Planning Commission

December 13, 2022 at 1:15 PM
1001 11th Avenue, City Center South, Greeley, CO 80631

Agenda

1. Call to Order
2. Roll Call
3. Approval of the Agenda

EXPEDITED AGENDA

The following items are routine in nature, fully described in the accompanying reports, and therefore staff summary presentations will be suspended unless requested by the Commission or member of the public in attendance at the meeting.

4. A public hearing to consider a request from DCP Midstream for a natural gas compressor station with various compression equipment on approximately 15.38 acres in the Holding Agriculture zoning district (USR2022-0011).
5. A public hearing to consider a request from Jeff and Kelly Cook, to rezone approximately 1.722 acres of land located at 1603, 1611, 1613, and 1619 7th Avenue from R-H (Residential High Density) to MU-H (Mixed Use High Intensity) zone district (ZON2022-0008).

END OF EXPEDITED AGENDA

6. Consideration of the 2022 Water Efficiency Plan Update
7. Consideration of proposed Water and Sewer Design Criteria and Construction Specifications
8. Staff Report
9. Adjournment

Planning Commission Agenda Summary

December 13th, 2022

Key Staff Contact: Michael Franke, Planner I, (970) 350-9782

Title:
Public Hearing to consider a Use by Special Review for a natural gas compressor station with associated facility equipment, known as the Canvasback Compressor Station, located south of US Highway 34, approximately ¾ mile west of 83rd Avenue, and east of 95th Avenue in the Holding Agriculture zoning district. (Project: USR2022-0011).

Summary:
The applicant, Michael Pishaki, on behalf of DCP Midstream, seeks approval of a Use by Special Review (USR) to allow for a new compressor station with associated equipment in the H-A (Holding Agriculture) zoning district. The subject site is located south of US Highway 34, approximately ¾ mile west of 83rd Avenue, and east of 95th Avenue. The subject parcel is 15.38-acres in size and is currently used for other oil and gas well production, dry crop farmland, and undeveloped land. The operation will consist of a construction and production phase for the proposed development. The City of Greeley Development Code states oil and gas development is permitted within all zoning districts upon approval of the USR process due to the highly regulated nature for oil and gas production.

Recommended Action:
Approval:
Based on the application received and the preceding analysis, the Planning Commission finds that the proposed Use by Special Review for compressor station with associated facility equipment in the H-A (Holding Agriculture) zoning district is consistent with the Development Code criteria of Section 24-206 (Items 1-8) and the proposed operation meets the provisions contained in Section 24-1102, Oil and Gas; and therefore, approve the Use by Special Review.

Attachments:
Staff Report
Attachment A – Aerial & Vicinity Map
Attachment B – Existing Zoning Map
Attachment C – Narrative and Operations Plan
Attachment D – Overall Site Plan
Attachment E – Environmental and Safety Plan
Attachment F – Traffic Impact Study
Attachment G – Tactical Response Plan
Attachment H – Noticing Boundary Area
Attachment I – Landscape Plan

PLANNING COMMISSION SUMMARY

ITEM: Use by Special Review (USR) for a compressor station and associated equipment in the H-A (Holding-Agriculture) Zoning District

FILE NUMBER: USR2022-0011

PROJECT: Canvasback Compressor Station Use by Special Review

LOCATION: Approximately ½ mile south of US Hwy 34, approximately ¾ mile west of 83rd Avenue, and east of 95th Avenue

APPLICANT: Michael Pishaki, on behalf of DCP Midstream.

CASE PLANNER: Michael Franke, Planner I

PLANNING COMMISSION HEARING DATE: December 13th, 2022

PLANNING COMMISSION FUNCTION:
Review the proposal for compliance with Section 24-1102, Oil and Gas Operations, and Section 24-206, Review Criteria/Uses by Special Review, of the City of Greeley Development Code and either approve, approve with conditions, or deny the request.

EXECUTIVE SUMMARY

The City of Greeley is considering a request by Michael Pishaki, on behalf of DCP Midstream, for approval of a Use by Special Review (USR) to allow a compressor station facility with various compression equipment that would be used to compress and transport natural gas. The proposed project would be on a property located approximately ½ mile south of US Hwy 34, approximately ¾ mile west of 83rd Avenue, and east of 95th Avenue (*Attachment A – Aerial & Vicinity Map and Attachment D – Overall Site Plan*). The subject site is approximately 15.38 acres in size and is zoned H-A (Holding Agriculture).

A. REQUEST

The applicant is requesting approval of a USR to allow a compressor station with various associated equipment used to compress and transport natural gas on a 15.38-acre site in the H-A zoning district. (*Attachment D – Overall Site Plan and Attachment C – Narrative*).

B. STAFF RECOMMENDATION

Approval.

C. LOCATION

Current Zoning:

H-A (Holding Agriculture) (*see Attachment B – Existing Zoning Map*)

Abutting Zoning:

North: H-A (Holding Agriculture) and I-L (Industrial Light Intensity)
South: H-A (Holding Agriculture)
East: H-A (Holding Agriculture)
West: H-A (Holding Agriculture)

Surrounding Land Uses:

North: Drop-Crop Farmland and Utilities
South: Dry Crop Farmland and Oil & Gas
East: Drop Crop Farmland and Oil & Gas
West: Dry Crop Farmland and Oil & Gas

Site Characteristics:

The site is primarily utilized for dry crop farming and undeveloped land. The site is nestled between the West Boomerang Ditch. The site is rural in nature containing portions of undeveloped land and sections of dry crop farming throughout. There is a small pond adjacent to the site with natural area, but there are no ecological hazards within the site. To the east of the pond there are three producing oil wells (Lundvall 1, Lundvall 18-6, Lundvall 18-12) and seven other oil wells that are abandoned (Chismar 18-63-1HC, Chismar 18-64-1HC, Chismar 19-69HC, Chismar 18-77-1HN, Chismar 18-78-1HN, Chismar 18-79-1HN, and Chismar 18-79HN). It is important to note all existing oil wells are not located within the compressor station parcel created by the minor subdivision process. Overall, the site is flat with elevation sloping downward slightly as moving south across the site.

D. BACKGROUND

The subject site was annexed into the City of Greeley and zoned H-A, in 2000, as part of the Lundvall Annexation (Reception No. 2835105, 2835106, and 2865059) (File No. A 35:00 and Z 37:00). The subject site has remained undeveloped, other than oil and gas operations.

E. OPERATIONS AND SITE DEVELOPMENT

General Operations and Characteristics:

The Canvasback Compressor Station would contain up to two compressor engines, which will be fully housed within an enclosed metal building. Additional equipment and structures proposed for the project would include, a compressor building, maintenance building, sales gas meter building, motor control center, communications tower, and an inlet meter building.

Gas would be transported to and from the facility by existing and proposed system of pipelines. The entire facility would be graveled and fenced. An electronic access gate would be installed to limit access to DCP employees and authorized users. Lighting would be kept to the minimum amount required and would utilize the dark-sky lighting standards. (*Attachment C – Narrative and Operations Plan*).

During construction the following vehicles would access the city right-of-way, Ninety-fifth Avenue: Bulldozers, back hoes, stringing trucks, side booms, dump trucks, and pickup trucks. After completion of construction, vehicles would periodically be on-site including cars, pickup trucks, and transport vehicles to inspect the valves and any site upkeep.

During the construction phase, water would be hauled in for dust mitigation and fire prevention purposes. Additionally, bottled water would be utilized for drinking and portable toilets would be available on site. Water for irrigating the plants indicated on the landscaping plan would be provided by two (2) freshwater tanks erected on or near the compressor station for the use of irrigating trees and shrubs via an automatic drip irrigation system. This water would be used for irrigation only and would remain on the site.

A site-specific Stormwater Management Plan (SWMP) has been submitted and reviewed for the project, which outlines sediment and erosion control measures to be implemented during and following the completion of the site construction to reduce the possibility of erosion and offsite sedimentation. Runoff from offsite drainage areas that are tributary to the parcel would be routed through the parcel and around the developed compressor station pad to the unnamed tributary to Sheep Draw. Stormwater runoff from the developed compressor station facility pad would be routed overland to a proposed onsite water quality pond, where it would be released at historic rates to the unnamed tributary to Sheep Draw. In addition to stormwater attenuation, the water quality pond would also be a secondary containment control for the facility's primary onsite spill containment areas/controls, in adherence with DCP's standard spill prevention control and countermeasures practices. The pond would be lined with a geosynthetic clay liner system and its release would include a manually operated valve (normally closed) that would be opened after each storm event has concluded and once DCP personnel have inspected the collected runoff is pollutant free. The disturbed area would be reclaimed as specified by landowner agreement.

The Canvasback Compressor Station would be an unmanned facility during operations, except for daily visits by DCP employees for monitoring and periodic visits from contractors for maintenance, and contracted services. There would be no full-time employees located on site. The contracted services can include consumable deliveries, condensate transport, produced water disposal, safety inspections, portable restroom cleaning, and additional miscellaneous services such as weed spraying. Based on the nature of the station being unmanned, there is no need for permanent water and sewer service. The location would be

remotely monitored by DCP 24 hours a daily, 365 days per year to allow for an immediate response to any indications of spills or releases.

Construction of the Canvasback Compressor Station would commence once the applicable approvals are issued and would take approximately 12 months to complete. Construction is currently planned to begin in January 2023 and finish would be finished approximately December 2023. Given the construction timeline, operations may begin in October 2023. The compressors on-site operate 24 hours a day, 7 days a week, 365 days a year. However, the station would automatically adjust to run only the engine compressors needed to adequately handle the volume of gas flowing through the pipeline.

DCP Midstream is required to use Best Management Practices during all phases of operations.

On-Site Storage:
During operation, only spare parts would be stored on site. Only critical spare parts and additional safety equipment would be stored on site. DCP stores topsoil onsite during construction and uses it as needed during construction. After construction, DCP spreads out the topsoil pile on location; however, DCP would use topsoil stockpiles wherever possible for additional screening and buffering.

Landscaping and Reclamation:
DCP designed the landscape plan for the Canvasback Compressor Station in an effort to comply with the purpose and intent of the City's Development Code landscaping standards and is requesting to be consistent with surrounding use oil and gas sites in the nearby vicinity. The proposed plan allows for optimal screening, reduces the overall footprint, and allows a substantial amount of land to be restored back to farmable ground after interim reclamation is complete. DCP's Landscape Plan addresses the City's standards for aesthetics, health and safety, environment and energy, and water efficiency. The Landscape Plan utilizes the natural topography on the southwest side, while screening and buffering the north, east, and west sides with xeriscape plantings. After the station has been constructed, the disturbed area would be required to be re-seeded with native seed mix and a mixture of trees and shrubs, estimated August 2023 (*see Attachment I – Landscape Plan).*

Upon successful completion of construction, disturbed soil areas may be natively seeded to support vegetation growth, soil stabilization and to prevent erosion. All site reclamation would be required to be in conformance with the City of Greeley code as well as COGCC rules and regulations.

APPROVAL CRITERIA

Use by Special Review: Uses by Special Review possess characteristics which require a public hearing to determine if a proposed use has the potential to adversely affect other

land uses, transportation systems, public facilities, or the like in the surrounding neighborhood. The Planning Commission may require conditions of approval necessary to eliminate or mitigate, to an acceptable level, any potentially adverse effects of the proposed use.

Section 24-206.b of the Development Code contains eight criteria that are used to evaluate Uses by Special Review:

1. All criteria for site plan review in Section 24-207

Staff Comment: The proposed project satisfies the requirements of Section 24-207 of the Development Code. The applicant has addressed all staff comments and included all required materials to satisfy the criteria for a Site Plan Review and for the Use by Special Review. (*Attachment D – Overall Site Plan*).

The proposal complies with this criterion

2. The application furthers the intent of the proposed zoning district, does not conflict with the intent of any abutting districts, and is otherwise determined to be consistent with the Comprehensive Plan.

The following Imagine Greeley Comprehensive Plan policies apply to this request:

- **NR-3.6 Resource Extraction**
  To the extent possible, minimize negative impacts from the extraction of sand, gravel, oil and gas, and other natural resources on the environment and surrounding land uses. Encourage the thoughtful reclamation of land that has been mined.

- **NR-3.11 Oil and Gas Operations**
  Encourage the co-location of oil and gas facilities, where possible, to minimize the overall footprint of affected areas and impacts on adjacent land uses and the environment.

- **TM-4.1 Truck Impacts**
  Establish and enforce appropriate truck routes to and through the city, including for hazardous materials. Encourage the co-location of oil and gas facilities in order to minimize impacts of transporting these resources on the community.

  Staff Comment: DCP Midstream proposes a compressor station and all associated equipment on one site, complying with co-location

standards of item NR-3.11. The cluster concept allows the operator to successfully compress and transmit natural gas, while reducing the footprint on the surface.

DCP Midstream will utilize an access road, 95th Ave/County Road 25, off US Highway 34 for all traffic associated with construction for the Canvasback Compressor Station. The site shall have one access road serving the site. The access road would be constructed to accommodate local emergency vehicles. The access road would be constructed as shown on the construction plans. DCP is required to maintain the access road in compliance with the City of Greeley's Municipal Code and ensure that all access road standards are met, in accordance to Section 24-1102.c.4. (see *Attachment D – Overall Site Plan and Attachment F – Traffic Study*).

The proposal complies with this criterion.

3. **Any associated site development or construction complies with requirements of this code, including any conditions or additional requirements identified for the particular use.**

Staff Comment: The proposed project complies with all development code requirements for site development and construction standards. Additional requirements, such as visual, noise, air quality, environmental, etc. mitigation have been provided within the narrative, operation plans, and submitted studies. Various city departments, external agencies, and abutting municipalities have reviewed the project proposal and have expressed no concern with the proposal as it meets all requirements for site design, site construction, production, and transmission of oil and gas goods.

The proposal complies with this criterion.

4. **Compatibility with the area in terms of operating characteristics such as hours of operation, visible and audible impacts, traffic patterns, intensity of use, and other potential impacts on adjacent property. The cumulative impact of a concentration of similar existing uses may be considered as part of the impact of a particular use.**

Staff Comment: The operating characteristics of the proposed project are within normal standards for the site location and abutting properties.

The site location is experienced with other oil and gas operations to the same standards as the proposed project. The surrounding uses of dry crop farmland, oil and gas production, create similar impacts to the proposed project and are not unusual for this area of the city.

DCP Midstream has conducted several studies and submitted each to the city for review, such as an Emergency Action Plan (EAP and Tactical Response Plan (TRP), Traffic Study, Final Drainage and Erosion Control Reports and Plans, Light Mitigation Plan, Environmental Study, etc. DCP Midstream must continuously monitor conditions of the site to comply with various mitigation standards. Upon review, staff found all submitted mitigation and response plans to be in compliance with City, County, State, and COGCC requirements.

Traffic impacts would be the greatest during the construction phase. DCP Midstream would utilize the lease access road, 95th Avenue and US Highway 34 for all traffic associated with construction and operation of the compressor station and associated equipment proposed. Ninety-fifth Avenue is designed and constructed to handle oil and gas production traffic, general traffic, and farming equipment. US Highway 34 is equipped for large travel volumes and truck travel. DCP Midstream is required to obtain all required Colorado Department of Transportation (CDOT) permits. Most of the traffic associated with construction and maintenance for the proposed Canvasback Compressor Station would come from 95th Ave/County Road 25, off US Highway 34. Any additional traffic would be accessing from 37th St. The project does not propose any traffic impacts unusual to the site and abutting properties. (*Attachment F - Traffic Impact Study, and Attachment C – Narrative and Operation Plan*).

The proposal complies with this criterion.

5. **The site is physically suitable for the proposed use, and whether any additional site specific conditions are necessary for the use to be appropriate and meet these criteria.**

Staff Comment: The 15.38-acre site is currently undeveloped and utilized for dry crop farmland. The site is adjacent to unoccupied parcels to the

east and south. The nearest structure to the facility is to the northeast, containing equipment used for electric utility. The site is unoccupied and accessed irregularly by the utility company employees. The equipment is over 600 feet away from the edge of the compressor station site boundary. To the west, there is additional dry-crop farmland with numerous plugged & abandoned oil & gas wells heads. Staff has not received any concerns from surrounding property owners regarding the proposed project.

All on-site equipment is required to be at least 150 feet from any wells or associated equipment in the low-density areas of the city and at least 200' from any occupied building. The proposed compressor station equipment is located at least, if not more than 150 feet from any occupied building or other existing equipment. The COGCC requires setbacks of at least 500 feet from any occupied building and at least 2,000 feet from any school facility, childcare center, and other habited uses. The proposed project complies with the COGCC regulations. The site is physically suitable for the proposed development and meets or exceeds the setback requirements required by the city and the COGCC. *(Attachment D – Overall Site Plan)*

The proposal complies with this criterion

6. **Whether a limited time period for the permit is reasonably necessary to either limit the duration of the use, assess the use against changing conditions in the area, or ensure periodic reporting and ongoing enforcement of the permit.**

Staff Comment: It is not necessary to limit the duration of the use. A limited time for the permit operation is not proposed, other than the natural timeline proposed for the project. The estimated schedule for the beginning of the site construction would be approximately January 2023, with construction ending in approximately December 2023. Operations are anticipated to begin in October 2023. Reclamation of the land shall take place once construction is completed. The compressor station site would operate until compression and transmission services are no longer needed or deemed economically unviable. Currently, there are no development plans in this area that would propose changing conditions in the area.

Periodic reporting and ongoing enforcement are required to be provided by DCP Midstream to agencies such as the COGCC for compliance with mitigation regulations. If necessary, City of Greeley Fire Department shall work with the applicant to address any issues violating municipal requirements for oil and gas operations. DCP Midstream must continuously monitor the project site. A DCP Midstream employee is required to visit the site daily. DCP Midstream staff shall address any aspects of the project that may fall out of compliance to meet regulatory requirements at the local, state, and federal levels.

The proposal complies with this criterion.

7. **The long-range plans for the surrounding area are not negatively impacted considering the permanence of the proposed use, the permanence of existing uses in the area, and any changes in character occurring in the area.**

Staff Comment: The subject area is identified in the Imagine Greeley Comprehensive Plan Land Use Guidance map as a suburban area, surrounded by mixed-use uses and community separator. At this time, there are not any anticipated developments Projected long range uses for this area could include residential commercial, and higher density residential uses to the north, closer to US Highway 34. The areas to the south of the site might develop with suburban development and remain agricultural for a community separator. The proposed project is placed as far south as possible, away from US Highway 34, where any potential future mixed-use development may occur in the future. Existing uses in the area are similar and suitable for oil and gas development, including dry crop farmland, vacant land, and other existing oil and gas operations. Mitigation measures are proposed to reduce impacts, or the cumulative effects associated with continuous oil and gas development within the area.

In general, staff has seen an increase in oil and gas activity on the western and southern sides of the city as operators look to identify locations that meet COGCC setback and spacing requirements and provide accessibility to resources located underdeveloped portions of the city. As this site may operate for several years, staff encouraged the operators to locate the facilities as away from potential residential development and provide some improvements based on the nexus of rough

proportionality for each site, such as landscaping and access roadways, which staff finds to be applicable for the Canvasback project.

The proposal complies with this criterion.

8. **The recommendations of professional staff or other technical reviews associated with the application.**

Staff Comment: The City of Greeley sent out referrals to potentially impacted agencies and did not receive any concerns or comments regarding the proposal of the Canvasback Compressor Station. CDOT has no objections or concerns regarding the proposed development.

Various agencies and city departments have been involved in the review of the proposed project as planned due to compliance with required standards of local, state, and federal policies for oil and gas development and production. DCP Midstream has submitted the proposed project to the COGCC for review and hearing approval.

The proposal complies with this criterion

Oil and Gas Operations

Applications for Uses by Special Review for oil and gas operations are subject to the provisions of Section 24-1102, Oil and Gas. Sections 24-1102.c through Section 24-1102.h address well and production facility setbacks, disposal of production waste, seismic operations, signage, access roads, environmental requirements, recordation of flow lines, reclamation of the site, abandonment and plugging of wells, well operations in high density areas, compliance with COGCC, review criteria, and inspection requirements.

Staff Comment: A review of information submitted by the applicant indicates compliance with Sections 24-1102.c through 24-1102.h. These design and operational requirements are reflected in the site plan, landscape plan and standards attached for potential approval (*Attachment D – Overall Site Plan, Attachment E – Environmental and Safety Plan, and Attachment C – Narrative and Operations Plan*).

This proposal complies with this criterion.

F. PHYSICAL SITE CHARACTERISTICS

1. HAZARDS

There are no known hazards on the proposed subject site.

2. WILDLIFE

The proposed site falls within the Big Game Management Area, which covers all of Greeley and surrounding areas. DCP conducted a biological survey of the proposed facility site and surrounding area. No protected species or their habitats were found to occur within the facility footprint. DCP would be required to maintain the existing trees, willows, and wetland habitats within the project area, which would continue to provide wildlife habitat. If wildlife issues or concerns are identified during construction or operations, DCP environmental personnel would coordinate with the Colorado Department of Parks and Wildlife.

A small portion of the proposed Canvasback facility is located within the half-mile buffer to a nesting area identified by CPW. This includes the access point, pipeline valves, and storage areas. The compressor building and associated equipment are located outside of this half-mile buffer. To meet project scheduling and customer commitments, DCP is planning to initiate construction on the project within the seasonal restrictions recommended by CPW of December 1 through July 31. DCP Midstream reached out to the United Stated Fish and Wildlife Services (USFWS) department regarding information on potential impacts to the nesting area and the need for an incidental take permit to begin work on the project within the seasonal restriction period. The USFWS reviewed the project and found that impacts to the nest are unlikely to occur and recommends against obtaining an incidental take permit. Given that no disturbance is proposed within 660-feet of the nesting area and only limited surface disturbance and permanent infrastructure are proposed just within the 0.5-mile buffer of the nest; the USFWS does not think that disturbance take is likely to occur in response to this project.

Although the CPW may recommend timing restrictions within a half-mile of the nest, any impacts from this project to the nest site are regulated under the Bald and Golden Eagle Protection Act under the jurisdiction of the USFWS. As the USFWS does not believe this project would result in impacts to the bald eagle nest, the project can move forward as currently planned, based on review and comment provided by the USFWS.

As an advisory to the applicant, the Development Code indicates that if there are black-tailed prairie dogs inhabiting portions of the site, they must be properly removed as indicated in Section 24-1102 (e) (2) and destruction of prairie dog towns many do not occur during the nesting season (May 15 – September 15) due to the potential presence of the burrowing owl. If burrowing owls are actively nesting on the site or brood-rearing is present, a plan shall be developed by the applicant and approved by the City and/or the Colorado Division of Wildlife. It must be implemented before development occurs. Staff finds the applicant has worked with appropriate agencies and coordinated strategies for ecological mitigation. No activity for the proposed project shall disturb any ecologically

significant lands nearby. The applicant shall work to mitigate against any impacts to ecologically significant areas.

3. FLOODPLAIN

The subject site is not located in the floodplain or floodway according to Federal Emergency Management Administration (FEMA) flood data.

4. DRAINAGE AND EROSION

A drainage report was submitted by the applicant and reviewed by the Engineering Development Review Division, which indicates that significant changes in natural drainage patterns are not anticipated. The compressor station site will be monitored during the various phases of the project for any stormwater erosion or sedimentation concerns. Necessary measures would be required to be taken to correct any problems, immediately in most cases. DCP must continue to monitor the site until all applicable regulatory requirements for revegetation have been met.

5. TRANSPORTATION

DCP would utilize an access road, 95th Ave/County Road 25, and US Highway 34 for the majority of traffic associated with construction and maintenance for the proposed Canvasback Compressor Station, with any additional traffic accessing 37th St. The access road must be constructed at a minimum of 24 to 30 foot wide (based on location on the site, see Site Plans for details), with a minimum 13.5 feet of overhead clearance. The access road is required to be constructed of 1 and ½ in crushed road base over a minimum of 6 inches of subgrade or aggregate base course compacted to 95% Standard Proctor Density. The access road would be properly graded for adequate drainage and maintained to prevent dust and mud; culverts shall be utilized where necessary. DCP has corresponded with CDOT about access to the site, so any required CDOT permitting shall be coordinated between the two parties. A transportation study/memo has been prepared by a traffic consultant. (see Attachment F – Traffic Study).

G. SERVICES

1. WATER

Because no personnel are on the location for an extended period of time during or after construction, no potable water services of any kind would be required or provided. Any water required for construction purposes shall be the responsibility of the applicant to acquire in coordination with the City of Greeley Water and Sewer Department, or other applicable supplier. During the construction phase, water would be hauled in for dust mitigation and fire prevention purposes. Additionally, bottled water shall be utilized for drinking and portable toilets will be available. Water for irrigating the plants indicated on the landscaping plan would be provided by two (2) freshwater tanks erected on or near the compressor station for the use of irrigating trees and shrubs via an automatic drip irrigation system. This water would be used for irrigation only.

2. SANITATION

Portable sanitary facilities would need to comply with COGCC Rules and Regulations and maintained on the location during construction. Because no personnel would be on location for an extended period of time during or after construction, no sewer services of any kind would be required or provided. An DCP employee or contractor must visit the site every day and is required to pick up and dispose of any debris.

3. EMERGENCY SERVICES

The property would be served by the City of Greeley's Fire Department, as it serves the residences along US Highway 34 corridor, east of State Highway 257. The nearest fire station to the site is Greeley Fire Department Station No. 6, approximately 2 miles from the site. Additionally, an Emergency Response and Fire Protection Plan (ERFPP), also called Tactical Response Plan, was reviewed by the Greeley Fire Department and complies with City standards (*see Attachment G – Tactical Response Plan*).

As the emergency response agency, that would be called to mitigate an incident, the Greeley Fire Department has implemented strategies to mitigate the risks associated with potential incidents related to oil and gas facilities, just as they do with the vast array of other risks in the community. These strategies consist of identifying the hazards associated with oil and gas operations, developing a mitigation strategy, updating the strategy as the risks change, implementing the plan, when necessary (response), and then reviewing and making corrections as necessary after an incident.

Some highlights of this strategy include the Greeley Fire Department being actively involved in the review and permitting of oil and gas operations; training and equipping members of their department to be prepared to fight flammable liquids fires; command staff attending courses on handling oil and gas well emergencies; incorporating oil and gas well response into the required training program for all firefighters; reviewing local incidents outside the Departments response area and sharing critique information with all personnel. The Fire Department uses a fire suppression foam trailer to improve flammable liquid fire mitigation response time.

4. PARKS/OPEN SPACES

The City of Greeley's *Parks, Trails, and Open Lands Master Plan* (PTOL) does not identify any future parks or trails that would intersect the proposed project parcel or site. PTOL does propose a neighborhood park to the south of the subject site; however, the neighborhood park would not be implemented until residential development in this area occurs. Such development is not projected to occur within the lifetime of the proposed project. The City of Greeley Parks Department reviewed and accepted the proposed project as planned. No open space or parks is required with this development; however, sufficient open space (not usable) would be present after construction has completed.

5. SCHOOLS

This project would have no impact on area schools. No schools are proposed or located within the site.

H. NEIGHBORHOOD IMPACTS

1. VISUAL

The Canvasback Compressor Station would be painted Carlsbad Canyon Tan in accordance with the City's regulations to blend into the surrounding area. Existing vegetation would remain, and additional landscaping would be installed in accordance with the landscape plan for the site. Any lighting fixtures necessary to maintain site security is required to comply with the Development Code standards. Any on site fencing shall be constructed in a manner that provides additional visibility screening from the operation. DCP is required to add screening to the proposed chain link fence and ensure color chosen complies with Section 24-1102.e.2(c) of the Municipal Code while providing visual mitigation from equipment.

Lighting for the Canvasback Compressor Station is designed to comply with the City of Greeley's Development Standards for the special lighting application and to ensure "Dark Sky" compliance. The lighting fixtures as described in the Photometric Study, would all be directed downward, fully cutoff with flat lenses that are implemented in a "Dark Sky" compliant manner. The Study also demonstrates that the lighting design and fixtures does not allow light trespass from the subject site.

2. NOISE

Any operations involving mechanical equipment are subject to and is required to comply with the noise regulations set forth by the City of Greeley.

In determining noise mitigation, DCP has taken into consideration specific site characteristics, such as nature and proximity of adjacent development, prevailing weather patterns including wind directions, topography, any mechanized equipment on-site. The compressor turbines are anticipated to be the primary source of noise associated with the operation of the site. These compressors would be located within metal buildings that provide sound insulation capabilities to limit noise impacts off site. DCP would maintain the existing surrounding vegetation including large cottonwood trees, willows, and other shrubby vegetation in the northeast and southwestern sections of the facility. Additional trees and shrubs would be planted along the north and east edges of the site, as described in the provided Landscape Plan. Finally, DCP has conducted baseline noise surveys of the surrounding area; a copy of the Baseline Sound Level Monitoring Results report is provided with this USR application. Based on the planned sound insulation, existing and proposed vegetation, and existing noise in the area, excess noise is not anticipated to be an issue with the proposed facility.

Mitigation of potential impacts, such as noise, would be handled in accordance with state regulations, along with applicable Municipal Code standards. Staff finds the project plans as proposed provide adequate noise mitigation in relation to the surrounding land uses and oil and gas development.

I. PUBLIC NOTICE AND COMMENT

A total of six (6) notification letters, per Development Code requirements, regarding the public hearing for the proposed Use by Special Review were mailed on November 28th, 2022 to property owners within 1,000 feet of the site. Signs were posted on the site on November 28th, 2022. To date, no comments have been received. No phone calls, emails, or letters were received by the City of Greeley or DCP Midstream expressing concerns regarding the project. (*see Attachment K – Noticing Boundary Area*).

J. MINERIAL ESTATE OWNER NOTIFICATION

Mineral notice is required for a public hearing. The applicant has provided ample notice to the mineral owner for the subject site and is in compliance with noticing requirements specific to mineral estate owners.

K. PLANNING COMMISSION RECOMMENDED MOTION

Approval:

Based on the application received and the preceding analysis, the Planning Commission finds that the proposed Use by Special Review for compressor station with associated facility equipment in the H-A (Holding Agriculture) zoning district is consistent with the Development Code criteria of Section 24-206 (Items 1-8) and the proposed operation meets the provisions contained in Section 24-1102, Oil and Gas; and therefore, approve the Use by Special Review.

Denial:

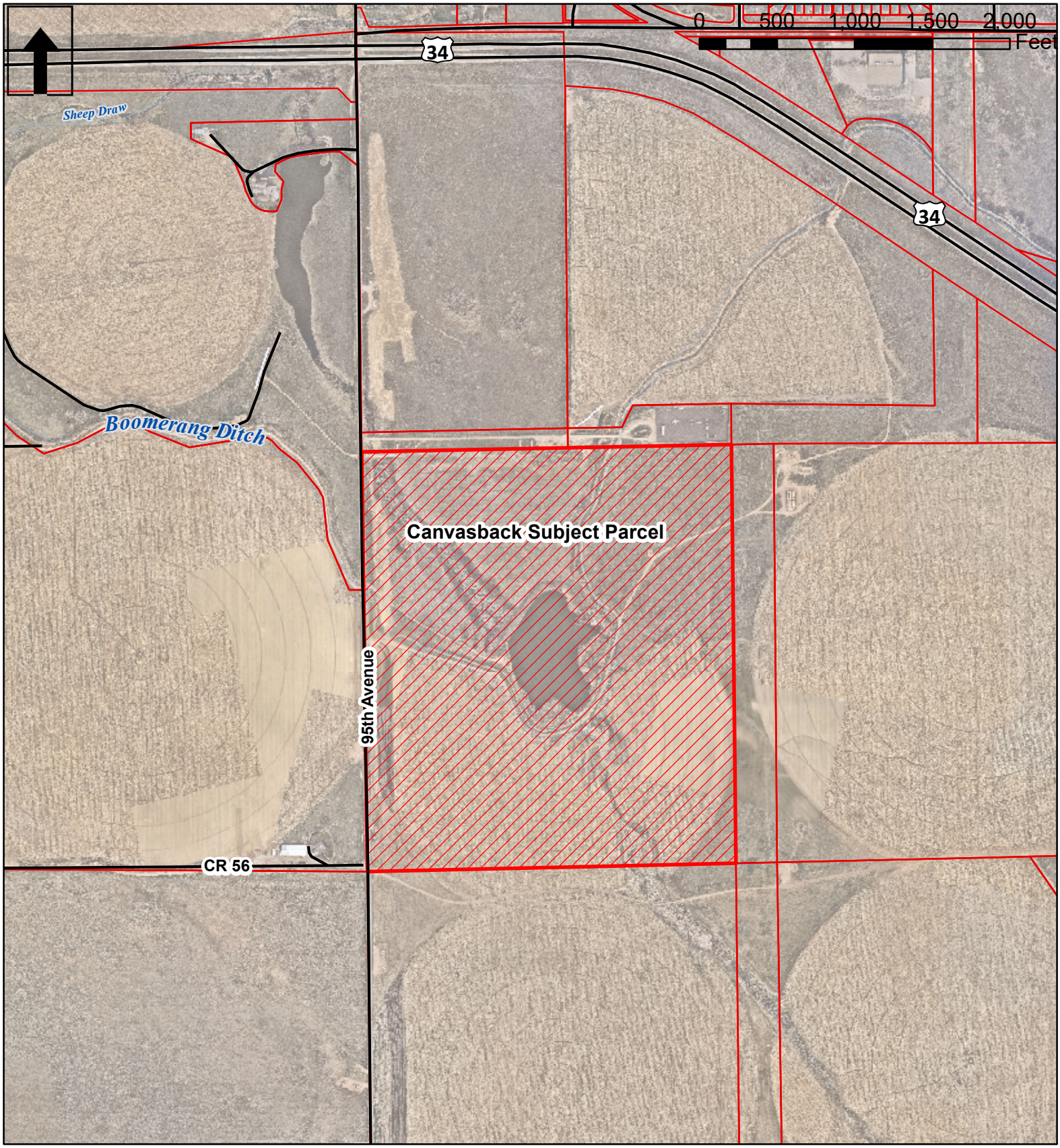
Based on the application received and the preceding analysis, the Planning Commission finds that the proposed Use by Special Review for a compressor station with associated facility equipment in the H-A (Holding Agriculture) zoning district is not consistent with the Development Code criteria of Section 24-206 (Items 1-8) and the proposed operations does not meet the provisions contained in Section 24-1102, Oil and Gas; and therefore, deny the Use by Special Review.

ATTACHMENTS

Attachment A – Aerial & Vicinity Map
Attachment B – Existing Zoning Map
Attachment C – Narrative and Operations Plan
Attachment D – Overall Site Plan
Attachment E – Environmental and Safety Plan
Attachment F – Traffic Impact Study

Attachment G – Tactical Response Plan
Attachment H – Noticing Boundary Area
Attachment I – Landscape Plan

Attachment A - Canvasback Compressor Station Vicinity Map



Canvasback Subject Parcel

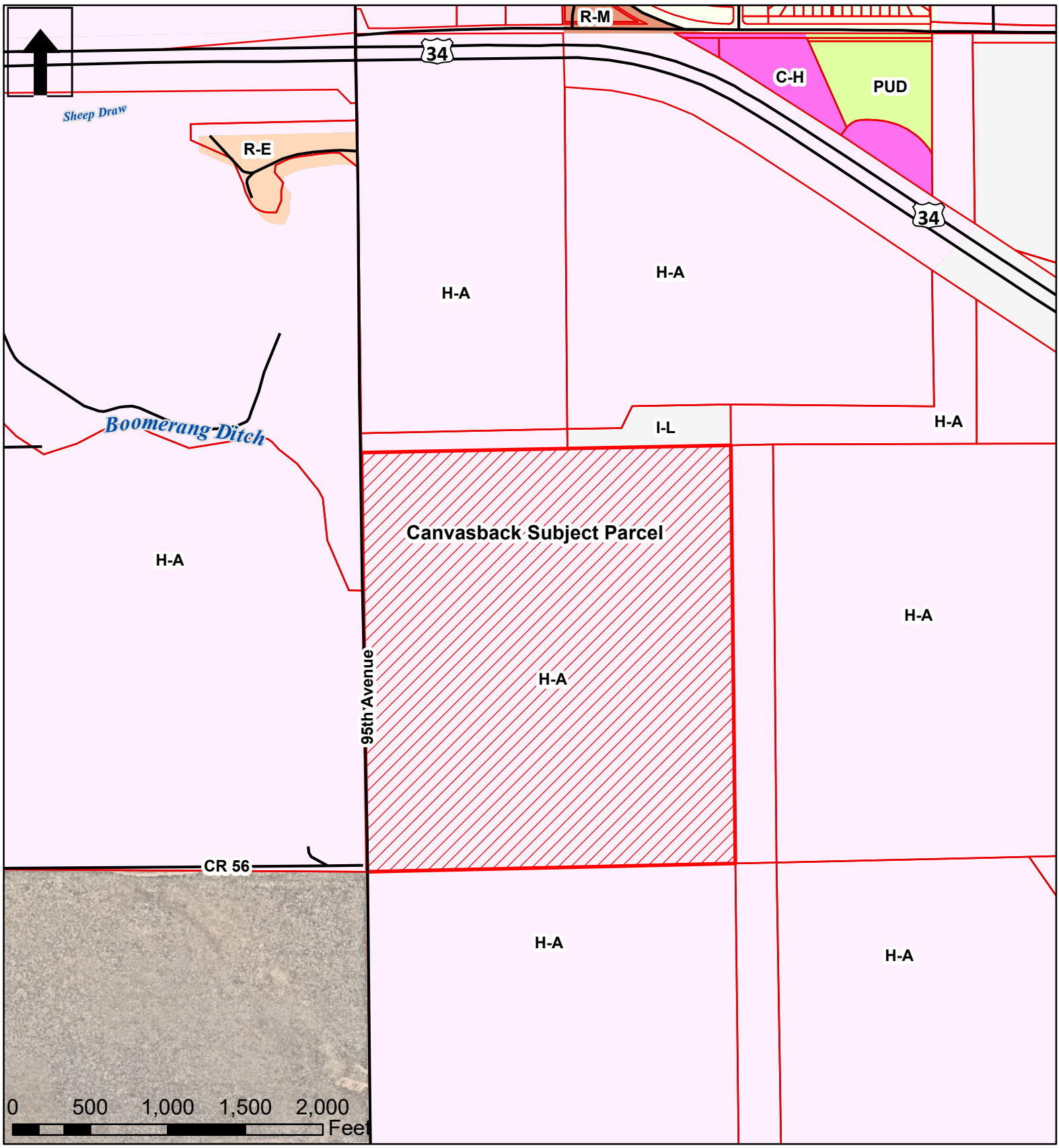
Greeley Parcels

Streets

City of Greeley Colorado

COMMUNITY DEVELOPMENT

Attachment B - Canvasback Compressor Station Vicinity and Zoning Map



- Canvasback Subject Parcel
- Greeley Parcels
- Streets
- Conservation District**
- Commercial Low Intensity
- Commercial High Intensity
- Holding Agriculture
- Industrial Low Intensity
- Industrial Medium Intensity
- Industrial High Intensity
- Planned Unit Development
- Residential Estate
- Residential Low Density
- Residential Medium Density
- Residential High Density
- Residential Mobile Home

City of Greeley Colorado

COMMUNITY DEVELOPMENT

Attachment C - Narrative and Operations Plan

CITY OF GREELEY
LAND USE APPLICATION/USE BY SPECIAL REVIEW

APPLICANT:

600 E. Layton Avenue
Suite 900
Denver, Colorado 80237

PROPOSED CANVASBACK COMPRESSOR STATION
USR2022-0011

NWSW SECTION 18, TOWNSHIP 5 NORTH, RANGE 66 WEST, 6TH P.M.
WELD COUNTY, COLORADO

SUBMITTAL JUNE 22, 2022
RESUBMITTAL SEPTEMBER 9, 2022
RESUBMITTAL OCTOBER 17, 2022

DCP MIDSTREAM, LP
CANVASBACK COMPRESSOR STATION
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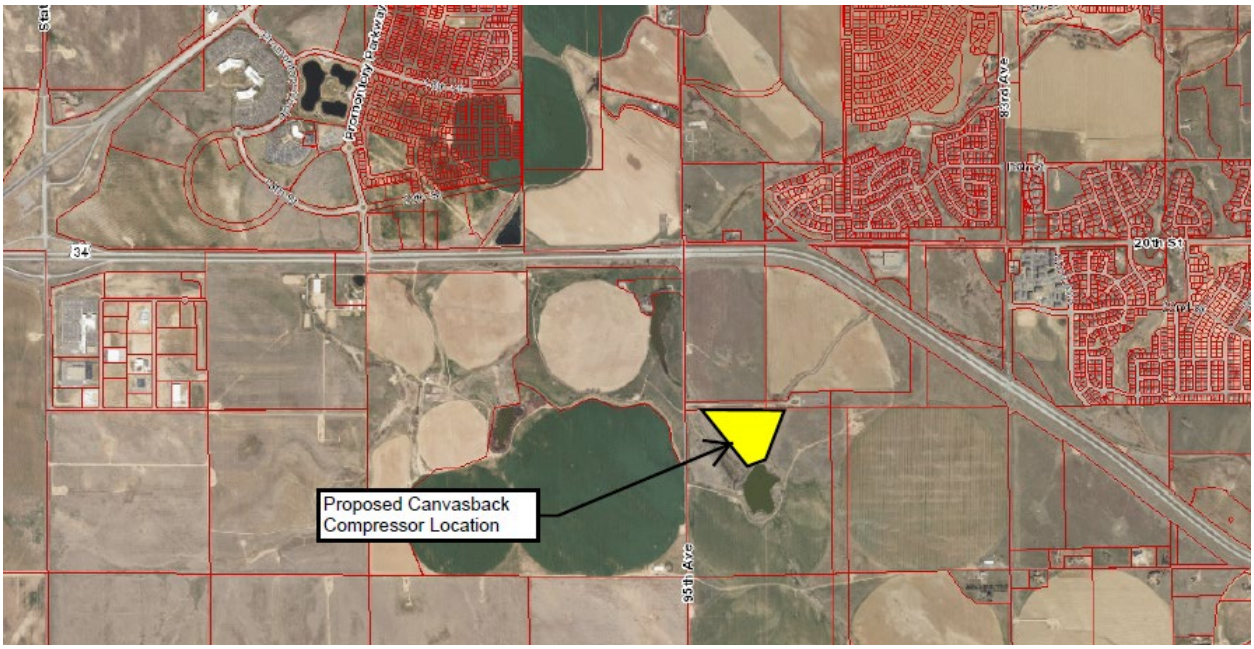
Overview of Use by Special Review Requirements

Description of Proposed Use

This Use by Special Review (USR) application is referred to as the Canvasback Compressor Station and submitted by DCP Midstream Operating Company, LP (DCP). The Denver-Julesburg (DJ) Basin produces varying amounts of natural gas that need to be routed via a system of pipelines through a number of compressor stations in Weld County, Colorado.

This proposed site is located on Parcel 095918000005 within the City of Greeley municipal boundaries and is zoned H-A Holding Agriculture. The parcel is surrounded by parcels that are also zoned H-A.

A compressor station helps the transportation process of natural gas from one location to another. Natural gas, while being transported through a pipeline, needs to be constantly pressurized in certain distance intervals. The gas in the compressor station is pressurized by special turbines, motors, and engines. The proposed compressor station will be owned and operated by DCP.



The proposed operation outlined in this USR application includes various compression equipment that will be used to compress and transport natural gas. The equipment being proposed will include, but not limited to, compressors, vapor recovery units, separators, dehydrators, storage tanks, and additional supporting compression equipment.

The compressors on-site will operate 24 hours a day, 7 days a week, 365 days a year. However, the station will automatically adjust to run only the engine compressors needed to adequately handle the volume of gas flowing through the pipeline.

A pre-application meeting with City of Greeley personnel was held on March 16, 2022, and the preliminary siting of the project was given approval to move forward with the USR process.

This application for a Use by Special Review permit, pursuant to Section 24/Chapter 11 – Supplemental Standards/24-1102 – Oil & Gas and 24-207 – Site Plan of the Greeley Development Code, and Chapter 18 of the Greeley Municipal Code, includes a full description of the operational phases related to the proposed Canvasback Compressor Station.

Details of the Site

DCP is proposing to build Canvasback , a new compressor station off of County Road 25, approximately 0.49 mile south of where the road intersects Highway 34. The proposed natural gas compression equipment is required to expand and enhance the existing natural gas being collected from nearby gathering systems and will compress the gas for delivery to pipelines for processing at existing DCP gas plants. DCP currently is under contract to purchase the 15.38-acre section of land within Parcel 095918000005 where the facility will be located.

This particular location was chosen by DCP and is important for the following reasons:

- Proximity to existing and future locations of well pads and existing pipelines
- No nearby residences
- Nearby parcels include power substation, existing oil and gas locations, planned PDC well/facility pad to the north (USR2022-0006), and interest in a possible solar field to the east
- Appropriate size of parcel for compressor footprint
- Existing access
- Some surrounding vegetation
- Landowner willing to sell property
- Proximity to existing and future locations of well pads and existing pipelines makes location ideal from a hydraulic perspective
- Location has passed preliminary emission air modelling requirements within the guidance of CDPHE rules and regulations

The Canvasback Compressor Station will contain up to two compressor engines, which will be fully housed in a metal building. Additional coolers, storage tanks, meters, piping, and ancillary equipment will also be located on site as indicated on the provided Plan Set and Construction Drawings. Gas will be transported to and from the facility by an existing and proposed system of pipelines. The Canvasback Compressor Station will be an unmanned facility during operations except for periodic visits by DCP employees or contractors for maintenance monitoring, and contracted services. The location will be remotely monitored by DCP around the clock to allow for an immediate response to any indications of spills or releases. The entire facility will be graveled and fenced. Lighting will be kept to the minimum amount required and will utilize the dark-sky lighting standards.

Construction of the Canvasback Compressor Station will commence once the applicable approvals are issued and will take approximately 12 months to complete. Vehicle traffic will increase during construction and then be reduced to one or two vehicles per day during operations and two to three vehicles per week for contracted services. In addition to the USR from the City of Greeley, DCP will obtain additional federal, state, or local approvals, as applicable, for the facility.

Description of the number of people who will use this site

The Canvasback Compressor Station will be an unmanned facility during operations, except for daily visits by DCP employees for monitoring and periodic visits from contractors for maintenance, and contracted services . These contracted services can include consumable deliveries, condensate transport, produced water disposal, safety inspections, portable restroom cleaning, and additional

miscellaneous services such as weed spraying. There will be no permanent full-time employees post-construction located on site. Based on the nature of the station being unmanned, there is no need for permanent water and sewer service.

Description of the number of employees proposed to be employed at this site
There will be no full-time employees located on site, with the exception of daily inspection and/or periodic maintenance activities and contracted services.

Description of the hours of operation
The compressors on-site operate 24 hours a day, 7 days a week, 365 days a year. However, the station will automatically adjust to run only the engine compressors needed to adequately handle the volume of gas flowing through the pipeline.

Description of the type and number of structures to be erected (built) on this site
The Canvasback Compressor Station has the following types of structures planned: compressor building, maintenance building, sales gas meter building, motor control center, communications tower, inlet meter building. The entire facility will be graveled and fenced. An electronic access gate will be installed to limit access to DCP employees and authorized users.

Description of animals, if any, to be on this site
There will be no animals on site.

Description of the kind of vehicles (type, size, weight) that will access this site and how often
During construction the following vehicles will access the right-of-way: Bulldozers, back hoes, stringing trucks, side booms, dump trucks, and pickup trucks. After completion of construction the vehicles that will periodically be on-site include cars, pickup trucks, and transport vehicles to inspect the valves and any upkeep at the facility.

Description of who will provide fire protection to the site
The Greeley Fire Protection District would be the emergency response district that could be dispatched in the unlikely event of an incident. Water or other fire retardants would be transported to the site, if necessary. The DCP emergency response team will be the first line of response for emergency situations and will coordinate with local responders as outlined in the Emergency Response Plan with Tactical Response Plan (TRP) Card.

Description of water source on the property (both domestic and irrigation)
During the construction phase, water will be hauled in for dust mitigation and fire prevention purposes. Additionally, bottled water shall be utilized for drinking and portable toilets will be available. Water for irrigating the plants indicated on the landscaping plan will be provided by two (2) freshwater tanks erected on or near the compressor station for the use of irrigating trees and shrubs via an automatic drip irrigation system. This water will be used for irrigation only.

Description of sewage disposal system on the property (existing and proposed)
There is no need for a permanent sewage disposal system. Employees will have access to a portable restroom during the construction stage of the station and during operation.

If storage or warehousing is proposed, what type of items will be stored
During operation, only spare parts will be stored on site. Only critical spare parts and additional safety equipment will be stored on site.

Explanation of the proposed landscaping for the site
DCP designed the landscape plan for the Canvasback Compressor Station in an effort to comply with the purpose and intent of the City's Landscaping Standards, and to stay consistent with surrounding use by special review locations. The proposed plan allows for optimal screening, reduces the overall footprint, and allows a substantial amount of land to be restored back to farmable ground after interim reclamation is complete. DCP's Landscape Plan addresses the City's standards for aesthetics, health and safety, environment and energy, and water efficiency. The Landscape Plan utilizes the natural topography on the southwest side, while screening and buffering the north, east, and **west** sides with xeriscape plantings.

Explain any proposed reclamation procedures when termination of the Use by Special Review activity occurs
Upon successful completion of construction, disturbed soil areas may be natively seeded to support vegetation growth, soil stabilization and to prevent erosion. All site reclamation will be in conformance with the City of Greeley code as well as COGCC rules and regulations.

Explain how the storm water drainage will be handled on the site
A site-specific Stormwater Management Plan (SWMP) will be developed for the project, which outlines sediment and erosion control measures to be implemented pre, during, and post construction to reduce the possibility of erosion and offsite sedimentation. The disturbed area will be reclaimed as specified by landowner agreement.

Explain how long it will take to construct this site and when construction and landscaping is scheduled to begin
The construction on the station is expected to begin pending the approval of this USR and will take approximately 12 months to complete. After the station has been constructed, the disturbed area will be re-seeded with native seed mix and a mixture of trees and shrubs, estimated August 2023. Please refer to the Native Seed Mix table provided in the Landscape Plan, included with this application.

Explanation of where storage and/stockpile of wastes will occur on this site
DCP stores topsoil onsite during construction and uses it as needed during construction. After construction, DCP spreads out the topsoil pile on location; however, DCP will use topsoil stockpiles wherever possible for additional screening and buffering.

List of Property Owners within 1,000 feet of the Proposed Site

Matthew J. Chismar Trust
3051 Taliesin Way
Fort Collins, Colorado 80524
Weld County Parcel No. 095918000005

Poudre Valley Rural Electric Association
Property Tax Department
PO Box 272550
Fort Collins, Colorado 80527
Weld County Parcel No. 095918200008 & 095918201001

Public Service Company of Colorado
Tax Service Department
PO Box 1979
Denver, Colorado 80201
Weld County Parcel No. 095918000004

PDC Energy Inc
1775 Sherman Street, Suite 3000
Denver, Colorado 80203
Weld County Parcel No. 095918200009

Matthew J. Chismar Irrevocable Trust
27027 County Road 25
Greeley, Colorado 80634
Weld County Parcel No. 095713000013

Lundvall Six LLC
2015 Clubhouse Drive, Suite 101
Greeley, Colorado 80634
Weld County Parcel No. 095918200010

LEI Investments LLC & Steve S. Lundvall
2015 Clubhouse Drive, Suite 101
Greeley, Colorado 80634
Weld County Parcel No. 095713101002

Surface Owner:

Matthew J. Chismar Trust
3051 Taliesin Way
Fort Collins, Colorado 80524
Weld County Parcel No. 095918000005

2018 Imagine Greeley Comprehensive Plan and Consistency with Surrounding Land Uses

DCP is familiar with the City of Greeley's regulations as they relate to oil and gas operations. It is DCP's intent to build and operate the Canvasback Compressor Station in a manner that is not detrimental to the public health, safety, welfare, the environment, and wildlife resources, or detrimental to the character of the surrounding area. The proposed use shall be consistent with the Imagine Greeley Comprehensive Plan. The location, site, design, and operation characteristics of the proposed use shall be compatible with the existing and future land uses within the general area in which the proposed use is to be located, and will not create significant noise, traffic or other conditions or situations that may be objectionable or detrimental to other permitted uses in the vicinity. DCP understands that reasonable conditions may be placed on uses by special review to protect public health, safety, welfare, the environment, and wildlife resources. The site shall be physically suitable for the type and intensity of the proposed land use. The proposed land use shall not adversely affect traffic flow or parking in the neighborhood.

The proposed use for the Canvasback Compressor Station shall be consistent with the Imagine Greeley Comprehensive Plan. DCP has and will continue to demonstrate responsible stewardship of natural resources and the environment within the City of Greeley limits, as well as Weld County and the State of Colorado. DCP acknowledges the City of Greeley's wish to continue to build and expand upon existing efforts as they relate to the environment and protection of natural resources, as well as its continuing efforts to develop new ways to preserve open lands. DCP's focus on water and air quality is consistent with the City of Greeley's in the face of the City's future growth.

DCP designed the landscape plan for the Canvasback Compressor Station in an effort to comply with the purpose and intent of the City's Landscaping Standards, and to stay consistent with surrounding use by special review locations. The proposed plan allows for optimal screening, reduces the overall footprint, and allows a substantial amount of land to be restored back to farmable ground after interim reclamation is complete. DCP's Landscape Plan addresses the City's standards for aesthetics, health and safety, environment and energy, and water efficiency. The Landscape Plan utilizes the natural topography on the southwest side, while screening and buffering the north and east sides with xeriscape plantings.

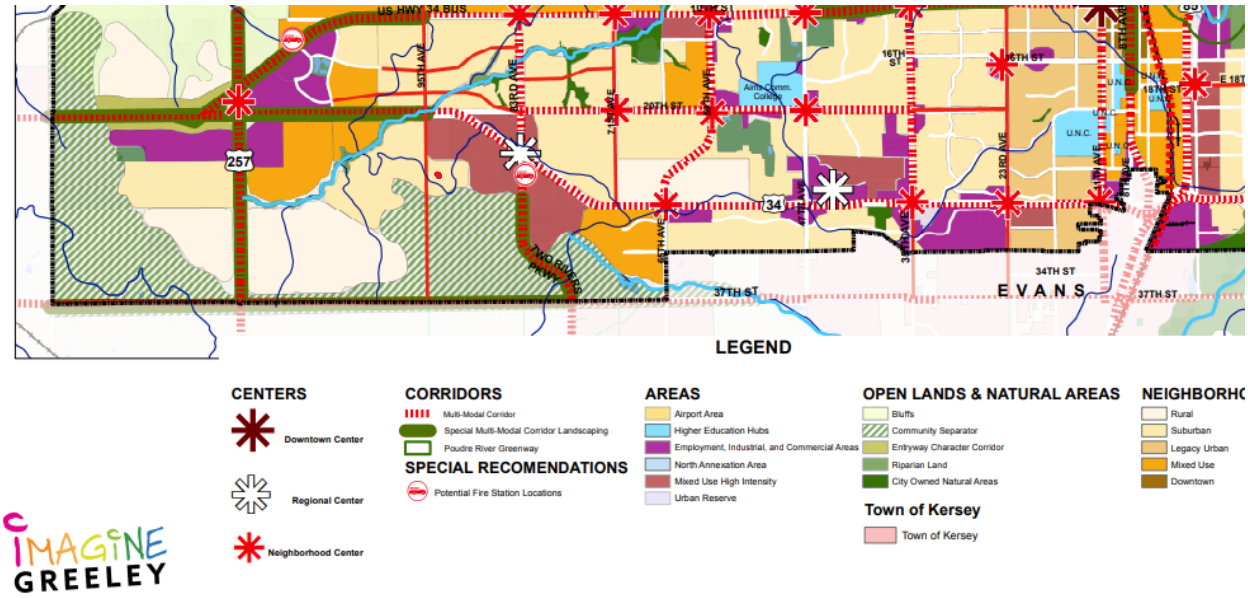
All waste will be stored, handled, transported, treated, recycled, or disposed of in accordance with federal, state, and county regulations, to prevent any significant adverse environmental impact on air, water, soil, or biological resources. (Ord. 27, 1998 §1).

DCP will abide by State law and regulations concerning noise abatement (Title 25, Article 12, C.R.S.), together with applicable local government ordinances, rules, or regulations. DCP has detailed its plans in this Land Use Application for addressing all nuisance impacts in the section on Environmental and Safety Plans, and all safety impacts in DCP's Emergency Response Plan.

How is this USR application consistent with the intent of the 2018 Imagine Greeley Comprehensive Plan and City of Greeley Development Code

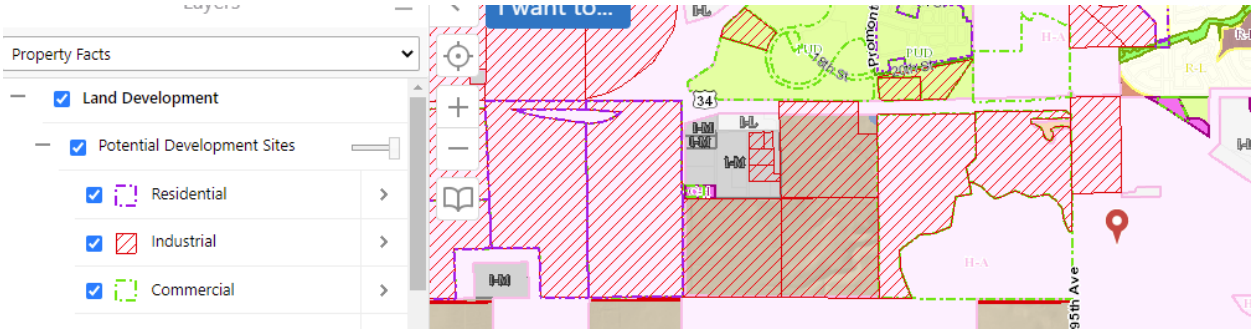
- DCP will ensure and monitor compliance with all Municipal, State, and Federal laws and rules
- DCP will minimize or mitigate adverse land use impacts and provide mutual accommodation of the surface owners
- DCP will mitigate, minimize, and avoid adverse impacts to adjacent and future land uses and ecological resources wherever possible
- DCP will ensure that the city's infrastructure and groundwater resources are protected

The future land use for the Canvasback Compressor Station is designated as Suburban Neighborhood and is surrounded by a Mixed-Use High Intensity Area, per the Imagine Greeley Land Use Guidance Map. The area's boundaries include Highway 34 to the north and northeast, and Boomerang Ditch, which could limit the potential for much suburban development.

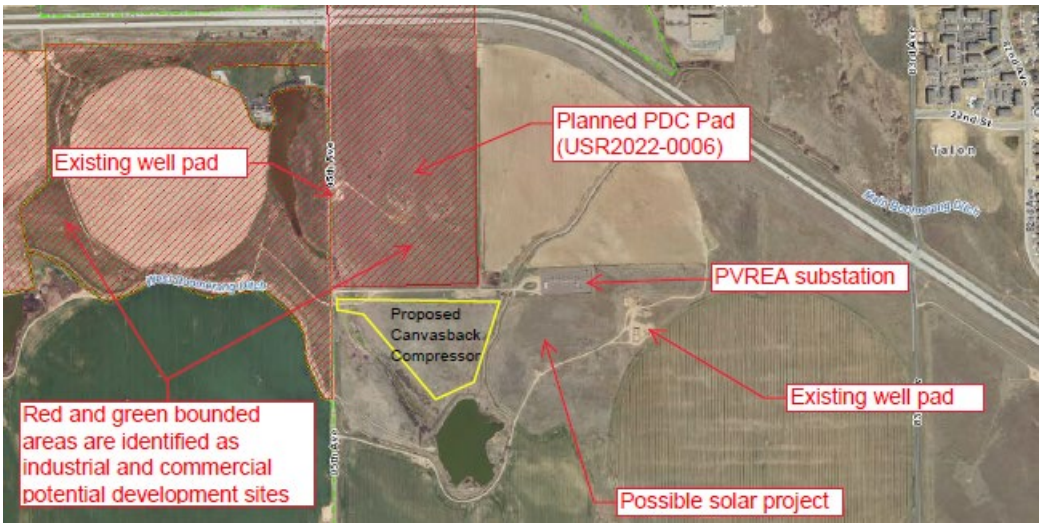


Objective GC-2.4 Mixed-Use and Transit-Supportive Development intent is to "Promote horizontal and vertical mixed-use development that integrates a variety of housing, commercial, employment, and recreational uses particularly in centers and along corridors identified on the Land Use Guidance Map." The DCP Canvasback Compressor Station is located south of a Multi-Modal Corridor and east of a Regional Center, and compliments the existing and proposed surrounding land uses.

Type of uses surrounding the site (consistency and compatibility with surrounding land uses)
The site for the Canvasback Compressor Station does not interfere with the existing use of the area. The parcel is zoned H-A Holding Agriculture and is surrounded by both commercial use and oil and gas development; additionally, the site is south and east of what is designated as potential industrial development sites per the Greeley Land Development map, and west of a Poudre Valley Rural Electric Association (PVREA) substation



- The proposed project will have minimal impact on existing residential uses and is compatible, complimentary, and consistent with surrounding land uses;
- Boomerang Ditch surrounds the site, which would limit the potential for expanded development in proximity to the proposed compressor site;
- Surrounding land uses include permitted/existing/producing oil and gas wells on locations owned and operated by PDC Energy, Inc. and Noble Energy, Inc., a PVREA substation. DCP has been in communication with surrounding landowners and has been told that additional industrial uses are currently in the early planning stages for adjacent parcels.



Proposed Landscaping

DCP designed the landscape plan for the Canvasback Compressor Station in an effort to comply with the purpose and intent of the City's Landscaping Standards, and to stay consistent with surrounding use by special review locations. The proposed plan allows for optimal screening, reduces the overall footprint, and allows a substantial amount of land to be restored back to farmable ground after interim reclamation is complete. DCP's Landscape Plan addresses the City's standards for aesthetics, health and safety, environment and energy, and water efficiency. The Landscape Plan utilizes the natural topography on the southwest side, while screening and buffering the north and east sides with xeriscape plantings.

Stormwater Drainage

The parcel for the Canvasback Compressor Station is located within the Sheep Draw Basin and is tributary to an unnamed tributary to Sheep Draw, which is located west of the compressor station facility. Runoff from offsite drainage areas that are tributary to the parcel will be routed through the parcel and around the developed compressor station pad to the unnamed tributary to Sheep Draw. Stormwater runoff from the developed compressor station facility pad will be routed overland to a proposed onsite water quality pond, where it will be released to the unnamed tributary to Sheep Draw. In addition to stormwater attenuation, the water quality pond will also be a secondary containment control for the facility's primary onsite spill containment areas/controls, in adherence with DCP's standard spill prevention control and countermeasures practices. The pond will be lined with a geosynthetic clay liner system and its release will include a manually operated valve (normally closed)

that will be opened after each storm event has concluded and once DCP personnel have inspected the collected runoff is pollutant free.

Operational Phases

Construction Period: January 2023 to December 2023
Operation Period: October 2023
Please note that this schedule is subject to change, dependent upon, but not limited to, availability of materials, supply chain issues, etc.

All On-Site and Off-Site Improvements and Timeline

A list of all equipment is shown on the Plan Set and Construction Drawings included with this application, along with the proposed phases of construction.

Other improvements are as follows:
Site grading and drainage
Access Road construction
Fencing around the entire site with an electronic access gate
Landscaping

Timeline of phases is an estimate and may fluctuate depending on, but not limited to, economic conditions, part availability, and weather conditions.

Required Permits

- Grading Permit
- Flammable or Combustible Liquids Permit if an above ground fuel storage tank will be on site
- Public Works Right-of-Way Permit if improvements will be made within the public ROW or public easements
- Temporary Use Permit for Staging Area
- CDPHE Stormwater Discharge Permit
- USACE Permitting

Environmental Mitigation and Operation Standards

DCP will make every effort to minimize and mitigate any anticipated impacts the proposed project will have on public health and the environment, keeping in mind the intent behind the Natural Resources Section of the 2018 Imagine Greeley Comprehensive Plan.

The facility is proposed at a location that limits impacts to the environment and surrounding landowners. DCP is committed to working with the City and landowners to address and mitigate environmental concerns. Specific details on how these concerns will be addressed are provided below.

Noise Control

Any operations involving mechanical equipment are subject to and will comply with the noise regulations set forth by the City of Greeley.

In determining noise mitigation, DCP has taken into consideration specific site characteristics, such as nature and proximity of adjacent development, prevailing weather patterns including wind directions, topography, any mechanized equipment on-site. The compressor turbines are anticipated to be the primary source of noise associated with the operation of the site. These compressors will be located within metal buildings that provide sound insulation capabilities to limit noise impacts off site. DCP will maintain the existing surrounding vegetation including large cottonwood trees, willows, and other shrubby vegetation in the northeast and southwestern sections of the facility. Additional trees and shrubs will be planted along the north and east edges of the site, as described in the provided Landscape Plan. Finally, DCP has conducted baseline noise surveys of the surrounding area; a copy of the Baseline Sound Level Monitoring Results report is provided with this USR application. Based on the planned sound insulation, existing and proposed vegetation, and existing noise in the area, excess noise is not anticipated to be an issue with the proposed facility.

Lighting

Lighting for the Canvasback Compressor Station is designed to comply as closely as possible with the City of Greeley's Development Standards for the special lighting application and to ensure "Dark Sky" compliance. The fixtures described in the Photometric Study included with this application will be directed downward, fully cutoff with flat lenses that are implemented in a "Dark Sky" compliant manner. The Study also demonstrates that the lighting design and fixtures do not allow light past the site property line.

Visibility

The Canvasback Compressor Station will be painted Carlsbad Canyon Tan in accordance with the City's regulations to blend into the surrounding area. Existing vegetation will be kept and new plantings will occur as indicated in the landscape plan. Lighting will be the minimum necessary to maintain site security and all lighting will adhere to dark-sky lighting standards. Fencing on site shall be constructed in a manner that provides additional visibility screening from the operation. DCP will add screening to the proposed chain link fence and ensure color chosen complies with Section 24-1102.e.2(c) of the Municipal Code while providing visual mitigation from equipment.

Safety

The entire facility will be graveled and fenced. An electronic access gate will be installed to limit access to DCP employees and authorized users. A site-specific emergency response has been prepared and is provided with this application. Additionally, this facility will be incorporated into DCP's existing Weld

County Emergency Response Plan that provides guidelines when responding to emergency for any facility located in Weld County, CO.

Wildlife

The proposed site falls within the Big Game Management Area, which covers all of Greeley and surrounding areas. DCP conducted a biological survey of the proposed facility site and surrounding area. No protected species or their habitats were found to occur within the facility footprint. DCP will maintain the existing trees, willows, and wetland habitats within the project area, which will continue to provide wildlife habitat. If wildlife issues or concerns are identified during construction or operations, DCP environmental personnel will coordinate with the Colorado Department of Parks and Wildlife.

Floodplain Restrictions

There are no floodplain restrictions affecting the proposed site.

Air and Water Quality

DCP is working with the CDPHE to obtain applicable air permits required for the facility. Permit applications have been submitted to the CDPHE and are currently under review. DCP will comply with all CDPHE permit requirements during the construction and operation of the facility.

In addition to the air permits, DCP will obtain approvals from the City of Greeley and the CDPHE for stormwater impacts associated with the construction and operation of the facility. This will include the development of a site-specific construction stormwater management plan that will be reviewed by the City as part of the Grading Permit approval. The facility drainage report is included with this application and includes water quality details associated with the operations of the facility. DCP will work with the City and the CDPHE to ensure all water quality requirements are met.

The Biologists Report, included with this USR application, follows the City of Greeley's Development Code guidelines for developments that have the potential to impact Areas of Ecological Significance. This report identifies wetland areas within or adjacent to the proposed facility boundaries. DCP has designed the facility to avoid impacts to all wetland areas with the exception of the existing access road across the drainage to Sheep Draw. The existing access across these wetlands may be improved to meet safety standards for accessing this facility. If impacts to these wetlands occur, DCP will work with the US Army Corps of Engineers on the review and approval of any required permits. The report also finds that no impacts to rare plant or wildlife species are expected.

By avoiding water quality impacts, minimizing the project footprint in nearby wetlands, and complying with CDPHE air permitting requirements, the facility is not anticipated to impact significant natural features in the area.

Access Roads

The site for the Canvasback Compressor Station is to be developed at approximately the southeast corner of 95th Avenue and 24th Street. The site is to temporarily be accessed by an existing dirt access road adjacent to the north end of the site. Upon completion, the site will be accessed by improving an existing dirt road that is 100 feet south of the existing dirt road; this new site access also aligns with a dirt roadway west of 95th Avenue.

DCP will maintain all access roads in compliance with the City of Greeley's Municipal Code and ensure all access road requirements are met according to Section 24-1102.c.4. The access roads will be

constructed to accommodate local emergency vehicles. The roads will be maintained for access at all times. Traffic will be routed to minimize local interruption. Please see the Plan Set and Construction Drawings included with this application for ingress/egress location.

Traffic/Trip Generation

The site for the Canvasback Compressor Station is on an undeveloped agricultural parcel that is accessible via two unpaved drives along 95th Avenue, which is also currently unpaved but planned to be improved as a 2-lane minor arterial roadway. The site is expected to be completed before 95th Avenue is improved. During the initial stages of construction, the site proposes to use the existing access currently used to access a PVREA site roughly 100 feet north of the site. The site proposes to use the final access at the northern site boundary.

The most intensive period of construction is expected to be the general construction phase, lasting roughly 9 months during the middle of the construction timeline. During the general construction period, the site is expected to have 12 daily truck deliveries/hauls, and 40 staff that generate roughly 104 daily trips and 44 trips during each of the site peak hours.

The existing infrastructure is expected to be sufficient for the expected trip generation of the site. Please refer to the Traffic Memo included with this application for more detail.

Waste Management

DCP will dispose of all wastes in accordance with City of Greeley Code and COGCC rules and regulations.

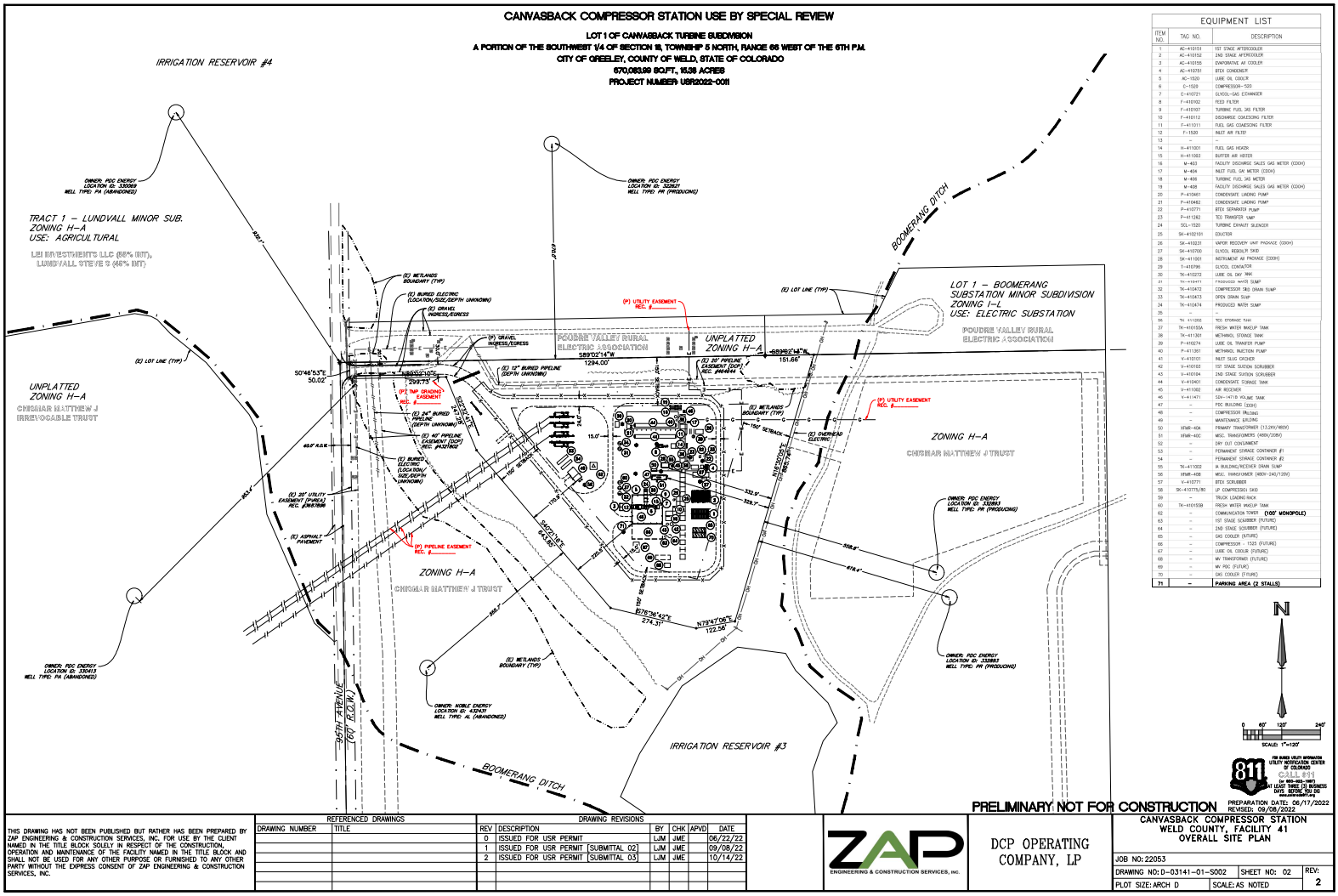
Sanitary Facilities

Portable sanitary facilities that comply with City regulations will be provided and maintained on the location during the construction phase of the project. Because no personnel are on the location for an extended period of time, no city services or sanitary services of any kind will be required or provided after the station has been completed and put into production. A DPC employee or contractor will visit the site every day and will be responsible for picking up and disposing of any debris.

Weed Control

All disturbed areas shall be kept reasonably free of noxious weeds and undesirable species as practicable. A third party weed control service will be contracted annually, if necessary, to prevent and control the reoccurrence of noxious or excessive weed growth. DCP will drag the lease roads and the compressor site as needed with a “drag” designed to remove weeds. Weeds that cannot be controlled with this method will be sprayed as needed with a systemic herbicide. Any additional weed control required to maintain the site free of weeds will be implemented if the standard plan is not sufficient.

Attachment D - Site Plan



EQUIPMENT LIST

ITEM NO.	TAG NO.	DESCRIPTION
1	AC-410151	1ST STAGE AFTERCOOLER
2	AC-410152	2ND STAGE AFTERCOOLER
3	AC-410155	EVAPORATIVE AIR COOLER
4	AC-410151	BTEX CONDENSER
5	AC-1520	LUBE OIL COOLER
6	C-1520	COMPRESSOR - TGS
7	E-410721	GLYCOL-GAS EXCHANGER
8	F-410102	FEED FILTER
9	F-410107	TURBINE FUEL GAS FILTER
10	F-410112	DISCHARGE COALESCING FILTER
11	F-411011	FUEL GAS COALESCING FILTER
12	F-1520	INLET AIR FILTER
13	--	--
14	H-411001	FUEL GAS HEATER
15	H-411063	BUFFER AIR HEATER
16	M-403	FACILITY DISCHARGE SALES GAS METER (COOCH)
17	M-404	INLET FUEL GAS METER (COOCH)
18	M-406	TURBINE FUEL GAS METER
19	M-408	FACILITY DISCHARGE SALES GAS METER (COOCH)
20	P-410401	CONDENSATE LOADING PUMP
21	P-410402	CONDENSATE LOADING PUMP
22	P-410771	BTEX SEPARATOR PUMP
23	P-411282	TEG TRANSFER UMP
24	SCL-1520	TURBINE EXHAUST SILENCER
25	SK-4102101	EDUCTOR
26	SK-410231	VAPOR RECOVERY UNIT PACKAGE (COOCH)
27	SK-410700	GLYCOL REBOILER SKID
28	SK-411501	INSTRUMENT AIR PACKAGE (COOCH)
29	T-410796	GLYCOL CONTACTOR
30	TK-410272	LUBE OIL DAY TANK
31	TK-410471	PRODUCED WATER SUMP
32	TK-410472	COMPRESSOR T&D DRAIN SUMP
33	TK-410473	OPEN DRAIN SUMP
34	TK-410474	PRODUCED WATER SUMP
35	--	--
36	TK-411002	TEG STORAGE TANK
37	TK-4101550A	FRESH WATER MAKEUP TANK
38	TK-411301	METHANOL STORAGE TANK
39	P-410274	LUBE OIL TRANSFER PUMP
40	P-411301	METHANOL INJECTION PUMP
41	V-410101	INLET SLUG CATCHER
42	V-410103	1ST STAGE SUCTION SCRUBBER
43	V-410104	2ND STAGE SUCTION SCRUBBER
44	V-410401	CONDENSATE STORAGE TANK
45	V-411002	AIR RECEIVER
46	V-411471	SDV-1471® VOLUME TANK
47	--	PDC BUILDING (12X9)
48	--	COMPRESSOR BUILDING
49	--	MAINTENANCE BUILDING
50	XFMR-40A	PRIMARY TRANSFORMER (13.2KV/480V)
51	XFMR-40C	MISC. TRANSFORMERS (480V/208V)
52	--	DRY DUST CONTAINMENT
53	--	PERMANENT STORAGE CONTAINER #1
54	--	PERMANENT STORAGE CONTAINER #2
55	SK-411002	VB BUILDING/HEATER DRAIN SUMP
56	XFMR-40B	MISC. TRANSFORMER (480V-240/120V)
57	V-410771	BTEX SCRUBBER
58	SK-410775/80	BTEX COMPRESSOR SKID
59	--	TRUCK LOADING RACK
60	TK-4101550B	FRESH WATER MAKEUP TANK
62	--	COMMUNICATION TOWER (100' MONOPOLE)
63	--	1ST STAGE SCRUBBER (FUTURE)
64	--	2ND STAGE SCRUBBER (FUTURE)
65	--	GAS COOLER (FUTURE)
66	--	COMPRESSOR - 1525 (FUTURE)
67	--	LUBE OIL COOLER (FUTURE)
68	--	MV TRANSFORMER (FUTURE)
69	--	MV PDC (FUTURE)
70	--	GAS COOLER (FUTURE)
71	--	PARKING AREA (2 STALLS)

THIS DRAWING HAS NOT BEEN PUBLISHED BUT RATHER HAS BEEN PREPARED BY ZAP ENGINEERING & CONSTRUCTION SERVICES, INC. FOR USE BY THE CLIENT NAMED IN THE TITLE BLOCK SOLELY IN RESPECT OF THE CONSTRUCTION, OPERATION AND MAINTENANCE OF THE FACILITY NAMED IN THE TITLE BLOCK AND SHALL NOT BE USED FOR ANY OTHER PURPOSE OR FURNISHED TO ANY OTHER PARTY WITHOUT THE EXPRESS CONSENT OF ZAP ENGINEERING & CONSTRUCTION SERVICES, INC.

REFERENCED DRAWINGS

DRAWING NUMBER	TITLE

DRAWING REVISIONS

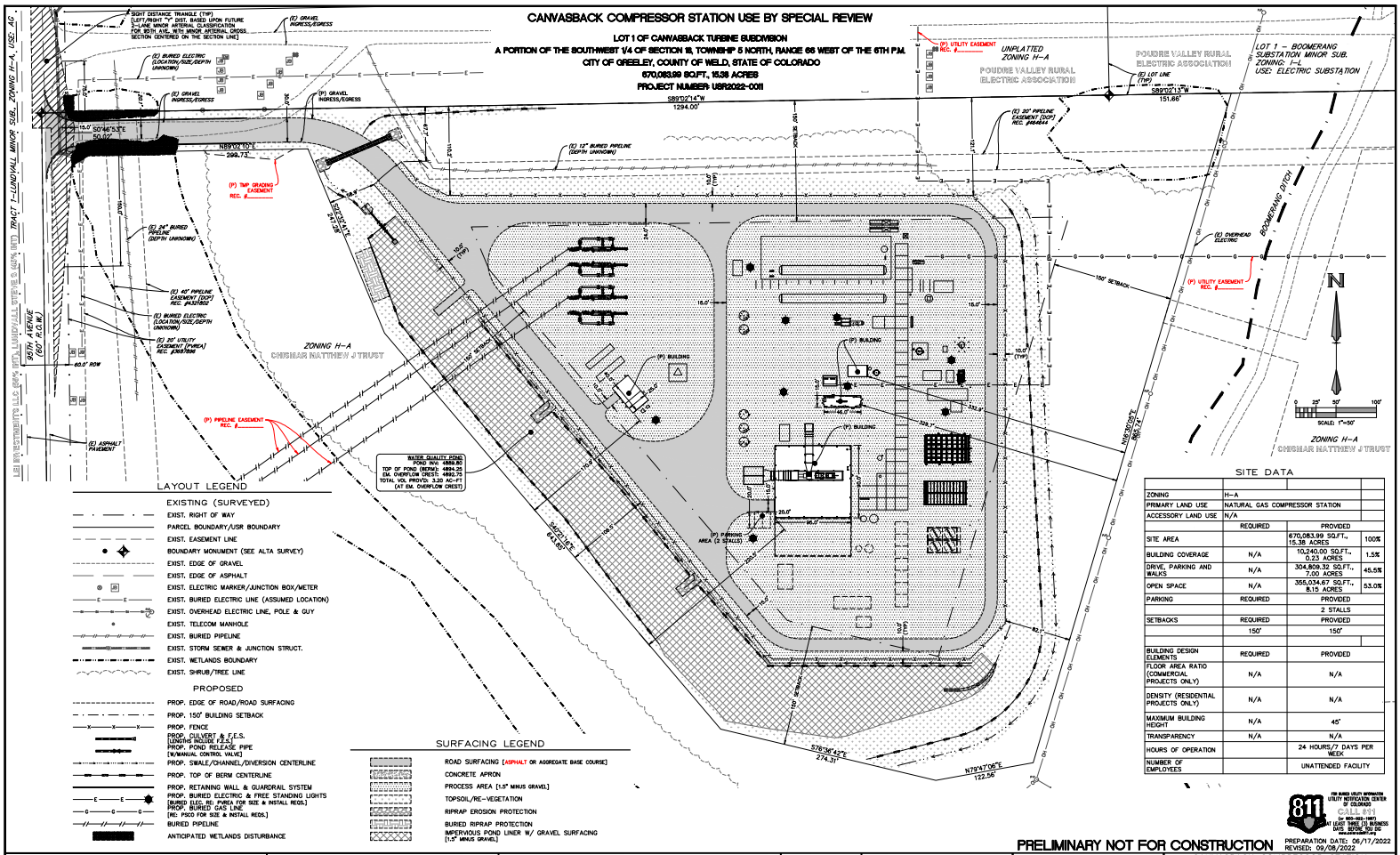
REV	DESCRIPTION	BY	CHK	APVD	DATE
0	ISSUED FOR USR PERMIT	LJM	JME		06/22/22
1	ISSUED FOR USR PERMIT [SUBMITTAL 02]	LJM	JME		09/08/22
2	ISSUED FOR USR PERMIT [SUBMITTAL 03]	LJM	JME		10/14/22

ZAP ENGINEERING & CONSTRUCTION SERVICES, INC.

DCP OPERATING COMPANY, LP

CANVASBACK COMPRESSOR STATION
WELD COUNTY, FACILITY 41
OVERALL SITE PLAN

JOB NO: 22053
DRAWING NO: D-03141-01-S002 | SHEET NO: 02 | REV: 2
PLOT SIZE: ARCH D | SCALE: AS NOTED



SITE DATA			
ZONING	H-A		
PRIMARY LAND USE	NATURAL GAS COMPRESSOR STATION		
ACCESSORY LAND USE	N/A		
	REQUIRED	PROVIDED	
SITE AREA		670,083.99 SQ.FT., 15.38 ACRES	100%
BUILDING COVERAGE	N/A	10,240.50 SQ.FT., 0.23 ACRES	1.5%
DRIVE, PARKING AND WALKS	N/A	304,809.32 SQ.FT., 7.00 ACRES	45.5%
OPEN SPACE	N/A	355,034.67 SQ.FT., 8.15 ACRES	53.0%
PARKING	REQUIRED	PROVIDED	
		2 STALLS	
SETBACKS	REQUIRED	PROVIDED	
	150'	150'	
BUILDING DESIGN ELEMENTS	REQUIRED	PROVIDED	
FLOOR AREA RATIO (COMMERCIAL PROJECTS ONLY)	N/A	N/A	
DENSITY (RESIDENTIAL PROJECTS ONLY)	N/A	N/A	
MAXIMUM BUILDING HEIGHT	N/A	45'	
TRANSPARENCY	N/A	N/A	
HOURS OF OPERATION		24 HOURS/7 DAYS PER WEEK	
NUMBER OF EMPLOYEES		UNATTENDED FACILITY	

THIS DRAWING HAS NOT BEEN PUBLISHED BUT RATHER HAS BEEN PREPARED BY ZAP ENGINEERING & CONSTRUCTION SERVICES, INC. FOR USE BY THE CLIENT NAMED IN THE TITLE BLOCK SOLELY IN RESPECT OF THE CONSTRUCTION, OPERATION AND MAINTENANCE OF THE FACILITY NAMED IN THE TITLE BLOCK AND SHALL NOT BE USED FOR ANY OTHER PURPOSE OR FURNISHED TO ANY OTHER PARTY WITHOUT THE EXPRESS CONSENT OF ZAP ENGINEERING & CONSTRUCTION SERVICES, INC.

REFERENCED DRAWINGS	
DRAWING NUMBER	TITLE

DRAWING REVISIONS					
REV	DESCRIPTION	BY	CHK	APVD	DATE
0	ISSUED FOR USR PERMIT	LJM	JME		06/22/22
1	ISSUED FOR USR PERMIT [SUBMITTAL 02]	LJM	JME		09/08/22
2	ISSUED FOR USR PERMIT [SUBMITTAL 03]	LJM	JME		10/14/22

ZAP ENGINEERING & CONSTRUCTION SERVICES, INC.

DCP OPERATING COMPANY, LP

CANVASBACK COMPRESSOR STATION
WELD COUNTY, FACILITY 41
SITE PLAN

JOB NO: 22053		
DRAWING NO: D-03141-01-S003	SHEET NO: 03	REV: 2
PLOT SIZE: ARCH D	SCALE: AS NOTED	

Biologists Report,
DCP Canvasback Compressor Station

Prepared for:
DCP Midstream
3026 4th Avenue
Greeley, CO 80631

Prepared by:
Wildland/LWR Consultants, Inc.
1001 Jefferson Drive
Berthoud, CO 80513

March 2022

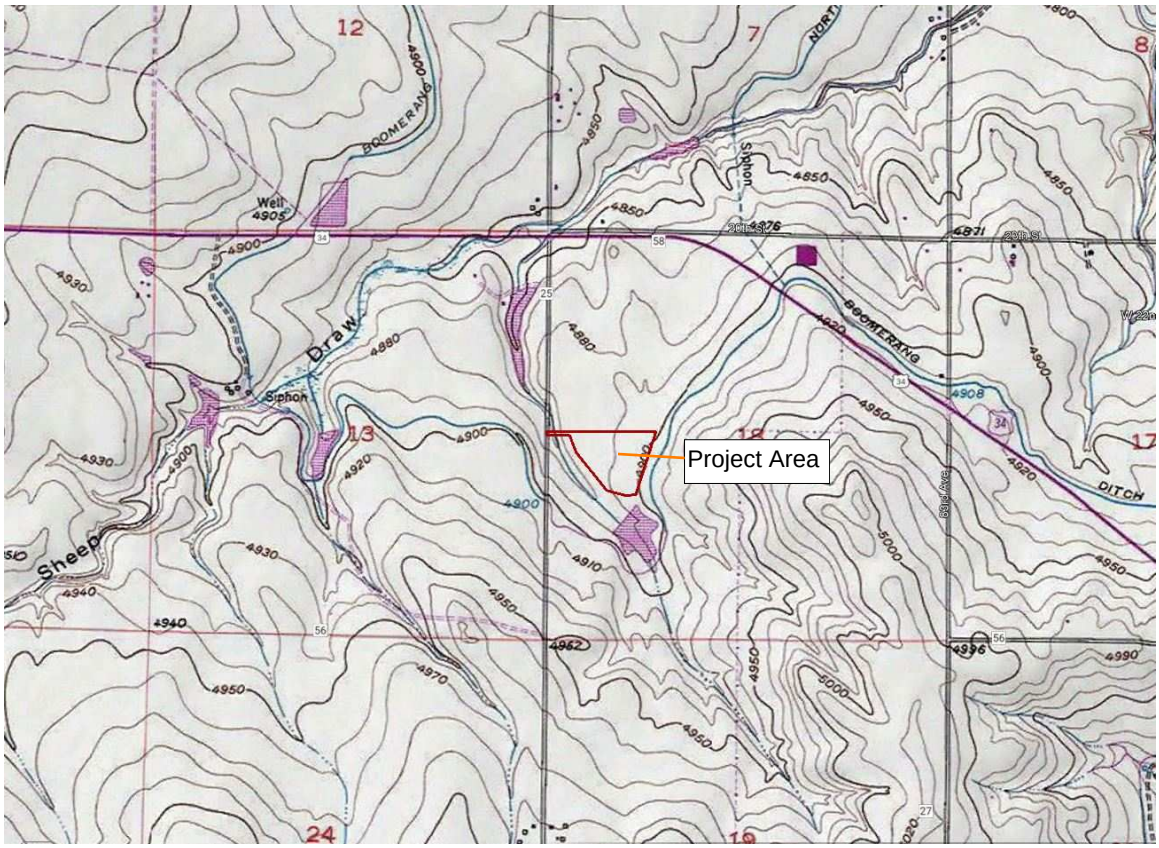
1.0 Introduction

DCP Midstream proposes to build a 15.3+- acre Canvasback Natural Gas Compressor station in southwest Greeley Colorado. The purpose of the compressor station is to move raw natural gas in the Weld County area providing additional capacity to existing Pipelines. The site vicinity map (Map 1) shows the project location. 95th Avenue borders the western site boundary, the Boomerang Ditch borders the eastern site boundary. The Canvasback Compressor Station will be constructed within the Township, Range and Sections:

- Township 5N, Range 66W, S18, SW1/4

This Biologists Report was prepared to follow the City of Greeley Development Code guidelines for developments that have the potential to impact areas of ecological significance (Chapter 18.48, City of Greeley 2021). These guidelines require a Biologists Report to discuss development impacts to sites that are mapped as high or moderate areas of Ecological Significance. The project includes areas mapped High areas of Ecological Significance (drainage to Sheep Draw) and Moderate Ecological Significance (Boomerang Ditch) on the City of Greeley Areas of Ecological Significance Map (City of Greeley 2011).

Map 1. Canvasback Compressor Station, Vicinity Map



This report was prepared by Eric Berg of Wildland/LWR Consultants, Inc. (WCI). Mr. Berg is a Certified Wildlife Biologist, and Certified Professional Wetland Scientist, with over 25 years of experience completing environmental impact studies. WCI is an approved ecological consultant by the City of Greeley.

2.0 Site Description

The proposed compressor site is located in the southwest section of Greeley, Colorado in Weld County. The site is located in an area currently dominated by agricultural land (**Attachment A, Photos**). The existing land use on the site is agriculture/pasture. The elevation of the site ranges from approximately 4880 to 4904 feet above sea level. The site is almost level but slopes/drains mainly towards the northwest.

2.1 Vegetation Communities, Wetlands

The dominant plant community on the site is pasture/seeded grassland. Dominant plants include: smooth brome, little bluestem, intermediate wheatgrass, sunflower and a few other species. Field margins, fencerows and ditch banks support seeded grasses and weedy vegetation. Trees present include stands of cottonwood and coyote willow in the northeast site corner. There are groves of Russian olive trees just to the west of the site along a drainage to Sheep Draw. There are a few plains cottonwood trees just east of the site boundary along the Boomerang Ditch.

Wetlands (dominated by cattails, reed canarygrass and prairie cordgrass) are present along a drainage that connects to Sheep Draw (Figure 2, Attachment A, Photo 1 and 4). A wetland (dominated by plains cottonwood, coyote willow, and reed canarygrass) is present in the northeast site corner in an area that my receive groundwater flows from the Boomerang Ditch (Photo 2 and 5). Wetland vegetation is also present along the Boomerang Ditch to the east of the site and the pond to the south of the site (Photo 3 and 8). National Wetland Inventory (NWI) mapped wetlands are present along the drainage to Sheep Draw, the Boomerang Ditch and the pond just south of the site (USFWS 2022).

2.2 Wildlife, Wildlife Corridors

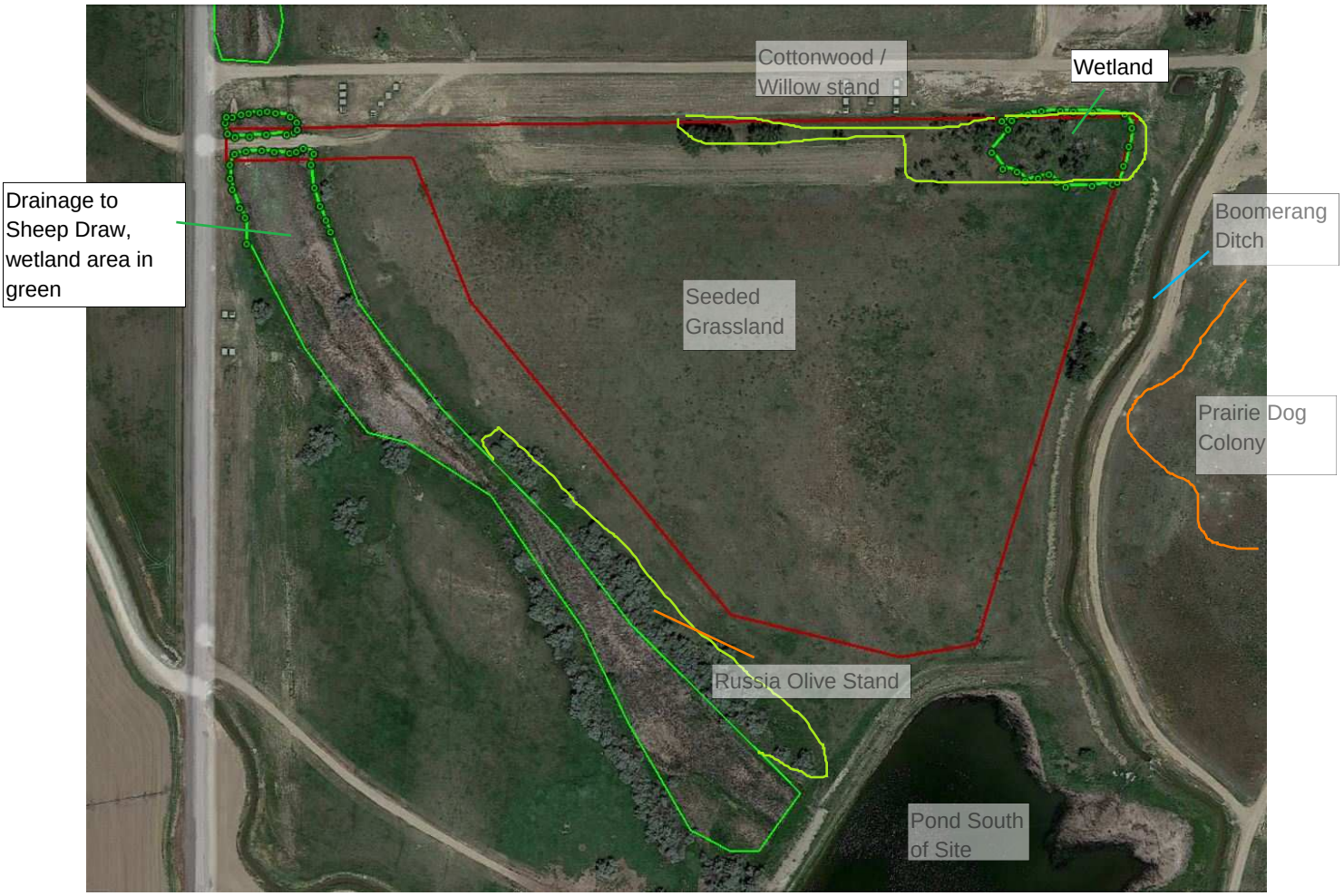
The project area provides habitat to wildlife species adapted to agricultural lands/pasture lands. The pasture land on the site does not provide important wildlife habitat areas.

Wildlife species likely to use the pasture lands and weedy field margins periodically include: coyote; red fox; a variety of small mammals (deer mouse, meadow vole, house mouse, jackrabbit, cottontail rabbit); a variety of birds (meadow lark, mourning dove, house finch, English sparrow, horned lark, black-billed magpie, starling, American kestrel, ring-necked pheasant, Canada goose, and other species); and a few reptiles (western terrestrial garter snake, gopher snake) (Andrews and Righter 1992, Colorado Division of Wildlife 1990, Fitzgerald et al. 1994, Hammerson 1999). Canada geese use the fields for foraging. There are no black-tailed prairie dog colonies on the site. The

nearest colony is just to the east of the site (to the east of the Boomerang Ditch). No raptor nests were observed near the ROW during March 2022 field reviews. Raptors use the area for foraging. Species that may be present include: red-tailed hawk, rough-legged hawk, Swainson's hawk, northern harrier, American kestrel, and great-horned owl.

An active bald eagle nest is located approximately 2.1 miles to the SE of the ROW along the Big Thompson River. The construction ROW is outside the 0.5 mile buffer zone of this nest. Project construction would not impact this nest.

Map 2, Site Inventory Map, Canvasback Compressor Station, site boundary in red.



Currently wildlife can move freely through the area. The wetland fringe along the intermittent drainage to Sheep Draw and the Boomerang Ditch provides a narrow wildlife movement corridor in the area. This area also provides nesting areas to riparian and wetland migratory bird species. The grove of cottonwood and coyote in the northeast site corner also provides a migratory bird nesting area. The pond to the south of the site provide good habitat to waterfowl and waterbirds.

2.3 Sensitive and High Interest Species

Sensitive and High Interest species with potential to occur in the project area include:

Ute ladies' tresses orchid (*Spiranthes diluvialis*), Federally Threatened Species. The wetland area along the canal supports poor potential habitat to the federally listed Ute ladies' tresses orchid (USFWS 1992; Spackman *et al*. 1997). There are no known locations of this plant east of Interstate 25 and no known populations in the City of Greeley. Past negative surveys for this species have been completed in good potential habitat areas of Greeley (Sheep Draw, Cache la Poudre River, South Platte River and other wetlands/wet meadows). The wetlands on and adjacent to the site have been degraded by past human activities (burning, dredging, weed control) it is very unlikely that this species is present in the project area.

Colorado butterfly plant (*Gaura neomexicana*) Formerly Federally Threatened Species, now delisted. The wetland area along the pond supports poor potential habitat to the federally listed Colorado butterfly plant (USFWS 1992; Spackman et al. 1997). There are no known locations no known populations in the City of Greeley. Past negative surveys for this species have been conducted in good potential habitat areas in and near the City of Greeley. The narrow wetland habitat along the pond is the south section of the project area has been degraded by past human activities (burning, dredging, weed control) it is very unlikely that this species is present in the project area.

Preble's meadow jumping mouse (PMJM) (*Zapus hudsonius preblei*). Federally Threatened Species. The Preble's meadow jumping mouse preferred habitat includes shrubby/wooded riparian zones (Armstrong et al. 1997). The nearest good potential habitat area for this species are several miles to the north along the Cache la Poudre River. There is no good potential habitat for this species along or near the pipeline ROW. Trapping efforts conducted in the past on good potential habitat areas in and near Greeley along Sheep Draw, the Cache la Poudre River, and South Platte River completed by WCI and other groups have been negative for this species. It is unlikely that this species is present in the project area. The drainage to Sheep Draw does not provide consistent riparian habitat connections to downstream areas.

Eastern Black Rail: (*Laterallus jamaicensis jamaicensis*). Federally Threatened Species. The distribution of the eastern black rail in Colorado is poorly understood. The species is documented as nesting in the Arkansas River Valley. The USFWS considers Weld County probable for supporting a breeding population and Larimer County as possible for supporting a breeding population (USFWS 2020). The Colorado Breeding Bird Atlas has no locations for this species mapped in Larimer or Weld Counties (Colorado Breeding Bird Atlas 2016). In Colorado's most recent Breeding Bird Atlas, eastern black rails were detected exclusively in extensive cattail marshes with standing water in the Arkansas Valley (Wickersham 2016). Suitable habitat has dense or thick emergent vegetation with high vegetation density (interspersion) as well as a mixture of new and residual growth (Colorado Division of Parks and Wildlife (CDPW) 2016). The drainage to Sheep supports narrow cattail dominated wetlands. However, it is very unlikely that this species is present on or near the project.

Bald eagle (*Haliaeetus leucocephalus*). Formerly listed as Threatened now delisted. The site is mapped as bald eagle winter range (CDPW 2022). The nearest bald eagle nest is located 3.25 miles north of the site along the Cache la Poudre River.

Other raptors and Migratory Birds. During a field reconnaissance of the site completed in March 2022 no raptor nests were located on or near the site. The adjacent wetlands and riparian habitat along the drainage to Sheep Draw provides nesting habitat to red-

winged blackbirds, swamp sparrows and a few other migratory birds species. The mixed cottonwood grove and coyote willow thicket in the northeast site corner provides nesting habitat to a variety of migratory nesting birds.

3.0 Assessment of Potential Impacts

3.1 Vegetation Communities, Wetlands

Project construction will result in the temporary disturbance of approximately 15.3 +- acres of mainly pasture land to industrial use.

No impacts are anticipated to rare plants or rare plant communities, or native plant communities as a result of project construction. The wetland and riparian area in the northeast section of the site will not be disturbed by construction. Project construction would impact the wetland in the northeast site corner. The road access into the site may impact the wetland along the drainage to Sheep Draw. A permit from the Army Corps of Engineers for wetland fill/disturbance may be required for project construction.

3.2 Wildlife and Wildlife Corridors

Project construction will result in the temporary disturbance of approximately 15.3 +- acres of mainly agricultural land during construction.

Except for the small grove of cottonwood trees and coyote willows in the northeast site corner and the adjacent drainage to Sheep Draw there are no key or important wildlife habitats on the site. The grove of cottonwoods and coyote willows in the northeast site corner will not be disturbed by construction. The drainage to Sheep Draw will not be disturbed except for the road crossing. The site provides poor potential habitat to the Preble's meadow jumping mouse and Eastern black-rail. There are no black-tailed prairie dog colonies on the site. No impacts to rare wildlife species are anticipated with project construction. The best migratory bird nesting habitat on and adjacent to the site

(drainage to Sheep Draw, wetland and cottonwood/willow stand NE site corner) will remain undisturbed except for a road crossing of the drainage.

4.0 Conclusions, Mitigation, Enhancement

Project construction will result in the conversion of approximately 15.3+- acres of seeded grassland to industrial uses. A small area of wetlands may be disturbed associated with road construction across the drainage to Sheep Draw. No impacts to rare plant or wildlife species are expected.

The following mitigation and enhancement measures are proposed by the project proponent:

- The ACOE would be consulted to determine the jurisdictional status of wetlands on the site. It is anticipated that the wetland in the northeast site corner would be non-jurisdictional because of lack of connection to other wetlands and waters. The wetland along the drainage to Sheep Draw should be jurisdictional. If required appropriate permit(s) would be obtained from the ACOE for any wetland impacts. Wetland mitigation would be completed if required by the ACOE.
- The only impact to the drainage to Sheep Draw would be the road crossing. A no disturbance buffer area of approximately 120 to 400 feet will be established from the edge of the project to the drainage to Sheep Draw.
- The wetlands and mixed stand of cottonwoods and coyote willow in the northeast site corner would not be disturbed by site construction.
- A no disturbance buffer area of approximately 60 to 200 feet will be established from the edge of the project to the pond south of the site.
- A no disturbance buffer area of approximately 50 to 130 feet will be established from the edge of the project to the Boomerang Ditch.
- Stormwater and Erosion Control: Project construction will follow best management practices (BMP's) outlined in a Stormwater Management Plan for the project. A Stormwater General Permit has be obtained from Colorado

Department of Public Health and Environment. Following this plan and using appropriate BMP's will reduce the potential for sedimentation into the adjacent canals, reduce offsite erosion and sedimentation and reduce dust production during construction.

- Post construction storwmater flows would be channeled into an approved detention/water quality basin to help minimize water quality issues into adjacent waters.

5.0 References

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City of Greeley, 2011. Areas of Ecological Significance Map.

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Fitzgerald, J.P., C.A. Meaney, D.M. Armstrong. 1994. Mammals of Colorado. Denver Museum of Natural History and University Press of Colorado. 467pp.

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U.S. Fish and Wildlife Service. 2022. IPAC Resource Report Canvasback.

Attachment A:
Site Photos

Photo 1. Drainage to Sheep Draw looking south from existing road crossing.

Photo 2. Wetland area and cottonwood/willow stand NE site corner looking west.

Photo 3. Looking south along the Boomerang Ditch, just east of the NE site boundary.

Photo 4. Road crossing of drainage to Sheep Draw, looking east along the north site boundary.

Photo 5. View to the south from the NE site boundary, willows and wetland area.

Photo 6. View to the north from the SE site corner.

Photo 7. View to the north from the SW site corner, seeded pasture, Russian olive trees off of the site along the drainage to Sheep Draw.

Photo 8. Pond south of the south site boundary.

Attachment F - Traffic Impact Study

TRIP GENERATION MEMORANDUM

Date:	June 7, 2022
To:	Scott Logan – City of Greeley
From:	Chris Rolling, PE
RE:	Canvasback Booster Station – Greeley, CO
Project #:	022-03158
Cc:	File

Introduction and Objective

This traffic memorandum summarizes the existing and projected traffic conditions of the proposed Canvasback Booster Station in Greeley, CO to be developed on the east side of 95th Avenue approximately ½ mile south of US Highway 34. Access to the site will temporarily be by an existing dirt road adjacent to the north end of the site. Upon completion, access to the site is proposed to be from a driveway approximately 100 feet south of the existing road which aligns with an existing dirt road on the west side of 95th Avenue.

The objective of this memorandum is to review the existing adjacent roadway network and to determine both the trip generation and distribution of the site during the site's expected construction from December 2022 through December 2023. Upon completion in early 2024, the site is not expected to generate daily traffic volumes. This memorandum is performed in accordance with City of Greeley and Institute of Transportation Engineers (ITE) criteria.

Figure 1 shows the vicinity map of the project.

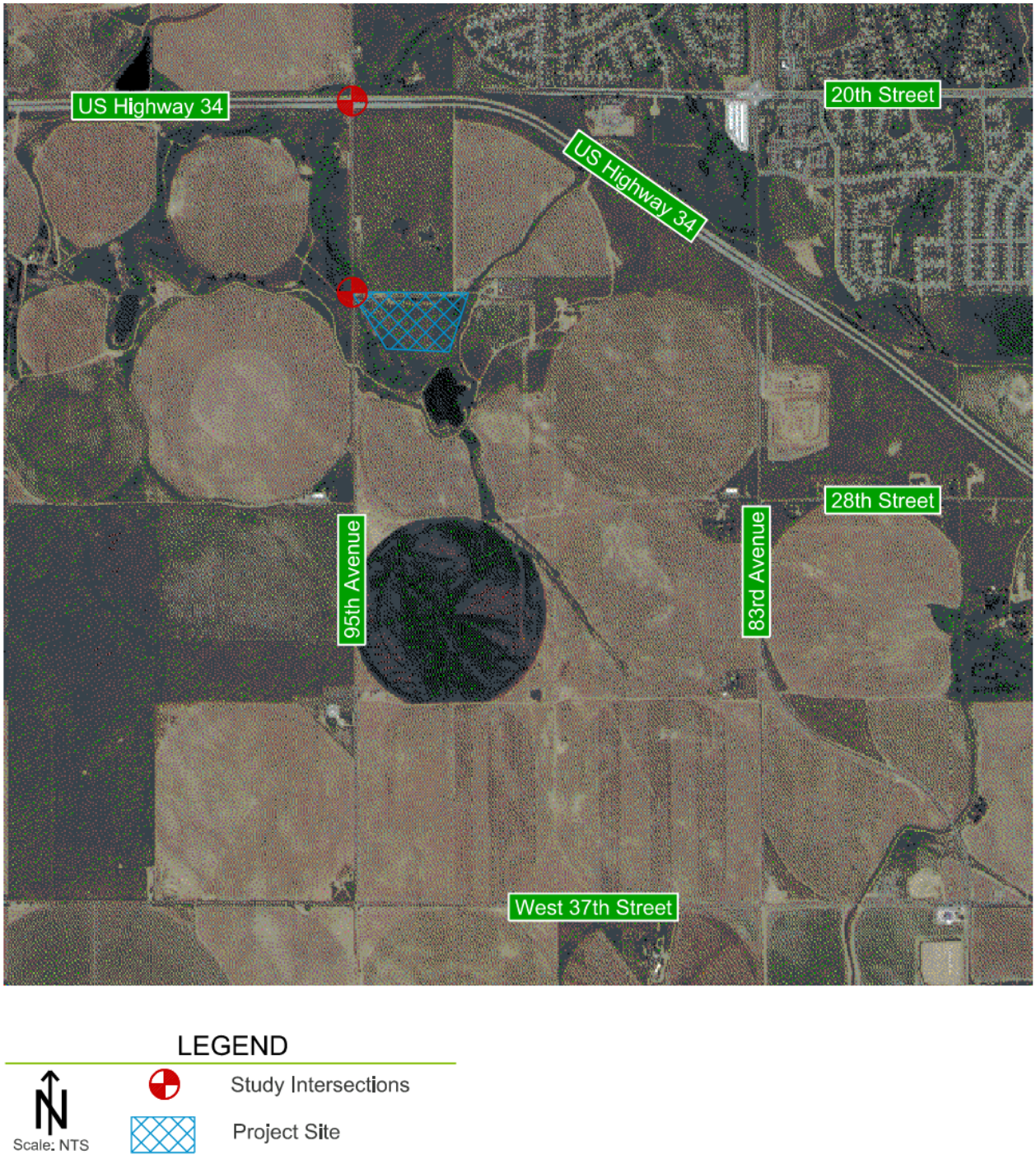

Figure 1: Site Vicinity Map

Existing Roadways

The site to be developed approximately at the southeast corner of 95th Avenue and 24th Street. The site is to temporarily be accessed by an existing dirt access road adjacent to the north end of the site. Upon completion, the site will be accessed by improving an existing dirt road which is 100 feet south of the existing dirt road; this new site access also aligns with a dirt roadway west of 95th Avenue.

US Highway 34 is a 4-lane regional divided freeway/expressway which has left and right deceleration-lanes onto 95th Avenue. The CDOT State Highway Access Code (SHAC) defines the functional classification for state routes and the Online Transportation Information System (OTIS) provides an online catalogue of data for CDOT facilities. The latter shows this as an Expressway (E-X) as defined by CDOT. The intersection of US Highway 34 and 95th Avenue is a full movement, two-way-stop-controlled (TWSC) intersection and is expected to serve most of the site traffic. Existing average annual daily traffic (AADT) is 28,000 vehicles per day (vpd).

95th Avenue, also referred to as WCR 25, is a minor arterial roadway which is currently an unimproved 2-lane dirt roadway. The *Greeley 2035 Transportation Vision Plan* identifies 95th Avenue to be improved as a 2-lane minor arterial between US Highway 34 and West 37th Street by 2035.

West 37th Street, also referred to as WCR 54, is a minor arterial roadway which is a paved 2-lane roadway with unpaved shoulders adjacent near 95th Avenue. While site traffic can access the site via this roadway, it is expected that most trips will reach the site from US 34 to the north.

The existing roadway characteristics are listed in **Table 1** and the roadway geometry is shown in **Figure 2**.

Table 1: Existing Roadway Characteristics

Roadway	Section	Median Type	Posted Speed	Functional Classification
US Highway 34	4-Lane	Divided Highway	65 mph	Expressway (E-X)[1]
95th Avenue	2-Lane	Dirt Road	35 mph	Minor Arterial[2]
West 37th Street	2-Lane	Undivided	35 mph	Minor Arterial2

1. Per CDOT SHAC and OTIS
2. Per Greeley Roadway Classifications

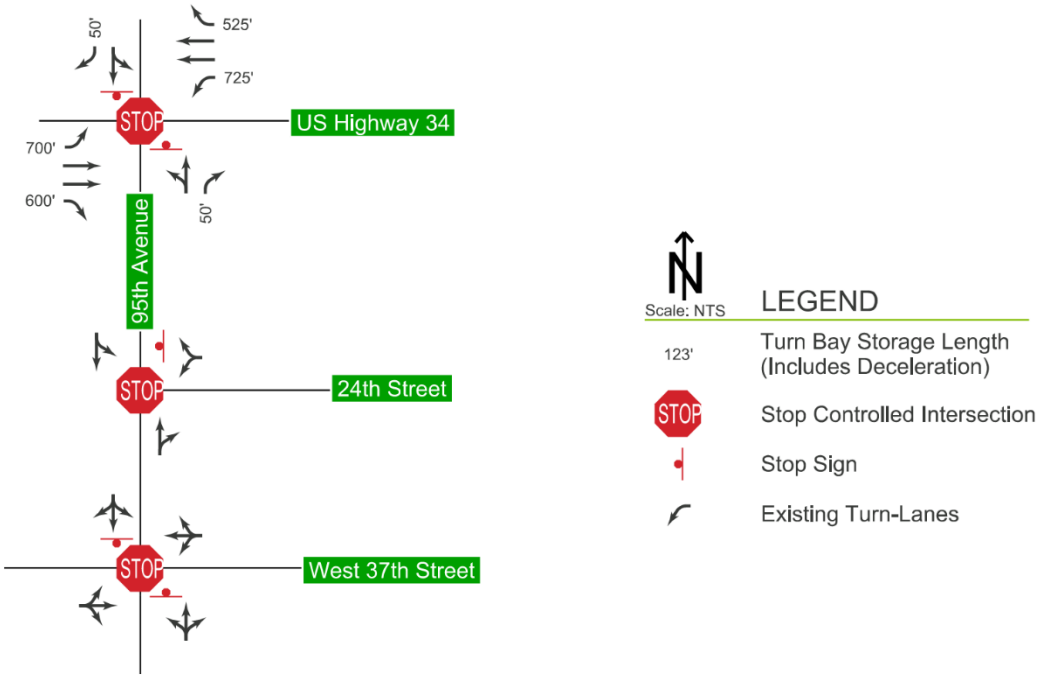

Figure 2: Roadway Geometrics

Site Conditions

The site is currently undeveloped agricultural land and is zoned as H-A Holding Agricultural. The City of Greeley zoning plan identifies the general area in and around the site to be planned as a mixture of residential and light commercial properties. As April 2022, there are no residential or commercial projects under review along 95th Avenue south of US Highway 34 other than this site.

