PHASE II DRAINAGE REPORT

FOR

GOLD CROWN FIELD HOUSE
TOWN OF CASTLE ROCK, COLORADO
CASE NO. SDP26-0014

Prepared for:

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CORE Project Number: 25-092-001

September 24, 2026

Engineer's Statement:

I affirm that this report and plan for the Phase II drainage design of Gold Crown Field House, was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Castle Rock Drainage Design and Technical Criteria for the owners thereof. I understand that the Town of Castle Rock does not and will not assume liability for drainage facilities designed by others.

_____

Todd Wolma, P.E.
Colorado Professional Engineer
License #59513

OWNER/DEVELOPER'S STATEMENT:

Gold Crown Foundation, Inc. hereby certifies that the drainage facilities for Gold Crown Fieldhouse shall be constructed according to the design presented in this report. I understand that the Town of Castle Rock does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that The Town of Castle Rock reviews drainage plans pursuant to the Municipal Code; but cannot, on behalf of Gold Crown Fieldhouse, guarantee that final drainage design review will absolve Gold Crown Foundation, Inc. and/or their successors and/or assigns of future liability for improper design.

_____

Print Name

_____

Authorized Signature

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I. GENERAL LOCATION AND DESCRIPTION

A. Site Location

This drainage report supports the design of Gold Crown Field House development, which consists of an 83,000 sf indoor sports facility, 82,000 sf of outdoor playing fields and associated vehicle circulation drives and parking.

The project area is in the Northwest Quarter of Section 22, Township 8 South, Range 67 West of the Sixth Principal Meridian.

The proposed Gold Crown Field House is within the Dawson Trails planned development. At present, the site is vacant land. The site of bounded by Dawson Trails Boulevard on the southeast, an open space parcel (Tract C) on the south, rural residential lots of the unincorporated Twin Oaks subdivision on the west, and undeveloped, unincorporated parcels on the north. The development parcel lies within the southern half of Planning Area PL1-07, which designates parks, recreation, cultural and civic facilities as allowable uses. The northern half of PL 1-07 is planned to be a sports facility, with on-site drainage generally being separate from the GCFH facility.

B. Description of Property

The legal description of the development parcel is Dawson Trails Filing No. 1, Tract F, with a total land area of 44.1 acres. The proposed development will improve the southern 25 acres of the tract as a separate lot.

The project is proposed to be phased, with the current phase including a smaller 69,000-sf fieldhouse and associated parking. Future phases will include a 14,000-sf building expansion, turf fields, additional access road and additional parking. The on-site detention pond has been sized to accommodate the full buildout condition, with minimal updates to the outlet structure as future phases are developed.

The project site has been recently graded with areas of significant cut on the west and north edges of the site. Cut slopes on the west and north fringes are generally 4:1, and the site interior is consistently graded at about 3%, sloping toward the northeast. Ground cover consists of newly reseeded grasses.

Soils within the project area are detailed on the soils map in Appendix A. Most of the project site is covered by hydrologic group C soils. A small area of historic type B soils is in the northwest corner of the site and a small area of historic type A soils is in the southeast corner of the site.

No major drainageways pass through the site boundary. A very small finger of the floodplain from Gambel Ridge North Tributary (0.004 acres) crosses the southeast corner of the property. The floodplain encroachment results from a backwater condition and is not an area of effective flow conveyance. The floodplain

encroachment is also well outside the limits of proposed disturbance. The Gambel North floodplain is recognized by the Town of Castle Rock, but is not a FEMA-mapped drainageway. The entire site is within flood hazard Zone X unshaded, outside of the 0.2% annual chance flood, as depicted on FIRM panel 08035C0282G.

There are no irrigation canals within or near the project area.

There are no notable geologic features within or near the site.

The proposed land use is a recreational facility, which consists of a 83,000 building, 82,000 sf of outdoor playing fields and associated vehicle circulation drives and parking.

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Drainage Basins

The entire development site lies within Basin A as defined by the Dawson Trails Filing 1 Phase III Drainage Report [Reference E]. A significant area of off-site runoff drains eastward and southward toward the site from undeveloped and rural residential parcels that are outside of the Dawson Trails Planned Development Boundary and outside of the Town of Castle Rock incorporation limits. These off-site basins west and north of the project site are defined as OS-A, consistent with their delineations in the Dawson Trails Filing Phase III Drainage Report.

The areas within the development site (Tract F) are defined as sub-basins A3, A6 and A9 in the Dawson Trail Filing 1 Phase III Drainage Report. These areas are overlot graded and seeded. They are assumed to have a build-out imperviousness of 25%. All areas of Tract F and off-site areas west of tract F surface drain over rundowns and interim swales to existing area inlets at design points A3, A6 and A9. Intercepted flows are routed through an existing storm sewer system in Dawson Trails Boulevard to Pond A.

There are no major drainageways within the project limits or within the Pond A watershed. Gambel Ridge North Tributary is an improved drainageway that traverses Tract C, south of the project site, but no part of the proposed development routes to that drainageway under existing conditions or the proposed design.

B. Minor Drainage Basins

Offsite Drainage Basins (routed to Pond A)

7 offsite sub-basins within OS-A drain into Tract F from across the western and northern property lines.

Sub-basin OS-A3.1 contains a narrow off-site watershed that drains southward toward the project site. Consistent with Filing 1 infrastructure construction, OS-A3.1 drains to existing Inlet A12 in northern Tract F. With construction of the proposed roundabout and northern retaining wall, flows from this basin are routed to inlet A9 through the relocated swale north of the entrance drive.

Sub-basin OS-A3 contains undeveloped off-site area that drains into existing basin A9. With construction of the proposed roundabout and northern retaining wall, flows from this basin are routed to inlet A9 through the re-located swale north of the entrance drive.

Sub-basins OS-A4, OS-A5 & OS-A6 contain undeveloped off-site areas that drain into existing basin A6. The existing surface flow path to existing Inlet A6 is interrupted by proposed construction, and the offsite flows route through a bypass storm system to their original interception point at design point A6.

Sub-basins OS-A7 & OS-A8 contain rural residential off-site areas that drain into existing basin A3. The existing surface flow path to existing Inlet A3 is interrupted by proposed construction, and the offsite flows route through a bypass storm system to their original interception point at design point A3.

Sub-basins A1, A4 and A7 contain the west half of Dawson Trails Boulevard along the project frontage. These areas drain, respectively to type R inlets A1, A4 and A7 on the west edge of Dawson Trails Boulevard. The proposed development causes minor adjustment to the delineations of these basins, but there are no significant alterations of their flow patterns or associated drainage infrastructure. These basins are included in the runoff calculations for complete accounting of all impact flow areas.

On-site Basins routed to Pond A

Sub-basin A3.1 contains areas of the buffer zone west of the development site. This area is recently reseeded and is assigned an imperviousness of 20%. A3.1 receives run-on flows from basins OS-A7 and OS-A8. The existing flow path is interrupted by a proposed retaining wall, which re-directs flows through a swale above the wall to area inlet A3.1. Another proposed area inlet captures flows from OS-A7 immediately east of the western property boundary. Combined flows from inlets OS-A7 and A3.1 are routed through a bypass storm sewer to design point A3 of the existing Dawson Trails Boulevard storm sewer system.

Sub-basin A3.2 contains undeveloped areas of Tract F1 and Tract C south of the project site. This area is recently reseeded and is assigned an imperviousness of 20%. Consistent with Filing 1 infrastructure construction, the runoff from sub-basin A3.2 drains through the existing roadside swale west of Dawson Trails Boulevard to existing area inlet A3. With construction of the proposed southern access drive, flows will route through a culvert and to proposed area inlet A3.2, which connects to the bypass storm sewer at design point A3.

Sub-basin A3.3 contains the southern leg of proposed Road 2 between the Road 2 high point and Dawson Trails Boulevard. Flows are captured by inlet A3.3 at the low point in Road 2, where they combine with flows from A3.2. Combined flows are captured in area inlet A3.2 and routed to the bypass storm sewer at design point A3. The composite imperviousness of sub-basins A3.1, A3.2 & A3.3 does not exceed the 25% imperviousness assumption that is accommodated by Pond A.

Sub-basins A6.1 and A6.2 contain undeveloped areas of Tract F northwest of the project site. These areas are recently reseeded and are assigned an imperviousness of 20%. A6.1 and A6.2 receive run-on flows from basins OS-A6/OS-A5 and Os-A4, respectively. Combined flows are intercepted by area inlets A6.1 and A6.2 and are routed through a bypass storm sewer to design point A6 of the existing Dawson Trails Boulevard storm sewer system.

Sub-basin A9.1 contains areas of the northeastern fringe of the site that surface flow across the Tract F1 boundary to sub-basin A9.2, as described below.

Sub-basin A9.2 contains the proposed north access drive between the proposed roundabout and Dawson Trails Boulevard, including future right-of-way dedications. Flows are captured by inlet A9.2 at the low point in Road 1 and area routed through existing swale A9 and ultimately to existing inlet A9 and the Dawson Trails Boulevard storm sewer system.

Sub-basin A9.3 contains areas of existing basin A9 within Tract F that are north of the proposed development limits. Most of this area is recently reseeded and is assigned an imperviousness of 20%. A9.3 receives run-on flows from basins OS-A3-A5 and OS-A3.1. Combined flows are conveyed by existing swale A9 to existing area inlet A9, which routes through existing Dawson Trails Boulevard storm sewer system. The composite imperviousness of sub-basins A9.1, A9.2 & A9.3 does not exceed the 25% imperviousness assumption that is accommodated by Pond A.

Sub-Basin A4.1 contains a narrow fill slope between the proposed fire lane and Dawson Trails Boulevard. This area cannot be practicably routed to Pond A6 and sheet flows across the east property boundary to Basin A4, ultimately captured in Inlet A4 and routed to Pond A. Sub-basin A4.1 has and imperviousness of 20%, which is within the accommodation of Pond A.

On-site Basins routed to Pond A6

Sub-basin 1.01 contains a portion of the cut slope west of the project area. This area cannot be practicably bypassed and is captured in an area inlet for routing to Pond A6.

Sub-basin 1.02, 1.05, 1.11 and 1.12 contain the roof area of the proposed field house. These areas drain through underground roof drain piping to the on-site storm sewer system.

Sub-basin 1.03 contains a small landscape area west of the building. Flows from this basin are captured by an area inlet at Design Point 1.03 and routed to Pond A6.

Sub-basins 1.04, 1.07 and 1.13 contain portions of the fire lane and building perimeter. These areas drain to type R inlets at Design Points 1.04, 1.07 and 1.13, respectively, on the outer edge of the fire lane.

Sub-basins 1.06 and 1.08 contain the southwest parking lot and drain via surface flow to type R inlets at Design Points 1.06 and 1.08 respectively. Intercepted flows are routed via storm sewer to Pond A6.

Sub-basins 2.01 and 2.02 contain the northwest parking lot and drain via surface flow to type R Inlets at Design Points 2.01 and 2.02, respectively. Intercepted flows route via storm sewer to Pond A6.

Sub-basin 2.03 contains a portion of the cut slope north of the project area. This area cannot be practicably bypassed and is captured in an area inlet for routing to Pond A6.

Sub-basins 2.04 and 2.05 contain areas of the west access loop, the fire lane, and adjacent landscape areas. These areas surface flow by curb and gutter to on-grade type R inlets 2.04 and 2.05. Bypass flows from Inlet 2.04 route to Inlet 2.05, where full capture of major storm flows is attained for routing to Pond A6.

Sub-basins 2.06 and 2.07 contain the turf field, which is served by an underdrain system. An imperviousness of 80% is assigned to these basins. The fields are designed with a level grade and have a high rate of infiltration. All runoff, including the major storm rainfall, is assumed to be captured by the underdrain system with no excess runoff to adjacent basins.

Sub-basin 3.0 contains proposed detention pond A6 and directly tributary areas.

III. DRAINAGE DESIGN CRITERIA

A. Regulations

The proposed stormwater facilities are designed to be compliant with Town of Castle Rock drainage criteria. This includes design rainfall, allowable inlet ponding, pipe velocities, pond storage, freeboard and maintenance provisions.

The Urban Storm Drainage Criteria Manual (USDCM) is referenced for principles of Water Quality Capture Volume and 100-year detention where these functions separated out from a typical full-spectrum design.

Runoff analysis in this report references the 2024 (current) revisions of USDCM Chapter 6. In particular, surface imperviousness values reflect the current version of MHFD Criteria Manual Table 6-3.

Design criteria for pond features, such as forebay, low flow channel and outlet structure, reference the 2024 (current) revision of USDCM Volume 3.

B. Drainage Studies, Master Plans, Site Constraints

The entire project area and offsite tributary areas are analyzed within the scope of the Dawson Trails Filing 1 Phase III Drainage Report. The infrastructure installed per that design includes conveyance of project site and tributary off-site flow to existing Pond A, and accommodation of detention and water quality treatment for up to 25% imperviousness of the project area.

Generally, all runoff originating from the site or passing through the site is intercepted at Design Points A3, A6 and A9 of the Filing 1 drainage design. These design points are connected to a storm sewer trunk line in Dawson Trails Boulevard

by 24" pipes at A3 and A9, and a 42" pipe at A6. These three connections are the outfall points at which all proposed outflows are conveyed to Pond A.

Apart from the Dawson Trails Filing 1 Phase III Drainage Report, there are no drainageway master plans, infrastructure master plans, or adjacent site plans that influence the design of drainage infrastructure within the Gold Crown Field House development.

Apart from the pipe size constraints at design points A3, A6 and A9, and the imperviousness accommodation of Pond A, there are no physical, topographic or hydraulic constraints that substantially impact the drainage design for this project.

C. Hydrology

Rational method is used for on-site and off-site runoff calculations. On-site sub-basins range from 0.1 to 3.3 acres in size. Offsite sub-basins and fringe areas range from 0.1 to 32 acres in size.

The 5-year mean recurrence interval is used for the minor drainage system design. The 100-year mean recurrence interval is used for the major drainage system design.

Design 1-hour rainfall amounts are 1.43 in. for the 5-year event and 2.60 in. for the 100-year event. These values are taken from Table 6-1 of the Town's drainage criteria.

Water Quality Capture Volume is determined from the MHFD-Detention_v4-07 spreadsheet, using the methods defined in MHFD Criteria Manual Volume 3. The MHFD-Detention_v4-05 spreadsheet is also used for pond storage and outflow calculations. MHFD-Detention_v4-07 is used to evaluate pond performance during significant storm events and sizing of flow-bypassing components.

All hydrology is assuming full build out conditions of the project including all future phases.

D. Hydraulics

Curb/gutter conveyance capacities and curb inlet flow interception are calculated using MHFD-Inlet_v5.03 spreadsheet. A manning's n-value of 0.016 is assumed for all areas of asphalt parking lot paving.

Swale flows and surface drainage depths across parking lots are computed with Hydraflow Express Extension for Autodesk Civil 3D, Version 2022.

Analysis of hydraulic grade lines in storm sewers will be included in the Phase III Drainage Report.

The MHFD-Detention_v4-06 spreadsheet is used for pond routing and outflow calculations.

E. Storage and Water Quality Enhancement

Existing Pond A is a sub-regional extended detention basin that provides 100-year detention and water quality capture volume for all off-site tributary areas, and for on-site area (Tract F) up to 25% composite imperviousness, per the Dawson Trails Filing 1 Phase III Drainage Report. Flows from off-site areas and from undeveloped and fringe on-site areas are routed to Pond A in conformance with that pond's detention accommodation.

The developed areas on the site, generally within the perimeter access drive, exceed the 25% composite imperviousness accommodation and are routed to proposed on-site Pond A6. Pond A6 is a full-spectrum facility that provides water quality and detention for all on-site tributary area in conformance with Town of Castle Rock drainage regulations.

The four-step process of water quality control is detailed in section IV.C of this report.

IV. STORMWATER MANAGEMENT FACILITY DESIGN

A. Stormwater Conveyance Facilities

Drainage through the site is conveyed through two distinct systems. Drainage from off-site areas and undeveloped portions of the site is captured where existing surface flow patterns are interrupted by proposed development. The captured flows are routed through a bypass storm sewer system to their original point of interception in the existing Dawson Trail Boulevard system, and subsequently to Pond A. Drainage from developed areas of the property is generally conveyed by surface flow, curb & gutter to street inlets, areas inlets, and roof drains. All captured flows from the on-site collection system are routed to full spectrum pond A6.

Generally, inlets are placed at low points in the site grading, with 6 to 12 inches of ponding and a defined emergency overflow path to an adjacent basin. On-grade inlets 2.04 and 2.05 are designed to fully capture of major storm flows for routing to Pond A6.

Top-of wall concrete swales for conveyance of offsite flows are designed per Town detail SD-07. Grass-lined swales A3.2 and A9 are designed with 5-foot bottom widths, 5:1 side-slopes at velocities less than 5 feet per second.

Street capacities are evaluated per Town of Castle Rock drainage classification A. 6" flow depth (top of vertical curb) is used for all flow analyses, except where major storm depth up to 12" can be ensured by the grading design along the entire flow path.

Pond A6 is designed with maintenance provisions in accordance with Section 13 of the Town's drainage criteria. Drainage easements will be dedicated around the detention pond, along the bypass storm sewer lines, and along the top-of-wall swales, which convey off-site runoff.

Conveyance of all flows leaving the site is accommodated by existing storm infrastructure of Dawson Trails Filing 1. All flows are conveyed to existing pond A.

B. Stormwater Storage Facilities

Full-spectrum detention is provided in proposed Pond A6 for developed areas of the site. The pond is in the east corner of the site and outfalls to an existing storm sewer system in Dawson Trails Boulevard that routes to existing sub-regional Pond A.

Per the Dawson Trails Filing 1 Phase III Drainage Report, existing Pond A was designed to accommodate up to 25% imperviousness from all of Tract F, which includes the development site. Undeveloped areas along the north and west edges of the property and fringe areas that drain away from the property route directly to the existing storm sewer system in Dawson Trails Boulevard. These areas have a combined composite imperviousness of less than 25% and are therefore accommodated by Pond A.

