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Final Drainage Study for The Steamboat Springs Winter Sports Club Outdoor Training Facility

Physical Address: 34120 Forest Road 321, Steamboat Springs, Colorado 80487
Legal Description: Pt Lot 1 Green Horn Ranch (TA 25 = 169.88ACS) Total 173.88 ACS

Final Drainage Report: 03/06/2026

Prepared For: Steamboat Ski and Resort Corporation
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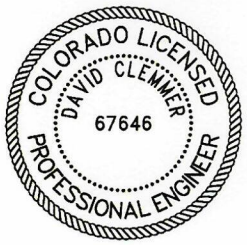
NOTE

City of Steamboat Springs plan review and approval is only for general conformance with City design criteria and City code. The City is not responsible for the accuracy and adequacy of the design, dimensions, and elevations that shall be confirmed and correlated at the job site. The City of Steamboat Springs assumes no responsibility for the completeness or accuracy of this document.

CERTIFICATION

I hereby affirm that this Drainage Report for the SSWSC Training Facility was prepared by me (or under my direct supervision) for the owners thereof and is, to the best of my knowledge, in accordance with the provisions of the City of Steamboat Springs Storm Drainage Criteria and approved variances. I understand that the City of Steamboat Springs does not and will not assume liability for drainage facilities designed by others.



David Clemmer, P.E.
State of Colorado No. 0067646

Date: 03/06/2026

1.0 Introduction

This report provides a detailed analysis of the existing and proposed drainage conditions for the construction of an outdoor training facility for the Steamboat Springs Winter Sports Club (SSWSC) Program, hereon referred to as the Project. The Project includes the construction of a new ski ramp and recreation pond that will be used for seasonal training purposes through the SSWSC Program. As part of the Project, a new gravel road will be installed to provide parking as well as access to the outdoor training facility. Additionally, there will be four new Olympic size trampolines, a storage shed, a tuning shed, and a viewing platform installed at the site in combination with this Project.

This report includes all data, engineering methods, assumptions, and calculations used by Four Points Surveying and Engineering (Four Points) to design the stormwater drainage system for the project. Four Points prepared this report and performed engineering calculations for the project in accordance with the most recent version of the City of Steamboat Springs Drainage Criteria and Engineering Standards.

A. Location

Figure 1: Vicinity Map – SSWSC Program Outdoor Training Facility

Source: City of Steamboat Springs GIS, OpenStreetMap

The Project is located within the Green Horn Ranch Subdivision and within a portion of the land owned by the Steamboat Ski and Resort Corporation. The outdoor training facility is considered on the Voo Doo ski trail at the Steamboat Resort.

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Existing land use is mountain resort recreational, and the site is fully contained within the Open Space and Recreation (OR) zoning district. Land coverage consists primarily of native grasses, gravel roads/trails and some denser pockets of woodlands separating the adjacent ski runs. Proposed land use will remain as mountain resort recreational. The contributing drainage area of the Project to be analyzed is approximately 23.0 acres.

B. Planning Application

This final drainage study is for a conditional use development plan application for the proposed Project prepared by Four Points Surveying and Engineering on behalf of the owner, the Steamboat Springs Winter Sports Club Program.

C. Drainage Reports for Adjacent Developments

City Stormwater Master Plan, Prepared by Short Elliott Hendrickson (SEH) in April of 2013.

2.0 Drainage Criteria and Methodology Used

Drainage criteria and methodology used for this Final Drainage Study were prepared in conformance with Chapter 5.0, *Drainage Criteria* of the City of Steamboat Springs Engineering Standards, latest edition.

A. Design Rainfall and Storm Frequency

Design rainfall values used for this Final Drainage Study were obtained from Table 5.5.1, P1 and Intensity-Duration Frequency Values, included in Chapter 5 of the City Engineering Standards.

Table 5.5.1.P1 and Intensity-Duration-Frequency Values

Return Period	P1	Rainfall Intensity for Storm Duration				
		5-min	10-min	15-min	30-min	60-min
1.25-year	0.38	1.79	1.33	1.06	0.66	0.39
2-year	0.55	2.58	1.90	1.52	0.95	0.56
5-year	0.82	3.84	2.84	2.26	1.42	0.83
10-year	1.04	4.89	3.61	2.88	1.81	1.06
25-year	1.34	6.30	4.66	3.71	2.33	1.36
50-year	1.57	7.38	5.46	4.35	2.73	1.60
100-year	1.79	8.42	6.22	4.96	3.12	1.82
500-year	2.31	10.86	8.03	6.40	4.02	2.35

As required in the City Engineering Standards, the minor and major storms include the 5-year storm recurrence interval and the 100-year storm recurrence interval, respectively.

B. Runoff Calculation Methodology

Runoff calculation method: Small basin peak flow runoff was analyzed using the Rational Method, shown in Eq-1.

Eq-1: Rational Method: **Q = CiA**

Where: Q = runoff, (cubic feet per second, cfs)
C = runoff coefficient, (dimensionless)
i = rainfall intensity, (inches per hour)
A = basin area, (acres)

C. Culvert and Storm Sewer Design Methodology

The Project will include a new eighteen-inch diameter CMP culvert at the entry of the gravel access road to the outdoor training facility. Sizing and capacity of the culvert was reviewed using AutoCAD HydroFlow Express software, which utilizes Manning's equation for open channel flow. The pipe is effectively sized to pass the major design storm without overtopping the gravel access road. Reference the documents included in the appendices for additional information.

Additionally, there will be a four-inch diameter HPDE outlet pipe for the recreation pond that will be installed in combination with an inline Agri-Drain control structure. The discharge pipe will be operating under headwater conditions to release water within the recreational pond facility. Calculations have been provided in the appendix to detail the maximum discharge rate of the outlet drain.

D. Detention Discharge and Storage Methodology

There are no permanent detention facilities included for this project. The project falls under an exclusion category as the total site disturbance is less than one acre. Therefore, detention discharge and storage methodology was not reviewed in combination with this report. Reference the Detention section later in this report for additional information.

E. Discuss HEC-HMS methodologies and parameters, if HEC-HMS was used.

HEC-HMS was not used in combination with this report. Calculations are solely based on the Rational Method.

3.0 Existing Conditions

A. Ground Cover, Imperviousness, Topography and Size

Existing ground cover consists of a combination of vegetated cover and gravel surfacing for roadways and bike trails that have been established through the area. There are pockets of wooded land cover separating the ski trails of Vouge, Voo Doo, and See Me.

Following the criteria that was established through the City Stormwater Master Plan, the entire contributing basin was conservatively estimated at 5% imperviousness to reflect the OR zoning district. There are no paved surfaces or building rooftops currently present within the contributing 23.0-acre drainage basin, EB1.

Topography for the surrounding area is generally steep, with slopes reaching up to 2:1 (horizontal to vertical) in given areas. Grades slightly flatten at the bottom of Vogue and Voo Doo in confluence with Shortcut, which is used as an access road and bike trail in the summer months of the year. Topographic slopes were estimated at an average of 25% for the contributing drainage basin.

The overall size of the property owned by the Steamboat Ski and Resort Corporation is 173.88 acres. However, the development is contained within a 23.0-acre contributing drainage basin that is segmented above by an existing ridge at the top of Vouge and See Me. The contributing drainage basin of interest is shown on the Predevelopment Drainage Plan as EB1, which mimics the 23.0-acre drainage basin, defined as BU24, that was included as part of the City Stormwater Master Plan.

B. Existing Stormwater Systems

There are no existing stormwater systems in place within the contributing drainage basin. In general, runoff generated within the contributing basin is conveyed via overland flow, shallow concentrated flow, and channel flow over steep topography from the southeast to the northwest. There is a small, wooded drainage channel at the downstream limits of the basin (west of Short Cut Road) that concentrates flow before discharging at the basin outfall, denoted as DP1 and further described in the following sections.

C. Other Notable Features (Canals, major utilities, etc.)

The City Stormwater Master Plan was reviewed in combination with this Final Drainage Study. There were no other notable features contained with the contributing drainage basin. Notable infrastructure downstream of the development includes the existing detention basin that was installed on 1965 Ski Time Square Drive which routes treated stormwater to the Burgess Creek, which has been used over recent years as “The Beach” at the base of the ski mountain.

D. Site Outfall and Ultimate Outfall Locations

The contributing drainage basin outfalls into an existing ditch that runs parallel with a gravel road, defined as Right of Way. The site outfall is denoted as Design Point 1 (DP1) on the Predevelopment Drainage Plan and is consistent with Figure 24 included in the City Stormwater Master Plan. Stormwater concentrates through this ditch-line and is conveyed to the west before entering into a precast drainage inlet at the T-Bar property. The drainage structure routes flow to an existing detention pond facility located at 1965 Ski Time Square Drive prior to the ultimate discharge into the Burgess Creek.

E. Existing System Capacity

Due to minimal infrastructure currently in place within the contributing basin, existing system capacity evaluation is not necessary for purposes of this report. Existing system capacity downstream of the contributing basin will remain unaffected as the project will not result in any increases in peak discharges, as further described in the following sections.

F. NRCS Soil Type

An NRCS Web Soil Survey is included in the appendices.

Soil types within the contributing drainage basin include:

- Routt Loam → Hydrologic Soil Group Rating: C
- Bucklon very stony-Skyway complex → Hydrologic Soil Group Rating: D
- Mine Loam → Hydrologic Soil Group Rating: B

The Bucklon very stony-Skyway complex makes up 93% of the contributing drainage basin. Therefore, the entire analysis area was conservatively estimated at a Hydraulic Soil Group D rating. Hydrologic D rated soils are typical of soils that have poor infiltrative qualities and therefore promote the potential for surface runoff.

G. Existing Easements

The Final Plat of Green Horn Ranch, under reception number 832258, was reviewed to determine any existing easements that have been established on the subject property.

1. An existing Sewer Line Easement that wraps close to the northern lot line boundary, along Right of Way. The sewer easement is recorded under reception number 770697.

2. There is an existing water line easement in place that amended and replaced the original easement included under Reception Number 770696, Book 374, Page 345 and Book 376, Page 318 and was re-recorded at time of the Final Plat. The easement alignment is on Lower Valley View and terminates at a Water Storage Reservoir Easement at Book 374, Page 343 and Book 376, Page 316.

3. There is an existing centerline ski lift and aerial tramway easement that is established per Book 393, Page 509. This is shown on the westernmost edge of the property and near the Christy lift mid-station.

4. There is an existing Ingress and Egress Easement per Book 762, Page 1067 and a Relocated Road Easement per Book 393, Page 509 and Book 395, Page 379 (re-recorded). These two easements are established north of One Steamboat Place, near the Christy lift mid-station.

5. There is an existing 15-foot-wide sidewalk, utility and snow removal easement dedicated by the latest final plat. This is established near Ski Trail Lane, also in close proximity to the Christy lift mid-station.

It is not anticipated that any of these existing easements will be impacted by the Project due to their proximity in relation to the development area.

H. Existing FEMA Floodways and Floodplains

FEMA's National Flood Hazard Layer GIS Database was reviewed in combination with this report. There is an existing Zone A floodplain at the northeast corner of the property that terminates into a Zone X floodplain designation. Zone X designations include an area of minimal flood hazard. The Zone X designation was established as part of a Letter of Map Revision

(LOMR) filed through FEMA under Permit Number 18-08-0922P with an effective date of 07/29/2019. The LOMR that was approved in 2019 is not reflected in the FIRM Rate Map.

The contributing drainage basin for the Project outfalls into the Zone X floodplain, indicating that there is minimal flood hazard at the downstream confluence of the Project. The Project also reduces peak flow from predevelopment conditions, as further detailed.

4.0 Proposed Conditions

A. Ground Cover, Imperviousness, Topography and Size

Ground cover for the contributing basin will remain similar to predeveloped conditions. Land alterations include a new 0.13-acre gravel access road that will be constructed over existing native grass cover. Additionally, a couple of small sheds, a viewing platform, and an elevated ski jump will be constructed for use with the training facility. These small improvements convert approximately 0.14 acres of existing vegetation to rooftop cover, which is defined in the Engineering Standards as 90% impervious. Finally, a new recreation pond will be installed below the elevated ski jump, which makes up approximately 0.24 acres of surface area, and 1.20 acre-feet of storage. The recreation pond will typically include a seasonal pool of water during facility operations.

Under pre-development conditions, the contributing drainage basin was estimated at 5.0% imperviousness to remain consistent with the City Stormwater Master Plan. Under proposed conditions, percent imperviousness of the collective contributing basins increases to 5.4%.

The general topography for the contributing drainage basin remains similar to predeveloped conditions. Grades will be flattened in location of the gravel road in order to accommodate vehicular access to the training facility. The shed and viewing platform will be constructed on existing grade, they have been established at a flatter portion of the site. Additionally, terrain will be modified in location of the elevated ski jump to regrade the slope beneath the jump for construction of the elevated platform. Lastly, existing terrain will be excavated and removed in location of the recreation pond to facilitate a maximum of ten feet of storage depth for the recreation pond to be used as a landing area for the ski jump. There are also two four-foot max height boulder walls provided in combination with the grading of the gravel access road.

The total site disturbance required for the project is 0.97 acres, comprising less than 1% of the total 173.88-acre property owned by the Steamboat Ski and Resort Corporation.

B. Proposed Stormwater Systems

There will be minimal hydraulic improvements included as part of this Project. A new eighteen-inch diameter CMP culvert will be installed at the connection of the new gravel access road with Shortcut. Additionally, the new gravel access road will include an upstream vegetated catch-swale that be installed to convey upstream surface runoff towards the entry culvert.

For the recreation pond, an inline Agri-drain water control structure will be used as a manual release system to discharge stored water. Information on the Agri-drain system is included within the appendices of this report.

C. Outlets: Historic and Proposed Flow

The historic outlet location for the contributing drainage basin has been maintained between pre-developed and post-developed conditions. This is denoted as DP1 on both the pre-development and post-development drainage plans included in the appendices of this report. Peak discharge rates at the site outfall have been reduced from predevelopment conditions.

D. Hydraulic Calculations

Hydraulic calculations are provided for the vegetated catch-swale and the new eighteen-inch diameter CMP culvert at the entry of the gravel access drive. Calculations were performed using AutoCAD HydroFlow Express software. The calculations utilize Manning's equation for open channel flow.

Furthermore, hydraulic calculations have been provided for the discharge pipe of the Agri-drain system, which consists of a four-inch diameter HDPE pipe. The outlet of the Agri-drain will be operating under fully submerged conditions to effectively drain stored water within the recreation pond. Calculations provided detail the maximum discharge rate of the pipe, operating under maximum headwater conditions. The pipe will only be used when the Agri-drain system is manually activated to drain the recreation pond.

E. Major and Minor Flow Summary Table

The predeveloped site consists of a singular drainage basin, EB1, encapsulating the entire contributing drainage area. This basin was delineated to mimic the overall size, shape, and percent impervious of the BU24 basin shown on the City Stormwater Master Plan.

Under post-developed conditions, EB1 has been split into four distinct subcatchment areas, denoted as Development Basins 1, 2, 3, and 4 (DB1, DB2, DB3, and DB4). A summary of each is provided:

Development Basin 1: DB1 includes a 4.55-acre subcatchment, making up the northern portion of the EB1 predeveloped basin. Stormwater runoff generated through this area is routed via overland flow and shallow concentrated flow down the north half of the Vouge ski trail over moderately sloping terrain, averaged at 25% slope. An existing ditch on the upgradient side of Shortcut conveys surface flows towards the proposed eighteen-inch diameter CMP culvert at the access road intersection with Shortcut. There are no land disturbing activities proposed within this subcatchment. The subcatchment was modeled at 5.0% impervious to mimic predevelopment conditions.

