Chaffee County North End Public Safety Complex

Draft Environmental Assessment | Buena Vista, CO

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FEMA

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ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DOLA	Colorado Department of Local Affairs
EA	Environmental Assessment
EIAF	Energy and Mineral Impact Assistance Fund
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMS	Emergency Medical Services
EO	Executive Order
EOC	Emergency Operations Center
EOC-L	Emergency Operations Center-Legislative Grant Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
HVAC	Heating, ventilation, and air conditioning
IPaC	USFWS Information for Planning and Consultation
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NO_2	Nitrogen Dioxide
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OPS	Division of Oil and Public Safety
O_3	Ozone
Pb	Lead
PM_{10}	Particulate Matter
PUD	Planned Unit Development

RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SHPO	State Historic Preservation Office
SO_2	Sulfur Dioxide
SRIA	Sandy Recovery Improvement Act
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1. SECTION ONE | INTRODUCTION

1.1. OVERVIEW

The mission of the Federal Emergency Management Agency (FEMA) is to reduce the loss of life and property and protect our institutions from all hazards by leading and supporting the nation in a comprehensive, risk-based emergency management program of mitigation, preparedness, response, and recovery. This Environmental Assessment was prepared in accordance with Unified Federal Review as outlined in The Sandy Recovery Improvement Act (SRIA) of 2013, Section 1106: Unified Federal Review. It mandates the establishment of an "…expedited and unified interagency review process to ensure compliance with environmental and historic requirements under Federal law relating to disaster recovery projects, in order to expedite the recovery process, consistent with applicable law."[1, 2] The Disaster Recovery Reform Act of 2018, Section 1220, requires FEMA to report on the Unified Federal Environmental and Historic Preservation review process, established pursuant to Stafford Act Section 429—Unified Federal Review, and report on an analysis of whether and how the unified process has expedited the interagency review process to ensure compliance related to disaster recovery projects; conduct a survey and analysis of categorical exclusions used by other Federal agencies that may be applicable to any activity related to a major disaster or emergency; and provide recommendations on further actions, including legislative proposals, to expedite and streamline the review process.

Issued on August 15, 2017, Executive Order (EO) 13807: Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects, requires Federal agencies to process environmental reviews and authorization decisions for "major infrastructure projects" as One Federal Decision. The EO sets a government-wide goal of reducing the average time to complete required environmental reviews and authorization decisions for major infrastructure projects to not more than two years from publication of a notice of intent to prepare an Environmental Impact Statement (EIS) to issuance of a Record of Decision (ROD) prepared under the National Environmental Policy Act of 1969 (NEPA).[3] The EO also requires all Federal authorization decisions for the construction of these projects to be completed within 90 days of the issuance of a ROD. One of the goals of the EO is to ensure that the Federal environmental review and permitting process for infrastructure projects is coordinated, predictable, and

[1] Library of Congress. H.R.219 – Sandy Recovery Improvement Act of 2013 113th Congress (2013-2014), https://www.congress.gov/bill/113th-congress/house-bill/219 (last visited April 7, 2023); *see* Federal Emergency Management Agency, Sandy Recovery Improvement Act of 2013, https://www.fema.gov/disaster/sandy-recovery-improvement-act-2013 (last visited April 7, 2023).

[2] Federal Emergency Management Agency, Unified Federal Environmental and Historic Preservation Review for Presidentially Declared Disasters, https://www.fema.gov/emergency-managers/practitioners/environmental-historic/review (last visited April 7, 2023).

[3] 42 United States Code (U.S.C.) 55 parts 4321 et seq., 2000.

transparent. Specifically, the EO directs Federal agencies with a role in the environmental review and permitting process for a major infrastructure project.

FEMA has prepared this Environmental Assessment (EA) to analyze the potential environmental consequences associated with the proposed action, while providing a framework for the evaluation of Federal and State laws and regulations. The Proposed Action Alternative and No Action Alternative are being analyzed in accordance with NEPA, the Council on Environmental Quality (CEQ) implementing regulations,[4] and the Emergency Management and Assistance Code of Federal Regulations (CFR)[5].

1.2. BACKGROUND

FEMA is preparing this EA for a proposed project submitted by Chaffee County, Colorado for the construction of the Chaffee County North End Public Safety Complex (Public Safety Complex) in Buena Vista. Funding would be provided through FEMA's Emergency Operations Center-Legislative Grant Program (EOC-L). Chaffee County would construct the Public Safety Complex to be used by the Chaffee County Emergency Medical Services (EMS), the Emergency Operations Management Department for Chaffee County, and the Chaffee County Sheriff's Office to serve the needs of northern Chaffee County.

The EA has been prepared to analyze the potential consequences to the natural and human environment associated with the Proposed Action Alternative and the No Action Alternative in accordance with NEPA and the CEQ implementing regulations. This EA is designed to meet FEMA's responsibilities under NEPA and to determine whether to prepare a Finding of No Significant Impact (FONSI) or a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the proposed project.

2. SECTION TWO | PURPOSE AND NEED

Background

Chaffee County is 1,015 square miles of mostly rural land, with the EMS department, Sheriff's Office, regional hospital, and medical air transport facility anchored at the southern end of the county in Salida, which is the county seat and core population center. Emergency responders and law enforcement officers' response capabilities are negatively affected by the approximately 40 minutes they must often travel to the northern end of the county because they lack a full facility base in this part of the county. Similarly, when an ambulance has been mobilized to a call, there can be a delay in response because of the extended travel times required to redeploy another vehicle to the north end of the county (Colorado Department of Local Affairs [DOLA] 2022).

[4] 40 Code of Federal Regulations (C.F.R.) 30 parts 1500 et seq.

[5] 44 [C.F.R. Ch. I Part 10, and 23 CFR 771.

EMS also cites increasing difficulty in recruiting and retaining medical responder staff due to the physical work environment and their basic, undersized, and somewhat antiquated facility in the southern end of the county. Currently, EMS utilizes a small bay it sublets from the Fire Protection District's building near Buena Vista, which is roughly 25 miles north of Salida. It is not sufficient for the EMS operational needs and will be less sufficient as the demands continue to increase. Similarly, the Sheriff's Office has its primary location in Salida. Without a facility near Buena Vista in the northern end of the county to accommodate their deputies and equipment, they are limited in presence and function. The Sheriff's Office often needs to utilize the small Search and Rescue garage near Buena Vista for trainings and occasionally incident command, which in-turn displaces the Search and Rescue responders (DOLA 2022).

The county Emergency Operations Center (EOC) currently operates from a rehabilitated modular building next to the landfill. The EOC lacks modern communication and technology infrastructure, with very limited physical space to serve as an incident command post, creating vulnerabilities during disaster response. The proposed EOC facility would also operate as an ancillary functional space for the county Office of Emergency Management.

Furthermore, Chaffee County's population has grown approximately 20 percent in the past two decades (DOLA 2023) and is forecast to increase an additional 25 percent county-wide by 2050, according to the Colorado Office of the State Demographer. Chaffee County annual tourism activity and recreation-focused visitors have also increased greater than 50 percent since 2016. The elevated demand on public safety and emergency response services is becoming increasingly difficult to meet within the current facilities and emergency infrastructure (DOLA 2022).

Purpose and Need

The purpose of FEMA's EOC Grant Program is to improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, strategically located, and fully interoperable EOCs with a focus on addressing identified deficiencies and needs. The project is needed to establish fully capable emergency operations facilities at the local level to ensure continuity of government operations in major disasters or emergencies caused by any hazard. A new facility in Buena Vista would efficiently support county-wide emergency response, improve operations and agency collaboration by co-locating services, enhance public safety and welfare for both residents and visitors in a historically under-resourced portion of the county, and more effectively support the increased population and continued rapid growth of tourism throughout the county.

Figure 1: Location map for proposed Chaffee County North End Public Safety Complex

3. SECTION THREE | PROPOSED ACTION AND ALTERNATIVES

3.1. INTRODUCTION

NEPA requires the investigation and evaluation of reasonable project alternatives, including impacts to the natural and human environment, as part of the planning process. This EA addresses two alternatives: Alternative #1 – No Action Alternative; and Alternative #2 – construction of the new Public Safety Complex on lot 2 of an undeveloped parcel at S17 T14S R78W (GPS: 38.826110, -106.130365), 200 Steele Dr, Buena Vista, Colorado 81201, Buena Vista, Colorado (Figure 1).

3.2. ALTERNATIVES CONSIDERED

Alternative 1: No Action

A No Action Alternative is required to be included in this EA in accordance with CEQ regulations implementing NEPA. The No Action Alternative is defined as maintaining the status quo and is used to evaluate the effects of not conducting the proposed project, providing a benchmark against which other alternatives may be evaluated.

Under the No Action Alternative, FEMA would not provide Federal funds to Chaffee County to construct a new Public Safety Complex in Buena Vista to serve the northern portion of the county. The EMS department would continue their main operations from their Salida location with a small outlet outside of Buena Vista that is not sufficient for the needs of the northern portion of the county. Likewise, the Sheriff's Office would continue to serve the entire county from their primary location in Salida, with distances of 25 miles to Buena Vista and farther to more northern portions of the county.

Alternative 2: Proposed Public Safety Complex (Proposed Action)

The Proposed Action Alternative involves the construction of the proposed Public Safety Complex located on lot 2 of the parcel at S17 T14S R78W (GPS: 38.826110, -106.130365), 200 Steele Dr, Buena Vista, Colorado 81201, Buena Vista, Colorado (Figure 1). The 2.14-acre, county-owned, undeveloped lot is two miles southwest of Buena Vista and one mile west of US Highway 24. The location provides efficient access to key infrastructure in the north end of the county, including the airport. Construction is anticipated to begin in 2023.

The Public Safety Complex project would house emergency response and law enforcement services in northern Chaffee County. The facility is being designed with purpose-built spaces for both the Sheriff's Office and the county EMS in one location, with flex space that can be utilized both for these agencies' training and meeting needs. The facility would provide a location for County Commissioner and community meetings that require a large space, accommodating up to 100 people. The EOC would also be housed in this building. In

addition, the facility would include on-site staff bunkhouses to accommodate staff needs during extended and overnight shifts.

The Public Safety Complex preliminary design includes a two-story 15,000 square foot metal building. The first floor would house shared offices, secured evidence storage and armory, staff and public restrooms, flex room for team trainings and large public meetings, fitness room, and five garage bays. Bay doors on both sides of the building would accommodate the storage and access needs for both Sheriff and EMS teams' vehicle fleet and various emergency response equipment. The second floor includes dormitory-style bunk rooms and showers to support up to 10 staff for extended hour/multi-day and overnight shifts, plus a kitchenette and small living/dining space. These living quarters are vital to accommodate per diem staff who do not have permanent housing in the county. The configuration of each space's use and soundproofing/damping in all areas was designed to reduce the impact of emergency operations on the sleep and restoration time staff need to perform their duties (DOLA 2022).

The proposed facility also includes 68 parking spaces, six of which are designated as handicap; six bicycle racks; an outdoor exercise space; two snow storage areas; dumpster enclosure; and a 6-foot-tall privacy fence around the perimeter of the property. Two access gates would be installed in the parking lot to control access at the rear (northern portion) of the property. New landscaping includes trees; shrubs and grasses; artificial turf; decorative landscape boulders, rocks, and cobble; solar lights; and native meadow seed mix (Wold Architects and Engineers 2023).

The Public Safety Complex concept has been under evaluation and active consideration by Chaffee County leadership since 2008 and specifically named in the county's Capital Improvement Projects priorities list since 2020. It was budgeted for and approved by the Board of County Commissioners and endorsed by the involved departments, namely EMS, Sheriff's Office, and Office of Emergency Management. The facility would both improve emergency response coordination, operational efficiency, and public safety efficacy for the northern half of the County (DOLA 2022).

Alternatives Analyzed and Dismissed

No other land parcels were seriously considered for the location of the proposed Public Safety Complex. The land parcel being analyzed was obtained by Chaffee County in 2017. It was identified for its unique location offering direct access to US Highway 285, a major north-south highway route east of the site. It is also adjacent to the Central Colorado Regional Airport, allowing for easy access to helicopter transports going to health care facilities on the Front Range of Colorado, a frequent need. The prior owner of the land parcel offered a discounted-value cost for the parcel because he recognized the importance of the emergency response facility to meet the needs of northern county residents and visitors. Given the relatively limited options near Buena Vista for this type of use, coupled with its value, this land parcel was determined to be the best option. No other alternatives were considered (Helmke 2023).

4. SECTION FOUR | AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.1. LAND USE AND PLANNING

4.1.1. AFFECTED ENVIRONMENT

The proposed project site is the undeveloped lot 2 on the property at 200 Steele Dr, Buena Vista, Colorado 81201, Buena Vista, Colorado. According to the Zoning Map, the property is currently zoned I-1 Light Industrial. The adjacent properties to the north, west, and east are zoned I-1 Light Industrial, and are occupied by ACA Products, an asphalt, concrete, and aggregate facility. Adjacent properties south of Steele Drive are zoned Colorado Center Planned Unit Development (PUD) with commercial facilities on the developed parcels.

The Central Colorado Regional Airport is located southeast of the site, on the east side of Co Rd 319. The site is directly outside of and adjacent to the Airport Protection Overlay area, established to minimize public and sensitive land use exposure to aircraft noise, reduce the possibility of aircraft accidents, and restrict non-compatible land uses (Jviation 2017).

According to the 2022 Buena Vista Parks and Trails Inventory, the following trails are located near the proposed project site (Guthrie and Lauren 2022).

- Gregg Drive Trail follows along Gregg Drive and Steele Street between Rodeo Road and Co Rd 319
- Airport Trail extends along Co Rd 319 from Gunnison Avenue to south of Steele Street
- Rodeo Road Trail follows Rodeo Road from Co Rd 306/Main Street south to Gregg Drive
- Peaks View Trail extends along Pleasant Avenue from Co Rd 306/Main Street south for about 1,300 feet, then turns west until it intersects Rodeo Road

4.1.2. Environmental Consequences

Alternative 1: No Action

There would be no changes to land use or zoning under the No Action Alternative.

Alternative 2: Proposed Public Safety Complex

There are no anticipated zoning or land use impacts associated with the construction of the proposed Public Safety Complex as the site is currently zoned I-1 for industrial use and “police or fire station use” is a Permitted By-Right use in this zone according to the Buena Vista Unified Development Code, Article 16.03- Use Regulations (Buena Vista 2023a).

4.2. PHYSICAL RESOURCES

4.2.1. AFFECTED ENVIRONMENT

According to the 2022 USGS 7.5-minute series topographic map for the Buena Vista West, Colorado Quadrangle, the project site elevation is 7,958 feet above mean sea level. Surface topography is flat and generally slopes from west to east towards the Arkansas River. As a part of site development, two exploratory pits were sampled on April 28, 2021, by Cesare, Inc. to determine subsurface conditions (Cesare, Inc. 2021 and Appendix A).

Geology

Per the 2005 Geologic Map of the Buena Vista West Quadrangle, Chaffee County, Colorado, surficial deposits onsite consist of Glacial Outwash, Bull Lake outwash deposits of the Quaternary period (Colorado Geological Survey, 2005).

Seismicity

Northern Chaffee County in an area of low-medium hazard for earthquakes per the U.S. Geological Survey (USGS) National Seismic Hazard Model (USGS 2022).

Soils

According to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Area for Chaffee-Lake area, soils underlying the project site consist of Dominson gravelly sandy loam, 1 to 9 percent slopes (DoD). This soil type is found on fan terraces and alluvial fans. It is somewhat excessively drained, has a low runoff class, and no frequency of flooding or ponding. Soil has moderate runoff, and the hazard of erosion is moderate to severe (USDA 2023 and Appendix B).

The soil type is classified as “somewhat limited” for the construction of small commercial buildings, which are considered structures under three stories high that do not have basements. "Somewhat limited" indicates the soil has features that are moderately favorable for the specified use, and the limitations can be minimized by special planning, design, or installation (USDA 2023 and Appendix B).

As part of the Geotechnical Study, Cesare, Inc. dug exploratory pits that encountered the following (Cesare, Inc. 2021 and Appendix A):

- 0.75 to 2.0 feet of a gravelly sand fill with cobbles in a silt matrix to depths of 0.75 to 2 feet.
- Soil consisting of a sand with gravel, cobbles, and boulders in a silty matrix to the remaining depth explored of 5 to 5.5 feet. The boulders were up to 21 inches in dimension.
- No bedrock or groundwater was encountered.

Prime Farmland

The Farmland Protection Policy Act (FPPA) was enacted in 1981 to minimize the unnecessary conversion of farmland to nonagricultural uses as a result of federal actions. In addition, the Act seeks to assure that federal programs are administered in a manner that will be compatible with state and local policies and programs that have been developed to protect farmland. The policy of the USDA NRCS is to protect significant agricultural lands from conversions that are irreversible and result in the loss of an essential food and environmental resource.

The soil type at the project site, Dominson gravelly sandy loam, 1 to 9 percent slope (DoD), is not considered to be prime farmland by the USDA NRCS Soil Survey Area for Chaffee-Lake area (USDA 2023 and Appendix B).

4.2.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

Under the No Action Alternative, no impacts to the geology, seismicity, soils, or prime farmland would occur since the new facility would not be constructed.

Alternative 2: Proposed Public Safety Complex

Under the Proposed Action Alternative, construction activities would not be deep enough to impact underlying geological resources. There would be no impacts to prime and unique farmland or seismicity from the Proposed Action. The 2021 International Building Codes and the Town of Buena Vista Specifications and Standards manual would be followed.

Short-term impacts to soils may occur during construction activities related to the disturbance of soils on the undeveloped project site. According to the Geotechnical Study conducted for the proposed project, existing fill under the project site should be removed and replaced with structural fill. Otherwise, there is a risk for slab movement to occur, which can result in damage to the slab and foundation walls (Cesare, Inc. 2021 and Appendix A).

Slopes and other areas devoid of vegetation should be protected against erosion. Appropriate soil erosion best management practices (BMPs) such as silt fence, inlet filters and mud tracking mats, and restoration work would be implemented to minimize storm water runoff. Any stockpiles of topsoil or clean fill material would be surrounded by silt fence and covered as necessary to prevent fugitive dust and soil erosion.

4.3. TRANSPORTATION FACILITIES and TRAFFIC CIRCULATION

4.3.1. AFFECTED ENVIRONMENT

All roads within Buena Vista (herein referred to as the local roads) are under the jurisdiction of the Buena Vista Public Works Streets Division. Public transportation within Buena Vista and immediate area is limited

to community shuttles/buses. The existing public roads adjacent or near the project site include Steele Drive (frontage), Gregg Drive heading west, Co Rd 319 heading south and US Highway 24 (two lane highway) to the east running northwest to southeast. Buena Vista has one airport (Central Colorado Regional Airport), which is directly southeast of the proposed project site. A Union Pacific railroad runs along US Highway 24 and is currently not operational.

4.3.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

Under the No Action Alternative, there would be no impacts to existing traffic and circulation because no construction would occur.

Alternative 2: Proposed Public Safety Complex

Under this alternative, construction activities would be limited to Gregg/Steele Drive. There would be minimal impacts to traffic and circulation during the construction period as alternate routes exist within the area. Impacts would be mitigated by preventing parking of any construction equipment or vehicles on town streets during business hours.

Anticipated long term impacts to local traffic would be minimal, with increased usage by emergency vehicles. Response vehicles are equipped with sirens and lights to safely navigate through traffic. The proposed Public Safety Complex would have adequate on-site parking for staff, visitors, and community members. According to the Colorado Department of Transportation (CDOT), US Highway 24 is 0.3 miles from the proposed project site and has an Annual Average Daily Traffic Count of over 10,000 through Buena Vista (CDOT 2023). The additional traffic volume associated with the Proposed Action is minimal and supplemented by access via the surrounding roadway system.

4.4. PUBLIC HEALTH AND SAFETY

4.4.1. AFFECTED ENVIRONMENT

The driving force of this project is for improvements to public health and safety, specifically related to emergency services. Compounding needs for the proposed Public Safety Complex include population growth, continued increase in tourism, the desire to improve operations and agency collaboration by co-locating services, the need to support county-wide emergency response efficiently and effectively, and the desire for a larger public meeting venue for County Commissioner meetings and county convenings.

To minimize risks to safety and human health, all construction activities would be performed using qualified personnel trained in the proper use of the appropriate equipment including all appropriate safety precautions; additionally, all activities would be conducted in a safe manner in accordance with the standards specified in Occupational Safety and Health Act regulations. EO 13045, Protection of Children, requires Federal agencies to prioritize identifying and assessing environmental health and safety risks that may disproportionately affect children.

Alternative 1: No Action

Under the No Action Alternative, there would be no construction on site and therefore no risk to the safety and security of the Buena Vista population regarding construction safety.

Without a new facility, the efficacy of emergency response would remain inadequate and is projected to worsen because the current full-facility base in Salida has approximately 40-minute response times for emergency services to the northern part of Chaffee County. The County's population has grown approximately 20 percent in the past two decades, from 16,312 in 2000 to 20,099 in 2021 (DOLA 2023) and is forecast to increase an additional 25 percent county-wide by 2050, with a decent percentage of this increase in the northern portion of the county, according to the Colorado Office of the State Demographer (DOLA 2022), increasing the delay of response times.

Alternative 2: Proposed Public Safety Complex

Under this alternative, the construction of the new Public Safety Complex would increase the effectiveness of the Chaffee County Office of Emergency Management and EMS, thus directly increasing the safety and security of Chaffee County's residents. Specifically, response times of critical personnel in the northern part of Chaffee County would be greatly reduced. The new building would also provide improved training facilities for emergency personnel. The training facilities would be used to ensure personnel are prepared to respond to a wide range of emergencies, including natural disasters, medical emergencies, and criminal activities. Improved training would result in better response times and more effective emergency services.

The proposed Public Safety Complex would also improve public health and safety by providing a safe location for emergency operations during disasters The new facility would incorporate several features that would enhance safety to the community including:

- Strategically located near the populated Town of Buena Vista, with service to northern Chaffee County, minimizing response times for elected officials, emergency responders, and others who staff or respond to the EOC. Ability to utilize existing radio, fiber optic, and antenna systems with minimal relocation.
- Easy access to US Highway 24 for mobility of staff and responders.
- Room for future expansion.
- Sufficient parking for personnel.
- Up-to-date emergency response technologies.
- ADA-compliant building and site.

Construction activities could present safety risks to those performing the activities. Access to the project site would be restricted to protect the public and to minimize risks to safety and human health. Appropriate signage and barriers would be in place prior to construction activities to alert pedestrians and motorists of project activities. FEMA has not identified any disproportionate health and safety risks to children.

4.5. HAZARDOUS MATERIALS AND WASTE

4.5.1. AFFECTED ENVIRONMENT

A Phase I Environmental Site Assessment of the proposed project site was not conducted. According to the U.S. Environmental Protection Agency (EPA) NEPAssist website, no Superfund National Priorities List (NPL) sites; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites; Toxic Release Inventory sites; Brownfields sites; or Toxic Substances Control Act sites are located within 3,000 feet of the proposed project site. ASI RRC, Inc., located at 28221 Co Rd 319 is the only Resource Conservation and Recovery Act (RCRA) site within this search radius, but the site does not have any violations (USEPA 2023a and Appendix B).

The Colorado Department of Labor and Employment Division of Oil and Public Safety (OPS) does not identify any open leaking underground storage tanks within 0.5 miles of the property site (OPS 2023a) and Appendix B). ACA Products Inc., located at 28221 Co Rd 319, has two aboveground storage tanks that have been temporarily out of use since May 2010; the tanks have capacities of 8,000 gallons and 10,000 gallons. The facility also has one documented release from an underground storage tank on September 16, 2008. After remediation was completed, a no further action letter was sent on July 2, 2009 (OPS 2023b).

The EPA map of radon zones indicates Chaffee County, and most of Colorado, is in Zone 1 (greater than 4.0 picocuries per liter), which indicates the highest risk of radon gas from radioactive decay of uranium naturally occurring in rocks and soil (EPA 2023b).

4.5.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

There are no impacts to or from hazardous materials and waste under the No Action Alternative.

Alternative 2: Proposed Public Safety Complex

The Proposed Action Alternative would not disturb any known hazardous materials or create any potential hazard to human health. If hazardous constituents are encountered during the proposed construction operations, appropriate measures for the proper assessment, remediation, and management of the contamination would be initiated in accordance with applicable Federal, State, and local regulations. The contractor is obligated to take appropriate measures to prevent, minimize, and control the spill of hazardous materials.

Exposure to radon gas increases in basements versus aboveground structures, however the proposed building would not have a basement. Chaffee County should evaluate whether a passive or active radon mitigation system should be installed during or after construction to reduce exposure to radon gas.

4.6. SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.6.1. AFFECTED ENVIRONMENT

On February 11, 1994, President Clinton signed Executive Order 12898, entitled, "Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations." The EO directs Federal agencies, "to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States…" This EA analyzed socioeconomic and demographic data for the project area to determine if a disproportionate number of minority or low-income persons may be adversely affected by the proposed project.

For the purposes of this EA, a minority and/or low-income population exists if the People of Color Population and/or Low-Income Population equals or exceeds the 50th percentile compared to the average of the state where the affected environment is located. This means that the minority and/or low-income population, as defined by EPA's EJSCREEN, exceeds the statewide average. For this screening analysis, the statewide average is the threshold for identifying a minority or low-income community.

EJSCREEN also includes multiple "EJ Indexes," which identify minority and/or low-income populations that are exposed to human health or environmental risks. This may include areas that are below the statewide average for minority and/or low-income populations (and therefore are not identified by review of the Demographic Indicators) but have a high level of environmental risk.

Using EJSCREEN, Chaffee County is not in the 80th percentile for EJ Indexes nor 50th percentile for People of Color, however, the county is at 68th percentile for Low Income. Buena Vista is in the 87th percentile for the Ozone EJ Index and 75th percentile for Low-Income. Focusing on a project radius of 0.5 miles shows 77th percentile for Low Income but does not meet the state percentile for People of Color nor any of the 12 EJ Indexes (U.S. EPA 2023c). Due to the Low-Income state percentile, the project area is located within a low-income community.

4.6.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

Under the No Action Alternative, disproportionately high and adverse impacts on minority or low-income populations would not exist, because no construction would occur.

Alternative 2: Proposed Public Safety Complex

Under this alternative, there are no direct, indirect, or cumulative adverse human health or environmental effects on minority or low-income populations. Presently, there is no fully operating Public Safety Complex that easily supports northern Chaffee County. The establishment of a Public Safety Complex within Buena Vista would benefit the county's low-income population as emergency responders and law enforcement would have faster response times. Low-income residents would no longer have to wait the extra time it takes

for EMS and the Sheriff's department to travel the 40 minutes from Salida to Buena Vista or other parts of northern Chaffee County, resulting in a beneficial impact on this population and all the residents in the northern portion of the county. The location near major highways and a regional airport can provide lifesaving transportation to health care facilities on the Front Range. With the new EOC location, the county would be more effective in responding to local disasters and emergencies that impact low-income communities.

Regarding Buena Vista's 87th percentile for Ozone EJ Index, there can be temporary construction-related negligible impacts to air quality, including from fuel-burning engines. However, mitigation measures to reduce air quality concerns from temporary impacts can be found in the air quality section below.

4.7. AIR QUALITY

4.7.1. AFFECTED ENVIRONMENT

The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards: (1) primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; and (2) secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Current criteria pollutants are Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Ozone (O_3), Lead (Pb), Particulate Matter (PM_{10}), and Sulfur Dioxide (SO_2).

According to the EPA Greenbook for Nonattainment Areas for Criteria Pollutants, Chaffee County is in an attainment area for criteria pollutants, meaning the air quality meets or is cleaner than the national standard (EPA 2023d).

4.7.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

Under the No Action Alternative, greenhouse gas emissions generated by EMS and Sheriff's Office vehicular traffic from Salida to Buena Vista, and the rest of the northern end of the county, would continue and potentially increase, having an adverse impact to air quality. However, there would be no impacts to air quality from facility construction since construction would not occur.

Alternative 2: Proposed Public Safety Complex

Under the Proposed Action Alternative, construction activities are largely limited to the project site; therefore, there are negligible impacts to air quality from construction. These would be mitigated by wetting down areas of disturbance to limit fugitive dust. In addition, emissions from fuel-burning engines could also temporarily increase the levels of some criteria pollutants, such as CO, NO_2, O_3, PM_{10} and some non- criteria pollutants

such as volatile organic compounds. To mitigate these emissions, fuel-burning equipment would be properly maintained and run times kept to a minimum.

The addition of the Public Safety Complex in Buena Vista reduces greenhouse gas emissions from EMS and Sheriff's Office vehicles traveling to and from Salida to northern portions of the county near Buena Vista, resulting in a long-term beneficial impact on air quality.

4.8. NOISE

4.8.1. AFFECTED ENVIRONMENT

The Noise Control Act was enacted in 1972 (P.L. 92-574). Inadequately controlled noise presents a growing danger to the health and welfare of the nation's population and that the major sources of noise include transportation vehicles and equipment, machinery, appliances, other products in commerce, climate, or recreation. Sounds that disrupt normal activities or otherwise diminish the quality of the environment are designated as noise. Noise can be stationary or transient, intermittent, or continuous.

The proposed project site is in an area zoned as industrial, and adjacent to an existing concrete, asphalt, and aggregate manufacturing facility. The Central Colorado Regional Airport is located approximately 775 feet from the project site, although the project site is outside of the 65 day-night average sound level (DNL) noise contour (Central Colorado Regional Airport 2023 and Appendix B). Several commercial facilities are located on the south side of Gregg Dr/Steele Dr. No residences or noise sensitive receptors are located near the proposed project site. Given the industrial nature of the surrounding area, relatively high levels of background noise occur on a regular basis in the area.

4.8.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

Under the No Action Alternative, there is no impact on noise generation if no construction occurs.

Alternative 2: Proposed Public Safety Complex

The proposed project site is located adjacent to an existing concrete, asphalt, and aggregate manufacturing facility, and close to the airport, both of which regularly generate noise. The addition of the Public Safety Complex minimally increases ambient noise levels but only intermittently. A back-up emergency generator would provide emergency power to the Public Safety Complex during power outages. This back-up generator would be tested periodically and operates if power outages occur during the operation of the facility and if the primary generator is disabled. Operation of this back-up generator could result in some noise impacts for intermittent and short periods of time. The generator would include standard noise shielding. This impact is minor due to the infrequent use of the generator.

Only temporary short-term increases in noise levels are anticipated during construction. To reduce noise levels, construction activities would be restricted to normal daylight business hours. Equipment and machinery utilized at the site would meet all local, State, and Federal noise regulations.

Per Federal Highway Administration and U.S. Department of Transportation regulations, agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), warehousing, malls, stores, shops, and Government managed land are exempt from long-term noise considerations.[6]

4.9. PUBLIC SERVICES AND UTILITIES

4.9.1. AFFECTED ENVIRONMENT

Public services are provided to facilities in and near Buena Vista by the Buena Vista Police Department, Chaffee County Sheriff's Office, Buena Vista Fire Department, Chaffee County Fire Protection District, Buena Vista Sanitation District for sewer service, the Town of Buena Vista for water, and the Buena Vista School District for schools. Sangre de Cristo Electrical Association is the primary electricity provider, while Atmos Energy and Comfurt Gas are the primary natural gas providers in the area.

4.9.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

Under the No Action Alternative, there are no impacts to existing utilities if no construction occurs. The Chaffee County Sheriff's Office and EMS Department would continue to operate primarily from their facilities in Salida, 25 miles to the south. Elevated response times would remain, resulting in an adverse impact on emergency response and law enforcement in the northern end of the county.

Alternative 2: Proposed Public Safety Complex

Under this alternative, public services and utilities are required for the construction and sustained operation of the proposed Public Safety Complex. The Buena Vista Fire Department and Chaffee County Fire Protection District would continue to provide firefighting services for the area. The Buena Vista Police Department would continue to provide law enforcement services for the town, while the Chaffee County Sheriff's Office would remain responsible for law enforcement response in all unincorporated portions of Chaffee County.

The construction of the proposed Public Safety Complex enhances local response to the public's health and safety needs, and improves emergency response and law enforcement's operations, response times, and overall presence in the community, equating to improved public services and outcomes for the public.

[6] 23 CFR § 772 - Analysis of traffic noise impacts.

Flexibility to use the facility as an ancillary EOC assists in protection of county infrastructure and natural resources during disaster response or related emergency management needs.

Utility providers for the proposed project would include the following (Town of Buena Vista 2023):

- Electric: Sangre de Cristo Electrical Association
- Natural Gas: Atmos Energy
- Sewer Service: Buena Vista Sanitation District
- Water: Town of Buena Vista Water Department
- Waste Disposal: to be determined, although Chaffee County Waste, Shamrock Disposal Service, and Waste Management service the area, along with the Chaffee County Landfill

All are available to establish connections to the proposed building and site as part of the proposed project. Universal green building standards and energy efficiency considerations would be incorporated into construction plans. Chaffee County is also pursuing an electrical design that incorporates a solar/photovoltaic system. The building designs include HVAC systems that are energy rated for efficiency and use design recommendations by an Energy Efficiency Audit (DOLA 2022).

4.10. WATER RESOURCES

4.10.1. AFFECTED ENVIRONMENT

Water Resources

There are no water resources on or adjacent to the proposed project site. The project site is located in the Arkansas River Headwaters Watershed, with the Arkansas River about 1.1 miles east of the site.

Floodplain Management

EO 11988 requires Federal agencies to consider the effect of their actions on the floodplain, evaluate alternatives to building in the floodplain, and to provide opportunity for public comment if there is no practicable alternative. Under requirements established in 44 CFR Section 60.3, participating communities shall require permits for all development, including temporary development, in the Special Flood Hazard Areas.