An overflow spillway is designed across the northeast pond berm with capacity to convey 100-year fully developed, unattenuated flows. The spillway design has at least 1 foot of freeboard from the highest water depth over the spillway crest to the top of berm. The downstream face of the spillway is protected by a cutoff wall and armored with riprap, in accordance with Figure 13-7 of the Town's Drainage Criteria. Overflows would flow to the low point in the north access drive and would overtop into existing swale A-9, continuing to existing area inlet A9. Any overflow that exceed the capacity of Inlet A9 would route further northeast in the swale system paralleling Dawson Trails Boulevard to existing inlets A12 or A15. All inlets route to existing Pond A located within Dawson Trails Filing No. 1.

The pond design is verified to release 97% of runoff from a 5-year or lesser storm within 72 hours, and to release 99% of runoff from a storm greater than a 5-year event within 120 hours.

Maintenance accommodations are designed for the water quality pond constructed with this project. These accommodations include vehicle access paths to the pond's forebay and outlet structure, compliant with Town criteria.

C. Water Quality Enhancement Control Measures

Implementation of the four-step process of water quality control includes the following features:

1) Runoff reduction: A significant portion of the site's perimeter is left in its existing state. Separately, segments of paved area of the north and south access points are routed through swales before connecting to the storm sewer system.

2) Full spectrum detention: On-site Full-spectrum detention is provided for areas of the site that are developed. Separately, fringe and perimeter areas are routed to existing full-spectrum detention Pond A.

3) Stream stabilization: There are no streams on the property. However, all open swales on and downstream of the development site are designed to have sustainable velocity and to protect against erosion.

4) Source Controls: To prevent illicit discharges into the stormwater system, source controls shall be implemented by the property owner as part of regular operations and maintenance of the facility. Examples of expected sources controls include the following:

   - Proper application of fertilizer
   - Regular clearing of de-icing materials (e.g. salt)
   - Snow removal and post-melt residue management
   - Proper disposal of landscape waste
   - Provisions for per waste management as appropriate
   - Regular maintenance and cleaning of facility grounds

   Additional source control provisions may be necessary if other potential facility functions carry a significant risk of illicit discharges.

Hydraulic properties, emergency considerations, and outfall details of the proposed full-spectrum pond are discussed in Section IV.B of this report.

Maintenance considerations of full-spectrum Pond A6 are detailed in Section IV.F of this report.

D. Floodplain Modification

No floodplain modifications are proposed as part of this project. There are no major drainageways traverse the site. A very small finger of the floodplain from Gambel Ridge North Tributary (0.004 acres) intersects the southeast corner of the property. The floodplain encroachment results from a backwater condition and is not an area of effective flow conveyance. The floodplain encroachment is also well outside the limits of proposed disturbance.

E. Geotechnical Investigation and Sub-surface Collection System Design

The site has no observed history of shallow groundwater or other sub-surface drainage issues. The building is designed as a slab-on-grade, and will have minimal susceptibility to disturbance by groundwater. A geotechnical study will be conducted as part of the design development process and its findings will be integrated into the drainage design as appropriate.

F. Operation and Maintenance

The proposed stormwater conveyance and treatment facilities, including Pond A6 are private improvements that will be owned and maintained by Gold Crown Field House.

Vehicle access to Pond A6's forebay and outlet structure are compliant with maintenance requirements in Section 13.6 of the Town's storm drainage criteria.

Recommended maintenance practices for extended detention basins in the Denver region are detailed in MHFD Criteria Manual Volume 3, Chapter 6, Section 7.

Regular maintenance of the stormwater facilities will include:

- Inspection and debris removal – twice annually
- Aeration – annually
- Sediment removal from forebay and trickle channel – annually

Occasional or as-needed maintenance activities will include:

- Sediment removal from basin bottom—when sediment volume reaches 20% WQCV (~15 to 25 years)
- Repair of eroded areas—as determined by inspection.

G. Additional Permitting Requirements

There are no attributes of this project, associated disturbance areas, or impacted drainages that are expected to trigger additional permitting requirements.

H. General

Runoff, conveyance and pond calculations that support this design are included in the appendices. Drainage maps showing routing of flows to meet the constraints of the existing system are also included in the appendices.

Further details of calculations, charts, and storm sewer modeling will be added at the design progressed through Site Development Plan review and refinement.

V. CONCLUSIONS

A. Compliance with Standards

The drainage infrastructure for the Gold Crown Field House project has been designed to adhere to Town of Castle Rock criteria and standards.

Developed areas of the site are designed with on-site full-spectrum detention. Undeveloped and fringe areas of the site that have composite imperviousness within the limits assumed by the Dawson Trails Filing 1 drainage design are routed to existing Pond A in conformance with the approved design.

The project area and associated drainage areas lie within the Chatfield Reservoir Watershed. To date, the project has not been subjected to specific requirements regarding Regulation No. 73.

B. Variances

No variances are proposed with this development.

C. Drainage Concept

Generally, the proposed drainage design of the Gold Crown Field House is guided by the accommodations and constraints of the Dawson Trails Filing 1 drainage design. Off-site tributary flows are bypassed through the site wherever possible to connect to the provisions of the Dawson Trail Boulevard Storm System. Areas of the site that are developed beyond the 25% imperviousness accommodation of Pond A are collected by an on-site storm sewer system and routed to proposed on-site Pond A6. The proposed pond is a full-spectrum facility that conforms to Town's pond design standards, and releases in the existing storm system at an attenuated rate that does not exceed the design flows defined by the Dawson Trails Filing 1 Phase III Drainage Report.

VI. REFERENCES

A. Town of Castle Rock Storm Drainage Design and Technical Criteria Manual, February 2025.

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

C. Web Soil Survey, Soil Survey Staff (Natural Resources Conservation Service), United States Department of Agriculture. Available online at the following link: https://websoilsurvey.sc.egov.usda.gov/. Accessed April 30, 2026.

D. Flood Insurance Rate Map (FIRM) No. 08035C0282G, Federal Emergency Management Agency, Revised March 16, 2016. Available online at the following link: https://msc.fema.gov/portal/home. Accessed April 30, 2025.

E. Phase III Drainage Report for Dawson Trails Filing 1 by CORE Consultants, approved April 21, 2025

Computer Modeling Programs:

A. StormCAD by Bentley Systems, Inc., Version 10.03.04.53.

B. Hydraflow Express Extension for Autodesk Civil 3D by Autodesk, Version 2026.

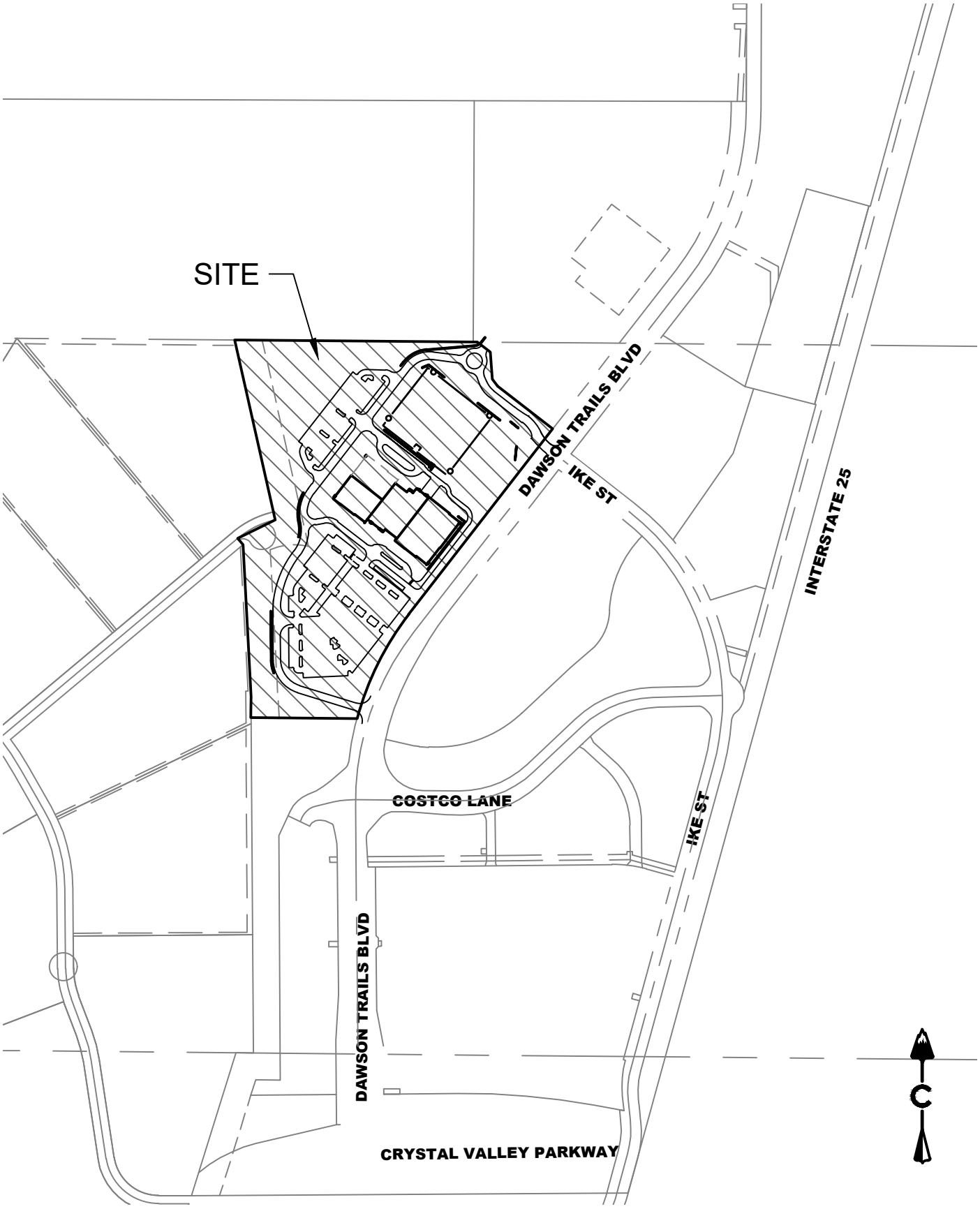
C. Detention Basin Design Workbook (MHFD-Detention v4.03.xlsm) by Mile High Flood District, Version 4.07, June 2025.

VII. APPENDICES

Appendix A	Vicinity Map, FEMA Firm Panel, Soil Report, Precipitation
Appendix B	Hydrologic Computations
Appendix C	Hydraulic Computations
Appendix D	Water Quality Enhancement Control Measures
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APPENDIX A

VICINITY MAP, FEMA FIRM PANEL, SOILS REPORT, PRECIPITATION



CORE CONSULTANTS. INC.
LIVEYOURCORE.COM

0 500'

1 inch = 500 ft.

GOLD CROWN FIELDHOUSE
VICINITY MAP

CREATED BY: LCC DATE: 05/06/2026

SHEET NUMBER 1 OF 1 SHEETS

JOB NUMBER 25-092

5/7/2026 10:41 AM - X:\25-092 GOLD CROWN FIELDHOUSE\CIVIL\REPORTS\UTILITY\2-FIGURES_VICINITY MAP - GCFH.DWG

National Flood Hazard Layer FIRMette

FEMA

104°53'6"W 39°20'58"N



104°52'29"W 39°20'30"N

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

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

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

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

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/30/2026 at 5:13 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

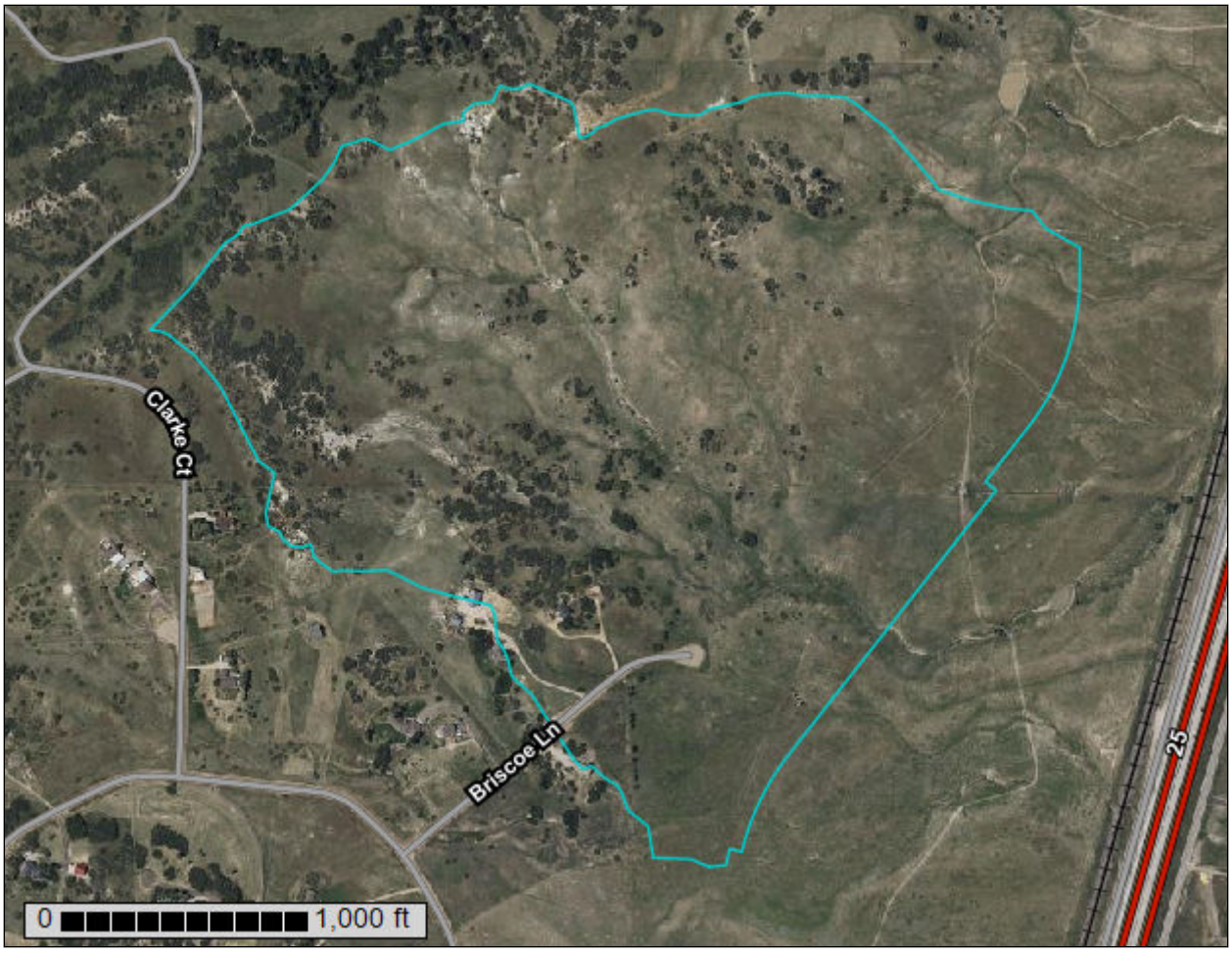
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Castle Rock Area, Colorado



June 9, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

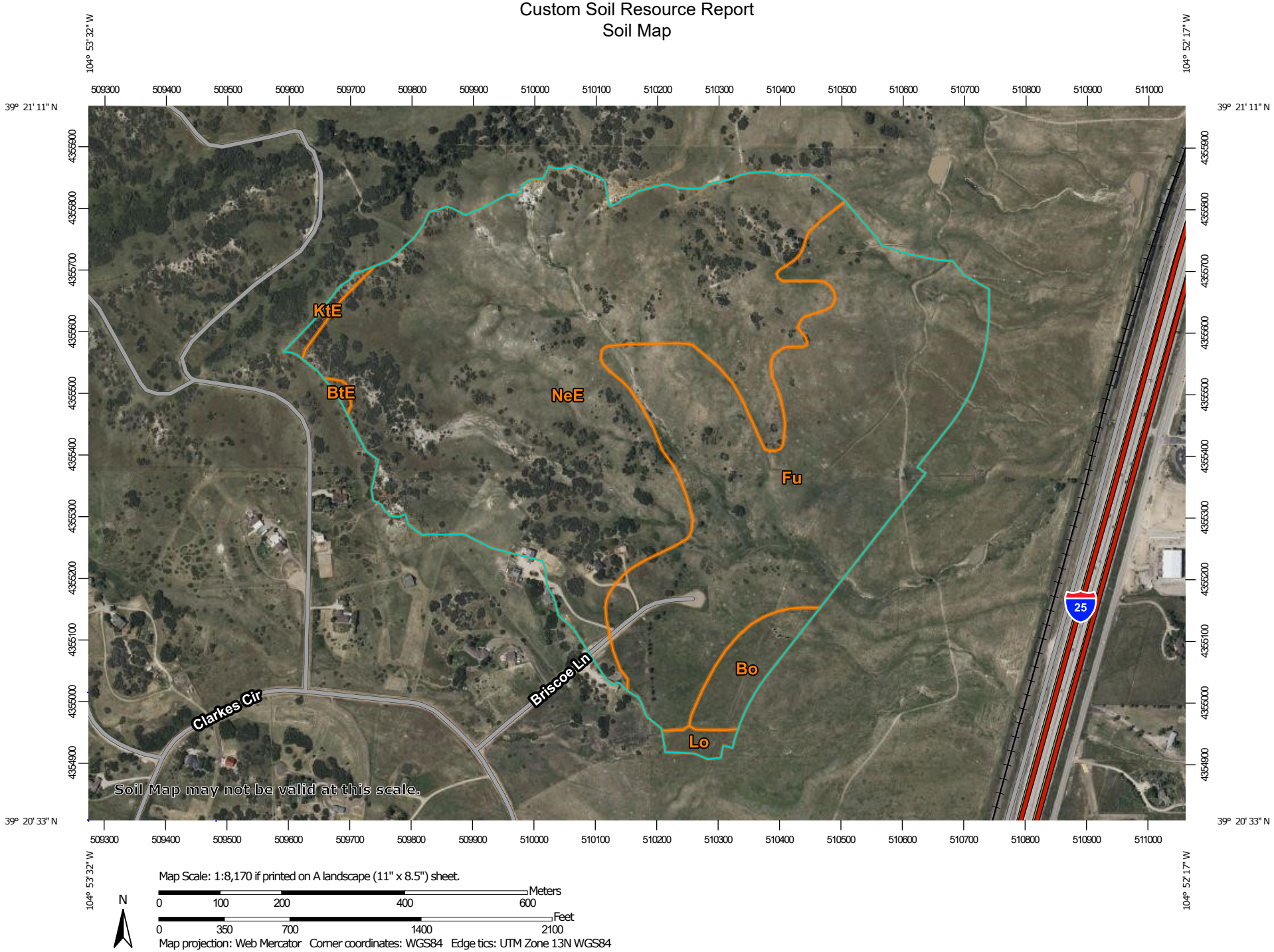
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 18, Aug 29, 2025