The site intends to temporarily use an existing unpaved driveway used by PVREA before improving another existing access found roughly 100 feet south of this access. These drives are to be designed to accommodate WB-65 truck-turning radii. An existing plan of the site and both the proposed temporary and final access locations can be found in **Figure 3**.

The site is expected to be constructed before 95th Avenue is to be improved and paved. There are no existing transit, bike, or pedestrian facilities adjacent to the site. The *Greeley 2035 Transportation Vision Plan* proposes a recreational trail be built on along the Boomerang Ditch which runs along the southern site boundary. The final proposed site access may need to be adjusted depending on the final alignment of West 24th Street if and when this roadway is developed east of 95th Avenue. There are no current proposed developments in the area and no current plans to develop West 24th Street at 95th Avenue, so no changes to the proposed site access are recommended at this time.

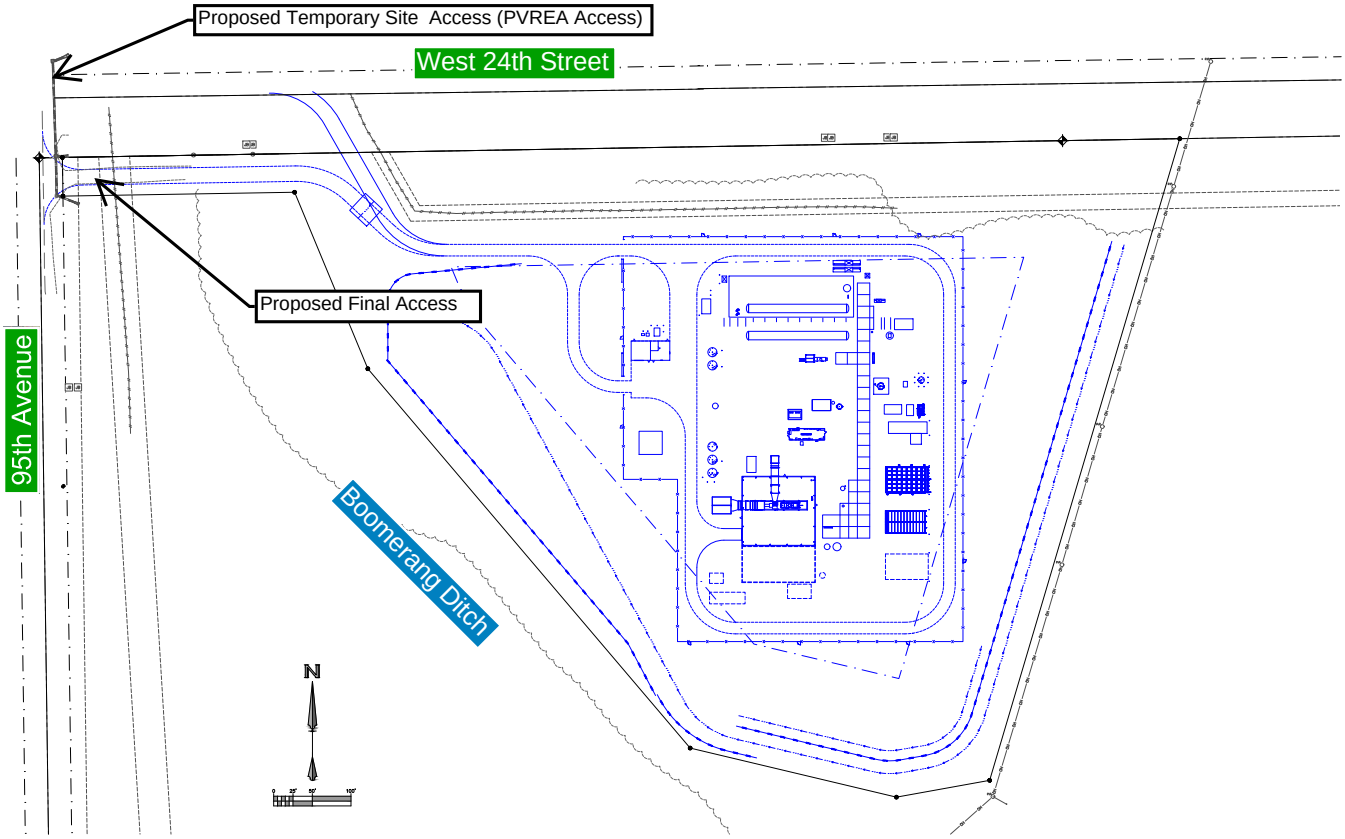

Figure 3: Proposed Site Plan

Trip Generation

Trip generation is typically determined using rates found in the *ITE Trip Generation Manual, 11th Edition*. However, the land use proposed for this site is not included in the manual so trip generation, the traffic volumes are estimated information provided from the owner based on comparable sites previously constructed. Note that the peak trip generation of this site is expected to be during construction of the site, after which traffic will reduce to infrequent maintenance staff. The existing site is undeveloped and does not generate traffic.

The construction schedule for the site is expected to take place for 12 months between December 1st, 2022, and December 1st, 2023. The construction of the site is expected to first consist of grading crews with heavy machinery being mobilized and de-mobilized during this period, then general construction which will have the highest expected craft workers and delivery trucks, and lastly demobilization. Construction activities are expected to be vary throughout the year, with the peak trip generation occurring during general construction. The expected construction timeline and trips generated is outlined in **Table 2**.

Table 2: Trip Generation

Site Trip Generation During Construction									
Phase	Timeline	Time	Trucks	Passenger Vehicles	Trips Generated	Trip Distribution		Primary Trips	
						Enter	Exit	Enter	Exit
Grading	12/1/22 Through 2/15/23	Daily Volumes	6	6	24	50%	50%	12	12
		AM Peak Hour (Site)	1	6	8	90%	10%	7	1
		PM Peak Hour (Site)	1	6	8	5%	95%	0	8
General Construction	2/15/23 Through 10/31/23	Daily Volumes	12	40	104	50%	50%	52	52
		AM Peak Hour (Site)	2	40	44	90%	10%	40	4
		PM Peak Hour (Site)	2	40	44	5%	95%	2	42
Demobilization	10/31/23 Through 12/1/23	Daily Volumes	6	10	32	50%	50%	16	16
		AM Peak Hour (Site)	1	10	12	90%	10%	11	1
		PM Peak Hour (Site)	1	10	12	5%	95%	1	11

The trip generation of the site is expected to be the highest during the general construction phase in which 12 trucks and 40 passenger vehicles are expected to both enter and exit the site each day. Trucks are assumed to be spaced out throughout the day and all craft workers and construction staff are assumed to enter and exit the site during a single AM and PM peak hour, respectively.

A specific contractor and construction schedule are not yet decided upon. Typically, the construction AM peak hour is expected to coincide with the adjacent street traffic peak hour at 7 AM, and the construction PM peak hour is expected to occur before the adjacent street traffic peak hour at 3PM.

Trip Assignment

Trips to the site are expected to mostly go into and out of the US Highway 34 and 95th Avenue intersection roughly ½ mile north of the site being the most direct access to the site which accommodates vehicle and truck turning. The staff is expected to arrive from surrounding communities and be distributed according to a gravity model in which the origin-destination of trips are weighed according to the distance and population of local communities in the Northern Front Range. The assigned trips and external trip distribution for the general construction phase are shown in **Figure 4**.

Trucks are likely to access the site via US Highway 34 at 95th Avenue. The existing roadway infrastructure accommodates trucks turning into the site. Vehicles exiting the site may experience significant delays trying to exit the site during peak hours if making a northbound left-turn at this intersection. Therefore, truck deliveries should occur outside the peak hours. If large trucks are leaving the site during peak hours, they could exit the site using an alternate route by driving south along 95th Avenue to West 37th Street, then head west to US Highway 257, then head north to access US Highway 34 via an interchange with ramp terminals. The geometry of each intersection along this route should be examined to verify the ability to accommodate large truck turning.

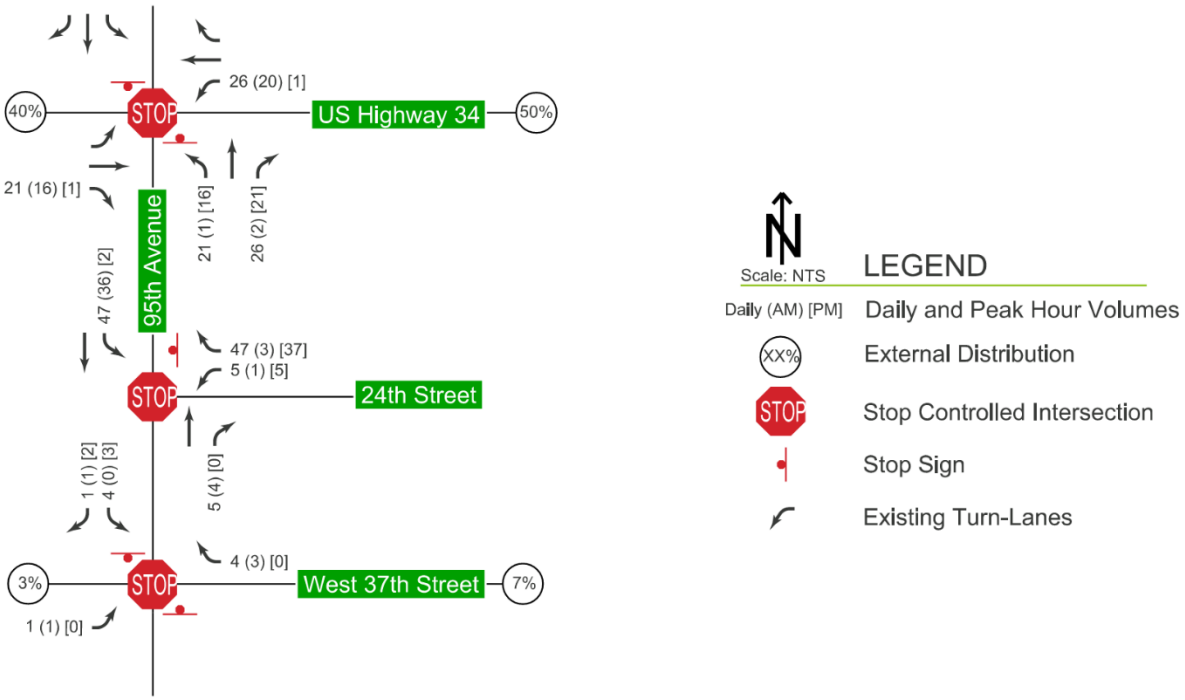

Figure 4: General Construction Phase Site Traffic Volumes

Summary and Conclusions

The purpose of this memorandum is to summarize the existing site conditions and the expected trips generated by the proposed Canvasback USR pumping station to be constructed east of 95th Avenue ½ mile south of US Highway 34, roughly at the future alignment of West 24th Street.

The site is on an undeveloped agricultural parcel which is accessible via two unpaved drives along 95th Avenue, which is also currently unpaved but planned to be improved as a 2-lane minor arterial roadway. The site is expected to be completed before 95th Avenue is improved. During the initial stages of construction, the site proposes to use the existing access currently used to access a PVREA site roughly 100 feet north of the site. The site proposes to use the final access at the northern site boundary as shown in **Figure 3**.

The site construction is expected to last for approximately 12 months from December 1, 2022 through December 1, 2023. Construction consists of grading, general construction, and demobilization periods. The most intensive period of construction is expected to be the general construction phase, lasting roughly 9 months during the middle of the construction timeline. During the general construction period, the site is expected to have 12 daily truck deliveries/hauls, and 40 staff which generate roughly 104 daily trips, and 44 trips during each of the site peak hours as shown in **Table 2**. Most of these trips are expected to reach the site using the intersection of US Highway 34 and 95th Avenue as the most direct route to the site. Upon completion of construction, the site is not expected to generate significant daily trips.

The existing infrastructure is expected to be sufficient for the expected trip generation of the site and no further improvements are recommended at this time. The site access may need to be adjusted in the future once an access management plan is developed for 95th Avenue as identified in the *Greeley 2035 Transportation Vision Plan*. Currently there are no residential or commercial design proposals within the site vicinity.

Attachment G - Tactical Response Plan

SITE SAFETY AND EMERGENCY ACTION PLAN

DCP Midstream, LLC

Canvasback Compressor Station – DCP Midstream

Greeley, CO, 80631

Address: TBD

WELD COUNTY, COLORADO

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SECTION 1 – APPROVAL SIGNATURES

Instructions: Company Representative to sign with concurrence review by local Fire Department/Districts

DCP Midstream			
Name	**Signature**	**Title**	**Date**
Michael Pishaki	8/10/2022 X Michael Pishaki Signed by: mobile.dcpmidstream.com	Sr. Permitting Specialist	8/10/2022
Fire District			
Name	**Signature**	**Title**	**Date**

Weld County Office of Emergency Management

Digitally Signed

SECTION 2 – SITE ADDRESS AND DIRECTIONS

a) Directions:

From the intersection of Highway 34 and 95th Avenue head South for 0.5 miles. The site's access road will be located on the West side of 95th Ave, you'll make a left turn directly onto the facilities access road and continue down for approximately 150 feet which will bring you right to the front gate which will be appropriately marked with DCP Midstream information.

b) Ingress and egress information:

The Canvasback facility will remain secured at all times. Main access is through an automatic gate where a code is entered to open the gate. All ingress and egress routes will be clearly identified and kept clear from parked/staged vehicles at all times.

c) Physical Address and GPS coordinates

- **Legal Description** – NWNW of Section 18, Township 5 North, Range 66 West
- **Address - TBD**
- **Town, CO, Zip –** Greeley, CO, 80631
- **Lat/Long:** Lat: 40°23'54.44"N Long: -104°49'44.92"W

d) Emergency Evacuation/Muster Assembly point(s)

For incidents in a particular area could pose a hazard to personnel onsite, such as a fire or hazardous material release, evacuation may be required to ensure the safety of onsite personnel. In the event of an emergency, site personnel will initially be evacuated to pre-designated muster assembly points.

- The Muster assembly points are identified on Figure 1 in this plan.
- The Muster assembly points will be identified during all site safety briefings for visitors, employees, and contract personnel.
- **Sign-In Sheets:** All employees and approved visitors to the Canvasback facility will be required to check in and out with operator on duty using an accountability sheet located in the control room. Upon checking in, employees and visitors will review and complete a safe work permit where safety precautions, site emergency information, and other DCP expectations will be reviewed. In addition, all personnel who enter the location must sign-out upon their departure.

SECTION 3 – LIST OF EMERGENCY CONTACTS

a) Energy Company

Name	Office Phone	Emergency/Cell
Corporate Office and Address	303-595-3331	888-204-1781
DCP Emergency Number	N/A	720-471-9715
EHS Supervisor	N/A	970-381-7527
EHS – Environmental	970-378-6711	720-357-6891

b) Energy Company Community/Media Relations

Name	Office Phone	Cell Phone
Jeanette Alberg	303-605-3424	720-376-4773
Personnel Name	303-264-2042	303-594-9201

c) First Responders (Fire, EMS, HazMat)

Name	Emergency Number	Non-Emergency Number
***All emergency notifications require notification to 911 first**		
Greeley Fire Department – Station #1	911	970-350-9504
Weld County Sheriff	911	970-356-4015
Colorado State Highway Patrol	911	970-506-4999

d) Local, State, and Federal Contacts

Name	Emergency Number	Non-Emergency Number
Weld County Office of Emergency Management	911	970-304-6540
CDPHE	none	877-518-5608
Colorado Parks & Wildlife	none	303-291-7227
National Response Center	800-424-8802	none

e) Medical Facilities *(Nearest locations to site)*

Name	Office Phone
Northern Colorado Medical Center	970-352-4121
Medical Center of the Rockies	970-624-2500
Northern Colorado Medical Facility (Burn Unit)	970-810-4121

f) Spill Response Organization (*Contracted***)**

Name	24/7 Emergency Number	Non-Emergency Number
ChemTrec	800-424-9300	800-262-8200

SECTION – 4 SITE SPECIFIC INFORMATION

a) Site Description

The Canvasback facility is a natural gas compressor station. Located off County Road 25, approximately 0.49 mile south of where the road intersects Highway 34. The natural gas compression station is required to expand and enhance the existing natural gas being collected from nearby gathering systems and will compress the gas for delivery to pipelines for processing at existing DCP gas plants. This facility will be unmanned and remotely monitored 24 hours a day, 7 days a week. Daily/ periodic visits by DCP employees or contractors for maintenance monitoring, and contracted services will also be necessary.

b) Nearby Schools, High Occupancy Buildings, Waterways

- Schools - None within 2500' of location.
- High Occupancy Buildings - None within 2500' of location.
- Waterways – Boomerang Ditch.

c) Site Safety Requirements and General Safety Information

The minimum personal protective equipment (PPE) to enter any DCP Midstream facilities include hard hat, safety glasses, safety toe boots, and personal gas monitors. All contractors and visitors are responsible for providing their employees with the appropriate training on and use of PPE while on DCP Midstream locations. In addition, all contract personnel entering a DCP Midstream location to perform work must understand and abide by DCP Midstream's contractor expectations relating to environmental, health, and safety requirements. All contractors' safety programs are verified using ISNetworld, a contractor management system.

The primary hazards that any person must be aware of while on a DCP Midstream facility include, but are not limited to, the potential for release of hydrocarbon gases and/or liquids from process equipment, heavy truck and equipment traffic, loud noise, high pressures, and the potential for a flash fire. These hazards can vary depending on the work being performed.

The facility has 24/7 remote monitoring using advanced SCADA systems. Operators are called out to site for various predetermined alarms.

d) SDS: Depending on the operations taking place on location, chemicals stored on-site may vary. In accordance with 49 CFR 1910.1200, Safety Data Sheets (SDS) will be made available for site personnel performing work and for first responders in a centralized location onsite**.**

e) Fire Suppression Water Supply

There are no fire suppression systems or water supply at the Canvasback facility. The facility has fire detection equipment which shuts down the facility to isolate fires.

f) Heavy Equipment List

There is no heavy equipment stored onsite at the Canvasback facility. Occasionally, trucks drive into the facility to haul condensate liquids out. Also, during construction activities, cranes and forklifts may be brought into the facility.

g) Chemicals stored on-site (Gallons)

TAG	TYPE	DESCRIPTION	CAPACITY
V–410401	PRESSURE VESSEL	CONDENSATE STORAGE TANK	90000 GAL.
TK–410271	TANK	LUBE OIL DAY TANK (FRAME OIL)	88 GAL.
TK–410272	TANK	LUBE OIL DAY TANK	500 GAL.
TK–410273	TANK	LUBE OIL DAY TANK (CYLINDER OIL)	88 GAL.
TK–410471	TANK	PRODUCED WATER SUMP	300 BBL
TK–410472	TANK	COMPRESSOR SKID DRAIN SUMP SLOP LUBE OIL/MIXED HYDROCARBON/WATER	300 BBL
TK–410473	TANK	OPEN DRAIN SUMP SLOP LUBE OIL/MIXED HYDROCARBON/WATER	90 BBL
TK–410474	TANK	PRODUCED WATER SUMP	300 BBL
TK–411202	TANK	TEG STORAGE TANK	90 BBL
TK–411301	TANK	METHANOL STORAGE TANK	90 BBL

Storage Location

- Lube Oil day tank - Compressor building
- Sumps - along the north side of the facility
- Condensate Storage Tank - West end of the facility
- TEG storage tank - South Side of the facility
- Methanol storage tank - Southwest of condensate vessel

SECTION 5 – MAPS AND DRAWINGS

Facility drawing

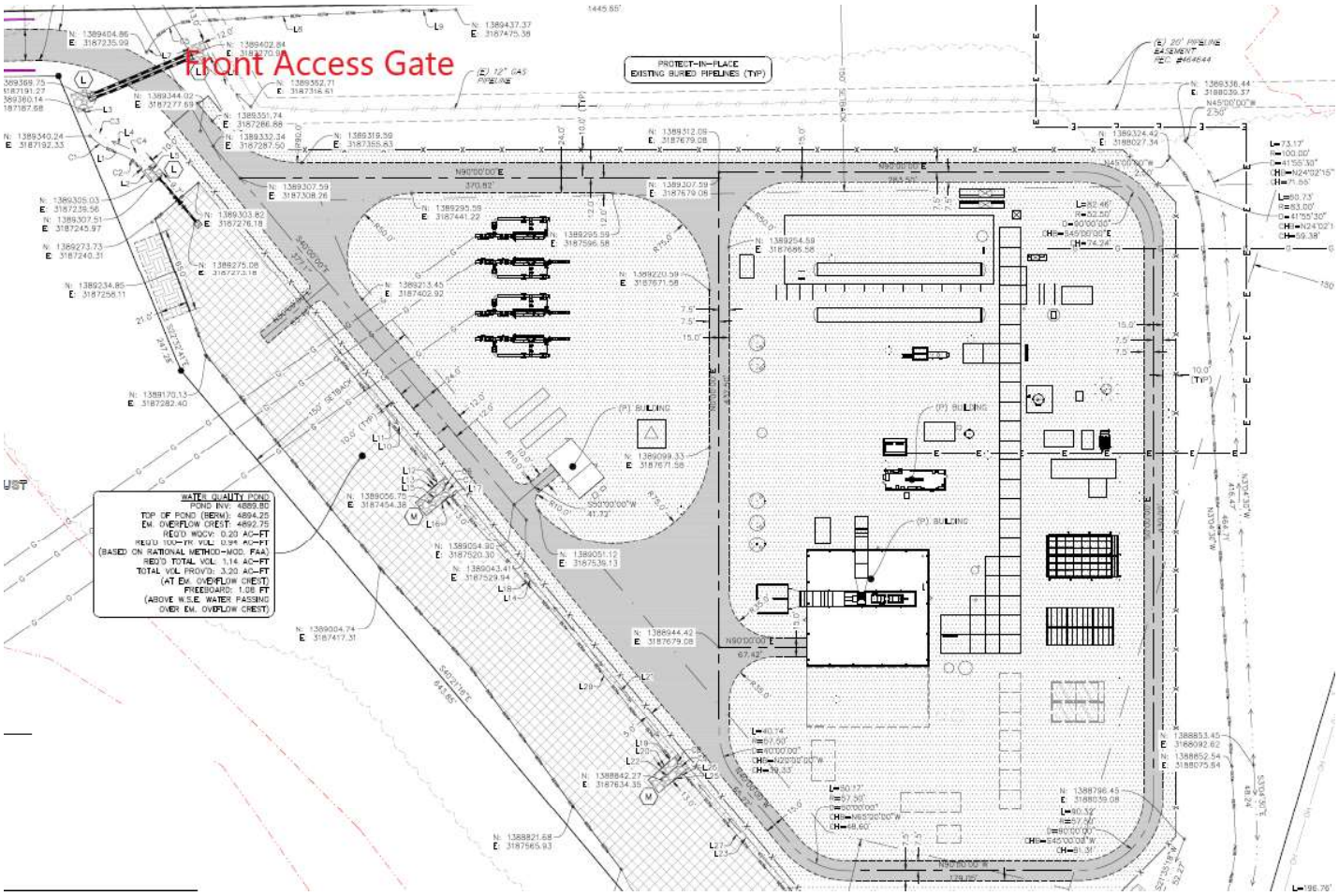
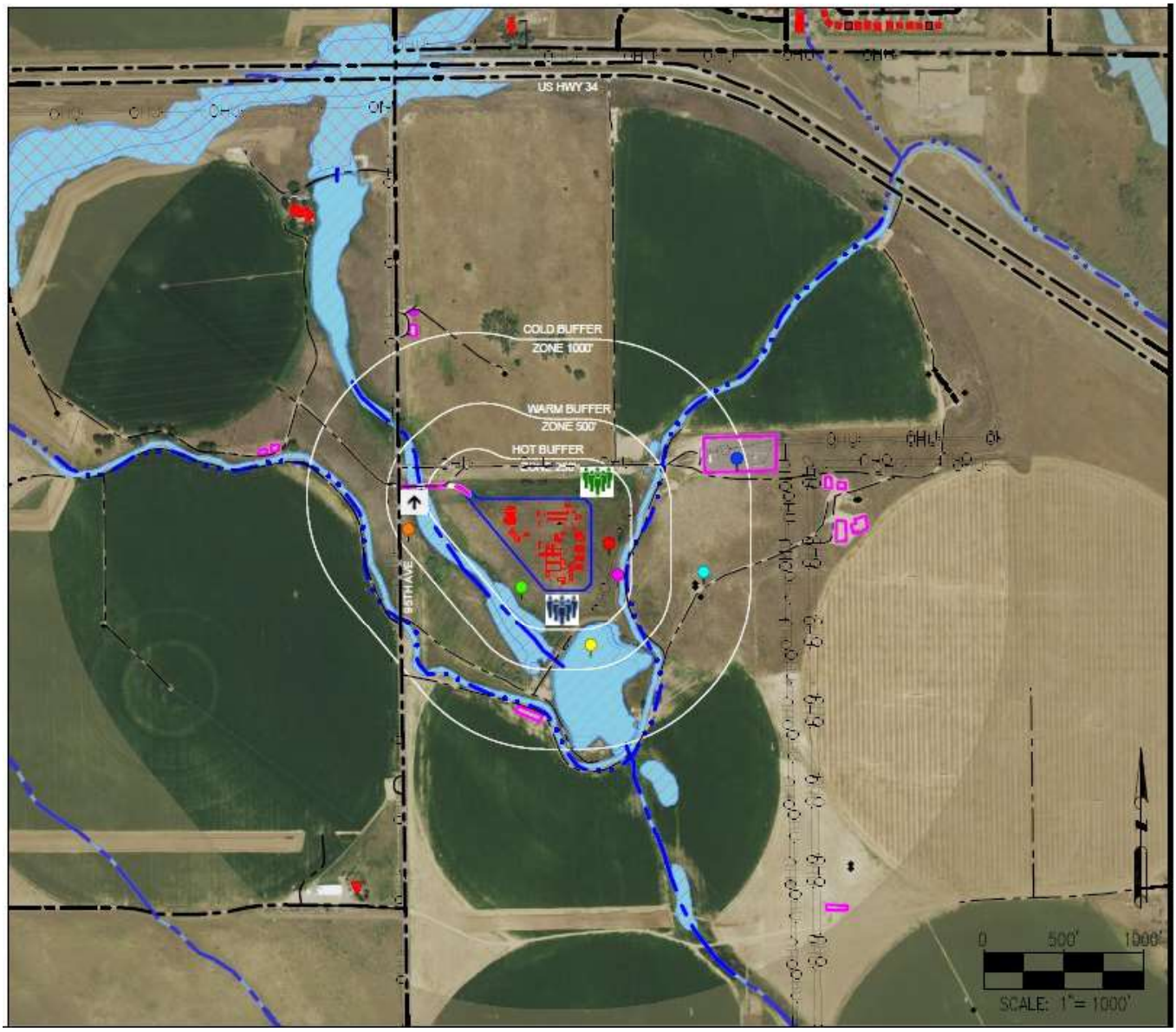


Figure 1

Project Location Access Map and Muster Point



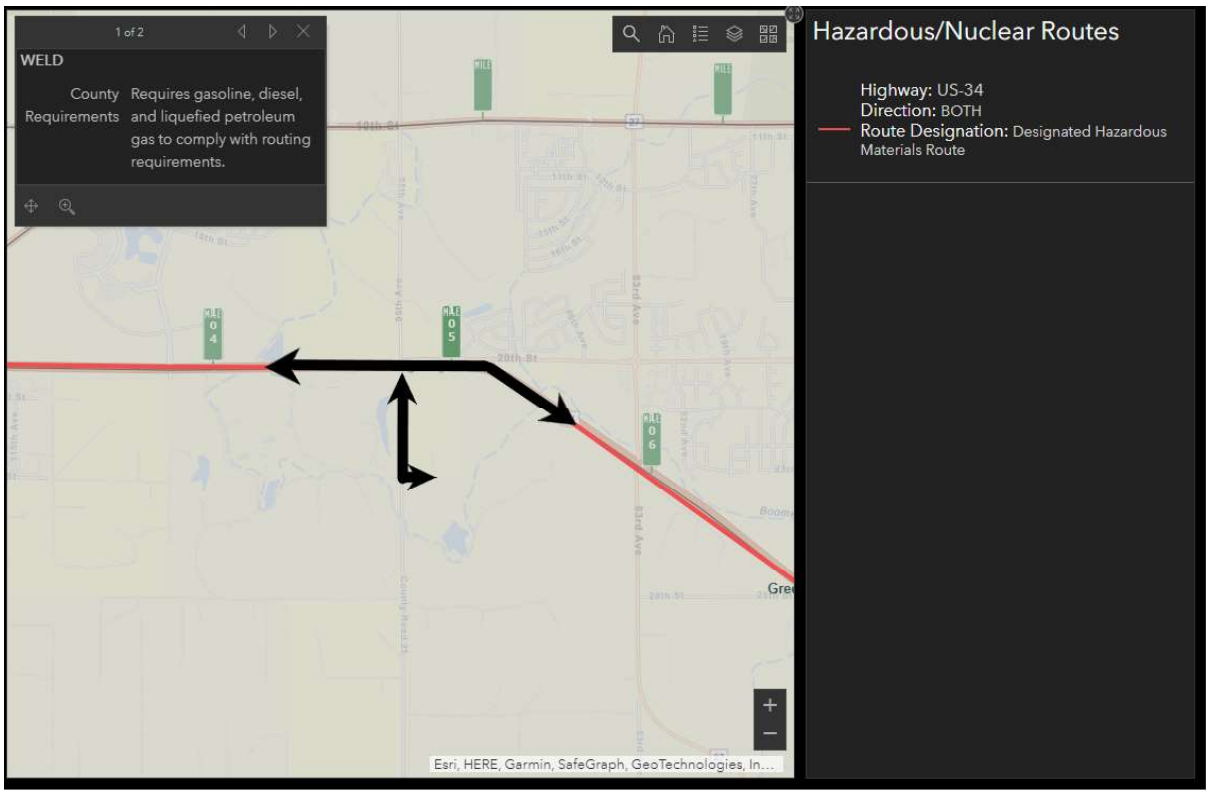
LEGEND

- PRIMARY MUSTER POINT
- SECONDARY MUSTER POINT
- PRIMARY INGRESS/EGRESS
- CRITICAL RECEPTOR
- EXISTING WELL
- FLOODPLAIN
- POND
- PROPOSED DISTURBANCE AREA
- PROPOSED FACILITIES
- EXISTING FACILITIES
- RESIDENCE
- WETLAND
- HOT, WARM, & COLD BUFFER ZONES

ERG ZONE (800 METERS)

- PROPOSED ACCESS ROAD
- PUBLIC ROAD
- PRIVATE ROAD
- OHU — OVERHEAD UTILITY
- STREAM
- DITCH

Figure 2
Haul Route /HazMat deliver Map
DCP Midstream and authorized contractors will use the recommended and approved HazMat routes as defined by CDOT (CDOT official routing recommendations below)



Hazardous Materials Routing

As a general rule, vehicles carrying an amount of hazardous materials that require placards, must remain on designated hazardous materials routes. There are some exceptions to the rule:

- You may leave an authorized route in order to service a vehicle.
- You may leave an authorized route for local pickup or delivery of hazardous materials.
- You may leave an authorized route due to emergencies that would make continued use of the route unsafe.
- You may leave an authorized route when it is closed pursuant to 42-20-304, CRS.

A person transporting hazardous materials may make successive local pickups and deliveries without returning to the route between deliveries, when returning to the route is unreasonable.

SECTION 6 – SPILL RESPONSE AND CLEAN-UP

a) Spill Response

Once a release has been discovered, it will be immediately stopped and contained if possible and if safe to do so. When containing a spill; a combination of sorbent rolls, pads, mats, socks, or containment boom may be deployed, or earthen berms will be constructed around the release to keep spilled material contained and from spreading. These materials will be provided by DCP Midstream and the contract company and kept on-site. During a spill, efforts will be made to minimize contact with live vegetation, nearby drainage, rivers, creeks, or streams. If the release is outside of secondary containment or poses a threat to flow off site, or impact environmentally sensitive areas, the spill response contractor should be notified for cleanup assistance, if needed, and for removal and disposal of spilled materials and contaminated areas.

In the event of a large incident requiring outside assistance/cascading resources, DCP Midstream has contracted with a January Environmental and Foster Trucking. January Environmental possesses a working knowledge of DCP Midstream operations, emergency response and the Incident Command System (ICS). Once notified January Environmental personnel can be on location within 3 hours.

b) Spill Reporting

The person reporting a spill may be required to supply the minimum spill assessment information to provide a complete understanding of the incident as possible to local, state, or federal agencies if applicable. Some initial spill response actions and information that may be reported are presented below:

- A spill/release will be reported to the Weld County LEPC if released material is property of DCP Midstream and meets the reporting thresholds mandated by Section 304 of the Emergency Planning and Community Right-To-Know Act (EPCRA).
- A spill/release will be reported to the CDPHE if released material is in the custody of a third party for spills meeting CDPHE reporting thresholds or are of any size that impact or threaten to impact waters of the state, a residence or occupied structure, livestock or public byway. An example would be an oil hauler over filling a truck and spills product onto the ground next to a flowing irrigation ditch.
- Once a spill is determined reportable, there is a 24-hour deadline to make initial notification to the LEPC and CDPHE depending on the product ownership. Spills/releases in the custody of DCP Midstream will be reported by a Company representative. Spills/releases in the custody of a third party will be reported by the responsible company's EHS Department to the appropriate agency and to DCP Midstream .

These regulatory guidelines will be strictly followed by DCP Midstream and any contractors operating under DCP Midstream guidance during all activities at the DCP Midstream .

SECTION 7 – REPORTABLE QUANTITIES

a) Reportable Quantities

Mandated by Section 312 of the Emergency Planning and Community Right-To-Know Act (EPCRA) – also known as SARA Title III – the Tier II form captures information about the types, quantities, and locations of hazardous chemicals at a given facility. The form also lists contact information for the facility's designated emergency point-of-contact.

- Any facility that is required to maintain MSDSs (or SDSs) under the Occupational Safety and Health Administration (OSHA) 49 CFR 1910.1200 regulations for hazardous chemicals stored or used in the workplace.
- Facilities with chemicals in quantities that equal or exceed the lists of lists thresholds must report.
- Propane, benzene, propane and methane are on the lists of lists and are known to be in crude oil. In addition, diesel is on the lists of lists and may be stored on oil and gas sites during construction and development.

b. Reportable Requirements

DCP Midstream will meet the requirements under 40 CFR Part 370 as needed, and submit any necessary Tier II reporting to the State of Colorado every year before March 1st.

SECTION 8 – EVACUATION INFORMATION

a. Evacuation Plan Procedures (public)

The procedure to be used in alerting the public in the event of than incident which could pose a threat to life or property will be arranged and coordinated with first responders and Weld County Emergency Management.

In the event of an emergency, the following steps will be immediately taken:

1. The DCP Midstream representative will immediately notify first responders (911), to warn the public of a potential chemical exposure.
2. First responders may conduct door to door evacuation notices in addition to reverse 911 and utilizing the Integrated Public Alert and Warning System (IPAWS).
3. DCP Midstream will be responsible for employees and contract personnel and will monitor essential and non-essential personnel traffic on or near the incident site.
4. General:
    a. The area included within the radius of exposure is considered to be the zone with the maximum potential hazard, per the Emergency Response Guide (ERG). When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated.
    b. In the event of a incident, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public, including all public areas.
    c. DCP Midstream will cooperate with these authorities to the fullest extent and will exert every effort by careful advice to such authorities to prevent panic or rumors.

DCP Midstream will dispatch appropriate personnel to the disaster site as soon as possible. The company's personnel will cooperate with and provide such information to civil authorities as they might require.

SECTION – 9 TRAINING AND EXERCISES

All facility supervisors at DCP have completed Incident Commander training and are expected to set up a Unified Command with local authorities and first responders including planning, training, and preparedness exercises.

DCP Midstream employees participate in multiple tabletop emergency scenarios, plant evacuations, and a regionwide drill conducted with local first responders. Facility operators review additional reoccurring emergency response training.

SECTION – 10 COORDINATION WITH FIRST RESPONDERS

a) In the event of an emergency requiring First Responders, Unified Command will be established between the DCP Midstream employee on location and First Responders present. Unified Command post will be established based on conditions present at time of incident.

b) DCP Midstream HS/PSM representative and first responders identified in this Emergency Action Plan have reviewed the EAP and have discussed coordination efforts in the event of an emergency requiring first responder assistance.

SECTION – 11 Plan Review and Update Procedures

a) Multi-year plan review and update:
DCP Midstream will notify OEM of changes to this plan.

b) Post incident plan review and update:
After an incident, DCP Midstream personnel debrief on the emergency response and complete a drill critique form. If deficiencies are noted, action plans to correct the deficiencies are created and tracked in an incident management system.

CANVASBACK COMPRESSOR STATION

ADDRESS:

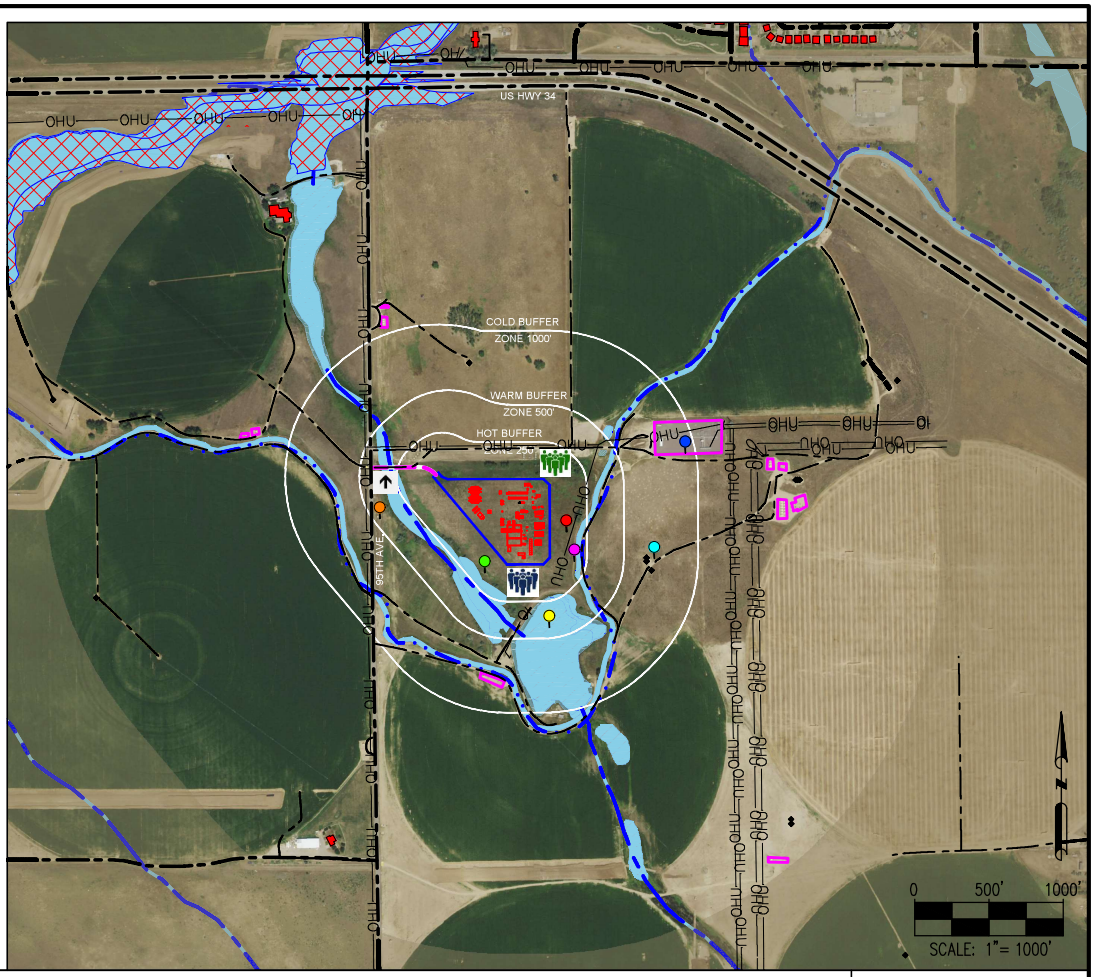
FACILITY LOCATION: 40.39842 °N, 104.82887 °W
ACCESS LOCATION: 40.39937 °N, 104.83225 °W

NOTIFICATIONS

1. DCP Midstream, LP 24-Hour Hotline
   970-356-9700
   888-204-1781
2. Greeley Police Department:
   911 AND 970-350-9600 (NON-EMERGENCY)
3. Greeley Fire Department
   911 & 970-350-9504 (NON-EMERGENCY)
4. Weld County OEM
   970-350-9600
5. Weld County Sheriff
   970-356-4015
6. Colorado Highway State Patrol
   303-239-4501
7. Weld County O&G Energy Department
   970-400-3580
7. Colorado Oil & Gas Commission
   303-894-2100
8. Colorado Department of Public Health & Environment
   877-518-5608
9. Colorado Parks & Wildlife
   303-291-7227
10. National Response Center
    800-424-8802

CRITICAL RECEPTORS

1. OVERHEAD UTILITIES
2. SURROUNDING WETLANDS
3. EXISTING FACILITIES
4. EXISTING WELLS
5. SURROUNDING DITCHES/STREAMS
6. 95TH AVENUE
7. EXISTING POND



SITE NAME:
CANVASBACK COMPRESSOR STATION

SURFACE LOCATION:
NW 1/4 SW 1/4 SEC. 18, T5N, R66W, 6TH P.M.
WELD COUNTY, COLORADO

ASCENT GEOMATICS SOLUTIONS
8620 Wolff Court
Westminster, CO 80031
(303) 928-7128
www.ascentgeomatics.com

FIELD DATE:	
N/A	
DRAWING DATE:	
06-20-22	
BY: CSG	CHECKED BY: IJM

LEGEND

- = PRIMARY MUSTER POINT
- = SECONDARY MUSTER POINT
- = PRIMARY INGRESS/EGRESS
- = CRITICAL RECEPTOR
- = EXISTING WELL
- = FLOODPLAIN
- = POND
- = PROPOSED DISTURBANCE AREA
- = PROPOSED FACILITIES
- = EXISTING FACILITIES
- = RESIDENCE
- = WETLAND
- = HOT, WARM, & COLD BUFFER ZONES
  ERG ZONE (800 METERS)
- = PROPOSED ACCESS ROAD
- = PUBLIC ROAD
- = PRIVATE ROAD
- OHU = OVERHEAD UTILITY
- = STREAM
- = DITCH

Note: This Tactical Response Card is a reference tool and is intended to provide guidance during an actual event or exercise. Placement of resources may need to be adjusted according to environmental variables. It is the responsibility of emergency response personnel to be trained in response and to be able to make adjustments to the card as needed.

DATA SOURCES:
-AERIAL IMAGERY: NAIP 2019
-HYDROLOGY: NHD

PUBLICLY AVAILABLE DATA SOURCES HAVE NOT BEEN INDEPENDENTLY VERIFIED BY ASCENT.

FIRE DEPARTMENT RESPONSE GUIDELINES

COMMAND

- Establish initial command post near the oil & gas location entrance.
- Position should provide a clear view of the entire scene.
- Advise responding units and resources to stage near location entrance.
- Locate operator lease sign on location (located at the entrance /site access).
- If industry personnel are not on location, call the 24-Hour Emergency Contact number located on the sign.
- Establish unified command with operator on-site liaison.
- Develop incident action plan with the operator to mitigate incident
- **Strategy - *Always defensive unless a life safety need is identified!***

INCIDENT STABILIZATION

- Implement Hazardous Materials response protocols.
- All personnel operating in hazard zones should be in appropriate PPE, to include a personal mobile air monitoring device.
- Establish Hot, Warm, Cold Zones, and ERG zones.
- Exposure Concerns --- Equipment, nearby structures, neighborhoods, roadways, etc.
- Monitor weather conditions, especially wind direction.
- Air monitoring for vulnerable areas and locations around incident.
- Conduct evacuations of citizens, bystanders, and resources at risk.
- Identify and address any water supply and/or foam requirements necessary to mitigate the incident.

SPECIAL CONSIDERATIONS

- If evacuations are needed, coordinate with Weld County OEM before ordering an evacuation to establish evacuation routes, shelters, shelter in-place and to utilize IPAWS (reverse 9-1-1).
- Request mutual aid apparatus and equipment asap to minimize operational delays.
- Consider and address any potential impacts to critical receptors identified near the location.
- Consider requesting a HazMat Team if needed to assist with mitigation.
- Consider requiring a fire investigation for any fire and/or explosion.
- Keep the public and stakeholders informed of response activities.
- Notify FAA if Air Traffic restrictions are needed (requested through OEM) ***(very large incident)***

ASCENT GEOMATICS SOLUTIONS
8620 Wolff Court
Westminster, CO 80031
(303) 928-7128
www.ascentgeomatics.com

INDUSTRY RESPONSE OBJECTIVES

Ensure safety of the public, first responders, employees, and contractors. Minimize impact to the environment and local community. The following response objectives checklist shall be followed:

SAFETY - PROTECT LIFE

- Evaluate and account for all personnel
- Isolate all potential ignition sources
- Establish site control (safe perimeter and evacuation routes)
- Contact emergency services as needed (911, Fire, LEPC)
- Identify hazard(s) of emitted material (obtain SDS)
- Implement air monitoring around impacted area
- Continually assess site hazards/risks

RESPONSE - INCIDENT STABILIZATION

- Notify internal personnel and agencies
- Assign on-site liaison to the incident commander
- Establish a unified command post and field communications
- Establish Hot, Warm, Cold Zones, and ERG Zone
- Identify and establish staging area to support response operations
- Activate emergency shutdown procedures (ESD)
- Activate response action contractors for equipment and manpower as needed (e.g, Well Control, spill/HazMat clean-up, etc.)

ENVIRONMENTAL - PROTECT THE ENVIRONMENT

- Identify, prioritize, and protect environmentally sensitive areas
- Verify if water has been impacted
- Implement waste handling, disposal and decontamination procedures as needed
- Contain and recover spilled materials
- Notify appropriate agencies

SPECIAL CONSIDERATIONS

- Keep the public and stakeholders informed of response activities

FACILITY INFORMATION

Compressor Station Liquid Storage:

- **Oil (BBL) - XXXX BBL**
- **Water (BBL) - XXXX BBL**
- *1 Barrel (BBL) = 42 Gallons

Specific Facility Hazardous Conditions: (chemicals stored on site)

TAG	TYPE	DESCRIPTION	CAPACITY
V-410401	PRESSURE VESSEL	CONDENSATE STORAGE TANK	90000 GAL.
TK-410271	TANK	LUBE OIL DAY TANK (FRAME OIL)	88 GAL.
TK-410272	TANK	LUBE OIL DAY TANK	500 GAL.
TK-410273	TANK	LUBE OIL DAY TANK (CYLINDER OIL)	88 GAL.
TK-410471	TANK	PRODUCED WATER SUMP	300 BBL
TK-410472	TANK	COMPRESSOR SKID DRAIN SUMP SLOP LUBE OIL/MIXED HYDROCARBON/WATER	300 BBL
TK-410473	TANK	OPEN DRAIN SUMP SLOP LUBE OIL/MIXED HYDROCARBON/WATER	90 BBL
TK-410474	TANK	PRODUCED WATER SUMP	300 BBL
TK-411202	TANK	TEG STORAGE TANK	90 BBL
TK-411301	TANK	METHANOL STORAGE TANK	90 BBL

Storage Location

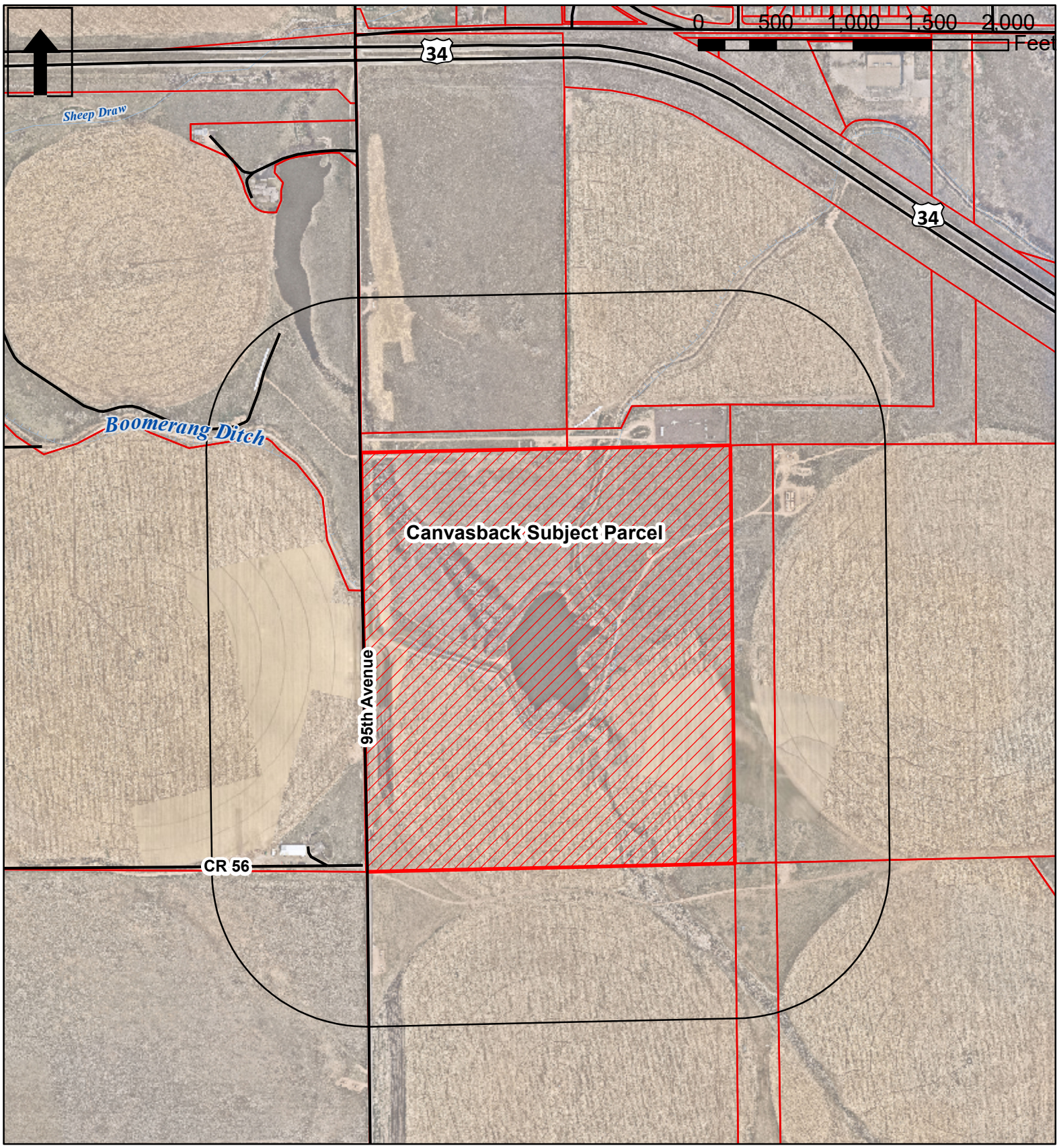
- **Lube Oil day tank - Compressor building**
- **Sumps - along the north side of the facility**
- **Condensate Storage Tank - West end of the facility**
- **TEG storage tank - South Side of the facility**
- **Methanol storage tank - Southwest of condensate vessel**

Is Water Supply Available on Location?

FIRE HYDRANTS – NONE
WATER STORAGE TANKS

DCP Midstream is a memeber of the Colorado Preparedness & Response Network (CPRN) and has access to foam for firefighting through CPRN in the event of an incident with a fire.

Attachment H - Canvasback Compressor Noticing Boundary Area



Canvasback Subject Parcel
Canvasback_Noticing_Buffer
Greeley Parcels
Streets

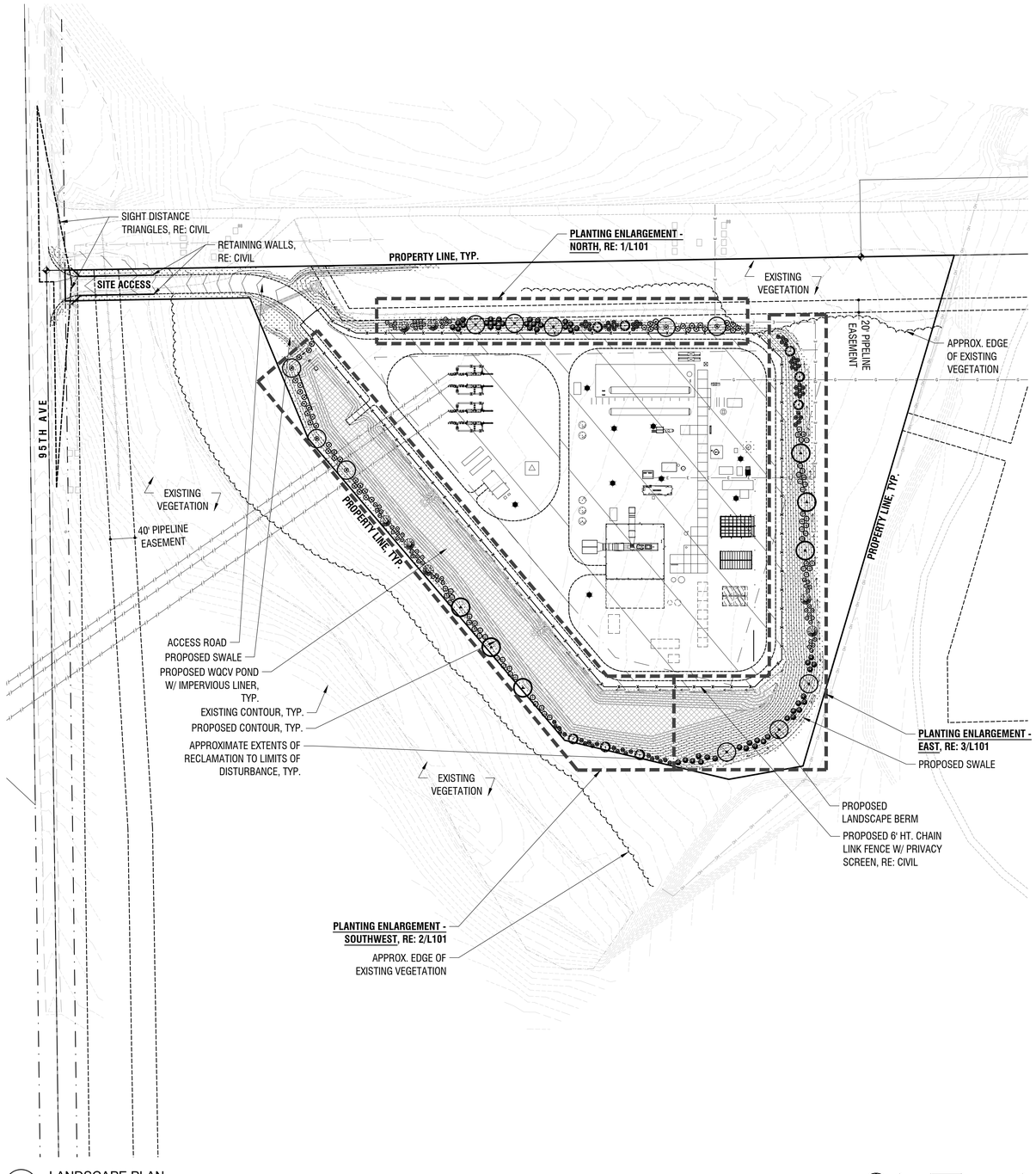
City of Greeley Colorado | COMMUNITY DEVELOPMENT

Attachment I - Landscape Plan

CANVASBACK COMPRESSOR STATION USE BY SPECIAL REVIEW USR2022-0011

PLAT INFO

A PORTION OF THE SOUTHWEST 1/4 OF SECTION 18, TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.
COUNTY OF WELD, CITY OF GREELEY, STATE OF COLORADO
670,083.98 SQ.FT., 15.38 ACRES



1 LANDSCAPE PLAN
1"=100'

Scale: 1" = 100'

PLANTING REQUIREMENTS

NORTH EDGE

TYPE II PERIMETER - IN COMBINATION WITH EXISTING VEGETATION FOR 25% REDUCTION OF PERIMETER LANDSCAPE REQUIREMENTS (PROPOSED USE: MEDIUM-INTENSITY, ADJACENT SHARE USE: LOW-INTENSITY)

10' WIDTH MIN.				
QUANTITY / TYPE (PER 100 LF)		*LENGTH (FT)*	*REQUIRED**	***PROVIDED***
2	TREES	615	9	9
16	SHRUBS	615	74	74

**(QUANTITY x (LENGTH / 100)) x 25% REDUCTION= REQUIRED*

EAST EDGE

TYPE II PERIMETER - IN COMBINATION WITH BERM FOR 25% REDUCTION OF PERIMETER LANDSCAPE REQUIREMENTS (PROPOSED USE: MEDIUM-INTENSITY, ADJACENT SHARE USE: LOW-INTENSITY)

10' WIDTH MIN.				
QUANTITY / TYPE (PER 100 LF)		*LENGTH (FT)*	*REQUIRED**	***PROVIDED***
2	TREES	750	11	11
16	SHRUBS	750	90	90

**(QUANTITY x (LENGTH / 100)) x 25% REDUCTION= REQUIRED*

SOUTHWEST EDGE

TYPE II PERIMETER - IN COMBINATION WITH EXISTING VEGETATION FOR 25% REDUCTION OF PERIMETER LANDSCAPE REQUIREMENTS (PROPOSED USE: MEDIUM-INTENSITY, ADJACENT SHARE USE: LOW-INTENSITY)

10' WIDTH MIN.				
QUANTITY / TYPE (PER 100 LF)		*LENGTH (FT)*	*REQUIRED**	***PROVIDED***
2	TREES	775	12	12
16	SHRUBS	775	93	93

**(QUANTITY x (LENGTH / 100)) x 25% REDUCTION= REQUIRED*

PLANT SCHEDULE

	TYPE	SYM.	QTY.	BOTANICAL NAME	COMMON NAME	PLANTING SIZE	ESTIMATED SIZE AT MATURITY
	TREES						
⊗	DEC.	AN	5	ACER NEGUNDO 'SENSATION'	SENSATION BOXELDER	2" CAL.	25-30' HT X 20-25' SPD
⊛	DEC.	CO	6	CELTIS OCCIDENTALIS	WESTERN HACKBERRY	2" CAL.	50-60' HT X 40-50' SPD.
▲	DEC.	GD	6	GYMNOCLADUS DIOICUS	KENTUCKY COFFEETREE	2" CAL.	50-60' HT X 40-50' SPD.
⊙	EVG.	PE	8	PINUS EDULIS	PINON PINE	6' HT.	20-30' HT X 10-20' SPD
⊛	EVG.	PP	7	PINUS PONDEROSA	PONDEROSA PINE	6' HT.	60-80' HT X 30-40' SPD
	SHRUBS						
⊙	DEC.	ART	42	ARTEMESIA TRIDENTATA	TALL WESTERN SAGE	#5 CONT.	3-12' HT X 3-6' SPD.
●	EVG.	JM	49	JUNIPERUS X MEDIA 'SEA GREEN'	SEA GREEN JUNIPER	#5 CONT.	5-6' HT X 6-8' SPD.
●	DEC.	PC	41	PRUNUS X CISTENA	PURPLE LEAF SAND CHERRY	#5 CONT.	6-8' HT X 4-6' SPD.
⊙	DEC.	RT	57	RHUS TRILOBATA	THREELEAF SUMAC	#5 CONT.	3-8' HT X 3-6' SPD.
⊙	DEC.	RG	47	RHUS GLABRA	SMOOTH SUMAC	#5 CONT.	8-15' HT X 8-10' SPD.
	PERENNIALS						
	ANNUALS			0 SF			
	GROUNDCOVER			0 SF			
	MULCH			0 SF			

NATIVE SEED MIX

DRYLAND PASTURE MIX	
TYPE	PERCENTAGE
DAHURIAN WILDRYE, JAMES	20%
FORAGE PERENNIAL RYEGRASS, VNS	20%
ORCHARDGRASS, PROFILE	15%
SMOOTH BROME, VNS	15%
INTERMEDIATE WHEATGRASS, RUSH	15%
PUBESCENT WHEATGRASS, LUNA	15%

SEEDING RATE: 20-25 LBS. PER ACRE

BROADCASTING RATE: 30-35 LBS. PER ACRE

PLANTING NOTES

1. PLANT QUANTITIES ARE PROVIDED FOR CONTRACTOR'S CONVENIENCE ONLY AND SHALL BE VERIFIED BY CONTRACTOR BY REVIEWING PLANTING PLAN SYMBOLS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL PLANT MATERIAL INCLUDING SEEDED AREAS IN A HEALTHY STATE DURING CONSTRUCTION. ANY DAMAGE TO PLANT MATERIAL DUE TO NEGLECT BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. ALL SHRUBS AND TREES TO BE MULCHED WITH WESTERN RED CEDAR MULCH, DEPTH PER DETAIL.
4. PROJECT INCLUDES EXTENSIVE UTILITY SYSTEMS. VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO PLANTING. REPORT ANY CONFLICTS TO OWNER.
5. NO TREE SHALL BE PLANTED WITHIN 10 FEET OF ANY UNDERGROUND UTILITY LINE UNLESS APPROVED BY OWNER.
6. IF ANY TRANSFORMERS, GROUND-MOUNTED HVAC UNITS, UTILITY PEDESTALS, AND SIMILAR FEATURES ARE NOT SHOWN ON THE USR, ADDITIONAL LANDSCAPING AND SCREENING MAY BE REQUIRED BASED UPON FIELD CONDITIONS DURING THE SITE INSPECTION PRIOR TO ISSUANCE OF THE CERTIFICATE OF OCCUPANCY, OR FINAL INSPECTION, AS APPLICABLE.

IRRIGATION NOTES

1. TWO (2) FRESH WATER TANKS WILL BE ERECTED ON OR NEAR THE COMPRESSOR STATION FOR THE USE OF IRRIGATING THE TREES AND SHRUBS VIA A FULLY FUNCTIONING, AUTOMATIC DRIP IRRIGATION SYSTEM. THE WATER TANKS WILL BE USED FOR IRRIGATION ONLY.
2. POINT SOURCE DRIP EMITTERS SHALL BE UTILIZED TO WATER INDIVIDUAL PLANTS.
3. APPROPRIATE DPC PERSONNEL WILL MONITOR & MAINTAIN RESPONSIBILITY FOR IRRIGATION SYSTEM.

SEEDING NOTES

1. ALL AREAS TO BE SEEDED SHALL BE DE-COMPACTED TO AN 8" DEPTH PRIOR TO ANY AMENDMENT OR SEEDING ACTIVITIES.
2. ALL LANDSCAPE AREAS TO RECEIVE A1 ORGANICS CLASS I COMPOST AT A RATE OF 3 CY/1,000 SF OR AS NEEDED PER SOIL ANALYSIS. SOIL TESTS, ANALYSIS AND RECOMMENDATIONS TO BE PROVIDED BY REVEGETATION CONTRACTOR.
3. TILL SOIL TO A 6" DEPTH (SEPARATE OPERATION FROM 8" DE-COMPACTION) TO CREATE A UNIFORM SEED BED AND TO INCORPORATE COMPOST AMENDMENTS. THE OBJECTIVE IS TO HAVE THE SURFACE SOIL LOOSE ENOUGH TO ALLOW FOR ROOT GROWTH AND FIRM ENOUGH ON THE SURFACE FOR GOOD SEED TO SOIL CONTACT.
4. THE SOIL SURFACE AFTER SHALL BE RELATIVELY FREE OF ROCKS, DEBRIS, AND DIRT CLODS GREATER THAN 3" DIAMETER TO ALLOW FOR PROPER SEED PLACEMENT.
5. DRILL SEED ON ALL SLOPES 2.5:1 OR FLATTER. DRILL SEEDERS SHALL CONTAIN AT LEAST TWO SEED BOXES, ONE FOR FLUFFY OR TRASHY SEED AND ONE FOR SMALL GRASSES, DOUBLE DISK FURROW OPENERS ON SEVEN INCH SPACING, DEPTH BANDS, AND PRESS WHEELS OR DRAG CHAINS. SEED SHOULD BE PLANTED TO A DEPTH OF ONE-QUARTER TO ONE-HALF INCH. IF AT ALL POSSIBLE SEED IN SPRING (SPRING THAW TO JUNE 1) AND FALL (SEPT. 10 TO CONSISTENT GROUND FREEZE) SEEDING WINDOWS.
6. HAND SEEDING MAY BE UTILIZED ON SMALL LOCALIZED AREAS THAT ARE EITHER TOO STEEP OR CANNOT BE ACCESSED USING STANDARD SEEDING EQUIPMENT. ALL BROADCAST SEED RATES TO BE DOUBLED AND RAKE INCORPORATED.
7. UNIFORMLY APPLY CERTIFIED WEED FREE STRAW MULCH AT 2 TONS/ACRE. CRIMP STRAW MULCH INTO THE SOIL A MINIMUM 1.5" DEPTH TO PREVENT BLOWING. IF SOIL CONDITIONS DO NOT ALLOW FOR A GOOD CRIMP/ANCHORING OF THE STRAW MULCH APPLY PLANTAGO TACKIFIER AT A RATE OF 200 LB/ACRE.

COMMUNITY DEVELOPMENT DIRECTOR

DIRECTOR OF COMMUNITY DEVELOPMENT _____ DATE _____

WILDRYE DESIGN

CANVASBACK COMPRESSOR STATION

WELD COUNTY, FACILITY 41

Prepared For

DCP Operating Company, LP
6900 E Layton Ave, Suite 900
Denver, Colorado 80237

Landscape Architect

Wildrye Design LLC
802 Senecio Ct
Lafayette, Colorado 80026
303 325 1461

811 Know what's below. Call before you dig.

Stamp:

CHRISTINA M SCHNEIDER LA.0001107 PROFESSIONAL LANDSCAPE ARCHITECT STATE OF COLORADO LICENSED LANDSCAPE ARCHITECT
09/08/2022

Issue:

Preliminary Landscape Plan	06/20/22
Final Landscape Plan	09/08/22

Project Number:	22-008
Date:	06/20/22
Drawn By:	CS

LANDSCAPE PLAN & NOTES

L100
SHEET 1 OF 3

CANVASBACK COMPRESSOR STATION USE BY SPECIAL REVIEW USR2022-0011

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COUNTY OF WELD, CITY OF GREELEY, STATE OF COLORADO
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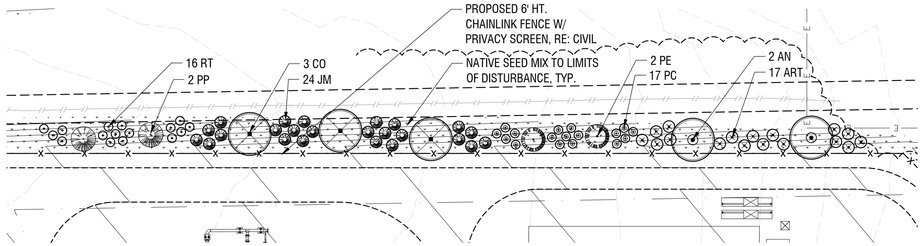
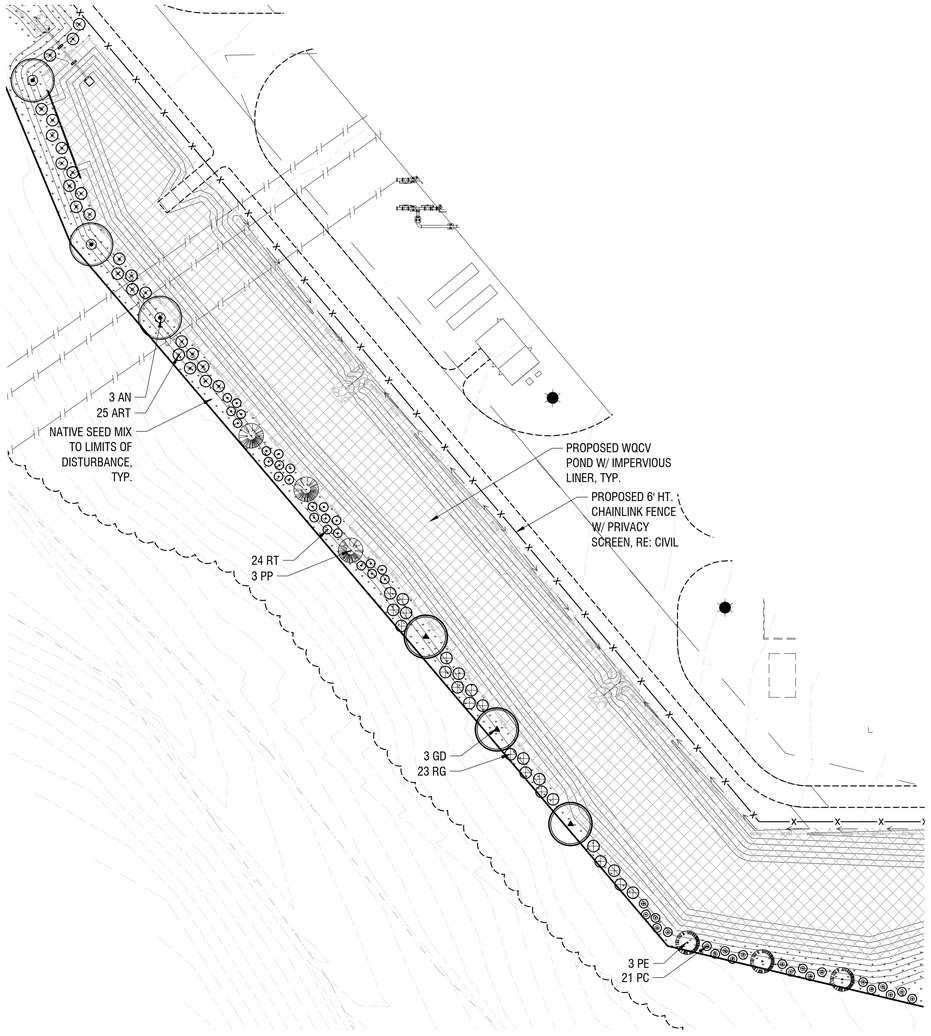
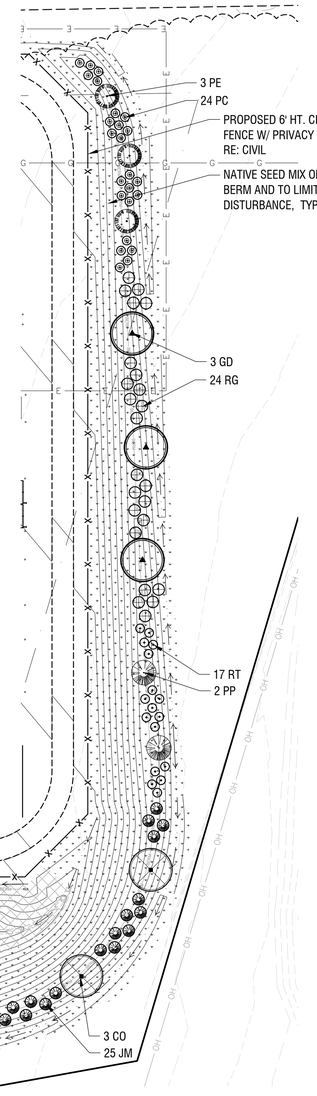


1 PLANTING ENLARGEMENT - NORTH
1"=50'
Scale: 1" = 50'



2 PLANTING ENLARGEMENT - SOUTHWEST
1"=50'
Scale: 1" = 50'



3 PLANTING ENLARGEMENT - EAST
1"=50'
Scale: 1" = 50'

PLANT SCHEDULE

	TYPE	SYM.	QTY.	BOTANICAL NAME	COMMON NAME	PLANTING SIZE	ESTIMATED SIZE AT MATURITY
	TREES						
	DEC.	AN	5	ACER NEGUNDO 'SENSATION'	SENSATION BOXELDER	2" CAL.	25-30' HT X 20-25' SPD
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	SHRUBS						
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	PERENNIALS						
	ANNUALS		0 SF				
	GROUNDCOVER		0 SF				
	MULCH		0 SF				

NATIVE SEED MIX

DRYLAND PASTURE MIX	
TYPE	PERCENTAGE
DAHURIAN WILDRYE, JAMES	20%
FORAGE PERENNIAL RYEGRASS, VNS	20%
ORCHARDGRASS, PROFILE	15%
SMOOTH BROME, VNS	15%
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SEEDING RATE: 20-25 LBS. PER ACRE

BROADCASTING RATE: 30-35 LBS. PER ACRE

WILDRYE DESIGN

CANVASBACK COMPRESSOR STATION

WELD COUNTY, FACILITY 41

Prepared For

DCP Operating Company, LP
6900 E Layton Ave, Suite 900
Denver, Colorado 80237

Landscape Architect

Wildrye Design LLC
802 Senecio Ct
Lafayette, Colorado 80026
303 325 1461

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Stamp:

CHRISTINA M SCHNEIDER LA.0001107 Digitally Signed Licensure STATE OF COLORADO LICENSED LANDSCAPE ARCHITECT

09/08/2022

Issue:

Preliminary Landscape Plan	06/20/22
Final Landscape Plan	09/08/22

Project Number:	22-008
Date:	06/20/22
Drawn By:	CS

PLANTING ENLARGEMENTS

L101
SHEET 2 OF 3

CANVASBACK COMPRESSOR STATION USE BY SPECIAL REVIEW USR2022-0011

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COUNTY OF WELD, CITY OF GREELEY, STATE OF COLORADO
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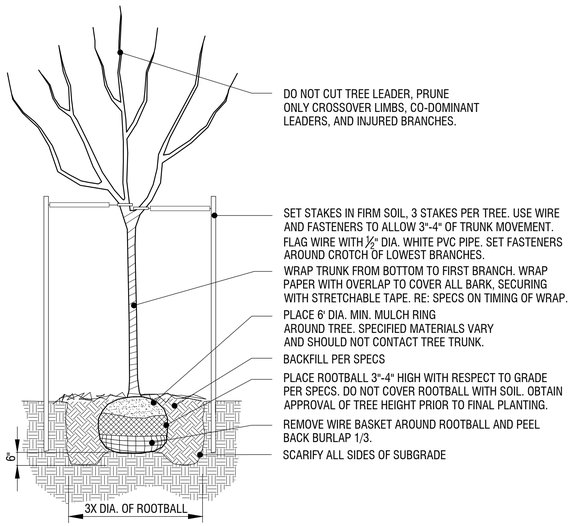
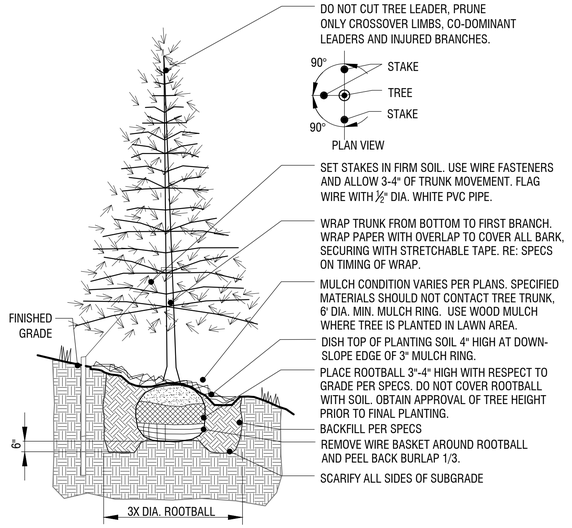
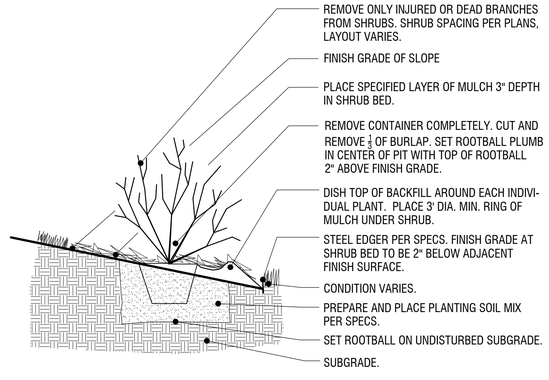


1 DECIDUOUS TREE PLANTING
NTS



2 EVERGREEN TREE ON SLOPE PLANTING
NTS



3 SHRUB ON SLOPE PLANTING
NTS

WILDRYE DESIGN

CANVASBACK COMPRESSOR STATION

WELD COUNTY, FACILITY 41

Prepared For

DCP Operating Company, LP
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Denver, Colorado 80237

Landscape Architect

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09/08/2022

Issue:

Preliminary Landscape Plan	06/20/22
Final Landscape Plan	09/08/22

Project Number:	22-008
Date:	06/20/22
Drawn By:	CS

PLANTING DETAILS

L102
SHEET 3 OF 3

Planning Commission Agenda Summary

December 13, 2022

Key Staff Contact: Darrell Gesick, Planner III, 970-350-9822

Title:
Public hearing to consider a Rezone from R-H (Residential High Density) to MU-H (Mixed-Use High Intensity) zone district for properties located at 1603, 1611, 1613, and 1619 7th Avenue.

Summary:
The landowners and applicants, Jeff and Kelly Cook, have requested to rezone approximately 1.722 acres of land located at 1603, 1611, 1613, and 1619 7th Avenue from R-H (Residential High Density) to MU-H (Mixed Use High Intensity) zone district. The applicants are requesting the rezone to provide more development options for the subject sites. The applicants intend to provide a variety of uses that would provide services to the surrounding residential uses in the area. Some of the anticipated uses may be office, therapeutic massage, counseling services, hair salon, and art studio. Previous uses on these properties included a church and single-family residential use.

Recommended Action:
Approval
Based on the application received and the preceding analysis, the Planning Commission finds that the proposed rezoning from R-H (Residential High Density) Zone District to the MU-H (Mixed-Use High Intensity) Zone District meets the Development Code criteria, Sections 24-204 and therefore, recommends approval of the rezone request to the City Council.

Attachments:
Staff Report
Attachment A - Zoning/Vicinity Map
Attachment B - Photo Aerial Map
Attachment C - Project Narrative
Attachment D - Rezone Boundary Map
Attachment E - Site Analysis Map
Attachment F - Zoning Suitability Map
Attachment G - Neighborhood Notification Boundary Map

PLANNING COMMISSION SUMMARY

ITEMS: Rezone property from R-H (Residential High Density) to MU-H (Mixed-Use High Intensity)

FILE NUMBER: ZON2022-0008

PROJECT: 1603, 1611, 1613, and 1619 7th Avenue Rezone

LOCATION: 1603, 1611, 1613, and 1619 7th Avenue

APPLICANTS: Jeff and Kelly Cook

CASE PLANNER: Darrell Gesick, Planner III

PLANNING COMMISSION HEARING DATE: December 13, 2022

PLANNING COMMISSION FUNCTION:
The Planning Commission shall consider the staff report, along with testimony and comments made by the applicant and the public and shall then make a recommendation to the City Council regarding the application in the form of a finding based on the review criteria in Section 24-204 of the Development Code.

EXECUTIVE SUMMARY
The City of Greeley is considering a request from Jeff and Kelly Cook to rezone 1.722 acres of land located at 1603, 1611, 1613, and 1619 7th Avenue from R-H (Residential High Density) to MU-H (Mixed-Use High Intensity) zone district (see Attachments A, C, and D).

A. REQUEST
The applicants are requesting approval of a rezone (see Attachment C).

B. STAFF RECOMMENDATION
Approval

C. LOCATION

Abutting Zoning:
North: C-H (Commercial High Intensity)
South: R-H (Residential High Density)
East: R-H (Residential High Density)
West: C-H (Commercial High Intensity)

Surrounding Land Uses:
North: 16th Street/Coffee Shop/Residential
South: Residential
East: 7th Avenue/Residential
West: Commercial/Residential

Site Characteristics:

The site consists of a former church use, residential lot, and two lots that are undeveloped dirt area that was used for parking by the former church user. The property is relatively flat land and has a large, landscaped parkway area with some street trees along both 7th Avenue and 16th Street.

D. BACKGROUND

The subject site was developed in the 1920's. From the 1920's until recently the subject site was used as a church, with one single-family dwelling on a lot to the south. Recently, the applicants purchased the property from the church and intends to develop the site with a variety of uses that would serve the surrounding neighborhood.

E. APPROVAL CRITERIA

Development Code Section 24-204 Rezoning Procedures

The review criteria found in Section 24-204(b) of the Development Code shall be used to evaluate the zoning amendment application.

1. **The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan.**

   The Imagine Greeley Comprehensive Plan's Land Use Guidance Map designates the subject property as a Mixed-Use area. Supported uses include residential, commercial, office, retail, personal service, and institutional. A mix of uses, either vertical or across multiple sites, are encouraged.

   Goal 4 – Prioritize Infill and Redevelopment

   Objective GC-4.2 Reinvestment/Adaptive Reuse - Encourage reinvestment in established areas of Greeley to maximize the use of existing public infrastructure. Support the use of creative strategies to revitalize vacant, blighted, or otherwise underutilized structures and buildings through adaptive reuse.

   Objective GC-4.3 Infill Compatibility - Promote the use of site design and building architecture that is sympathetic to the surrounding area and enhances the desirable character and form of the neighborhood or area.

   Staff Comment: This proposal is in accordance with Goal 4, Prioritize Infill and Redevelopment, of the Imagine Greeley Comprehensive Land Use Plan. The rezoning request for this site would encourage reinvestment of an existing structure that is using existing public infrastructure.

   The proposal complies with this criterion.

Additionally, the following specific goals and objectives of the Imagine Greeley Comprehensive Plan support the proposed rezone:

Growth and City Form:

- GC-1.2 Form of Growth: Encourage compact urban form over sprawl development.
- CG-2.2 Jobs/Housing Balance: Support zoning and development patterns that expand opportunities for people who live in Greeley to also work in Greeley (and vice-versa).
- GC-2.3 Pedestrian and Bicycle-Oriented Development: Encourage development pattens that encourage walking and bicycling whenever possible – by locating employment, shopping, and other services within a quarter mile of residential areas.

Economic Health and Human Services:

- EH-2.4 Land Use: Promote land use decisions that support walkability and improve access to basic needs.
- EH-2.5 Walkability and "Bikability": Plan and design neighborhoods so employment, schools, shopping, parks, transit, and other facilities are within a 10-minute safe walk of housing.
- EH-2.6 Built Environment: Encourage construction of built environments that support health and active living, such as mixed-use centers and neighborhoods, that support walkability and provide safe options for active transportation.

2. The proposal can fulfill the intent of the zoning district considering the relationship to surrounding areas.

Staff Comment: The proposed rezone would allow for more development options, which fulfills the intent of the proposed zoning district of MU-H and is consistent with other uses in the surrounding area. The mixed-use district encourages a mix of uses in a walkable setting that complements higher density areas. The surrounding area currently consists of residential, coffee shop, and restaurants. The applicant is proposing a multi-tenant use building that could range from personal service, such as, therapeutic massage, counseling, and hair salon. With more development options, there is more potential to provide services to the surrounding area.

The proposal complies with this criterion.

3. Whether the area changed, or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area

Staff Comment: The majority of this area has been developed out for many years, which includes commercial and residential to the north, residential to the east and south, and commercial and residential to the west. Recently, a multi-family project developed to the northwest of the subject site.

Under the current zoning, which limits uses to high density residential uses, would limit redevelopment opportunities for the sites. Typically, only single-family, two-family, and multi-family uses, with a few very low intensities commercial uses, would be allowed in the R-H zone district. The proposed MU-H zone district would allow for more flexibility in development options, including a variety of uses, such as, residential, assembly, food and beverage, lodging, personal services, and retail. Planning staff concludes that it is in the public's interest to rezone the subject site to allow for more options.

The proposal complies with this criterion.

4. **Whether the existing zoning been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity.**

Staff Comment: The existing zoning has been in place since the 1920's, with the church being built in 1920. The existing zoning is not necessarily inappropriate; however, most of the uses the applicant has proposed for the site tend to be allowed in the C-L zone. Instead of rezoning to a traditional commercial zoning district, where some uses could be impactful to the surrounding residential uses, it would be more appropriate to rezone to the proposed MU-H zone, where service type uses could be provided. Rezoning the site would provide more development opportunities.

The proposal complies with this criterion.

5. **The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development.**

Staff Comment: The proposed rezoning would provide complementary development options to the surrounding zoning and existing uses by creating a reasonable transition between residential and higher intensity commercial uses to the west.

The proposal complies with this criterion.

6. **The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district.**

Staff Comment: The subject site is served by the City of Greeley. Any proposed development or redevelopment of the subject site would be reviewed for compliance with City standards and improvement to infrastructure

may be required at that time. Additional information regarding City services can be found in this report in Sections F, G, and H.

The proposal complies with this criterion.

7. **The change will serve a community need, provide an amenity or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning.**

   Staff Comment: The proposed rezoning would allow more development options if the site were rezoned to MU-H, allowing for more potential services for the community, making the rezone more appropriate than the current zoning district.

   The proposal complies with this criterion.

8. **Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community.**

   Staff Comment: Any reasonably anticipated negative impacts on this area resulting from this rezoning would be mitigated as part of the development review process by the consistent enforcement of Municipal Code and Development Code requirements regarding landscaping buffers, architectural features, setbacks, and other relevant codes and policies. A conceptual traffic study and drainage report were provided with this application, and the final drainage and traffic needs would be further evaluated at the time of site plan or plat, as necessary.

   The proposal complies with this criterion.

9. **The recommendations of professional staff or advisory review bodies.**

   Staff Comment: City staff recommends approval of this rezoning request.

F. SITE CHARACTERISTICS

1. SUBDIVISION HISTORY

The property is currently platted as part of the Arlington Heights Subdivision, which was done in 1887. The applicant has indicated that they would combine all the lots into one large lot in the near future through a minor subdivision process. Minor subdivisions are reviewed and approved administratively by City staff.

2. HAZARDS

Staff is unaware of any potential hazards that presently exist on the subject site.

3. **WILDLIFE**
   The subject site is not located in an area identified for moderate or high wildlife impacts. There are no known impacts that would occur to wildlife if the site were rezoned.

4. **FLOODPLAIN**
   The proposed rezone is not located within the 100-year floodplain or floodway, according to the adopted Federal Emergency Management Administration (FEMA) flood data.

5. **DRAINAGE AND EROSION**
   This rezone will not affect the existing drainage for the site. Any proposed development of the site would require the documentation and review by City staff of all drainage, detention, water quality, and erosion mitigation as a condition of the development of the site.

6. **TRANSPORTATION**
   The City's Transportation Planner and Engineering Development Review staff have reviewed the traffic impact analysis with the proposed concept plan and found that additional traffic would not create a significant impact on existing roadway systems.

   No additional improvements were warranted based on projected traffic. Further analysis would be conducted at time of site plan review once exact layouts and densities are confirmed.

G. SERVICES

1. **WATER**
   Current water services adequately serve the subject property with additional capacity available if needed.

2. **SANITATION SEWER**
   Current sewer services adequately serve the subject property with additional capacity available if needed.

3. **EMERGENCY SERVICES**
   Emergency services are available and can adequately serve the subject property.

4. **PARKS/OPEN SPACES**
   No public parks or public open space areas are proposed with this request and the request would not create any private parks or open space. The proposed rezone should have little to no impact on parks or open space in the community.

5. **SCHOOLS**
   No schools are proposed or located within the site.

H. NEIGHBORHOOD IMPACTS

1. VISUAL

No visual impacts are anticipated with the rezone request. Any development plan application for the property would be reviewed for compliance with the City's Development Code requirements regarding visual impacts.

2. NOISE

No noise impacts are anticipated with the rezone request. Any potential noise created by future development will be regulated by the Municipal Code.

I. PUBLIC NOTICE AND COMMENT

Neighborhood notices for this meeting were mailed to surrounding property owners on November 14, 2022, per Development Code requirements. A sign was also posted on the site on November 14, 2022. The public hearing notice was placed on the City of Greeley's website on November 14, 2022.

J. MINERAL ESTATE OWNER NOTIFICATION

Mineral notice is not required for a rezone request.

K. PLANNING COMMISSION RECOMMENDED MOTION

Approval (Staff recommendation) -

Based on the application received and the preceding analysis, the Planning Commission finds that the proposed rezoning from R-H (Residential High Density) Zone District to the MU-H (Mixed-Use High Intensity) Zone District **meets** the Development Code criteria, Sections 24-204 and therefore, recommends approval of the rezone to the City Council.

Denial-

Based on the application received and the preceding analysis, the Planning Commission finds that the proposed rezoning from R-H (Residential High Density) Zone District to the MU-H (Mixed-Use High Intensity) Zone District **does not** meet the Development Code criteria, Sections 24-204 and therefore, recommends denial of the rezone to the City Council.

ATTACHMENTS

Attachment A – Zoning & Vicinity Map
Attachment B – Photo Aerial Map
Attachment C – Project Narrative
Attachment D – Rezone Boundary Map
Attachment E – Site Analysis Map
Attachment F – Zoning Suitability Map
Attachment G – Neighborhood Notification Boundary Map

Zoning/Vicinity Map
1603, 1611,1613, and 1619 7th Avenue Rezone

City of Greeley Colorado

ZON2022-0008

Legend

- Structure
- FEATURE_SUBTYPE
- Water Body
- Weld Parcels
- Road Centerline
- Roads

0 100 200 Feet

Photo Aerial Map
1603, 1611,1613,
and 1619 7th Avenue Rezone

City of Greeley Colorado

ZON2022-0008

Legend

- Road Centerline
- **FEATURE_SUBTYPE**
- Water Body
- Weld Parcels
- Origin Cache Mask

0 50 100 Feet

Rezoning Request for the Ambry Building
Lots 1,2,3,4,5,6,7,8,9,10
1603, 1611, 1613, 1619 7th Avenue 716 16th Street 80631
Arlington Heights subdivision
City of Greeley, County of Weld, State of Colorado
1.09 Acres
Project Number ZON2022-xxxx

July 11, 2022

Submitted by Jeff Cook and Kelly Langley Cook
Surveying by King Surveyors
Civil Engineering by Permits & Engineering Co.

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ZON2022-XXXX

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2	Request abstract
3	Existing Conditions and Site Analysis Map
4	Zoning Suitability Map
5	Project Boundary Map
6	Full legal description of project boundary (in word document)
7	General Layout - Arrangement and Character of streets and open spaces - Anticipated scale, intensity, and character of the proposal - Public and community facilities
8	Phasing or Implementation Plan - Not Applicable At This Time
9	Detail Plans - Not Applicable At This Time
10	Project Narrative
	Additional documentation - Available if Requested

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1.09 Acres
ZON2022-XXXX

Request Abstract

We are requesting a rezoning of the property bloc 1603, 1611, 1613, 1619 7th Avenue 716 16th Street from residential to mixed use. The following documentation will explain the plan for use, phasing, environmental upgrade, neighborhood improvement plans, and the benefit to the city and community of the rezoning this property to mixed use.

Jeff and Kelly Cook

Residing at: 1215 18th Street, Greeley, Colorado 80631
DBA: Bad Plan LLC.

970-232-5898
970-576-6050

Jeff: whatisatlas@gmail.com
Kelly: kelly.langleycook@unco.edu

Rezoning Request for the Ambry Building
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1603, 1611, 1613, 1619 7th Avenue 716 16th Street 80631
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See Attached Plan Set for Existing Conditions and Site Analysis Map

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See Attached Plan Set for Zoning Suitability Map

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See Attached Plan Set for Project Boundary Map

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PROPERTY DESCRIPTION

A parcel of land, being inclusive of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, Block 2 of Arlington Heights, recorded July 15, 1887 in Book 2 at Page 19 as Reception No. 25765 of the Records of Weld County, and a portion of 16th Street Right of Way, 7th Avenue Right of Way and 20' Alley Right of Way, located in the Southwest Quarter of Section 8, Township Five North (T.5N.), Range Sixty-five West (R.65W.) of the Sixth Principal Meridian (6th P.M.), City of Greeley, County of Weld, State of Colorado and being more particularly described as follows:
BEGINNING at the Southeast corner of said Lot 10 of Block 2, Arlington Heights and assuming the East line of said Block 2 of Arlington Heights as bearing South 00°02'24” East being a Grid Bearing East being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, with all other bearings contained herein relative thereto; THENCE South 89°57'36” West along the South line of said Lot 10 a distance of 200.00 feet to the West along the South line of said Lot 10 a distance of 200.00 feet to the centerline of said 20' Alley Right of Way; THENCE North 00°02'24” West along said centerline a distance of 300.00 feet to the centerline of West along said centerline a distance of 300.00 feet to the centerline of said 16th Street, 100' Right of Way; THENCE North 89°57'36” East along said centerline a distance of 250.00 feet to the centerline of East along said centerline a distance of 250.00 feet to the centerline of said 7th Avenue, 100' Right of Way; THENCE South 00°02'24” East along said centerline a distance of 300.00 feet to the extended line of East along said centerline a distance of 300.00 feet to the extended line of the South line of said Lot 10; THENCE South 89°57'36” West along said line a distance of 50.00 feet to the POINT OF BEGINNING. West along said line a distance of 50.00 feet to the POINT OF BEGINNING.

Said described parcel of land contains 75,000 Square Feet or 1.722 Acres, more or less (±) and is subject to any rights-of-way or other easements of record or as now existing on said described parcel of land.

See Attached FULL LEGAL DESCRIPTION OF PROJECT BOUNDARIES (Word doc)

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ZON2022-XXXX

See Attached Plan Set for General Layout Plan

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PHASING IMPLEMENTATION PLAN
NOT APPLICABLE AT THIS TIME

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DETAIL PLANS
NOT APPLICABLE AT THIS TIME

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THE AMBRY

Narrative Prospectus:

Jeff: In 1994 I set off for college. Everything I owned was sandwiched in a small blue Hyundai and as I entered town the first place I stopped was Margie's Java Joint. This was my first experience of Greeley, Colorado.

Since that moment, most of the last 30 years of my life has revolved around the rhythms on 16th Street. From doing schoolwork at the coffee shop and throwing performances on Central campus, to graduating and renovating the Beetle (now the "Taste of Philly"), to starting the Block Party, seeing it grow and move downtown, to teaching philosophy for 15 years at UNC. Kelly and I first met and were married in our neighborhood, and in Cranford we bought a house that we built into a home with our two kids.

Kelly: When Jeff was in graduate school it seemed like we drove to Greeley every weekend. Denver was a big adventure, but Greeley was home. We moved back as quickly as we could. In 2003, I started teaching at Frontier Academy. We joined a tiny church, we bought our first home, our kids were born at NCMC, we bought a second home closer to downtown so we could walk the campus and Glenmere Park. Now our coffee dates are at Margie's and the Blue Mug (and John Galt, of course!), and our nights out at the Rio. We take all of our friends to Patrick's when they come to town. We spend anniversaries going to the Greeley Phil. Birthdays in our house mean a special trip to the Nerd Store and Blush Boutique. We don't just want to reside in Greeley, we want to be a part of Greeley. When we bought the Atlas building it began our life-long love of restoring what was broken and abandoned and making it into the type of Greeley we had seen and known all along. Fifteen years later you can enter the Atlas at any time and you will find it packed with friends catching up over coffee, students studying late in to the night, a quinceñera and someone on a zoom meeting… all at the same time!

Jeff: Our neighborhood has been the hub of my closest relationships. The community grounded in the Atlas Theater has been a source of life for me and for our area. We have always had as our central calling an investment in (what we affectionately call) "16th Street Culture". In 2008, we took an old mechanic's garage that had been cast off by a Denver based investor and we made it one of the more beautiful spaces in our city.

In the Theater, we have watched friends envision and launch businesses like Luna's, John Galt Coffee Company, the Maddie and the Moxi. In our spaces we have celebrated weddings, high holy days, first birthdays, 40th anniversaries and the funerals of those we have lost. We have housed a church that for many years has been a stabilizing point on the east side of 8th, and in the Theater we continue to create a hub for our city's amazing artists. From gallery shows to regular jazz music to

local theater productions, ours is a space of artists and we would like the life seen in the Atlas Theater to begin to spread to the rest of the corridor we love.

Kelly: Among the many community events at the Atlas, we've hosted town hall meetings, "coffee with a cop," fundraisers for schools, the District 6 gallery hop, first Friday art openings, fundraisers for Alzheimer's research, UNC concerts of every variety and fourteen Indie Arts Winter Markets. Thousands of folks have found and built lasting community through the Atlas theater. We even hung in there through COVID and the yearlong renovation of our street with no awards of public monies despite the fact our business is getting lots of people packed in the same room to hug and celebrate life. Since the reopening of our state, our primary question has been: "How do we contribute to the vibrant, growing, artist-driven improvements to the town that we love?" When the owner of the church on 7th Ave and 16th asked if we were interested in purchasing the property we jumped.

Jeff and Kelly:

We have changed the name of the space to **The Ambry**, and we believe it will be one of the most desirable spaces for housing a small business in our city.

Three years ago Charlotte and Dell Stolte, stewards of the church on 7th , died and much of the life they brought to their space passed with them. Last year, the remaining church leadership found they could no longer afford the space, had in fact allowed the space to fall into neglect and disrepair, and offered the property to us. We purchased it with great hope in its possibilities. We believe The Ambry is one of the most beautiful buildings in our city. Built in 1920, it has housed and loved the people of East Greeley, fed thousands and stands as the first impression of many driving into Greeley on 16th toward Downtown and the University.

But The Ambry has not been loved in return for many years. For those who live nearby, the space is known for being either empty and in ill-repair, a lot for cars and garbage, or an unsafe place of unsavory activities. We will change this. The Cook family is energized and ready to make major investments in this property that will not only support our work across the street, but The Ambry will be a true gateway for the wonderful homes to the south and all the future potential we see commercially to the north on 7th Avenue.

Proposed usage and vision

The Ambry building will maintain its original aesthetic and exterior features, but we will transform the interior into a home for small local businesses and a co-working spaces, housing upward of 12 independent designers, artists, and contractors. The goal is for the Ambry to become a multi-use, symbiotic space with positive impact on the surrounding businesses and residential neighbors. It will provide overlapping services such as therapeutic massage, counseling and hair styling as well as quiet tailored workspaces for Greeley's arts workforce.

All the historic elements of the Ambry building will be kept intact. Much needed updates will be done within (upgrades to electric, plumbing, solar and HVAC) as well as accessibility (ramp for wheel chair access) and necessary upgrades to fire safety. But we also see the large lot to the south as a canvas. We will fill it with trees and vines and showcase how the rest of Greeley can accommodate cars while at the same time making their parking spaces beautiful.

Market for the proposed project

The market for the Ambry is two-fold. The Ambry will house small offices in the main Cathedral space and basement and small businesses in the annex and former parsonage. We have pre-rental agreements with EK salon (hair), The Lavender Archive (tattoo), Earth Roots Massage Therapy, Mirasol Collective (natural healing arts), Around the Circle Coaching (counseling) and the Serpentine Lines Design Company (furniture restoration). We envision the businesses we add not only having similar hearts but working in over lapping ways. In short, we want to create the types of spaces where we would want to go to work and the types of businesses we would want to enjoy next to our coffee shop.

This building will be a dynamic space, built to modify over the years. The plan for the coworking space is being developed with input from current contractors in Greeley who do website design and computer programming. Using their needs as a guide (quiet single workspace, places to hold small meetings, a sound proof booth for Zoom meetings, and yet a shared community) we are creating spaces within The Ambry. As different business owners work with us, we will "retool" overtime to meet their needs and adapt to the future of our economy.

Thanks to the variety of businesses, we anticipate The Ambry will draw a large and diverse cross-section of folks from across Northern Colorado. We anticipate that patrons of all ages, genders, socio-economic and cultural backgrounds will access the retail and service spaces. For the Co-working space we feel this demographic is exactly the same as the folks the Maddie projects are hoping to attract: Professionals and entrepreneurs ages 25-50.

Our projected numbers for the project have our rents at below market value in order to attract and support business upstarts, but we have a significant cushion in order to ensure we can pay the mortgage, utilities, and upkeep costs. Renting multiple spaces to multiple types of business owners allows us to have variety and flexibility, as well as steady income to achieve all our goals.

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Narrative on Greeley Development Code (October 1, 2021 by goudlevans)

We have reviewed the Greeley Development Code (GDC) and our plans for The Ambry (1603, 1611, 1613, 1619 7th Avenue and 716 16th Street - here after referred to as "The Ambry") meet or exceed compliance in all areas for development of our project. Along with the plans created by P & E we would like to submit the following highlights to our commitment to that plan and the further development of Greeley under the vision of city planners:

Further development of The Ambry (meets all rules of construction (GCD 24-102 a. 1-10). Furthermore we believe the businesses within The Ambry will solve issues of public health, safety, and welfare (GCD 24-102 b.) as the previous owners' care and keep of the building and adjoining lots created several problems for the city and surrounding community as detailed below.

The Ambry is currently non-conforming but we will bring it up to date on several civil codes such as handicap accessibility, fire safety, water retention and drainage on the property. Under the "Rules of construction" (GCD 24-105 g.1.) we request to update the building under the *benign nonconformity* usage clause. The plans demonstrate that not only will the updates to The Ambry have no "negative effect on the long-term development within the district," they are indeed "compatible with the intent and design objective for future development in the immediate surroundings." Two examples of this are the need for better parking for the entire neighborhood which will be done at our expense using environmentally sound parking lot materials (GCD 24-207 b.3.b) as well as creating safer pedestrians walkways by clearly marking and lighting entrance and exits to the redesigned parking structure (GCD 24-207 b.2.a, GCD 24-207 b.2.b).

For the Minor Subdivision change The Ambry plans meet all review criteria (GCD 24-202 b. 1-7). In addition, The Ambry will enhance the neighborhood, community, and city in the following ways:

Minor Subdivision (GCD 24-202)

In accordance with GCD 24-202 b. 5. the current state of the Ambry does not conform to compatibility requirements to maintain the peace and autonomy of nearby property owners (GCD 24-202 b. 6). The previous owners let the parking lot fall into a state of deep disrepair which we believe harms the safety and value of surrounding homes. By improving the parking lot, landscaping, entrances and exits of this space, as well as a plan to build single family homes on the existing lots that match the current building standards and aesthetics of existing properties, The Ambry improvement plan will enhance the neighborhood and property values for surrounding owners or (GCD 24-501 a. 1-6*[1]).

**** Our comments on the code are in bold.***

Review Criteria:

[1] Subpoint 7 is not applicable for this plan

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1. No new streets or other public land dedication is needed. If additional right-of-way for existing streets is included with a minor subdivision, acceptance of the dedication by City Council is required. **** Correct***
2. No significant increase in service requirements (utilities, schools, traffic control, streets, etc.) or impact on the ability to maintain existing service levels will result. **** Correct, in fact, we believe the new plan will actually help with traffic and parking congestion in the downtown area as well as create visibility and safer pedestrian and biking spaces. Furthermore, we are taking a residential building designed to host up to 700 people with a gravel parking lot and dropping both the occupancy of the building and improving the look and performance of the lot.***
3. The application does not alter the interpretation of any zoning district boundaries due to adjustments to any lots. ****No, we are requesting a change to zoning as well***
4. All resulting lots meet the legal standards of the subdivision regulations and applicable zoning districts. **** Correct***
5. The lot patterns meet all eligibility requirements for minor subdivisions, and are otherwise compatible with the surrounding area and any previously approved preliminary or final plat for the subject property. In determining compatibility, the size and dimension of lots, the layout and design of existing subdivisions and rights-of-way, the degree of change to the character and pattern of buildings, and potential impact on surrounding property shall be considered. **** Correct in addition, the changes and impact to surrounding property will be positive in so much as the changes to The Ambry will create safer and more aesthetically pleasing living and working spaces for all surrounding neighbors both commercial and residential. Additionally, the businesses and activity in The Ambry building will further the vision set by the DDA, Greeley Arts District and Downtown Greeley Business District. By shifting from what has been a near abandoned and heavily neglected building over the past decade into a vibrant space for small business created by underrepresented communities as well as workspaces for designers and artisans, The Ambry is in perfect alignment with the goals of downtown development.***

6. No other significant issues exist with potential development enabled by the plat that could impact planning policies in the area or adjacent property owners. ****Correct, see above. All anticipated changes are positive for property owners and folks who utilize neighborhood spaces and services of all kinds.***

One should think of our commercial work having a symbiotic relationship with the neighborhood we love east of 8th and the Maddie Buildings. One might think of it in the same light as a commercial space in the Stapleton

neighborhood in Denver or St Michal's out west. The Ambry will likewise enhance everything we presently do at the Atlas Theater.

Rezoning (GCD 24-204)

The present zoning seems a strange clerical error. The Ambry is not a residence. It is a 13,000 square foot building with 80 parking spots, squarely housed downtown. To the North across 16th Street all zoning is high commercial and across the alley *on the same block* to the west is high commercial zoning along 8th. The Ambry sits on one of few commercial arteries running through the center of Greeley. When changed, the Ambry will not be a strange outlier in the middle of residential housing; it will elevate the commercial space presently there and make it better.

The rezoning we propose is not only in line with neighborhood standards and precedent, we believe it will improve the lives and spaces of all surrounding business owners and residents.

Review Criteria

1. The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan. **** Correct***

2 The proposal can fulfill the intent of the zoning district considering the relationship to surrounding areas. **** Correct, as stated above, the surrounding area is commercial, and the building (established in 1920) is designed to host hundreds of people at a time. The proposed usage of the Ambry as a co-working space along with small retail stores and services (massage therapy, hair salon, etc.) strikes a fine balance for everyone involved. The owners of the Ambry are able to invest in business owners who need small, affordable spaces to do work vital to the community, the other business owners on the surrounding blocks (Romas, the Maddie, Daruma, Sammie's Chicken, John Galt Coffee, etc.) will see more draw to their businesses as patrons take advantage of what the region has to offer. New patrons will be drawn to East Greeley and the downtown corridor through this opening as they come to patronize their favorite businesses. Folks in the new apartment buildings built by the Maddie, as well as homeowners and other renters in the area will not only enjoy new work spaces but will also see an enhancement in safety as an occupied, well-lit and well maintained building and parking lot will make walking and living safer. Lastly, because the occupancy is minimal (small office spaces, single owner retail shops) the traffic and congestion will be minimal, and we do not anticipate homeowners will see a marked increase in traffic.***

3. Whether the area changed, or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area **** Correct. Before the remodel and opening of the Atlas, Roma was the only regional business on our side of the 16th street and 8th avenue intersection that was able to sustain a meaningful presence for the past two decades. Because of the work of the City paired with the Atlas improvements, investors like the Maddie (and soon, Sammie's Chicken) have seen more potential on this street. We are helping to build a safer, lovelier, more enjoyable space that matches the needs of our growing city and encouraging communal life to the East.***

4 Whether the existing zoning has been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity. **** Correct. Once again it is our contention that the zoning is inaccurate for the usage of a space like ours and the precedent set by surrounding businesses for some time.***

5. The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development. **** Correct, see above***

6. The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district. **** Correct.***

7. The change will serve a community need, provide an amenity or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning. **** Correct we have already been very compliant with city needs (even at the expense of our lawn and landscaping as the city is currently installing fiber and the trucks that drive up on the grass have ruined the lawn and broken parts of the newly install sprinkler system). From the slowdown/ shutdown of our other business for weeks at a time as the utilities and streets were being improved for the Maddie to this current inconvenience we have demonstrated a self-sacrificial posture and have not failed to work with the city to serve the greater good.***

8. Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community. **** Correct, indeed, the property in it's current state (as left by previous owners) is a blight on our neighborhood. We are taking the***

time and personal expense to assure that not only is The Ambry a benefit, but one of the most desirable spaces to do business in Northern Colorado.

9. The recommendations of professional staff or advisory review bodies.
**** Correct***

Site plan (GCD 24-207)

With the reemergence of Romas, the fantastic success of the Atlas Theater and the addition of the Maddie, as well as all the other empty spaces coming to life along 8th, the corner of 7th and 16th is a space of immense importance. It is a gateway to arguably the most undervalued commercial spaces in Greeley along 7th Ave to the North, and the beautiful homes that line 7th Ave to the south. Changing this one intersection with life will have major effects in both directions bringing economic value and potential to an underutilized artery.

Review Criteria:

1. The alternative shall not alter any use standard, and deviation from any dimension or quantity standard shall be limited to 10%, except where specific sections authorize greater deviations. The Redevelopment Area established in Section 24-1007, shall not be limited in the extent of alternative compliance that may be considered.
****Correct***

2. The alternative shall be based on specific conditions of the site that make the applicable standard impractical, or where compliance with the standard would not clearly advance the intent and design objective of the standard. ****Correct. As stated before, the current state of The Ambry and surrounding properties does not meet the standards or potential of the existing neighborhood. It has been an undesirable eyesore. The changes proposed will enhance the intent and design objective of this standard by creating better living, working, and traveling spaces as well as an aesthetic upgrade which will further open East Greeley and folks arriving into Greeley via HWY 85 into through this corollary.***

Review Criteria.

In general, any site plan in compliance with all applicable standards of this code shall be approved. In making a determination of compliance with the standards applied to particular site, or exercising any discretion under the standards, a site plan shall be reviewed according to the following criteria:

1. ***Generally.***
(a) The plan meets all applicable standards or the criteria for any discretionary approvals. **** Correct***

(b) The plan does not substantially undermine any goals or objectives of the Comprehensive Plan that are applicable to the area or to the specific project. **** Correct. This plan will enhance the goals and objectives of the comprehensive plan and the development plans being made by the City of Greeley to create better pedestrian access and over-all safety to the downtown area. We hope our project is an extra infusion of energy for the great work already started.***

(c) The plan does not present any other apparent risks to the public health, safety or welfare of the community. **** Correct. Again, the building in it's present condition as left by previous owners allows for risks to public health and safety. Our plans will help to mitigate those risks.***

2. ***Site Design and Engineering***.

(a) The plan provides safe access and internal circulation considering the site, the block and other surrounding connections, and appropriately balances vehicle, bicycle and pedestrian needs for the context. **** Correct***

(b) The plan provides or has existing capacity for utilities and other required improvements to serve the proposed development. **** Correct***

(c) The plan provides adequate management of storm water runoff. **** Correct***

(d) The plan provides proper grading considering prevailing grades and the relationship to adjacent sites. **** Correct***

3. ***Landscape and Open Space Design.***

(a) The plan creates an attractive aesthetic environment and improves relationships to the streetscape or other nearby public, civic or common spaces. **** Correct. We are working with local legend Jerry Nelson to design sustainable and Colorado specific landscapes that will enhance 16th street and the entire neighborhood. As said above, our parking lot is one of the few blank canvases in our area. If you have seen what Jeff has done with the back of the Atlas Theater, do not be surprised when we make this parking space the bar by which future developments ought to be judged both for beauty and environmental regard.***

(b) The plan enhances the environmental and ecological functions of un-built portions of the site, and makes effective use and conservation of water resources. **** Correct, The Ambry parking lot design allows water to drain back through the ground. Eliminating***

the use of asphalt when ever possible and reducing summertime temperatures is a highlight of our process! We will plant no less than 20 trees on our lot, and mark parking spaces with vegetation, grape vines and rocks instead of spray paint.

(c) The plan reduces the exposure and adverse impact of more intense activities or components of the site or building on the streetscape and on adjacent properties. **** Correct. Upon execution our plan will create safer physical spaces on site and in the surrounding area.***

In addition to the required review criteria, we have created our plan to enhance the community in the following ways:

Residential Development Standards (GCD 24-501), Non Residential Development standards (GCD 24-601) such as frontage design, landscaping, parking, exterior lighting, and (GCD) Access and Parking Standards.

The Ambry Plan demonstrates full compliance with each of these sections. In addition, here are some highlights from each of these sections in which the Ambry plan will enhance living standards for the neighborhood:

GCD 24-5 – Residential Development Standards

Intent and Applicability

In so much as The Ambry property is situated within a mix usage space we want to honor all residential needs as if we lived next door! Therefore our plan is designed to "improve the appearance and livability of the neighborhood using good civic design and reinforce the distinct character of the existing neighborhood" (GCD 24-501 a.1.) Additionally, we will design and maintain a more walkable streetscape and sidewalk area along with the regular maintenance of shade-producing trees (note we have been caring for these trees by having trimmed and sprayed for over a year at our expense even before we owned the building because we know that health trees are a public good) (GCD 24-501 a.3.). Lastly, we will "promote lasting and sustained investment in neighborhoods with quality design" by improving on the property in high quality and sustainable ways (GCD 24-501 a.7).

The Frontage Design will enhance the neighborhood image, coordinate with the streetscape and current investment in lighting and improvement by the city (GCD 24-503 1. a., GCD 24-504 1.b.) As well as "provide livable outdoor spaces that activate the streetscape (and)… reinforce neighborhood character… (GCD 24-503 1.f., GCD 24-503 1.g.).

The plan specifically the front of building landscaping will implement natural features with "aesthetic and ecological value" and serve a civic space for informal public outdoor seating and gathering (GCD 24-504 a.1, GCD 24-504 a.2, GCD 24-504 a.7.)

GCD 24-6 – Nonresidential Development Standards

Intent and Applicability

The Nonresidential Development Standards have the following intent:
1. Promote good civic design and improve the appearance and vibrancy of commercial districts, employment centers, civic spaces, and other public places. **** Correct. At present The Ambry building has the potential to create and enhance a vibrant commercial district that marries well with the surrounding businesses and residential area. Our proposed plan will move this from potential to reality.***

2. Design and locate open spaces as an extension of the public realm, and emphasize the different contexts of places throughout the City***. * Correct. Because the space will serve the Wedding and Events of the Atlas Theater, we will spend heavily on exterior improvements, making the building and parking area an backdrop for photographs. This will not only serve our guests, but elevate our entire area East of 7th with beauty.***

3. Improve the accessibility of centers and districts throughout the City by arranging development within multi-modal networks, and coordinating site access and internal circulation systems with these networks. **** Correct. Currently this end of the city is at best dead and at worst, dangerous. We are a perfect path to businesses on 16th street and 8th avenue for folks traveling by car, bike, or on foot. Furthermore, the folks the Ambry will draw to the space to work or find services will find themselves more connected to the other amenities downtown Greeley has to offer.***

4. Use buildings to shape streetscapes and public spaces, and design building facades and lot frontages to relate to these spaces. **** Correct. See notes above on landscaping and other improvements.***

5. Refine the design, scale, and details of buildings based on the relationship to the public realm and make distinctions in design based on the context of development. **** Correct.***

6. Improve the value of places, strengthen the economic potential of commercial districts and employment centers, and promote lasting and sustained investment in nonresidential development through good design. **** Correct. We bring calm and economic stability to an area that has been unsafe. Having a multi-use building with committed small companies and independent***

contractors utilizing the space is an ideal use of this beautiful building and will be a boon to the community.