The proposed project site is located on Flood Insurance Rate Map Panel 08015C0309D, effective date December 7, 2017, in an area designated as Zone X and not within a Special Flood Hazard Area (Appendix B).

Wetlands and Waters of the US

EO 11990, Protection of Wetlands, requires Federal agencies to take action to minimize the destruction or modification of wetlands, by considering both direct and indirect impacts to wetlands that may result from Federally funded actions.

According to the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory, there are no wetlands or Waters of the US on or adjacent to the proposed project site. Freshwater emergent and freshwater forested/shrub wetlands exist approximately 580 feet northeast of the proposed project site (USFWS 2023a and Appendix B).

Wild and Scenic Rivers and Nationwide Rivers Inventory

The Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq. [7], was enacted in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act safeguards the unique character of these designated wild and scenic rivers while recognizing the potential for their appropriate use, development, and encourages river management. The Nationwide Rivers Inventory is a National Park Service listing of free-flowing river segments in the US believed to possess one or more "outstandingly remarkable" natural or cultural values that are at least regionally significant. These segments are potential candidates for inclusion in the National Wild and Scenic River System.

There are no Wild and Scenic Rivers in Chaffee County; the only Wild and Scenic River in Colorado is a segment of the Cache la Poudre River in Larimer County in northern Colorado (National Wild and Scenic Rivers System 2023). The Arkansas River segment in Chaffee County is on the Nationwide Rivers Inventory (National Park Service 2023 and Appendix B).

4.10.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

No impacts to water resources, floodplains, wetlands/Waters of the US, Wild and Scenic Rivers or rivers on the Nationwide Rivers Inventory would occur under the No Action Alternative.

Alternative 2: Proposed Public Safety Complex

There would be no impacts to water resources, floodplains, wetlands/Waters of the US, Wild and Scenic Rivers or rivers on the Nationwide Rivers Inventory from the Proposed Action Alternative.

The current land surface consists of industrial ground with little vegetation, with relatively high stormwater runoff. The proposed project and associated paved surfaces (i.e., parking lot) does increase the amount of impermeable area; however, the increased landscaped area increases permeability, resulting in an overall decrease in stormwater runoff. Construction design includes two snow storage/stormwater retention basins located on the northeast and southeast corners of the parking lot to act as infiltration areas. These basins are positioned to intercept stormwater flows prior to exiting the project site. The stormwater retention basins allow stormwater from small precipitation events to infiltrate rather than flow offsite,

[7] Public Law 90-542; 16 U.S. Code. 1271 et seq: Congressional declaration of policy., 1968

benefiting stormwater quality; these are regulated under Section 401 of the Clean Water Act (Crabtree Group Inc. 2023 and Appendix C).

Temporary soil erosion control measures would be installed and maintained throughout construction to prevent additional soil erosion.

A National Pollution Discharge Elimination System permit is not required for the Proposed Action. However, construction disturbing over one acre of land requires a stormwater permit per the Colorado Department of Public Health and Environment. A Stormwater Pollution Prevention Plan would also be necessary.

4.11. BIOLOGICAL RESOURCES

4.11.1. AFFECTED ENVIRONMENT

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include Federally listed (endangered or threatened), proposed, and candidate species designated by the USFWS. Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the Endangered Species Act (ESA) of 1973[8] and sensitive ecological areas as designated by State or Federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, and crucial summer and winter habitats).

Vegetation

The project site is currently undeveloped industrial land largely devoid of vegetation. Vegetation on site consists primarily of sparse grass and cacti (Cesare, Inc. 2021 and Appendix A).

EO 13112: Invasive Species, requires Federal agencies to prevent the introduction of invasive species and provide for their control to minimize the economic, ecological, and human health impacts that invasive species cause. EO 13112 defines invasive species as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health, including noxious weed plant species. Invasive species often outcompete the species that historically occurred in a particular ecosystem, altering the species composition of the plant community and its functions.

Wildlife

Fish and wildlife include the species that occupy, breed, forage, rear, rest, hibernate, or migrate through the project area. Regulations relevant to fish and wildlife include the Bald and Golden Eagle Protection Act

[8] 16 U.S.C. 1531–1544

(BGEPA) [9], the Migratory Bird Treaty Act (MBTA)[10], and the ESA. The BGEPA as amended, provides for the protection of bald and golden eagles by prohibiting the take, possession, sale, purchase, barter, transport, export, or import of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. The MBTA decrees that all migratory birds and their parts (including eggs, nests, and feathers) are protected. Nearly all native North American bird species are protected by the MBTA. Under the MBTA, the taking, killing, or possessing migratory birds is unlawful.

Migratory birds may pass through the area due to the nearby wetlands and the Arkansas River about a mile away.

Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect and restore threatened and endangered plants and animals and their habitats. ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species. In compliance with Section 7 of the ESA, a review of the potential impacts to Federally listed endangered, threatened and candidate species has been completed.

The USFWS planning tool Information for Planning and Consultation (IPaC) for Endangered Species Assessment was utilized to determine if there are any known or listed endangered, threatened, or special concern species, high quality natural communities, or other unique natural features known to occur at or near the proposed project site. The IPaC report is included in Appendix D.

The following species are known or expected to be on or near the proposed project site:

Canada Lynx

The Canada Lynx (*Lynx canadensis)* is found in boreal spruce-fir, boreal/hardwood, and subalpine forest systems in Canada, Alaska, Montana, Wyoming, Idaho, Washington, and Oregon, and some Great Lakes and New England states. The Canada lynx was reintroduced in Colorado by Colorado Parks and Wildlife beginning in 1999. The species prefers habitat characterized by deep snow and dense horizonal forest cover that supports snowshoe hare populations, its primary food source. The Canada Lynx is a threatened species in the contiguous U.S. (USFWS 2023b). According to the USFWS' IPaC tool, the project site is outside designated critical habitat for the Canada lynx (Appendix D). The project site does not support habitat for the lynx.

[9] 16 U.S.C 668 et seq.

[10] 16 U.S.C. 701-719c

Gray Wolf

The gray wolf (*Canis lupus*), an endangered species, only needs to be considered for projects in Colorado that include a predator management program (Appendix D), which this project does not.

Mexican Spotted Owl

The Mexican spotted owl (*Strix occidentalis lucida*), a threatened species, occurs in forested mountains and canyonlands throughout the southwestern U.S. and Mexico. It ranges from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into several states of Mexico. There is no critical habitat for the Mexican spotted owl on or near the proposed project site (USFWS 2023c).

Monarch butterfly

The Monarch butterfly (*Danaus plexippus*) is a candidate species and not yet listed or proposed for listing. The species is found throughout the U.S. in a variety of habitats but is dependent on milkweed plants for egg-laying. No critical habitat has been designated for this species (USFWS 2023d).

4.11.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

Under the No Action Alternative, there are no impacts to biological resources because no construction would occur.

Alternative 2: Proposed Public Safety Complex

The Proposed Action Alternative would not impact threatened and endangered species or native vegetation. The retention pond and any areas disturbed during construction that remain undeveloped or landscaped would be reseeded with native plant species in order to minimize the encroachment of invasive species.

There are no trees present on the project site, which are known to be nesting grounds for migratory birds. Since there is no habitat present, there are no impacts to migratory birds from the proposed project. BMPs would be implemented to minimize impacts to any migratory bird species. Additionally, if nests are observed, the Colorado Parks and Wildlife would be notified immediately. Should any migratory birds be discovered during construction, work in the subject area must cease and the applicant should contact FEMA Environmental and Historic Preservation for further guidance.

4.12. CULTURAL RESOURCES

4.12.1. AFFECTED ENVIRONMENT

Cultural resources include the physical evidence or place of past human activity: site, object, landscape, and structure or a site, structure, landscape, object, or natural feature of significance to a group of people traditionally associated with it. The National Historic Preservation Act (NHPA) was passed in 1966 to

preserve historical and archaeological sites in the United States of America, This Act created the National Register of Historic Places (NRHP), the list of National Historic Landmarks, and the State Historic Preservation Offices (SHPO). The NRHP is the Nation's official list of cultural resources worthy of preservation and is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. To be eligible for listing, a property must meet one of four eligibility criteria and have sufficient integrity.

Colorado's rich cultural history is directly linked to the diversity of the landscape. The Colorado Historic Sites Database contains thousands of documented historic properties across the state. Currently there are approximately 47 historic properties listed on the NRHP in Chaffee County, including a variety of individual dwellings, historic districts, ranches and farmsteads, mining camps, bridges, public buildings, cemeteries, and Native American/Euro American archaeological sites.

Historic Properties

In addition to review under NEPA, consideration of effects to historic properties is mandated under Section 106 of the NHPA, as amended, and implemented by 36 CFR Part 800. Requirements include identification of significant historic properties that may be affected by the Proposed Action. Historic properties are defined as archaeological sites, standing structures, or other historic resources listed in or eligible for listing in the NRHP (36 CFR 60.4). As defined in 36 CFR Part 800.16(d), the Area of Potential Effect (APE), "is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist."

Archeological Resources

In addition to identifying historic properties that may exist in the proposed project's APE, FEMA must also determine, in consultation with the appropriate SHPO what effect, if any, the action would have on historic properties. Moreover, if the project has an adverse effect on these properties, FEMA must consult with the SHPO on ways to avoid, minimize, or mitigate the adverse effect. During construction, ground disturbing activities would be monitored. Should human skeletal remains or historic or archaeological materials be discovered during construction, all ground-disturbing activities on the project site must cease and the coroner's office (in the case of human remains), FEMA, and the Colorado SHPO notified immediately.

Historic Records Review

A senior FEMA historic preservation specialist conducted a review of the Colorado online cultural resources database (COMPASS, SHPO Information Management Unit) on March 03, 2023. Additional historical background research pertaining to the project was also undertaken, with follow-up written and phone consultation with the following SHPO staff:

- Mark Tobias, Director, Intergovernmental Services
- Erin Bornemann, Director, Information Management

- Jessika Smith, COMPASS Database administrator

The proposed project site served for at least 40 years as a combined gravel mine, concrete and asphalt plant and is heavily disturbed as a result of this activity. Historic mapping showed the project area as undeveloped until approximately the early 1980s. The database search did not show the project site as previously surveyed and otherwise did not indicate any historic properties (structures or archaeological sites) situated within the area of proposed development. A wide variety of historic properties (mostly individual structures dating from the late the 19th to early 20th century) are recorded within a mile of proposed development. However, the project would have no direct or indirect effects on any of these historic properties.

The SHPO Director of Intergovernmental Services agreed with FEMA Environmental and Historic Preservation's conclusion that the project site exhibits very low archaeological potential (related to either prehistoric or historic time periods), and even if such sites are present, they would not remain intact from prior mining activities. Because of the low probability for sites to occur in this particular area and the level of ground disturbance, consultation with Native American tribes with ancestral interest in this location was not warranted.

4.12.2. ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action

Under the No Action Alternative, there would be no construction on site and therefore no impacts to historic or cultural resources.

Alternative 2: Proposed Public Safety Complex

Under the Proposed Action Alternative, the construction of a new Public Safety Complex would not have the potential to impact historic properties.

4.13. CUMULATIVE IMPACTS

The CEQ regulations[11] implementing the procedural provisions of NEPA of 1969, as amended[12] defines cumulative effects as: "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or local) or person undertakes such other action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR

[11] 40 Code of Federal Regulations [CFR] § 1500-1508.

[12] 42 USC § 4321.

1508.7)."[13] In accordance with NEPA and to the extent reasonable and practical, this EA considered the combined effect of the Proposed Action and other actions occurring or proposed in the vicinity of the proposed project site.

4.13.1. SUMMARY OF CUMULATIVE IMPACTS

Other projects in the area include the following:

- Sufficient housing is a dire need of the county, and housing developments have been and will continue to be constructed in the area.
- The historic McGinnis Gym in downtown Buena Vista is being renovated for future school and community use (Chaffee County Times 2022).
- A new park, Billy Cordova Memorial Park and Trail, will be constructed in the Sunset Vista IV neighborhood near Grouse Road and Larissa Lane (Buena Vista 2023b).
- Several trail extensions are planned in the Buena Vista area (Guthrie and Platman 2022).

After considering the Proposed Action along with these other projects, there are no cumulative impacts.

5. SECTION FIVE | MITIGATION MEASURES and PERMITS

Construction of the new Public Safety Complex would be completed in general accordance with the following mitigation measures to lessen impacts to the local community:

- During construction, the selected contractor would water down construction areas as necessary to prevent fugitive dust emissions that would impact local air quality.
- Construction equipment would be operated with factory-equipped vehicle emissions controls including mufflers.
- BMPs to reduce or eliminate runoff impacts during construction would be implemented and following construction; the site would be landscaped and vegetated to reduce the potential for soil erosion.
- Construction noise would be temporary and mitigated by limiting construction to normal daylight hours.
- In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity would be discontinued, the area secured, and the SHPO and FEMA notified.
- If any hazardous materials are found during construction, materials would be characterized, remediated, and disposed of as appropriate, and otherwise handled in accordance with applicable local, State, and Federal laws and regulations.

[13] 40 CFR § 1508.7.

In accordance with applicable local, State, and Federal regulations, the applicant would be responsible for acquiring any necessary permits prior to commencing construction at the proposed project site. The following permits and approvals may be required prior to construction:

- Colorado Department of Public Health and Environment (CDPHE) Stormwater Construction Permit for greater than one acre disturbed
- Commercial Building Permit (Chaffee County Building Department)
- Commercial/Multi-Family Building Permit (Town of Buena Vista)
- Access Permit/Driveway (Town of Buena Vista)
- Commercial/Multi-Family Water Tap Application (Town of Buena Vista)

6. SECTION SIX | SUMMARY OF IMPACTS

The following table summarizes the potential impacts of each alternative on the resource areas discussed in SECTION FOUR | AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES. Table 6-1 is organized by each resource area for each alternative. Permits and conditions are summarized, as well as best management practices.

Table 6-1: Summary of Impacts

Resource Area (EA reference section)	Alternative 1: No Action	Alternative 2: Public Safety Complex	Permits Required	Best Management Practices (BMPs)	Conditions
Land Use and Zoning (14.1)	No impacts to land use or zoning.	No zoning or land use impacts since the site is currently zoned I-1 for industrial use and "police or fire station use" is a Permitted By-Right use in this zone.	County Commercial Building Permit Town Commercial/Multi-Family Building Permit Access Permit/Driveway	None	None
Physical Resources (14.2)	No impacts to geology, seismicity, soils, or prime farmland.	No impacts to geological resources, seismicity, or prime and unique farmland. Soils underlying the site should be removed and replaced with structural fill.	None	Slopes and other areas devoid of vegetation should be protected against erosion. Appropriate soil erosion BMPs such as silt fence, inlet filters and mud tracking mats and restoration work are implemented to minimize storm water runoff. Any stockpiles of topsoil or clean fill material are surrounded by silt fence and covered as necessary to prevent fugitive dust and soil erosion.	The Applicant is responsible for verifying and compliance with all permit requirements.

Resource Area (EA reference section)	Alternative 1: No Action	Alternative 2: Public Safety Complex	Permits Required	Best Management Practices (BMPs)	Conditions
Transportation Facilities (14.3)	No impacts to existing traffic and circulation.	Limited impacts to traffic and circulation near Gregg/Steele Drive during the construction period. Alternate routes exist within the area. Impacts are mitigated by preventing parking of any construction equipment or vehicles on town streets during business hours. Long term impacts to local traffic are possible with increased usage by emergency vehicles but are anticipated to be minimal as response vehicles are equipped with sirens and lights, allowing them to safely navigate through traffic. The proposed building has adequate on-site parking to accommodate staff, visitors, and community members. Additional traffic volume on US Highway 24 is anticipated to be minimal and can be accommodated by the surrounding roadway system.	None	Applicant will, to the extent possible, follow BMPs to minimize impacts to transportation facilities.	Parking of any construction equipment or vehicles on town streets during business hours is prohibited.

Resource Area (EA reference section)	Alternative 1: No Action	Alternative 2: Public Safety Complex	Permits Required	Best Management Practices (BMPs)	Conditions
Public Health and Safety (14.4)	Without a new facility, infrastructure for emergency response, and thus the public, is impacted because the location of the current full-facility base in Salida does not allow for expedited emergency services to the northern part of Chaffee County.	The construction of a new Public Safety Complex increases the effectiveness of the Chaffee County EMS Department, thus directly increasing the safety and security of Chaffee County's population. Specifically, response times of critical personnel are reduced as a result of easier access via US Highway 24 to the northern part of Chaffee County. The proposed Public Safety Complex provides improved training facilities for emergency personnel to prepare for a wide range of emergencies, resulting in better response times and more effective emergency services. The new building improves public health and safety by providing a safe location for emergency operations during disasters. Construction activities could present safety risks to those performing the activities. There are no disproportionate health and safety risks to children.	None	Access to the site is restricted to protect the public and to minimize risks to safety and human health. Appropriate signage and barriers are in place prior to construction activities to alert pedestrians and motorists of project activities.	The Applicant will implement best management practices to minimize impacts to public health hand safety and is responsible for verifying compliance with all permit requirements.

Resource Area (EA reference section)	Alternative 1: No Action	Alternative 2: Public Safety Complex	Permits Required	Best Management Practices (BMPs)	Conditions
Hazardous Materials (14.5)	This alternative does not disturb any hazardous materials or create any potential hazard to human health.	The Proposed Action would not disturb any known hazardous materials or create any potential hazard to human health. If hazardous constituents are encountered during the proposed construction operations, appropriate measures for the proper assessment, remediation and management of the contamination will be initiated in accordance with applicable Federal, State, and local regulations.	None	The contractor will take appropriate measures to prevent, minimize, and control the spill of hazardous materials.	Hazardous Materials used during construction must be appropriately separated and disposed of in an approved disposal site or landfill. Asphalt must be recycled as a blended base material or appropriately separated and disposed of in an approved disposal site or landfill in accordance with the CDPHE authorized waste management regulations.
Socioeconomic and Environmental Justice (14.6)	This alternative does not include any Federal action. There is no requirement for compliance with Executive Orders (EO) 12898: Environmental Justice since there are no Federal actions.	Low-income populations may benefit during the construction process through the provision of construction jobs and multiplier effects of expenditures in the local economy. The new Public Safety Complex will benefit low-income populations as there will be faster EMS and police response times, as well as the EOC supporting Northern Chaffee County more effectively. Buena Vista is at a high level of environmental risk for ozone. However, effects are temporary construction-related negligible impacts to air quality.	None	Fuel-burning equipment run times will be kept to a minimum and equipment will be properly maintained.	Applicant will, to the extent possible, follow best construction practices to minimize impacts to low-income populations, including mitigation measures to reduce air quality concerns from temporary impacts.

Resource Area (EA reference section)	Alternative 1: No Action	Alternative 2: Public Safety Complex	Permits Required	Best Management Practices (BMPs)	Conditions
Air Quality (14.7)	Greenhouse gas emissions generated by EMS and Sheriff's Office vehicular traffic from Salida to the northern end of the county will continue, resulting in an adverse impact to air quality. However, there are no impacts to air quality from facility construction since construction would not occur.	Construction activities are limited to the project area; therefore, there are negligible impacts to air quality from construction. These will be mitigated by wetting down areas of disturbance to limit fugitive dust. In addition, emissions from fuel-burning engines could also temporarily increase the levels of some criteria pollutants, such as CO, NO_2, O_3, PM_{10} and some non- criteria pollutants such as volatile organic compounds. The addition of the Public Safety Complex in Buena Vista reduces greenhouse gas emissions from EMS and Sheriff's Office vehicles traveling from Salida to northern portions of the county near Buena Vista, resulting in a beneficial impact on air quality.	None	Fuel-burning equipment run times will be kept to a minimum and equipment will be properly maintained.	Applicant will, to the extent possible, follow best construction practices to minimize impacts to air quality. The contractor should keep all equipment in good working order to minimize air pollution. Disturbed areas will be wetted down as needed to prevent fugitive dust.
Noise (14.8)	No impact on noise generation because no construction would occur.	Due to the industrial nature of the project area, the proposed project has a minimal increase of ambient noise levels and only intermittently, primarily when emergency vehicles are conducting training or dispatched and when the back-up generator is in use during power outages. Temporary, intermittent increases in noise levels are anticipated during construction.	None	Construction activities are restricted to normal daylight business hours. Equipment and machinery utilized at the site will meet all local, State, and Federal noise regulations.	Applicant will, to the extent possible, follow best construction practices to minimize noise impacts.

Resource Area (EA reference section)	Alternative 1: No Action	Alternative 2: Public Safety Complex	Permits Required	Best Management Practices (BMPs)	Conditions
Public Services and Utilities (14.9)	No impacts to existing utilities. If the new Public Safety Complex is not constructed in Buena Vista, longer emergency response times will continue, resulting in an adverse impact on populations needing emergency response and law enforcement in the northern end of the county.	The construction of the proposed Public Safety Complex enhances local response to the public's health and safety needs, improves emergency response and law enforcement's operations, response times, and increases their overall presence in the community, equating to improved public services and outcomes for the public. The flexibility to use the facility as an ancillary EOC assists in protection of county infrastructure and natural resources during disaster response or related emergency management needs. Utility providers have the capacity to support the project. Chaffee County is also pursuing plans to incorporate a solar/photovoltaic system into the building's electrical design.	None	Universal green building standards and energy efficiency considerations are incorporated within the new construction.	None
Water Resources (14.10)	No impacts to water resources, floodplains, wetlands/Waters of the US, or Wild and Scenic Rivers.	No impacts to water resources, floodplains, wetlands/Waters of the US, or Wild and Scenic Rivers.	Storm water permit for construction is required by CDPHE, along with a Stormwater Pollution Prevention Plan. Stormwater retention basins require a permit under Section 401 of the Clean Water Act.	BMPs will be implemented during construction to minimize erosion and landscaping and paving after construction will be implemented. Temporary soil erosion control measures will be installed and maintained throughout construction to prevent soil erosion.	The Applicant is responsible for verifying compliance with all permit requirements, including permit conditions and regional conditions as provided by the US Army Corps of Engineers (USACE).

Resource Area (EA reference section)	Alternative 1: No Action	Alternative 2: Public Safety Complex	Permits Required	Best Management Practices (BMPs)	Conditions
Biological Resources (14.11)	No impacts to biological resources.	The proposed project does not impact threatened and endangered species, wildlife, migratory birds, or native vegetation.	None	The retention pond and any areas disturbed during construction that remain undeveloped or landscaped will be reseeded with native plant species to minimize the encroachment of invasive species. Implement local BMPs for control of erosion and sedimentation. Notify Colorado Parks and Wildlife if onsite bird nests are discovered. Contact USFWS immediately by telephone at (303) 236–4773 if any threatened or endangered species are found alive, dead, injured, or hibernating within the project area.	Applicant will, to the extent possible, follow best construction practices to minimize impacts to any species. Should any migratory birds or threatened or endangered species be discovered during construction (Refer to Appendix D), work in the subject area must cease and the applicant should contact FEMA Environmental and Historic Preservation for further guidance.
Cultural Resources (14.12)	No impacts to historic or cultural resources.	The construction of a new Public Safety Complex does not have the potential to impact historic properties.	None	During construction, ground disturbing activities will be monitored. Should human skeletal remains or historic or archaeological materials be discovered during construction, all ground-disturbing activities on the project site will cease and the coroner's office (in the case of human remains), FEMA, and the Colorado SHPO will be notified immediately.	During construction, ground disturbing activities will be monitored. Should human skeletal remains or historic or archaeological materials be discovered during construction, all ground-disturbing activities on the project site will cease and the coroner's office (in the case of human remains), FEMA, and the Colorado SHPO will be notified immediately.

Resource Area (EA reference section)	Alternative 1: No Action	Alternative 2: Public Safety Complex	Permits Required	Best Management Practices (BMPs)	Conditions
Cumulative Impacts (14.13)	No cumulative impacts.	There are no cumulative impacts due to this project when considered with other projects in the area.	None	None	None

7. SECTION SEVEN | PUBLIC INVOLVEMENT

7.1. PUBLIC NOTICE OF AVAILABILITY

The following document was released for a 14-day public comment period spanning (Pending Public Comment)

PUBLIC NOTICE OF AVAILABILITY TO COMMENT ON AN ENVIRONMENTAL ASSESSMENT (EA) FOR THE CHAFFEE COUNTY NORTH END PUBLIC SAFETY COMPLEX, BUENA VISTA, COLORADO

The Federal Emergency Management Agency (FEMA) is providing notice that an Environmental Assessment (EA) to evaluate a proposed Public Safety Complex in Buena Vista, Colorado, is available for public review and comment. We issue this notice to provide the opportunity for other Federal and State agencies, Native American tribes, non-governmental organizations, and the public to comment on the EA. A Notice of Intent was published March 13th, 2023, and no comments were received. These actions are part of our effort to comply with the general provisions of the National Environmental Policy Act (NEPA); NEPA regulations; other Federal laws, regulations, and Executive Orders; and our policies for compliance with those laws and regulations including 44 C.F.R. Part 9 and FEMA Directive 108-1 & Instruction 108-1-1.

The purpose of FEMA's EOC Grant Program is to improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, strategically located, and fully interoperable EOCs with a focus on addressing identified deficiencies and needs. The project is needed to establish fully capable emergency operations facilities at the local level to ensure continuity of government operations in major disasters or emergencies caused by any hazard. A new facility in Buena Vista would efficiently support county-wide emergency response, improve operations and agency collaboration by co-locating services, enhance public safety and welfare for both residents and visitors in a historically under-resourced portion of the county, and more effectively support the increased population and continued rapid growth of tourism throughout the county.

All FEMA funded actions will be completed in compliance with applicable federal, tribal, state, and local laws, regulations, Executive Orders, etc. including the Clean Air Act, Clean Water Act, Endangered Species Act, National Historic Preservation Act, Executive Order 11988 (Floodplain Management), Executive Order 11990 (Protection of Wetlands), and Executive Order 12898 (Environmental Justice).

The comment period for the draft EA will remain open for 14 days following publication of this notice. After gathering public comments, the draft EA will become final in accordance with FEMA Directive 108-1 & Instruction 108-1-1, FEMA's implementing procedures for NEPA.

The Draft EA is available for viewing online at the following locations:
https://www.fema.gov/emergency-managers/practitioners/environmental-historic/nepa-repository
https://mars.colorado.gov/

https://www.chaffeecounty.org/Public-Notices

You can provide comments or obtain more detailed information about the proposed project by contacting FEMA Region 8 by email at fema-r8ehp@fema.dhs.gov and including 'Buena Vista EOC EA' in the subject line or by U.S. Mail at "Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267 Attn: "Kyle Cheeseman."

8. SECTION EIGHT| LIST OF PREPARERS

This EA was prepared by:

FEMA Region VIII, Denver, CO

- Steven Hardegen – FEMA Regional Environmental Officer
- Richard Myers – FEMA Deputy Regional Environmental Officer
- Pamela Roszell – FEMA Environmental Protection Specialist
- Kyle Cheeseman – FEMA Environmental Protection Specialist
- Charles Bello – FEMA Advisor, Environmental and Historic Preservation
- Mary Brillante - FEMA Environmental Protection Specialist
- Cathy Jo Beecher – FEMA Environmental Protection Specialist
- Margaret Hansen – FEMA Environmental Protection Specialist

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LIST OF APPENDICES

FEMA has worked to ensure this EA is accessible to persons with disabilities, in compliance with Section 508 of the Rehabilitation Act of 1973. The EA's appendices provide supporting documentation related to the analysis of the Proposed Action. In case these appendices pose a challenge to be viewed electronically by persons with disabilities, each appendix is briefly described and summarized below. If further accommodation is needed, please email fema-r8ehp@fema.dhs.gov

Appendix A. *Geotechnical Study*

This report is a geotechnical-engineering study prepared by Cesare, Inc. that discusses existing subsurface conditions at the proposed project site. The 30-page report was stamped by Professional Engineer Darin R. Duran on June 10, 2021. It characterizes existing subsurface conditions at the site and assists in determining design criteria for planning, site development, foundation systems, interior floor systems, exterior flatwork, and surface and subsurface drainage adjacent to structures. The report discusses the results of the field exploration (through exploratory pits observed on April 28, 2021) and laboratory testing and includes related exhibits, photos, and graphs.

Appendix B. *Resource Maps*

This 38-page appendix created by FEMA Environmental and Historic Preservation includes exhibits and reports related to the resources located at the proposed project site. Exhibits include a location map, USDA soil survey, and maps and supporting documentation for hazardous materials and toxic substances, socioeconomics and environmental justice, air quality, noise (Central Colorado Regional Airport noise contours), floodplains, wetlands, Wild and Scenic Rivers, and the Nationwide Rivers Inventory.

Appendix C: *Drainage Report*

This report is a study prepared and stamped by Professional Engineer Tracy Vandaveer of Crabtree Group Inc. on January 27, 2023, that discusses existing conditions related to drainage at the proposed project site. The 74-page report discusses site topography, soils underlying the site, precipitation frequency estimates, runoff analysis, curve numbers for the drainage areas, detention volumes, runoff rates, and Colorado Revised Statute 37-92-602(8) compliance. It also includes exhibits and tables such as a drainage map, NRCS soils report, and runoff analysis including National Oceanic and Atmospheric Administration precipitation estimates, watershed model schematics, and hydrograph and pond reports.

Appendix D. *U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) Report*

This 14-page USFWS report is an automatically generated list of species and other resources such as critical habitat that are known or expected to be on or near the proposed project site. It also includes graphics related to probability of presence and breeding season for migratory birds of concern.

APPENDIX A: GEOTECHNICAL STUDY

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

GEOTECHNICAL STUDY

Chaffee County Public Safety and EMS Building
200 Steele Drive
Buena Vista, Colorado

Report Prepared for:

Mr. Gary Greiner
Development Engineer
Chaffee County Development Services Department
104 Crestone Avenue, Room 125
Salida, CO 81201

Project No. 21.6037
June 10, 2021

Corporate Office: 7108 South Alton Way, Building B • Centennial, CO 80112
Locations: Centennial • Frederick • Silverthorne • Salida/Crested Butte
Phone 303-220-0300 • www.cesareinc.com

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

GEOTECHNICAL STUDY

Chaffee County Public Safety and EMS Building
200 Steele Drive
Buena Vista, Colorado

Report Prepared for:

Mr. Gary Greiner
Development Engineer
Chaffee County Development Services Department
104 Crestone Avenue, Room 125
Salida, CO 81201

Project No. 21.6037
June 10, 2021

Report Prepared by:

Darin R. Duran, P.E.
Principal, Manager - Salida and Crested Butte

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COMMON ABBREVIATIONS

AASHTO.....American Association of State Highway and Transportation Officials
ABC.....aggregate base course
ACI .....American Concrete Institute
ADA .....Americans with Disabilities Act
ADSC .....Association of Drilled Contractors
AI .....Asphalt Institute
APM .....asphalt paving material
ASCE.....American Society of Civil Engineers
ASTM .....American Society for Testing and Materials
AWWA .....American Water Works Association
bgs.....below ground surface
CDOT .....Colorado Department of Transportation
CBR.....California Bearing Ratio
CFR.....Code of Federal Regulations
CGS.....Colorado Geological Survey
CKD .....cement of kiln dust stabilized subgrade
CMU.....concrete masonry unit
CTB.....cement treated base course
deg .....degree
EDLA.....equivalent daily load application
e_m.....edge moisture variation distance
EPS .....expanded polystyrene
ESAL .....equivalent single axle loads
f'c .....specified compressive strength of concrete at the age of 28 days
F_a .....seismic site coefficient
FHWA .....Federal Highway Administration
FS .....factor of safety
F_v.....seismic site coefficient
GSA.....global stability analysis
GVW .....gross vehicle weight
IBC .....International Building Code
ICC-ES.....International Code Council Evaluation Services, Inc.
IRC .....International Residential Code
kip .....1,000 pounds-force
km .....kilometer
LTS .....lime treated subgrade
MDD .....maximum dry density
mg/L .....milligrams per liter
MGPEC.....Metropolitan Government Pavement Engineers Council
mm .....millimeter
Mr .....resilient modulus
MSE .....mechanically stabilized earth
mV .....millivolts
NAPA .....National Asphalt Pavement Association
N_{DESIGN} .....design gyrations
OMC.....optimum moisture content

OSHA ..... Occupational Safety and Health Administration
OWTS ..... onsite wastewater treatment system
PCA ..... Portland Cement Association
PCC ..... portland cement concrete
pcf ..... pounds per cubic foot
pci ..... pounds per cubic inch
pH ..... power of hydrogen
psf ..... pounds per square foot
psi ..... pounds per square inch
PT ..... post-tension
S_s ..... mapped spectral accelerations for short periods
UBC ..... Uniform Building Code
USGS ..... United States Geological Survey

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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1. PURPOSE

1.1 GENERAL

Cesare, Inc. (Cesare) performed a geotechnical study for the proposed Chaffee County Public Safety and EMS Building to be located at 200 Steele Drive in Buena Vista, Colorado. The study was made to characterize existing subsurface conditions at the site and assist in determining design criteria for planning, site development, foundation systems, interior floor systems, exterior flatwork, surface and subsurface drainage adjacent to structures, and to present other pertinent geotechnical issues. Information gathered during the field exploration and laboratory testing is summarized in Figures 1 and 2 and Appendices A through C. Cesare's opinions and recommendations presented in this report are based on data generated during this field exploration, laboratory testing, and its experience.

1.2 SCOPE OF SERVICES

The scope of services performed is detailed in Cesare's Proposal Agreement No. SC210212 which was approved on March 3, 2021.