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

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Bo	Blakeland-Orsa association, 1 to 4 percent slopes	4.4	2.7%
BtE	Bresser-Truckton sandy loams, 5 to 25 percent slopes	0.3	0.2%
Fu	Fondis-Kutch association	62.1	38.7%
KtE	Kutch sandy loam, 5 to 20 percent slopes	0.8	0.5%
Lo	Loamy alluvial land	1.1	0.7%
NeE	Newlin gravelly sandy loam, 8 to 30 percent slopes	91.7	57.2%
Totals for Area of Interest		**160.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Castle Rock Area, Colorado

Bo—Blakeland-Orsa association, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: jqy5
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Blakeland and similar soils: 50 percent
Orsa and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blakeland

Setting

Landform: Hills, Alluvial fans
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits

Typical profile

H1 - 0 to 13 inches: sandy loam
H2 - 13 to 24 inches: loamy coarse sand
H3 - 24 to 60 inches: loamy coarse sand

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Description of Orsa

Setting

Landform: Alluvial fans, Hills
Landform position (three-dimensional): Base slope

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkosic sedimentary rock

Typical profile

H1 - 0 to 20 inches: coarse sandy loam
H2 - 20 to 60 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 1 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Bresser

Percent of map unit: 5 percent
Hydric soil rating: No

Kassler

Percent of map unit: 5 percent
Hydric soil rating: No

Sandy alluvial land

Percent of map unit: 5 percent
Hydric soil rating: No

BtE—Bresser-Truckton sandy loams, 5 to 25 percent slopes

Map Unit Setting

National map unit symbol: jqy9
Landscape: Gently sloping-to moderately steep uplands
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Bresser and similar soils: 50 percent
Truckton and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bresser

Setting

Landscape: Gently sloping-to moderately steep uplands
Landform: Gently sloping-to moderately steep terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 30 inches: sandy clay loam
H3 - 30 to 60 inches: loamy sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Description of Truckton

Setting

Landscape: Uplands
Landform: Terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkosic sedimentary rock

Typical profile

H1 - 0 to 4 inches: sandy loam
H2 - 4 to 19 inches: sandy loam
H3 - 19 to 60 inches: sandy loam

Properties and qualities

Slope: 10 to 25 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Newlin

Percent of map unit: 5 percent
Hydric soil rating: No

Blakeland

Percent of map unit: 5 percent
Hydric soil rating: No

Stapleton

Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Fu—Fondis-Kutch association

Map Unit Setting

National map unit symbol: jqyq
Landscape: Uplands
Elevation: 5,500 to 6,800 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Fondis and similar soils: 50 percent
Kutch and similar soils: 35 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fondis

Setting

Landscape: Uplands
Landform: Valley sides, Draws
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits over coarse-silty outwash derived from arkose

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 24 inches: clay
H3 - 24 to 60 inches: sandy clay loam

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R049XB208CO - Clayey Foothill
Hydric soil rating: No

Description of Kutch

Setting

Landscape: Uplands
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-textured residuum weathered from calcareous shale

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 32 inches: clay
H3 - 32 to 36 inches: weathered bedrock

Properties and qualities

Slope: 5 to 40 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R049XB208CO - Clayey Foothill
Hydric soil rating: No

Minor Components

Bresser

Percent of map unit: 5 percent
Hydric soil rating: No

Newlin

Percent of map unit: 5 percent
Hydric soil rating: No

Hilly gravelly land

Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

KtE—Kutch sandy loam, 5 to 20 percent slopes

Map Unit Setting

National map unit symbol: jqz5
Elevation: 5,500 to 6,800 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Kutch and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kutch

Setting

Landform: Valley sides, Alluvial fans, Below stony steep land along major drainageways
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous fine-loamy clayey shale

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 32 inches: clay
H3 - 32 to 36 inches: weathered bedrock

Properties and qualities

Slope: 5 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Bresser

Percent of map unit: 7 percent
Hydric soil rating: No

Newlin

Percent of map unit: 7 percent
Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Lo—Loamy alluvial land

Map Unit Setting

National map unit symbol: jqzb
Elevation: 7,000 to 8,000 feet
Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 44 to 46 degrees F
Frost-free period: 115 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Loamy alluvial land: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loamy Alluvial Land

Setting

Landform: Flood plains, Swales
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 20 inches: sandy loam
H2 - 20 to 40 inches: stratified loamy sand to clay loam
H3 - 40 to 60 inches: sand and gravel

Properties and qualities

Slope: 1 to 5 percent
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Frequent
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C
Ecological site: R049XY036CO - Overflow
Hydric soil rating: No

Minor Components

Sampson

Percent of map unit: 7 percent

Hydric soil rating: No

Bresser

Percent of map unit: 7 percent
Hydric soil rating: No

Sandy alluvial land

Percent of map unit: 5 percent

Fluvaquentic haplustolls

Percent of map unit: 1 percent
Landform: Terraces
Hydric soil rating: Yes

NeE—Newlin gravelly sandy loam, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: jqzg
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Newlin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newlin

Setting

Landform: Rolling to moderately steep terraces, Mesas, Plateaus
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Unconformable sandy and gravelly and/or mixed source alluvium

Typical profile

H1 - 0 to 8 inches: gravelly sandy loam
H2 - 8 to 17 inches: gravelly sandy clay loam
H3 - 17 to 22 inches: gravelly sandy loam
H4 - 22 to 60 inches: very gravelly sand

Properties and qualities

Slope: 8 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Bresser

Percent of map unit: 5 percent
Hydric soil rating: No

Stapleton

Percent of map unit: 4 percent
Hydric soil rating: No

Satanta

Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 2 percent
Landform: Swales
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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.

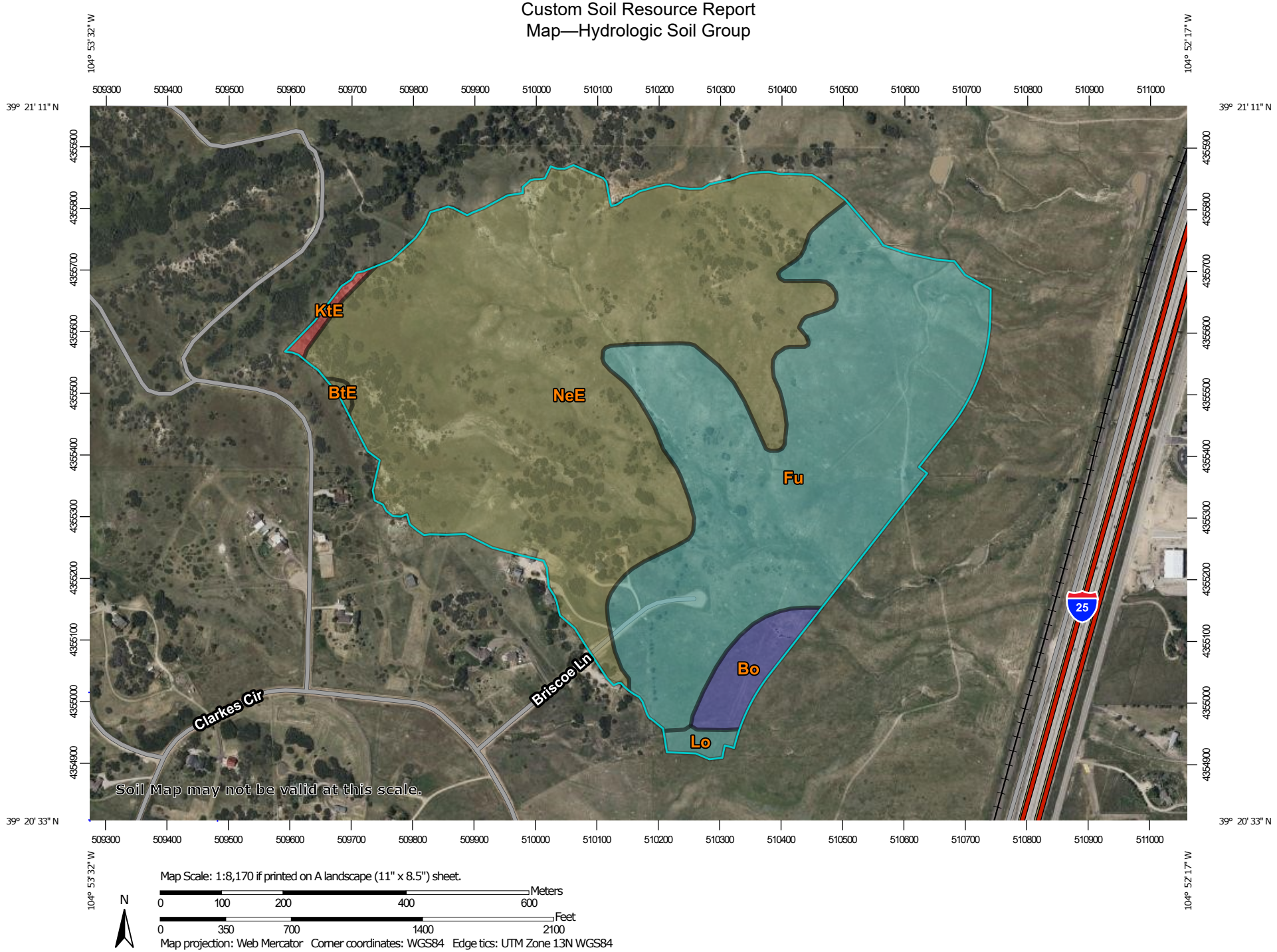
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:8,170 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

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 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 18, Aug 29, 2025

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

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Bo	Blakeland-Orsa association, 1 to 4 percent slopes	A	4.4	2.7%
BtE	Bresser-Truckton sandy loams, 5 to 25 percent slopes	B	0.3	0.2%
Fu	Fondis-Kutch association	C	62.1	38.7%
KtE	Kutch sandy loam, 5 to 20 percent slopes	D	0.8	0.5%
Lo	Loamy alluvial land	C	1.1	0.7%
NeE	Newlin gravelly sandy loam, 8 to 30 percent slopes	B	91.7	57.2%
Totals for Area of Interest			**160.3**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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6.0 Introduction

This chapter summarizes methodology for determining rainfall and runoff information for the design of stormwater management facilities in the Town. The methodology is based on the procedures presented in the MHFD Manual in the Rainfall and Runoff chapters. The design procedures outlined in the MHFD Manual, supplemented by the information provided in this chapter, apply to all projects in the Town.

6.0.1 Stormwater Quality Considerations. One of the most significant impacts of urbanization is the increase in peak flow rates, runoff volumes, and frequency of runoff from impervious areas. This increase in runoff can lead to severe stream erosion, habitat disruption, and increased pollutant loading. At the same time, with proper planning, the increased runoff volumes can be managed to create or supplement existing wetland areas or riparian habitats, which may provide significant benefits to the watershed. The increase in runoff from development is especially pronounced when drainage systems are designed to quickly and "efficiently" convey runoff from paved areas and roofs directly into inlets and storm sewers, discharging eventually into drainageways that are typically designed to convey flows at maximum acceptable velocities. Whether for one site or for a whole watershed, this increase in runoff and acceleration of flood peaks is reflected accurately by the hydrologic methods discussed herein.

As discussed in Chapter 14, Stormwater Quality, effective stormwater management today seeks to disconnect impervious surfaces, slow down flows, and convey runoff over vegetated ground surfaces, leading to filtering, infiltration, and attenuation of flows. These principles can also be reflected in the hydrologic variables discussed in this chapter, yielding longer times of concentration and reduced peak runoff. Specifically, Section 6.6 provides design guidance to account for the hydrologic effects of Minimizing Directly Connected Impervious Areas.

6.1 Design Rainfall

Rainfall data to be used in the Town of Castle Rock is based on the *National Oceanic and Atmospheric Administration Precipitation-Frequency Atlas of the Western United States, Volume III-Colorado* (NOAA Atlas), published in 1973. Precipitation depth maps shown in the NOAA Atlas were used to determine representative one-hour and six-hour point rainfall values for the Town. Following the guidelines in the NOAA Atlas, these point values were used to develop two-hour and three-hour values as well as the intensity-duration curves for use in the Town. The Rainfall chapter of the MHFD Manual provides additional discussion on the use of rainfall data obtained from the NOAA Atlas.

6.1.1 One-hour Rainfall. There is very little variation in the NOAA Atlas isopluvial (equal precipitation depth) map within the Town of Castle Rock; therefore, one set of one hour design point rainfall values, indicated in Table 6-1, apply to the Town.

TABLE 6-1
1-HOUR POINT RAINFALL VALUES FOR
THE TOWN OF CASTLE ROCK (INCHES)

2- YR	5-YR	10-YR	50-YR	100-YR
1.06	1.43	1.66	2.26	2.60

The one-hour rainfall depths are the basis of the Town's intensity-duration rainfall curves and are used to formulate design storm distributions.

6.1.2 Intensity-Duration Curves. Rainfall intensity based on storm duration for a variety of storm return periods can be found on Figure 6-1 at the end of this chapter. These curves were developed using distribution factors provided in the NOAA Atlas and also provided in Table RA-4 of the MHFD Manual. These Intensity-Duration curves are based on Equation RA-3 in the Rainfall Section of the MHFD Manual.

6.1.3 Six-hour Rainfall. In order to use the Colorado Urban Hydrograph Procedure (CUHP), two, three or six-hour rainfall distributions are required, depending on watershed area. Table RA-1 in the MHFD Manual summarizes storm durations, area adjustments, and incremental rainfall depths to be used in CUHP based on watershed area. The UD-Raincurve Spreadsheet included in the MHFD Manual shall be used to generate the rainfall distribution curves necessary for a CUHP model. In order to generate these distribution curves, the one-hour and six-hour rainfall depths for the design return periods are necessary. Since the Town of Castle Rock is not located within MHFD boundaries, the rainfall depth-duration-frequency curves provided in the MHFD Manual do not provide rainfall values for the entire Town. Therefore these values are provided in these Criteria. The 1-hour point values can be found in Table 6-1 of this chapter. The six-hour point values are as follows:

TABLE 6-2
6-HOUR POINT RAINFALL VALUES FOR
THE TOWN OF CASTLE ROCK (INCHES)

2- YR	5-YR	10-YR	50-YR	100-YR
1.5	2.0	2.2	3.0	3.4

The UD-Raincurve spreadsheet shall be used for all portions of the Town. Once the rainfall distribution curves are generated using the MHFD UD-Raincurve Spreadsheet, the CUHP model is to be set up following the procedures provided in the Runoff chapter in Volume 1 of the MHFD Manual.

6.2 Selecting a Method to Estimate Runoff

Two primary methods for estimating storm runoff, peak flow rates and total volumes are used in the Town.