GCD 24-6 Access and Parking

Although there is currently a flat dirt lot that has been used for parking, to call this area a parking lot is a bit of a stretch. It is not marked, not finished, and poorly lit. By creating clear entry and exit points, well marked and well lit parking spaces, and safe access to surrounding businesses, our parking plan we will take a "junk lot" and instead create additional parking spaces for the use of our businesses and open to public parking (GDC 24-701 b. 2.) resurface the area using environmentally friendly technologies that also meet the space and access requirements (GDC 24 701 b.4).

We will also provide bicycle parking and handicap ramp access to a space that has previously lacked these accommodations (GDC 24-703. d., GDC 24 703 e.). Lastly, our plan utilizes all parking landscaping guidelines in order to ensure environmental sustainability and regulations (GDC 24 704 a.).

GC 24-801 Landscape Standards

A goal both personal and corporate for all businesses and properties owned by the Cook family is that of sustainability and commitment to local vegetation. In the Atlas building we use exclusively wind power for electricity. The Amby will be developed along the same ethic and standards.

Intent & Applicability

a. Intent. The intent of the landscape standards is to:

1. Protect natural landscapes, Greeley's agriculture traditions, and "Tree City USA" designation to strengthen the City's identity as growth occurs. **** Correct we will design and maintain a more walkable streetscape and sidewalk area along with the regular maintenance of shade-producing trees (note we have been caring for these trees by having trimmed and sprayed for over a year at our expense even before we owned the building because we know that health trees are a public good) (GCD 24-501 a.3.). Lastly, we will "promote lasting and sustained investment in neighborhoods with quality design" by improving on the property in high quality and sustainable ways (GCD 24-501 a.7).***

2. Improve City's image and build value with a well-designed public realm, coordinating landscape design for streetscapes, open spaces, civic places. **** Correct, please see plan above.***

3. Promote quality private investment that corresponds with investments in the public realm, and emphasize distinct areas throughout the City with natural landscape materials. **** Correct, please see plan above.***

4. Coordinate landscape and design amenities across multiple sites with special attention to the relationship of public and private frontages. **** Correct, please see plan above.***

5. Encourage site and landscape design that allows spaces to serve multiple aesthetic, screening, environmental, recreational, or social functions. **** Correct, please see plan above.***

6. Provide comfort, spatial definition, and visual interest to active spaces including streetscapes, walkways, civic spaces, parks, trails, or other similar outdoor gathering places. **** Correct, the overall development of the neighborhood and community is paramount to our plan, and much of this will be met in how we honor the exterior spaces.***
7. Conserve energy and limited resources through landscape design, and protect and integrate established natural amenities rather than plant or design new ones. **** Correct, please see plan above particularly as it pertains to tree maintenance and parking lot.***

8. Screen and mitigate the visual, noise, or other impacts of high-intensity areas of sites and buildings, or where the scale and pattern of development changes. **** Correct, we anticipate no visual, audio, or other neighborhood impacts of any kind.***

9. Implement the City's Landscape Policy Plan for Water Efficiency, conserve water, and shift to water–conscious landscape design that is regionally appropriate and specific to the arid Front Range climate. **** Correct, please see plan above particularly as it pertains to tree maintenance and parking lot.***

Project Timeline

Development Review and Opportunities to improve designs and/or coordinate with public and private investments.

This document is a large part of our review process, and we will use the notes and meetings created with this process to follow all city and state guidelines as well as take into consideration any requests by the DDA or city of Greeley that will better allow us to maintain and bolster the over-all vision for Greeley development. We have carefully studied the Greeley Comprehensive Plan and made significant changes to The Ambry project based on that document. We feel we meet or exceed every requirement and we hope to make our city and the neighborhood we have loved for three decades proud.

We welcome any suggestions for changes or collaboration from others, both public and private, making improvements to this community and we will continue to have an open door for further development and ideas in the future.

At this time, we do not anticipate any community reviews or special public information necessary, but we are happy to add that to our process if the committee deems it necessary.

Conclusion

The Ambry project is a continuation of our love for this community and our desire to watch it grow in meaningful, connected, sustainable ways. Although the assignment of approval for shifting usage and zoning is a technical one, our hearts are too deeply invested to have this document merely reflect code requirements. The development of the code was certainly part of a desire that everyone who loves this community holds dear to be good stewards of this beautiful city. We hope that our plans reflect that intent, and we welcome your comments and feedback as we work through this process together.

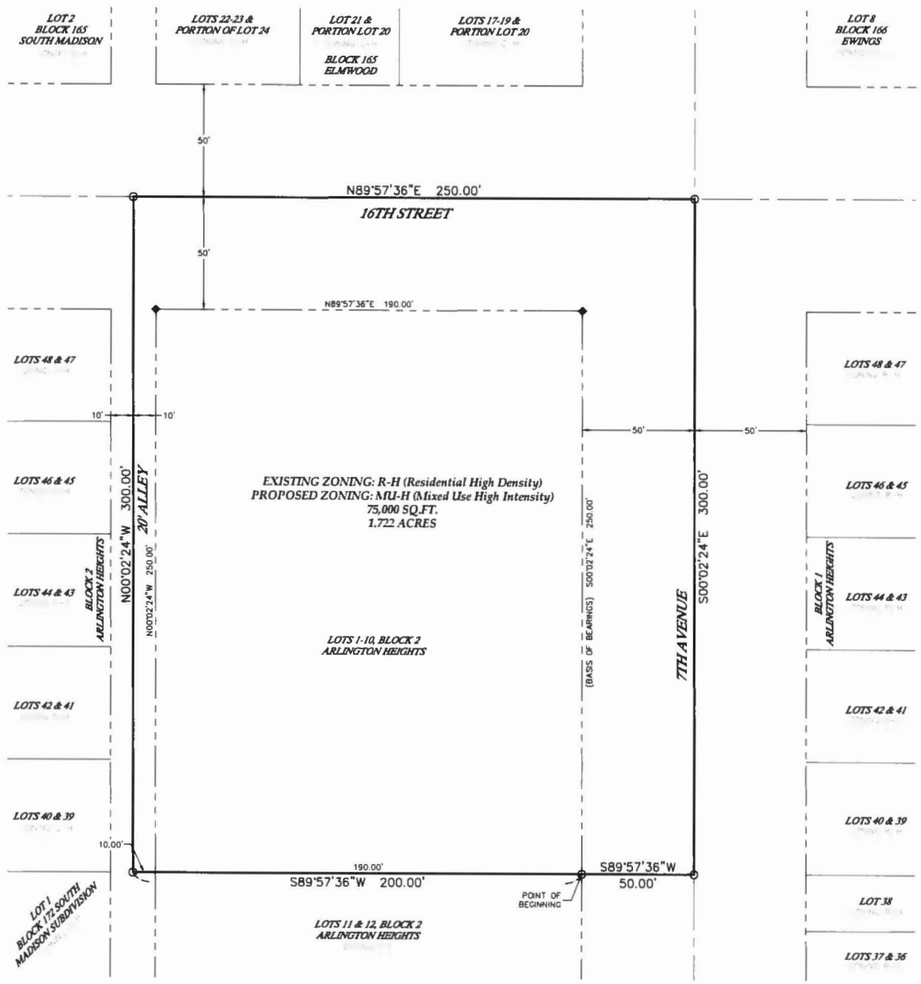
Thank you for your time and consideration,

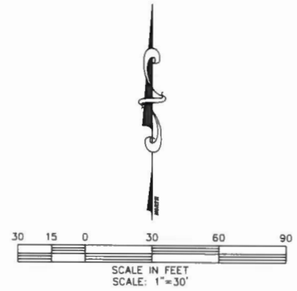
Jeff and Kelly Cook

1603,1611,1613 & 1619 REZONING

Of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, Block 2, Arlington Heights,
and a portion of 16th Street Right of Way, 7th Avenue Right of Way and 20' Alley Right of Way,
Situate in the Southwest Quarter of Section 8, Township 5 North, Range 65 West of the 6th P.M.,
City of Greeley, County of Weld, State of Colorado
1.722 Acres
Project Number: ZON2022-0008

PROJECT BOUNDARY MAP





LEGEND

- CENTERLINE
- RIGHT OF WAY LINE
- BOUNDARY LINE
- CALCULATED POSITION

PRELIMINARY

Paul B. Groves – On Behalf Of King Surveyors
Colorado Licensed Professional
Land Surveyor #38209

DATE: 7/5/2022
FILE NAME: 20220183-RZN
SCALE: 1"=30'
DRAWN BY: CSK
CHECKED BY: PG

KING SURVEYORS
650 E. Garden Drive | Windsor, Colorado 80550
phone: (970) 686-5011 | email: contact@KingSurveyors.com

REVISIONS: DATE:

1603,1611,1613 & 1619 REZONING
FOR
JEFF COOK
716 16TH STREET
GREELEY, CO 80631

PROJECT #: 20220183

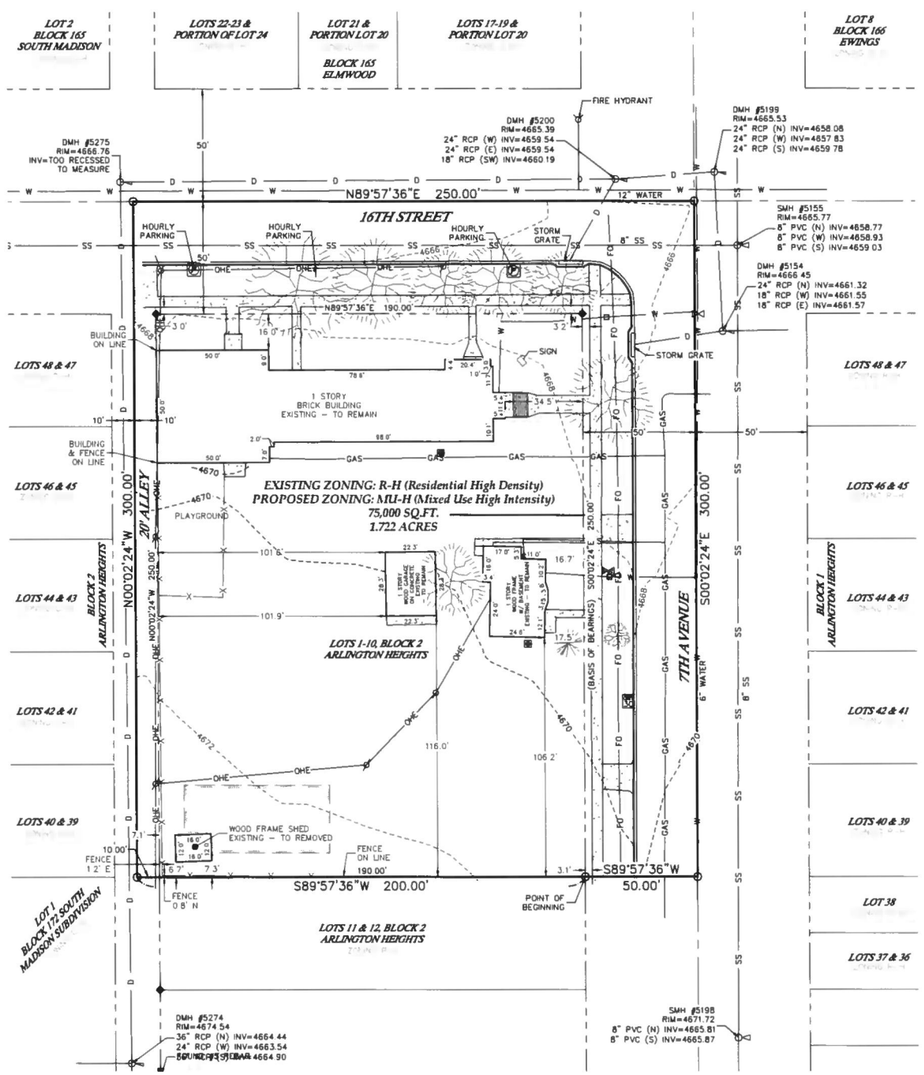
4

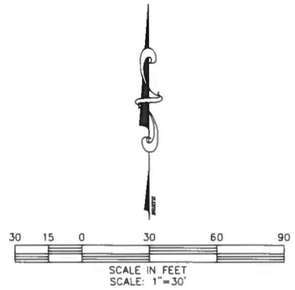
SHEET 4 OF 5

1603,1611,1613 & 1619 REZONING

Of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, Block 2, Arlington Heights,
and a portion of 16th Street Right of Way, 7th Avenue Right of Way and 20' Alley Right of Way,
Situate in the Southwest Quarter of Section 8, Township 5 North, Range 65 West of the 6th P.M.,
City of Greeley, County of Weld, State of Colorado
1.722 Acres
Project Number: ZON2022-0008

EXISTING CONDITIONS MAP





LEGEND

EDGE OF ASPHALT	FOUND MONUMENT AS DESCRIBED
EDGE OF LANDSCAPING	FOUND #4 REBAR WITH ORANGE PLASTIC CAP LS 34995
FENCE LINE	SET 24" OF #4 REBAR WITH A RED PLASTIC CAP STAMPED KS, LS 38105
FIBER OPTIC LINE	
GAS LINE	
WATER LINE	
OVERHEAD POWER LINE	AIR CONDITIONER UNIT
DRAINAGE LINE	POWER POLE
SANITARY LINE	GAS METER
CENTER LINE	IRRIGATION VALVE
EASEMENT LINE	WATER VALVE
RIGHT-OF-WAY LINE	WATER METER
PROPERTY LINE	SIGN
PINE TREE	DRAINAGE MANHOLE
DECIDUOUS TREE	SANITARY MANHOLE
FIRE HYDRANT	

FLOOD PLAIN NOTE

The subject property is in flood zone 'X', "areas determined to be outside the 0.2% annual chance of floodplain" per FEMA flood map 08123C1537E revised January 20, 2016.

PRELIMINARY

Paul B. Groves – On Behalf Of King Surveyors
Colorado Licensed Professional
Land Surveyor #38209

DATE: 7/5/2022
FILE NAME: 20220183-RZN
SCALE: 1"=30'
DRAWN BY: CSK
CHECKED BY: PG

KING SURVEYORS
650 E. Garden Drive | Windsor, Colorado 80550
phone: (970) 686-5011 | email: contact@KingSurveyors.com

DATE:
REVISIONS:

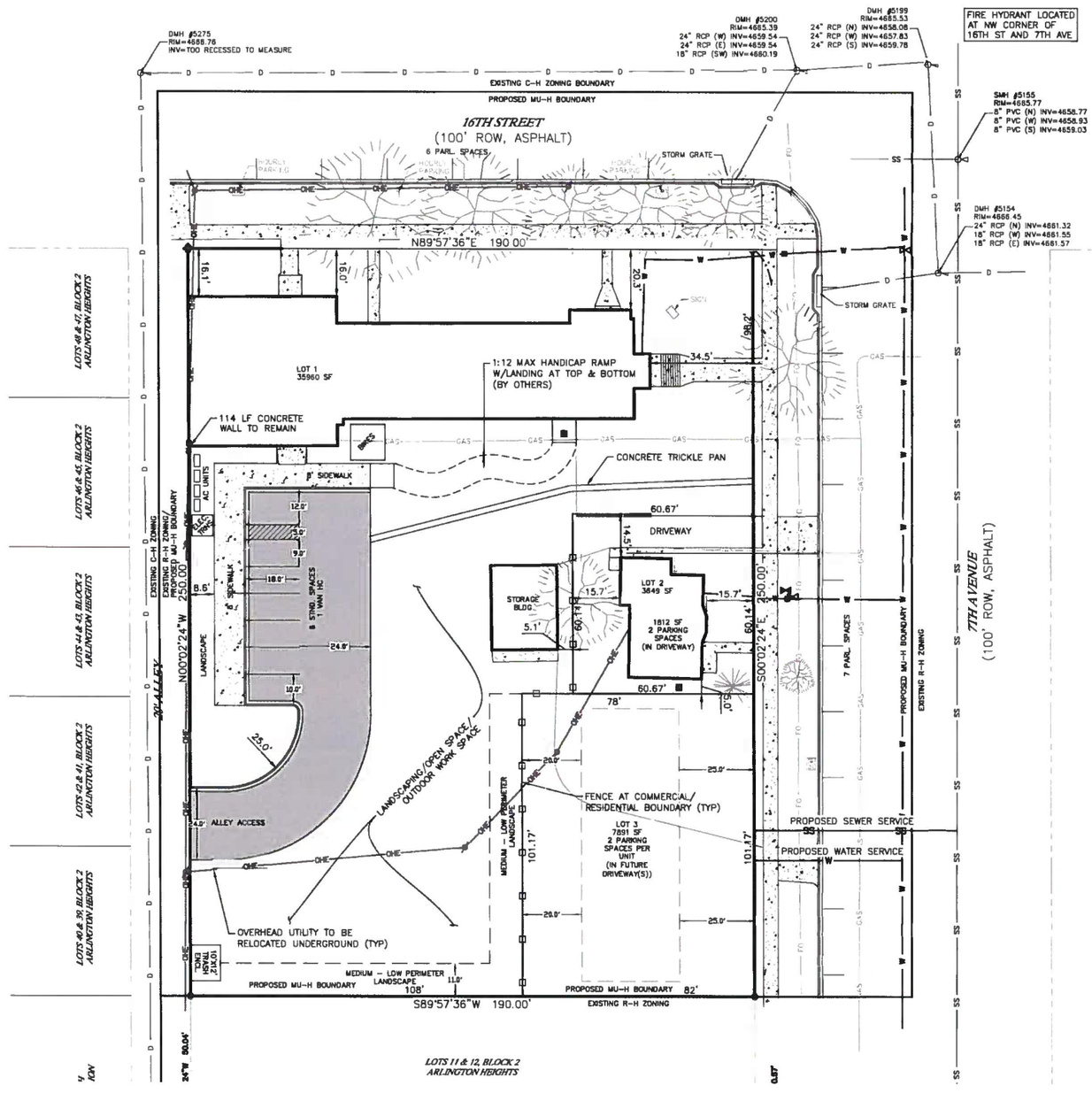
1603,1611,1613 & 1619 REZONING
FOR
JEFF COOK
716 16TH STREET
GREELEY, CO 80631

PROJECT #: 20220183

2

SHEET 2 OF 5

SITE PLAN REVIEW



LOT DETAILS:
1. LOT 1:
   1.1. COMMERCIAL LOT
2. LOT 2:
   2.1. DETACHED HOUSE – SMALL LOT
   2.2. OPEN SPACE REQUIRED – 20%
   2.3. OPEN SPACE PROVIDED – 49%
3. LOT 3:
   3.1. MULTI-UNIT HOUSE – STANDARD LOT
   3.2. ALLOWS FOR 2 TO 4 PRIMARY UNITS
   3.3. 25% OPEN SPACE REQUIRED

PARKING SUMMARY:
LOT 1 REQUIRED PARKING: 24 SPACES
PARKING REDUCTION AVAILABLE:
- ADJACENT PARKING: 13 SPACES X 0.75 FACTOR = 10 ADJACENT SPACES
- PARKING WITHIN 300': 87 SPACES X 0.25 FACTOR = 22 SPACES WITHIN 300'
- TOTAL PARKING AVAILABLE TO REDUCE ONSITE PARKING = 32 SPACES

PARKING PROPOSED ON SITE = 7 SPACES

PHASING PLAN:
1. PHASE 1: OCCUPY LOT 1 COMMERCIAL BUILDING UTILIZING ADJACENT PARKING SPACES.
2. PHASE 2: CONSTRUCT ON SITE PARKING LOT AND LANDSCAPING IMPROVEMENTS WITHIN 3 YEARS OF SITE PLAN APPROVAL.

LEGEND

- EDGE OF ASPHALT
- EDGE OF LANDSCAPING
- FENCE LINE
- FIBER OPTIC LINE
- GAS LINE
- WATER LINE
- OVERHEAD POWER LINE
- DRAINAGE LINE
- SANITARY LINE
- EASEMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY BOUNDARY
- INTERIOR PROPERTY LINE
- PINE TREE
- DECIDUOUS TREE
- FOUND MONUMENT AS DESCRIBED
- FOUND #4 REBAR WITH ORANGE PLASTIC CAP LS 34985
- SET 24" OF #4 REBAR WITH A RED PLASTIC CAP STAMPED KS, LS 38105
- AIR CONDITIONER UNIT
- POWER POLE
- GAS METER
- IRRIGATION VALVE
- WATER VALVE
- WATER METER
- SIGN
- DRAINAGE MANHOLE
- SANITARY MANHOLE

PARKING LOT PAVING

CONCRETE SIDEWALK

P&E Co. PERMITS & ENGINEERING
WWW.PERMITSANDENGCO.COM PH: (970) 978-1627

JEFF AND KELLY COOK

THE AMBREY
716 16TH STREET
PRELIMINARY SITE PLAN

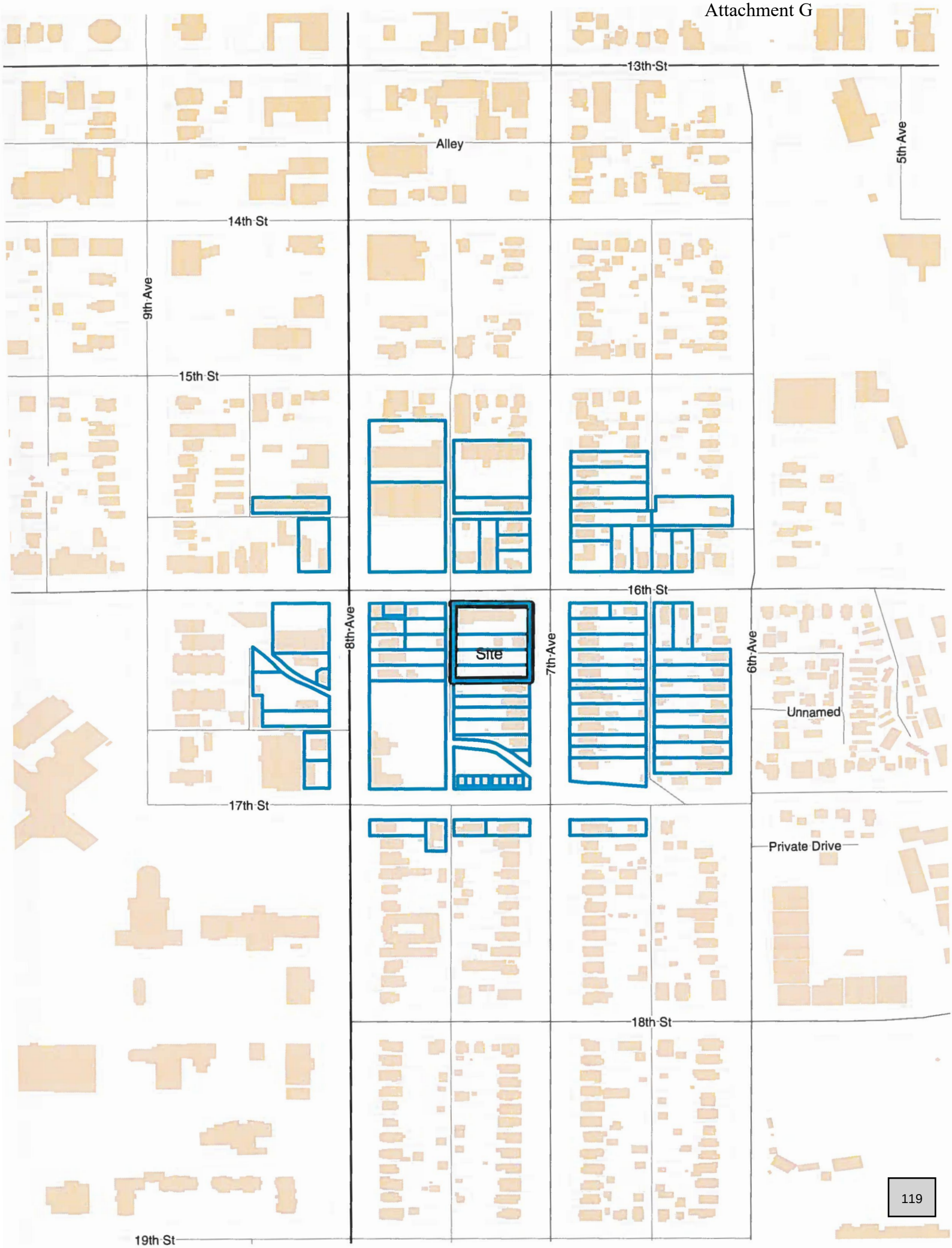
REVISION DESCRIPTION	DATE

SEAL AREA

PRELMINARY

SURVEY INFO KING 8/13/2022
DRAWING NAME CIVIL
DRAWING SIZE 22" X 34"
SHEET 5 OF 5

S1


13th St
Alley
5th Ave
14th St
9th Ave
15th St
16th St
8th Ave
Site
7th Ave
6th Ave
Unnamed
17th St
Private Drive
18th St
19th St

Planning Commission Agenda Summary

December 13, 2022

Key Staff Contact: Sean Chambers, Director Water and Sewer

Title:
Consideration of the City of Greeley 2022 Water Efficiency Plan

Summary:

The Water Conservation Act of 2004 requires all Colorado water providers who supply more than 2,000 acre-feet of water to submit or update water efficiency plans for approval by the Colorado Water Conservation Board (CWCB) every seven years. The plans contain key information about historical and projected water demands, water supply reliability, future needs, proposed demand management activities, and monitoring processes.

This is the third update to the original 2008 Water Conservation Plan. The City of Greeley's new draft Water Efficiency Plan (WEP) is a roadmap of strategic objectives and water conservation programs to ensure future water supplies. The WEP builds on the City's current properties and includes existing codes, criteria, and strategic plans with a lens on water conservation.

The main objectives of the WEP are to maximize widespread efficiency in all indoor water use, set goals for more resilient landscapes, and educate customers on water use goals. It will provide direction on how to advance water conservation efforts and build citywide capacity to:

- Create efficiencies and consistencies among policies, plans, projects, and programs
- Maximize cost-saving opportunities
- Create goals with clear measurements for success

The Water and Sewer Department has worked diligently to coordinate with a 60-day public comment period from August 3, 2022, through October 3, 2022. These methods included online forms, social media campaigns, two online open houses (August 18th and September 15th), Water and Sewer's monthly newsletter, press release on August 9th, presentation and information sharing to commission/advisory boards and targeted outreach for local businesses and organizations. Colorado Water Conservation Board (CWCB) also provides a review of the WEP to ensure compliance with the Water Conservation Act.

Following public engagement, key stakeholder engagement, and a review with Planning Commission, the Water and Sewer Board approved and recommended the

Water Efficiency Plan to Council at their October 10, 2022, Board meeting and City Council approval on consent at the December 6, 2022 meeting.

Recommended Action:
Endorse adoption of the 2022 Water Efficiency Plan by reference to the City's 2018 Comprehensive Plan.

Attachments:
2022 Water Efficiency Plan

WATER EFFICIENCY PLAN

GREELEY, CO

City of Greeley Colorado

2022

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City of Greeley's Water Efficiency Plan

Executive Summary

Securing safe and sufficient water supplies for Greeley's future generations in face of significant water uncertainties like drought, wildfires, climate change, etc. is a challenge. Successful stewardship of precious water resources is a benchmark by which future generations will judge the current citizens and water utility staff. The City of Greeley's (City) Water Efficiency Plan (WEP) is a roadmap to establish strategic objectives and goals to outline programs and measures to ensure sufficient water supply for the future.

The City of Greeley is the business Center for Weld County, the county seat and the second largest community in Northern Colorado. The leading industries in Weld County have remained consistent and the top five are agriculture, manufacturing, energy production, health and Wellness, and business services. With the adoption of the 1958 City Charter, Greeley citizens created a Council-appointed Water Board with the duty to "acquire, develop, convey, lease, and protect water and sewer assets, supplies, and facilities." The citizens also gave the Board the power to set the minimum water and sewer rates necessary for operation, maintenance, debt service, and depreciation. This separate rate setting authority allows City Council to focus on economic development, knowing there will be a healthy water system to support their efforts.

The Water and Sewer Board has an important role in Greeley leadership, with seven voting members appointed by the City Council, as well as the Mayor, City Manager and Director of Finance as ex-officio members. The Director of Water and Sewer is the primary staff representative to this Board. As such, the Director has the responsibility to provide reports and recommendations to the Board related to their autonomous rate-making and water resource authority, and to adhere to the City Council policies and priorities as directed by the City Manager. The Water and Sewer Board has been continuously engaged in strenuous and independent oversight of the department's strategic direction, budget, and operations since its creation. This overseeing is supplemented by the annual examination of the Water and Sewer's budget by City Council.

Through the Water and Sewer Department, drinking water and irrigation water is provided to approximately 108,000 Greeley citizens. Kodak, along with three nearby municipalities (Evans, Windsor, and Milliken), annually transfer yield associated with their water rights to Greeley for water treatment and delivery. The Water and Sewer Department serves Greeley by treating and distributing nearly 9 billion gallons of water every year with more than 500 miles of pipelines, two drinking water plants, a wastewater treatment plant, three treated water reservoirs, six raw water reservoirs and a variety of pumping stations.

Greeley provides drinking water to over 108,000 residents, hundreds of businesses, other municipalities through approximately 28,000 individual accounts. Most accounts (82%) represent single family residents, however, use only one-third of the total water. Commercial, industrial, and institutional (CII) meters made up 7% of the total number of accounts but many CII water users represent a large amount of water consumption.

Greeley's water demands are similar what is seen within the Colorado Front Range communities with highest water demands during the summer due to outdoor irrigation and lowest during the winter. Under average weather conditions, about one-half of the total annual water use by all Greeley's customers is for outdoor irrigation (including non-potable deliveries for irrigating parks, schools and other large outdoor areas). Absent intentional measures to reduce demand, outdoor water use increases to about 55% of annual use under hot and dry conditions. During the peak irrigation season from June through September, outdoor water use typically makes up about 70% of total use. That percentage increases under hot and dry conditions.

Although Greeley's population has grown by approximately 17%, per capita, demand has decreased by 11% as noted. This overall declining trend in system wide per capita demand is from single family residentials sector and gradual decreases in indoor use in particular.

Reducing water demand not only improves drought resilience but can reduce or defer and potentially avoid high costs of new infrastructure. Conservation has been included in Greeley's overall supply planning for over 30 years. Greeley developed its first water conservation plan in 1992—outside of State of Colorado's requirements. The City will update the WEP every five to seven years and as such, this is the third update to the original 2008 Greeley WEP to the Colorado Water Conservation Board (CWCB).

As of 2021, the City's Water Conservation program has a full time Water Conservation Manager, Water Conservation Administrator (Project Manager), and two Water Conservation Specialists. In addition, the City hires seasonal labor and outside contractors on a as needed bases.

The WEP builds on the City's current priorities and is designed to integrate and synthesize existing codes, criteria, roadmaps and strategic plans with the lens of water conservation. It is meant to be the guiding document that provides direction to advance water conservation efforts and build organizational capacity to:

- Create efficiencies, synergies, and consistencies among policies, plans, projects and programs
- Maximize cost savings opportunities
- Create goals to measure success and progress

With a use of triple bottom line approach, the Water Conservation team will transform Greeley's water conservation efforts to a sustainable future. This approach offers water efficiency goals to be optimized, innovated, and improve water efficiencies across multiple divisions within Greeley. This WEP encompasses current plans and reports from the Greeley's Water and Sewer Department—since water efficiency is connected to multiple divisions. These include:

- *Imagine Greeley Comprehensive Plan, February 2018*
- *Greeley Non-Potable Water Master Plan, June 2021*
- *Greeley Water Transmission and Distribution Master Plan, June 2021*
- *Greeley Integrated Water Resources Plan, draft 2022*
- *Greeley Drought Emergency Plan, January 2021*
- *Enhancing Greeley's Water Efficiency Portfolio through Performance Analysis Report, May 2022*

The water efficiency is centered around a sustainable water future that revolves around Greeley's community, prosperity, and water conservation management. This Plan is designed to support the five core values for Water Conservation:

- Drive water conservation through innovation and technology
- Provide excellent customer service
- Continue and build on Greeley's water conservation history
- Commit to sustainability and environmental stewardship
- Fulfill future customer needs and changing values

Greeley's 2022 WEP is designed to reduce systemwide water use and have identified programs that could reduce water demand by 2,034 acre-feet of water savings by 2030. Section 3.2- Water Efficiency Goals describes a 7-year scorecard to track progress and provide accountability and transparency within Water Conservation. While Section 4- Water Efficiency Activates describes existing and new program to be implemented over the coming year to meet cumulative water savings.

This plan was developed through an iterative process of public input starting with an initial citizen survey in 2021 and refined through a formal public comment process, Water and Sewer Board and City Council's adoption. Securing safe and sufficient water supplies for future generations of Greeley residents in the face of significant uncertainties such as drought and climate change is a major challenge. This 2022 Water Efficiency Plan (WEP) for the City of Greeley establishes clear goals and outlines programs and measures to help ensure a sufficient water supply for the future. The WEP continues the Greeley water legacy of responsible planning, innovation and service.

1.0 Profile of Existing Water Supply System

1.1 OVERVIEW

The City of Greeley (City) is located at 40.4233°N, 104.709°W in a region known as northern Colorado and lies approximately 49 miles north/northeast of Denver (see Figure 1). Greeley is the Weld County seat and the largest City in the county, with a population now exceeding 108,000 people. Total population served is the City of Greeley itself in addition to wholesale water-purchasing municipalities near Greeley—Windsor, Evans, and Milliken. The City's elevation is 4,658 feet above sea level covering a total area of 30,730 acres. Greeley's long-range growth area adds an additional 27,599 acres to the City's size.

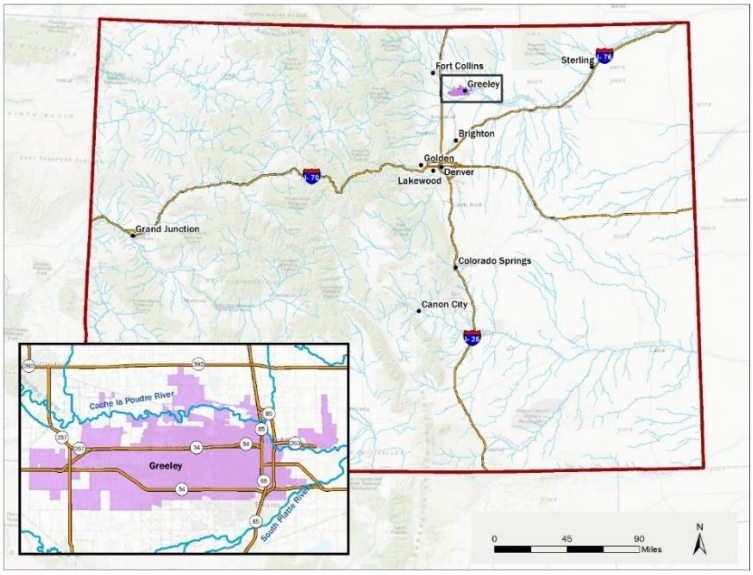


Figure 1: City of Greeley's Location

Greeley, originally known as Union Colony, was organized in 1870 by Nathan Meeker, the agriculture editor for Horace Greeley's New York Tribune. Meeker dreamed of founding a "utopian community based on temperance, religion, education, agriculture, irrigation, cooperation, and family values."[1]

Located on Colorado's high plains, Greeley's average annual precipitation is 12-14 inches per year. Because Greeley is not located near a consent water flows, most of our water supply is brought through infrastructure through other parts of the state. Greeley owns surface water rights in four major river basins—the Cache la Poudre River, Big Thompson River, Laramie River and Colorado River—and operates six water storage reservoirs year-round as part of its public drinking water system. The high mountain reservoirs are Barnes Meadow, Comanche, Hourglass, Milton Seaman, Peterson, and Twin Lakes. The reservoirs capture spring snowmelt that is released as needed to meet Greeley's water demands.

Greeley's aquifer storage and recovery (ASR) project, Terry Ranch, was added to the water portfolio in March 2021. This ASR project will be developed in stages over long period of time and is currently off-line.

[1]*Confluence- The Story of Greeley Water by Gregory J. Hobbs, Jr. and Michael Welsh, 2020*

1.2 WATER SUPPLY RELIABILITY

1.2.1 Water System Profile

Greeley's water sources include direct river diversions, ownership in the Colorado-Big Thompson (C-BT) and Windy Gap projects, high mountain reservoirs, and rights in several irrigation companies. In addition, the Terry Ranch Aquifer Storage Recovery (ASR) project will provide 1.2 million acre-feet of water and aquifer storage in the future. Greeley treats water at two treatment plants, the Bellvue plant located on the Poudre River and the Boyd Lake Plant located adjacent to Boyd Lake in the Big Thompson River drainage. The City also owns and operates a non-potable system with associated ditch shares, storage, and wells. Kodak, along with three nearby municipalities (Evans, Windsor, and Milliken), annually transfer yield associated with their water rights to Greeley for treatment and delivery.

The City's water supply system stretches more than 60 miles from the westernmost raw water collection and storage facilities to the easternmost reaches of its finished water distribution system. Future water supplies from Terry Ranch extends 40 miles to the northeast of Greeley.

Water Rights

Greeley draws raw water from four main river basins on both sides of the Continental Divide: the Cache la Poudre (Poudre), Big Thompson, Upper Colorado, and Laramie. This diversity of supply sources increases the reliability and security of Greeley's system. A map of the Greeley water supply system is shown in Figure 2.

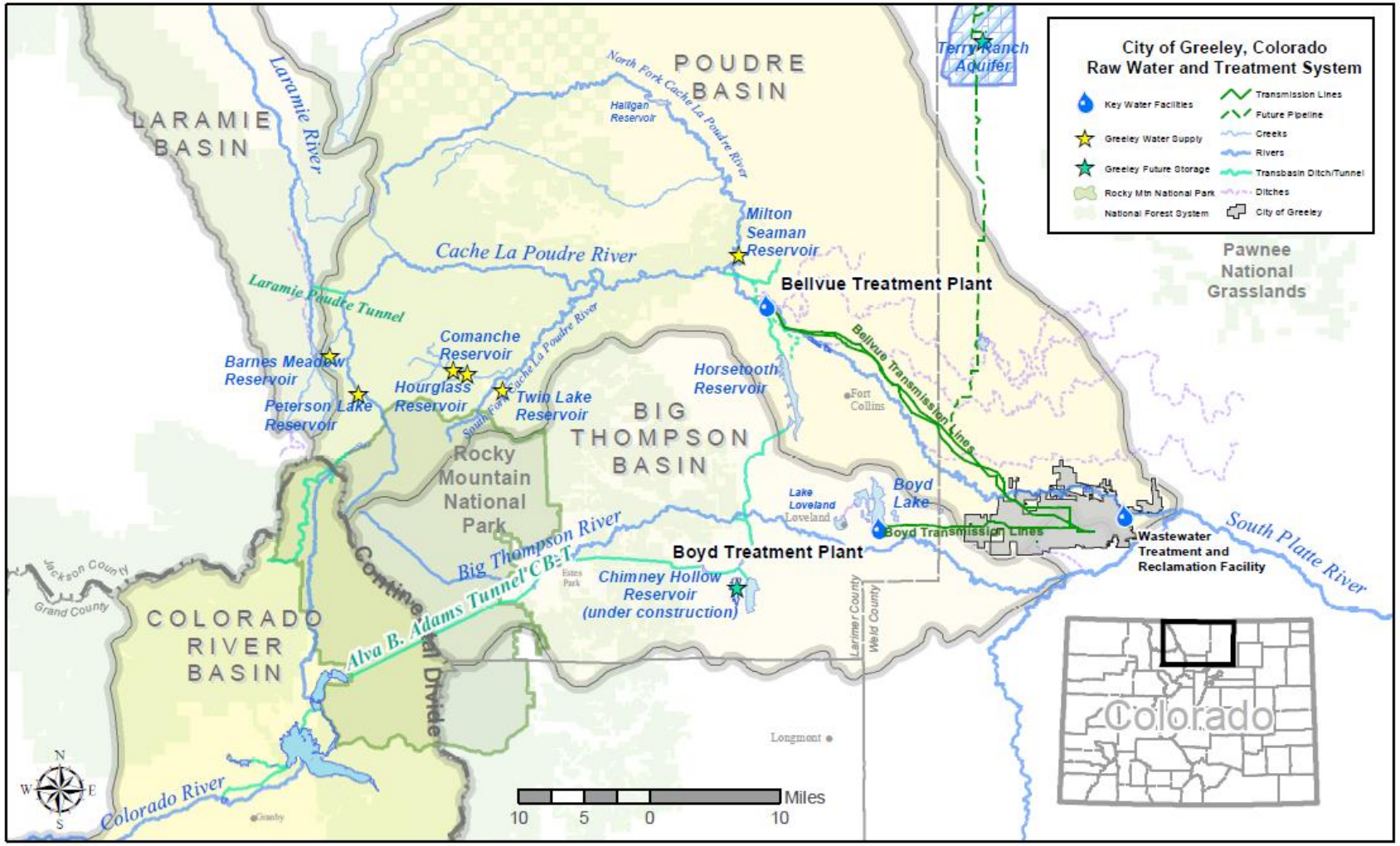


Figure 2: City of Greeley's water collection and treatment systems.

Cache la Poudre River

Greeley owns senior direct flow rights on the Poudre River. The direct flow rights consistently yield 9,000 acre-feet for treatment at the Bellvue Plant.

Milton Seaman Reservoir, on the Poudre River's North Fork, is the City's largest multi-year storage vessel within the Poudre basin (Figure 3). Milton Seaman Reservoir is primarily used as a drought storage vessel and in most years remains relatively full with about 5,000 acre-feet of available water supplies.

Other Poudre basin rights include storage rights in five high mountain reservoirs: Barnes Meadow, Peterson, Comanche, Hourglass, and Twin Lakes. The reservoirs capture water at high elevations from some of the Poudre River tributaries. Hourglass reservoir has the most senior rights. However, Greeley's high mountain reservoir storage rights are currently only for irrigation and have low yields in drought years.

A majority of Greeley's Poudre River water rights are treatable at the Bellvue water treatment plant (Bellvue). However, some of Greeley's Poudre River water rights cannot be physically delivered to Bellvue. For example, Greeley's ownership in the Greeley Irrigation Company (GIC or the No. 3 Ditch) represents a supply located in the lower portion of the Poudre basin. These supplies are located too far downstream for treatment and thus are used for non-potable irrigation of Greeley's parks, golf courses and larger landscapes. This reduces the amount of treated water used by the City.

Greeley also owns, and is in the process of acquiring, additional storage in the lower Poudre Basin. These storage facilities will reduce treated water demands and provide operational flexibility. For example, Poudre Ponds at Greeley are lined gravel pits located near the City that reuse, not physically but via river exchange, waste water effluent (effluent). Greeley uses the exchanged effluent to meet augmentation, non-potable, and return flow obligations.

Colorado River

Greeley also obtains water from two interrelated transmountain diversion projects – the Colorado-Big Thompson (C-BT) and Windy Gap projects (Figure 3). Raw water from these projects can be delivered to either of Greeley's two treatment plants.

The C-BT Project provides supplemental water to its service area in northeastern Colorado. The project boasts 800,000 acre-feet of active storage and a relatively senior water right on the Colorado River. Owned by the U.S. Bureau of Reclamation, it is operated by the Northern Colorado Water Conservancy District (NCWCD). With 22,565 units, Greeley is the largest municipal holder of C-BT rights.

The Windy Gap Project was planned and built between 1969 and 1985. Six C-BT stakeholders (Greeley, Loveland, Fort Collins, Longmont, Boulder, and Estes Park) cooperated to form a municipal subdistrict which oversees the Project and establishes the assessments for the existing Windy Gap shareholders.

Windy Gap consists of a diversion dam on the Colorado River, pump station, and a pipeline to deliver water to Lake Granby. The C-BT system conveys the water from Lake Granby to Windy Gap customers

on the Front Range (Figure 3). The Windy Gap Subdistrict has a contract with the U.S. Bureau of Reclamation to allow the C-BT system to transport the water when there is unused capacity. In either a wet or dry year, Windy Gap does not yield. In a dry year, senior rights limit diversions and there may be little water to deliver. In a wet year, the C-BT system is at capacity and has no spare room to store or move Windy Gap water to the East Slope.

The Windy Gap Firming Project, which began construction in 2021, will create a 90,000 acre-foot East Slope reservoir known as Chimney Hollow. Greeley has committed to 9,189 units in the project. Construction is estimated to be complete by 2025.

Big Thompson River

In the 1960s, Greeley began to acquire shares in three related agricultural water companies: the Seven Lakes Company, the Lake Loveland Company, and the Greeley-Loveland Irrigation Company (collectively the Greeley-Loveland Irrigation Companies (GLIC)). As the City grew westward over ground historically irrigated by GLIC water rights, Greeley accepted shares of GLIC for raw water dedication. Greeley currently leases many GLIC shares back to agriculture. GLIC water rights are relatively junior and do not yield well during droughts. Greeley can only treat its GLIC water supplies at the city's Boyd Lake Plant. Greeley also uses GLIC water to meet non-potable irrigation demands in an effort to conserve and minimize plant treatment and transmission costs.

Laramie River

Greeley owns 1/3 of the Laramie Poudre Tunnel Company, which yields about 1,100 acre-feet of water per year. The Tunnel water rights have been changed for municipal use and can be treated at Bellvue. Because they are transbasin rights, Greeley can reuse the water until extinction, usually through the reuse of effluent for augmentation demands. In addition, Greeley also owns a small interceptor ditch right in the Laramie River Basin that yields up to 300 acre-feet per year.

Terry Ranch

In 2021, the City added 1.2 million acre-feet of water to the City's vast water portfolio. Terry Ranch is an aquifer storage and recovery project that is currently not online. The City anticipates brining Terry Ranch online in two phases. First, aquifer recovery of native water from Terry Ranch will be utilized to supplement City's supplies during times of drought or emergencies. Second, aquifer storage will pump legally available excess water supplies to Terry Ranch and store the water for aquifer recovery during low water years.

1.2.2 Drought Planning

In January 2021, the Water and Sewer Department updated its 15-year-old Drought Emergency Plan. Water conservation techniques and programs—like the Water Budget for single-family residential customers—have made Greeley citizens more efficient. To create equity among Greeley's customers, minimize impacts to landscapes, and minimize financial impacts to citizens and the water utility, the Drought Emergency Plan allows flexibility to modify the measures it puts in place based on evolving drought conditions and the degree of success achieved in reducing water by its citizens.

Under average weather conditions, about one-half of the total annual water use by Greeley's customers is for outdoor irrigation (including non-potable deliveries for irrigating parks, schools and other large outdoor areas). Absent intentional measures to reduce demand, outdoor water use increases to about 55% of annual use under hot and dry conditions. During the peak irrigation season from June through September, outdoor water use typically makes up about 70% of total use. That percentage increases under hot and dry conditions.

Greeley has successfully navigated previous droughts, including the most severe drought during the past few decades which was experienced in 2001-2003. To maintain sufficient water supplies in storage to guard against the potential for sever and prolong droughts, current target storage is at 21,300 AF and will be re-evaluated regularly. With C-BT as the single largest component of Greeley's water supply, yields are determined annually by the quota set by the Northern Colorado Water Conservancy District which manages the C-BT project.

Each April, shortly after the C-BT quota for the year has been established, Greeley's Water Resources staff will project the storage volume that will be available on April 1st of the following year under "conservative" assumptions of high outdoor irrigation demands from Greeley's customers (as has been typical under hot and dry conditions during years such as 2002 and 2012) and low yields from Greeley's water supplies. Based on that projection, Greeley will declare an adequate water year, or a drought under one of four potential levels. This process is summarized in Figure 3. Water savings goals for each potential drought level are:

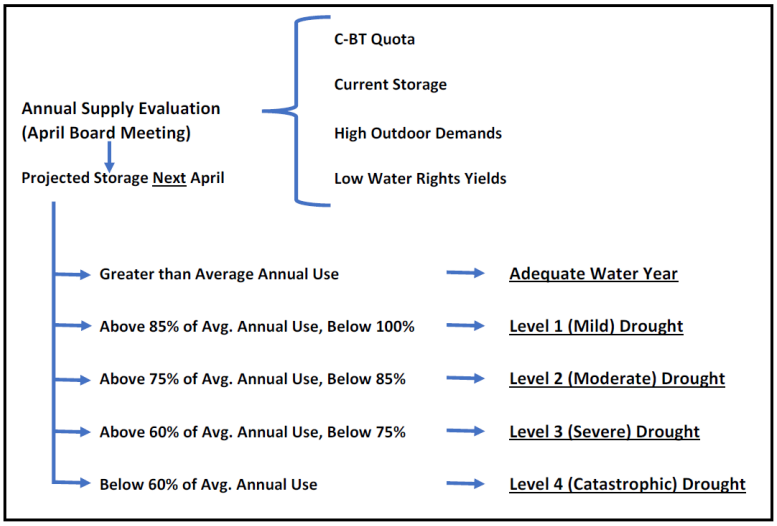


Figure 3: Annual Greeley Water Supply Evaluation and Drought Declaration Process

Greeley may also decide to declare a mild drought and invoke the drought response measures discussed later in this plan if other adverse events that affect Greeley's water supplies (for example if wildfires affect the watersheds that Greeley relies on), or in times when a regional drought response in Northern Colorado is deemed appropriate by the Greeley's Water and Sewer Board.

Drought response and restrictions are for outdoor irrigation use only. The following Table identifies Greeley's recommended response measures for water budgets and landscape restriction for each of the potential drought levels.

Table 1: Greeley Drought Response Measures

GREELEY DROUGHT RESPONSE PROGRAM 2020					
With a two year recovery period	**Adequate Yr**	**Mild**	**Moderate**	**Severe**	**Catastrophic**
LEVEL OF RESPONSE	no drought	1	2	3	4
Target Storage	100%	85% to 99%	75% to 84%	60% to 74%	Less than 60%
Target Reduction (outdoor)	0%	15%	25%	50%	70%
Target Storage (in AF)	21,300	18,100	16,000	12,800	10,700
Annual Outdoor Reduction Goal	normal conservation	1,530	2,560	5,130	7,170
MEASURES					
Water Budget and Restrictions					
Single Family Residential on Water Budget		15%	25%	50%	70%
Proposed Water Budget Reduction	0%	15%	25%	50%	70%
Recommended Schedule Suggested Days		max 3 days/week	2 days/week	1 day/week	
Multi Family & HOA Not on Water Budget	mand. 3/wk	max 3 days/week	2 days/week	1 day/week	no watering
Reductions in Use	0%	15%	25%	50%	70%
Commercial Industrial Institutional (ICI)	mand. 3/wk	3 days/week	2 days/week	1 day/week	no watering
Reduction on Landscape Water Same as SFR	Normal conservation	15%	25%	50%	70%
Restrictions Landscape (Non Water Budget)					
Lawns/Turf	set day /week 3 days/week	no irrigation until May1 or after Sept. 30	irrigation May-Oct; 1"/week	no watering in July; let go dormant	no watering June 15-Aug 15
Non-watering Hours	10am-6pm	10am-6pm	10am-6pm	8am-8pm	8am-8pm
Installing New Lawns & Watering Permits	yes w/soil prep	yes w/soil prep	not June-Aug	not June-Aug	none
Multi Family	3 days/week	3 days/week	2 days/week	1 day/week	no watering
Large Properties with > 4 acres of Turf Need to Submit a Water Budget to Get a Watering Variance	3 days/week	1.5"/week WB	1.0"/week WB	only enough to keep it alive	not allowed
Trees and Shrubs		on days or drip or by hand			
Vegetable Gardens		on days or drip or by hand			
Flower Gardens		on days or drip or by hand			
Non Potable Ditch Water (city system)		follow restrictions or restrictions due to delivery			
Non Potable Ditch Water (private)		cannot regulate			
Well Water		cannot regulate			

GREELEY DROUGHT RESPONSE PROGRAM 2020					
With a Two Year Recovery Period	**Adequate Yr**	**Mild**	**Moderate**	**Severe**	**Catastrophic**
LEVEL OF RESPONSE	No drought	1	2	3	4
Other outdoor Uses (hosing and washing)					
Home Car Washing	with BMPs and no runoff	bucket & shut off	bucket & shut off	commercial car wash	commercial car wash
Frequency		1x/week	1x/month	not allowed	not allowed
Washing Sidewalks, Driveways, Garages or Other Pavement		prohibited except for health or safety			not allowed
Siding on Houses, Patios, Decks		only in prep. for painting/staining 1 x per year with power washer			not allowed
Fleet Washing at Auto Dealerships/Mobile		1x/week	1x/month	not allowed	not allowed
Car Washes -Fundraising		prohibited except at commmercial carwashes			
Commercial/restaurant/fast food					
Drive Thru/Sidewalk		prohibited except for health or safety			only with a bucket & broom
Parking Lot		prohibited			
Fountains/Ponds/Pools/Spas					
Water Fountains (w/o fish)		unrestricted	no topping off	no water	no water
Public		unrestricted	no topping off	no water	no water
Private		unrestricted	unrestricted	no topping off	no topping off
Ponds with Fish or Plants		unrestricted	unrestricted	unrestricted	topping only to preserve fish
Swimming Pools and Spa's Private		unrestricted	Unrestricted	not allowed	not allowed
Semi-Private Neighborhoods		unrestricted	Unrestricted	not allowed	not allowed
City Pools		unrestricted	Unrestricted	no topping off	no topping off
City Uses					
City Parks /Athletic Fields		water budget	water budget cut	prioritize athletic fields only	
Golf Courses		10-20% cut back	10-20% cut back no watering roughs	max 1"/wk for tees and greens only	max 1"/wk for tees and greens only
City Facilities & Around Buildings		3 days/wk	2 days/week	1 day/week	no watering
Street Cleaning/Parking Lots with Trucks		unrestricted	unrestricted	restricted to essential situations	
Hydrant Flushing & Testing		unrestricted	limited to critical situations		
Washing Fleet Vehicles & Mobile Washers		1 x /week	every other week	1 x /month	none

One of the most important elements of any drought response plan is timely and effective communication with citizens to explain the situation and motivate the necessary changes in water use behavior. Improved technology, social media, and the customer WaterSmart portal portrays additional avenues for reaching and educating citizens. Figure 4 summarizes key messages for each of Greeley's customer groups from the 2021 *Greeley Drought Emergency Plan.*

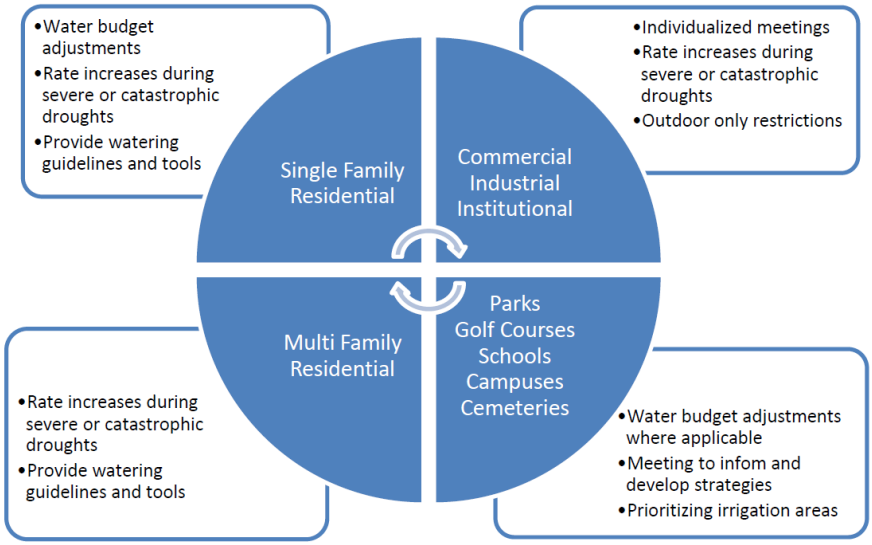


Figure 4: Summary of drought messaging strategies for Greeley's different customer groups.

1.3 SUPPLY-SIDE LIMITATION AND FUTURE NEEDS

As part of Greeley's long-term water efficiency planning process, future water demands come from both potable water (treated drinking water) and non-potable water (raw water). Using the *2021 Non-Potable Master Plan*, the City planned a 5-year and 20-year capital improvement projects planning horizons which align with the years 2025 and 2040. Buildout timeframe will vary depending on multiple factors and therefore, a year is not provided.

It is worth noting that water conservation methods, such as improved landscaping practices and the encouragement and adoption of non-potable water for irrigation, may help reduce the City's annual water demands. Conditions will change with time, and uncertainties will impact the accuracy of total water demands. With the best current information from the *BBC Research & Consulting 2018 report*, water demands at buildout are presented in Table 2.

Table 2: Annual Demand Projections at Buildout

Demand	Total Water Demand (AFY)[1]
Existing	30,500
Future Demands	43,800
TOTAL	**74,300**

[1] AFY= acre-feet per year

This WEP encompasses current plans and reports from the Greeley's Water and Sewer Department—since water efficiency is connected to multiple divisions. These include:

- *Imagine Greeley Comprehensive Plan, February 2018*
- *Greeley Non-Potable Water Master Plan, June 2021*
- *Greeley Water Transmission and Distribution Master Plan, June 2021*
- *Greeley Integrated Water Resources Plan, draft 2022*
- *Greeley Drought Emergency Plan, January 2021*
- *Enhancing Greeley's Water Efficiency Portfolio through Performance Analysis, May 2022*

The City is currently updating its *Water Supply Master Plan* through a process termed *Integrated Water Resource Plan* (IWRP) and is scheduled to be completed the end of 2022. The IWRP process will evaluate Greeley's long-term water supply sustainability, develop a road map to buildout and identify near-term capital improvement projects while incorporating future risk and uncertainty. The vision of the IWRP is to produce "an actionable and adaptive master plan for Greeley's water resources that uses modern defensible methods to develop a roadmap ensuring a reliable water support for our community through an uncertain future". Accordingly, the City will identify level of service goals that will act as guard rails to assist in planning to meet community standards.

As part the process, the IWRP will evaluate a suite of future conditions to plan for called "planning scenarios". These scenarios define key components of future conditions such as the state of Greeley's water supply system as mentioned above, demands, climates and other system risks. Once the planning scenarios are selected, near-term horizon projects will be identified to fill identified future supply gaps and meet level of service goals. Additionally, the IWRP will refine Greeley's understanding of the operations and sustainability of the Terry Ranch project, Greeley's identified long-term water supply project.

To allow flexibility with a focus on sustainability, a triple-bottom line (TBL) approach will be implemented in this WEP. This method allows measurable outcome for each category- community, prosperity, and water conservation management. TBL allows the water conservation team to adapt the general framework to the needs of different plans from multiple divisions, projects, policies (infrastructure investment or educational programs) or different customer classes (single family residential to commercial) by a case-by-case approach.

Future needs and challenges will always be present for water in the west. A summary of water supply limitations and future needs is shown in Table 3. This table is based on Worksheet A from the CWCB reporting criteria.

Table 3. Water supply challenges and future needs.

Future Needs/Challenges	Yes	No
System is in a designated critical water supply shortage area	X	
System experiences frequent water supply shortages and/or emergencies		X
System has substantial non-revenue water		X
Experiencing high rates of population and demand growth	X	
Planning substantial improvements or additions	X	
Increases to wastewater system capacity anticipated	X	
Need additional drought reserves		X

Drinking water quality issues	X	
Aging infrastructure in need of repair	X	
Issues with water pressure in portions of distribution system	X	

2.0 Water Demands and Historical Demand Management

It is critical to monitor and understand potable and non-potable water demands and which factors will impact the. This section of the WEP focuses on demographics, service area characteristics, water demand trends, and past, current and future demand management activities and forecasts.

2.1 DEMOGRAPHICS AND SERVICE AREA CHARACTERISTICS

Greeley was founded in 1870 as Union Colony, a utopian temperance colony at the confluence of the Cache la Poudre and South Platte Rivers. The first settlers were hand selected by Nathan Meeker after a passionate article the in New York Tribune requesting like-minded folks to settle the area.

Greeley is part of what Stephen Long called "The Great American Desert" because of the native vegetation of grasses and low shrubs. Earlier settlers focused on irrigation and agriculture, education, and religion. As in the past, agriculture remains a focus for Greeley with a large immigrant population. In the 1920's Greeley was making 25% of the nation's sugar from sugar beets, and leftovers were used to feed cattle. The cattle industry remains an important aspect of Greeley's culture and businesses.

Greeley is the business Center for Weld County, the county seat and the second largest community in Northern Colorado. The leading industries in Weld County have remained consistent and the top five are agriculture, manufacturing, energy production, health and Wellness, and business services. Greeley is the home to JBS USA, Leprino Foods Company, Noble Energy Inc., TTEC, Banner Health, UC Health and a complete spectrum of business associated with agribusiness, food production, business services, construction, energy, and water resources. The City of Greeley is committed to actively promoting the development of a progressive economy by creating opportunities to attract and grow target business and industry activities. Weld County is currently forecasted to grow faster than any other part of Colorado.

Demographics of Greeley are provided using the *2019 U.S. Census Bureau's American Community Survey* data (https://data.census.gov/cedsci). Greeley is a relatively young community with a median age of 32 years old. As a diverse community, languages spoken at home vary in Greeley with English (75%), Spanish (21%), Asian and Pacific Islander (1.1%), other Indo-European languages (0.8%), and other languages (1.2%). Median household income is $57,537 which is lower than the state average of $75,231. Poverty rates are around 15.8% for all ages in Greeley with 59.9% of the population is employed. Around 60% of all residents own their home and median rents costs $1,300 monthly. The average family size is 3.49 people per household.

2.2 HISTORICAL WATER DEMANDS

2021 Analysis of Meter Type and Billed Consumption

Greeley was one of the first Front Range communities to be fully metered and serves a wide variety of water customers. Most metered account are single family residences. Residential meters represent 82% of the total number of customer accounts. Many of these accounts use small amounts of water each month. For this reasons, residential accounts used only 32% of the total billed water in 2021. Commercial, industrial, and institutional (CII) meters made up 7% of the total number of accounts but many CII water users represent a large amount of water consumption. The direct use of non-potable water—raw water from the local irrigation ditches—has contributed to reduced per capita consumption. Non-potable water is use for landscape irrigation only for CII users, golf courses and internal City Parks.

Table 4: 2021 Water Demands by customer class and billed water use.

2021 Water Demands		
Customer Type	**Average Number of Accounts**	**Billed Water Use (gallons)**
Residential	23,202	2,870,282,000
Multi-family	2,221	1,013,071,000
CII *	2,040	2,569,134,000
Other	640	1,376,765,000
Irrigation-only non-potable	69	1,045,209,000
Total	**28,172**	**8,874,461,000**

**Commercial, Industrial, and Institutional accounts*

Water Use Patterns

Water use patterns vary greatly with each water customer Greeley serves. From personal homes, businesses and large landscapes, water use widely changes. This water use diversity is driven by a wide range of factors, some of which can be mitigated through education, behavioral or technical changes.

Residential household water patterns are relatively easy to compare due to the water budget that promotes and rewards water efficiency (more information on the water budget is presented in Section 4.3). However, comparing CII properties has proven to be more difficult. For example, trying to compare water use for a small coffee shop to a large office building or large industrial user is erroneous data.

Most notable is the water consumption use and altered behavioral patterns that occurred during the COVID-19 pandemic. On March 11, 2020, the world health organization declared COVID-19 a pandemic. Within a month of former President Trump declaring a nationwide emergency, Greeley began shutting

down to prevent the spread of COVID-19. The shutdown included school systems, businesses, and local governments.

Looking at the water consumption data in 2020, residential family household increased their daily water consumption by 37.4% from the previous year compared in April. With the pandemic, hygiene is a critical pathway for protections such as washing hands, showering, and washing clothes. In addition, stay at home orders or recommendations increased the frequency of toilet flushes per person. This pattern appeared to continue throughout the summer of 2020 with more residents finding sanctuary within their gardens and landscapes—defiant gardening.

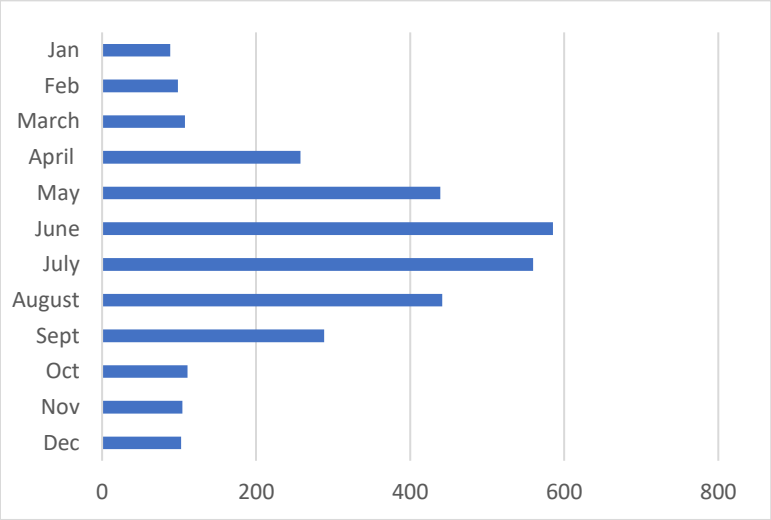


Figure 5: 2020 monthly water consumption (million gallons) single family residents.

Water consumption for CII customers varied greatly due to temporarily closed businesses, universities, schools, and changes in business practices because of the COVID-19 pandemic. March 2020's water consumption for CII customers decreased by 35.3% as compared to March in 2019 and was the lowest was water consumption since 2010 for the City.

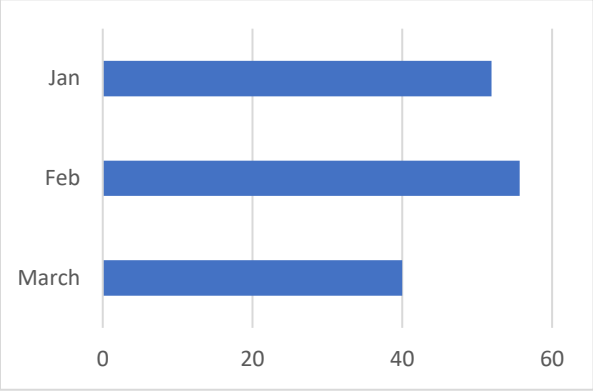


Figure 6: 2020 monthly water consumption in million gallons for CII customers

It is recommended any water use data in 2020 should be used with caution given the dramatic changes in a short period to time.

For residential users, in 2021 between 75 to 95% of households were careful with their monthly water use and stayed within their water budgets. Throughout time in Greeley, automatic irrigation systems have been installed making it easier to use water. For that reason, households using automatic irrigation systems often have higher consumption patterns. Irrigation systems can be confusing to use or typically

the irrigation controller is set once and forgotten. Greeley has several strategies to address irrigation inefficiencies through better management of irrigation schedules and reducing the peak water demands during the irrigation season.

Using a 12-year period, single family residential water demands are 37% outdoor use versus 63% indoor use (Figure 7). Outdoor use is dependent on weather patterns and pandemics. Over the years, a consistent development pattern is noted that single-family residential parcels continue to decrease in size over the years.

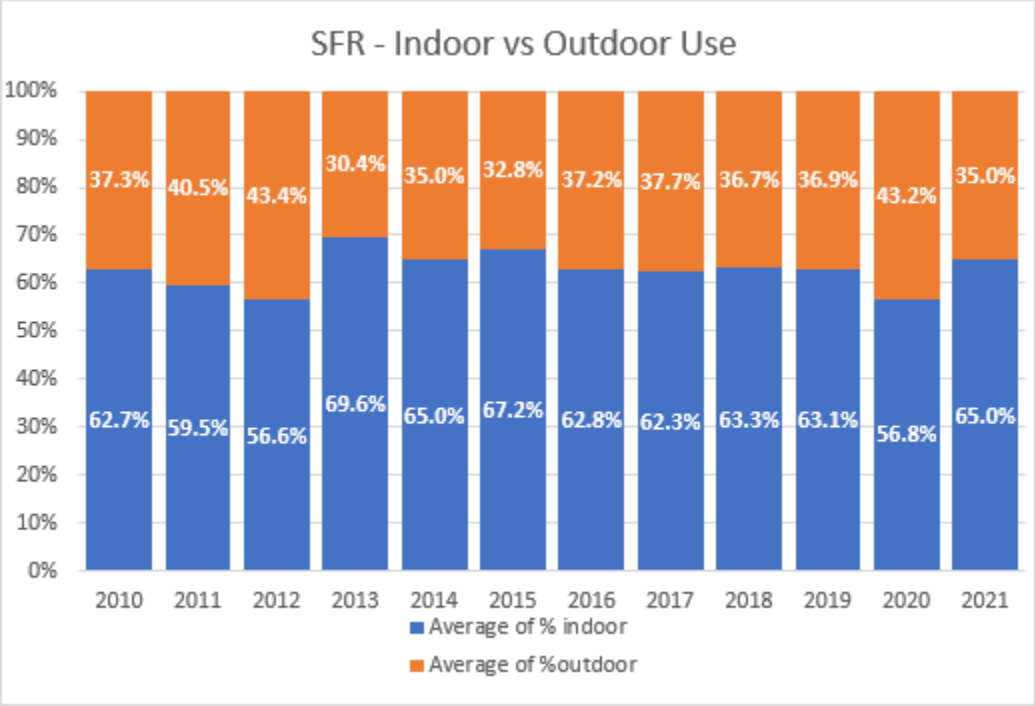
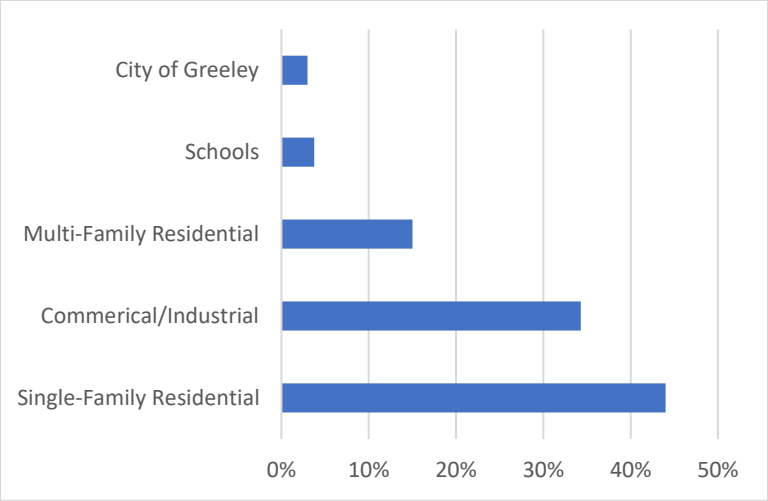


Figure 7: Single family residential indoor versus outdoor water use for Greeley

Baseline Water Use

Based on the five-year rolling average, total water demand is approximately 82% within Greeley and the remainder is associated with customers located outside of Greeley. A majority of accounts are composed of residents (82%) with the remainder comprised of commercial, industrial, parks, golf course, and schools. Thirty-seven percent of residential water use goes to landscaping; therefore, residential use shows a strong seasonal variation with nearly 75% of the of the total City annual use occurring between May and October.



In-City treated water use customer type is shown in Figure 8. Using a 10-year rolling average, residential demand is the highest (44%) followed by Commercial/Industrial users (33%). This distribution of customer types is common in the Front Range.

Figure 8: Percentage of In-City Potable Demand by Land Use Types 10-year rolling average.

Looking at 2021 treated water consumption, the top key accounts for annual potable water use within Greeley are:

- Food Manufacturing
- Beef processing
- Manufacturing
- Universities
- Public Schools

Figure 9 shows a 10% reduction in per capita residential demand, dropping from 119 gallons per capita per day (GPCD) in 2012 to 107 GPCD in 2021. Due to variations in precipitation, populations densities and landscaping, Greeley does not compare GPCD to other communities to assess water use and the effectiveness of its conservation programs. Greeley uses GPCD as an internal comparison to demonstrate use reductions.

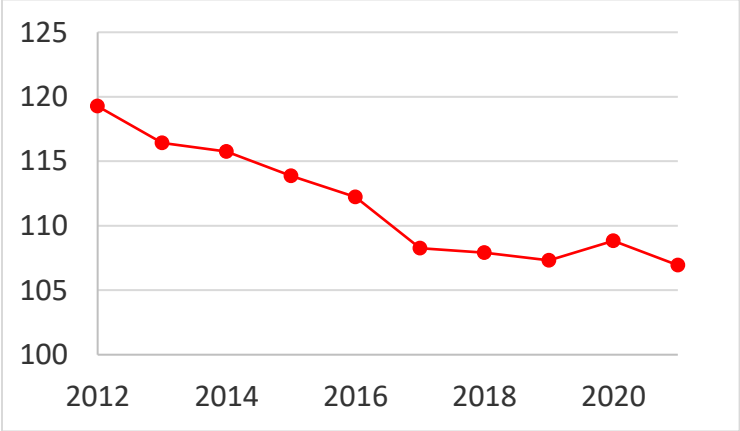


Figure 9: Residential water use from 2012-2021 in GPCD

Although Greeley's population has grown by approximately 17%, per capita, demand has decreased by 11% as noted in Figure 10. This overall declining trend in system wide per capita demand is from single family residents. Replacement and retrofits of new high efficiency toilets, showerheads, washing machines, and dishwashers has led to less water use than previous older models. (Figure 9). Existing residential homes have more than offset the increase in demand from newer builds and business for almost 20-years.

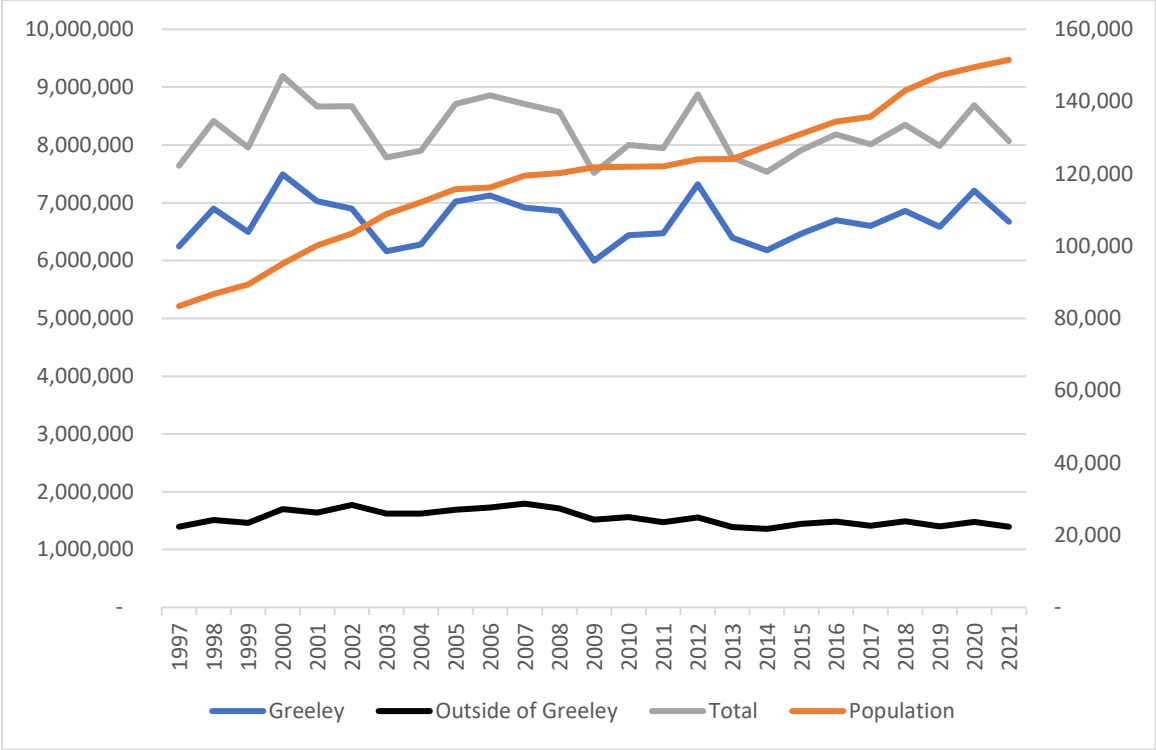


Figure 10: System wide water use from 1997-2021 in thousand gallons per capita per day (left-axis) and population growth (right-axis)

System wide water uses will change throughout time and are dependent on factors like economic conditions, new construction, outside and CII end users, and land development patterns. The City will continue to monitor changes to optimize water conservation planning and implementation.

SYSTEM WATER LOSSES

An annual water audit and loss control report was completed in 2021 using the methodology prescribed by the *American Water Works Association M36 manual*. The results have shown that there are two primary categories for losses in Greeley: real and apparent. The real losses include physical losses of water either through leakage or theft, while apparent losses were found in systematic data handling errors and unauthorized consumption. Real losses have been estimated at 5% and apparent losses at 0.5%. Greeley is committed to its water loss control, detection and maintenance system and will continue to strive to maintain exceptional system efficiency.

Currently, Greeley's annual water demand on a rolling, five-year average is 7,997,513,000 gallons or 24,543.43 acre-feet. Sources of water loss include:

- Water seeping into soils surrounding distribution and customer piping
- Runoff from overwatering, which seeps into surrounding soils and eventually enters the South Platte River alluvial aquifer.
- Building sources, such as leaking toilets, which ends up in the City's wastewater collection/treatment system.

System wide water main leak detection is done on an on-going basis. The goal of the Leak Detection Program is to survey around 30 miles or 6% of existing older water mains per year. Water crews utilizes the latest wireless technology with a SEBA KMT GT-3 series of leak detection equipment. This system transmits data collected by noise and pressure loggers through the main water lines in real-time. Once leaks are identified and authenticated, crews begin repairs. In addition, Water crews respond to reported leaks and make necessary repairs in a timely manner.

Starting on July 2020, the City of Greeley has been replacing older water meters with Advanced Metering Infrastructure (AMI) as part of its water conservation program. The AMI Project demonstrates the City's ongoing commitment to honor the call to water stewardship. As of March 2022, over 11,763 AMI meters have been installed.

Greeley has documented both quantifiable water savings and improved water demand management as more AMI smart meters replace existing outdated standard volumetric meters. With this near real-time data communication and notification system, the City now has the capability to mitigate water leaks and losses, educate customers on how to reduce water usage, and help control water consumption during water emergencies, shortages, and droughts. By having access to daily meter readings (rather than once-per-month readings), the City has and will continue to reduce non-revenue producing water by a significant amount.

ANNUAL PEAK DAY DEMANDS

The water use peak day for each year typically occurs, though not always, during July in Greeley. The overall water system, including treatment, transmission, and distribution, must be able to meet the peak day of use. Daily production and peaking factors for Greeley's two water treatment plants (Bellvue and Boyd) are represented in Table 5 from 2015-2019.

Table 5: Daily Production Summary and Peaking Factors for Greeley's Water Treatment Plants (2021 Water Transmission and Distribution Master Plan Appendix A)

Production (MGD)				Peaking Factor (PF)		
Year	Average Day	Peak Month (average Day July)	Max Day	Peak Month/Average Day	Max Day/Average Day	Max Day/Peak Month
2015	21.75	38.28	44.00	1.76	2.02	1.15
2016	23.32	42.49	49.90	1.82	2.14	1.17
2017	23.19	40.86	46.12	1.76	1.99	1.13
2018	19.81	32.31	41.58	1.63	2.10	1.29
2019	18.52	29.93	38.49	1.62	2.08	1.29

All production values are in million gallons per day (MGD) units and peaking factors are ratios of these values. 2016 was the year of highest average and maximum day productions and includes the highest peak month production during the 5-year period of record. However, peaking factors are relatively consistent across the 5-year period of record.

2.3 PAST AND CURRENT DEMAND MANAGEMENT ACTIVITIES

In Greeley's 2008 Water Conservation Plan (WCP), a goal was established of reducing demand by 8.2% or 3,300 acre-ft of cumulative water savings from 2010-2030 directly through its conservation programs. To achieve that original goal, a net impact of 144 years acre-feet per year, every year until 2030 would need to be achieved. In Greeley's 2017 WCP, at goal was established of reducing demand by 9.3% from 2015-2035 through its conservation programs. To achieve the 2017 goal, a new impact of 156 acre-feet per year, every year until 2035 would need to be accomplished.

As shown in Figure 11, actual water saving exceeded the yearly goal of 156 acre-feet per year. In fact, by the end of 2021, Greeley had achieved total cumulative conservation savings of more than 2,555 acre-feet since 2010. That is approximately 77% of the 3,300 acre-feet 2017 goal has been completed by 2021.

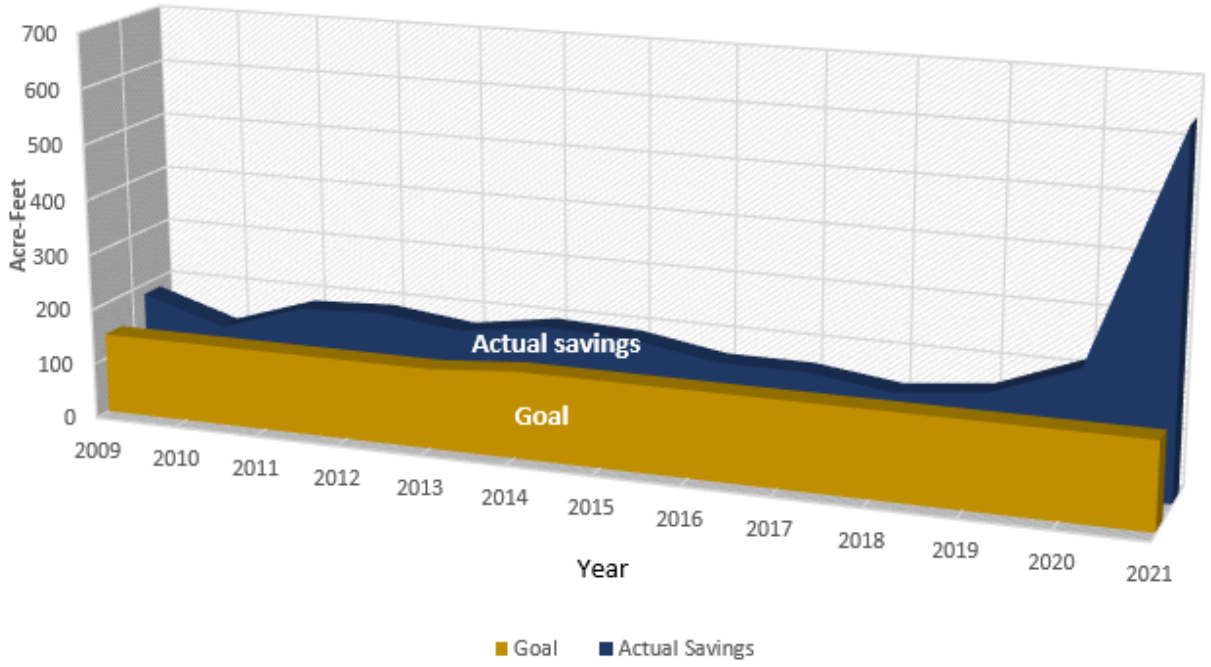


Figure 11- 2009-2021 Water Use Efficiency Plan Saving

CURRENT DEMAND MANAGEMENT ACTIVITIES

A list of current demand management activities and year of initiation is represented in Table 6. Over time programs and activities have changed from the 2017 WCP or were developed after the 2017 WCP and are a result of needs, technology, resources, and opportunities. A complete description of these programs can be found in Section 4.3

Table 6: Current demand management activities

Program Area	Date Initiated
Ordinance No. 65 restricted the time-of-day outdoor watering could occur	1893
Mandatory watering restrictions (3 days per week- no watering from noon to 5 p.m.)	1907
Water Loss Control Program	Mid 1990s
Metering	Mid 1990s
Xeriscape Grants	1997
Landscape Lecture Series	1997
Speakers Bureau	1997
Water-Related Facility Tours	1997
Xeriscape Education	1997
Outdoor Irrigation Audits	1999
Weather Sensor Installation for audit customers	2002
Sod/Establishment Variances (and soil amendment requirement)	2002
Indoor Water Audits	2006
Commercial Water Audits	2006
Irrigation Rebates	2006
Commercial Rebates	2006
Irrigation Controller Programming	2006
Toilet Rebates	2006
Clothes Washer Rebate	2006
Discounted Garden in a Box kits	2012
WaterSmart Portal and Home Reports	2013
Showerhead Exchanges	2013
Teacher Training	2013
Faucet Aerator Installation for Audit Customers	2013
Online Plant Database	2015
Tiered Rates	2017
Water Budget (residential customers)	2017
Professional Landscape Certification Rebates	2017
Life After Lawn, formerly known as Cash for Grass	2018
Discounted Compost Bins	2018
Discounted Rain Barrels	2018
Leak Detection with advance metering infrastructure	2020

Spatial trends in water conservation program participation indicate that the Water Conservation team has been highly expansive and affective (Figure 12). With the use of spatial analysis, the Water Conservation Program will continue targeting outreach around specific programs and Greeley's social-economic diversity.

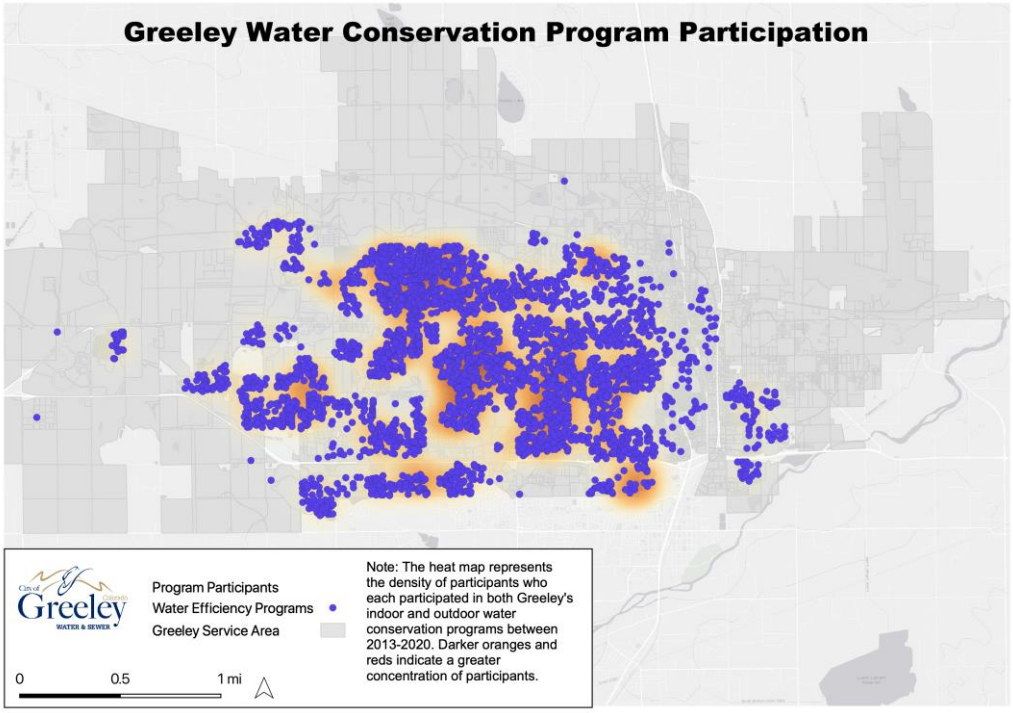


Figure 12. Greeley Water Conservation Program participation form 2013-2020.

Past and Current Land Use Activities

Greeley introduced its first lawn watering restrictions in 1907 and imposed fines for violations.[2] At the time, the City's population numbered no more than 8,000, and in a remarkable feat of conservation continuity, those first rules still apply today to nearly 108,000 citizens. For example, daily lawn watering and watering during the heat of the day is forbidden. Greeley's lawn watering restrictions (the minimum applicable every year) are shown in Table 9.

Table 9. Greeley Mandatory (Adequate Year) Watering Restrictions Schedule

Watering Periods	Single Family residences on a Water Budget	Single Family residences and duplex with even numbered addresses ending in: 0,2,4,6,8 and not on a water budget	Single Family residences and duplex with odd numbered addresses ending in: 1,3,5,7,9 and not on a water budget	All others: CII, homeowner association common areas, multi-family residences, government, non-profit, places of worship.
Jan 1st - April 14th	No Lawn Watering	No Lawn Watering	No Lawn Watering	No Lawn Watering
April 15th- August 31st.	Stay within their water budget. No watering from 10 am to 6 pm	Sunday, Tuesday, Thursday. No watering from 10 am to 6 pm	Monday, Wednesday, Saturday. No watering from 10 am to 6 pm	No watering from 10 am to 6 pm

2 A 1908 Greeley Tribune article reports "eight or nine prominent Greeley" citizens complained that their fines for sprinkling out of hours should go to the water works fund, not to the Police Magistrate.

City ordinance establishes the following water restrictions in Greeley:

- Waste of water is prohibited at any time.
- Sprinkler irrigation shall not occur between 10:00 a.m. and 6:00 p.m. from May through August even when water supplies are adequate.
- Drip irrigation, low-volume spray or bubbling sprinklers, hose-end sprinklers and weeping type soaker hoses are allowed to water trees, shrubs or flower beds at any time.
- Hand-watering of vegetables and flower gardens, trees and shrubs and individual brown spots in a lawn is allowed at any time, so long as water waste does not occur. Hand-watering means holding in the hand a hose with attached positive shutoff nozzle and does not include operating a hose with a sprinkler or manually operating an irrigation controller.
- Except during time of adequate water supply, hand-watering to clean hard surfaces such as driveways and parking lots is prohibited. Hand watering to clean property, such as roof gutters, eaves, windows or in preparation for painting, is allowed as long as water waste does not occur.
- Public organizations. The use of water for sprinkling lawns, gardens and trees on the grounds of public organizations, public parks and public golf courses served by the city water system will be permitted at any time with written variance from the director of water and sewer

When landscaping a new home or planting seed or sod in an established yard, Greeley residents must get a variance to water during restricted periods. Greeley also requires residents to prepare the soil with compost (organic matter) before receiving a variance. Under a 2002 City ordinance, new lawns require proof of adequate compost. The program has the following rules:

- Sod and compost receipts must be provided to the City to verify the installation.
- Four cubic yards of compost must be used for every 1,000 square feet of sod put down.
- The compost must be rototilled, and the property owner must provide photos or tiller rental receipts as proof.
- City employees check to verify the new lawn and compost.
- The property owner must post a variance notice when the off-hour irrigation is occurring.

Greeley is also actively working with the City of Evans and City of Windsor (two of our wholesale customers) to incorporate water planning into land use planning as these adjoining cities are linked through economies, land, agriculture, and resources.

Planned Land Use Activities

On December 15, 2015, the City of Greeley adopted the *Landscape Policy Plan for Water Efficiency* (LPPWE) was intended to be a sub-element of the Greeley 2060 Comprehensive Plan. The LPPWE is a cooperative planning project with the City's:

- Manager's Office
- Water and Sewer Department
- Culture, Parks and Recreation Department
- Community Development Department

LPPWE provides the foundation and detailed goals and policies for the City to further advance efforts in the areas of education, regulation, and incentives which maintains Greeley's existing quality landscape and urban forest. The Water Conservation team has met the specific goals

outlined that provided adequate information, training and examples of water efficient landscapes that enable the design, installation and maintenance of quality landscapes that use landscape water efficiently.

To boost land use activities around water conservation, the City of Greeley and Evans participated in 2019 *Growing Water Smart*, a joint program of the Sonoran Institute and Lincoln Institute of Land Policy's Babbitt Center to integrate land use and water planning at the community level. Greeley and the City of Evans are leveraging our relationships and providing values to our water customers by joining water conservations participation and marketing strategies. To continue collaboration, Greeley is participating with Evans' 2022 Growing Water Smart Metrics to show value of Evans' Water Efficiency Plan implementation process.

As part of the 2019 *Growing Water Smart*, synergies between City's Community Development and Water and Sewer leverages landscape codes to provide lasting water conservation values to Greeley. On October 1, 2021, City Council approved the adoption of a new development code that included planned landscape use and irrigation activities. Because of these code revisions, in the Fall of 2021, the City of Greeley was recognized by the American Planning Association, Colorado Chapter for "promoting health, equity, and community engagement through land use code language."

With the revised code in 2021, the Water and Sewer Department embarked in creating two criteria for water conservation. These Criteria include 1) *Landscape and Irrigation Criteria* and 2) *Non-potable Irrigation System Design Criteria.* These two Criteria will be adopted within the Engineering's Design Criteria update in the Fall of 2022.

The *Landscape and Irrigation Criteria* is intended to provide information for the design, review, installation and maintenance of landscape and irrigation systems within the City of Greeley to promote the efficient use of water and the reduction of water waste through best management practices.

These Criteria focuses on new development for:

- Civic and Open spaces
- Common areas for all customer classes (outlots, pocket parks, usable detention, private/on-lot required/usable areas)
- Right-of-ways
- Municipal buildings
- Multi-family residential
- Non-residential (institutional, commercial, and industrial)

Adoption of the *Landscape and Irrigation Criteria* is set for Fall of 2022 after following public participation and engagement sessions. Water Conservation and Community Development are working together to ensure processes are in place for communications regarding land-use development and water conservation practices.

The *Non-potable Irrigation System Design Criteria* is part of the Non-Potable Master Plan which is to expand the non-potable water system and reduce the use of potable water for irrigation purposes and improve irrigation practices, which is key to the City's long-term water conservation plan. The City uses non-potable water to irrigate both public and private property throughout the City. The City has a preexisting network of irrigation ditches for supplying source water for irrigation purposes.

2.4 DEMAND FORECAST

Greeley is the 12th largest city in Colorado and has developed into cultural and academic hub, hosting educational institutions such as the University of Northern Colorado (UNC) and Aims Community College. The City offers an affordable cost of living with many options for housing and economic growth. The City's population grew from 20,354 in 1950 to an estimated 108,175 in 2019. The City continuous to experience strong population growth through both infill and expansion of residential, industrial and commercial development within the City's defined service area.

To plan for the water needs of the City, current and future demands on the system were analyzed to help determine what steps the City should take to ensure that sufficient supply is available. Details on methodology for projecting future water demands for the water transmission and distribution system hydraulic model (water model) can be found in the *2021 Greeley Water Transmission and Distribution Master Plan.*

The City's Long-Range Expected Growth Area (LREGA) is the area where it plans to provide water services. The future population, and resulting demands, that were distributed over the LREGA for each planning horizon used the "middle" projection from the *City of Greeley Population and Water Demand Projections* (2018 BBC Research & Consulting and 2021 Greeley Non-Potable Master Plan), referred to as the BBC report, as shown in Figure 13. Because the 2075 projection does not represent the buildout year for the City within the LREGA boundary, a buildout population was extrapolated using planning data and factors.

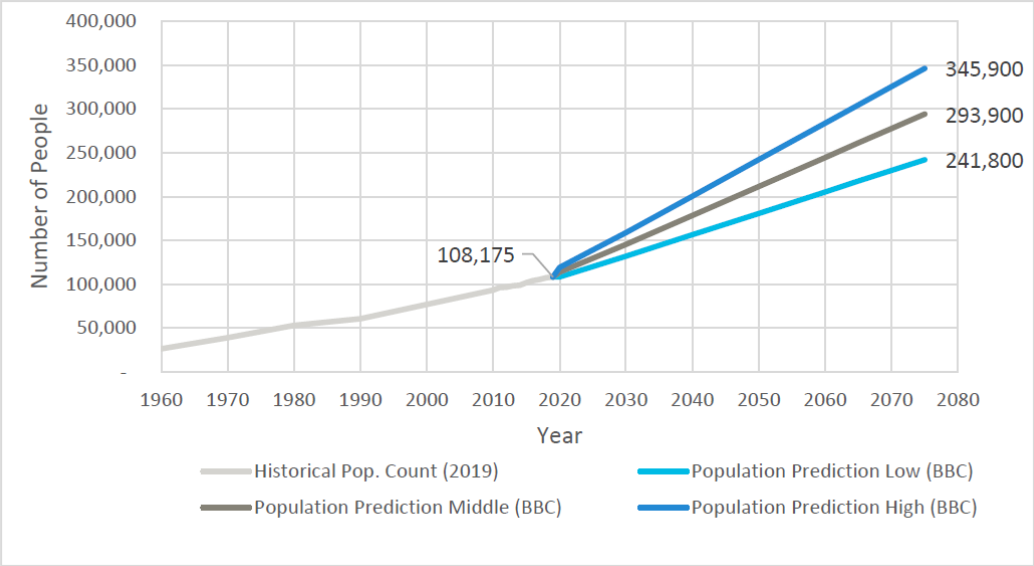


Figure 13: Historical and Projected Population Growth for Greeley

Water demands were determined using four planning horizons that were developed for existing, 2025, 2040 and buildout. Demand scenarios with all water and with non-potable irrigation are incorporated into future model to plan for sufficient system capacity at all planning horizons. The projected demands are future peak month (summer) water demands that come directly from water use and follow a diurnal pattern with a peaking factor for both residential and nonresidential demands. Table 7 focuses on infrastructure needs based on peak summer demands.

Table 7. Peak Mouth Demand Projections by Planning Horizon (2021 Water Transmission & Distribution Master Plan 2-27)

Projection Tier	Acres	Population	Residential Demand (MGD)	Nonresidential Demand (MGD)	Total Demand (MGD)
Existing	11,883	107,146	N/A	N/A	46.0
2025	15,116	128,458	2.4	2.1	50.5
2040	29,467	179,430	8.2	5.5	59.7
Buildout	44,914	425,271	35.9	20.4	102.4

Wholistically, it important for the City of plan on total annual water demands through buildout. Bear in mind, that water conservation methods listed in this Plan will help reduce the City's annual water demands. Conditions will change with time and uncertainties will impact the accuracy of total water demands. With the best current information from the *BBC Research & Consulting 2018 report* and the *2021 Water Transmission and Distribution Master Plan*, water demands at buildout are presented below:

Table 8. Annual Demand Projections at Buildout (2021 Water Transmission & Distribution Master Plan, ES-17)

Demand	Total Water Demand (AFY)	Potable Water Demand (AFY)	Non-potable Water Demand (AFY)
Existing	30,500	28,600	1,900
Future Demands	33,500	28,300	5,200
New High Industrial Users (theoretically)	10,300	10,300	0
Total	74,300	67,200	7,100

3 Integrated Planning and Water Efficiency Benefits and Goals

3.1 WATER EFFICIENCY AND WATER SUPPLY PLANNING

As previously discussed, the City is currently updating its water supply master plan with an IWRP. In step with the vision of the IWRP, the City is integrating a suite of approaches to secure the sustainability and reliability of future water supplies. The process calls for the development of key system performance metrics and level of service goals. Performance metrics are quantitative features used to evaluate performance of the water supply system, whereas level of service goals help define acceptable system performance and are often related to policy decisions. Subsequently, the City will identify risks and uncertainties to which the Greeley water supply system may be susceptible to, prioritizing those most pertinent to the system. These decisions will precipitate the development of Planning Scenarios that describe the future conditions the City will plan for. Once scenarios are developed, the City will develop water resource alternatives that fill identified supply gaps and meet level of service goals.

Goals for the IWRP include:

- Creating a short term (5-10 year) critical infrastructure project plan
- An actionable water resources strategy including the approach to future water acquisition, conservation efforts and watershed protection activities

- Actionable operation strategy for the timing and integration of the Terry Ranch ASR project.

The Water Conservation Team acts as part of the IWRP process by assisting to define key system performance metrics and setting level of service goals; identifying system risks and uncertainties; and selecting water resource alternatives. The IWRP is scheduled to be complete in December of 2022. Water efficiency is an integral piece of planning for water supply reliability and resilience. The IWRP expects that Greeley as a community will continue to act with water smart values to lessen system vulnerabilities in drought and non-drought conditions.

3.2 WATER EFFICIENCY GOALS

The water efficiency goals are to provide Greeley's community with tool and resources for sustainable water conservation practices utilizing customer service, education, and technology. The City used a triple bottom line (TBL) approach that will transform Greeley's water conservation efforts to a more sustainable future. TBL offers water efficiency goals to be optimized, innovated, and improve water efficiencies across multiple divisions within Greeley. The water efficiency is centered around a sustainable water future that revolves around Greeley's community, prosperity, and water conservation management. For the City, TBL means creating an optimal mix of water efficiency, cost effectiveness and community first in daily Water Conservation operations.

This Plan is designed to support the five core values for Water Conservation:

- Drive water conservation through innovation and technology
- Provide excellent customer service
- Continue and build on Greeley's water conservation history
- Commit to sustainability and environmental stewardship
- Fulfill future customer needs and changing values

Through WEP implementation, the goal is to reduce total water demand by 2,034 acre-feet of water savings by 2030. To accomplish our water efficiency goals, TBL will be used to evaluate our performance and make data-informed priorities and decisions. Table below represent a 7-year scorecard to track progress and provide accountability and transparency within Water Conservation. The 7-year scorecard is used as a guidance for the Water Conservation team, to document multi-year goals and to evaluate resource allocations. To guide, measure and track progress, an Annual Scorecard is developed and will be presented to the Water Board annually. The 7-year scorecard is centered by sustainability through community, prosperity and water conservation management.

Community	Performance Indicators	Status	Resources Allocation
Education- Lecture and Presentations	▪ Educational awareness of methods for water conservation. ▪ Community outreach and engagement for classrooms, civic clubs, and other groups. ▪ Work to enhance cohesiveness of presentations and water related topics.	Ongoing	▪ Staff Time- Full time person assigned to Water Conservation Administration ▪ Guest speakers ▪ Educational materials ▪ Marketing
Education-Teacher Training	▪ Provide teachers credits for water and conservation issues for local teachers ▪ Correlate material within lesson plans towards water resources	Ongoing	▪ Staff Time- Full time person assigned to Water Conservation Administration and Water Conservation Specialist ▪ Educational materials (models, lesson plans, etc.) ▪ Credits and Transportation
Education- Tours	▪ Provide the public with opportunities to tour Water facilities including the Water-wise gardens.	Ongoing	▪ Staff Time- Full time person assigned. ▪ Educational Materials ▪ Hand-on demonstration ▪ Transportation
Online Water Efficiency Tools	▪ Maintenance and updates to current online tools. ▪ Contract agreements and associated budgets. ▪ Ensure tools are customer friendly and provide accurate information.	Ongoing	▪ Staff Time- Full time water conservation assigned. ▪ Legal for contract agreements. ▪ Internal Departments- IT and Communications and Engagement.
Technology and Innovation	▪ Survey to evaluate program outreaches and more effective communication strategies. ▪ Use data-based information to construct a more effective outreach strategy. ▪ Explore methods to engage all sectors of the community and embrace diversity.	New (2021)	▪ Staff Time- Full time person assigned to Water Conservation Manager and Administration ▪ Survey materials ▪ Open Forums ▪ Marketing
Strategic Marketing Plan	▪ Create quarterly plans to support objectives of the water conservation program related to marketing strategies. ▪ Quarterly report on progress on all strategic briefs including budget allocation will be created. ▪ Alignment of other city public relations strategic planning with Water Conservation	Ongoing	▪ Staff Time- Full time person assigned to Water Conservation Manager, Water Conservation Administration and Community Engagement Department ▪ Budgeting
Collaboration	▪ Continue to leverage community and professional partnerships through guidance and reducing barriers. ▪ Outreach to community businesses, non-profits, irrigation and landscape industries, etc. to create partnerships and methodology for water savings. ▪ Tap into the Water-Energy nexus. ▪ Pilot projects- testing new ideas based on data.	Ongoing and New	▪ Staff Time- Full time person assigned to Water Conservation Manager, Water Conservation Administration and Water Conservation Specialist. ▪ Hosting meetings and forums ▪ Agreements ▪ Associated educational credits and certifications ▪ Educational materials

Prosperity	Performance Indicators	Status	Resources Allocation
Rebates and Incentives	▪ Annual review of rebate program including alignment with state and federal standards, industry changes and data-driven decisions on rebate performances. ▪ Annual review of return on investment and water savings. ▪ Alignment with the Water Department & City initiatives.	Ongoing	▪ Staff Time- Full time water conservation manager and water conservation specialist assigned. ▪ Federal, State and local standards to guide changes ▪ Alignment with other City initiatives ▪ Finance and Billing Departments
Advanced Metering Infrastructure (AMI) Optimization	▪ Expansion of WaterSmart participation ▪ Utilization of spatial data paired with other dataset to detect patterns in water budgets, rebate/incentives utilization, irrigation practices, etc. to improve the Water Conservation programs. ▪ Utilize WaterSmart's data to improve efficiency, communications strategies and customer engagement. ▪ Provide customers with notifications and/or alerts regarding water usage	Ongoing and New	▪ Staff Time- Full time water conservation assigned. ▪ Internal Departments- IT, Water Resources, Meter Shop, Engineering, GIS, Water Conservation, Billing and Finance ▪ WaterSmart software
Leak Detection	▪ Reduction of water loss due to leaks. ▪ Provide customers with notifications and/or alerts regarding water usage (i.e. water leaks, burst water pipes, emergency water issues). ▪ Leak repair credit ▪ Develop a new program to quantify and reduce leaks.	New	▪ Staff Time- Full time and part-time water conservation assigned. ▪ Internal Departments- IT, Water Resources, Meter Shop, Engineering, GIS, Billing and Finance, and Communications and Engagement ▪ WaterSmart software ▪ Educational materials and marketing
Enforcement	▪ Provide educational opportunities and/or fees to water wasters. ▪ Enforcement of the Landscape and Irrigation Criteria, and lawn variances. ▪ Develop policies and tracking methods for Drought Emergency Plan, Landscape and Irrigation Criteria and lawn variances. ▪ Develop policies and methods for tracking ▪ Community outreach and engagement.	New	▪ Staff Time- Full time and part-time water conservation assigned ▪ Internal Departments- IT, Water Resources, Meter Shop, GIS, Billing, Finance, Parks, and Community Engagement. ▪ Seasonal staff for enforcement ▪ Alignment with other City initiatives ▪ Educational materials and marketing
Income Qualified	▪ Ensure social equality for Water Conservation programs and project. ▪ Enhance opportunities to serve all community members. ▪ Explore methods to engage all sectors of the community and embrace diversity.	New	▪ Staff Time- Full time and part-time water conservation assigned ▪ Internal Departments- IT, GIS, Billing, Finance, and Communications and Engagement. ▪ Community Engagement. ▪ Educational materials and marketing

Water Conservation Management	Performance Indicators	Status	Resources Allocation
Organizational Collaboration	▪ Alignment with internal City partnerships for water savings. ▪ Meet quarterly with internal staff from different divisions/departments to maximize collaboration. ▪ Pilot projects- testing new ideas based on data	Ongoing	▪ Staff Time- Full time person assigned. ▪ Federal and State standards to guide changes ▪ Align with other city initiatives ▪ Data monitoring
Land Use	▪ Leveraging the Water budget for all customer classes targeting outdoor water use. ▪ Promoting water wise landscapes and demonstration garden areas. ▪ Maintenance of the Landscape and Irrigation Criteria ▪ Survey landscapes to have a pulse on landscape health.	Ongoing and new	▪ Staff Time- Full time person assigned. ▪ Align with other city initiatives ▪ Community Engagement. ▪ Educational materials ▪ Marketing
Water Conservation Development	▪ Aligning performance goals with the annual scorecard and 7-year scorecard. ▪ Provide training and leadership opportunities for staff. ▪ Workload alignments with individual programs. ▪ Improve efficiency through cross-training, documenting operations and procedures, increase internal mobility and ensure collaboration. ▪ Targeting water efficiency programs	Ongoing and new	▪ Staff Time- Full time Water Conservation Manager ▪ Align with other city initiatives ▪ Training ▪ Memberships, sponsorships, etc.
Financial Resources and Budget	▪ Submit a water conservation budget annually. ▪ Track budget and return on investment for each program. ▪ Leverage resource through grants and other funding opportunities.	Ongoing	▪ Staff Time- Full time Water Conservation Manager and input form staff.
Reporting	▪ State reporting including HB1051 ▪ Annual score cards to the Board ▪ Ensuring website information, reports and forms for the public are updated. ▪ Aligning data analysis internally on water consumption. ▪ Drought Emergency Plan reserve tracking ▪ Update Water Efficiency Plan	Ongoing and New	▪ Staff Time- Full time person assigned. ▪ Internal staff- Water Resources, IT, and Communications and Engagement
Water Loss	▪ AWWA M36 Water Loss Audit (M36) occurring annually. ▪ Internal collaboration on water loss ▪ Assets management with AMI meters.	Ongoing and New	▪ Staff Time- Full time person assigned. ▪ Alignment with AWWA audits

The Water Conservation team revisits the Water Efficiency Plan (WEP) approximately every five to seven years. As part of this process, Conservation's success at accelerating gallons per capita per day (GPCD) reductions and mitigating peak demand is part of the *IWRP, Water Transmission and Distribution Master Plan and the Greeley Non-Potable Water Transmission and Distribution Master Plan*.

4.0 Water Efficiency Activities

4.1 SUMMARY OF THE SELECTION PROCESS

Historically the entire suite of current water conservation programs is regularly evaluated and judged against annual, seasonal, per customer and per capita demands. However, in 2020, the City, in conjunction with WaterNow Alliance and Western Resource Advocates, performed an analyses of the water conservation program portfolio in order to inform future budgetary decisions and program priorities. The full report in found in Appendix A. Methodologies included a customer survey, an equity-focused spatial analysis of past program participation, and a water use change analysis.

Future evaluation criteria, in conjunction with the high WRP long term planning goals. Water conservation staff will continue developing a variety of potential programs with based on best management practices, studies, reports, innovated technologies, and customer feedback. As always, the water conservation team will discuss potential programs with other Front Range and western water providers as well as CWCB staff.

Program screen criteria are based on water savings potential, cost effectiveness, community vitality and likelihood of success (Table 10).

Table 10. Evaluation criteria for success

Evaluation Criteria	Description
Water Savings Potential	Water consumption reduction per customer account.
Cost Effectiveness	Return on investment ratio to ensure the best cost effectiveness.
Community Vitality	Continue to be a community developed by design and water smart.
Likelihood of Success	Best acceptance of a program, market strategies and feasibility. Pilot programs can be used to rank success.

4.2 Demand Management Activities

These programs are defined according to CWCB's primary water efficiency categories and are displayed as part of the TBL—Community, Prosperity, and Water Conservation Management in the below tables. **Through these demand management activities, an estimated 2,034 acre-feet of water savings by 2030 could be achieved.**

Community	
Water Efficiency Activities	
Education	Lectures and Presentations
	Teacher Training
	Tours
	Water Wise Demonstration Gardens
Online water efficiency tools	Water Budget Calculations
	Registration and apply for education, program, audits and rebates
	Contact the Water Conservation Team
	Watering schedules and restrictions
	Violations Reporting
	Water wise landscape guidelines
	Plant database
	Videos and presentations
	New seed/sod variances
	WaterSmart Portal
***New* Technology and Innovation**	Conduct surveys for baseline data
	Public engagement and impacts to water conservation programs
	Data gathering and outputs using GIS to make inform decisions on programs
Strategic Marketing Plan	Face to face marketing
	New Outreach demographics
	New releases
	Newsletters
	Paid Advertising
	Promotional items
	Direct mail
	Online communication
Collaboration	Creating partnerships on projects
	New Tap into the Water-Energy nexus
	Guidance for other partners
	Reduce barriers and provide water savings value
Cumulative Water Savings 2022- 2030 (acre-feet)	**386**

Prosperity	
Water Efficiency Activities	
Rebates and Incentives (Outside)	Irrigation Water Audits
	Sprinkler nozzle and heads rebates
	Smart Controllers rebates
	Pressure reducing valve
	Irrigation Flow Senor
	Life After Lawn (turf to water-wise plants conversion)
	Rain and soil sensors
	Professional landscape Certification
Rebates and Incentives (Inside)	Indoor Water Audits
	Showerhead and aerators-free
	Toilets and Urinal Rebates
	Pre-rinse spray valve- free for commercial properties
	New Dipper wells
	New Frozen food defrost
	Washing machine rebates- multiple family only
	New Commercial ozone laundry washer
	New Commercial Food Steamer
***New* Advance Metering Infrastructure (AMI) Optimization**	Enhance leak detection
	Minimize water loss
	Daily water monitoring capabilities
	More accurate billing
	Better customer service
	Reduced fuel by eliminating drive-by meter readings
Leak Detection	***New*** WaterSmart software to alert customer of leaks, high usage, and unexpected use
Enforcement	No wasting water
	No watering between 10 am - 6 pm
***New* Income Qualified**	Affordable housing rehab projects
	Assistance programs
Cumulative Water Savings 2022- 2030 (acre-feet)	**1,363**

Water Conservation Management	
Water Efficiency Activities	
Organizational Collaboration	Water use goals
Land Use	Water Budget- conservation based rates
	Water Wise landscapes partnership
	New Landscape and Irrigation Criteria
	New Non-potable irrigation system
***New* Water Conservation Development**	Targeting water efficiency programs
Financial Resources and Budget	Determine relevant business impact metrics for each program
	Pursue funding and resource opportunities
Reporting	House Bill 10-1051
	Water Efficiency Plan
	Drought Emergency Plan reserve tracking
	Annual score cards for accountability
Water Loss Control Programs	Distribution System Leak Detection
	Distribution system pressure management
	Water Loss Annual Audit
Cumulative Water Savings 2022- 2030 (acre-feet)	**285**

4.3 DEMAND MANAGEMENT ACTIVITIES

The WEP is designed to maximize water use and be a blueprint to facilitate water demand management. With a use of the TBL approach the following foundational activities will meet our savings requirements through 2030.

Community

Educational Programs: Greeley's robust educational programs include teacher training, tours, tailored customer service, landscape lectures, presentations, newsletters, and social media postings on various water conservation programs. This includes:

Lecture and Presentations: Making connections and partnerships in the community helps position Greeley's Water Conservation program is an important resource. Water conservation staff sponsors and participates in a broad array of events and educational activities to foster face-to-face interactions. Greeley participates in fairs, events sponsored by other organizations, festivals, neighborhood meetings, speaking engagements, discussions with local civic groups and classroom visits. Online lectures series have grown in popularity and provide landscape lectures to help the Greeley community save water and create natural ecosystems to become more drought resilient.