2. SUMMARY OF FINDINGS AND CONCLUSIONS

This section is intended as a summary only and does not include design details. The report should be read in its entirety and utilized for design.

- Subsurface conditions consist of 0.75 to 2 feet of a sandy gravel fill over a sand with gravel, cobbles, and boulders in a silt matrix. No bedrock or groundwater were encountered to the full depth explored of 5.5 feet.
- Spread or pad type footings bearing entirely on the native soil are adequate to support the structure. Slabs-on-grade are appropriate for interior floor systems.
- Good surface drainage should be established and positive drainage away from the structures, pavement, and other site improvements should be provided during construction and maintained throughout the life of the proposed structures. Below grade areas, such as crawlspaces, should be provided with an exterior perimeter subsurface drainage system.

3. SITE CONDITIONS

The site is located at 200 Steele Drive in Buena Vista, Colorado. A vicinity map is shown in Figure 1. The site is currently undeveloped land. The property is about 2 acres in size. The site is bound by Steele Drive to the south, an entry roadway for ACA Products to the east, and a storage yard for ACA Products to the north and west. Topography of the site is flat with a grade change of about 4 feet to the southeast. Vegetation onsite consists of sparse grass and cacti. No bodies of water or bedrock outcrops were observed onsite.

4. PROPOSED CONSTRUCTION

The proposed structure will encompass about 10,800 square feet. It will be a two stories and slab-on-grade floors, with no basement. It will house a garage, warehouse, and office space. Cesare assumes the structure will be serviced by offsite wastewater services.

5. GEOLOGIC CONDITIONS

5.1 SURFICIAL DEPOSITS

The "Geologic Map of the Buena Vista West Quadrangle, Chaffee County, Colorado", prepared for the CGS by McCalpin, et al., dated 2005, indicates that surficial deposits onsite consist of:

- Glacial outwash.

6. FIELD EXPLORATION

Subsurface conditions were explored on April 28, 2021 by observing two exploratory pits at locations indicated in Figure 2. Exploratory pits were excavated 5 to 5.5 feet deep. The pits were excavated prior to Cesare's site visit. Graphical logs of the subsurface conditions observed, locations of sampling, and further explanation of the exploration performed are in Appendix A.

7. LABORATORY TESTING

Cesare personnel returned samples obtained during field exploration to its laboratory where professional staff visually classified them and assigned testing to selected samples to evaluate pertinent engineering properties. Laboratory tests performed are listed in Table 7.1. Further discussion of laboratory testing and the laboratory test results are in Appendix B.

TABLE 7.1. Laboratory Testing Performed

Laboratory Test	To Evaluate
Grain size analysis	Grain size distribution for classification purposes.
Atterberg limits	Soil plasticity for classification purposes.
Water soluble sulfate content	Potential corrosivity of the soil on cementitious material.

8. SUBSURFACE CONDITIONS

The exploratory pits encountered:

- 0.75 to 2 feet of a gravelly sand fill with cobbles in a silt matrix to depths of 0.75 to 2 feet.
- soil consisting of a sand with gravel, cobbles, and boulders in a silty matrix to the remaining depth explored of 5 to 5.5 feet. The boulders were up 21 inches in dimension.
- no bedrock.
- no groundwater at the time of observations.

The subsurface conditions encountered in Cesare's borings are reasonably consistent with those described in Section **5. GEOLOGIC CONDITIONS**. These observations represent conditions at the time of field exploration and may not be indicative of other times or other locations.

Groundwater can be influenced by variations in seasons, weather, precipitation, drainage, vegetation, landscaping, irrigation, leakage of water and/or wastewater systems, etc., both onsite and offsite. Discontinuous zones of perched water may develop within the overburden material, especially during spring after thawing of frozen subgrade material.

Photo 1. View of conditions encountered in Exploratory Pit EP-1.

Photo 2. View of conditions encountered in Exploratory Pit EP-1.

9. GEOLOGIC HAZARDS

The following subsections present a cursory geologic hazards assessment.

9.1 RADON

The U.S. Environmental Protection Agency map of radon zones indicates that virtually all of western Colorado, including Chaffee County, is in Zone 1 (www.epa.gov/radon/zonemap.html). Although there is no known safe level of radon, Zone 1 is the zone of highest risk for exposure to radon gas

(i.e., greater than 4 picoCuries per Liter (pCi/L)). The Colorado Geological Survey (CGS) published a report that related geologic setting and building construction with radon levels (CGS 1991 Open-File Report 91-4). Residences with basements had higher levels of radon than residences built on grade on the same geologic material. The CGS is careful to state that radon potential can vary considerably within the same geologic unit due to the nonuniform distribution of uranium, secondary leaching, and the accumulation of uranium and other radioactive elements into other strata.

Based on levels of radon recorded in residences in the region and the presence of rock types that are known to produce radon, it is reasonable to assume that radon emission into buildings is occurring in the Buena Vista area. The EPA, the Colorado Department of Public Health and Environment (CDPHE) Radiation Management Division, and the National Association of Home Builders (NAHB) recommend that all new residences constructed in Zone 1 should include radon resistant features. These organizations also recommend that after the building is constructed, radon should be measured and if the results are greater than 4 pCi/L, the system should be upgraded from passive to active (usually by installing a fan). In the EPA publication, Building Radon Out: A Step-by-Step Guide on How to Build Radon-Resistant Homes (USEPA Office of Air and Radiation EPA/402-K-01-002, April 2001), three practical and inexpensive alternatives for passive, sub-slab depressurization systems are presented; gravel with vents, perforated pipes, or soil gas collection mats. Recommendations for passive and active design and construction techniques for reducing radon gas can be found on the EPA radon website www.epa.gov/radon or the CDPHE radon website www.cdphe.state.co.us/hm/rad/radon.12. geotechnical Considerations

10. GEOTECHNICAL CONSIDERATIONS

10.1 EXISITING FILL

Fill encountered beneath foundations and/or slabs-on-grade should be removed and replaced as structural fill in accordance with Section **16. STRUCTURAL FILL/BACKFILL SOIL**.

11. FOUNDATION RECOMMENDATIONS

11.1 SPREAD FOOTINGS

Structures may be founded on conventional spread footings or pad type footings bearing entirely on the natural, undisturbed soil below frost depth and below any existing manmade fill in accordance with the following design recommendations:

a) A frost depth of 24 inches should be assumed for this area (Chaffee County Exhibit M to Ordinance 2018-02).
b) The footings should be designed for a maximum allowable soil bearing pressure of 3,500 psf based on dead load plus full live load.
c) Continuous footings should have a minimum width of 16 inches and isolated pad type footings should have a minimum dimension of 18 inches.
d) Using the soil pressure previously recommended, Cesare estimates the maximum settlement for the structure will be on the order of 1 inch, with differential settlement potentially on the order of 0.5 inches. Footings should be proportioned as much as practicable to reduce differential settlement.
e) Steel reinforcement for continuous concrete foundation walls should be designed to span localized settlements over 10 feet.

f) All soft or loose soil beneath footing areas should be redensified in place, or removed and replaced with properly compacted structural fill, suitable flow fill, or concrete prior to placement of footing concrete.
g) Particles larger than 12 inches in dimension should be removed from exposed footing subgrade.
h) Removal of cobbles and/or boulders from the soil at the foundation elevation can result in depressions, which can be backfilled with compacted onsite soil or concrete.
i) Cesare should observe all footing excavations prior to placement of concrete to determine if bearing conditions are consistent with those assumed in its recommendations.

12. LATERAL EARTH PRESSURES

12.1 FOUNDATION WALLS

Lateral pressures on walls depend on the type of wall, hydrostatic pressure behind the wall, type of backfill material, and allowable wall movements. Cesare recommends drain systems be constructed behind walls to reduce the potential for hydrostatic pressures to develop. Where anticipated/permissible wall movements are greater than 0.5% of the wall height, lateral earth pressures can be estimated for an "active" condition. Where anticipated wall movement is less than approximately 0.5% of the wall height or wall movement is constrained, lateral earth pressures should be estimated for an "at rest" condition. Recommended lateral earth pressures for onsite material are provided in Table 12.1.

The recommended values for lateral earth pressures provided in Table 12.1 are given in terms of an equivalent unit weight. The equivalent unit weight multiplied by the depth below the top of the ground surface is the horizontal pressure against the wall at that depth. The resulting pressure distribution is a triangular shape. These soil pressures are for horizontal backfill with no surcharge loading and no hydrostatic pressures. If these criteria cannot be met, Cesare should be contacted for additional criteria.

The unfactored or ultimate coefficients of sliding resistance between concrete and bearing soil are in Table 12.1.

TABLE 12.1. Lateral Earth Pressures and Coefficients of Sliding Resistance for Onsite Material

Backfill Material Type	Equivalent Unit Weight (pcf)			Coefficient of Sliding Resistance
	Active	At Rest	Passive	
Onsite 3 inch minus material	40	55	300	0.7

13. INTERIOR FLOORS

If the existing fill is not removed and recompacted as recommended herein, there is a risk for slab movement to occur. Movement can result in damage to the slab, as well as items supported on the slab or partially on the slab and partially on foundation walls. Damage can consist of cracking, vertical offsets, horizontal separation, tilting, or racking, etc.

If the owner chooses to construct a slab without removal of existing fill, at a minimum, the slab-on-grade shall be properly jointed and separated from bearing members and utilities. In addition, the exposed slab subgrade soil should be proof rolled and any soft areas redensified or stabilized with structurally controlled fill.

13.1 SLAB-ON-GRADE CONSTRUCTION DETAILS

Slabs-on-grade cracking can occur because of compressing the supporting soil but also as a result of concrete curing stresses. If slab-on-grade floors are chosen, Cesare recommends that design and construction of all interior slab-on-grade floors incorporate the following considerations and precautions. These details will not reduce the amount of movement but are intended to reduce potential damage from settlement of the supporting subgrade take place. The ACI Committee 302, "Guide for Concrete Floor and Slab Construction (ACI 302.R-96)", should be consulted for methods/techniques to reduce the occurrence of concrete shrinkage cracks and other potential issues associated with concrete finishing and curing.

a) A vapor barrier is recommended beneath concrete slabs-on-grade that will support equipment sensitive to moisture or will be covered with wood, tile, carpet, linoleum, or other moisture sensitive or impervious coverings. Location of the vapor barrier should be in accordance with recommendations provided by ACI 302.2R-06, "Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials". Further discussion of vapor barriers is in Appendix C.
b) Plumbing beneath slabs should be thoroughly pressure tested during construction for leaks prior to slab placement.
c) Backfill in the utility trenches beneath slabs should be compacted as specified in Section **16. STRUCTURAL FILL/BACKFILL SOIL.**
d) Plumbing and utilities that pass through the slab should be isolated from the slabs.
e) Provide frequent control joints in the slab in accordance with ACI 302.1R-15.
f) Use of load transfer devices at construction and contraction joints is recommended when positive load transfer is required (See ACI 302.1R).

14. EXTERIOR FLATWORK

Flatwork supported on foundation wall backfill may settle and crack if the backfill is not properly moisture conditioned and compacted.

Exterior flatwork should be isolated from the structures. Exterior flatwork should be expected to move, although measures can be incorporated into construction to limit the movement or effects of the movement. Cesare recommends flatwork not be doweled into structure foundations, but rather supported on a haunch to limit settlement. The haunch should extend the full length of the slab.

Exterior flatwork, such as driveways and sidewalks, is normally constructed as slabs-on-grade. Porches and patios are increasingly constructed as structurally supported slabs, which in Cesare's opinion, is the most positive means of keeping slabs from moving and adversely affecting the operation of doors or means of egress. Cesare recommends that landings and slabs at egress doors, as well as porches and patios, be constructed as structurally supported elements if potential movement cannot be tolerated.

Simple decks that are not integral to the structure and can tolerate foundation movement can be constructed with less substantial foundations. A short pier or footing bottomed below frost depth can be used if movement is acceptable and if acceptable by local building requirements. Use of deeper foundation elements can reduce potential movement. Footings or short piers should not be underlain by wall backfill, due to risk of settlement. Inner edges of decks may be constructed on haunches and detailed such that movement of the deck foundations will not cause distress to the structure.

14.1 OVERHANGING ROOFS

Porches, patios, or decks with overhanging roofs that are integral to the structure, such that foundation movement cannot be tolerated, should be constructed with the same foundation type as the structure.

15. EXCAVATIONS

Conventional earthmoving equipment should be adequate to excavate the onsite soil. Boulders will be encountered. All excavations should be properly sloped and/or braced, and local and federal safety codes should be observed. Slopes and other areas void of vegetation should be protected against erosion. If temporary shoring is required, a contractor specializing in design and construction of shoring should be contacted.

It is the contractor's responsibility to provide safe working conditions and comply with OSHA Standards-Excavations, 29 CFR Part 1926. The following guidelines are provided for planning purposes. Sloping and shoring requirements must be evaluated at the time of construction by the contractor's competent person as defined by OSHA. OSHA classifications for various material types and the steepest allowable slope configuration corresponding to those classifications are shown in Table 15.1.

TABLE 15.1. Allowable Slope Configuration for Onsite Material

Material Type	OSHA Classification	Steepest Allowable Slope Configuration*
Gravelly sands	Type C	1-1/2:1

* Units horizontal to units vertical. The values shown apply to excavation less than 20 feet in height. Conditions can change and evaluation is the contractor's responsibility.

The classifications and slope configurations in Table 15.1 assume that excavations are above the groundwater table, there is no standing water in the excavations, and there is no seepage from the slope into the excavations, unless otherwise specified. The classifications and slope configurations in Table 15.1 assume that the material in the excavations is not fractured, adversely bedded, jointed, nor left open to desiccate, crack, or slough, and are protected from surface runoff. There are other considerations regarding allowable slope configurations that the contractor is responsible for, including proximity of equipment, stockpiles, and other surcharge loads to the excavation. The contractor's competent person is responsible for all decisions regarding slope configuration and safety conditions for excavations.

Excavations should not undermine existing foundation systems of structures or infrastructure unless they are adequately protected. At a minimum, new excavations should not intersect a line drawn on a 34 degree angle down and away from the bottom edge of the existing foundation systems or

bottom edge of infrastructure. If this condition cannot be met, shoring or staged excavations may be required. If shoring is required, a condition survey of the adjacent structures is recommended before construction starts and upon completion of construction. In Cesare's experience, condition surveys include, but may not be limited to, photographs of any distress to adjacent structures.

Permanent slopes should be no steeper than 2:1 and should be revegetated or otherwise protected from erosion.

16. STRUCTURAL FILL/BACKFILL SOIL

Where fill/backfill soil is necessary, the suitable onsite inorganic soil may be used below, around, and above the structure. At this site, unsuitable material is defined as topsoil, organics, trash, ash, frozen material, hard lumps, and clods, and particles larger than 3 inches. Existing onsite fill material can be reused for structural fill/backfill, provided it is free of unsuitable material. If unsuitable material is encountered in the existing fill, it cannot be reused as fill/backfill. Recommendations for fill/backfill placement are:

a) Fill/backfill material should be placed in loose lifts and compacted in accordance with Table 16.1
b) Maximum loose lift thickness shall be 12 inches depending on the type of equipment used to apply compactive effort and shall be reduced if the specified compaction cannot be obtained with the equipment used.
c) Fill/backfill should not be placed if material is frozen or if the surface upon which fill/backfill is to be placed is frozen.
d) Fill/backfill material should be placed and spread in horizontal lifts of uniform thickness in a manner that avoids segregation.
e) Placement surface should be kept free of standing water, debris, and unsuitable material during placement and compaction of fill/backfill material.
f) Fill/backfill maximum allowable particle size is 3 inches. Do not incorporate oversize material in the fill/backfill that is incapable of being broken down by the equipment and methods being employed to process and compact the fill/backfill. Process and compact material in the lift, as necessary, to produce the specified fill/backfill characteristics. If oversize particles remain in the lift after processing and compacting, remove oversize material to produce a fill/backfill within specified requirements.

TABLE 16.1. Compaction Specifications

Fill Location	Material Type (General)	AASHTO Classification*	Moisture Content (%)	Relative Compaction (%)	Compaction Standard
Structural fill (includes all overlot grading)	Granular material that is clean to silty	A-1, A-2-4, A-2-5, A-3, A-4, A-5	±3% of OMC	≥95%**	Standard Proctor (ASTM D698)
Fill in nonstructural areas (e.g., landscaping)	Granular material that is clean to silty	A-1, A-2-4, A-2-5, A-3, A-4, A-5	NA	≥90%**	Standard Proctor (ASTM D698)

*Material not meeting the AASHTO classification indicated should not be used as structural fill.

** If fill thickness greater than 15 feet is planned, additional requirements may apply.

16.1 IMPORT FILL

Material imported for structural fill should be tested and approved for use onsite by the project geotechnical engineer prior to hauling to the site. Proctor and classification tests should be conducted to determine if the fill meets required specifications. Fill material should be well graded, meeting the specifications in Table 16.2.

TABLE 16.2. Import Fill Specifications

Soil Parameter	Specification
Maximum particle size	3 inches
Percent finer than No. 200 sieve	10% to 20%
Liquid limit	30% maximum
Plasticity index	15% maximum

17. SUBSURFACE DRAINAGE

Groundwater was not encountered during this study. Since the structure has no basement, crawlspace, or other below grade space, a subsurface drain is not considered necessary for this structure. If below grade construction, such as a crawlspace or basement, is considered for this structure, Cesare should be notified to review this recommendation.

18. SURFACE DRAINAGE

Good drainage and surface water management is important. Performance of site improvements, such as foundations, floors, hardscape, and pavement, are often adversely affected by failing to establish and/or maintain good site drainage. Grades must be adjusted to provide positive drainage away from the structure and other site improvements during construction and maintained throughout the life of the proposed facility. The following drainage precautions are recommended:

a) The ground surface around the perimeter foundation walls should be sloped to drain away from the structure in all directions. Current building codes require a minimum slope of 6 inches in the first 10 feet (5%) of the structure. At the completion of construction, Cesare recommends a continuous slope away from foundations of 12 inches in the first 10 feet (10%), where site constraints permit. Cesare recommends that concrete and pavement adjacent to structures slope at a rate of at least 2% away from the structure or as otherwise required by ADA criteria. Maximum grades practical should be used for paving and flatwork to prevent areas where water can pond.
b) Joints that occur at locations where paving or flatwork abuts the structure should be properly sealed with flexible sealants and maintained.
c) The ground surface should be sloped so that water will not pond between or adjacent to structures and other site improvements. Curbs, sidewalks, paths, plants, or other improvements should not block, impede, or otherwise disrupt surface runoff. Use of chases and weep holes to promote drainage is encouraged. Landscape edging should be perforated or otherwise constructed in a manner to prevent ponding of surface water, especially in the vicinity of the backfill soil.
d) Drainage swales should be located as far away from the foundation as practicable.
e) If site constraints do not allow for the recommended slopes, the project civil engineer shall provide a method for drainage that is equivalent to the recommendations herein.

Water should not be allowed to pond adjacent to or near foundations, flatwork, or other improvements.

f) Roof downspouts and other water collection systems should discharge onto pavements or extend away from the structure well beyond the limits of the backfill zone using downspout extensions, appropriately sized splash blocks, or other means. Buried downspout extensions are discouraged as they can be difficult to monitor and maintain.
g) Irrigation directly adjacent to the structure is discouraged and should be minimized. Sprinkler lines, zone control boxes, and sprinkler drains shall be located outside the limits of the foundation backfill. Sprinkler systems should be placed so that the spray from the heads, under full pressure, does not fall within 5 feet of the foundation walls.
h) Plants, vegetation, and trees that require moderate to high water usage are discouraged and should not be located within 5 feet of foundation walls.
i) Plantings that are desired within 5 feet of the foundation should be placed in watertight planters/containers.
j) The project civil engineer shall perform measurements to document that positive drainage, as described in this section or as otherwise designed by the project civil engineer, is achieved. Maintenance of surface drainage is imperative subsequent to construction and is the responsibility of the owner and/or tenant.

19. SOIL CHEMICAL TESTING

19.1 SULFATE EXPOSURE

Water soluble sulfate contents of 0.00% were measured on samples collected from Exploratory Pit EP-2 between depths of 0.75 to 5.5 feet. Results are summarized in Appendix B. The PCA publication, *Design and Control of Concrete Mixtures* 2002 and the ACI publication, *Building Code Requirements for Structural Concrete and Commentary* consider this range negligible for water soluble sulfate exposure.

20. GEOTECHNICAL RISK

The concept of risk is an important aspect of any geotechnical study. The primary reason for this is that the analytical methods used by geotechnical engineers are generally empirical and must be tempered by engineering judgment and experience, therefore, the solutions or recommendations presented in any geotechnical study should not be considered risk free, and more importantly, are not a guarantee that the interaction between the soil and the proposed construction will perform as predicted, desired, or intended. The engineering recommendations presented in the preceding sections constitute Cesare's best estimate of those measures that are necessary to help the structures perform in a satisfactory manner based on the information generated during this study, training, and experience in working with these conditions.

21. LIMITATIONS

This document has been prepared as an instrument of service for the exclusive use of Chaffee County for the specific application to the project as discussed herein and has been prepared in accordance with geotechnical engineering practices generally accepted in the state of Colorado at the date of its preparation. No warranties, either expressed or implied, are intended or made. This document should not be assumed to contain information for other parties or other purposes.

The findings of this study are valid as of the date its preparation. Changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of people on this or adjacent properties. Standards of practice evolve in engineering and changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this study may be invalidated wholly or partially by changes outside of Cesare's control, therefore, this study is subject to review and should not be relied upon without such review after a period of 3 years.

In the event that changes, including but not limited to, the nature, type, design, size, elevation, or location of the project or project elements as outlined in this report are made, the conclusions and recommendations contained in this report shall not be considered valid unless Cesare reviews the changes and either confirms or modifies the conclusions of this report in writing.

Cesare should be retained to review final plans that are developed for proposed construction to judge whether the recommendations presented in this report and any addenda have been appropriately interpreted and incorporated in the project plans and specifications as intended.

The exploration locations for this study were selected to obtain a reasonably accurate depiction of underground conditions for design purposes and these locations are often modified based on accessibility and the presence of underground or overhead utility conflicts. Variations from the soil conditions encountered are possible. These variations may necessitate modifications to Cesare's design recommendations, therefore, Cesare should be retained to observe subsurface conditions, once exposed, to evaluate whether they are consistent with the conditions encountered during Cesare's exploration and that the recommendations of this study remain valid. If parties other than Cesare perform these observations and judgements, they must accept responsibility to judge whether the recommendations in this report remain appropriate.

Cesare's scope of services for this report did not include either specifically, or by implication, any environmental assessment of the site or identification of contaminated or hazardous material or conditions. Additionally, none of the services performed in connection with this study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not, of itself, be enough to prevent mold from growing in or on the structures involved.

At a minimum, Cesare should be retained during construction to observe and/or test the following:

- C completed excavations.
- C placement and compaction of fill.
- C proposed import or onsite fill material.

Cesare offers many other construction observations, materials engineering, and testing services and can be contacted to discuss further.

W:\2021\SCB\21.6037.A Chaffee County Public Safety Building\ACAD\Boring Location Map.dwg 5/25/2021 2:27 PM

N

0 3,000' 6,000'

APPROXIMATE SCALE: 1 INCH = 3,000 FEET

BACKGROUND IMAGE FROM GOOGLE EARTH

FIGURE 1
Vicinity Map

PROJECT NO:	21.6037		
PROJECT NAME:	Chaffee County Public Safety Building		
DRAWN BY:	JBE	CHECKED BY:	DRD
DWG DATE:	05.25.21	REV. DATE:	--

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W:\2021\SCB\21.6037.A Chaffee County Public Safety Building\ACAD\Boring Location Map.dwg 5/25/2021 2:28 PM

LEGEND:

EP-1 EXPLORATORY PIT NUMBER AND APPROXIMATE LOCATION

N

0 150' 300'

APPROXIMATE SCALE: 1 INCH = 150 FEET

BACKGROUND IMAGE FROM GOOGLE EARTH

FIGURE 2
Site Plan and Location of Exploratory Pits

PROJECT NO:	21.6037		
PROJECT NAME:	Chaffee County Public Safety Building		
DRAWN BY:	JBE	CHECKED BY:	DRD
DWG DATE:	05.25.21	REV. DATE:	--

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APPENDIX A

Field Exploration

PROJECT NAME	Chaffee County Public Safety Building	EXPLORATORY PIT ID	EP-1	Page 1 of 1
PROJECT NUMBER	21.6037	PIT ELEVATION	7970ft.	
CESARE REP.	D.Duran	PIT LOCATION		
DATE STARTED	4/28/2021	EXCAVATOR COMPANY		
DATE COMPLETED	4/28/2021	TYPE OF EXCAVATOR		
CO STATE PLANE				

WATER LEVEL & CAVE DEPTH (ft)	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	DEPTH (ft)	SAMPLE	NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	LL-PL-PI	FINES (%)	SWELL-CONSOL VOL CHANGE/SURCHARGE PRESSURE (psf)
			FILL, SAND, gravel, cobbles in a silt matrix, poorly graded, slightly moist, brown (SP-SM; A-1-b).		0.0				NV-NP-NP	8	
		7968		2							
			SAND, gravel, cobbles and boulders in a silt matrix, boulders up to 21 inches in dimension, poorly graded, slightly moist, light brown to brown (SP-SM; A-1-a).		2.5						
		7965		5							
			Pit excavated to 5 feet		5.0						

LEGEND

WATER LEVEL AT TIME OF EXCAVATION

DEPTH OF REFUSAL

BULK SAMPLE

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PROJECT NAME	Chaffee County Public Safety Building	EXPLORATORY PIT ID	EP-2
PROJECT NUMBER	21.6037	PIT ELEVATION	7969ft.
CESARE REP.	D.Duran	PIT LOCATION	
DATE STARTED	4/28/2021	EXCAVATOR COMPANY	
DATE COMPLETED	4/28/2021	TYPE OF EXCAVATOR	
CO STATE PLANE			

WATER LEVEL & CAVE DEPTH (ft)	GRAPHIC LOG	ELEVATION (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	DEPTH (ft)	SAMPLE	NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	LL-PL-PI	FINES (%)	SWELL-CONSOL VOL CHANGE/SURCHARGE PRESSURE (psf)
			FILL, SAND, gravel, cobbles in a silt matrix, poorly graded, slightly moist, brown (SP-SM; A-1-b).		0.0						
		7968.25		0.75							
			SAND, gravel, cobbles and boulders in a silt matrix, boulders up to 18 inches in dimension, poorly graded, slightly moist, light brown to brown (SP-SM; A-1-a).						NV-NP-NP	7	
					2.5						
					5.0						
		7963.5		5.5							
			Pit excavated to 5.5 feet								

LEGEND

WATER LEVEL AT TIME OF EXCAVATION

DEPTH OF REFUSAL

BULK SAMPLE

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APPENDIX B

Laboratory Testing

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SUMMARY OF LABORATORY TEST RESULTS
Chaffee County Public Safety and EMS Building
Project No. 21.6037

Sample Location		Water Soluble Sulfates (%)	Gradation			Atterberg Limits		Material Type
Pit	Depth (feet)		Gravel (%)	Sand (%)	Silt/ Clay (%)	Liquid Limit (%)	Plasticity Index (%)	
EP-1	0 to 2		16	76	8	NV	NP	(SP-SM) Poorly graded sand with silt and gravel; A-1-b
EP-2	0.75 to 5.5	0.00	41	52	7	NV	NP	(SP-SM) Poorly graded sand with silt and gravel; A-1-a

NP = non plastic
NV = no value

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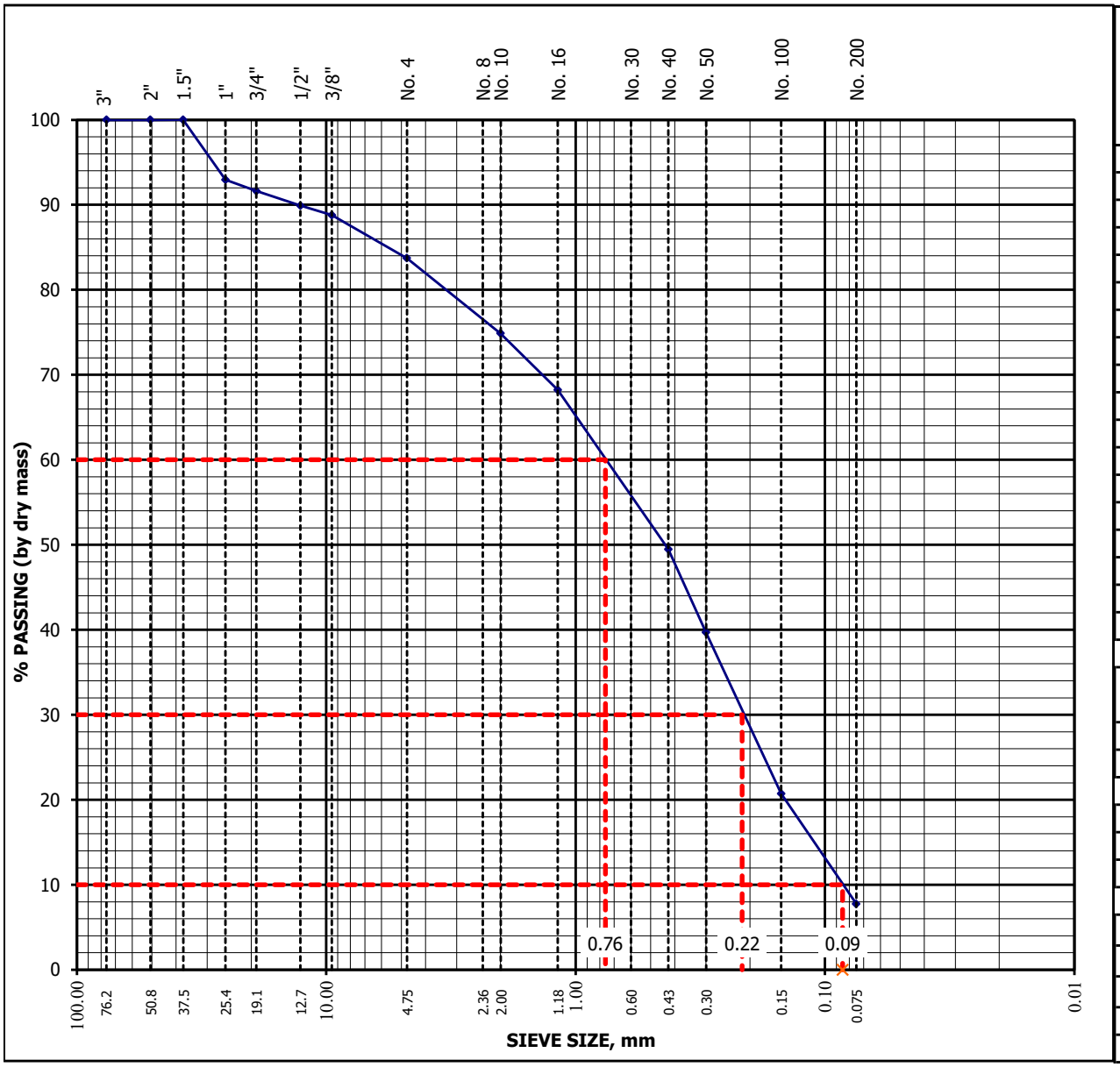
GRADATION PLOT - SOIL & AGGREGATE

Project Number:	21.6037	Date:	26-May-21
Project Name:	Chaffee County Public Safety and EMS Building	Technician:	D. Duran
Lab ID Number:	SC212094	Reviewer:	G. Hoyos
Sample Location:	EP-1 at 0' to 2'		
Visual Description:	SAND, with silt, and gravel, brown		

AASHTO M 145 Classification: **A-1-b** **Group Index:** **0**

Unified Soil Classification System (ASTM D 2487): **(SP-SM) Poorly graded sand with silt and gravel**



Sieve Size	% Passing
3"	
2"	
1.5"	100
1"	93
3/4"	92
1/2"	90
3/8"	89
#4	84
#8	
#10	75
#16	68
#30	
#40	49
#50	40
#100	21
#200	7.7

Moisture (M) & Density (D)	
M, %:	0.6
D, pcf:	

LL	NV
PL	NP
PI	NP

D_{60}	0.76
D_{30}	0.22
D_{10}	0.09
Cu	**8.94**
Cc	**0.72**

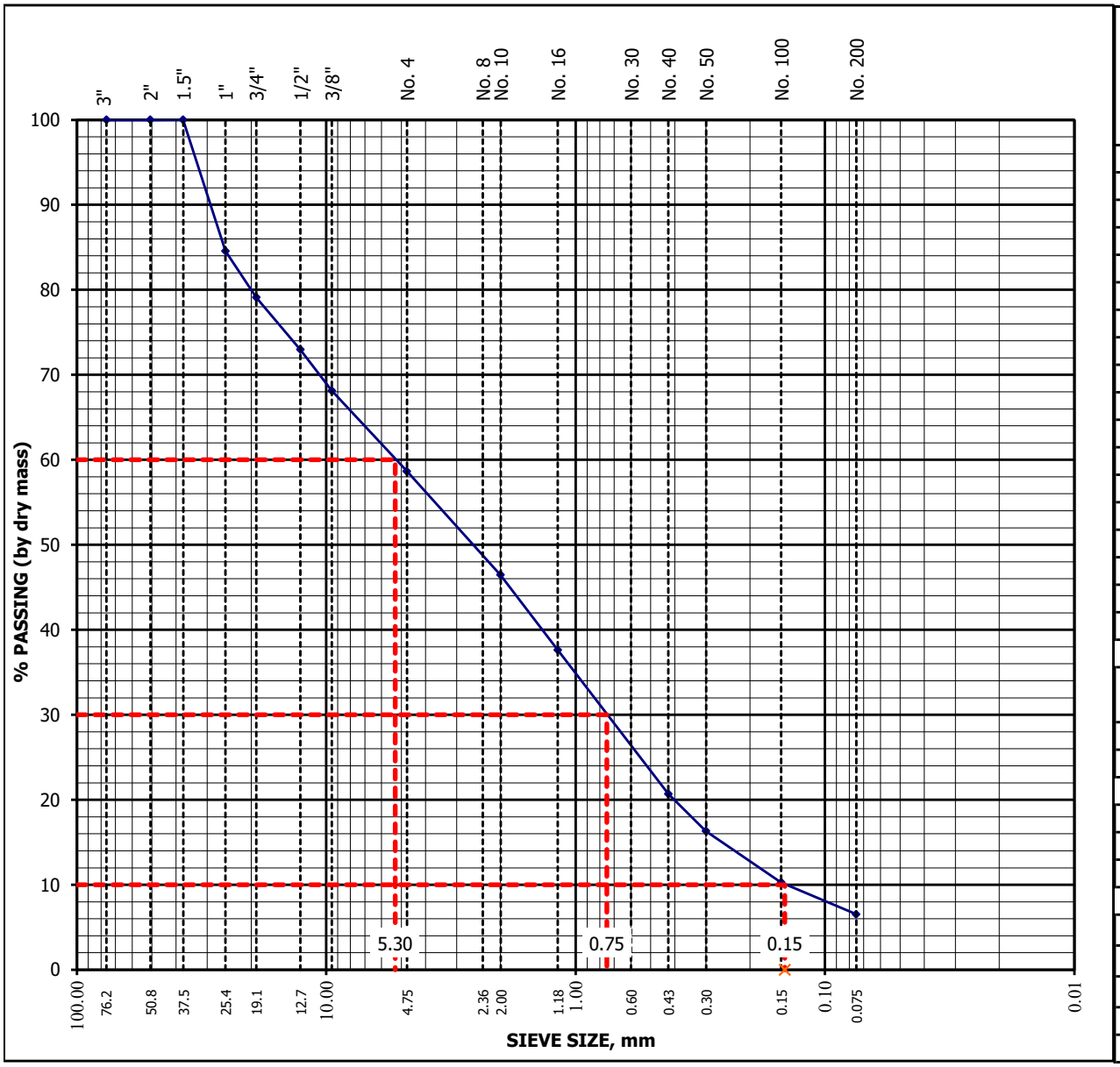
CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

GRADATION PLOT - SOIL & AGGREGATE

Project Number:	21.6037	Date:	31-May-21
Project Name:	Chaffee County Public Safety and EMS Building	Technician:	D. Duran/M. Donaldson
Lab ID Number:	SC212095	Reviewer:	G. Hoyos
Sample Location:	EP-2 at 0.75' to 5.5'		
Visual Description:	SAND, with silt, and gravel, brown		

AASHTO M 145 Classification: **A-1-a** **Group Index:** **0**

Unified Soil Classification System (ASTM D 2487): **(SP-SM) Poorly graded sand with silt and gravel**



Sieve Size	% Passing
3"	
2"	
1.5"	100
1"	85
3/4"	79
1/2"	73
3/8"	68
#4	59
#8	
#10	46
#16	38
#30	
#40	21
#50	16
#100	10
#200	6.5

Moisture (M) & Density (D)	
M, %:	0.4
D, pcf:	

LL	NV
PL	NP
PI	NP

D_{60}	5.30
D_{30}	0.75
D_{10}	0.15
Cu	**36.55**
Cc	**0.73**

CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

APPENDIX C

Vapor Barriers

VAPOR BARRIERS

If it is determined that a vapor retarder/barrier is warranted, Cesare recommends that the vapor barrier comply with ASTM E1745, and if moisture sensitive flooring will be utilized, have a permeance below 0.01 perms before and after mandatory conditioning testing. The vapor retarder/barrier should be installed per ASTM E1643 and the design professional should consider project specific requirements in specification verbiage. See the ACI Committee 302, "Guide for Concrete Floor and Slab Construction (ACI 302.R-96)" for additional discussion and guidance regarding the use of vapor retarders/barriers beneath floor slabs.