Development Basin 2: DB2 includes a 2.32-acre subcatchment, making up the northern-central portions of the EB1 predeveloped basin. Stormwater runoff generated through this area is routed via overland flow and shallow concentrated flow down the south half of the Vouge ski trail over moderately sloping terrain, averaged at 25% slope. The new catch-swale on the upgradient side

of the gravel access road conveys surface flows towards the eighteen-inch diameter CMP culvert at the access road intersection with Shortcut. Increases to imperviousness in this subcatchment includes 1,065 square feet (0.02 acres) of new gravel access road, generally replacing existing vegetated area. Additionally, there are approximately 2,250 square feet (0.05 acres) of roof area, conservatively estimated for the trampolines, small sheds and the viewing tower, replacing existing vegetation. The resultant overall subcatchment percentage impervious for the DB2 basin was calculated at 7.0%.

Development Basin 3: DB3 includes a 5.61-acre subcatchment, making up the central and eastern portions of the EB1 predeveloped basin. Stormwater runoff generated through this area is routed via overland flow and shallow concentrated flow down the Voo Doo ski trail over moderately sloping terrain, averaged at 25%. The new recreation pond is located at the bottom of this subcatchment area. Surface flows are captured within the recreation pond and stored until the Agri-drain system is manually activated to release the recreation pond. Thus, surface drainage contained within the DB3 subcatchment is retained and does not contribute to the site outfall until water from the recreation pond is released through the Agri-drain system. Increases to imperviousness in this subcatchment includes the elevated ski jump, which was modeled as 4,032 square feet (0.09 acres) of rooftop at 90% imperviousness. The resultant percentage imperviousness for DB3 is 6.2%.

Development Basin 4: DB4 includes a 10.52-acre subcatchment, making up the southern and western portions of the EB1 predeveloped basin. Stormwater runoff generated through this area is routed via overland flow and shallow concentrated flow down the See Me ski trail over moderately sloping terrain averaged at 25%. The basin drains over shortcut and into a drainage channel through a wooded portion of the property before reaching the site outfall at DP1. Increases to imperviousness in this subcatchment includes 4,690 square feet (0.11 acres) of the gravel access road replacing existing vegetation, modeled at 40% imperviousness per City drainage standards. The resultant percentage imperviousness for DB4 is 5.3%.

Peak discharge rates of the single predevelopment drainage basin (EB1) and the four developed subcatchment areas (DB1-DB4) are provided in the table below.

Table 1: Major and Minor Flow Summary Table

Basin ID	Area (acres)	Impervious Area (%)	Runoff	
			Q_5 (cfs)	Q_{100} (cfs)
Existing - EB1	23.00	5.0%	5.38	33.41
Proposed -DB1	4.55	5.0%	1.55	9.63
Proposed - DB2	2.32	7.0%	0.93	5.49
Proposed - DB3	5.61	6.2%	2.29	13.78
Proposed - DB4	10.52	5.3%	2.52	15.54

A comparison table for peak discharge rates at the design point outfall (DP1) is provided within Table 2.

Table 2: Design Point Summary – Peak Flow Rate Comparison

Outfall ID	Area (acres)	Impervious Area (%)	Runoff	
			Q_5 (cfs)	Q_{100} (cfs)
DP1 – pre-developed	23.00	5.0%	5.38	33.41
DP1 – post-developed	17.39	5.4%	4.19	25.70

Peak discharge rates for the minor and major storm events are reduced from pre-developed to post-developed conditions. The recreation pond intercepts 5.61 acres of the contributing drainage basin. As shown through these calculations, the amount of land area intercepted by the recreation pond outweighs the minor increases to site imperviousness to decrease peak discharges at the Project outfall.

There are notable discrepancies between the peak discharge rates presented on Figures 24, 34, and 34.1 of the City Stormwater Master Plan versus the values that are provided in Table 1 of this report. The City Stormwater Master Plan was calculated in 2013 with smaller precipitation depth and intensity values in comparison to the latest Engineering Standards, as shown in Table 5.5.1 that is included earlier within this report. Additionally, varying hydraulic methods were selected between this Final Drainage Study and the City Stormwater Master Plan. This report utilizes the Rational Method which is accepted for watersheds of less than 160 acres, per Section 5.6.2 of the City Engineering Standards. The hydraulic methods included with the City Stormwater Master Plan included programming using PCSWMM methods which are accepted for a much larger drainage basin and hydraulic analyses. Depletion losses are not accounted for in the Rational Method which could also result in the difference in peak discharge values at the DP1 outfall location.

The hydraulic methods used within this Drainage Study have been checked and reviewed for accuracy and they're in conformance with the latest City Engineering Standards.

F. Proposed Easements

No drainage easements are provided at this time.

G. Off Site Flows

There are no additional off-site flows that pass through the Project site. The 23.0 acre contributing drainage basin includes all of the site runoff impacting the Project.

H. Impacts on Downstream Properties and CLOMR/LOMR Impacts

The Project reduces peak discharge from predeveloped conditions due to the capture of stormwater included with the recreation pond. Therefore, flooding risks on downstream properties have been reduced with the intended design.

I. Detention Ponds

Detention ponds are not required for the project. The Project includes less than an acre of total site disturbance. Therefore, the Project meets exclusion criteria for not requiring a permanent stormwater treatment facility per Section 5.12.3, *Applicability* of the City Engineering Standards. Sites that meet this exclusion category are not required to meet the Water Quality Capture Volume Standard, Pollutant Removal (TSS) Standard, or the Runoff Reduction (Infiltration) Standard, as outlined in Section 5.12.4, *Design Standards* of the City Engineering Standards.

At this time, the Ownership group has filed a Notice of Intent (NOI) through the Colorado Division of Water Resources (DWR) to permit the recreation pond facility as a non-jurisdictional pond. Requirements for non-jurisdictional ponds include less than ten feet of storage depth, less than 20 acres of surface area, and less than 100 acre-feet of storage volume. The recreation pond that has been designed conforms with all of these requirements. The pond will be permitted through the state to meet applicable augmentation requirements for surface waters. For additional reference on pond sizing and volume criteria, a stage-storage diagram of the recreation pond is provided in the appendices.

J. Curb and Gutter

Not applicable. There are no curb and gutter systems integrated or necessary for this project.

K. Culverts

Two culverts were reviewed for purposes of this Project. These include an eighteen-inch diameter CMP installed at the intersection of the new gravel access road with Shortcut as well as a four-inch diameter HDPE outlet drain that will be installed in combination with the inline Agri-drain control structure of the recreation pond.

1. Indicate whether each culvert is under inlet/outlet control

The eighteen inch entry culvert is able to effectively convey the major and minor design storms while operating under inlet control. During the minor storm event, the headwater does not exceed the pipe diameter, and the inlet is unsubmerged. During the major storm event, the headwater exceeds the pipe diameter, and the inlet is fully submerged. However, during the major storm event, stormwater collects at the inlet side of the pipe without overtopping the gravel access drive or Shortcut. See the workbook included in the appendices for additional information.

The four-inch discharge pipe of the Agri-drain system operates with a submerged inlet at all times, as it's used to release stored volume contained within the recreation pond in the fall. During maximum ponding depth conditions, the headwater is approximately 9.5 feet above the invert of the outlet pipe. Under these conditions, the pipe acts as an orifice. As the depth of the pond is reduced from the outlet pipe, the flow rate of the pipe is minimized. The pipe is operating under inlet control at all times.

Due to the four-inch pipe diameter, the maximum discharge rate of the pipe is approximately 1.4 cfs. Calculations have been provided in the appendices to detail this determination. At this flow rate, it would require approximately 10 hours to drain the pond. Due to the flow rate

dropping with the reduction of headwater in the pond, it is estimated that the time required to drain the entire pond at full storage conditions is approximately 15 hours.

2. Show that headwater is less than the maximum allowable

The maximum allowable headwater depths are discussed in Section 5.10.2.1.2 of the City Engineering Standards. These standards are typically required for culverts beneath arterial and collector roadways as well as local roadways, primary commercial and multifamily access drives, and emergency access routes. The culvert that is implemented at the new gravel access drive of the outdoor training facility was checked under minor storm conditions to evaluate these parameters. Under these conditions, the headwater is less than the pipe diameter and the road is not inundated. Therefore, the culvert as designed meets allowable headwater requirements for local roadways.

The discharge pipe of the recreation pond is not applicable to these standards, as it does not convey beneath a designated city roadway.

3. Indicate design velocities

The eighteen inch diameter CMP culvert discharges at a maximum velocity of 5.75 feet per second during the major design storm. See the attached culvert worksheet in the appendices.

The four-inch diameter pipe of the recreation pond operating under maximum headwater conditions, discharging at 1.4 cfs, has a maximum downstream velocity of 4.2 feet per second. This determination is based on the continuity equation, Q = AV. The velocity of the pipe at the outlet is calculated at 1.4 cfs / 0.33 feet = 4.2 ft/second.

4. Indicate required and provided flow rates.

The required flow rate for the eighteen-inch CMP is 9.63 cfs in order to successfully pass the major design storm of the contributing DB1 basin. As this value is exceeded, headwater at the inlet side of the pipe begins to overtop gravel access. However, the pipe is effectively designed to pass the 100-year, major storm event of the contributing subcatchment.

The maximum flow rate of the four-inch HDPE outlet pipe is 1.4 cfs during maximum headwater conditions in the pond. The discharge of the pipe has been carefully reviewed to provide a discharge rate that will not overwhelm existing downstream infrastructure. At a maximum flow rate of 1.4 cfs, the discharge rate is less than the pre-developed basin during the 2-year storm event. Therefore, downstream infrastructure will not be overwhelmed as a result of draining the pond.

5. Discuss whether outlet protection is required and what will be used.

Section 5.10.3.9, *Outlet Protection* of the Engineering Standards details when outlet protection measures shall be required. Furthermore, as detailed in Table 5.7.3, the maximum permissible velocity of grass channel with less erosive soil is 7.0 feet per second. Both the 18-inch culvert and discharge pipe of the recreation pond will drain to channels under these conditions. Maximum velocities for these pipes, as detailed in the prior sections, do not require the need for outlet protection.

L. Inlets

Not applicable. No inlets are required for this Project.

M. Channels

There is a small catch-swale integrated with the new gravel access drive that collects the DB2 subcatchment.

1. Indicate design velocity (and type of dissipation if required)

The design velocity of the vegetated catch swale is 5.77 feet per second under the major design storm criteria. This is less than the 7.0 feet per second permissible velocity requirement for grass lined channels with non-erosive soils and thus the channel does not require any additional energy dissipation measures.

2. Indicate required and provided flow capacity

The required flow capacity is 5.49 cfs in order to effectively convey the major design storm from the contributing DB2 subcatchment. The swale is able to convey up to 15 cfs before the gravel entry road begins to overtop.

3. Show critical cross section(s) including water surface.

Included in the appendices are two design worksheets that detail the cross section of the catch-swale, operating under minor and major design storm conditions.

N. Site Discharge

1. Discuss detention to ensure discharge is less than or equal to historic flow.

Detention measures are not included with this Project, as previously described. However, peak discharge rates at the design point outlet have been reduced to pre-development conditions due to the recreation pond, which will be permitted through the Colorado Division of Water Resources.

2. Downstream Impacts

Due to the decrease in peak discharge rates as a result of the project, there are no additional risks to downstream facilities.

5.0 Post Construction Stormwater Management

A permanent stormwater treatment facility is not required for this project, as previously described. A small site stormwater management plan will be included with the grading and excavation and building permit applications to detail all temporary control measures that will be implemented during construction and prior to final site stabilization.

6.0 Conclusions

A. General Summary

Existing drainage patterns will generally be maintained under the proposed conditions. The only difference includes the 5.61 acres of contributing drainage basin that will be captured and stored by the recreation pond. The historic outfall point DP1 will be maintained between existing and proposed conditions.

The proposed drainage for the Project includes a new eighteen-inch CMP culvert, a catch-swale above the gravel access road, and the recreation pond and outlet control system included with the inline Agri-drain control structure.

B. Compliance

The proposed stormwater drainage system complies with City Drainage Criteria. The Project meets exclusion criteria outlined in Section 5.12.3 of the Drainage Standards such that a permanent stormwater treatment facility is not required.

C. Historic and Proposed Site Flows

Proposed peak flow will be less than peak historic flows from the Project site. The drainage associated with the Project will not have an adverse impact on adjacent or downstream properties.

D. Proposed New Stormwater System Requirements

An operations and maintenance plan is not required for this project; there are no new permanent stormwater facilities integrated with the design. The recreation pond will follow any applicable State requirements pertaining to operations and maintenance.

7.0 References

Urban Drainage and Flood Control District Criteria Manual, 2018.
NOAA Precipitation Frequency Server. NOAA Atlas 14, Volume 8, Version 2. www.NOAA.com
City of Steamboat Springs Engineering Drainage Criteria, Latest Version.
City of Steamboat Springs, Stormwater Master Plan, Prepared by SHE, April of 2013.

8.0 Figures

A. Vicinity Map
B. NRCS Web Soil Survey
C. FIRM Rate Map 08107CO883D & Dynamic FIRMette Map
D. Civil Site Plan
E. Pre-development Drainage Plan (11X17)
F. Post-development Drainage Plan (11X17)
G. Figures from City Stormwater Master Plan
H. Approval Letter - Drainage Scope Approval Form

9.0 Appendices

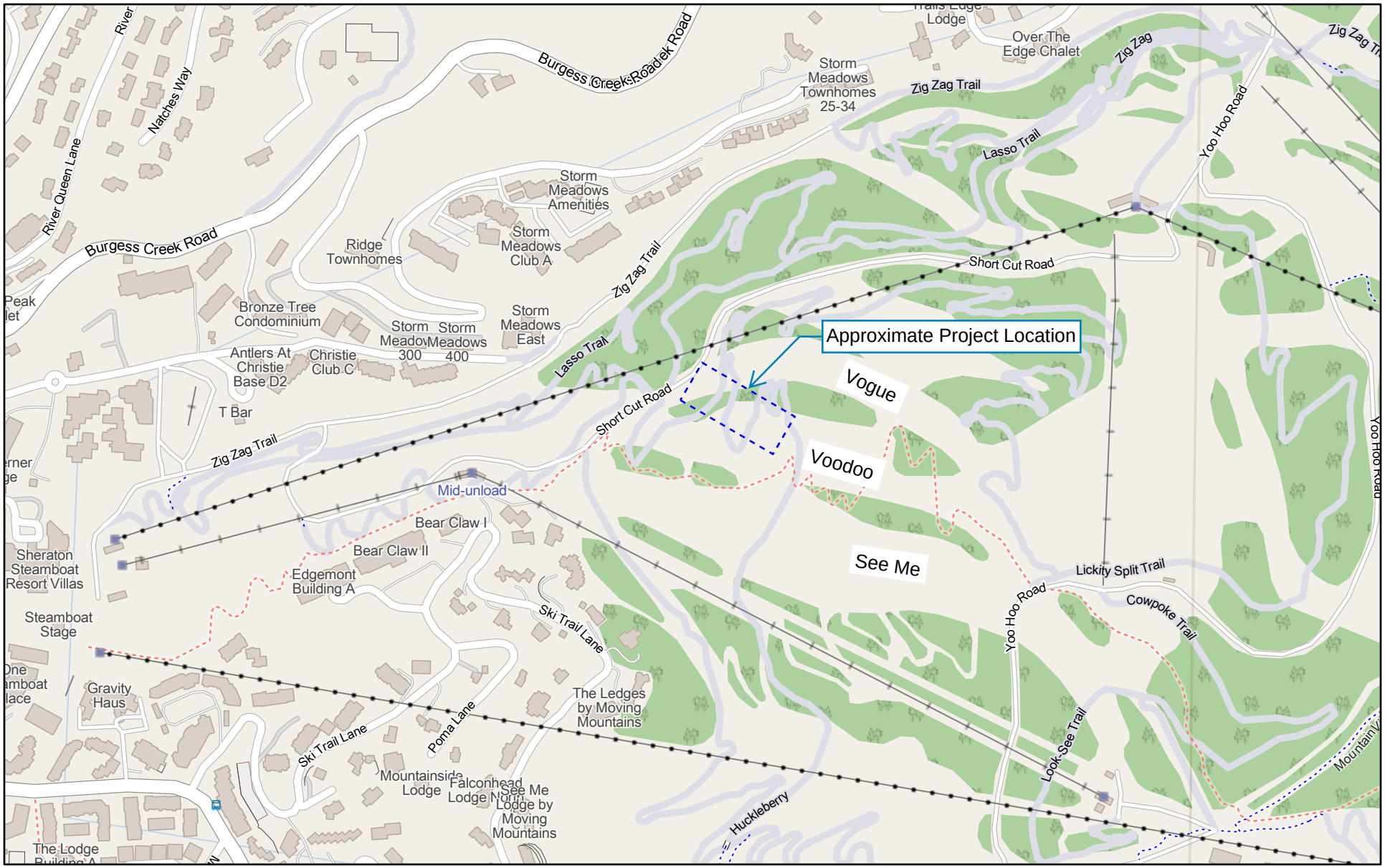
A. Runoff Calculations
B. Culvert Calculations
   B.1 Eighteen Inch CMP Calculations
   B.2 Recreational Pond Four Inch HDPE Calculations
C. Channel Calculations
D. Agri-Drain System Information
E. Recreation Pond – Stage Storage Table

FIGURE A:

VICINITY MAP

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

VICINITY MAP



3/4/2026, 9:47:43 AM

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri

ArcGIS Web AppBuilder

FIGURE B:

NRCS WEB SOIL SURVEY

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

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 Routt Area, Colorado, Parts of Rio Blanco and Routt Counties

March 4, 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 Scale: 1:3,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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 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 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Routt Area, Colorado, Parts of Rio Blanco and Routt Counties
Survey Area Data: Version 15, Aug 29, 2025

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

Date(s) aerial images were photographed: Jul 2, 2021—Aug 25, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
50F	Routt loam, 25 to 65 percent slopes, very stony	1.0	4.6%
113	Bucklon, very stony-Skyway complex, 30 to 75 percent slopes	21.0	93.0%
119	Mine loam, 30 to 75 percent slopes	0.6	2.5%
Totals for Area of Interest		**22.6**	**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.