Teacher Training: Greeley co-sponsors The Confluence Institute which is a four-day training of K-12 teachers on water and conservation issues at the Poudre Learning Center. It provides teachers with resources and activities to use inside their classrooms. Teachers received District Six credit. Also Caring for Our Watershed project is sponsored by the Poudre Learning Center and Agrium. Water Resources staff support the project by judging projects and mentoring students through implementation.

Tours: Making connections within the community is done by providing city wide tours. Tours vary from watersheds, demonstration gardens to treatment plants.

Water Wise Demonstration Garden: This garden was designed to show customers what Xeriscape is and is not and to provide examples of plant material that can be utilized in their own landscapes, it also demonstrates alternative turf.

Online water efficiency tools: There are multiple online tools providing 24-hour access to customers on water efficiency options that include:

- Calculate customers' personalized water budgets and view calculated irrigable areas.
- Registration and apply for educational opportunities, programs, audits and rebates.
- Ability to contact the Water Conservation team through email or phone
- Watering schedules and restrictions
- Reporting water violations
- Water wise landscape guideline, and plant database
- Location of demonstration gardens
- Videos and presentation on past landscape lectures
- Application for new seed/sod variances. This ensures the correct soil preparations standards have been completed.

- WaterSmart portal that includes tutorials, educational material, ability to view of current and past bills, and leak and high use notifications. This process includes a Home Water Report**.** This report utilizes social marketing where you create social norms by giving the customer a score card on their use and compare them to similar family and property sizes.

Technology and Innovation: As part of the core values of Water Conservation, the Conservation Team will use technology to streamline and evaluate water conservation programs. Making informed decisions on water conservation programs-- which work well and sunsetting those which didn't work according to plan-- it not only standard business but guidance us to be more effective. Using technology to our advance is key for long-term conservation goals.

Strategic Marketing Plan: Greeley is steadfast in the belief that personal contact is most effective element. Program staff strives to be visible in the community and to meet was as many citizens as possible. As noted in the *Enhancing Greeley's Water Efficiency Portfolio* through Performance Analysis, face to face marketing harness synergies across conservation programs. This document also provides guidance on targeting outreach based on demographics, survey data, and marketing methods. The Water Conservation Program uses new releases, newsletters, paid advertising, promotional giveaway items, direct mail, and online communications. Quarterly the water communications plan is reviewed to help focus, monitor, and evaluate the Water Conservation outreach efforts. Conservation information and initiatives are an important part of Greeley's Water and Sewer's overall public messaging.

Collaboration: Collaboration improved the way water conservation work together and problem solve. Through working with our community members, the Water Conservation team will continue to innovate, improved efficiency, increase success and help achieve the water conservation goals. The Water Conservation team will be looking at methods to tap into the Water-Energy nexus, LEED building projects, regionalized messaging, landscape certifications and work with our schools systems.

Prosperity

Rebates and Incentives:

Annually, the Water Conservation Team reviews rebate and incentive programs to algin with State and Federal standards, industry changes and data-driven decision on rebate performances. Below is a list of outdoor and indoor programs.

A. Outdoor Programs like:

1. Irrigation Audits- Throughout the summer Greeley's Water Conservation Team offers outdoor irrigation audits. Staff visit properties to perform a visual inspection and collect data to diagnose irrigation inefficiencies, educate customers on proper operation, scheduling techniques and maintenance. Customers receive a final report with recommendations along with a personalized irrigation schedule.
2. Sprinkler nozzle and head rebates- By replacing old technology with nozzles and heads with modern low volume this is save overall irrigation water application rates. In addition, by ensure head and nozzles match each zone, this will all efficiencies in application rate.
3. Smart Controllers Rebate -Smart Controllers apply the water according to the weather and reduce the need for customers to know how to adjust their run times. When coupled with an

irrigation audit and quality sprinkler heads, it can improve the efficiency of the water applied, human error and the "set it and forget it" mentality.

4. Pressure Reducing Valve- Greeley pressure ranges from 80-120 psi which is too high for most irrigation systems thus causing misting and /or displaced water due to even slight breezes. Another pressure reducing valve occurs during the drip irrigation conservation process. Rebates are to offset the cost of installing a pressure reducer on their sprinkler system allowing it to run at the correct pressure.
5. Irrigation Flow Senor- Flow sensor can sense when other than normal flow is going through the sprinkler system or line and can shut off the clock to avoid a large amount of water leaking out a broken pipe or if a sprinkler head gets damaged.
6. Life After Lawn (Turf to water-wise plants)- This program incentivizes customers to replace water thirsty turf with low water and/or native perennials, trees and shrubs or native grasses.
7. Rain and soil sensors – Rain sensors are adjustable and can shut off the system when the threshold of precipitation is met. Soil moisture sensor detect the amount of moisture in the soil and will activate the system when that water is depleted. the system will water on demand rather than on a set schedule which could save water.
8. Professional Landscape Certification -Provides incentives for landscape contractors to pursue certifications and continuing education.
9. Pool covers: Besides offering energy savings, pool cover also conserve water by reducing the amount of make-up water needed by 30-50%.

B. Indoor Programs:

1. Indoor audits-These audits work as an educational tool to help Greeley citizens realize all the uses of water indoor, like AC units, humidifiers, and auto-fill floats. This face-to-face marketing allow to assist in leak detection and provide information about other conservation programs.
2. Showerhead and aerators exchange-This is a relatively simple way to upgrade plumbing fixtures to WaterSense standard which can help save water and energy by providing free showerheads and aerators.
3. Toilets and Urinal Rebates- By replacing older toilet and urinal this will help save water and many times you are also fixing a leak the customer didn't know they had.
4. Pre-rinse spray valve-These high-pressure valves apply water in a way that helps dishwashers remove the most stubborn food from dishes, pots and pans before they go into the dish machine.
5. Dipper wells- Low-efficiency dipper wells operate using a continuous flow of water. High-efficiency dipper wells have automatic shutoffs and other features to dramatically reduce their water use.
6. Frozen food defrost-Food - This product prevent excessive water from going down the drain while thawing frozen foods.
7. Washing machine rebates (Shared facilities only) New HE washers save water by using 4-7 gallons per cycle compared to loading washer that can use 40 or more gallons.
8. Commercial ozone laundry washer: Ozone works best in cold water, so large facilities do not have to pay for energy to heat the water. In addition, the process reduces total water usage by creating an overall more efficient wash process.

9. Commercial Food Steamer: Energy Star certified steam cookers save 90% or more water when compared to older standard steam cooker models. Updating commercial food steamers will save water and energy.

Advance Metering Infrastructure (AMI) optimization and monthly Meter Reading: Every connection to Greeley's water utility infrastructure is metered. Customer's meters are read monthly or through AMI on an hourly time scale. AMI is scheduled to be completed in 2026 for the whole City of Greeley. The AMI system provides near real-time monitoring and alert capabilities that will detect high usage and leaks when paired with the WaterSmart software. Benefits of AMI are:

- Enhanced leak detection
- Minimized water loss
- Daily water monitoring capabilities for customers rather than waiting a month for a record of water usage.
- More accurate billing
- Better customer service
- Reduced fuel usage by eliminating drive-by meter readings and additional vehicles to check meters

WaterSmart software allows customer to review, understand and make decisions about their own water use. This not only does this on-line portal improves water efficiency but provides communication strategies and customer encouragement.

Leak Detection: Currently the AMI system is paired with the WaterSmart software and can alert customers to leaks, high usage, and unexpected use. The customer is then alerted via text message or e-mail. Water Conservation staff also make efforts to notify customers that do not have contact information on file through door tags. Leak repair assistance offers a credit to customers that discover a leak in their water system on a case-by-case basis. Working with other internal staff, the Water Conservation team will be developing a new program to quantify and reduce leaks.

Enforcement: The Water Conservation team takes an educational approach to enforcement. Wasting water and watering in the middle of the day between 10:00 am and 6:00 pm are prohibited. First time offenders receive a written notice with program offerings to better help the customer understand their water use and improve efficiency. If there is no action taken by the customer, then the City has the ability to levy fines.

Income Qualified: Greeley is a culturally dynamic community with different socio-economic conditions within Greeley's customer base. Most outdoor over-use of water occurs by the higher-income customers. Though lower-income customers typically do not contribute to high summer water production levels but have challenges with indoor use. From the *Enhancing Greeley's Water Efficiency Portfolio through Performance Analysis* report, water conservation can harness synergies for outreach opportunities and provide a suite of future programs to this important population.

Water Conservation Management

Organizational Collaboration: Partnerships are key to help create community messages, obtain feedback, keep abreast to industry trends, pooling resources and ensure reasonable and effective water savings actions.

Greeley continuously networks finding the best resources for specific water conservation programs. Through this collaboration process, the Water Conservation Team will align with community partnerships that follow the core values. The Water Conservation team works one-on-one with key organizations locally, and at the State and Federal government levels.

Land Use:

Water Budget**:** Water budgets support the City's goals of promoting efficient water use. A water budget is the most equitable (fair) way to reward efficiency and discourage water waste. A water budget is unique to each residential household and provides your home all the water you need. It is based on:

- Family size
- Landscape size
- Real-time weather conditions

In this custom tiered rate has four tiers as illustrated in Figure 14 – rewarding customer that stay within their water budget.

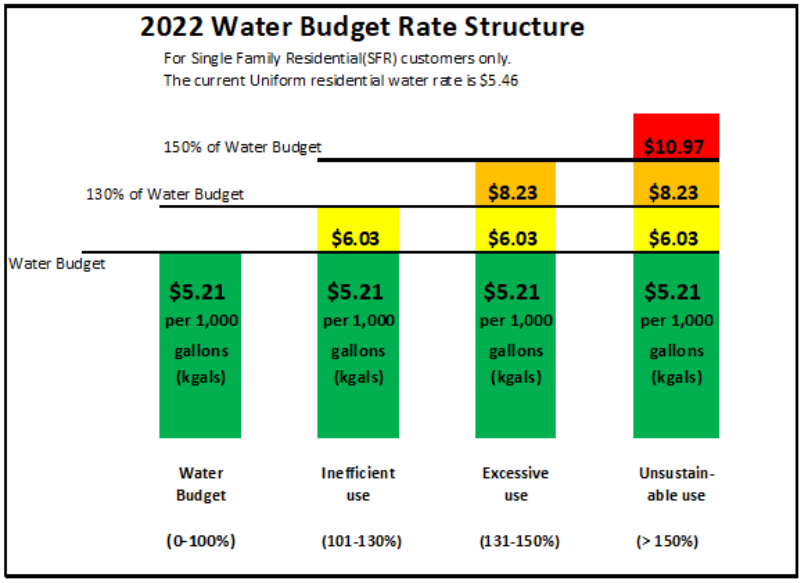


Figure 14. 2022 Water Budget Rate Structure

Since 2017, the Water Conservation Program evaluated and implemented a water-budget-based rate structure for each single-family residential customer, including information on each household's irrigated area and forecasted demand based on weather data. This empowered customers with information that would allow them to take an active role in monitoring and lowering their consumption (and in turn their water bills) through a water-budget-based rate

structure. Part of the rate model includes targeted communication pieces to customers who regularly exceed water budgets, flagging exceptionally high-water bills, and notifying users who grossly exceed their water budget.

Water Wise Landscapes: Water conservation maintains two demonstration gardens to support customer education on water-wise landscape plants. Other projects include partnerships. One with the University of Northern Colorado on showcasing water wise landscapes by removing non-essential turf by the student center. The second is partnering with the Stormwater division and CSU Stormwater center, Greeley has installed five rain garden demonstration projects in Greeley.

Additional methods to promote water wise landscapes, such as customer recognition or grants yard makeovers will continue to be developed.

Landscape and Irrigation Criteria and Non-potable Irrigation System Design Criteria: The *Landscape and Irrigation Criteria* is intended to provide information for the design, review, installation and maintenance of landscape and irrigation systems within the City of Greeley to promote the efficient use of water and the reduction of water waste through best management practices.

The Non-potable Irrigation System Design Criteria expand the non-potable water system and reduce the use of potable water for irrigation purposes and improve irrigation practices.

Landscape and irrigation plan reviews are for new CII development, civic and open spaces, rights-of-way, and common areas. This review and inspection help contractors maintain quality work and help protect property owners against innately inefficient irrigation systems. Furthermore, the total landscape water requirements are calculated and submitted during the landscape and irrigation plans review process.

Water Conservation Development: Targeting water efficiency programs is key to success. This is based on data informed decisions, performance accountability and staffing levels. Here are some main future focuses:

- Water Users: The purpose of the measure to is target water users, analyze water use, develop efficiency benchmarks and determine ways to help all customer classes to become more water efficient.
- Governmental Properties: The Water Conservation Team is working with City departments to improve water efficiencies within its own City's property. This includes fixture updates, water budgets for open spaces like parks, and landscape innovations.
- Customer service: From leak detection to landscape changes, the Water Conservation customer care installs a lasting history for the Greeley community. The Water Conservation team will leverage billing systems and WaterSmart to provide more meaningful usage information to customers. This will support educational opportunities.
- Technology and innovation: Methodologies to use technology to innovate water conservation programs.
- Internal water conservation staff: A success water conservation program needs people to guide water conservation efforts in the community. There are currently four full-time employees, one-part time employee and a seasonal staff and volunteers dedicated to developing, implementing and promote water conservation efficiency programs in Greeley. Ensuring processes are streamlined, staff are cross trained, and are aware of the latest water conservation technologies

is the backbone of success for the WEP. Personalized performance goals will align with the annual scorecard and 7-year score card in this plan.

As new ideas emerge, pilot projects will be conducted. This will test the viability of executing the project at a full scale and help manage risk and reveal flaws in the plan before substantial resources have been committed.

Financial Resources and Budget: The Water Conservation Program measures the return on investment for water conservation programs. This provides relevant business impact metrics for each program and allows the Water Conservation Manager to make data-driven decisions on each program. Levering financial resources provides value to the Greeley community. Since 2020, the Water Conservation team has secured over $3.5 million dollars in grants and professional services boosting long-term water conservation efforts. Water Conservation will continue to pursue funding and resource opportunities.

Reporting: State, local and internal reporting is critical analysis how water conservation is tracking within all programs. These tools are used to guide decision-making and solve any identified issues. The Water Conservation will continue to report to CWCB all requirements associated with House Bill 10-1051 and continuous tracking methods mentioned in Section 5.2 of this WEP.

Water Loss Control Programs: Greeley's robust Water Loss program includes annual water audit and loss control reports using the methodology prescribed by the American Water Works Association M36 manual, system wide water main leak detection program, an active meter maintenance program with meter replacements to AMI meters by 2026, and strong asset management assessment and planning group to replace aging infrastructure.

5.0 Implementation and Monitoring Plan

Greeley has one of the most robust and longest-standing water conservation programs in the State of Colorado. Using the roadmaps mentioned in the WEP, the Water Conservation Manager will plan, develop, and lead the Water Conservation team to cost effectively reduce water use for Greeley through dynamic programing and outreach.

5.1 IMPLEMENTATION PLAN

Demand management solutions are implemented using data driven decisions and by removing planning barriers such the lack of leadership, limited manpower to complete tasks, inadequate resources and funding, and impractical business planning. Through the Water Conservation leadership team, 7-year scorecards will guide, and track performance of the water conservation programs. Staff will create an annual scorecard on specific programs and projects to address the long-term goals from the 7-year scorecard. The annual scorecard will be showcased at public Board meetings. Using the triple bottom line approach will allow flexibility to pilot new programs and sunset others.

The Water Conservation team will be setting the level of service goals as part of its short and long-term demand management strategy of the Integrated Water Resource Planning.

5.2 MONITORING PLAN

Greeley monitors all water conservation and efficiency programs activities by those customers who have participated through costs and estimated water savings. Business impact metrics will be measured

through water savings analysis using similar methodologies found in the *Enhancing Greeley's Water Efficiency Portfolio through Performance Analysis* report.

Accurate monitoring will be performed by analyzing per capita water use, per unit water use and accounting for variations created by annual weather conditions. Data will be submitted for House Bill 10-1051 annually. In addition, Greeley will annually conduct self-water audits and loss control programs following the guideline of the American Water Works Association M36 manual and participate in the Colorado Water Loss Control Initiative.

Geospatial analysis paired with customer surveys will allow the Water Conservation team to stay informed on customers' values and interests, and to benchmark water conservation programs through time. Furthermore, surveys will allow Greeley to expand on the success of its existing program and further focus how to reach targeted audiences using community based social marketing campaigns.

Using the latest technology, the AMI data paired with WaterSmart software will allow daily weekly, and monthly data analysis and reports. Greeley's water customers have access to safe, secure, real-time data of their water usage through an online customer portal. Accurate information allows customers to proactively partner with the City in its conservation efforts by monitoring and adjusting their personal usage—a feature that will be especially beneficial to commercial and landscape customers who have higher usage rates and thus, higher water bills.

6.0 Adoption of New Policy, Public Review and Formal Approval

6.1 Adoption of New Policy

WEP adoption involved internal and external stakeholder feedback, flexibility and finalizing the WEP with the Water and Sewer's Director. In addition, in 2021 over 720 customers provided survey responses to gain a better understanding of customers' awareness of- and interest in- Greeley's water conservation programs. Results of the survey are found in Appendix A. Survey results have been integrated into this WEP.

6.2 PUBLIC REVIEW PROCESS

Through Greeley's Communications and Engagement staff, a communication plan and marketing strategies were developed. These included:

Executive Team and Internal Staff: Both Water and Sewer's executive team and staff were briefed at various times throughout 2021 and 2022 providing input, suggestions, and insight to optimize end results of the WEP. The plan will be part of the Integrated Water Resources Plan to evaluate Greeley's long-term water supply sustainability and incorporate near-term projects to reduce future water risks and uncertainty.

Technical Analysis: The Water Conservation team was selected to WaterNow Alliance's Project Accelerator program for support in analyzing the performance of its water conservation program portfolio to inform future budgetary decisions, program priorities, and this WEP.

60 Day Public Comment Period: As part of the communication plan, the 2022 WEP was posted the Water and Sewer long range planning website starting on August 3, 2022 to promote and solicited feedback. Those comments will be provided in Appendix B. Tactics to engage the public were through

social media, website updates, Water and Sewer's monthly newsletter, news release, Speak Up Greeley project page, presentations to Boards, virtual public briefing/open house and key stakeholder working group meetings.

6.3 EFFICIENCY PLAN APPROVAL (Pending)

Please note this section will include approval from the Water and Sewer Board along with City Council

Local Approval

CWCB Approval

6.4 WATER EFFICIENCY PLAN REVIEW AND UPDATE

Greeley will submit a formal water efficiency plan update by 2029. A review and revision of each section will be completed as necessary.

Appendices

APPENDIX A: ENHANCING GREELEY'S WATER EFFICIENCY PORTFOLIO THROUGH PERFORMANCE ANALYSIS

APPENDIX B: PUBLIC NOTICE ANNOUNCEMENT, PUBLIC COMMENTS, & OFFICIAL PLAN ADOPTION

Please note this section will include approval from the Water and Sewer Board along with City Council

APPENDIX A

2022 Water Efficiency Plan

CITY OF GREELEY, COLORADO

Enhancing Greeley's Water Efficiency Portfolio through Performance Analysis

September 2022

WESTERN RESOURCE ADVOCATES

waternow alliance

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Executive Summary

The City of Greeley has one of the most robust and longest-standing water conservation programs in the State of Colorado. In 2020, the City applied for and was selected to WaterNow Alliance's Project Accelerator program for support in analyzing the performance of its water conservation program portfolio in order to inform future budgetary decisions, program priorities, and the City's forthcoming Water Efficiency Plan update. This report synthesizes key findings and methodologies from the conservation program performance analysis which included a customer survey, an equity-focused spatial analysis of past program participation, and a water use change analysis.

This analysis found that across the board, Greeley's Water Conservation Programs have saved both water and money, and have been highly valued by program participants. During the six years spanning 2013-2018, selected programs engaged nearly 5,000 participants, and achieved water savings ranging from 2.9 to 19.5 AF per year per program. These programs' average cost per acre foot savings is far below the current cost of water from the Colorado Big-Thompson Project. Based on the customer survey, 94% of respondents reported that Greeley's conservation programs were important or very important. While the data analysis suggests that these programs are effective, it also provides insight into specific programs to expand or condense and how to most effectively conduct outreach to Greeley's target audiences.

Program Prioritization

1. *Residential Audits:* Residential Audits (both indoor and outdoor) saved an estimated 19.5 AF per year, which is encouraging because the customer survey results suggest continued interest in further participation in this program, particularly the Outdoor Irrigation Audit. The quantitative analysis also shows that participation in the Residential Audit often overlaps with participation in other indoor and outdoor water conservation programs, suggesting that this program is an effective "gateway" to utilizing other water conservation tools and resources. Survey results support this finding in that 95% of Residential Audit participants reported taking some kind of water saving action as a result of their audit.
2. *Outdoor Efficiency Incentives:* The survey showed particularly large interest in outdoor water efficiency rebates and incentives. There may be an opportunity to expand participation in programs like the Smart Controller Rebate, PRV Rebate, and Rotary Nozzles Rebate. These programs have high water savings per account but have seen lower levels of overall participation, compared to other programs. The outdoor Life After Lawn and Garden in a Box programs – though not captured by the water use change analysis – were the most popular incentive opportunities for future participation according to the survey results.
3. *Educational Programs & Online Efficiency Tools:* Greeley's array of educational programs and online tools were, for the most part, well utilized by Greeley residents and of interest to respondents for future participation. Many past participants reported taking specific water savings actions as a result of participation in an educational program. While data on staff resources and cost for educational programs and online efficiency tools is beyond the scope of this project, one can assume that most of these programs and tools are less expensive and time intensive than residential audits and outdoor efficiency incentive programs.

Communications and Outreach

1. *Harness synergies across conservation programs.* Approximately 30% of residents were part of multiple conservation programs, suggesting there may be ways to further encourage participants to take advantage of other relevant programs. Strategies may include continuing to encourage participants to complete an audit as an entry point to other programs, as well as reaching out to past participants to suggest additional or complementary programs.
2. *Create targeted outreach on specific programs to Hispanic and Latino customers*. Survey results suggest some differences in program preferences among Hispanic and Latino respondents. For example, respondents of Hispanic, Latino or Spanish origin expressed more interest in the High Efficiency Toilet rebate. These insights could help target outreach around specific programs in neighborhoods with larger percentages of Hispanic and Latino residents, as identified in the spatial analysis, or help prioritize the translation of specific program materials.

3. *Take advantage of popular outreach methods.* Email updates and monthly e-newsletters were the most popular form of communication for most customers. These channels can be used to further promote and increase awareness of the conservation programs, specifically Greeley's online efficiency tools with which respondents were generally less familiar.
4. *Focus community engagement messaging on customers' key water conservation motivations.* Motivation to participate in future water conservation programs is primarily based on saving money on water bills, protecting Greeley's limited water resources, reducing personal use, paying for a fixture or appliance, and supporting community values.

The City of Greeley should be very proud of its efforts to build a popular, impactful, and highly valued Water Conservation Program. The report is intended to act as a tool for Greeley's Water Conservation team to make data-drive decisions, and to be a resource to Colorado's water conservation community in evaluating the impact of conservation programs and scaling-up future investments in water conservation.

Introduction

The City of Greeley's leadership in water conservation began in 1907, with the City's first watering restrictions, and Greeley now has one of the most robust water conservation programs in the State of Colorado.[1] Given the City of Greeley's (Greeley, Greeley Water, or the City) semi-arid climate, receiving less than 13 inches of rainfall per year, these water conservation programs form an important strategy to ensure a reliable and sufficient water supply for city residents, now and into the future.[2] Greeley's extensive water conservation programs have been successful at reducing water demand and keeping water rates affordable. These programs included free irrigation audits, direct installation of smart irrigation controllers, a conservation lecture series, a water-budget based rate structure, and a Life After Lawn turf replacement program, among many others.

In 2020, Greeley Water applied for WaterNow Alliance's Project Accelerator program[3] for capacity and expertise in optimizing its existing conservation programs through data-driven, performance analysis and an equity-focused analysis of metrics such as socioeconomic status of

[1] City of Greeley, Colorado. (2016). Greeley Water Conservation Report 2016.

[2] City of Greeley, Colorado. (2020). Conservation. https://greeleygov.com/services/ws/conservation/

[3] See: https://waternow.org/our-work/our-work-projects/project-accelerator/.

participants, age and geographic distribution, and the value of each program to the City's residents. The resulting analysis, shared in the below report, will drive the City's next Water Efficiency Plan and inform its annual water conservation program budget and priorities.

Through the Project Accelerator, WaterNow Alliance (WaterNow) and Western Resource Advocates (WRA) worked with Greeley Water, to evaluate the City's water efficiency program portfolio through several key phases:

(1) Interviews on the program background and priorities with City staff and officials;
(2) Background research on and review of the City's water efficiency program portfolio and available data;
(3) A customer survey on Greeley's water conservation programs;
(4) Quantitative analysis of Greeley's water conservation programs;

The report focuses on phases three and four of the project (customer survey and quantitative performance analysis) and synthesizes key findings on the City's water conservation program portfolio. The intent of this report is to support Greeley's water conservation team as they make important future decisions on programs and budgets. It is also intended to be shared with the broader Colorado water community as a resource for those that are interested in scaling up their investment in water conservation and evaluating the impact of their programs.

Customer Survey Findings

In February and March 2021, the project team conducted a survey of Greeley Water & Sewer customers to gain a better understanding of customers' awareness of – and interest in – Greeley's water conservation programs. Questions included past participation rates, potential future participation, general sentiments, and personal actions taken to advance water conservation. The survey focused on four key categories of Greeley's conservation strategies, each with their own programs. The individual programs are listed below and more information on each program is provided in Appendix A.

1. *Educational Programs*
    a. Landscape Lecture Series – free lectures and workshops on landscape topics to improve water efficiency
    b. Xeriscape Education – literature, classes, and tours of Greeley's Xeriscape gardens
    c. Tours of Greeley water-related facilities
    d. Teacher Training on water conservation issues for local teachers
    e. Speakers Bureau – Greeley Water speakers visit classrooms, civic clubs, and other groups
    f. Annual Mayor's Water Challenge – water use reduction contest
2. *Water Audits*
    a. Residential Indoor Water Audits
    b. Residential Outdoor Irrigation Audits
    c. Commercial Audits (Indoor and/or Outdoor)
    d. Outdoor Irrigation Rebates – available to those that have completed an audit (e.g., smart irrigation controller, rotary sprinkler nozzles)
    e. Commercial Rebates – available to those that have completed an audit (e.g., water efficient appliances, irrigation hardware)

3. *Water Efficiency Incentive Programs*
    a. Compost Bin or Discounted Rain Barrel Sale
    b. Discounted Garden in a Box Kit
    c. Free Low-Flow Showerhead Exchange
    d. High Efficiency Toilet Rebate
    e. Life After Lawn Turf Replacement Rebates
4. *Online Water Efficiency Tools*
    a. Water Budget Resource
    b. WaterSmart Customer Portal
    c. Online Plant Database
    d. Greeley Water Conservation Webpage

The survey was based on 45 questions, including optional demographic questions derived from the U.S. Census demographic questions. It was conducted using the Alchemer survey tool which allowed for advanced survey logic. The survey questions were derived based on past water conservation survey research conducted by the project team including San Diego County Water Authority's 2017 Water Issues Public Opinion Poll[4], Seattle Public Utilities 2006 Residential Water Conservation Benchmarking Survey[5], and Soquel Creek Water District's 2015 Voter Survey on Water Issues.[6] Questions were modified to suit Greeley's local context, priorities, and values. The full list of survey questions and survey logic is available in Appendix B.

Over the course of two months, Greeley Water staff advertised the survey through bill stuffers, emails to a listserv of approximately 600 people, social media, the WaterSmart portal, the water conservation webpage, and other outlets (see Appendix C for bill stuffer design). To promote survey participation, respondents were entered into a raffle to receive gift certificates for local restaurants. The survey, which took participants approximately 10-15 minutes to complete, garnered 720 completed responses.

Of note, based on the voluntary nature of this survey and the survey's findings on program participation, this pool of survey respondents is likely more engaged with Greeley's water conservation programming than the City of Greeley's broader public. While this may influence the survey results, importantly, the survey respondents are among Greeley's target audience, as they are those that are likely to engage and respond to outreach and opportunities presented by the utility in the future.

That being said, it is important to acknowledge that a shortcoming of this survey is that some segments of Greeley's population are under-represented when compared to 2020 census data. Perhaps most notably, 9% of survey respondents identified as Hispanic, Latino, or of Spanish origin, whereas, per Greeley's 2020 Census bureau data, 39% of the population identifies as

[4] https://www.sdcwa.org/sites/default/files/2017%20SDCWA%20Poll%20Complete%20Report.pdf
[5] http://www.seattle.gov/Documents/Departments/SPU/Documents/2006WaterConservationSurvey.pdf
[6] https://www.soquelcreekwater.org/ArchiveCenter/ViewFile/Item/74

Hispanic, Latino or Spanish origin. This discrepancy may be partially attributed to the fact that the survey was only offered in English. Additionally, 93% of survey respondents said they own their own homes. This suggests that renters are under-represented in this survey as – per the 2020 census data – Greeley is only 60% owner-occupied housing units. This discrepancy is unsurprising given renters are likely to be less attuned to water conservation incentives that their landlord would be more likely eligible for, and many renters (particularly in multi-family housing) do not pay their own water bill. When possible, survey results described below are analyzed based on demographic information. Additionally, demographic program participation information is represented in the quantitative Spatial Trends Section of this report. Results from the demographic survey questions are available in Appendix D. Opportunities for better targeting future outreach to reach a wider cross-section of Greeley's community is provided in the Recommendations section.

Awareness & Importance of Greeley Water Conservation Programming

Survey respondents were asked if they were aware of each of the four primary types of Greeley Water programs: 1) education-related programs, 2) water efficiency incentive programs, 3) water audits, and 4) online water efficiency tools. Respondents were most aware of the water efficiency incentives and least aware of the online water efficiency tools. As illustrated in Figure 1, in order of awareness, 80% were aware of water efficiency incentive programs, 76% were aware of education-related programs, 70% were aware of water audits, and 55% were aware of online water efficiency tools.

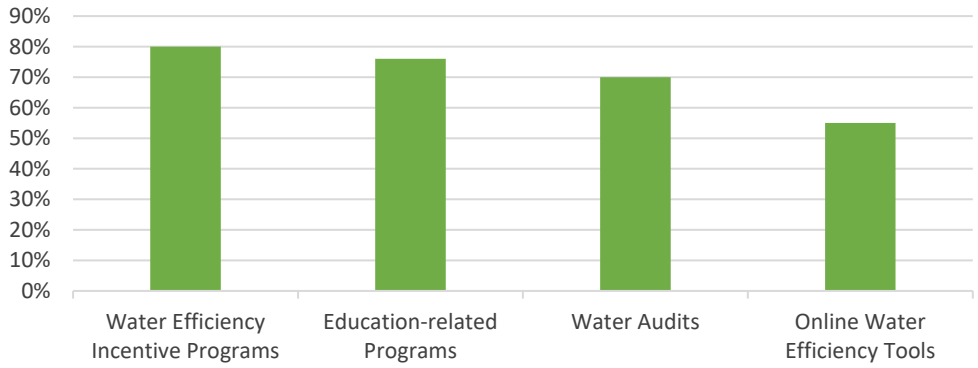


***Figure 1**. Percentage of respondents aware of four primary categories of conservation programming among all participants.*

Figure 2 indicates that across the board, survey respondents felt that Greeley's water conservation programs were important, with a total of 94% of respondents reporting that the programs were important or very important. Notably, when the results were analyzed for those respondents that were completely *unaware* of Greeley's four various conservation programs prior to completing the survey, the vast majority (approximately 90%) of these respondents still felt Greeley's conservation programs were very important or important.

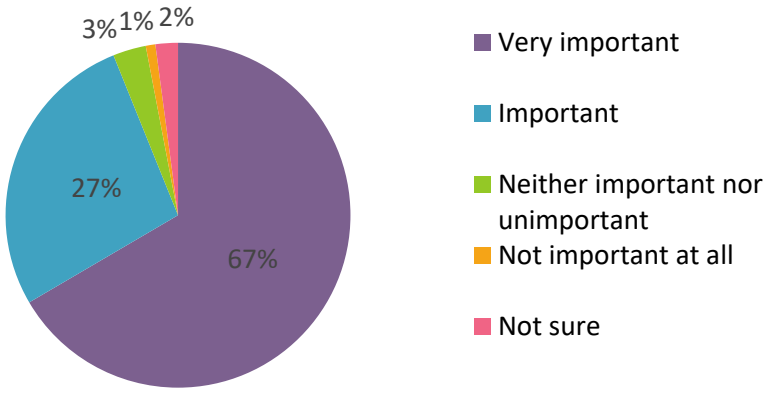


***Figure 2**. Importance of Greeley's Water Conservation Programs.*

These results are a strong indication that Greeley's water conservation programs are valued amongst their customers and customers are largely aware of the various available programs. The exception to this high level of customer awareness is the online efficiency tools. There are benefits to continue additional outreach efforts, particularly since these education-based tools will practically cost the same to update and maintain regardless of how many customers utilize the tools.

Outreach Strategies

Figure 3 captures how respondents prefer to receive information about Greeley's water conservation programs. Sixty-four percent (64%) indicated that they prefer email updates or updates through the monthly newsletter, followed by 37% that prefer bill inserts, and 30% that prefer the Greeley Water website. These results suggest that Greeley should continue – and perhaps increase – communications through email campaigns and the monthly newsletter, which is a relatively cost-effective and quick way to connect with customers.

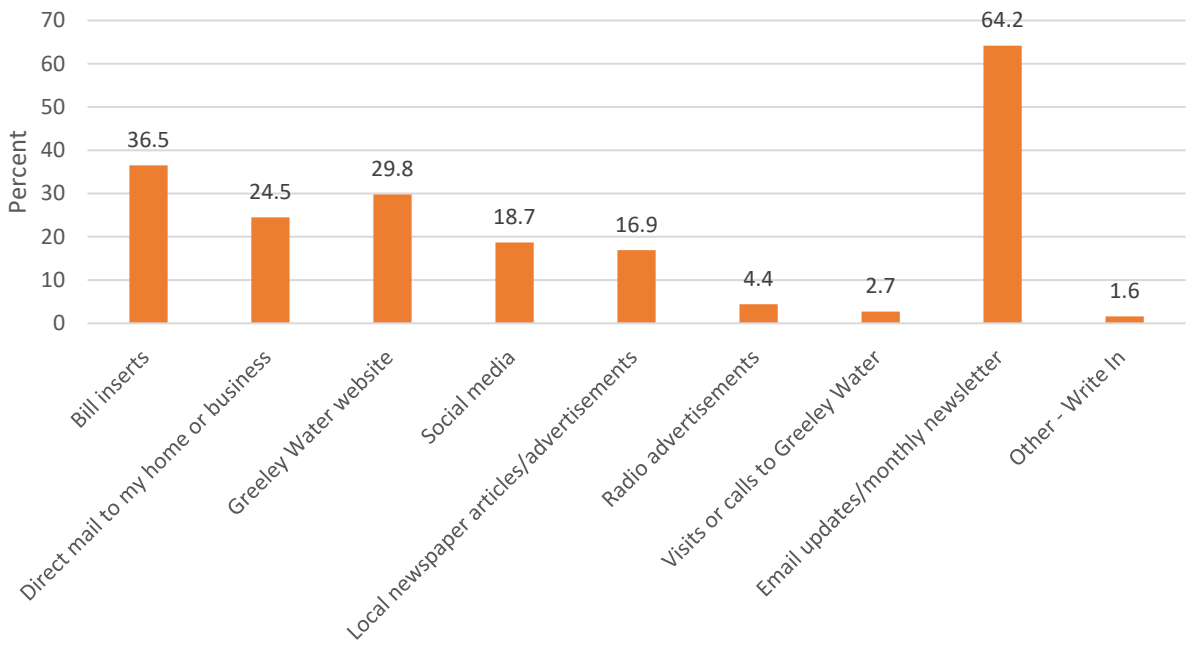


Figure 3. *Preferred Contact Method for Greeley Water Conservation Information.*

Communication through email updates and/or the monthly e-newsletters was the most popular for all age brackets except ages 18-24. For the 18-24 age bracket, social media was most preferred. If Greeley is interested in effectively reaching this target audience, investment in compelling and frequent social media content could be fruitful.

Participant Motivations

As Figure 4 illustrates, when survey respondents were asked what would motivate them to participate in a Greeley water conservation program in the future, the most common response was to save money on water bills (85%), followed by protecting Greeley's limited water resources (65%), to reduce personal use (47%), and to support community values (38%). To save more water than my neighbors (14%) was the least frequently reported motivational values.

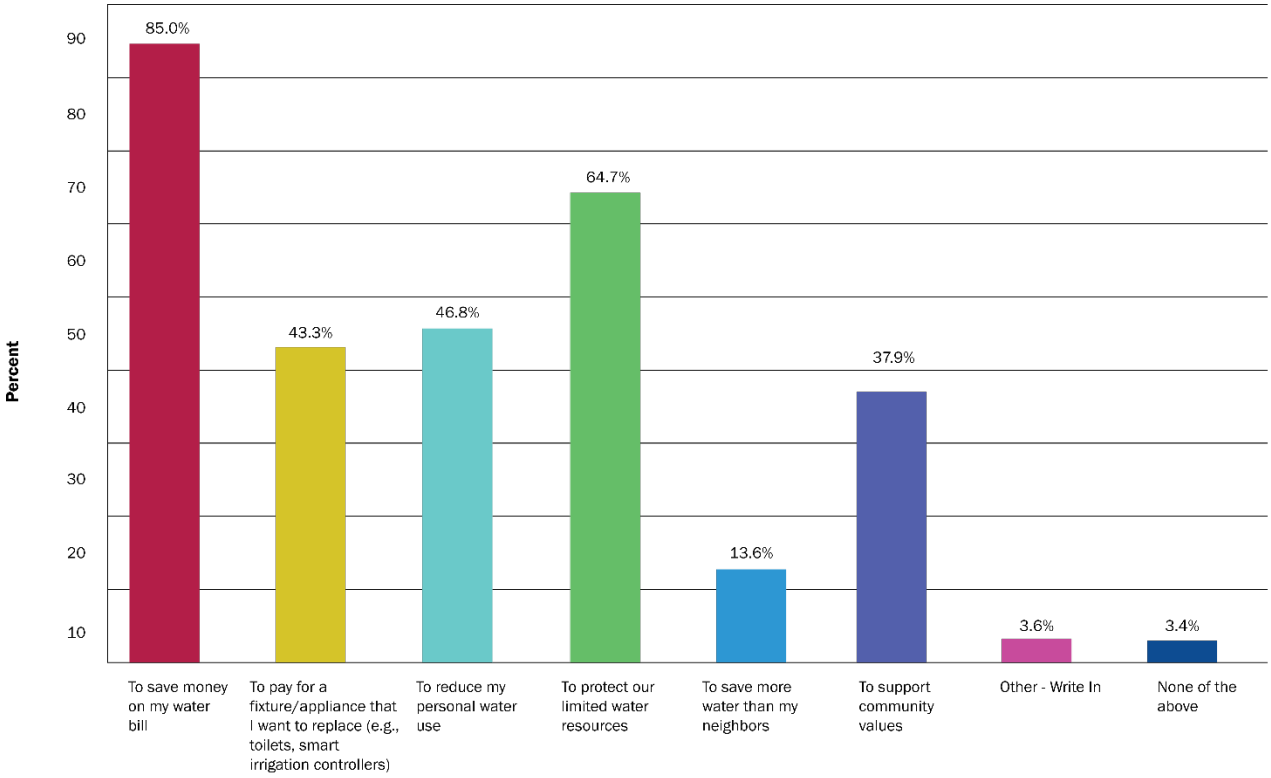


Figure 4. *Motivation for participating in future water conservation programming.*

Participant motivations remained consistent for both respondents that were unaware of Greeley's water conservation programs prior to the survey and for respondents of Hispanic, Latino or Spanish origin compared to other respondents. While saving money on water bills was consistently the top response across all income levels, individuals in the lowest income bracket chose supporting community values as the second most common motivator for participation (60%).

Additionally, Figure 5 shows that 31% of survey respondents reported that they could reduce both indoor and outdoor water use easily. A slightly greater percentage (39%) felt it would be easier to reduce the amount of water they now use for outdoor landscaping and gardening. Notably, only 24% of respondents felt they could neither reduce their indoor nor outdoor water

use easily. It's unclear from the results whether respondents felt they couldn't reduce their water use because they had already taken dramatic action to do so, they simply were unmotivated to reduce their use, or if they faced barriers that made it challenging to reduce their use (e.g. cost, expertise, labor, etc.).

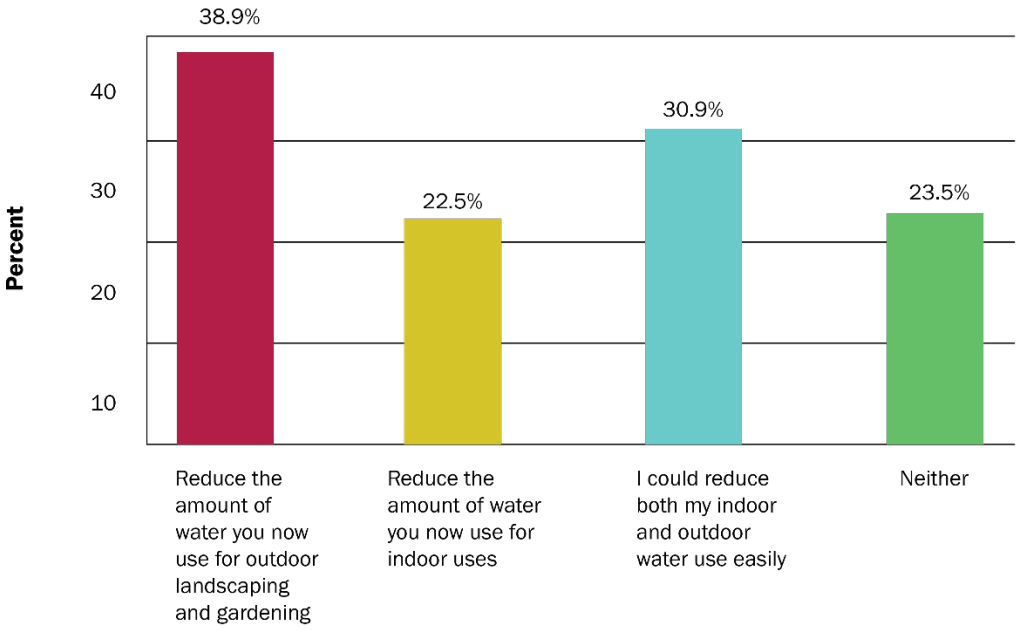


***Figure 5**. Ease of saving water indoors and outdoors.*

Past & Future Program Participation

For each of the four primary categories of conservation programs (1) educational programs, 2) water audits, 3) water efficiency incentive programs, and 4) online water efficiency tools), respondents were asked:

a. *Past Participation* - Which programs have you participated in over the past 5 years?
b. *Water Savings Actions* - What water saving actions resulted from your program participation?
c. *Rating* - How helpful did you find the the specific program on a scale of 1-5, with 1 being least helpful and 5 being most helpful?
d. *Future Participation* - How likely are you to participate in the program within in the next 3 years?

Survey results are summarized below and additional information on past program participation can be found in the quantitative analysis results section.[7]

[7] The following section summarizes results from the quantitative analysis of Greeley's water conservation programs and includes some – but not all – of Greeley's conservation programs. The quantitative analysis focuses on rebate and audit programs, rather than educational programing and online tools. The analysis also only includes programs with sufficient data that were active between 2013-2018, excluding some more recent program additions. Since the quantitative analysis results are not comprehensive of all Greeley conservation programs, the survey results can give us a comparative sense of participation levels. However, as noted above, it is clear from comparing survey results with actual participation numbers in the quantitative analysis that survey respondents were more likely to participate in conservation programming than Greeley's general public.

1. Educational Programs

a. Past Participation

Illustrated in Figure 6, the landscape lecture series (32%) and Xeriscape education (23%) were the most common programs for respondents to have participated in within the past five years. 56% of respondents had not participated in any educational programs.

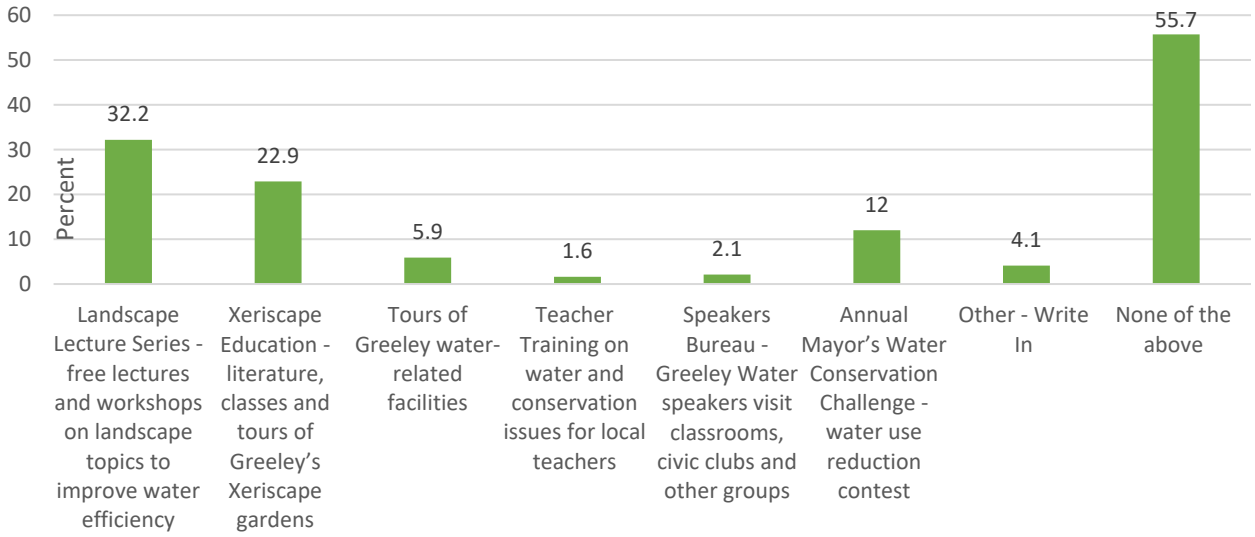


***Figure 6**. Past Participation in Education-Related Programs.*

b. Water Savings Actions

As Figure 7 shows, while water savings associated with educational programs can be challenging to quantify, when asked if respondents had taken some kind of water savings action after participating in an educational program, the vast majority affirmed that they had taken one or more actions that included, but were not limited to:

- Changing their water use behavior in some way (57%)
- Switching to more waterwise plants or landscaping practices (55%)
- Updating or adjusting their irrigation system to improve water efficiency (54%)

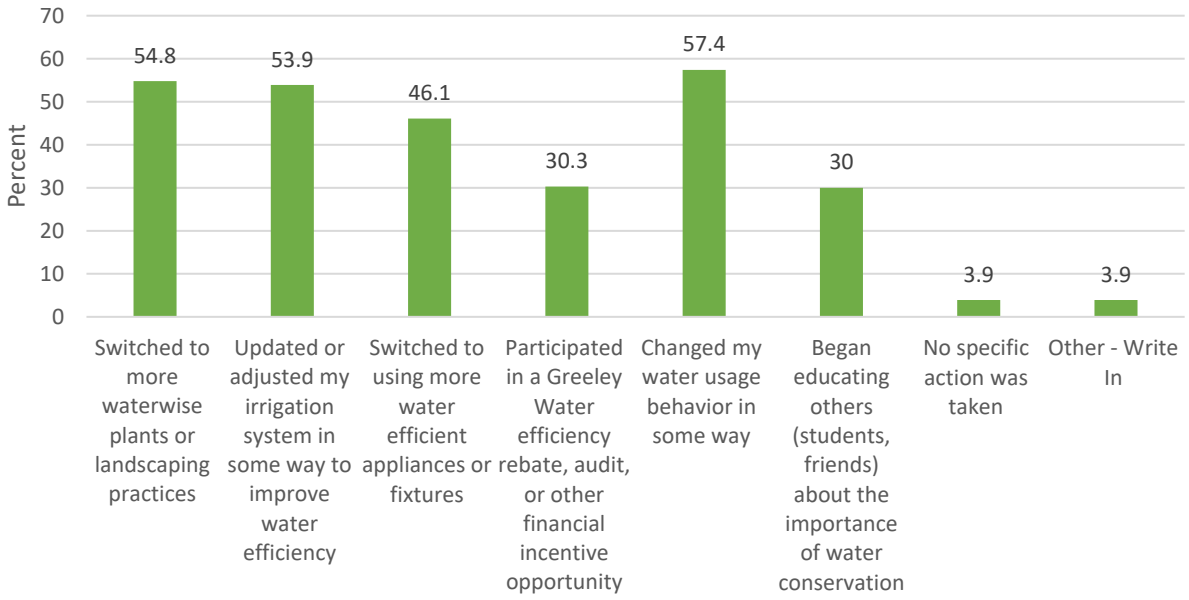


***Figure 7**. Water saving action taken after participating in and Educational Program.*

c. Rating

Most respondents found the education programs they participated in to be helpful or very helpful on a scale of 1-5 with one being the less helpful and five being very helpful. The most popular programs for past participation were also the highest scoring programs, using this metric. Ninety-one percent (91%) of respondents rated the Landscape Lecture Series as helpful or very helpful, followed by the Xeriscape Education/Tour (89%). Tours of Greeley Water Facilities and the Annual Mayor's Water Challenge had slightly lower responses, with 74% and 65% of respondents, respectively, ranking them as helpful or very helpful. Interestingly, while the Annual Mayor's Water Challenge had larger participation numbers than the Tours of Greeley Water Facilities, it was reported as slightly less helpful than the facility tours.

d. Future Participation

Consistent with the past participation results, as Figure 8 illustrates, the Landscape Lecture Series (57%) and Xeriscape Education (53%) were the most common programs for respondents to express interest in participating in within the next 3 years. Interestingly, 26% of respondents were also interested in tours of Greeley water-related facilities, compared to just 6% of respondents who had participated in tours in the past (a 20-percentage point gap). Comparatively, while 12% of respondents had participated in the Mayor's Water Conservation Challenge in the past, only 20% of respondents expressed an interest in participating in the

future (an 8-percentage point gap). Seventy-seven percent (77%) of all respondents were interested in participating in future educational programs, far more than the 44% that had participated in any of these programs in the past, suggesting a strong amount of interest in exploring more education programs among survey respondents.

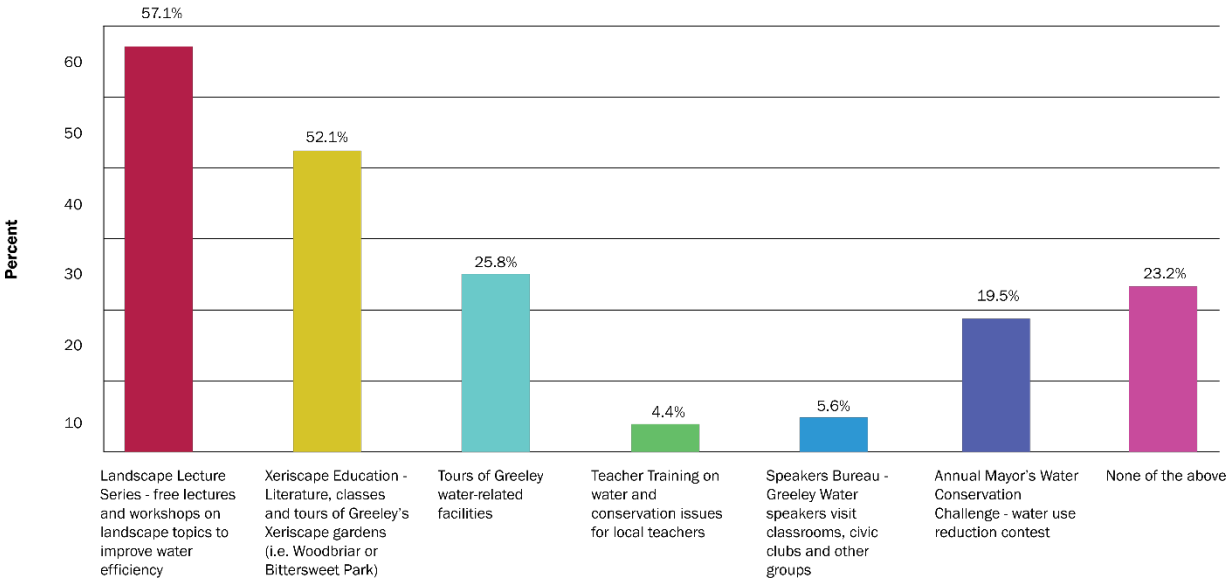


Figure 8. *Participant interest in future participation in Educational Programs.*

Future participation results remained consistent amongst those respondents who were unaware of the educational programs prior to the survey. However, as one might expect, a greater percentage – 40% of these respondents, compared to 23% of all survey respondents – were not interested in participating in education programs in the future. Amongst survey respondents in the lowest income bracket, a slightly smaller percent was interested in the Landscape Lecture Series (36%) and Xeriscape Education (44%), however, respondents in this income bracket were slightly more interested in Tours of Greeley Water facilities (36%). Amongst respondents of Hispanic, Latino or Spanish origin, results were fairly consistent with overall survey responses, however, respondents expressed more interest in the Annual Mayor's Water Challenge (28% compared to 20% for all respondents) and less interest in Xeriscape Education (44% compared to 53% for all respondents).

2. Water Audits

a. Past Participation

Figure 9 shows that of the survey respondents, 24% had participated in an outdoor irrigation audit, 13% had participated in an indoor water audit, and just 2% had participated in commercial audits. Seventy-two percent (72%) of respondents had not participated in any water audit programs.

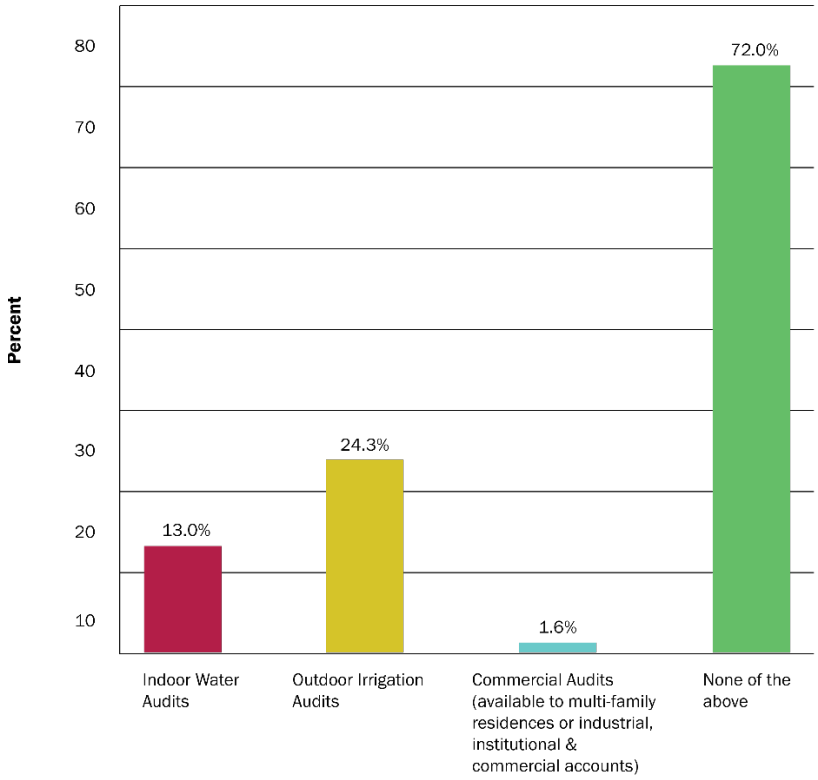


***Figure 9**. Past Participation in Water Audits.*

b. Water Savings Action

After completing a water audit, most respondents took some type of water saving action. Captured in Figure 10, for indoor audits, such actions included: receiving and installing a free low flow showerhead(s) and/or faucet aerator(s) (79%), changing their water use behavior in some way (59%), and upgrading an old high-water use appliances/fixture to a water efficient appliance/fixture (41%). For outdoor irrigation audits, captured in Figure 11, common actions included: adjusting their irrigation watering schedule (74%), adjusting their irrigation system to improve water efficiency (48%), receiving a rebate from Greeley Water to install a smart sprinkler controller (31%), and switching to more water wise plants or landscaping practices (31%).

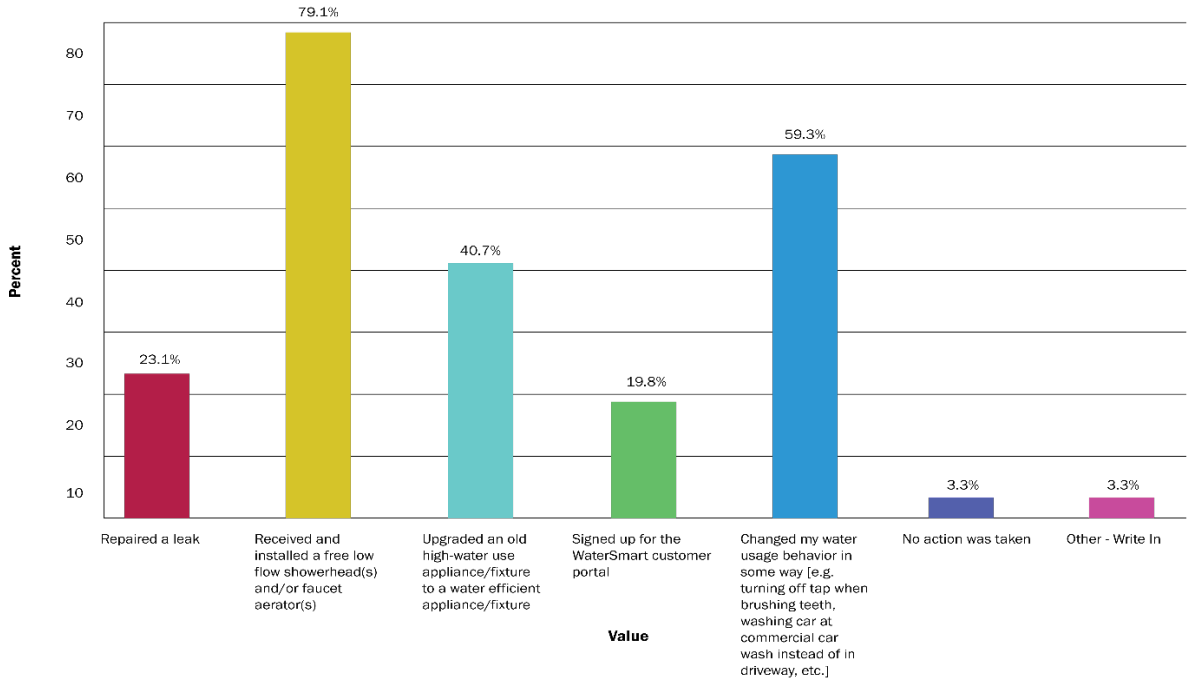


Figure 10. *Water savings actions taken as a result of indoor water audit.*

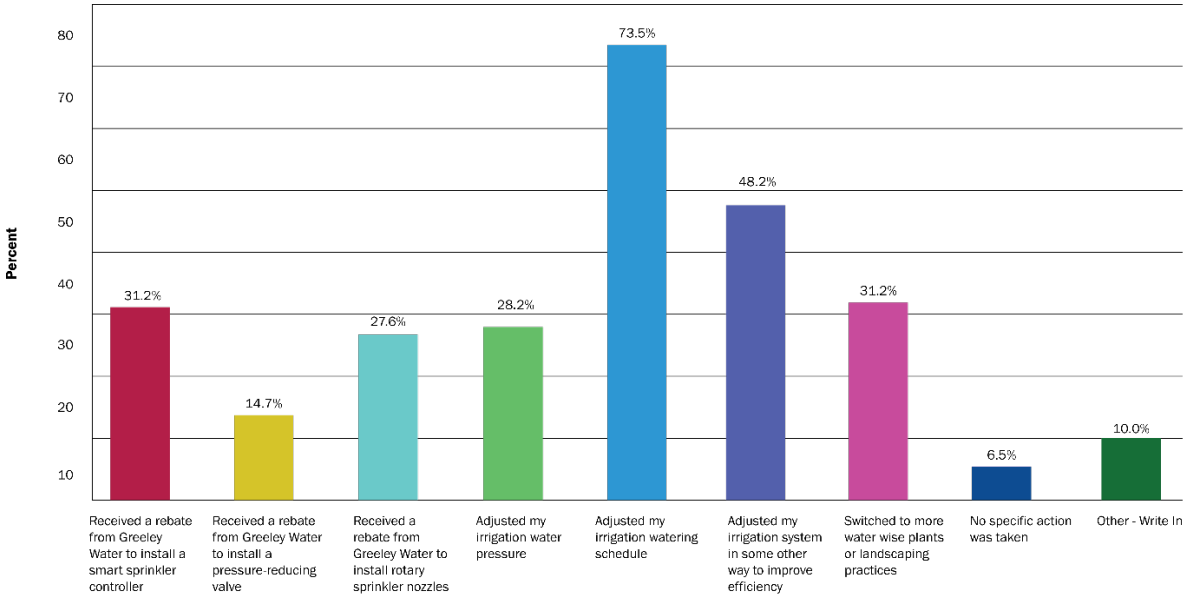


Figure 11. *Water savings action taken as a result of outdoor water audit.*

c. *Rating*

The vast majority of survey respondents who participated in a water audit found the program to be helpful or very helpful (i.e., scoring them a 4 or 5 on a scale of 1-5 with 5 being very helpful). Residential Outdoor Irrigation Audits scored the highest (86% of respondents who participated ranking them as helpful or very helpful), followed closely by Commercial Audits (Indoor and/or Outdoor) (83%) and Residential Indoor Audits (81%). Additionally, 89% of respondents that received an outdoor irrigation rebate following their irrigation audit found that rebate to be helpful or very helpful (i.e., scoring them a 4 or 5 on a scale of 1-5).

d. *Future Participation*

Consistent with the past participation results, Figure 12 shows that the Residential Outdoor Irrigation Audit (45%) was the program that respondents expressed the most interest in participating in in the future. Forty percent (40%) of respondents were also interested in taking advantage of Outdoor Irrigation Rebates, available to those that have participated in a Residential Outdoor Irrigation Audit. Thirty-one (31%) of respondents were interested in participating in Residential Indoor Water Audits in the future.

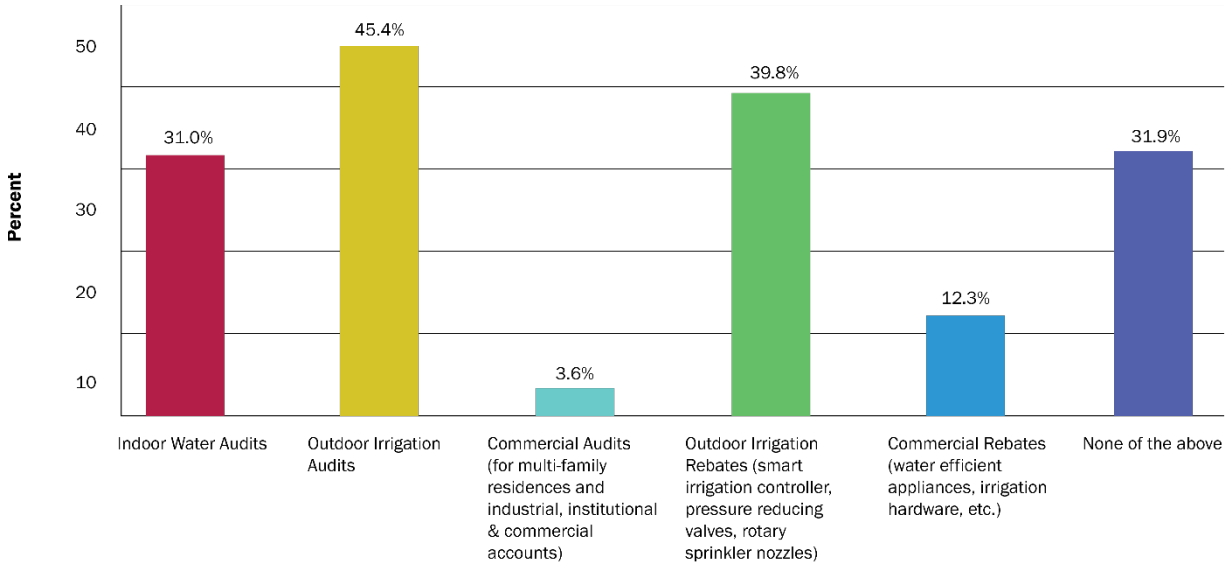


Figure 12. *Participant interest in future participation in Water Audits.*

For those that were unaware of Greeley's audit program prior to this survey, outdoor irrigation rebates (36%) and residential irrigation audits (32%) remained the most popular opportunities for future participation. Survey respondents in the lowest income bracket expressed less interest in all audits compared to higher income respondents. Whereas respondents of Hispanic, Latino or Spanish origin expressed slightly more interest in outdoor irrigation rebates

(50% compared to 26% for those of non-Hispanic, Latino or Spanish origin) and more interest in commercial rebates (26% compared to 11% for those of non-Hispanic, Latino or Spanish origin).

3. Water Efficiency Incentives

a. Past Participation

Captured in Figure 13, the Free Low-Flow Showerhead Exchange was the most common water efficiency program for survey respondents to have participated in (22% of respondents), followed by the High Efficiency Toilet Rebate (17%), and the discounted Garden in a Box Kit (15%). The Showerhead Exchange and Garden in a Box program, in particular, are perhaps most well-utilized since they have very low barriers to entry as they are open to both homeowners and renters and only require having a shower or a space to grow a garden. On the other hand, the Life After Lawn Program was the least common for past participation (8%) perhaps due to the fact that this program only launched in 2020 during the COVID pandemic and requires a more significant investment of time and funding from the participant.

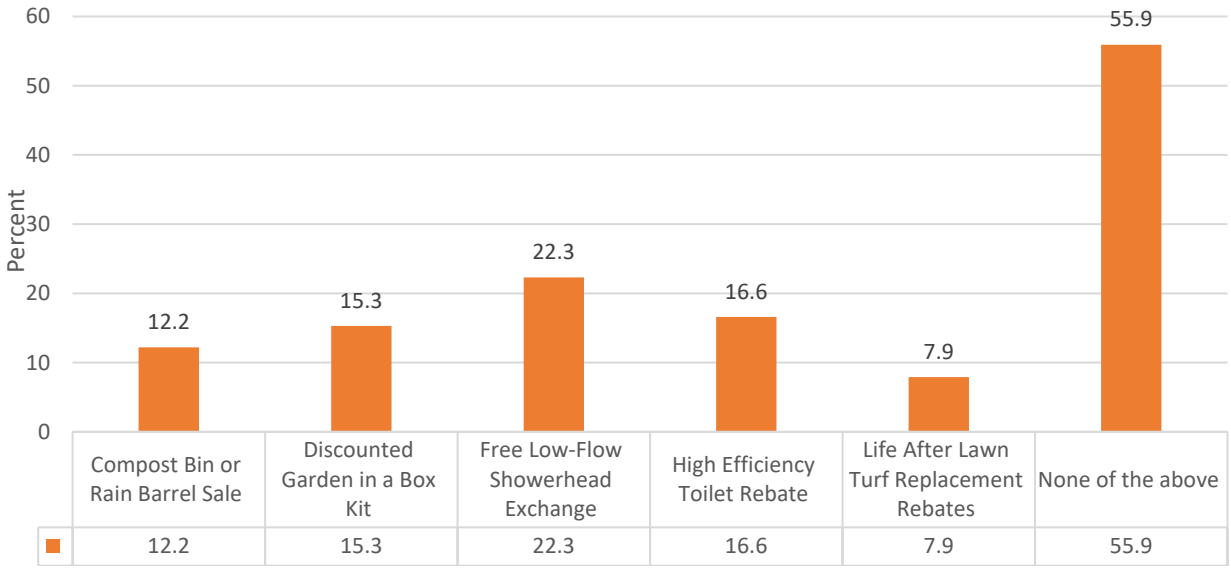


Figure 13. *Past participation in Water Efficiency Incentives.*

b. Rating

The vast majority of participants – at least 84% of participants for all programs – found the Water Efficiency Incentive to be valuable or very valuable (indicated by rating programs a 4 (valuable) or 5 (very valuable) on a scale of 1-5. The high efficiency toilet rebate ranked the highest at 94%, followed by the Garden in a Box program at 92%. The program that the most

respondents had participated in – the Low-Flow Showerhead Exchange – was rated as slightly less valuable (88%).

c. Future Participation

Figure 14 shows that discounted Garden in a Box kits (48%) and Life After Lawn turf replacement rebates (39%) rose to the top as the most popular incentive opportunities for future participation. Free Low-Flow Showerheads were less popular (19%), perhaps due in part to community saturation, given the greatest percentage of survey respondents had participated in showerhead exchanges in the past (22%) and the perceived economic value (cost is approximately $20-$40). Only 19% were not interested in any efficiency incentive programs.

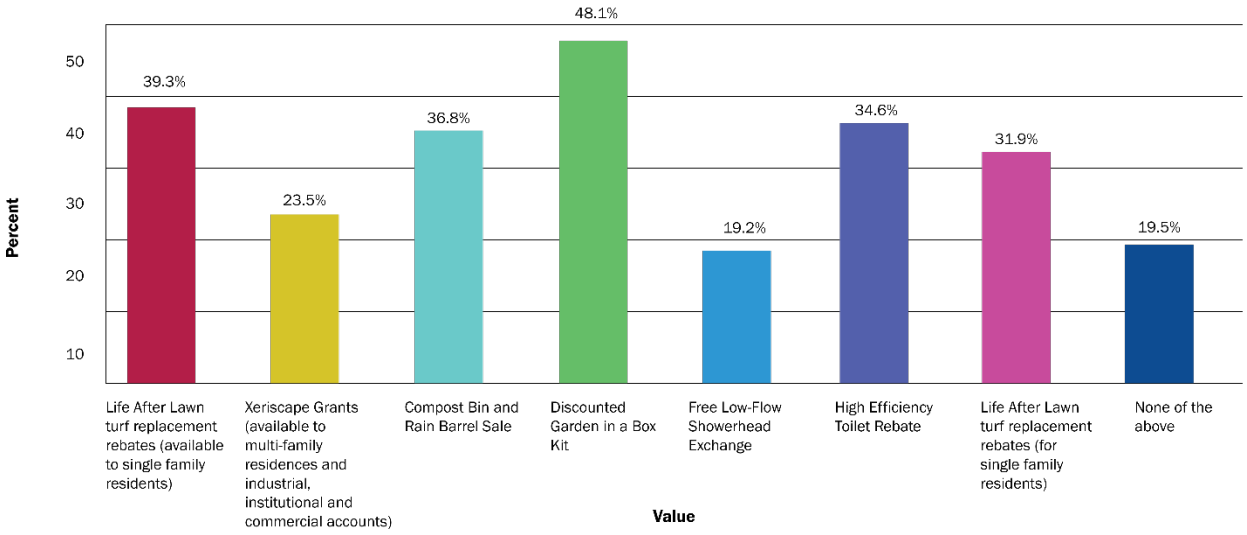


Figure 14. *Participant interest in future participation in Water Efficiency Incentives.*

For those that were unaware of efficiency incentive programs, respondents were most interested in high efficiency toilet rebates (38%), followed closely by compost bin and rain barrel sales (36%) and discounted Garden in a Box kits (36%). For respondents in the lowest income bracket, a larger percent (43%) expressed that they were not interested in any of the incentive programs, compared to 19% for all survey respondents. However, for those in the lowest income bracket that *were* interested in incentive programs, respondents expressed the most interest in Life After Lawn (32%) and High Efficiency Toilet Rebates (32%).

For most programs, respondents of Hispanic, Latino or Spanish origin, expressed slightly more interest in efficiency incentives than those of non-Hispanic, Latino or Spanish origin, particularly the High Efficiency Toilet Rebate (52% compared to 34% for non-Hispanic, Latino or Spanish Origin) and the Life After Lawn program (46% compared to 39% for those of non-Hispanic, Latino or Spanish origin). The reverse was true for the Compost Bin and Rain Barrel Sale in

which just 24% of respondents of Hispanic, Latino or Spanish origin were interested in participating in the future, versus 38% of non-Hispanic, Latino or Spanish origin respondents.

d. Life After Lawn Results

In conversation between the Project Team and Greeley Water staff, Greeley staff expressed a targeted interest in potentially expanding its existing Life After Lawn Program. Thus, the survey included several questions specific to this program. Encouragingly, Figure 15 shows 59% of survey respondents said they would be "very willing" or "may consider" removing grass from their front yard, while only 16% said they would not consider this. Figure 16 shows that when asked what the primary barriers keeping them from replacing grass with low water landscaping were, the most common responses were cost (62%) and physical labor involved (52%), both barriers that can be mitigated, in part, through expanded Life After Lawn Program funding opportunities.

Interestingly, 28 individual respondents wrote-in under the "Other" category that HOA rules and restrictions were their biggest barrier to replacing some or all of their grass. In Colorado, as of 2021, HB 21-1229 increases protections for property owners in HOA-guided communities and does not allow for HOAs to mandate turf grass or prohibit water wise landscaping.[8] It's most likely that these respondents were not aware of this policy change and it may be fruitful for Greeley Water to conduct a targeted outreach campaign to both homeowners and HOA governing bodies to update them on this change.

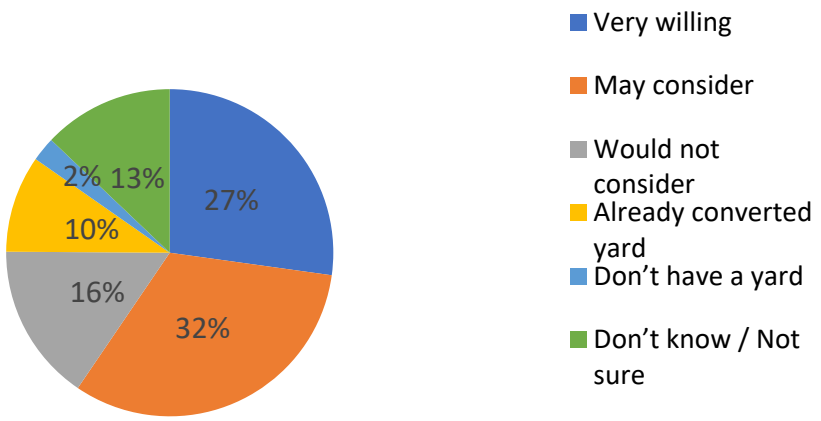


Figure 15. *Participant willingness to remove grass from their front yard.*

[8] https://leg.colorado.gov/bills/hb21-1229

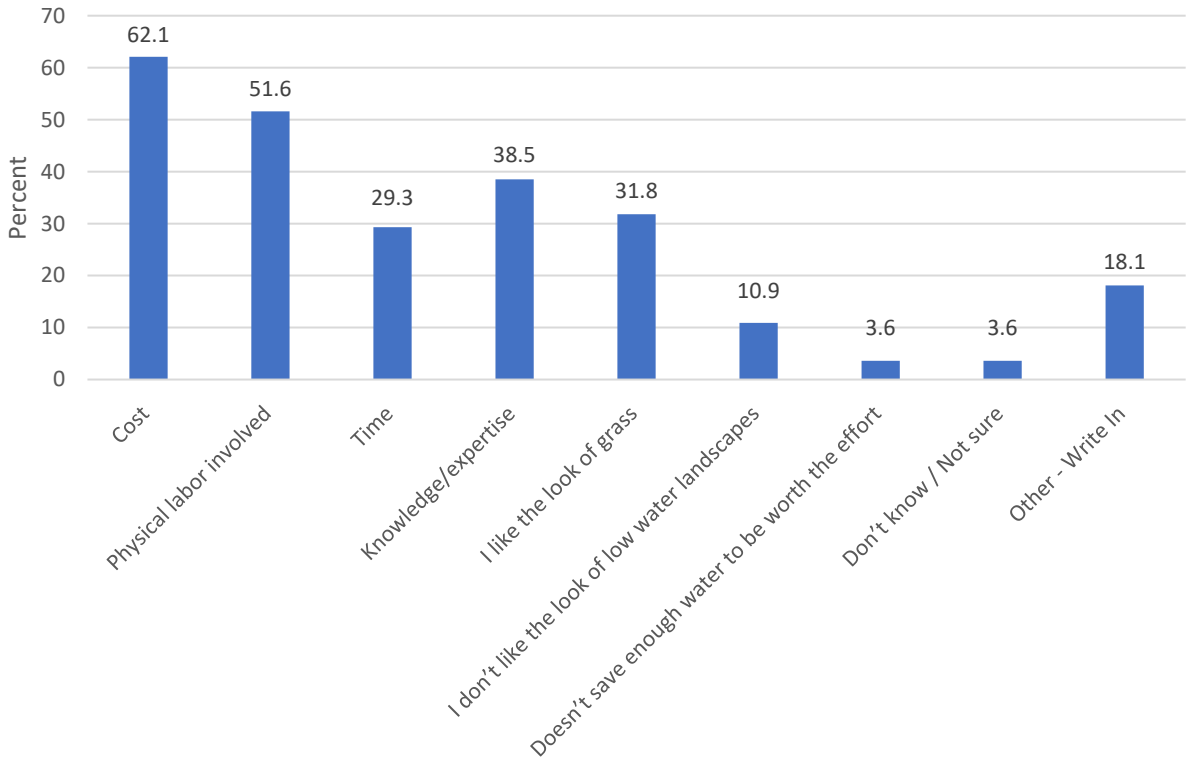


Figure 16. *Primary barriers to replacing turf.*

4. Online Water Efficiency Tools

a. Past Utilization

Figure 17 shows that of those respondents that had used Greeley's online tools, Greeley's Water Conservation webpage was most common (26%) followed by the Online Plant Database (20%). The Water Budget Portal (15%) and WaterSmart Customer Portal (11%) were less commonly used. 59% of respondents had not used any of Greeley Water's online tools.

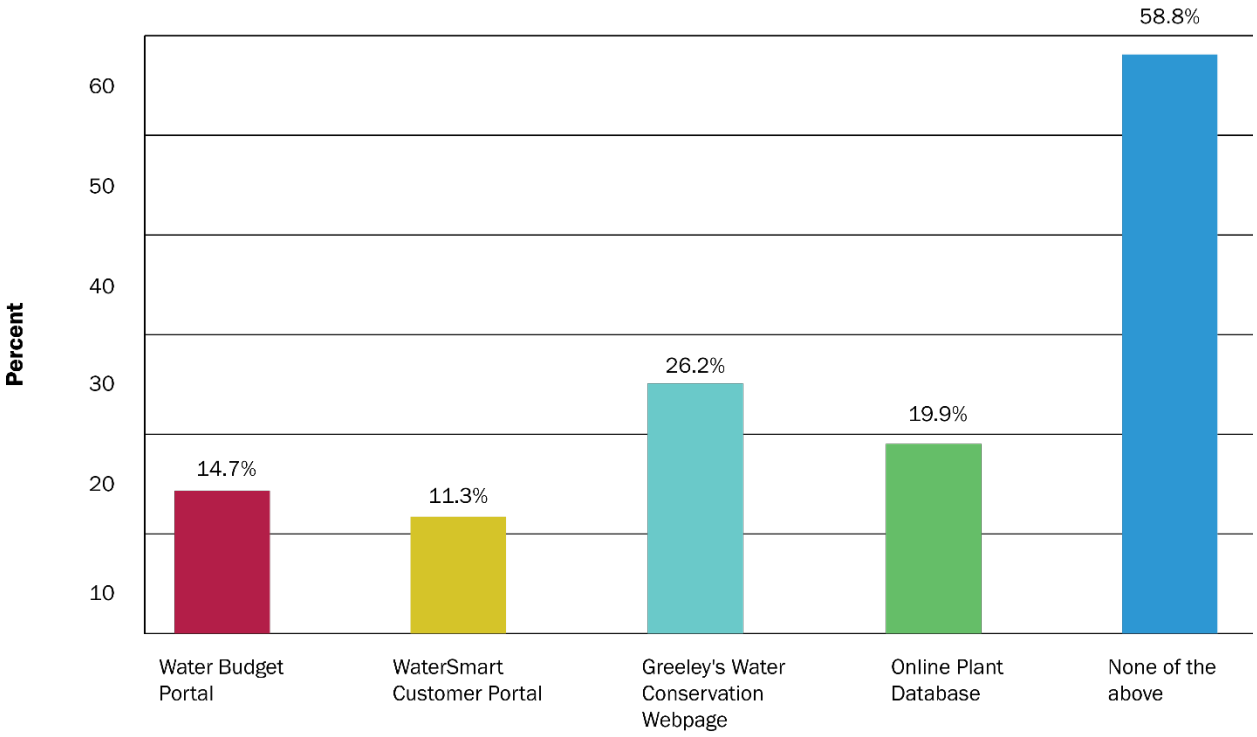


Figure 17. *Past Utilization of Greeley Water Online Water Efficiency Tools.*

b. Rating

The majority of respondents who had used Greeley's Online Water Efficiency Tools found them to be helpful or very helpful (i.e., scoring them a 4 or 5 on a scale of 1-5). The Online Plant Database scored the highest (92%), followed by the Water Conservation Webpage (86%), the WaterSmart Customer Portal (76%) and the Water Budget Portal (76%).

c. Motivation for using WaterSmart Portal

The WaterSmart Portal was of particular interest to Greeley staff as this is a relatively new tool and staff have been conducting a significant outreach effort around the tool. Thus, an additional question was asked to determine why respondents were utilizing the WaterSmart Portal. Of those that utilized the customer portal, most respondents used it to learn more

about their water use (73%) and to find out what the water budget was and better understand the portal (71%).

d. Future Utilization

Unlike past participation results, Figure 18 illustrates that respondents were most interested in using the Online Plant Database in the future (53%) compared to the Water Budget Portal (44%), WaterSMART Customer Portal (43.3%), and Water Conservation Webpage (42%). The results remained consistent for respondents that were unaware of Greeley's Online Water Efficiency Tools prior to the survey, with the largest percentage interested in using the Online Plant Database (44%). Since the Online Plant Database, in particular, was less likely to have been used in the past, these results suggest that participants may be more interested in utilizing this resource once they are reminded of it or made aware of it.

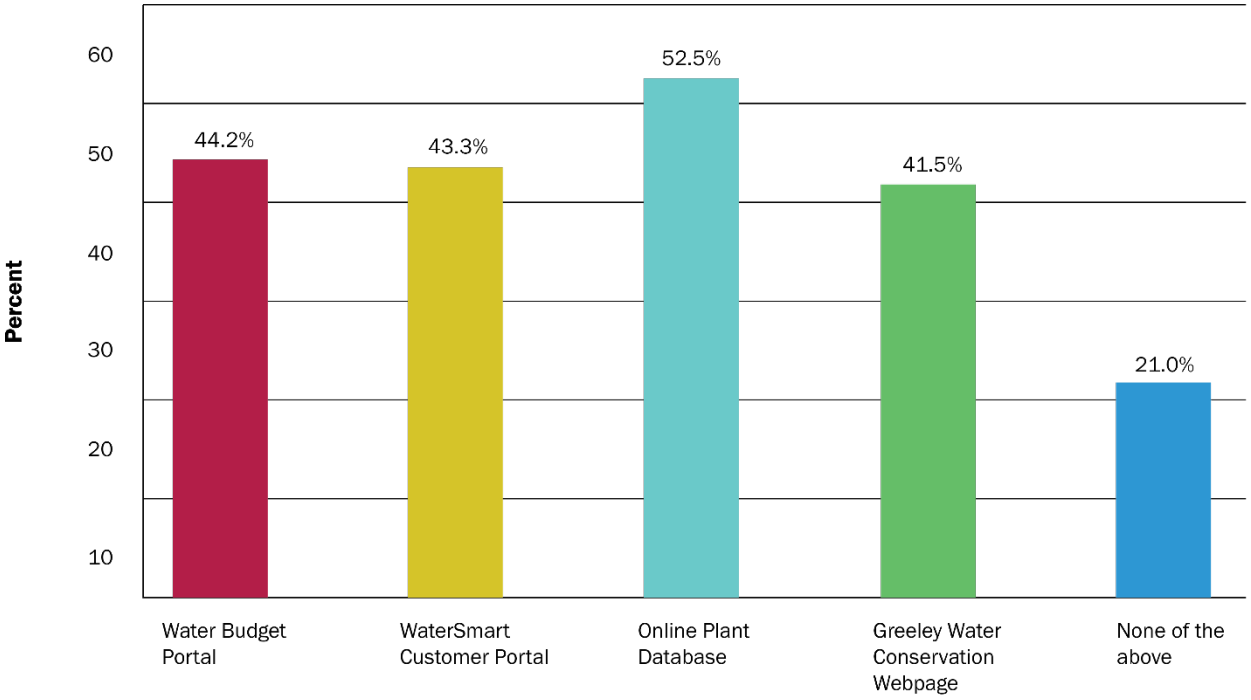


Figure 18. *Participant interest in future participation in Online Efficiency Tools*.

Compared to other income brackets, the lowest income bracket was most interested in Greeley's Water Conservation Webpage (57% compared to 42% for all survey respondents). Respondents of Hispanic, Latino or Spanish origin were more interested in the Water Budget Portal (59% compared to 43% of those of non-Hispanic, Latino or Spanish origin) and the WaterSMART customer portal (56% compared to 43% of those of non-Hispanic, Latino or Spanish origin). Those of Hispanic, Latino, or Spanish origin were less interested in using the Online Plant Database (43% compared to 54% of those of non-Hispanic, Latino or Spanish origin).

Key Findings from the Customer Survey

Importance & Effectiveness of Conservation Programming

Survey results demonstrate that Greeley's Water Conservation Program is popular, impactful, and highly valued. Overwhelmingly, survey respondents found Greeley's Water Conservation program to be important, with 94% reporting that the programs are important or very important. This finding is perhaps even better exemplified by the numerous respondents that chose to write-in on the survey with positive feedback on the various programs. For example, one respondent said, "I'm impressed by the efforts the water education program is making and their foresight given our growing population in a dry climate. Programs are very accessible for residents." Another wrote, "Please continue to offer these types of programs. Conserving water is critical here in the West." Still another noted, "It does not matter how many times I interact with a Greeley water official. They are always very informative and willing to help." In fact, several Greeley Water Conservation staff members were even mentioned by name in these positive comments.

Across the board, the survey results indicate a strong degree of awareness of, interest in, participation in, and value derived from Greeley's current portfolio of Water Conservation Programs, as demonstrated in the analysis below. Compared to those that had participated in programming in the past, for almost all programs the percentages increased when asked whether respondents wanted to participate in programming in the future.

Outreach Strategies

Greeley Water can most effectively reach their customers with conservation opportunities through email updates and the monthly newsletter, bill inserts, and the Greeley Water website. It should be noted that for younger demographics, ages 18-24, investment in compelling and frequent social media content could be fruitful. Messages that may resonate with Greeley

Water customers, based on survey participants water conservation motivations, include: saving money on water bills, protecting Greeley's limited water resources, reducing personal use, paying for a fixture or appliance, and supporting community values.

Educational Programs

The Landscape Lecture Series and Xeriscape Education were consistently the most common programs for respondents to have participated in the past, the programs that were rated as most helpful and the most common programs for respondents to be interested in participating in within the next 3 years. Interestingly, there was a strong increase in interest for future participation in tours of Greeley Water Facilities, compared to those that had participated in the past (26% compared to 6%). And respondents in the lowest income bracket were slightly more interested in these tours than other income brackets (36% compared to 26%). The Annual Mayor's Water Challenge, on the other hand, scored the lowest of the Educational Programs on interest in future participation and the rating of how helpful the program was for those that had participated in the past. Respondents of Hispanic, Latino or Spanish origin expressed greater interest in the Mayor's Water Challenge than those of non-Hispanic, Latino, or Spanish origin (28% compared to 20%).

While the water savings benefits associated with educational programs can be challenging to quantify, the vast majority of respondents affirmed that they had taken some kind of water savings action as a result of participating in an educational program, including switching to more waterwise plants or landscaping practices and updating or adjusting their irrigation system to improve water efficiency, among other actions.

The Educational Program results suggest that Greeley Water should prioritize – and perhaps even expand – its Landscape Lecture Series and Xeriscape Education offerings. There's also a strong interest in participation in tours of Greeley Water facilities. The Annual Mayor's Water Challenge was slightly less popular. However, given the relatively low cost of participation in the program by the City and Greeley's history of scoring consistent high for resident participation compared to other cities in the region, it is likely worthwhile to continue this annual tradition.

Water Audits

The Residential Outdoor Irrigation Audit was consistently the most common program for respondents to have participated in in the past, the program that was rated as most helpful and the most common program for respondents to be interested in participating in within the next 3 years (45%). The Outdoor Irrigation Rebates, available to those that have participated in an Outdoor Irrigation Audit, were also widely of interest to respondents for future participation (40%). Respondents of Hispanic, Latino or Spanish origin, in particular, expressed slightly more interest in Outdoor Irrigation Rebates than those of non-Hispanic, Latino or Spanish origin (50% and 40%, respectively).

Residential indoor audits were reported as less popular, though 31% of respondents were still interested in participating in the future. Notably, since this survey was administered, Greeley Water has seen a significant increase in sign-ups for Residential Indoor Audits related to the City's roll-out of Advanced Metering Infrastructure and leak detection notifications.

Commercial Audits and Rebates were more challenging to compare in this survey as 96% of respondents identified as Greeley residents and only 4% identified as Greeley business/commercial customers. Thus, the relatively low Commercial Audit program interest is directly correlated to the low number of overall commercial customers that participated in the survey.

Across the board, the majority of past water audit participants reported that they had taken some kind of water saving action as a result of the audit (e.g. receiving and installing a low flow showerhead and/or faucet aerator or adjusting their irrigation watering schedule). Based on these findings, Greeley Water should continue to prioritize its Residential Outdoor Irrigation Audit program and associated Irrigation Rebates. The results do not suggest that the City should discontinue any of its water audit offerings at this time.

Water Efficiency Incentives

While the Free Low Flow Showerhead Exchange was the most common program for respondents to have participated in within the last five years (22%), discounted Garden in a Box kits (48%) and Life After Lawn turf replacement rebates (39%) rose to the top as the most popular incentive opportunities for future participation. The Free Low Flow Showerheads were reported as the least popular for future participation (19%). The vast majority of past participants found all programs to be very valuable (at least 84%), however the high efficiency toilet rebate ranked the highest (94%) followed by the Garden in a Box program (92%).

Respondents that were unaware of efficiency incentive programs prior to taking the survey expressed more interest in high efficiency toilet rebates (38%), followed closely by compost bin and rain barrel sales (36%) and discounted Garden in a Box kits (36%). Respondents in the lowest income bracket, expressed the most interest in Life After Lawn (32%) and High Efficiency Toilet Rebates (32%). And those of Hispanic, Latino or Spanish origin, expressed slightly more interest in efficiency incentives than those of non-Hispanic, Latino or Spanish origin, particularly the High Efficiency Toilet Rebate (52%) and the Life After Lawn program (46%).

The majority of respondents (59%) also expressed a willingness to replace all or some of their lawns with water efficient landscaping and indicated that cost and physical labor were the primary barriers keeping them from taking this step. One could expect that participation in the Life After Lawn Program and Garden in a Box Program would help to negate these barriers.

The results suggest that the Life After Lawn program, the Garden in a Box program, and the High Efficiency Toilet Rebate program (due to its interest among the lowest income bracket and

those unaware of conservation programming) should be prioritized by Greeley Water moving forward. Greeley Water may wish to assess participation at upcoming events in its Low Flow Showerhead Exchange Program to determine, as this survey suggests, whether this program may has reached community saturation at this time. Still, the Low Flow Showerhead Exchange Program is one of the more accessible programs to all Greeley residents, including renters, and can readily be "coupled" with other conservation program offerings (e.g. giveaways at a Landscape Lecture Series).

Online Water Efficiency Tools

Of the four main categories of programming, respondents were least aware of the Online Water Efficiency Tools compared to other programming categories, suggesting a potential benefit of increased outreach and communication efforts around these specific tools. The Online Plant Database, however, scored consistently high for respondents that had used the tool in the past (20%), were interested in using it in the future (53%) and found the tool to be helpful or very helpful (92%).

Compared to other income brackets, respondents in the lowest income bracket were most interested in Greeley's Water Conservation webpage (57%). Respondents of Hispanic, Latino or Spanish origin were more interested than those of non-Hispanic, Latino and Spanish origin in the Water Budget Portal (59%) and the WaterSmart customer portal (56%).

The results do not suggest that any of Greeley's Online Water Efficiency Tools should be discontinued, however, should limited capacity and resources exist for tool updates, it may be most beneficial to prioritize the Online Plant Database. Outreach and communication efforts should expand, to the extent possible, for all the online tools.

Future Water Conservation Programming Opportunities

Some respondents also chose to write-in recommendations for additions or modifications to Greeley Water Conservation programming. Some common themes included:

- Expand the Life After Lawn program to provide financial incentives for back yards, not just front yards.
- Provide graywater kits.
- Encourage and provide rebates for residents to do more mulching.
- Provide brochures on various water conservation programming to real estate agents.
- Provide yards signs to individuals participating in Outdoor Irrigation Audits and Life After Lawn.

Considerations for Future Surveys

Greeley's Water Conservation Program should endeavor to complete a Water Conservation Customer Survey every 5-7 years to stay in informed on customers' values and interests, and to analyze trends and changes in respondent answers over time. To the extent feasible, the

majority of the questions should remain fairly consistent between surveys to demonstrate any changes or trends over time. However, questions will likely be adjusted based on changes to the Water Conservation Program Portfolio and Greeley Water priorities.

Without asking specific questions on new programming or recommendations, this survey garnered a number of written responses with suggestions for updates to Greeley's Water Conservation Program portfolio. Because of this, in the future, Greeley may also consider adding questions about potential conservation programs under consideration by the City. For example, if the City adopted a graywater ordinance and wanted to consider providing free Laundry-to-Landscape parts kits, they could ask respondents about their interest in this program and what resources they would need to make their participation feasible.

Additionally, while the survey garnered 720 completed responses, it also had a 21% abandonment rate (meaning 191 additional people started the survey and did not complete it). This abandonment rate is typical for longer questionnaires and since respondents did not drop-off at a particular question or questions, we can deduce that the drop-offs were not due to survey design or technical issues and instead were primarily due to survey length.[9] Survey abandonment both reduces a survey's sample size for analysis and can result in a less representative sample. While the project team was aware of the abandonment challenges of a longer survey from the outset, it was determined that asking all questions in this initial survey would be important to determining what data might be most significant. Given the outcomes of the survey, the project team would like to make the following recommendations for scaling-back this survey in future iterations:

- *Remove awareness questions* – Respondents were asked at the beginning of the survey which specific Greeley Water Conservation program they were "aware of" prior to completing the survey. These questions were primarily included in order to analyze results alongside interest in future programming (i.e. of those customers that Greeley Water hasn't effectively been reaching, how many are now interested in participating in a given program in the future once they're made aware of that program). However, in almost all cases, the future participation results remained consistent between those that were aware of the program prior to the survey, and those that weren't.
- *Remove most written response boxes* – Past participants of the four main categories of conservation programs were provided an optional write-in box to share more about their participation. While many respondents took advantage of providing feedback and positive comments, a single write-in box for additional comments at the end of the survey would likely be sufficient to garner these responses while moving respondents more quickly through the survey.
- *Remove Life After Lawn Questions* – Specific Life After Lawn questions were included in the survey since this is a new Greeley Water Program and thus, more limited

[9] Industry research shows that on average 15% will abandon a survey at 10 minutes and 20% will abandon at 60 questions: https://issuu.com/marymala/docs/survey_abandonment_rates

information would be gathered under the past participation and awareness results. While the findings may support program outreach efforts, the specific questions will likely not need to be included in future surveys as sufficient information will be gleaned from responses related to future participation.

Finally, given the City's interest in connecting with Hard-to-Reach populations, Greeley should consider translating the survey, and associated outreach materials, into Spanish and offering the survey bilingually.[10] If this approach is taken, the City could analyze results based on those that participated in the survey in Spanish and determine which, if any, Water Conservation Programming might be most impactful to offer bilingually.

Survey Conclusion

The City of Greeley should be very proud of its efforts to build an extensive and valuable Water Conservation Program. The customer survey results will allow the City to expand on the success of its existing program and further hone in on how to reach their target audience. The survey results should be considered in unison with the quantitative analysis sections described below.

[10] According to the National Library of Medicine, "Hard-to-Reach is a term used to describe those sub-groups of the population that are difficult to reach or involve in research or public health program due to their physical and geographical location . . . or their social and economic situation": https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3963617/#:~:text=Introduction-,'Hard%2Dto%2Dreach'%20is%20a%20term%20used%20to,and%20economic%20situation%20%5B1%5D.

Quantitative Analysis of Greeley's Water Conservation Programs

To complement the information gathered on Greeley's Water Conservation Programs directly from participants though the survey, this project also analyzed geographic trends in participation among participants and quantified the water savings that resulted from participation in these programs. The following sections describe each of these approaches in greater detail.

Spatial Trends in Water Conservation Program Participation

This analysis used the 2019 U.S. Census Bureau's American Community Survey (ACS) data,[11] combined with data tracking participation in Greeley's water conservation programs, to explore if and how participation varies according to demographic characteristics, such as community members' preferred language, identification as Hispanic or Latino by race and/or by origin, home ownership status, median household income, and internet access, among other characteristics. The goal of this analysis is to identify any trends or patterns in participation that could help to inform future outreach.

[11] The American Community Service (ACS) data reflects information gathered annually by the U.S. Census Bureau. The Bureau poses questions to randomly sampled addresses each year, and then uses this information to calculate community demographic information. This ACS data complements the Decennial Census the Bureau conducts every 10 years, which seeks responses from every resident. For information, see: https://www.census.gov/programs-surveys/acs/about.html.

Participation in Greeley's water conservation programs was compared to key demographic data from the US Census Bureau's American Community Survey (ACS) dataset. For more details and descriptions of each data source included in this analysis, please see Appendix E.

This data was analyzed at the block group scale. Block groups are statistical divisions of census tracts, generally defined to contain between 600 and 3,000 people.[12] Block groups are the smallest geographical unit for which the US Census Bureau publishes sample data (data which is sampled from a portion of all households, rather than collected for each household). The analysis used block groups since they represented the most recent and most granular census data available at the time of the analysis.

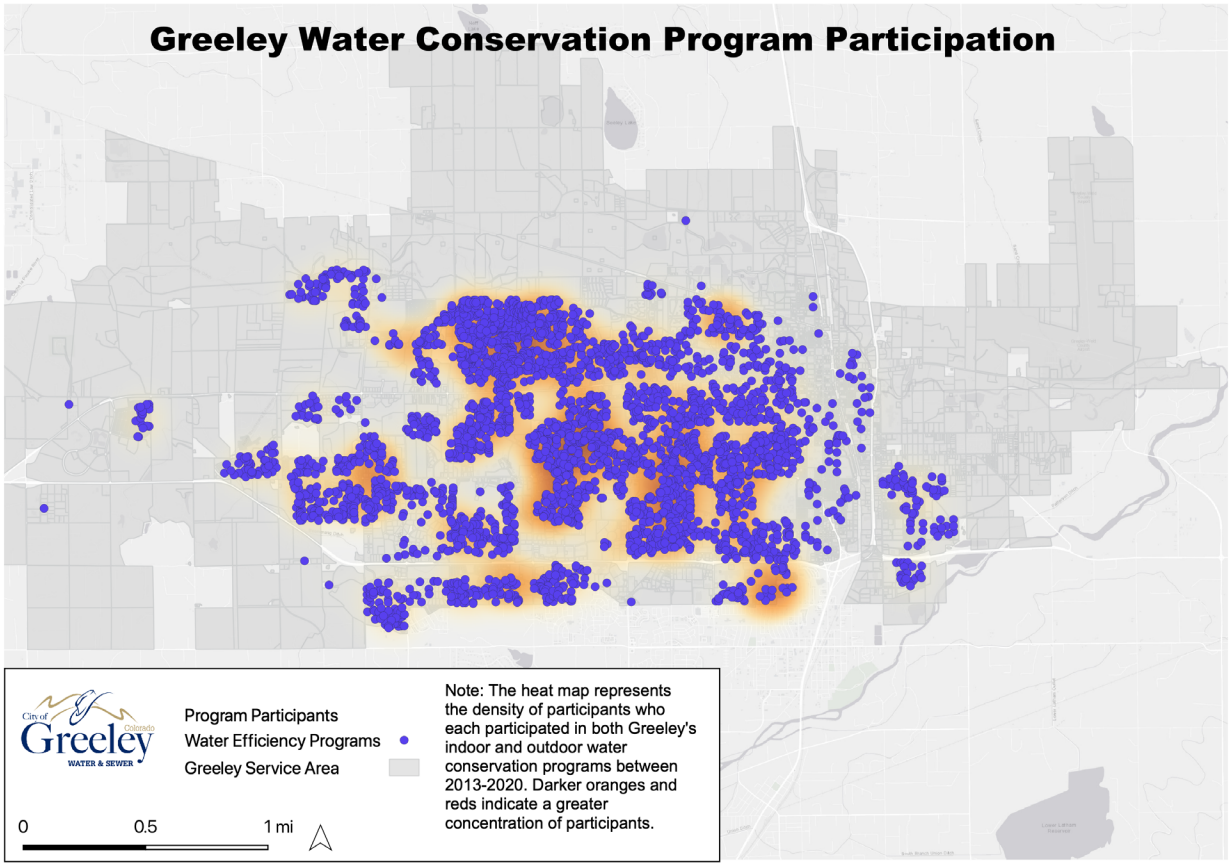


Figure 19. *Greeley Water Conservation Program participation from 2013-2020.*

As Figure 19 illustrates, participation in Greeley's water conservation programs is densest in the center of the City, and sparser in the outer sections of Greely's service area, in the southwest quadrant of the city's center, and in the northeast quadrant of the city's center.

[12] U.S. Census Bureau. (2021). "Glossary." Available: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_4.

Figures 20 and 21 compare these geographic patterns in participation with different demographic characteristics. In the northeast and southwest quadrants of the City's center, areas of sparser water conservation program participation are also areas with higher percentages of renter-occupied housing; with lower household income; and (particularly in the northeast section of the city's center) with high percentages of residents speaking Spanish, Asian American or Pacific Islander (AAPI) languages, or Indo-European languages.

Around the perimeter of Greeley's service area, water conservation program participation is also sparser, in part reflecting a lower population density in these areas of the City. New builds typically occur in the perimeter of the City, and are therefore likely to be water efficient indoors; however, there may still be opportunities for these customers to reduce their water use further, particularly through outdoor water conservation. These perimeter areas also differ somewhat in their demographics, as they represent areas with greater median household income; lower percentages of residents speaking Spanish, an AAPI, or Indo-European language. The percentage of renter-occupied housing is these neighborhoods is lower overall, though it varies by block group. In general, the northern edge of the service area has larger percentages of renter-occupied housing, and the southwest corner of the service area has lower percentages of renter-occupied housing.

These demographic trends suggest that strategies for increasing participation within the City's core might require strategies such as language translation (e.g., through partnerships with local community groups or non-profit organizations) and a particular emphasis on programs that renters are eligible to participate in. In-person events may be especially helpful, providing the opportunity for in-person translation to occur in a face-to-face setting and avoiding the need for Internet access, which may be lower in areas with lower median incomes. Engaging the outer perimeter of the city, in contrast, might be most effectively done through other forms of outreach, such as direct mail, bill inserts, or email outreach, that target participants spread across a wider area. This outreach might also highlight programs aimed at both renters and homeowners and include a focus on outdoor water use (reflecting the fact that outdoor water use may be higher in higher income, more sparsely populated areas).

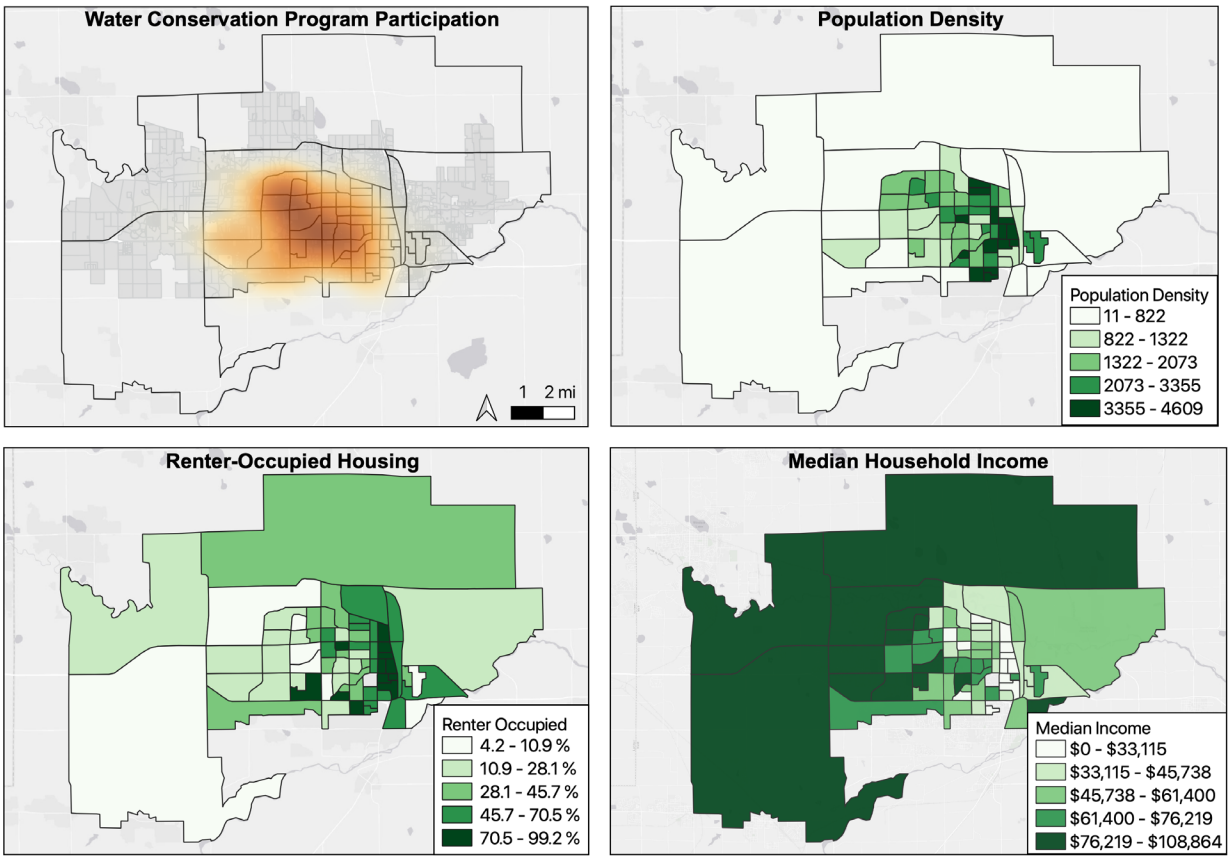


Figure 20. *Greeley Water Conservation Program participation (top left), compared with population density, percentage of renter-occupied housing, and median household income for US Census block groups in Greeley's service area.*

Unsurprisingly, many trends in these demographic characteristics correspond with each other. For instance, areas with lower median income often have higher percentages of renter-occupied housing. The trends in residents speaking languages other than English also offer some interesting points of comparison. Spanish is the language, aside from English, that is most commonly spoken in Greeley, ranging from 3-76% of residents in a block group, compared to a maximum of 10% of residents in a block group speaking an AAPI language, and a maximum of 8% speaking an Indo-European language. Figure 22 shows the neighborhoods with the highest percentages of each language spoken across the City. Many neighborhoods have distinct languages that are especially prominent, but the neighborhood shown in orange, in the City's northwest corner, has high percentages of residents speaking all three languages, suggesting that approaches that provide translation or engagement in a number of different languages might be most effective here.

As Figures 22 and 23 illustrate, participation in water conservation programs is lower in neighborhoods where more residents speak Spanish. However, it's important to note that water conservation program participation is not low in all neighborhoods with high percentages

of Spanish-speaking residents. For instance, water conservation participation is fairly high in the southern-most dark green neighborhood (showing large percentages of Spanish speakers) in Figure 22. Understanding what contributed to higher levels of participation here could offer insights into strategies that could be replicated in demographically similar neighborhoods.

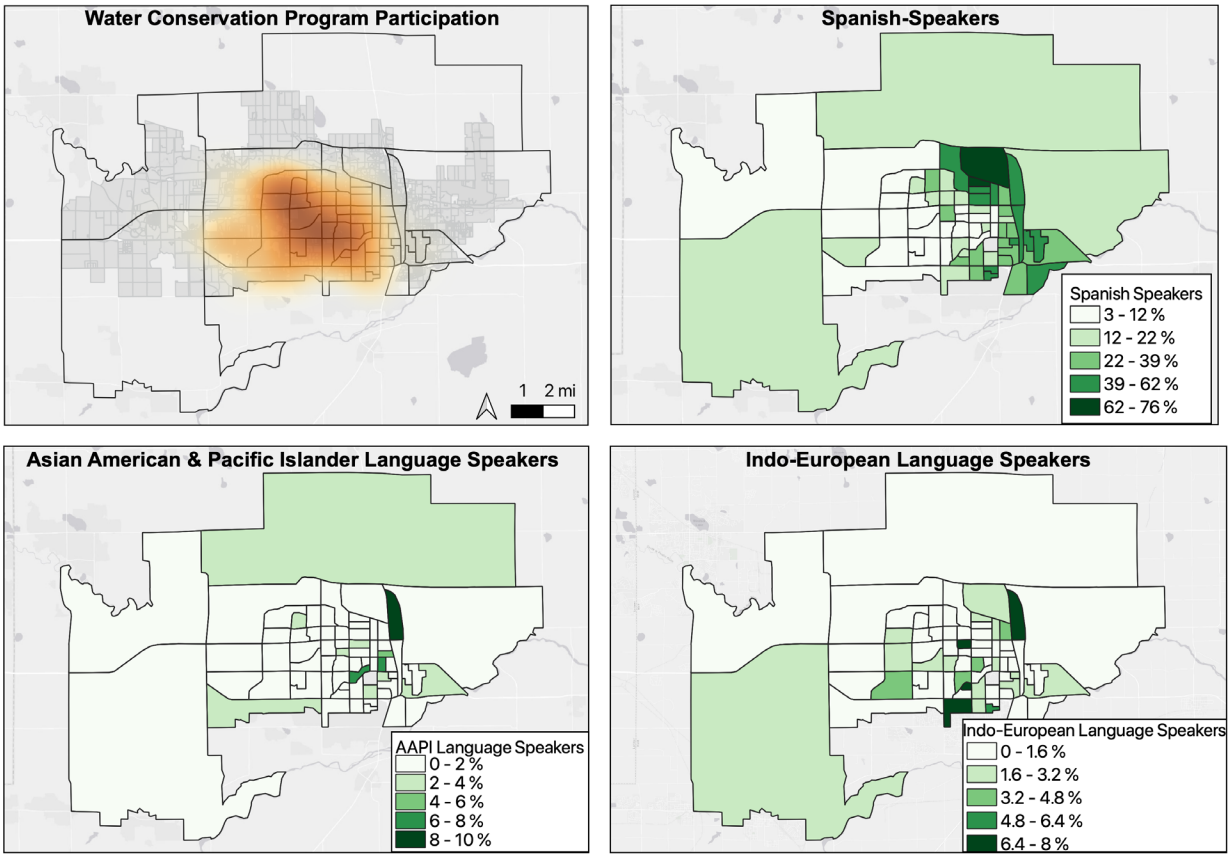


Figure 21. *Greeley Water Conservation Program participation (top left, shown in terms of population density), compared with percentage of Spanish, Asian American and Pacific Islander, and Indo-European speakers for US Census block groups in Greeley's service area.*

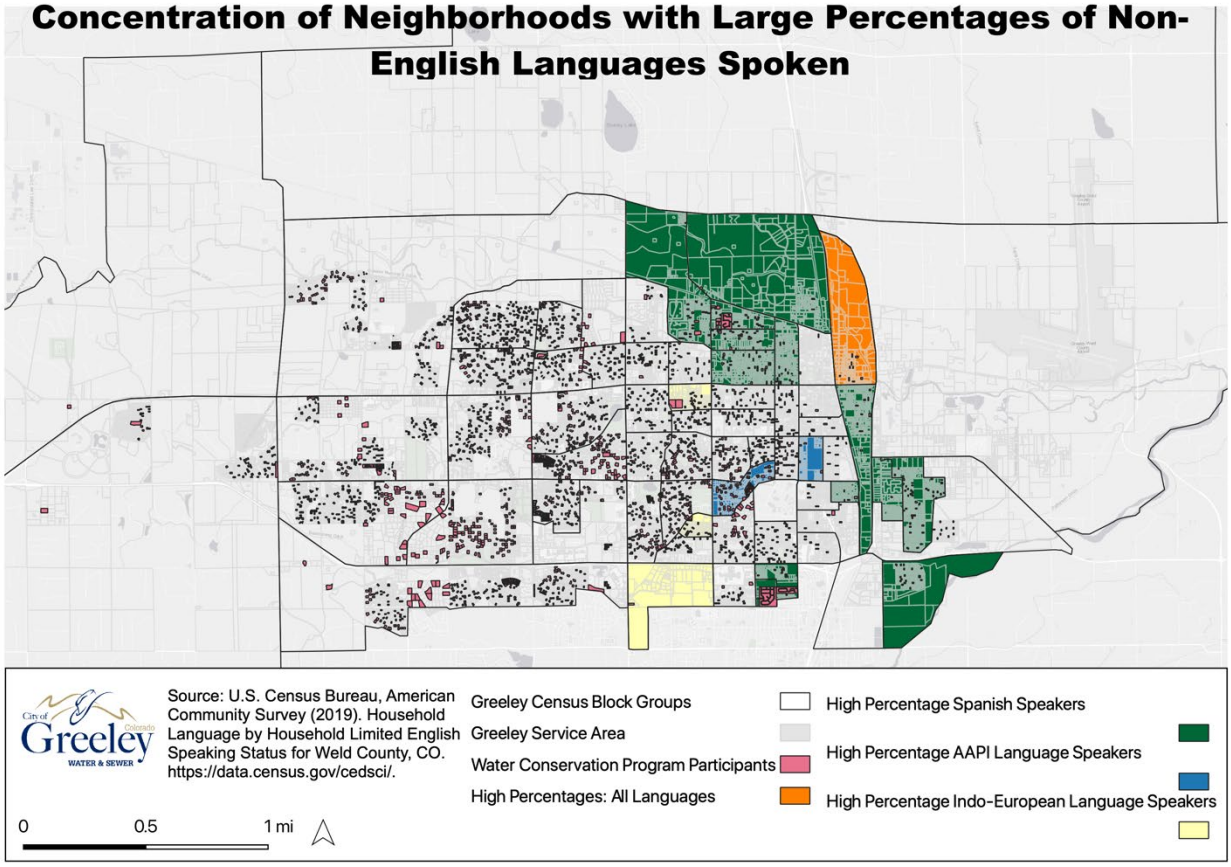


Figure 22. *This map shows the block groups or neighborhoods with the largest concentrations of residents speaking languages other than English, including Asian American and Pacific Islander (AAPI) Languages (shown in blue), Indo-European Languages (shown in yellow), and Spanish (shown in green). The legend indicates what percentage of residents in block group speak each language. The orange neighborhood has high percentages of residents speaking each of these languages.*

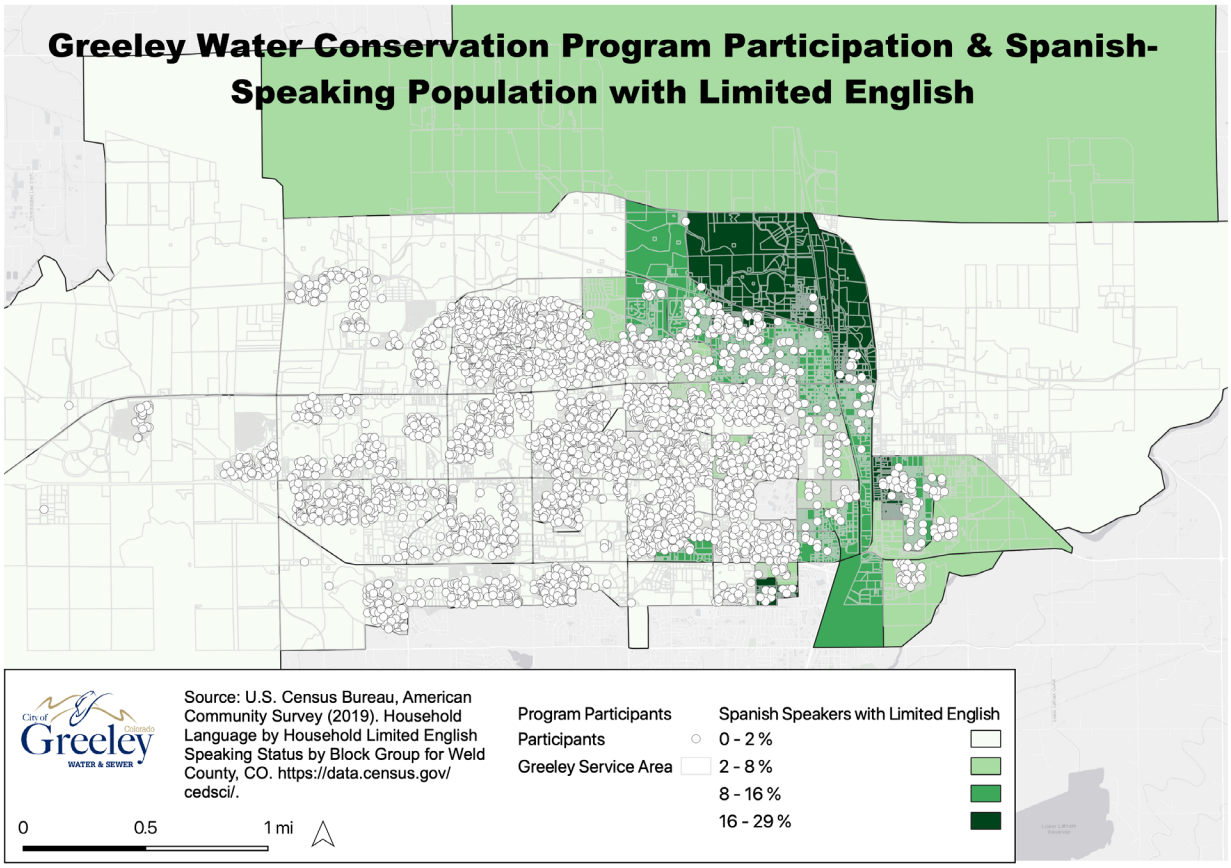


Figure 23. *Greeley Water Conservation Program participation compared with the percentage of Spanish speakers with limited English in a US Census block group.*

Water Use Change Resulting from Water Conservation Programs

In addition to analyzing geographic trends, this project analyzed the water use change resulting from participation in a subset Greeley's water conservation programs, focusing in particular on incentive and audit programs. Measuring the water efficiencies resulting from participation in one of Greeley's water conservation program sheds light on the return on investment in these programs and provides relevant business impact metrics. Also through this analysis, customers' participation in each water conservation program is tracked over time.

