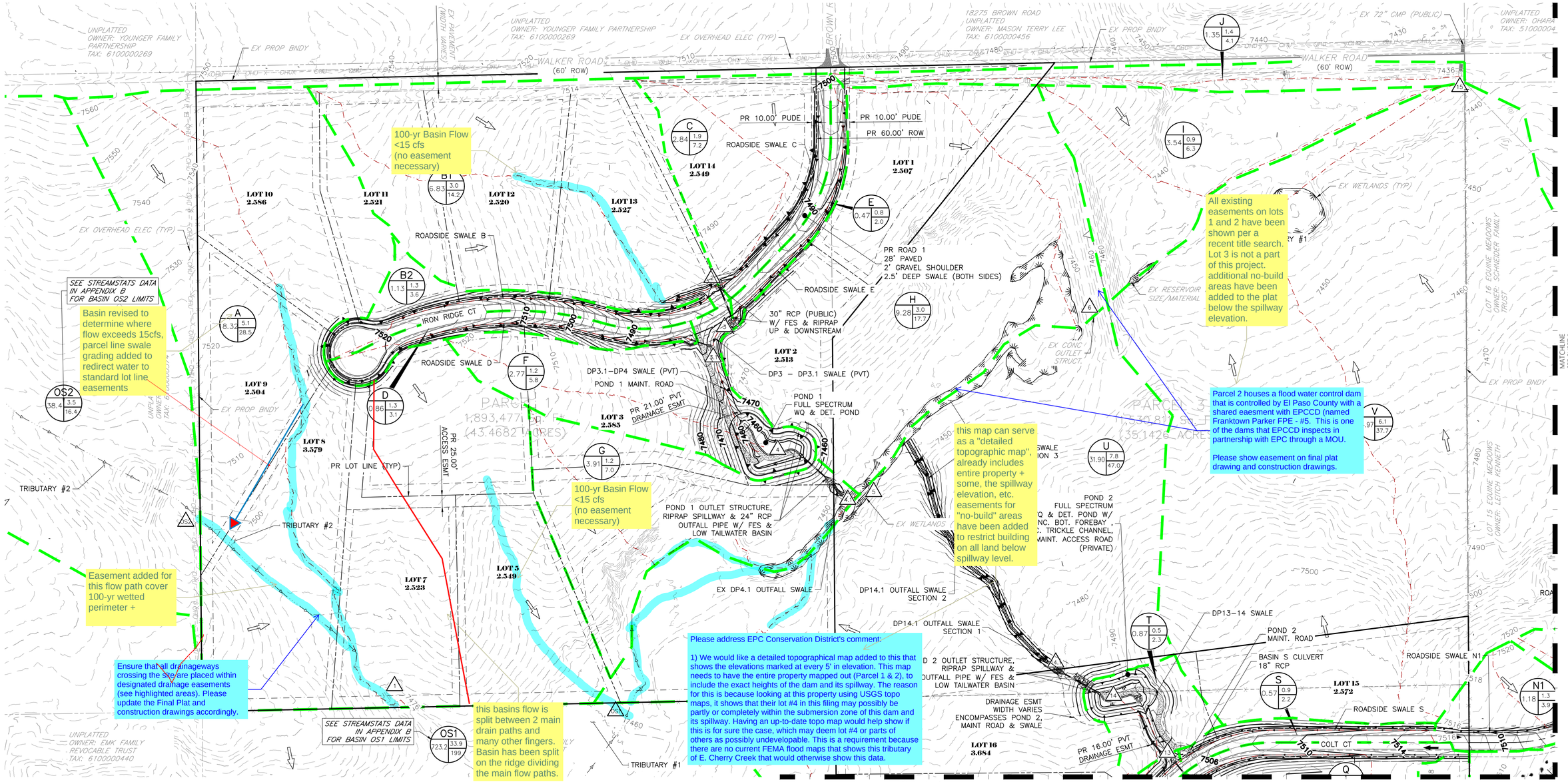
LOCATION: EPC

09/17/2025

ALL TERRAIN ENGINEERING

IRON RIDGE SUBDIVISION

PROPOSED DRAINAGE MAP



PROPOSED CALCS - BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A	18.32	5.5%	0.11	0.38	31.1	5.1	28.5
B1	6.83	9.9%	0.14	0.41	20.7	3.0	14.2
B2	1.13	32.3%	0.34	0.55	15.9	1.3	3.6
C	2.84	16.2%	0.20	0.45	16.4	1.9	7.2
D	0.86	41.9%	0.42	0.60	14.6	1.3	3.1
E	0.47	42.7%	0.43	0.60	9.5	0.8	2.0
F	2.77	4.3%	0.14	0.41	20.4	1.2	5.8
G	3.91	3.9%	0.11	0.37	23.3	1.2	7.0
H	9.28	3.1%	0.10	0.37	19.9	3.0	17.7
I	3.54	2.0%	0.09	0.36	21.8	0.9	6.3
J	1.35	27.1%	0.30	0.51	14.9	1.4	4.1
K	0.89	7.0%	0.12	0.39	9.6	0.4	2.4
L	11.99	4.9%	0.11	0.38	27.2	3.5	20.0
M	2.06	4.9%	0.11	0.38	13.4	0.8	4.8
N1	1.18	25.7%	0.27	0.50	11.3	1.3	3.9
N2	1.25	18.2%	0.21	0.46	11.2	1.1	3.8

PROPOSED CALCS - BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
O	0.60	22.4%	0.24	0.47	10.1	0.6	2.0
P	5.00	13.4%	0.18	0.43	17.8	2.9	11.7
Q	1.21	21.2%	0.24	0.47	11.7	1.1	3.8
R	1.82	24.8%	0.27	0.50	14.3	1.8	5.5
S	0.57	36.8%	0.37	0.57	9.8	0.9	2.2
T	0.87	5.8%	0.13	0.38	9.5	0.5	2.3
U	31.90	4.4%	0.10	0.37	32.8	7.8	47.0
V	24.97	3.9%	0.10	0.37	31.2	6.1	37.7
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4

DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.6	202.5
OS2	3.5	16.4
OS3	4.3	20.4
1	5.1	28.5
2	5.9	23.7
3	6.4	25.1
3.1	7.4	27.2
4	8.4	32.1
4.1	0.1	23.9
5	4.2	38.9
6	8.6	69.3
7	3.5	20.0

DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
8	0.8	4.8
9	2.3	7.7
10	2.9	9.6
11 (ONSITE)	4.6	22.9
11 (TOTAL)	8.9	43.3
12	2.9	14.9
13	4.7	21.5
14	4.8	22.5
14.1	0.1	14.4
15 (ONSITE)	10.5	77.1
15 (TOTAL)	45.2	279.5

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		

ORIGINAL SCALE: 1" = 100'