Routt Area, Colorado, Parts of Rio Blanco and Routt Counties

50F—Routt loam, 25 to 65 percent slopes, very stony

Map Unit Setting

National map unit symbol: k0gc
Elevation: 6,890 to 8,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 38 to 41 degrees F
Frost-free period: 30 to 70 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Routt, Very Stony

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 12 inches: loam
A2 - 12 to 22 inches: loam
A3 - 22 to 27 inches: loam
B/E - 27 to 29 inches: clay loam
B/E - 29 to 31 inches: loam
Bt1 - 31 to 46 inches: clay
Bt2 - 46 to 65 inches: clay

Properties and qualities

Slope: 25 to 65 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.07 to 0.21 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C

Ecological site: F048AY449CO - Aspen Woodland
Hydric soil rating: No

Minor Components

Impass
Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R048BY296CO - Claypan
Hydric soil rating: No

Venable
Percent of map unit: 5 percent
Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R048AY241CO - Mountain Meadow
Hydric soil rating: Yes

Slater
Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F048AY449CO - Aspen Woodland
Other vegetative classification: ASPEN (null_3)
Hydric soil rating: No

113—Bucklon, very stony-Skyway complex, 30 to 75 percent slopes

Map Unit Setting
National map unit symbol: k0jg
Elevation: 6,890 to 8,200 feet
Mean annual precipitation: 24 to 28 inches
Mean annual air temperature: 37 to 40 degrees F
Frost-free period: 30 to 70 days
Farmland classification: Not prime farmland

Map Unit Composition
Bucklon, very stony, and similar soils: 45 percent
Skyway and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bucklon, Very Stony

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium over residuum weathered from granite and gneiss

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 8 inches: fine sandy loam
Cr - 8 to 60 inches: bedrock

Properties and qualities

Slope: 30 to 75 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 6 to 12 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): 8
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Ecological site: R048AY237CO - Stony Loam
Hydric soil rating: No

Description of Skyway

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Colluvium derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 17 inches: fine sandy loam
A2 - 17 to 25 inches: cobbly sandy loam
C - 25 to 34 inches: cobbly sandy loam
Cr - 34 to 44 inches: bedrock

Properties and qualities

Slope: 30 to 75 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): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 8
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: B
Ecological site: R048AY238CO - Brushy Loam
Hydric soil rating: No

Minor Components

Routt

Percent of map unit: 10 percent
Landform: Mountain slopes
Landform position (three-dimensional): Mountainbase
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F048AY449CO - Aspen Woodland
Hydric soil rating: No

Rogert

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R048AY237CO - Stony Loam
Hydric soil rating: No

119—Mine loam, 30 to 75 percent slopes

Map Unit Setting

National map unit symbol: k0jn
Elevation: 7,050 to 8,200 feet
Mean annual precipitation: 24 to 28 inches
Mean annual air temperature: 37 to 40 degrees F
Frost-free period: 30 to 70 days
Farmland classification: Not prime farmland

Map Unit Composition

Mine and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mine

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Slope alluvium over colluvium derived from granite and gneiss

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: loam
Bw1 - 6 to 10 inches: loam
Bw2 - 10 to 23 inches: loam
Bw3 - 23 to 36 inches: gravelly sandy loam
C - 36 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 30 to 75 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 high to high (0.71 to 2.13 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 8
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: B
Ecological site: F048AY918CO - Spruce-Fir Woodland
Hydric soil rating: No

Minor Components

Dorpat

Percent of map unit: 10 percent
Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F048AY918CO - Spruce-Fir Woodland
Hydric soil rating: No

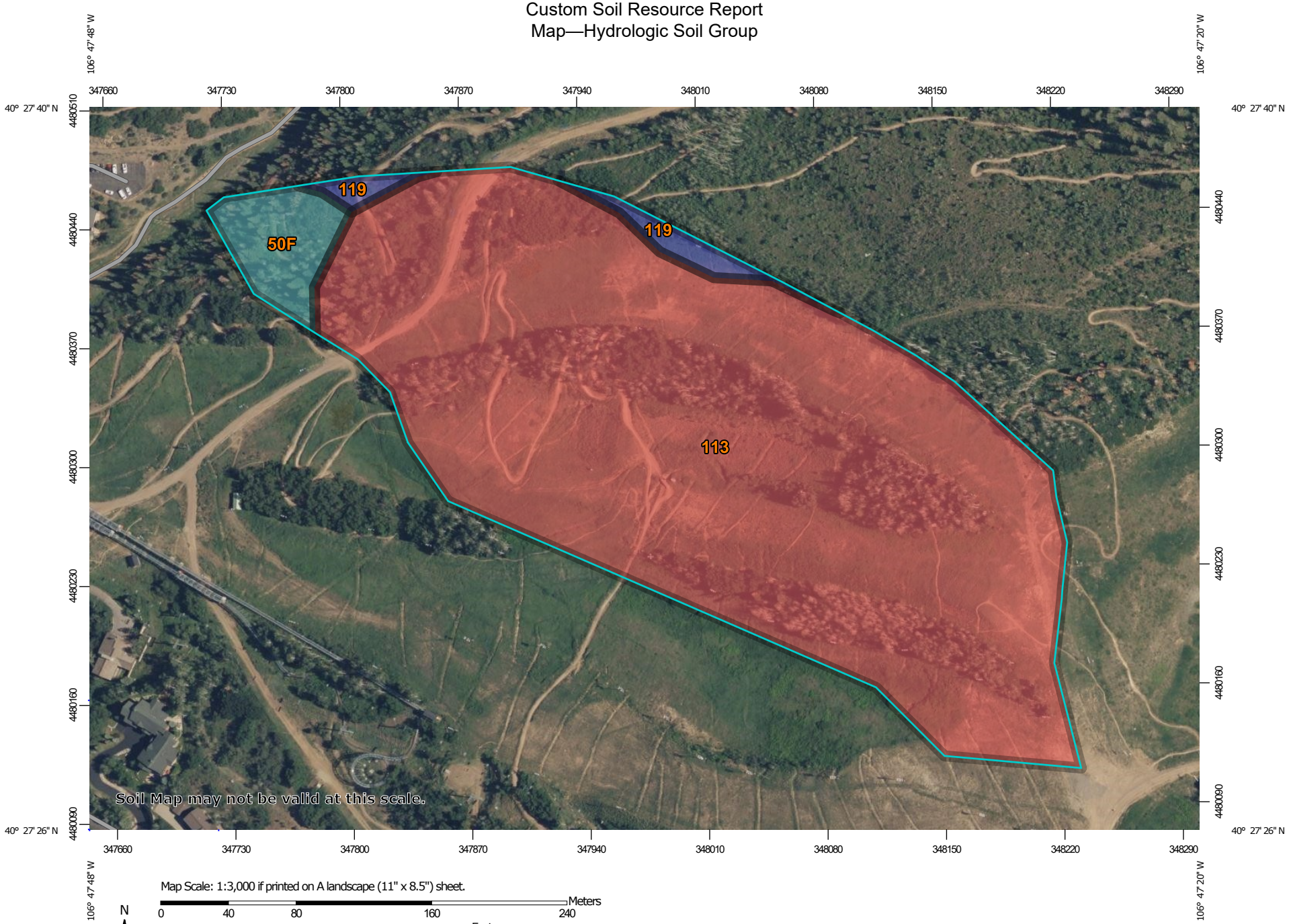
Merino

Percent of map unit: 10 percent
Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F048AY912CO - Lodgepole Pine
Hydric soil rating: No

Perfecto

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F048AY918CO - Spruce-Fir Woodland
Hydric soil rating: No

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:3,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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

MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Routt Area, Colorado, Parts of Rio Blanco and Routt Counties
Survey Area Data: Version 15, Aug 29, 2025

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

Date(s) aerial images were photographed: Jul 2, 2021—Aug 25, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	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
50F	Routt loam, 25 to 65 percent slopes, very stony	C	1.0	4.6%
113	Bucklon, very stony-Skyway complex, 30 to 75 percent slopes	D	21.0	93.0%
119	Mine loam, 30 to 75 percent slopes	B	0.6	2.5%
Totals for Area of Interest			**22.6**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

FIGURE C:

FIRM RATE MAP 08107CO883D

DYNAMIC FIRMette MAP

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

NOTES TO USERS

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

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

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

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

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

The **projection** used in the preparation of this map is Universal Tranverse Mercator (UTM) zone 13. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

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

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

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

Base map information shown on this FIRM was provided in digital format by Routt County GIS Department.

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

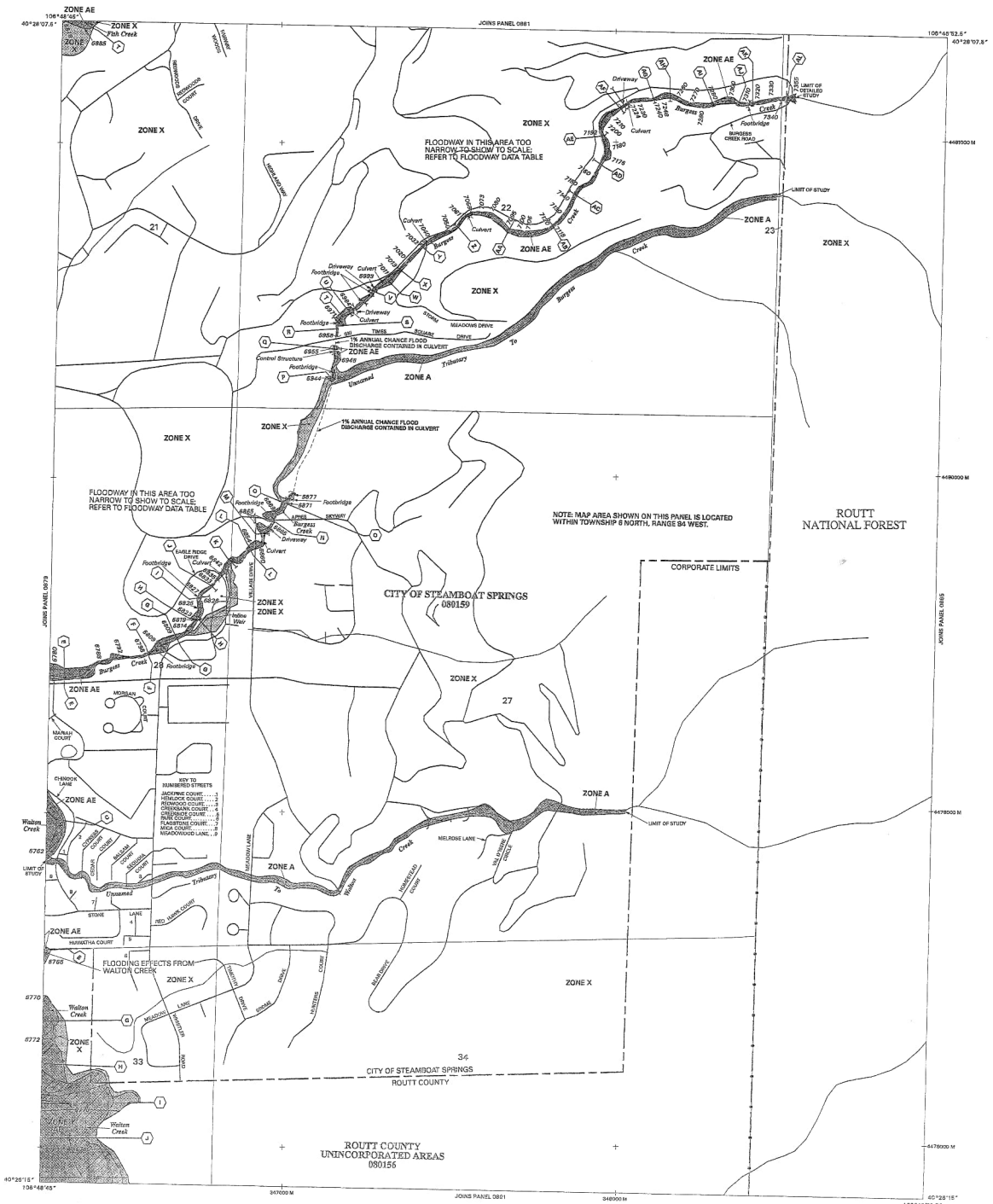
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which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

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this PANEL may be available. Contact the **FEMA Map Service Center** at the following phone numbers and Internet address for information on all related products available from FEMA:

Phone: 800-358-9616
FAX: 800-358-9620
www.fema.gov/msc

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

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

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

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.