Table 1 captures the water programs included in this analysis. The programs included in the water savings analysis were limited to programs that had at least 50 participants with sufficient data to calculate the change in water use resulting from their participation in this program (for more details about this approach, see the following Methodology section).

Program	Participation Analysis	Water Savings Analysis
Life After Lawn (formally Cash for Grass)	√	
Commercial Audits (Indoor + Outdoor)	√	√
ET Sensor Rebate	√	
Front Loading Washer Rebate	√	√
Irrigation Controller Rebate	√	
PRV Rebate	√	√
Residential Audits (Indoor + Outdoor)	√	√
Rotary Nozzles Rebate	√	√
Showerhead Exchange	√	
Smart Controller Rebate	√	√
Spray Head Sprinkler Exchange	√	
Toilet Rebates	√	√

Table 1. *A list of programs included in this report's analysis of participation trends and water use changes. See Appendix G for more detailed descriptions of each program.*

The methodology followed approaches from other Colorado municipalities on water efficiency program studies. To better understand the methodology used in conducting these water efficiency program analyses, interviews with other Colorado agencies were conducted, and reviewed materials and reports from similar studies. A review of the key findings from this research and these conversations is provided in the Appendix F.

Methodology

In consultation with Greeley, WaterNow and WRA focused a subset of Greeley's water conservation programs, which were primarily audit and rebate programs. Please see Appendix G for more detailed descriptions of each program.

This study covers participation in water efficiency programs during the years 2013-2018. Given the unusual factors such as the COVID19 pandemic and stay-at-home orders, 2020 water use is not included in these calculations. The water use change for participation in programs during 2018 is analyzed using only 2019 water use data.

The first step conducted was to calculate the change in annual water use resulting from a customer account's participation in a water conservation program. To do this, we compared customers' average annual water use pre- and post- participation in a water conservation program. Water consumption comparisons of pre- and post- participation were based on two-year averages. For example, if a water audit was conducted in 2016, the average from 2014 and 2015 consumption was compared to 2017 and 2018 water consumption. This average annual water savings was then applied to each year a customer was active in a program (e.g., if a

customer participated in a program 2014, we applied the average annual water savings to the years 2014-2018). For some programs, specifically the Commercial and Residential Audits, we applied a five-year limit on water savings and a 20% annual discount on savings, based on the literature review reflected in the AWE Water Conservation Tracking Tool.[13] This same tool indicated lifetime savings for other programs that went beyond the six years included in this analysis (see Appendix H for more details).

This approach was applied to programs, focusing on a customer's indoor and/or outdoor water use depending on the type of water use addressed by the program. Indoor water use was determined as the total water use during the months of January, February, March, November, and December. Outdoor water use was defined as water use during the months of April through October, that was greater than the average indoor monthly water use for that year. Outdoor water consumption was normalized for changing weather conditions using Greeley's annual Irrigation Water Requirement (IWR). A more detailed description of this methodology is included in Appendix F.

Customer accounts were filtered if sufficient data were present and if participation in a program was greater than 50 accounts. For example, the Spray Head Sprinkler Exchange was removed from the analysis because there were only 6 past participants in this program between 2013-2018. The cost of each program reflects both the cost of equipment and rebate, in addition to an estimated cost for the staff time needed to implement the program (see Appendix G for more details on cost calculations).

While many other methodologies could also provide helpful insight into the change in water use resulting from water conservation program participation, this approach was determined to be the best match for Greeley's existing data and data format.

Results and Discussion

Water Use Change

Results are represented in Table 2 and compared to literature and the Alliance for Water Efficiency's Water Conservation Tracking Tool's model default values.

While each program shown in Table 2 generated water savings during the 2013-2018 time period, the amount of savings varies significantly across different programs. Three programs resulted in especially large savings for the period of the study: the Residential Audit (19.5

[13] The AWE Water Conservation Tracking Tool is an Excel-based spreadsheet tool for evaluating the water savings, costs, and benefits of urban water conservation programs and for projecting future water demands. The tool includes a review of literature assessing the anticipated average water savings, savings duration, and annual savings decay rate of a different conservation programs. See: Alliance for Water Efficiency (AWE). Water Conservation Tracking Tool. Available: https://www.allianceforwaterefficiency.org/resources/topic/water-conservation-tracking-tool.

AF/year), the Front Loading Washing Rebate (17.1 AF/year), and the Toilet Rebates (14.7 AF/year). The programs with the largest water savings reflect high levels of interest and participation in these programs, in addition to the water savings generated by these interventions. Water savings were also generated by the following water conservation programs: Smart Controller Rebates (4.3 AF/year); the Pressure Reducing Valve (PRV) Rebate and Rotary Nozzles Rebate (3.2 AF/year) and the Commercial Audits (2.9 AF/year).

Programs' overall water savings are heavily influenced by the number of customers who participate in a program. The Front Loading Washer Rebate, for instance, has both high total savings and high levels of water savings per customer account. The Smart Controller Rebate, PRV Rebate, and Rotary Nozzles Rebates have comparatively lower levels of total participation, but a high level of water savings for each participating account. In other words, despite their low cumulative savings, it may be worth maintaining or exploring the additional demand for these programs – to determine if additional outreach could grow participation and expand the programs' overall water savings beyond individual customers' water savings. Additionally, an important consideration is that the number of participants included in this analysis is lower than the total number of program participants in Greeley's water conservation programs. Many participants simply did not have sufficient water use data to be included in the calculations. Using a conservative approach, if a conservation program had less than 50 customer accounts with sufficient data, those accounts were excluded from the final calculations. Bear in mind, their inclusion would also increase the total AF of water saved through conservation programs.

In terms of the return on investment (ROI) or the cost invested for each AF of water a program saves, all individual water conservation cost less than $625 per acre-foot. The Front Loading Washer Rebate is cheapest ($181 per AF), followed closely by the PRV Rebate ($188/AF), and the Rotary Nozzles Rebate ($190/AF). Commercial Audits ($285/AF) and Residential Audits ($341/AF), along with the Smart Controller Rebate ($403/AF) make up the middle of the pack. The Toilet Rebates ($625/AF) are the most expensive program. The analysis defined costs as the raw cost of providing a rebate in addition to the staff time needed to review a rebate or administer an audit. Additional costs – such as the cost to advertise or create programs – are not reflected in this analysis.

Please note it is not recommended to simply sum the total saved water from all programs. For a single customer account, there may have been times when the account participated in multiple programs; combining water savings values would lead to potential double-counting. A summation approach does give a rough estimate of the approximate savings across the selected programs, which is roughly 65 acre-feet per year, or 389 acre-feet between 2013-2018. Dividing the total cost of the included programs by the water savings realized by their participants estimates a cost per acre foot of $1,350 per AF. Water conservation programs far exceed the cost per acre foot when compared to water right acquisitions from the Colorado Big-Thompson Project (estimated to be $62,500 per share as of July 2020, according to the

Loveland Reporter-Herald).[14] While the savings from water conservation do not continue into perpetuity, many have a fairly long expected lifetime of savings, ranging from 5 years (for audit programs) to 25 years (for toilet rebates). For a more detailed description of the estimated duration of each program's water savings, see Appendix H.

To ensure Greeley's estimated water savings were reasonable, the results were compared to published values found in the AWE Water Conservation Tracking Tool (see Appendix H). For most programs, the results are similar. The most notable exceptions are the Commercial and Residential Audit programs, where the values found through the analysis are lower that what would be expected based on the AWE model default values. However, participation in audits includes a wide range of variables, such as individual behavior change and different weather conditions. For example, even while normalizing for weather by using IWR, conditions may still affect resident's behavior and attitudes towards water use. For the Commercial Audit program, it is also possible that participants are overall using water more efficiently, but the water demand is higher because their business grew. Participation in these audits is an educational opportunity which may also lead to participation in other rebates, playing a role in generating the larger individual savings seen in some of the other programs.

Conservation Program*	Number of Accounts	Annual Water Savings (AF)	Annual ROI ($/AF/Year)	Estimated Annual Savings Per Account (Gallons/Year)
Residential Audits (Indoor + Outdoor)	1294	19.5	$341	4,903
Front Loading Washer Rebate	994	17.1	$181	33,714
Toilet Rebates	756	14.7	$625	6,271
Smart Controller Rebate	132	4.3	$403	10,682
PRV Rebate	149	3.2	$188	7,093
Rotary Nozzles Rebate	147	3.2	$190	7,013
Commercial Audits (Indoor + Outdoor)	182	2.9	$285	5,118

*For Residential and Commercial Audits, participants could select either or both the indoor and outdoor audits.
** The Toilet Rebate program encompasses the 0.8 GPF Toilet, Dual Flush Toilets, Low Flow Toilet, and Ultra Low Flow Toilet programs. See Appendix G for more details about these programs.

[14] Amundson, Ken. (17 June 2020). "NoCo Real Estate Summit: Water drives home prices, but can be controlled." *Loveland Reporter-Herald.* https://www.reporterherald.com/2020/06/17/noco-real-estate-summit-water-drives-home-prices-but-can-be-controlled/.

***Only accounts with sufficient water use data were included in these calculations, and only programs with at least 50 participants with sufficient water use data are presented in this table.

Table 2. *Estimated water savings achieved by selected water conservation programs. Study period from 2013-2018.*

Participation in Water Conservation Programs

Total program participation from 2013-2018 is shown in Figures 24-26. During the study's time period, there is a noted rate of decay along with a period of stabilization in the total participation. This fluctuation may have occurred based on multiple independent factors, including the following:

1. Weather conditions: the 2012 drought may have caused an increase in participation in Water Conservation Programs that waned over time.
2. Marketing campaigns: outreach can spark interest that fades over time.
3. Staffing levels: Greeley's ability to conduct audits is dependent on staffing levels, which have fluctuated over the years.
4. Change in programs: Program fluctuation is a key component of participation. For instance, if a new program is initiated there may be a surge in participation or a sense of urgency to alter behaviors.
5. Rates: Increasing rates may affect program participation; similarly, as customers take control of their own water budgets, their behavior and interest in conservation programs may change.
6. Natural saturation: Programs focused on fixtures and appliances will have a saturation period.
7. Local, state, or federal changes: Regulatory changes have occurred, and have focused on limiting water use for fixtures and appliances. As a result, new builds within a community naturally would have more water efficient products.

Figure 26 breaks down the program participation according to each program during the study period. The highest total participation was in the Residential Audit Program (1,670), followed by the Front-loading Washer Rebate (1,050), and Toilet Rebates (770). These programs are followed by the Showerhead Exchange and Commercial Audit Programs (220 each), the PRV Rebate (175), and the Rotary Nozzles Rebate (160), the Smart Controller Rebate (140), the ET Sensor Rebate (55), and the Irrigation Controller Rebate (15).[15] Note the Cash for Grass program, now referred to Life After Lawn, started as a pilot project in 2018. The relatively low participation in Cash for Grass (7 participants in 2018) reflects the earlier stage of the pilot project. Participation in the Spray Head Sprinkler Exchange Program started off very low, with just 6 participants in the program when it was getting started during 2016-2018, but increased significantly in 2019, jumping to over 50 participants.

[15] The Smart Controller Rebate Program included the installation of these devices by Greeley Water Conservation Specialists; the Irrigation Controller Rebate was installed by participating customers.

The trends in participation within each program can shed light on future outreach and engagement decisions. Other independent factors as mentioned above (such as weather conditions, marketing campaigns, and staffing levels, etc.) do influence trends. It is important to note that though trends should be monitored and considered for water conservation program management. Specifically, as Figure 26 shows, demand for many programs including the Residential Audit, Commercial Audit, Smart Controller Rebate, Rotary Nozzles Rebate, and PRV Rebate, remained relatively consistent from 2013-2018, suggesting a continued interest in and need for these programs. For the Audit programs, which have an estimated water savings lifetime of five years, water demands may be renewed as new business managers or homeowners take over water management on an account, and as water use appliances and behaviors change and shift over time. The decline in some programs may reflect a natural saturation of customer needs, or other shifts in customer demand. For instance, the Front Loading Washer Program was phased out by Greeley in response to market changes. The Toilet Rebate program shifted to support only hyper-efficient toilets in the wake of updated state regulations mandating the sale of water-efficient toilets.[16]

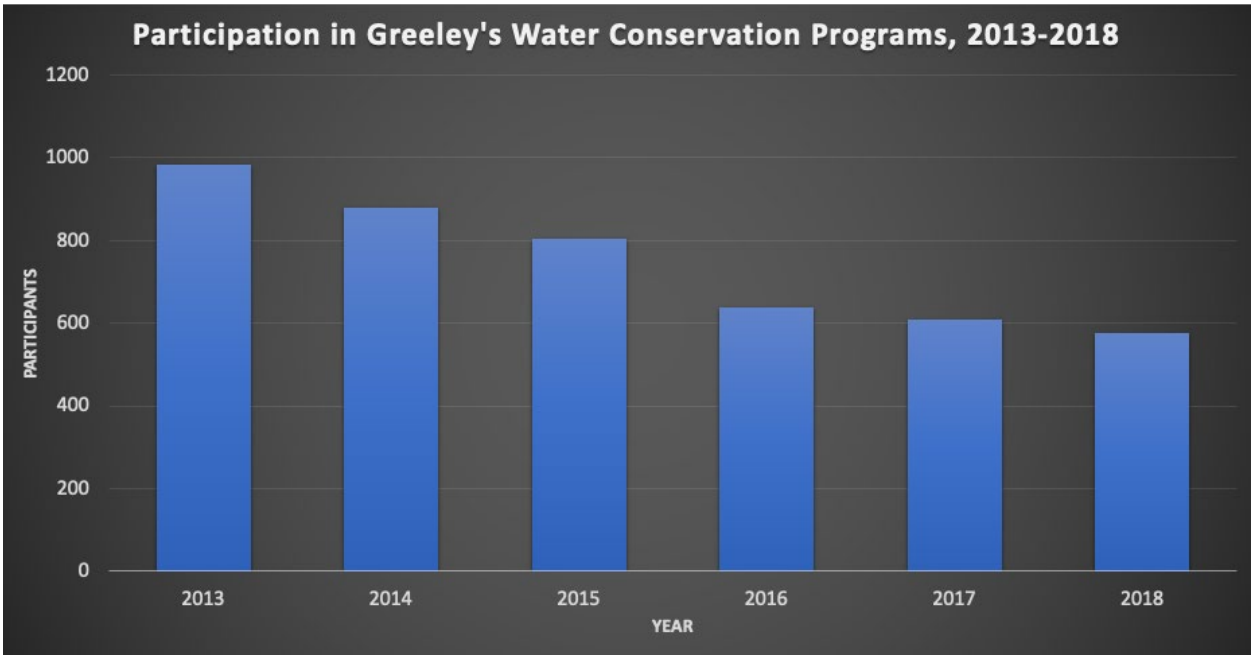
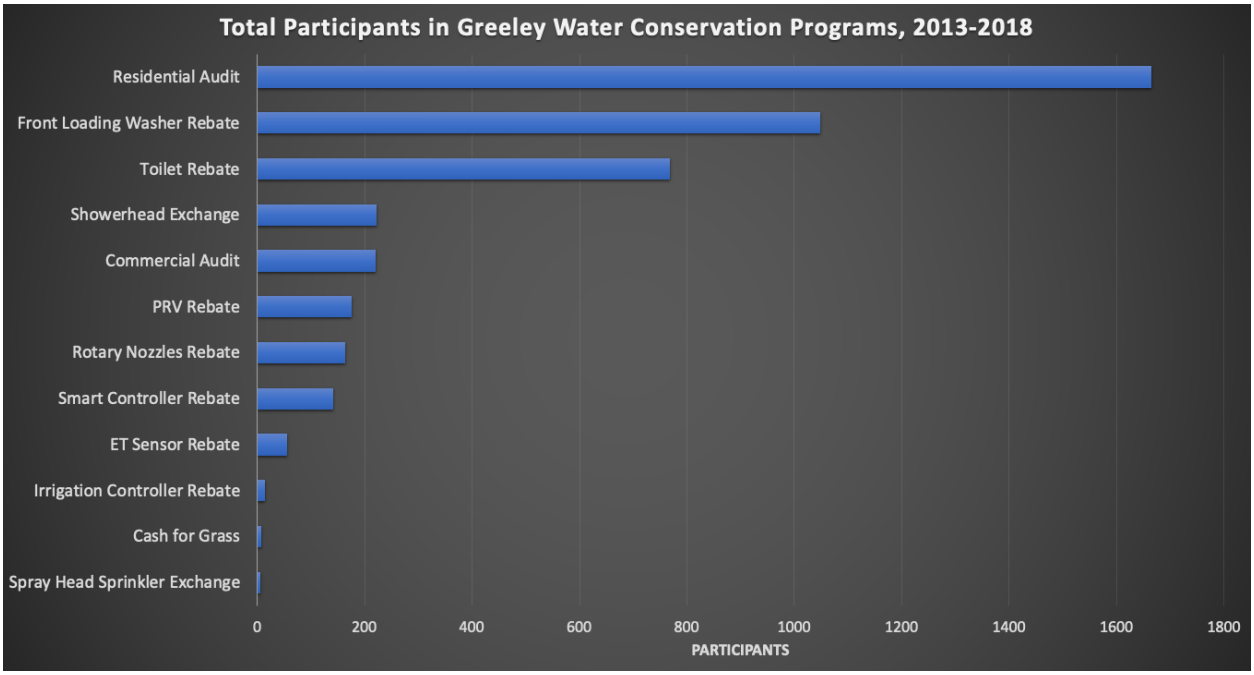


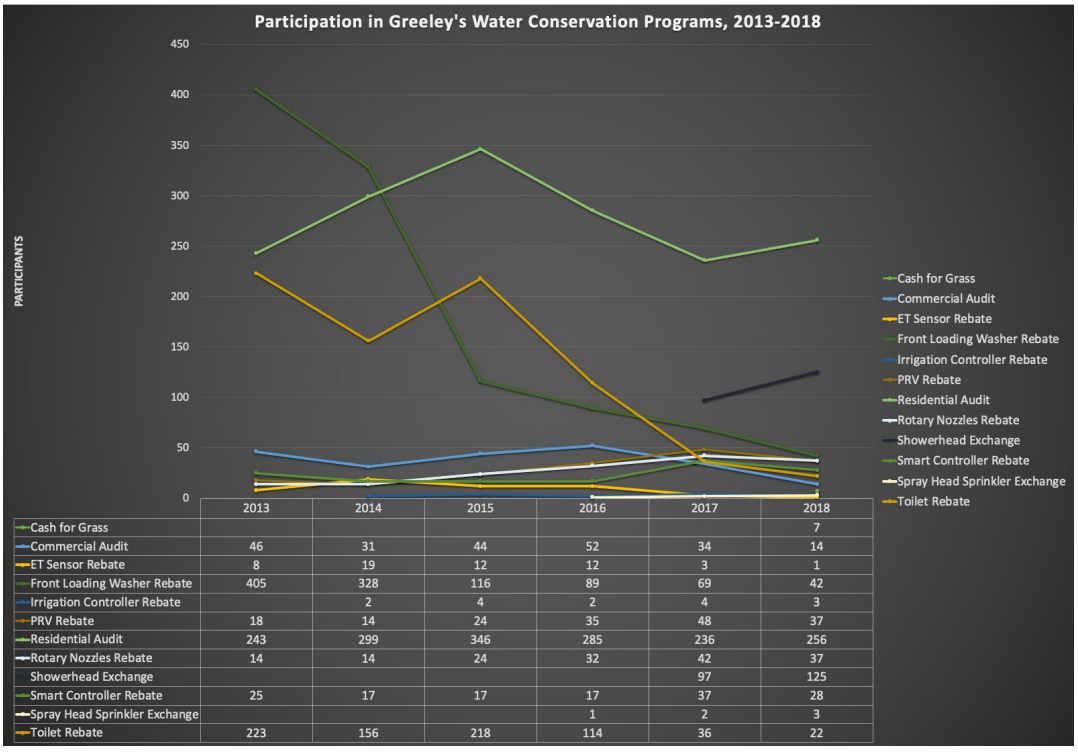
Figure 24. *Participation in Greeley's water conservation programs from 2013-2018.*

[16] Senate Bill 14-103, which took effect in 2016, requires all new applicable fixtures (including lavatory faucets, toilets, urinals and showerheads) sold in Colorado to be in compliance with federal WaterSense standards. For toilets, this means using 1.28 gallons of water or less per flush, as opposed to the federally mandated maximum of 1.6 gallons per flush. (See: Concerning the Phase-out of the Sale of Certain Low-Efficiency Plumbing Fixtures, SB 14-103, (2014). Available: https://www.statebillinfo.com/bills/bills/14/103_rev.pdf).



*For Residential and Commercial Audits, participants could select either or both the indoor and outdoor audits.
** The Toilet Rebate program encompasses the 0.8 GPF Toilet, Dual Flush Toilets, Low Flow Toilet, and Ultra Low Flow Toilet programs. See Appendix G for more details about these programs.

Figure 25. *Participation in Greeley's water conservation programs from 2013-2018.*



	2013	2014	2015	2016	2017	2018
Cash for Grass						7
Commercial Audit	46	31	44	52	34	14
ET Sensor Rebate	8	19	12	12	3	1
Front Loading Washer Rebate	405	328	116	89	69	42
Irrigation Controller Rebate		2	4	2	4	3
PRV Rebate	18	14	24	35	48	37
Residential Audit	243	299	346	285	236	256
Rotary Nozzles Rebate	14	14	24	32	42	37
Showerhead Exchange					97	125
Smart Controller Rebate	25	17	17	17	37	28
Spray Head Sprinkler Exchange				1	2	3
Toilet Rebate	223	156	218	114	36	22

*For Residential and Commercial Audits, participants could select either or both the indoor and outdoor audits.
** The Toilet Rebate program encompasses the 0.8 GPF Toilet, Dual Flush Toilets, Low Flow Toilet, and Ultra Low Flow Toilet programs. See Appendix G for more details about these programs.

Figure 26. *Program-specific trends in participation in Greeley's water conservation programs from 2013-2018.*

Table 3 captures the amount of overlap, among customers participating in multiple programs. Highlighted values in Table 3 represent the highest participation overlap. Approximately 30% of all participants in water conservation programs between 2013-2018 participated in multiple programs. Unsurprisingly, participants in the Residential Audit overlap with many other conservation programs targeting both indoor water use (e.g., the Front Loading Washer Rebate, Showerhead Exchange, and Toilet Rebate) and outdoor water use (e.g., the Smart Controller Rebate, PRV Rebate, Rotary Nozzles Rebate). The low number of overlaps between the Commercial Audit and other programs makes it difficult to draw firm conclusions. Most overlaps occur in programs focused on indoor water use, including the Toilet Rebate, Front Loading Washer Rebate, and Showerhead Exchange. This might reflect the primary water uses of participating businesses; it could also suggest an opportunity to engage more commercial, industrial, and institutional (CII) customers in outdoor water efficiency programs.

Many of the customer accounts that participated in the Toilet Rebate also participated in the Front Loading Washer Rebate, suggesting multiple appliances were replaced simultaneously (e.g., as part of a larger home renovation or construction project). There is also a fair amount of overlap on outdoor water efficiency rebates, including the ET Sensor Rebate, Smart Controller Rebate, and Rotary Nozzles Rebate, and PRV Rebate, with especially high levels of overlap between the PRV Rebate and Rotary Nozzles Rebate. This suggests these residents may be either be participating in a holistic upgrade to their irrigation systems, or incrementally adding improvements over time. In either case, the results suggest that there are opportunities to engage participants in one program in additional conservation activities.

	Cash for Grass	Commercial Audit	ET Sensor Rebate	Front Loading Washer Rebate	Irrigation Controller Rebate	PRV Rebate	Residential Audit	Rotary Nozzles Rebate	Showerhead Exchange	Smart Controller Rebate	Spray Head Sprinkler Exchange	Toilet Rebate
Cash for Grass	NA	0	0	0	0	0	2	1	0	1	0	1
Commercial Audit		NA	2	8	1	3	1	4	6	2	0	10
ET Sensor Rebate			NA	7	3	27	36	22	1	44	0	9
Front Loading Washer Rebate				NA	1	12	150	17	18	15	0	76
Irrigation Controller Rebate					NA	2	7	2	0	1	1	2
PRV Rebate						NA	104	127	11	45	3	24
Residential Audit							NA	103	129	84	3	143
Rotary Nozzles Rebate								NA	11	45	1	26
Showerhead Exchange									NA	8	1	21
Smart Controller Rebate										NA	1	21
Spray Head Sprinkler Exchange											NA	0
Toilet Rebate												NA

*For Residential and Commercial Audits, participants could select either or both the indoor and outdoor audits.
** The Toilet Rebate program encompasses the 0.8 GPF Toilet, Dual Flush Toilets, Low Flow Toilet, and Ultra Low Flow Toilet programs. See Appendix G for more details about these programs.

Table 3. *Overlap between participations in Greeley's Water Conservation Programs, 2013-2018.*

Recommendations

Effectiveness of Water Conservation Programs

Across the board, Greeley's Water Conservation Programs have saved both water and money, engaging nearly 5,000 participants between 2013 to 2018, and saving water ranging from 2.9 to 19.5 AF per year per program. These programs' average cost per acre foot savings is $1,350, far below the current cost for Colorado Big-Thompson Project water shares. While the data analysis suggests that these programs are effective, it also provides insight into the projects it may make sense to expand or condense.

Program Prioritization

1. *Residential Audits:* The Residential Audits (Indoor and Outdoor) saved an estimated 19.5 AF per year, which is encouraging because the customer survey results suggest continued interest in further participation in this program, particularly the Outdoor Irrigation Audit. The quantitative analysis also shows that participation in the Residential Audit often overlaps with participation in other indoor and outdoor water conservation programs, suggesting that this program is an effective "gateway" to utilizing other water conservation tools and resources. Survey results support this finding in that 95% of Residential Audit participants reported taking some kind of water saving action as a

result of their audit. Separate from this analysis, Greeley Water is experiencing a recent increase in demand for indoor audits due to AMI leak detection services.

2. *Outdoor Efficiency Incentives:* The survey showed particularly large interest in outdoor water efficiency rebates and incentives. There may be an opportunity to expand participation in programs like the Smart Controller Rebate, PRV Rebate, and Rotary Nozzles Rebate. These programs have high water savings per account but have seen lower levels of overall participation, compared to other programs. The outdoor Life After Lawn and Garden in a Box programs – though not captured by the water use change analysis – were the most popular incentive opportunities for future participation according to the survey results.
3. *Educational Programs & Online Efficiency Tools:* Per the survey results, Greeley's array of educational programs and online tools were, for the most part, well utilized by Greeley residents and of interest to respondents for future participation. Many past participants reported taking specific water savings actions as a result of participation in an educational program. While data on staff resources and cost for educational programs and online efficiency tools was not included in the scope for this project, one can assume that most of these programs and tools are less expensive and time intensive than residential audits and outdoor efficiency incentive programs.

Communications and Outreach

In addition to the potential benefits of targeting outreach to specific neighborhoods and communities within the City, there may be opportunities to continue to harness synergies across conservation programs. Recommended steps are listed below:

4. Lower participation in Greeley's water conservation programs often coincides with areas that have higher percentages of renter-occupied housing; lower household income, and higher percentages of residents speaking Spanish, Asian American or Pacific Islander (AAPI) languages, or Indo-European languages. The primary areas of these populations are located in the northeast and southwest areas of the City's center. These trends suggest that increasing participation within the city's center might require strategies such as language translation (e.g., through partnerships with local community groups or non-profits) and a particular emphasis on programs that renters are eligible to participate in. In-person events may be especially helpful, providing the opportunity for in-person translation and avoiding the need for Internet access, which may be lower in areas with lower median incomes.
5. Around the perimeter of Greeley's service area, participation is also sparser, in part reflecting a lower population density in these areas of the City. These neighborhoods tend to have larger median household income; lower percentages of residents speaking Spanish, AAPI, or Indo-European languages; and lower percentages of renter-occupied housing. Engaging these perimeter neighborhoods might be most effectively done through other forms of outreach, such as direct mail, bill inserts, or email outreach, that

target participants spread across a wider area, and include programs aimed at both renters and homeowners.

6. In addition to the potential benefits of targeting outreach to specific neighborhoods and communities within the City, there may be opportunities to continue to harness synergies across conservation programs. Approximately 30% of residents were part of multiple conservation programs, suggesting there may be ways to further encourage participants to take advantage of other relevant programs. Strategies may include continuing to encourage participants to complete an audit as an entry point to other programs, as well as reaching out to past participants to suggest additional or complementary programs.
7. Survey results suggest some differences in program preferences among Hispanic and Latino respondents. For example, respondents of Hispanic, Latino or Spanish origin expressed more interest in the High Efficiency Toilet rebate. These insights could help target outreach around specific programs in neighborhoods with larger percentages of Hispanic and Latino residents as identified in the spatial analysis or help prioritize the translation of specific program materials.
8. Popular outreach methods, such as email updates and the monthly newsletters, offer ways to further promote and increase awareness of the conservation programs, specifically Greeley's Online Efficiency Tools with which respondents were generally less familiar.
9. Motivation in future water conservation programs is primary based on saving money on water bills, protecting Greeley's limited water resources, reducing personal use, and supporting community values. Community engagement messaging may focus on these key points for better marketing strategies.

Considerations for Future Water Conservation Program Analysis

It is recommended for the Greeley's Water Conservation Program to complete a Water Conservation Customer Survey every 5-7 years to stay in informed on customers' values and interests, and to analyze trends and changes in respondent answers over time. Keeping the questionnaire consistent (See Appendix B) is key for comparing results.

Updating the quantitative analysis on an annual basis could also enable Greeley Water to follow trends in participation in real time and shed light on the impact of different outreach and communication strategies. Documenting factors that may affect participation, such the number of program staff, outreach and communications activities, and introduction of AMI technology, could help interpret changes in participation over time. If resources allow, future analyses could also combine the spatial and water use change analyses, to visualize and showcase water use changes by neighborhoods and potentially foster friendly competition among different locations in the City.

Conclusion

It is important to keep in mind that Greeley's substantial gains in water conservation – reducing water usage by 20% from 2007-2018 even as the City's population has grown– are not entirely captured by the water savings associated with the conservation programs analyzed for this project. Water demand in Greeley is also influenced by state and local water use policies and regulations, rates, and market trends. Integrated water and land use planning approaches, such as conservation-oriented system development charges, plumbing codes, zoning standards, and landscaping ordinances, have likely resulted in significant water savings. Greeley's water budget-based rate structure also provides residential customers with a price signal to incentivize conservation. And market trends and state regulations have led to the standardization of more water efficient appliances, fixtures, and equipment available for purchase. Finally, the introduction of AMI presents additional incentives and tools to enhance water conservation behavior and program participation. While comparing the value of policies and regulations with the impact of water conservation programs is beyond the scope of this project, it is important to recognize their importance to Greeley's water supply resiliency goals.

The City of Greeley should be very proud of its efforts to build a popular, impactful, and highly valued Water Conservation Program. This performance analysis – including the customer survey, spatial analysis on participation, and change in water use analysis – is intended to provide the City with new data and information to prioritize its Water Conservation Program spending and to inform its forthcoming Water Efficiency Plan update. Greeley may also elect to use the tools and methodologies established through this project in upcoming years to assess program performance over time.

Appendix

Attachment A – Summary of Greeley's Water Efficiency Portfolio from 2013-2020

The following section provides an overview of Greeley's four primary categories of conservation programming: 1) Education programs, 2) Water Efficiency Incentives, 3) Water Audits, and 4) Online Efficiency Tools.

1. Education Programs

Landscape Lecture Series: Free lectures and workshops are offered January through September on a variety of landscape topics to improve water efficiency outdoors.

Xeriscape Education: Literature and tours of Greeley's Xeriscape garden provide tools and resources to help residents implement water-wise landscaping principles and reduce water use.

Tours: Tours of Greeley's water-related facilities are offered seasonally, for groups of 10 or more.

Teacher Training: Greeley sponsors training programs on water and conservation issues for local teachers (e.g., Project WET provides water resource education materials that are

appropriate for many different age groups and cultures and offer comprehensive coverage of the broad topic of water.[17])

Speakers Bureau: Speakers for classrooms, civic clubs, and other groups are available upon request. Presentations can be tailored to a specific age group, topic or learning objective (e.g., watersheds, water conservation, water law, water quality, water sources, xeriscape).

Mayor's Challenge for Water Conservation: The annual, national Mayor's Challenge for Water Conservation runs from April 1- 30. This non-profit national community service campaign encourages leaders to inspire their residents to make a series of simple pledges at mywaterpledge.com to use water more efficiently, reduce pollution and save energy.

2. Water Efficiency Incentives

Irrigation Rebates (Residential and Commercial)
Customers who have completed an irrigation audit can qualify for rebates that reduce the cost of -irrigation equipment – including smart sprinkler controllers, pressure-reducing valves, and rotary sprinkler nozzles – by up to 50 percent of the cost.

Pressure-Reducing Valves
A pressure-reducing valve reduces misting – a fine spray that results from irrigation systems that apply water at a very high pressure, resulting in excessive evaporation and water drifting away from the intended irrigation area. By regulating water pressure and preventing misting, these valves make irrigation systems more efficient.[18]

Rotary Nozzles
Rotary nozzles increase uniformity and reduce overspray in irrigation systems. They operate by rotating a stream of water over the landscape, in contrast to the mist produced by spray-head sprinklers.[19]

Smart Controllers
Smart controllers (also called ET Controllers) use information about site conditions (rain, wind, slope, soil, plant type, etc.) to apply the right amount of water to maintain healthy growing conditions. Because smart controllers can be more efficient than traditional time-based irrigation controllers, they often reduce use by at least 25 percent, saving both money and water. Rebates for smart controllers cover half of the cost with customers pay the remaining $300.[20]

[17] Project WET (Water Education Today). (2020). https://www.projectwet.org/.
[18] City of Greeley, CO. "Water Conservation Rebates." Available: https://greeleygov.com/services/ws/conservation/water-conservation-rebates.
[19] Ibid.
[20] Ibid.

Typically, a Greeley Water employee will conduct an irrigation audit, and share the report with participants within a few days. In the past, once the participant had purchased any irrigation equipment, a Greeley Water employee would return to the site to help the participant set up the new equipment (e.g., schedule a new smart sprinkler controller) and to teach the participant how to use it. (This direct installation component has been phased out in 2022, but was a part of the program during the years included in the quantitative analysis.)

Commercial Rebates (available to multi-family residences and industrial, institutional and commercial accounts)
Rebates are available for a variety of indoor and outdoor water-using devices, including: bathroom fixtures; kitchen and restaurant equipment; laundry appliances (including washing machines); industrial devices; and irrigation hardware.[21] Free commercial audits help customers determine which products may be appropriate for their facility. Customers are strongly encouraged - but not required - to go through a commercial audit before receiving any rebates.

Front Loading Washer Rebates (available single-family residences, multi-family residences and industrial, institutional, and commercial accounts)
Rebates are available for a variety for high-efficiency front loading clothes washers which used less water and energy than standard top loading clothes washers. For each eligible washers purchased, a customer can receive a $100 rebate. In 2018, the residential front-loading washer rebates stopped.

Professional Landscape Certification (available to landscape contractors)
Rebates are available to landscape contractors who work in Greeley to obtain training and continuing education to obtain their Certified Landscape Technician certification.

Showerhead Exchanges (available to all customers)
At showerhead exchanges, which are held periodically at events, customers can exchange their old showerheads for new low-flow models at no cost. New showerheads are also available through Greeley's Indoor Water Audits.

Toilets
Toilets that use 0.8 gallons per flush or less are eligible for rebates from the City of Greeley. For each eligible toilet purchased, a household can receive a $50 rebate, with a two-toilet rebate per household limit. An additional $25 is given for recycling the old toilet in conjunction with the rebate. To participate, residents need only a receipt and a completed application.[22]

[21] For a detailed list of possible commercial rebates, please see: City of Greeley, CO. "Water Conservation Rebates." Available: https://greeleygov.com/services/ws/conservation/water-conservation-rebates.
[22] City of Greeley, CO. "Water Conservation Rebates." Available: https://greeleygov.com/services/ws/conservation/water-conservation-rebates.

Lawn Replacement Incentives

Cash for Grass Rebates/Life After Lawn Bluegrass Replacement Program[23]
Greeley water customers can get cash for replacing their lawn with low water use plants. This pilot program aims to replace lawns with more sustainable landscapes, including Xeriscape, rain gardens, and pollinator plants. The program provides rebates – of up to $2 per square foot – for 500 to 2,000 square feet of lawn removed per single-family residence, and 5,000 to 20,000 square feet at a non-residential or HOA property. The converted Xeriscape area must be irrigated using drip irrigation, micro spray irrigation or hand watering. While in theory this program seeks to target users who are exceeding their outdoor water budget, in practice these types of customers make up a small minority of participants in this program. Most participants are single-family residents, but this program also includes larger customers, such as HOAs, churches and other commercial properties.

This pilot grew out of a 2018 pilot study.[24] While the program was mostly dormant in 2019, approximately 30 customers participated in 2020.

Xeriscape Grants (available to multi-family residences and industrial, institutional, and commercial accounts)
Matching grants (of up to $2,500 per year) are available to replace turf with Xeric plantings that require little or no water. This program can also install Xeric plantings in locations that did not previously have any landscaping in place. Multi-phase projects can receive additional funding in subsequent years. These grants can fund smaller HOA projects, small businesses, schools, places of worship, and other areas that have a maintenance plan in place. Many churches have been particularly interested in this program.

Seasonal Offerings

Compost Bin and Rain Barrel Sale (available to all customers)
Greeley periodically offers its customers discounted compost bins, which helps with soil drainage, and rain barrels, that capture water to be used for watering the customer's landscape.

Garden in a Box (available to all customers)
During the spring and fall, Greeley offers discounted Garden In A Box kits that enable customers to plant low water-use gardens at home. Kit options vary to fit different sizes and levels of sun exposure, and include low-water plants; a professionally designed plant-by-number map; and plant care instructions.

[23] City of Greeley, Colorado. (2020). "Life After Lawn: Bluegrass Replacement Program." Available: https://greeleygov.com/services/ws/home/blog/water/2020/01/16/life-after-lawn-turf-replacement-program.
[24] City of Greeley, Colorado. (2020). "Life After Lawn: Bluegrass Replacement Program." Available: https://greeleygov.com/services/ws/home/blog/water/2020/01/16/life-after-lawn-turf-replacement-program.

3. *Water Audits*

Greeley's free, voluntary water audits help customers identify ways to conserve water, and are targeted to indoor, outdoor, and commercial water use.

Indoor Water Audits (available to all customers)
A Greeley Water Auditor will come to a property to:

- Look for leaks and other sources of water waste
- Check high water use appliances
- Provide low-flow showerheads and faucet aerators at no cost
- Make recommendations for repairs and upgrades

Outdoor (Irrigation) Audits (available to all customers)
From the months of April through October, Greeley Water specialists will come to a property to:

- Inspect watering zones and identify problems
- Measure how much water is being applied
- Check water pressure and recommend adjustments
- Develop a custom watering schedule

Typically, a Greeley Water employee will conduct the audit, and share the report with participants within a few days. The participant will often then participate in Greeley's rebate program for, e.g., a smart sprinkler controller.

Commercial Water Audits (available to multi-family residences and industrial, institutional and commercial accounts)
During a commercial water audit, a Greeley Water specialist will:

- Review how a facility is using water
- Identify areas of water waste
- Provide recommendations and custom water use targets

  The specifics of an audit often depend on the industry the customer is working in, but typically includes an examination of any water heaters, laundry rooms, toilets, or leaks

4. *Online Water Efficiency Tools*

Water Budget Portal (available to those customers on a water budget)
Greeley calculates water rates for single-family homes using water budgets (the amount of water a single-family residence needs each billing period, as determined by persons per household, landscape size, and real-time weather conditions). On the Water Budget Portal,[25]

[25] Available at: efficiencyrewarded.com.

customers can change their indoor water use profile, view their outdoor map, and get answers to common questions.

WaterSmart Customer Portal (available to all customers)
The WaterSmart Program is an online portal[26] that allows customers to view and understand their home water use. Using the portal, it's possible to see when and where a customer is using the most water, and how their water usage compares to similar households in the area. This offers a starting point for identifying ways to be more efficient.

Online Plant Database (available to all customers)
This online plant database[27] helps customers select low water-use plants that are well-suited to Greeley's semi-arid climate. It includes over 350 plants along with photos, descriptions, and planting tips.

Water Conservation Webpage (available to the public)
Greeley's water conservation webpage contains a wide variety of resources, tools, and tips for indoor and outdoor water conservation, including the City's available rebates, audits, and educational programs.

Other
In 2020, Greeley started implementing advanced metering infrastructure (AMI), and sharing data gathered through AMI with participating customers. This is worth noting AMI was not used for analyses in this report but may be a tool to assist in future efficiency analyses.

[26] Available at: greeleygov.com/watersmart.
[27] Available at: plantsforgreeley.com.

Appendix B – Customer Survey Questionnaire: Water Efficiency Program Performance

Description in beginning: The City of Greeley is currently evaluating its Water Conservation Program to determine what programs are most beneficial to the City's water conservation goals and of most value to Greeley Water customers. Your feedback will help the City update its conservation programs to best serve Greeley Water customers. This survey will take approximately 10-15 minutes. As a token of appreciation, you will be entered into a raffle to receive a $50-$100 gift card to a local restaurant.

1. Please tell us who you are [check all that apply]
    a. Greeley resident
    b. Greeley business/commercial customer
    c. Other [Please specify]

    *Note: This survey is intended for **Greeley Water Customers only.***

2. The City of Greeley currently offers all of the following water efficiency programs, tools and incentives to customers. Prior to this survey, which of the following programs were you aware that Greeley Water offered to their customers? Note: This question is asking only if you are aware of these programs, not if you have participated in them. [Mark all that apply or "None"]

    Education Programs:
    a. Landscape Lecture Series - free lectures and workshops on landscape topics to improve water efficiency
    b. Xeriscape Education - Literature, classes and tours of Greeley's Xeriscape gardens (I.e. Woodbriar or Bittersweet Park)
    c. Tours of Greeley water-related facilities
    d. Teacher Training on water and conservation issues for local teachers
    e. Speakers Bureau - Greeley Water speakers visit classrooms, civic clubs and other groups
    f. Annual Mayor's Water Conservation Challenge –water use reduction contest
    g. None, I was not aware that Greeley Water offered any of the above programs

    Water Audits:
    h. Indoor Water Audits
    i. Outdoor Irrigation Audits
    j. Commercial Audits (for multi-family residences and industrial, institutional & commercial accounts)
    k. Outdoor Irrigation Rebates (smart irrigation controller, pressure reducing valves, rotary sprinkler nozzles)
    l. Commercial Rebates (water efficient appliances, irrigation hardware, etc.)
    m. None, I was not aware that Greeley Water offered any of the above programs

    Other Efficiency Incentives:
    n. Life After Lawn turf replacement rebates (available to single family residents)
    o. Xeriscape Grants (available to multi-family residences and industrial, institutional and commercial accounts)

p. Compost Bin and Rain Barrel Sale
q. Discounted Garden in a Box Kit
r. Free Low-Flow Showerhead Exchange
s. High Efficiency Toilet Rebate
t. Life After Lawn turf replacement rebates (for single family residents)
u. None, I was not aware that Greeley Water offered any of the above efficiency incentives

Online Water Efficiency Tools:

v. Water Budget Portal
w. WaterSmart Customer Portal
x. Online Plant Database
y. Greeley Water Conservation webpage
z. None, I was not aware that Greeley Water offered any of the above water efficiency tools.

- ***In Section 1, respondents will automatically skip over each of the programs which they replied "None" to***

SECTION 1: CURRENT PROGRAMS (Customers who have participated)

A. EDUCATION PROGRAMS

3. **Education Programs:** In the past 5 years, which of the following Greeley water efficiency education-related programs have you participated in? [Please select all that apply, or "None" if you haven't participated in any of these programs]
    a. Landscape Lecture Series - free lectures and workshops on landscape topics to improve water efficiency
    b. Xeriscape Education - Literature, classes and tours of Greeley's Xeriscape gardens (I.e. Woodbriar or Bittersweet Park)
    c. Tours of Greeley water-related facilities
    d. Teacher Training on water and conservation issues for local teachers
    e. Speakers Bureau - Greeley Water speakers visit classrooms, civic clubs and other groups
    f. Annual Mayor's Water Conservation Challenge - water use reduction contest
    g. None
    h. Other [Please specify]

- *If none, page skip to Water Audits section*
- *If they marked any of these programs move to Q#4 which will present **only** the education program(s) they selected*

4. **Education Programs:** On a scale of 1-5, how helpful did you find the specific Water Efficiency Education Program(s) indicated below. (1 = not helpful at all, 5 = very helpful)

	1 (not helpful)	2	3	4	5 (very helpful)	Not sure
Landscape Lecture Series						
Xeriscape Education/Tour						
Tours of Greeley Water facilities						
Teacher Training						
Speakers Bureau						
Annual Mayor's Water Conservation Challenge						
[Other]						

5. **Education Programs:** What type of action, if any, was taken as a result of participating in _____? *[Mark all that apply]*
    a. Switched to more waterwise plants or landscaping practices (e.g. replaced turf grass with native plants)
    b. Updated or adjusted my irrigation system in some way to improve water efficiency
    c. Switched to using more water efficient appliances or fixtures (e.g. faucet aerators, low-flow showerhead, low-flow toilet)
    d. Participated in a Greeley Water efficiency rebate, audit, or other financial incentive opportunity
    e. Changed my water usage behavior in some way (e.g. turning off tap when brushing teeth, washing car at commercial car wash instead of in driveway, etc.)
    f. Began educating others (students, friends) about the importance of water conservation
    g. No specific action was taken
    h. Other [Please specify]

    Blank is the specific program(s) they indicated in Q3. Repeat question if they indicated a change associated with more than one Education Program

6. **Education Program:** Is there anything else you'd like to share with us about your participation in a Greeley Water Education Program? *[Optional]*

WATER AUDITS

7. **Water Audits:** Greeley's free, voluntary water audits help customers identify ways to conserve water, and are targeted to indoor, outdoor, and commercial water use. In the past 5 years, which of the following Greeley Water Audit programs have you participated in? [Mark all that apply]

a. Indoor Water Audits
b. Outdoor Irrigation Audits
c. Commercial Audits (available to multi-family residences, industrial, institutional & commercial accounts)
d. None

- *If none, page skip to Other Efficiency Programs*

8. **Water Audits:** On a scale of 1-5, how helpful did you find the water audit program indicated below? (1 = not helpful at all, 5 = very helpful)

	1	2	3	4	5	Not sure
Indoor Water Audits						
Outdoor Irrigation Audits						
Commercial Audits						

Include only the audits they indicated participating in in Q8

9. **Indoor Water Audits:** What type of action, if any, was taken as a result of participating in an **Indoor Water Audit**? [Select all that apply]
a. Repaired a leak
b. Received and installed a free low flow showerhead(s) and/or faucet aerator(s)
c. Upgraded an old high-water use appliance/fixture to a water efficient appliance/fixture
d. Signed up for the WaterSmart customer portal
e. Changed my water usage behavior in some way *[e.g. turning off tap when brushing teeth, washing car at commercial car wash instead of in driveway, etc.]*
f. No action was taken
g. Other [please specify]

Only for those who indicated in #8 that they had participated in an indoor audit

12. **Water Audits:** Do you have any recommendations for Greeley Water on improving the indoor audit program? [Optional]

_____

13. **Outdoor Water Audits:** What type of action, if any, was taken as a result of participating in an Outdoor Irrigation Audit? [Select all that apply]
a. Received a rebate from Greeley Water to install a smart sprinkler controller
b. Received a rebate from Greeley Water to install a pressure-reducing valve
c. Received a rebate from Greeley Water to install rotary sprinkler nozzles
d. Adjusted my irrigation water pressure
e. Adjusted my irrigation watering schedule

f. Adjusted my irrigation system in some other way to improve efficiency
g. Switched to more water wise plants or landscaping practices
h. No specific action was taken
i. Other [please specify]

14. **Water Audits:** On a scale of 1-5, how valuable did you find Greeley Water's Outdoor Irrigation Rebate? (1 = not valuable, 5 = valuable)

	1	2	3	4	5	Not sure
Outdoor Irrigation Rebate						

- *Only if respondents received a rebate, identified in Q13*

15. **Water Audits:** Do you have any recommendations for Greeley Water on improving the irrigation audit and/or associated irrigation rebate program? [Optional]

_____

16. **Water Audits:** What type of action, if any, was taken as a result of participating in a Commercial Water Audit? [Select all that apply]

h. Repaired a leak
i. Received and installed a free low flow showerhead(s) and/or faucet aerator(s)
j. Received a pre-rinse spray nozzle
k. Received a rebate from Greeley Water for bathroom fixtures, kitchen/restaurant equipment, laundry appliances (including washing machines), industrial devices, and/or irrigation hardware, etc.
l. Upgraded an old high-water use appliance to a water efficient appliance
m. Changed water usage behavior in some way
n. Created a policy on water conservation or some other educational event for employees
o. No specific action was taken
p. Other [please specify]17. **Water Audits:** On a scale of 1-5, how valuable did you find Greeley Water's Commercial Rebate? (1 = not valuable, 5 = valuable)

	1	2	3	4	5	Not sure
Commercial Rebate						

- *Only if they received a rebate*

17. **Water Audits:** Do you have any recommendations for Greeley Water on improving the commercial audit and/or rebate program? [Optional]

_____

18. **Water Audits:** Is there anything else you'd like to share with us about your participation in a Greeley Water Audit? [Optional]

_____

OTHER EFFICIENCY INCENTIVE PROGRAMS

19. In the past 5 years, which of the following Greeley Water Efficiency Incentive programs have you participated in? [Select all that apply]

a. Compost Bin and Rain Barrel Sale
b. Discounted Garden in a Box Kit
c. Free Low-Flow Showerhead Exchange
d. High Efficiency Toilet Rebate
e. Turf Retrofit: Life After Lawn
f. None

If none, Skip to Online Efficiency Tools

20. Efficiency Incentive Programs: On a scale of 1-5, how valuable did you find the specific Water Efficiency Education Program(s) indicated below. (1 = not valuable at all, 5 = very valuable)

- *Only list the programs they indicated participating in*

Efficiency Incentive Program	1	2	3	4	5	Not sure
Compost Bin & Rain Barrel Sale						
Discounted Garden in a Box Kit						
Free Low Flow Showerhead Exchange						
High Efficiency Toilet Rebate						
Turf Retrofit: Life After Lawn						

22. Efficiency Incentive Programs: Do you have any recommendations for Greeley Water on improving the _____ program? *[Optional]*

_____

- *Only the program(s) they indicated participated in in Q #19*

ONLINE WATER EFFICIENCY TOOLS

23. In the past 5 years, which of the following Greeley Water Online Water Efficiency Tools have you utilized? *[Select all that apply]*

a. Water Budget Portal
b. WaterSmart Customer Portal
c. Greeley's Water Conservation Webpage
d. Online Plant Database
e. None

If none, Skip ahead to next section

24. **Online Water Efficiency Tools:** On a scale of 1-5, how helpful did you find the specific Water Efficiency Education Program(s) indicated below. (1 = not valuable at all, 5 = very valuable)

- *Only list the programs they indicated participating in*

	1	2	3	4	5	Not sure
Water Budget Portal						
WaterSmart Customer Portal						
Greeley's Water Conservation Webpage						
Online Plant Database						

25. Why did you choose to utilize the water budget portal? *[Select all that apply in order of importance]*
a. To find out what the water budget was and better understand it
b. To update my household information (e.g. people in my household, irrigable area)
c. To learn more about my water use
d. To save money on my water bill
e. To reduce my personal water use
f. To protect our limited water resources
g. To save more water than my neighbors
h. To support community values
i. Other

- *Only if they used the water budget portal*

26. Why did you choose to utilize the WaterSmart customer portal? *[Select all that apply in order of importance]*
j. To review my water bill
k. Because I had a large bill or a leak
l. To update my household profile
m. To learn more about my water use
n. To save money on my water bill
o. To reduce my personal water use
p. To protect our limited water resources
q. To save more water than my neighbors

r. To support community values
s. Other

- *Only if they used the WaterSmart portal*

SECTION 2: WATER EFFICIENCY BEYOND GREELEY PROGRAMS

1. The following is a list of possible water saving actions for your home or business. What actions – if any – have you taken in the last 5 years (2015 – 2020) to reduce your water use? *[Select as many as apply]*

Outdoor Activities

a. Adjusted irrigation system and timers
b. Installed a rain sensor to shut off irrigation system
c. Installed a smart irrigation controller
d. Reduced/skipped watering
e. Replaced lawn or garden with low water plants or other material (e.g. vegetable garden, rock, mulch, hardscape)
f. Upgraded irrigation system with high-efficiency equipment
g. Installed a rain barrel/cistern
h. Started a compost bin or pile
i. Began tracking rainfall on my site
j. Began running my irrigation system manually
k. Used a broom instead of a hose to clean paved areas
l. Fixed outdoor leaks (sprinkler, spas, etc.)

Indoor Activities

m. Purchased a high-efficiency clothes washer
n. Installed faucet aerators
o. Installed low flow showerheads
p. Installed a water efficient toilet(s)
q. Washed only full loads of clothes or dishes
r. Took shorter showers
s. Fixed indoor leaks (toilet, faucet, etc.)
t. I don't let the water run unnecessarily
u. Other [please specify]
v. None

2. Which of the following would be easier for you to do?
   a. Reduce the amount of water you now use for outdoor landscaping and gardening
   b. Reduce the amount of water you now use for indoor uses
   c. I could reduce both my indoor and outdoor water use easily
   d. Neither

SECTION 3: LOOKING FORWARD / FUTURE PARTICIPATION & IMPROVEMENTS

1. What would motivate you to participate in Greeley's water conservation program? *[Select all that apply in order of importance]*

a. To save money on my water bill
b. To pay for a fixture/appliance that I want to replace (e.g toilets, smart irrigation controllers)
c. To reduce my personal water use
d. To protect our limited water resources
e. To save more water than my neighbors
f. To support community values
g. Not applicable, I'm not motivated to participate
h. Other [please specify]

2. The City of Greeley currently offers all of the following water efficiency programs, tools and incentives to customers. What water efficiency programs, if any, are you most interested in participating in in the next 3 years, using a scale of 1 to 5, with 1 being not interested and 5 being very interested. *[Mark all that apply, if you have already participated or are not eligible for this specific rebate mark N/A]*

Education Programs:

a. Landscape Lecture Series - free lectures and workshops on landscape topics to improve water efficiency
b. Xeriscape Education - Literature, classes and tours of Greeley's Xeriscape gardens (I.e. Woodbriar or Bittersweet Park)
c. Tours of Greeley water-related facilities
d. Teacher Training on water and conservation issues for local teachers
e. Speakers Bureau - Greeley Water speakers visit classrooms, civic clubs and other groups
f. Annual Mayor's Water Conservation Challenge –water use reduction contest

Water Audits:

g. Indoor Water Audits
h. Outdoor Irrigation Audits
i. Commercial Audits (for multi-family residences and industrial, institutional & commercial accounts)
j. Outdoor Irrigation Rebates (smart irrigation controller, pressure reducing valves, rotary sprinkler nozzles)
k. Commercial Rebates (water efficient appliances, irrigation hardware, etc.)

Other Efficiency Incentives:

l. Life After Lawn turf replacement rebates (available to single family residents)
m. Xeriscape Grants (available to multi-family residences and industrial, institutional and commercial accounts)
n. Compost Bin and Rain Barrel Sale
o. Discounted Garden in a Box Kit
p. Free Low-Flow Showerhead Exchange
q. High Efficiency Toilet Rebate
r. Life After Lawn turf replacement rebates (for single family residents)

Online Water Efficiency Tools:

s. Water Budget Portal
t. WaterSmart Customer Portal
u. Online Plant Database
v. Greeley Water Conservation webpage

Only if they selected a program in Q1 of Sec. 3

3. How important do you feel the City of Greeley's water efficiency programs are?
    a. Very important
    b. Important
    c. Neither important nor unimportant
    d. Not important

4. How do you prefer to receive information about saving water and Greeley Water's efficiency programs? [*Select all that apply]*
    a. Bill inserts
    b. Direct mail to my home or business
    c. Greeley Water website
    d. Social media
    e. Local newspaper articles/advertisements
    f. Radio advertisements
    g. Visits or calls to Greeley Water
    h. Email updates/monthly newsletter

5. How willing, if at all, would you be to adopt a low water use landscape by removing turf grass from your front yard?
    a. Very willing
    b. May consider
    c. Would not consider
    d. Already converted yard (skip ahead)
    e. Don't have yard (skip ahead)
    f. Don't know / Not sure (skip ahead)

6. What are the primary barriers keeping you from replacing some or all of your grass with low water use landscaping? *[Select as many as apply]*
    a. Cost
    b. Physical labor involved
    c. Time
    d. Knowledge/expertise
    e. I like the look of grass
    f. I don't like the look of low water landscapes
    g. Doesn't save enough water to be worth the effort
    h. Other [Specify]
    i. Don't know / Not sure

SECTION 4: DEMOGRAPHICS

You may select prefer not to answer for any of the following questions

1. Do you own or rent your current place of residence?
    a. Own
    b. Rent
    c. Other [Write in]
    d. I do not live in Greeley
    e. Prefer not to answer

2. What type of residence do you live in?
    a. Apartment
    b. Condo/townhome
    c. Patio home
    d. Duplex
    e. Mobile home
    f. Single-family detached
    g. Other
    h. I do not live in Greeley
    i. Prefer not to answer

3. Which of the following best describes your age?
    a. 18-24
    b. 25-34
    c. 35-54
    d. 55-64
    e. 65+
    f. Prefer not to answer

4. Are you of Hispanic, Latino or Spanish origin?
    a. Yes
    b. No
    c. Prefer not to answer

5. How would you describe yourself? *[Select all that apply]*
    a. Black or African American
    b. Asian
    c. Native Hawaiian or Pacific Islander
    d. Native American or Alaska Native
    e. White
    f. Other [Write in]
    g. Prefer not to answer

6. Which of the following categories best describes your household income, that is from all persons in your household before all taxes?
    a. Under $25,000
    b. $25,000 - $49,000
    c. $50,000 - $75,000
    d. $75,000 - $99,999
    e. $100,000 - $149,999
    f. $150,000 - $249,999
    g. $250,000 and above
    h. Prefer not to answer

FINAL

7. Thank you so much for completing this questionnaire. To be entered into the raffle, please provide your name and email (preferred) or phone number. *Note: your contact details will not be correlated with your survey responses.*
    a. Name
    b. Email
    c. Phone

To learn more about Greeley's water efficiency programs, please visit https://greeleygov.com/services/ws/conservation/about.

Appendix C – Greeley Water Conservation Bill Stuffer

City of Greeley Colorado
WATER & SEWER

Greeley is looking for your opinion!
Turn over to learn more.
Greeleygov.com/conserve

Your opinions on Greeley's water conservation efforts matter!

The City of Greeley is conducting an evaluation of its water conservation programs to determine which programs are most effective in helping the city meet its conservation goals.

Your feedback on these programs, regardless if you have participated or not, will help ensure that we can continue to improve our conservation programs and help you *save water and money.*

For participating in this 5-15 minute survey, you will be entered to win a $100 gift card to a local restaurant and other prizes!

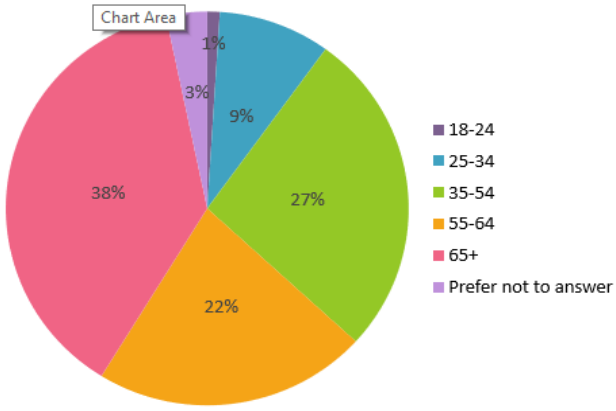
Type the URL below into a web browser or use the QR code with your smartphone camera to access the survey.

http://bit.ly/GreeleyWater

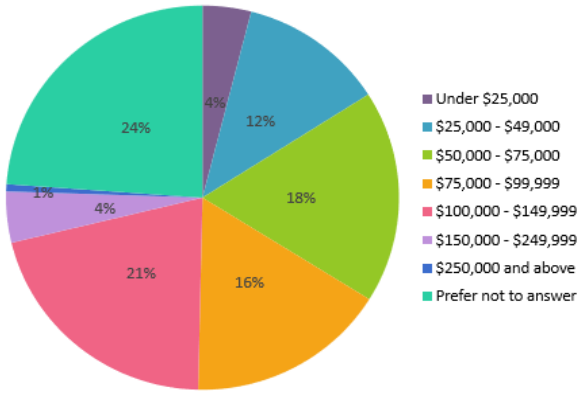
Thank you!

Appendix D – Demographic Survey Results

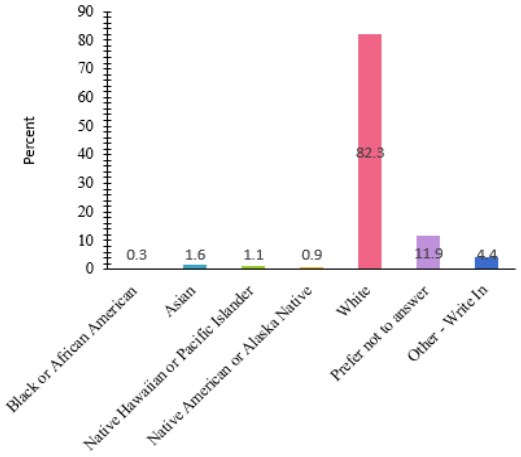
Which of the following best describes your age?



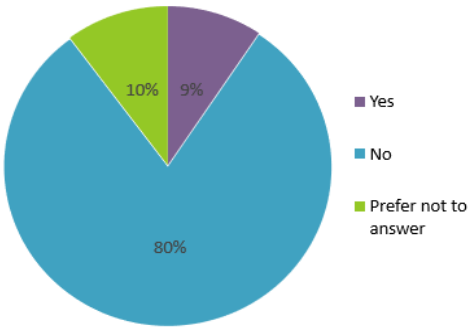
Which of the following categories best describes your household income, that is from all persons in your household before all taxes?



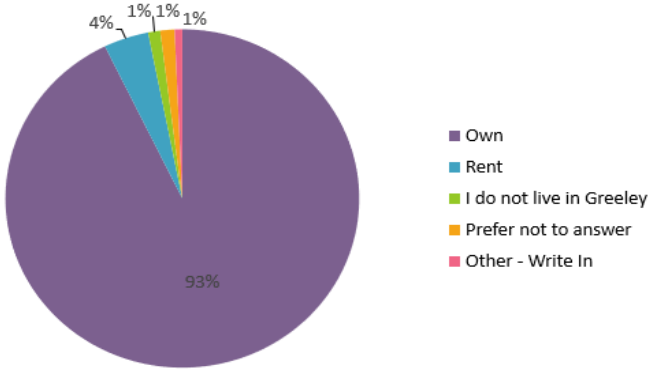
How would you describe yourself?



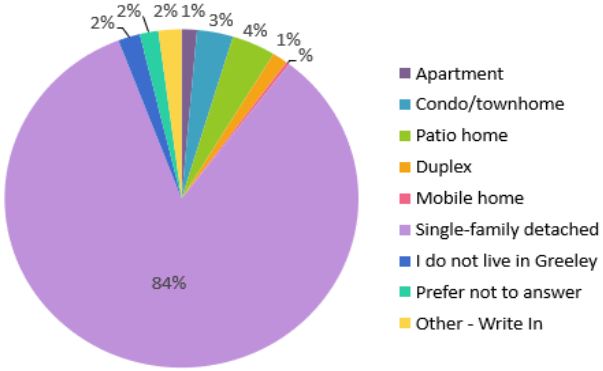
Are you of Hispanic, Latino, or Spanish origin?



Do you own or rent your current residence?



What type of residence do you live in?



Appendix E – Spatial Trends in Water Conservation Program Participation: Analysis and Data Sources

Additional details and maps visualizing the spatial analysis of participation in Greeley's water conservation programs are available here.

A detailed description of the U.S. Census Bureau's American Community Survey (ACS) data underlying the analysis is summarized in Table A-1 below. [28]

Demographics Visualized in Maps	Data Source
Percentage of Renter-Occupied Housing	US Census Bureau. (2020). 2015-2019 American Community Survey 5-Year Estimates. Total Population in Occupied Housing by Tenure by Units in Structure. https://data.census.gov/ cedsci/.
Population speaking an Asian American and Pacific Islander language Population speaking an Indo-European language Spanish-Speaking Population Spanish-Speaking Population with Limited English	US Census Bureau. (2020). 2015-2019 American Community Survey 5-Year Estimates. Household Language by Household Limited English Speaking Status. https://data.census.gov/cedsci/. *Asian American and Pacific Islander languages are defined by the US Census Bureau as including Chinese (incl. Mandarin, Cantonese), Japanese, Korean, Hmong, Vietnamese, Khmer, Thai, Lao, or other Tai-Kadai languages, Tagalog (incl. Filipino), Ilocano, Samoan, Hawaiian, or other Austronesian languages, and other languages of Asia.* *Indo-European languages are defined by the US Census Bureau as languages spoken over the greater part of Europe and Asia as far as northern India (e.g., French, Armenian, Bengali, Nepali, Marathi, Telugu, Tamil, etc.).* *Spanish-Speaking Population includes all residents who speak Spanish (but may also, e.g., speak another language, such as English). Spanish-Speaking Population with Limited English includes residents who speak Spanish and who have limited fluency in English.*[29]
Percent of Population that Identifies as Hispanic or Latino by Race	US Census Bureau. (2020). 2015-2019 American Community Survey 5-Year Estimates. Hispanic or Latino Origin by Race. https:// data.census.gov/cedsci/. *U.S. federal government agencies adhere to standards issued by the Office of Management and Budget, which specify that race and Hispanic*

[28] The American Community Service (ACS) data reflects information gathered annually by the U.S. Census Bureau. The Bureau poses questions to randomly sampled addresses each year, and then uses this information to calculate community demographic information. This ACS data complements the Decennial Census the Bureau conducts every 10 years, which seeks responses from every resident. For information, see: https://www.census.gov/programs-surveys/acs/about.html.

[29] A more detailed explanation of how the US Census defines language categories is available at: https://www.census.gov/topics/population/language-use/about.html.

	origin (also known as ethnicity) are two separate and distinct concepts. The question underlying this data asks respondents if they view themselves as having racial identity that is Hispanic or Latino (which does not preclude also having additional racial identities). [30] [31]
Percent of Population that Identifies as Hispanic or Latino by Origin	US Census Bureau. (2020). 2015-2019 American Community Survey 5-Year Estimates. Hispanic or Latino Origin. https:// data.census.gov/cedsci/. *U.S. federal government agencies adhere to standards issued by the Office of Management and Budget (OBM), which specify that race and Hispanic origin (also known as ethnicity) are two separate and distinct concepts. Hispanic origin can be viewed as the heritage, nationality, lineage, or country of birth of the person or the person's parents or ancestors before arriving in the United States. OMB defines "Hispanic or Latino" as a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race. People who identify as Hispanic, Latino, or Spanish may be any race.* [32] [33] [34]
Median Household Income	US Census Bureau. (2020). 2015-2019 American Community Survey 5-Year Estimates. Median Household Income in the Past 12 Months (in 2019 Inflation-Adjusted Dollars). https:// data.census.gov/ cedsci/.
Total Population Population Density	US Census Bureau. (2020). 2015-2019 American Community Survey 5-Year Estimates. Total Population. https://data.census.gov/ cedsci/.

Table A-1. *2020 U.S. Census Bureau American Community Survey (ACS) data included in the analysis of Greeley's water conservation programs.*

[30] U.S. Census Bureau. (2021). "About the Hispanic Population and its Origin." Available: https://www.census.gov/topics/population/hispanic-origin/about.html.

[31] U.S. Census Bureau. (2010). *Overview of Race and Hispanic Origin: 2010.* Available: https://www.census.gov/content/dam/Census/library/publications/2011/dec/c2010br-02.pdf/.

[32] U.S. Census Bureau. (2021). "About the Hispanic Population and it's Origin." Available: https://www.census.gov/topics/population/hispanic-origin/about.html.

[33] U.S. Census Bureau. (2021). "Hispanic Origin." Available: https://www.census.gov/topics/population/hispanic-origin.html.

[34] For additional context about this Census question and the nuances of how Hispanic and Latino race and origin are interpreted in the Census, please see: Pew Research Center. (23 September 2021). "Who is Hispanic?" Available: https://www.pewresearch.org/fact-tank/2021/09/23/who-is-hispanic/.

Appendix F – Review of Water Efficiency Program Analyses

The review of water efficiency program analyses highlighted several core elements in approaches to methodologies for calculating water use changes resulting from water conservation and water efficiency programs. These elements are listed here and described in greater detail in the sections below.

1. Data Included
2. Water Savings Methodologies
3. Baselines and Control Groups
4. Metrics Tracking Program Costs, Benefits, and Return on Investment
5. Methodologies for Understanding Participation in Conservation Programs
6. Analysis Applications & Key Findings

1. Data Included

The data underlying water efficiency program analyses often included:

- Water demand numbers/consumption data from billing information
- Population numbers
- Rebate program participation and available program details (number and type of dishwashers, toilets, clothes washers installed, etc.)
- Educational program participation details (monthly classes held, number of Garden in a Box kits distributed, etc.)
- Program costs

2. Methodologies: Water Savings

Analyses of water use change or water savings take a number of different forms. The sections below describe two approaches representative of different styles of conducting this analysis.

A. <u>Example One: Program Performance Analysis</u>

One study used R/R Studio to conduct its water efficiency program analysis; this software was chosen because of its free open-source nature, and because it enables the creation of replicable codes. The analysis team pulled water consumption data from customers' billing information, and combined (or joined) this with data on participation in water efficiency programs. This data informs two key sets of calculations around indoor water use and outdoor water use.

The general methodology applies the formula below:

> **Water use change** = Water use the year prior to participating in program – water use the year after participating

To calculate **indoor water use**, the study uses the formula below:

Indoor water use = (Total use for Dec-Mar) + (WQA if month's use exceeds WQA, otherwise total use for Apr-Nov)

Where WQA (Winter Quarterly Average) = Average use December, January and February.

- This approach defines the winter quarter as including the billing data from January, February, and March. December billing data is excluded because, given the way Aurora's billing cycle is timed, January billing data encompasses most of the water use in December. March billing data is included to encompass water use in February.
- This approach calculates the winter quarter's average water use (WQA) and multiplies this by 12, to estimate water use in: (a) the year before and (b) the year after participation in a water efficiency program.
- This approach compares water use across years, rather than across months.

To calculate **outdoor water use**, the study uses the formula below:

Outdoor water use = Apr – Oct water use greater than WQA. Outdoor water use is normalized for weather.

- This approach calculates the total water consumption during the year's outdoor months (April through November[35]) and subtracts the average indoor water use (described above as the average water use during the winter quarter or WQA). The average indoor water use average was applied to all months of the year before it was subtracted from the total water consumption during the year's outdoor months.
- This approach normalizes the data based on weather conditions: specifically, Plant Water Requirements (PWR). The PWR of the year in question was compared to PWR in the year before, and to a 10-year rolling average. If PWR was higher in the year before, compared to the 10-year rolling average, a ratio was created to adjust consumption down to account for this.

Several additional steps also help prepare the data for analysis:

- Any outliers were removed from the analysis before it was conducted.
- Households in behavior-oriented programs were only included if the account was not transferred from a previously participating customer.
- Customers that had a leak or break investigation from field services were not included in the analysis.

[35] November meter reads are used to completely capture October water use data.

B. Example Two: Water Conservation Program Evaluation

In another example, a community partnered with and used a company's proprietary Sustainability Information Management System (SIMS) software to develop a spatial dataset including each customer's account and account number, address, customer class, and program participation. They focused their water savings analysis on a subset of customers: single-family households with data going back to at least 2005. This reflected the fact that single family households made up the majority (over 95%) of water efficiency participants. Monthly data from 2005 was necessary to pre-date customer involvement in water efficiency programs, though this criteria did limit the number of customers included in the analysis. Customers that met both criteria accounted for 38-69 percent of program participants.

This study's general methodology involved calculating the average daily water use/connection for each month, using the following approach for all customers included in the analysis:

> **Average daily water use for [month]** = Sum of daily water use for all participants in the program of interest/number of available records for a particular month
>
> The sum of participant's daily water use was divided by the number of available records, since not all participants had complete water records for the entire period of interest.

This data was used to estimate both (1) the annual water savings of water efficiency programs and (2) the accumulated water savings from January 2005 to January 2011.

To calculate the water savings of **indoor water use** programs, this study calculated the wintertime daily average water use:

> **Indoor water use** = Average daily water use from December through March
>
> Winter use was defined as December through March for all years except for 2005 (which used January - March) and 2020 (which used December and January).
>
> This calculation measures changes in daily wintertime use per connection (units: gallons/day).

To calculate the water savings of **outdoor water use** programs**,** the anaylsis calculated the total summertime outdoor water use:

> **Outdoor water use** = Sum of all customer daily water use from April through October - (estimated daily wintertime water use from the preceding winter * 214 days)

This calculation measures changes in seasonal water use per connection (units: gallons).

To account for the variable seasonal impact of wind, precipitation, and temperature, the summertime water use was compared to summertime water use in the previous year. Based on this comparison, a ratio was applied to normalize water use across different years. For instance, evaluations of one conservation program's participants summertime water use for each of the years between 2006 - 2011 were normalized to the summertime water use in the year 2005.

C. Additional Questions and Considerations

There are many different approaches to calculating the water savings from water use efficiency programs. Key questions include:

- How to **define "indoor" and "outdoor" water use** (for instance, what months are used to determine when outdoor water use is likely to occur).
- How to **adjust data to calculate indoor water use** (some programs, for instance, have meter reads that separate indoor and outdoor water use, making the calculations to distinguish between indoor and outdoor water use unnecessary).
- How to account for **variable temperature, wind and precipitation rates** and their impact on outdoor water use over time. For instance, while one city calculates the PWR from year to year, and uses this ratio to normalize outdoor water use across years, another used the ratio of water usage from year to year as the basis of a similar calculation.

Time frames: It can be challenging to account for the impacts of a particular program over time. One report took the approach of calculating savings on a one-time basis (rather than tracking them over the long term). This analysis is branded as a "change analysis" – rather than a water savings analysis – as the impacts of programs often vary widely across different years, and do not always result in water savings.

Another analysis, in comparison, calculates both the annual and the accumulated savings over the implementation of a water efficiency program. Its assessment also notes a wide range of savings across different years, which may reflect both variability in meter reading and billing across different time periods, as well as larger-scale water use trends.

Risk of Double-Counting: There is often a risk of "double-counting" water savings from participants who participate in multiple programs. Isolating program-specific savings was described as often very challenging across our informational interviews. Possible approaches to addressing this risk include:

- Using a hierarchy model. One approach involves assigning a different weight to different water conservation programs, to estimate how much each contributed to overall water savings, and to avoid double counting.
- Including a very clear disclaimer when presenting water savings numbers across different program types, noting that program-specific savings cannot simply be added up to get an overall total without a risk of double-counting and additional uncertainty.

3. Baselines and Control Groups

There are several different approaches to determine a reference point to measure the impact of water efficiency programs from.

One approach is to establish a control group, a group of customers with similar (1) water use and (2) seasonal variation in water use as customers participating in water efficiency programs.

An analysis by one community, for instance, mirrored the indoor and outdoor water use calculations for water efficiency programs for a group of 1,000 customers who did not participate in water efficiency programs, and had water usage data going back to 2005. Three-year rolling averages of water use were calculated across all control group participants, to smooth out some variability in gallons of water use/day/connection, due to variation in the dates of meter reads, among other factors. Outdoor water use data among control participants was also normalized according to the same method as treatment group participants (based on a ratio comparing current seasonal water use to seasonal water use in a control year).

Another approach is to measure changes in participating customers, prior to, during, and after their participation in water efficiency programs.

We found a number of analyses that took this approach. This methodology includes the caveat that many sources of variability – from the dates of meter reads and billing, to changes in weather conditions, to other larger trends in water use – can influence this data.

These approaches are not mutually exclusive; conducting both can offer complementary insights into the impact of different programs.

4. Metrics tracking program costs, benefits, and return on investment

A brief summary of common metrics used to calculate and communicate the costs, benefits and returns on investment for various programs follows below.

- Total annual program costs
- Water savings (gallons per day per unit or connection)
- Water savings (estimated gallons saved annually by a program)
- Water savings (estimated gallons saved over project lifetime)
- Water savings (total acre feet saved per year)
- Water savings (cumulative water savings across several years)
- Cost/AF (according to year, to indoor/outdoor water use, and to program)
- Rebate efficiency (AF/rebate)
- Average savings/customer per program
- For indoor rebates, years before the customer saved enough money to realize a return on their investment
- Deep dives into case studies of high-volume users

5. Methodologies for understanding participation in conservation programs (indoor, outdoor)

A. Spatial analysis

Cities often used spatial analysis to explore participation across different neighborhoods.

Several reports, for instance, display maps that visualize participation indoor and outdoor water efficiency programs across different neighborhoods.

Key visualizations include:

- The **rate of participation in indoor and outdoor water efficiency programs by neighborhood**. This can include neighborhood-by-neighborhood analyses, and/or a hot spot analysis of participation in indoor and outdoor water efficiency programs across the city.
- The **change in water use by neighborhood**. One community has displayed maps highlighting the 10-15 neighborhoods with the largest savings. The visualizations take the approach of celebrating savings, rather than naming and shaming neighborhoods with high water consumption. These maps explore water savings in terms of both aggregate and average water use changes.

These analyses only include customers who have several years of data available. It's also important to note that turnover and new developments can significantly affect neighborhood water use levels from year to year.

B. Customer and market segmentation analysis

In addition to mapping participation, one community has explored using U.S. Census data to develop customer and market segmentation. For instance, based on statistical analyses, it is possible to identify what kinds of distinct customer groups exist, based on

considerations such as infrastructure, demographics, and water use levels and patterns. This kind of analysis can support targeted marketing; for instance, identifying different water use patterns across different cultures and targeting marketing towards specific water uses. It's important to have a way to flag changes in who lives at a property and to filter the analysis for this, when conducting this kind of analysis.

A number of analyses also track participation by customer category, such as: combined, commercial, irrigation class, multi-family, and residential, or more detailed categories such as: auto dealership, church, condo, cross-listed, duplex/triplex, manufactured home, hotel/motel, multifamily (4-8), multifamily (9+), office, other, recreational, retail, single family, warehouse, and undefined. For instance, one city found that their Slow the Flow program, which provides free irrigation consultations, efficiency tests, and customized irrigation schedules, initially had high levels of residential demand, necessitating budget increases for the program. Currently, however, the program mostly attracts larger customers, such as HOAs.

Analysis Applications and Key Findings

For the communities we spoke to, water efficiency analyses serve both internal and external purposes. These analyses help inform planning for future infrastructure and supply needs. Internally, they also help justify the use of staff time to implement efficiency programs, and benchmark the performance of different efficiency programs, to guide internal decisions about the future evolution and prioritization of different efficiency programs. For instance, one community found that while its toilet rebate program offered a strong return on investment initially, once the program had replaced most of the older toilets, it had a diminishing impact on water savings, unless it started to target larger customers (e.g., schools, apartment complexes).

Additional Advice and Best Management Practices

Several cross-cutting themes and best practices – described in greater detail below – emerged through interviews with communities who conducted a water use change analysis.

A. Starting points and scoping the analysis

The communities suggested considering several key points when developing an analysis, including:

- The future goals for data collection and analysis. Ideally, these considerations can also feed into the monitoring process – by starting with the question "how will we track this?" at the beginning of a program.
- Keeping analyses "simple but defensible," and "only as complex as they have to be." One respondent noted that while it's easy to make evaluations of water use quite complicated, often in response to input from internal experts, it's important to also take into account the considerations around maintaining the data and repeating analyses across different years, potentially under the direction of different team

members. It's also helpful to keep the intended audiences for the analysis in mind, and to consider what types of metrics will be most effectively communicated. Often, these are the most straightforward indicators.

- Updating analyses across different years. One respondent noted that they have worked to find a balance between updating methodology – to reflect lessons learned and to try new analytical approaches – and consistency with past methodologies, which makes it possible to easily compare program performance across different years.

B. Data Management

The interviews uncovered several recommendations around data management:

- Standardizing the process for entering, and cleaning and processed data is very helpful. It is ideal to devote some time to thinking through data input, data use, and the data infrastructure plan as part of the larger analysis process.
- It is vital to ensure the presence of joiner IDs (e.g., names, customer IDs, etc.) to match and combine information across different data sources.
- In terms of sharing data across analysts, it's helpful when all analysts use the same program (e.g., Excel, R Studio, ArcGIS) to ensure consistency across different analyses and any data sets that feed into the analysis. Sometimes combining or manipulating information from different systems (e.g., accessing and analyzing data from a system tracking customer water use) creates challenges.

C. Communicating the Results

In terms of communicating the results, several overarching suggestions included:

- Tailoring the findings for different audiences; some metrics may be more interesting to internal planners or analysts who are most familiar with implementing water efficiency programs; other metrics may resonate more with public or policy-focused audiences.
- One City has branded its analysis as a "change analysis" rather than "water savings analysis," since they do not always see water savings in the yearly analysis. Providing clear context to help viewers interpret the results and to understand what types of information they draw from is crucial.

Report	Description
Aurora Water. (2015). Aurora Water Conservation: 2015 Annual Report.	Summary of results of water efficiency analysis, in terms of both water savings and community participation in water efficiency programs.
Aurora Water. (2015). 2015 Municipal Water Efficiency Plan.	Summary of water efficiency programs, and calculation of water savings by program from 2002-2012. This memo references Aurora's more recent methodology (which has been updated significantly since 2015), and also provides a detailed description of the program's earlier approaches to measuring water savings from efficiency programs.
Alliance for Water Efficiency (AWE) Water Conservation Tracking Tool	The Alliance for Water Efficiency (AWE) has developed an Excel-based Water Conservation Tracking Tool[36] that evaluates water savings, costs, and benefits for a water utility's conservation programs, using a standardized methodology for water savings and cost-benefit accounting. It includes a list of pre-defined conservation activities users can select to guide their analysis. The program also estimates reduction in greenhouse gas emissions resulting from changes to plumbing and/or energy codes and conservation program activity.
City of Longmont, CH2MHill and Great Western Institute. (January 2013). Water Conservation Program Evaluation.	Assesses the effectiveness of water conservation programs supported by the City of Longmont, and recommends adjustments to make those programs more cost effective. Includes a detailed description of the methodology behind the assessment of water conservation programs.
City of Longmont, CH2MHill and WaterDM. (September 2017). Water Efficiency Master Plan: Update to the 2008 Water Conservation Plan.	Section 4, "Current and Future Water Efficiency Efforts," summarizes the history and intended future for Longmont's water efficiency programs. It describes trends in gross and per capita residential water use and estimates future water savings from water efficiency programs.
Feinglas, S., Gray, C., and Mayer, P. (November 2013).	This study examines the long-term impact of water conservation on water rates and tap fees in the City of

[36] For more details, visit: https://www.allianceforwaterefficiency.org/resources/topic/water-conservation-tracking-tool.

Conservation Limits Rate Increases for a Colorado Utility. Alliance for Water Efficiency.	Westminster, Colorado and finds that rates would be substantially higher today if not for water savings achieved since 1980. Analysis draws on water demand records, water rates, tap fees, and capital project costs from 1980 through 2010.
Resource Central. (2020). 2019 Annual Report: Water Conservation Impact.	Overview of quantitative and qualitative metrics for different water conservation programs, including many educational programs.
Water Research Foundation. (April 2016). Residential End Uses of Water, Version 2: Executive Report.	The study identifies variations in water use by fixture or appliance (updating a 1999 study) and evaluates future conservation potential. It also includes predictive models to forecast residential demand.

Appendix G – Water Use Change Analysis: Detailed Methodology

In consultation with Greeley, WaterNow and WRA identified a subset of Greeley's water conservation programs to focus the participation and water use analysis on (the full list of these programs is described in greater detail in Table A-2 below).

The analysis covers participation in water efficiency programs during the years 2013-2018. Given the unusual factors – the COVID pandemic and resulting stay-at-home orders – affecting 2020 water use, 2020 water use is not included in these calculations, and the water use change for participation in programs during 2018 is analyzed using only 2019 water use data.

To conduct the analysis, we compared customers' average water use two years prior to participation in Greeley's water conservation programs, with their average water use two for two years following their participation in a water use program. While many other methodologies could provide helpful insight into the change in water use resulting from water conservation program participation (see the *Resources and Reports* section in Appendix F for a more detailed description of methodological approaches and related studies), this approach was determined to be the best match for Greeley's existing data and data format.

Specifically, we applied the following calculation to participants in evaluated programs:

> **Water use change** = Average water use for the two years prior to participating in program – average water use for the two years after participating

This approach was applied to programs targeting indoor and outdoor water use. Indoor water use was calculated as the total water use during the months of January, February March, November, and December. For the remaining seven months of the year, it was assumed that indoor water use was the average monthly during these five winter months. A customer's annual indoor water use was calculated using the approach below:

> **Indoor water use** = (Total use in Jan., Feb., March, Nov., Dec.) + (WQA*7)
>
> WQA (Winter Quarterly Average) = Average water use in Jan., Feb., March, Nov., Dec.

Outdoor water use was defined as water using during the months of April through October, that was greater than the average indoor water use. Outdoor water use was calculated using the approach below:

> **Outdoor water use** = Apr. – Oct. water use, greater than WQA

Outdoor water use between years was normalized for weather, by using Greeley's annual Irrigation Water Requirement (IWR).

Once participants' indoor or outdoor water use (depending on the conservation program being evaluated) was calculated, the average water use change was first calculated, and then applied to the years that a participant was active in the program (e.g., if a customer participated in 2014, the average annual water savings was applied to the years 2015-2018). We referenced the default lifetime savings and annual savings decay rates cited in the AWE Water Conservation Tracking Tool; based on these values, only the Commercial and Residential Indoor and Outdoor Programs had a savings decay rate (of 20 percent annually) and a lifetime savings rate (of five years) that applied to the analyzed programs. The toilet rebates, for instance, had an estimated 25-years of savings – far beyond the six years included in this analysis (see Table A-3 for more details).

The cost calculations used for each program typically included both the cost of a rebate along with administrative costs. It is important to note that the estimates around staff time are limited to the installation of a particular program or rebate (e.g., the process of reviewing an application). Longer, more overarching processes – such as developing programs, transportation, equipment, or advertising to increase participation in a program – are not captured in this analysis's cost calculations.

Appendix G, Table A-2

Program Name	Description	Indoor/Outdoor Water Use	Customer Types	Years Analyzed
Commercial and Residential Audits				
Commercial 2013-2018 Use: Commercial Audits 2013-2018	Indoor Water Audits: Greeley Water Specialists come to a property to: ● Review how a customer is using water ● Identify areas of water waste ● Provide recommendations and custom water use targets Outdoor (Irrigation) Audits: Greeley Water Specialists come to a property to: ● Inspect watering zones and identify problems ● Measure how much water is being applied ● Check water pressure and recommend adjustments ● Develop a custom watering schedule	Indoor and/or Outdoor	CII, MFR	2013-2018
Residential 2013-2018 Use: Residential Audits 2013-2018		Indoor and/or Outdoor	SFR	2013-2018
Indoor Conservation Programs				
0.8 GPF Toilet Rebate	Toilets that use 0.8 gallons per flush or less are eligible for rebates (with a two-toilet rebate per household limit).	Indoor	CII, MFR, SFR	2014-2018
Dual Flush Toilet Rebate	Greeley provided rebates for dual flush toilets, a variation of the flush toilet that uses two buttons or a handle mechanism to flush different amounts of water.	Indoor	CII, MFR, SFR	2013-2018
Low Flow Toilet Rebate		Indoor	CII, MFR, SFR	2016-2018

Ultra Low Flow Toilet Rebate	A low-flush toilet (or low-flow toilet or high-efficiency toilet) is a flush toilet that uses significantly less water than traditional high-flow toilets	Indoor	CII, MFR, SFR	2013-2018
Toilet Rebates	Includes and summarizes the four programs listed above: an 0.8 GPF Toilet (2014-2018); a Dual Flush Toilet (2013-2018); a Low Flow Toilet Rebate (2016-2018); and an Ultra Low Flow Toilet Rebate (2013-2018).	Indoor	CII, MFR, SFR	2013-2018
Front Loading Washer Rebate	Greeley provided rebates for high-efficiency front loading clothes washers, which use less water and energy than standard top loading clothes washers. This program ended in 2018.	Indoor	CII, MFR, SFR	2013-2018
Showerhead Exchange	At showerhead exchanges, which are held periodically at events, customers can exchange their old showerheads for new low-flow models at no cost.	Indoor	CII, MFR, SFR	2017-2018
Outdoor Conservation Programs				
ET Sensor Rebate	An ET Sensor uses factors such as solar radiation, air temperature, relative humidity, and wind to calculate evapotranspiration and communicate it to the central software (e.g., to an irrigation controller) via the host controller's communication.	Outdoor	CII, MFR, SFR	2013-2018
Spray Head Sprinkler Exchange	Greeley enabled customers can exchange their old spray heads for more efficient models.	Outdoor	CII, MFR, SFR	2016-2018
Rotary Nozzles Rebate	Rotary nozzles increase uniformity and reduce overspray in irrigation systems. They operate by rotating a stream of water over the landscape, in contrast to the mist produced by spray-head sprinklers.	Outdoor	CII, MFR, SFR	2013-2018
Smart Controller Rebate	Smart controllers are automatic timing devices with nonvolatile memory used to remotely control valves that operate an irrigation system that is contractor grade quality. Smart controllers are able to self-adjust	Outdoor	CII, MFR, SFR	2013-2018
Irrigation Controller Rebate		Outdoor	CII, MFR, SFR	2014-2018

	and reschedule irrigation events based on integrated instrumentation that measures evapotranspiration (weather-based) or soil moisture or flow or a combination. Smart Controller Rebates were installed by Greeley's Water Conservation Specialists, while Irrigation Controller Rebates were installed by the customer.			
Pressure Reducing Valve (PRV) Rebate	A pressure-reducing valve reduces misting, a fine spray that results from irrigation systems that apply water at a very high pressure, resulting in excessive evaporation and water drifting away from the intended irrigation area.	Outdoor	CII, MFR, SFR	2013-2018
Cash for Grass Rebate	Greeley water customers who are exceeding their outdoor water budget can get cash for replacing their lawn with low water use plants. This 2018 pilot program aims to replace lawns with more sustainable landscapes, including Xeriscape, rain gardens, and pollinator plants.	Outdoor	CII, MFR, SFR	2018

Table A-2. *A summary of programs included in the analysis of program participation and water use savings. This list was narrowed down, and the final results only include programs if the number of customers with sufficient water use data was larger than 50. Year analyzed include all years that the program was active during the 2013-2018 window the analysis considers.*

Appendix H – Comparison of Results to Reference Values

Greeley Water Conservation Program	AWE Conservation Program	AWE Model Values (gpd/unit)	AWE Model Values: Estimated Annual Savings Per Account (gpy/unit)	AWE Model Values: Estimated Annual Water Savings (AF)	Life of Savings (years)	Savings Decay (% /year)
Residential Audits (Indoor + Outdoor)	SFR Water Use Audit	33.9 gpd/unit	12,374	23	5	20
Front Loading Washer Rebate	SFR Washer Rebate	19.3gpd/unit	7,044.5	17.11	15	0
Toilet Rebates	SFR ULFT Replacement, SFR HET Replacement	20.9 gpd/unit - 27.8 gpd/unit	7,628.5 – 10,147	16.26	25	0
Smart Controller Rebate	SFR Smart Irrigation Controller Rebate	26.1 gpd/unit	9,527	3	10	0
PRV Rebate	ND	ND	ND	ND	ND	ND
Rotary Nozzles	SFR Irrigation Nozzle Replacement	1.6 gpd/unit	584	3.37	10	0
Commercial Audits (Indoor + Outdoor)	CII Large Landscape Water Audit	893 gpd/unit	325,945	87	5	20

**For Residential and Commercial Audits, participants could select either or both the indoor and outdoor audits.

** The Greeley Toilet Rebate program encompasses the 0.8 GPF Toilet, Dual Flush Toilets, Low Flow Toilet, and Ultra Low Flow Toilet programs. See Appendix G for more details about these programs.

***Only accounts with sufficient water use data were included in these calculations, and only programs with at least 50 participants with sufficient water use data are presented in this table.

****For the columns labeled **"AWE Model Values: Estimated 6 Year Water Program Savings (AF)"** and "**AWE Model Values: Estimated Annual Water Savings (AF)"** the AWE model values were substituted for the calculated average annual water savings, to compare the study's results to the results that would have been realized using model values.

***Table A-3**. Estimates of water savings for included programs using the default values from the AWE Water Conservation Tracking Tool.*

Table A-3 compares the values found in this analysis with the default model values used in the AWE Water Conservation Tracking Tool. For most programs, the results are similar, with a few exceptions, notably the Commercial and Residential Audit programs, where the values found through the analysis are lower that what would be expected based from the AWE model default values. However, participation in these programs includes an especially wide range of variables, such as individual behavior change and different weather conditions (even while normalizing for weather by using IWR, conditions may still affect resident's behavior and attitudes towards water use). For the Commercial Audit program, in particular, it is also possible that while participants are using water more efficiently, their overall water use still increases (for instance, their customer base or production grows, increasing their total water use). Participation in these Audits may also lead to participation in other rebates, as seen in the especially high level of overlap between the Residential Audit and other conservation programs, playing a role in generating the larger individual savings seen in some of the other programs.

APPENDIX B

2022 Water Efficiency Plan

CITY OF GREELEY, COLORADO [Company address]

Public Notice Announcement

On August 3, 2022 Greeley's Water Efficiency Plan was posted to the Water Conservation homepage at https://greeleygov.com/services/ws/conservation/about for the 60-day public comment period ending on October 3, 2022. It included a button that linked to a form for people to provide input on the content of the plan. The form asked people to provide their suggestions to improve the Water Efficiency Plan, how they ranked the plan overall on a scale of 1 to 5, and if they had any further comments.

In total, the City received 13 written comments on the plan. Each comment was individually addressed and responded to by the Conservation Manager, Dena Egenhoff and found in Appendix B. During this time period, the City also ran a social media campaign across multiple channels (Water & Sewer Facebook and Twitter, and City of Greeley Facebook and Instagram). Please see Appendix B summary of social media analytics to understand the detailed performance of the 12 total posts on these platforms. In summary:

- 7.54K impressions
- 141 reactions
- 7.09K reach
- 174 engagements
- 2.31% engagement rate

The conservation team also hosted two online open houses; one on August 18, 2022 from noon to 1 p.m. and one on September 15, 2022 from 5 – 6 p.m. In total, 28 people registered two attend the meetings, and 7 people attended.

The meetings, and the opportunity to provide feedback online were promoted in both the August and September Water & Sewer monthly newsletter, which is sent to 2,750 people who have signed up to receive them. In total, the plan received 41 unique clicks across both newsletters (12 to the Conservation home page; 29 to the Zoom link to register for the open house).

A press release was sent on August 9, 2022 (https://greeleygov.com/government/ceo/press-release/greeley-releases-draft-water-efficiency-plan-for-public-comment) requesting public comments on the draft plan. This led to coverage by the Greeley Tribune, which interviewed Dena Egenhoff (Conservation Manager) and published an article "Greeley officials seek feedback on draft water efficiency plan" (https://www.greeleytribune.com/2022/08/19/greeley-officials-seek-feedback-on-draft-water-efficiency-plan/) on August 18, 2022. This article detailed the various approaches to water conservation outlined in the draft plan and encouraged readers to provide input during the public comment period.

The City of Greeley's Boards and Commissions are a critical link to the community. Dena Egenhoff provided key information and presented at commission/advisory board meetings, connecting key City department stakeholders and board members to the plan. Information was provided to:

- Parks and Recreation Advisory Board – information sent to Board on August 16, 2022
- Planning Commission – presentation on August 23, 2022

Local businesses and organizations were also targeted for outreach, inviting them to attend the virtual open houses and provide comments on the draft plan.

- Poudre Learning Center
- Immigrant and Refugee Center
- JBS
- Greeley-Evans School District 6
- Greeley Rotary Club
- Greeley Chamber of Commerce
- Greeley Area Realtors
- Northern CO Homebuilders Association
- Greeley Economic Development Association
- Downtown Development Authority
- Visit Greeley
- United Way

On October 19, 2022, the WEP will be presented the Water and Sewer Board for motion for approval and make recommendation for the City Council. During the November 15, 2022, City Council meeting, the WEP will be presented for approval through a city resolution.

Public Comments

8/8/2022- Online Form from Torrie

Comment:
How about kickbacks to customers who use less water, like a yearly rebate. Also. Source of free pest free good quality mulch for residents to use up to a certain amount. Look to other communities with water saving programs.

Reply:
Hi Torrie,

Many thanks for your feedback on the Water Efficiency Plan. I like your idea about free good quality mulch and will add that accept to our short term list of projects.

As for kickback for customers, that one of the reasons we have a water budget. I'm not sure if you are aware of the water budget, but it promotes and rewards water efficiency by providing the lowest water rates. If you use more than what is in your budget, you'll pay the higher rate. Here is some more information on the water budget if you are interested. https://greeleygov.com/services/ws/water-budget/about.

Again, thank you for your comments on the Water Efficiency Plan. Because of community members like you, Greeley is a leader in water conservation efforts.

Best,
Dena

8/10/2022- Online Form from Natalie Stevens

Comment:
I've been following and have been involved with Greeley Water Conservation programs for 20+ years. You finally have all this excellent research in the appendix, but you don't use it all in the plan. Referring to those facts and stats would be great to make the plan more effective. I don't think adding that performance analysis appendix makes enough connections for me on what has worked in the past and what hasn't, and what areas we should grow. I wish you would integrate some of this information into the primary plan. It seems like this data wasn't used in the decision-making on the program plan. Slapping it on in the appendix doesn't help me as a reader. You're not leveraging all your resources to formulate your new direction intelligently. Kind of like "here are the tactics" and "here is the research behind it." Connecting at least a little of this data into the plan would help me understand your goals, rationale and direction a bit more. Like in that appendix document (page 21), you show the barriers to turf replacement. Wouldn't it be wise to look deeper into those barriers and ensure your program(s) address those things? For example, if HOAs are a factor, will you make an effort to address that? Like, as making an effort to reach out to HOAs, attend their board meeting and make a strong case for water conservation, especially in terms of cost savings. I remember the other plans pointed out the percentage decrease in water use. That was the selling point, the simple communication that was marketed to the masses. On page 5, you say it "reduces water demand by 2,034 acre-feet of water savings by 2030." Aside from the sentence being poorly written, it isn't specific enough. What is the percentage of reduction? Is that per year or in total? For the average resident, we see water in gallons and more than 667 trillion gallons, which seems so much more impactful to non-water-nerds. It would get the public's attention. Don't scrap acre-feet, but add gallons, too. There is little new or innovative about this year's plan. Most of what is laid out here has been going on for a long while. What makes it better or focused on the future? How is it better? How is this an upgrade? I don't know after I read this. It doesn't get me excited about what you are proposing. It's very status quo. Greeley is a statewide leader in water conservation, and this plan doesn't fully showcase that. You have some of the new things listed in the tables (pages 35-37), but they aren't explained how these new items will benefit the community and our water conservation efforts. I would love to see a sentence or two about each of these "new" projects and why they are being pursued. For instance, you can list outreach demographics, tap into the Water-Energy nexus, frozen food defrost and more but without any commentary or context, who cares? Those general descriptions/buzzwords could mean a lot of things. There is a description about dipper wells on page 40, but nothing about it being part of a commercial kitchen and the claim that it will "dramatically reduce their water use" is fuzzy. How much is expected to be saved? Why does it matter? How are you going to do outreach to restaurants and commercial kitchens? On page 38, explaining how educational programs are integrated into water savings would help show its value. Is it a face-to-face marketing tool? When people know more about water, do they appreciate it more and be more apt to save it? I know there is a connection there, but this document doesn't show it to someone who might not know the importance of that relationship in that context. This is just one example, but there are others like that scattered throughout the document. I guess the parts are all there, but it doesn't come together as a whole. My main concern is that it doesn't show confidence or a firm grasp of how things are planned, explained or interconnected. Do a better job at selling your programs.
1
This document needs a good copy edit. To be frank, it is poorly written and reads like a first draft. It is a bit embarrassing that the city would provide this document for public comment. Like many government documents, it had multiple authors and no consistent voice. You need a good copy editor to review it with a neutral eye and fix it. There are incomplete sentences, grammar concerns, missing punctuation, inconsistent/random capitalization, spacing issues, changes in font sizes and other glaring problems.

Greeley is spelled wrong at least three times in the document, including in the first paragraph of the executive summary. There are also so many inconsistencies in how things like numbers, time of day, dates and percentages are expressed. Some areas seemed repetitive and stated the same information in more than one place, so organization is also an issue. It also should be written in a more formal style. Remove expressions and phrases that make it more casual, like using etc. within the narrative. See page 42 about the water budget; it switches to “you” instead of “water customers,” creating an inconsistent tone. You obviously copied and pasted that section from somewhere else, like from a web page. No shade, just be aware of that kind of thing. ___ It seems like the department has provided less and less communication about water conservation programs within the last few years. I don’t know if the change in staff, leadership or direction created this shift. Maybe COVID disrupted the flow. It's great that you say you will do a regular communication plan, and I hope it helps you communicate on all of your excellent programs. There are ongoing online resources like that plant database, WaterSmart and others that don’t seem to get the promotion they should, especially since WaterSmart is made even better with the new water meters. That stuff should be more consistent in your communication efforts, especially on social media. I also suggest that you work on the tone of your messaging to the community. I’ve observed that it has gradually changed over the years. It seems much more corporate and institutional than it had been. I guess the vibe has been less about framing yourselves as the water customers' partner, guide, and trusted expert than in the past. It is more about looking at things from the city's perspective, not the audience's. I don’t think that approach is working in your favor. A formal marketing plan is excellent, but if your coms don’t directly make a connection with customers, it isn’t going to change behavior. Don’t forget to explain your program's benefits, like simply sharing the success of a customer's experiences. For example, tell a story about a resident that got an irrigation audit, then, based on recommendations, reprogrammed their system, used your rebate and then saved X dollars a summer, and the grass looked better than ever. It has to go beyond simple awareness, and I think your data proves it. ___ I hope you take this constructive criticism in the spirit it was intended. This is tough love.

8/15/2022 Online Form Natalie Stevens

Comment:
Left comments previously and I’m back for more thanks to a reminder on Facebook. When I looked again, I noticed that the chart and stats on page 19 looked totally off. Most of Greeley’s water is used outdoors. I though the stats were closer to 45% indoor and 55% outdoor. Isn’t it 70% outdoor and 30% indoor in the summer. That were the stats Greeley used for years. What changed? Is it counted differently? How is ICI taken into account. Is it different? That was the premise of previous plans, that since outdoor use is more than indoor, so more programs are needed in that regard.

Hi Natalie,

Thank you very much for your feedback on the Water Efficiency Plan. I wanted to mention this plan is technical as required by the Colorado Water Conservation Board (CWCB). The CWCB has a specific format which needs to be followed the Water Conservation Act HB04-1365. To learn more visit. https://cwcb.colorado.gov/municipal-water-efficiency-plan-guidance-document. With your communications background ideally, there would be two documents- one for the public in a digestible format and one for the technical covering the Water Conservation Act (HB04-1365). This document is not unfortunately technical as determined by CWCB.

It sounds like you are very passionate about the Water Efficiency Plan. Could we have scheduled a one-on-one to discuss more? From your first comment, the Enhancing Greeley's Water Efficiency Portfolio has been included in the Water Efficiency Plan. Specifically, it will be used in the strategic marketing and has been used in the background calculations to determine the 2030 goal of accumulated 2,034 acre-feet of water savings.

From you comment regarding the outdoor water use, we double checked our calculations and data analysis, and page 19 chart is correct. The 45/55 ratio is an older value and does not currently represent our single family residential indoor/outdoor ratio. There has been a shift in outdoor watering within our community- newer builds with a smaller outdoor area to irrigate. You mentioned 70/30 ratio in the summer months which can occur depending on the weather patterns at the time (drier and hotter). Please keep in mind that figure on page 19 is annually and only for single family residents.

Thanks again Natalie for your comments and time. Please let me know a time when we can meet virtually or in person to discuss more.

Best,
Dena

Note: No further follow-up from Natalie Stevens

8/15/2022 **Online Form from Sarah**
Comment:
Get rid of golf courses that aren't free to the public. They're a waste of land and resources. Talk to unco about their watering schedule and how wasteful it is when they are watering the sidewalk instead of the grass for hours. Provide and install free rain barrels for poor families and non-profits. Schedule citywide laundry days depending on location and family size. Reduce all sprinkler times by 10 minutes. Plant only xeric plants.

Good Morning,

I wanted to thank you for your feedback on the Water Efficiency Plan. You mention these points in your comments:

1. Get rid of golf courses
2. Talk with UNC on watering schedules
3. Provide and install free rain barrels
4. Schedule citywide laundry days
5. Reduce all sprinkler by 10 minutes
6. Plant only xeric plants

All of these are wonderful ideas. And in fact, some of these points are either incorporated already in Water Conservation or slated for future plans. Below I touched on each subject you brought up and tied it back to the Water Efficiency Plan (WEP).

1. For each new development, including golf courses, water use dedication is required. The costs of either water rights or cash-in-lieu makes future golf courses not profitable. I do not anticipate no future golf courses based on water dedication costs. In addition, the Golf Course Advisory Board is working on

a plan to make the current courses more water efficient. I've assigned our water conservation team to work with the City's Golf Course Advisory Board to reach that goal. If you are interested here is a resource for you. https://greeleygov.com/services/ws/development/raw-water-dedication. As for our accountability on topic, this will be reflected in our annual score card under Water Conservation Management- Organizational Collaboration in the WEP.
2. UNC water schedules: Greeley has partnered with UNC on a water efficiency project by removing 1 acre of traditional turf and replace the area with water-wise plants along with other functions. During the process, Water Conservation and UNC have drafted a memorandum of understanding to promote water efficiency for the landscapes at UNC. We are looking at wrapping up the memorandum of understanding by the of this year and launch the 1 acre landscape conversion in 2023. Meanwhile, if you see water waste at UNC (broken head or watering a sidewalk), please report the issue here: https://greeleygov.com/services/ws/conservation/watering-violations. Our Water Conservation team will reach out to UNC to see if we can resolve the issue. As for our accountability on topic, this will be reflected in our annual score card under Water Conservation Management- Organizational Collaboration in the WEP.
3. Rain barrels are allowed in Colorado for households but can only hold 110 gallons of water or less. This volume is tied to State legislation. Though rain barrels are a method for conserving water, the return on investment is much less then let's say a toilet. We run calculations for each program and determine a return on investment. For example, a household would save around $326.72 per year in upgrading a new toilet versus $1.86 per year for a rain barrel. At this time, our rebate programs will be focusing on larger water saving methods like household toilets, showerheads, aerators, irrigation systems and landscape changes to water-wise plants. As for our accountability on topic, this will be reflected in our annual score card under Water Conservation Management- financial resources and budget in the WEP.
4. I'm curious about your idea on laundry days. We are working with our multi-family and larger apartment complexes to rebate coin operated watering machines for water efficient washers as a method. If you don't mind sharing more about laundry days, it would be appreciated. Accountability for washing machines, this will be reflected in our annual score card under Prosperity- Rebates and Incentives in the WEP.
5. As for sprinkler systems, unfortunately I do not have the ability to control the amount of time for each outdoor watering system. However we do have an outdoor water budget that is customized for each household. The water budget rewards water efficiency pain for the lowest rate. I plan to look into strategic marketing strategies to remind water customers on seasonal adjustments such as reducing sprinkler times as our weather patterns shift. As for our accountability on topic, this will be reflected in our annual score card under Community- strategic marketing in the WEP.
6. Xericscapes or what I like to call Water-Wise plants- our Water Conservation Team have drafted a new Water and Sewer Design Criteria called Section 6- Landscape and Irrigation Criteria for new developments. It is planed to pass through City Council by the end on December 2022. The goals is starting January 2023, new development for civic and open spaces, common areas, right of ways, municipal buildings, multi-family residential, commercial, industrial and institutional will be limited on the amount of traditional turf that can be planted. Developers will have to provide a water budget for their landscape which the City will review and approve. For current landscapes, our Life After Lawn program has doubled in size for 2022 is anticipated to remove around 150,000 square feet of traditional high water use turf for low water use plant material. As for our accountability on topic, this will be reflected in our annual score card under Water Conservation Management- Land Use in the WEP.

Thank you once again for your comments and time. Together we can make Greeley's water sustainable.

Best,
Dena

8/15/2022 Online Form from Lawrence

Comment:
Have we done any research on this subject? This seems really important to be decided on a forum without proper tools to decide if the water is going to the right places and if not. Whats needed to address those areas with extra government help (new laws).This wasn't really thought out correctly. I mean we could all think of places using water incorrectly. For example golf courses. How much water do they use

Good Morning Lawrence,

I wanted to personally thank you for your feedback on the water efficiency plan. You mentioned these points in your comments.