- Rational Method

APPENDIX B

HYDROLOGIC COMPUTATIONS

GCFH Existing Hydrology

CORE Project #: 25-09-001

Prepared By: TCW

IMPERVIOUS CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-3

		Residential & Commercial							Landscape Area					Soil Type		
		Residential			Commercial											
		Park Area	0.25 - 0.75 acres	2.5 acres or larger	Medium Density	Roof/ Concrete	Asphalt/ Ponded Water	Packed Gravel	2-7% Slope	>7% Slope	Historic			Soil Type A Area	Soil Type B Area	Soil Type C/D Area
% Imperv.		25.00%	30.00%	12.00%	80.00%	90.00%	100.00%	40.00%	20.00%	20.00%	5.00%					
BASIN	Design Point	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Total Area (ac)	Percent Impervious	Area (ac)	Area (ac)	Area (ac)
A-3	A3	8.46	-	-	-	-	-	-	-	-	-	8.46	25.0%	3.07	-	5.39
A-6	A6	12.30	-	-	-	-	-	-	-	-	-	12.31	25.0%	0.65	-	11.66
A-9	A9	7.38	-	-	-	-	-	-	-	-	-	7.38	25.0%	-	-	7.38
OS-A3	OSA3	-	-	-	-	-	-	-	-	-	10.03	10.03	5.0%	-	7.99	2.04
OS-A4	OSA4	-	-	-	-	-	-	-	-	-	32.13	32.13	5.0%	-	25.81	6.32
OS-A5	OSA5	-	-	-	-	-	-	-	-	-	15.88	15.88	5.0%	-	14.59	1.29
OS-A6	OSA6	-	-	9.95	-	-	-	-	-	-	13.45	23.41	8.0%	-	23.41	-
OS-A7	OSA7	-	-	4.07	-	-	-	-	-	-	1.01	5.08	10.6%	-	2.88	2.21
OS-A8	OSA8	-	-	-	-	-	-	-	-	-	2.04	2.04	5.0%	-	-	2.04
		-	-	-	-	-	-	-	-	-	-	-		-	-	-
Total DP A3-A9		**28.15**	**0.00**	**14.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**74.54**	**116.71**	**10.7%**	**3.72**	**74.67**	**38.32**

GCFH Existing Hydrology

CORE Project #: 25-09-001
Prepared By: TCW

COMPOSITE DEVELOPED BASIN WEIGHTED "C" CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-4

Table 6-4. Runoff coefficient equations based on NRCS soil group and storm return period

NRCS Soil Group	Storm Return Period						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.84i^{1.124}$	$C_A = 0.85i+0.025$	$C_A = 0.78i+0.110$	$C_A = 0.65i+0.254$
B	$C_B = 0.84i^{1.169}$	$C_B = 0.86i^{1.088}$	$C_B = 0.81i+0.057$	$C_B = 0.63i+0.249$	$C_B = 0.56i+0.328$	$C_B = 0.47i+0.426$	$C_B = 0.37i+0.536$
C/D	$C_{C/D} = 0.83i^{1.122}$	$C_{C/D} = 0.82i+0.035$	$C_{C/D} = 0.74i+0.132$	$C_{C/D} = 0.56i+0.319$	$C_{C/D} = 0.49i+0.393$	$C_{C/D} = 0.41i+0.484$	$C_{C/D} = 0.32i+0.588$

i = % imperviousness/100 expressed as a decimal
C_A = Runoff coefficient for NRCS HSG A soils
C_B = Runoff coefficient for NRCS HSG B soils
C_{CD} = Runoff coefficient for NRCS HSG C and D soils.
Natural Resource Conservation Service (NRCS)

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
			A	0.14	0.15	0.16	0.31	3.07					
A-3	25.0%	0.25	B	0.17	0.19	0.26	0.54		8.46	0.16	0.21	0.26	0.48
			C or D	0.18	0.24	0.32	0.59	5.39					
			A	0.14	0.15	0.16	0.31	0.65					
A-6	25.0%	0.25	B	0.17	0.19	0.26	0.54		12.30	0.17	0.24	0.31	0.57
			C or D	0.18	0.24	0.32	0.59	11.66					
			A	0.14	0.15	0.16	0.31						
A-9	25.0%	0.25	B	0.17	0.19	0.26	0.54		7.38	0.18	0.24	0.32	0.59
			C or D	0.18	0.24	0.32	0.59	7.38					
			A	0.02	0.02	0.02	0.15						
OS-A3	5.0%	0.05	B	0.03	0.03	0.10	0.45	7.99	10.03	0.03	0.04	0.11	0.46
			C or D	0.03	0.08	0.17	0.50	2.04					
			A	0.02	0.02	0.02	0.15						
OS-A4	5.0%	0.05	B	0.03	0.03	0.10	0.45	25.81	32.13	0.03	0.04	0.11	0.46
			C or D	0.03	0.08	0.17	0.50	6.32					
			A	0.02	0.02	0.02	0.15						
OS-A5	5.0%	0.05	B	0.03	0.03	0.10	0.45	14.59	15.88	0.03	0.04	0.10	0.45
			C or D	0.03	0.08	0.17	0.50	1.29					
			A	0.03	0.03	0.04	0.17						
OS-A6	8.0%	0.08	B	0.04	0.05	0.12	0.46	23.41	23.41	0.04	0.05	0.12	0.46
			C or D	0.05	0.10	0.19	0.52						
			A	0.05	0.05	0.05	0.19						
OS-A7	10.6%	0.11	B	0.06	0.07	0.14	0.48	2.88	5.08	0.06	0.10	0.17	0.50
			C or D	0.07	0.12	0.21	0.53	2.21					
			A	0.02	0.02	0.02	0.15						
OS-A8	5.0%	0.05	B	0.03	0.03	0.10	0.45		2.04	0.03	0.08	0.17	0.50
			C or D	0.03	0.08	0.17	0.50	2.04					
			A	0.05	0.05	0.06	0.19	3.72					
Total DP A3-A9	10.7%	0.11	B	0.06	0.08	0.14	0.48	74.67	116.71	0.06	0.09	0.16	0.48
			C or D	0.07	0.12	0.21	0.53	38.32					

GCFH Existing Hydrology

CORE Project #: 25-09-001

Prepared By: TCW

TIME OF CONCENTRATION CALCULATIONS | BASIN A

-REFERENCE UDFCD Vol.1 Section 2.4

NRCS Conveyance factors, K -REFERENCE UDFCD Vol.1 RUNOFF Table 6-2

SF-2

Heavy Meadow	3	Short Grass Pasture & Lawns	7	Grassed Waterway	15
Tillage/field	5	Nearly Bare Ground	10	Paved Area & Shallow Gutter	20

SUB-BASIN DATA			INITIAL / OVERLAND TIME			CHANNEL / TRAVEL TIME T(t)						T(c) CHECK (URBANIZED BASINS)		FINAL T(c)
DRAIN BASIN	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	% IMPER-VIOUS	USDCM Eq . 6-5	min.
A-3	8.46	0.21	300	8.9	13.6	330	2.6	7	1.1	4.8	18.4	25.0%	24.5	18.4
A-6	12.31	0.24	286	1.2	25.1	1141	2.8	7	1.2	16.4	41.4	25.0%	30.9	30.9
A-9	7.38	0.24	300	4.2	16.7	638	2.4	7	1.1	9.8	26.6	25.0%	27.3	26.6
OS-A3	10.03	0.04	500	4.6	25.8	1110	5.6	7	1.7	11.2	37.0	5.0%	33.2	33.2
OS-A4	32.13	0.04	350	11.4	16.0	2000	5.0	7	1.6	21.3	37.3	5.0%	40.5	37.3
OS-A5	15.88	0.04	500	17.0	16.9	1850	5.1	7	1.6	19.4	36.3	5.0%	39.2	36.3
OS-A6	23.41	0.05	200	12.5	11.6	1850	7.0	7	1.9	16.6	28.2	8.0%	36.1	28.2
OS-A7	5.08	0.10	200	6.0	14.2	580	7.4	7	1.9	5.1	19.3	10.6%	27.6	19.3
OS-A8	2.04	0.08	126	10.0	9.7	130	11.5	7	2.4	0.9	10.6	5.0%	25.8	10.6

GCFH Existing Hydrology

CORE Project #: 25-09-001

Prepared By: TCW

RATIONAL METHOD PEAK RUNOFF

5-Year STORM Rainfall Depth-Duration-Frequency (1-hr) = **1.43**

SF-3

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA ac.	5yr Runoff COEFF	T(c) min	C x A	I in/hr	Q cfs
A3	A-3	8.46	0.21	18.4	1.74	2.93	5.12
A6	A-6	12.31	0.24	30.9	2.89	2.20	6.38
A9	A-9	7.38	0.24	26.6	1.77	2.41	4.26
OSA3	OS-A3	10.03	0.04	33.2	0.42	2.11	0.88
OSA4	OS-A4	32.13	0.04	37.3	1.33	1.97	2.62
OSA5	OS-A5	15.88	0.04	36.3	0.58	2.00	1.16
OSA6	OS-A6	23.41	0.05	28.2	1.29	2.33	2.99
OSA7	OS-A7	5.08	0.10	19.3	0.48	2.87	1.39
OSA8	OS-A8	2.04	0.08	10.6	0.16	3.78	0.59

GCFH Existing Hydrology

CORE Project #: 25-09-001

Prepared By: TCW

RATIONAL METHOD PEAK RUNOFF

100-YR STORM

SF-3 Rainfall Depth-Duration-Frequency (1-hr) = **2.60**

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA ac.	100YR RUNNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs
A3	A-3	8.46	0.48	18.4	4.10	5.33	21.86
A6	A-6	12.31	0.57	30.9	7.03	4.01	28.19
A9	A-9	7.38	0.59	26.6	4.33	4.38	18.94
OSA3	OS-A3	10.03	0.46	33.2	4.62	3.84	17.73
OSA4	OS-A4	32.13	0.46	37.3	14.79	3.58	52.88
OSA5	OS-A5	15.88	0.45	36.3	7.21	3.64	26.22
OSA6	OS-A6	23.41	0.46	28.2	10.85	4.23	45.88
OSA7	OS-A7	5.08	0.50	19.3	2.53	5.21	13.21
OSA8	OS-A8	2.04	0.50	10.6	1.03	6.87	7.07

GCFH Proposed Hydrology

CORE Project #: 25-092
Prepared By: LCC

IMPERVIOUS CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-3

		0.00														
		Land Use (Off-site)			0.00				Landscape Area					Soil Type		
		Park Area	SFH Rural 0-3 du/ac	Roofs	Asphalt/ Concrete	Packed Gravel	Turf Field with Underdrain	Extended Detention Basin	Receving Pervious Area	All other (Disturbed)	Historic			Soil Type A Area	Soil Type B Area	Soil Type C/D Area
% Imperv.		25.00%	35.00%	95.00%	95.00%	60.00%	80.00%	25.00%	20.00%	20.00%	5.00%					
BASIN	Design Point	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Total Area (ac)	Percent Impervious	Area (ac)	Area (ac)	Area (ac)
OS-A3	**OSA3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**10.03**	**10.03**	**5.0%**	**-**	**7.99**	**2.04**
OS-A4	**OSA4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**32.13**	**32.13**	**5.0%**	**-**	**25.81**	**6.32**
OS-A5	**OSA5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**15.88**	**15.88**	**5.0%**	**-**	**14.59**	**1.29**
OS-A6	**OSA6**	**-**	**9.95**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**13.45**	**23.41**	**17.8%**	**-**	**23.41**	**-**
OS-A7	**OSA7**	**-**	**4.07**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.01**	**5.08**	**29.0%**	**-**	**2.88**	**2.21**
OS-A8	**OSA8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.04**	**2.04**	**5.0%**	**-**	**-**	**2.04**
A1	**A1**	**-**	**-**	**-**	**0.60**	**-**	**-**	**-**	**-**	**-**	**-**	**0.60**	**95.0%**	**0.60**	**-**	**-**
A3.1	A3.1	-	-	-	-	-	-	-	-	2.44	-	2.44	20.0%	-	-	2.44
A3.2	A3.2	-	-	-	-	-	-	-	-	1.12	-	1.12	20.0%	0.51	-	0.61
A3.3	A3.3	-	-	-	0.17	-	-	-	-	-	-	0.17	95.0%	0.17	-	-
A3	**A3**	**-**	**-**	**-**	**0.17**	**-**	**-**	**-**	**-**	**3.56**	**-**	**3.73**	**23.4%**	**0.68**	**-**	**3.05**
A4.1	**A4.1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0.26**	**-**	**0.26**	**20.0%**	**0.04**	**-**	**0.22**
A4	**A4**	**-**	**-**	**-**	**0.64**	**-**	**-**	**-**	**-**	**-**	**-**	**0.64**	**95.0%**	**0.31**	**-**	**0.33**
A6.1	A6.1	-	-	-	-	-	-	-	-	2.62	-	2.62	20.0%	-	1.19	1.43
A6.2	A6.2	-	-	-	-	-	-	-	-	0.71	-	0.71	20.0%	-	-	0.71
A6	**A6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3.33**	**-**	**3.33**	**20.0%**	**-**	**1.19**	**2.14**
A7	**A7**	**-**	**-**	**-**	**0.67**	**-**	**-**	**-**	**-**	**-**	**-**	**0.67**	**95.0%**	**-**	**-**	**0.67**
A9.1	A9.1	-	-	-	-	-	-	-	-	0.29	0.11	0.40	15.9%	-	-	0.40
A9.2	A9.2	-	-	-	1.21	-	-	-	-	0.07	-	1.28	91.1%	-	-	1.28
A9.3	A9.3	-	-	-	-	-	-	-	-	3.00	-	3.00	20.0%	-	-	3.00
A9	**A9**	**-**	**-**	**-**	**1.21**	**-**	**-**	**-**	**-**	**3.36**	**0.11**	**4.68**	**39.1%**	**-**	**-**	**4.68**
Total Bypass		**-**	**14.02**	**-**	**3.29**	**-**	**-**	**-**	**-**	**10.51**	**99.50**	**127.32**	**11.9%**	**1.63**	**89.62**	**36.07**

		0.00														
		Land Use (Off-site)			0.00				Landscape Area					Soil Type		
		Park Area	SFH Rural 0-3 du/ac	Roofs	Asphalt/ Concrete	Packed Gravel	Turf Field with Underdrain	Extended Detention Basin	Receving Pervious Area	All other (Disturbed)	Historic			Soil Type A Area	Soil Type B Area	Soil Type C/D Area
% Imperv.		25.00%	35.00%	95.00%	95.00%	60.00%	80.00%	25.00%	20.00%	20.00%	5.00%					
BASIN	Design Point	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Area (ac)	Total Area (ac)	Percent Impervious	Area (ac)	Area (ac)	Area (ac)
1.01	1.01	-	-	-	-	-	-	-	-	0.48	-	0.48	20.0%	-	-	0.48
1.02	1.02	-	-	0.34	-	-	-	-	-	-	-	0.34	95.0%	-	-	0.34
1.03	1.03	-	-	-	0.09	-	-	-	-	0.13	-	0.22	50.2%	-	-	0.22
1.04	1.04	-	-	-	0.62	-	-	-	-	0.08	-	0.70	86.4%	-	-	0.70
1.05	1.05	-	-	0.67	-	-	-	-	-	-	-	0.67	95.0%	-	-	0.67
1.06	1.06	-	-	-	0.94	-	-	-	-	0.04	-	0.98	91.8%	-	-	0.98
1.07	1.07	-	-	-	2.70	-	-	-	-	0.63	-	3.33	80.8%	1.45	-	1.88
1.08	1.08	-	-	-	0.84	-	-	-	-	0.36	-	1.20	72.8%	1.08	-	0.12
1.11	1.11	-	-	0.67	-	-	-	-	-	-	-	0.67	95.0%	-	-	0.67
1.12	1.12	-	-	0.34	-	-	-	-	-	-	-	0.34	95.0%	0.01	-	0.33
1.13	1.13	-	-	-	0.49	-	-	-	-	0.26	-	0.75	68.5%	0.18	-	0.57
2.01	2.01	-	-	-	0.50	-	-	-	-	0.20	-	0.70	74.0%	-	0.05	0.65
2.02	2.02	-	-	-	0.47	-	-	-	-	0.01	-	0.48	93.1%	-	-	0.48
2.03	2.03	-	-	-	-	-	-	-	-	0.49	-	0.49	20.0%	-	-	0.49
2.04	2.04	-	-	-	1.16	-	-	-	-	0.39	-	1.55	76.2%	-	-	1.55
2.05	2.05	-	-	-	0.18	-	-	-	-	0.07	-	0.25	73.7%	-	-	0.25
2.06	2.06	-	-	-	0.13	-	1.00	-	-	0.22	-	1.35	71.7%	-	-	1.35
2.07	2.07	-	-	-	0.03	-	0.87	-	-	0.13	-	1.03	73.1%	-	-	1.03
3.0	3.0	-	-	-	-	0.09	-	0.63	-	0.58	-	1.30	25.3%	-	-	1.30
GCFH	**GCFH**	**-**	**-**	**2.02**	**8.15**	**0.09**	**1.88**	**0.63**	**-**	**4.06**	**-**	**16.83**	**72.4%**	**2.71**	**0.05**	**14.06**
Pond A6		**-**	**-**	**2.02**	**8.15**	**0.09**	**1.88**	**0.63**	**-**	**4.06**	**-**	**16.83**	**72.4%**	**2.71**	**0.05**	**14.06**
		-	-	-	-	-	-	-	-	-	-	-		-	-	-
Total On-site		**-**	**-**	**2.02**	**8.32**	**0.09**	**1.88**	**0.63**	**-**	**11.50**	**0.11**	**24.55**	**56.4%**	**3.44**	**1.24**	**19.88**

GCFH Proposed Hydrology

CORE Project #: 25-092
Prepared By: LCC

COMPOSITE DEVELOPED BASIN WEIGHTED "C" CALCULATIONS

-REFERENCE UDFCD Vol.1 RUNOFF Table 6-4

Table 6-4. Runoff coefficient equations based on NRCS soil group and storm return period

NRCS Soil Group	Storm Return Period						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.84i^{1.124}$	$C_A = 0.85i+0.025$	$C_A = 0.78i+0.110$	$C_A = 0.65i+0.254$
B	$C_B = 0.84i^{1.169}$	$C_B = 0.86i^{1.088}$	$C_B = 0.81i+0.057$	$C_B = 0.63i+0.249$	$C_B = 0.56i+0.328$	$C_B = 0.47i+0.426$	$C_B = 0.37i+0.536$
C/D	$C_{C/D} = 0.83i^{1.122}$	$C_{C/D} = 0.82i+0.035$	$C_{C/D} = 0.74i+0.132$	$C_{C/D} = 0.56i+0.319$	$C_{C/D} = 0.49i+0.393$	$C_{C/D} = 0.41i+0.484$	$C_{C/D} = 0.32i+0.588$

i = % imperviousness/100 expressed as a decimal
C_A = Runoff coefficient for NRCS HSG A soils
C_B = Runoff coefficient for NRCS HSG B soils
C_{CD} = Runoff coefficient for NRCS HSG C and D soils.
Natural Resource Conservation Service (NRCS)

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
OS-A2	5.0%	0.05	A	0.02	0.02	0.02	0.15	12.94	21.18	0.03	0.05	0.13	0.47
			B	0.03	0.03	0.10	0.45						
			C or D	0.03	0.08	0.17	0.50	8.24					
OS-A3	5.0%	0.05	A	0.02	0.02	0.02	0.15	7.99	10.03	0.03	0.04	0.11	0.46
			B	0.03	0.03	0.10	0.45						
			C or D	0.03	0.08	0.17	0.50	2.04					
OS-A4	5.0%	0.05	A	0.02	0.02	0.02	0.15	25.81	32.13	0.03	0.04	0.11	0.46
			B	0.03	0.03	0.10	0.45						
			C or D	0.03	0.08	0.17	0.50	6.32					
OS-A5	5.0%	0.05	A	0.02	0.02	0.02	0.15	14.59	15.88	0.03	0.04	0.10	0.45
			B	0.03	0.03	0.10	0.45						
			C or D	0.03	0.08	0.17	0.50	1.29					
OS-A6	17.8%	0.18	A	0.09	0.09	0.10	0.25	23.41	23.41	0.11	0.13	0.20	0.51
			B	0.11	0.13	0.20	0.51						
			C or D	0.12	0.18	0.26	0.56						
OS-A7	29.0%	0.29	A	0.17	0.18	0.19	0.34	2.88	5.08	0.20	0.25	0.32	0.58
			B	0.20	0.22	0.29	0.56						
			C or D	0.21	0.27	0.35	0.60	2.21					
OS-A8	5.0%	0.05	A	0.02	0.02	0.02	0.15	2.04	2.04	0.03	0.08	0.17	0.50
			B	0.03	0.03	0.10	0.45						
			C or D	0.03	0.08	0.17	0.50	2.04					