ZONE A99 Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL. 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross Section Line
- 23 — — — 23 — Transect Line
- 97°03'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276000M — 1000-meter Universal Transverse Mercator grid values, zone 13
- 600000 FT — 5000-foot grid ticks
- DX5510× — Bench mark (see explanation in Notes to Users section of this FIRM panel).
- ⌀ M1.5 — River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
FEBRUARY 4, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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

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

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

PANEL 0883D

FIRM
FLOOD INSURANCE RATE MAP
ROUTT COUNTY,
COLORADO
AND INCORPORATED AREAS

PANEL 883 OF 1475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	CONTAINS NUMBER	PANEL	SUFFIX
ROUTT COUNTY, UNINCORPORATED AREAS	080156	0883	D
STEAMBOAT SPRINGS, CITY OF	080159	0883	D

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

MAP NUMBER
08107C0883D

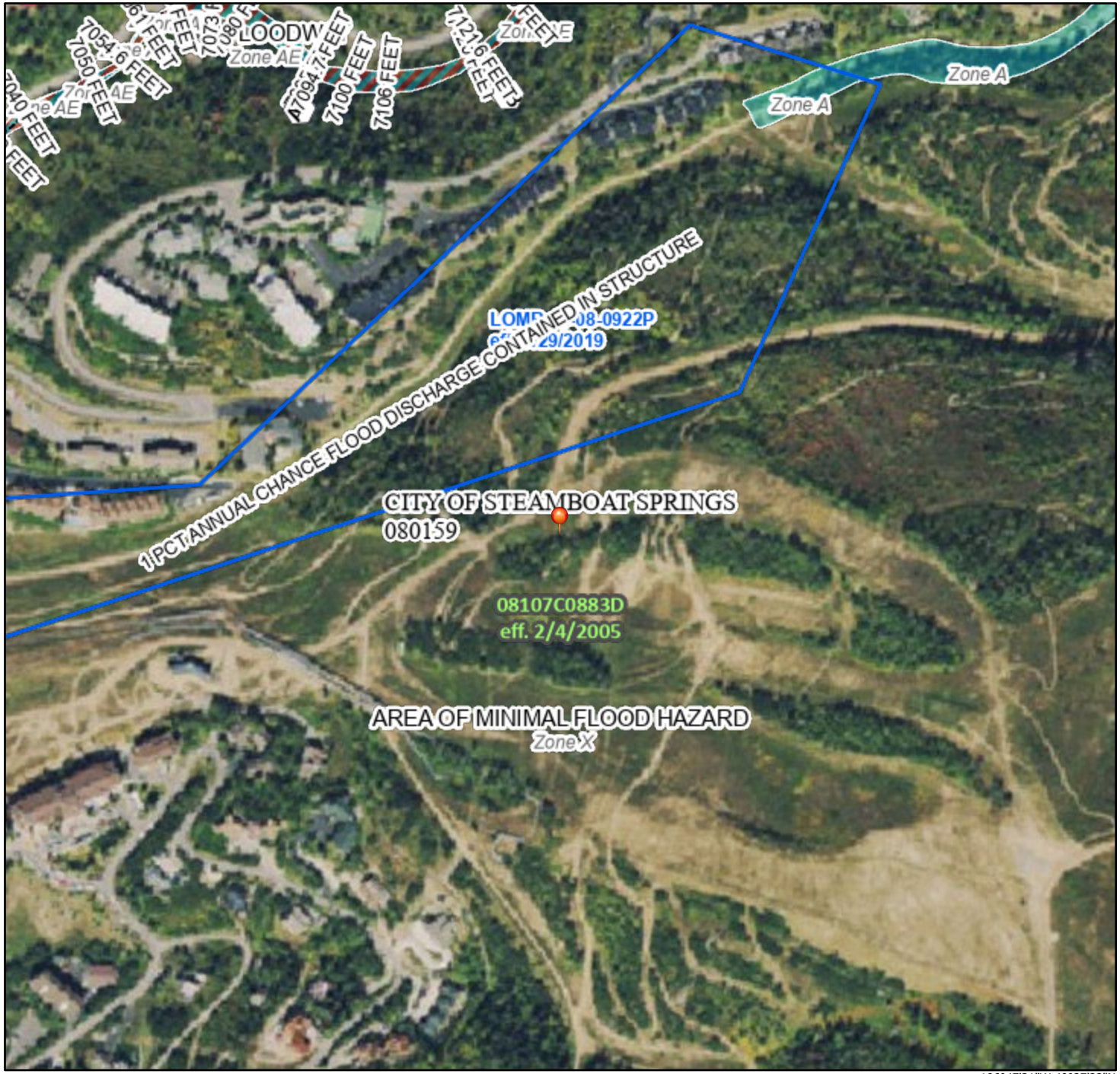
EFFECTIVE DATE:
FEBRUARY 4, 2005

Federal Emergency Management Agency

National Flood Hazard Layer FIRMette

FEMA

106°47'58"W 40°27'50"N



106°47'21"W 40°27'22"N

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

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

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

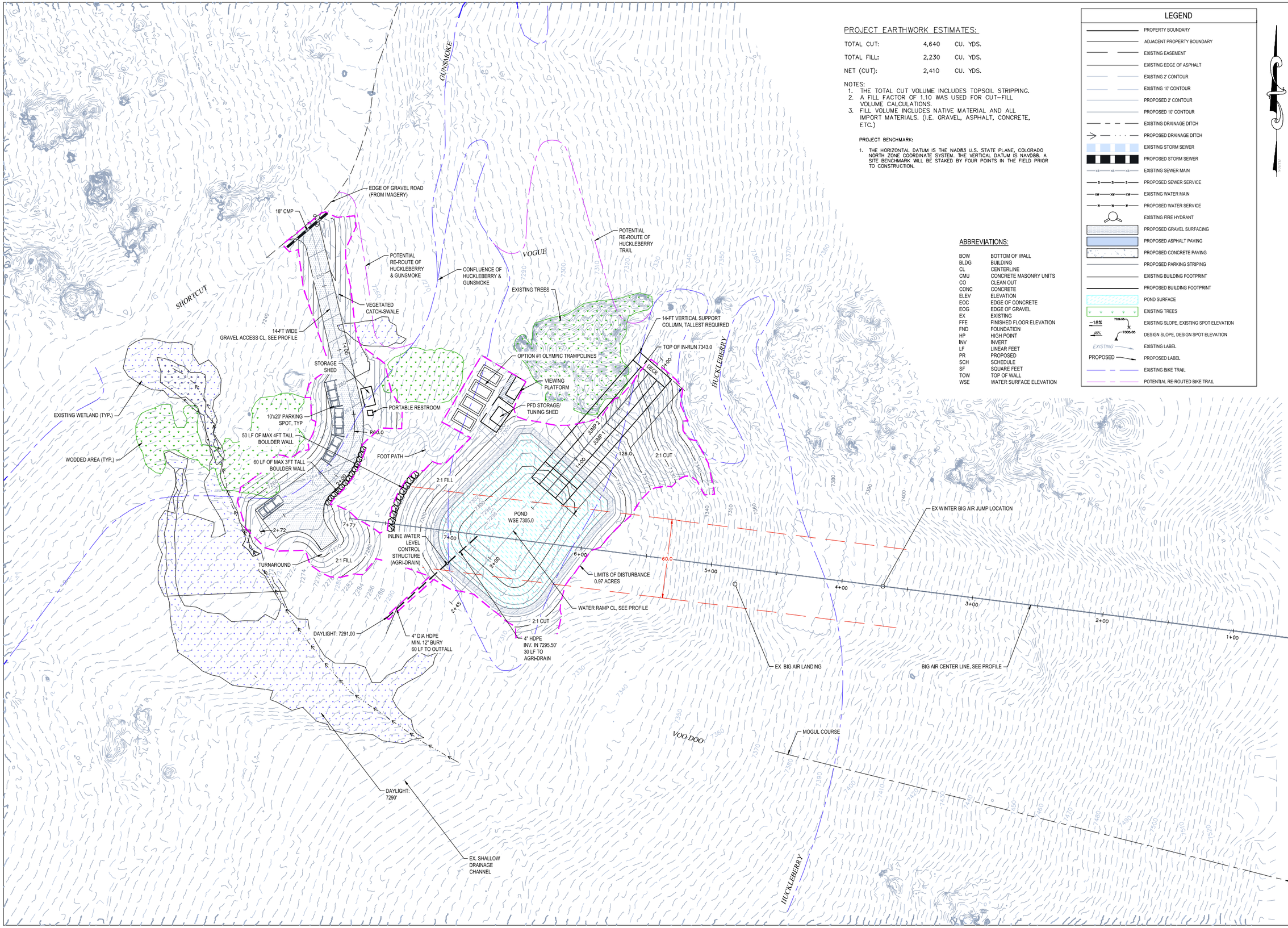
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/6/2026 at 1:33 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new 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.

FIGURE D:

CIVIL SITE PLAN

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772



PROJECT EARTHWORK ESTIMATES:

TOTAL CUT:	4,640	CU. YDS.
TOTAL FILL:	2,230	CU. YDS.
NET (CUT):	2,410	CU. YDS.

NOTES:
1. THE TOTAL CUT VOLUME INCLUDES TOPSOIL STRIPPING.
2. A FILL FACTOR OF 1.10 WAS USED FOR CUT-FILL VOLUME CALCULATIONS.
3. FILL VOLUME INCLUDES NATIVE MATERIAL AND ALL IMPORT MATERIALS. (I.E. GRAVEL, ASPHALT, CONCRETE, ETC.)

PROJECT BENCHMARK:

1. THE HORIZONTAL DATUM IS THE NAD83 U.S. STATE PLANE, COLORADO NORTH ZONE COORDINATE SYSTEM. THE VERTICAL DATUM IS NAVD88. A SITE BENCHMARK WILL BE STAKED BY FOUR POINTS IN THE FIELD PRIOR TO CONSTRUCTION.

ABBREVIATIONS:

BOW	BOTTOM OF WALL
BLDG	BUILDING
CL	CENTERLINE
CMU	CONCRETE MASONRY UNITS
CO	CLEAN OUT
CONC	CONCRETE
ELEV	ELEVATION
EOC	EDGE OF CONCRETE
EOG	EDGE OF GRAVEL
EX	EXISTING
FFE	FINISHED FLOOR ELEVATION
FND	FOUNDATION
HP	HIGH POINT
INV	INVERT
LF	LINEAR FEET
PR	PROPOSED
SCH	SCHEDULE
SF	SQUARE FEET
TOW	TOP OF WALL
WSE	WATER SURFACE ELEVATION

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- EXISTING EASEMENT
- EXISTING EDGE OF ASPHALT
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED 10' CONTOUR
- EXISTING DRAINAGE DITCH
- PROPOSED DRAINAGE DITCH
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING SEWER MAIN
- PROPOSED SEWER SERVICE
- EXISTING WATER MAIN
- PROPOSED WATER SERVICE
- EXISTING FIRE HYDRANT
- PROPOSED GRAVEL SURFACING
- PROPOSED ASPHALT PAVING
- PROPOSED CONCRETE PAVING
- PROPOSED PARKING STRIPING
- EXISTING BUILDING FOOTPRINT
- PROPOSED BUILDING FOOTPRINT
- POND SURFACE
- EXISTING TREES
- EXISTING SLOPE, EXISTING SPOT ELEVATION (-18% 7304.85)
- DESIGN SLOPE, DESIGN SPOT ELEVATION (4% 7305.00)
- EXISTING LABEL
- PROPOSED LABEL
- EXISTING BIKE TRAIL
- POTENTIAL RE-ROUTED BIKE TRAIL

FOUR POINTS SURVEYING ENGINEERING
410 S. Lincoln Ave, Unit 15
P.O. Box 775966
Steamboat Springs, CO 80487
(970)-871-6772
www.fourpointsse.com

No.	DATE	REVISIONS	INT

SSWSC WATER RAMP FACILITY

PART LOT 1 GREEN HORN RANCH
34120 FOREST ROAD 321

Horizontal Scale

0 30' 60'

SCALE: 1" = 30'

Contour Interval = 2 ft

DATE: 03-06-2026
JOB #: 1157-010
DRAWN BY: CFB
DESIGN BY: CFB
REVIEW BY: WNM

IF THIS DRAWING IS PRESENTED IN A FORMAT OTHER THAN 24" X 36", THE GRAPHIC SCALE SHOULD BE UTILIZED.

DRAWING: CIVIL SITE PLAN

SHEET # 1

FIGURE E:

PRE-DEVELOPMENT DRAINAGE PLAN (11X17)

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

PREDEVELOPMENT DRAINAGE PLAN LEGEND

- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- DRAINAGE BASIN BOUNDARY (EXISTING)
- FLOW PATH, OVERLAND FLOW
- FLOW PATH, CONCENTRATED
- 1 — HISTORIC OUTFALL POINT
- A / B | C — A: BASIN DESIGNATION; B: BASIN AREA (ACRES); C: % IMPERVIOUS

HISTORIC OUTFALL POINTS:

1. EB1 HISTORIC OUTFALL VIA CONCENTRATED FLOW THROUGH DRAINAGE CHANNEL TO DP1. ULTIMATE DISCHARGE INTO BURGESS CREEK FURTHER TO THE WEST.

Table 1: Major and Minor Flow Summary Table

Basin ID	Area (acres)	Impervious Area (%)	Runoff	
			Q_5 (cfs)	Q_{100} (cfs)
Existing - EB1	23.00	5.0%	5.38	33.41
Proposed -DB1	4.55	5.0%	1.55	9.63
Proposed - DB2	2.32	7.0%	0.93	5.49
Proposed - DB3	5.61	6.2%	2.29	13.78
Proposed - DB4	10.52	5.3%	2.52	15.54

FOUR POINTS SURVEYING ENGINEERING
410 S. Lincoln Ave, Unit 15
P.O. Box 775966
Steamboat Springs, CO 80487
(970)-871-6772
www.fourpointsse.com

No.	DATE	REVISIONS	INT

SSWSC WATER RAMP FACILITY
PART LOT 1 GREEN HORN RANCH
34120 FOREST ROAD 321

Horizontal Scale
0 80' 160'
SCALE: 1" = 80'

Contour Interval = 5 ft

DATE: 03-06-2026
JOB #: 1157-010
DRAWN BY: DSC
DESIGN BY: CFB
REVIEW BY: WNM

IF THIS DRAWING IS PRESENTED IN A FORMAT OTHER THAN 24" X 36", THE GRAPHIC SCALE SHOULD BE UTILIZED.

DRAWING: PREDEVELOPMENT DRAINAGE PLAN

SHEET #
DR1

FIGURE F:

POST-DEVELOPMENT DRAINAGE PLAN (11X17)

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

POSTDEVELOPMENT DRAINAGE PLAN LEGEND

- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- DRAINAGE BASIN BOUNDARY (EXISTING)
- FLOW PATH, OVERLAND FLOW
- FLOW PATH, CONCENTRATED
- 1 — HISTORIC OUTFALL POINT
- A / B / C — A: BASIN DESIGNATION; B: BASIN AREA (ACRES); C: % IMPERVIOUS

HISTORIC OUTFALL POINTS:

1. DB1, DB2, DB4 HISTORIC OUTFALL VIA CONCENTRATED FLOW THROUGH DRAINAGE SWALE TO DP1. ULTIMATE DISCHARGE INTO BURGESS CREEK FURTHER TO THE WEST.
1. DB3 IS COLLECTED BY THE RECREATION POND AND DOES NOT OUTFALL AT DP1 UNTIL THE POND FACILITY IS DRAINED.

Table 1: Major and Minor Flow Summary Table

Basin ID	Area (acres)	Impervious Area (%)	Runoff	
			Q_5 (cfs)	Q_{100} (cfs)
Existing - EB1	23.00	5.0%	5.38	33.41
Proposed -DB1	4.55	5.0%	1.55	9.63
Proposed - DB2	2.32	7.0%	0.93	5.49
Proposed - DB3	5.61	6.2%	2.29	13.78
Proposed - DB4	10.52	5.3%	2.52	15.54

FOUR POINTS SURVEYING ENGINEERING
410 S. Lincoln Ave, Unit 15
P.O. Box 775966
Steamboat Springs, CO 80487
(970)-871-6772
www.fourpointsse.com

No.	DATE	REVISIONS	INT

SSWSC WATER RAMP FACILITY
PART LOT 1 GREEN HORN RANCH
34120 FOREST ROAD 321

Horizontal Scale
0 80' 160'
SCALE: 1" = 80'
Contour Interval = 2 ft

DATE: 03-06-2025
JOB #: 1157-010
DRAWN BY: DSC
DESIGN BY: CFB
REVIEW BY: WNM

IF THIS DRAWING IS PRESENTED IN A FORMAT OTHER THAN 24" X 36", THE GRAPHIC SCALE SHOULD BE UTILIZED.