1) Have we done any research on this subject? This seems really important to be decided on a forum without proper tools to decide if the water is going to the right places and if not.
2) What's needed to address those areas with extra government help (new laws).
3) This wasn't really thought out correctly. I mean we could all think of places using water incorrectly. For example golf courses. How much water do they use

Thanks for your insights and thoughts. Absolutely research has been done on water conservation, water planning, water sources etc. If you are curious about some of our planning processes please check following documents: https://greeleygov.com/services/ws/system/planning. As for new government laws, our water conservation team has a history of passing local ordinances, criteria, municipal code updates, state legislation and assisted drafting in federal bills and legislation. I was honored enough to provide testimony and assisted in passing this recent piece of legislation for House Bill 22-1151 https://cwcb.colorado.gov/turf.

As for golf courses, you asked how much water do they use. In 2021, golf courses used 1.5% of the total water for Greeley or around the equivalent of 800 homes worth of water. The customer type that uses the most water are single family households. However Greeley's economic drivers commercial, industrial and institutional are a close second.

I would encourage you to attend our virtual open house on September 15th from 5-6 pm to ask specific questions. You can register here.
https://greeleygov.zoom.us/meeting/register/tZIpcOigrT0vGdT2qbZaazQ5NLIyg02D7F_T. Thank you once again for your comments and time. Together we can make Greeley's water sustainable.

8/19/2022 Online Form-Unknown

Comment:
Why remove beautiful prairie grass and go back to wasteful wasteful bluegrass. Get rid of wasteful bluegrass

Good Afternoon,

I wanted to thank you for your feedback on the Water Efficiency Plan and thought it would be nice to hear directly from our Water Conservation Team. You mention these points in your comments:

- Why remove beautiful prairie grass and go back to wasteful bluegrass. Get rid of wasteful bluegrass.

Wonderful ideas regarding our native landscapes in Greeley and Colorado. And in fact, some of these points are either incorporated already in Water Conservation or slated for future plans. Below I touched on turf and tied it back to the Water Efficiency Plan (WEP).

- Our Water Conservation Team have drafted a new Water and Sewer Design Criteria called Section 6- Landscape and Irrigation Criteria for new developments. It is planned to pass through City Council by the end on December 2022 and be part of our development requirements. The goals is starting January 2023, new development for civic and open spaces, common areas, right of ways, municipal buildings, multi-family residential, commercial, industrial and institutional will be limited on the amount of traditional turf that can be planted. Developers will have to provide a water budget for their landscape which the City will review and approve. This criteria incentives new development for native plants and grasses.
- For current landscapes, our Life After Lawn program has doubled in size for 2022 is anticipated to remove around 150,000 square feet of traditional high water use turf for low water use plant material. We are anticipating State funding to give this program a boost in which we can expand converting bluegrass to water-wise landscapes. I was honored enough to provide testimony and assisted in passing this recent piece of legislation for House Bill 22-1151 https://cwcb.colorado.gov/turf. Greeley supports landscapes beyond bluegrass.
- Collaboration with other entities. Greeley has partnered with UNC on a water efficiency project by removing 1 acre of traditional turf and replace the area with water-wise plants along with other functions. During the process, Water Conservation and UNC have drafted a memorandum of understanding to promote water efficiency for the landscapes at UNC. We are looking at wrapping up the memorandum of understanding by the of this year and launch the 1 acre landscape conversion in 2023.
- We are working to reward water efficiencies by applying outdoor water budgets to commercial businesses- similar to what we have in place for single family residents. This will be at least a 5-year project given the data acquisitions and software needs.

To hold us accountable for our actions, we developed an annual score cards which will be presented at our public Water and Sewer board meetings. In the public board meetings will provide further details on our plans for the year. What I mentioned above fall under Water Conservation Management- Land Use and Organizational Collaboration in the draft Water Efficiency Plan.

I would encourage you to attend our virtual open house on September 15th from 5-6 pm for clarification and other questions. You can register here.
https://greeleygov.zoom.us/meeting/register/tZIpcOigrT0vGdT2qbZaazQ5NLIyg02D7F_T.

Thank you once again for your comments and time. Together we can make Greeley's water sustainable.

Best,
Dena

8/24/2022 Online Form- Jeff
Comment:
100% behind the triple bottom line format- efficiency needs to be a part of our water future, and this is one of the few ways that puts a number on the value of conservation.

Note: No contact information and therefore no response.

9/13/2022 Online Form- Kennedy Dechant
Comment:
I believe the water plan is much too complicated for the average citizen of Greeley to engage with in a manner that allows them to contribute an effective opinion as to what they believe about this water plan.

Hi Kennedy,

I wanted to thank you for your feedback on the Water Efficiency Plan. You mention this point in your comment:

I believe the water plan is much too complicated for the average citizen of Greeley to engage with in a manner that allows them to contribute an effective opinion as to what they believe about this water plan

Actually I agree with you. The Water Efficiency Plan (WEP) is a technical document in which is mandated through the Water Conservation Act of 2004 (HB04-1365). The State governing agency is the Colorado Water Conservation Board has minimum plan requirements and must follow a specific format. The format makes sense at the State level since they need a consist group of information from all utilities across Colorado. Each WEP is critical for State reporting and ultimately feeds into the State's Colorado Water Plan.

As a method to fill the State's needs along with our community, I developed annual score cards. To hold us accountable for our actions, the score cards will be presented at our public Water and Sewer board meetings start of the year and end of the year and tied to our Water Conservation Team's performance evaluations. In the public board meetings will provide further details on our plans for the year and allow for more public feedback. The Board meeting are the 3rd Wednesday of each month at 2:00 pm in the Council Chambers at the City Center South Campus, 1001 11th Ave.,
The goal is to have community folks, such as yourself, provide feedback at the start of the year and hold us accountable for our actions at the end of the year. Click here to find out more about the Water and Sewer Board.

I would encourage you to attend our virtual open house on September 15th from 5-6 pm for clarification and other questions. You can register here.
https://greeleygov.zoom.us/meeting/register/tZIpcOigrT0vGdT2qbZaazQ5NLIyg02D7F_T.

Thank you once again for your comments and time. Together we can make Greeley's water sustainable.

Best,
Dena

9/13/2022 Online Form- Soren Hobbs

Comment:
As a student of UNC, I often think about how much water the expansive lawns here require. I think converting even small parts of lawns like these to native plants that need less water would be a great help.

Hi Soren,

I wanted to thank you for your feedback on the Water Efficiency Plan. You mention this point in your comment:

As a student of UNC, I often think about how much water the expansive lawns here require. I think converting even small parts of lawns like these to native plants that need less water would be a great help.
First thank you for just viewing water as resource that should be used wisely. You are correct about traditional tuft conversations and water reduction. Our Water Conservation Team have drafted a new Water and Sewer Design Criteria called Section 6- Landscape and Irrigation Criteria for new developments. It is planned to pass through City Council by the end on December 2022. The goals is starting January 2023, new development for civic and open spaces, common areas, right of ways, municipal buildings, multi-family residential, commercial, industrial and institutional will be limited on the amount of traditional turf that can be planted. Developers will have to provide a water budget for their landscape which the City will review and approve. Also these Criteria rewards native plants selection by reducing water allocations for new development. For current landscapes, our Life After Lawn program has doubled in size for 2022 and is anticipated to remove around 150,000 square feet of traditional high water use turf for low water use plant material. As for our accountability on topic, this will be reflected in our annual score card under Water Conservation Management- Land Use in the WEP. In addition, we are working the UNC to retrofit around 1 acre of traditional turf to low water as a demonstration and commitment to our water resources. Being a student, I would encourage you to participate in that process find out more through Dr. Chelsie Romulo and Sarah Boyd- UNC Landscape and Transportation Manger.

I would encourage you to attend our virtual open house on September 15th from 5-6 pm for clarification and other questions. You can register here.
https://greeleygov.zoom.us/meeting/register/tZIpcOigrT0vGdT2qbZaazQ5NLIyg02D7F_T.

Thank you once again for your comments and time. Together we can make Greeley's water sustainable.

Best,
Dena

9/13/2022 Online Form- Sandis Walter

Comment:
For the drought planning, are there reasonable plans to account for possible ways that climate change would impact the city? Climate change could potentially cause increasingly drastic droughts and accounting for this possibility would be critical since climate change has been increasingly prevalent.
2
Honestly, I don't really know how to rank the water efficiency plan. There is no metric/rubric of how I am supposed to rank the Water Efficiency Plan because I am a student at UNC and not extremely knowledgeable in this area. The document is also extremely long so it is difficult to be able to skim, much less read the whole thing. It would be easier to understand if there was also a summary written in easier-to-understand language.

Hi Sandis,

I wanted to thank you for your feedback on the Water Efficiency Plan. You mention these points in your comment:

1. For the drought planning, are there reasonable plans to account for possible ways that climate change would impact the city? Climate change could potentially cause increasingly drastic droughts and accounting for this possibility would be critical since climate change has been increasingly prevalent.
2. Honestly, I don't really know how to rank the water efficiency plan. There is no metric/rubric of how I am supposed to rank the Water Efficiency Plan because I am a student at UNC and not extremely knowledgeable in this area. The document is also extremely long so it is difficult to be able to skim, much less read the whole thing. It would be easier to understand if there was also a summary written in easier-to-understand language.

As for drought planning, yes in fact we have an Emergency Drought Plan in place and provides triggers to reduce outdoor water use when water is scarce. Important objectives of the plan are:
• Create equality among Greeley customers
• Minimize impacts to landscapes
• Minimize financial impact to customers and the water utility

For longer future water risks like climate change, we create models that calculate the difference between water supplies and water demand now and into the future. We use planning scenarios to reflect risk and uncertainties (climate, wildfire, population changes, large economic growth). We look at future risks and uncertainties of our climate and model what that would do to our water supplies. For example if climate is hotter and dryer, we figure out that are the water supply gaps and how can we reduce those risks. In that scenario of hotter and dryer climates, we would look at increasing conservation techniques, change our plant operations, and trigger other water supply projects (Terry Ranch) to meet indoor water demands.

As for the Water Efficiency Plan, I agree with you- it be rough to digest. The Water Efficiency Plan (WEP) is a technical document in which is mandated through the Water Conservation Act of 2004 (HB04-1365).

The State governing agency is the Colorado Water Conservation Board has minimum plan requirements and must follow a specific format. The format makes sense at the State level since they need a consist group of information from all utilities across Colorado. Each WEP is critical for State reporting and ultimately feeds into the State's Colorado Water Plan.

As a method to fill the State's needs along with our community, I developed annual score cards. To hold us accountable for our actions, the score cards will be presented at our public Water and Sewer board meetings start of the year and end of the year and tied to our Water Conservation Team's performance evaluations. In the public board meetings will provide further details on our plans for the year and allow for more public feedback. The Board meeting are the 3rd Wednesday of each month at 2:00 pm in the Council Chambers at the City Center South Campus, 1001 11th Ave.,
The goal is to have community folks, such as yourself, provide feedback at the start of the year and hold us accountable for our actions at the end of the year. Click here to find out more about the Water and Sewer Board.

I would encourage you to attend our virtual open house on September 15th from 5-6 pm for clarification and other questions. You can register here.
https://greeleygov.zoom.us/meeting/register/tZIpcOigrT0vGdT2qbZaazQ5NLIyg02D7F_T.

Thank you once again for your comments and time. Together we can make Greeley's water sustainable.

Best,
Dena

9/13/2022 Online Form- Lauren Wong Dolloff

Comment:
Will there be any other tips to help limit run-off and overwatering?
3
There were many suggestions and alternatives that would help with people trying to conserve water. The successfully addressed many different aspects of water use and how to conserve more for the future.

Hi Lauren,

I wanted to thank you for your feedback on the Water Efficiency Plan. You mention these points in your comment:
1. Will there be any other tips to help limit run-off and overwatering?
2. There were many suggestions and alternatives that would help with people trying to conserve water. The successfully addressed many different aspects of water use and how to conserve more for the future.
Correct there are already tips to help limit run-off and overwatering. These can be found here on our website. We also personalize over 250 outdoor sprinkler system controllers annually and provide educational materials to our water customers regarding cycle and soak methods. This occurs during our outdoor water auditing process. Another methodology that's already in place it's called our water budget. We customize a water budget for each single family resident based on their landscape size, persons per household, and weather conditions. When a customer stays within their water budget, they get the lowest rate. If they are overwatering, they'll have to pay for a higher rate of water use. All of

these elements mentioned above fall underneath the Water Efficiency Plan, Score card- Water Conservation Management- Land Use.

Thank you once again for your comments and time. Together we can make Greeley's water sustainable.

Best,
Dena

9/14/2022 Online Form-Pennie Nichol

Comment:
Hello, I was just wondering if there was a version available for native Spanish speakers. This document seems to be a bit inaccessible for some folks and I was wondering if there was any plan for it to become more accessible and understandable. Will there be outreach done in these communities to ensure that they also have a chance to share their opinion on Greeley's water plan? And at meetings, if there will be a translator available to ensure that these folks have equal access?

Hi Pennie,

I wanted to thank you for your feedback on the Water Efficiency Plan. You mention this point in your comment:

I was just wondering if there was a version available for native Spanish speakers. This document seems to be a bit inaccessible for some folks and I was wondering if there was any plan for it to become more accessible and understandable. Will there be outreach done in these communities to ensure that they also have a chance to share their opinion on Greeley's water plan? And at meetings, if there will be a translator available to ensure that these folks have equal access?

Specifically for the Water Efficiency Plan, outreach has been broadscale for collecting public comments, in line with the approach of other Colorado municipalities. Our targeted and personalized outreach is most impactful when working to implement programs and ensure that residents understand how they can best use and participate in our conservation programs. As mentioned in Appendix A, Enhancing Greeley's Water Efficiency Portfolio through Performance Analysis, we realize that our outreach strategies are quintessential for targeting specific audience and we need to expand into areas with renters and language barries. As mentioned in the scorecard under Communication and marketing strategy are key for success especially dealing with those who may not speak English. We are working with our Communications and Engagement Department, to adapt those residents needing additional language options.

So far, we have been able to have WaterSmart software in Spanish and English and have been advertising on a local Spanish speaking radio station about this tool for community members. We have also translated water audit reports in Spanish and ensured messaging for specific water conservation programs are included as bilingual. We will continue developing methods to outreach to those Greeley community member that can benefit from our conservation programs.

Best,
Dena

9/29/2022 Online Form- Davin

Comment:

Give city of Greeley residents a tax credit to zero scape their front lawns to help with water conservation

Hi Davin,

I wanted to thank you for your feedback on the Water Efficiency Plan. You mention this point in your comment:

Give city of Greeley residents a tax credit to zero scape their front lawns to help with water conservation

First thank you for your interest in the water as a resource that should be used wisely. Zero-scape implies only rock landscapes which would be considered a violation of city code since 50% of the landscape must be vegetated. If you meant Xericscape- those landscapes that are water wise plants suited for Colorado conditions, Greeley already incentivizes community residents. Instead of tax credits, we incentivize Greeley customers retrofit existing landscapes into water wise landscapes $1 per square foot through our Life After Lawn program. In addition, Greeley residents are rewarded with the lowest rates if they stay within their water budget. Between those two methods, the Water Conservation provides incentives for water efficiencies specifically for landscapes.

Also I wanted you to connect with Evan's Water Conservation Coordinator- Justine Schoenbacher. I would suggest contacting Justine at jschoenbacher@evanscolorado.gov to know more what is happening within Evans.

Thank you once again for your comments and time. Together we can make Greeley's water sustainable.

Best,
Dena

Content Performance: Water Efficiency Plan

01 July 2022 - 29 September 2022

City of Greeley, CO, City of Greeley, Greeley, Colorado, Greeley Water Dept., City of Greeley Government and Greeley Water

Content performance

1 Filters

POSTS ↓	IMPRESSIONS	REACTIONS	REACH	ENGAGEMENTS	ENGAGEMENT RATE	VIDEO VIEWS
13	8.3K	148	7.72K	184	2.22%	N/A

City of Greeley, CO
29 Sep, 4:00 PM · Water...

The public comment period for the draft Water Efficiency Plan closes on...

Impressions	174
Reactions	2
Reach	137
Engagements	3
Engagement rate	1.72%
Video views	-

City of Greeley Governm...
29 Sep, 4:00 PM · Water...

The public comment period for Greeley Water's draft Water Efficien...

Impressions	298
Reactions	2
Reach	298
Engagements	4
Engagement rate	1.34%
Video views	-

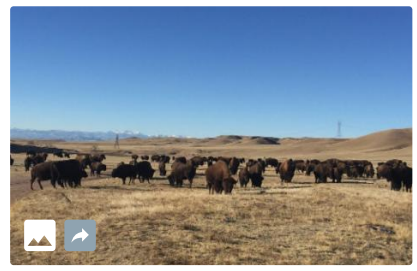
Greeley Water
23 Sep, 9:24 AM · Water...

Don't forget! If you didn't get a chance to attend one of the online...

Impressions	117
Reactions	3
Reach	106
Engagements	3
Engagement rate	2.56%
Video views	-

City of Greeley Governm...
14 Sep, 9:30 AM · Water...

To better understand our "year of storage" and other ongoing plans fo...



Impressions	1K
Reactions	7
Reach	1K
Engagements	9
Engagement rate	0.87%
Video views	-

Greeley, Colorado
9 Sep, 7:00 PM · Water...

Have you got water conservation on the mind? Us too. We're seeking...

Impressions	1.5K
Reactions	58
Reach	1.4K
Engagements	61
Engagement rate	4.2%
Video views	-

City of Greeley Governm...
9 Sep, 7:00 PM · Water...

Have you got water conservation on the mind? Us too. We're seeking...

Impressions	373
Reactions	1
Reach	354
Engagements	1
Engagement rate	0.27%
Video views	-

City of Greeley, CO
9 Sep, 11:01 AM · Water...

We're seeking community feedback on @greeleywater's plan for water...

Impressions	182
Reactions	N/A
Reach	132
Engagements	2
Engagement rate	1.1%
Video views	-

City of Greeley
9 Sep, 9:01 AM · Water...

Have you got water conservation on the mind? Us too. We're seeking...

Impressions	584
Reactions	12
Reach	414
Engagements	16
Engagement rate	2.74%
Video views	-

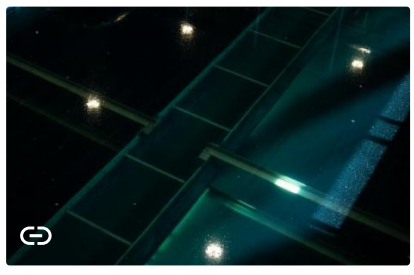
Greeley Water
8 Sep, 10:00 AM · Water...

Join us next week for our virtual open house to discuss Greeley's Water...

Impressions	161
Reactions	5
Reach	154
Engagements	8
Engagement rate	4.97%
Video views	-

Greeley Water
23 Aug, 7:00 PM · Water...

Water Conservation Manager Dena Egenhoff sat down with the Greeley...



Impressions	198
Reactions	3
Reach	180
Engagements	5
Engagement rate	2.53%
Video views	-

Greeley Water
17 Aug, 10:00 AM · Water...

Last chance to register for this Thursday's lunchtime virtual open...

Impressions	246
Reactions	2
Reach	228
Engagements	3
Engagement rate	1.22%
Video views	-

City of Greeley Governm...
15 Aug, 8:00 AM · Water...

We want your input on Greeley Water's plan for water efficiency!...

Impressions	2.4K
Reactions	7
Reach	2.3K
Engagements	22
Engagement rate	0.92%
Video views	-

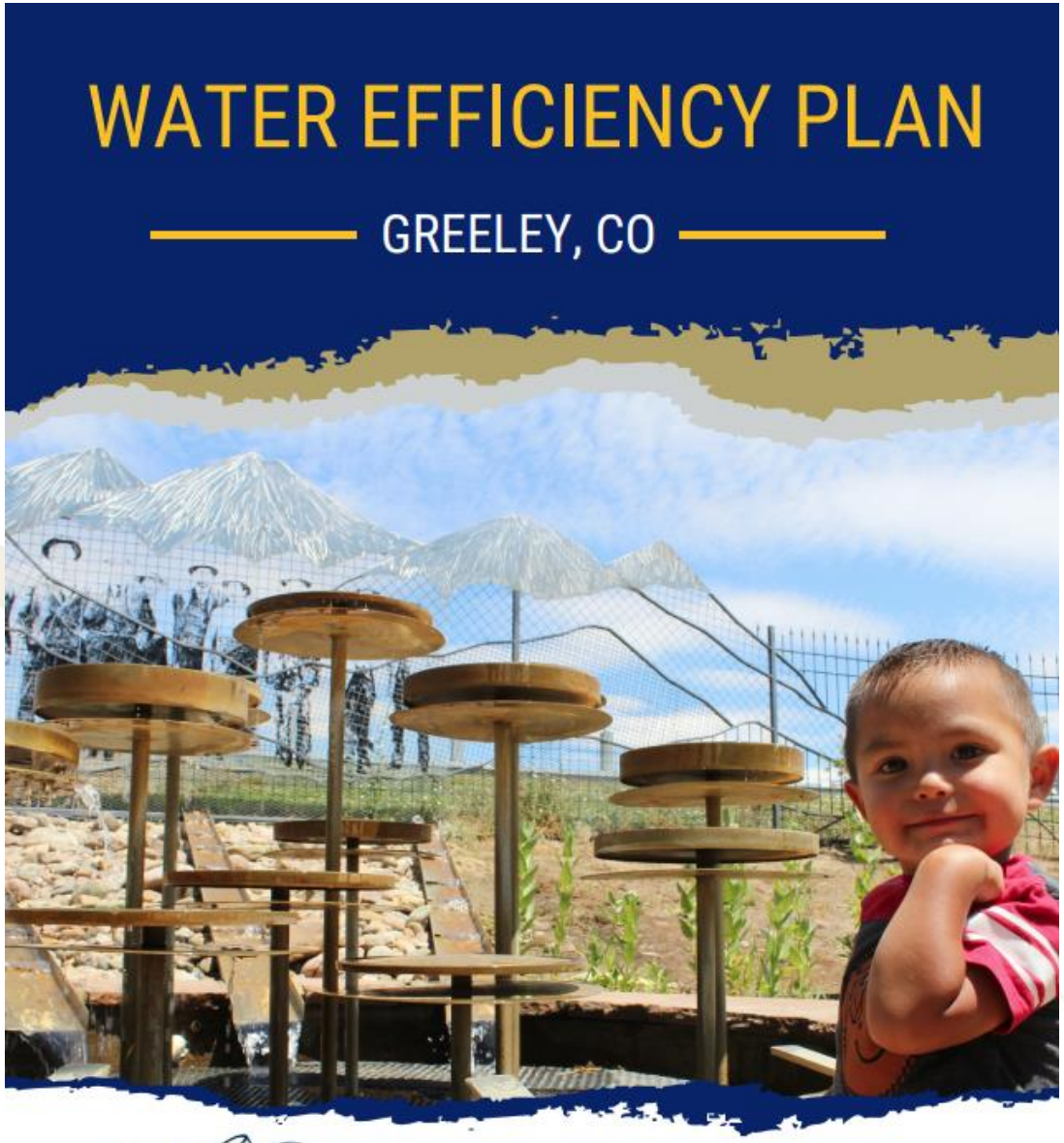
Greeley, Colorado
15 Aug, 8:00 AM · Water...

We want your input on Greeley Water's plan for water efficiency!...

Impressions	**1.1K**
Reactions	**46**
Reach	**1K**

2022 Water Efficiency Plan Update

Planning Commission
December 13, 2022



City of Greeley Water & Sewer Utilities Department
www.greeleygov.com/water

Water Supply Sustainability Strategy

- Continue acquire water and build on Greeley's water conservation legacy
- Provide water wise landscape education
- Adopt innovation and technology that supports water use efficiency
- Water for a livable community with healthy landscape and tree canopy for current and future Greeley residents

City of Greeley Colorado

Water Efficiency Legacy

- **Water Conservation is an important element of Greeley's long-range water supply planning**
  - Water & Sewer Water Master Plan, - 2004
  - Water Conservation Plans - 2008 and 2015
  - Imagine Greeley Comprehensive Plan, - 2018
  - Water & Sewer's Drought Emergency Plan - 2021
  - Water & Sewer's Non-Potable Water Master Plan - 2021
  - Advanced Metering Infrastructure Project, - 2020 – 2025
  - Water & Sewer's Integrated Water Resources Plan - 2023

City of Greeley Colorado

Water Efficiency Plan (WEP)

- **Required by the State (C.R.S. §37-60-126)**
  - Plan update required every seven years
  - Prior conservation plans (2008 & 2015)

- **WEP is a technical guidance document**
  - Goal: To guide continuous efficiency improvements
    - Create efficiencies, synergies, and consistencies among policies, plans, and programs
    - Set goals to measure success and progress

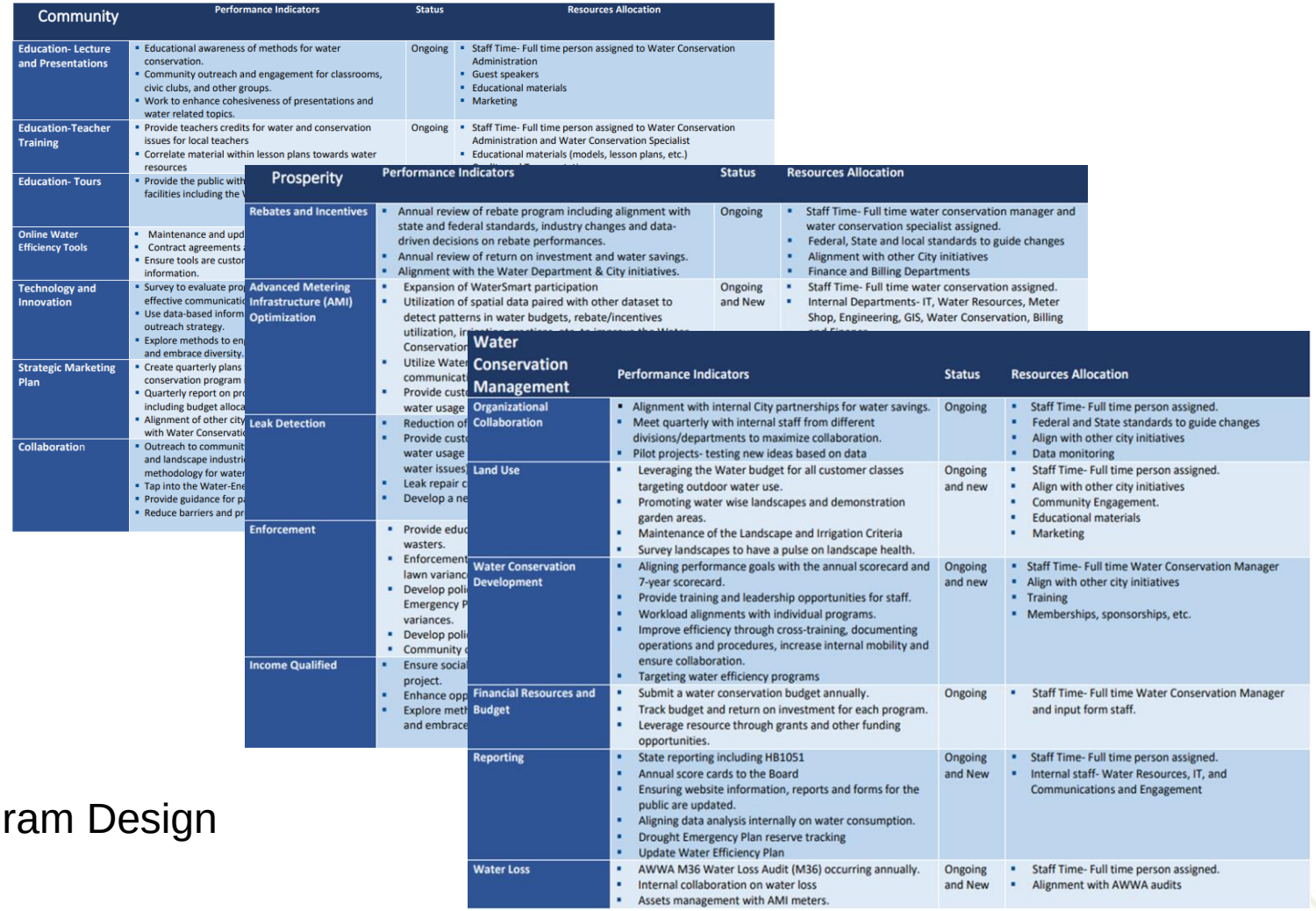
City of Greeley Colorado

Achieving WEP Goals

Utilize Criteria for Selection of Water Efficiency Activities

- Water Savings Potential
- Initiative Cost Effectiveness
- Contribution to Community Vitality
- Likelihood of program success

WEP Score Card
Goals & Strategies



Community	Performance Indicators	Status	Resources Allocation
Education- Lecture and Presentations	▪ Educational awareness of methods for water conservation. ▪ Community outreach and engagement for classrooms, civic clubs, and other groups. ▪ Work to enhance cohesiveness of presentations and water related topics.	Ongoing	▪ Staff Time- Full time person assigned to Water Conservation Administration ▪ Guest speakers ▪ Educational materials ▪ Marketing
Education-Teacher Training	▪ Provide teachers credits for water and conservation issues for local teachers ▪ Correlate material within lesson plans towards water resources	Ongoing	▪ Staff Time- Full time person assigned to Water Conservation Administration and Water Conservation Specialist ▪ Educational materials (models, lesson plans, etc.)
Education- Tours	▪ Provide the public with facilities including the		
Online Water Efficiency Tools	▪ Maintenance and upd ▪ Contract agreements ▪ Ensure tools are custor information.		
Technology and Innovation	▪ Survey to evaluate pro effective communicatio ▪ Use data-based inform outreach strategy. ▪ Explore methods to en and embrace diversity.		
Strategic Marketing Plan	▪ Create quarterly plans conservation program ▪ Quarterly report on pro including budget alloca ▪ Alignment of other city with Water Conservatio		
Collaboration	▪ Outreach to communit and landscape industri methodology for water ▪ Tap into the Water-Ene ▪ Provide guidance for pa ▪ Reduce barriers and pr		

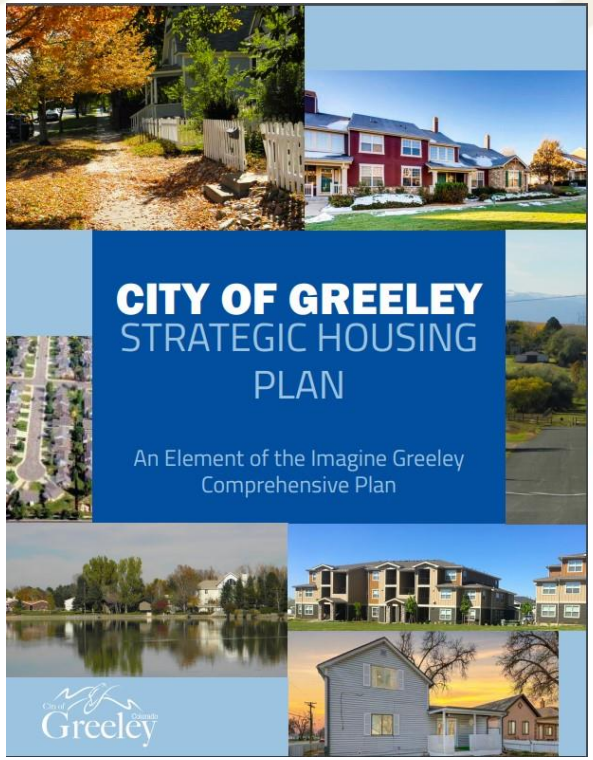
Prosperity	Performance Indicators	Status	Resources Allocation
Rebates and Incentives	▪ Annual review of rebate program including alignment with state and federal standards, industry changes and data-driven decisions on rebate performances. ▪ Annual review of return on investment and water savings. ▪ Alignment with the Water Department & City initiatives.	Ongoing	▪ Staff Time- Full time water conservation manager and water conservation specialist assigned. ▪ Federal, State and local standards to guide changes ▪ Alignment with other City initiatives ▪ Finance and Billing Departments
Advanced Metering Infrastructure (AMI) Optimization	▪ Expansion of WaterSmart participation ▪ Utilization of spatial data paired with other dataset to detect patterns in water budgets, rebate/incentives utilization, in Conservation ▪ Utilize Water communicat ▪ Provide cust water usage	Ongoing and New	▪ Staff Time- Full time water conservation assigned. ▪ Internal Departments- IT, Water Resources, Meter Shop, Engineering, GIS, Water Conservation, Billing
Leak Detection	▪ Reduction of ▪ Provide custo water usage water issues ▪ Leak repair c ▪ Develop a ne		
Enforcement	▪ Provide educ wasters. ▪ Enforcement lawn varianc ▪ Develop poli Emergency P variances. ▪ Develop poli ▪ Community		
Income Qualified	▪ Ensure socia project. ▪ Enhance opp ▪ Explore meti and embrace		

Water Conservation Management	Performance Indicators	Status	Resources Allocation
Organizational Collaboration	▪ Alignment with internal City partnerships for water savings. ▪ Meet quarterly with internal staff from different divisions/departments to maximize collaboration. ▪ Pilot projects- testing new ideas based on data	Ongoing	▪ Staff Time- Full time person assigned. ▪ Federal and State standards to guide changes ▪ Align with other city initiatives ▪ Data monitoring
Land Use	▪ Leveraging the Water budget for all customer classes targeting outdoor water use. ▪ Promoting water wise landscapes and demonstration garden areas. ▪ Maintenance of the Landscape and Irrigation Criteria ▪ Survey landscapes to have a pulse on landscape health.	Ongoing and new	▪ Staff Time- Full time person assigned. ▪ Align with other city initiatives ▪ Community Engagement. ▪ Educational materials ▪ Marketing
Water Conservation Development	▪ Aligning performance goals with the annual scorecard and 7-year scorecard. ▪ Provide training and leadership opportunities for staff. ▪ Workload alignments with individual programs. ▪ Improve efficiency through cross-training, documenting operations and procedures, increase internal mobility and ensure collaboration. ▪ Targeting water efficiency programs	Ongoing and new	▪ Staff Time- Full time Water Conservation Manager ▪ Align with other city initiatives ▪ Training ▪ Memberships, sponsorships, etc.
Financial Resources and Budget	▪ Submit a water conservation budget annually. ▪ Track budget and return on investment for each program. ▪ Leverage resource through grants and other funding opportunities.	Ongoing	▪ Staff Time- Full time Water Conservation Manager and input form staff.
Reporting	▪ State reporting including HB1051 ▪ Annual score cards to the Board ▪ Ensuring website information, reports and forms for the public are updated. ▪ Aligning data analysis internally on water consumption. ▪ Drought Emergency Plan reserve tracking ▪ Update Water Efficiency Plan	Ongoing and New	▪ Staff Time- Full time person assigned. ▪ Internal staff- Water Resources, IT, and Communications and Engagement
Water Loss	▪ AWWA M36 Water Loss Audit (M36) occurring annually. ▪ Internal collaboration on water loss ▪ Assets management with AMI meters.	Ongoing and New	▪ Staff Time- Full time person assigned. ▪ Alignment with AWWA audits

- **Community**
  - Education, Training, Future Ready Program Design
- **Prosperity**
  - AMI Metering, Leak Detection, Efficiency Rebates Income Qualified
- **Conservation Management**
  - Data Driven Programs, Water Loss Analysis, Land Use, Drought Reserve Fund, and Collaboration within the City

City of Greeley Colorado

Water Efficiency Plan Impact
- Future water savings target for 2030



Water Efficiency Goals by Focus Area	Acre-Feet
Community - Outreach & Education	386
Prosperity - AMI Metering and Design Criteria	1,363
Water Conservation Management	285
Total	**2,034**

IMAGINE GREELEY

City of Greeley Colorado

WEP Public Outreach

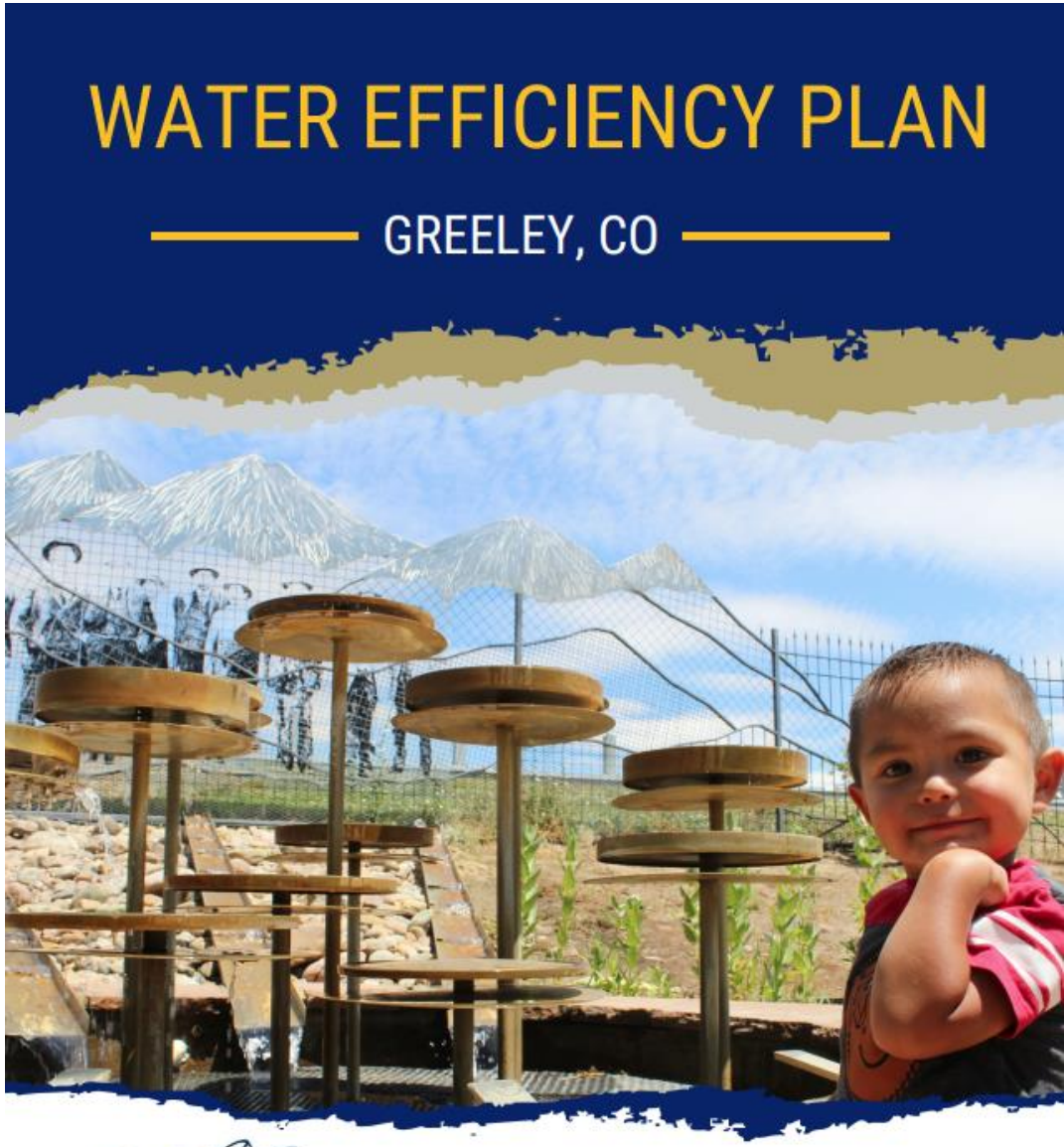
- ✓ City Board and Commissions
  - ✓ Planning Commission and Park & Recreation Advisory Board Briefings
- ✓ Communications and Social Media- Facebook, Twitter, & LinkedIn
- ✓ Community Open Houses- 8/18/22 & 9/15/22
- ✓ Media- Tribune (6/10/22 and 8/18/22) and Water & Sewer monthly newsletter
- ✓ Targeted local businesses & community organization stakeholders
- ✓ Website and online form https://greeleygov.com/conseve

City of Greeley Colorado

Recommendation

Following public engagement, key stakeholder engagement and a review with Planning Commission, the Water and Sewer Board approved and recommended the Water Efficiency Plan to Council at their October 10, 2022 Board meeting and City Council approval on consent at the December 6, 2022 meeting; and therefore

Staff recommends approval to adopt the 2022 Water Efficiency Plan (WEP) by reference to the City's 2018 Comprehensive Plan



Questions

Planning Commission Agenda Summary

December 13, 2022

Key Staff Contact: Sean Chambers, Director Water and Sewer

Title:
Update on Water & Sewer Department Design Criteria & Construction Specification

Summary:
The City of Greeley Water and Sewer Department is updating the current design criteria from 2008 with new standards to accommodate new technologies, techniques, and materials. As you know, the City of Greeley is growing, and updating the design standards will assist in development and ensure quality utility infrastructure into the future. These updates will also facilitate recent non-potable system requirements adopted by City Council in February of 2022, incorporate the Non-Potable Water, Sanitary Sewer, Transmission & Distributions Master Plans that were completed in 2021, and align with the updated development code completed in 2021. As the City is growing at a rapid pace, these updates will help provide long term infrastructure needs to better prepare and accommodate this growth.

The updated design criteria for the potable water distribution, sanitary sewer collection, non-potable irrigation system, and landscape & irrigation will guide developers and engineers in expanding and connecting to the City's utilities. The larger changes include added lift station criteria, changes to the non-potable system criteria, updated criteria to incorporate the new development code changes, compliance with Subsurface Utility Engineering (SUE) law requirements, and the addition of landscape & irrigation design criteria along with many other smaller changes.

The Water and Sewer Department has worked diligently to coordinate with other departments, engineering development review staff for consistency, a presentation and discussion with the Builders, Realtors, & Developer group in July of 2021, review and input from the Planning Commission in March, August, November of 2022, and we receive comments and questions from engineers, developers, and designers throughout Greeley on details, design criteria, and specifications from April to December of 2022.

Recommended Action:
Approve and Recommend to City Council the Adoption of the January 2023 Water & Sewer Design Criteria and Construction Specifications.

Attachments:
Attachment A – Ordinance for Adopting new Design Criteria and Construction Specifications
Attachment B – January 2023 Design Criteria and Construction Specifications

DESIGN CRITERIA
AND
CONSTRUCTION SPECIFICATIONS

VOLUME III

POTABLE WATER DISTRIBUTION,
SANITARY SEWER COLLECTION,
NON-POTABLE IRRIGATION SYSTEMS,
AND LANDSCAPE & IRRIGATION

January 2023

DEPARTMENT OF WATER & SEWER

CITY OF GREELEY, COLORADO

FORWARD

The City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, Non-Potable Irrigation Systems, and Landscape Irrigation* documents are intended to provide guidance for the design, review, and construction of those public utility improvements pertaining to water in or under the public right-of-way or dedicated easements.

This document represents an attempt to assist those in the design, review, and construction industry to provide quality and long-lasting public utility improvements and facilities. The document also provides for consistency in the areas of design, review, and construction.

This document is not intended to replace or restrict the function of the design engineer or the innovativeness and expertise of developers and contractors. Users of this document are encouraged to submit their ideas and methods of improving this document.

_____

Sean Chambers
Water and Sewer Director

Effective: January 31, 2023

CITY OF GREELEY, COLORADO

DEPARTMENT OF WATER & SEWER

DESIGN CRITERIA

AND

CONSTRUCTION SPECIFICATIONS

VOLUME III

POTABLE WATER DISTRIBUTION, SANITARY SEWER COLLECTION, NON-POTABLE IRRIGATION SYSTEMS, AND LANDSCAPE & IRRIGATION

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POTABLE WATER DISTRIBUTION, SANITARY SEWER COLLECTION, NON-POTABLE IRRIGATION SYSTEMS, AND LANDSCAPE & IRRIGATION DESIGN CRITERIA

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SECTION 1

GENERAL REQUIREMENTS

1.01 SCOPE

The purpose of the City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems and Landscape and Irrigation*, hereafter referred to as the "Criteria", is to present the minimum design and technical criteria for the analysis and design of potable water distribution, sanitary sewer collection, and non-potable irrigation systems for which City of Greeley acceptance is required. The Criteria may be amended as new technology is developed or a need for revision is demonstrated and proven through experience and use. The Design Engineer shall be responsible for compliance with these Criteria as well as other applicable design and construction standards in the preparation of engineering reports, construction drawings, and specifications for City review and acceptance.

1.02 DEFINITIONS AND ABBREVIATIONS

Wherever the following words, phrases, and abbreviations appear in these specifications they shall have the following meaning:

A. ac – acre

B. ac-ft – acre-feet

C. ANSI – American National Standards Institute

D. APPROVED PLAN – The latest revised Construction Drawing(s) accepted by the City of Greeley.

E. APWA – American Public Works Association

F. AS-CONSTRUCTED DRAWINGS – Drawings reflecting actual conditions and information for the project after construction is completed.

G. ASME – American Society of Mechanical Engineers

H. ASTM – American Society for Testing Materials

I. AWWA – American Water Works Association

J. CDOT – Colorado Department of Transportation

K. CDPHE – Colorado Department of Public Health and Environment

L. cfs – cubic feet per second

M. CITY – City of Greeley

N. CONSTRUCTION DRAWINGS – Engineered working drawings including plan, profile, and detail sheets of proposed development and utility improvements accepted by the City.

O. CONTRACTOR – The individual, firm, partnership, corporation, or combination thereof, private, municipal, or public including joint ventures, which, as an independent contractor, has entered into a contract with the Developer/Owner.

P. CRITERIA – City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems.*

Q. DESIGN ENGINEER – The partnership, corporation, or individual who is registered as a Professional Engineer, according to Colorado statutes, who is hired by the Developer/Owner to conduct engineering design services and may be empowered by the Developer/Owner to act as his agent for the project.

R. DEVELOPER – The owner, corporation, association, partnership, agency, or individual who or which shall participate in development, has entered into a development agreement with the City and has entered into an agreement with the Design Engineer and Contractor to perform the development work.

S. DEVELOPMENT – Any construction or activity which changes the basic characteristic or use of land on which construction or activity occurs, including but not limited to, any non-natural change to improved or unimproved real estate, substantial improvements to buildings or other structures, installation of utilities, mining, dredging, filling, grading, paving, extraction, or drilling operations.

T. DEVELOPMENT CODE – A section of the City Municipal Code prepared by the City of Greeley Community Development Department which sets forth requirements and standards for land development, land use, and the *Subdivision Regulations*.

U. DIP – Ductile-iron pipe.

V. EASEMENT – A right granted by the property owner permitting a designated part or interest of the property to be used by others for specific use or purpose.

W. EPA – Environmental Protection Agency

X. ft^2 – square feet

Y. ft/s – feet per second

Z. GEOTECHNICAL ENGINEER – A partnership, corporation, or individual who is registered as a Professional Engineer, according to Colorado statutes, proficient in the area of soil mechanics, and who is hired by the Developer/Owner to conduct subsurface soils investigations and evaluations, ground water assessments, and other related engineering services.

AA. gpcd – gallons per capita per day

BB. gpd – gallons per day

CC. gpm – gallons per minute

DD. HP - horsepower

EE. INSPECTOR – Representative of the City of Greeley designated to conduct construction/field observation.

FF. LAND SURVEYOR – A registered Professional Land Surveyor, according to State of Colorado statutes, who is hired by the Developer/Owner to determine the boundaries and elevations of land and/or a structures and other related surveying services.

GG. LIVING UNIT - one or more connected rooms, constituting a separate, independent housekeeping establishment for owner occupancy, or rental or lease as a single unit on a monthly basis or longer, physically separated from any other room or dwelling units which may be in the same structure and served by no more than one gas meter and one electric meter.

HH. MAY – A permissive condition. Where the word "may" is used, no requirement for design or application is intended.

II. NEC – National Electric Code

JJ. NFRWQPA – North Front Range Water Quality Planning Association (regional 208 agency)

KK. NON-POTABLE – Water that is not treated to approved drinking water standards and is not suitable or intended for human consumption, but is produced and delivered for irrigation use.

LL. OSHA – Occupational Safety and Health Administration

MM. OWNER – Any person having title or right of ownership in the surface estate of real property or leasehold interest within.

NN. PGI – PVC Geomembrane Institute

OO. PLANNING COMMISSION – Appointed members to advise the City Council on land use planning and development and to make decisions on land use matters.

PP. PLANS – See CONSTRUCTION DRAWINGS.

QQ. PLC – Programmable Logic Controller

RR. PROFESSIONAL ENGINEER – An engineer registered with the State of Colorado according to State of Colorado statutes.

SS. PROFESSIONAL LAND SURVEYOR – A land surveyor registered with the State of Colorado according to State of Colorado statutes.

TT. psi – pounds per square inch

UU. PVC – Polyvinyl chloride

VV. SDC – City of Greeley *Design Criteria and Construction Specifications, Volume 1, Streets.*

WW. SDDC – City of Greeley *Design Criteria and Construction Specifications, Volume II, Storm Drainage.*

XX. SDR – Standard Dimension Ratio (pipe outside diameter over minimum pipe wall thickness).

YY. SHALL – A mandatory condition. Where certain requirements in the design or application are described with the "shall" stipulation, it is mandatory that these requirements be met.

ZZ. SHOULD – An advisory condition. Where the word "should" is used, it is considered to be advisable usage, but not mandatory. Deviations may be allowed when reasons are given which show that the intent of the standard is met.

AAA. SPECIFICATIONS – The construction specifications portion of the City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems.*

BBB. STRUCTURE - Anything constructed or erected on or in the ground, the use of which requires a more or less permanent location on or in the ground, and, including, but not limited to, walls, retaining walls, fences, parking lots, parking slabs and oil and gas production facilities.

CCC. STANDARDS – The design criteria portion of the City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems.*

DDD. SUBCONTRACTOR – Any person, firm or corporation, other than the employees of the Contractor, who enters into contract with the Contractor, to furnish labor, materials, or labor and materials.

EEE. SUBDIVISION REGULATIONS – A section of the Development Code prepared by the City of Greeley Community Development Department, which contains requirements for various land use, land development, and subdivision processes.

FFF. UNCC – Utility Notification Center of Colorado.

GGG. UNDERDRAINS – Private line or system that controls or managing any subsurface water on individual foundation lot or lots. No private underdrain systems shall be allow in Water & Sewer easements.

HHH. UTILITY – City of Greeley Water and Sewer Department.

III. UTILITIES – Shall mean all utilities, wet and dry, on site prior to the time of any design and development and all utilities proposed with design. Wet utilities shall include, but are not limited to potable water lines, sanitary sewer lines, non-potable irrigation lines, transmission gas lines, storm water lines, ditches and other runoff conveyance elements. Dry utilities shall include, but are not limited to electric lines, telephone lines, gas service lines, fiber optic lines, and cable television lines.

JJJ. VFD – Variable Frequency Drive

KKK. WATER AND SEWER DIRECTOR – Shall mean the Director of the City of Greeley Water and Sewer Department or their designated representative.

LLL. WQCD – Water Quality Control Division of CDPHE

1.03 MINIMUM STANDARDS

A. The City of Greeley's Community Development Department has Development Code documents that can help define the various processes required for projects within the City.

B. The City's review and acceptance will only be to determine if the plans and specifications conform to the City's requirements. The City's review and acceptance will not relieve the Developer, Design Engineer and Contractor from responsibility for any variation from the City requirements or adequate design standards. The City's review and acceptance shall not constitute any assumption of responsibility or liability for the design or construction. It is the intent and purpose of these standards and specifications to obtain high quality construction throughout, with the completed work complying with the City standards and specifications.

C. All vertical and horizontal control shall be based on the currently adopted City of Greeley vertical and horizontal monumentation. Proposed reference monumentation shall be approved by the City prior to survey. A list of approved monuments may be obtained from the City.

1.04 RELATIONSHIP TO OTHER STANDARDS

A. Whenever a provision of these Criteria and any other provision in any law, ordinance, resolution, rule, policy, or regulation of any kind contain any restrictions covering any subject matter within these Criteria, the most restrictive standard shall apply.

B. The provisions of these Criteria and standards are minimum requirements that do not preclude the use of more restrictive standards by the Design Engineer or City.

C. Adherence to these Criteria does not remove the Developer's responsibility to investigate and obtain any other regulatory permits or approvals, from either local, regional, state, or federal agencies, that may be required for a particular project.

1.05 REVIEW AND ACCEPTANCE

A. All potable water, sanitary sewer, and non-potable irrigation construction plans and specifications submitted to the City for review preliminary and final, comment, and acceptance shall be prepared by, or under the direct supervision of a Professional Engineer. Said Professional Engineer shall be responsible for the design, preparation of the construction drawings and reports, determining material specifications, and reviewing the field survey for accuracy.

B. The construction plan review process for all development as outlined in the *Development Code* shall be followed.

1. The preliminary plan set shall be reviewed by the City for general compliance with these Criteria and the City shall provide comments to the Developer or their agents regarding corrections, additions, and omissions.

2. All submittals to the City shall be done in accordance with the city Development Code.

3. It is the responsibility of the Design Engineer to confirm that submittals are in conformance with these current standards. Any preliminary or final submittal not meeting these criteria may be rejected without review.

4. After final corrections are made and the plans are accepted, the plans set shall be signed by the Water and Sewer Director or designated representative(s). The signing of the plans will constitute acceptance. The acceptance is qualified in that: ***The plans are reviewed and accepted for concept only and the plan acceptance does not imply responsibility by the Water and Sewer Department or the City of Greeley for accuracy and correctness. The plans acceptance does not imply that quantities of items indicated on the plans are the final quantities required. The plans acceptance shall not be construed for any reason as acceptance of financial responsibility by the Water and Sewer Department or City of Greeley for additional items not shown that may be required during the planning or engineering phase and the construction phase.***

C. See Section 6 *Landscape and Irrigation Design Criteria* to determine if additional review and supervision by a registered Landscape Architect is required.

D. If the Design Engineer responsible for the plans disagrees with any requested changes to the submitted plans that may be required by the City for acceptance, such disagreement shall be brought to the attention of the City, and if required by the City, in writing.

E. The Seal of the Design Engineer on plans so corrected and accepted for construction will signify that the Professional Engineer has reviewed, approved, and authorized said corrected plans for construction.

F. No construction shall be undertaken without a City accepted and signed set of Construction Drawings and a recorded plat or required potable water, sanitary sewer, and/or non-potable irrigation easements.

SECTION 2

SUBMITTAL REQUIREMENTS

2.01 GENERAL

Requirements discussed in this section are the minimum for potable water distribution, sanitary sewer collection, and non-potable irrigation systems and are not meant to be all-inclusive. Other requirements may be needed for a complete design. The Design Engineer shall consider the maintenance and operational aspects of the potable water distribution, sanitary sewer collection, and non-potable irrigation systems' infrastructure, as well as constructability in their design.

A. All construction drawings shall be legible and submitted on PDF 22" x 34" or 24" x 36" sheets. Additional sizes may be accepted with prior approval.

B. A legend describing all line types, symbols, and abbreviations shall be shown either on the cover sheet or each individual sheet.

C. Each sheet in the Construction Drawings shall be marked "PRELIMINARY, NOT FOR CONSTRUCTION" with the date of submittal. This statement shall be removed on the final City accepted Construction Drawings.

D. City accepted and signed construction plans are required prior to the City's issuance of construction permits.

2.02 PRELIMINARY CONSTRUCTION PLAN REQUIREMENTS

For Preliminary subdivisions, plans shall be submitted to the City for review and acceptance prior to the preparation of final Construction Drawings. Acceptance of the preliminary submittal shall constitute only a conceptual acceptance and shall not be construed as acceptance of specific design details. The preliminary plans' submittal requirements are outlined below and in the City of Greeley Community Development Department's Construction Plan checklist.

A. Utility Sheet

1. A general overview of the entire project including, but not limited to, streets (complete with names), alleys, lot and block numbers, all proposed and existing utilities on and within 100 feet of the project site, all existing and proposed easement, rights-of-way on and adjacent to the project site, and storm water facilities.

2. The entire project shall be shown on one (1) sheet unless the project is too large to show sufficient detail. City acceptance must be granted to show the project on more than one sheet and a key map to aid in drawing orientation and locating the sheet construction in relation to the overall project will be required on each sheet.

3. Proposed project phasing for utilities and structures.

4. Proposed point(s) of connection for potable water, sanitary sewer, or non-potable irrigation mains to the existing system(s). All existing potable and non-potable water lines shall be labeled with the pipe diameter, type of material, and year of installation

(available from the City). All existing sanitary sewer lines shall show existing manholes, complete with rim and invert elevations, and pipe diameter.

5. Geotechnical bore locations shall be shown in plan view within the utility plans.

6. Any other information deemed necessary by the Design Engineer or City.

2.03 FINAL CONSTRUCTION PLAN REQUIREMENTS

A. Final Construction Plans shall contain the same information as indicated in the Preliminary Construction Plan Requirements section 2.02 of these Criteria with additional requirements as outlined below and in the City of Greeley Community Development Department's Final Construction Plan checklist. After one (1) year from the original acceptance date, the City may require resubmittal of the plans for review and acceptance due to revised or updated City design criteria or construction specifications.

B. City accepted easements or a City accepted final plat must be executed before final Construction Plan acceptance.

C. One set of 22" x 34" or 24" x 36" plans shall be submitted to the City for acceptance signatures when all known issues have been addressed to the satisfaction of the City. Additional sizes may be accepted with prior approval. Once the plans receive City signatures, the Developer or their agents shall make copies of the signed plans and provide them to the City.

D. An electronic version, in a format acceptable to the City, of the final Construction Drawings shall be provided to the City at the time of plan signatures.

E. Potable water, sanitary sewer, and non-potable irrigation main designs shall be provided on separate plan and profile sheets specific to potable water, sanitary sewer, and non-potable irrigation.

F. The Cover Sheet shall contain a signature line for all Ditch Companies, or end user(s) if the ditch is not controlled by a Ditch Company, that have their facilities impacted or modified by the project.

G. All utility verifications shall be in compliance with Colorado Revised Statute 9-1.5 as updated.

H. "Call Utility Notification Center of Colorado (UNCC) at 1-800-922-1987 or dial 811 for utility locates 72 hours prior to any excavation work" shall be put on all drawing sheets.

I. Conduit Plan

1. The conduit plan serves to show all proposed utility conduits crossing public rights-of-way and easements. ***The conduit plan may be a separate sheet from the utility plan as requested by the City.***

2. Provide a general overview of the project including but not limited to street names, street rights-of-way, all proposed and existing utilities, all proposed and existing easements, and lot and block numbers.

3. Show all utility conduits crossing the public rights-of-way and easements and indicate the utility conduit diameter, number of conduits, depth of installation, and name of utility using the conduit.

4. Add the following note to the conduit plan: "All utility conduit crossings of potable water, sanitary sewer and non-potable irrigation lines shall be encased in High Density Polyethylene (HDPE) or fusible C900-16 PVC Pipe, with minimum Standard Dimension Ratio (SDR) 11 across the entire easement or right-of-way width. The encasement joint shall be butt fused. Flexible joints are not allowed."

J. Construction Plan View

1. Clear distance between utilities shall be outside wall to outside wall.

2. Show and label proposed and existing easements, rights-of-way, and property lines.

3. Indicate the proposed method of connection to existing potable water distribution, sanitary sewer collection, and non-potable irrigation systems.

4. Show all proposed and existing potable water, sanitary sewer, and non-potable irrigation services. Indicate the station of service locations on the potable water, sanitary sewer, and non-potable irrigation mains or include a tabular list of stations.

5. Where the minimum cover over sanitary sewer mains provides less than 10 feet of elevation difference between the top of foundation grade and the top of the sewer main, a note shall indicate the lot is served by a "shallow sewer" and appropriate elevation information shall be provided. Shallow sewer is defined in *Section 4* of these Criteria.

K. Pothole information of all water or sewer mainlines and impacted services. At critical locations and as determined by City, with date including month and year, elevation, depth and datum.

L. Construction Profile View

1. Show all existing and proposed utility crossings in compliance with Colorado Revised Statute 9-1.5 as updated. Existing utility crossing locations and elevations shall be obtained from the current project design field survey. Existing utilities shall be potholed as required to perform complete and accurate design prior to construction plan acceptance. Field obtained elevations shall be provided on the Construction Drawings complete with when the field information was gathered, the exact location where it was collected, the Firm that performed the potholing and surveying, and the date the survey was conducted.

   a. Clear distance between utilities shall be outside wall to outside wall.

2. Where the potable water and sanitary sewer mains are within two feet vertically of each other, all water and sewer services that cross a main shall be shown.

3. Provide all pertinent information for existing utilities, refer to checklist for details.

4. Provide pipe slope, manhole inverts in and inverts out (main and service line), and rim

elevations and manhole stationing for proposed sanitary sewer lines.

5. Any other information deemed necessary by the Design Engineer or City.

M. Standard Drawing (Detail) Sheets

1. Include all project applicable City of Greeley Standard Drawings as part of the construction plans set. Water and Sewer Department Standard Drawings are provided in these Criteria. Refer to the Department of Public Works' *SDC* and *SDDC,* latest revision, for other project related details.

2. All City of Greeley Standard Drawings shall contain the City logo in the bottom left corner. If any standard City detail is modified, the City logo shall be removed from the detail and placed on a separate sheet before standard details. All modified detail shall be stamped by design engineer.

3. Where Standard Drawings are not applicable to the work, provide project specific construction details. These shall include construction details of critical connections, atypical crossings, special fittings and appurtenances, and any other details deemed necessary by the Design Engineer or City.

N. Requirements for Changes to Final Accepted Plans

1. Should circumstances warrant changes from the City accepted Construction Plans, acceptance of the changes shall be obtained from the City prior to construction.

2. All modified drawings shall be on 22" x 34" or 24" x 36" sheets. Depending on the extent of the changes, the City will decide if revised plans are required.

O. Wastewater Pumping Station (Lift Station) Final Construction Plans

1. Lift station final construction plan requirements are specific to the design requirements of the lift station in addition to state and regional guidelines. Refer to *Section 4* for lift station requirements.

P. Geotechnical bore logs and groundwater data shall be shown in the Construction Plans.

2.04 FINAL PLAT AND REPLAT REQUIREMENTS

A. Final plats shall adhere to the requirements set forth in the City of Greeley Development Code Chapter 3: *Subdivision Regulations* and the Department of Public Works' *SDC,* latest revision. The following requirements shall also apply:

1. Clearly show, label, and dimension newly dedicated and existing potable water, sanitary sewer, and non-potable irrigation easements.

2. Clearly denote the allocation of any new or existing water dedication credits between the parcels included on the plat.

3. Where minimum cover over sanitary sewer provides less than 10 feet of elevation difference between the finished top of foundation elevation and the invert of the sewer

main, the plat shall indicate that the lot is served by a "shallow sewer". Shallow sewer is defined in *Section 4* of these Criteria.

4. Where a single service is allowed for multiple buildings on a single lot the plat shall indicate that if the lot is ever subdivided the service and main configuration must be brought into alignment with the current City of Greeley Design Criteria.

5. All platted lots shall be adjacent to a public potable water distribution and sanitary sewer collection main. No potable water or sanitary sewer services shall cross lot lines.

B. For all replats where lot lines or street locations change, all existing potable water, sanitary sewer, and non-potable irrigation mains, services, fire hydrants, fire sprinkler lines, etc. shall be relocated to their appropriate location or abandoned. Potable water distribution, sanitary sewer collection, and non-potable irrigation system designs in this replatted area must conform to the current City of Greeley Design Criteria.

2.05 LANDSCAPE PLANS REQUIREMENTS

A. No plant material with mature growth greater than three (3) feet in height shall be planted within potable water, sanitary sewer, or non-potable irrigation easements.

B. No shrubs shall be planted within five (5) feet or trees within ten (10) feet of potable and non-potable water meters, fire hydrants, sanitary sewer manholes, or potable water, sanitary sewer, and non-potable irrigation mains and services.

C. Clearly show and label all proposed and existing potable water and non-potable irrigation meter pits/vaults, mains and services, sanitary sewer mains and services, fire hydrants, and easements on the landscape plans.

D. Show and label all proposed water taps that will be used for landscape irrigation.

E. Provide a table summarizing irrigation water use by area per Section **20-254** of municipal code

F. See Section 6: *Landscape and Irrigation Design Criteria* for additional landscape plan requirements that may apply.

G. Add sections 2.05-A and 2.05-B of these Criteria as notes on the landscape plans.

2.06 EASEMENTS

A. When it is not feasible for potable water, sanitary sewer, or non-potable irrigation main installation to be in a dedicated street right-of-way, the installation shall be made within a dedicated easement. The conditions for allowance of such an exception shall be determined for each individual case. The minimum easement width acceptable to the City is as follows:

1. For a dedicated potable water, sanitary sewer, or non-potable irrigation main easement containing just one (1) main, the width shall be twenty (20) feet or twice the depth to the invert of the pipe, whichever is greater. This easement shall be for the exclusive use by City of Greeley potable water, sanitary sewer, or non-potable irrigation mains. The easement name, which shall be "PERMANENT POTABLE WATER EASEMENT",

"PERMANENT SANITARY SEWER EASEMENT" or "PERMANENT NON-POTABLE WATER EASEMENT", and the easement width shall be labeled on the Construction Drawings and plat.

2. For any combination with two utilities, potable water, sanitary sewer or non-potable irrigation main easements, the total width shall be thirty (30) feet or twice the maximum depth to the invert of each utility, whichever is greater. This easement shall be for the exclusive use by the City of Greeley. The easement name and the easement width shall be labeled on the Construction Drawings and plat.

3. For any combination with three utilities, potable water, sanitary sewer or non-potable irrigation main easements, the total width shall be forty (40) feet or twice the maximum depth to the invert of each utility, whichever is greater. This easement shall be for the exclusive use by the City of Greeley. The easement name and the easement width shall be labeled on the Construction Drawings and plat.

4. Where pipes of diameters greater than sixteen inches (16") are installed additional easement width may be required to account for pipe width.

B. The mains within the easement shall be located as centrally as feasible within the easement while maintaining required separation from other mains and accounting for the depths of mains where necessary.

C. There shall be no detention ponds, berms greater than three (3) feet, permanent structures, fences, trees, shrubs with mature height greater than three (3) feet, or other obstructions that will impede the ability of the City to adequately maintain and service the main(s) located within the easement.

D. Easements not dedicated with a plat, shall be dedicated by separate document and recorded prior to City acceptance of the Construction Drawings. Easement dedication by separate document shall include:

1. Easement Dedication Form. An easement dedication form shall be completed by the Developer. Standard easement dedication forms are available in the appendix. The completed easement dedication form must be signed by the property Owner and notarized.

2. Exhibit Map. An exhibit map (8 ½" x 11") with sufficient description information to establish the legal boundary of the easement shall be provided. The exhibit map shall show and label all existing easements, property lines, and public rights-of-way. The City may request additional information, not listed here, for the exhibit at the city's discretion.

3. A Written Legal Description of the dedicated easement boundary.

4. Funds for Recording. The Developer shall provide cash or a check made out to the **City of Greeley** for the easement recording fees. The City shall provide the recording fee sum once all easement documents are finalized**.** ***The City does not provide the funds for recording easement documents.***

5. Once the easement dedication documents are accepted by the City and the recording fees

have been provided in the appropriate amount, the City shall have the easement documents recorded with Weld County.

2.07 HYDRAULIC REPORT – POTABLE WATER & SANITARY SEWER

A hydraulic analysis for the potable water distribution and sanitary sewer collection systems for a given project shall be submitted by the Design Engineer, as a report, to the City for review and acceptance. The report shall be accepted by the City prior to final Construction Drawing acceptance. The hydraulic analysis report will be reviewed by the City, along with the Construction Drawings, in the same review and acceptance process as outlined in *Section 1*of these Criteria. Projects that move forward to final design without a City accepted potable water distribution and sanitary sewer collection system hydraulic analysis report are subject to possible design changes, including but not limited to, pipe re-alignment, upsizing, extensions, and additional stubouts.

The objective of the hydraulic analysis report is to assist the Design Engineer with designing a project's potable water distribution and sanitary sewer collection systems to adequately serve peak demands while adhering to the design requirements set forth in these Criteria. For the potable water distribution system, the hydraulic analysis report serves as a tool for demonstrating the necessary number of connection points to the existing system for adequate water line looping, system reliability and required pipe sizing. For the sanitary sewer collection system, the hydraulic analysis report evaluates peak flow quantities, flow type, pipe capacity, and flow velocity and establishes appropriate pipe sizing.

Non-potable irrigation system hydraulic and design reports are also required for projects utilizing non-potable water for irrigation purposes; however, since non-potable irrigation systems are unique, the non-potable hydraulic and design report requirements have been provided in section 2.08 of these Criteria.

The written hydraulic report shall include the following information:

A. Title Page

1. Report title.

2. Project name and location.

3. The name, address, and phone number of the Owner, Developer and Design Engineer that prepared the report.

4. Report preparation date.

B. Engineer Certification Sheet

1. The report shall be prepared by or under the supervision of a Professional Engineer, licensed to practice in the State of Colorado, possessing adequate experience in the design of potable water distribution and sanitary sewer collection systems. The report shall contain a certification sheet with the following statement to be signed and sealed by the Design Engineer:

   "I understand the City's acceptance does not relieve the Design Engineer's responsibility for errors, omissions, or design deficiencies for which the City is held harmless.

_____

Registered Professional Engineer

(Affix Seal)

C. Table of Contents

D. Project Description and Location

1. Clearly state the location of the project. Provide a site vicinity map specifying the project's geographical location and the project area in acres. The project acreage shall be the same as on the project plat.

2. Clearly state the land use zoning, estimated number of residential lots or living units, commercial square footages, and the irrigated acreages.

3. Indicate if the project will be phased. Elaborate on the anticipated timing for each project phase and the phase's associated building and infrastructure construction.

4. For multifamily, commercial, or industrial developments, indicate if potable or non-potable water will be used for landscape irrigation.

5. Identify the locations of all potable water, sanitary sewer, and non-potable irrigation connection points to the existing systems.

6. Provide the pipe diameter, pipe material, and year of installation for the existing potable water, non-potable water, and sanitary sewer lines.

E. References and Appendices

1. Provide a page referencing all design criteria, resources, and modeling software used in preparing the hydraulic report.

2. Provide appendices as necessary to include modeling result printouts, copies of demand assumption data, and fire flow test results.

3. Hydrant flow tests results may be available from Greeley Fire Department (970-350-9511). Obtained fire flow test pressures will be evaluated for use by the City on a case by case basis.

F. Potable Water System Report Requirements and Assumptions

1. Provide all used equations, demand assumptions, and essential design requirements, parameters, and constraints.

2. Indicate the software package(s) and version used for the water system modeling.

3. Indicate in which City of Greeley potable water pressure zone the project is located.

4. Provide calculations for estimated population, design flows and velocities, irrigated acreage, irrigation application rates, peaking factors, and any other necessary design

calculations.

5. Provide hydrant fire flow and fire sprinkler system flow requirements.

G. Potable Water System Analysis and Modeling

1. Modeling Scenarios

a. Static. The static scenario shall establish the available water pressure for the site with no demands on the system and serves to check that pressure requirements are maintained.

b. Peak hour demand plus fire flow. This scenario shall include peak hour domestic water use[1] demands plus fire flow[2].

c. Peak hour demand plus fire flow with one (1) water connection closed. While using the determined potable water demands for the peak hour plus fire flow scenario, each connection to the existing potable water system shall be closed, in turn, and modeled. Fire flow shall be placed at a hydrant nearest to the closed connection. This scenario represents a worst-case water demand condition and shall only serve to demonstrate how the potable water distribution system within the development functions during this condition. It is acceptable to have the potable water system velocity requirements violated in this scenario only. The system must maintain a minimum pressure of 20 psi with fire flow.

d. Phasing. Water modeling shall be required for the incomplete potable water system as indicated per the planned phasing on the Construction Drawings, in order to demonstrate that peak hour demand plus fire flow can be met for the interim phased condition.

The hydraulic report shall verify that a proposed potable water system can provide the required water demands for a given development, at an acceptable pressure, and meet the overall potable water system design requirements set forth in these Criteria. At the City's discretion all ultimate connections to existing water mains may be required regardless of development phasing. Upsizing water mains within a development as a means to increase water system capacity in lieu of making a connection to another water source, is not permitted.

If the hydraulic water model demonstrates that a larger main is required to serve the phased condition than would be needed for the full build out condition, the Developer is required to install the larger pipe at their expense and is not eligible for pipe oversizing reimbursement from the City when the larger pipe is no longer needed.

e. Additional scenarios. At the City's discretion, the City may require additional

[1] Domestic water use shall refer to all household and corresponding lot irrigation for single family and applicable multifamily residential potable water use. It shall also refer to all potable water use, including potable irrigation, for commercial and industrial uses.

[2] Fire flow shall be inclusive of fire hydrant and fire sprinkler flow. Residential, commercial, or industrial developments requiring fire sprinkler systems shall have fire sprinkler demands, in addition to hydrant fire flows, placed in the hydraulic water model at appropriate node locations.

scenarios, adjustments to the fire flow placement, reservoir elevations, and existing system connections, revisions to the pipe and node schematic layout, and other model modifications as necessary to verify that the proposed potable water system will meet the design requirements and potable water demands of the development and the City as a whole.

f. At the City's discretion, the hydraulic analysis may be required to extend beyond the limits of the project boundary.

g. Demands for undeveloped parcels shall be calculated based on the higher of the current or anticipated land use or zoning of the property.

h. Model must be compatible and capable of being integrated with City's hydraulic model developed with InfoWater. Model must be provided to Water and Sewer upon request.

2. Modeling Procedure

a. Connections to the existing potable water distribution system are typically denoted as reservoirs with the same hydraulic grade elevation. The City shall provide inflow pressure.

b. Place estimated domestic water, fire sprinkler, and irrigation tap demands at appropriate node locations within the model as they relate within the project.

c. Locate fire flow demands at hydrant locations according to the modeling scenarios in section 2.07-G of these Criteria. The maximum allowable fire flow provided from any one (1) hydrant shall be 1,500 gpm. If the required fire flow is in excess of 1,500 gpm, the next closest hydrant shall be used until the required fire flow is met.

d. Depending on the location of the development, existing potable water system performance and reliability in the area, number of available potable water connections, and surrounding land uses, some of the project's proposed potable water connections may require modeling as a demand point or no connection instead of a water source. The City shall provide additional outflow demands for a development on a case by case basis.

H. Potable Water System Report Results

1. Provide a schematic layout of the potable water distribution system showing and labeling the reservoir connections, pipe network, and demand nodes as presented and analyzed for each water model scenario.

2. Provide a Reservoir Report for the static condition. The Reservoir Report shall include the following information:

a. Reservoir Identification Label

b. Elevation (ft) per City of Greeley datum

3. Provide Pipe Reports for all modeled scenarios. Pipe Reports shall include the following

information.

a. Modeled Scenario Title

b. Pipe Identification Label

c. Pipe Length (ft)

d. Pipe Diameter (in)

e. Pipe Material

f. Hazen-Williams Coefficient

g. Pipe Control Status (open or closed)

h. Pipe Velocity (ft/s)

i. Upstream Calculated Pressure (psi)

j. Headloss (ft)

4. Provide Junction/Node Demand Reports for all modeled scenarios. Junction/Node Demand Reports shall include the following information:

a. Modeled Scenario Title

b. Node Identification Label

c. Node Elevation (ft) per City of Greeley datum

d. Node Demand (gpm)

e. Calculated Hydraulic Grade (ft)

f. Pressure (psi)

I. Potable Water System Design Conclusions

1. Discuss hydraulic analysis results for all modeled scenarios.

2. Confirm that the pipe velocity and pressure requirements during the peak hour demand plus fire flow operating condition are met per *Section 3* of these Criteria.

3. Confirm that the pressure requirements during the peak hour demands plus fire flow operating conditions, with one water connection closed, are met per *Section 3* of these Criteria.

4. Discuss any potable water line oversizing required by the City over and above what is necessary for the development's potable water needs.

5. For phased developments, discuss phased construction of the potable water distribution

system and confirm that potable water pipes are sized and looped appropriately to meet the peak hour, plus fire flow demand velocity and pressure requirements during the interim condition.

J. Sanitary Sewer System Design Requirements and Assumptions

1. Provide all used equations, demand assumptions, and essential design requirements, parameters, and constraints.

2. If a model is required, it must be compatible with the City's InfoSWMM model. Model must be provided to Water and Sewer upon request.

3. Provide calculations for estimated population, design flows, peaking factor(s), hydraulic design, infiltration, flow type, and any other necessary design calculations.

K. Sanitary Sewer Systems Analysis and Modeling

1. If the development is phased, the sanitary sewer system shall be analyzed for full build out. This evaluation shall include the development's sanitary sewer flows and anticipated offsite sanitary sewer flows impacting the sanitary sewer system within the development.

2. Evaluate the development's sanitary sewer sizing for capacity to convey offsite flows.

3. Undeveloped areas shall have sanitary sewer flows calculated based on the higher of the current or anticipated land use or zoning of the property.

4. The City may require additional analysis in order to further verify that the proposed sanitary sewer system will meet the design requirements and needs of the development and the City. The City will evaluate sanitary sewer system hydraulic evaluations on a case by case basis.

L. Sanitary Sewer System Report Results

1. Provide a schematic layout of the sanitary sewer collection system showing and labeling all manholes, design points used for analysis, pipe slopes, and pipe sections.

2. Provide written calculations or printouts of software analysis results for each pipe evaluation including the following information:

   a. Pipe Diameter (in)

   b. Material

   c. Date of installation

   d. Pipe Slope (%)

   e. Sub and Super Critical Calculations, when a model is required

   f. Manning's n Value

g. Pipe Discharge-(gpm)

h. Pipe Flow Velocity (ft/s)

i. Pipe Flow Depth (in)

j. d/D (depth of flow/diameter of pipe)

k. Maximum Capacity at d/D of 50% and/or 80% – (gpm) dependent on date of installation

M. Sanitary Sewer System Conclusions

1. Discuss analysis results for all pipe evaluations.

2. Confirm that acceptable pipe velocities and flow depth criteria are met.

3. If design constraints arise and pipe velocity, flow depth, minimum allowable slope per pipe diameter, or any other Criteria requirements cannot be maintained, the Design Engineer shall provide the City written explanation as to why the Criteria is violated, why the non-standard sewer system design should be accepted, and request a variance to the Criteria. Water & Sewer Department acceptance is required for the variance.

4. Discuss any sanitary sewer main oversizing required by the City over and above what is necessary for the development needs.

5. Indicate if the development is served by "shallow sewer." Shallow sewer is defined in *Section 4* of these Criteria.

6. Discuss potential impacts that future upstream developments may have on the sanitary sewer capacity through the proposed development. Explain the capacity issues within the development and the proposed solutions for resolving them.

N. Supplemental Engineering Calculations

1. These calculations shall include but are not limited to pipe restrained lengths, external pipe load analysis, traffic loadings, casing pipe wall thickness, and air and vacuum release valve sizing.

2. Any calculations deemed necessary by the Design Engineer or City.

O. Wastewater Pumping Stations (Lift Station) Design Report

1. Refer to *Section 4* of these Criteria and CDPHE for lift station design and approval guidelines and lift station design report requirements.

2.08 DESIGN REPORT – NON-POTABLE IRRIGATION SYSTEM

The objective of the non-potable irrigation system design report is to assist the Design Engineer with designing a non-potable irrigation system and storage facility to adequately serve peak season irrigation demands while adhering to the design requirements set forth in these Criteria. Refer to section 2.07 of these Criteria regarding report review and acceptance.

The non-potable irrigation system design report shall include, but is not limited to, the following information:

A. Title Page, Engineer Certification Sheet, and Table of Contents requirements, refer to section 2.07 of these Criteria.

B. Project Description and Location

1. Clearly state the location of the project. Provide a site map identifying the project area and location of the non-potable storage facility (pond), pump station, discharges/fill lines, and overflow works.

2. Indicate if the non-potable system will be phased. Elaborate on the anticipated timing of the project phasing and how it will affect the overall design and construction of the non-potable irrigation system.

3. If connecting to an existing non-potable irrigation system, identify locations of pipe connections. Provide the pipe diameter, pipe material, and year of installation of the existing main.

C. References and Appendices

1. Provide a page referencing all design criteria, resources, and modeling software used in preparing the design report.

2. Provide appendices as necessary to include supplementary information.

D. Non-potable Irrigation System Report Requirements and Assumptions

1. Provide all used equations, assumptions, design methodologies, essential requirements, parameters, and constraints.

2. Indicate any software package(s) and version used for the non-potable pipe system modeling. The model should be compatible with Innovyze InfoWater for incorporation into the City's model.

3. Provide calculations for determining irrigated acreage, required storage volume, pond design including high and low operating elevations, watering requirements, application rates, and design flow.

4. Provide the number and type of pumps, motor horsepower, system head curves, head computations, discharge pressure, and any other pertinent information for the pump system design.

E. Discussion Items

1. Discuss specific design features of the non-potable irrigation system and their requirements, including but not limited to, non-potable/potable water sources and means of delivery into the system, the lining and aeration system, pond shoreline treatment, overflow works, and pond design.

2. General design requirements for the pump station, including but not limited to, power

and electrical requirements, control and monitoring systems, and building requirements.

F. Non-Potable Irrigation System Analysis and Modeling

1. The non-potable irrigation system shall be modeled for the static scenario and the design irrigation demands scenario. Refer to section 2.07 of these Criteria for modeling procedures and report results requirement.

G. Non-potable Irrigation System Design Conclusions

1. Discuss hydraulic analysis results for all modeled scenarios.

2. Confirm that the pipe velocity and pressure requirements during irrigation demand are met per *Section 5* of these Criteria.

H. The City may require electronic copies of the hydraulic models be submitted.

2.09 GEOTECHNICAL SOILS REPORT

A. A geotechnical soils evaluation, prepared by or under the supervision of a Geotechnical Engineer, licensed in the State of Colorado, shall be submitted to the City for review and shall be accepted by the City prior to final Construction Drawing acceptance. The geotechnical soils report shall describe the classifications and characteristics of the soils encountered on the project and include recommended methods of backfilling and compaction. Refer to the Department of Public Works' *SDC,* latest revision, for soils testing and geotechnical soils report requirements.

B. The Geotechnical Engineer shall evaluate groundwater conditions for the site and provide recommendations for sanitary sewer main groundwater barriers.

C. The geotechnical soils evaluations shall include information required to determine potential corrosive soils with pH and resistivity, refer to section 3.11 of these Criteria.

2.10 VERIFICATION SURVEY DRAWING REQUIREMENTS

A. Prior to paving, the Design Engineer shall provide the City with a survey of the installed potable water, sanitary sewer, and non-potable irrigation systems. The purpose of this survey is to verify that the mains and appurtenances were installed per design and within allowable construction tolerances. Once the City has accepted the verification survey, the City shall give the Contractor written notice to proceed with paving construction. ***Verification Survey plans <u>are not</u> As-Constructed Record drawings***. See section 2.11 of these Criteria for As-Constructed Record Drawing requirements.

B. The Verification Survey drawing(s) shall be prepared for easy modification and transition to final As-Constructed Record drawings.

C. The Verification Survey drawings shall be modified from the original construction plan and profile sheets showing the design information as well as the surveyed information. The original design information shall be shown as "lined through" if as constructed conditions differs from approved construction plans. The surveyed information shall be located in the same area as the design information and shall be either "clouded" or made with a heavier line weight than the design information for clear differentiation.

D. Verifications Survey drawings shall be prepared by a Professional Engineer. Surveyed elevations for the Verification Survey shall be obtained by a Colorado Registered Land Surveyor. The Surveyor shall obtain horizontal locations, surveyed elevations and information for the following: To the same precision and datum as design drawings.

1. Potable and non-potable – Horizontal locations of valves, fire hydrants, blow-offs, air/vacuum release valves, and top of pipe elevations at all valves.

2. Sanitary sewer – Horizontal locations of manholes, diameter of manholes, sizes of installed pipe, invert elevations of all mainline pipes and services entering and exiting a manhole, distances between manholes, pipe slopes based on the surveyed invert elevations, and proposed manhole rim elevations.

3. Utilities – Provide horizontal and vertical location of all existing and proposed utility crossings.

4. For potable and non-potable water lines, provide the proposed final ground elevations at all valve boxes. ***Surveyed top of valve nut and valve nut key extension elevations. This information must be used to calculate top of pipe elevation based on the height of the installed valve bonnet, which varies due to pipe diameter and valve manufacturer.***

5. Any other surveyed information as required by the City.

A. Construction tolerances shall be:

1. Water System - Horizontal locations: ± 0.30 feet and Elevations: ± 0.30 feet

2. Sanitary System - Horizontal locations: ± 0.30 feet and Elevations: ± 0.02 feet

B. Survey measurement accuracy shall be:

1. Horizontal locations: ± 0.10 feet

2. Elevations: ± 0.01 feet

2.11 AS-CONSTRUCTED RECORD DRAWING REQUIREMENTS

A. The Contractor and Design Engineer shall be responsible for recording As-Constructed information on a set of Record Drawings kept at the construction site. A representative of the Developer shall monitor construction to assure that changes in construction (as approved in writing) and other pertinent details, such as horizontal location of fittings and manholes, valves, top of pipe elevations, manhole inverts, service tap locations, pipe sizes, depths, etc. are kept current on the As-Constructed Record Drawings.

B. Where the construction is phased with a more than 30-day lapse between phases, As-Constructed Record Drawings shall be submitted to the City after each completed phase. The Construction Drawings for all future phases shall also reflect the "As-Constructed" conditions of the previous phases.

C. At a minimum, the As-Constructed Record Drawings set shall include the following sheets from the original accepted Construction Drawings:

1. Cover Sheet

2. Utility Plan

3. All potable water, sanitary sewer, and non-potable irrigation plan and profile sheets.

4. All construction details and City of Greeley Standard Drawings that were used in the construction of the potable water distribution, sanitary sewer collection, and non-potable irrigation.

5. Landscape plans.

D. The As-Constructed Record Drawings shall show the original design information as well as the As-Constructed information. The original design information shall be shown as "lined through". The As-Constructed information shall be located in the same areas as the design information and shall be either "clouded" and/or made with a heavier line weight as the design information for clear differentiation. The month and year of the construction shall also be noted.

E. A Colorado Registered Land Surveyor shall certify the As-Constructed horizontal locations and surveyed elevations of all items listed in section 2.10 of these Criteria in addition to:

1. Final sanitary sewer manhole rim elevations and Inverts.

2. Final top of water valve box elevations, top of pipe.

3. Construction tolerances shall be evaluated based on original design and City design criteria.

4. Measurement tolerances shall be:

i. Horizontal locations: ± 0.10 feet

ii. Elevations: ± 0.01 feet

F. The project responsible Design Engineer and Land Surveyor shall observe construction, as required, in order to certify the conditions and information recorded on the As-Constructed Record drawings is true and correct.

G. The General Contractor for the project shall sign each drawing sheet of the As-Constructed Record plans set with the following statement:

I, _____, hereby state that this project was constructed to City of Greeley accepted Construction Drawings and standards, as designed by the project Design Engineer, and as field staked by the project Land Surveyor. All deviations to the approved Construction Drawings, standards, design, or survey were so noted on field drawings and these were provided to the project Design Engineer for acceptance and inclusion in the As-Constructed Record Drawings.

_____

Construction Company

_____

Address

_____

Authorized Representative

_____

Title Date

H. A Professional Land Surveyor shall perform or directly supervise all field survey data collection to verify the As-Constructed conditions and shall stamp and seal each drawing sheet in the As-Constructed Record Drawing set with the following statement:

I, _____, hereby state that this project was field staked for construction per City of Greeley accepted Construction Drawings and standards and in accordance with the project design. I certify that the field survey information obtained for the As-Constructed Drawings was obtained in accordance with City current standards and is accurately represented on these As-Constructed Record Drawings.

_____

Registered Professional Land Surveyor

(Affix Seal)

I. A Professional Engineer shall review all the As-Constructed information for compliance with the original approved design and standards and shall stamp and seal each drawing sheet in the As-Constructed Record plan set with the following statement:

I, _____, hereby state that I have reviewed the As-Constructed information provided by the project Contractor and project Land Surveyor. I certify that according to the information provided the As-Constructed Record Drawings are in compliance with the City of Greeley accepted Construction Drawings and standards and will function as designed.

_____

Registered Professional Engineer

(Affix Seal)

J. As-Constructed Record signed and sealed drawings shall be submitted to and accepted by the City prior to issuance of Substantial Completion, in the form of one electronic PDF version and one file package containing GIS spatial data compatible with ESRI ArcGIS using the coordinate system referenced in the most recent City of Greeley Control Points Datasheet. The two (2) year warranty period for the installed potable water, sanitary sewer, and non-potable irrigation systems will begin **after** the Certificate of Substantial Completion has been issued by the City. The request for the Substantial Completion Certificate may be initiated by the City or requested by the Developer, but in all cases is the sole responsibility of the Developer.

K. The City will compare the certified As-Constructed Record Drawing information with the approved Construction Drawings, previously submitted Verification Survey, and information the City may be aware of during the construction process. Any corrections, additions, or omissions to the As-Constructed Record Drawings shall be provided to the Design Engineer who prepared the As-Constructed Drawings for changes.

L. The Certificate of Substantial Completion, will NOT be granted until the As-Constructed Drawings for the potable water, sanitary sewer, and non-potable irrigation systems are accepted by the City. (Ordinance 44, 2002)

M. The Certificate of Final Acceptance occurs at the end of the two year warranty period and final walk through of the project.

2.12 REIMBURSEMENT FOR PUBLIC INFRASTRUCTURE DESIGN AND INSTALLATION COSTS

A. The City may require the Developer to install a potable water, sanitary sewer or lift station, non-potable irrigation main or non-potable pond and pump station larger than is needed to adequately serve development.

B. For the installation of mains the City will reimburse the Developer for the materials costs above that required for the development. The difference in materials costs shall only include the difference in pipe materials, manhole materials, valve materials, and fitting materials. Additional materials costs, if any, shall be agreed upon in writing, prior to commencement of construction.

C. For sanitary sewer collection main oversizing, the City may reimburse the Developer for additional costs due to sanitary sewer main installation excavation depth or width beyond that required for the development.

D. If the City requested oversizing results in significant change to horizontal or vertical alignment, additional reimbursement may be agreed to prior to construction.

E. For the installation of sanitary sewer lift stations and non-potable ponds and pump stations the City will reimburse the Developer for the materials costs above those required by the development on a pro rata basis using the portion of the lift or pump station capacity that is not required for the development. The scope of the reimbursement and the reimbursement ratio shall be agreed upon in writing prior to the commencement of construction.

F. For non-potable pond oversizing, the City may reimburse the Developer for extra excavation and materials costs due to additional depth above that required size for the development.

G. The Developer shall submit a materials list with unit prices, quantities, and, if appropriate, a cost comparison between the two pipe sizes under consideration. Reimbursement will only be paid after the As-Constructed Record Drawings have been accepted by the City. Copies of material invoices for materials delivered to the development site and used in construction shall be provided along with the Developer's request for reimbursement.

H. If the Developer is required to design and construct off site potable water, sanitary sewer, or non-potable irrigation mains in order to serve the development, the Developer may be eligible for design and construction cost reimbursements from other developments that connect to that main. Conversely, if the Developer connects to potable water, sanitary sewer, or non-potable irrigation mains constructed by another Developer or the City, the Developer may be required to participate in the design and construction costs of those lines. Refer to the *City of Greeley Charter and Code, Title 20: Public Services*, sections 20-159, 20-160, 20-161, 20-322, 20-323, and 20-324 for additional reimbursement requirements.

2.13 Subsurface Utility Engineering

A. All new underground facilities, including laterals up to the structure or building being served shall be electronically locatable when installed as required by Colorado Revised Statute 9-1.5-103 as amended

B. All services including potable water, non-potable irrigation water, and sanitary sewer must be locatable up to the structure using tracer wire. See Water & Sewer standard details for the required tracer wire specifications.

C. Potable and non-potable irrigation water mains shall be locatable using tracer wire. See Water & Sewer standard details for the required tracer wire specifications.

D. Sanitary sewer mains do not require tracer wire as they are electronically locatable by other means, including. robots, sonde, and camera systems.

SECTION 3

POTABLE WATER DISTRIBUTION SYSTEM DESIGN CRITERIA

3.01 GENERAL

The purpose of this section is to provide information for the design and layout of a potable water distribution system. Potable water distribution system design shall be in accordance with the City of Greeley *Water Master Plan*, latest revision, and these Criteria.

This section is not intended to be inclusive of all situations and the Design Engineer may be required to use additional engineering judgment to meet the overall design intent for constructability and long-term operations and maintenance. **This Design Criteria typically applies to potable water mains sixteen inches (16") in diameter and smaller.** The City of Greeley Water and Sewer Director reserves the right to make final determinations of the system design based on the best interest of the City's system. Refer to standard detail drawings for additional design information.

3.02 DEFINITIONS

A. Potable Water Distribution Mains

1. A potable water distribution main is a water pipe that primarily serves as a delivery conduit to transport potable water from transmission mains or reservoirs directly to individual water services.

2. Potable water distribution mains within the City are eight inches (8"), twelve-inches (12"), and sixteen-inches (16") in diameter.

B. Potable Water Transmission Mains

1. A potable water transmission main is a water pipe that primarily serves as a delivery conduit to transport potable water directly to the distribution reservoirs and mains.

2. Potable water transmission mains are generally larger than sixteen inches (16") in diameter.

C. Potable Water Services

1. Potable water services include all piping, fittings, and appurtenances used to convey potable water from the distribution main to the customer.

3.03 DESIGN FLOW

A. The potable water distribution system shall be designed to transport peak hour plus fire flow demands in accordance with these Criteria.

B. All water demands used in the design of potable water distribution systems are subject to approval by the City.

C. Design Flow

1. The water demand criteria presented in the following table are minimum criteria and the City reserves the right to modify the Criteria, at any time, for the design of specific projects. Potable water demand criteria for uses not provided in the table shall be determined during system design.

TABLE 3-1: Potable Water Design Flow

Residential			
Zoning based on *City of Greeley Charter and Code*, *Chapter 24.401, Zoning*			
Use	**Units Per Acre***	**Occupancy**	**Peak Hour Demand**
R-E	3	3.1 persons	1.9 gpm/unit
R-L	5	3.1 persons	1.9 gpm/unit
R-M	10	2.7 persons	1.7 gpm/unit
R-H	20	1.7 persons	1.1 gpm/unit
R-MH	15	1.7 persons	1.1 gpm/unit
*Use these unit per acre values unless specific unit counts are known			
Commercial			
Where uses are known, use the specific demand values. Commercial demands based on 1000 ft^2 of building area unless noted otherwise. Otherwise use the appropriate zoning demand values.			
Use	**Average Day Demand without Irrigation**		
C-L	1500 gpd per acre		
C-H	3000 gpd per acre		
I-L & I-M	1500 gpd per acre		
I-H	3000 gpd per acre		
Use	**Average Day Demand**		
Restaurant	500 gpd		
Retail/Office	200 gpd		
Grocery	430 gpd		
Laundry, Dry Cleaning	1000 gpd		
Auto Dealer, Repair/Servic	115 gpd		
Car Wash with Water	1500 gpd		
Hospital	380 gpd		
Hotel/Motel	350 gpd		
Retirement & Nursing	350 gpd		
School	12 gpd/student without showers 36 gpd/student with showers		
Religious Building	300 gpd		

Warehouse (Non-industrial)	25 gpd
Irrigation	25 gpm per acre

2. Irrigation is included in the residential water demand, but not included in the commercial water demand. Irrigation demands for commercial uses shall be determined using the provided irrigation demand criteria and the commercial development's estimated irrigated acreage.

3. For residential demands without irrigation flows, a base flow of 60 gallons per capita per day shall be used.

4. Treat Mixed-Use High Intensity Zoning as 50% R-H and 50% C-H and Mixed-Use Low Intensity Zoning as 50% R-H and 50% C-L unless a more detailed breakdown is known.

5. Due to the extreme variation in water consumption amongst the different types of industry, industrial water demands shall be determined during system design when the industrial use is known.

D. Peaking Factor

1. The peaking factor for indoor water use should align with the peaking factor for sanitary sewer in most situations. Instances where the two peaking factors do not align will require approval by the City of Greeley.

2. A domestic peaking factor shall be obtained from ASCE Peak Flow Curve G[1]:

$$P_f = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

Where P = Population in thousands (example: P = 2 for population of 2,000)

$$P_f = \frac{18 + \sqrt{\frac{F}{60000}}}{4 + \sqrt{\frac{F}{60000}}}$$

Where F = Flow in gallons per day (based on 60 gpcd in Table 4-1)

E. Fire Flows

1. Contact City of Greeley Fire/Rescue Department (970-350-9510) for the latest adopted fire code and to confirm project fire flow requirements.

2. For design purposes, the maximum allowable fire flow provided from any one (1)

[1] American Society of Civil Engineers (ASCE). 1982. *Gravity Sanitary Sewer Design and Construction. Manuals and Reports on Engineering Practice – No. 60.* Reston, VA: American Society of Civil Engineers.

hydrant is 1,500 gpm. Fire flow may be obtained from more than one (1) fire hydrant providing the additional hydrants are accessible to any possible fire location and meet the spacing requirements and distances from structures as specified in section 3.19 of these Criteria and by the City of Greeley Fire Department.

3.04 PRESSURE REQUIREMENTS

Potable water distribution systems must be designed to provide minimum and maximum system pressures as discussed in the following sections. Water system pressure information for the City's existing system shall be verified by the City.

A. The potable water distribution system in all areas shall be designed for a maximum pressure of 125 psi and a minimum pressure of 40 psi at peak hour demands without fire flow.

B. Twenty (20) psi residual pressure is required at any one (1) hydrant with peak hour demand plus fire flow with one (1) water connection closed.

C. Pressure zones shall conform to existing City of Greeley pressure zones as provided in the *Water Master Plan*, latest revision. Specific information on the pressure zones or to confirm which pressure zone a development or site is actually located may only be obtained from the City. See Table 3.2 for ground elevation ranges for each pressure zone.

D. Pressure regulating valves (PRV) or control valves will be required between pressure zones. The final PRV location shall be determined by the City.

TABLE 3-2: Pressure Zone Elevation Ranges

Zone1: 4740' – 4500'
Zone 2: 4840' – 4740'
Zone 3: 4940' – 4840'
Zone 4: 5060 – 4940'

3.05 HYDRAULIC DESIGN

A. Friction Coefficient

1. Potable distribution mains shall be designed using a Hazen-Williams friction coefficient "C" equal to 120.

B. Velocity

1. All pipes shall be sized for a maximum water velocity of no greater than five (5) feet per second (fps) at peak hour demand and seven (7) fps at peak hour demand plus fire flow.

3.06 POTABLE WATER MAIN SIZE

A. Unless specifically indicated in the *Water Master Plan*, sixteen-inch (16") mains are required every mile and twelve-inch (12") mains are required every half-mile. Other distribution mains shall have a minimum diameter of eight inches (8").

B. Hydrant leads connecting to the potable distribution system shall be six inches (6") in diameter. Other pipe diameters for hydrant leads are prohibited.

3.07 DEPTH OF BURY

A. The minimum depth of cover shall be five (5) feet and the maximum depth of cover should generally not exceed six (6) feet. Design preference is to minimize lowering which can be challenging to locate and maintain.

B. When design or constructability constraints are present, deeper or shallower water main installation may be permitted only with acceptance from the City. Additional design and installation considerations may be required by the City depending on the situation. Design considerations should minimize additional fittings and elevation changes where feasible.

3.08 CONNECTIONS TO THE EXISTING POTABLE WATER SYSTEM

A. Main connections to the existing potable water distribution system shall be made by wet tap or cut in tee. All wet taps and all cut-in tees on mains smaller than 16" diameter shall be made by the Contractor under the direct supervision of the City. It is the Contractor's responsibility to provide all approved tapping materials (tapping sleeves, tapping valves, insulator kit, etc.). Taps for new 8" and 12" main connections to existing 16" or larger mains shall be performed by the City unless otherwise directed.

B. Connections to the existing transmission mains or distribution mains larger than sixteen-inch (16") shall be limited and must be approved by City.

C. For wet taps on existing transmission mains or sixteen-inch (16") and larger distribution mains, manufacturer's shop drawings and specifications for the proposed tapping sleeve shall be submitted to the City for review and acceptance prior to installation of the tapping sleeve by the Contractor.

D. Taps on existing transmission mains or sixteen-inch (16") and larger distribution mains shall require the installation of an insulator kit between the tapping sleeve and tapping valve.

E. Connection to cast iron mains constructed prior to 1950 may require replacement or non-standard fittings which must be reviewed and approved by City of Greeley Water & Sewer department.

F. Construction documents shall include a note for all wet taps: "Contractor to reference specifications for approved tapping materials and prior to installation shall contact Distribution for direct supervision of installation by the City."

3.09 LOCATION AND LOOPING OF POTABLE WATER MAINS

A. Potable water mains shall be located in the center of a dedicated street right-of-way, where feasible, or within a dedicated exclusive easement of appropriate width. If narrow street

sections do not allow the water line to be located in the center of the street right-of-way while maintaining clearances from other utilities and the lip of street gutter, the City may allow the potable water main to be located five (5) feet offset from centerline of the street right-of-way. City approval is required for all other proposed potable water main locations.

B. The centerline of potable water mains shall not be placed closer than five (5) feet to the lip of street gutter without prior acceptance by the City. Preferred location is to maximize distance from lip of gutter.

C. Potable water mains serving a cul-de-sac shall be extended to within ten (10) feet of the lip of street gutter at the end of the cul-de-sac and shall have a hydrant assembly placed on the line.

D. A potable water main serving one (1) lot shall extend all the way across the frontage for that lot.

E. Where non-compliant or private water mains or service lines exist within or adjacent to a new development, replacement of lines or additional connections to those lines may be required.

F. Permanent dead-ends are prohibited without prior approval by Water & Sewer. City preference is no dead-end lines and may require additional infrastructure to meet water quality requirements.

G. Temporary dead-ends with services shall have a fire hydrant or a flushing station with an acceptable discharge point at the end of the line.

H. Temporary dead-ends with no services shall have a closed valve at the point of connection with the active distributions system and will not require a hydrant or flushing station after the valve.

I. For temporary phasing, an adequate number of connections to the existing potable water distribution system as determined through hydraulic modeling and approved by the Water & Sewer shall be provided.

1. Potable water mains shall extend to the extremities of the property or the subdivision served. Extensions shall be in appropriate locations to provide adequate water connections and to maintain looping requirements for adjacent, future developments and to facilitate the completion of the grid described in section 3.06 of these Criteria.

2. Water mains shall be extended offsite when required to tie into the existing distribution system for additional water source connections. Appropriately sized easements shall be provided.

J. In all instances, the City shall determine the potable water system looping, connections, and valving in order to maintain overall water system performance. Ultimately, the required source connections to the existing potable water system shall be solely determined by the Water & Sewer Department.

1. New developments shall have at minimum two separate and distinct connections to the existing system to provide reliability for maximum fire flows in case of pipe failure and

better system circulation to maintain acceptable water quality. Source connections shall be made on opposite sides of the development.

3.10 POTABLE WATER SYSTEM PHASED INSTALLATION AND STUBOUTS

A. Potable water distribution system phasing, if proposed by the Developer, shall be clearly identified on the overall utility plan. Water plan and profile sheets shall clearly show and label the phasing transitions in the potable water line design.

B. The proposed potable water system phasing shall maintain looping integrity within the system as described in section 3.09 of these Criteria.

C. The phased potable water system design shall meet the phased water demands for the development and adhere to all potable water system and hydraulic design requirements provided in these Criteria.

D. Locate line valves and temporary fire hydrant and flushing station at the end of each phase or stub out, as described in section 3.09 of this criteria. The stubout shall be shown on the potable water plan and profile sheets.

E. Phased water line or stubout construction shall be extended a minimum ten (10) feet beyond phased street paving to avoid asphalt removal during excavation for future connections.

F. Phased potable water mains or stubouts intended for future connections shall be valved such that only one (1) valve needs to be closed when the main is extended and no customers are without water service when the line is extended. The valve must be appropriately restrained so it will not "blow off" when the water line is exposed and all thrust blocking is removed for the extension. See section 3.14 of these Criteria regarding pipe restraint.

G. The maximum length of a stubout shall be fifty (50) feet unless otherwise approved by the City.

H. Potable water main stubouts not utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

3.11 PIPE MATERIAL

A. Potable water pipes less than or equal to sixteen-inches (16") in diameter shall be AWWA C151 cement-lined ductile iron pipe or AWWA C900-16 polyvinyl chloride (PVC) pressure pipe.

1. HDPE pipe and fused PVC may be used with City approval for specifically identified purposes, location and uses such as horizontally bored crossings.

B. The Design Engineer shall specify the pipe material and class, as required for specific project conditions. The pipe material and class shall be called out on the Construction Drawings.

C. All ductile iron pipe shall be protected against soil corrosion based on the corrosion level determined from pH and Resistivity levels in accordance with the following table. If the corrosion level is found to be Medium or lower, the pipe shall be wrapped with 8-mils of V-Bio Enhanced Polyethylene Encasement in accordance with AWWA C105. If the Corrosion level is Medium-High or High, then additional Zinc coating of the pipe shall be required.

TABLE 3-3: Corrosive Soil Function of pH and Resistivity

pH	Resistivity (Ohms-cm)	Corrosion
<3.5	Any	High
3.5-4	<4,500	High
	>4,500	Medium-High
4.5-5.5	<4,500	High
	4,500-5,000	Medium-High
	>5,000	Medium
5.5-6.0	<1,000	High
	1,000-5,000	Medium-High
	5,000-10,000	Medium
	>10,000	Medium-Low
6.0-9.0	<1,000	High
	1,000-3,000	Medium-High
	3,000-10,000	Medium
	10,000-20,000	Medium-Low
	>20,000	Low

3.12 VALVES

A. All valves shall be located in dedicated street right-of-way or within a dedicated exclusive easement of appropriate width. City approval is required for all other proposed valve locations.

B. Gate Valves

1. Gate valves are assigned in the potable water distribution system so that no single accident, break, or repair necessitates shutting down a length of pipe greater than 1,000 feet in all directions or no more than one hundred fifty (150) people are out of service at any one time.

2. At street intersections, gate valves shall be located at the extension of property lines, wherever possible.

3. Gate valves shall be located a minimum five (5) feet away from the edge of concrete cross pans or cutters and away from intersection. This requirement has precedence over section 3.12-B. of these Criteria.

4. Fire hydrant and fire sprinkler line gate valves shall be placed at the main. These gate

valves shall be mechanical joint valves and fasten to a mechanical joint anchor tee (swivel tee) on the main.

5. All potable water line valves shall have a concrete collar around the valve box in accordance with *SDC* Standard Drawings.

6. City may require additional valves to allow for maintenance and control and minimizing service outages. Final valve locations shall be solely determined by the City.

7. Valves shall be provided at both ends of water pipelines where the potential of inaccessibility for repairs may exist, this may include; rivers, ponds, ditches, railroads and highways. Where looping is required, valves shall be located at easement lines or ROW to maintain potable service.

C. Combination Air Valves

1. Sixteen-inch (16") diameter mains shall have combination air valves installed at high points along the main and shall be properly sized by the Design Engineer in accordance with the manufacturer's recommendation. The City shall have final determination on valve size, placement, and type of valve to install.

D. Pressure Regulating Valves

1. Pressure regulating valves (PRVs) control pressures between potable water distribution system and shall be placed at pressure zone boundary. The final installation location shall be determined by City.

2. The standard PRV size is eight inches (8") for all 8" mains unless otherwise approved by the City. For all mains larger than 8", duplex PRVs are required and shall be sized according to hydraulic calculations unless otherwise approved by the City.

E. Blowoffs

1. Any required blowoff location shall utilize a city approved fire hydrant or flushing station.

3.13 PIPE ALIGNMENT

A. Potable water mains may have a change in alignment or grade to avoid obstructions, within the limits of the pipe joints. If joint deflections is not feasible or permitted by the City, an appropriate bend fitting shall be used.

B. Allowable Joint Offset for PVC Pipe

TABLE 3-4: Maximum PVC Pipe Joint Deflection or per manufacturers limits whichever is more restrictive

Pipe Diameter (in)	Maximum Joint Deflection (°)
8"	1°

12”	1°
16”	1°

C. PVC pipe can be joined with High Deflection (HD) Couplings which allow five degrees (5°) of pipe joint deflection per coupling. HD couplings can be used in the place of small bends or where it is undesirable or impossible to joint deflect the pipe.

D. Allowable Joint Deflection for DIP Pipe

TABLE 3-5: Maximum DIP Pipe Joint Deflection or per manufacturers limits whichever is more restrictive

Pipe Diameter (in)	Maximum Joint Deflection (°)
6”	4.0°
8”	4.0°
12”	4.0°
16”	2.5°

3.14 THRUST BLOCKING AND PIPE RESTRAINT

A. Concrete thrust blocks or pipe restraints shall be constructed at all mainline bends, tees, dead ends, and valves as shown in the City of Greeley Standard Drawings.

B. Thrust Blocks

1. The thrust block details, as shown in the City of Greeley Standard Drawings, are to be used as minimums only. The Design Engineer shall determine the required size of thrust blocks to use.

2. If for any reason (i.e. temporary dead end line), concrete thrust blocks cannot be used, restrained push-on or mechanical joint restraints shall be required.

C. Pipe Restraint

1. The pipe restraint details, as shown in the City of Greeley Standard Drawings, are to be used as minimums only. The Design Engineer shall determine the required size of thrust blocks to use.

2. For transmission mains, the Design Engineer shall determine the length of required pipe restraint, for the pipe material being used, PVC or DIP, in accordance with AWWA M41 *Ductile-Iron Pipe and Fittings* or AWWA M23 *PVC Pipe – Design and Installation*, latest revision.

D. In some instances (i.e. fire hydrants, large diameter fire lines, water line lowering’s, etc.) thrust blocks may be required in addition to pipe restraint. The design engineer or City shall make such determinations on a case-by-case basis.

3.15 POTABLE WATER MAIN AND SERVICE ENCASEMENTS FOR WET UTILITIES

Wet utilities should be defined as any pipeline that could contaminate the potable water system.

A. No general statement can be made to cover all encasement conditions, therefore only typical encasement situations are addressed in this section. Encasement requirements shall ultimately be determined by the City on a case-by-case basis.

B. Refer to construction specification *Section 02445, Casing Pipe – Borings and Encasements* for encasement pipe material, diameter, and wall thickness (if applicable), casing spacers, and standard detail end seals, and installation requirements. No encasements shall be constructed from poured concrete.

C. The use of "line" or "lines" in this section shall refer to both mains and services.

1. Where sanitary sewer lines cross beneath potable water lines with less than eighteen inches (18") clearance or any sanitary sewer lines cross above potable water lines, or the ten (10) feet horizontal clearance between potable water lines and sanitary sewer lines cannot be maintained, pipe encasement shall be designed and constructed so as to protect the potable water line.

2. Where non-potable Distribution lines cross above or below potable water lines with less than eighteen inches (18") clearance, pipe to be center on potable water Main or Fused and shall be designed and constructed so as to protect the potable water line.

3. Pipe encasement shall be placed on the sanitary sewer line or non-potable irrigation line except in situations where the sanitary sewer or non-potable irrigation line is existing. Where the sanitary sewer or non-potable irrigation line is already constructed, the pipe encasement shall be placed on the potable water line. Priority shall be given to encase service lines before main lines.

4. The encasement pipe shall extend a minimum ten (10) feet on either side of the crossing measured from the outside diameter of the crossed pipe. Longer casing pipes may be required depending on the encasement situation.

5. For any atypical encasement sizing situations, the Design Engineer shall size the encasement pipe such that the inside clearance is at least one inch (1") greater than the maximum outside diameter of the casing spacer runners.

6. Where storm water lines cross above potable water mains, storm water pipe joints shall utilize rubber gaskets and exterior joint wrap a minimum ten (10) feet on either side of the crossed potable water main, measured from the outside diameter of the pipe.

D. Potable water main crossings under any open irrigation ditch shall have a minimum five (5) feet of cover and shall be encased.

E. Bored utility crossings shall have a minimum twenty-four inches (24") of vertical clearance from the outside diameter of the utility casing to the outside diameter of the potable water line if the bored utility crosses above the potable water line and a minimum thirty-six inches (36") of vertical clearance from the outside diameter of the utility casing to the outside diameter of the potable water line if the bored utility crosses below the water line.

F. If there are horizontal or vertical clearance conflicts between the potable water line and gravity utilities, the City may require that the potable water main be lowered, raised, or realigned in order to maintain the required clearances.

3.16 POTABLE WATER MAIN BORINGS & ENCASEMENTS REQUIRED BY OTHER AGENCIES

A. Installation of potable water mains through City of Greeley or another agency's right-of-way, easement, or other, may require a bored casing pipe to facilitate main installation. The type of bored casing material and its properties will be specified by the agency granting permission to cross. Such crossings shall be subject to approval by the City to avoid conflicts in requirements or standards between the City and the agency granting permission to cross.

1. A letter, permit, or approved crossing application from the agency granting permission to cross, must be provided to the City prior to the boring.

2. The City shall not accept any bored crossings imposed with an annual user or crossing fee from the agency granting permission to cross. All bored crossing fees, if applicable, shall be paid by the Developer prior to the boring.

B. The minimum requirements for bored casings within the City shall be in accordance with construction specification *Section 02445, Casing Pipe – Borings and Encasements. & standard drawings*

1. The required bore length of casing pipe shall be determined by the Design Engineer and must be accepted by the City.

2. All bored casing shall have a minimum of twenty-four inches (24") of vertical clearance from the outside diameter of the casing pipe to the outside diameter of the utility line if the bored casing crosses above the utility and a minimum thirty-six inches (36") of vertical clearance from the outside diameter of the casing pipe to the outside diameter of the utility line if the bored casing crosses below the utility, unless more stringent requirements by other utility.

3.17 POTABLE WATER SERVICES AND FIRE SPRINKLER LINES

A. General

1. Potable water service lines shall not be installed in trenches with other wet or dry conduits/utilities. A service line shall be separated from other conduits a minimum ten (10) feet horizontally and eighteen inches (18") vertically. The only exception will be a fire sprinkler line. In this instance, the horizontal separation may be a minimum of five (5) feet, from outside diameter of the pipe and final determination. This shall be evaluated by the City on a case-by-case basis.