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
A1	95.0%	0.95	A B C or D	0.79 0.79 0.78	0.81 0.81 0.81	0.82 0.83 0.84	0.85 0.87 0.87	0.60	0.60	0.79	0.81	0.82	0.85
A3.1	20.0%	0.20	A B C or D	0.10 0.13 0.14	0.11 0.15 0.20	0.12 0.22 0.28	0.27 0.52 0.57	2.44	2.44	0.14	0.20	0.28	0.57
A3.2	20.0%	0.20	A B C or D	0.10 0.13 0.14	0.11 0.15 0.20	0.12 0.22 0.28	0.27 0.52 0.57	0.51 0.61	1.12	0.12	0.16	0.21	0.43
A3.3	95.0%	0.95	A B C or D	0.79 0.79 0.78	0.81 0.81 0.81	0.82 0.83 0.84	0.85 0.87 0.87	0.17	0.17	0.79	0.81	0.82	0.85
										-	-	-	-
A4.1	20.0%	0.20	A B C or D	0.10 0.13 0.14	0.11 0.15 0.20	0.12 0.22 0.28	0.27 0.52 0.57	0.04 0.22	0.26	0.13	0.19	0.25	0.52
A4	95.0%	0.95	A B C or D	0.79 0.79 0.78	0.81 0.81 0.81	0.82 0.83 0.84	0.85 0.87 0.87	0.31 0.33	0.64	0.78	0.81	0.83	0.86
A6.1	20.0%	0.20	A B C or D	0.10 0.13 0.14	0.11 0.15 0.20	0.12 0.22 0.28	0.27 0.52 0.57	1.19 1.43	2.62	0.13	0.18	0.25	0.55
A6.2	20.0%	0.20	A B C or D	0.10 0.13 0.14	0.11 0.15 0.20	0.12 0.22 0.28	0.27 0.52 0.57	0.71	0.71	0.14	0.20	0.28	0.57
A7	95.0%	0.95	A B C or D	0.79 0.79 0.78	0.81 0.81 0.81	0.82 0.83 0.84	0.85 0.87 0.87	0.67	0.67	0.78	0.81	0.84	0.87
A9.1	15.9%	0.16	A B C or D	0.08 0.10 0.11	0.08 0.12 0.17	0.09 0.19 0.25	0.23 0.50 0.55	0.40	0.40	0.11	0.17	0.25	0.55
A9.2	91.1%	0.91	A B C or D	0.74 0.75 0.75	0.76 0.78 0.78	0.78 0.80 0.81	0.82 0.85 0.86	1.28	1.28	0.75	0.78	0.81	0.86
A9.3	20.0%	0.20	A B C or D	0.10 0.13 0.14	0.11 0.15 0.20	0.12 0.22 0.28	0.27 0.52 0.57	3.00	3.00	0.14	0.20	0.28	0.57
1.01	20.0%	0.20	A B C or D	0.10 0.13 0.14	0.11 0.15 0.20	0.12 0.22 0.28	0.27 0.52 0.57	0.48	0.48	0.14	0.20	0.28	0.57
1.02	95.0%	0.95	A B C or D	0.79 0.79 0.78	0.81 0.81 0.81	0.82 0.83 0.84	0.85 0.87 0.87	0.34	0.34	0.78	0.81	0.84	0.87
1.03	50.2%	0.50	A B C or D	0.34 0.38 0.38	0.36 0.41 0.45	0.37 0.46 0.50	0.50 0.66 0.69	0.22	0.22	0.38	0.45	0.50	0.69
1.04	86.4%	0.86	A B C or D	0.69 0.71 0.70	0.71 0.73 0.74	0.73 0.76 0.77	0.78 0.83 0.84	0.70	0.70	0.70	0.74	0.77	0.84
1.05	95.0%	0.95	A B C or D	0.79 0.79 0.78	0.81 0.81 0.81	0.82 0.83 0.84	0.85 0.87 0.87	0.67	0.67	0.78	0.81	0.84	0.87
1.06	91.8%	0.92	A B C or D	0.75 0.76 0.75	0.77 0.78 0.79	0.78 0.80 0.81	0.83 0.86 0.86	0.98	0.98	0.75	0.79	0.81	0.86
1.07	80.8%	0.81	A B C or D	0.64 0.65 0.65	0.65 0.68 0.70	0.67 0.71 0.73	0.74 0.81 0.82	1.45 1.88	3.33	0.65	0.68	0.70	0.78

Basin ID	% Imperv.	*i*	Soil Type	Runoff Coefficients, C				Basin Area	Total Area	Weighted Runoff Coefficients, C			
				2-Year	5-Year	10-Year	100-Year			2-Year	5-Year	10-Year	100-Year
1.08	72.8%	0.73	A	0.56	0.57	0.59	0.68	1.08	1.20	0.56	0.58	0.60	0.69
			B	0.58	0.61	0.65	0.77						
			C or D	0.58	0.63	0.67	0.78	0.12					
1.11	95.0%	0.95	A	0.79	0.81	0.82	0.85		0.67	0.78	0.81	0.84	0.87
			B	0.79	0.81	0.83	0.87						
			C or D	0.78	0.81	0.84	0.87	0.67					
1.12	95.0%	0.95	A	0.79	0.81	0.82	0.85	0.01	0.34	0.78	0.81	0.83	0.87
			B	0.79	0.81	0.83	0.87						
			C or D	0.78	0.81	0.84	0.87	0.33					
1.13	68.5%	0.69	A	0.51	0.53	0.55	0.64	0.18	0.75	0.54	0.58	0.62	0.74
			B	0.54	0.57	0.61	0.75						
			C or D	0.54	0.60	0.64	0.76	0.57					
2.01	74.0%	0.74	A	0.57	0.59	0.60	0.69		0.70	0.59	0.64	0.68	0.79
			B	0.59	0.62	0.66	0.77	0.05					
			C or D	0.59	0.64	0.68	0.79	0.65					
2.02	93.1%	0.93	A	0.77	0.78	0.80	0.84		0.48	0.77	0.80	0.82	0.87
			B	0.77	0.80	0.81	0.86						
			C or D	0.77	0.80	0.82	0.87	0.48					
2.03	20.0%	0.20	A	0.10	0.11	0.12	0.27		0.49	0.14	0.20	0.28	0.57
			B	0.13	0.15	0.22	0.52						
			C or D	0.14	0.20	0.28	0.57	0.49					
2.04	76.2%	0.76	A	0.59	0.61	0.62	0.70		1.55	0.61	0.66	0.70	0.80
			B	0.61	0.64	0.67	0.78						
			C or D	0.61	0.66	0.70	0.80	1.55					
2.05	73.7%	0.74	A	0.56	0.58	0.60	0.69		0.25	0.59	0.64	0.68	0.79
			B	0.59	0.62	0.65	0.77						
			C or D	0.59	0.64	0.68	0.79	0.25					
2.06	71.7%	0.72	A	0.54	0.56	0.58	0.67		1.35	0.57	0.62	0.66	0.78
			B	0.57	0.60	0.64	0.76						
			C or D	0.57	0.62	0.66	0.78	1.35					
2.07	73.1%	0.73	A	0.56	0.58	0.59	0.68		1.03	0.58	0.63	0.67	0.78
			B	0.58	0.61	0.65	0.77						
			C or D	0.58	0.63	0.67	0.78	1.03					
3.0	25.3%	0.25	A	0.14	0.15	0.16	0.31		1.30	0.18	0.24	0.32	0.59
			B	0.17	0.19	0.26	0.54						
			C or D	0.18	0.24	0.32	0.59	1.30					

GCFH Proposed Hydrology

CORE Project #: 25-092
Prepared By: LCC

TIME OF CONCENTRATION CALCULATIONS | BASIN A

-REFERENCE UDFCD Vol.1 Section 2.4 *NRCS Conveyance factors, K -REFERENCE UDFCD Vol.1 RUNOFF Table 6-2*

SF-2

Heavy Meadow	3	Short Grass Pasture & Lawns	7	Grassed Waterway	15
Tillage/field	5	Nearly Bare Ground	10	Paved Area & Shallow Gutter	20

SUB-BASIN DATA			INITIAL / OVERLAND TIME			CHANNEL / TRAVEL TIME T(t)						T(c) CHECK (URBANIZED BASINS)		FINAL T(c)
DRAIN BASIN	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	% IMPER-VIOUS	USDCM Eq . 6-5	min.
OS-A2	21.18	0.05	500	11.0	19.2	1715	5.8	7	1.7	16.9	36.1	5.0%	37.4	36.1
OS-A3	10.03	0.04	500	4.6	25.8	1110	5.6	7	1.7	11.2	37.0	5.0%	33.2	33.2
OS-A3.1	2.12	0.07	380	7.9	18.3	1350	5.2	7	1.6	14.1	32.4	5.0%	35.3	32.4
OS-A3.2	1.55	0.06	150	8.7	11.3	1315	5.3	7	1.6	13.6	24.9	5.0%	34.9	24.9
OS-A4	32.13	0.04	350	11.4	16.0	2000	5.0	7	1.6	21.3	37.3	5.0%	40.5	37.3
OS-A5	15.88	0.04	500	17.0	16.9	1850	5.1	7	1.6	19.4	36.3	5.0%	39.2	36.3
OS-A6	23.41	0.13	200	12.5	10.7	1850	7.0	7	1.9	16.6	27.4	17.8%	33.1	27.4
OS-A7	5.08	0.25	200	6.0	12.1	580	7.4	7	1.9	5.1	17.2	29.0%	23.8	17.2
OS-A8	2.04	0.08	126	10.0	9.7	130	11.5	7	2.4	0.9	10.6	5.0%	25.8	10.6
A1	0.60	0.81	40	2.5	2.5	365	3.0	20	3.5	1.8	4.2	95.0%	11.4	5.0
A3.1	2.44	0.20	75	20.0	5.2	350	3.7	20	3.9	1.5	6.8	20.0%	25.2	6.8
A3.2	1.12	0.16	90	16.7	6.4	270	4.1	7	1.4	3.2	9.6	20.0%	24.5	9.6
A3.3	0.17	0.81	35	2.3	2.4	270	1.5	20	2.4	1.8	4.2	95.0%	11.5	5.0
				0.0			0.0							
A4.1	0.26	0.19	50	4.0	7.4	315	2.9	20	3.4	1.6	8.9	20.0%	25.2	8.9
A4	0.64	0.81	45	3.3	2.4	455	2.9	20	3.4	2.2	4.6	95.0%	11.9	5.0
A6.1	2.62	0.18	160	21.9	7.6	180	2.2	15	2.2	1.3	9.0	20.0%	24.3	9.0
A6.2	0.71	0.20	90	20.0	5.7	75	2.7	7	1.1	1.1	6.8	20.0%	23.2	6.8
A7	0.67	0.81	85	2.4	3.6	460	2.8	20	3.4	2.3	5.9	95.0%	11.9	5.9
A9.1	0.40	0.17	65	2.3	10.3	290	3.8	20	3.9	1.2	11.6	15.9%	25.5	11.6
A9.2	1.28	0.78	65	2.3	3.5	275	4.0	20	4.0	1.1	4.7	91.1%	11.6	5.0
A9.3	3.00	0.20	40	20.0	3.8	1050	3.8	15	2.9	6.0	9.8	20.0%	30.2	9.8
1.01	0.48	0.20	140	21.4	7.0						7.0	20.0%		7.0
1.02	0.34	0.81	70	5.0	2.5	270	2.2	20	3.0	1.5	4.0	95.0%	11.2	5.0
1.03	0.22	0.45	65	4.6	5.7						5.7	50.2%		5.7
1.04	0.70	0.74	45	2.2	3.3	490	2.0	20	2.9	2.9	6.2	86.4%	14.0	6.2
1.05	0.67	0.81	70	5.0	2.5	270	2.2	20	3.0	1.5	4.0	95.0%	11.2	5.0
1.06	0.98	0.79	45	4.4	2.3	540	3.0	20	3.4	2.6	4.9	91.8%	12.8	5.0
1.07	3.33	0.68	110	2.3	6.1	70	1.0	20	2.0	0.6	6.7	80.8%	12.8	6.7
1.08	1.20	0.58	285	3.0	11.1	240	1.9	20	2.7	1.5	12.5	72.8%	15.2	12.5
1.11	0.67	0.81	70	5.0	2.5	400	2.0	20	2.8	2.4	4.9	95.0%	12.0	5.0
1.12	0.34	0.81	70	5.0	2.5	230	2.2	20	2.9	1.3	3.8	95.0%	11.0	5.0
1.13	0.75	0.58	32	3.1	3.6			20			3.6	68.5%		5.0

SUB-BASIN DATA			INITIAL / OVERLAND TIME			CHANNEL / TRAVEL TIME T(t)						T(c) CHECK (URBANIZED BASINS)		FINAL T(c)
DRAIN BASIN	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	% IMPER-VIOUS	USDCM Eq . 6-5	min.
2.01	0.70	0.64	144	24.3	3.5	240	1.5	20	2.4	1.7	5.1	74.0%	15.1	5.1
2.02	0.48	0.80	140	2.5	4.8	105	1.4	20	2.4	0.7	5.5	93.1%	10.8	5.5
2.03	0.49	0.20	105	23.8	5.9	50	2.0	7	1.0	0.8	6.7	20.0%	23.1	6.7
2.04	1.55	0.66	40	2.5	3.7	640	1.1	20	2.1	5.1	8.8	76.2%	18.2	8.8
2.05	0.25	0.64	40	2.5	3.9	165	3.6	20	3.8	0.7	4.6	73.7%	14.2	5.0
2.06	1.35	0.62	50	2.0	4.8	400	1.0	20	2.0	3.3	8.2	71.7%	17.3	8.2
2.07	1.03	0.63	50	2.0	4.7	550	1.0	20	2.0	4.6	9.3	73.1%	18.3	9.3
3.0	1.30	0.24	102	11.8	6.9						6.9	25.3%		6.9

GCFH Proposed Hydrology

CORE Project #: 25-092
Prepared By: LCC

RATIONAL METHOD PEAK RUNOFF

5-Year STORM Rainfall Depth-Duration-Frequency (1-hr) = **1.43**

SF-3

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

BASIN INFORMATON				DIRECT RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA ac.	5yr Runoff COEFF	T(c) min	C x A	I in/hr	Q cfs
OSA2	OS-A2	21.18	0.05	36.1	1.05	2.01	2.11
OSA3	OS-A3	10.03	0.04	33.2	0.42	2.11	0.88
OSA3.1	OS-A3.1	2.12	0.07	32.4	0.15	2.14	0.33
OSA3.2	OS-A3.2	1.55	0.06	24.9	0.09	2.50	0.23
OSA4	OS-A4	32.13	0.04	37.3	1.33	1.97	2.62
OSA5	OS-A5	15.88	0.04	36.3	0.58	2.00	1.16
OSA6	OS-A6	23.41	0.13	27.4	3.07	2.37	7.27
OSA7	OS-A7	5.08	0.25	17.2	1.25	3.04	3.79
OSA8	OS-A8	2.04	0.08	10.6	0.16	3.78	0.59
A1	A1	0.60	0.81	5.0	0.48	4.85	2.34
A3.1	A3.1	2.44	0.20	6.8	0.49	4.45	2.16
A3.2	A3.2	1.12	0.16	9.6	0.18	3.94	0.70
A3.3	A3.3	0.17	0.81	5.0	0.14	4.85	0.66
A4.1	A4.1	0.26	0.19	8.9	0.05	4.04	0.19
A4	A4	0.64	0.81	5.0	0.52	4.85	2.51
A6.1	A6.1	2.62	0.18	9.0	0.46	4.03	1.87
A6.2	A6.2	0.71	0.20	6.8	0.14	4.43	0.63
A7	A7	0.67	0.81	5.9	0.55	4.64	2.53
A9.1	A9.1	0.40	0.17	11.6	0.07	3.65	0.24
A9.2	A9.2	1.28	0.78	5.0	1.00	4.85	4.86
A9.3	A9.3	3.00	0.20	9.8	0.60	3.90	2.33
1.01	1.01	0.48	0.20	7.0	0.10	4.40	0.42
1.02	1.02	0.34	0.81	5.0	0.28	4.85	1.34
1.03	1.03	0.22	0.45	5.7	0.10	4.67	0.46
1.04	1.04	0.70	0.74	6.2	0.52	4.57	2.38
1.05	1.05	0.67	0.81	5.0	0.55	4.85	2.65
1.06	1.06	0.98	0.79	5.0	0.77	4.85	3.75
1.07	1.07	3.33	0.68	6.7	2.26	4.47	10.10
1.08	1.08	1.20	0.58	12.5	0.69	3.52	2.45
1.11	1.11	0.67	0.81	5.0	0.55	4.85	2.65
1.12	1.12	0.34	0.81	5.0	0.28	4.85	1.34
1.13	1.13	0.75	0.58	5.0	0.44	4.85	2.12
2.01	2.01	0.70	0.64	5.1	0.45	4.82	2.16
2.02	2.02	0.48	0.80	5.5	0.38	4.73	1.81
2.03	2.03	0.49	0.20	6.7	0.10	4.46	0.43
2.04	2.04	1.55	0.66	8.8	1.02	4.06	4.15
2.05	2.05	0.25	0.64	5.0	0.16	4.85	0.78
2.06	2.06	1.35	0.62	8.2	0.84	4.17	3.50
2.07	2.07	1.03	0.63	9.3	0.65	3.98	2.60
3.0	3.0	1.30	0.24	6.9	0.31	4.41	1.39