The 2018 IBC, Section 1805.2 Dampproofing states that where hydrostatic pressure will not occur, as determined by Section 18-03.5.4, floors shall be dampproofed in accordance with this section.

Section 1805.2 Floors, states,

> "*Dampproofing materials for floors shall be installed between the floor and the base course required by Section 1805.4.1, except where a separate floor is provided above a concrete slab. Where installed beneath the slab, dampproofing shall consist of not less than 6-mil (0.006 inch; 0.152 mm) polyethylene with joints lapped not less than 6 inches (152 mm), or other approved methods or materials. Where permitted to be installed on top of the slab, damp proofing shall consist of mopped-on bitumen, not less than 4-mil; (0.004 inch; 0.102 mm) polyethylene, or other approved methods or materials. Joints in the membrane shall be lapped and sealed in accordance with the manufacturer's installation instructions*".

Section 1805.4.1 Floor Base Course, states,

> "*Floors of basements, except as provided for in Section 1805.1.1 shall be placed over a floor base course not less than 4 inches (102 mm) in thickness that consists of gravel or crushed stone containing no more than 10 percent of material that passes through a No. 4 (4.75mm) sieve.*"

Cesare recommends that the architect be consulted regarding the need for a vapor retarder or vapor barrier. Decision to include a vapor retarder/barrier beneath the slab is dependent on the sensitivity of floor coverings and building use to moisture.

APPENDIX B: RESOURCE MAPS

Appendix B | RESOURCE MAPS

USDA Soil Survey

Soil Map—Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties

Map Scale: 1:961 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 45 90 180 270

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 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 15, Sep 7, 2022

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

Date(s) aerial images were photographed: Oct 29, 2021—Oct 30, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DoD	Dominson gravelly sandy loam, 1 to 9 percent slopes	2.4	100.0%
Totals for Area of Interest		**2.4**	**100.0%**

Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties

DoD—Dominson gravelly sandy loam, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: jq8d
Elevation: 7,200 to 8,800 feet
Mean annual precipitation: 11 to 16 inches
Frost-free period: 75 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Dominson and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dominson

Setting

Landform: Fan terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or moderately coarse-textured gravelly outwash

Typical profile

H1 - 0 to 11 inches: gravelly sandy loam
H2 - 11 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R048AY316CO - Dry Mountain Outwash
Hydric soil rating: No

Minor Components

St. elmo

Percent of map unit:
Hydric soil rating: No

Data Source Information

Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 15, Sep 7, 2022


106° 7' 52" W
106° 7' 46" W
401830
401850
401870
401890
401910
401930
401950
38° 49' 36" N
38° 49' 30" N
4298170
4298150
4298130
4298110
4298090
4298070
4298050
4298030
4298010
4297990
401810
Map Scale: 1:919 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 10 20 40 60
Feet
0 40 80 160 240
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

Very limited

Somewhat limited

Not limited

Not rated or not available

Soil Rating Lines

Very limited

Somewhat limited

Not limited

Not rated or not available

Soil Rating Points

Very limited

Somewhat limited

Not limited

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 15, Sep 7, 2022

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

Date(s) aerial images were photographed: Oct 29, 2021—Oct 30, 2021

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

Small Commercial Buildings

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
DoD	Dominson gravelly sandy loam, 1 to 9 percent slopes	Somewhat limited	Dominson (100%)	Slope (0.14)	2.3	100.0%
Totals for Area of Interest					**2.3**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Somewhat limited	2.3	100.0%
Totals for Area of Interest	**2.3**	**100.0%**

Description

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification of the soil). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

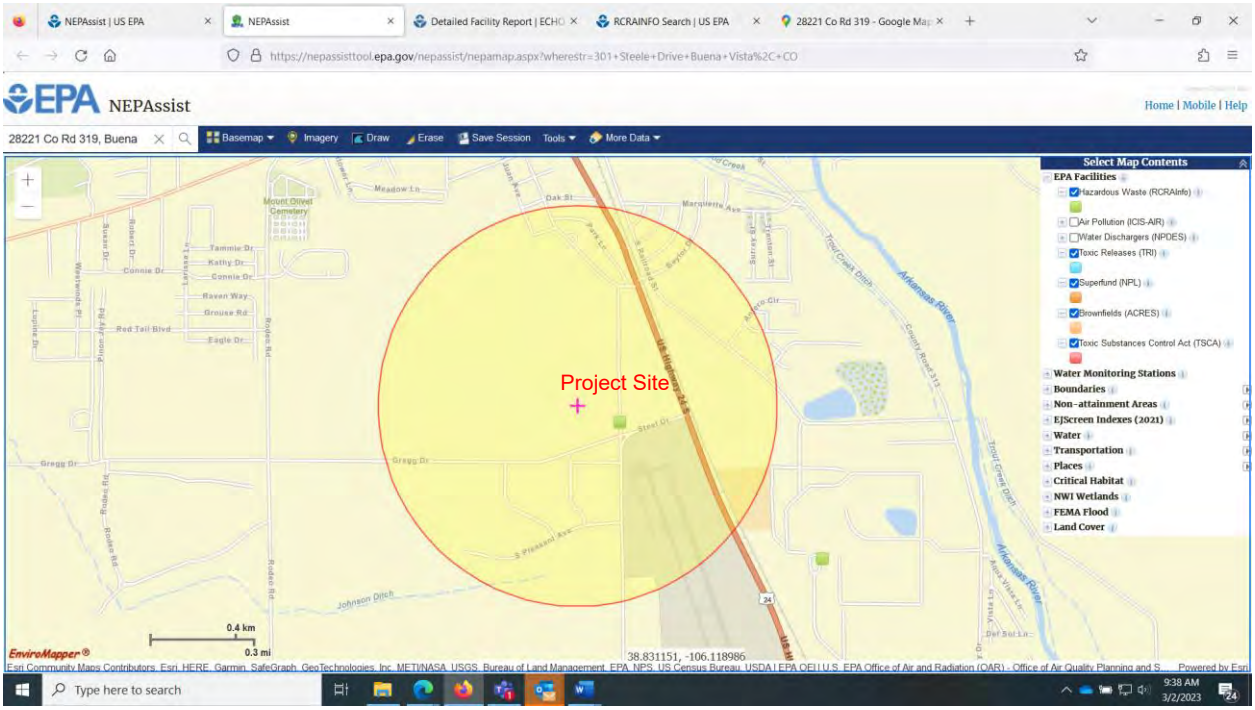
Aggregation Method: Dominant Condition

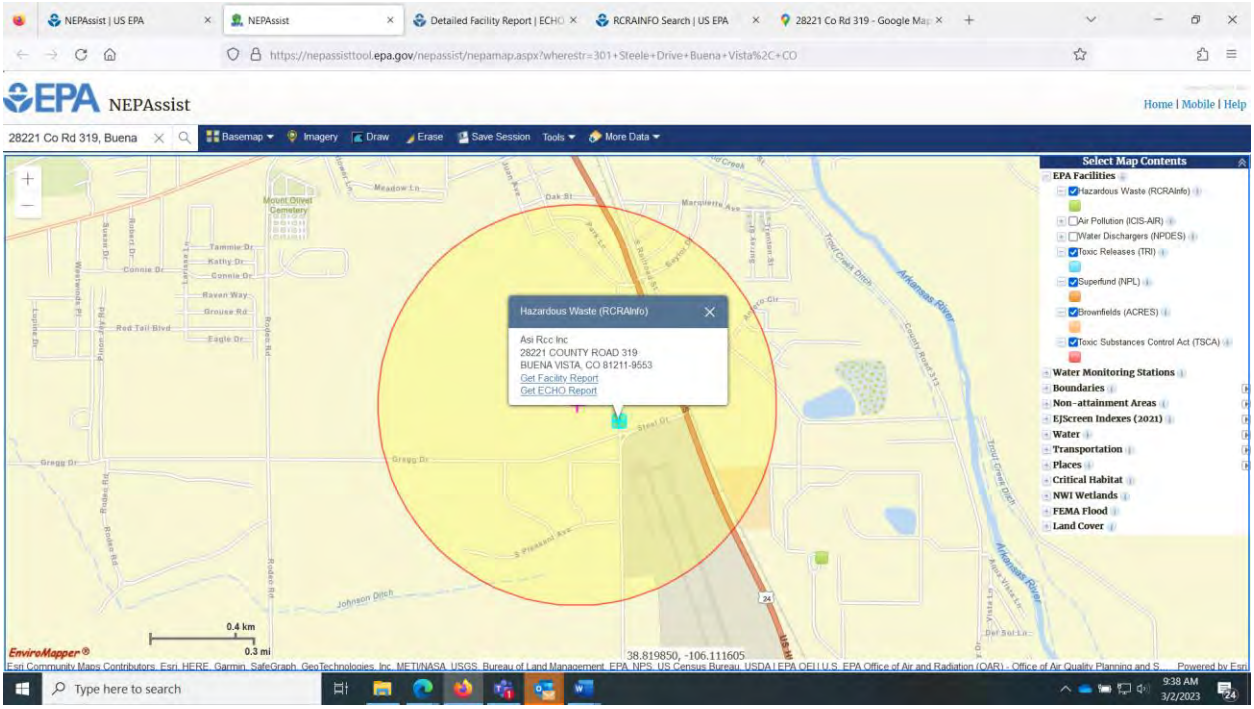
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Hazardous Materials and Toxic Substances

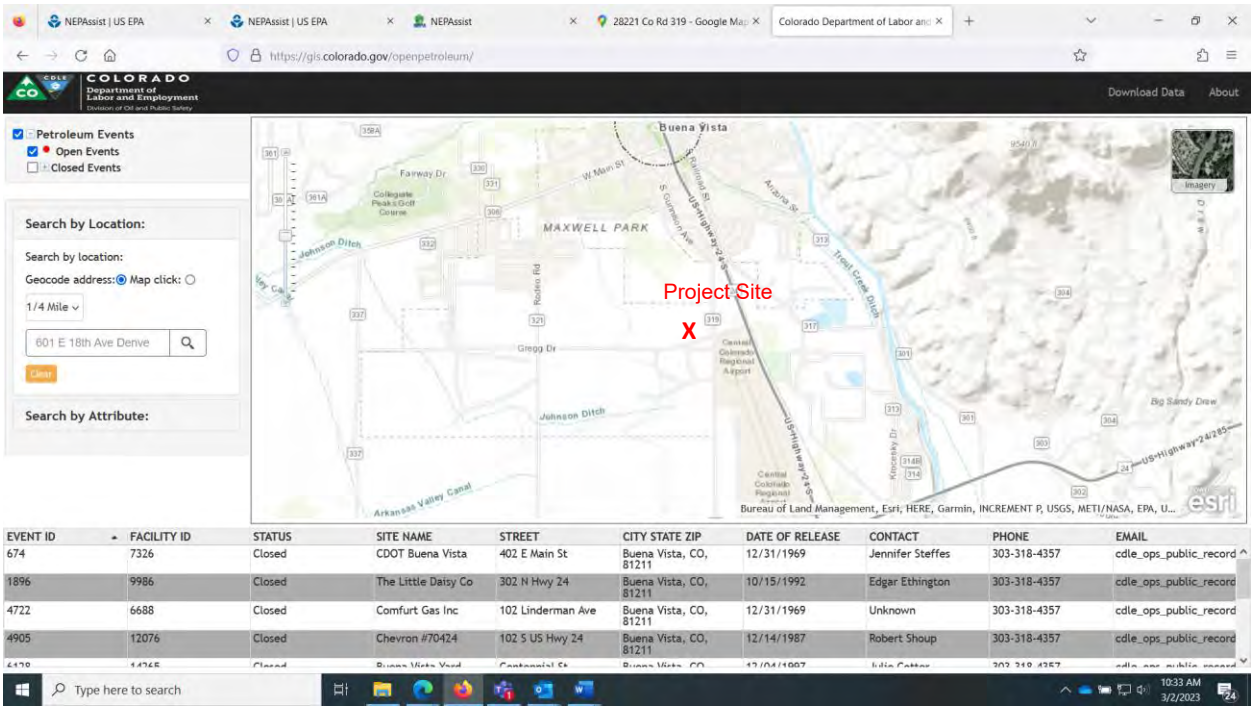
Hazardous Materials and Toxic Substances





USEPA NEPAssist:
https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=28221+Co+Rd+319%2C+Buena+Vista%2C+CO+81211

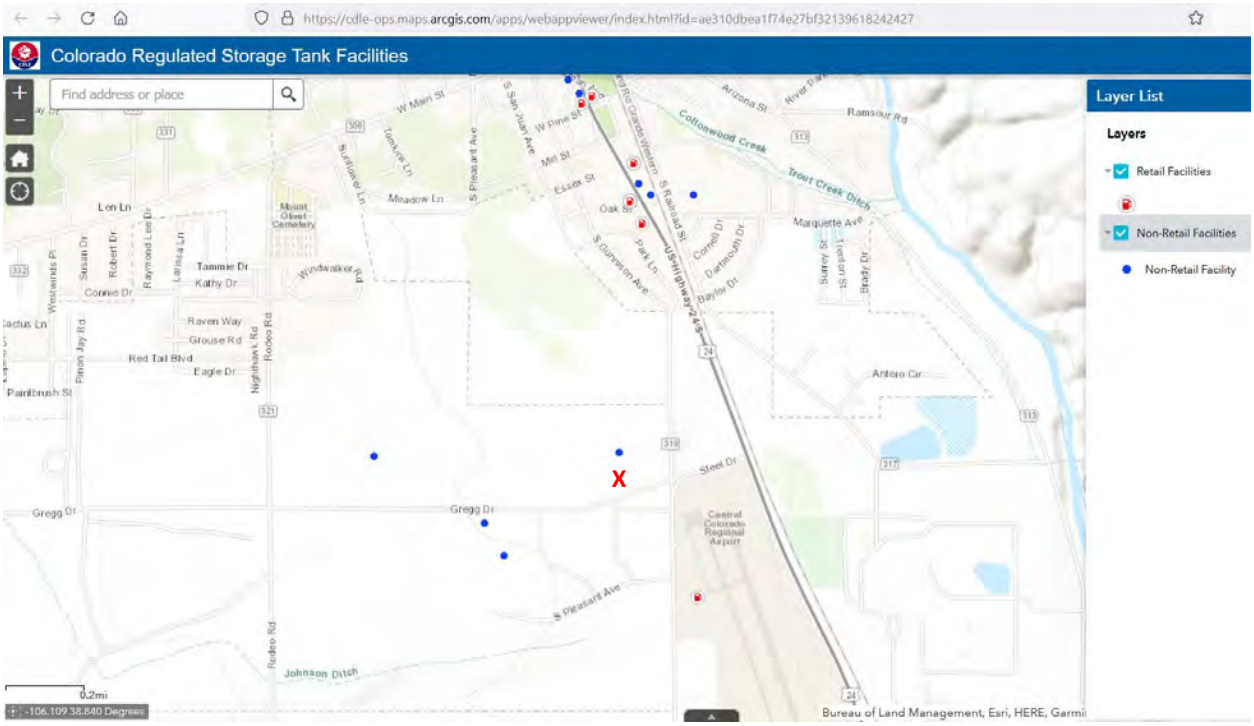
Open Leaking underground storage tanks:

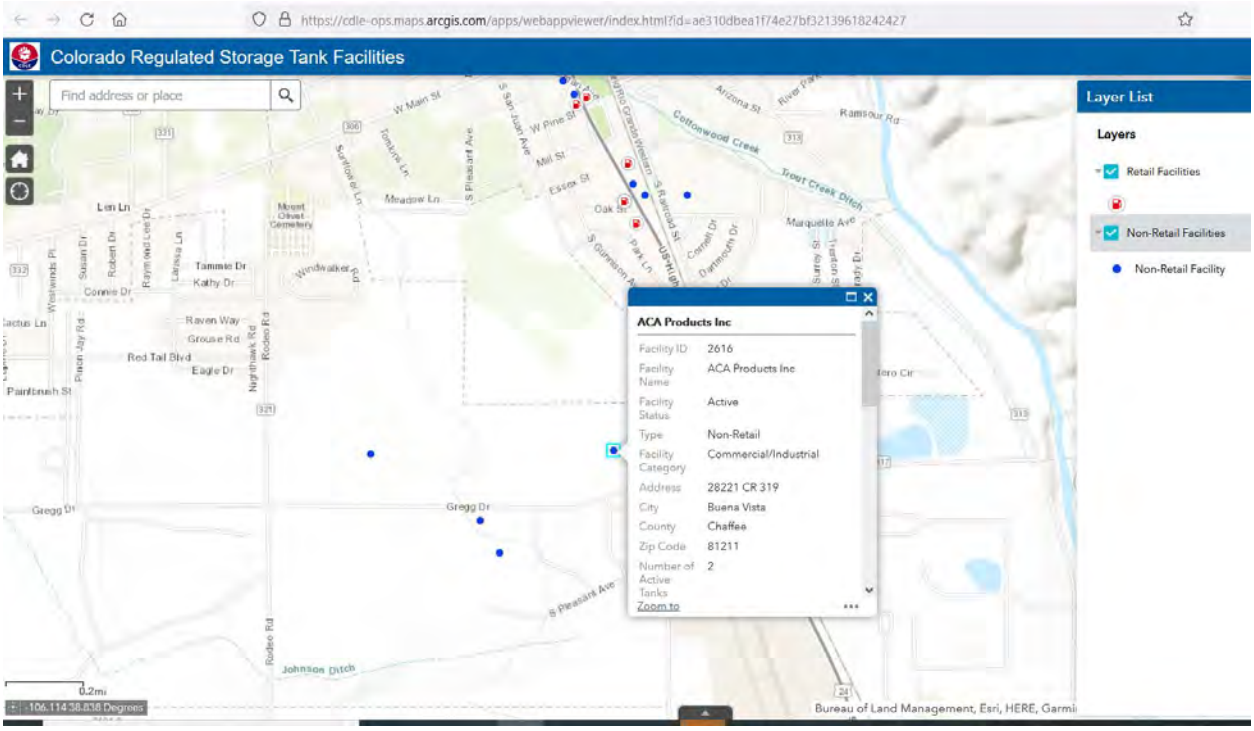


EVENT ID	FACILITY ID	STATUS	SITE NAME	STREET	CITY STATE ZIP	DATE OF RELEASE	CONTACT	PHONE	EMAIL
674	7326	Closed	CDOT Buena Vista	402 E Main St	Buena Vista, CO, 81211	12/31/1969	Jennifer Steffes	303-318-4357	cdle_ops_public_record
1896	9986	Closed	The Little Daisy Co	302 N Hwy 24	Buena Vista, CO, 81211	10/15/1992	Edgar Ethington	303-318-4357	cdle_ops_public_record
4722	6688	Closed	Comfurt Gas Inc	102 Linderman Ave	Buena Vista, CO, 81211	12/31/1969	Unknown	303-318-4357	cdle_ops_public_record
4905	12076	Closed	Chevron #70424	102 S US Hwy 24	Buena Vista, CO, 81211	12/14/1987	Robert Shoup	303-318-4357	cdle_ops_public_record

Colorado Division of Oil and Public Safety: https://gis.colorado.gov/openpetroleum/

Tanks:





https://socgov18.my.site.com/s/facility/a0p3h000004CZy9/2616

Information

Facility ID	2616
Facility Name	ACA Products Inc
Address	28221 CR 319
City	Buena Vista
County	Chaffee
Zip Code	81211
Address Coordinates	38.827135 , -106.130244
Station Brand	
Meter Brand	
Number of Metered Products	0
Number of Bulk FL Meters	0
Number of Bulk LP Meters	0
Monthly Retail Volume	0
Unattended	☐

Facility Owner	ACA Products
Primary Contact	Josh Criswell
Facility Category	Commercial/Industrial
Status	Active
Number of Active Tanks	2
Financial Responsibility	Not Listed
Tribe Owned	☐
Located On Reservation	No

Tanks (6+)

Tank N...	Record ...	Status	Products
TNK-0...	AST	Tempora...	RUL
TNK-0...	AST	Tempora...	DSL
TNK-0...	UST	Perman...	DSL
TNK-0...	UST	Perman...	GSLN
TNK-0...	UST	Perman...	DSL
TNK-0...	UST	Perman...	UNK

View All

Facility Contacts (3)

Facilit...	Contact ...	Owner ...	Role
FCON-...	ACA Pro...	ACA Pro...	Facility ...
FCON-...	ASI RCC...	ASI RCC...	Facility ...
FCON-...	ACA Pro...	ACA Pro...	Operator

View All

Inspections (6+)

Inspec...	Inspecti...	Record ...	Inspecti...
INS-09...	8/12/20...	Compliа...	AST

Detailed Facility Report

Detailed Facility Report

Facility Summary

ASI RCC INC

28221 COUNTY ROAD 319, BUENA VISTA, CO 81211

FRS (Facility Registry Service) ID: 110007713073
EPA Region: 08
Latitude: 38.826737
Longitude: -106.127866
Locational Data Source: FRS
Industries: Construction of Buildings
Indian Country: N

Enforcement and Compliance Summary

Statute	CAA
Compliance Monitoring Activities (5 years)	--
Date of Last Compliance Monitoring Activity	--
Compliance Status	No Violation Identified
Qtrs in Noncompliance (of 12)	0
Qtrs with Significant Violation	0
Informal Enforcement Actions (5 years)	--
Formal Enforcement Actions (5 years)	--
Penalties from Formal Enforcement Actions (5 years)	--
EPA Cases (5 years)	--
Penalties from EPA Cases (5 years)	--

Statute	RCRA
Compliance Monitoring Activities (5 years)	--
Date of Last Compliance Monitoring Activity	01/19/2012
Compliance Status	No Violation Identified
Qtrs in Noncompliance (of 12)	0
Qtrs with Significant Violation	0
Informal Enforcement Actions (5 years)	--
Formal Enforcement Actions (5 years)	--
Penalties from Formal Enforcement Actions (5 years)	--
EPA Cases (5 years)	--
Penalties from EPA Cases (5 years)	--

Regulatory Information

Clean Air Act (CAA): Permanently Closed Synthetic Minor (CO0000000877700993)

Clean Water Act (CWA): No Information

Resource Conservation and Recovery Act (RCRA): Inactive Other, (COD084031780)

Safe Drinking Water Act (SDWA): No Information

Go To Enforcement/Compliance Details
Known Data Problems

Other Regulatory Reports

Air Emissions Inventory (EIS): No Information

Greenhouse Gas Emissions (eGGRT): No Information

Toxic Releases (TRI): No Information

Compliance and Emissions Data Reporting Interface (CEDRI): No Information

Facility/System Characteristics

Facility/System Characteristics

System	Statute	Identifier	Universe	Status	Areas	Permit Expiration Date	Indian Country	Latitude	Longitude
FRS		110007713073					N	38.826737	-106.127866
ICIS-Air	CAA	CO0000000877700993	Synthetic Minor Emissions	Permanently Closed			N	38.8272	-106.12788
RCRAInfo	RCRA	COD084031780	Other	Inactive ( )			N		

Facility Address

System	Statute	Identifier	Facility Name	Facility Address	Facility County
FRS		110007713073	ASI RCC INC	28221 COUNTY ROAD 319, BUENA VISTA, CO 81211	Chaffee County
ICIS-Air	CAA	CO0000000877700993	ASI RCC INC	28221 COUNTY RD 319, BUENA VISTA, CO 81211	
RCRAInfo	RCRA	COD084031780	ASI-RCC	28221 CNTY RD 319, BUENA VISTA, CO 81211	Chaffee County

Facility SIC (Standard Industrial Classification) Codes

System	Identifier	SIC Code	SIC Description
ICIS-Air	CO0000000877700993	1442	Construction Sand And Gravel

Facility NAICS (North American Industry Classification System) Codes

System	Identifier	NAICS Code	NAICS Description
ICIS-Air	CO0000000877700993	212321	Construction Sand and Gravel Mining
RCRAInfo	COD084031780	23621	Industrial Building Construction

Facility Tribe Information

Reservation Name	Tribe Name	EPA Tribal ID	Distance to Tribe (miles)

No data records returned

Enforcement and Compliance

Compliance Monitoring History

Last 5 Years

Statute	Source ID	System	Activity Type	Compliance Monitoring Type	Lead Agency	Date	Finding (if applicable)

No data records returned

Entries in italics are not counted as EPA official inspections.

Compliance Summary Data

Statute	Source ID	Current SNC (Significant Noncompliance)/HPV (High Priority Violation)	Current As Of	Qtrs with NC (Noncompliance) (of 12)	Data Last Refreshed
CAA	CO0000000877700993	No	02/24/2023	0	02/23/2023
RCRA	COD084031780	No	02/24/2023	0	02/23/2023

Three-Year Compliance History by Quarter

Statute	Program/Pollutant/Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12+
CAA (Source ID: CO0000000877700993)		04/01-06/30/20	07/01-09/30/20	10/01-12/31/20	01/01-03/31/21	04/01-06/30/21	07/01-09/30/21	10/01-12/31/21	01/01-03/31/22	04/01-06/30/22	07/01-09/30/22	10/01-12/31/22	01/01-03/31/23
	Facility-Level Status	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified
	HPV History												
	Violation Type / Agency / Programs / Pollutants												

Statute	Program/Pollutant /Violation Type	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12+
RCRA (Source ID: COD084031780)		04/01-06/30/20	07/01-09/30/20	10/01-12/31/20	01/01-03/31/21	04/01-06/30/21	07/01-09/30/21	10/01-12/31/21	01/01-03/31/22	04/01-06/30/22	07/01-09/30/22	10/01-12/31/22	01/01-03/31/23
	Facility-Level Status	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified	No Violation Identified
	Violation / Agency												

Informal Enforcement Actions

Last 5 Years

Statute	System	Source ID	Type of Action	Lead Agency	Date

No data records returned

Entries in italics are not counted as "informal enforcement actions" in EPA policies pertaining to enforcement response tools.

Formal Enforcement Actions

Last 5 Years

Statute	System	Law/Section	Source ID	Type of Action	Case No.	Lead Agency	Case Name	Issued/Filed Date	Settlements/Actions	Settlement/Action Date	Federal Penalty Assessed	State/Local Penalty Assessed	Penalty Amount Collected	SEP Cost	Comp Action Cost

No data records returned

Environmental Conditions

Watersheds

12-Digit WBD (Watershed Boundary Dataset) HUC (RAD (Reach Address Database))	WBD (Watershed Boundary Dataset) Subwatershed Name (RAD (Reach Address Database))	State Water Body Name (ICIS (Integrated Compliance Information System))	Beach Closures Within Last Year	Beach Closures Within Last Two Years	Pollutants Potentially Related to Impairment	Watershed with ESA (Endangered Species Act)-listed Aquatic Species?

No data records returned

Assessed Waters From Latest State Submission (ATTAINS)

State	Report Cycle	Assessment Unit ID	Assessment Unit Name	Water Condition	Cause Groups Impaired	Drinking Water Use	Aquatic Life	Fish Consumption Use	Recreation Use	Other Use

No data records returned

Air Quality Nonattainment Areas

Pollutant	Within Nonattainment Status Area?	Nonattainment Status Applicable Standard(s)	Within Maintenance Status Area?	Maintenance Status Applicable Standard(s)

No data records returned

Pollutants

Toxics Release Inventory History of Reported Chemicals Released in Pounds per Year at Site

TRI Facility ID	Year	Total Air Emissions	Surface Water Discharges	Off-Site Transfers to POTWs (Publicly Owned Treatment Works)	Underground Injections	Releases to Land	Total On-Site Releases	Total Off-Site Transfers

No data records returned

Toxics Release Inventory Total Releases and Transfers in Pounds by Chemical and Year

Chemical Name

No data records returned

COLORADO - EPA Map of Radon Zones

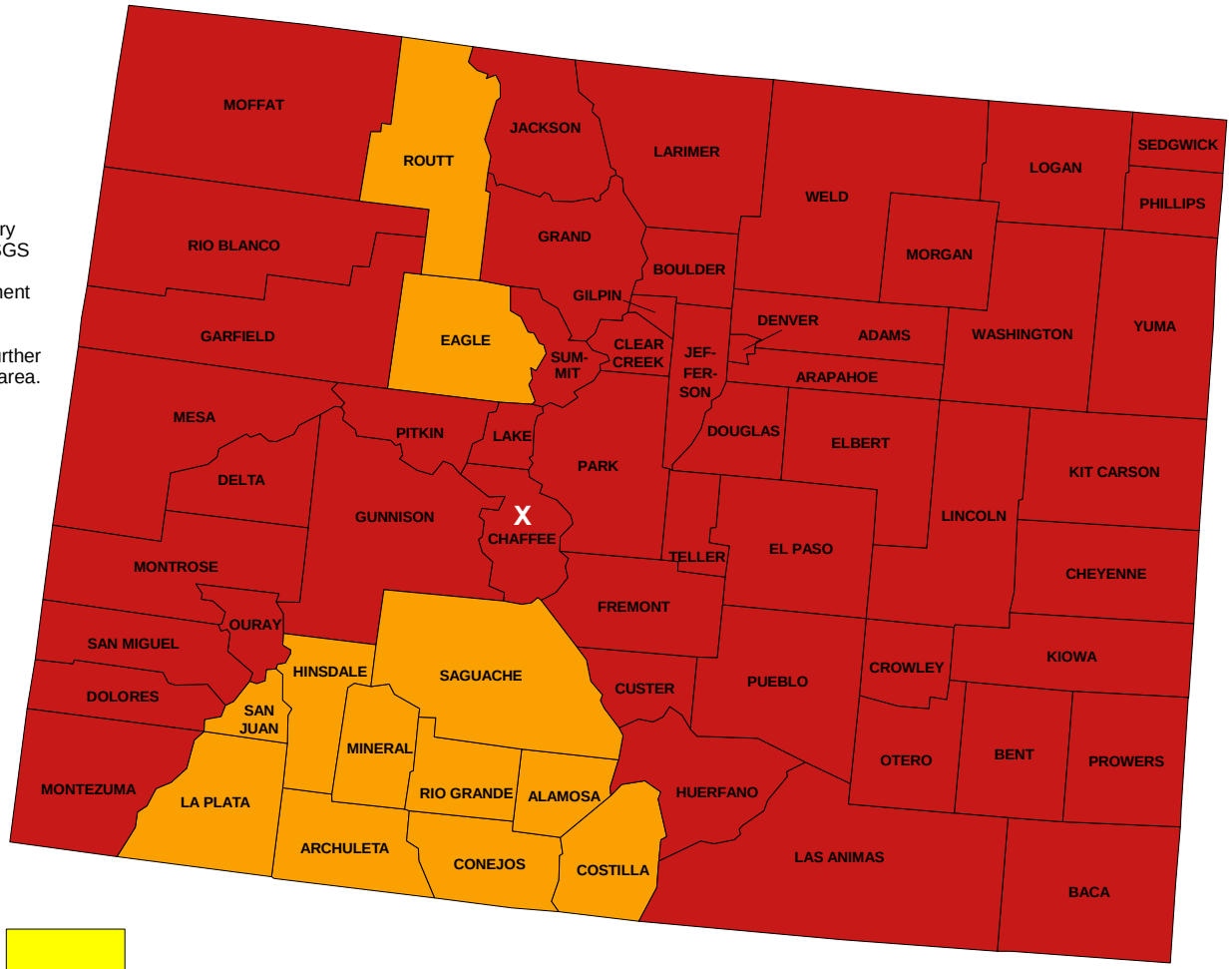
http://www.epa.gov/radon/zonemap.html

The purpose of this map is to assist National, State and local organizations to target their resources and to implement radon-resistant building codes.