2. Potable water services and fire sprinkler lines for a given lot must be tapped on the potable water main within the confines of the extended property lines. Certain lots and cul-de-sacs may have the potable water service line or fire sprinkler line located anywhere along the lot frontage but shall be a minimum three (3) feet and preferred location is five (5) feet inside the property line being served.

3. No potable water service taps shall be made on fire sprinkler lines.

4. All taps shall require a tapping saddle or tapping sleeve and valve as shown in standard detail. No direct taps are allowed.

5. Potable water services and fire sprinkler lines not intended to be utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

B. Water Services

1. Refer to construction specification *Section 02514, Water Service Lines, Meters, and Appurtenances,* for service pipe materials and installation requirement.

2. A separate potable water service line and meter must serve each building with individual owners.

3. No potable water service lines shall cross property lines, including irrigation systems, unless otherwise approved by the City for irrigating multiple outlots. Irrigation systems from a single potable water service shall only be allowed for use on that single property. Refer to appendix section *A2 – Compound Tap Exemption Policy for Irrigation of Multiple Outlots.*

4. No compound potable water taps are allowed. Refer to *City of Greeley Charter and Code, Title 20: Public Services*, Section 20-253.

5. Where one or more master meters are allowed for residential units, meters shall be configured to serve contiguous groups of units on one lot with no more than an estimated twenty-five residents served by a single master meter. The master metered system shall also be designed and constructed such that the property owner does not become a public water provider under state or federal regulations.

6. Pressure boosters are prohibited without adequate backflow protection.

7. Potable water services shall be located a minimum five (5) feet inside the property being served.

8. Under no condition is a potable water service to be located under driveways, trees, or other permanent structures.

9. Potable water service taps shall be separated by at least five (5) feet, measured along the potable water main length, including when taps are on opposite sides of the potable water main. Potable water service taps shall also be a minimum five (5) feet from all joints, fittings, or valves.

10. The corporation stop, curbstop, meter, that portion of the service line between the corporation stop and the meter, and five (5) feet past the meter shall all be the same internal diameter.

11. Potable water service curb stops shall be located ± one (1) foot from the property line or easement boundary and preferred inside the row. Potable water service meter

pits/vaults shall be located as close as possible beyond the curb stop. See City of Greeley Standard Drawings for additional service and meter installation requirements.

12. Potable water service meter pits/vaults shall normally be located after the curbstop in a landscaped area or streetscape. Meter pits/vaults shall not be installed in any street, parking area, driveway, or sidewalk unless otherwise approved by the City. If a meter pit/vault is permitted by the Water & Sewer Department to be located in any traffic area, the pit/vault shall be designed to withstand HS-20 traffic loadings. Curbstops with tracer wire test stations shall be in a valve box.

13. There shall be no major landscaping (trees, boulders, or shrubs with mature growth greater than three (3) feet), buildings, or other permanent structures within ten (10) feet of the meter pit/vault.

14. The maximum allowable number of living units on a single tap may be determined using a fixture analysis per the process outlined in the most recent edition of AWWA Manual of Water Supply Practices M22 – Sizing Water Service Lines and Meters. If no analysis is provided, the maximum values are shown below: Any residential project requesting a domestic tap larger than three inches (3") shall be reviewed on a case-by-case basis.

TABLE 3-6: Living Units Allowed Per Tap Size

Tap Size (inch)	Maximum Allowable Living Units
3/4"	2
1"	4
1 ½"	10
2"	25
3"	45

15. Commercial and industrial developments may provide potable water service stubouts, if the end user is known.

C. Fire Sprinkler Lines

1. Fire sprinkler lines two-inch (2") or smaller shall be type "K" copper. Fire sprinkler lines larger than two-inch (2") shall be restrained DIP. Restrained DIP fire sprinkler lines require concrete thrust blocking at the main and a gate valve at the main. Fire sprinkler lines are not metered.

2. Fire sprinkler lines must be connected to the potable water distribution system. Connections to non-potable irrigation system are prohibited.

3.18 POTABLE WATER MAINS AND SERVICES IN RELATION TO DRY UTILITIES

Dry utilities shall be defined as any utility pipeline that could not contaminate the potable water system.

A. Potable water services and distribution mains shall have a minimum ten (10) feet horizontal and eighteen inches (18") vertical separation from all utilities measured from outside

diameter.

B. Dry utility crossings shall be encased in high density polyethylene pipe (HDPE), Standard Dimension Ratio (SDR) 11 or approved equal from edge to edge of the easement or right-of-way, or ten (10) feet on either side of the potable water main, whichever is greater. Final determination shall be accepted only by the City

C. Right angle utility crossings are only permitted above and below the potable water main with adequate clearance. Non-right-angle crossings shall be approved by the City. Parallel installation of other utilities in exclusive water easements are not permitted.

D. For a potable water line crossing situation not specifically mentioned in this section, the crossing requirements provided in these Criteria shall be applied to that particular situation to the best extent possible.

3.19 FIRE PROTECTION AND HYDRANT SPACING

A. All fire protection, fire flow, and hydrant requirements are subject to approval by the Greeley Fire Department.

B. Hydrant Spacing

1. Residential structures shall be no further than 250 feet, fire access distance[2], from a fire hydrant.

2. In R-L zoned areas, fire hydrant spacing shall be no further than 600 feet measured along the street curb line.

3. In R-M and R-H zoned areas, fire hydrants shall be spaced equal to or less than 500 feet apart, measured along the street curb line. Structures shall be 250 feet or closer, fire access distance, from a fire hydrant.

C. In commercial and industrial areas, structures shall be 250 feet or closer, fire access distance, from a fire hydrant.

D. Where potable water mains are extended along streets where hydrants are not needed for the protection of structures, hydrants shall be provided at spacing not to exceed 1,000 feet.

E. Hydrants shall be located at intersections whenever possible. Hydrants located mid-block shall be aligned with the extension of a property line.

F. Fire hydrants shall be installed in accordance with construction specification *Section 02516, Water Utility Distribution Fire Hydrants* and City of Greeley Standard Drawings.

G. A three (3) foot radius in all directions around the hydrant shall be clear of obstructions.

1. Where hydrants are vulnerable to vehicular damage, crash posts shall be provided outside of the three (3) foot radius clearance in all directions from the hydrant and a

[2] Fire access distance is the distance a fire pumper must travel to lay a standard hose line from a hydrant to the primary access point of a structure. The hose lay distance is not measured over unimproved areas that may be impassable due to weather conditions, obstructions, etc.

minimum of one foot from edge of sidewalk.

2. When hydrants are located less than 4 feet from a vehicular travel path, or not protected by curb and gutter then crash posts shall be provided. Crash posts shall be concrete filled pipes that are four-inches (4") in diameter and a minimum of four (4) feet in height above the finished ground surface with two (2) feet of post below the finished ground surface.

H. All hydrants must be within dedicated exclusive easements or public rights-of-way. Refer to *Section 2* of these Criteria for easement requirements.

3.20 CROSS CONNECTION AND BACKFLOW PREVENTION

A. Potable water service lines on any property or inside any building shall have NO physical connection with any pipes, pumps, hydrants, tanks or non-potable irrigation systems that could draw or discharge any unsafe or contaminated water (including steam condensation or cooling water) into the potable water distribution system.

B. For additional information on cross connection or backflow prevention requirements, refer to appendix section *A1 – Cross Connection and Backflow Prevention Policy*.

SECTION 4

SANITARY SEWER COLLECTION SYSTEM DESIGN CRITERIA

4.01 GENERAL

A. The purpose of this section is to provide information for the design and layout of a sanitary sewer collection system. Sanitary sewer collection system design shall be in accordance with the City of Greeley Sanitary Sewer Master Plan, latest revision, and these Criteria.

B. This section is not intended to be inclusive of all situations and the Design Engineer may be required to use additional engineering judgment to meet the overall design intent for constructability and long-term operations and maintenance. **This Design Criteria typically applies to sanitary sewer mains twelve inches (12") in diameter and smaller.** The City of Greeley Water and Sewer Director reserves the right to make final determinations of the system design based on the best interest of the City's system. Refer to standard detail drawings for additional design information.

4.02 DEFINITIONS

A. Sanitary Sewer Collection Mains

1. A sanitary sewer collection main is a sanitary sewer pipe that gathers wastewater flows directly from individual sanitary sewer services or private sewer mains and transports.

B. Sanitary Sewer Interceptor Lines

1. Sanitary sewer interceptors within the City are fifteen inches (15"), eighteen inches (18"), or twenty one inches (21") in diameter.

C. Sanitary Sewer Trunk Lines

1. A sanitary sewer trunk line is a sanitary sewer pipe that collects sewage flows from the collection mains and interceptors and carries those flows to the wastewater treatment facility.

2. Sanitary sewer trunk lines are larger than twenty-one inches (21") in diameter.

3. All sanitary sewer trunk lines require additional approval through the Colorado Department of Public Health and Environment (CDPHE), and all permitting shall be completed by Developer and Design Engineer and must be approved and signed by City.

D. Sanitary Sewer Services

1. Sanitary sewer services include all piping, fittings, and appurtenances used to convey sanitary sewage from the plumbing system of a structure to a sanitary sewer collection main.

2. Sanitary sewer services are typically four inches (4") or six inches (6") in diameter.

4.03 **DESIGN FLOW**

A. The sanitary sewer collection system shall be designed to carry peak wastewater flows plus infiltration/inflow in accordance with these Criteria.

1. Depending on a development's location, consideration of upstream and offsite flow contributions may be required by the City to ensure proper sizing of the sanitary sewer collection mains within the development. This will be determined by the City on a case by case basis.

2. Depending on the existing capacity of the downstream sanitary sewer collection system, the City may require verification that the downstream sewer system can convey the development's peak flows. If the downstream capacity is inadequate, the Developer may be required to make appropriate downstream sewer system upgrades. This will be determined by the City on a case by case basis.

3. Any infill or redevelopment project that is an intensification of use shall require the Developer to verify that the downstream sewer system can convey the development's peak flows. If the downstream capacity is inadequate, the Developer may be required to make appropriate downstream sewer system upgrades.

B. Design Flow

1. The wastewater flows presented in the following table are minimum criteria and the City reserves the right to modify the Criteria, at any time, for the design of specific projects. Wastewater flows for uses not provided in the table shall be determined during system design.

TABLE 4-1: Sanitary Sewer Design Flow

Residential			
Zoning based on City of Greeley Charter and Code, Chapter 24.401, Zoning District Development Standards			
Use	Units Per Acre	Occupancy	Average Day Wastewater Flows*
R-E	3	3.1 persons	0.13 gpm/unit
R-L	5	3.1 persons	0.13 gpm/unit
R-M	10	2.7 persons	0.11 gpm/unit
R-H	20	1.7 persons	0.07 gpm/unit
Commercial			
Use			Average Day Wastewater Flows*
C-L (not specified)			1,500 gpd/acre (minimum)
C-H (not specified)			3,000 gpd/acre (minimum)
Retail/Offices			200 gpd/1,000 SF
Hotels/Motels			350 gpd/1,000 SF
Restaurants			500 gpd/1,000 SF

Bars and Lounges	300 gpd/1,000 SF
Neighborhood Stores	200 gpd/1,000 SF
Department Stores	200 gpd/1,000 SF
Laundry and Dry Cleaning	1,000 gpd/1,000 SF
Banks	300 gpd/1,000 SF
Nursing Homes	350 gpd/1,000 SF
Warehouses	25 gpd/1,000 SF
Car Washes with Water Reuse	1,500 gpd/1,000 SF
Auto Dealer/Repair/Service	115 gpd/1,000 SF
Grocery Store	430 gpd/1,000 SF
Religious Buildings	300 gpd/1,000 SF
Factories	800 gpd/1,000 SF
Hospitals	380 gpd/1,000 SF
Schools (without showers)	12 gpd/student
Schools (with showers)	36 gpd/student
Industrial	
Use	Average Day Wastewater Flows*
I-L (not specified)	1,500 gpd/acre
I-M (not specified)	1,500 gpd/acre
I-H (not specified)	3,000 gpd/acre
**1cfs = 448.33 gpm* *Average day wastewater flow per capita = 60 gpcd*	

2. All flows used in the design of sanitary sewer collection systems are subject to approval by the City.

C. Peaking Factor

1. A domestic peaking factor shall be obtained from ASCE Peak Flow Curve G[1]:

$$P_f = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

Where P = Population in thousands (example: P = 2 for population of 2,000)

[1] American Society of Civil Engineers (ASCE). 1982. *Gravity Sanitary Sewer Design and Construction. Manuals and Reports on Engineering Practice – No. 60.* Reston, VA: American Society of Civil Engineers.

$$P_f = \frac{18 + \sqrt{\frac{F}{60000}}}{4 + \sqrt{\frac{F}{60000}}}$$

Where F = Flow in gallons per day (based on 60 gpcd in Table 4-1)

4.04 INFILTRATION AND INFLOW (I/I)

A. Infiltration and inflow (I/I) is extraneous water flow that enters the sanitary sewer collection system.

1. Infiltration is water entering the sanitary sewer collection system from the ground through service connections, defective pipes, pipe joints, and manhole connections.

2. Inflow is unintentional water entering the sanitary sewer collection system from roof drains, underdrains, surface stormwater runoff, and natural drainage. Any direct connections to the sanitary sewer system shall be removed and directed to the appropriate locations.

B. 200 gallons per day per inch-diameter per mile of pipe shall be added to the peak design wastewater flow as the allowance for I/I.

C. 500 gallons per day per inch-diameter per mile of pipe located in groundwater shall be added to the peak design wastewater flow as the allowance for I/I.

D. I/I flows are not subject to a peaking factor.

4.05 HYDRAULIC DESIGN

A. The required pipe size shall be computed by Manning's Equation below:

$$Q = \frac{1.49}{n} A R^{2/3} \sqrt{S}$$

Where:

Q = Flow (cfs)
n = Manning's Coefficient of 0.013
A = Area of Flow (ft^2)
R = Hydraulic Radius (A/P)
Where: P = Wetted Perimeter
S= Slope of pipe (ft/ft)

B. All sanitary sewer collection mains shall be designed to a maximum depth of flow, depending on age.

1. Half full (d/D=0.5) for all mains constructed prior to 2022 due to historical tap locations on the mark.

2. 4/5 full (d/D=0.8) for all new development.

Where:
d = Depth of Flow
D = Diameter of Pipe

C. Minimum design velocity at peak flow shall not be less than two (2) ft/s or greater than seven (7) ft/s. Where 2 ft/s is not feasible, the minimum slope shall be 1% slope for 8" pipe.

1. Sewer shall be designed for velocities less than seven (7) ft/s whenever possible and for subcritical flows whenever possible.

2. When conditions require velocity to be greater than seven (7) feet per second, special provisions shall be made to avoid scour and protect against displacement caused by erosion or impact.

D. When lines are 10" and larger, Developer shall analyze flows for hydraulic jumps and special provisions shall be made to avoid H2S and protect against its effects.

4.06 SANITARY SEWER MAIN SIZE AND SLOPE

A. The following table shows the minimum allowable slopes per sanitary sewer main diameter. These minimum slopes may be used provided that the hydraulic design requirements in 4.05 of these Criteria are met.

TABLE 4-2: Minimum Sanitary Sewer Main Slopes (ASCE)

Pipe Diameter (in)	Minimum Slope (%)
8"	0.40%
10"	0.28%
12"	0.22%
15"	0.15%
18"	0.12%
21"	0.10%

B. The maximum slope for any sanitary sewer collection main shall be 5%

C. The City requires sanitary sewers to maintain a consistent slope throughout the sewer alignment in order to maintain capacity.

D. All proposed sanitary sewers shall maintain the same inner diameter (ID) pipe size to match the existing City collection system; no downsizing shall be allowed.

E. The City may require the Developer to install a sanitary sewer collection main larger than is needed to adequately service the development. Refer to *Section 2* of these Criteria for oversizing reimbursement.

4.07 DEPTH OF BURY

A. Sanitary sewer collection mains shall have four (4) feet minimum depth of cover from the top of pipe to finished ground surface.

B. Where grading, existing field conditions, or service constraints demonstrate that a sanitary sewer main must have less than four (4) feet of cover or when sewer main installation is deeper than twenty (20) feet at the invert, refer to section 4.10.

C. Installation of sanitary sewer mains with depths greater than twenty (20) feet at the invert shall require written approval from Water & Sewer after all reasonable effort is made to keep depths to less than twenty feet.

D. Where the elevation difference between the top of foundation and the top of the sanitary sewer collection main is less than ten (10) feet, the Construction Drawings and the plat shall indicate the lot is served by a "shallow sewer" and appropriate elevation information shall be given.

4.08 LOCATION OF SANITARY SEWER COLLECTION MAINS

A. All sanitary sewer collection mains shall be located in dedicated street right-of-ways. Any other sanitary sewer collection mains shall be in a dedicated easement of appropriate width (refer to section 2.06). City approval is required for all proposed locations.

B. The centerline of sanitary sewer collection mains shall not be placed closer than five (5) feet to the lip of the street gutter without prior acceptance by the City. The sewer collection mains centerline should avoid traffic wheel paths where feasible.

C. Sanitary sewer collection mains shall extend to the upstream extremities of the property or subdivision being served. Main extensions shall be in appropriate locations to provide adequate sanitary sewer system connections for adjacent, future developments.

1. A sanitary sewer collection main serving one (1) lot shall extend all the way across the frontage for that lot.

2. The City may grant exceptions to sanitary sewer collection main extensions if development of an adjacent property is located in a different sewer basin, or if the

property can currently connect to the sanitary sewer system. This will be determined by the City on a case by case basis.

3. Sanitary sewer mains shall be extended offsite when required to tie into the existing collection system.

D. Sanitary sewer collection mains shall be straight between manholes, both in alignment and slope.

E. Stormwater and underdrain piping shall be distinguishable by color from sanitary sewer collection mains.

4.09 SANITARY SEWER COLLECTION SYSTEM PHASED INSTALLATION AND STUBOUTS

A. Sanitary sewer collection system phasing, if proposed by the Developer, shall be clearly identified on the master utility plan. Sewer plan and profile sheets shall clearly show and label the phasing transitions in the sanitary sewer main design.

B. The phased sanitary sewer collection system shall be designed for full build out of the development being served including any additional offsite flows that must be passed through the development. Stub-out shall be designed for future development flows.

C. Phased sanitary sewer main or stub-out construction shall be extended a minimum ten (10) feet beyond phased street paving to avoid asphalt removal during excavation for future connections.

D. A stub-out for future connection shall be provided for an adjoining phase or adjacent future developments.

E. The stub-out design and installation shall maintain both vertical and horizontal alignment in accordance with these Criteria. The stub-out shall be shown on the sanitary sewer plan and profile sheets with the length and end of pipe invert labeled.

F. The end of the stub-out shall be sealed with a removable watertight plug restrained by half (1/2) a cubic yard of concrete behind the plug until the time of future connection.

G. The maximum length of a stub-out shall be forty (40) feet unless otherwise approved by the City. If the maximum stub-out length must be exceeded, the sewer main installation shall end at a terminal manhole or be extended to the next upstream manhole.

H. Sanitary sewer main stub-outs not utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

4.10 PIPE MATERIAL

A. Sanitary sewer collection mains shall be polyvinyl chloride (PVC) SDR 35 pipe suitable for sanitary sewer flows.

B. Alternative pipe materials shall only be used in the following situations:

1. Where sanitary sewer collection mains are installed less than four (4) feet from the finished ground elevation to the top of pipe, approval by Water & Sewer Department is required.

    a. The pipe material shall be PVC SDR 26 with flow fill from bottom of trench to one (1) foot above top of pipe, and the full trench width, and manhole to manhole.

2. Where sanitary sewer collection mains are installed deeper than twenty (20) feet at the invert, polyvinyl chloride (PVC) SDR 26 shall be used.

    a. For alternative pipe material installation situations, external load (earth and live load) analysis is required to verify the minimum alternative pipe material is suitable for the specific project conditions. If the alternative pipe material is unsuitable, the Design Engineer shall specify an acceptable pipe material. External pipe load calculations shall be submitted to the City for review and acceptance.

    b. The length of alternative pipe material to install shall be called out on the Construction Drawings.

C. Changes between pipe materials are not permitted along a continuous sewer main. The alternative pipe material shall be installed from manhole to manhole.

D. To allow new connections to mains that are damaged, the main shall be replaced or rehabilitated per specifications from the upstream to downstream manhole.

4.11 MANHOLE LOCATION AND SIZE

A. General

1. Manholes shall be installed at every change in direction, slope, or connection with other sanitary sewer collections mains.

2. There shall be no more than three (3) lines designed to discharge into any one manhole. This includes both main and service lines.

3. The Design Engineer shall determine if conditions require an interior protection on the manhole from microbial induced corrosion. Acceptable protections for new construction are polymer concrete, concrete with Xypex Bio-San C500 admixture, or approved HDPE manhole liner systems. Acceptable protections for existing manholes are polymer concrete liner systems or coatings. Water & Sewer Department reserves the right to require additional locations where interior coatings may be required. Locations that require interior manhole protections may include, but are not limited to:

    a. Locations where hydraulic jump may occur and the next downstream manhole.

    b. Every drop manhole and the next adjacent downstream manhole.

c. Any manhole where invert slope exceeds 5% or velocities exceed 5 ft/s or where flows change from supercritical to subcritical.

4. Buoyancy calculations shall be provided for manholes and pipes where groundwater may be encountered, has been identified in the geotechnical report, is located in the floodplain or other water sources are present. The manhole shall be sealed from the outside with an approved seal wrap, where groundwater or other water sources are present.

5. Connection and modifications of existing manholes that are constructed of bricks or show signs of damage shall be replaced or rehabilitated and coated per specifications.

B. Manhole Location

1. All manholes shall be located in dedicated street right-of-way or within a dedicated easement of appropriate width (refer to section 2.06). City approval is required for all other proposed manhole locations.

2. The center of manholes shall not be placed closer than eight (8) feet to the lip of the street gutter without prior acceptance by the City.

3. The edge of the manhole cover shall be located a minimum five (5) feet from the edge of cross pans, wherever feasible.

4. Manholes located outside of the street section shall be located in areas not subject to flooding, stormwater conveyance, ponding or detention.

a. If locating manholes in stormwater conveyance areas cannot be avoided, a solid, watertight, bolt down manhole cover with an integral rubber gasket, shall be used.

b. Manholes located within the 100-year flood plain shall have a solid, watertight, rubber gasket, bolt down manhole cover. The manhole cover and grade ring shall be bolted to the manhole cone, and all manhole joints and grade rings shall be sealed from the outside with an approved seal wrap.

c. Manholes located within groundwater or where other water sources are present, shall have all manhole joints and grade rings sealed from the outside with an approved seal wrap.

5. Manholes outside of road rights-of-way shall be provided with direct access by means of an all-weather road. All-weather road requirements are as follows:

a. All-weather roads shall be designed to support City maintenance vehicles up to thirty-five (35) tons with a minimum turning radius of sixty (60) feet.

b. At a minimum, all-weather roads shall be ten (10) feet wide with eight (8) inches of compacted aggregate base course. Subgrade preparation, compaction, and aggregate base course shall be in accordance with *SDC* construction specifications.

c. If the all-weather road is longer than fifty (50) feet and does not have a public road access from both ends, an appropriately sized turn around shall be provided.

d. The Design Engineer shall verify that these minimum requirements for the all-weather road are suitable for the specific project conditions.

e. The all-weather road shall be located in a dedicated sanitary sewer or access easement.

C. Manhole Size and Spacing

1. The following table displays the diameter of standard manholes and the maximum manhole spacing for each sanitary sewer pipe diameter:

TABLE 4-3: Standard Manhole Diameter and Spacing

Sewer Pipe Diameter (in)	Manhole Diameter (ft)	Manhole Spacing (ft)
8”	4 ft	450 ft
10”	4 ft	450 ft
12”	4 ft	550 ft
15”	5 ft	550 ft
18”	5 ft	550 ft
21”	5 ft	550 ft

2. The following table displays the diameter of inside drop manholes. Use standard manhole spacing from Table 4-3 for inside drop manhole spacing. Inside drop manhole shall only be allowed for utility conflicts and pipe sizes up to eight inches (8”). City approval is required for all other proposed inside drops.

TABLE 4-4: Inside Drop Manhole Diameter

Inside Drop Pipe Diameter (in)	Manhole Diameter (ft)
4” or 6”	4 ft
8”	5 ft

4.12 MANHOLE INVERTS

A. The minimum elevation drop across a manhole shall be one-tenth of a foot (0.1 ft) except where cast-in-place manholes are to be installed over existing sanitary sewer mains. In such cases, the existing sanitary sewer pipe grade determines the elevation drop across the manhole, by constructing the cast-in-place manhole over the existing, straight sewer main and removing the upper half of the pipe.

B. Where a smaller sanitary sewer main joins a larger one, the smaller sanitary sewer main crown elevation shall match the crown elevation of the larger sanitary sewer main. This includes sanitary sewer service lines.

C. Where the invert elevation difference between the invert in and invert out is twenty four inches (24”) or more and eight inches (8”) or smaller pipe size, an inside drop apparatus

shall be constructed. Refer to City of Greeley Standard Drawings for drop manhole construction.

D. Sanitary sewer mains and services entering a manhole with less than twenty four inches (24") but greater than six inches (6") of elevation difference between the invert in and invert out shall be avoided. If unavoidable, the invert shall have a sloping bench to prevent solids deposition.

4.13 GROUNDWATER BARRIERS

A. Groundwater barriers shall be installed across the sanitary sewer collection main, ten (10) feet upstream of every manhole, in areas where sanitary sewer collection mains are below groundwater.

B. Refer to the Standard Drawings and construction specification *Section 02315, Excavation and Fill* for additional information and installation requirements for groundwater barriers.

4.14 SANITARY SEWER MAIN AND SERVICE ENCASEMENTS

A. Refer to 3.15 of these Criteria and construction specification Section 02445, Casing Pipe – Borings and Encasements for typical sanitary sewer main and service encasement requirements.

4.15 SANITARY SEWER MAIN BORINGS

A. Refer to 3.16 of these Criteria and construction specification Section 02445, Casing Pipe – Borings and Encasements for sanitary sewer main boring requirements.

4.16 SANITARY SEWER SERVICES

A. General

1. Sanitary sewer service lines shall not be installed in trenches with dry conduits/utilities. A service line shall be separated from other conduits a minimum of five (5) feet horizontally and eighteen inches (18") vertically.

2. Sanitary sewer service lines shall not be installed in trenches with wet conduits/utilities. A service line shall be separated from other conduits a minimum of ten (10) feet horizontally and eighteen inches (18") vertically.

3. Sanitary sewer services for a given lot must be tapped on the sanitary sewer collection main within the confines of the extended property lines. The sanitary sewer service line shall be located a minimum five (5) feet inside the property being served.

4. Sanitary sewer services not utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

B. Sewer Services

1. Sanitary sewer services shall be polyvinyl chloride (PVC) SDR 35 pipe

2. Sanitary sewer services are four inches (4") or six inches (6") in diameter and shall have a minimum slope of 1% (1/8" per foot).

3. The maximum allowable slope for a sanitary sewer service is 8%.

4. If a sanitary sewer service line is required to be greater than six inches (6") in diameter, its design and connection to the existing sanitary sewer system shall be considered as a

collection main. Even though the sanitary sewer service is larger than six inches (6") in diameter, it is still considered private and maintained by the property owner.

5. A separate sanitary sewer service line must serve each structure.

6. No sanitary sewer service lines shall cross property lines.

7. Compound sanitary sewer services shall be avoided where feasible.

8. Sanitary sewer service connections at manholes shall be avoided where feasible.

9. Sanitary sewer services shall be located a minimum ten (10) feet downstream of the potable water service, wherever feasible.

10. Sanitary sewer service connections at manholes shall be avoided where feasible.

11. The sanitary sewer service line shall be electronically locatable and have tracer wire installed per *Section 02534, Sanitary Sewer Service Lines* and Standard Detail Drawings.

12. Tapping new connections to the existing sanitary sewer system shall be completed by City.

13. Sanitary sewer service connections to the sanitary sewer collection main shall be made with a tee or tapping saddle and shall be separated by at least five (5) feet along the

sewer main length, including when connections are on opposite sides of the sanitary sewer collection main.

14. Sanitary sewer service wyes are not allowed on the sanitary sewer collection main except in cul-de-sacs where a manhole or tee connection is not feasible.

15. Sanitary sewer service clean-outs are not permitted in the public right-of-way or sanitary sewer easement.

16. Sanitary sewer service connections to 15", 18" or 21" collection system interceptors or trunk lines are not permitted unless approved by the Water & Sewer Department.

4.17 SANITARY SEWER MAINS AND SERVICES IN RELATION TO OTHER UTILITIES

A. Refer to 3.18 of these Criteria and construction specification Section 02510, Water Utility Distribution Piping for sanitary sewer main and service separation in relation to other utilities requirements.

4.18 SANITARY SEWER LIFT STATIONS AND FORCE MAINS

A. All lift stations with capacities at 2,000 gallons per day (gpd) or greater are subject to Colorado Department of Health and Environment (CDPHE) Regulation 22.

B. Cost Responsibilities

1. Design and Construction

   a. The Developer shall be solely responsible for all costs associated with the design and construction of the lift station and force mains. This includes the cost of any easements, land acquisition, documents associated with permitting approval through CDPHE and North Front Range Water Quality Association (NFRWQPA), and any other cost associated with the project.

2. Reimbursement

   a. Where additional service area outside of the proposed development is anticipated, the City of Greeley will require the lift station and associated improvements to provide additional capacity than what is necessary for the initial development. Refer to Section 2.12 of this criteria for additional clarification.

3. Operations and Maintenance

   a. Public Facilities: Public lift stations are defined as any lift station serving more than one user and accepted by the Public utility. Operations and maintenance activities shall be the responsibility of the City for all public lift stations only upon completion and acceptance of the proposed improvements. The Developer shall provide an operations and maintenance manual and procedures for all equipment and processes associated with the lift station. The Developer shall coordinate with the City during

the planning and design phases on equipment operations and maintenance requirements.

b. Private Facilities: Private lift stations are defined as any lift station serving only one user. Operations and maintenance responsibilities for private lift stations are the sole responsibility of the owner or private entity.

C. Planning and Permitting

1. General

a. Gravity based solutions are preferred to lift stations as it provides the most reliable and lowest cost service for our customers. The use of a lift station and force main shall be evaluated on a case-by-case basis. If there is an appropriate gravity solution, then the developer shall design and construct the proposed improvements meeting the City of Greeley Criteria. Any lift station or force main shall first be approved by the City following proper justification by the Developer. Where a lift station is determined to be required it shall be designed to allow for an eventual connection into a gravity system.

b. The lift station and force main design shall adhere to state and regional approval processes and the Developer shall keep informed and notify the City of major milestones during the design and approval processes. The Developer shall adhere to the submittal requirements previously stated in Section 2 of these Criteria.

2. Procedures

a. The Developer shall employ the services of an engineer licensed in Colorado that has successfully designed and permitted at least two lift stations of similar size as proposed, within the State of Colorado. The Developer and the engineer shall adhere to the following procedures through the planning and design phases:

i. Coordinate a conceptual project meeting with the City to provide justification for the project and initial design considerations including site location, force main alignments, land acquisition requirements, preliminary design criteria, project schedule, and permitting requirements.

ii. Upon initial conceptual acceptance for consideration of the need for a lift station, provide written project justification for the project and design considerations including site location, force main alignments, land acquisition requirements, preliminary design criteria, project schedule, and permitting requirements.

iii. Attend follow up meeting following completion of the review of conceptual documents.

iv. It is the expectation that the developer keep the City informed of the project's progress from design through construction approval. This includes notifying the City of the major project milestones associated NFRWQPA and CDPHE review and approval process and allowing for City review of major reports and documents. Major milestones include but are not limited to:

- Site Application submittal to NFRWQPA

- Signed and approved Site Application submitted to CDPHE
- Basis of Design Report (BDR) submittal to CDPHE
- Design approval from CDPHE
- Funding requests
- Public meetings/outreach

v. Upon the City's review and acceptance of the conceptual design, the applicant may proceed with the Lift Station Site Application process in accordance with CDPHE Regulation 22.
   - The Site Application shall be submitted to NFRWQPA following review and acceptance by the City
   - Following NFRWQPA and local agencies approval of the Site Application, the applicant shall submit the Site Application and required counterparts in accordance with Regulation 22 to CDPHE for review and approval

vi. The Lift Station BDR shall be reviewed by the City prior to submitting the BDR to CDPHE for review and approval. The BDR shall include at least a 60 percent design package and shall only be submitted to CDPHE upon City approval of 60 percent design package.

vii. Prepare and deliver final design plans and technical specifications for the City's review and approval.

viii. Applicant shall coordinate with the City through the construction bidding process as necessary.

ix. Applicant shall coordinate construction inspections with City Inspectors.

x. Applicant shall submit all construction submittals for review including shop drawings and data and operation and maintenance manuals.

xi. Applicant shall coordinate with the City for start-up testing and required training.

xii. Applicant shall submit final record drawings to the City in AutoCAD and pdf format.

3. Colorado Department of Public Health and Environment (CDPHE)

   a. The design and construction of all lift stations and force mains shall adhere to CDPHE's most recent version of Regulation 22 – Site Location and Design Approval for Domestic Wastewater Treatment Works (The City reserves the right to review all procedures and reports required under Regulation 22 and request revision if necessary. Where CDPHE's Regulation 22 and the City's Criteria differ, the more restrictive of the conditions shall apply.

4. North Front Range Water Quality Planning Association (NFRWQPA)

   a. The planning and Site Application process of the proposed lift station and force main shall be in accordance with NFRWQA wastewater utility plan guidance. The applicant will be required to provide updates to the City's Wastewater Utility Plan

(WUP) for the proposed lift station and force main as part of the Site Application process.

b. The process for obtaining lift station approval from the Water Quality Control Division (WQCD) begins with the NFRWQPA (www.nfrwqpa.org). CHPHE *Regulation 22*, latest revision, requires that prior to WQCD final design review and approval, the lift station Site Application must be submitted to the NFRWQPA. Refer to the NFRWQPA website and *Regulation 22* for guidelines and requirements on the lift station site location and design approval process.

5. City of Greeley

a. The Developer shall coordinate with the following City's departments to ensure all procedures and policies are adhered to.

i. Water and Sewer Department

ii. Community Development

ii-a. Engineering Development Review

ii-b. Planning Department

ii-c. Building Inspections

iii. Other Departments as Required

6. Lift Station Design Criteria

a. Applicable Codes, Environmental Compliance, and Health and Safety

i. Applicable Codes: For work done in the City, work shall be performed in accordance with the codes established by the City's building department.

ii. Environmental Compliance: Environmental assessments and/or environmental reviews may be required as a preliminary investigation to determine if a particular parcel of real property is subject to recognized environmental constraints such as, and not limited to the following: floodplain areas, wetlands, endangered species, and hazardous conditions. Should environmental constraints exist as identified above, it is the Developer's responsibility to incorporate mitigation measures to comply with environmental requirements in accordance with applicable and current rules and regulations.

iii. Health and Safety: Public lift stations are required to conform to all City and OSHA health and safety requirements. City operation staff safety shall also be considered during the design and construction of the lift station including, but not limited to:

- Readily accessible equipment placement for maintenance activities
- Classified areas in accordance with the National Fire Protection Association (NFPA) 820 Regulations
- Lifting assistance for heavy equipment

- Nonslip floor finishes
- Handrails
- First-aid and safety equipment
- Fall protection
- Limitation of confined spaces – it is desired by the City to limit confined space entries where possible

b. Determination of Wastewater Flows

i. Existing wastewater flows shall be calculated using the calculation methods stated in Section 4.03, 4.04, and 4.05. Should the project area not fit the previously stated design flow estimation methods, applicable and industry-standard calculation methods shall be utilized. Methods include real-time flow monitoring or calculations based on land-use. Methods and calculations shall be included in relevant planning documents and subject to City's review.

ii. Proposed and future wastewater flow projections shall be estimated for the build-out conditions of the service area. Estimation methods shall be based on projected land-use. The planning period and projected land-use within the service area shall be coordinated with the City during the planning phases.

iii. Organic and other applicable wastewater constituent loadings shall be considered and evaluated based on existing and projected land-use. It is the Developer's responsibility to calculate based on most current available information, flows and constituent loadings for accessing available sewer and wastewater treatment capacities.

c. Impacts on Downstream Lift Stations or Sewer Capacities

i. Ultimate peak hour design flows shall be used to determine the impact to downstream collection system infrastructure including treatment facilities, lift stations, and sewers. Existing infrastructure needs to be able to accommodate peak flows and loadings from new lift stations and force mains. The capacity of existing infrastructure to accommodate flows from new lift stations shall be justified to the City as part of the planning and design documents.

d. Lift Station Capacity

i. Lift station capacity shall be designed to accommodate existing and future projected peak flows for the entire service area.

ii. Hydraulic calculations and system/pump curves require consideration and shall be submitted for review during the planning phases to the City of Greeley and as part of the CDPHE's approval process.

iii. Receiving sewers shall be evaluated to ensure adequate capacity to accommodate the ultimate lift station flow.

e. Emergency Storage

i. The lift station shall be designed for at least 60 minutes of emergency storage at peak hour flow conditions or as required by CDPHE. Emergency storage can utilize volume within the wet well above the high level alarm and upstream collection system piping provided that it is demonstrated that back-up will not occur into any existing or potential future service connections or taps. No future taps shall be constructed within the section of influent sewer or sewers to the lift station designated to provide emergency storage. If a piping connection is required to accommodate emergency storage provisions, the invert of the pipe connecting the wet well to emergency storage shall be above the high level alarm. Additional emergency storage may be required at the discretion of the City based on site location, emergency response time, and potential environmental concerns.

ii. Emergency storage can be accomplished using an additional storage vault structure. The emergency storage structures shall provide adequate access and floor slope for cleaning and shall be designed with pre-cast concrete, cast-in-place concrete, fiberglass reinforced plastic, or other approved equals. If constructed of concrete, adequate protection (i.e. polymer concrete or concrete admixtures) shall be provided to mitigate corrosion caused by hydrogen sulfide. If used, the emergency storage vault shall be designed to provide flow to and from the wet well to the vault and with adequate access for pumping via vacuum truck or other appropriate method.

iii. If emergency storage can be accomplished through gravity flow from the lift station to another existing collection system, the City may consider that as an option to meet emergency storage requirements. It shall be demonstrated that the gravity overflow, existing collection system, and downstream facilities be adequately sized to accept increased flow. Additionally, should the collection system be operated by another entity, a legal agreement stating the entity can and shall receive emergency flows shall be coordinated and presented to the City during the design review process.

7. Force Main Design Criteria

a. Materials and Sizing

i. Force main material shall be AWWA C900-16 with minimum wall thickness of at least DR-25. DR-18 or DR-14 shall be required if pressure or surface loading at any location in the system exceeds the DR-25 pressure rating.

ii. Force mains shall be minimum 4-inch diameter. Force mains shall be sized appropriately for a minimum fluid velocity of 2 feet per second and maximum velocity of 7.5 feet per second. Sizing shall also conform to CDPHE design requirements, whichever is most limiting. Parallel force mains are strongly preferred by the City for maintenance procedures, emergency conditions, and capacity optimization between existing and build-out flows. If parallel force mains are not considered feasible for a specific installation, it shall be demonstrated that the force main diameter is optimal for existing and build-out flow velocities.

iii. If force main diameter is such that the wastewater velocity is less than 2 feet per second at initial operating conditions, the design shall include VFDs on the pumps to allow the motors for the pump or pumps to increase frequency to increase the wastewater velocity in the force main to be a minimum of 3 feet per second for a minimum flushing time of 5 minutes. Reference the Electrical and Controls section of this criteria.

b. Access / Cleaning Stations

i. Force main clean-out access shall be provided every 500-feet in situations where the force main is 950-feet or longer. Clean-outs shall provide adequate access to allow for pipeline condition observations via video camera and maintenance.

c. Protection, Bedding and Compaction

i. Pipe bedding and backfill of force mains shall conform to the specifications in Section 02315 of these standards.

d. Force Main Alignments and Separation

i. The minimum buried depth of the force main shall be 48-inches from top of pipe.

ii. Wastewater force mains shall adhere to CDPHE and City standards for separation between potable water lines and other utilities. Wastewater force mains shall travel below existing potable water lines meeting the minimum requirements as outlined in Section 4.18. Should minimum separation requirements not be possible, refer to encasement requirements in Section 4.15 of the Criteria.

iii. Should the wastewater force main alignment be such that it cannot accommodate these separation requirements vertically or horizontally, provisions shall be provided to safeguard the existing utilities in accordance with the City design criteria and construction standards.

e. Special Permitting Requirements

i. In situations where the force main alignment crosses areas that include wetlands, floodplains, irrigation ditches, railroads, and waterways, the Developer shall be responsible for all permitting during the design phase to ensure that local and state requirements are adhered to. The Developer shall document all required permits with the City prior to proceeding with construction. In all cases, the Developer shall evaluate alternative force main alignments to minimize impact to sensitive areas described herein.

ii. Easements required for the force main alignment shall adhere to Section 2.06 of these criteria. All easements required for the force main shall be approved by the City and granted to the City prior to City of Greeley approval of construction documents.

8. Land Acquisition and Easements

   a. All land area requests for the lift station sites shall be submitted and approved by the City prior to starting the land acquisition process. Lift Stations shall be located on property deeded to the City. The minimum size for the lift station site shall allow for adequate equipment access, maintenance activities, and ancillary equipment (i.e. generator, odor control, emergency storage, etc.). In no cases shall the lift station site be less than 2,500 square feet in size. Applicant shall provide preliminary lift station site drawings showing major lift station components, security, buildings, and access for the City to review and determine required site size.

   b. Force main alignments exiting the lift station site up to the point of gravity connection shall be contained within an sewer easement and shall be dedicated to the City per Section 2.06 of this criteria.

D. Lift Station Site

1. Location and Topography

   a. The lift station and site location shall be designed and constructed to limit disturbance to the surrounding properties both aesthetically and during construction activities. The site shall allow adequate access to the site from existing public right of way. The lift station site shall be designed to provide adequate drainage away from the lift station and building and conform to City standards for drainage and storm water management plans. Developer shall perform a geotechnical evaluation of the site to determine soil conditions and hydrology as well as recommendations for lift station construction. Lift station sites shall be located outside of the FEMA 100-year floodplain with the finished floor elevation of the lift station a minimum of 2-feet above the floodplain. All lift station site locations are subject to review and approval by the City and CDPHE Regulation 22.

2. Lift Station Building / Enclosure

   a. The lift station shall be enclosed in a weatherproof structure. The lift station enclosure and lift station pumping components as a minimum shall be accessible without permitting for confined space access. As a minimum the lift station enclosure shall be ventilated and heated and conform to the City's planning and building department requirements and applicable structural and building codes. The size of the building or enclosure shall allow for adequate clearance to maintain pumping equipment, piping, valves, electrical gear and controls. The minimum spacing between pumps shall be 30 inches, spacing around pumps of 36 inches, and electrical panel clearance shall be no less than 48 inches or as required by the National Electrical Code. Building or enclosure entry ways, hatches and overhead doors shall allow for convenient access and equipment removal for maintenance and replacement. All lift station enclosures or buildings must be approved by the City

and applicable architectural committees that are associated with the subdivision or local association.

3. Aesthetics

    a. The lift station shall be subject to the City's Development Review process and applicable development standards. The lift station architecture and aesthetics shall be designed to match the surrounding structures. Landscaping shall be considered and planned to match the surrounding environment with low maintenance and water use. Appropriate screening and other methods shall be utilized to minimize noise and visual impacts.

4. Access

    a. All wastewater lift stations shall be sited to allow access by all-weather surface roads capable of accommodating maintenance trucks from public right of way to the lift station site. The access shall at a minimum support HS-20 loading with a minimum width of 15 feet. The access points and site shall be designed to allow WB-50 trucks to maneuver within the site and exit the site without backing into public right of way. The site layout shall allow for access to the wet well and vacuum/jetter truck to clean out accumulated material in the wet well. All hard or concrete surfaces shall be designed for the expected vehicle and equipment loads.

5. Security Fencing

    a. The lift station site shall contain perimeter security fencing minimum 6' in height. The fencing is subject to the City of Greeley Municipal Code and shall be reviewed and approved by the City.

    b. The lift station site access gate shall have a minimum size full width opening of 18-feet and of lockable type.

6. Lighting

    a. Lighting shall be provided at the lift station site to allow for necessary activities during night and times of low visibility. The lighting system shall be designed to provide illumination best suited for the station layout which may include suspended, wall, or ceiling mounted fixtures and shall be suitable for routine maintenance activities and inspections. Site lighting equipped with photocells shall not be

allowed. Refer to Chapter 18 of Greeley Municipal Code for more information, as applicable.

7. Potable Water

   a. The site shall have access to potable water. Potable water connection, service size, backflow device and meter shall be coordinated with the City. At a minimum, there shall be a frost proof yard hydrant located in the vicinity of the wet well.

E. Lift Station Components

1. Pumping System

   a. Each Lift Station shall have a minimum of 2 pumps. The pumps shall be designed to accommodate existing flows and future flows from fully developed contributing area. Firm capacity of the pump system shall be designed (or phased) to pump ultimate peak flow at maximum computed total dynamic head. Pump operation shall be automatic but fitted with the capability to run the system in manual control.

   b. Lift Stations shall be designed as a duplex system as a minimum. Duplex system for ultimate flow of the service area, shall be designed so that each pump is sized for peak hourly flow. The applicant shall provide a spare pump of the same capacity. Lift stations serving service areas that are phased over several years shall be designed initially as a duplex system as a minimum with room to add additional pumps for meeting the ultimate flow demands of the service area. Lift stations that are designed with more than two pumps shall be capable of pumping peak hourly flows with the largest pump out of service. The applicant shall provide a spare pump matching the size of the largest pump in service.

   c. In all cases pumping systems shall be designed to accommodate existing and build-out flows with adequate redundancy as defined by CDPHE Regulation 22 and in these criteria. If future build-out conditions require pumps (greater than 2) that are not needed for near term flow conditions, the lift station shall be designed to add additional pumps, piping, valves, electrical and controls without the need for a major system shutdown and / or bypass pumping.

   d. Pumping system shall be designed to allow for adequate access between other pumps, piping, and ancillary equipment for maintenance activities including, but not limited to, routine maintenance and inspection and pump removal.

   e. Required Pumping System Type: Above Ground Mounted Self-priming Suction

      The pumping system is self-priming suction pumps placed on grade with minimal piping to suction from the wet well. The only accepted manufacturer for the pumping system is Gorman Rupp. Pumping systems shall be site-specific designs or pre-packaged systems meeting site requirements. All designs are contingent upon review and approval by the City.

f. Alternate Pumping System

If the Developer, with approval from the City, determines above ground mounted self-priming suction pumps are insufficient for the application, the Developer can seek a variance to utilize either wet well / dry well or submersible pump configurations. The Developer must adequately prove that the alternative pump configuration is the optimal choice for the application and include evaluations between both dry-pit and submersible configurations.

i. Submersible Pumps: Where above ground mounted self-priming suction pumps are insufficient, City of Greeley will only consider submersible pumps where the ultimate build out peak hour flow rate is less than 100 gallons per minute. Where submersible pumps are approved by City of Greeley, the pumps must be removable without entering the wet well by providing rail and crane system. Control Panels and associated equipment shall be located within an enclosure of adequate size. The Developer shall provide two spare pumps to the City of Greeley.

ii. Wet Well/Dry Well: Where above ground skid mounted self-priming suction pumps are insufficient and flow rate is greater than 100 gallons per minute during peak hour flow at full build out, the lift station shall be configured to provide separate wet wells and dry wells. Common walls between wet wells and dry wells shall be water and gas tight. Suitable and safe means of access shall be provided to the dry well for operations staff, maintenance, and removal of all equipment from the dry well. Access shall include separate equipment and access hatches. Access to the dry well shall be provided through stairs. Ladder access is not allowed. Where dry wells are considered, the lift station shall be designed to ensure that surface runoff cannot enter the lift station. Where groundwater may exist above the dry well, adequate measures shall be provided to prevent infiltration of groundwater into the dry well and wet well.

g. Pumping System Components

i. Each pump shall have a dedicated check valve, plug valve, and air-relief valve on the discharge side of the pump. Pressure gauges shall be provided on both the suction and discharge (prior to the check valve) side of the pump. Pressure gauges shall be provided with a pulsation snubber constructed of 316 stainless steel and an isolation valve. It is preferred that these pump system components are supplied by the pump manufacturer if supplied as a skid-type system to ensure compatibility, performance, and single point of supply.

h. Hydraulics

i. Pumps shall be designed to accommodate existing and future flows. Pump design calculations shall be included in the design reports and subject to City review. Hydraulic calculations shall include pipe friction losses using appropriate friction coefficients and minor friction losses. Net positive suction head available ($NPSH_A$) and net positive suction head required ($NPSH_R$) shall be considered to ensure pump cavitation will not occur. Control descriptions for the pumps shall consider water levels required to maintain adequate $NPSH_A$ and $NPSH_R$.

2. Station Piping

    a. Material and sizing

        i. Station piping shall be 316 stainless steel or ductile iron pipe and sized to accommodate the necessary flow ranges. Flanged header pipe shall be ductile iron complying with ANSI/AWWA A21.51/C115 and Class 53 thickness. Flanges shall be ductile iron class 150, or as required by pumping application and pressures, and comply with ANSI B16.1. Generally, the liquid velocity in the station piping shall be no less than 3 feet per second and no greater than 7 feet per second.

        ii. All ductile iron piping shall be glass lined in accordance with ASTM B1000, use pipe suitable for glass lining with minimum Class 53 thickness.

    b. Expansion Joints/Victaulic Coupling

        i. Station piping shall include expansion joints, flanged coupling adaptors and/or grooved couplings to allow for dismantling of station piping for maintenance and parts replacement.

3. Grinders

    a. Grinders may be required, which the City will determine on a case by case basis, depending on expected flows and loading.

        i. Grinders shall be in-line only.

        ii. Accepted manufacturers are Franklin-Miller or approved equal.

        iii. All grinders are contingent upon review and approval by the City.

4. Valves

    a. Plug Valves

        i. Isolation valves shall be eccentric non-lubricated plug valves. Each pump discharge shall have a dedicated isolation valve so that each pump can be isolated from the common discharge header. Plug valves shall be of cast iron body, ASTM A126 Class B. Valve plugs shall be cast iron ASTM A126 Class B covered with a Buna-N Rubber compound. The seats are to be a corrosion resistant alloy either 316 stainless steel or nickel. Valve body shall be semi steel with flanged end connections drilled to 150 pounds, or higher as required by application pressures. Valve shall be operated with a single lever actuator providing lift, turn, and reseat action. The lever shall be equipped with a locking device to hold the plug in the desired position. Valves shall be able to pass a spherical solids not less than 3 inches diameter. Accepted manufacturers include DeZurik, Valvmatic, Milliken.

b. Check Valves (4” or more in diameter)

i. Check valves shall be swing check valves capable of passing a 3-inch spherical solid. Check valves shall meet the latest AWWA C508 standard and be of the resilient hinge check valve type. All internal hardware shall be stainless steel. Valve shall be equipped with flanged ends and be fitted with an external lever and spring. Valves shall be equipped with removable cover plate to permit entry or for complete removal of internal components without removing the valve from the line. Valve shall be rated at 175 PSI water working pressure, 350 PSI hydrostatic test pressure. For high pumping head applications (150 feet or greater), the Developer shall submit a type of check valve that will minimize hydraulic surges or slam to the system. Each pump discharge shall have a dedicated check valve. Accepted manufacturers include Val-matic, DeZurik, Victaulic, Golden Anderson.

c. Combination Air and Vacuum Valves

i. Sewage rated combination air and vacuum valves shall be placed at the discharge of pumps as close to the check valve as possible and at any local high points in the station piping. Route discharge line to sump. Accepted manufacturers include Val-matic and Golden Anderson.

5. Bypass Pumping Assembly

a. Lift Station Out of Service

i. A bypass pumping configuration shall be designed to bypass the lift station should it ever need to be taken offline. The bypass pumping configuration shall include provisions to bypass the entire lift station as well as lift station components including the wet well and pumping equipment and station piping. Bypass connections shall also be included on the common discharge header to the lift station pumps (station piping) as well as the force main (site piping) along with isolation valves. All bypass connections shall be at a minimum 6” camlock.

b. Approach Manhole

i. An approach manhole shall be constructed upstream of the wet well within the lift station site boundaries. The approach manhole shall serve as a common connection for the gravity sewer or sewers feeding the pump station and shall connect to the wet well by a single gravity pipe.

c. Wet well

i. Lift Station wet wells shall be Polymer Concrete or concrete with Xypex Bio-San C500 admixture to prevent corrosion on the interior surfaces caused by concentrated levels of H2S and other corrosive properties of raw wastewater.

ii. All wet well penetrations shall be link sealed and grouted to prohibit any leakage from the wet well or groundwater infiltration.

d. Coatings and Paintings

i. All exposed carbon steel or ductile iron surfaces, piping and equipment shall have field-applied protective painting or coating except where material (i.e. PVC, stainless steel, hot-dipped galvanized or aluminum) or factory coating warrants exception. All paint and coatings systems shall be approved by the City and shall adhere to City standards for color coding.

6. Electrical and Controls

a. Arc Flash

i. Study

i-a. Provide arc flash study on the electrical equipment per NFPA 70E.

ii. Labeling

ii-a. Provide labeling per NFPA 70E.

b. Electrical Equipment

i. All electrical control panels with controls and wiring shall be built in accordance with NEC, UL, NFPA 70E, NFPA 820 and ETL standards. The electrical components and enclosure shall be labeled as a complete UL listed assembly with manufacturer's UL label applied to the door. Developer shall coordinate with City Building Department on applicable codes.

ii. Developer shall coordinate with the City for electrical utility providing electrical service. Station shall be provided with a separate utility transformer and meter/main with ground fault protection. Primary power to the station shall be 480-volt, 60 Hz, 3-phase service per utility provider standards. Developer is required to pay permitting, design, and costs for primary power to the lift station site. Secondary power service shall be designed by a certified electrical engineer licensed in the State of Colorado. As a minimum, the station shall include service disconnect panel, automatic transfer switch (ATS), motor control center (MCC) or electrical distribution panel. The service disconnect panel shall be mounted on the exterior face of the lift station building common wall to the indoor electrical switch gear.

iii. The ATS shall be provided to switch from normal utility power to standby emergency power upon power outage and switch back to normal power once the power outage is restored. The ATS shall have indicating lights for normal power, emergency power, and a digital panel indicating volts and amps. The ATS shall be mounted inside the lift station building integral to the MCC. The ATS manufacturer shall be compatible and approved by the accepted lift station pump manufacturer, Gorman Rupp. The City's standard for standby emergency power is natural gas-powered engine generators manufactured and provided with the lift station pumps manufacturer, Gorman Rupp. If the lift station pumps are provided by a manufacturer other than Gorman Rupp, the Developer shall

provide the ATS and standby emergency power generator specifications and manufacturer for City review and approval.

iv. Electrical switchgear (480 volt) shall be mounted in a NEMA 1 MCC with removable buckets within a NEMA 3R wrapper. A step-down transformer shall be included to provide power service to a separate light or power panel rated for 120 / 240-volt service. The light or power panel is required to provide service for interior and exterior lighting, receptacles, ventilation and controls. Switchgear shall be manufactured by Cutler-Hammer, Allen Bradley, Square "D", or approved equal by the City.

v. Transient voltage suppression rated at 80 KA minimum shall be provided at the main electrical service panel and shall be installed in accordance with the latest requirements of NEC Article 285.

vi. Wiring to any instrumentation shall be multi-conductor shielded cable suitable for Class 2 low voltage controls. Must use Black and red wiring in cable for all class 2 low voltage controls.

vii. All wiring that that is running from VFD to motor shall be VFD rated cabling if shared with other VFDs.

viii. All wiring from control panels to motors shall be in liquid-tight conduit with copper conductors rated not less than 600 volts AC. All wiring shall follow NEC code and local code.

c. VFDs and Soft Start and Stop

i. All motor sizes greater than 20 HP shall be equipped with a reduced voltage solid state start and stop or also known as soft start and stop. The use of variable frequency drives (VFD) for the lift station pumps shall be evaluated on a case-by-case basis. The Developer will be required to demonstrate the advantages for installing VFDs for the ranges of pumped flows. The soft start / stop device and / or VFD shall be mounted adjacent to the MCC. Accepted manufacturers for the soft start / stop and VFD equipment shall be Allen-Bradley, Eaton or Mitsubishi.

d. Level Controls

i. The primary level control system used for the lift station to turn pumps on and off and sequence lead and lag operations shall consist of the radar level measurement type. The primary level control system shall have a minimum of five differential level set points including low liquid level, start / stop lead pump, start / stop lag pump, start / stop standby pump (if required), and high water level. The level control shall be equipped with a transmitter device and user interface screen for user set points and display of liquid level in the wet well. Contacts shall be provided for selected alarm outputs for integrating into the SCADA and telemetry system. Accepted manufacturers for level control shall be Endress Hauser or a manufacturer approved by the City.

ii. In addition to the primary level control system, the lift station shall be equipped with a secondary level control system for back-up. The secondary level control

shall consist of electro-mechanical float switches for low water cut-off, pump on / off, and high-water alarm. Accepted manufacturers for float switches shall be Siemens Water Technologies Model 9G-EF or approved equal.

iii. The secondary level control system would be based on a PID loop and use wet well levels to modulate the VFD speed.

e. Lift Station Control Systems

i. Controls shall provide automatic reset of alarm conditions for normal power fail, high water level, standby pump run, and a common alarm contact. However, alarm conditions shall activate an alarm light that is mounted at the roof line of the lift station building or enclosure. Any pump alarm conditions shall require manual reset and SCADA reset. All lift station alarm outputs shall be transmitted via telemetry system to on-call City operation staff and master SCADA control center.

ii. The lift station PLC shall be an Allen Bradley CompactLogix 5069-L320ER. Alternative PLC's must be approved by the City.

7. Control Panel

a. Each control panel shall contain adequate surge protective devices.

b. The PLC control panel shall be sized to adequately contain all PLC and communication equipment and rated for NEMA 4X/12 enclosure.

8. Human Machine Interface (HMI)

a. Redlion G15C1100

b. HMI program shall be unlocked and copy of program given to City of Greeley I&C department after commissioning of Control Panel.

9. PLC (Programmable Logic Controller)

a. Allen Bradley Studio 5000 Platform

b. Compactlogix or Controllogix Series

c. IO check to be done after completion of control panel being installed.

d. Each PLC shall have a minimum of a 2-hour uninterrupted power supply (UPS).

e. Program shall be unlocked and copy of program given to City of Greeley I&C department after commissioning of PLC.

10. Instrumentation

a. Vibration Sensor must be provided on each motor.

i. Acceptable Manufacturer

i-a. Allen Bradley

i-b. Banner

b. Radar

i. Must install one radar to read the level of the wetwell and also backup floats

ii. Only acceptable manufacturer is Endress Hauser

c. Backup Floats

i. Must be approved by the City.

d. Discharge Flow Meters

i. Acceptable Flow Meter Manufacturers

i-a. Endress Hauser

i-b. Rosemount

i-c. Must have an approved vendor do a start up on the flow meter.

ii. Communication

ii-a. Ethernet IP

ii-b. Modbus TCP

iii. Flow totals must come from the meter and not be calculated in the PLC.

iv. The flow meter shall be fitted with grounding rings as required with 150 pound flanged connections.

b. Upstream Flow Meters

i. Acceptable Flow Meter Manufacturers

i-a. ISCO or approved equal

i-b. It will need to have a Tienet box in the manhole.

i-c. Must have an approved vendor do a start up on the flow meter.

i-d. Manufacture: Isco Tienet 360 LaserFlow. Signature Laser flow meter transmitter.

ii. Communication

ii-a. Ethernet IP

ii-b. Modbus RTU

11. Programming

a. Alarms

   i. Contact City of Greeley I&C Department for list.

b. Trending

   i. All analog signals

c. PLC (Programmable Logic Controller)

   i. Communication

      i-a. PLC to PLC messaging must be done through Ethernet.

      i-b. PLC to VFD communication must be done through Ethernet.

d. HMI/SCADA

   i. Status Colors

   ii. Motor Status

      ii-a. Green - Running in Auto

      ii-b. Red – Off

      ii-c. Yellow – Running in Hand or Manual

      ii-d. Red flashing - Faulted

e. Back-up Power Supply

   i. Back-up power shall be supplied at the lift station to power the pumps and ancillary equipment in the event of a power outage. The back-up power system shall be natural gas powered. The Gorman Rupp standby engine system is preferred, and the Developer shall determine if that system is suitable for the application. Other back-up power systems will be considered if application is not suitable for the Gorman Rupp system. If not provided by Gorman Rupp, alternate back-up power system will be evaluated and approved by the City on a case-by-case basis. The City's preference for alternate back-up power systems is Cummins for both the generator and ATS.

f. Telemetry and SCADA

   i. The Remote Telemetry Unit (RTU) shall communicate by way of Ethernet or Allen Bradley Ethernet. Use approved City of Greeley radio system. Programming of SCADA system must be done by an approved and qualified contractor.

   ii. Provide 40-foot pole for SCADA radio, which can be integrated into light pole.

   iii. Required Data and Inputs in SCADA

iii-a. Intrusion alarm

iii-b. Wetwell Level - Floats

iii-c. Wetwell Level - Radar

iii-d. Wetwell Low Level activated

iii-e. Wetwell High Level activated

iii-f. VFD Running Amps from VFD or Softstart

iii-g. Flow (gpm)

iii-h. Flow Totalization - must be the totalizer from flow meter

iii-i. Flow total from yesterday

iii-j. Pump motor status

iii-k. Softstart or VFD status “"Faulted”

iii-l. Softstart or VFD status on/off

iii-m. Power Fail

iii-n. Amperage for each pump

iii-o. VFD status on/off

iii-p. VFD speed (Hz)

iii-q. VFD Reference

iii-r. Station common alarm

iii-s. Generator Running

iii-t. Generator Switch in Normal or Emergency

iii-u. Generator common alarm

iii-v. Runtime for each pump

iii-w. Pump starts

iii-x. Control Panel Temperature

iii-y. Pump Selector Switches status

iii-z. H2S Monitoring System in wetwell or discharge manhole

iii-aa. Calculated Inflow (gpm)

iii-bb. Flood Alarm

iii-cc. Phase Monitor power status

iii-dd. Generator battery voltage

iii-ee. Vibration sensors on motors

iii-ff. Building or Vault temperature

g. Alternate Communication

i. Provide an option to install fiber from Lift Station to closest City of Greeley fiber pull box.

ii. Must use a City of Greeley approved vendor.

h. H2S Monitoring Systems in Wet well or discharge manhole

i. The City may require that the Developer design and install H2S monitoring and mitigation in the manhole the force main discharges into. Factors that may require H2S monitoring in the manhole include pump flow, force main length and location of the discharge manhole.

12. Mechanical

a. Ventilation

i. Adequate ventilation shall be designed in buildings and vaults as required and adhere to all applicable State, NFPA, and OSHA requirements. Ventilating system shall consist of electric or natural gas make-up air units sized to provide a minimum of 6 air changes per hour and shall automatically begin operation upon user selected indoor temperature settings for both summer and winter modes. Supplemental cooling and heating will be required if building temperatures exceed 85 degrees Fahrenheit (F) or fall below 55 degrees F. Ventilation shall be accomplished by the introduction of fresh air in the station and be filtered to remove debris and minimize particles. Ventilation fans shall automatically come on upon entry of the lift station enclosure or building or activated by the light switch adjacent to the entry door.

ii. In addition to the make-up air ventilation system, supplemental heat shall be required using electric or natural gas unit heaters to maintain a minimum temperature of 55 degrees F. Unit heaters shall be automatically controlled thermostatically. Heating systems shall be designed based on an outside ambient temperature of negative 20 degrees F.

b. Air Conditioning

i. Air conditioning shall be provided if ventilation system cannot ensure inside air temperate of below 85 degrees F within a reasonable time period of ventilating.

Cooling systems shall be designed based on an outside ambient temperature of 105 degrees F.

c. Drains

iii. Lift station enclosures or buildings shall contain no floor drains that connect to the wet well. The enclosure at the level the pumps are located shall include a trench drain which slopes to a sump pit equipped with a duplex submersible sump pump system controlled with weighted float level switches. The sump pump system shall discharge to the top of the wet well with an air gap. The pump system shall be sized based on expected drain flows such as air release valves, maintenance, etc. Each sump pump discharge shall contain a check valve and isolation valve along with a pump removal system. The sump pump system shall be connected to the back-up or emergency power system.

iv. Pumps shall be equipped with drains that flow via gravity to the wet well for evacuating wastewater during maintenance.

v. The lift station site shall be equipped with a perimeter drain if recommended from the geotechnical study.

13. Odor Control and H2S Generation

a. The lift station shall be evaluated for the odor mitigation system and final determination of implementing odor control measures will be reviewed and determined by the City. Supporting data, calculations, or assumptions for hydrogen sulfide generation based on estimated wastewater characteristics and industry standards shall be included in the evaluation. In the absence of supporting data and / or calculations, the Developer shall utilize the latest edition of "Metcalf and Eddy Wastewater Engineering Treatment and Resource Recovery" for medium strength sulfide concentrations in wastewater. Other factors to consider in the evaluation include but are not limited to:

- Proximity to and use of neighboring properties
- Wastewater composition (BOD5, COD, TSS, Sulfides, TKN, Ammonia-N)
- Wind direction and downwind properties
- Operation and maintenance requirements of odor control system

b. If odor control is determined necessary, the type of system shall be selected based on the site-specific needs of the lift station. All ancillary equipment and necessary provisions shall be incorporated into the design of the lift station to provide a functional system. Odor control systems may include but are not limited to the following mitigation technologies:

- Carbon absorption systems
- Biological scrubber or filter
- Chemical scrubber

c. If odor control is not required, provisions for future addition of odor control facilities (i.e., installation of ventilation ducts and penetration into the wet well for future connections) shall be provided.

14. Force Main Components

a. Connection to Existing Gravity Sewer and Discharge Manhole

i. Force mains shall connect to a gravity wastewater system at a manhole, or a structure designed to receive pumped wastewater. At a minimum the discharge manhole and the next two downstream manholes shall be polymer concrete, concrete with Xypex Bio-San C500 admixture, or approved HDPE manhole liner systems. The force main discharge shall be designed to minimize turbulence and scour within the connecting structure. The City will determine on a case by case whether odor control is required at the receiving structure.

b. Isolation Valves

i. It is desired by the City to design the force main to limit required valves along the force main alignment. High points and low points shall be minimized along the pipe alignment.

ii. If required, isolation valves shall be plug valve type. All direct buried plug valves shall normally remain open (with exception of bypass connection and isolation valves) and be installed with a valve box and lid. Accepted manufacturers include DeZurik, Valvmatic, Milliken

c. Air and Vacuum Relief Valves

i. High points and low points shall be minimized along the pipe alignment.

ii. Air relief valves shall be provided on ultimate and local high points throughout the force main alignments. All air relief valves shall be located in an access manhole or vault appropriately sized for the application and maintenance staff access. Air and vacuum relief valves shall be minimized along the pipe alignment and must be approved by City.

d. Fittings

i. Piping shall be PVC or ductile iron and sized to match the force main size.

i-a. PVC force main material shall be in accordance with AWWA C900-16 with minimum wall thickness of at least DR-25. DR-18 or DR-14 shall be required if pressure or surface loading at any location in the system exceeds the DR-25 pressure rating.

i-b. All ductile iron piping shall be glass lined in accordance with ASTM B1000, use pipe suitable for glass lining with minimum Class 53 thickness.

15. Testing and Start-up

    a. Lift Stations

        i. The Developer shall develop a plan to test and demonstrate successful and flawless performance of all equipment and components of the lift station in manual and automatic mode. The start-up and testing plan shall be submitted to the City for review prior to commencing the start-up. A factory representative for the pumps and controls and City I&C and Operations representatives shall be on site for the start-up operations.

    b. Force Mains

        i. Force mains shall undergo hydrostatic pressure testing for at least two hours at two times the working pressure. Test results shall be documented and demonstrate holding pressure within the criteria and specifications described in the City's Design Criteria and Construction Specifications (see Section 01713 Water Distribution System Testing for requirements).

16. Operation and Maintenance Procedures and Warranties

    a. Operations and Maintenance

        i. The Developer shall supply the Water and Sewer Department with two (2) complete sets of operation and maintenance instructions, shop drawings, and pump curves. An electronic set on a thumb drive shall also be submitted. Developer and/or manufacturer shall provide one half day training on operations of the lift station for City Staff.

        ii. Operation and maintenance instructions shall be specific to the equipment installed. All non-relevant reference material shall be removed or clearly crossed out using heavy red line.

        iii. All emergency power generation equipment shall have operation and maintenance instructions. Must provide training for operations and maintenance staff. Contractors to verify that generator alarms work in SCADA.

    b. Warranties

        i. A two (2) year warranty shall be provided for the lift station system including performance, materials, and installation.

        ii. The date of substantial completion shall be specifically determined, in writing, for the lift station system.

        iii. Any warranties associated with the lift station shall be transferred to the City after final acceptance and construction is complete.

17. Standard Details

    a. Flow Schematic

    b. Below Grade Lift Station

    c. Above Grade Lift Station

    d. Bypass Pumping Detail

SECTION 5

NON-POTABLE IRRIGATION SYSTEM DESIGN CRITERIA

5.01 GENERAL

The City of Greeley (City) uses non-potable (untreated) water to irrigate both public and private property throughout the City. The City has a network of irrigation ditches for supplying source water for irrigation purposes. The typical irrigation system arrangement is a "hub-and-spoke" layout where irrigation water is diverted from an irrigation ditch to an irrigation water storage pond and then pumped to the distribution system to provide sufficient pressure and capacity to serve many customers. Another arrangement specifically for a small irrigation system is a direct connection between the ditch and pump station excluding the storage pond. The goal of the City is to expand the non-potable water system and reduce the use of potable water for irrigation purposes and improve irrigation practices, which is key to the City's long-term water conservation plan.

The purpose of this section is to provide information for the design and configuration of a non-potable irrigation system. Non-potable irrigation system design shall align with the City of Greeley's *Non-Potable Water Master Plan* (Master Plan), latest revision. The City of Greeley Water and Sewer Director reserves the right to make final determinations of the system design based on the best interest of the City's system. Refer to standard detail drawings for additional design information.

This section is not intended to be inclusive of all situations and the Design Engineer may be required to use additional engineering judgment to meet the overall design intent for constructability and long-term operations and maintenance.

The Design Engineer shall meet with Engineering Development Review (EDR) and Water and Sewer (W&S) Departments to discuss how new developments fit into the City's overall Non-Potable Water Master Plan to provide non-potable irrigation service at acceptable pressures in both new and existing areas.

The Master Plan shows proposed service area boundaries and conversion areas. These service area boundaries are subject to change during the planning phase based on property boundaries, non-potable water supplies, planned conversion areas, existing system capacities, and other factors. Final service area boundaries shall be determined by the Water & Sewer Department.

The City has the right to oversize the irrigation system to serve customers outside the development's improvements limits. The City will reimburse the developer for oversizing based on Section 2.12 of these Criteria.

The Design Engineer shall also meet with the ditch company from where the raw water is being diverted. The City will assist in coordinating the meeting and have a City representative present. The purpose of this meeting is to discuss the diversion requirements such as check structures,

head gates, and flow measurement, and determine if there is sufficient capacity within the ditch to serve the new Non-potable Irrigation System.

The non-potable irrigation storage pond and pump station facility shall be located on property deeded to the City. The raw water supply line and its appurtenances between the water source (i.e. ditch) and the storage pond shall be within a utility easement dedicated to the City.

The Design Engineer shall provide supporting calculations, design methodologies, and references documentation used to establish the design parameters. All information shall be included in the Non-Potable Irrigation System Design Report. Refer to Section 2.08 of these Criteria for Non-Potable Irrigation System Design Report requirements and formatting.

The Non-Potable Irrigation System Design Report shall be stamped and certified by a Professional Engineer registered in the state of Colorado. The design report shall verify that the proposed non-potable irrigation system can provide the required irrigation demands for the service area, at an acceptable pressure, and meet the overall non-potable irrigation system design requirements set forth in these Criteria.

The City of Greeley Water and Sewer Director reserves the right to make final determinations of the system design based on the best interest of the City's system.

5.02 DEFINITIONS

A. Non-potable Irrigation System – The non-potable irrigation system consists of (1) ditch headgate and appurtenances to divert flows, (2) raw water supply line and appurtenances between the water source and storage pond, (3) storage pond, (4) pump station facility, and (5) distribution mains and appurtenances.

B. Non-potable Irrigation Main - A pressurized pipeline that conveys non-potable water to individual non-potable irrigation services.

C. Non-potable Irrigation Services – Non-potable irrigation services include all piping, fittings, and appurtenances used to convey non-potable water from the irrigation main to the consumer.

D. Air Gap – A method of backflow prevention defined as the unobstructed, physical distance of two (2) feet minimum of free atmosphere between the discharge point of a potable water supply line and the highest level of the irrigation storage pond or the FEMA 100-year floodplain, whichever is greater.

E. Reduced Pressure Zone (RPZ) Backflow Preventer – A device that can be connected to a potable water system to supply water to a non-potable water system and protect the potable

water system from backflow contamination. The device consists of two check valves with a pressure vacuum breaker in the middle. This devise can be used in lieu of an Air Gap.

F. Shoulder month/season – The periods in early spring and late fall where non-potable customers require some irrigation water, but the agricultural ditches are not operational, occasionally resulting in the non-potable water system being supplied by potable water.

G. Shoulder tap – A connection from the potable water distribution system to the non-potable water system to provide water for irrigation purposes during the early spring and late fall shoulder months.

H. Service Area – The general geographic area that is served by or expected to be served by an individual non-potable irrigation supply system.

I. Conversion Area – A previously developed parcel that is currently irrigated by potable water but may consider switching to non-potable irrigation in the future; the amount of irrigated area for this type of customer is typically known.

5.03 DESIGN FLOW

A. The non-potable irrigation system shall be designed to transport peak season irrigation demands in accordance with these Criteria.

B. All irrigation demands used in the design of non-potable irrigation systems are subject to approval by the City.

C. Pump Station Design Capacity

1. The non-potable irrigation demand criteria presented below are the minimum criteria and the City reserves the right to modify the criteria, at any time, for the design of specific projects. The non-potable irrigation application rates includes provisions for evapotranspiration and operational efficiency losses in the non-potable irrigation system.

2. The City's goal is to minimize the size of the pump station by having a balanced system. A balanced system is where half the irrigable areas within a service area are being irrigated on any given irrigation day. Refer to Section 6 *Landscape Irrigation Criteria* for additional information regarding irrigating operational requirements.

   a. Weekly Irrigation Application Rates:

      i. Bluegrass turf, arborvitae, willows = 1.9 inches/week

      ii. Tall Fescue, columbine, potentilla purple coneflower = 1.6 inches/week

      iii. Buffalograss turf, sedums, succulents, iris, penstemon = 0.9 inches/week

      iv. Native grasses, yarrow, rabbitbrush = 0.2 inches/week

b. Daily Watering Window = 8 hours

c. Irrigation Days/Week = 6 days (Monday through Saturday)

i. Single family residential may irrigate up to three (3) days per week on their assigned days.

ii. All other areas including, but not limited to civic and open spaces, common areas for all customer classes, right-of-ways, municipal buildings, multi-family residential, and non-residential areas may irrigate 6 days per week (Monday through Saturday) with half of the area being irrigated on any given irrigation day.

3. Sizing the design capacity of a pump station shall be based on the following equation:

$$\sum \boldsymbol{Q_{i,ii,iii,iv}} = \frac{\boldsymbol{a}}{\boldsymbol{b}} \boldsymbol{x} \frac{\boldsymbol{c}}{\boldsymbol{d}} \boldsymbol{x} \frac{\boldsymbol{e}}{\boldsymbol{f} \boldsymbol{x} \boldsymbol{g}}$$

Where:

Q = Pump Station Design Capacity (gpm)

a = Irrigation Application Rate (inches/week)

b = Number of Irrigation Days per Week (days/week)

c = Total Irrigable Area (acres)

d = 12 inches/foot (conversion factor)

e = 325,829 gallons/acre-foot (conversion factor)

f = Daily Watering Window (hours/day)

g = 60 minutes/hour (conversion factor)

5.04 HYDRAULIC DESIGN

A. Raw Water Supply Pipe

1. The design flow shall be based on the time it takes to replace two (2) full days' worth of storage over a 24 hour period.

2. Pipe size shall be computed by Manning's Equation up to a maximum 80% full and friction coefficient of 0.015, but shall not be less than 12-inches in diameter.

B. Pump Station Intake Pipe

1. The design flow shall be based on the Pump Station Design Capacity.

2. Pipe diameter shall be based on a maximum velocity of 1.0 feet per second (fps) when the pipe is flowing full, but shall not be less than 24-inches in diameter.

3. The intake pipe shall be equipped with a passive intake screen. Refer to 5.21 of these Criteria for additional information.

C. Distribution System

1. Distribution System Pressure

a. For new developments with no conversion areas within the non-potable pump station's service area, the non-potable irrigation pump station and distribution system within the service area shall be designed for a maximum pressure of 125 psi and a working pressure range of 70 - 100 psi at high points and the furthest service point of application.

b. For new developments that include conversion areas within the service area, the Design Engineer shall consider potable water system pressures based on fire hydrant static pressures provided by the City when sizing the pump station and distribution system. Static pressures that exceed 90 psi shall be brought to the W&S Department's attention.

2. Friction Coefficient

a. Non-potable irrigation lines shall be designed using a Hazen-Williams friction coefficient "C" equal to 120.

3. Velocity

a. All pipes shall be sized for maximum water velocity of no greater than five (5) feet per second (fps) at peak flow.

4. The minimum size of non-potable irrigation mains shall be six-inches (6") in diameter.

5.05 DEPTH OF BURY

A. The minimum depth of cover shall be four (4) feet and the maximum depth of cover shall be six (6) feet for non-potable irrigation mains.

B. When design or constructability constraints are present, deeper or shallower main installation may be permitted only with acceptance from the City. Additional design and installation considerations may be required by the City depending on the situation.

5.06 CONNECTIONS TO THE EXISTING NON-POTABLE IRRIGATION SYSTEM

A. Connections to the existing non-potable irrigation system shall be in accordance with the *Construction Specifications, Section 02510, Water Utility Distribution Piping*.

5.07 LOCATION AND LOOPING OF NON-POTABLE IRRIGATION MAINS

A. All non-potable irrigation mains shall be located in dedicated street right-of-way or within a dedicated easement of appropriate width. City approval is required for all other proposed non-potable irrigation main locations.

B. The centerline of non-potable irrigation mains shall not be placed closer than three (3) feet

to the inner edge of concrete gutter without prior acceptance by the City.

C. A non-potable irrigation main serving one (1) lot shall extend all the way across the frontage for that lot.

D. Non-potable irrigation mains shall extend to the extremities of the property or the subdivision served. Extensions shall be in appropriate locations to provide adequate connections.

E. The City shall determine on a case by case basis if non-potable irrigation system looping is required for a development.

5.08 NON-POTABLE IRRIGATION SYSTEM PHASED INSTALLATION AND STUBOUTS

A. Non-potable irrigation system phased installation and stubouts shall be in accordance with Section 3.10 of these Criteria.

B. Locate temporary blowoff assemblies at the end of each phase or stubout.

5.09 PIPE MATERIAL

A. PVC: AWWA C900-16 DR 18 (235 PSI) polyvinyl chloride (PVC) pressure pipe, purple color for direct buried applications only. Refer to construction specification *Section 02513, for Polyvinyl Chloride Pressure Pipe* for additional information.

B. DIP:

1. ANSI/AWWA C151/A21.51 ductile iron pipe with mechanical joints for direct buried applications only. Refer to Section 3.11 C. of these Criteria for corrosion protection requirements.

2. ANSI/AWWA C115/A21.88 flanged ductile iron pipe with flat faced flanges for exposed applications only.

3. Refer to construction specification *Section 02512, for Ductile Iron Pipe* for pipe additional information.

C. Steel: AWWA C200 steel pipe for both direct bury and exposed applications. Design Engineer shall determine required thickness for each application. The Design Engineer shall submit proposed interior and exterior coatings for City review and approval.

5.10 VALVES

A. All valves shall be located in dedicated street right-of-way or within a dedicated easement of appropriate width. City approval is required for all other proposed valve locations.

B. Gate Valves

1. Gate valves shall be installed in accordance with Section 3.12 of these Criteria and *W&S Standard Drawings*, latest revision.

2. All non-potable water line valves located in paved areas shall have a concrete collar

around the valve box in accordance with *W&S Standard Drawings*, latest revision.

3. Refer to construction specification *Section 02515, Water Utility Distribution Valves* for gate valve requirements.

C. Air/Vacuum Valves

1. Air/Vacuum Valves shall be installed at all high points along the non-potable irrigation main and shall be properly sized by the Design Engineer in accordance with the manufacturer's recommendation. The City shall have final determination on valve size and placement. NOTE: It is the City's preference that the number of high points within the pipeline be minimized.

2. Refer to construction specification *Section 02515, Water Utility Distribution Valves* for Air/Vacuum valve requirements.

3. Reference *W&S Standard Drawings* for installation requirements.

D. Non-potable Blowoffs

1. Non-potable blowoffs shall be installed at the end of all non-potable irrigation mains. The City may also require that non-potable blowoffs be located at low points within the system.

2. Reference *W&S Standard Drawings* for installation requirements.

5.11 PIPE ALIGNMENT

A. The curved pipe alignment design requirements for non-potable irrigation mains shall be in accordance with Section 3.13 of these Criteria.

5.12 THRUST BLOCKING AND PIPE RESTRAINT

A. Thrust blocking and pipe restraint requirements for non-potable irrigation mains shall be in accordance with Section 3.14 of these Criteria.

5.13 NON-POTABLE IRRIGATION MAIN AND SERVICE ENCASEMENTS

A. Refer to Section 3.15 of these Criteria and construction specification Section 02445, Casing Pipe – Borings and Encasements for typical non-potable irrigation main and service encasement requirements.

5.14 NON-POTABLE IRRIGATION MAIN BORINGS

A. Refer to section 3.16 of these Criteria and construction specification Section 02445, Casing Pipe – Borings and Encasements for non-potable irrigation main boring requirements.

5.15 NON-POTABLE IRRIGATION SERVICES

A. General

1. Non-potable irrigation service lines shall not be installed in trenches with other

conduits/utilities.

2. There shall be no physical connections between the non-potable irrigation system and the potable water system unless an approved backflow device is used to prevent non-potable water from entering the potable water system (i.e. RPZ device).

3. Non-potable irrigation services not utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

B. Irrigation Services

1. Non-potable irrigation services 3/4" to 2" in diameter shall be crosslinked PEXa in accordance with AWWA C904 with acceptable manufacturers is Municipex®, Uponor AquaPEX®, or approved equal.

2. The non-potable irrigation service for a given lot must be tapped on the non-potable irrigation main within the confines of the extended property lines unless excepted by the City for the irrigation of multiple outlots under single ownership. Refer to appendix section *A2 – Compound Tap Exemption Policy for Irrigation of Multiple Outlots.* Otherwise, irrigation systems from a single non-potable irrigation service shall only be allowed for use on that single property. Refer to *City of Greeley Charter and Code, Title 14: Public Services*, Section 14.04.200 for compound tap restrictions.

3. Non-potable irrigation services shall not be located under driveways, trees, or other permanent structure.

4. Non-potable irrigation services shall be located a minimum three (3) feet inside the property being served.

5. Non-potable irrigation service taps shall be separated by at least two (2) feet, measured along the non-potable irrigation main length, including when taps are on opposite sides of the non-potable irrigation main. Non-potable irrigation service taps shall also be a minimum two (2) feet from all joints, fittings, or valves.

6. The corporation stop, curbstop, meter, the service line between the corporation stop and the meter, and five (5) feet past the meter shall all have the same equivalent inside pipe diameter.

7. Non-potable irrigation shutoff valves (curb stops and gate valves) shall be placed within one (1) foot of the property line or easement boundary (inside or outside).

8. Non-potable irrigation meter vaults pits/vaults shall normally be located after the curbstop in a landscaped area or streetscape. Meter pits/vaults shall not be installed in any street, parking area, driveway, or sidewalk unless otherwise approved by the City. If a meter pit/vault is permitted by the Water & Sewer Department to be located in any traffic area, the pit/vault shall be designed to withstand HS-20 traffic loadings. Curbstops with tracer wire test stations shall be in a valve box.. See *W&S Standard Drawings* for additional service and meter installation requirements.

9. There shall be no major landscaping (i.e. boulders, and trees, or shrubs with mature growth greater than three (3) feet), and buildings, or other permanent structures within

ten (10) feet of the meter vault.

10. Pressure boosters are allowed if required. Booster pumps must be prefabricated units with variable speed controls. Provide submittal cut sheets for City approval prior to ordering booster pump.

5.16 NON-POTABLE IRRIGATION MAINS AND SERVICES IN RELATION TO OTHER UTILITIES

A. Non-potable irrigation mains and services shall have a minimum eighteen-inch (18") vertical separation and minimum five (5) feet horizontal separation or twice the depth of the invert of the pipe, whichever is greater from all utilities measured from outside diameter.

B. Where non-potable irrigation lines cross above or below potable water lines with less than eighteen-inch (18") clearance, pipe encasement shall be designed and constructed so as to protect the potable water line. Note: It is the City's preference to have non-potable waterlines located below potable water lines.

C. Non-potable irrigation main crossings under any open irrigation ditch shall have a minimum five (5) feet of cover and shall be encased.

D. Dry utility crossings shall be encased in high density polyethylene (HDPE) pipe, Standard Dimension Ratio (SDR) 11 from edge to edge of the easement or right-of-way, or ten (10) feet on either side of the non-potable irrigation main, whichever is greater. Perpendicular utility crossings are permitted above and below the non-potable irrigation main. Parallel installation of other utilities in non-potable irrigation easements is not permitted.

E. Bored utility crossings shall have a minimum twenty-four inches (24") of vertical clearance from the outside diameter of the utility casing to the outside diameter of the non-potable irrigation line if the bored utility crosses above or below the non-potable irrigation line.

F. If there are horizontal or vertical clearance conflicts between the non-potable irrigation line and a utility, the City may require that the non-potable irrigation main be lowered, raised, or realigned in order to maintain the required clearances.

G. For a non-potable irrigation line crossing situation not specifically mentioned in this section, the crossing requirements provided in these Criteria shall be applied to that particular situation to the best extent possible.

5.17 UNDERGROUND MARKING AND IDENTIFICATION

A. Underground un-detectable marking tape shall be installed 18-inches above non-potable irrigation mains.

B. Reference construction specification Section 02315, Excavation and Fill for Marking Tape Requirements.

5.18 NON-POTABLE IRRIGATION WATER STORAGE FACILITIES (PONDS)

A. General

1. All water to be stored in the non-potable irrigation pond and the pond location shall be approved by the Water and Sewer Department prior to proceeding with facility design.

2. Combining non-potable irrigation storage with storm water detention requires approval by both the Water and Sewer Department and Public Works Department Storm Water Division. A written explanation shall be submitted describing the circumstance as to why a combined pond is needed.

3. The Design Engineer shall determine the high and low operating levels, required design storage volume, and the invert elevation of the pump station intake pipe.

4. The Design Engineer shall design a gravity flow raw water supply pipe from the water source (i.e. ditch) to the irrigation storage pond.

5. There shall be no major landscaping (trees, shrubs) with mature height greater than three (3) feet planted within ten (10) feet of the liner anchor trench.

B. Storage Volume Design

1. Non-potable irrigation ponds shall be sized to accommodate a minimum four (4) days of supply based on the Pump Station Design Capacity. The four day supply volume shall not include the dead storage.

2. Dead storage shall be based on the water level that limits the wet well inflow below 75% of the Pump Station Design Capacity. For example, if the Pump Station Design Capacity is 1,000 gpm, the dead storage begins when the inflow is less than 750 gpm.

3. A minimum freeboard of 12-inches shall be provided for storage ponds not combined with storm water and 18-inches for combined storage ponds.

4. Minimum usable storage volume of an irrigation storage pond shall be based on the following equation:

$$V = \frac{Q \; x \; a \; x \; b \; x \; c}{d}$$

Where:

V = Total Useable Storage Volume (acre-feet)

Q = Pump Station Design Capacity (gpm)

a = Daily Watering Window = 8 hours/day

b = 60 minutes/hour (Conversion Factor)

c = Days of Storage (days) = 4 minimum

d = 325,829 gallons/acre-foot (Conversion Factor)

5. The minimum depth of the pond shall be 8-feet from the full pond surface level to the bottom.

6. Pond side slopes shall include a 4:1 safety bench for 12-feet horizontally and 3:1 slope thereafter to achieve maximum depth of pond. If steeper side slopes are required to meet storage volume requirements due to site constraints, then fencing must be installed around the pond for safety purposes. Fencing materials must match architectural components of development or HOA fencing requirements.

7. The non-potable irrigation pond shall be designed with either an overflow spillway if topography allows or an overflow structure hydraulically connected to storm sewer.

    a. Spillway or overflow structure shall be designed to convey a minimum of 150% of the pond fill rate based on 5.04 A. 1. of these Design Criteria.

    b. The Design Engineer shall provide necessary design information and construction details on the Construction Drawing for the irrigation pond overflow/spillway.

8. If the non-potable irrigation pond is intended to also function as a stormwater detention facility, with approval from the City, the Design Engineer shall include the additional detention storage volume over and above that required for irrigation operations. Refer to the *SDDC*, for stormwater detention pond design requirements. In addition, the irrigation source water flow shall be measured and recorded. Refer to 5.22 of these Criteria for additional information.

C. Non-Potable Irrigation Pond Liner

1. All non-potable irrigation ponds shall be designed with an approved liner system. Field conditions, constructability, storage volume fluctuations, costs, warranty, and operation and maintenance shall be considered in the selection and design of the pond liner system.

2. Approved pond liner materials are listed in Section 02666 Pond Liners. A layer of 10 oz/sy. geotextile must be included on top and bottom of pond liner material for protection purposes.

3. The Design Engineer may specify a pond liner alternative depending on the project conditions. The alternative pond liner system is subject to approval by the City.

4. Lining installation in areas where groundwater pressure can occur shall be avoided. The bottom of the liner shall be above the water table to prevent the liner from floating.

5. Additional Pond Liner Information:

    a. Site structures such as piping, concrete, and drains shall be completed prior to lining installation.

    b. The design and construction requirements for special liner installations such as anchor trenches, pipe protrusions through the liner, liner vents, batten attachments to concrete structures, seaming methods/testing, subgrade preparation, and cover treatment over the liner shall be in accordance with the manufacturer's specifications and the design shall ensure that the liner warranty is not invalidated. Coordination with and approval by the liner manufacturer is required. The proposed special liner installation details are subject to approval by the City.

c. Construction details for special liner installation items shall be provided by the Design Engineer to be included on the Construction Drawings.

D. Shoreline Protection Treatment

1. Non-potable irrigation ponds shall be designed with a perimeter shoreline protection treatment to protect against wave action erosion. Due to the numerous shoreline protection treatments available (i.e. riprap, boulders, perimeter concrete walls, geotextile products, riparian plantings) the Design Engineer shall propose a suitable shoreline protection treatment depending on the project conditions. The proposed shoreline protection treatment for erosion protection is subject to approval by the City.

2. The Design Engineer shall make special considerations regarding the selection, design, and installation of shoreline protection treatment to ensure that the liner warranty is not invalidated. Coordination with and approval by the liner manufacturer is required.

3. Areas subject to scouring water velocities, such as at the raw water supply pipe discharge conveyance into the pond or beneath the pond fill line/service, shall be adequately protected against erosion and wash out (i.e. concrete splash pad, grouted riprap, large boulders, or appropriately sized riprap).

4. Appropriate construction details for shoreline protection treatment and erosion protection shall be provided by the Design Engineer to be included on the Construction Drawings.

5.19 AERATION SYSTEMS

A. The Criteria provided here offer generic guidelines for the design of non-potable storage pond aeration systems. Each aeration system is unique and requires special design, therefore, it is the Design Engineer's responsibility to design a fully operational system for the given conditions and provide necessary construction details and specifications to accompany the design.

B. Refer to construction specification *Section 11230, Aeration System* for additional non-potable pond aeration system requirements.

C. Aeration System Design

1. Coordinate the aeration system design and construction with the non-potable irrigation pump station design. House and incorporate aeration system components within the irrigation pump station building.

2. Aeration system design components shall include, but are not be limited to, air compressors, aftercoolers, condensate separators, electrical controls, valves, pipe manifolds, flow meters, gauges, aeration pods/diffusers, housing requirements, installation and operational instructions, and recommended maintenance.

3. The Construction Drawings for the aeration system shall show a typical layout, elevation and plan views, and critical dimension for the aeration system design and construction. The aeration system manufacturer is responsible for the layout and design of the aeration system supplied and any special coordination issues that affect

the critical dimensions, layout or orientation of the aeration system.

4. Aeration system shall be sized to provide four (4) pond volume turnovers per day based on the following equation:

$$X = \frac{V\ x\ b}{c}$$

Where:

X = Number of Fine Bubble Diffusers

V = Pond Volume (millions of gallons)

b = 4 (Turnovers/day)

c = Effective Turnover Rate = d x e / f

Where (numbers below are based a disk aeration module with model ADS LWA-3, other manufactures and models will require calculations changes based on specific equipment):

d = Diffuser Depth (feet)

e = Diffuser Turnover Rate = 3.5 mgd

f = Diffuser Effective Depth = 15 ft

5. Fine Bubble Diffusers shall be spaced to provide even coverage.

5.20 NON-POTABLE IRRIGATION PUMP STATION

A. General

1. All pump station site locations are subject to review and approval by the City.

2. Pump station sites shall be located outside of the FEMA 100-year floodplain.

3. The pump station finished floor elevation shall be a minimum of 2-feet above the storage pond's highest water surface elevation to prevent water overflowing the wet well into the pump station building.

4. The non-potable irrigation pump station location shall allow adequate access to the site from new or existing public right of way. The site shall be designed to provide adequate drainage away from the pump station building, pond, and conform to City standards for drainage and storm water management plans.

5. The building shall be sited to allow access by all-weather surface roads capable of accommodating maintenance trucks from public right of way to the pump station site. The access shall at a minimum support HS-20 loading with a minimum width of 15

feet. The access points and site shall be designed to allow WB-50 trucks to maneuver within the site and exit the site without backing into public right of way. The site layout shall allow for access to the wet well and vacuum/jetter truck to clean out accumulated material in the wet well. All paved surfaces shall be designed for the expected vehicle and equipment loads.

6. Developer shall have a geotechnical evaluation completed of the site to determine soil conditions and hydrology as well as recommendations for storage pond, pump station foundation and wet well construction. Refer to Section 2.09 of these Criteria for Geotechnical Soils Report for additional information.

7. The Criteria provided here offer guidelines for the design of non-potable irrigation pumping systems. Each pumping system is unique and requires special design, therefore, it is the Design Engineer's responsibility to design a fully operational system for the given conditions and provide necessary construction details and specifications to accompany the design.

8. Refer to construction specification *Section 15140, Irrigation Pump Station* for additional non-potable irrigation pump system requirements.

B. Pump System Design

1. The pump system shall be designed with a reinforced concrete one common wet well and multiple vertical turbine pumps to provide irrigation flows at varying demands and constant discharge pressure. Pump redundancy is not required.

2. Each pump shall have a dedicated VFD to control the pump.

3. The bottom of the wet well shall be a minimum 4-feet below the invert of the intake pipe.

4. The wet well shall be designed to prevent vortexes and cavitation which can adversely affect pump performance.

5. Pump efficiency shall be a minimum eighty percent (80%) at the specified operating point.

6. The pump system design shall include a skid assembly to support all pump components during shipping and to serve as the installed mounting base. The base shall be of sufficient size and strength to resist twisting and bending from hydraulic forces and support the full weight of all components (i.e. pumps, motors, filters, piping, valves, etc.).

7. The pump system shall include a pressure maintenance pump for sustaining the pressure in the non-potable irrigation system during non-irrigated times and shall operate no more than every 15-minutes to maximize pump life. If the pressure maintenance pump operates more frequently then allow larger pressure differential (in pump controls) to reduce operating cycles to recover lost water pressure.

8. Pump system design components shall include, but not be limited to, motors, filters, valves, gauges, mounting and support structures, power and electrical equipment,

control systems, operator interface devices, alarms, data acquisition and telemetry, and monitoring devices.

9. Pump discharge piping and filter waste pipe shall be supported 6 to 18-inches off the building floor and exit through the wall before pipe burial.

10. Filter to waste pipe shall discharge into the storage pond a minimum distance of 100-feet from the Pump Station Intake Pipe inlet and liner protection is required.

11. The Construction Drawings for the irrigation pumping system shall show a typical layout, elevation and plan views, and critical dimensions or clearances for the pump system, building, wet well, electrical, etc.

12. The pump system manufacturer is responsible for the layout and design of the pump system supplied and any special coordination issues that affect the critical dimensions, layout or orientation of the pump system.

13. The pump system design is subject to approval by the City.

5.21 PUMP STATION INTAKE PIPE AND INTAKE SCREEN

A. Intake pipe shall be AWWA C900-16 DR32.5 (125 PSI) polyvinyl chloride (PVC) pressure pipe, color purple or green or ASTM F679 PVC gravity sewer pipe.

B. The exposed section of the intake pipe shall have intermediate concrete pipe cradles with a stainless steel strap to secure the pipe to the cradle. The maximum length of unsupported pipe shall be 9-feet.

C. Intake Screen

1. Intake pipe shall be equipped with a square shaped passive intake screen constructed of 16 gauge, flattened 304 stainless steel, with 3/8 x 7/8 inch openings. The frame shall be constructed of stainless steel.

2. The intake screen shall be sized such that the velocity through the screen does not exceed 0.25 feet per second (ft/s).

3. The bottom of the screen shall be a minimum 16-inches above the bottom of the pond. The intake screen shall be supported by and mounted on top of a reinforced concrete block.

D. Intake Pipe Isolation

1. The wet well shall be equipped with a slide gate or the intake pipe equipped with a buried gate valve to shut off flow between the storage pond and wet well. Refer to Construction Specification *Section 15140 for Slide Gates and Gate Valves*.

5.22 RAW WATER SUPPLY SYSTEM

A. Raw water supply pipes shall have a minimum eighteen-inch (18”) vertical separation and minimum five (5) feet horizontal separation or twice the depth of the invert of the pipe, whichever is greater from all utilities measured from outside diameter.

1. Pipe Material: PVC, DIP, or RCP. Refer to City of Greeley *Stormwater Design Standards*, Section 6, subsection 9.3.7 for additional culvert information.

B. The raw water supply line shall be located on the opposite side of the pond as the non-potable pump station intake structure to promote water turnover within the pond and minimize stagnation that leads to water quality degradation.

C. Flow shall be controlled by a hand wheel operated slide gate (headgate) mounted to a reinforced concrete headwall. The headwall shall be equipped with a steel trash rack anchored to the concrete headwall with stainless steel hardware.

1. Head Gate Manufactures/Models: Refer to Construction Specification *Section 11285, Slide Gates*.

2. Refer to City of Greeley *Stormwater Design Standards*, Section 9, subsection 9.3.7 for additional trash rack requirements.

3. The headgate configuration shall be approved by both the City and the associated ditch company.

D. Flow Measurement

1. A parshall flume shall be used to measure flow in close proximately to the headgate. Construction of the parshall flume shall be dictated by the ditch company.

2. The flow approaching the parshall flume shall be subcritical and operate under free-flow conditions.

a. The parshall flume shall be equipped with an 8-inch diameter stilling well to measure the flow depth using either a stage recorder or a non-contact level radar measurement device with the signal transmitted to the City's SCADA system via the Pump Station's Remote Telemetry Unit (RTU). Power shall be brought from the non-potable pump station to power either unit. Refer to Section 5.2 of these Design Criteria for additional SCADA information.

b. Where the Colorado Department of Natural Resources (DNR) requires flow data, a stage discharge recorder shall be mounted on top of the stilling well to compute and log discharge flow and totals.

i. Manufacturer and Model: Sutron Corporation, model SDR-0001-4 or approved equal.

c. For locations where the DNR does not require flow data, a radar level measuring unit may be used in place of the stag recorder.

i. Manufacturer and Model: Endress and Hauser - Micropilot FMR10 or approved equal.

E. Check Structures

1. A check structure may be required where there is not sufficient depth within the irrigation ditch to provide sufficient head to achieve the raw water supply design flow. If the Design Engineer determines that a check structure is needed, a HEC-RAS model shall be created to compute water surface profiles. The check structure shall not prevent deliveries of water to downstream users.

2. The check structure shall be constructed of reinforced concrete with removable boards.

5.23 PUMP BUILDING

A. The pump building shall be a precast concrete building sufficiently sized to house all the equipment including but not limited to pump skid, electric and controls cabinets, telemetry cabinet, and aeration system.

B. There shall be a minimum 4-feet spacing between the building walls and pump skid.

C. There shall be sufficient space between the pump skid filter(s) and building walls to allow removal of the filter screen for servicing and replacement. Space must be also provided to meet all electrical code requirements.

D. The minimum wall height shall be 8-feet 6-inches with equipment doors sufficiently sized to be remove and replace electrical and controls panels.

E. The pump building shall be equipped with two trench type floor drains that run either the width or length of the building and connect directly and perpendicular to the wet well.

F. Refer to construction specification *Section 15140, Irrigation Pumps for additional requirements*.

5.24 SHOULDER MONTH WATER SUPPLY

A. All non-potable irrigation systems require a backup potable water tap (shoulder tap) for providing irrigation water when non-potable water is unavailable ("shoulder months"). There is no Plant Investment Fee (PIF) required for a shoulder tap.

B. Shoulder month water supplies must be approved by the City.

C. Shoulder month water shall be discharged into the non-potable irrigation system's water storage facility (pond). A candy cane configured discharge pipe with a minimum two (2) foot air gap shall be provided between the shoulder tap discharge and the maximum operating or overflow elevation of the pond water surface, whichever is greater.

D. The shoulder tap shall be size based on the maximum water demands during shoulder months or at least four (4) inches in diameter and metered. Only City personnel may operate the shoulder tap.

5.25 SCADA

A. A Remote Telemetry Unit (RTU) shall be provided to communicate with the City's SCADA system. The RTU shall communicate with the City's SCADA via City fiber optic if within 1,500-feet of the pump station. If fiber optic is not available, the RTU shall communicate via XetaWave radios.

B. The RTU shall communicate with the pump system and instrumentation by way of Modbus serial or Ethernet, or Allen Bradley Ethernet or serial. If there is no ability to communicate with the Control Panel, analog and digital inputs may be utilized.

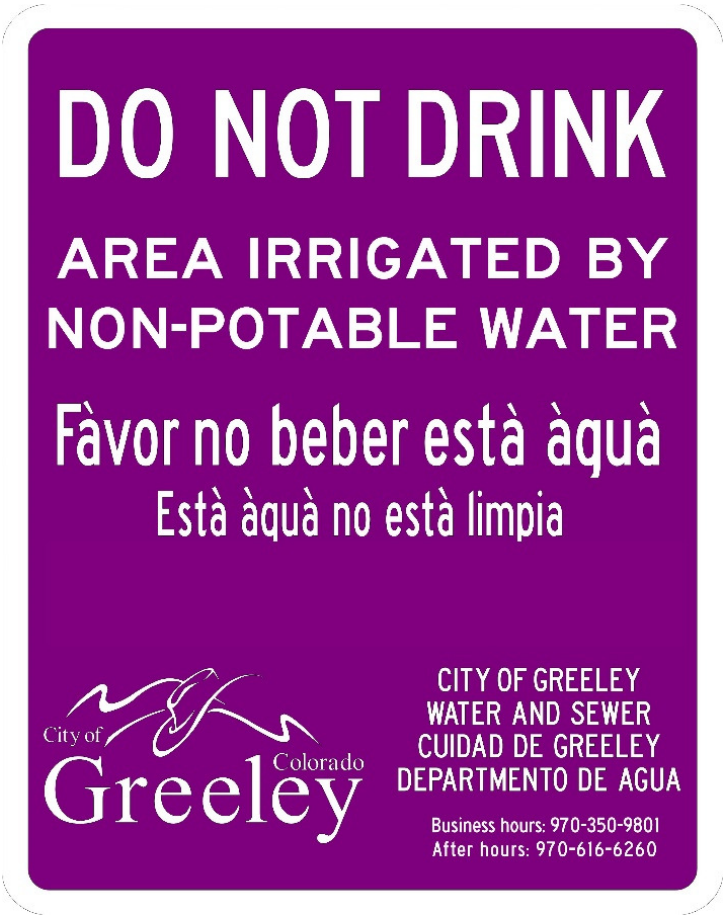
C. Refer to construction specification *Section 15140, Irrigation Pumps for additional requirements*.

5.26 SIGNAGE

A. Signage must be posted at sites where non-potable water is utilized for irrigation. Signs shall be posted near sidewalks and paths that provide access into the non-potable irrigated area(s). Where neighborhoods use non-potable water for irrigating individual homes, all street access points into the neighborhood shall also be posted. Coordinate signage locations with the City of Greeley during design process.

B. An example of an approved sign is provided below (sign design/layout provided by Area Wide Protective).

C. Signs shall be 12-inches wide by 18-inches tall. Holes for fastening the sign to post shall not damage nor cover any text.



5.27 WATER DEDICATION REQUIREMENTS FOR NON-POTABLE IRRIGATION

A. Contact the Water and Sewer Department and refer to *City of Greeley Charter and Code, Title 20: Public Works and Utilities* regarding water dedication requirements.

5.28 WATER SUPPLY WELLS

A. Under certain circumstances the City may, at its election and in its sole discretion, accept use of a well(s) to meet non-potable needs. In that case, ownership of the well(s) would need to be transferred to the City and the well(s) permit changed to non-exempt irrigation well permit. Depending on the development layout and capacity of the well(s), the well could be used directly for irrigation without filling a storage pond first. The Design Engineer would need to evaluate each system individually and obtain City approval. Sufficient information regarding the well(s) such as condition and sustainable yield will be required to assist in the evaluation.

SECTION 6

LANDSCAPE AND IRRIGATION DESIGN CRITERIA

6.01 GENERAL

The City of Greeley Landscape and Irrigation Criteria and Standards, hereafter referred to as the "Criteria", is intended to provide information for the design, review, installation and maintenance of landscape and irrigation systems within the City of Greeley to promote the efficient use of water and the reduction of water waste through best management practices. Both landscape and irrigation systems should be designed for non-potable water as outlined in Section 5 of these criteria.

It is the purpose and intent of this Criteria to support the City of Greeley Comprehensive Plan, the Greeley Water Master Plan, and the Landscape Policy Plan for Water Efficiency to:

Promote water conservation

- Reduce or eliminate outdoor water waste
- Reduce peak summer water usage
- Reduce water demand of new construction and development
- Reduce overall per capita demand
- Guide smart development by incorporating land use and water planning principals
- Guide smart development through practices, problem solving, technology and innovation
- Utilize onsite stormwater runoff to supplement landscape irrigation through rainwater harvesting

Support attractive and sustainable landscapes

- Use of low-water plants like native landscapes and xeriscape
- Stormwater and rain garden utilization, such as bio-retention practices, stormwater wetlands, dry wells
- Support an urban canopy by strategically placed trees to reduce heat islands and energy use

These Criteria shall be regarded as the minimum requirements and performance standards for the design, installation and maintenance of landscape and irrigation systems.

Whenever a provision of these Criteria and any other provision of the City of Greeley Municipal Code or any provisions in any law, ordinance, resolution, rules or regulations of any kind, contains any requirements covering any of the same subject matter, the requirements that are more restrictive or impose higher standards shall govern. If there is a discrepancy in the interpretation of these Criteria, the Water and Sewer Director or designee thereof, shall make the final determination of the intent of these Criteria.

Supplemental information including but not limited to forms, checklists, notes, etc. are available on the City of Greeley's website and shall be referenced or submitted in accordance with the requirements set forth in these Criteria. It is the responsibility of the owner, designer, installer or maintenance contractor to obtain the latest version of any submitted document, as the City will periodically update these items.

- Landscape and Irrigation Criteria Checklists

- Irrigation Performance Audit Guidelines
- Irrigation Performance Audit Form
- Water Budget Chart and Example
- Pressure calculations worksheet
- WaterWise Best Management Practices
- Example of median and right-of-way designs
- Preferred plant list database

6.02 DEFINITIONS

A. APPLICATION RATE: The depth of water applied to a given area and during a specific time, usually expressed in inches per hour or inches per week.

B. CHECK VALVE OR ANTI-DRAIN VALVE*:* A valve located under or incorporated within a sprinkler head or other location within the system to prevent the system from draining on the lowest head(s) when the system is off.

C. COMPOST: Fully finished, stabilized, and mature product, derived from decomposed plant and organic material that can be added to the soil as an amendment. Compost provides increased nutrient uptake, increased water holding capacity, and improves the soil structure of the site. This is not the same as topsoil.

D. CYCLE AND SOAK: Method of irrigation where water is applied in multiple, short cycles. This allows the water to be applied more slowly, allowed to soak into the soil and prevent run-off, promoting deeper roots and healthier plants.

E. DISTRIBUTION UNIFORMITY: The measure of the uniformity of the irrigation water over a defined area.

F. DROUGHT: Periods or seasons with below average precipitation.

G. EMITTERS: A pressure compensating emitter component of an irrigation system that disperses water to the landscape (i.e., sprinklers, bubblers, micro-sprays, etc.)

H. ESTABLISHED LANDSCAPE*:* The point at which plants in the landscape have developed roots into the soil beyond the root ball, which promotes long-term health and growth.

I. ESTABLISHMENT PERIOD: The first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth. Native habitat mitigation areas and trees may need three (3) to five (5) years for establishment.

J. HARDSCAPES: A non-living landscape feature that is made of any durable material (pervious and non-pervious) such as building, pavement, walkways and parking areas-including those of crushed stone, patios, and decks.

K. HYDROZONE: An area within a landscape where the plant materials require a similar amount of water. For this document, hydrozones are divided into four (4) categories:

- *Very-Low Hydrozone:* Plant materials that require less than one gallon per square foot of area per growing season of supplemental water once established. The plant materials within this zone are typically drought-tolerant natives. This hydrozone is designated by the letter "V" on landscape plans.
- *Low Hydrozone:* Plant materials that require between one (1) and nine (9) gallons per square foot of area per growing season of supplemental water. This hydrozone shall be designated by the letter "L".
- *Moderate Hydrozone*: Plant materials that require between ten (10) and 14 gallons per square foot of area per growing season of supplemental water. This hydrozone shall be designated by the letter "M".
- *High Hydrozone*: Plant materials that require more than 14 gallons per square foot of area per growing season of supplemental water. The plant material within this zone is intended for high-pedestrian traffic areas such as sport fields or community gathering spaces. This hydrozone shall be designated by the letter "H".

L. IRRIGATION EFFICIENCY: The measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. Greater irrigation efficiency can be expected from well designed and maintained systems.

M. LOW FLOW IRRIGATION OR DRIP IRRIGATION: The application of irrigation water at low pressure through a system of tubing or lateral lines and emitters such as point source, pressure compensating compents, dripper lines, micro-sprays and bubblers. Low flow irrigation systems apply small volumes of water, measured in gallons per hour, slowly at or near the root zone of plants.

N. MAINTENANCE OR MAINTENANCE OF LANDSCAPING: Shall mean but not be limited to regular watering, mowing, pruning, fertilizing, clearing of debris and weeds, the removal and replacement of dead plants and the repair and replacement of an irrigation system. Any activity undertaken to prevent the deterioration, impairment, or need for repair of an area, structure, rights-of-way, or land use.

O. MASTER SHUT-OFF VALVE*:* An automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system.

P. MONOCULTURE: Large planting of the same species or even cultivar.

Q. MULCH: Organic material such as leaves, bark, straw, wood chips or inorganic mineral materials such as rocks, gravel, decomposed granite or pebbles smaller than a half-inch in diameter left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

R. NON-ESSENTIAL AREAS: A high hydrozone with traditional turf that receives little, if any, use (i.e., the only person who walk on those areas is the person maintaining the turf).

S. PREFERRED TURF: Very-low to low hydrozones grasses such as Buffalo Grass (*Buchloe dactyloides*), Blue Grama (*Bouteloua gracilis*), or other native species.

T. REFERENCE EVAPOTRANSPIRATION or ET: A standard measurements of environmental parameters which affect the water use of plants. ET is typically expressed as the depth of water in inches or the volume of water in gallons used by an irrigated landscape area over a period of time.

U. RIGHT-OF-WAY LANDSCAPING Shall mean landscaping located within the public or private right-of-way adjacent to a privately owned lot, outlot, or tract, including parkways.

V. SEASONAL WATERING SCHEDULE: The programmed schedule set in the Smart Irrigation Controller. The schedule is based on the summation of the water that has been lost to evaporation and that has been used by the plant materials. The amount of water required to meet the needs of the plant materials change with the weather (seasons).

W. SMART IRRIGATION CONTROLLER: A contractor-grade automatic timing device with nonvolatile memory that automatically adjusts the programmed run time or watering frequency based on changes in weather or soil moisture. Smart controllers may have local weather-based (ET) sensors or soil moisture-based sensors directly, or the smart controllers may be linked to a weather station via internet connection or cellular data card. Acceptable controllers must be selected from the Environmental Protection Agency's WaterSense labeled irrigation controller list. Retail grade controllers are not acceptable.

X. SOIL AMENDMENT: An organic and inorganic material that is added to native soil to improve texture, moisture holding capacity, nutrient capacity, and water and air infiltration.

Y. SUSTAINABLE LANDSCAPES: Landscapes that feature climate-appropriate landscape design and efficient technologies and are maintained through efficient irrigation practices to support community water objectives.

Z. TRADITIONAL TURF: High hydrozones grasses defined as Bluegrass (*Poa pratensis*), genus Poa and turf type tall fescue (*Festuca arundinacea*) and cultivars thereof having dense tufts blades and creeping rhizomes.

AA. WATER BUDGET: The water that is applied annually from an irrigation system to an established landscape area. It is based upon the area's reference evapotranspiration and is adjusted for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.

BB. XERIC LANDSCAPING OR XERISCAPE OR WATERWISE: Shall mean the use hydrozones that are very-low to low-water use in place of plants that typically require more water to survive and include, but are not limited to, plants having a low or very low water requirement.