GCFH Proposed Hydrology

CORE Project #: 25-092
Prepared By: LCC

RATIONAL METHOD PEAK RUNOFF

100-YR STORM

SF-3 Rainfall Depth-Duration-Frequency (1-hr) = **2.60**

-REFERENCE UDFCD Vol.1 EQ 5-1 & EQ 6-1

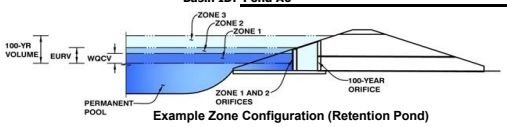
BASIN INFORMATON				DIRECT RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA ac.	100YR RUNNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs
OSA2	OS-A2	21.18	0.47	36.1	9.98	3.65	36.38
OSA3	OS-A3	10.03	0.46	33.2	4.62	3.84	17.73
OSA3.1	OS-A3.1	2.12	0.50	32.4	1.06	3.90	4.12
OSA3.2	OS-A3.2	1.55	0.48	24.9	0.74	4.54	3.38
OSA4	OS-A4	32.13	0.46	37.3	14.79	3.58	52.88
OSA5	OS-A5	15.88	0.45	36.3	7.21	3.64	26.22
OSA6	OS-A6	23.41	0.51	27.4	11.92	4.30	51.32
OSA7	OS-A7	5.08	0.58	17.2	2.95	5.53	16.31
OSA8	OS-A8	2.04	0.50	10.6	1.03	6.87	7.07
A1	A1	0.60	0.85	5.0	0.51	8.82	4.50
A3.1	A3.1	2.44	0.57	6.8	1.38	8.08	11.16
A3.2	A3.2	1.12	0.43	9.6	0.48	7.16	3.44
A3.3	A3.3	0.17	0.85	5.0	0.14	8.82	1.28
A4.1	A4.1	0.26	0.52	8.9	0.13	7.34	0.99
A4	A4	0.64	0.86	5.0	0.55	8.82	4.87
A6.1	A6.1	2.62	0.55	9.0	1.43	7.34	10.48
A6.2	A6.2	0.71	0.57	6.8	0.40	8.05	3.24
A7	A7	0.67	0.87	5.9	0.59	8.44	4.94
A9.1	A9.1	0.40	0.55	11.6	0.22	6.63	1.46
A9.2	A9.2	1.28	0.86	5.0	1.10	8.82	9.68
A9.3	A9.3	3.00	0.57	9.8	1.70	7.09	12.04
A9	A9	4.68	0.64	5.0	3.02	8.82	26.59
1.01	1.01	0.48	0.57	7.0	0.27	7.99	2.17
1.02	1.02	0.34	0.87	5.0	0.30	8.82	2.62
1.03	1.03	0.22	0.69	5.7	0.15	8.49	1.29
1.04	1.04	0.70	0.84	6.2	0.59	8.31	4.88
1.05	1.05	0.67	0.87	5.0	0.59	8.82	5.16
1.06	1.06	0.98	0.86	5.0	0.84	8.82	7.44
1.07	1.07	3.33	0.78	6.7	2.61	8.12	21.16
1.08	1.08	1.20	0.69	12.5	0.83	6.40	5.29
1.11	1.11	0.67	0.87	5.0	0.59	8.82	5.16
1.12	1.12	0.34	0.87	5.0	0.30	8.82	2.62
1.13	1.13	0.75	0.74	5.0	0.55	8.82	4.87
2.01	2.01	0.70	0.79	5.1	0.55	8.76	4.82
2.02	2.02	0.48	0.87	5.5	0.42	8.60	3.57
2.03	2.03	0.49	0.57	6.7	0.28	8.11	2.25
2.04	2.04	1.55	0.80	8.8	1.23	7.38	9.11
2.05	2.05	0.25	0.79	5.0	0.20	8.82	1.73
2.06	2.06	1.35	0.78	8.2	1.05	7.58	7.96
2.07	2.07	1.03	0.78	9.3	0.81	7.23	5.84
3.0	3.0	1.30	0.59	6.9	0.76	8.02	6.12

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)

Project: **Gold Crown Field House Full buildout**

Basin ID: **Pond A6**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	**EDB**	
Watershed Area =	16.83	acres
Watershed Length =	1,100	ft
Watershed Length to Centroid =	600	ft
Watershed Slope =	0.035	ft/ft
Watershed Imperviousness =	72.40%	percent
Percentage Hydrologic Soil Group A =	16.1%	percent
Percentage Hydrologic Soil Group B =	0.3%	percent
Percentage Hydrologic Soil Groups C/D =	83.6%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Castle Pines - City Office	

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) =	0.402	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	1.248	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.06 in.) =	1.016	acre-feet	1.06	inches
5-yr Runoff Volume (P1 = 1.43 in.) =	1.499	acre-feet	1.43	inches
10-yr Runoff Volume (P1 = 1.66 in.) =	1.810	acre-feet	1.66	inches
25-yr Runoff Volume (P1 = 1.72 in.) =	1.933	acre-feet		inches
50-yr Runoff Volume (P1 = 2.01 in.) =	2.339	acre-feet		inches
100-yr Runoff Volume (P1 = 2.6 in.) =	3.209	acre-feet	2.60	inches
500-yr Runoff Volume (P1 = 3.07 in.) =	3.892	acre-feet		inches
Approximate 2-yr Detention Volume =	0.945	acre-feet		
Approximate 5-yr Detention Volume =	1.389	acre-feet		
Approximate 10-yr Detention Volume =	1.597	acre-feet		
Approximate 25-yr Detention Volume =	1.568	acre-feet		
Approximate 50-yr Detention Volume =	1.691	acre-feet		
Approximate 100-yr Detention Volume =	2.102	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.402	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.846	acre-feet
Zone 3 (100yr + 1 / 2 WQCV - Zones 1 & 2) =	1.055	acre-feet
Total Detention Basin Volume =	2.303	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	

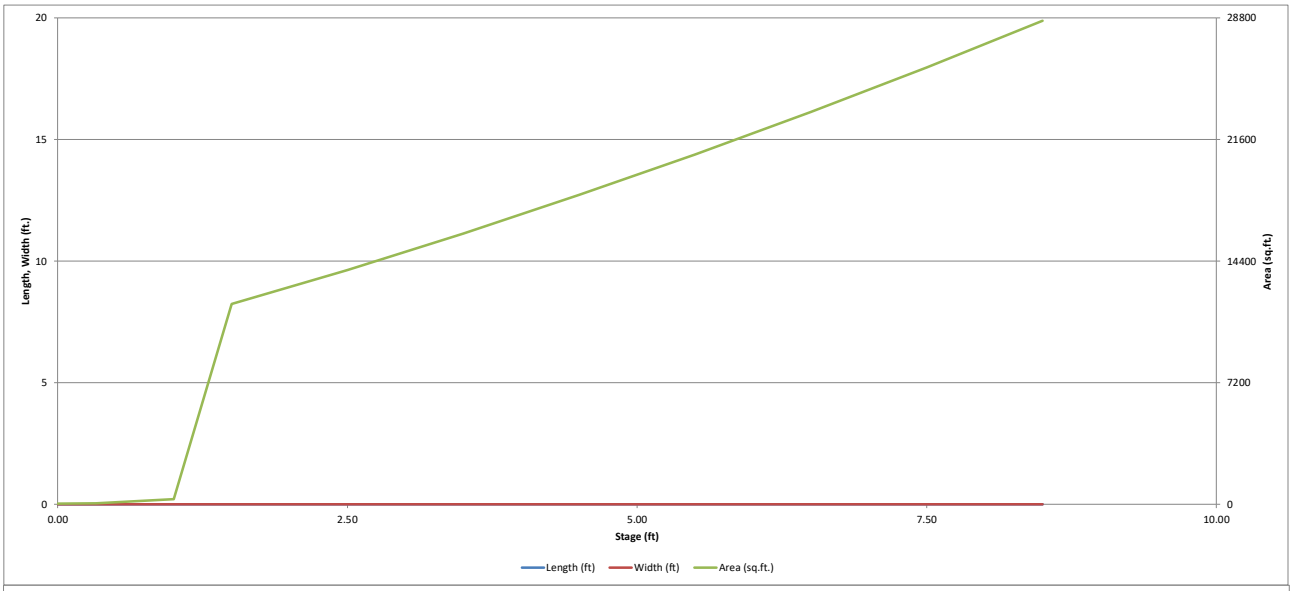
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user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

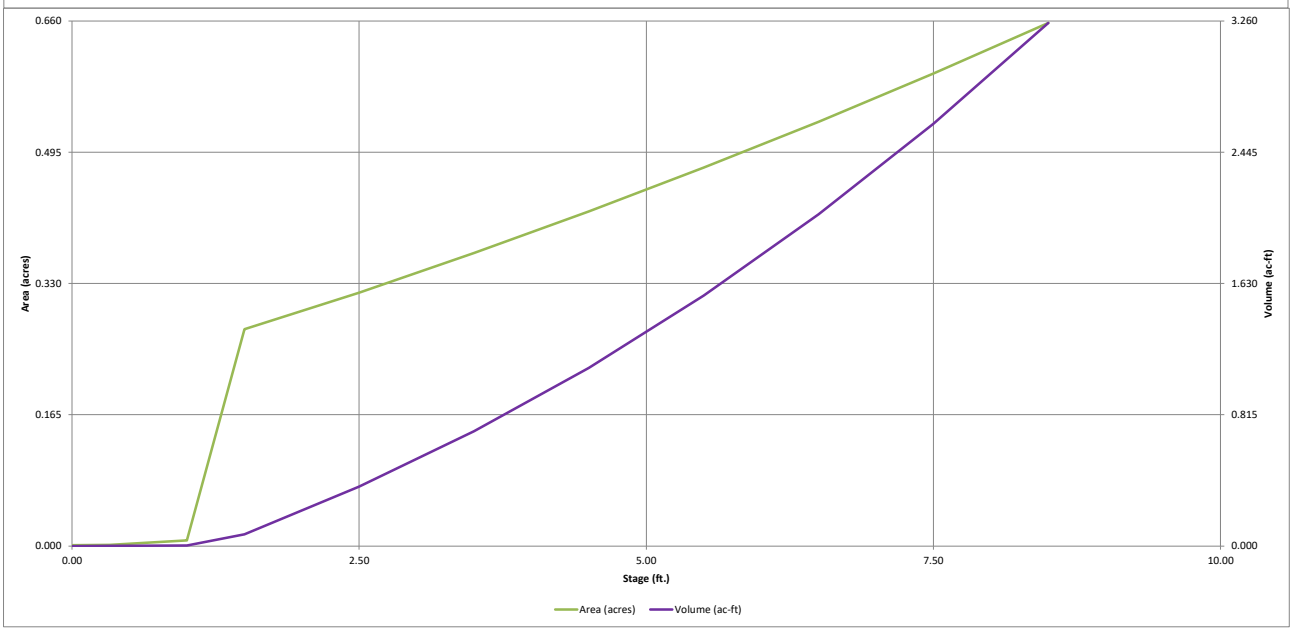
Depth Increment = 0.10 ft

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)
Top of Micropool	--	0.00	--	--	--	50	0.001		
6363.83	--	0.33	--	--	--	60	0.001	18	0.000
6364.5	--	1.00	--	--	--	300	0.007	139	0.003
6365	--	1.50	--	--	--	11,865	0.272	3,180	0.073
6366	--	2.50	--	--	--	13,875	0.319	16,050	0.368
6367	--	3.50	--	--	--	16,038	0.368	31,006	0.712
6368	--	4.50	--	--	--	18,320	0.421	48,185	1.106
6369	--	5.50	--	--	--	20,719	0.476	67,705	1.554
6370	--	6.50	--	--	--	23,238	0.533	89,683	2.059
6371	--	7.50	--	--	--	25,876	0.594	114,240	2.623
6372	--	8.50	--	--	--	28,637	0.657	141,497	3.248

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.07 (June 2025)



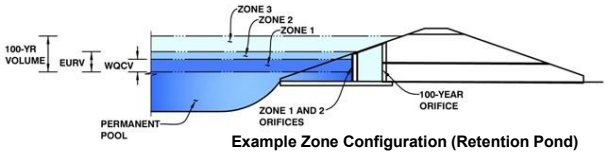


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)

Project: **Gold Crown Field House Full buildout**

Basin ID: **Pond A6**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.61	0.402	Orifice Plate
Zone 2 (EURV)	4.83	0.846	Rectangular Orifice
Zone 3 (100+1/2WQCV)	6.95	1.055	Weir&Pipe (Restrict)
Total (all zones)		2.303	

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

			Calculated Parameters for Underdrain		
Underdrain Orifice Invert Depth =		ft (distance below the filtration media surface)	Underdrain Orifice Area =		ft^2
Underdrain Orifice Diameter =		inches	Underdrain Orifice Centroid =		feet

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

			Calculated Parameters for Plate		
Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	1.444E-02	ft^2
Depth at top of Zone using Orifice Plate =	4.88	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	19.50	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	2.08	sq. inches (diameter = 1-5/8 inches)	Elliptical Slot Area =	N/A	ft^2

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	1.63	3.25					
Orifice Area (sq. inches)	2.08	2.08	2.08					

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

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Rectangular	Not Selected		Calculated Parameters for Vertical Orifice	Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	2.64	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.03	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	4.88	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.08	N/A	feet
Vertical Orifice Height =	2.00	N/A	inches				
Vertical Orifice Width =	2.00		inches				

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		Calculated Parameters for Overflow Weir	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.90	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.90	N/A	feet
Overflow Weir Front Edge Length =	6.00	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 =	9.06	N/A	
Horiz. Length of Weir Sides =	3.00	N/A	feet	Overflow Grate Open Area w/o Debris =	14.24	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	7.12	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

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

	Zone 3 Restrictor	Not Selected		Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	1.57	N/A	ft^2
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.58	N/A	feet
Restrictor Plate Height Above Pipe Invert =	12.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.57	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

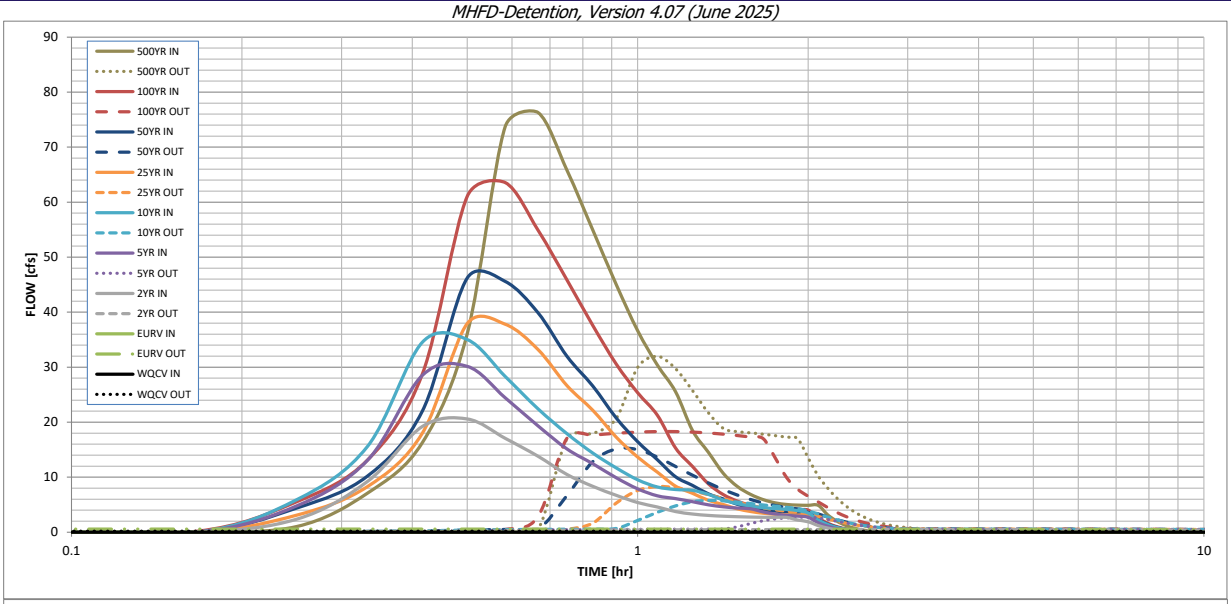
			Calculated Parameters for Spillway		
Spillway Invert Stage=	6.50	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.85	feet
Spillway Crest Length =	20.00	feet	Stage at Top of Freeboard =	8.35	feet
Spillway End Slopes =	10.00	H:V	Basin Area at Top of Freeboard =	0.65	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	3.15	acre-ft

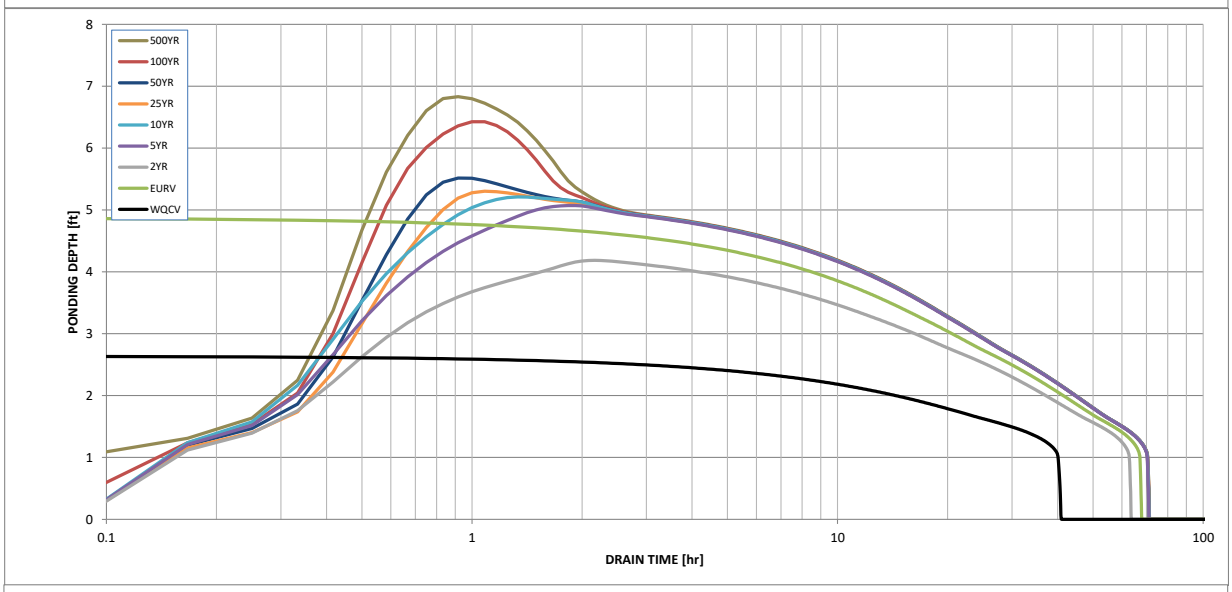
Routed Hydrograph Results — *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