This map is not intended to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones.

All homes should be tested, regardless of zone designation.

IMPORTANT: Consult the publication entitled "Preliminary Geologic Radon Potential Assessment of Colorado" (USGS Open-file Report 93-292-H) before using this map. http://energy.cr.usgs.gov/radon/grpinfo.html This document contains information on radon potential variations within counties. EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.



Zone 1 Zone 2 Zone 3

Socioeconomics and Environmental Justice

Community

EJScreen EJ Indexes

Twelve environmental justice (EJ) indexes of EJScreen, EPA's screening tool for EJ concerns. EPA uses these indexes to identify geographic areas that may warrant further consideration or analysis for potential EJ concerns. The index values below are for the Census block group or 1-mile maximum (US or State) in which the facility is located. Note that use of these indexes does not designate an area as an "EJ community" or "EJ facility." EJScreen provides screening level indicators, not a determination of the existence or absence of EJ concerns. For more information, see the EJScreen home page.

Show EJ Indexes calculated based on: Census Block Group - US

Census Block Group EJ Indexes (percentile)	
Particulate Matter 2.5	0
Ozone	66
Diesel Particulate Matter	0
Air Toxics Cancer Risk	0
Air Toxics Respiratory Hazard Index	0
Traffic Proximity	36
Lead Paint	48
Risk Management Plan (RMP) Facility Proximity	0
Hazardous Waste Proximity	1
Superfund Proximity	29
Underground Storage Tanks (UST)	45
Wastewater Discharge	34

Number of EJ Indexes Above 80th Percentile
0

View EJScreen Report (US/regional/state percentiles, 1-mile average)

Demographic Profile of Surrounding Area (1 mile)

This section provides demographic information regarding the community surrounding the facility. ECHO compliance data alone are not sufficient to determine whether violations at a particular facility had negative impacts on public health or the environment. Statistics are based upon the 2010 U.S. Census and 2016 - 2020 American Community Survey (ACS) 5-year Summary and are accurate to the extent that the facility latitude and longitude listed below are correct. EPA's spatial processing methodology considers the overlap between the selected radii and the census blocks (for U.S. Census demographics) and census block groups (for ACS demographics) in determining the demographics surrounding the facility. For more detail about this methodology, see the DFR Data Dictionary.

General Statistics (U.S. Census)	
Total Persons	1,508
Population Density	499/sq.mi.
Housing Units in Area	726

General Statistics (ACS (American Community Survey))	
Total Persons	2,021
Percent People of Color	24%
Households in Area	648
Households on Public Assistance	0
Persons With Low Income	551

Age Breakdown (U.S. Census) - Persons (%)	
Children 5 years and younger	101 (7%)
Minors 17 years and younger	354 (23%)
Adults 18 years and older	1,154 (77%)
Seniors 65 years and older	273 (18%)

Race Breakdown (U.S. Census) - Persons (%)	
White	1,441 (96%)
African-American	7 (0%)
Hispanic-Origin	81 (5%)
Asian/Pacific Islander	4 (0%)

General Statistics (ACS (American Community Survey))	
Percent With Low Income	36%

Geography	
Radius of Selected Area	1 mi.
Center Latitude	38.826737
Center Longitude	-106.127866
Land Area	99%
Water Area	1%

Income Breakdown (ACS (American Community Survey)) - Households (%)	
Less than $15,000	45 (6.94%)
$15,000 - $25,000	0 (0%)
$25,000 - $50,000	205 (31.64%)
$50,000 - $75,000	237 (36.57%)
Greater than $75,000	161 (24.85%)

Race Breakdown (U.S. Census) - Persons (%)	
American Indian	12 (1%)
Other/Multiracial	43 (3%)

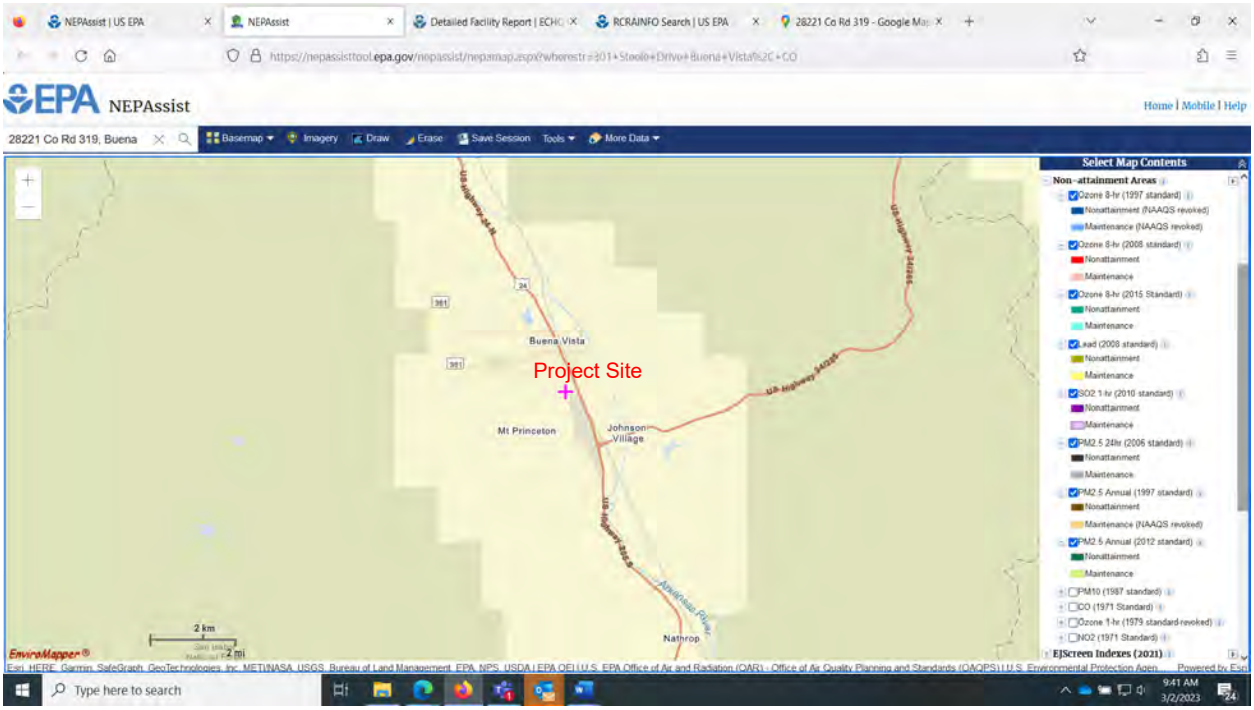
Education Level (Persons 25 & older) (ACS (American Community Survey)) - Persons (%)	
Less than 9th Grade	17 (1.07%)
9th through 12th Grade	78 (4.93%)
High School Diploma	749 (47.35%)
Some College/2-year	306 (19.34%)
B.S./B.A. (Bachelor of Science/Bachelor of Arts) or More	354 (22.38%)

LAST UPDATED ON SEPTEMBER 21, 2022

DATA REFRESH INFORMATION

Air Quality

Air Quality



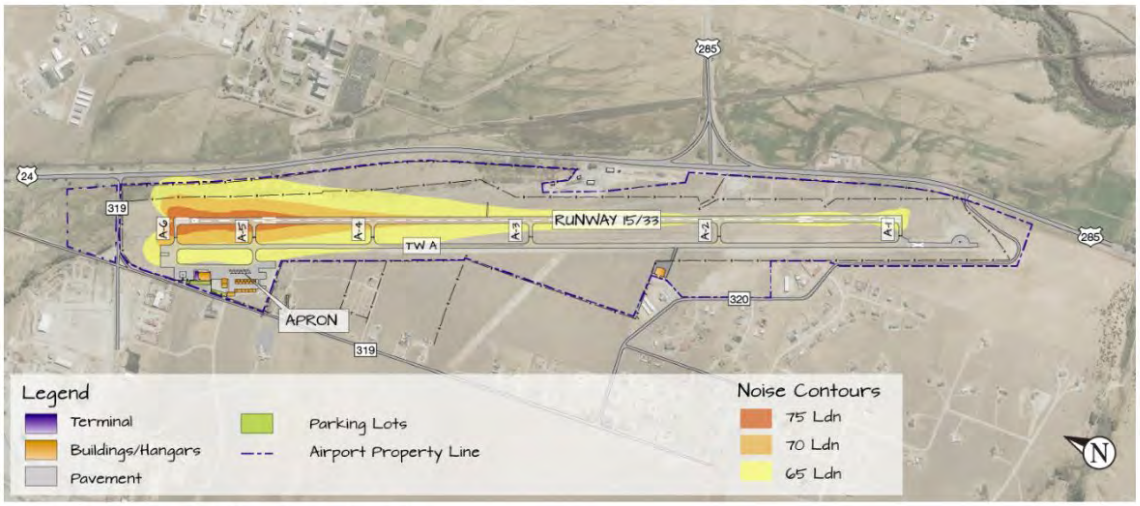
NEPAssist- Air Quality non-attainment areas:

https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=28221+Co+Rd+319%2C+Buena+Vista%2C+CO+81211

Noise

Airport Noise Contours

FIGURE 2-19 – 2015 DNL NOISE CONTOURS



Source: KB Environmental Sciences, Inc., 2016

Source: 2016 Central Colorado Regional Airport Master Plan Update

Water Resources

National Flood Hazard Layer FIRMette

106°8'7"W 38°49'53"N

106°7'30"W 38°49'25"N

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

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

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

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

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

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

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 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 3/2/2023 at 1:21 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands

March 2, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

COLORADO

Colorado has approximately 107,403 miles of river, of which 76 miles or one river are designated as wild & scenic—less than 1/10th of 1% of the state's river miles.

+ View larger map

Cache la Poudre River

EXPLORE DESIGNATED RIVERS

Choose A State Go

Choose A River Go

While progress should never come to a halt, there are many places it should never come to at all. — Paul Newman

https://www.rivers.gov/river-app/index.html?state=CO

COLORADO

Buena Vista

Legend

https://www.nps.gov/maps/full.html?mapId=8adbe798-0d7e-40fb-bd48-225513d64977

Nationwide Rivers Inventory

This is a listing of more than 3,200 free-flowing river segments in the U.S. that are believed to possess one or more "outstandingly remarkable" values.

National Park Service
U.S. Department of the Interior

APPENDIX C: DRAINAGE REPORT

JANUARY 27, 2023

DRAINAGE REPORT

Chaffee County EMS Building

Buena Vista Colorado

TRACY VANDAVEER
Crabtree Group Inc.
Salida, Colorado

Project No. #21023

719.539.1675
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Appendix C D-1

1 CERTIFICATIONS

Engineer's Certification

This report for the drainage design of Chaffee County EMS Building was prepared by me (or under my direct supervision) in accordance with the Municipal Code of the Town of Buena Vista and was designed to comply with the provisions thereof. I understand that the Town of Buena Vista does not and will not assume liability for the drainage facilities design.

Janurary 27, 2023
Date

Signature [SIGN AND DATE P.E. SEAL]

Tracy L. Vandaveer
Printed Name

Owner's Certification

Chaffee County Hereby certifies that the drainage facilities for **Buena Vista EMS Facility** shall be constructed according the design presented in this report. I understand that the Town of Buena Vista does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the Tow of Buena Vista reviews drainage plans pursuant to Colorado Revised Statutes Title 30, Article 28; but cannot, on behalf of **Chaffee County** guarantee that final drainage design review will absolve **Chaffee Coutny** and/or their successors and/or assigns of future liability for improper design. I further understand that the approval of the Final Plat, Final Development Plan, and/or Subdivision Development Plan does not imply approval of my engineer's Drainage design.

Name of Developer

Authorized Signature

Date

2 INTRODUCTION

The Chaffee County EMS Building is a proposed infill development of existing lots in Buena Vista, Colorado. The project will consist of the demolition of construction of a new building, parking lot, and associated infrastructure on a vacant lot. The site is comprised of 2.14 acres of land, currently zoned and utilized as an industrial site.

3 EXISTING CONDITIONS

The subject site is located off of Steele Drive, approximately 0.3 miles west of the Steele Drive/Highway 24 intersection, as shown in Figure 1 below. The site is bounded by industrial properties on the north, east, and west, and by Steele Drive on the south.

Figure 1 - Vicinity Map

The subject site is te existing topography of the site is relatively flat with existing slopes of approximately 1%, and drainage generally flowing in a northeasterly direction.

4 SOILS

Information for the on-site soils was obtained from the USDA Web Soil Survey (U.S. Department of Agriculture, n.d.). The soils consist of Dominson gravelly sandy loam (DoD). The Dominson series of soils are assigned to hydraulic Soils Group A; with a hydraulic conductivity (KSat) of 80 micrometers per second. The site Soil information is summarized in Table 1 below.

Table 1-Soils Information

Map unit symbol	Map unit name	Hydraulic Rating	Rating (micrometers/sec.)	Percent of AOI
Dod	Dominson gravelly sandy loam, 1 to 9 percent slopes	A	80.0390	100.0%
			Totals for Area of Interest	100.0%

5 PRECIPITATION

Precipitation amounts for the Design Storms were obtained from the NOAA precipitation frequency estimates for the subject area. The Design Storms utilized in the analysis are summarized in Table 2 below.

Table 2 – Design Storms

	Design Storm				
	2yr-24hr	10yr-24hr	25yr-24hr	50yr-24hr	100yr-24hr
Cumulative Rainfall (in)	1.21	1.69	2.01	2.28	2.55

6 RUNOFF ANALYSIS

The Runoff Analysis was performed utilizing Autodesk "*Hydroflow*" hydrograph extension for Civil 3D software. Drainage areas were modeled utilizing the methods described in the Natural Resources Conservation Service (NRCS) Technical Release #55 (TR-55), with a Type II storm distribution.

6.1 CURVE NUMBERS

Curve Numbers for the Drainage areas were determined from the proposed conditions, as shown in Table 3

Table 3 - Runoff Curve Number

		PRE-DEVELOPED			DA-1			DA-2			DA-3		
Land Use Description	HSG	Curve No.	Area (acres)	Area (%)	Curve No.	Area (acres)	Area (%)	Curve No.	Area (acres)	Area (%)	Curve No.	Area (acres)	Area (%)
Urban Industrial	A	79	2.14	100%	0			0			79		
Impervious	A	96			96	0.85	65%	96	0.41	59%	96	0.14	90%
Gravel	A	41			41	0.25	19%	0			41		
Landscaping	A	49			49	0.20	15%	49	0.28	41%	49	0.02	10%
		Totals	**2.14**	**100%**	**Totals**	**1.30**	**100%**	**Totals**	**0.68**	**100%**	**Totals**	**0.16**	**100%**
Weighted Runoff Coefficient				**79**			**78**			**77**			**91**

In the existing condition, stormwater runoff is relatively high due to the site being comprised of industrial ground with little vegetation. In the poste developed state, the site will have more impermeable area, however it will also have more landscaped area which offsets the increase in permeability, with a

corresponding decrease in stormwater runoff. The exception to this is Drainage Area 3, which has very little landscaping. However, Drainage area 3 is small, consisting of 0.16 acres, so the net effect is relatively small.

6.2 DETENTION VOLUMES

Although the change in stormwater runoff is expected to be relatively small, infiltration areas were still incorporated into the site design. The infiltration areas were located positioned to intercept stormwater flows prior to existing the site, which allows water from small events to infiltrate rather than flow offsite. This infiltration of the stormwater events will benefit stormwater quality, as pollutants carried by the stormwater are retained, and filtered out by the soils.

6.3 RUNOFF RATES

Modeling of the proposed system shows a decrease in off-site stormwater runoff, as can be seen in Table 4 below. The decrease seen is a result of the increase in site landscaping and incorporation of the retention ponds, both of with promote infiltration, into the site design.

Table 4 - Site Runoff Rates

	2-yr	10-yr	25-yr	50-yr	100-yr
Pre-Developed	0.3	0.9	1.5	2.0	2.6
Post-Developed	0.0	0.1	0.4	0.4	1.2
Difference	(0.3)	(0.8)	(1.1)	(1.6)	(1.4)

7 COLORADO REVISED STATUTE §37-92-602 (8) COMPLIANCE

Colorado Revised Statute §37-92-602 (8) requires that stormwater facilities release 97% of all runoff from a 50year event within 72 hours and 99% of runoff from all events within 120 hours. The Saturated hydraulic conductivity (Ksat) of the on-site soils is 80 micrometers per second, as reported by the NRCS Soils Report for the Project. Converting to a inched per hour yields:

$$80mm/\sec * \frac{1in}{25{,}400mm} * \frac{60sec}{min} .* \frac{60min}{hr} = \mathbf{11.3}\,\boldsymbol{\frac{in}{hr}}..$$

Given that the proposed depth of the detention ponds is 2-ft., the time to infiltrate a full ponds can be calculated as:

$$24\ in. * \left(11.3\frac{in}{hr}\right)^{-1} = \mathbf{2.1}\ \boldsymbol{hrs}.$$

8 CONCLUSION

Development of the site will impact the on-site generated stormwater, however, the impact will be mitigated through increased landscaping and infiltration basins incorporated into the site design. With these features, the development will decrease stormwater flows to the adjacent properties. The infiltration facilities proposed consist of shallow ponds that ill infiltrate in less than 72 hours, in compliance with Colorado Revised Statute §37-92-602 (8).

Appendix A

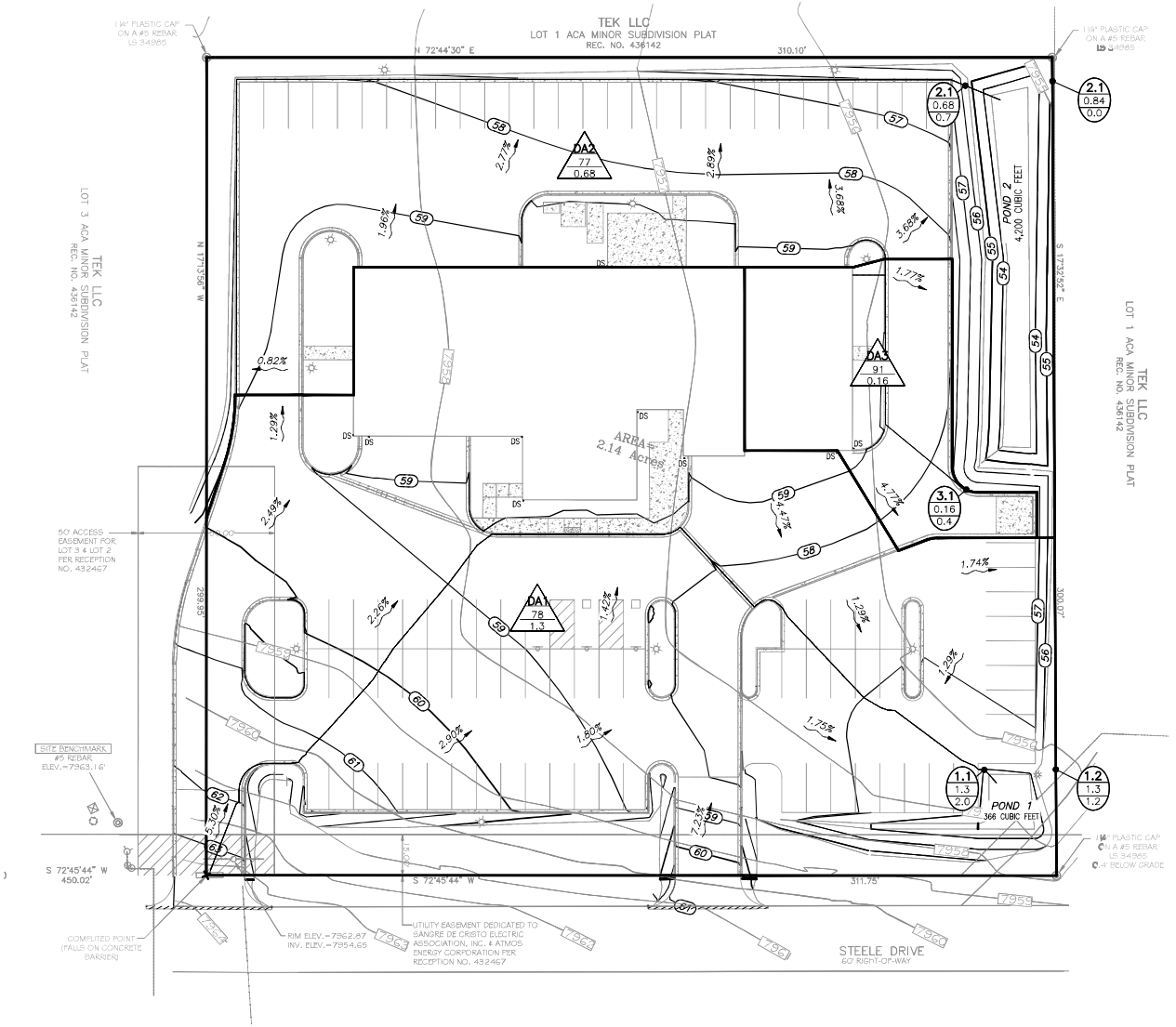
DRAINAGE MAP

BUENA VISTA EMS BUILDING

DRAINAGE PLAN

CHAFFEE COUNTY

JANUARY, 2023



GRAPHIC SCALE

20' 0 20' 40' 60'

(CONTOUR INTERVAL = 1 FOOT)

A BASIN DESIGNATION
B COMPOSITE RUNOFF COEFFICIENT
C DRAINAGE BASIN AREA (ACRES)

D DESIGN POINT DESIGNATION
E DESIGN POINT TRIBUTARY AREA (ACRES)
F DESIGN POINT 100-YR FLOW RATE (CFS)

PREPARED BY:

CRABTREE GROUP INC.
ENGINEERING SMART GROWTH™

SHEET NO. 1 OF 1

BUENA VISTA EMS BUILDING - DRAINAGE PLAN

Appendix B

SOILS REPORT

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 Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties

April 29, 2022

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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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 (CHAFFEE COUNTY EMS BUILDING)

Map Scale: 1:975 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 45 90 180 270

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 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 14, Sep 2, 2021

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

Date(s) aerial images were photographed: Oct 29, 2021—Oct 30, 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 (CHAFFEE COUNTY EMS BUILDING)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DoD	Dominson gravelly sandy loam, 1 to 9 percent slopes	2.1	100.0%
Totals for Area of Interest		**2.1**	**100.0%**

Map Unit Descriptions (CHAFFEE COUNTY EMS BUILDING)

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.

Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties

DoD—Dominson gravelly sandy loam, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: jq8d
Elevation: 7,200 to 8,800 feet
Mean annual precipitation: 11 to 16 inches
Frost-free period: 75 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Dominson and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dominson

Setting

Landform: Alluvial fans, fan terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or moderately coarse-textured gravelly outwash

Typical profile

H1 - 0 to 11 inches: gravelly sandy loam
H2 - 11 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R048AY316CO - Dry Mountain Outwash
Hydric soil rating: No

Minor Components

St. elmo

Percent of map unit:
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

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

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

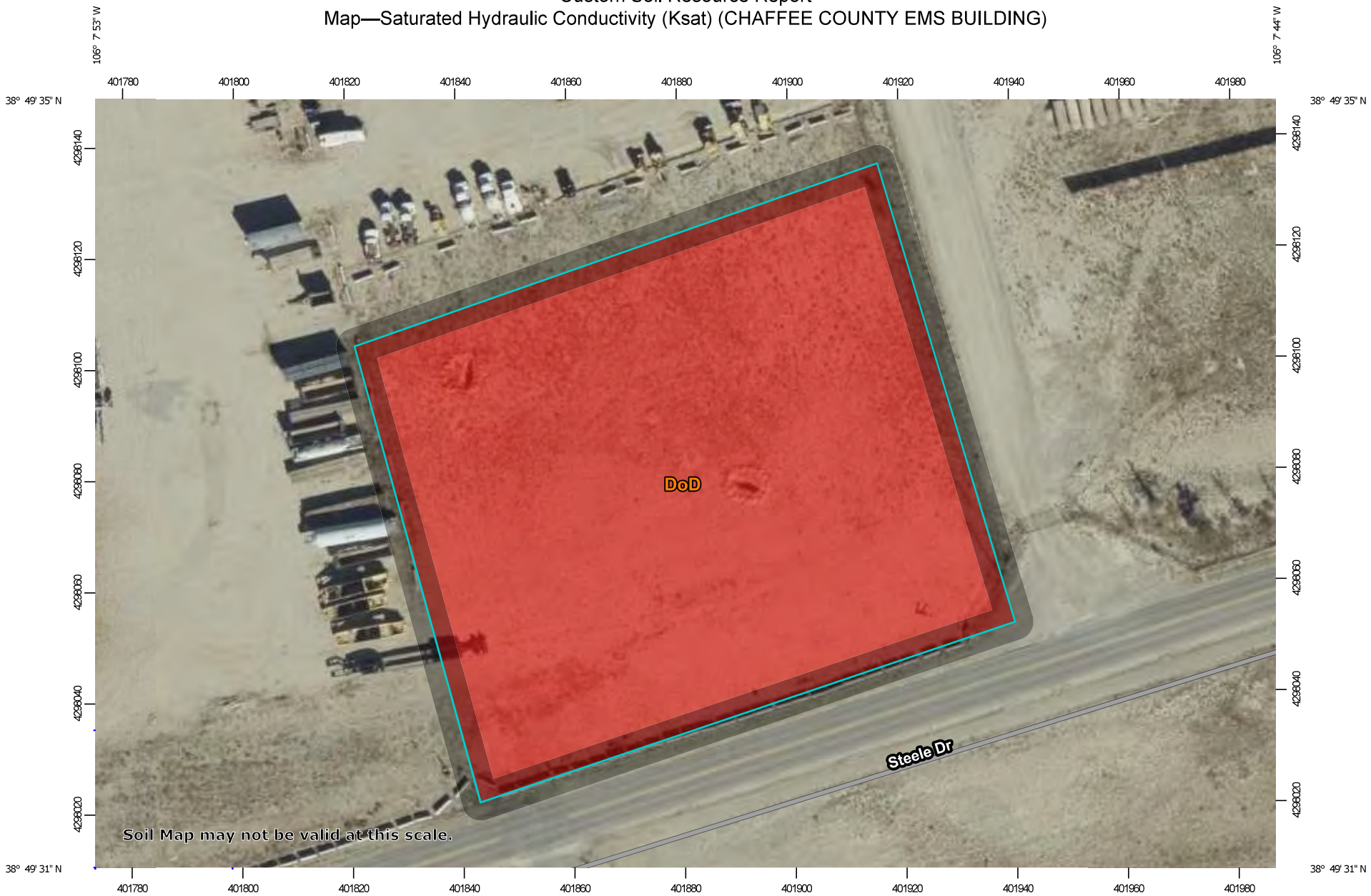
Saturated Hydraulic Conductivity (Ksat) (CHAFFEE COUNTY EMS BUILDING)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Custom Soil Resource Report
Map—Saturated Hydraulic Conductivity (Ksat) (CHAFFEE COUNTY EMS BUILDING)



Map Scale: 1:975 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 45 90 180 270

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

= 80.0390

Not rated or not available

Soil Rating Lines

= 80.0390

Not rated or not available

Soil Rating Points

= 80.0390

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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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.

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Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 14, Sep 2, 2021

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

Date(s) aerial images were photographed: Oct 29, 2021—Oct 30, 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—Saturated Hydraulic Conductivity (Ksat) (CHAFFEE COUNTY EMS BUILDING)

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
DoD	Dominson gravelly sandy loam, 1 to 9 percent slopes	80.0390	2.1	100.0%
Totals for Area of Interest			**2.1**	**100.0%**

Rating Options—Saturated Hydraulic Conductivity (Ksat) (CHAFFEE COUNTY EMS BUILDING)

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Component" returns the attribute value associated with the component with the highest percent composition in the map unit. If more than one component shares the highest percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher attribute value should be returned in the case of a percent composition tie. The result returned by this aggregation method may or may not represent the dominant condition throughout the map unit.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Slowest

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Interpret Nulls as Zero: No

This option indicates if a null value for a component should be converted to zero before aggregation occurs. This will be done only if a map unit has at least one component where this value is not null.

Layer Options (Horizon Aggregation Method): All Layers (Weighted Average)

For an attribute of a soil horizon, a depth qualification must be specified. In most cases it is probably most appropriate to specify a fixed depth range, either in centimeters or inches. The Bottom Depth must be greater than the Top Depth, and the Top Depth can be greater than zero. The choice of "inches" or "centimeters" only applies to the depth of soil to be evaluated. It has no influence on the units of measure the data are presented in.

When "Surface Layer" is specified as the depth qualifier, only the surface layer or horizon is considered when deriving a value for a component, but keep in mind that the thickness of the surface layer varies from component to component.

When "All Layers" is specified as the depth qualifier, all layers recorded for a component are considered when deriving the value for that component.

Whenever more than one layer or horizon is considered when deriving a value for a component, and the attribute being aggregated is a numeric attribute, a weighted average value is returned, where the weighting factor is the layer or horizon thickness.