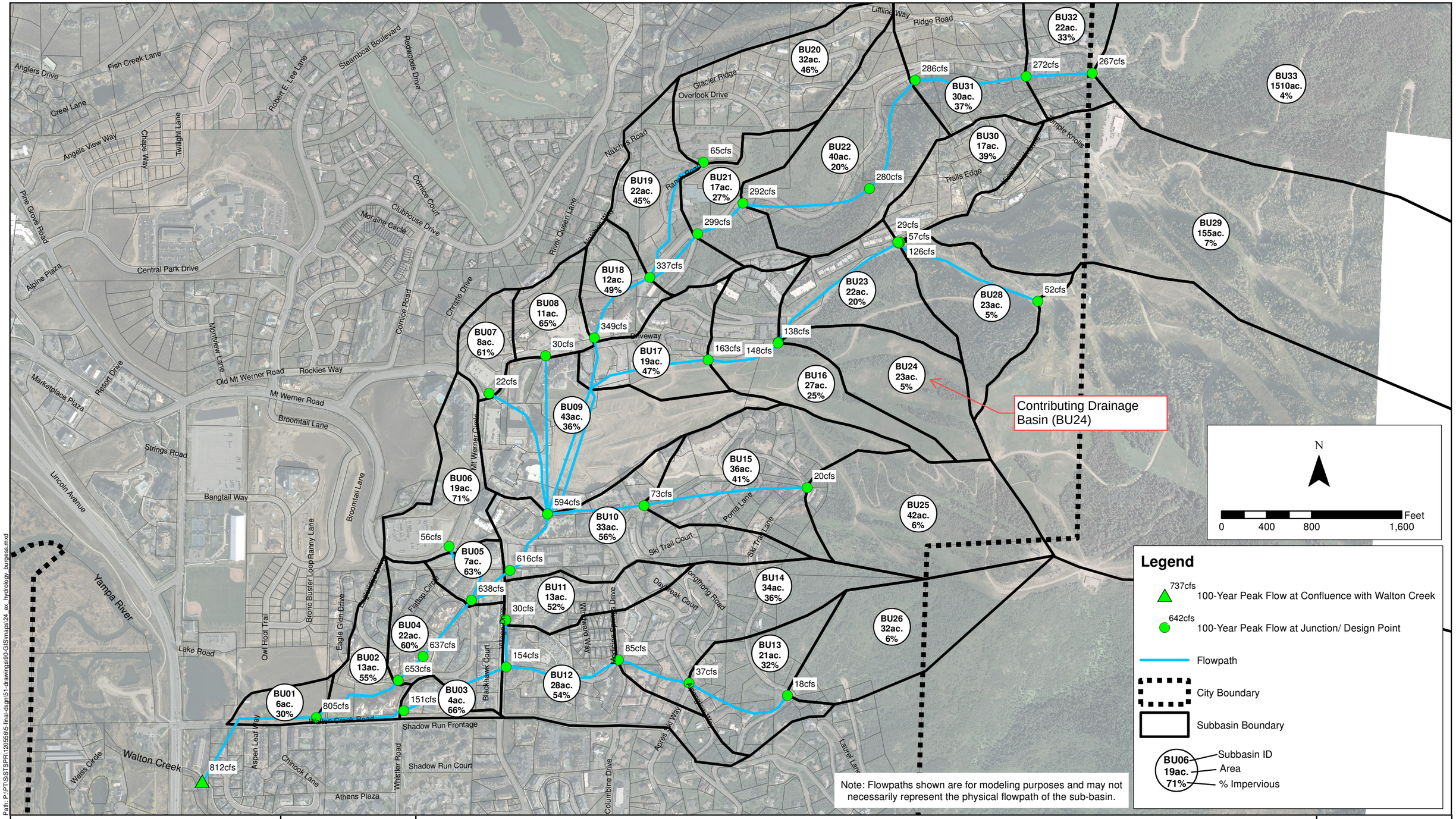
DRAWING: POST-DEVELOPMENT DRAINAGE PLAN

SHEET #
DR2

FIGURE G:

FIGURES FROM CITY STORMWATER MASTER PLAN

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772



Path: P:\PTS\STSPR\120556\5-final-dsgn\51-drawings\90-GIS\maps\24_ex_hydrology_burgess.mxd

SEH
390 UNION BOULEVARD, SUITE 630
LAKEWOOD, CO 80228
PHONE: (303) 586-5800
FAX: (888) 908-8166
www.sehinc.com

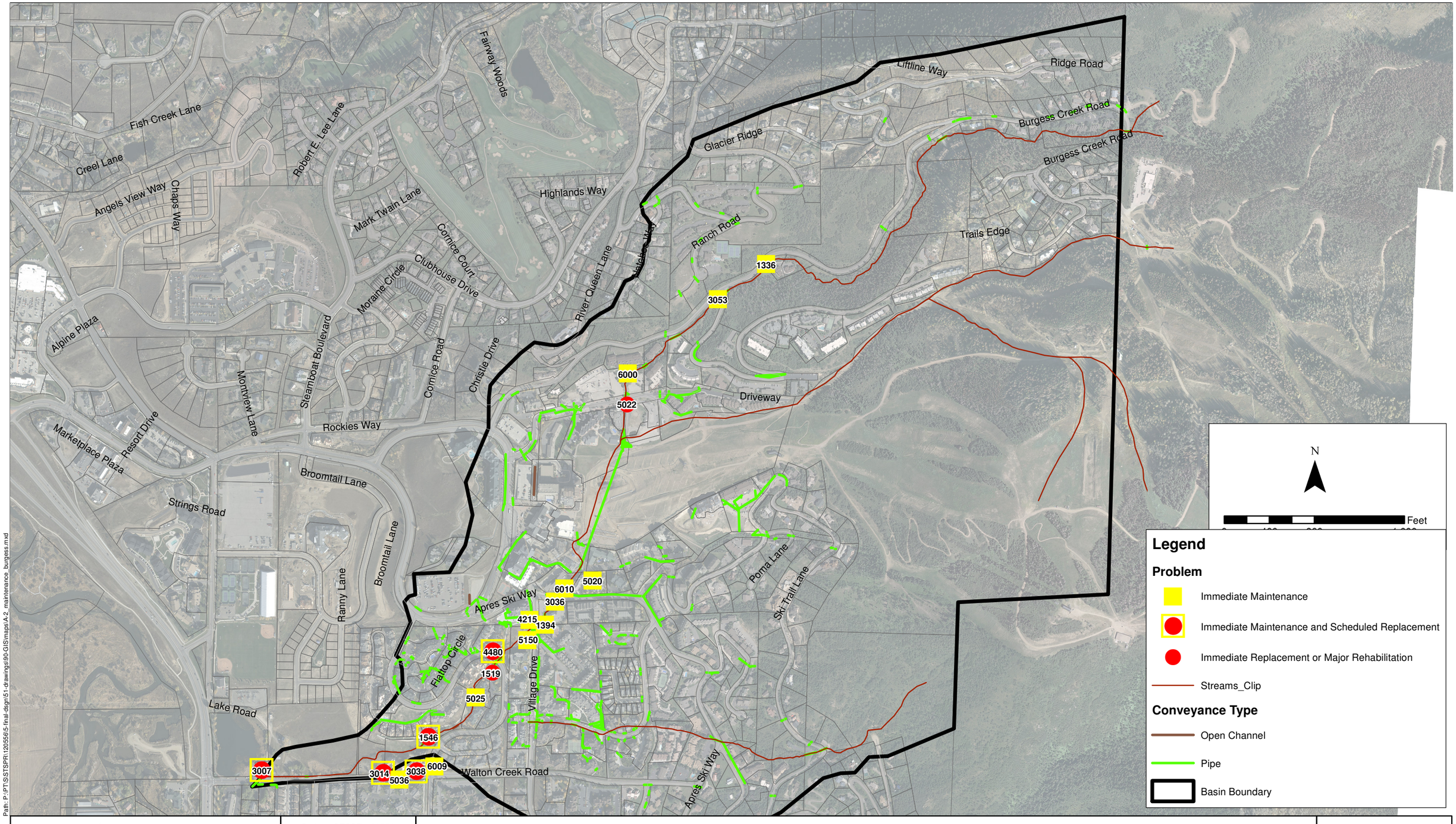
Project: STSPR 120556
Print Date: 2/21/2013

Map by:
Projection:
Source:

Existing Hydrologic Conditions - Burgess Creek

Citywide Stormwater Master Plan
City of Steamboat Springs, Colorado

Figure 24



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SEH
390 UNION BOULEVARD, SUITE 630
LAKEWOOD, CO 80228
PHONE: (303) 586-5800
FAX: (888) 908-8166
www.sehinc.com

Project: STSPR 120556
Print Date: 3/6/2013

Map by:
Projection:
Source:

Problems and Needs Map - Burgess Creek

Citywide Stormwater Master Plan
City of Steamboat Springs, Colorado

Figure
A-2

FIGURE H:

APPROVAL LETTER – DRAINAGE SCOPE APPROVAL FORM

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

City of Steamboat Springs

Drainage and Stormwater Treatment Scope Approval Form - Planning Applications

Prior to starting a development plan and before the first drainage submittal, a Drainage and Stormwater Treatment Scope Approval Form must be submitted for review and signed by the City Engineer. A signed form shall also be included in every drainage submittal as Attachment A. This Scope Approval Form is for City requirements only. Values may be approximate. The City encourages supporting calculations and figures to be attached.

Project Information

Project Name: SSWSC Training Facility
Project Location: 34120 Forest Road 321
Applicant Name and Contact: Cameron Breton - cameronb@fourpointsse.com
Drainage Engineer Name and Contact: Walter Magill, PE - walterm@fourpointsse.com
Application Type: Development Plan
Proposed Land Use: Seasonal Pond Training Facility

Project Site Parameters

Total parcel area (acres): 173.88
Disturbed area (acres): 0.97
Existing impervious area (acres, if applicable): 5% of 23.0 acres = 1.15 acres (50,094 sf)
Proposed new impervious area (acres): 0.08 acres (gravel access + storage shed rooftops)
Proposed total impervious area (acres): 1.23 acres total
Proposed number of project outfalls: 1
Number of additional parking spaces: 4
Description and site percentage of existing cover/land uses:

Native Vegetation (~80%), Densely wooded areas (~15%), Gravel bike trails and access roads (~5%). Basin previously calculated at 5% imperiousness for OR zoning.

Description and site percentage of proposed cover/land uses:

Native vegetation (~77%), Densely wooded areas (~15%), Gravel bike trails and access roads (~6%), Retention Pond Facility (~1%), Shed structures (~1%)

Expected maximum proposed conveyance gradient (%): 50%
Description of size (acres) and cover/land uses of offsite areas draining to the site:

No off-site drainage basin areas included. BU24 basin is contained fully on-site.

Type of Study Required

Indicate type of study (check all that apply):

- ☐ Drainage Letter
- ☐ Conceptual Drainage Study
- ☑ Final Drainage Study
- ☐ Stormwater Quality Plan

Hydrologic Evaluation

Indicate hydrologic evaluation method:

- ☑ Rational Method
- ☐ HEC-HMS
- ☐ CUHP/SWMM
- ☐ Other:

Project Drainage

Number of subbasins to be evaluated: 1 Existing, 3 Proposed

Presence of pass through flow:

- ☐ Yes
- ☑ No

Description of proposed stormwater conveyance on site:

Retention pond with a controlled release. Vegetated swale and storm culvert.

Project includes roadway conveyance as part of design evaluation:

- ☑ Yes
- ☐ No

Description of conveyance of site runoff downstream of site, identify any infrastructure noted in Stormwater Master Plan noted as lacking capacity for minor or major storm event:

Runoff leaving the analysis area conveys to Burgess Creek near Torian Plum.
No infrastructure capacity problems identified in the Stormwater Master Plan.

Detention expected onsite:

- ☑ Yes
- ☐ No

Presence of Floodway or Floodplain on site:

- ☐ Yes
- ☑ No

Anticipated modification of floodway or floodplain proposed:

- ☐ Yes
- ☑ No

Describe culvert or storm sewer conveyance evaluative method:

Culvert capacity will be reviewed using AutoCAD HydroExpress software which integrates Manning's equation for pipe flow using the rational method.

Permanent Stormwater Treatment Facility Design Standard

Check all that apply with only one standard per tributary basin:

- ☐ WQCV Standard
- ☐ TSS Standard
- ☐ Infiltration Standard
- ☐ Constrained Redevelopment WQCV Standard
- ☐ Constrained Redevelopment TSS Standard
- ☐ Constrained Redevelopment Infiltration Standard
- ☑ Does not Require Permanent Stormwater Treatment (attach Exclusion Tracking Form)

Project Permanent Stormwater Treatment

Justification of choice of proposed design standard, including how the site meets the constrained redevelopment standard, infiltration test results, etc.:

Exclusion requested. Site disturbance is less than 1-acre and thus does not qualify per City Exclusions Guidance Tree - CH5 City Engineering Standards

Concept-level permanent stormwater treatment facility design details (type, location of facilities, proprietary structure selection, treatment train concept, etc.):

N/A

Proposed LID measures to reduce runoff volume:

N/A

Will treatment evaluation include off-site, pass through flow:

☐ Yes ☑ No

Required Attachments

Verify that the provided attachments are included within the initial submittal:

☑ Site plan

Approval – Staff Use Only

Please note that the approval of this scope approval form shall not be construed as an approval of the proposed use, but rather a methodology for evaluation of the proposed use. During the city development review process, the proposed use will be reviewed by city staff for compliance with code, standards, and community planning documents.

Approved By

City Engineer stamp:

February 24, 2026

David Clemmer
P.O. Box 775966
Steamboat Springs, CO 80487

RE: Approval Letter for Preconsultation - Drainage Scope Approval Form or Waiver Request for SSWSC Training Facility (PL20260025)

Dear David Clemmer,

The following are approved:

1. Drainage & Stormwater Treatment Scope Approval Form

If you have any questions or concerns please contact me at (970) 871-7019 or via email at acamano@steamboatsprings.net.

Sincerely,

Adan Camano

Adan Camano
Staff Engineer

Standard Form No. 6 Permanent Stormwater Treatment Facility Exclusions Tracking Form

If a site development is eligible for an exclusion from the requirement to implement permanent stormwater treatment facilities, this form must be filled out and submitted for approval. If an exclusion is sought, this form shall be attached to the development's Drainage and Stormwater Treatment Scope Approval Form when it is submitted for review. The City is required to track all sites excluded from the requirement to implement permanent stormwater treatment facilities. Initial values may be approximate, but final values must meet the requirements of Section 5.12.3 of the City's Engineering Standards. Supporting calculations, figures, and narrative must be included.