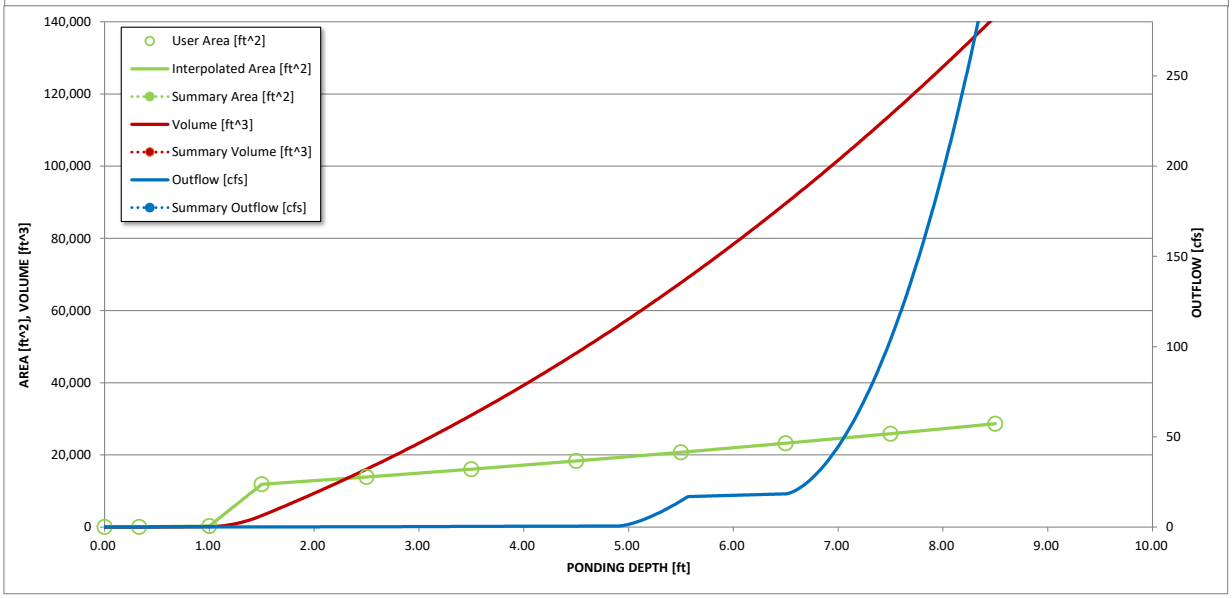
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.06	1.43	1.66	1.72	2.01	2.60	3.07
CUHP Runoff Volume (acre-ft) =	0.402	1.248	1.016	1.499	1.810	1.933	2.339	3.209	3.892
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.016	1.499	1.810	1.933	2.339	3.209	3.892
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.0	6.1	9.0	12.4	17.1	27.3	35.0
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.06	0.36	0.53	0.74	1.02	1.62	2.08
Peak Inflow Q (cfs) =	N/A	N/A	19.9	29.6	34.5	37.4	45.5	63.3	76.2
Peak Outflow Q (cfs) =	0.2	0.6	0.5	2.4	5.4	7.9	14.8	18.3	32.0
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.6	0.6	0.9	0.7	0.9
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 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	0.1	0.3	0.5	1.0	1.2	1.3
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	63	59	65	64	63	62	58	55
Time to Drain 99% of Inflow Volume (hours) =	**40**	66	62	70	69	69	68	67	66
Maximum Ponding Depth (ft) =	2.61	4.84	4.12	5.06	5.20	5.29	5.51	6.42	6.83
Area at Maximum Ponding Depth (acres) =	0.32	0.44	0.40	0.45	0.46	0.46	0.48	0.53	0.55
Maximum Volume Stored (acre-ft) =	0.404	1.252	0.950	1.346	1.409	1.456	1.554	2.011	2.238

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.07 (June 2025)







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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.18	1.04
	0:15:00	0	0.00	2.37	4.79	5.92	3.10	4.40	5.55	7.10
	0:20:00	0	0.00	9.23	13.08	15.60	8.30	10.21	13.12	16.29
	0:25:00	0	0.00	19.23	28.53	34.54	18.01	22.04	28.77	36.06
	0:30:00	0	0.00	20.59	30.15	35.03	37.93	46.20	61.05	73.68
	0:35:00	0	0.00	17.07	24.45	28.33	37.82	45.60	63.57	76.30
	0:40:00	0	0.00	13.82	19.34	22.44	33.22	39.91	54.92	65.82
	0:45:00	0	0.00	10.50	15.14	17.92	26.65	31.99	45.87	54.92
	0:50:00	0	0.00	8.34	12.45	14.38	22.16	26.57	37.58	45.01
	0:55:00	0	0.00	6.70	9.89	11.68	17.27	20.76	30.56	36.63
	1:00:00	0	0.00	5.39	7.88	9.53	13.66	16.45	25.36	30.40
	1:05:00	0	0.00	4.59	6.62	8.22	10.92	13.18	21.28	25.54
	1:10:00	0	0.00	3.75	6.11	7.76	8.37	10.08	15.30	18.48
	1:15:00	0	0.00	3.31	5.55	7.61	7.07	8.51	11.95	14.52
	1:20:00	0	0.00	3.05	4.98	6.86	5.79	6.97	8.79	10.69
	1:25:00	0	0.00	2.91	4.62	5.85	5.03	6.04	6.83	8.31
	1:30:00	0	0.00	2.82	4.39	5.18	4.25	5.07	5.65	6.87
	1:35:00	0	0.00	2.75	4.25	4.75	3.76	4.46	4.87	5.92
	1:40:00	0	0.00	2.71	3.69	4.46	3.45	4.07	4.39	5.34
	1:45:00	0	0.00	2.70	3.31	4.28	3.26	3.83	4.15	5.04
	1:50:00	0	0.00	2.70	3.07	4.15	3.16	3.70	4.06	4.92
	1:55:00	0	0.00	2.22	2.93	3.92	3.10	3.63	4.03	4.89
	2:00:00	0	0.00	1.90	2.71	3.49	3.07	3.59	4.03	4.89
	2:05:00	0	0.00	1.21	1.73	2.24	1.98	2.31	2.59	3.14
	2:10:00	0	0.00	0.75	1.07	1.40	1.25	1.46	1.64	1.99
	2:15:00	0	0.00	0.45	0.65	0.85	0.77	0.90	1.00	1.22
	2:20:00	0	0.00	0.25	0.38	0.49	0.45	0.53	0.59	0.72
	2:25:00	0	0.00	0.13	0.21	0.27	0.26	0.30	0.33	0.40
	2:30:00	0	0.00	0.05	0.09	0.11	0.11	0.13	0.15	0.18
	2:35:00	0	0.00	0.01	0.02	0.03	0.03	0.03	0.04	0.05
	2:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

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Summary Stage-Area-Volume-Discharge Relationships

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

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

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

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

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

APPENDIX C

HYDRAULIC COMPUTATIONS

NOT UTILIZED

APPENDIX D

WATER QUALITY ENHANCEMENT CONTROL MEASURES

Permanent Water Quality Determination Worksheet (Taken from 2019 SDDTCM Sections 13.1.4 and 13.1.5)

Project: Gold Crown Fieldhouse **Project #:** SDP26-0014 **Applicant:** Gold Crown Foundation, Inc.

1	Non-applicable Sites		
Section	**Question**	**Response**	**Instructions**
1.1	Will the project result in a temporary disturbance of greater than one acre?	No	Proceed to section 1.2.
.		Yes	Proceed to section 2.
1.2	Is the project part of a larger common plan of development or sale where multiple separate and distinct construction activities may be taking place at different times on different schedules, but remain related and are within 1/4 mile of each other? (A common plan of development will generally be documented on a site development plan, master plan, or equivalent, for the property/project)	No	Proceed to section 1.3.
.		Yes	Proceed to section 2.
1.3	Is the project within the Cherry Creek Watershed?	Yes	Permanent water quality control measures may be required. Refer to Water Qualtiy Control Regulation 72.7 for details and allowable exclusions.
.		No	Permanent water quality control measures are not required.
2	**Applicable Site Types and Exclusions by Variance**		
Section	**Question**	**Response**	**Instructions**
2.1	Does the project have more than 35% impervious area on the existing site?	No	Project is an applicable Development Site. Proceed to section 3.
.		Yes	Proceed to 2.2.
2.2	Does the project have greater than 75% impervious area on the existing site?	No	Project is an applicable Redevelopment Site. Proceed to section 3.
.		Yes	Project is an applicable Constrainted Redevelopment Site. Proceed to 2.3.
2.3	Will 100% of the runoff from the existing and proposed site be captured and treated using one or more of the allowable design standards for permanent water quality?	Yes	No further action required.
.		No	Proceed to 2.4.
2.4	Do any other water quality exclusions apply to the site?	No	Portions of the project are excluded. Proceed with design in accordance with Constrained Redevelopment standards and apply for **variance** for Constrained Redevelopment Sites.
.		Yes	Proceed to section 3. Following approval of other exclusions, design remaining site in accordance with Constrained Redevelopment standards and apply for **variance** for Constrained Redevelopment Sites.

3	**Applicable Sites with Other Exclusions by Variance**		
3.1	**Category 1: Roadways, bridges and trails only**		
3.1.1	Is the project a bike or pedestrian trail?	Yes No	Proceed to next line. Proceed to 3.1.2.
.	Is the trail for a roadway?	Yes No	Proceed to 3.1.2. Project is excluded. Submit **variance** for Trails Excluded from Permanent Water Quality Requirements.
3.1.2 .	Is the project primarily used for parking or access to parking?	Yes No	This exclusion does not apply. Permanent water quality is required. Proceed to 3.1.3.
3.1.3 .	Does the project add impervious area?	No Yes	Project is excluded. Submit **variance** for Pavement Management Sites Excluded from Permanent Water Quality Requirements. Proceed to 3.1.4.
3.1.4 .	Does the project add more than 8.25 feet of paved width at any location to the existing roadway?	No Yes	Project is excluded. Submit **variance** for Roadway Redevelopment Sites Excluded from Permanent Water Quality Requirements. Proceed to next line.
. .	Does the project add more than one acre of paved area per mile to an existing roadway?	No Yes	Project is excluded. Submit **variance** for Roadway Redevelopment Sites Excluded from Permanent Water Quality Requirements. Proceed to next line.
. .	Does the project increase the width by two times or more, on average, of the original roadway area?	No Yes	Existing areas of site are excluded only. Submit **variance** for Existing Roadway Surfaces Only Excluded from Permanent Water Quality Requirements. This exclusion does not apply. Permanent water quality is required.
3.2	**Category 2: Non-residential and non-commercial projects only**		
3.2.1 .	Is the project associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities, including activities necessary to prepare a site for drilling and the movement and placement of drilling equipment?	Yes No	Project is excluded. Submit **variance** for Oil and Gas Exploration Sites Excluded from Permanent Water Quality Requirements. Proceed to 3.2.2.
3.2.2	Is the project for stream stabilization?	Yes No	Project is excluded. Submit **variance** for Stream Stabilization Sites Excluded from Permanent Water Quality Requirements. Proceed to 3.2.3.
3.2.3 .	Is the project for installation or maintenance of aboveground or underground utilities or infrastructure that does not permanently alter the terrain, ground cover, or drainage patterns from those present prior to the construction activity including activities to install, replace or maintain utilities under roadways or other paved areas that return the surface to the same condition?	Yes No	Project is excluded. Submit **variance** for Aboveground and Underground Utilities Excluded from Permanent Water Quality Requirements. Proceed to 3.2.4.
3.2.4 .	Is the project on undeveloped land (land with no human-made structures such as buildings or pavement) that will remain undeveloped after the project?	Yes No	Project is excluded. Submit **variance** for Sites with Land Disturbances to Undeveloped Land that will Remain Undeveloped Excluded from Permanent Water Quality Requirements. Proceed to 3.2.5.
3.2.5 .	Will the post-project condition result in surface water discharge during the 80th percentile storm runoff event?	No Yes	Project is excluded. Submit **study** along with **variance** for Non-residential and Non-commercial Infiltration Conditions Excluded from Permanent Water Quality Requirements. This exclusion does not apply. Permanent water quality is required.

Section	Question	Response	Instructions
3.3	**Category 3: Residential, Agricultural and Commercial projects**		
3.3.1	Is the project a single-family residential lot, or agricultural zoned lands, greater than or equal to 2.5 acres in size per dwelling unit?	Yes	Proceed to next line.
.		No	Proceed to 3.3.2.
.	Is the project site greater than 10% impervious?	No	Project is excluded. Submit **variance** for Large Lot Single Family Sites Excluded from Permanent Water Quality Requirements.
.		Yes	Proceed to next line.
.	Is the project site greater than 20% impervious?	Yes	This exclusion does not apply. Permanent water quality is required.
.		No	Proceed to next line.
.	Will the post-project condition result in surface water discharge during the 80th percentile storm runoff event?	No	Project is excluded. Submit **study** along with **variance** for Large Lot Single Family Sites Excluded from Permanent Water Quality Requirements.
.		Yes	This exclusion does not apply. Permanent water quality is required.
3.3.2	Will 100% of the runoff from the residential or commercial site be captured?	Yes	This exclusion does not apply. Permanent water quality is required.
.		No	Proceed to next line.
.	Is all or a portion of the site undeveloped or will it remain undeveloped after construction?	Yes	This portion of the project is excluded. Submit **variance** for Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped Excluded from Permanent Water Quality Requirements. Proceed to next line.
.		No	Proceed to next line.
.	Is the remaining untreated impervious area greater than 20% of the site?	Yes	This exclusion does not apply. Permanent water quality is required.
.		No	Proceed to next line.
.	Is the remaining untreated impervious area greater than one acre?	Yes	This exclusion does not apply. Permanent water quality is required.
.		No	Proceed to next line.
.	Is it practicable to capture runoff from portions of the site that will not drain to a control measure?	No	Document justification demonstrating that it is not practicable to capture runoff from this portion of the site in the **drainage report**. No further action is needed.
.		Yes	TA36:D72his exclusion does not apply. Permanent water quality is required.

Summary of Water Quality Conformance to MS4 Permit

The purpose of this worksheet is to document conformance with the Town of Castle Rock's MS4 permit with regard to permanent water quality on land disturbance projects.

Project Name Gold Crown Field House

Project Owner Gold Crown Foundation

Project Location Dawson Trails Filing No. 1, Tract F

ToCR Project Number SDP26-0014

Total Site Area 25.12 **acres**

Total Size of Common Plan of Development 12.30 **acres**

Check all that apply:

- ☑ **Project within Plum Creek Basin**
- ☐ **Project within Cherry Creek Basin**

Estimated construction completion date 05/2028

---

1. The water quality control measure(s) for applicable development sites shall meet one of the following base design standards as per the SDDTCM Section 14.4. Please select all design standards that were applied to meet conformance with the MS4 on this site.

   - ☑ WQCV standard
   - ☐ Pollutant removal standard
   - ☐ Runoff reduction standard
   - ☑ Applicable site draining to regional WQVC control measure (accepts drainage prior to discharging to WOTS)
   - ☐ Applicable site draining to regional WQVC control facility (with receiving pervious area control measure upstream of WOTS)
   - ☐ Constrained redevelopment sites standard
     - Imperviousness of existing site _____/_____(Imp. Ac/Site Ac) =____%
     - Variance required TCV No. _____
   - ☐ Existing control measure with WQCV per previous criteria standards
     - Reference Construction Permit No. _____
   - ☐ Cherry Creek Basin only, choose one: ☐ Tier 1 ☐ Tier 2 ☐ Tier 3
   - ☐ No control measures provided (See Permanent WQ Worksheet for applicability)

Summary of Water Quality Conformance to MS4 Permit

2. Was an exclusion to water quality applied as per SDDTCM Section 13.1.5? ☐ Yes ☑ No

   i. If yes, please select all that apply, provide total excluded impervious area(s) and submit variance, as applicable: TCV No. _____

   ❒ Pavement management site

   Excluded impervious area: _____ acres

   ❒ Excluded roadway redevelopment

   Excluded impervious area: _____ acres

   ❒ Excluded existing roadway areas

   Excluded impervious area: _____ acres

   ❒ Above ground and below ground utilities

   ❒ Large lot single family home

   ❒ Non-residential and non-commercial infiltration

   Excluded impervious area: _____ acres

   ❒ Land disturbance for land to remain undeveloped

   Excluded impervious area: _____ acres

   ❒ Stream Stabilization Sites

   Excluded impervious area: _____ acres

   ❒ Trails

   Excluded impervious area: _____ acres

   ❒ Oil and Gas Exploration

3. For Development and Redevelopment sites, following any exclusions claimed above, was any portion of the site excluded up to 20% of the site and not to exceed one acre? ☐ Yes ☑ No

   If yes, complete the following:

   Excluded area: _____ acres

   Total Site area: _____ acres, _____ % site excluded

4. For Constrained sites, was any portion of the site excluded up to 50% of the site and not to exceed 50% of the impervious area? ☐ Yes ☐ No

   If yes, complete the following:

   Excluded area: _____ acres

   Excluded impervious area: _____ acres

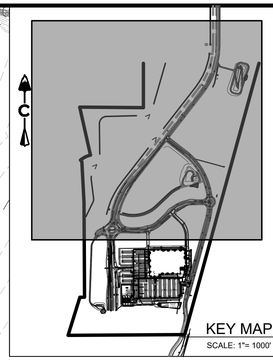
   Total Site area: _____ acres, _____ % site excluded

   Total Impervious area: _____ acres, _____ % impervious excluded

BACK POCKET

DRAINAGE MAPS





C

0 150' 300'

1 inch = 150 ft.