Soil Qualities and Features

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

Hydrologic Soil Group (CHAFFEE COUNTY EMS BUILDING)

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

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

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

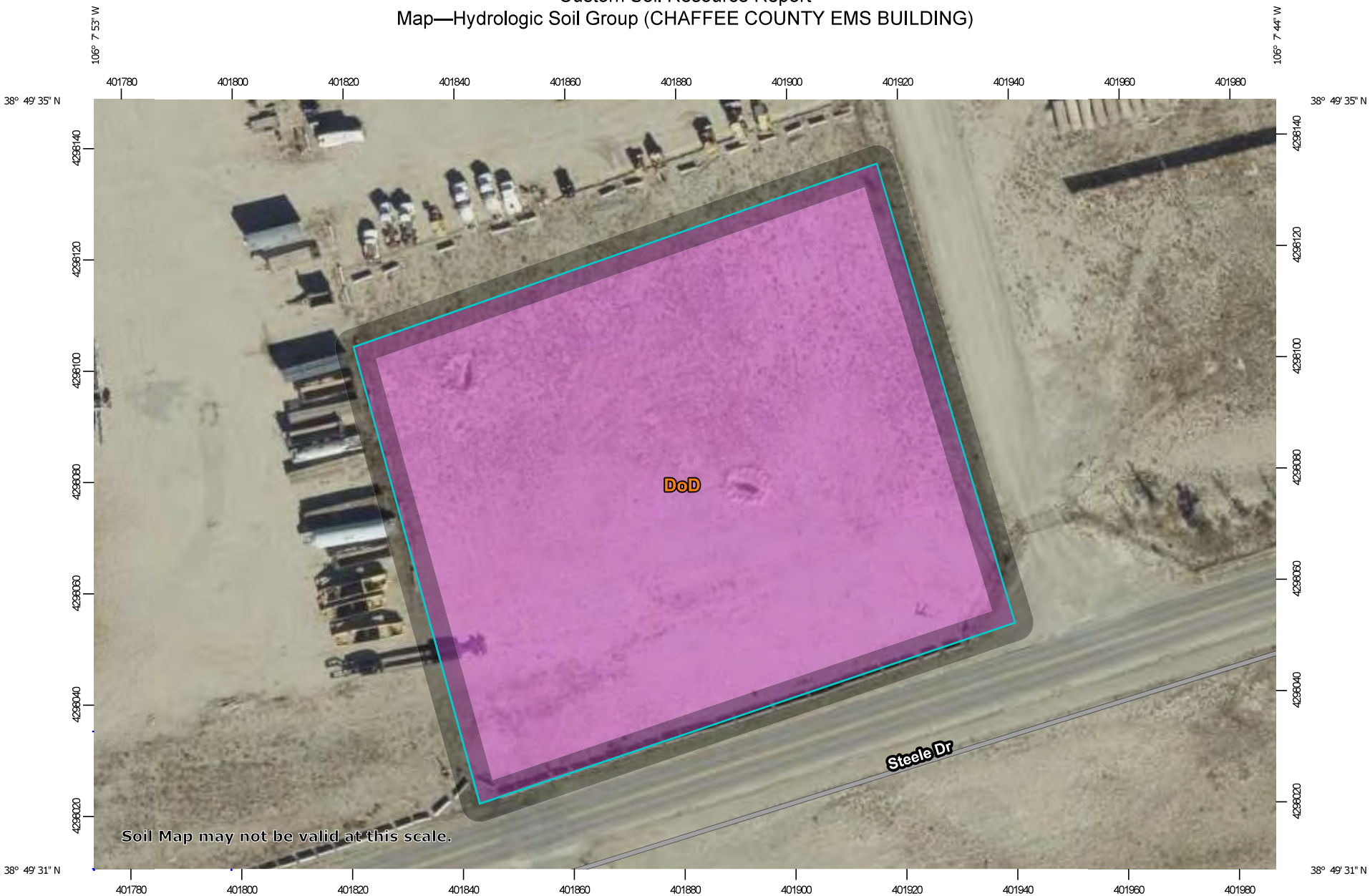
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

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

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

Custom Soil Resource Report
Map—Hydrologic Soil Group (CHAFFEE COUNTY EMS BUILDING)



Map Scale: 1:975 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 45 90 180 270

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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Soil Survey Area: Chaffee-Lake Area, Colorado, Parts of Chaffee and Lake Counties
Survey Area Data: Version 14, Sep 2, 2021

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

Date(s) aerial images were photographed: Oct 29, 2021—Oct 30, 2021

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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 (CHAFFEE COUNTY EMS BUILDING)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DoD	Dominson gravelly sandy loam, 1 to 9 percent slopes	A	2.1	100.0%
Totals for Area of Interest			**2.1**	**100.0%**

Rating Options—Hydrologic Soil Group (CHAFFEE COUNTY EMS BUILDING)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Appendix C

NOAA Precipitation Estimates

NOAA Atlas 14, Volume 8, Version 2
Location name: Buena Vista, Colorado, USA*
Latitude: 38.8261°, Longitude: -106.1303°
Elevation: 7962.3 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.133** (0.105-0.173)	**0.184** (0.145-0.239)	**0.269** (0.211-0.351)	**0.343** (0.268-0.450)	**0.449** (0.339-0.616)	**0.534** (0.392-0.741)	**0.622** (0.441-0.885)	**0.714** (0.484-1.05)	**0.840** (0.547-1.27)	**0.939** (0.594-1.43)
10-min	**0.195** (0.154-0.253)	**0.269** (0.212-0.350)	**0.395** (0.310-0.514)	**0.503** (0.392-0.659)	**0.658** (0.496-0.901)	**0.782** (0.575-1.09)	**0.911** (0.645-1.30)	**1.05** (0.709-1.53)	**1.23** (0.801-1.86)	**1.38** (0.870-2.10)
15-min	**0.238** (0.187-0.309)	**0.328** (0.258-0.427)	**0.481** (0.377-0.627)	**0.613** (0.478-0.803)	**0.802** (0.605-1.10)	**0.954** (0.701-1.32)	**1.11** (0.787-1.58)	**1.27** (0.865-1.87)	**1.50** (0.977-2.26)	**1.68** (1.06-2.56)
30-min	**0.318** (0.250-0.412)	**0.447** (0.352-0.581)	**0.660** (0.518-0.861)	**0.840** (0.655-1.10)	**1.09** (0.819-1.49)	**1.29** (0.942-1.78)	**1.49** (1.05-2.11)	**1.69** (1.14-2.46)	**1.96** (1.27-2.95)	**2.17** (1.37-3.32)
60-min	**0.419** (0.330-0.543)	**0.560** (0.441-0.728)	**0.795** (0.624-1.04)	**0.993** (0.774-1.30)	**1.27** (0.953-1.73)	**1.48** (1.09-2.05)	**1.70** (1.20-2.41)	**1.93** (1.30-2.81)	**2.23** (1.45-3.35)	**2.46** (1.56-3.76)
2-hr	**0.519** (0.414-0.665)	**0.674** (0.537-0.864)	**0.930** (0.738-1.20)	**1.15** (0.904-1.48)	**1.45** (1.10-1.94)	**1.68** (1.25-2.29)	**1.92** (1.38-2.68)	**2.17** (1.49-3.11)	**2.50** (1.64-3.69)	**2.75** (1.76-4.13)
3-hr	**0.596** (0.479-0.756)	**0.742** (0.595-0.942)	**0.986** (0.788-1.26)	**1.19** (0.949-1.53)	**1.49** (1.14-1.98)	**1.72** (1.29-2.32)	**1.96** (1.42-2.72)	**2.21** (1.53-3.15)	**2.54** (1.69-3.74)	**2.80** (1.81-4.18)
6-hr	**0.744** (0.605-0.930)	**0.873** (0.709-1.09)	**1.09** (0.886-1.37)	**1.29** (1.04-1.62)	**1.57** (1.22-2.06)	**1.79** (1.36-2.39)	**2.03** (1.49-2.77)	**2.28** (1.60-3.20)	**2.62** (1.77-3.79)	**2.89** (1.90-4.24)
12-hr	**0.902** (0.743-1.11)	**1.03** (0.848-1.27)	**1.26** (1.03-1.55)	**1.45** (1.18-1.81)	**1.74** (1.38-2.25)	**1.97** (1.52-2.59)	**2.22** (1.65-2.99)	**2.48** (1.77-3.44)	**2.84** (1.95-4.05)	**3.13** (2.08-4.52)
24-hr	**1.06** (0.886-1.29)	**1.21** (1.01-1.47)	**1.47** (1.22-1.79)	**1.69** (1.40-2.07)	**2.01** (1.61-2.56)	**2.28** (1.78-2.94)	**2.55** (1.92-3.37)	**2.84** (2.05-3.86)	**3.23** (2.25-4.53)	**3.55** (2.39-5.04)
2-day	**1.22** (1.03-1.46)	**1.41** (1.19-1.69)	**1.73** (1.45-2.08)	**2.00** (1.67-2.41)	**2.38** (1.93-2.98)	**2.69** (2.12-3.40)	**3.00** (2.29-3.90)	**3.32** (2.43-4.44)	**3.76** (2.64-5.17)	**4.10** (2.81-5.73)
3-day	**1.34** (1.14-1.59)	**1.55** (1.32-1.84)	**1.90** (1.61-2.26)	**2.20** (1.85-2.63)	**2.62** (2.13-3.24)	**2.95** (2.35-3.70)	**3.28** (2.52-4.22)	**3.63** (2.68-4.81)	**4.10** (2.91-5.59)	**4.46** (3.08-6.17)
4-day	**1.44** (1.23-1.69)	**1.66** (1.42-1.96)	**2.03** (1.73-2.40)	**2.34** (1.98-2.78)	**2.78** (2.28-3.42)	**3.13** (2.50-3.90)	**3.48** (2.69-4.45)	**3.84** (2.85-5.05)	**4.33** (3.09-5.86)	**4.71** (3.27-6.47)
7-day	**1.67** (1.45-1.94)	**1.91** (1.65-2.23)	**2.32** (1.99-2.70)	**2.65** (2.27-3.11)	**3.12** (2.58-3.78)	**3.49** (2.82-4.29)	**3.86** (3.02-4.86)	**4.24** (3.18-5.50)	**4.76** (3.43-6.34)	**5.15** (3.62-6.98)
10-day	**1.88** (1.63-2.16)	**2.14** (1.86-2.47)	**2.57** (2.22-2.97)	**2.93** (2.52-3.40)	**3.42** (2.85-4.10)	**3.81** (3.10-4.64)	**4.20** (3.30-5.24)	**4.60** (3.47-5.90)	**5.12** (3.72-6.77)	**5.53** (3.91-7.43)
20-day	**2.46** (2.16-2.79)	**2.79** (2.46-3.17)	**3.33** (2.93-3.80)	**3.78** (3.30-4.32)	**4.38** (3.69-5.14)	**4.83** (3.98-5.77)	**5.28** (4.21-6.46)	**5.73** (4.38-7.21)	**6.31** (4.64-8.17)	**6.74** (4.84-8.90)
30-day	**2.93** (2.61-3.30)	**3.33** (2.96-3.75)	**3.97** (3.52-4.48)	**4.49** (3.95-5.08)	**5.17** (4.38-6.00)	**5.68** (4.71-6.70)	**6.17** (4.95-7.46)	**6.65** (5.13-8.27)	**7.26** (5.39-9.29)	**7.70** (5.59-10.1)
45-day	**3.53** (3.16-3.93)	**4.01** (3.59-4.47)	**4.77** (4.25-5.33)	**5.37** (4.76-6.02)	**6.14** (5.24-7.04)	**6.71** (5.61-7.81)	**7.24** (5.85-8.64)	**7.75** (6.02-9.51)	**8.37** (6.26-10.6)	**8.80** (6.44-11.4)
60-day	**4.04** (3.64-4.47)	**4.59** (4.13-5.08)	**5.44** (4.87-6.03)	**6.10** (5.44-6.79)	**6.94** (5.95-7.88)	**7.54** (6.34-8.71)	**8.10** (6.59-9.59)	**8.62** (6.73-10.5)	**9.24** (6.95-11.6)	**9.65** (7.11-12.4)

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

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

Please refer to NOAA Atlas 14 document for more information.

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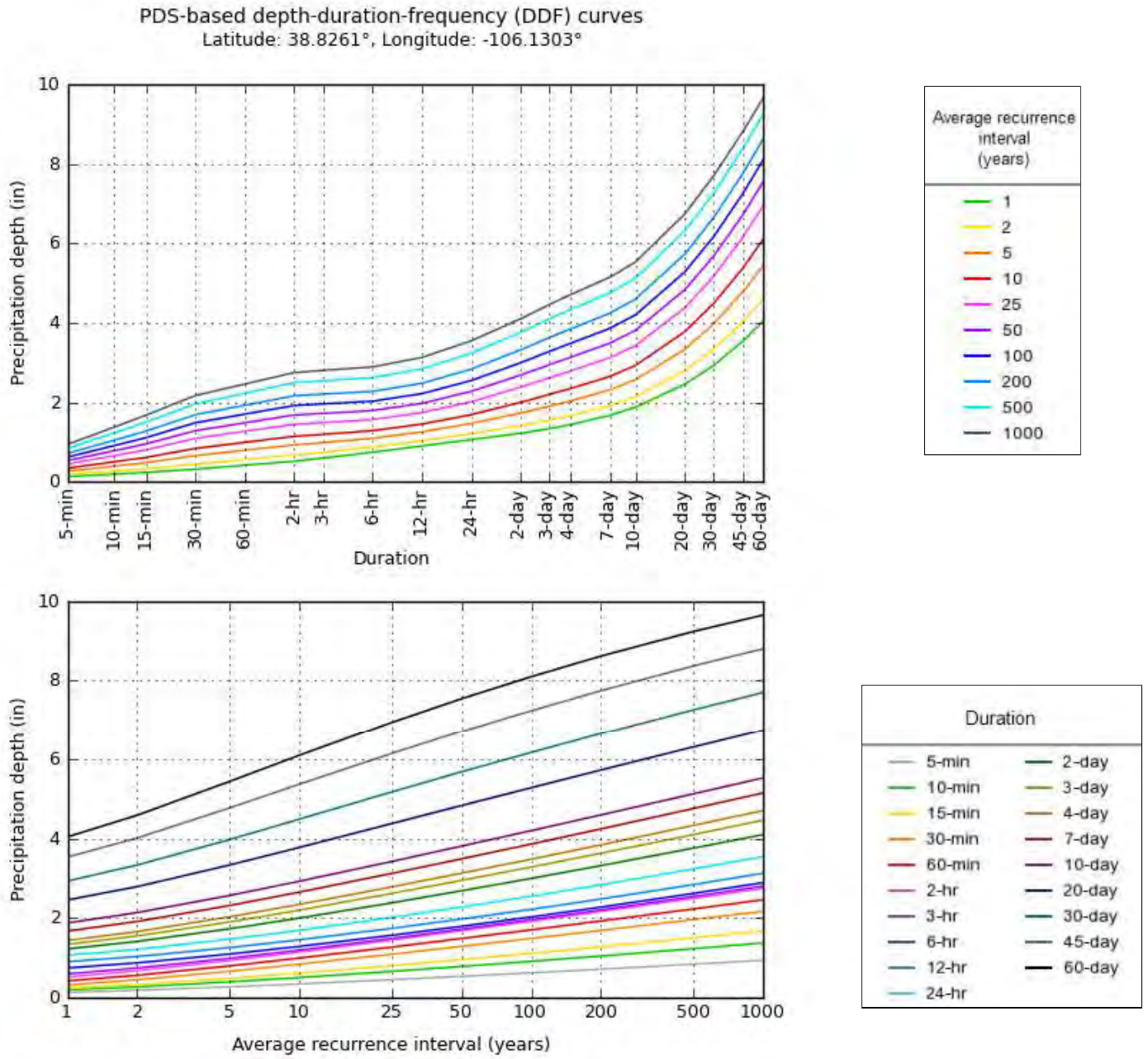
PF graphical



NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Mon Jan 30 17:32:29 2023

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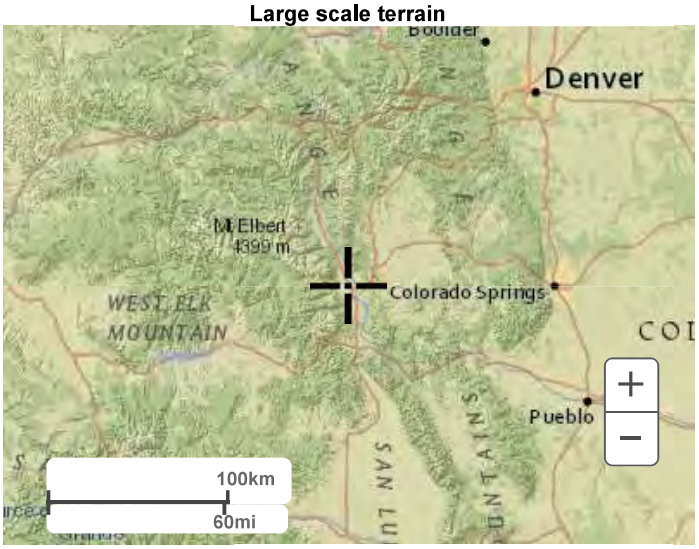
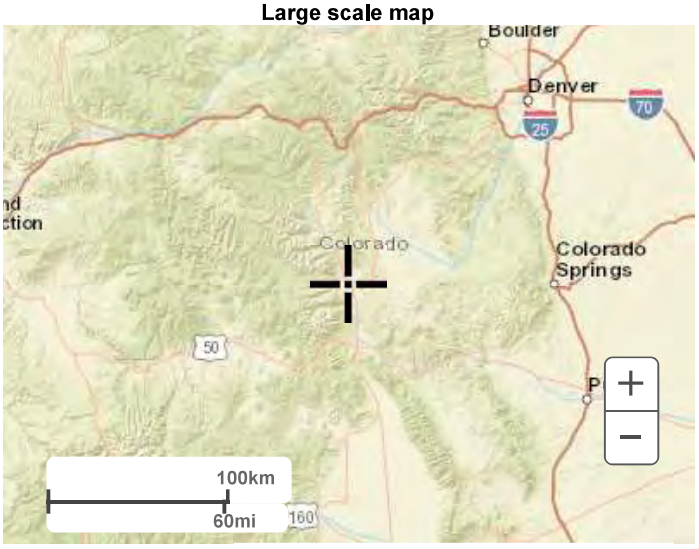
Maps & aerials

Small scale terrain

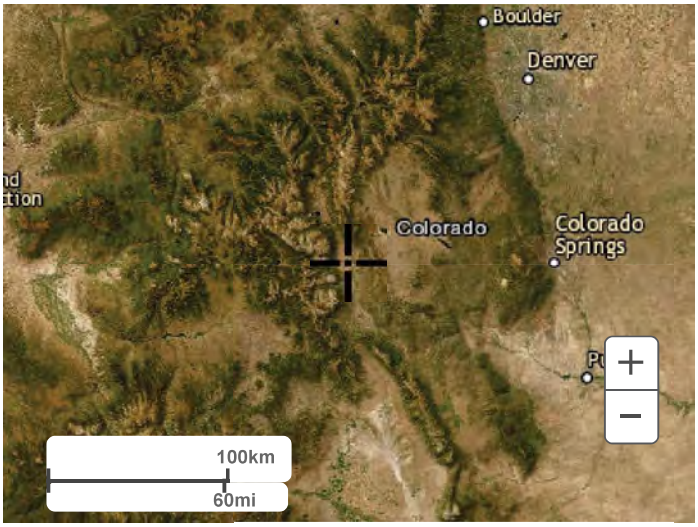
Large scale terrain



Large scale map



Large scale aerial



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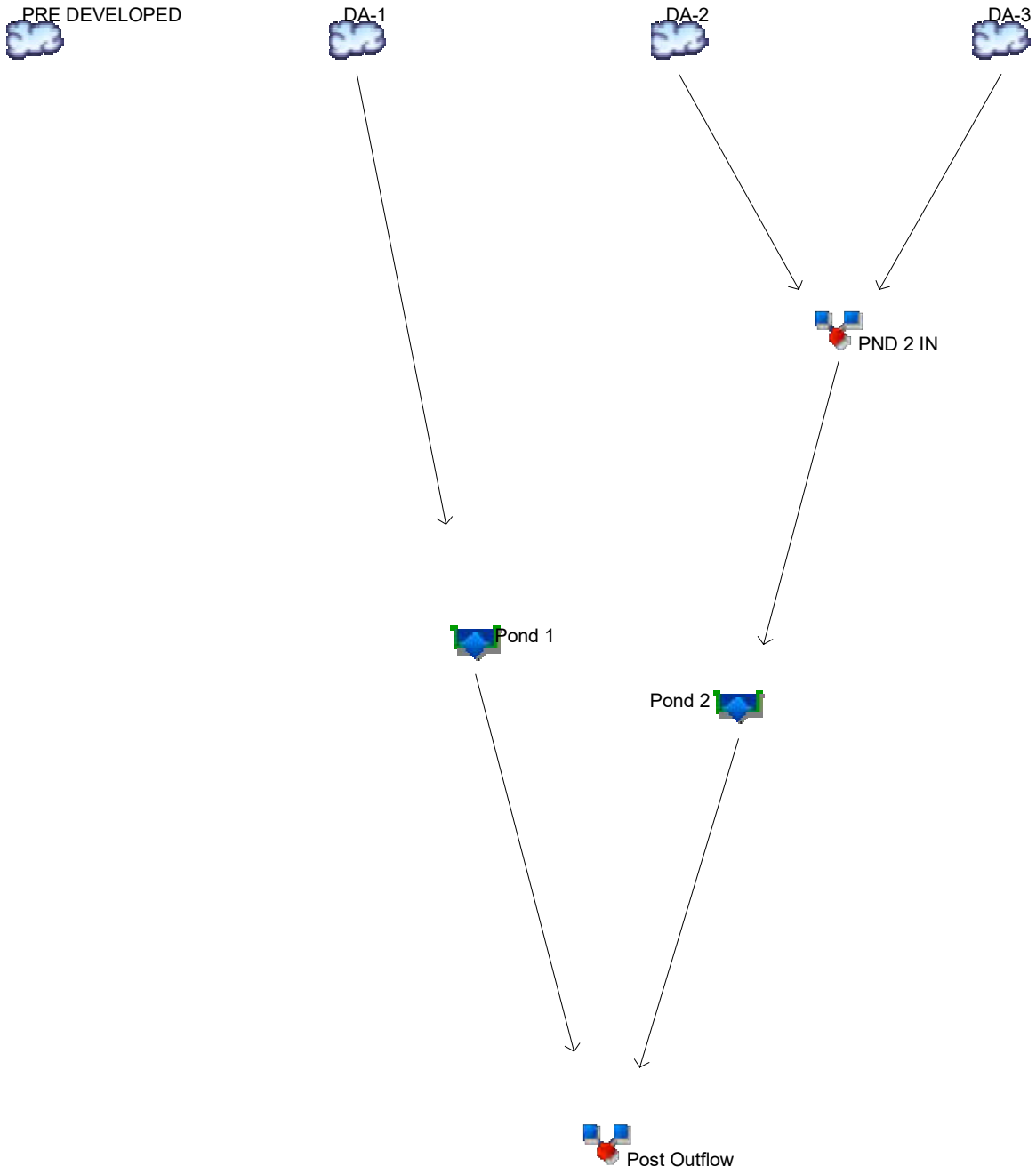
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Appendix D

RUNOFF ANALYSIS

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PRE DEVELOPED
2	SCS Runoff	DA-1
3	SCS Runoff	DA-2
4	SCS Runoff	DA-3
5	Combine	PND 2 IN
6	Reservoir	Pond 1
7	Reservoir	Pond 2
8	Combine	Post Outflow

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

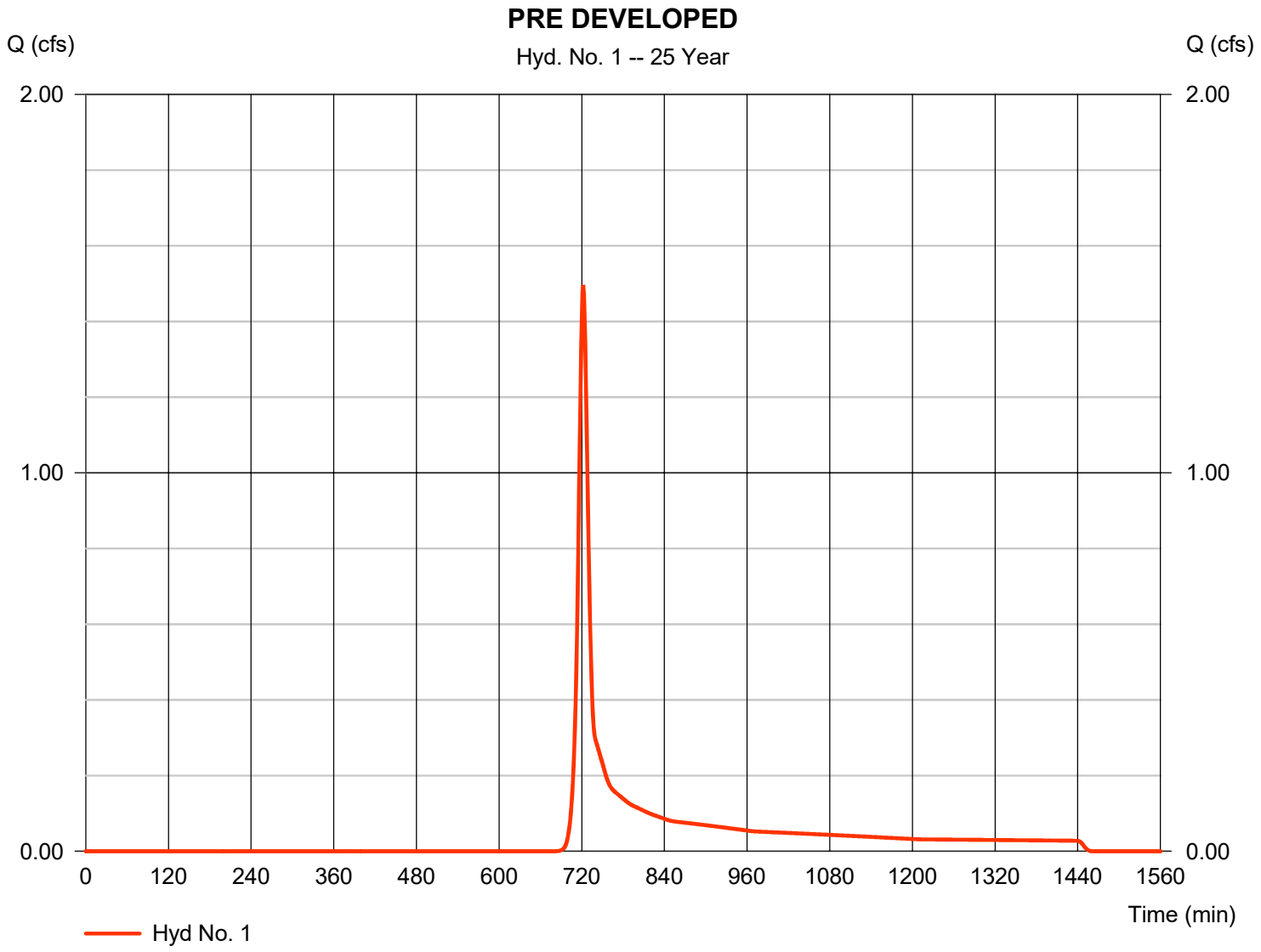
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.496	1	722	4,040	------	------	------	PRE DEVELOPED
2	SCS Runoff	1.134	1	718	2,385	------	------	------	DA-1
3	SCS Runoff	0.353	1	724	1,150	------	------	------	DA-2
4	SCS Runoff	0.294	1	718	624	------	------	------	DA-3
5	Combine	0.567	1	721	1,775	3, 4	------	------	PND 2 IN
6	Reservoir	0.442	1	725	1,840	2	7956.45	691	Pond 1
7	Reservoir	0.000	1	n/a	0	5	7954.17	1,775	Pond 2
8	Combine	0.442	1	725	1,840	6, 7	------	------	Post Outflow

Hydrograph Report

Hyd. No. 1

PRE DEVELOPED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.496 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	4,040 cuft
Drainage area	=	2.140 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.00 min
Total precip.	=	2.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



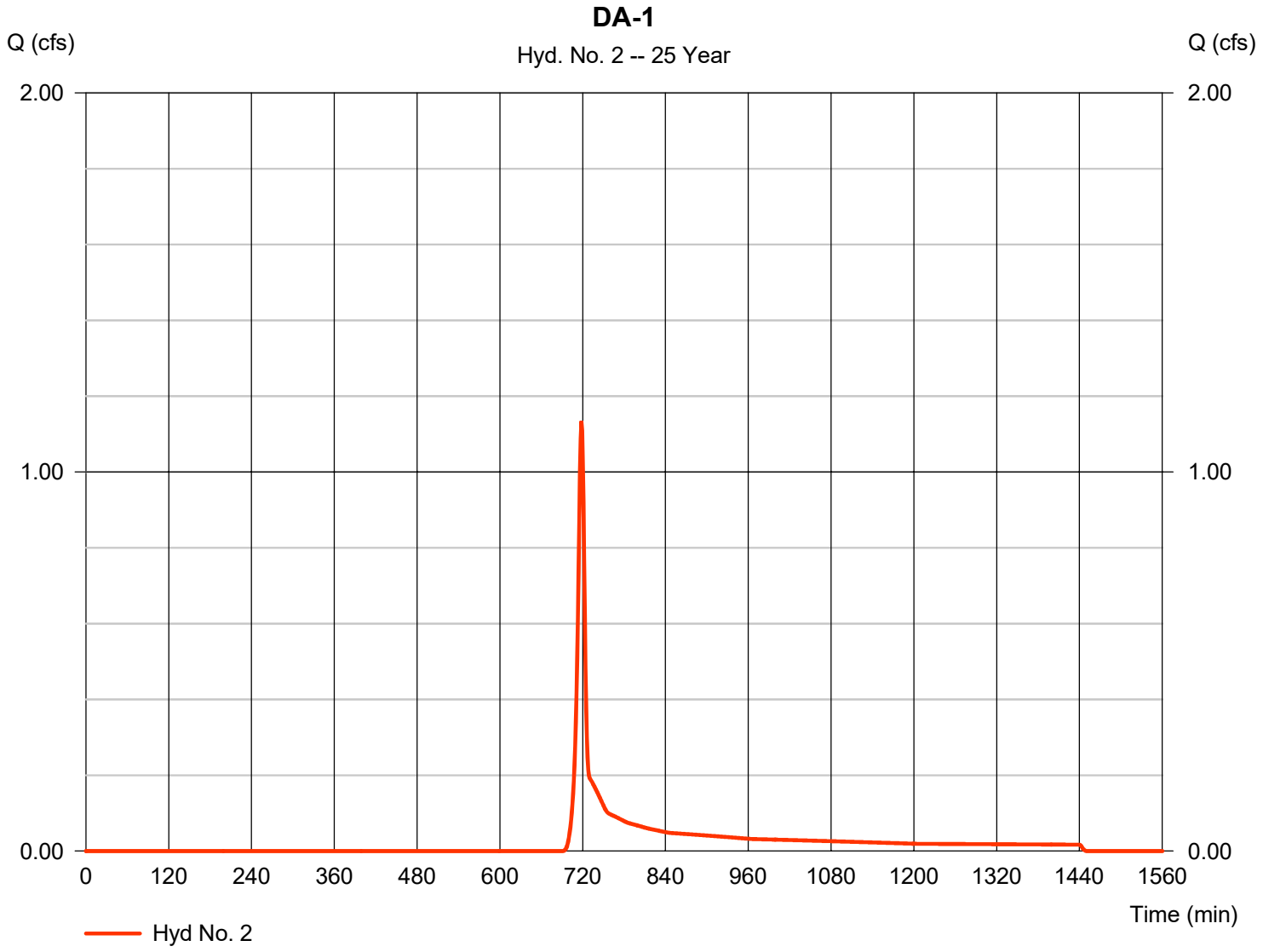
Hydrograph Report

Hyd. No. 2

DA-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.134 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	2,385 cuft
Drainage area	=	1.300 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	5.40 min
Total precip.	=	2.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.850 x 96) + (0.250 x 41) + (0.200 x 49)] / 1.300



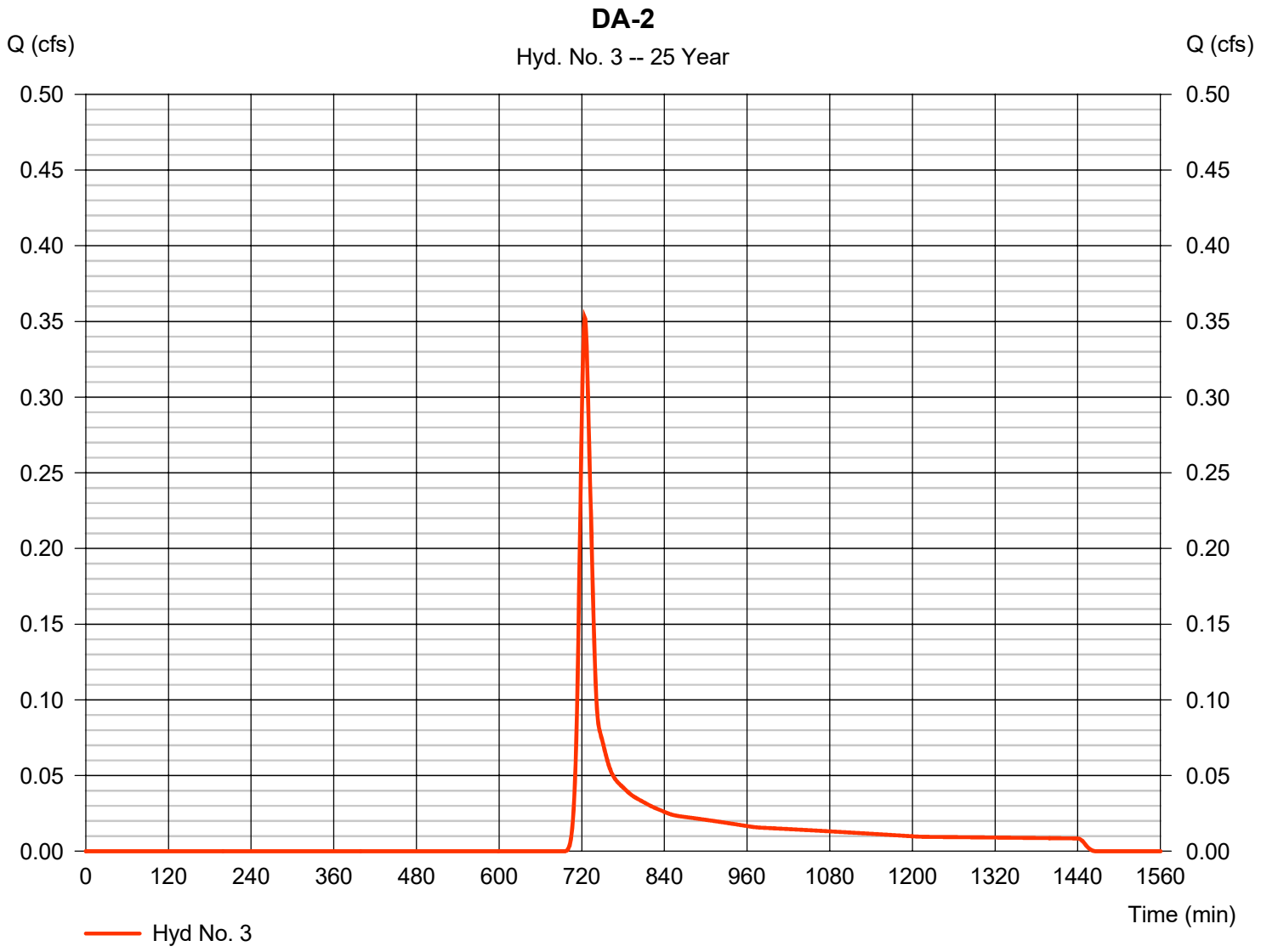
Hydrograph Report

Hyd. No. 3

DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.353 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	1,150 cuft
Drainage area	=	0.690 ac	Curve number	=	77*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	15.90 min
Total precip.	=	2.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.410 x 96) + (0.280 x 49)] / 0.690