PROPOSED DRAINAGE MAP

IRON RIDGE SUBDIVISION

JOB NO. 25009 | SHEET 1

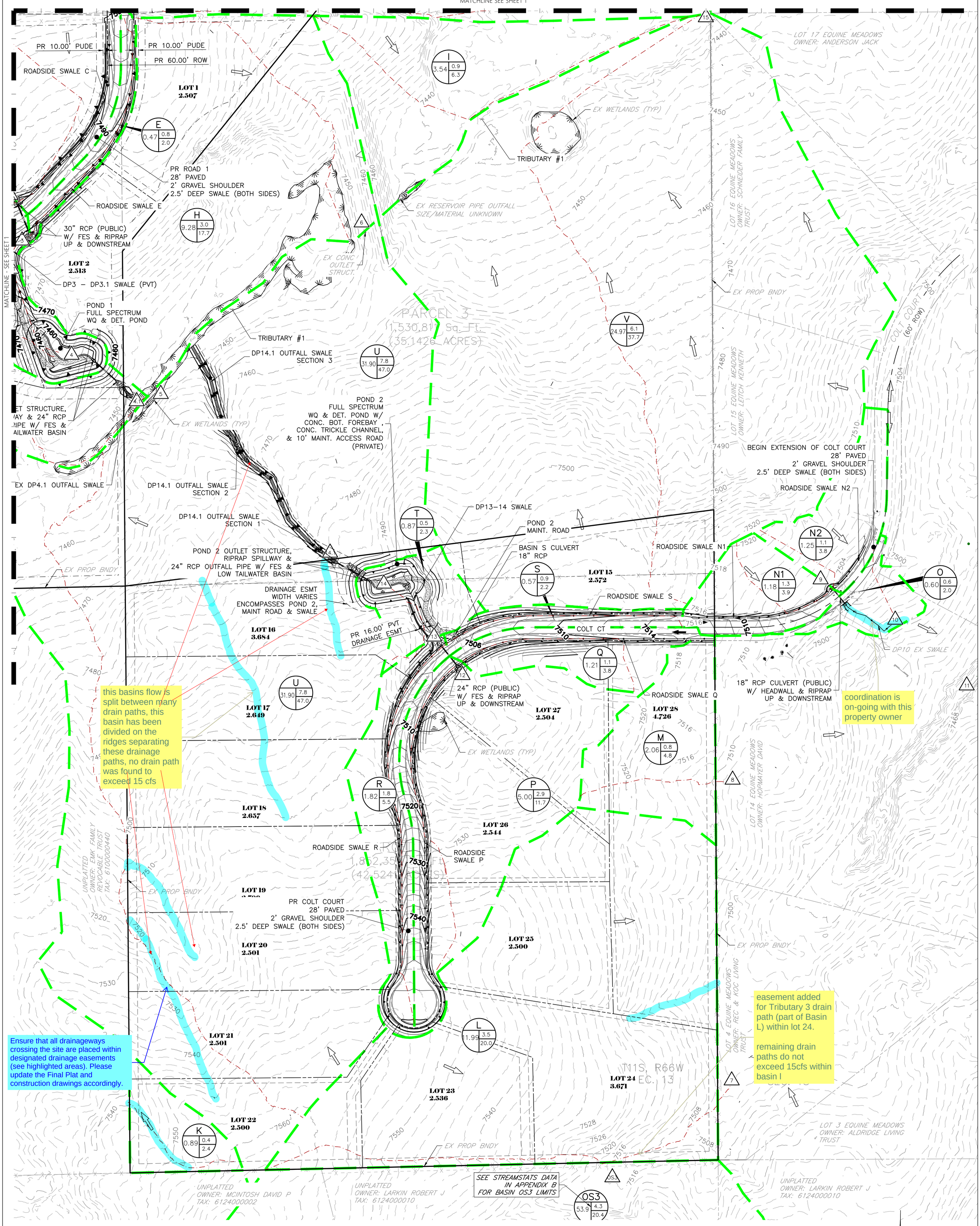
LOCATION: EPC

05/27/2026

ALL TERRAIN ENGINEERING

IRON RIDGE SUBDIVISION

PROPOSED DRAINAGE MAP



PROPOSED CALCS - BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A	18.32	5.5%	0.11	0.38	31.1	5.1	28.5
B1	6.83	9.9%	0.14	0.41	20.7	3.0	14.2
B2	1.13	32.3%	0.34	0.55	15.9	1.3	3.6
C	2.84	16.2%	0.20	0.45	16.4	1.9	7.2
D	0.86	41.9%	0.42	0.60	14.6	1.3	3.1
E	0.47	42.7%	0.43	0.60	9.5	0.8	2.0
F	2.77	4.3%	0.14	0.41	20.4	1.2	5.8
G	3.91	3.9%	0.11	0.37	23.3	1.2	7.0
H	9.28	3.1%	0.10	0.37	19.9	3.0	17.7
I	3.54	2.0%	0.09	0.36	21.8	0.9	6.3
J	1.35	27.1%	0.30	0.51	14.9	1.4	4.1
K	0.89	7.0%	0.12	0.39	9.6	0.4	2.4
L	11.99	4.9%	0.11	0.38	27.2	3.5	20.0
M	2.06	4.9%	0.11	0.38	13.4	0.8	4.8
N1	1.18	25.7%	0.27	0.50	11.3	1.3	3.9
N2	1.25	18.2%	0.21	0.46	11.2	1.1	3.8

PROPOSED CALCS - BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