Project Information	
Project/site name:	SSWSC Training Facility
Project/site location:	34120 Forest Road 321
Developer name/ contact info:	Native Excavating 1878 13th Street, Steamboat Springs, CO 80487
Drainage engineer name/contact info:	Walter Magill, PE walterm@fourpointsse.com
Owner name/ contact info:	Steamboat Ski and Resort Corporation 2305 Mount Werner Circle, Steamboat Springs, CO 80487
Anticipated Construction Completion Date:	09/01/2026

Project Site Parameters	
Total parcel area (acres):	173.88
Disturbed area (acres):	0.97 acres
Existing impervious area (acres):	5% of 23 acres = 1.15 acres (50,094 sf) [from City Stormwater Master Plan]
Proposed new impervious area (acres):	0.08 acres (gravel access + storage sheds)
Proposal total impervious area (acres):	1.23 acres
Excluded impervious area (acres):	N/A

Exclusion Category:

☐ 1. Pavement Management Site ☐ 2. Excluded Roadway Redevelopment

☐ 3. Excluded Existing Roadway Area ☐ 4. Aboveground & Underground Utilities

☐ 5. Large Lot Single Family Site

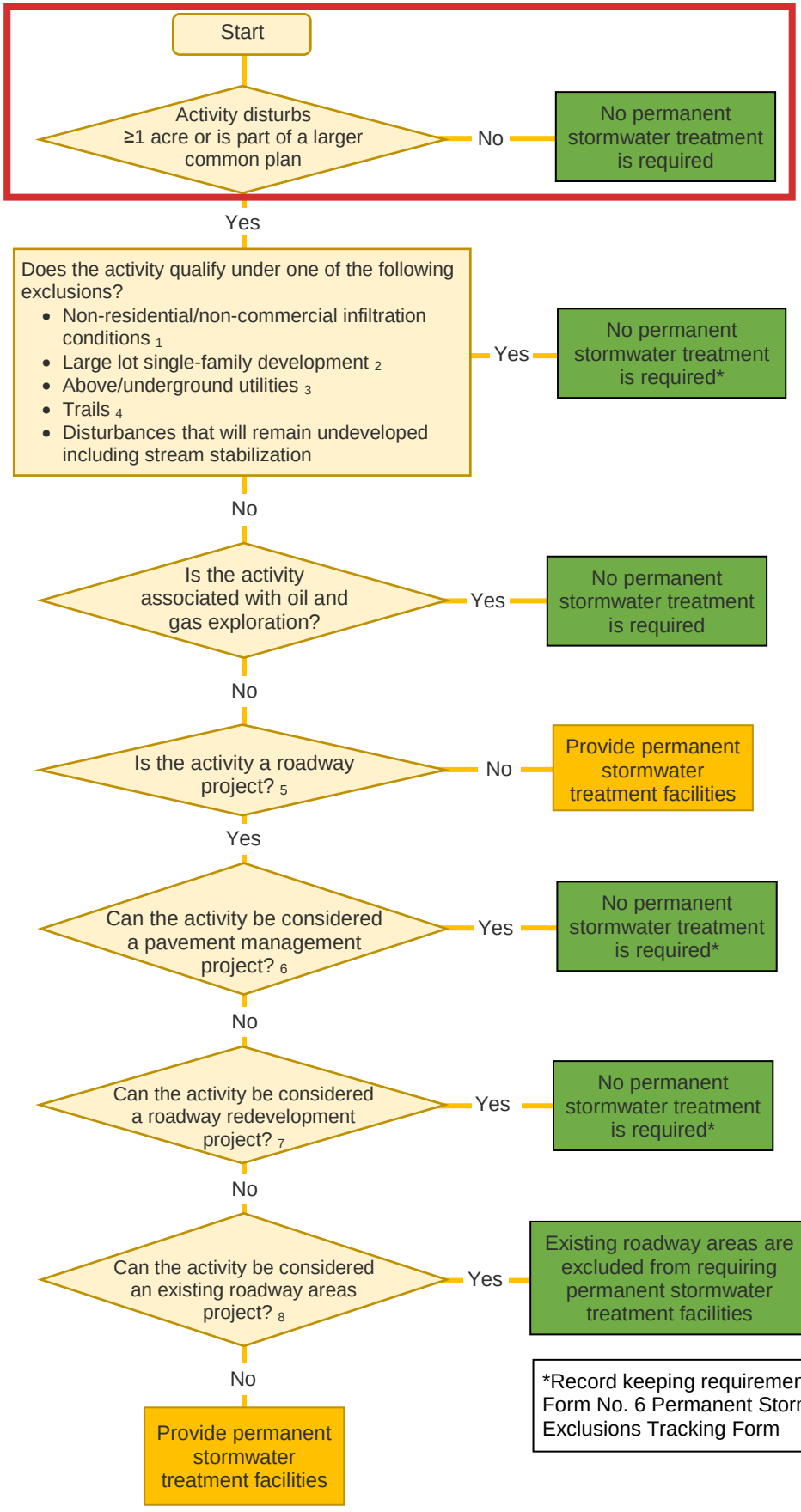
☐ 6. Non-Residential & Non-Commercial Infiltration Conditions

☐ 7. Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped

☐ 8. Stream Stabilization Sites ☐ 9. Trails Other - See attached

Permanent Stormwater Treatment Exclusions Guidance Tree

The purpose of this document is to provide guidance on determining when and which, exclusions may apply. Where exclusions do apply, permanent stormwater treatment facilities are not required for the portion of the site that meets the applicable exclusion. This document also identifies record keeping requirements.



1. Non-residential & non-commercial infiltration conditions means that post-development surface conditions do not result in any stormwater discharge from the site during the 80th percentile storm event. It must be fully infiltrated.

2. Large lot single family sites mean disturbance greater than 1 acre on a single-family lot that is 2.5 acres or larger with an imperviousness < 20%.

3. Above ground and underground utilities include installation or maintenance of underground utilities or infrastructure that does not permanently alter the terrain, ground cover or drainage patterns. This includes installing, replacing, or maintaining utilities under roads or other paved areas if the surface returns to the same condition.

4. Trails are access areas for the purpose of recreation or operations & maintenance activities. Trails do not include sidewalks that are parallel to or generally adjacent to roadways that are used as pedestrian access to streets.

5. Roadway projects include roads and bridges that are for vehicular travel and contiguous areas within 0.25 miles for pedestrians or bicycles, road drainage, or parking along the road. Areas primarily used for parking or access to parking are not included (see the parking lot guidance tree).

6. Pavement management projects include rehab, maintenance, & reconstruction of existing road pavement that do not add impervious area. This includes resurfacing, mill & overlay, white topping, black topping, curb & gutter replacement, concrete panel replacement, & pothole repair.

7. Roadway redevelopment projects add to an existing road of: not more than 8.25' of paved width at any location; less than 1 acres of paved area per mile of road; no additional capacity. The purpose must be to increase safety or improve roadway function.

8. Existing roadway areas means the project does not increase the width of the roadway by more than two times, on average.

*Record keeping requirements are included in Standard Form No. 6 Permanent Stormwater Treatment Facility Exclusions Tracking Form

APPENDIX A:

RUNOFF CALCULATIONS

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

RATIONAL METHOD RUNOFF ANALYSIS

Job #	1157-010	Date:	March 5, 2026
Job Name	SSWSC Outdoor Training Facility	Revised:	
Designed by:	DSC		

Existing Basin 1 (EB1) - EXISTING CONDITIONS

BASIN CHARACTERISTICS				TIME OF CONCENTRATION							RESULTS				
	Area, ac	% imp	Soil Type	Overland Flow - Surface Type 1		Overland Flow - Surface Type 2		Channel Flow		Tc, min	Event	C	*i*, in/hr	A, acres	Q, cfs
Landscape	21.20	2%	D	Surface Imperviousness	0.05	Surface Imperviousness		Land Surface	Heavy Meadow	Minimum	1-YR	0.02	0.6	23.00	0.27
Asphalt Parking & Walkways	0.00	100%		Length, ft	300	Length, ft		Length, ft	2400	Tc, min	2-YR	0.08	0.9	23.00	1.52
Roof	0.00	90%	P2	Slope, percent	15.0000	Slope, percent		Slope, ft/ft	0.2500	10.0	5-YR	0.18	1.3	23.00	5.38
Gravel	1.80	40%	1.4	Runoff Coefficient	0.18	Runoff Coefficient		Conveyance Coefficient	2.5	Final	10-YR	0.28	1.6	23.00	10.42
Other	0.00	0%						Velocity, ft/s	1.3	Tc, min	25-YR	0.39	2.1	23.00	18.99
	23.00	5.0%		Ti, min=	2.6	Ti, min=		Tt, min=	32.0	34.6	100-YR	0.52	2.8	23.00	33.41

Development Basin 1 (DB1) - PROPOSED CONDITIONS

BASIN CHARACTERISTICS				TIME OF CONCENTRATION							RESULTS				
	Area, ac	% imp	Soil Type	Overland Flow - Surface Type 1		Overland Flow - Surface Type 2		Channel Flow		Tc, min	Event	C	*i*, in/hr	A, acres	Q, cfs
Landscape	4.19	2%	D	Surface Imperviousness	0.05	Surface Imperviousness		Land Surface	Heavy Meadow	Minimum	1-YR	0.02	0.9	4.55	0.08
Asphalt Parking & Walkways	0.00	100%		Length, ft	300	Length, ft		Length, ft	1350	Tc, min	2-YR	0.08	1.3	4.55	0.44
Roof	0.00	90%	P2	Slope, percent	20.0000	Slope, percent		Slope, ft/ft	0.2500	10.0	5-YR	0.18	1.9	4.55	1.55
Gravel	0.36	40%	1.4	Runoff Coefficient	0.18	Runoff Coefficient		Conveyance Coefficient	2.5	Final	10-YR	0.28	2.4	4.55	3.00
Other	0.00	0%						Velocity, ft/s	1.3	Tc, min	25-YR	0.39	3.1	4.55	5.47
	4.55	5.0%		Ti, min=	2.3	Ti, min=		Tt, min=	18.0	20.3	100-YR	0.52	4.1	4.55	9.63

Development Basin 2 (DB2) - PROPOSED CONDITIONS

BASIN CHARACTERISTICS				TIME OF CONCENTRATION							RESULTS				
	Area, ac	% imp	Soil Type	Overland Flow - Surface Type 1		Overland Flow - Surface Type 2		Channel Flow		Tc, min	Event	C	*i*, in/hr	A, acres	Q, cfs
Landscape	2.08	2%	D	Surface Imperviousness	0.05	Surface Imperviousness		Land Surface	Heavy Meadow	Minimum	1-YR	0.02	1.0	2.32	0.04
Asphalt Parking & Walkways	0.00	100%		Length, ft	300	Length, ft		Length, ft	1130	Tc, min	2-YR	0.09	1.4	2.32	0.29
Roof	0.05	90%	P2	Slope, percent	20.0000	Slope, percent		Slope, ft/ft	0.2500	10.0	5-YR	0.19	2.1	2.32	0.93
Gravel	0.19	40%	1.4	Runoff Coefficient	0.18	Runoff Coefficient		Conveyance Coefficient	2.5	Final	10-YR	0.29	2.6	2.32	1.76
Other	0.00	0%						Velocity, ft/s	1.3	Tc, min	25-YR	0.40	3.4	2.32	3.15
	2.32	7.0%		Ti, min=	2.3	Ti, min=		Tt, min=	15.1	17.4	100-YR	0.52	4.5	2.32	5.49

Development Basin 3 (DB3) - PROPOSED CONDITIONS

BASIN CHARACTERISTICS				TIME OF CONCENTRATION							RESULTS				
	Area, ac	% imp	Soil Type	Overland Flow - Surface Type 1		Overland Flow - Surface Type 2		Channel Flow		Tc, min	Event	C	*i*, in/hr	A, acres	Q, cfs
Landscape	5.11	2%	D	Surface Imperviousness	0.05	Surface Imperviousness		Land Surface	Heavy Meadow	Minimum	1-YR	0.02	1.0	5.61	0.11
Asphalt Parking & Walkways	0.00	100%		Length, ft	300	Length, ft		Length, ft	1030	Tc, min	2-YR	0.09	1.4	5.61	0.69
Roof	0.09	90%	P2	Slope, percent	15.0000	Slope, percent		Slope, ft/ft	0.2500	10.0	5-YR	0.19	2.2	5.61	2.29
Gravel	0.41	40%	1.4	Runoff Coefficient	0.18	Runoff Coefficient		Conveyance Coefficient	2.5	Final	10-YR	0.28	2.7	5.61	4.36
Other	0.00	0%						Velocity, ft/s	1.3	Tc, min	25-YR	0.40	3.5	5.61	7.88
	5.61	6.2%		Ti, min=	2.6	Ti, min=		Tt, min=	13.7	16.3	100-YR	0.52	4.7	5.61	13.78

RATIONAL METHOD RUNOFF ANALYSIS

Job #	1157-010	Date:	March 5, 2026
Job Name	SSWSC Outdoor Training Facility	Revised:	
Designed by:	DSC		

Development Basin 4 (DB4) - PROPOSED CONDITIONS

BASIN CHARACTERISTICS				TIME OF CONCENTRATION								RESULTS			
	Area, ac	% imp	Soil Type	Overland Flow - Surface Type 1		Overland Flow - Surface Type 2		Channel Flow		Tc, min	Event	C	*i*, in/hr	A, acres	Q, cfs
Landscape	9.61	2%	D	Surface Imperviousness	0.05	Surface Imperviousness		Land Surface	Heavy Meadow	Minimum	1-YR	0.02	0.6	10.52	0.13
Asphalt Parking & Walkways	0.00	100%		Length, ft	300	Length, ft		Length, ft	2350	Tc, min	2-YR	0.08	0.9	10.52	0.73
Roof	0.00	90%	P2	Slope, percent	15.0000	Slope, percent		Slope, ft/ft	0.2500	5.0	5-YR	0.18	1.3	10.52	2.52
Gravel	0.91	40%	1.4	Runoff Coefficient	0.18	Runoff Coefficient		Conveyance Coefficient	2.5	Final	10-YR	0.28	1.7	10.52	4.87
Other	0.00	0%						Velocity, ft/s	1.3	Tc, min	25-YR	0.39	2.1	10.52	8.84
	10.52	5.3%		Ti, min=	2.6	Ti, min=		Tt, min=	31.3	33.9	100-YR	0.52	2.8	10.52	15.54

Design Point 1 Summary - Post Developed Conditions

BASIN CHARACTERISTICS				TIME OF CONCENTRATION								RESULTS			
	Area, ac	% imp	Soil Type	Overland Flow - Surface Type 1		Overland Flow - Surface Type 2		Channel Flow		Tc, min	Event	C	*i*, in/hr	A, acres	Q, cfs
Landscape	15.88	2%	D	Surface Imperviousness	0.05	Surface Imperviousness		Land Surface	Heavy Meadow	Minimum	1-YR	0.02	0.6	17.39	0.21
Asphalt Parking & Walkways	0.00	100%		Length, ft	300	Length, ft		Length, ft	2350	Tc, min	2-YR	0.08	0.9	17.39	1.22
Roof	0.05	90%	P2	Slope, percent	15.0000	Slope, percent		Slope, ft/ft	0.2500	5.0	5-YR	0.18	1.3	17.39	4.19
Gravel	1.46	40%	1.4	Runoff Coefficient	0.18	Runoff Coefficient		Conveyance Coefficient	2.5	Final	10-YR	0.28	1.7	17.39	8.07
Other	0.00	0%						Velocity, ft/s	1.3	Tc, min	25-YR	0.39	2.1	17.39	14.64
	17.39	5.4%		Ti, min=	2.6	Ti, min=		Tt, min=	31.3	33.9	100-YR	0.52	2.8	17.39	25.70

APPENDIX B:

CULVERT CALCULATIONS

1. EIGHTEEN INCH DIAMETER CMP – GRAVEL ACCESS ROAD
2. OUTLET PIPE - RECREATION POND

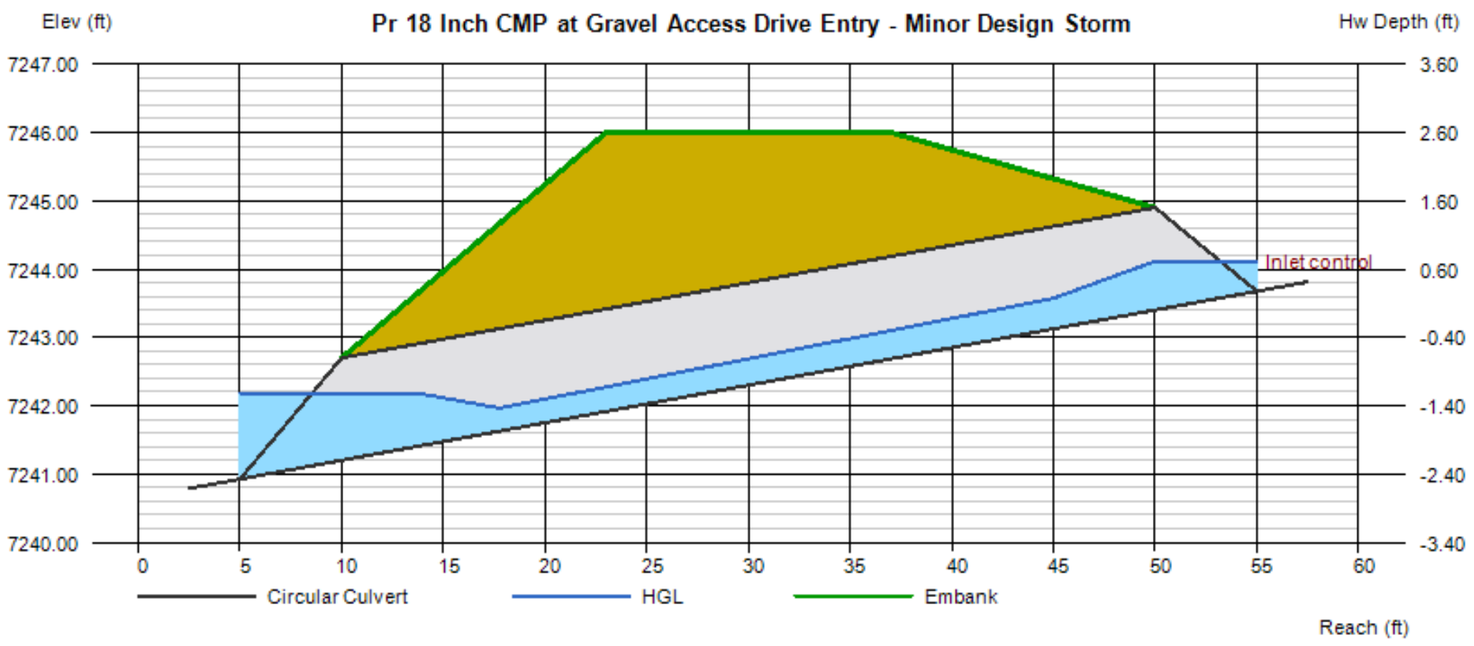
Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Mar 5 2026

Pr 18 Inch CMP at Gravel Access Drive Entry - Minor Design Storm

Invert Elev Dn (ft)	= 7241.20	**Calculations**	
Pipe Length (ft)	= 40.00	Qmin (cfs)	= 1.52
Slope (%)	= 5.50	Qmax (cfs)	= 1.56
Invert Elev Up (ft)	= 7243.40	Tailwater Elev (ft)	= (dc+D)/2
Rise (in)	= 18.0		
Shape	= Circular	**Highlighted**	
Span (in)	= 18.0	Qtotal (cfs)	= 1.55
No. Barrels	= 1	Qpipe (cfs)	= 1.55
n-Value	= 0.023	Qovertop (cfs)	= 0.00
Culvert Type	= Circular Corrugate Metal Pipe	Veloc Dn (ft/s)	= 1.26
Culvert Entrance	= Mitered to slope (C)	Veloc Up (ft/s)	= 3.30
Coeff. K,M,c,Y,k	= 0.021, 1.33, 0.0463, 0.75, 0.7	HGL Dn (ft)	= 7242.18
		HGL Up (ft)	= 7243.87
Embankment		Hw Elev (ft)	= 7244.11
Top Elevation (ft)	= 7246.00	Hw/D (ft)	= 0.48
Top Width (ft)	= 14.00	Flow Regime	= Inlet Control
Crest Width (ft)	= 14.00		

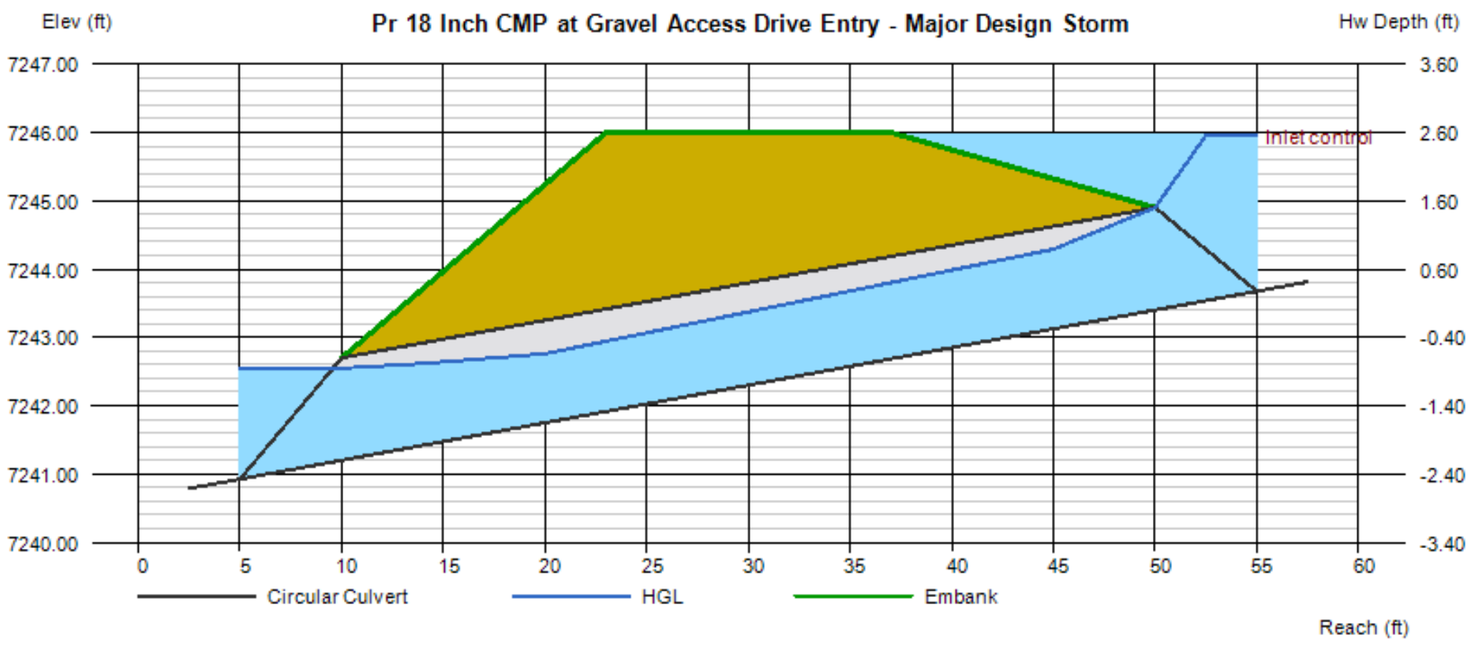


Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Mar 5 2026

Pr 18 Inch CMP at Gravel Access Drive Entry - Major Design Storm

Invert Elev Dn (ft)	= 7241.20	**Calculations**	
Pipe Length (ft)	= 40.00	Qmin (cfs)	= 9.60
Slope (%)	= 5.50	Qmax (cfs)	= 9.70
Invert Elev Up (ft)	= 7243.40	Tailwater Elev (ft)	= (dc+D)/2
Rise (in)	= 18.0		
Shape	= Circular	**Highlighted**	
Span (in)	= 18.0	Qtotal (cfs)	= 9.63
No. Barrels	= 1	Qpipe (cfs)	= 9.63
n-Value	= 0.023	Qovertop (cfs)	= 0.00
Culvert Type	= Circular Corrugate Metal Pipe	Veloc Dn (ft/s)	= 5.75
Culvert Entrance	= Mitered to slope (C)	Veloc Up (ft/s)	= 6.37
Coeff. K,M,c,Y,k	= 0.021, 1.33, 0.0463, 0.75, 0.7	HGL Dn (ft)	= 7242.55
		HGL Up (ft)	= 7244.60
Embankment		Hw Elev (ft)	= 7245.96
Top Elevation (ft)	= 7246.00	Hw/D (ft)	= 1.71
Top Width (ft)	= 14.00	Flow Regime	= Inlet Control
Crest Width (ft)	= 14.00		



Calculations for 4 Inch HDPE Outlet Pipe

Orifice Equation: $Q = C_d A(2gh)^{1/2}$

Where:

Q = flow (cfs)

C_d = Orifice Coefficient = 0.65 (sharp-edged orifice)

A = Area (ft^2)

g = Gravitational Constant = 32.2 ft/sec^2

h = Head on orifice measured from centerline (ft)

$Q = (0.65) * (0.25*\pi*0.33^2) * (2*32.2*9.5ft)^{1/2}$

Q = 1.38 cfs (rounded to 1.4 cfs)

Note: Friction losses are not included with these calculations. This is a conservative approach, including head losses would result in a lower discharge rate.

Time to Drain Recreation Pond:

t = V/Q

Where:

t = time (s)

V = Volume of pond, max storage conditions (ft^3)

Q = flow (cfs)

t = 52,310 ft^3 / 1.4 cfs = 37364 seconds = 623 minutes = **10.4 hours = 0.43 days**

Note: As the headwater in the pond is lowered by the outlet pipe, the discharge rate of the pipe is reduced. Therefore, conservatively, the pond takes approximately **15 hours** to release while factoring in these parameters.

APPENDIX C:

CHANNEL CALCULATIONS

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Mar 5 2026

Gravel Access Drive - Vegetated Catch Swale - Minor Design Storm

Triangular

Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 7258.00
Slope (%)	= 12.00
N-Value	= 0.040

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.93

Highlighted

Depth (ft)	= 0.36
Q (cfs)	= 0.930
Area (sqft)	= 0.26
Velocity (ft/s)	= 3.59
Wetted Perim (ft)	= 1.61
Crit Depth, Yc (ft)	= 0.43
Top Width (ft)	= 1.44
EGL (ft)	= 0.56

Section

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Mar 5 2026

Gravel Access Drive - Vegetated Catch Swale - Major Design Storm

Triangular

Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 7258.00
Slope (%)	= 12.00
N-Value	= 0.040

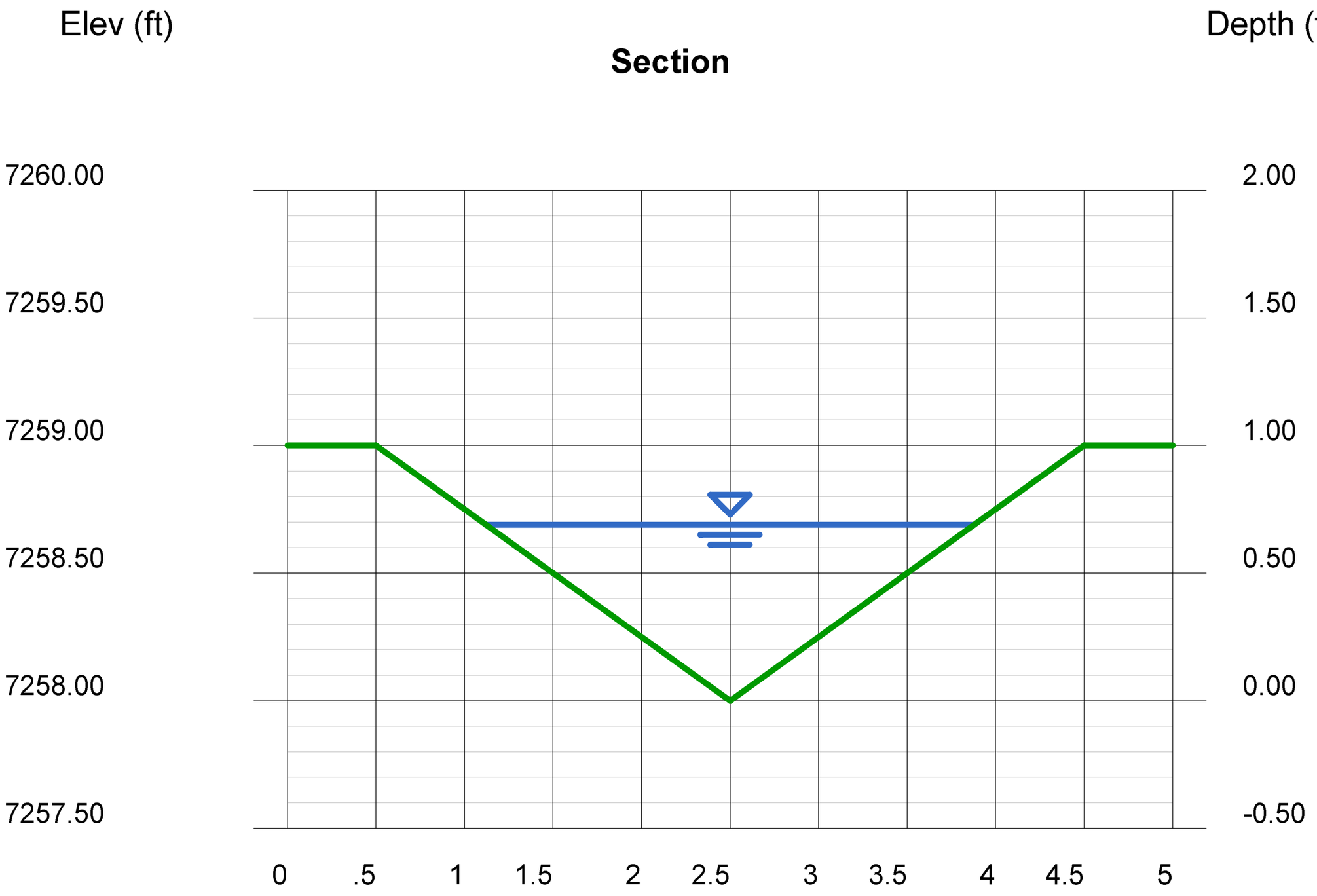
Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.49

Highlighted

Depth (ft)	= 0.69
Q (cfs)	= 5.490
Area (sqft)	= 0.95
Velocity (ft/s)	= 5.77
Wetted Perim (ft)	= 3.09
Crit Depth, Yc (ft)	= 0.86
Top Width (ft)	= 2.76
EGL (ft)	= 1.21

Section



APPENDIX D:

AGRI-DRAIN SYSTEM INFORMATION

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

AGRI DRAIN

1462 340th St.
Adair, IA 50002

641-742-5211
800-232-4742

www.agridrain.com
info@agridrain.com

Inline Water Level Control Structure™

- Available in manual or automated.
- Constructed of rugged ½" PVC with lockable plastic lid.
- Stainless steel screws and custom anodized aluminum corr extrusions used for strength and durability.*
- Flexible couplers allow PVC, plastic pipe, or other materials be easily attached. *(Please specify type of pipe when order*
- Rugged injection molded stoplogs in 5" and 7" heights for adjustability (included in structures with 4" through 12" pipe sizes).
- PVC stoplogs with metal hooks in 5" and 7" heights for adjustability (included in structures with 15" through 24" pipe sizes).
- Stoplog maintenance recommended: Remove stoplogs and grease seal with Ultra Lube (included). Ensure there is no debris in the tracks or along the bottom of the structure. Replace stoplogs after greasing, ensuring bottom stoplog is installed first.
- To minimize seepage, align stoplogs firmly against one side of the stoplog track.
- Stoplogs must remain in track during structure installation.
- Structures are intended for gravity flow; some seepage may occur.
- 5-year warranty on all standard structures.

**For water that is caustic, acid, corrosive, salt, or pH below 5 pH or above 9 pH, please notify us of your requirements to ensure structures are built with compatible hardware. For these applications, Agri Drain recommends stainless steel.*

Call for details on Automated.

US Patent No. 6,715,508 B2
US Patent No. 6,786,234 B2
Canadian Patent No. 2,403,456
Canadian Patent No. 2,466,976

Comes with a handle to install and remove stoplogs.