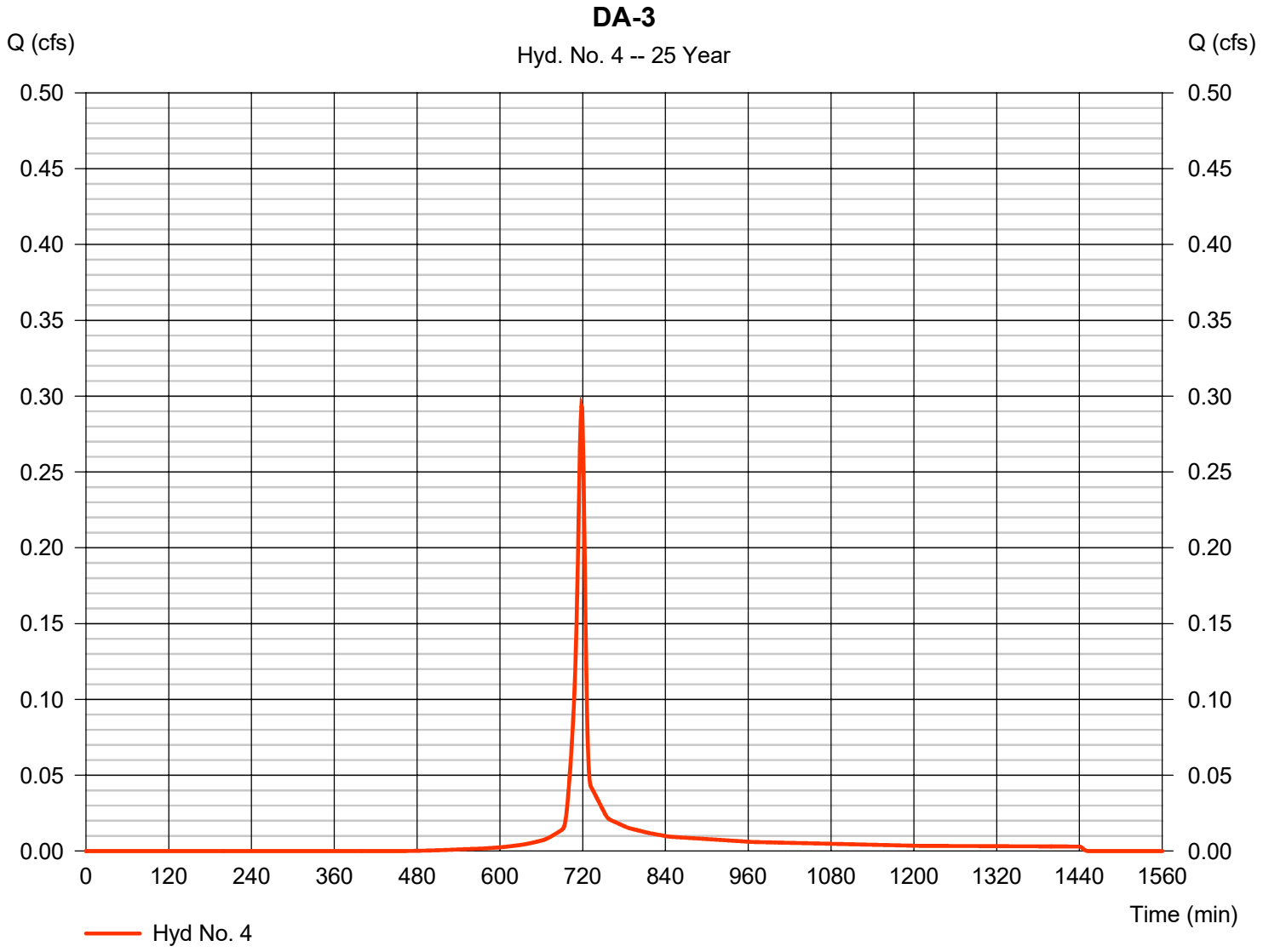
Hydrograph Report

Hyd. No. 4

DA-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.294 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	624 cuft
Drainage area	=	0.160 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.00 min
Total precip.	=	2.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.140 x 96) + (0.020 x 49)] / 0.160

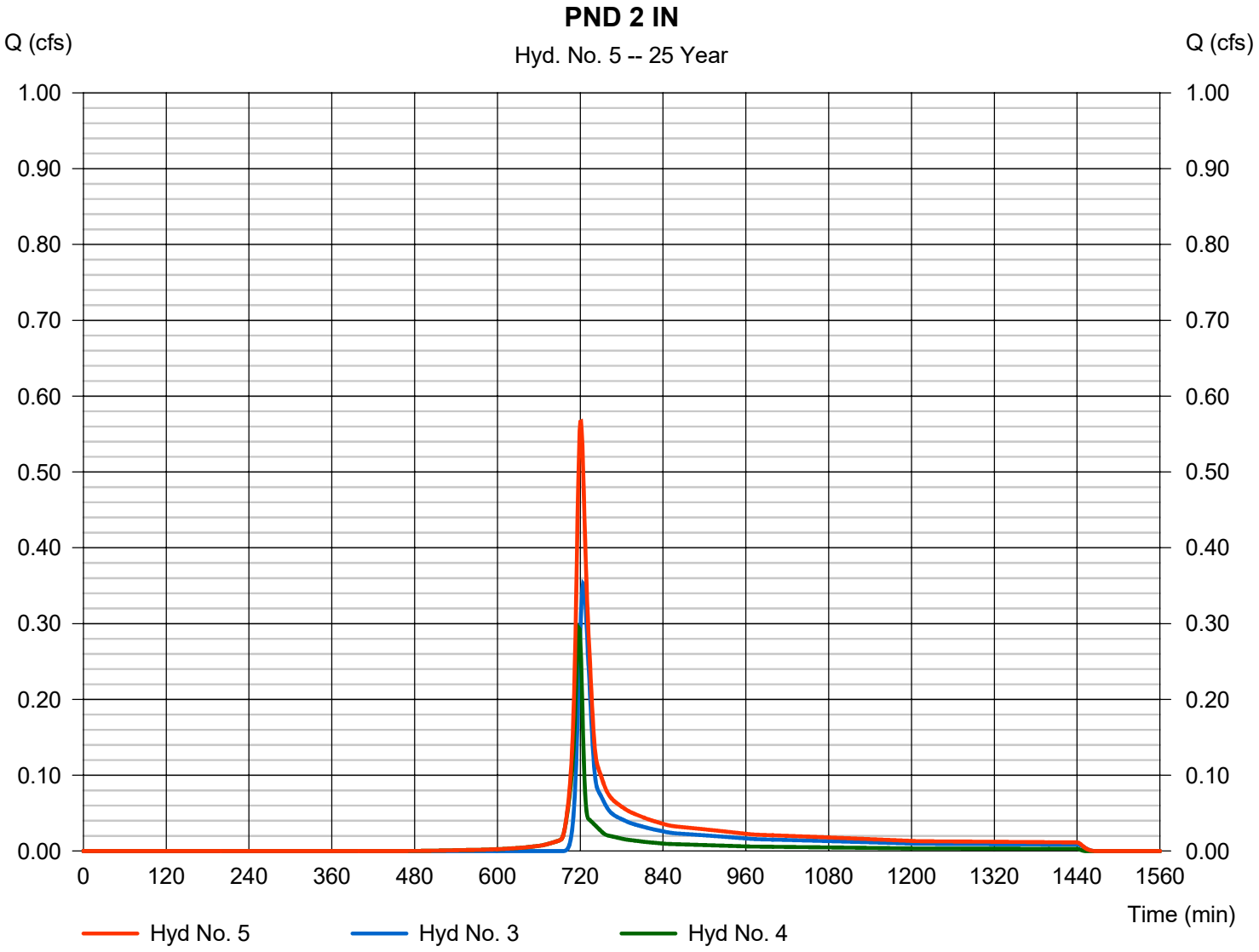


Hydrograph Report

Hyd. No. 5

PND 2 IN

Hydrograph type	=	Combine	Peak discharge	=	0.567 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	1,775 cuft
Inflow hyds.	=	3, 4	Contrib. drain. area	=	0.850 ac



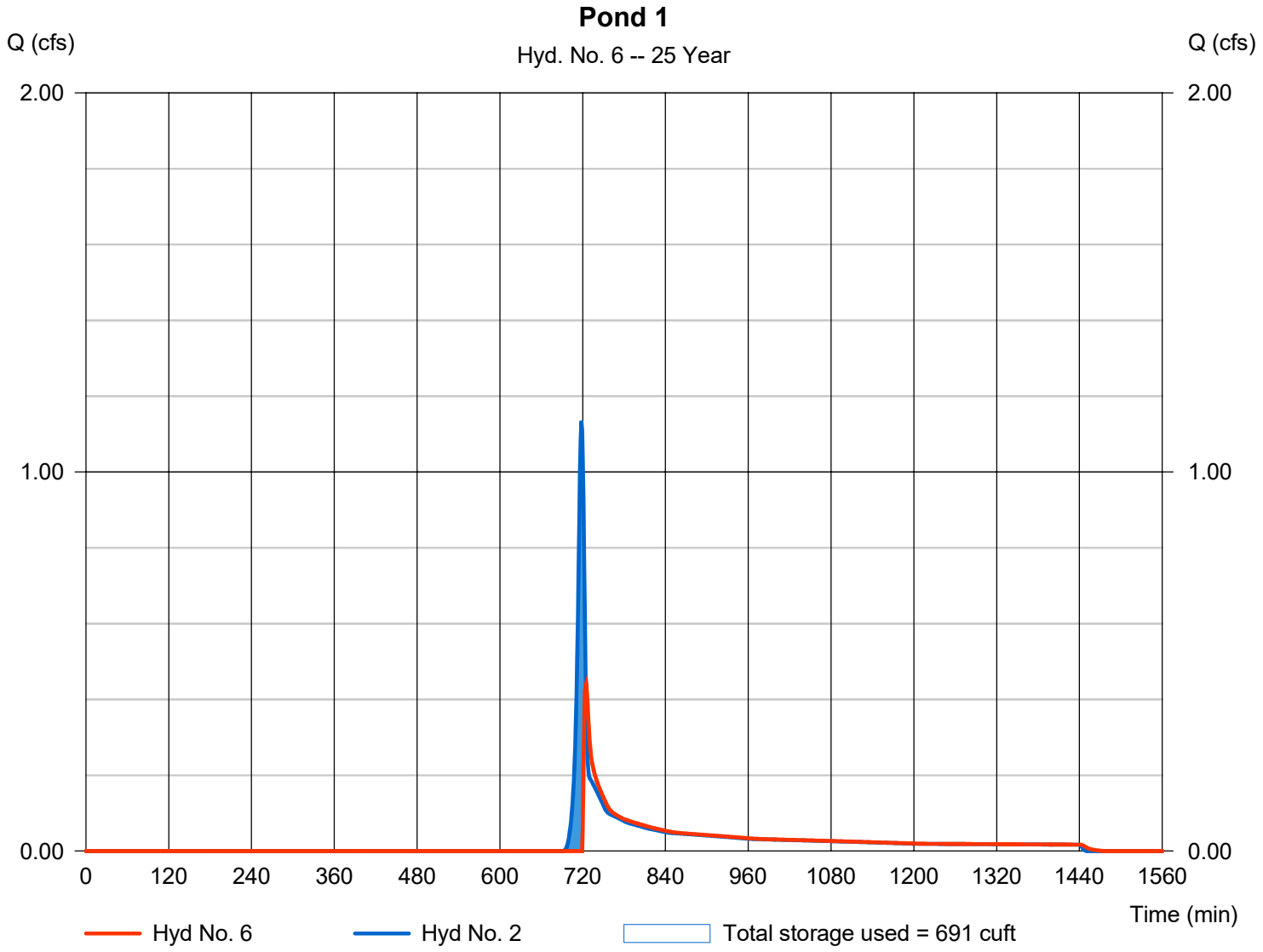
Hydrograph Report

Hyd. No. 6

Pond 1

Hydrograph type	=	Reservoir	Peak discharge	=	0.442 cfs
Storm frequency	=	25 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	1,840 cuft
Inflow hyd. No.	=	2 - DA-1	Max. Elevation	=	7956.45 ft
Reservoir name	=	<New Pond>	Max. Storage	=	691 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - <New Pond>

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 7955.55 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	7955.55	357	0	0
0.45	7956.00	756	250	250
0.95	7956.05	1,200	489	739
1.45	7957.00	1,200	600	1,339

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

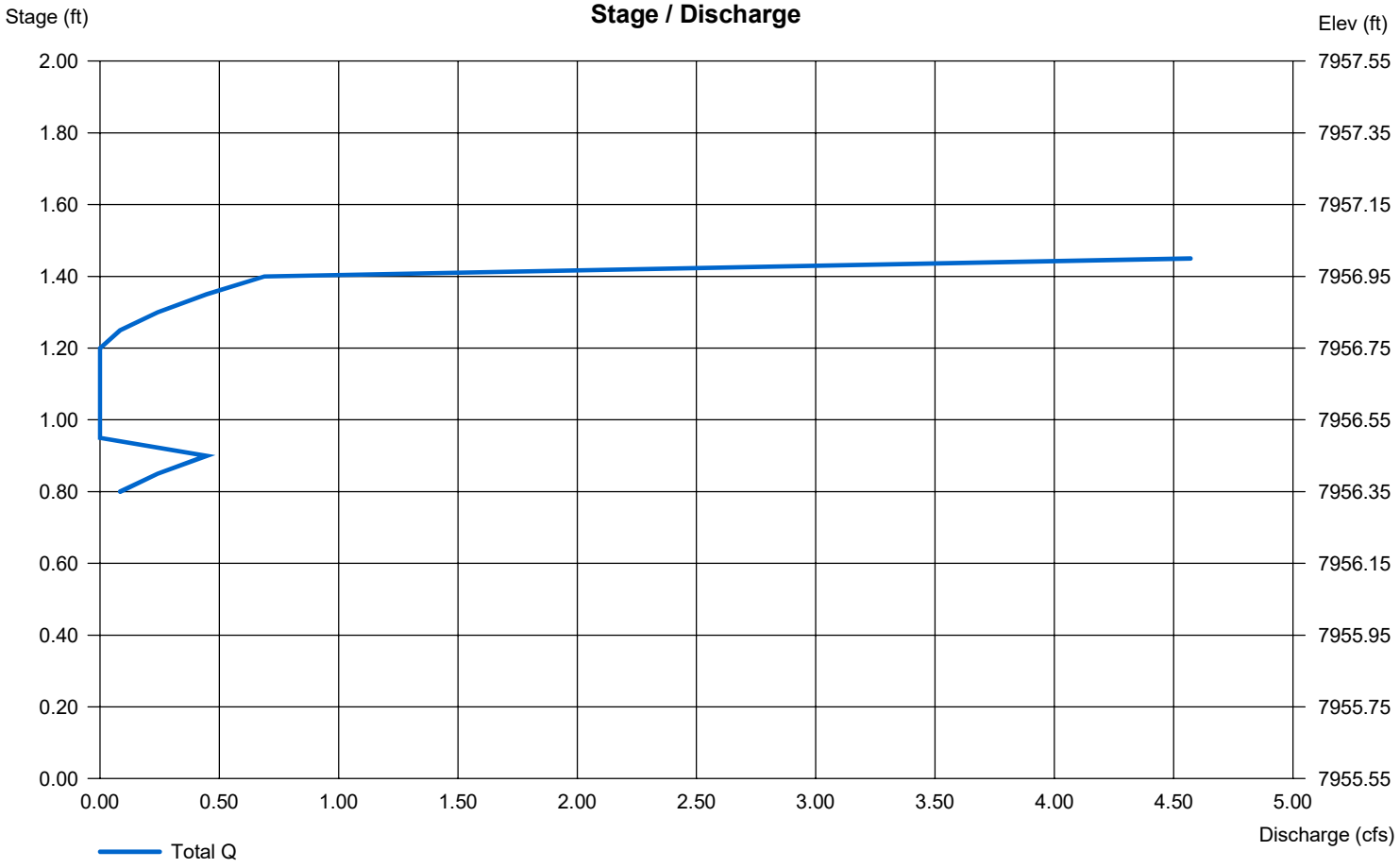
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 7956.30	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



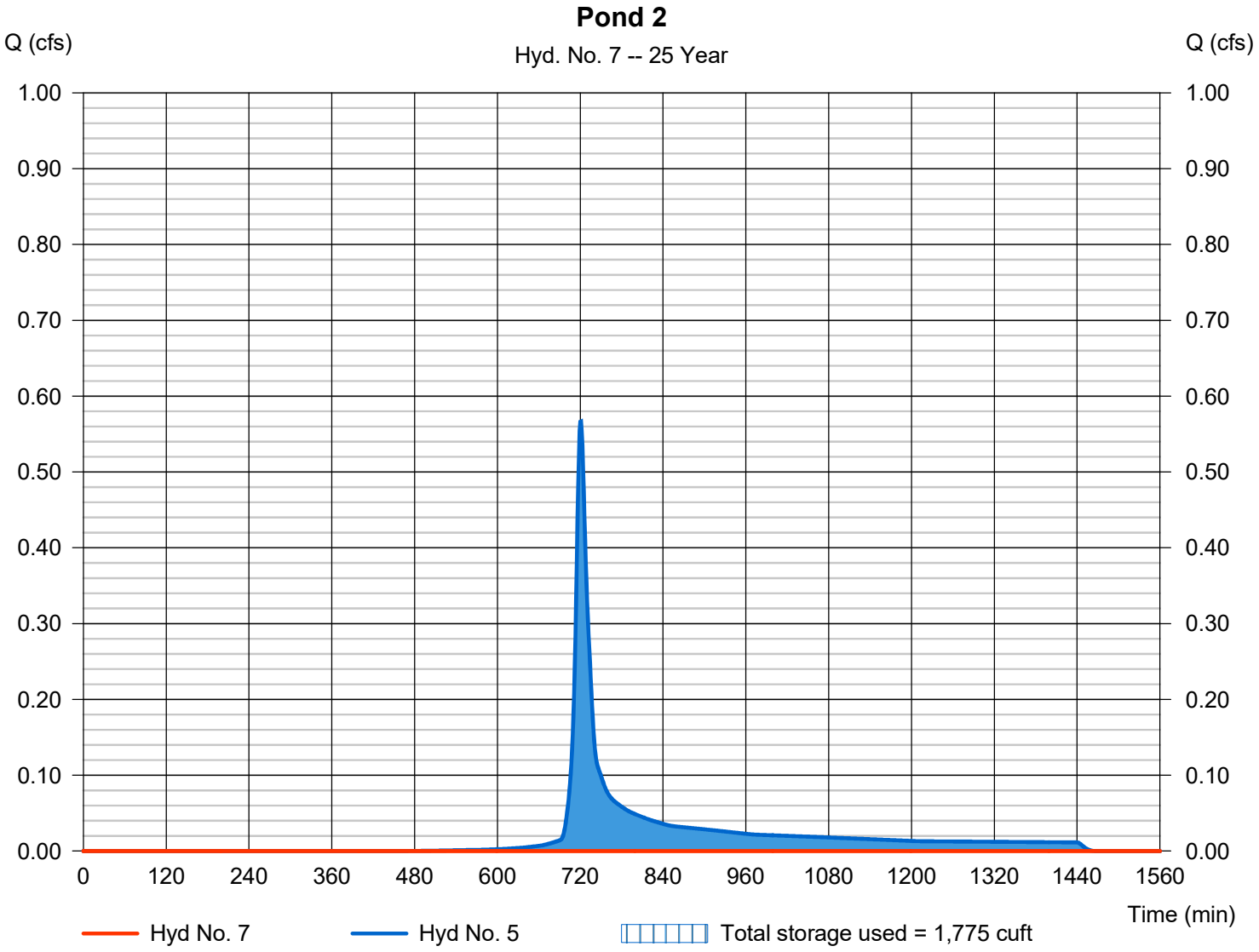
Hydrograph Report

Hyd. No. 7

Pond 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	25 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	5 - PND 2 IN	Max. Elevation	=	7954.17 ft
Reservoir name	=	Pond 2	Max. Storage	=	1,775 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Pond 2

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 7953.21 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	7953.21	1,288	0	0
0.79	7954.00	2,045	1,317	1,317
1.79	7955.00	3,258	2,651	3,968

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .000	.000	.000	n/a
Orifice Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

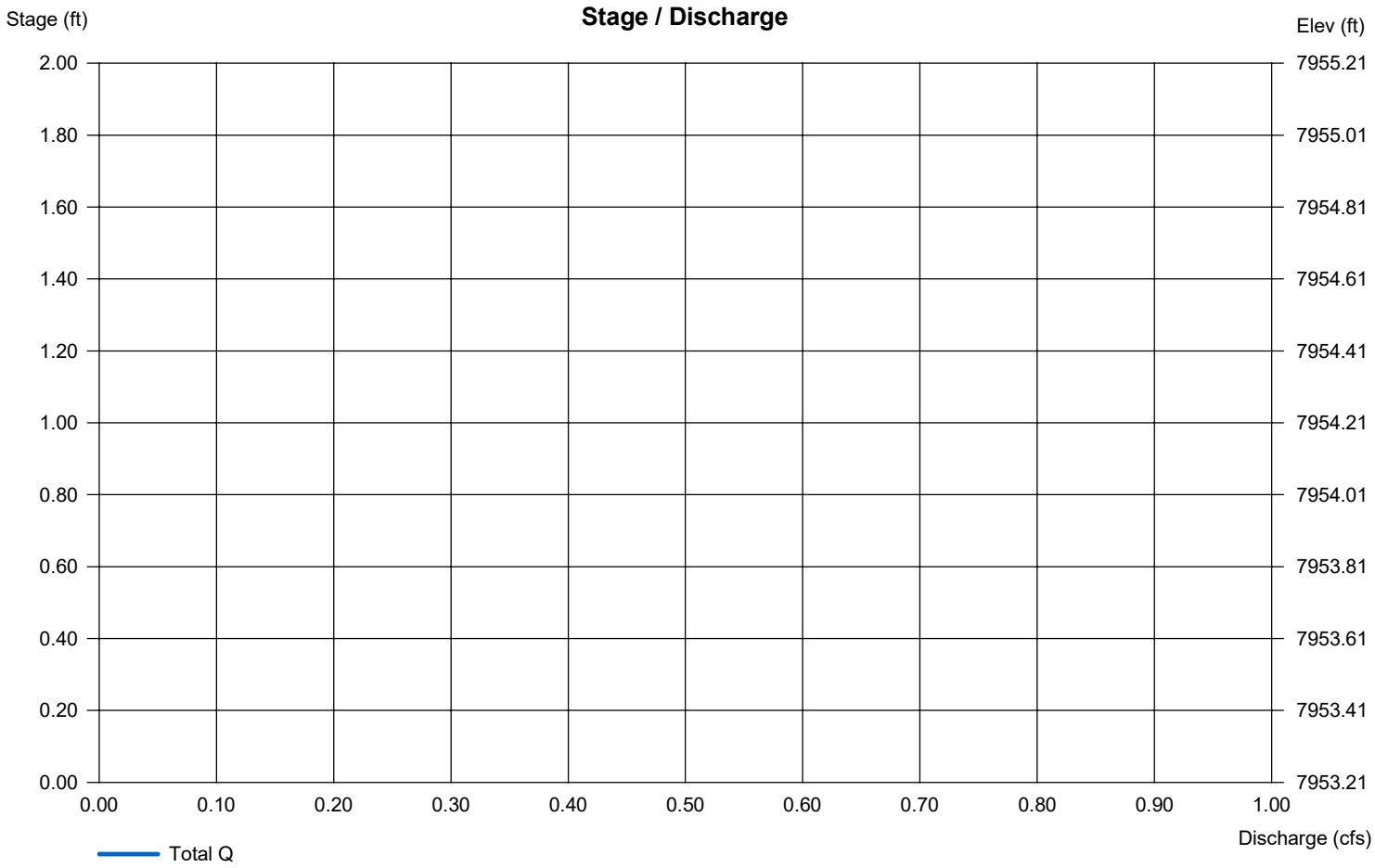
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

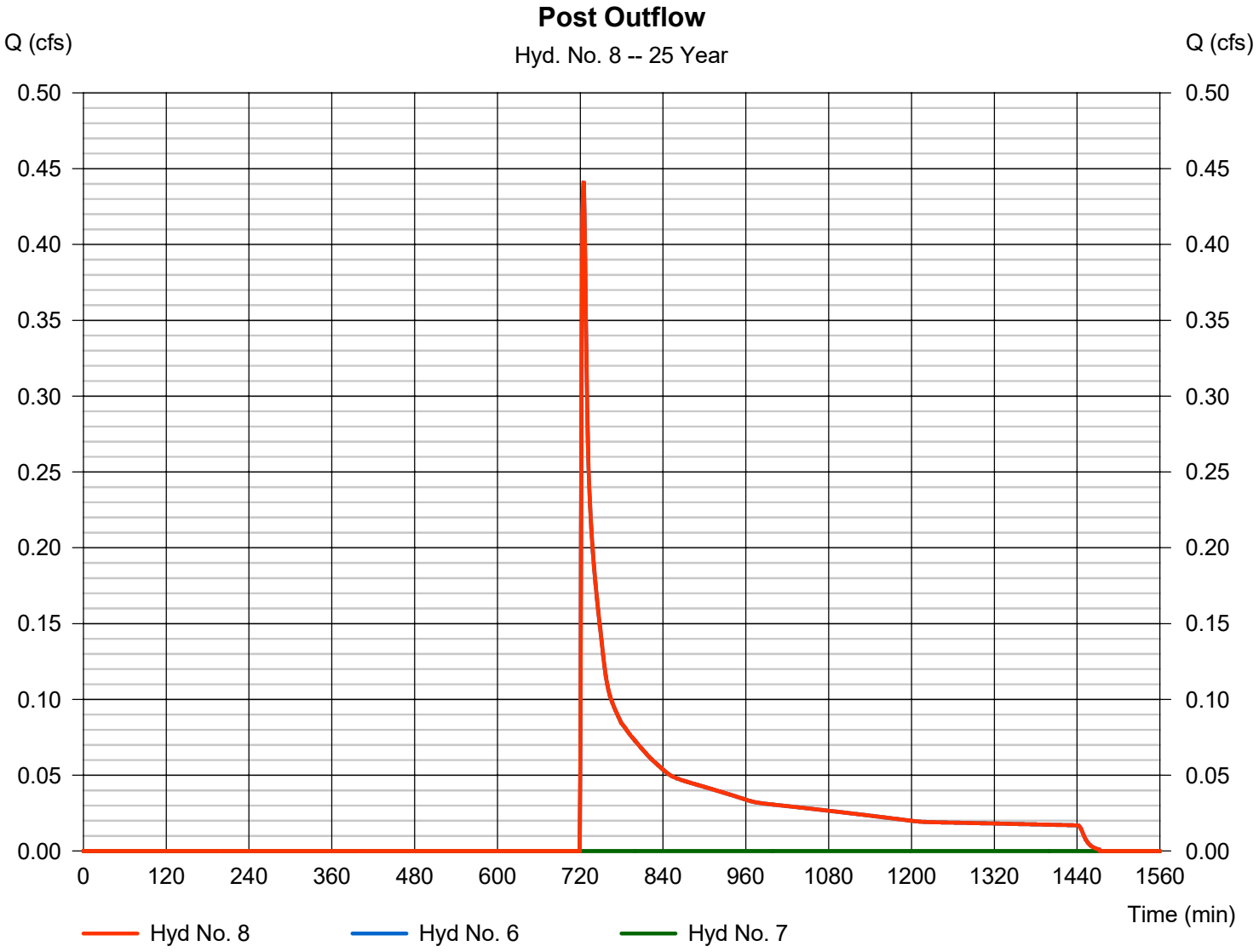


Hydrograph Report

Hyd. No. 8

Post Outflow

Hydrograph type	=	Combine	Peak discharge	=	0.442 cfs
Storm frequency	=	25 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	1,840 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

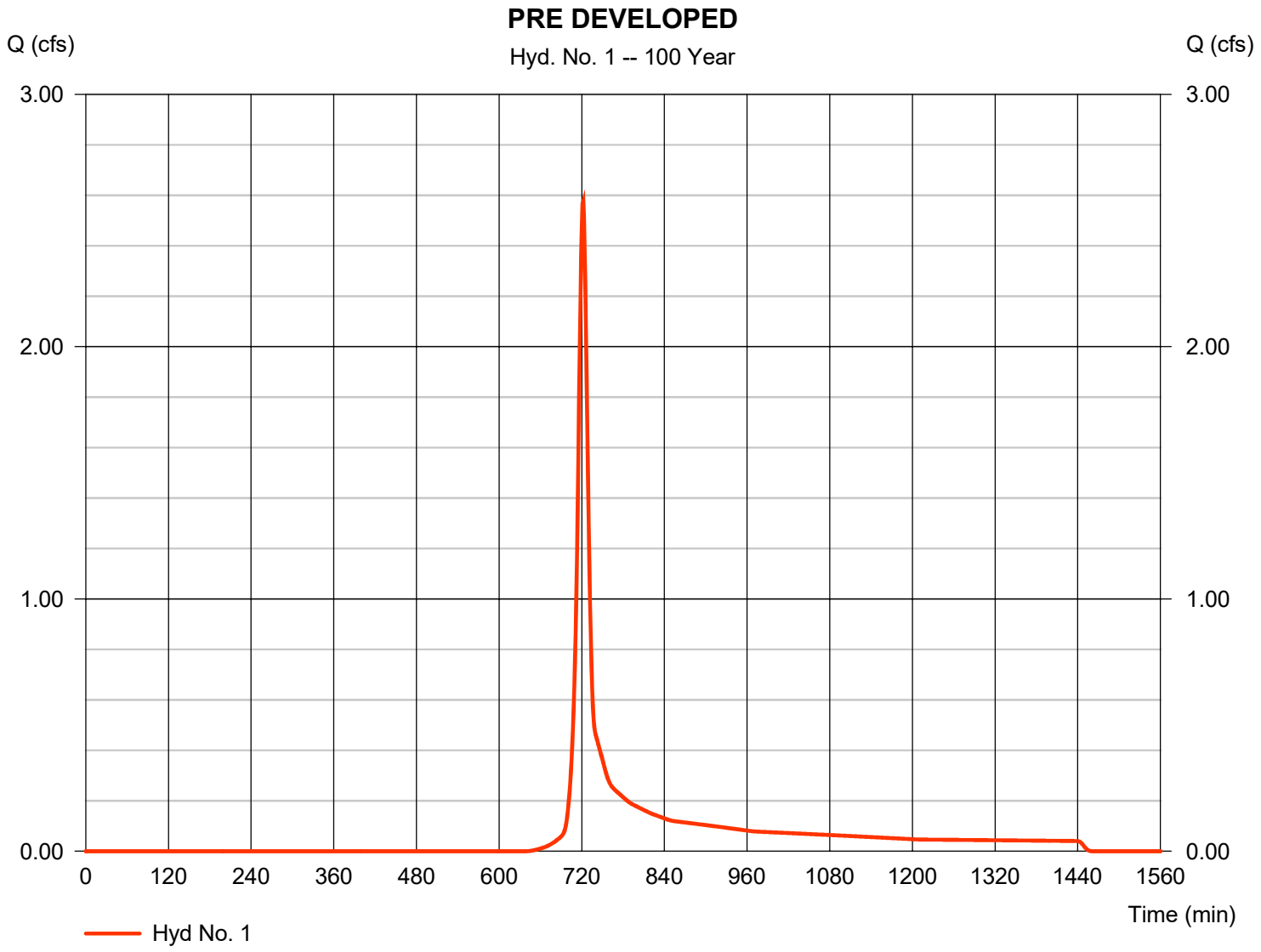
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.574	1	722	6,661	------	------	------	PRE DEVELOPED
2	SCS Runoff	1.970	1	718	3,993	------	------	------	DA-1
3	SCS Runoff	0.650	1	724	1,957	------	------	------	DA-2
4	SCS Runoff	0.415	1	718	892	------	------	------	DA-3
5	Combine	0.955	1	721	2,850	3, 4	------	------	PND 2 IN
6	Reservoir	1.231	1	723	2,953	2	7956.57	1,288	Pond 1
7	Reservoir	0.000	1	n/a	0	5	7954.58	2,850	Pond 2
8	Combine	1.231	1	723	2,953	6, 7	------	------	Post Outflow

Hydrograph Report

Hyd. No. 1

PRE DEVELOPED

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.574 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	6,661 cuft
Drainage area	=	2.140 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.00 min
Total precip.	=	2.55 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