LEGEND

EXISTING / PROPOSED

- BASIN DESIGNATION
- AREA (AC) / IMPERVIOUSNESS
- DESIGN POINT
- DIRECTIONAL FLOW ARROW
- EMERGENCY OVERFLOW ROUTE
- PROPOSED DRAINAGE BASIN
- EXISTING DRAINAGE BASIN
- PROPOSED MAJOR CONTOUR (5280)
- PROPOSED MINOR CONTOUR (5279)
- EXISTING MAJOR CONTOUR (5280)
- EXISTING MINOR CONTOUR (5279)
- EASEMENT
- RIGHT OF WAY (R.O.W.)
- CENTERLINE
- PROJECT BOUNDARY
- PROPOSED STORM & STUB OUT
- EXISTING STORM & STUB OUT
- STORM MANHOLES
- STORM INLETS
- FES, FOREBAY, & TRICKLE CHANNEL
- OUTLET STRUCTURE
- CRUSHER FINES MAINTENANCE ACCESS
- RIPRAP
- 100 YEAR FLOODPLAIN
- WETLAND
- LIMITS OF CONSTRUCTION
- RETAINING WALL
- DRAINAGE SWALE

RUNOFF SUMMARY TABLE

DESIGN POINT	BASIN	DIRECT RUNOFF AREA (AC)	DIRECT RUNOFF 5-Year RUNOFF (CFS)	DIRECT RUNOFF 100-Year RUNOFF (CFS)
A3	A-3	8.46	5.12	21.86
A6	A-6	12.31	6.38	28.19
A9	A-9	7.38	4.26	18.94
OSA3	OS-A3	10.03	0.88	17.73
OSA4	OS-A4	32.13	2.62	52.88
OSA5	OS-A5	15.88	1.16	26.22
OSA6	OS-A6	23.41	2.99	45.88
OSA7	OS-A7	5.08	1.39	13.21
OSA8	OS-A8	2.04	0.59	7.07

GOLD CROWN FIELDHOUSE
PROJECT NO. SDP26-0014

CORE CONSULTANTS. INC.
3473 S. BROADWAY
ENGLEWOOD, CO 80113
303.703.4444
LIVEYOURCORE.COM

LAND DEVELOPMENT | ENERGY | PUBLIC INFRASTRUCTURE

CORE

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	6/12/2026	TW
2	2ND SUBMITTAL	9/24/2026	TW

GOLD CROWN FIELDHOUSE
CASTLE ROCK, COLORADO

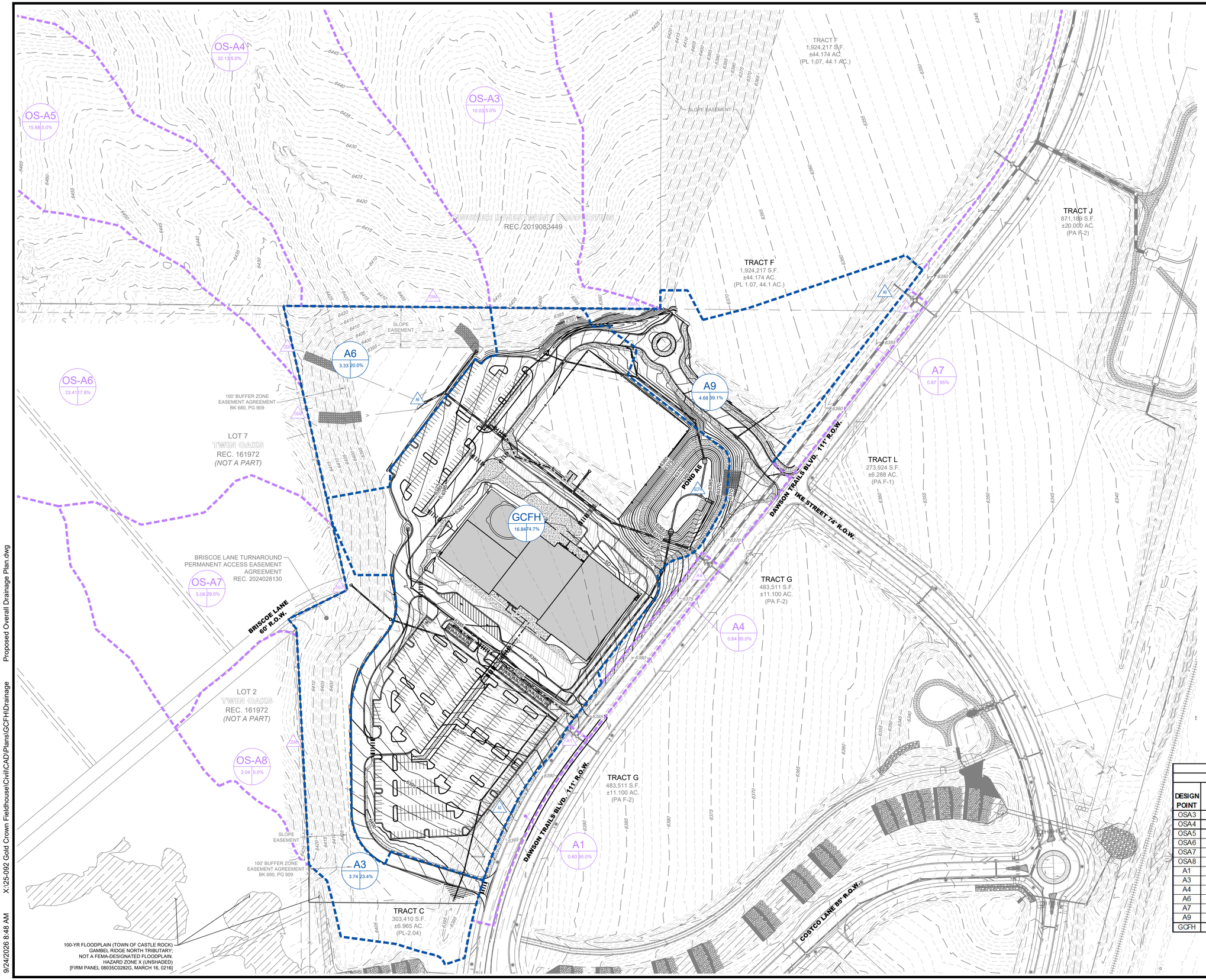
DRAINAGE MAPS
EXISTING DRAINAGE MAP

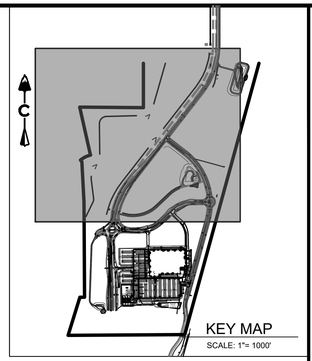
DESIGNED BY: LC
DRAWN BY: LI
CHECKED BY: TW

SDP NO. 26-0014

SHEET 1 OF 4

9/24/2026 8:43 AM X:\25-092 Gold Crown Fieldhouse\Civil\CAD\Plans\GCFH\Drainage Existing Drainage Map.dwg





0 100' 200'

1 inch = 100 ft.

LEGEND

EXISTING / PROPOSED

- BASIN DESIGNATION (X; 00.0 | 00.0%)
- AREA (AC) / IMPERVIOUSNESS
- DESIGN POINT
- DIRECTIONAL FLOW ARROW
- EMERGENCY OVERFLOW ROUTE
- PROPOSED DRAINAGE BASIN
- EXISTING DRAINAGE BASIN
- PROPOSED MAJOR CONTOUR (5280)
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- RIPRAP
- 100 YEAR FLOODPLAIN
- WETLAND
- LIMITS OF CONSTRUCTION
- RETAINING WALL
- DRAINAGE SWALE

RUNOFF SUMMARY TABLE

DIRECT RUNOFF					
DESIGN POINT	BASIN	AREA (AC)	IMPERVIOUS (%)	5-Year RUNOFF (CFS)	100-Year RUNOFF (CFS)
OSA3	OS-A3	10.03	5.0%	0.88	17.73
OSA4	OS-A4	32.13	5.0%	2.62	52.88
OSA5	OS-A5	15.88	5.0%	1.16	26.22
OSA6	OS-A6	23.41	17.8%	7.27	51.32
OSA7	OS-A7	5.08	29.0%	3.79	16.31
OSA8	OS-A8	2.04	5.0%	0.59	7.07
A1	A1	0.60	95.0%	2.34	4.50
A3	A3	4.13	23.1%	3.01	13.72
A4	A4	0.64	95.0%	2.51	4.87
A6	A6	3.33	20.0%	2.93	16.14
A7	A7	0.67	95.0%	2.53	4.94
A9	A9	4.59	30.0%	6.25	24.57
GCFH	GCFH	16.65	74.7%	42.33	93.41

GOLD CROWN FIELDHOUSE
PROJECT NO. SDP26-0014

CORE CONSULTANTS. INC.
3473 S. BROADWAY
ENGLEWOOD, CO 80113
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LAND DEVELOPMENT | ENERGY | PUBLIC INFRASTRUCTURE

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	6/12/2026	TW
2	2ND SUBMITTAL	9/24/2026	TW

GOLD CROWN FIELDHOUSE
CASTLE ROCK, COLORADO
DRAINAGE MAPS
PROPOSED OVERALL DRAINAGE PLAN

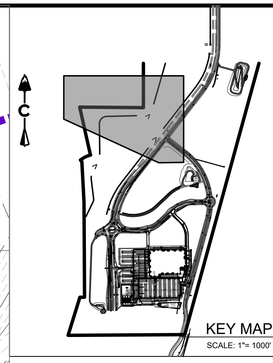
DESIGNED BY: LC
DRAWN BY: LI
CHECKED BY: TW

SDP NO. 26-0014

SHEET 2 OF 4

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RUNOFF SUMMARY TABLE					
DIRECT RUNOFF					
DESIGN POINT	BASIN	AREA (AC)	IMPERVIOUS (%)	5-Year RUNOFF (CFS)	100-Year RUNOFF (CFS)
OSA3	OS-A3	10.03	5.0%	0.88	17.73
OSA4	OS-A4	32.13	5.0%	2.62	52.88
OSA5	OS-A5	15.88	5.0%	1.16	26.22
OSA6	OS-A6	23.41	17.8%	7.27	51.32
OSA7	OS-A7	5.08	29.0%	3.79	16.31
OSA8	OS-A8	2.04	5.0%	0.59	7.07
A1	A1	0.60	95.0%	2.34	4.50
A3.1	A3.1	2.44	20.0%	2.16	11.16
A3.2	A3.2	1.12	20.0%	0.70	3.44
A3.3	A3.3	0.17	95.0%	0.66	1.28
A4.1	A4.1	0.26	20.0%	0.19	0.99
A4	A4	0.64	95.0%	2.51	4.87
A6.1	A6.1	2.62	20.0%	1.87	10.48
A6.2	A6.2	0.71	20.0%	0.63	3.24
A7	A7	0.67	95.0%	2.53	4.94
A9.1	A9.1	0.40	15.9%	0.24	1.46
A9.2	A9.2	1.28	91.1%	4.86	9.68
A9.3	A9.3	3.00	20.0%	2.33	12.04
1.01	1.01	0.48	20.0%	0.42	2.17
1.02	1.02	0.34	95.0%	1.34	2.62
1.03	1.03	0.22	50.2%	0.46	1.29
1.04	1.04	0.70	86.4%	2.38	4.88
1.05	1.05	0.67	95.0%	2.65	5.16
1.06	1.06	0.98	91.8%	3.75	7.44
1.07	1.07	1.44	82.7%	4.65	9.73
1.08	1.08	3.09	76.8%	7.06	14.97
1.11	1.11	0.67	95.0%	2.65	5.16
1.12	1.12	0.34	95.0%	1.34	2.62
1.13	1.13	0.75	68.5%	2.12	4.87
2.01	2.01	0.70	74.0%	2.16	4.82
2.02	2.02	0.48	93.1%	1.81	3.57
2.03	2.03	0.49	20.0%	0.43	2.25
2.04	2.04	1.55	76.2%	4.15	9.11
2.05	2.05	0.25	73.7%	0.78	1.73
2.06	2.06	1.35	71.7%	3.50	7.96
2.07	2.07	1.03	73.1%	2.60	5.84
3.0	3.0	1.30	25.3%	1.39	6.12



0 50' 100'

1 inch = 50 ft.

LEGEND

EXISTING / PROPOSED

- BASIN DESIGNATION
- AREA (AC) / IMPERVIOUSNESS
- DESIGN POINT
- DIRECTIONAL FLOW ARROW
- EMERGENCY OVERFLOW ROUTE
- PROPOSED DRAINAGE BASIN
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- RETAINING WALL
- DRAINAGE SWALE

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ENGLEWOOD, CO 80113
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#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	6/12/2026	TW
2	2ND SUBMITTAL	9/24/2026	TW

GOLD CROWN FIELDHOUSE
CASTLE ROCK, COLORADO

DRAINAGE MAPS

DETAILED DRAINAGE PLAN - NORTH

DESIGNED BY: LC
DRAWN BY: LI
CHECKED BY: TW

SDP NO. 26-0014

SHEET 3 OF 4

GOLD CROWN FIELDHOUSE
PROJECT NO. SDP26-0014

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BRISCOE LANE TURNAROUND
PERMANENT ACCESS EASEMENT
AGREEMENT
REC. 2024028130

LOT 2
TWIN OAKS
REC. 161972
(NOT A PART)

BRISCOE LANE
60' R.O.W.

SLOPE
EASEMENT

100' BUFFER ZONE
EASEMENT AGREEMENT
BK 680, PG 909

MATCH LINE SHEET 3

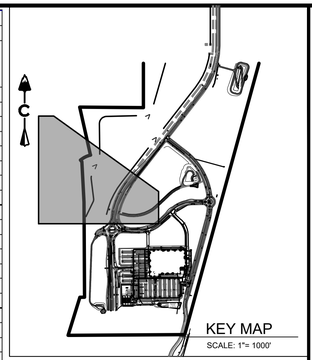
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±6.965 AC.
(PL-2.04)

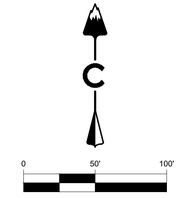
TRACT G
483,511 S.F.
±11.100 AC.
(PA F-2)

DAWSON TRAILS BLVD. 111' R.O.W.

CONNECT TO EXISTING 24" RCP

RUNOFF SUMMARY TABLE					
DIRECT RUNOFF					
DESIGN POINT	BASIN	AREA (AC)	IMPERVIOUS (%)	5-Year RUNOFF (CFS)	100-Year RUNOFF (CFS)
OSA3	OS-A3	10.03	5.0%	0.88	17.73
OSA4	OS-A4	32.13	5.0%	2.62	52.88
OSA5	OS-A5	15.88	5.0%	1.16	26.22
OSA6	OS-A6	23.41	17.8%	7.27	51.32
OSA7	OS-A7	5.08	29.0%	3.79	16.31
OSA8	OS-A8	2.04	5.0%	0.59	7.07
A1	A1	0.60	95.0%	2.34	4.50
A3.1	A3.1	2.44	20.0%	2.16	11.16
A3.2	A3.2	1.12	20.0%	0.70	3.44
A3.3	A3.3	0.17	95.0%	0.66	1.28
A4.1	A4.1	0.26	20.0%	0.19	0.99
A4	A4	0.64	95.0%	2.51	4.87
A6.1	A6.1	2.62	20.0%	1.87	10.48
A6.2	A6.2	0.71	20.0%	0.63	3.24
A7	A7	0.67	95.0%	2.53	4.94
A9.1	A9.1	0.40	15.9%	0.24	1.46
A9.2	A9.2	1.28	91.1%	4.86	9.68
A9.3	A9.3	3.00	20.0%	2.33	12.04
1.01	1.01	0.48	20.0%	0.42	2.17
1.02	1.02	0.34	95.0%	1.34	2.62
1.03	1.03	0.22	50.2%	0.46	1.29
1.04	1.04	0.70	86.4%	2.38	4.88
1.05	1.05	0.67	95.0%	2.65	5.16
1.06	1.06	0.98	91.8%	3.75	7.44
1.07	1.07	3.33	80.8%	10.10	21.16
1.08	1.08	1.20	72.8%	2.45	5.29
1.11	1.11	0.67	95.0%	2.65	5.16
1.12	1.12	0.34	95.0%	1.34	2.62
1.13	1.13	0.75	68.5%	2.12	4.87
2.01	2.01	0.70	74.0%	2.16	4.82
2.02	2.02	0.48	93.1%	1.81	3.57
2.03	2.03	0.49	20.0%	0.43	2.25
2.04	2.04	1.55	76.2%	4.15	9.11
2.05	2.05	0.25	73.7%	0.78	1.73
2.06	2.06	1.35	71.7%	3.50	7.96
2.07	2.07	1.03	73.1%	2.60	5.84
3.0	3.0	1.30	25.3%	1.39	6.12





LEGEND

EXISTING / PROPOSED

- BASIN DESIGNATION
- AREA (AC) / IMPERVIOUSNESS
- DESIGN POINT
- DIRECTIONAL FLOW ARROW
- EMERGENCY OVERFLOW ROUTE
- PROPOSED DRAINAGE BASIN
- EXISTING DRAINAGE BASIN
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- PROPOSED MINOR CONTOUR
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LAND DEVELOPMENT | ENERGY | PUBLIC INFRASTRUCTURE

#	REVISION DESCRIPTION	DATE	BY
1	1ST SUBMITTAL	6/12/2026	TW
2	2ND SUBMITTAL	9/24/2026	TW

GOLD CROWN FIELDHOUSE
CASTLE ROCK, COLORADO
DRAINAGE MAPS
DETAILED DRAINAGE PLAN - SOUTH

DESIGNED BY: LC
DRAWN BY: LI
CHECKED BY: TW

SDP NO.
26-0014

SHEET
4 OF 4

GOLD CROWN FIELDHOUSE
PROJECT NO. SDP26-0014

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