Inline Water Level Control Structure™			
Pipe Size	Available Heights	Width	Depth
4"	2' - 12'	8"	10"
6"	2' - 12'	8"	10"
8"	2' - 12'	11 5/8"	12"
10"	2' - 12'	14"	16"
12"	2' - 12'	16"	20"
15"	2' - 12'	20"	24"
18"	2' - 12'	24"	28"
24"	3' - 10'	31"	39"

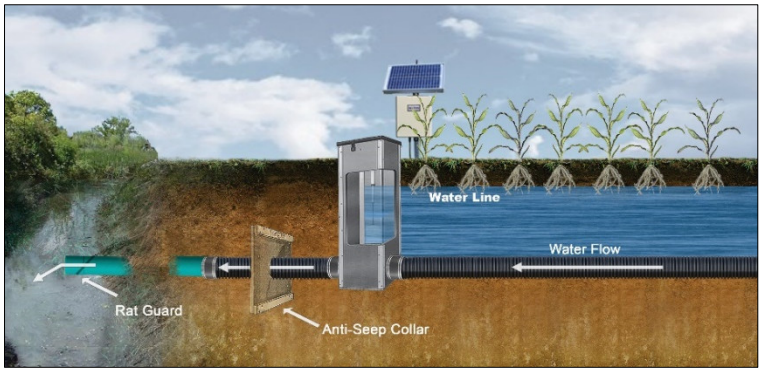
Rugged injection molded stoplogs used in structures with 4", 6", 8", 10", and 12" pipe sizes.

PVC stoplogs with stainless steel lifting hooks used in structures with 15", 18", and 24" pipe sizes.

Stoplog Retainer

Hold extra stoplogs up & out of the way!

- Stainless steel retainer hooks to lowest stoplog that you want to hold up within your Inline Water Level Control Structure™.



Standard Box Dimensions for Inline Water Level Control Structures™

Pipe Size	Box Width (Inside Dimension)	Box Depth (Inside Dimension)
4"	8"	10"
6"	8"	10"
8"	11 5/8"	12"
10"	14"	16"
12"	16"	20"
15"	20"	24"
18"	24"	28"
24"	31"	39"

APPENDIX E:

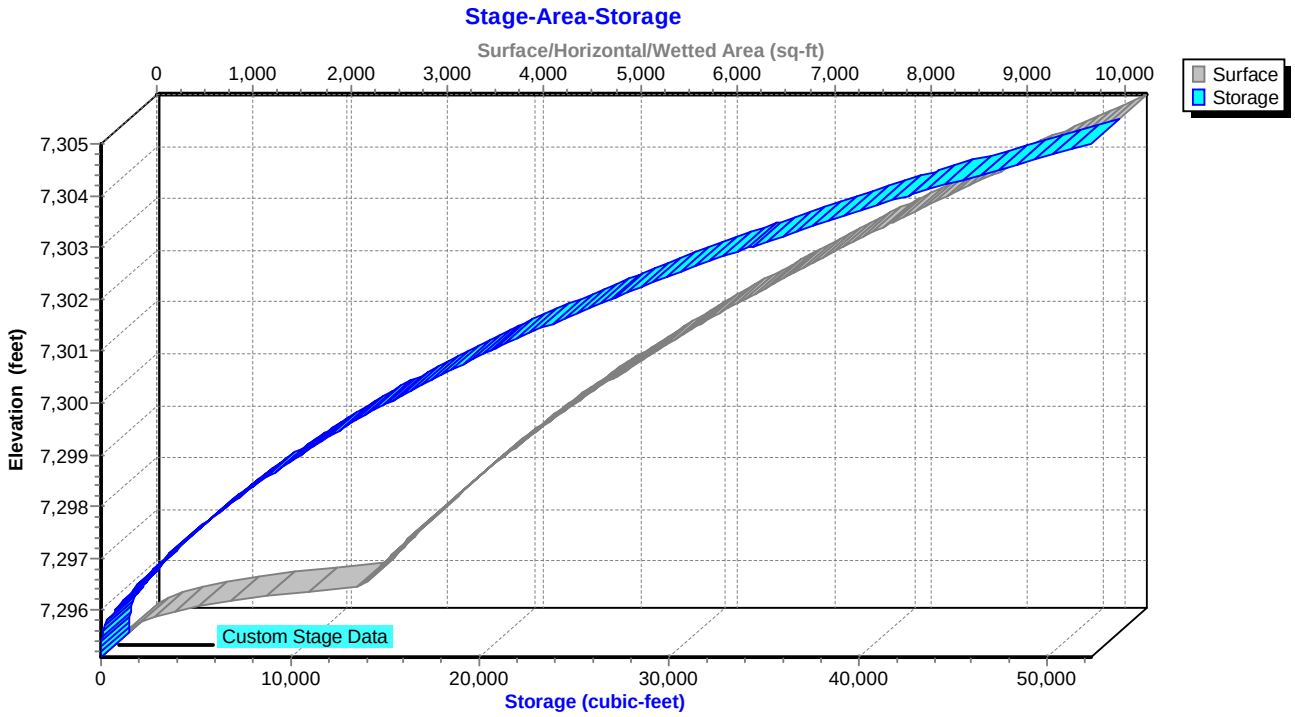
RECREATION POND – STAGE STORAGE TABLE

Four Points Surveying and Engineering
410 South Lincoln Avenue, Suite 105
P.O. Box 775988
Steamboat Springs, CO 80487
(970) 871-6772

Stage-Area-Storage for Pond 2P: Recreation Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
7,295.10	0	0
7,295.20	30	1
7,295.30	119	8
7,295.40	267	27
7,295.50	475	63
7,295.60	742	124
7,295.70	1,069	214
7,295.80	1,455	339
7,295.90	1,900	507
7,296.00	2,405	721
7,296.10	2,457	965
7,296.20	2,510	1,213
7,296.30	2,563	1,467
7,296.40	2,617	1,726
7,296.50	2,671	1,990
7,296.60	2,726	2,260
7,296.70	2,781	2,535
7,296.80	2,837	2,816
7,296.90	2,894	3,103
7,297.00	2,951	3,395
7,297.10	3,009	3,693
7,297.20	3,067	3,997
7,297.30	3,127	4,306
7,297.40	3,186	4,622
7,297.50	3,246	4,944
7,297.60	3,307	5,271
7,297.70	3,369	5,605
7,297.80	3,430	5,945
7,297.90	3,493	6,291
7,298.00	3,556	6,644
7,298.10	3,620	7,002
7,298.20	3,684	7,368
7,298.30	3,749	7,739
7,298.40	3,815	8,118
7,298.50	3,881	8,502
7,298.60	3,948	8,894
7,298.70	4,015	9,292
7,298.80	4,083	9,697
7,298.90	4,151	10,108
7,299.00	4,220	10,527
7,299.10	4,295	10,953
7,299.20	4,370	11,386
7,299.30	4,446	11,827
7,299.40	4,523	12,275
7,299.50	4,600	12,731
7,299.60	4,678	13,195
7,299.70	4,756	13,667
7,299.80	4,836	14,146
7,299.90	4,915	14,634
7,300.00	4,996	15,129
7,300.10	5,080	15,633
7,300.20	5,165	16,146
7,300.30	5,251	16,666
7,300.40	5,338	17,196
7,300.50	5,425	17,734
7,300.60	5,513	18,281
7,300.70	5,601	18,836
7,300.80	5,690	19,401
7,300.90	5,780	19,975
7,301.00	5,871	20,557
7,301.10	5,964	21,149
7,301.20	6,057	21,750
7,301.30	6,152	22,360
7,301.40	6,247	22,980
7,301.50	6,342	23,610
7,301.60	6,439	24,249
7,301.70	6,536	24,897
7,301.80	6,634	25,556
7,301.90	6,733	26,224
7,302.00	6,832	26,903
7,302.10	6,933	27,591
7,302.20	7,035	28,289
7,302.30	7,138	28,998
7,302.40	7,242	29,717
7,302.50	7,346	30,446
7,302.60	7,451	31,186
7,302.70	7,557	31,937
7,302.80	7,664	32,698
7,302.90	7,771	33,469
7,303.00	7,879	34,252
7,303.10	7,989	35,045
7,303.20	8,100	35,850
7,303.30	8,211	36,665
7,303.40	8,324	37,492
7,303.50	8,437	38,330
7,303.60	8,551	39,179
7,303.70	8,665	40,040
7,303.80	8,781	40,912
7,303.90	8,897	41,796
7,304.00	9,014	42,692
7,304.10	9,133	43,599
7,304.20	9,252	44,518
7,304.30	9,372	45,450
7,304.40	9,493	46,393
7,304.50	9,615	47,348
7,304.60	9,737	48,316
7,304.70	9,861	49,296
7,304.80	9,985	50,288
7,304.90	10,109	51,293
7,305.00	**10,235**	**52,310**

Pond 2P: Recreation Pond



Standard Form No. 3 Final Drainage Study Checklist

Instructions:

1. The applicant shall identify with a "check mark" if information is provided with letter. If applicant believes information is not required, indicate with "N/A" and attach separate sheet with explanation.
2. The reviewer will determine if information labeled "N/A" is required and whether additional information must be submitted.

I. General

- ✓ A. Report typed and legible in 8½" x 11" format.
- ✓ B. Report bound (comb, spiral, or staple – no notebook).
- ✓ C. Drawings that are 8½ x 11 or 11 x 17 bound within report, larger drawings (up to 24 x 36) included in a pocket attached to the report. Drawings shall be at an appropriate size and scale to be legible and include project area.

II. Cover

- ✓ A. Report Type – Final Drainage Study.
- ✓ B. Project Name, Subdivision, Original Date, Revision Date.
- ✓ C. Preparer's name, firm, address, phone number.
- ✓ D. "DRAFT" for 1st submittal and revisions; "FINAL" once approved.

III. Title Sheet

- ✓ A. Table of Contents.
- ✓ B. Certification, PE Stamp, signature, and date from licensed Colorado PE.
- ✓ C. Note: City of Steamboat Springs plan review and approval is only for general conformance with City design criteria and the City code. The City is not responsible for the accuracy and adequacy of the design, dimensions, and elevations that shall be confirmed and correlated at the job site. The City of Steamboat Springs assumes no responsibility for the completeness or accuracy of this document.

IV. Introduction

- ✓ A. Description of site location, size in acres, existing and proposed land use, and any pertinent background info.
- ✓ B. Reference planning application type and plan set date and preparer.
- ✓ C. Identify drainage reports for adjacent development.

V. Drainage Criteria and Methodology Used

- ✓ A. Identify design rainfall and storm frequency.
- ✓ B. Identify the runoff calculation method used.
- ✓ C. Identify culvert and storm sewer design methodology.
- ✓ D. Identify detention discharge and storage methodology.
- ✓ E. Discuss HEC-HMS methodologies and parameters, if HEC-HMS is used.

VI. Existing Conditions (Pre-Development/Historic)

- ✓ A. Indicate ground cover, imperviousness, topography, and size of site (acres).
- ✓ B. Describe existing stormwater system (sizes, materials, etc.).
- ✓ C. Describe other notable features (canals, major utilities, etc.).
- ✓ D. Note site outfall locations and ultimate outfall location (typically Yampa River).
- ✓ E. Note capacity of existing system and identify any constraints.
- ✓ F. Identify NRCS soil type.
- ✓ G. Discuss any existing easements.
- ✓ H. Identify the FEMA Map reviewed, if site is in floodplain/way, and zone designation.

VII. Proposed Conditions

- ✓ A. Indicate ground cover, imperviousness, topography, and disturbed area (acres).
- ✓ B. Describe proposed stormwater system (sizes, materials, etc.).
- ✓ C. Describe proposed outlets and indicate historic and proposed flow for each.
- ✓ D. Include calculations for all culverts, ditches, ponds, etc. in appendix.
- ✓ E. Include a summary table for the 5- and 100-year events showing historic flow and proposed flow for total site and each basin.
- ✓ F. Discuss proposed easements.
- ✓ G. Describe off-site flows to be passed thru site.
- ✓ H. Summarize any impacts to downstream properties or indicate none. Reference CLOMR/LOMR and impacts.
- I. Detention Ponds.
  - N/A 1. Indicate pond volume and area (size and depth) requirement.
  - N/A 2. Indicate release rates.
  - N/A 3. Discuss outfall design, location, and overflow location.
  - N/A 4. Discuss maintenance requirements.
- J. Curb and Gutter
  - N/A 1. Indicate gutter capacity.
  - N/A 2. Indicate curb capacity.
  - N/A 3. Indicate design velocity
  - N/A 4. Indicate design depth of flow in street.
- K. Culverts
  - ✓ 1. Indicate whether each culvert is under inlet or outlet control.
  - ✓ 2. Show that headwater is less than the maximum allowable.
  - ✓ 3. Indicate design velocity.
  - ✓ 4. Indicate required and provided flow rates.
  - ✓ 5. Discuss whether outlet protection is required and what will be used.
- L. Inlets
  - N/A 1. Indicate inlet capacity.
  - N/A 2. Indicate the type of inlet(s) used.
- M. Channels
  - ✓ 1. Indicate design velocity (and type of dissipation if required).
  - ✓ 2. Indicate required and provided flow capacity.
  - ✓ 3. Show critical cross-section(s) including water surface.
- N. Site Discharge
  - ✓ 1. Discuss use and design of detention to ensure discharge is less than or equal to historic flow.
  - ✓ 2. Provide documentation that downstream facilities are adequate and no adverse impacts to downstream property owners (i.e. no rise certification)

VIII. Post Construction Stormwater Management

✓ A. Discuss in general terms which permanent BMP practices will be used to control pollutant and sediment discharge after construction is complete. Exhibit A, Storm Water Quality Plan shall be attached that will give details (see separate checklist)

(See Report)

IX. Conclusions

✓ A. Provide general summary.
✓ B. Note if site complies with criteria and any variances to criteria.
✓ C. Indicate if peak proposed flow is less than, equal to, or greater than peak historic flow for each outfall, design point, and for the total site.
✓ D. List proposed new stormwater system requirements.

X. References

✓ A. Provide a reference list of all criteria, master plans, drainage reports and technical information used.

XI. Tables

✓ A. Include a copy of all tables prepared for the study.

XII. Figures

✓ A. Vicinity Map.
✓ B. Site Plan (include the horizontal and vertical datum used and all benchmarks).
C. Existing conditions.
✓ 1. Delineate existing basin boundaries.
N/A 2. Delineate offsite basins impacting the site.
✓ 3. Show existing and proposed topography at an interval of at least 2-ft.
✓ 4. Show existing runoff flow arrows.
✓ 5. Show existing stormwater features (structures, sizes, materials, etc.).
6. Show floodplain limits and information. (SEE FIRMETTE)
✓ 7. For each basin show bubble with basin number, acreage and % impervious.
✓ 8. For each outlet show bubble with acreage and historic flow and proposed flow or provide information in summary table on figure.

D. Proposed Conditions
✓ 1. Delineate proposed basin boundaries.
✓ 2. Show proposed runoff flow arrows.
✓ 3. Show existing and proposed topography at an interval of at least 2-ft.
✓ 4. For each basin show bubble with basin number, acreage and percent impervious or provide a summary table or figure.
✓ 5. For each outlet show bubble with acreage, historic flow, and proposed flow or provide a summary table or figure.
✓ 6. Show floodplain limits and information. (SEE FIRMETTE)
✓ 7. Show proposed building footprints and FFE for commercial and multi-family
✓ 8. Show property lines and easements (existing and proposed). (SEE VICINITY MAP)
✓ 9. Label public and private facilities. A general note can be placed on the plans in lieu of labeling all facilities, if applicable.

XIII. Appendices

✓ A. Runoff Calculations.
✓ B. Culvert Calculations.
N/A C. Pond Calculations.
✓ D. Other Calculations.

Acknowledgements

Standard Form No. 3 was prepared by: David S. Clemmer 03-06-26
Date

✓ **Include Attachment A – Scope Approval Form (see Standard Form No. 5)**
(N/A) **Include Attachment B – Storm Water Quality Plan (see Standard Form No. 4)**