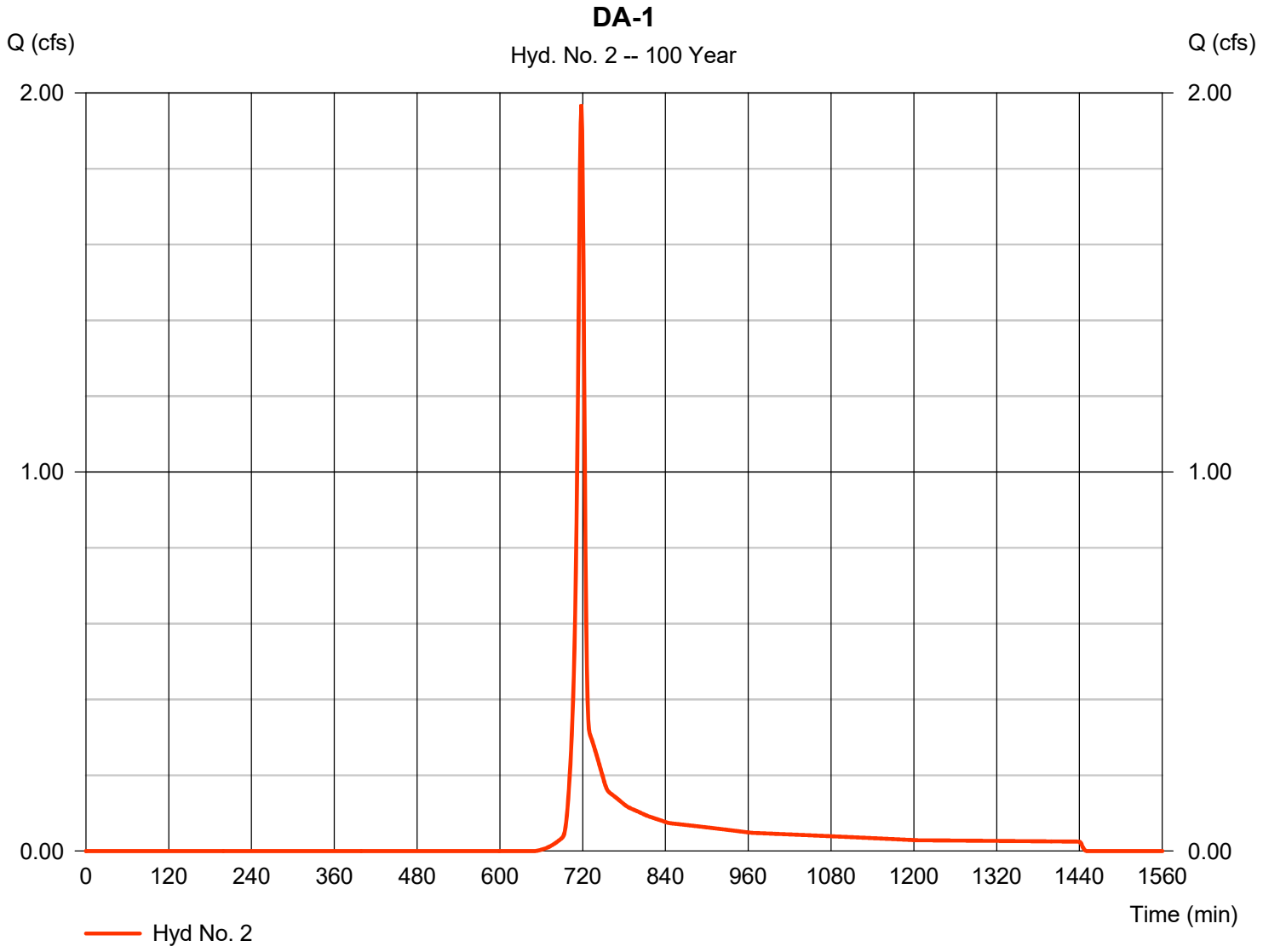
Hydrograph Report

Hyd. No. 2

DA-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.970 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	3,993 cuft
Drainage area	=	1.300 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	5.40 min
Total precip.	=	2.55 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.850 x 96) + (0.250 x 41) + (0.200 x 49)] / 1.300



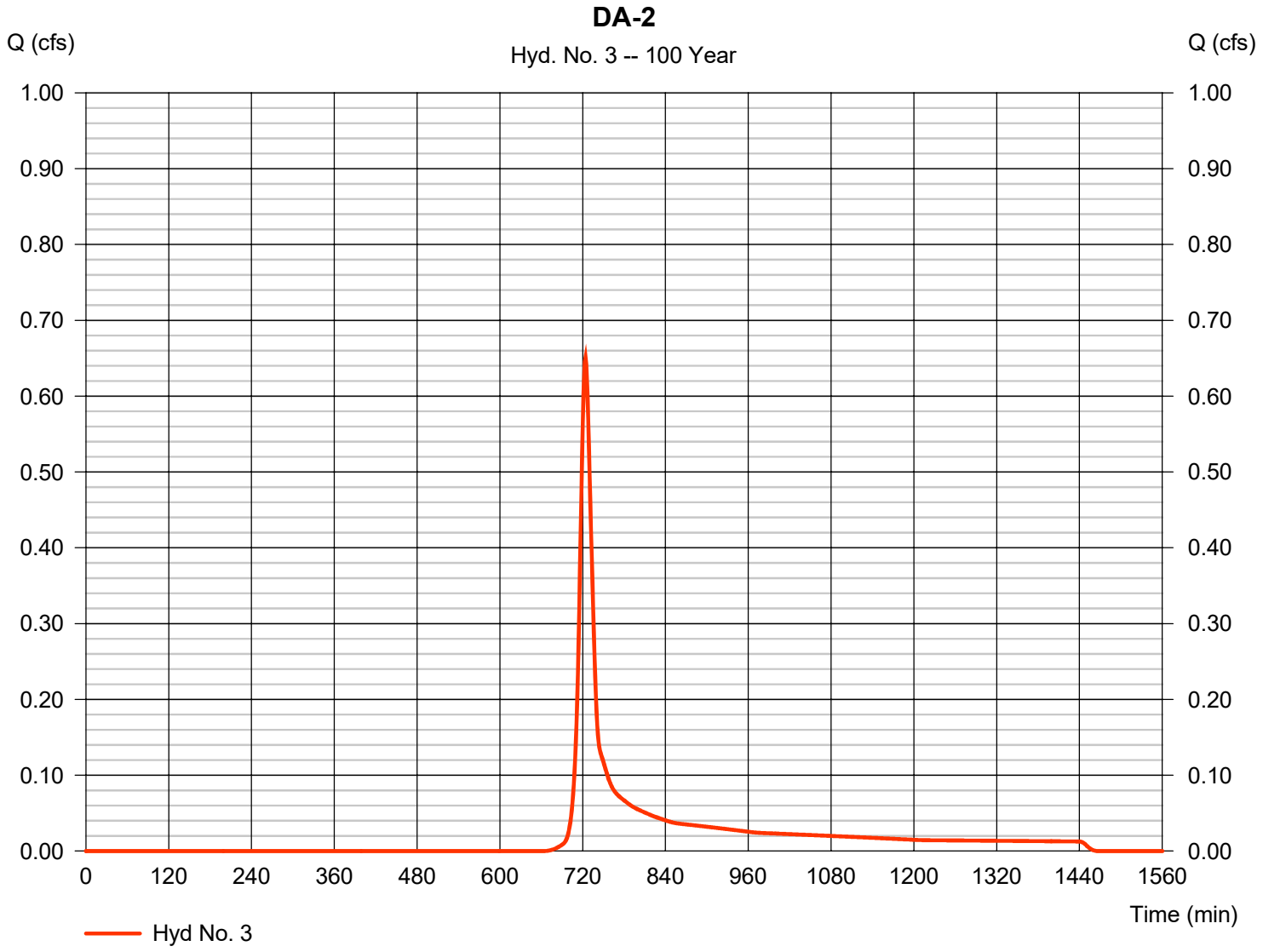
Hydrograph Report

Hyd. No. 3

DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.650 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	1,957 cuft
Drainage area	=	0.690 ac	Curve number	=	77*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	15.90 min
Total precip.	=	2.55 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.410 x 96) + (0.280 x 49)] / 0.690



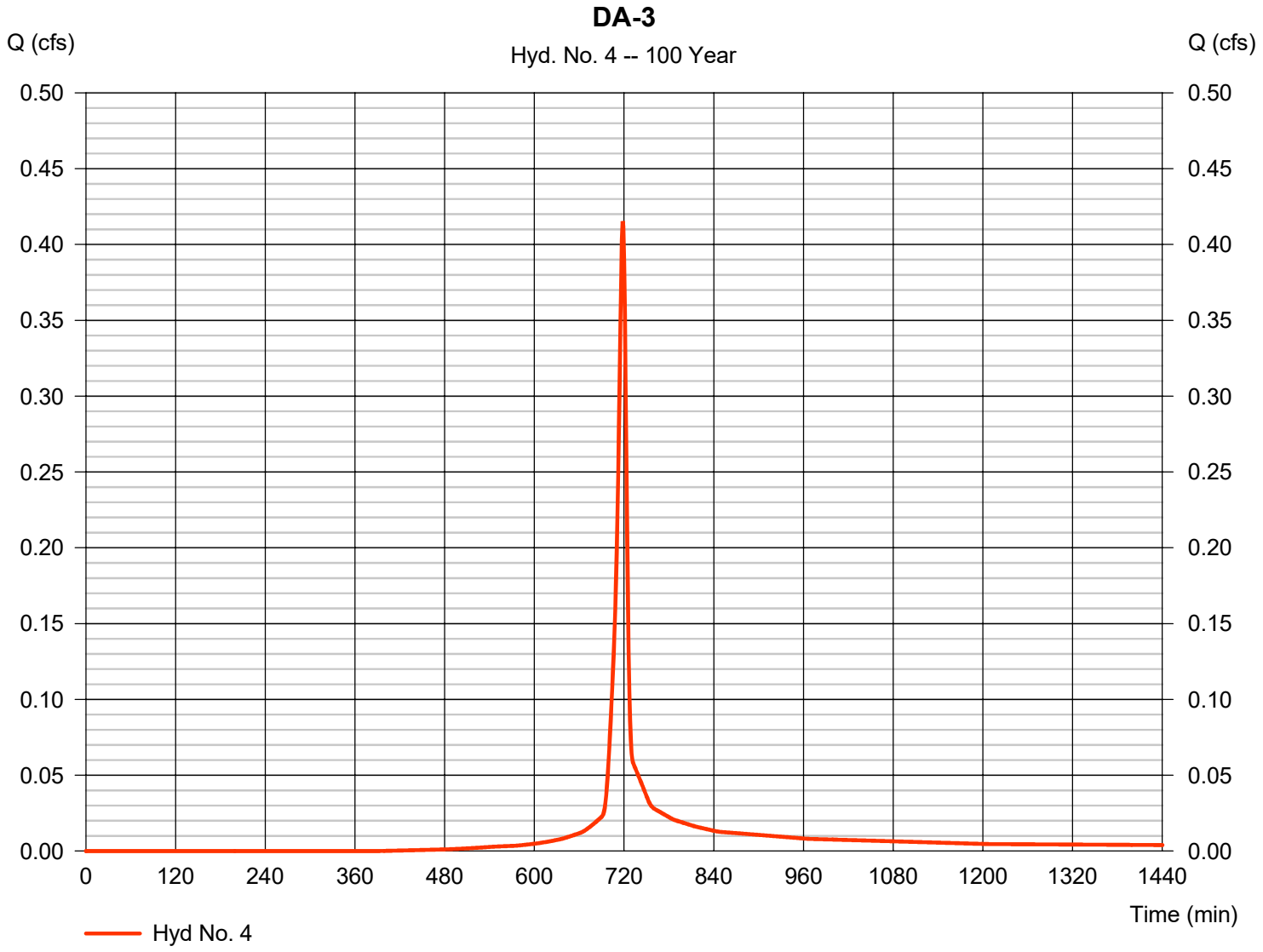
Hydrograph Report

Hyd. No. 4

DA-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.415 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	892 cuft
Drainage area	=	0.160 ac	Curve number	=	90*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.00 min
Total precip.	=	2.55 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.140 x 96) + (0.020 x 49)] / 0.160

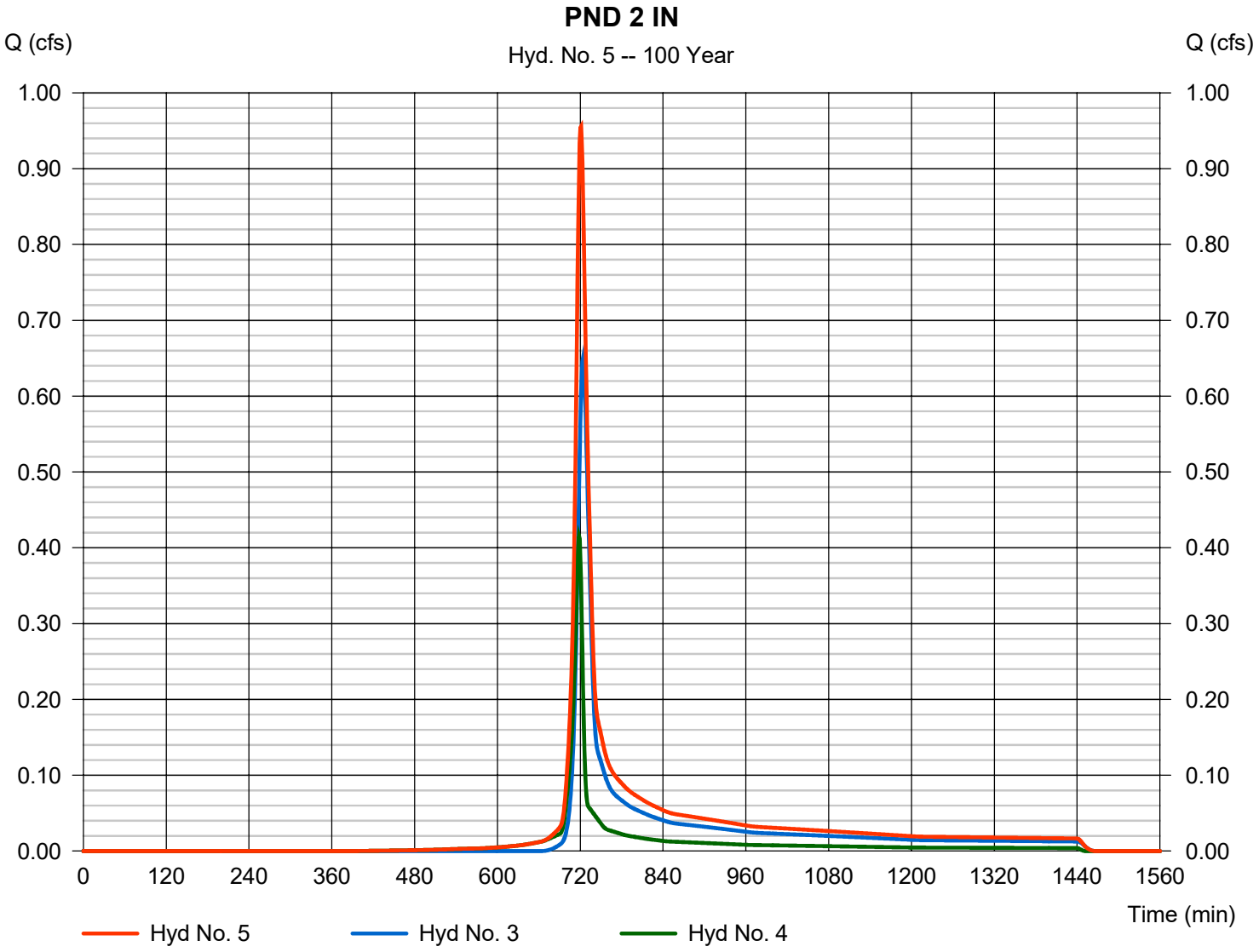


Hydrograph Report

Hyd. No. 5

PND 2 IN

Hydrograph type	=	Combine	Peak discharge	=	0.955 cfs
Storm frequency	=	100 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	2,850 cuft
Inflow hyds.	=	3, 4	Contrib. drain. area	=	0.850 ac



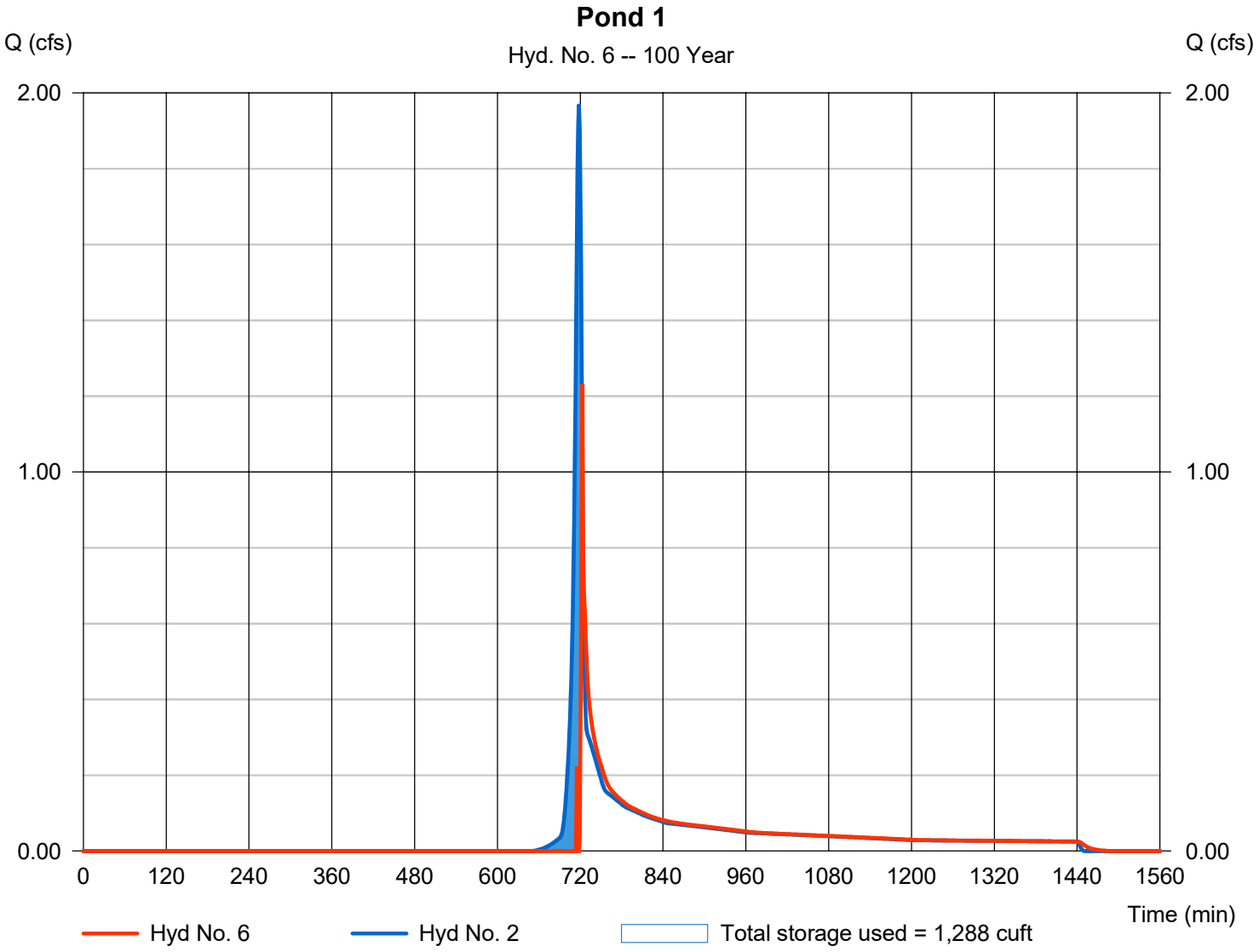
Hydrograph Report

Hyd. No. 6

Pond 1

Hydrograph type	=	Reservoir	Peak discharge	=	1.231 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	2,953 cuft
Inflow hyd. No.	=	2 - DA-1	Max. Elevation	=	7956.57 ft
Reservoir name	=	<New Pond>	Max. Storage	=	1,288 cuft

Storage Indication method used.



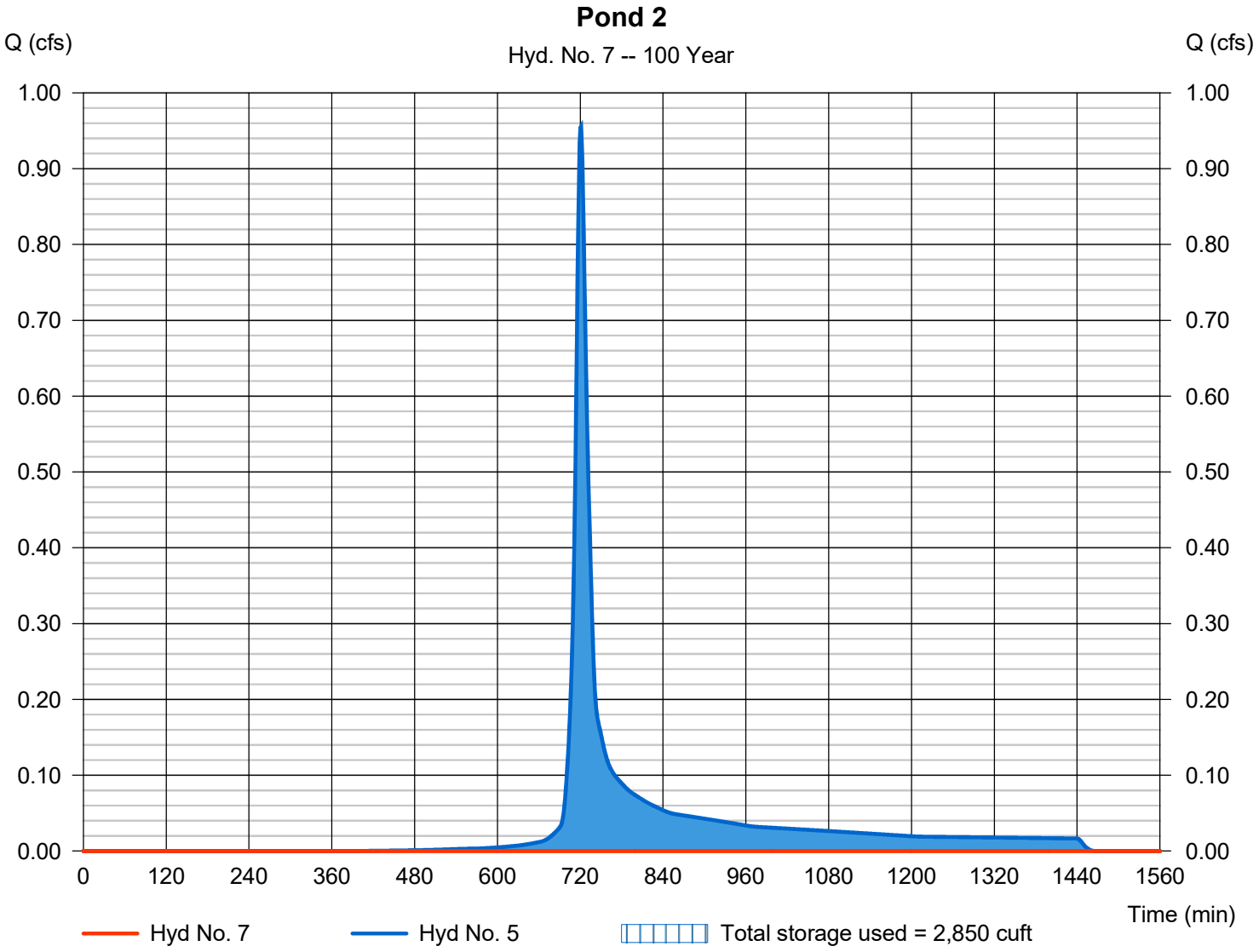
Hydrograph Report

Hyd. No. 7

Pond 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	100 yrs	Time to peak	=	n/a
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	5 - PND 2 IN	Max. Elevation	=	7954.58 ft
Reservoir name	=	Pond 2	Max. Storage	=	2,850 cuft

Storage Indication method used.

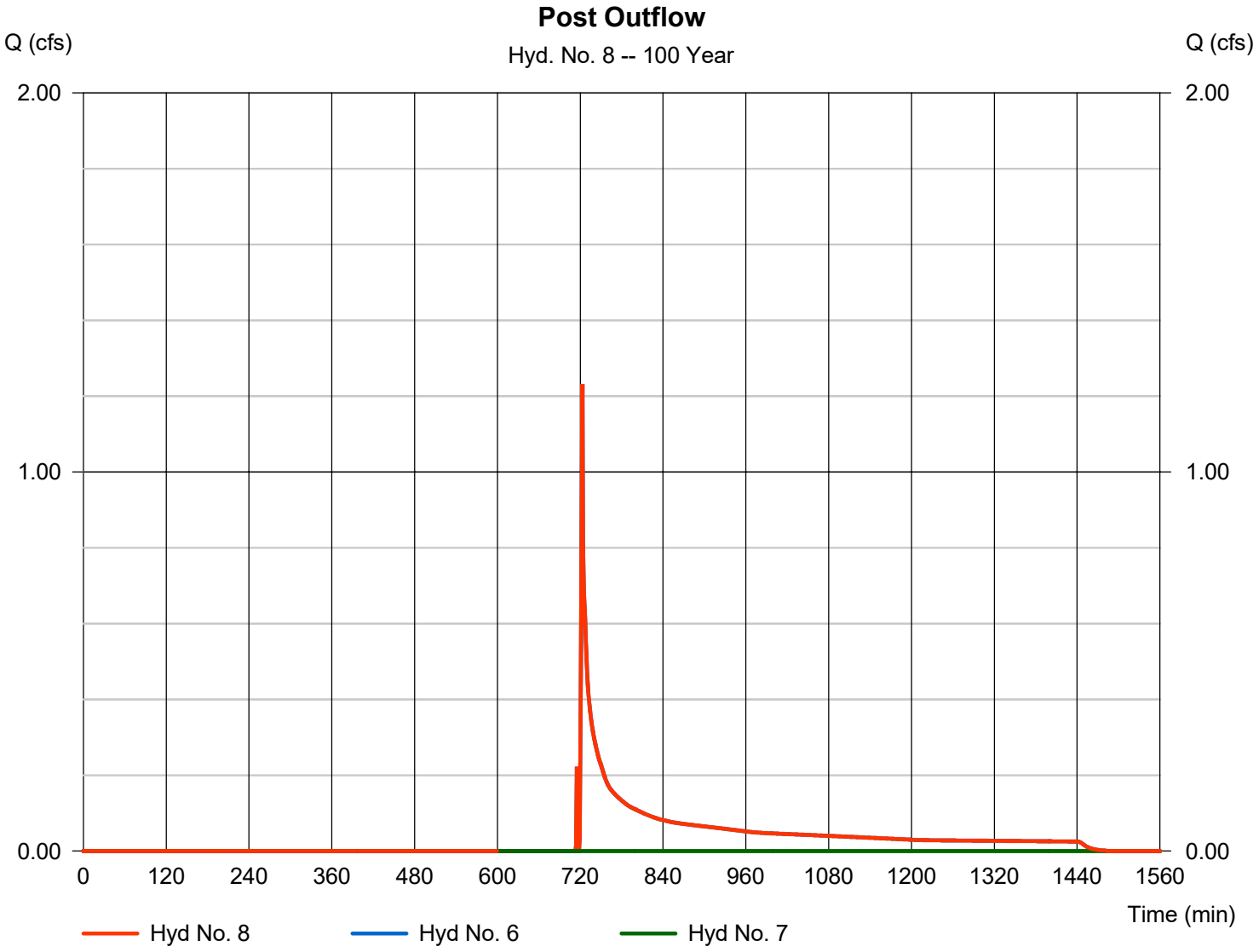


Hydrograph Report

Hyd. No. 8

Post Outflow

Hydrograph type	=	Combine	Peak discharge	=	1.231 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	2,953 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	0.000 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	22.6200	10.7000	0.8283	--------
3	0.0000	0.0000	0.0000	--------
5	33.6798	10.7000	0.8283	--------
10	42.1107	10.7000	0.8283	--------
25	51.6294	10.7000	0.8283	--------
50	59.7884	10.7000	0.8283	--------
100	67.0407	10.7000	0.8283	--------

File name: IDF CURVE.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.31	1.84	1.54	1.33	1.17	1.05	0.95	0.88	0.81	0.75	0.71	0.66
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	3.44	2.74	2.29	1.97	1.74	1.56	1.42	1.30	1.21	1.12	1.05	0.99
10	4.30	3.42	2.86	2.47	2.18	1.95	1.78	1.63	1.51	1.40	1.31	1.24
25	5.28	4.20	3.51	3.03	2.67	2.40	2.18	2.00	1.85	1.72	1.61	1.52
50	6.11	4.86	4.06	3.51	3.09	2.78	2.52	2.31	2.14	1.99	1.87	1.76
100	6.85	5.45	4.55	3.93	3.47	3.11	2.83	2.59	2.40	2.23	2.09	1.97

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	1.21	0.00	1.47	1.69	2.01	2.28	2.55
SCS 6-Hr	0.00	0.87	0.00	1.09	1.29	1.57	1.79	2.03
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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21023-DRAINAGE MODEL.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Friday, 01 / 27 / 2023

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APPENDIX D: U.S. FISH AND WILDLIFE SERVICE INFORMATION for PLANNING and CONSULTATION (IPaC) REPORT

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Chaffee County, Colorado

Local office

Colorado Ecological Services Field Office

(303) 236-4773
(303) 236-4005

MAILING ADDRESS
Denver Federal Center
P.O. Box 25486
Denver, CO 80225-0486

PHYSICAL ADDRESS
134 Union Boulevard, Suite 670
Lakewood, CO 80228-1807

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Canada Lynx Lynx canadensis There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened
Gray Wolf Canis lupus This species only needs to be considered if the following condition applies: • Lone, dispersing gray wolves may be present throughout the state of Colorado. If your activity includes a predator management program, please consider this species in your environmental review. There is **final** critical habitat for this species. https://ecos.fws.gov/ecp/species/4488	Endangered

Birds

NAME	STATUS
Mexican Spotted Owl Strix occidentalis lucida Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8196	Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	**Candidate**

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds

- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Brown-capped Rosy-finch Leucosticte australis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 15 to Sep 15
Cassin's Finch Carpodacus cassinii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15

Clark's Nutcracker Nucifraga columbiana — Breeds Jan 15 to Jul 15

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Virginia's Warbler Vermivora virginiae — Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9441

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

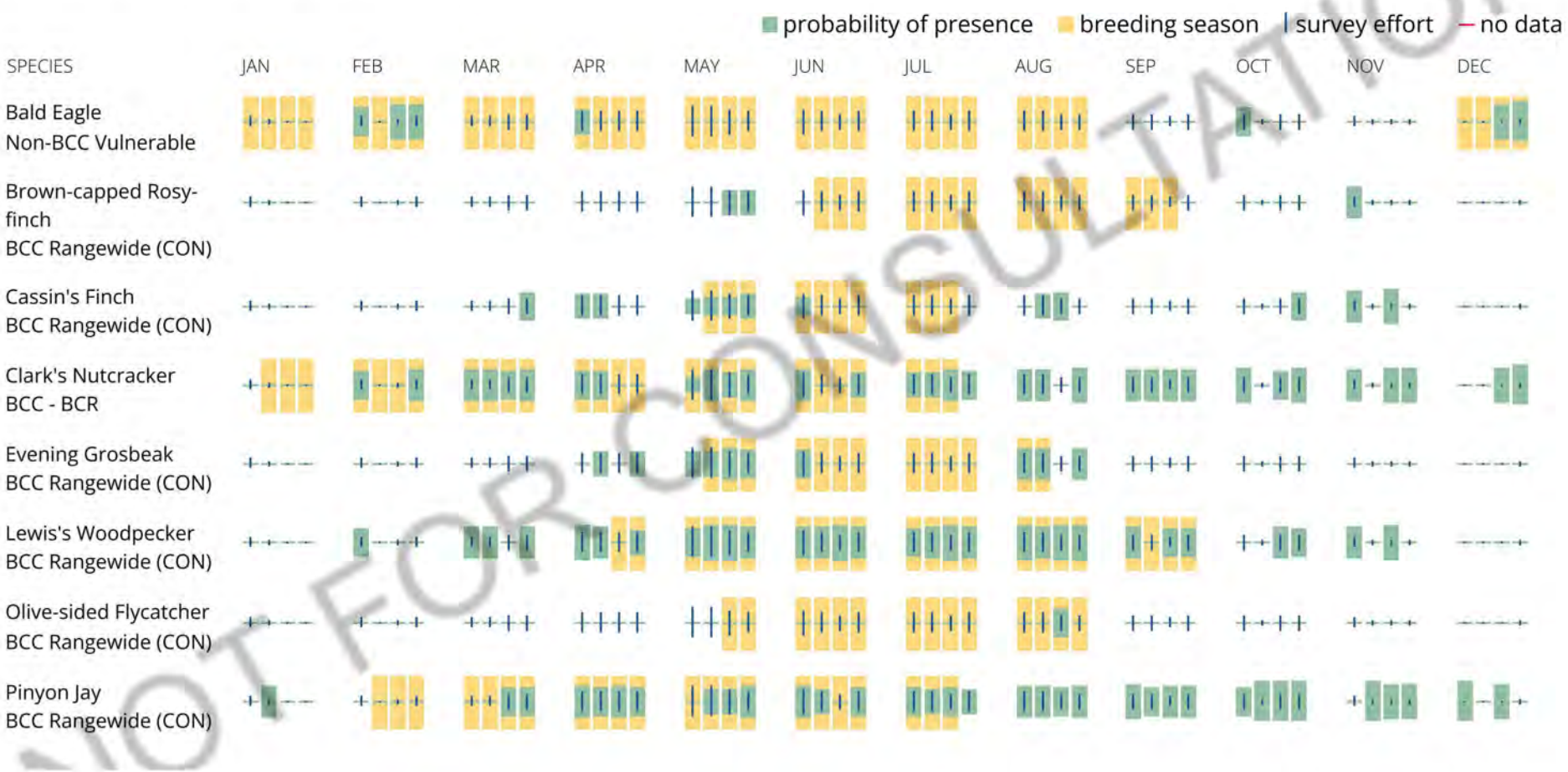
Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Virginia's Warbler
BCC Rangewide (CON)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.