O	0.60	22.4%	0.24	0.47	10.1	0.6	2.0
P	5.00	13.4%	0.18	0.43	17.8	2.9	11.7
Q	1.21	21.2%	0.24	0.47	11.7	1.1	3.8
R	1.82	24.8%	0.27	0.50	14.3	1.8	5.5
S	0.57	36.8%	0.37	0.57	9.8	0.9	2.2
T	0.87	5.8%	0.13	0.38	9.5	0.5	2.3
U	31.90	4.4%	0.10	0.37	32.8	7.8	47.0
V	24.97	3.9%	0.10	0.37	31.2	6.1	37.7
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4

DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.6	202.5
OS2	3.5	16.4
OS3	4.3	20.4
1	5.1	28.5
2	5.9	23.7
3	6.4	25.1
3.1	7.4	27.2
4	8.4	32.1
4.1	0.1	23.9
5	4.2	38.9
6	8.6	69.3
7	3.5	20.0

DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
8	0.8	4.8
9	2.3	7.7
10	2.9	9.6
11 (ONSITE)	4.6	22.9
11 (TOTAL)	8.9	43.3
12	2.9	14.9
13	4.7	21.5
14	4.8	22.5
14.1	0.1	14.4
15 (ONSITE)	10.5	77.1
15 (TOTAL)	45.2	279.5

N

100 50 0 100 200

ORIGINAL SCALE: 1" = 100'

PROPOSED DRAINAGE MAP

IRON RIDGE SUBDIVISION

JOB NO. 25009 | SHEET 2

LOCATION: EPC

09/17/2025

ALL TERRAIN ENGINEERING