CC. ZONE: Typically, an area served by a single irrigation control valve, sometimes referred to as a "station." Zones are comprised of plant materials and soil types with similar water requirements.

6.03 APPLICABILITY

A. These Criteria shall apply to all landscape and irrigation system designs, installation, and maintenance performed as a requirement of Chapter 8 – Landscape Standards of the Greeley Development Code and any other code, policy or criteria adopted by the City of Greeley. Areas that fall under these Criteria include but are not limited to:

- Civic and Open spaces
- Common areas for all customer classes (outlots, pocket parks, usable detention, private/on-lot required/usable areas)
- Right-of-ways
- Areas not responsible of a single-family and up to four (4) units per lot
- Municipal buildings
- Multi-family residential
- Non-residential (institutional, commercial, and industrial)

B. Applicability for these Criteria shall follow major development as defined in Chapter 8, Section 24-801(b) – Landscape Standards of the Greeley Development Code.

C. These Criteria shall govern over privately enforced guidelines or requirements related to landscaping and irrigation (i.e., business association, homeowners association design guidelines, regulations and requirements, etc.).

D. Exemptions or where these criteria do not apply to:
- Single-family and up to four (4) units per lot
- Row houses/townhomes individual parcels
- Ecological restoration projects not requiring a permanent irrigation system
- Exemptions listed in Chapter 8, Section 24-801(b)(3)- Landscape Standards

6.04 ENFORCEMENT

A. The City of Greeley shall be provided the opportunity to review all landscape and irrigation plans, site and soil amendments, design, and installation for compliance with these Criteria. The Criteria are enforced by the City or authorized representative.

B. All landscape improvements, indigenous plant material, and irrigation system components shall meet performance standards and supporting criteria. The City shall review all submittals for general compliance with these Criteria. An approval by the City does not relieve the owner, designer, installer or maintenance contractor from the responsibility of ensuring the design, plans, specifications, construction, maintenance, and record drawings are in compliance with these Criteria.

C. In the event of Level 3 or 4 drought declared by the Water and Sewer Board, extreme drought water use planting and temporary irrigation may occur at the discretion of the Water and Sewer Director or designee thereof. For drought declarations visit City of Greeley's website.

6.05 HANDLING OF TOPSOIL

A. Stripping and stockpiling of native topsoil onsite shall be required during construction. This topsoil shall be incorporated as the final layer of soil for landscaping unless soil contamination has been determined. Stockpiling shall be handled by the Stormwater Management Plan and applicable Best Management Practices- see Stormwater Section 12-Construction Water Quality, as amended. Soil contamination determinations shall be at the discretion of the Public Works Director or his or her designee.

B. The onsite replacement of topsoil and the addition of soil amendments are critical to successful establishment and ongoing health of plant material and efficient use of water through the life of the project.

6.06 SOIL AMENDMENTS

A. Soil amendments (organic or inorganic) shall adhere to the Greeley Municipal Code, Section 24-804(e)(3) – Landscape Standards Installation and Maintenance for all properties.

B. A minimum of four (4) cubic yards of compost per 1,000 square feet of area shall be used for non-native cool season turf.

C. Per Greeley Municipal Code Chapter 8, Section 24-801(b) and 24-804(e)(3) – Landscape Standards, soil amendment verification documentation and receipts shall be submitted to the Water and Sewer Department, Water Conservation Program prior to installation of plant material, and shall include review of adherence to all criteria and performance standards. Written documentation reflecting approved volume, method of tilling and type of soil amendment is required.

6.07 MULCH

A. Mulch (organic or inorganic) shall be used in areas used to cover bare ground, reduce evaporation, suppress weeds, moderate soil temperatures, and prevent soil erosion to promote landscape establishment within landscape beds. Seeding for large areas for grasses and naturalized landscape areas do not require mulch.

1. Organic Mulch
    a. Organic mulch material includes bark, and wood chips. No construction debris such as pallets shall be used.

    b. Shall be applied at one and a quarter (1.25) cubic yard per one hundred (100) square feet at a depth no less than four (4) inches, and as appropriate to each hyrozone.

    c. Shall be applied to soil surface, not against the plant stem, or high against the base of tree trunks to minimize disease.

d. Tree rings of mulch shall be provided for all trees within turf areas subject to mowing operations. Tree rings for evergreen trees shall extend to the dripline of the tree to avoid limbing up of evergreen trees.

2. Inorganic Mulch
   a. Inorganic mulch includes rock, gravel and pebbles (pea gravel) smaller than one and one half-inch (1.5) in diameter for water conservation and weed suppression. Any materials greater than a half-inch is not considered mulch.

   b. Rock mulch shall have a minimum depth of three (3) inches.

6.08 WEED BARRIER

A. Black plastic (polyethylene) is not allowed. Woven weed barrier fabrics (polypropylene), recycled rubber, and plastic weed barriers are not allowed with any plant material unless they are used for playgrounds, large-scale vegetable/edible plant production, or areas that are designated as rock greater than one and one half (1.5) inch in diameter (dry creek beds without vegetation).

B. Ecologically sound biodegradable weed barrier can be used.

6.09 SUSTAINABLE LANDSCAPE DESIGN

A. Hydrozones
   1. For the purposes of this document, hydrozones are broken into the following four categories:

Table 6-1: Hydrozone Category

Hydrozone Category	Water Needs	Landscape Examples
High	>14 gallons/S.F./season	Bluegrass turf, or other non-native cool season turf, arborvitae, willows
Moderate	10-14 gallons/S.F./season	Columbine, potentilla purple coneflower
Low	1-9 gallons/S.F./season	Buffalo grass turf, sedums, succulents, iris, penstemon
Very-Low	<1 gallons/S.F./season once established	Native grasses, yarrow, rabbitbrush

B. Landscape water budget and plant material

   1. Greeley Municipal Code, Chapter 8 – Landscape Standards shall be adhered to.

2. An annual water budget chart shall be submitted for the landscape and irrigation plans. A water budget chart will show the total annual water used, which shall not exceed an average of 15 gallons/square foot for the landscape for all hydrozones per tap.

3. Plants are to be hydrozoned with plants of similar hydrozone (i.e., low with low). Plants of very low hydrozones are not to be planted in moderate to high hydrozones.

4. High hydrozones shall be limited to appropriate high-use areas with high visibility and functional needs. No more than 25% of the design irrigated area shall be high hydrozones. Where commercial and industrial uses include residential or recreational components, such as, but not limited to, assisted living, schools and daycares, picnic grounds, pocket park, outlots, the Water and Sewer Director or his or her designee may approve a greater percentage of high hydrozones. The applicant must demonstrate that the additional high hydrozones (traditional turf grass) areas are being used in high-traffic areas, such as, but not limited to, athletic fields, children's play areas, parks, and courtyards.

5. Preferred turf grass species are not limited in the design.

6. Specifications are found under Stormwater Design Standards, Section 14- Vegetation and Irrigation as amended shall be followed for stormwater detention and retention ponds.

7. Plant material shall be selected from a list of native and other plants determined to be appropriate for and well adapted to the soil and local environmental conditions and solar exposure requirements. The material plant lists can be found under the Water and Sewer Department, Water Conservation's Plant Database and City of Greeley's Forestry Department Front Range Tree Recommendation List. Upon request to the Water and Sewer Director or their designee, additional plants may be added to the list that are appropriate for these criteria.

8. Plant materials should provide an enriched quality of life by providing multi-season interest, color, texture, and diversity in plant material using the City of Greeley's WaterWise Best Management Practices found under Water and Sewer Department, Water Conservation website www.greeleygov.com/wc.

9. Plant material that is banned for use by the City of Greeley, Weld County and/or the State of Colorado shall not be used. This applies to all builders, installers, and owners. See the Colorado Department of Agriculture website for detailed list of restrictions.

10. The following landscape practices are highly recommended:
    a. Methods outlined in the City of Greeley's WaterWise Landscaping Best Practices created by the Water Conservation program.

    b. Protection and preservation of native species and natural vegetation.

    c. Plant selection based on water needs, disease and pest resistance.

d. Implementing stormwater best management practices into the landscape and grading areas to minimize runoff and to increase on-site retention and infiltration.

e. Rain gardens, water quality ponds, bioswales and other landscape feature and practices that increase rainwater capture and create opportunities for infiltration while adhering to Colorado Statute 37-92-602(8) the water right of less than 72 hours of water retention and Storm Drainage Design Criteria and Construction Specification manual.

6.10 LANDSCAPE PLANS

Landscape Plan requirements shall be used to aid the applicant, designer, installer and maintenance contractor in the analysis, design, installation, and maintenance of landscapes. These requirements presented herein are the minimum necessary for landscape plan submittals and shall be considered in conjunction with the requirements set forth by the City's Community Development Department and Greeley Municipal Code, Chapter 8 – Landscape Standards.

A general landscape plan shall be included with the Site Development Plan submittal and a more detailed landscape and irrigation plan shall be submitted with the Construction Document submittal. All required forms, checklists and plant list can be found online at the City's website (www.greeleygov.com/wc)

All landscape plans shall adhere to the Water and Sewer Department's Design Criteria and Construction Specification-Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation System.

A. The proprosed landscape plans shall include:

1. All existing features that may influence landscape design such as prevailing winds, exposures, topography, hardscapes, and existing features like utilities, fences, structures etc. The design shall adhere to local zoning and codes related to utility easements, sight distance requirements, and buffer zones.

2. Design incorporating water efficient techniques described as follows:

   a. Group landscape material accordingly based upon hydrozones.

   b. Selected plants shall be well-adapted to the Greeley climate and site conditions. Plants shall be grouped according to water and light requirements.

   c. Irrigation equipment shall be appropriate to the hydrozone. Water should be applied deeply and infrequently to develop greater drought tolerance.

3. The identification of the landscape function and activities. This includes the overall theme of the site and neighborhood, onsite traffic patterns, and activity and service area needs.

4. Biodiversity in plant material such as trees and shrubs. Monoculture landscapes are not allowed to avoid drastic negative environmental and economic impacts from tree and shrub pests and diseases.

5. A water budget chart that shows the total annual water use, which shall not exceed an average of fifteen (15) gallons/square foot/year for each water tap and percentage of each landscape hydrozone type.

6. Accurate and clear identification of all applicable hydrozones as categorized in Section 6.09 A. and marked as defined in Section 6.02 K.

7. Final landscape design plans shall be stamped by a Colorado registered landscape architect.

6.11 IRRIGATION SYSTEM REQUIREMENTS

Per section Chapter 8, Section 24-804(h)-of the Greeley Municipal Code, an irrigation system design shall be submitted in conjunction with a landscape plan. The irrigation system design shall incorporate the required items set forth below:

A. Irrigation Methods and Layout

1. Provisions shall be made for permanent, automatic irrigation of all plant material, with the following exceptions:

   a. Very-low hydrozone plantings that do not require supplemental irrigation beyond establishment.

   b. Trees and other plants placed within the landscape area along residential local street parkways for single-family detached dwellings.

2. The irrigation method shall be selected to correlate the hydrozones shown on the landscape plan and irrigation water type (non-potable versus potable). The following criteria shall be followed during the design of the irrigation system:

   a. Drip irrigation or bubblers shall be used for trees and shrubs greater than three (3) feet apart.

   b. Rotors and pop-up heads with rotary nozzles shall be used for turf grass. Spray heads are not allowed unless pressure-compensating and retrofitted with rotary nozzles.

   c. Only drip irrigation or strip pattern rotary nozzles shall be used to irrigate strips eleven (11) feet wide or less. Spray and rotor irrigation is strictly prohibited in these areas.

   d. Inline emitter driplines are encouraged for higher density of planting.

e. Each hydrozone shall be irrigated based on a landscape with similar site and soil conditions and plant material with similar water needs. To the extent reasonably feasible, areas with significantly different solar exposures shall be zoned separately.

f. Traditional turf and non-turf areas shall be irrigated on separate hydrozones.

g. On steep grades, an irrigation method with a lower application rate shall be used in order to minimize runoff and, to the extent feasible, these areas shall be zoned separately and zoned in lines parallel to the slope rather than in blocks. On steep grades, traditional and preferred turf shall not be allowed on slopes greater than 25 percent where the toe is adjacent or within ten (10) feet to an impermeable hardscape.

h. All zones are designed with matching heads with matched precipitation rates and full coverage. Drip, micro-sprays, retrofitted spray heads with rotary nozzles, and rotors shall not be combined on the same zone.

i. Parking lot medians and islands that are surrounded by pavement shall be located in separate zones from other landscape areas.

B. Equipment

1. All equipment used in non-potable irrigation systems including but not limited to valves, valve box lids, sprinkler head tops, valve ID tags, and fittings must be clearly identified most commonly indicated by the manufacturer's addition of the color purple to the components.

2. Valves

a. A backflow prevention assembly shall be installed in accordance per Section 20-191 of the Greeley Municipal Code-Cross-connection control. All backflow assemblies shall be equipped with adequately sized winterization ports downstream of the backflow assembly and must be the same material type

b. To reduce water leaks from the irrigation system, a master shut-off valve shall be installed downstream of the backflow device to shut off water to the system automatically when not operating.

c. Flow sensors integrated with the Smart Irrigation Controller are required for single or combined point of connection flows of 15 gallons per minute (GPM) or greater and one (1) inch or greater water taps.

d. All valves shall have a manual ball value installed prior to the lateral valve.

e. One two (2) inch valve ID tag shall be attached to each control valve one-and-one-half (1.5) inches or greater water tap. Each tag must be labeled with controller and station number.

f. Valve box lids shall be branded with minimum two (2) inches characters stating the controller and the zone (station) number for all irrigation systems served by a one-and-one-half (1.5) inches or greater water tap.

g. For branching or T's of the main irrigation line that are served by a one-and-one half (1.5) inches or greater water tap isolation valves upstream of the branching or T's shall be required.

h. For irrigation mainline distances over 500 feet, upstream isolation valves are required.

3. Submeters for irrigation systems are encouraged to enable the owner and landscape maintenance contractor to monitor water use. The installation and maintenance of the submeter shall be borne by the owner of the property and not by the City. All such submeters shall be installed in accordance with the specifications established by the City.

4. Irrigation controllers shall be smart controllers as defined in 6.02.V. Taps sized one-and-one-half (1.5) inches and greater water tap shall have a constant data connection via Wi-Fi or cellular data card so weather-based (ET) data can be received by controller. Controllers shall be installed and programmed according to the manufacturer's specifications.

   a. Post at each smart irrigation controller a data input chart including the precipitation rate from the audit, water budget, and zone descriptions.

   b. Within thirty (30) days of the installation of new landscaping, the irrigation system Smart Controller(s) shall be reset to the normal seasonal watering schedule. Minor schedule adjustments for establishing the trees, shrubs, and perennials may be necessary.

   c. Irrigation days of the week shall follow Section 20-226 of the Greeley Municipal Code-Water conservation and use restrictions; drought response along with the current declaration of the City's water supplies.

5. Sprinklers and nozzles shall meet the following requirements:

   a. The type of sprinkler and associated nozzles shall be selected to correlate with the size and geometry of the zone being irrigated.

   b. Sprinklers shall be spaced no closer than seventy-five (75) percent of the maximum radius of throw for the given sprinkler and nozzle. Maximum spacing shall be head-to-head coverage.

c. Coverage arcs and radius of throw for turf areas shall be selected and adjusted to water only turf areas and minimize overspray onto vegetated areas, hard surfaces, buildings, fences, or other non-landscaped surfaces.

d. Sprinklers, bubblers, or emitters on each zone shall be of the same manufacturer. Multiple manufactures can be used throughout the system if each zone has the same manufacturer.

e. Sprinkler heads in turf areas shall have a minimum six (6) inch pop-up riser height. A four (4) inch pop-up riser height is permitted when the irrigation head is in line with a curb along a parking space. If pop-ups are installed within a perennial and groundcover beds, a twelve (12) inch pop-up riser shall be used.

f. Spray nozzles are not allowed.

g. Nozzles for rotors shall be selected to achieve an approximate uniform precipitation rate throughout the zone.

h. All pop-up heads s shall be equipped with check valves and pressure-regulating stems in accordance with Colorado House Bill 19-1231.

i. Rotors shall be equipped with internal check valves and pressure regulation.

j. Pressure-compensating emitters shall be used for drip irrigation. For sloped areas, check valve(s) shall be installed in the drip line whenever the valve is at a lower elevation.

k. Drip line shall be parallel to the slope whenever feasiable.

l. Properties with single or combined point of connection flow of 15 GPM or greater for a one (1) inch water tap or greater, shall have a control system capable of providing real-time flow monitoring and the ability to shut down and/or isolate the problem area(s) with isolation valve(s) in the event of a high flow condition.

m. Emitters shall be set back from foundations in accordance with Chapter 8, Section 24-802- Landscape standards.

n. Pop-up heads in turf areas shall be matched precipitation nozzles. Variable Arc Nozzles (VANS) are not acceptable for 90-, 180-, and 360-degree applications. High-Efficiency Variable Arch Nozzles (HE-VANS) are allowed in odd shaped areas (non-linear or triangular head spacing) where 90-, 180- and 360- degree nozzles are not applicable.

6. Sleeving shall meet the following requirements:

a. Sleeves shall be installed beneath paved areas to route irrigation pipes and wiring bundles. The diameter of sleeve shall be a minimum of twice that of the pipe and wiring bundle but no smaller than a two (2) inch diameter pipe. The ends of the sleeves shall extend past the edge of the curb, gutter, sidewalk, or other hardscape a minimum of eighteen (18) inches.

b. The sleeve material beneath sidewalks, drives and streets shall be PVC Class 200 pipe with solvent welded joints.

c. For all sleeving located under concrete, the pavement or other hard surfacing shall be notched on both sides to mark the sleeve location, and tracer wires shall be installed on the upper side and both ends of the sleeving.

d. Contain no joints when length is less than twenty (20) feet.

e. Separate sleeving used for irrigation lines and wiring bundles.

C. Water Pressure

1. The irrigation system designer shall verify the existing available water pressure.

   The irrigation system shall be designed such that the point-of-connection design pressure, minus the possible system pressure losses, is greater than or equal to the design sprinkler operating pressure at final build out.

2. All newly installed sprinkler bodies shall operate at the manufacturer's specific optimum performance pressure range, All pop-up bodies retrofitted with rotary nozzles shall operate at no less than twenty (20) psi and no more than forty-five (45) psi.

3. If the operating pressure exceeds the manufacturer's specified maximum operating pressure for any sprinkler body or nozzle, pressure shall be regulated at the zone valve or sprinkler heads.

4. Pressure boosters are allowed if required. Booster pumps must be prefabricated units with variable speed controls.

6.12 IRRIGATION DESIGN PLAN

The purpose of a preliminary irrigation design plans is to provide a general design and annual water allotment for landscapes. The final irrigation design plans build upon the preliminary design with additional details. In accordance with Greeley Municipal Code, Chapter 8, Section 24-804(h) – Landscape Standards, the irrigation plan shall be designed in conjunction with a landscape plan in a manner to maximize irrigation efficiencies:

A. Preliminary Irrigation Design Plans shall include:

1. Accurately and clearly identify all applicable hydrozones with square footage using the defined four categories in Section 6.10 and using letter marking found in Section 6.2 of these Criteria.

2. Include irrigation methods according to the hydrozones. All heads on a zone shall have matched precipitation nozzles.

3. A water budget chart that shows the total annual water use, which shall not exceed fifteen (15) gallons per square foot over the site.

4. All necessary system components are sized for adequately meeting the highest seasonal landscape demand with a three-day per week watering schedule. Irrigation shall occur within an eight-hour watering window or as allowable by Section 20-226 of the Greeley Municipal Code -Water conservation and use restrictions; drought response.

B. Final Irrigation Design Plans shall include:

1. Same information required for the Preliminary Irrigation Design Plan submittal and;

2. A Smart Irrigation Controller data input chart. Irrigation schedules for landscape establishment period and established planting shall include irrigation frequency, cycles per day, and minutes per cycle, and a note stating that the schedule is a guide only and actual field conditions may require more or less watering time as plants mature. Seasonal adjustment shall be included in the data input chart. The data input chart must provide scheduling for the highest water demand season and fall within the watering window allowable by Section 20-226 of the Greeley Municipal Code- Water conservation and use restrictions; drought response.

3. A pressure calculation worksheet that shall demonstrate the point-of-connection design pressure, minus the possible system pressure losses, is greater than or equal to the design sprinkler operating pressures.

4. A seasonal maintenance schedule beginning on April 15 through October 15 shall be shown on the irrigation plan to establish procedures for optimum irrigation efficiency and preventive maintenance practices that will conserve water resources. The maintenance schedule shall include 6.16- Irrigation System Maintenance

4. Final irrigation design plans must be approved by a licensed Irrigation Association Certified Irrigation Designer (CID).

5. The following General Notes:
   a. Contractor installing the system including name, address, and phone number

   b. All irrigation certifications

   c. All field adjustments or redesign to show “as-built” drawings after installation is complete

6. The owner of the property shall be provided:

a. "As-built" irrigation drawings

b. Water budget chart

c. Smart Irrigation Controller data input chart

d. Two (2) operating keys for each type of manually operated valves

e. Two (2) of each servicing wrench or tool needed for complete access, adjustment, and repair of sprinklers.

6.13 IRRIGATION SYSTEM INSTALLATION

Irrigation system installation shall be consistent with approved plans and meet the City's Criteria prior to issuance of Certification of Occupancy or other City approvals. Release of bonding or surety (if applicable) shall be withheld until approval is given.

Materials, installation, and execution for parks shall follow City of Greeley Design Criteria and Construction Specifications, Section 02810 Irrigation Specifications.

Otherwise the following shall occur for irrigation system installation:

A. Quality Assurance:

1. Irrigation system installation shall be consistent with approved system design and applicable water type (potable versus non-potable systems). For all systems with one and one-half (1.5) inches or greater water tap, it is recommended that the irrigation system be designed and constructed for non-potable water use.

2. Work and materials shall be in accordance with the latest edition of the National Electric Code, the Uniform Plumbing Code as published by the Western Plumbing Officials Association, and applicable laws and regulations of the governing authorities.

3. When contract documents call for material or construction of better quality or larger size than required by the above-mentioned rules and regulations, provide the quality and size required by the contract documents.

4. A Field Supervisor shall review and sign-off on the installation. Field Supervisors shall have at least five (5) years experience in irrigation system installation and be employed by a company that has been established in the green industry for three (3) or more years.

B. Installation

1. Contact the City of Greeley Water and Sewer Department at conserve@greeleygov.com when irrigation construction begins.

2. Installation shall be consistent with approved system design.

3. New and existing tree and shrub locations as shown on the landscape plans take precedence over irrigation equipment locations. Conflicts between irrigation system, planting material and architectural features shall be avoided.

4. Assembling pipe and fittings shall be in a manner recommended by the manufacturer and in accordance with accepted industry practices.

5. Spare wires

    a. In conventional (or traditional, single, multi-stand) systems, two (2) spare control wires and one (1) spare common wire shall be installed for the entire length of the mainline. At each valve location, a minimum of thirty (30) inches wire loop shall be provided and located in the valve box. End of wires shall be capped with water-proof wire connectors.

    b. In 2-wire (or decoder) systems, one (1) spare 2-wire shall be installed the entire length of the mainline. The spare 2-wire installed shall be in a different color than the rest of the 2-wire being used. At each valve location, a minimum of thirty (30) inches wire loop shall be provided and located in the valve box. End of all wires shall be capped with water-proof wire connectors.

6. Sprinkler assemblies shall be installed as per the specifications and at the locations of the irrigation plans. All sprinkler assemblies shall be installed for best performance. The City reserves the right to conduct follow-up audits as deemed necessary at the expense of the customer to ensure irrigation system efficiencies. Any deviations in the installation from the irrigation plan must be noted and included in the as-built drawings.

C. Testing

1. The mainline of the irrigation system shall be tested for each segment of mainline made operational and upon final installation completion to ensure it is free of leaks, defects, or deficiencies. The system shall be brought to normal operating pressure with the all valve manifolds and isolation valves open and all other conveying components closed. Any loss of pressure after two hours should be recorded, investigated, and isolated. Identified leaks shall be repaired and the mainline retested prior to testing any individual irrigation zones.

2. All irrigation zones shall be tested upon final installation completion to ensure the zones are free of leaks, defects, or deficiencies. Each zone shall be activated for five (5) minutes, and the water use shall be recorded from the installed flow sensor installed or calculated from start and stop water meter readings. Deviations from the zone application rate listed in the irrigation plan shall necessitate investigating the zone(s) for correct installation, layout, components, and repair. Post-repair zone testing will be required.

3. It is unlawful for any owner or user of water to fail to comply to the prevision of the Section 20-153 of the Greeley Municipal Code – Bills may be sent; process of bill disputes and to waste water through neglect or by reason of faulty or imperfect plumbing or fixtures per Section 20-123 of the Greeley Municipal Code- Failure to maintain; unlawful;notice;turnoff.

6.14 IRRIGATION PERFORMANCE AUDIT

Per Greeley Municipal Code, Section 24-801(b)(5) and 24-804(h)(5) a letter of substantial completion of the landscape plan and an irrigation performance audit must be completed prior to issuance of Certification of Occupancy or other City approvals. Release of bonding or surety (if applicable) shall be withheld until approval is given. Details of the Irrigation System Installation, Performance Audit and Landscape and Irrigation System Maintenance

A. Exemptions

1. Systems with only drip irrigation.

2. Landscape plans and plant installation without any turf areas.

3. Case-by-case as determined per the Water and Sewer Director or designee.

B. Certification

1. The contractor in charge of the irrigation system installation must contract to have an irrigation performance audit completed by a licensed professional independent of the installation contractor. Acceptable auditors are Greeley's Water Conservation Program personnel, a CLIA, or QWEL:

a. Certified Landscape Irrigation Auditor (CLIA) who is certified by the Irrigation Association, a non-profit industry organization dedicated to promoting efficient irrigation

b. Qualified Water Efficient Landscaper (QWEL) who is certified by EPA WaterSense

2. The cost of hiring a CLIA or QWEL shall be the responsibility of the contractor in charge of the installation.

C. Performance Audit Guidelines

1. Irrigation zones tested in the audit must be a representative sample of the entire irrigation system, and at a minimum shall include the evaluation of no less than twenty-five (25) percent of overhead irrigation zones, to include a minimum of two (2) zones per overhead sprinkler type. At the discretion of Greeley's Water and Sewer's Director or designee, the minimum number of zones may be increased depending on the size and complexity of the irrigation system.

2. The minimum acceptable distribution uniformities shall be seventy (70) percent for rotor and rotary zones.

3. Results below minimum acceptable distribution uniformity will require adjustments and/or repairs made to the irrigation system. These corrections will be noted on the irrigation as-builts and the test area re-audited until acceptable results are produced.

4. A signed copy of the Irrigation Performance Audit shall be submitted to and approved by the Water and Sewer Department, Water Conservation Program Manager before issuance of a Certificate of Occupancy or other City approvals.

6.15 LANDSCAPE MAINTENANCE

Per section 24-804(e) installation and maintenance of the landscape areas of the Greeley municipal code, the developer, owners' association, property managers, property owner and/or tenant, as required by Chapter 8, shall be responsible for maintaining in a healthy condition all on-lot and right-of-way landscaping, buffering, perimeter treatment, and screening improvements. The landscape and irrigation maintenance shall incorporate the required items set forth below:

A. The Owners' Association, property managers, property owner, and/or tenant shall be jointly and severally responsible for the regular maintenance of all landscaping elements and irrigation system in good condition. All landscaping shall be maintained free from disease, pests, weeds and litter.

B. Regular maintenance shall be consistent with the needs of the plant material and shall include pruning, mowing, fertilization, mulching and weeding, and plant materials replacement. Replacement materials shall be healthy plants of comparable size and species, meeting the original intent of the approved landscape design.

C. Preferred turf shall follow the City of Greeley’s Natural Areas & Trails Department No-Mow policy.

D. Best management practices to fix erosion shall be used to maintain landscapes and irrigation systems.

6.16 IRRIGATION SYSTEM MAINTENANCE

A. Annual maintenance of the irrigation system includes backflow prevention assembly testing, rain sensor testing, controller data or Wifi connection testing, and filter and strainer cleaning/replacement, and all other preventive maintenance practices that conserve water resources.

B. Leak repair, replacement of damaged system components, head adjustments, application rate adjustments, and all other preventive maintenance practices that conserve water resources shall be on-going through out the irrigation season.

C. A completed and passing backflow prevention assembly test consistent with the parameters outlined per Section 20-191 of the City of Greeley's Muncipal Code-Connection Control is required for irrigation system start-up. Proper assembly operations shall also be verified through passing backflow prevention assembly test when the assembly is taken out of service for maintenance or repair.

D. All irrigation system elements shall be repaired and replaced to maintain the minimum acceptable distribution uniformities of sixty (60) percent for rotor and rotory zones.

E. Irrigation controllers shall be seasonal adjusted using a cycle and soak method with no programming to irrigate between the times of 10:00 a.m. to 6:00 p.m.

F. Irrigation days of the week shall follow per Section 20-226 of the Greeley Municipal Code-Water conservation and use restrictions; drought response.

G. Subject to Chapter 14.08-Water Rates and Regulation, failure to maintain any plumbing or fixtures of any premises are so defective as to waste any water is unlawful and shall be subject to penalties and/or water shutoff.

H. Irrigation audits should be conducted every five (5) years following the initial irrigation system installation following Section 6.14- Irrigation Performance Audit to support long-term water efficiency.

CITY OF GREELEY, COLORADO

ORDINANCE NO. ___, 2023

AN ORDINANCE AMENDING SECTION 20-62 (STANDARDS FOR DESIGN AND CONSTRUCTION) AND ADOPTING SECTION 20-64 (ADOPTION OF DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS), TITLE 20 OF THE GREELEY MUNICIPAL CODE FOR THE CITY OF GREELEY

WHEREAS, the City of Greeley, Colorado ("City") is a home rule municipality empowered pursuant to Sections 1 and 6 of Article XX of the Colorado Constitution to, inter alia, construct, purchase, acquire, lease, add to, maintain, conduct, and operate water works and everything required therefor, within or without its territorial limits, for the use of the City; and

WHEREAS, Section 17-4(c) of the Greeley City Charter and Section 20-30 of the Greeley Municipal Code authorize the Board to acquire, develop, convey, lease and protect the water and sewer assets, supplies and facilities needed to fully use the water supplies decreed, adjudicated or contracted for the City; and

WHEREAS, the City of Greeley Water and Sewer Department has recently developed design criteria and construction specifications for and placed them into a manual entitled "Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, Non-Potable Irrigation Systems, and Landscape & Irrigation," dated January, 2023; and

WHEREAS, the manual requires all design and construction of water, sanitary sewer, non-potable, and landscape and irrigation facilities within the City to comply with the design criteria and construction specifications set forth therein; and

WHEREAS, Section 20-88 provides a penalty for violating the manual.

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. That Section 20-62 be amended to read as shown on Appendix A, attached hereto and incorporated herein.

Section 2. That Section 20-64 be adopted to read as shown on Appendix A.

Section 3. That the Director of Water & Sewer has the authority to make corrections to any typographical errors and other non-substantive corrections, additions, or deletions to the "Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, Non-Potable Irrigation Systems, and Landscape & Irrigation," dated January, 2023.

Section 4. Except as explicitly modified on Exhibit A, all other provisions of Title 20 of the Greeley Municipal Code shall remain in full force and effect.

Section 5. This Ordinance shall take effect on the fifth day following its final publication, as provided by Section 3-16 of the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED ON THIS _____ DAY OF _____ 2023.

ATTEST

_____

City Clerk

CITY OF GREELEY, COLORADO

_____

Mayor

APPENDIX A
ORDINANCE AMENDING TITLE 20
GREELEY MUNICIPAL CODE

Section 1. Section 20-62 shall be amended to read as follows:

Sec. 20-62. Standards for design and construction.

The director of water and sewer shall adopt and publish design and construction standards for water, ~~and~~ sanitary sewer, non-potable, and landscape and irrigation facilities to be connected to the city system or installed within its jurisdiction. The design and construction of water and sanitary sewer mains and appurtenances shall conform to the published standards, unless deviations from those standards are approved in writing by the director of water and sewer, or their designee. The city may refuse to accept facilities inadequately constructed or constructed in variance with city requirements. the city shall be held harmless for the engineer's or installer's failure to conform to city standards and specifications. The design criteria and construction standards for water, sanitary sewer, non-potable, and landscape and irrigation facilities are adopted by reference in section 20-64.

Section 2. Section 20-64 shall be amended to read as follows:

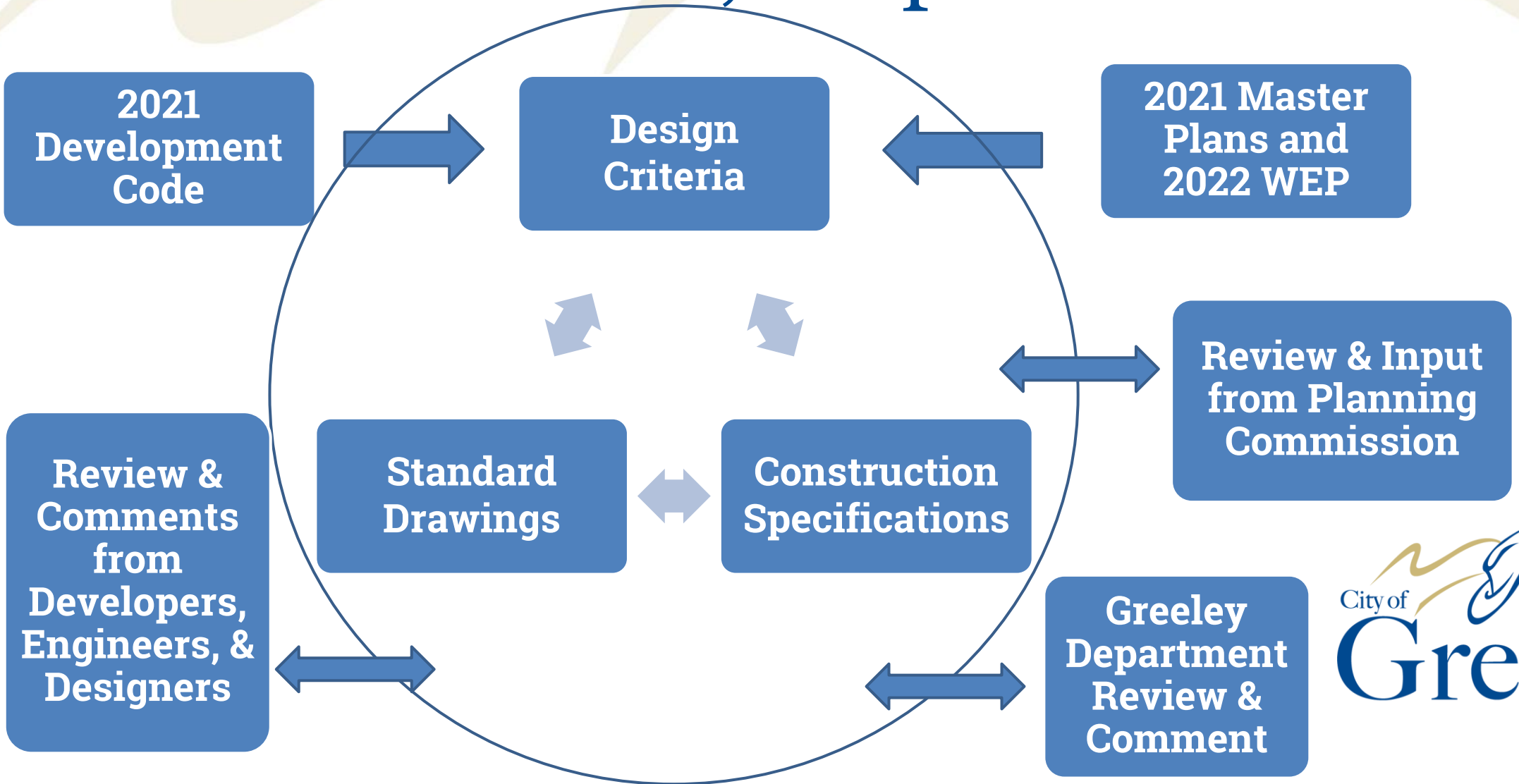
Sec. 20-64 - Adoption of standards.

All water, sanitary sewer, non-potable, and landscape and irrigation facilities within the city shall be constructed to the minimum standards established by the Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, Non-Potable Irrigation Systems, and Landscape & Irrigation, dated January 2023, in order to safeguard the public health, safety and welfare of the citizens of the city. Copies of the design criteria and construction standards shall be kept and maintained by the city clerk and department of water and sewer and shall be available for inspection at those locations during all business hours and can be located online at https://greeleygov.com/services/pw/design-criteria-and-construction-specifications.
Any person or entity convicted of violating these adopted design criteria and construction specification shall be punishable as provided in chapter 9 of title 1 of this Code as provided under Sec. 20-88.

Water and Sewer Department: Design Criteria Standards and focus on Chapter 6 commercial landscape and irrigation criteria

Planning Commission- December 13, 2022

Process for Updating Design Criteria, Standards Details, & Specifications

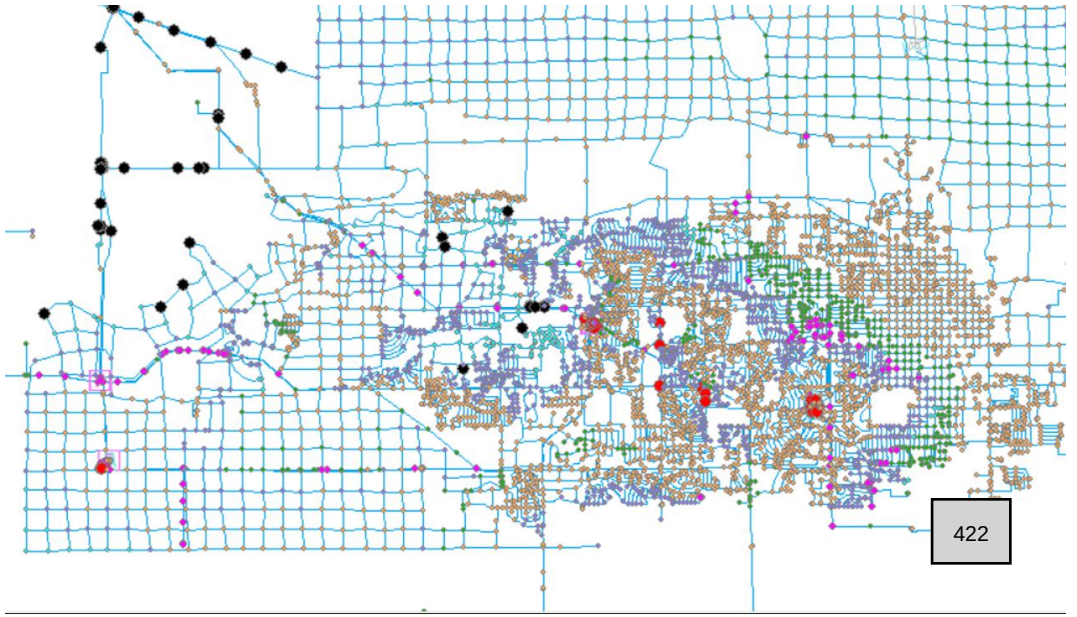


City of Greeley Colorado

Design Criteria

Goals

- **Alignment with W&S master plans published 2021.**
- **Align criteria with current W&S standards (Updated technology and equipment)**
- **Consistency across standards**
- **Coordination with other departments**
- **Potential for cost savings and reduced frequency of project RFI's**
- **Conformance to the new statewide Subsurface Utility Engineering (SUE) Laws**



Design Criteria: Sections 1-6

Section 1: General Requirements of Development

Section 2: Submittal Requirements

Section 3: Potable Water

Section 4: Sanitary Sewer

Section 5: Non-potable water

Section 6: Landscape and Irrigation

Section 1
General Requirements of Development

- **There were no substantive changes to this section**
- **Alignment with Engineering Development Review**

Section 2
Submittal Requirements

- **Hydraulic models in a format that can be integrated with the City's overall models – InfoWater & InfoSWMM**
- **Implementing stricter measurement tolerances for survey verifications and as-built drawings**
- **Provided more detail for reimbursement of oversized public infrastructure, particularly sanitary sewer lift stations and non-potable ponds and pump stations.**

City of Greeley Colorado

Section 3
Potable Water

- **Provides guidance for development when assumptions are made on future customers**
- **Updated future flows more accurately using zoning, acreages, and building footprints**
- **Updated connections standards**
- **Updated details and specifications**
- **Aligns with wastewater for consistency**

Residential			
Zoning based on *City of Greeley Charter and Code, Chapter 24.401, Zoning District Development Standards.*			
Use	**Units Per Acre***	**Occupancy**	**Peak Hour Demand**
R-E	3	3.1 persons	1.9 gpm/unit
R-L	5	3.1 persons	1.9 gpm/unit
R-M	10	2.7 persons	1.7 gpm/unit
R-H	20	1.7 persons	1.1 gpm/unit
R-MH	15	1.7 persons	1.1 gpm/unit
*Use these unit per acre values unless specific unit counts are known			
Commercial			
Where uses are known, use the specific demand values. Commercial demands based on 1000 ft^2 of building area unless noted otherwise. Otherwise use the appropriate zoning demand values.			
Use	**Average Day Demand without Irrigation**		
C-L	1500 gpd per acre		
C-H	3000 gpd per acre		
I-L & I-M	1500 gpd per acre		
I-H	3000 gpd per acre		
Use	**Average Day Demand**		
Restaurant	500 gpd		
Retail/Offices	200 gpd		
Grocery Store	430 gpd		
Laundry, Dry Cleaning	1000 gpd		
Auto Dealer, Repair/Service	115 gpd		
Car Wash with Water Reuse	1500 gpd		
Hospital	380 gpd		
Hotel/Motel	350 gpd		
Retirement & Nursing Home	350 gpd		
School	12 gpd/student without showers 36 gpd/student with showers		
Religious Building	300 gpd		
Warehouse (Non-industrial)	25 gpd		
Irrigation	25 gpm per acre		

Section 4
Sanitary Sewer

- **Defines wastewater flows for:**
  - **Commercial & Industrial customers based on zoning**
- **Provides guidance for development when assumptions are made on future customers**
- **Calculates future wastewater flows more accurately using zoning, acreages and building footprints**
- **Removes underdrains below sanitary sewer lines**
- **Detailed Lift station criteria**
- **Aligns with potable water for consistency**

Residential			
Zoning based on City of Greeley Charter and Code, Chapter 24.401, Zoning District Development Standards			
Use	Units Per Acre	Occupancy	Average Day Wastewater Flows*
R-E	3	3.1 persons	0.22 gpm/unit
R-L	5	3.1 persons	0.22 gpm/unit
R-M	10	2.7 persons	0.19 gpm/unit
R-H	20	1.7 persons	0.12 gpm/unit

Commercial	
Use	Average Day Wastewater Flows*
C-L (not specified)	1,500 gpd/acre (minimum)
C-H (not specified)	3,000 gpd/acre (minimum)
Retail/Offices	200 gpd/1,000 SF
Hotels/Motels	350 gpd/1,000 SF
Restaurants	500 gpd/1,000 SF
Bars and Lounges	300 gpd/1,000 SF
Neighborhood Stores	200 gpd/1,000 SF
Department Stores	200 gpd/1,000 SF
Laundry and Dry Cleaning	1,000 gpd/1,000 SF
Banks	300 gpd/1,000 SF
Nursing Homes	350 gpd/1,000 SF
Warehouses	25 gpd/1,000 SF
Car Washes	1,500 gpd/1,000 SF
Auto Dealer/Repair/Service	115 gpd/1,000 SF
Grocery Store	430 gpd/1,000 SF
Religious Buildings	300 gpd/1,000 SF
Factories	800 gpd/1,000 SF
Hospitals	380 gpd/1,000 SF
Schools (without showers)	12 gpd/student
Schools (with showers)	36 gpd/student

Industrial	
Use	Average Day Wastewater Flows*
I-L (not specified)	1,500 gpd/acre
I-M (not specified)	1,500 gpd/acre
I-H (not specified)	3,000 gpd/acre

**1cfs = 448.33 gpm*

Average day wastewater flow per capita = 60 gpcd

Section 5: Non-Potable Water

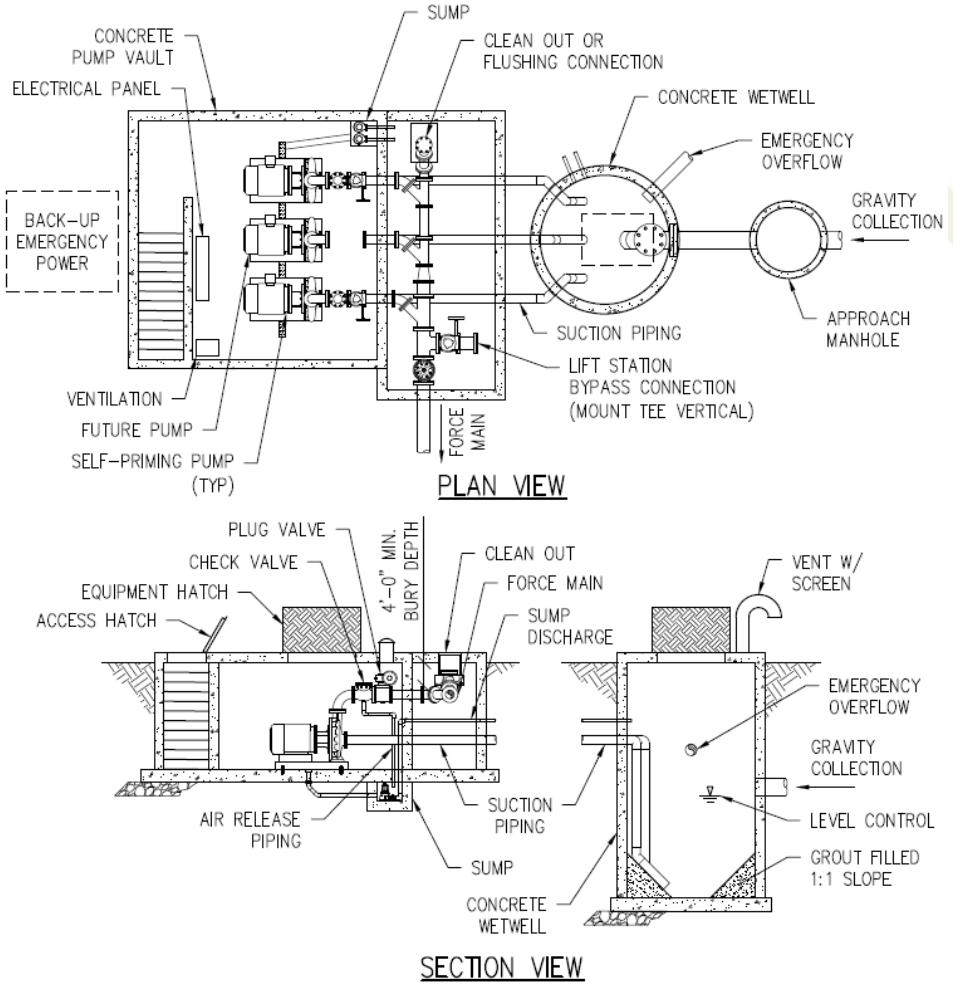
- **Comprehensive**
  - **Covers every aspect of non-pot system design.**
  - **Updated the process for flow calculations**
- **Easy to Follow**
  - **Simplified & logical progression.**
- **Aligns with NP Master Plan**
- **Regional Systems & Oversizing**
- **Predesign Meetings w/Stakeholders**

City of Greeley Colorado

Standard Drawings Sections 1-5

Key Updates

- **Updated details based on current materials and equipment**
- **Condensed meter vault details across non-potable and potable water meters**
- **Added standard lift station drawings to the sanitary sewer drawings**
- **Added utility locating details in accordance with the new SUE law in Colorado (SB 18-167)**



City of Greeley Colorado

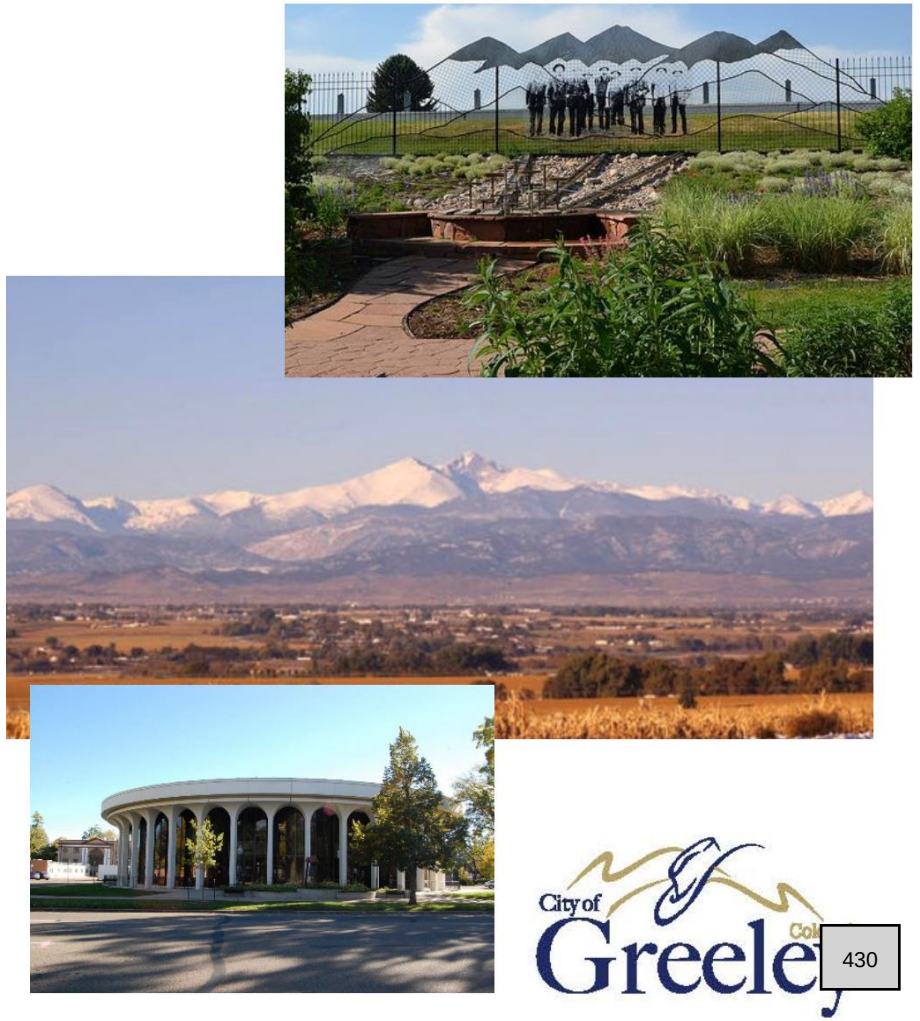
Section 6
Landscape and Irrigation

New Criteria:

- **Support existing City Plans**
- **Promotes water conservation**
- **Guides non-residential landscape design**
- **Support attractive and sustainable landscapes**

Applicable to:

- **Common areas**
- **Right-of-ways**
- **Municipal buildings**
- **Non-residential (commercial/industrial)**
- **Multi-family residential**



Why a landscape and irrigation criteria?

- **Providing long range water wise planning**
- **Water for a livable community with healthy landscape and tree canopy for current and future Greeley residents**

Why a landscape and irrigation criteria?

Following:

- **CRS 1973 § 31- 23-207, revised 1977**
- **City Ordnance 40, 2015 - Landscape Policy Plan for Water Efficiency**
- **2015 Water Conservation Plan**
- **2018 Comprehensive Plan**
- **Supports current Chapter 8 - Landscape Standards**

City of Greeley Colorado

Section 6-Landscape and Irrigation

Hydrozones

- **An area within a landscape where the plant materials require a similar amount of water.**
- **Four hydrozones**
- **Hydrozone breakdowns are the same as the irrigation water dedication requirements outlined in code**
- **Grouping plantings by hydrozone reduces overwatering**

Section 6-Landscape and Irrigation

Water Budget Chart

- **Upfront knowledge of average water demand for landscape.**
- **Equal the water dedication required for irrigation taps.**
- **Limits average irrigation to 15 gallons per square foot per year.**

City of Greeley

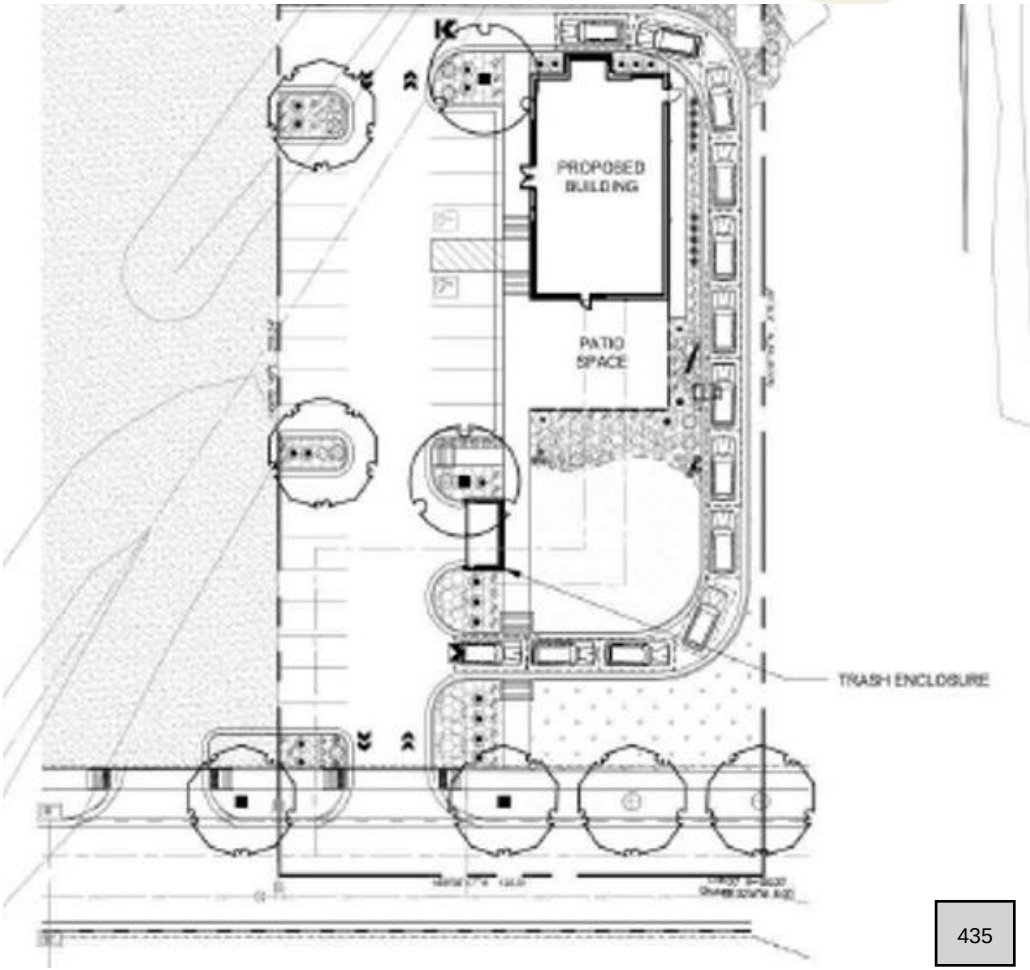
Water Budget Chart

ZONE ID for Tap	Irrigated Area Calculated (SF)	Percentage of each zone	Hydrozone (select one)	Water Need (gallons/SF)	Annual Water Use (gallons)
	10,000	25%	High	18	180,000
	10,000	25%	Moderate	14	140,000
	10,000	25%	Low	7	70,000
	10,000	25%	Very Low	0	-
			High	18	-
			Moderate	14	-
			Low	7	-
			Very Low	0	-
			High	18	-
			Moderate	14	-
			Low	7	-
			Very Low	0	-
			High	18	-
			Moderate	14	-
			Low	7	-
			Very Low	0	-
			High	18	-
			Moderate	14	-
			Low	7	-
			Very Low	0	-
			High	18	-
			Moderate	14	-
			Low	7	-
			Very Low	0	-
			High	18	-
			Moderate	14	-
			Low	7	-
			Very Low	0	-
			High	18	-
			Moderate	14	-
			Low	7	-
Subtotal	40,000				434 000
Average (Gallons/SqFt)		9.8			

Section 6-Landscape and Irrigation

Landscape & Irrigation Design and Plans

- **Site Plan – General Landscape Plan**
- **Construction Drawings – Detailed Landscape Plan**
- **Must be stamped by Colorado registered landscape architect**
- **Methods and configurations are guided by landscape plan's hydrozones**
- **Heads and nozzles in a single zone must have matched precipitation rates**



Section 6-Landscape and Irrigation

Irrigation System Installation and Performance Audit

- **Required prior to final approvals and release of landscaping bonding or surety where applicable**

- **Can be performed by Water & Sewer Conservation staff or private auditor**
  - **Certified Landscape Irrigation Auditor (CLIA)**
  - **Qualified Water Efficient Landscaper (QWEL)**
  - **City staff cheaper but limited availability**

Section 6-Landscape and Irrigation

Maintenance

- **Landscape maintenance following**
  - **Chapter 8- Landscape Requirements**
  - **Mow policy from Natural Areas and Trails**
  - **Best management practices**

- **Irrigation Maintenance**
  - **Annual checkup**
  - **Leak repairs**
  - **Replacement of damage systems**
  - **Head adjustments**
  - **Seasonal adjustments to irrigation controller**
  - **Suggested checkup every 5 years**

Section 6- Highlighted Changes

Refined definitions

Mulch and weed barriers

Added specifications on irrigation equipment:

- **Separate zones for medians/islands**
- **Smart controller, flow sensors, valves and pressure regulators to reduce water waste**
- **Sleeving**
- **Identification of purple infrastructure for non-potable**

Irrigation Design Plans and Install

- **Water windows**
- **Certified irrigation designer**

Irrigation Installation

- **Field supervisor**
- **Wiring**
- **Testing clarification**

Water audit guidelines

Irrigation system maintenance

City of Greeley Colorado

Engagement & Review

- **Introduced to Builders, Realtors, Developers - July 19, 2021**
- **Reviewed and Coordinated with other City Departments throughout process**
- **Reviewed by Engineering Development Review & Civil Inspections Staff**
- **Presented to Planning Commission to get Input and Feedback – March, August, November 2022**
- **Meetings & Review Comments from Engineers, Developers, Landscape designers, & Community members - March to June, 2022**
  - **155 comments and questions tracked and addressed**
  - **Additional meetings with external key member(s) September 30, 2022, November 8, 2022 and December 5, 2022.**

City of Greeley Colorado

Staff Recommendation

- **Approve and recommend to City Council the Adoption of the January 2023 Water & Sewer Design Criteria, Standard Details, and Construction Specifications**

Questions?

City of Greeley Colorado

2022 October Commercial Projects

Updated 11/10/2022

Case #	Project	Location	Description	Submittal Date	Stage	City Planner
SPR2022-0071	StillWaters Coffee Drive Thru	2332 27th Street	StillWaters Coffee drive thru located within 23 Church	10/24/2022	Design	Michael Franke
SPR2022-0070	Water and Ice Kiosk at Hillside Shopping Center	2509 11th Avenue	Water and Ice Kiosk in parking lot of Hillside Shopping Center	10/26/2022	Design	Michael Franke
SPR2022-0049	Starbucks at Boomerang Ranch	South of 10th Street and East of 83rd Avenue	Drive-Thru Restaurant	6/30/2022	Design	Darrell Gesick
ANX2022-0008	Wakes Annexation No.1	West of Hwy 85 Bypass, East of North 6th Avenue	Proposed annexation of 56.869 acres of land into the City of Greeley to be zoned H-A	8/3/2022	Design	Kristin Cote
ANX2022-0009	Wakes Annexation No.2	West of Hwy 85 Bypass, East of North 6th Avenue	Proposed annexation of 39.050 acres of land into the City of Greeley to be zoned H-A	8/3/2022	Design	Kristin Cote
ANX2022-0010	Wakes Annexation No.3	West of Hwy 85 Bypass, East of North 6th Avenue	Proposed annexation of 13.075 acres of land into the City of Greeley to be zoned H-A	8/3/2022	Design	Kristin Cote
ANX2022-0007	Schneigder Annexation	North of 10th Street and West of 83rd Avenue	Annexation	8/2/2022	Design	Caleb Jackson

2022 October Commercial Projects

Updated 11/10/2022

SPR2022-0060	Frontier Academy Stadium Building	6530 16th Street	Stadium building for press box, concessions, restrooms, etc.	7/20/2022	Design	Elizabeth Kellums
SPR2022-0059	Frontier Elementary Addition	2560 29th Street	Addition and renovation of Frontier Elementary	7/20/2022	Design	Elizabeth Kellums
USR2022-0011	Canvasback Compressor Station	Parcel 095918000005	Compressor Station	6/22/2022	Design	Michael Franke
SUB2022-0017	Canvasback Compressor Station	Parcel 095918000005	Minor Subdivision for a Compressor Station	6/30/2022	Design	Michael Franke
SPR2022-0034	Orthopedic Center of the Rockies	Parcel 095909442001	Orthopedic Center	4/22/2022	Design	Michael Franke
SPR2022-0012	Robles Warehouse w/ Outdoor Storage	120 15th Street	4,952.50 SF Office/Warehouse to house Oil and Gas Support Business	3/1/2022	Design	Kristin Cote
WCF2022-0004	Rooftop antennas at Westlake Shopping Center	2100 35th Avenue	Rooftop antennas on King Soopers, Westlake	4/19/2022	Design	Elizabeth Kellums
SUB2022-0014	Knolls West Subdivision, First Replat	5699 20th Street	Lot line adjustment	5/24/2022	Design	Darrell Gesick
SPR2022-0042	Heath Middle School	2223 16th Street	School Addition	5/13/2022	Design	Darrell Gesick

2022 October Commercial Projects

Updated 11/10/2022

SUB2022-0015	Lake Bluff Preliminary Subdivision	North of 10th Street and West of 95th Avenue	212 Lots	5/30/2022	Design	Darrell Gesick
WCF2022-0002	Dish Wireless Co-location	3737 10th Street	Dish Wireless Co-location	2/9/2022	Design	Elizabeth Kellums
WCF2021-0015	T-Mobile Wireless Upgrade	2435 2nd Avenue	T-Mobile Wireless Upgrade - EFR	10/19/2021	Design	Elizabeth Kellums
SPR2022-0030	Get Space Storage - Lot 1 The Shops at Sunset Ridge 1st Replat	5906 10TH ST	2 building self storage facility on existing commercial lot	4/25/2022	Design	Kristin Cote
SPR2022-0024	Highpoint Lot 1 Site Plan Review	11701 24th Street	Develop a multi-tenant retail building and a new gas station	3/24/2022	Design	Michael Franke
USR2022-0001	NOCO Disposal Service - Use by Special Review	1060 North 11th Avenue	Develop a 22,000 square foot trash transfer station	2/22/2022	Design	Kristin Cote
ZON2022-0002	1060 North 11th Avenue - Rezone	1060 North 11th Avenue	Rezone from I-M (DCMP) Development Concept Master Plan to I-M (Industrial Medium Intensity)	2/22/2022	Design	Kristin Cote
SPR2022-0010	Best Box Self Storage - Site Plan Review	12700 CR 58 (20th Street)	Develop a 56,690 square foot indoor storage facility	2/18/2022	Design	Kristin Cote
PUD2021-0016	Jackson Subdivision, 1st replat	North of 257 Spur and East of the Missile Silo	Replating an existing tract into a 15 acre lot and a 277 acre future development tract	5/10/2021	Design	Caleb Jackson

2022 October Commercial Projects

Updated 11/10/2022

MD2021-0003	Delantero Metropolitan District Nos. 1-10	South of Hwy 34, East of CR 17, West of Hwy 257 and North of 37th Street	Proposed approval of 10 related metropolitan districts as part of the Delantero Development	4/30/2021	Design	Darrell Gesick
SUB2021-0012	Boomerang Ranch Forth Filing	South of 10th Street, North of 12th Street and East of 83rd Avenue	1 - 1.10 acre (commercial use) and 27 acres of tracts for future development	4/14/2021	Design	Darrell Gesick
USR2022-0006	SRC Bypass 5-18 Oil and gas facility	South of Hwy 34 and East of 95th Avenue	32 oil and gas wells and associated equipment	11/2/2018	Design	Michael Franke
SPR2022-0062	Landscaping at DCP Midstream	3026 4th Avenue	Updating the landscaping along the ROW/Frontage of DCP's office	8/10/2022	Approved	Michael Franke
SPR2022-0061	Pickup lockers at Verizon Wireless	4650 Centerplace Drive	Installing pickup lockers for merchandise near front entrance of store	8/4/2022	Approved	Michael Franke
USR2020-0010	Blue Chip Oil and Gas	Parcel 095722000010	12 wells on 1 pad with production facility for oil and gas	5/25/2022	Approved	Michael Franke
USR2022-0009	Rainbow Oil and Gas	Parcel 095709401002	28 wells on 1 pad and production facility for oil and gas	5/25/2022	Approved	Michael Franke
SPR2022-0036	2901 1st Avenue SIte Plan Review, 1st Amendment	2901 1st Avenue	Storage building	4/29/2022	Approved	Kristin Cote

2022 October Commercial Projects

Updated 11/10/2022

SPR2022-0045	Residence Inn by Marriott	2495 28th Street	Residnce Inn Hotel, 110 rooms and conference center	6/27/2022	Approved	Michael Franke
PUD2022-0002	Colorado Premium PUD	2400 29th Street	PUD to establish Use	3/1/2022	Approved	Kristin Cote
DR2021-0002	3103 23rd Avenue - ATM Design Review	3103 23rd Avenue	Design Review for an ATM drive-up	2/19/2021	Approved	Kristin Cote
SPR2022-0041	Franklin Middle School	818 35th Avenue	School Addition	5/13/2022	Approved	Darrell Gesick
SPR2022-0008	Greeley lock and Key - Site Plan Review	2450 24th Street Road	Develop a 6,950 square foot retail building	2/18/2022	Approved	Darrell Gesick
SPR2022-0002	Snow Owl II - Site Plan Review	2211 115th Avenue	Develop a 34,000 square foot office / warehouse facility	1/12/2022	Approved	Darrell Gesick
ZON2021-0017	3115 35th Avenue - Rezone	3115 35th Avenue	Rezone from C-L (Commerical Low Intensity) to C-H (Commerical High Intensity)	11/16/2021	Approved	Darrell Gesick
PUD2021-0013	Delantero Preliminary PUD	South of Hwy 34, East of CR 17, West of Hwy 257 and North of 37th Street	812 acre mixed use project, including residential, commercial, industrial, schools, parks and open spaces	4/28/2021	Approved	Darrell Gesick

2022 October Commercial Projects

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WCF2022-0008	T-Mobile replace pole and antennas	2201 23rd Avenue	T-Mobile Replace pole and antennas	7/6/2022	Approved	Elizabeth Kellums
SUB2021-0025	McColoskey 6th Commercial Subdivision	East of 71st Avenue and South of 10th Street	Subdivision to replat a tract into a lot	9/1/2021	Approved	Darrell Gesick
SUB2021-0022	Meyer Minor Subdivision, 1st Replat	South of 8th Street, East of Ash Avenue and North of the Poudre River	Replat 1 lot into 2 lots	7/22/2021	Approved	Darrell Gesick
PUD2021-0011	4555 Centerplace Drive PUD, 1st Amendment	4555 Centerplace Drive	PUD amendment for site plan changes	3/26/2021	Approved	Darrell Gesick
USR2021-0001	225 22nd Street- C-Store USR	225 22nd Street	Demo Existing buildings and construct a 5,200 square foot C-Store w/ Gas sales	1/12/2021	Approved	Darrell Gesick
USR2018-0021	SRC Oestman 13-26 Pad/Facility	2085 N 47th Avenue	16 Oil wells and associated equipment Facility	10/23/2018	Approved	Darrell Gesick
S 6:17	Greeley Airport Business Park	2139 East 8th Street	13 Industrial Lots (2-4 Acres Each)	3/15/2017	Approved	Darrell Gesick
SUB2021-0033	H-P Greeley Subdivision, Sixth Replat	North of 8th Street and East of 71st Avenue	Reconfiguring 2 lots	1/5/2022	Approved	Kristin Cote

2022 October Commercial Projects

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S 28:15	Ironwood Business Park	Between 16th Street and 18th Street/East of 1st Avenue	13 Lot Industrial Subdivision (0.3 acre – 6 acre Lots)	12/16/2015	Approved	Darrell Gesick
SPR2021-0020	University Schools - High School Addition	6525 18th Street	8,095 square foot addition	11/19/2021	Approved	Kristin Cote
WCF2020-0012	1229 D Street - Cell Tower	1229 D Street	Replace an existing light pole with a new light pole and cell antenna	9/29/2020	Approved	Elizabeth Kellums
DR2021-0001	920 47th Avenue - ATM Design Review	920 47th Avenue	Design Review for an ATM drive-up	2/19/2021	Approved	Kristin Cote
SPR2021-0019	Billie Martinez School Addition	341 14th Aven.	12,700 SF Classroom Addn.	11/16/2021	Approved	Kristin Cote
DR2020-0011	Bank of America Greeley Mall	2263 Greeley Mall	Bank of America	7/25/2022	Construction	Michael Franke
SPR2022-0038	Firestone Redevelopment Façade revisions	1130 8th Avenue	Firestone Façade alterations	5/2/2022	Construction	Elizabeth Kellums
SPR2021-0017	2000 16th Street Site Plan Review - drive-thru coffee shop	2000 16th Street	Site Plan Review for a drive-thru coffee shop	10/14/2021	Construction	Caleb Jackson
SPR2022-0005	Jefferson High School - Site Plan Review	1420 2nd Street	Redevelop existing buildings and additional school space for a total of 54,446 square foot building	1/25/2022	Construction	April Medeiros

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SPR2022-0031	Bear Paw III Multi-Tenant Retail Building	4239 Centerplace Drive	Develop a multi-tenant retail building to the north of Bear Paw II	4/7/2022	Construction	Michael Franke
SPR2022-0011	Woodspring Suites Hotel - Site Plan Review	South of 8th Street and East of 71st Avenue	Develop a 4-story, 122 unit hotel	2/23/2022	Construction	Michael Franke
SPR2021-0016	2510 46th Avenue - Site Plan Amendment	2510 46th Avenue	Site Plan Review amendment to add parking south of the existing detention pond	10/7/2021	Construction	Michael Franke
SPR2022-0007	ENT Credit Union ITM	4735 25th Street	Installing ITM for ENT Credit Union. Adding Parapet Wall to North Elevation and Signage	2/2/2022	Construction	Michael Franke
USR2018-0023	SRC Stugart 6-20 Pad/Facility	7700 28th Street	32 Oil wells and associated equipment Facility	10/31/2018	Construction	Michael Franke
DR2021-0010	509 11th Avenue - Print Shop Design Review	509 11th Avenue	Change of use to allow a print shop	4/22/2021	Construction	Elizabeth Kellums
USR2021-0008	Greeley Rehab Hospital, USR	East of 71st Avenue and South of 10th Street	Use by special review for a Rehab Facility	9/1/2021	Construction	Darrell Gesick
DR2021-0006	501 8th Avenue, library infill Design Review	501 8th Avenue	Change of use from newspaper facility to a library use	3/19/2021	Construction	Elizabeth Kellums
PUD2020-0013	Suffolk PUD Fourth Filing, 1st Replat	North Centerplace Drive, West of 46th Avenue	Preliminary / Final PUD for a 3,174 square foot oil and lube changing facility	12/1/2020	Construction	Elizabeth Kellums

2022 October Commercial Projects

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SPR2020-0004	2401 35th Avenue - Highschool Site Plan Review	2401 35th Avenue	Site Plan Review to remove existing 138,083 square foot Greeley West High School and replace with a 270,000 square foot high school	4/2/2020	Construction	Darrell Gesick
USR2019-0008	Greeley Directional Oil and Gas USR, 3rd Amendment	South of Hwy 34 Bypass and East of Hwy 85 Bypass	Minor USR amendment to remove 22 tanks and modify the approved landscaping plan	4/1/2019	Construction	Darrell Gesick
DR2020-0016	7004 10th Street - Bank	7004 10th Street	Construct a 4,240 square foot bank facility	5/22/2020	Construction	April Medeiros
DR2020-0006	1645 1st Avenue - Design Review	1645 1st Avenue	1,150 square feet office / warehouse building	2/13/2020	Construction	Darrell Gesick
SPR2022-0023	Tointon Academy Site Plan Review Minor Amendment	West of 71st Avenue and South of 4th Street	Storage building	3/23/2022	Construction	Elizabeth Kellums

Planner Contact Information	
Caleb Jackson	**970-350-**
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Elizabeth Kellums	**970-350-9222**
Kristin Cote	**970-350-9876**
April Medeiros	**970-350-9241**
Michael Franke	**970-350-9782**
Meg Oren	**970-350-9824**

2022 October Residential Projects

Updated 11/10/2022

Case #	Project	Location	Description	Submittal Date	Stage	City Planner
ZON2022-0015	H-P Greeley Subdivision, Sixth Replat Rezoning	700 71ST AVE	Rezone 19.827 acres from I-L (Industrial Low Intensity) to R-M (Residential Medium Intensity)	8/31/2022	Design	Kristin Cote
SPR2022-0035	Stoneybrook Lot 3 & 4 Major Site Plan	South of F Street, West of North 35th Avenue	Est. a 142 site manufactured home community	4/25/2022	Design	Kristin Cote
ZON2022-0005	Stoneybrook Lot 2 & 3 Rezone to RMH	South of F Street, West of North 35th Avenue	Rezone to RMH to allow for 142 unit manufactured home community	4/22/2022	Design	Kristin Cote
SUB2022-0015	Lake Bluff - Tract C and E Preliminary Subdivision	North of 10th Street and West of 95th Avenue	Platting residential lots	5/25/2022	Design	Darrell Gesick
SPR2022-0048	Westgate Filing No. 1 Final PUD	South of 4th Street, East of 71st Avenue	216 Unit Apartment Complex	6/27/2022	Design	Kristin Cote
SUB2022-0018	Tract A & B of CCW Residential Subdivision, 2nd Filing	South of 4th Street, East of 71st Avenue	216 Unit Apartment Complex Subdivision	6/27/2022	Design	Kristin Cote
SPR2022-0047	2400 10th Ave Multi-family duplex	2400 10th Ave	duplex behind single family house	6/21/2022	Design	Elizabeth Kellums
SUB2022-0008	Avere Multi-Family Minor Sub	66th Avenue and 2nd Street	Minor Sub for multi-family project	3/30/2022	Design	Elizabeth Kellums
SPR2022-0029	Avere Multi-Family Site Plan	66th Avenue and 2nd Street	224 Apartments	3/30/2022	Design	Elizabeth Kellums

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SPR2022-0022	Thompson Thrift Apartments	North of HWY 34 and South of Centerplace Drive	336 Apartment Units	4/18/2022	Design	Michael Franke
SUB2022-0007	Centerplace Phase III Subdivision, 1st Replat	N. of HWY 34 and S. of Centerplace Drive	Subdivision of land into 1 Lot for Multifamily Development	4/18/2022	Design	Michael Franke
SUB2021-0034	Lake Bluff Final Plat	North of 10th Street and West of 95th Avenue	Platting 10 future Development Tracts and 19.72 Acres of Right-of-way	12/8/2021	Design	Darrell Gesick
ZON2021-0016	13th Street Rezone	North of 13th Street, South of 10th Street, West of 59th Avenue	Rezone 37 Acres from H-A and C-D to MU-H	11/1/2021	Design	Meg Oren
ZON2021-0005	Boomerang Ranch Forth Filing rezone	South of 10th Street, North of 12th Street and East of 83rd Avenue	Rezone a portion of a 27.77 acres from C-L to R-H	4/14/2021	Design	Darrell Gesick
SUB2021-0008	Rock Ridge Apartment Final Plat	East of 65th Avenue, South of Hwy 34 and West of the T-Bone Ranch Development	1 lot - 38.5 acres, 3 acre future development tract and ROW 29th Street	2/15/2021	Design	Darrell Gesick
SUB2020-0010	Shreve Subdivision	7929 28th Street	Subdivide 1 lot into 3 lots	8/24/2020	Design	Darrell Gesick
SUB2020-0011	Rockies Apartment Subdivision	1913 5th Street	Combine 3 parcels into 1 lot	5/22/2020	Design	Kristin Cote
DR2020-0017	Rockies Apartments Multifamily Development	1913 5th Street	50 unit apartment complex	5/22/2020	Design	Kristin Cote
SUB2020-0008	Clark Subdivision Filing No. 2 Final Plat	West of CR 31 and North of CR 66	29 single family large lot subdivision	4/21/2020	Design	Caleb Jackson
DR2019-0016	1131 8th Street - 5-plex	1131 8th Street	5 unit multifamily	6/26/2019	Design	Caleb Jackson

2022 October Residential Projects

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ZON2022-0004	Cobblestone Rezone	7460 W 28th Street	42.01 Acre rezone from Residential Estate and Commercial Low Denisty to Residential- High Denisty	3/2/2022	Approved	Kristin Cote
SPR2021-0021	Alpine Flats Multi-family Site Plan Review	South of 20th Street and West of 50th Avenue	200 unit multifamily Development	12/9/2021	Approved	Kristin Cote
SUB2021-0036	Alpine Flats Subdivision	South of 20th Street and West of 50th Avenue	Replat 3 lots into 1 lot	12/9/2021	Approved	Kristin Cote
SUB2021-0031	Promontory Imagine School 2nd Filing, Second Replat	East of Promontory Parkway and South of 16th Street	Replat a future development track into a lot and right-a-way for a public street	11/10/2021	Approved	Kristin Cote
SPR2022-0001	Centerplace Townhomes Site Plan Review	North of 24th Street Road and East of 42nd Avenue	30 townhome units	1/5/2022	Approved	Kristin Cote
SUB2021-0024	Leffler Minor Subdivision	15756 County Road 66	4-lot subdivision (large lots)	8/10/2021	Approved	Darrell Gesick
SUB2022-0001	Centerplace North Filing #6	North of 24th Street Road and East of 42nd Avenue	30 townhome lots	1/7/2022	Approved	Kristin Cote
ZON2021-0015	Leffler rezone	15756 County Road 66	Rezone from I-M to R-E (DCMP)	8/10/2021	Approved	Darrell Gesick
SPR2020-0019	Fox Run Apartments	South of 13th Street and West of 59th Avenue	118 Multifamily Units	10/14/2020	Approved	Darrell Gesick
SUB2021-0005	Broadview Park Subdivision, 1st Replat	809 30th Avenue	Split 1 lot into 2	1/13/2021	Approved	Elizabeth Kellums
SUB2021-0006	Immaculata Plaza Minor Subdivision, 2nd replat	923 6th Street	Split 1 lot into 2	2/3/2021	Construction	April Medeiros
USR2020-0008	Immaculata II Apartment - USR	923 6th Street	30 Multifamily Units	12/23/2020	Construction	April Medeiros

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SUB2021-0027	Westridge Subdivision, 5th Filing, 2nd Replat	West of 59th Avenue and South of 24th Street	Replat existing Subdivision right-of-ways and convert a tract into a lot	9/14/2021	Construction	Darrell Gesick
SPR2021-0011	The Reserve @ West T-Bone Ranch Phase III Multi-family Site Plan Review	North of 29th Street and East of 58th Avenue	120 multifamily units on 5.92 acres	5/27/2021	Construction	Caleb Jackson
USR2020-0006	Copper Platte Apartment - USR	2050 Greeley Mall Street	224 Multifamily Units	11/4/2020	Construction	Michael Franke
SUB2020-0030	Cottages at Kelly Farm	North of 4th Street and East of 59th Avenue	31 residential units	10/20/2020	Construction	Darrell Gesick
SPR2020-0003	29th Street Multifamily development	East of 65th Avenue, South of Hwy 34 and West of the T-Bone Ranch Development	732 unit multifamily Development	2/20/2020	Construction	Darrell Gesick
PUD2021-0007	Greeley West Multifamily Final PUD	North of Centerplace Drive, East of 42nd Avenue and West of 38th Avenue	304 Multifamily Units	2/11/2021	Construction	Meg Oren
PUD2020-0009	Stoneybrook Lot 4 - Final PUD	West of 35th Avenue, North of Ditch #3 and South of C Street	142 Manufactured home sites	8/26/2020	Construction	Caleb Jackson
USR2019-0018	1100 8th Avenue - 55 Resort	1100 8th Avenue	85 unit Multifamily	11/1/2019	Construction	Elizabeth Kellums
S 21:15	Northridge Estates	South of C Street and East of Northridge High School	230 Single Family Lots	7/15/2015	Construction	April Medeiros
SUB2019-0013	City Center West Residential, 2nd Filing	South of 4th Street, North of 8th Street and East of 71st Avenue	146 single family detached lots, 130 single-family attached units and a 6 acre park	5/3/2019	Construction	Michael Franke
SPR 20:17	Poudre Trails Multi-Family	30th avenue and C Street	296 multifamily Units	10/4/2017	Construction	Michael Franke
SPR2018-0034	Trails at Sheep Draw Multi-family	South of 10th Street, North of 12th Street and West of 86th Avenue	546 unit multi-family Housing	12/28/2018	Construction	Michael Franke

2022 October Residential Projects

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PUD2021-0002	Westgate Filing #1, Lot 1 Final PUD	West of 71st Avenue and North of Hwy 34 Bypass	288 Multifamily Units	1/28/2021	Construction	April Medeiros
PUD2020-0003	Westgate Filing No. 1 Final PUD	North of Hwy 34 Bypass and West of 71st Avenue	1 (15.97 acre) multifamily lot and 4 future Development Tracts	3/25/2020	Construction	April Medeiros
PUD 8:01	Promontory Residential- Phases 2 & 3	NE Corner of Promontory Parkway and 16th Street	Completion of Platted Single Family Residential	5/2/2017	Construction	Kristin Cote

Planner Contact Information	
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Meg Oren	970-350-9824

Monthly Construction Report

October 2022

Community Development

BUILDING INSPECTION

This report is two-sided to conserve our natural resources.

CONSTRUCTION ACTIVITY SUMMARY
October 2022

TOTAL PERMIT ACTIVITY

	No. of Permits	Valuation
New Residential, Commercial, Addition & Remodel, Footing and Foundations and Misc.:	369	$76,714,170

RESIDENTIAL

	No. of Permits/Buildings	No. Units	Valuation
Single Family Dwelling:	6	6	$ 2,037,310
Multi-Family (Buildings)	16/13	315	$ 53,173,919
Remodel and Addition Work:	31	n/a	$ 586,111

COMMERCIAL

	No. of Permits	Valuation
New Commercial Projects:	6	$13,299,040

Commercial projects valued over $100,000 are summarized.

- ***Construction of a New Core and Shell Building, at 2211 115th Avenue, by Roche Constructors, Inc., for a Total Valuation of $4,470,048.***
- ***Construction of a New Single Story Bank with Drive-thru ATM, at 2263 Greeley Mall, by Megen Construction Company, Inc., for a Total Valuation of $2,754,252.***
- ***Construction of a New One Story Clubhouse Building for an Apartment Complex, at 2025 50th Avenue, by Brinkman Construction, Inc., for a Total Valuation of $4,937,500.***
- ***Construction of a New Core and Shell Building for Future Offices, at 5124 20th Street, by H & K Construction, LLC, for a Total Valuation of $986,040.***
- ***Construction of a New Metal Building, at 2901 1st Avenue, by Beaver Builders, LLC, for a total Valuation of $150,000.***

Building Inspection Division
Construction Activity Comparative Analysis

		Oct 2022	Oct 2021	YTD 2022	YTD 2021
New Single Family Dwelling Units*	**# of Permits**	6	11	328	124
	# of Units	6	11	328	124
	Valuation	2,037,310	4,140,737	101,294,363	40,619,553
Single Family Footing & Foundation Only	**# of Permits**	0	0	13	19
	Valuation			353,027	475,887
New Multi-Family Dwellings Units*	**# of Permits**	16	12	101	250
	# of Buildings	13	3	74	90
	# of Units	315	12	1,578	610
	Valuation	53,173,919	3,086,767	238,865,746	104,172,065
Multi-Family Footing & Foundation Only	**# of Permits**	0	0	15	52
	Valuation			5,233,515	1,284,172
Residential Additions and Remodels	**# of Permits**	31	44	314	343
	Valuation	586,111	780,602	7,935,233	7,647,405
New Commercial Projects	**# of Permits**	6	2	61	23
	Valuation	13,299,040	6,616,806	106,712,157	147,857,534
Commercial Footing & Foundation Only	**# of Permits**	0	0	2	0
	Valuation			276,136	
Commercial Additions and Remodels	**# of Permits**	8	9	128	105
	Valuation	2,065,160	1,410,622	77,122,339	14,159,834
Miscellaneous Permits	**# of Permits**	301	275	2,303	2,274
	Valuation	5,548,130	3,921,976	33,435,030	28,804,464
Mobile Home Permits	**# of Permits**	1	0	46	3
	Valuation	4,500		327,000	18,500
TOTALS	**# of Permits**	369	353	3,311	3,193
	Valuation	76,714,170	19,957,510	571,554,546	345,039,414

***Number of units and number of permits will differ due to some multiple unit dwellings being issued under one permit.**

Permit Number	ISSUED	JOBVALUE	SITE_ADDR	PERMITTYPE	PERMITSUBTYPE	DESCRIPTION	CONTRACTOR_NAME	SITE_LOT_NO	SITE_BLOCK	SITE_SUBDIVISION	MODELNUMBER	BLDG_SQFT	BALANCE_DUE
2210-0001	10/10/2022	2,000	2526 54TH AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Basement Finish - bedroom and bathroom		13	3	HIGHLAND PARK WEST		1/0/1900	1/0/1900
BCN2205-0603	10/21/2022	4,470,048	2211 115TH AVE	COMMERCIAL NEW	CORE AND SHELL	New Core and Shell	ROCHE CONSTRUCTORS INC	8A	NONE	WEST GREELEY TECH CENTER 6TH MINOR		34000	0
BCN2206-0341	10/31/2022	3,140,113	10306 20TH ST BLDG K	COMMERCIAL NEW	APARTMENT	Build a New 21 Unit Apartment Building	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 2ND FG 1ST RPLT TRACT B		25090	0
BCN2206-0346	10/31/2022	3,140,113	10306 20TH ST BLDG S	COMMERCIAL NEW	APARTMENT	Build a New 21 Unit Apartment Building	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 2ND FG 1ST RPLT TRACT B		25090	0
BCN2206-0347	10/31/2022	3,140,113	10306 20TH ST BLDG T	COMMERCIAL NEW	APARTMENT	Build a New 21 Unit Apartment Building	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 2ND FG 1ST RPLT TRACT B		25090	0
BCN2206-0528	10/25/2022	2,754,252	2263 GREELEY MALL	COMMERCIAL NEW	OFFICE BANK PROFESSIONAL	single story bank with drive thru atm and on-site parking	MEGEN CONSTRUCTION COMPANY INC	1	NONE	GREELEY MALL MINOR SUB		4178	0
BCN2207-0179	10/06/2022	4,937,500	2025 50TH AVE CLUBHOUSE	COMMERCIAL NEW	AMUSEMENT RECREATION	Build a One Story Clubhouse for Apartment Complex	BRINKMAN CONSTRUCTION, INC.			HIGHLAND HILLS SUB		4269	0
BCN2207-0216	10/06/2022	4,937,500	2025 50TH AVE BLDG A	COMMERCIAL NEW	APARTMENT	Build a New 20 Unit Apartment Building	BRINKMAN CONSTRUCTION, INC.			HIGHLAND HILLS SUB		19332	0
BCN2207-0217	10/06/2022	4,937,500	2025 50TH AVE BLDG B	COMMERCIAL NEW	APARTMENT	Build a New 36 Unit Apartment Building	BRINKMAN CONSTRUCTION, INC.			HIGHLAND HILLS SUB		31946	0
BCN2207-0218	10/06/2022	4,937,500	2025 50TH AVE BLDG C	COMMERCIAL NEW	APARTMENT	Build a New 24 Unit Apartment Building	BRINKMAN CONSTRUCTION, INC.			HIGHLAND HILLS SUB		20324	0
BCN2207-0220	10/06/2022	4,937,500	2025 50TH AVE BLDG D	COMMERCIAL NEW	APARTMENT	Build a New 36 Unit Apartment Building	BRINKMAN CONSTRUCTION, INC.			HIGHLAND HILLS SUB		31946	0
BCN2207-0221	10/06/2022	4,937,500	2025 50TH AVE BLDG E	COMMERCIAL NEW	APARTMENT	Build a New 24 Unit Apartment Building	BRINKMAN CONSTRUCTION, INC.			HIGHLAND HILLS SUB		20324	0
BCN2207-0222	10/06/2022	4,937,500	2025 50TH AVE BLDG F	COMMERCIAL NEW	APARTMENT	Build a New 24 Unit Apartment Building	BRINKMAN CONSTRUCTION, INC.			HIGHLAND HILLS SUB		20324	0
BCN2207-0224	10/06/2022	4,937,500	2025 50TH AVE BLDG G	COMMERCIAL NEW	APARTMENT	Build a New 36 Unit Apartment Building	BRINKMAN CONSTRUCTION, INC.			HIGHLAND HILLS SUB		31946	0
BCN2208-0122	10/04/2022	986,040	5124 20TH ST	COMMERCIAL NEW	CORE AND SHELL	Core and Shell for future Office Building	H & K CONSTRUCTION LLC	4	NONE	PINNACLE OFFICE PARK 5TH RPLT		6000	0
BCN2209-0073	10/24/2022	150,000	2901 1ST AVE	COMMERCIAL NEW	WAREHOUSE	New concrete pad, metal building and landscaping	BEAVER BUILDERS LLC	NONE	PT	GREELEY COMMERCE CENTER		1600	0
BCN2209-0122	10/06/2022	3,986,016	5601 29TH ST BLDG 11	COMMERCIAL NEW	APARTMENT	Build a New 3-Story 24 Unit Apartment Building	ANCON II CONSTRUCTORS, INC			MOUNTAIN VIEW AT WEST T-BONE RANCH 4TH RPLT		28664	0
BCN2209-0125	10/31/2022	3,986,016	5601 29TH ST BLDG 10	COMMERCIAL NEW	APARTMENT	Build a New 3-Story 24 Unit Apartment Building	ANCON II CONSTRUCTORS, INC			MOUNTAIN VIEW AT WEST T-BONE RANCH 4TH RPLT		28664	0
BCN2210-0083	10/24/2022	1,200	7109 27TH ST	COMMERCIAL NEW	CONSTRUCTION TRAILER	Temporary Leasing Trailer to be used by property owner.	Will Lyons			WESTGATE 1ST FG		710	0
BCX2206-0516	10/11/2022	830,000	1801 16TH ST	COMMERCIAL EXISTING	REMODEL	Replacing the existing rad fluoro equipment with new	THE WHITING-TURNER CONTRACTING COMP	A	NONE	HOSPITAL ADD		516.00	0.00
BCX2207-0334	10/24/2022	20,000	2435 2ND AVE	COMMERCIAL EXISTING	TELECOMMUNICATION	TMobile Wireless Communications Facility Modifications	AARCO Wireless & Electrical Solutions Corp					250.00	0.00
BCX2208-0463	10/21/2022	15,861	2608 11TH AVE	COMMERCIAL EXISTING	REMODEL	Remodel interior for restaurant	HENRY'S REMODELING LLC	1	NONE	SUBURBAN SUB		0.00	0.00
BCX2209-0282	10/11/2022	50,000	501 N 14TH AVE	COMMERCIAL EXISTING	DEMOLITION	Demolition of current Greeley Stampede offices.	TURNKEY BUILDERS					0.00	0.00
BCX2209-0425	10/05/2022	529,149	2503 RESERVOIR RD	COMMERCIAL EXISTING	REMODEL	City of Greeley Reservoir Bldg/Water Dpt. Remodel & New Roof	GROWLING BEAR CONSTRUCTION					4777.00	0.00
BCX2209-0577	10/12/2022	22,450	2815 28TH ST A-F	COMMERCIAL EXISTING	METHAMPHETAMINE REMEDIATION	Decontamination for methamphetamine residue	ALL STAR ENVIRONMENTAL SERVICES INC	NONE	NONE	STEPHENS 1ST ANNEX		0.00	0.00
BCX2209-0616	10/14/2022	150,000	4206 CENTERPLACE DR	COMMERCIAL EXISTING	EV CHARGING SYSTEM	8 proposed EV charging stations and electrical equipment	POWERHOUSE RETAIL SERVICES	1	1	CENTERPLACE PHASE 3 MINOR SUB		0.00	0.00
BCX2210-0168	10/31/2022	447,700	4144 24TH STREET RD UNIT 2B	COMMERCIAL EXISTING	TENANT FINISH	Tenant improvement of roughly 3,000 sf.	ROCHE CONSTRUCTORS INC			CENTERPLACE NORTH 3RD FG 4TH RPLT		2925.00	0.00
BRN2205-0654	10/12/2022	376,906	6101 1ST ST	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC No Bsmt Incl Lwn Sprklr Crwl Spc	DR HORTON	13	3	NORTHRIDGE ESTATES 1ST REPLAT	X427	2,398.00	0.00
BRN2205-0728	10/07/2022	349,892	6121 1ST ST	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC No Bsmt Incl Lwn Sprklr Crwl Spc	DR HORTON	18	3	NORTHRIDGE ESTATES 1ST REPLAT	X426	2,222.00	0.00
BRN2205-0732	10/12/2022	265,119	6117 1ST ST	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC No Bsmt Incl Lwn Sprklr Crwl Spc	DR HORTON	17	3	NORTHRIDGE ESTATES 1ST REPLAT	X450	1,635.00	0.00
BRN2206-0361	10/12/2022	399,355	6113 1ST ST	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC No Bsmt Incl Lwn Sprklr Crwl Spc	DR HORTON	16	3	NORTHRIDGE ESTATES 1ST REPLAT	X430	2,546.00	0.00
BRN2208-0107	10/13/2022	1,219,048	4125 24TH STREET RD BLDG 8 UNIT 27	RESIDENTIAL NEW	4-PLEX	1 Unit if New 4-Plex Twnhme Bldg Incl AC No Bsmt Incl Lwn Sp	VECTOR CONSTRUCTION	27		CENTERPLACE NORTH SUB	N/A	8350	0
BRN2208-0211	10/13/2022	0	4125 24TH STREET RD BLDG 8 UNIT 28	RESIDENTIAL NEW	4-PLEX	1 Unit if New 4-Plex Twnhme Bldg Incl AC No Bsmt Incl Lwn Sp	VECTOR CONSTRUCTION	28		CENTERPLACE NORTH SUB	N/A	8350	0
BRN2208-0212	10/13/2022	0	4125 24TH STREET RD BLDG 8 UNIT 29	RESIDENTIAL NEW	4-PLEX	1 Unit if New 4-Plex Twnhme Bldg Incl AC No Bsmt Incl Lwn Sp	VECTOR CONSTRUCTION	29		CENTERPLACE NORTH SUB	N/A	8350	0
BRN2208-0213	10/13/2022	0	4125 24TH STREET RD BLDG 8 UNIT 30	RESIDENTIAL NEW	4-PLEX	1 Unit if New 4-Plex Twnhme Bldg Incl AC No Bsmt Incl Lwn Sp	VECTOR CONSTRUCTION	30		CENTERPLACE NORTH SUB	N/A	8350	0
BRN2209-0245	10/14/2022	438,038	402 66TH AVE	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC 414 sf Finish Bsmt Incl Lwn Sprklr	HARTFORD CONSTRUCTION LLC	148	1	CITY CENTER WEST RESIDENTIAL 2ND FG	Plan 6 Twain	2,570.00	0.00
BRN2209-0301	10/11/2022	208,000	2990 C ST 11	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	Install New Manufactured Home on Permanent Foundation	TYSON HOME SERVICE			CLOVER MEADOWS 1ST RPLT		1,456.00	0.00
BRN2210-0116	10/19/2022	4,500	3102 17TH AVE 91	RESIDENTIAL NEW	MOBILE HOME	Install new mobile home with Xi2 foundation system	CLAYTON HOMES	NONE	NONE	NORGREN 1ST ANNEX		1088	0
BRX2104-0121	10/18/2022	15,617	1115 102ND AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Basement Finish		13	14	PROMONTORY RESIDENTIAL 1ST FG		1/0/1900	1/0/1900
BRX2208-0558	10/27/2022	5,000	8703 15TH ST	RESIDENTIAL EXISTING	PATIO DECK COVER AWNING	patio cover for back yard	henry fatta			TRAILS AT SHEEP DRAW		1/0/1900	1/0/1900
BRX2209-0070	10/14/2022	30,000	3312 69TH AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Adding 2 bedrooms, storage room, and finish bathroom.	Madeline Lara	25	7	ST MICHAELS SUB		1/0/1900	1/0/1900
BRX2209-0167	10/18/2022	25,000	3314 66TH AVENUE CT	RESIDENTIAL EXISTING	BASEMENT FINISH	Finishing out basement with bathroom, bedroom, and living r	Tyler Schiffer	9	22	ST MICHAELS SUB		1/0/1900	1/0/1900
BRX2209-0524	10/05/2022	24,000	710 66TH AVE	RESIDENTIAL EXISTING	METHAMPHETAMINE REMEDIATION	Meth Remediation	CARLYLE INVESTMENT GROUP LLC			CITY CENTER WEST RESIDENTIAL 2ND FG		1/0/1900	1/0/1900
BRX2209-0532	10/12/2022	12,594	2219 74TH AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Basment Finish -Framing, Plumbing, Electrical, HVAC, Drywall	Elkstone Inc	12	13	HOMESTEAD HEIGHTS 4TH FG		1/0/1900	1/0/1900
BRX2209-0563	10/13/2022	1,935	4801 6TH ST	RESIDENTIAL EXISTING	PATIO ENCLOSURE SUNROOM	adding 2 walls to enclose existing roofing area with a door	christopher Gonzalez	13	4	WESTMOOR WEST		1/0/1900	1/0/1900
BRX2209-0581	10/12/2022	5,200	714 20TH ST	RESIDENTIAL EXISTING	CARPORT	Existing Carport was damaged. The rebuild replace it	MQ3 CONSTRUCTION LLC	1	1	ALTA VISTA ADD		1/0/1900	1/0/1900
BRX2209-0582	10/27/2022	32,157	2828 39TH AVE	RESIDENTIAL EXISTING	SIDING SOFFIT FASCIA	R&R 31 SQ SIDING	POWER HOME REMODELING GROUP	20	4	GATEWAY LAKES		1/0/1900	1/0/1900
BRX2209-0599	10/01/2022	36,679	3021 68TH AVENUE CT	RESIDENTIAL EXISTING	BASEMENT FINISH	Finish basement into living space	Carlos Perez	14	41	ST MICHAELS SUB		1/0/1900	1/0/1900
BRX2209-0613	10/13/2022	19,699	10211 19TH STREET RD	RESIDENTIAL EXISTING	BASEMENT FINISH	Adding 3 bedrooms in basement	Dan Hirst			PROMONTORY IMAGINE SCHOOL 3RD FG		1/0/1900	1/0/1900
BRX2210-0017	10/05/2022	33,933	505 9TH AVE UNIT 221	RESIDENTIAL EXISTING	METHAMPHETAMINE REMEDIATION	Meth clean up in unit 221 and common hallway 2nd floor	ASBESTOS PROFESSIONALS	1	NONE	MEEKER COMMONS SUB		1/0/1900	1/0/1900
BRX2210-0018	10/18/2022	29,451	104 50TH AVENUE CT	RESIDENTIAL EXISTING	SIDING SOFFIT FASCIA	Install 28 sq vinyl siding, soffit, fascia, capping. No stru	POWER HOME REMODELING GROUP	8	13	WEBER WEST SUB		1/0/1900	1/0/1900
BRX2210-0044	10/14/2022	32,500	3995 B ST	RESIDENTIAL EXISTING	ADDITION	Adding a garage onto existing house	Journey Homes, LLC	14	NONE	JOHNSON SUB 1ST ADD		1/0/1900	1/0/1900
BRX2210-0065	10/12/2022	17,416	10209 16TH STREET RD	RESIDENTIAL EXISTING	BASEMENT FINISH	Finish Basement	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		1/0/1900	1/0/1900
BRX2210-0124	10/14/2022	1,612	5035 3RD STREET RD	RESIDENTIAL EXISTING	SIDING SOFFIT FASCIA	Small Hail Repair using like siding	CNW SIDING & WINDOW CO.	11	3	WEBER WEST 8TH RPLT		1/0/1900	1/0/1900
BRX2210-0136	10/24/2022	8,000	1311 3RD ST	RESIDENTIAL EXISTING	DEMOLITION	Complete demolition of shed, haul off and disposal	Michael Major	NONE	A	GREELEY CITY		1/0/1900	1/0/1900
BRX2210-0176	10/19/2022	13,050	2124 13TH ST	RESIDENTIAL EXISTING	REMODEL	Convert 3 existing basement windows to egress windows	BASEMENT ESCAPE	5	1	MAPLEWOOD 2ND ADD		1/0/1900	1/0/1900
BRX2210-0185	10/27/2022	45,000	202 57TH AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Basement Finish	WINDHAM DEVELOPMENT INC	6	1	CROSIERS CORNER AT KELLY FARM SUB		1/0/1900	1/0/1900
BRX2210-0222	10/31/2022	4,197	6604 7TH ST	RESIDENTIAL EXISTING	PATIO DECK COVER AWNING	Patio Cover				CITY CENTER WEST RESIDENTIAL 2ND FG		1/0/1900	1/0/1900
BRX2210-0236	10/26/2022	20,905	1214 103RD AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Basement Finish	TYBUILD CUSTOM CONSTRUCTION INNOVATIONS	4	15	PROMONTORY RESIDENTIAL 1ST FG		1/0/1900	1/0/1900
BRX2210-0247	10/19/2022	22,134	211 N 47TH AVENUE CT	RESIDENTIAL EXISTING	SIDING SOFFIT FASCIA	R&R 21 SQ SIDING	POWER HOME REMODELING GROUP	16	23	WEBER WEST 5TH RPLT		1/0/1900	1/0/1900
BRX2210-0252	10/25/2022	24,313	709 43RD AVE	RESIDENTIAL EXISTING	SIDING SOFFIT FASCIA	Install new Composite Siding, vinyl soffit & aluminum fascia	UNI DESIGN	5	5	WESTMOOR ACRES 1ST FG		1/0/1900	1/0/1900
BRX2210-0256	10/31/2022	25,932	302 N 64TH AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Adding 2 Bedrooms, 1 Bathroom, 1 Laundryroom,1 Flex Space	juan manuel flores rodriguez			NORTHRIDGE ESTATES 1ST REPLAT		1/0/1900	1/0/1900
BRX2210-0258	10/27/2022	10,000	4328 22ND ST	RESIDENTIAL EXISTING	REMODEL	Tub to Shower Conversion; Shower valve replacement	Colorado Living LLC	19	2	VIRGINIA HILLS 1ST RPLT		1/0/1900	1/0/1900
BRX2210-0272	10/24/2022	28,500	4918 30TH ST	RESIDENTIAL EXISTING	BASEMENT FINISH	Finish basement	Maya Nguyen	15	6	T BONE RANCH SUB 1ST FG		1/0/1900	1/0/1900
BRX2210-0328	10/27/2022	25,000	4611 1ST STREET DR	RESIDENTIAL EXISTING	ACCESSORY STRUCTURES	build shop with electrical	Dean Shepard	20	10	PHEASANT RUN SUB 2ND FG		1/0/1900	1/0/1900
BRX2210-0336	10/25/2022	5,000	1525 45TH AVE	RESIDENTIAL EXISTING	REMODEL	change small basement window to a larger egress window	BASEMENT ESCAPE	3	1	COLLEGE GREEN 2ND FG		1/0/1900	1/0/1900
BRX2210-0356	10/31/2022	23,286	2307 APPLE AVE	RESIDENTIAL EXISTING	SIDING SOFFIT FASCIA	Install 22 sq vinyl siding, soffit, fascia, capping. No stru	POWER HOME REMODELING GROUP	13	5	PARKVIEW		1/0/1900	1/0/1900
BRX2210-0509	10/31/2022	6,000	1245 WILSHIRE AVE	RESIDENTIAL EXISTING	REMODEL	Putting 4 egress windows into basement		11	8	WILSHIRE 4TH ADD		1/0/1900	1/0/1900
ELEC2210-0008	10/03/2022	1,500	1308 13TH AVE	ELECTRICAL	SERVICE	200amp Service Upgrade	VENTARA LLC	2	1	CRANFORDS 2ND ADD		0	0
ELEC2210-0013	10/03/2022	15,000	2503 RESERVOIR RD	ELECTRICAL	SERVICE	Install New Branch Bldg Feeders/Services	ECKSTINE ELECTRIC CO					0	0
ELEC2210-0052	10/05/2022	16,000	1490 95TH AVE	ELECTRICAL	SERVICE	USR 17:17	JAMM Power Service					0	0
ELEC2210-0053	10/05/2022	7,673	5808 17TH ST	ELECTRICAL	SERVICE	Swamp out 150 amp service to 200amp w/ new breaker panel	ALLEN PLUMBING & HEATING	3	6	HILAND KNOLLS SUB		0	0
ELEC2210-0091	10/07/2022	2,500	2531 9TH AVENUE CT	ELECTRICAL	SERVICE	restore service		14	NONE	WHEELERS ADD		0	0
ELEC2210-0097	10/08/2022	1,200	2628 65TH AVE	ELECTRICAL	SERVICE	Shop Electrical		5	NONE	KEN WIL ACRES 1ST FG		0	0
ELEC2210-0104	10/10/2022	8,000	3490 O ST	ELECTRICAL	SERVICE	New service for pump at NWWD water line	Justin Martin					0	0
ELEC2210-0107	10/10/2022	2,000	2526 54TH AVE	ELECTRICAL	SERVICE	electrical for new room		13	3	HIGHLAND PARK WEST		0	0
ELEC2210-0128	10/11/2022	4,980	2564 19TH AVE	ELECTRICAL	SERVICE	Install new 200/200A meter/main combo.	BRS Field Oos, LLC	37	5	HILLSIDE ADD		0	0
ELEC2210-0131	10/11/2022	1,500	1420 2ND ST	ELECTRICAL	TEMPORARY ELECTRIC	200amp/3 phase 208Volt Temp power for construction	Chris Raskay	2	1	GREELEY DTR SITE		0	0
ELEC2210-0207	10/13/2022	40,000	716 16TH ST	ELECTRICAL	SERVICE	Electric Service Upgrade to 1000AMPS 3 phase 120 208 Service	KING ELECTRIC LLC	1	2	ARLINGTON HEIGHTS		0	0
ELEC2210-0214	10/13/2022	2,490	7226 20TH STREET LN	ELECTRICAL	SERVICE	Circuits for washer, dyer, & Range in basement		8	2	HOMESTEAD HEIGHTS SUB FG#1		0	0
ELEC2210-0215	10/13/2022	6,700	1215 19TH ST	ELECTRICAL	SERVICE	Upgrade Service to 200 amps and install subpanel in the gar	STEWART ELECTRICAL AND CONSTRUCTION LLC	1	9	CRANFORDS 2ND ADD		0	0
ELEC2210-0233	10/17/2022	2,200	317 N 9TH AVE	ELECTRICAL	SERVICE	Customer wants to remove out of date 200a panel and replace	ARMORED ELECTRIC SERVICE	3	32	CLAYTON PARK		0	0
ELEC2210-0251	10/17/2022	1,250	1015 19TH AVE	ELECTRICAL	SERVICE	install new 150 Amp service and 1 20 amp outlet on garage	SPRING CREEK ELECTRIC LLC	7	11	PACKARDS SUB		0	0
ELEC2210-0320	10/20/2022	3,500	2280 1ST AVE 100	ELECTRICAL	SERVICE	Upgrade service	AC/DC ELECTRIC INC	100	NONE	COUNTRYSIDE SOUTH PUD		0	0
ELEC2210-0327	10/20/2022	500	6603 3RD ST 1524	ELECTRICAL	SERVICE	Hook up Radon system	COLORADO ELECTRICAL SOLUTIONS	1524	NONE	SUMMER PARK CONDOS 26TH SUPP		0	0
ELEC2210-0473	10/27/2022	5,550	2427 6TH AVE	ELECTRICAL	SERVICE	Replace electrical service	H & S ELECTRIC LLC	8	5	VOLKS SUB		0	0
ELEC2210-0478	10/27/2022	1,500	2403 27TH ST	ELECTRICAL	SERVICE	Change out existing meter can on building	EATON ELECTRIC	5	2	STEPHENS SUB		0	0
ELEC2210-0499	10/28/2022	34,132	4318 CENTERPLACE DR	ELECTRICAL	SERVICE	Remove/Replace existing electric car charger station	ENCORE ELECTRIC INC	3	1	CENTERPLACE SUB 2ND FG		0	0
ELEC2210-0536	10/31/2022	2,000	2632 21ST AVE	ELECTRICAL	SERVICE	Replacing Panel	Mike Mansfield	23	3	HILLSIDE 1ST ADD		0	0
FLAT2208-0643	10/20/2022	800	2414 34TH AVE	FLATWORK		Flatwork - Adding on to existing driveway		10	2	WEST LAKE PARK 3RD FG		0	0
FLAT2208-0676	10/03/2022	8,000	3359 19TH STREET DR	FLATWORK		new and replace driveway	LION CONSTRUCTION	45	4	ROLLING HILLS 3RD ADD		0	0
FLAT2210-0092	10/07/2022	5,600	2632 14TH AVENUE CT	FLATWORK		replace driveway and sidewalk	vizcaino jesus	9	21	FARRS 5TH ADD		0	0
MECH2210-0009	10/03/2022	3,125	3102 17TH AVE 144	MECHANICAL	FURNACE	Replaced Furnace	AIRTECH HVAC SERVICES (AIR SOLUTION	NONE	NONE	NORGREN 1ST ANNEX		0	0
MECH2210-0011	10/03/2022	12,955	317 43RD AVENUE CT	MECHANICAL	FURNACE AND AIR CONDITIONING	remove existing furn/ac and replace with new like furn/ac	ALLEN PLUMBING & HEATING	14	4	PHEASANT RUN SUB		0	0
MECH2210-0015	10/03/2022	3,500	3520 HOLMAN CT	MECHANICAL	AIR CONDITIONING	Installing 2 separate AC units	AMERICAN AIR HEATING & A/C	11	NONE	SEELEY LAKE SUB 1ST FG		0	0
MECH2210-0039	10/04/2022	3,600	1921 78TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	replacing furnace and ac	PREMIER HEATING & A/C	4	2	MOUNTAIN VISTA FG#2		0	0
MECH2210-0058	10/06/2022	9,808	6607 3RD ST 1120	MECHANICAL	FURNACE AND AIR CONDITIONING	Furnace and A/C Change Out	BEST BUY HEATING & A/C	1120	NONE	SUMMER PARK CONDOS 6TH SUPP		0	0
MECH2210-0064	10/06/2022	11,400	5775 29TH ST 306	MECHANICAL	FURNACE AND AIR CONDITIONING	remove existing furn/ac and replace with new like furn/ac	ALLEN PLUMBING & HEATING	306	NONE	WEST FORK VILLAGE CONDO PHASE 3 2ND SUPP		0	0
MECH2210-0089	10/07/2022	13,284	2047 36TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	HVAC REPLACEMENT	MCCREERY AND SUN	1	3	MEADOWS PUD		0	0
MECH2210-0093	10/07/2022	3,000	1610 104TH AVENUE PL	MECHANICAL	AIR CONDITIONING	1610 104th Ave Pl	J&J Construction of Northern Colorado, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2210-0094	10/07/2022	5,988	3303 12TH STREET RD	MECHANICAL	FURNACE	Replaced Furnace	AIRTECH HVAC SERVICES (AIR SOLUTION	11	4	WESTWOOD 2ND ADD		0	0
MECH2210-0102	10/10/2022	500	1930 18TH AVE	MECHANICAL	GAS TEST	Pressure Test	AIR X-TREME	911	9	GLENMERE PARK		0	0
MECH2210-0105	10/10/2022	7,230	103 50TH AVE	MECHANICAL	FURNACE	Remove existing furnace and replace with new like furnace	ALLEN PLUMBING & HEATING	32	13	WEBER WEST 7TH RPLT		0	0
MECH2210-0114	10/10/2022	500	2321 27TH ST 510	MECHANICAL	GAS TEST	Pressure Test @ Unit 507 Beauty Supply	AIR X-TREME					0	0
MECH2210-0118	10/10/2022	4,500	950 52ND AVENUE CT T-4	MECHANICAL	AIR CONDITIONING	HVAC system replacement	EAST TO WEST HEATING AND AIR CONDITIONING LLC	4	NONE	WEST POINT CONDOS SUPP#4 BLDG J,K,S&T		0	0
MECH2210-0119	10/10/2022	1,100	2403 27TH AVENUE PL	MECHANICAL	AIR CONDITIONING	AC replacement	EAST TO WEST HEATING AND AIR CONDITIONING LLC	2	7	CASCADE PARK SOUTH		0	0
MECH2210-0121	10/11/2022	3,000	10505 16TH STREET RD	MECHANICAL	AIR CONDITIONING	10505 16th St Rd	J&J Construction of Northern Colorado, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2210-0127	10/11/2022	13,645	14749 66 CR	MECHANICAL	FURNACE AND AIR CONDITIONING	30,000 BTU hyper heat mini split system 2 heads 18,000/12,00	AFFORDABLE HEATING & A/C	1	NONE	CLARK MINOR 1ST AMD		0	0
MECH2210-0132	10/11/2022	12,312	2533 13TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	Remove existing install ac, condenser, furnace. Electrical	IMS HEATING & AIR INC	15	17	FARRS 4TH ADD		0	0
MECH2210-0137	10/11/2022	4,527	2313 33RD AVE	MECHANICAL	FURNACE	Install a 88k BTU 80% ng Furnace	JMP HEAT dba LION HOME SERVICE	23	1	WEST LAKE PARK 2ND FG		0	0
MECH2210-0165	10/12/2022	14,917	918 5TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	removed existing furn/ac and replaced with new like furn/ac	ALLEN PLUMBING & HEATING	17	129	BACONS SUB		0	0
MECH2210-0170	10/12/2022	3,000	1303 8TH AVE	MECHANICAL	FURNACE	Replacing 2 existing furnace	GREELEY FURNACE CO LLC	1	104	GREELEY CITY		0	0
MECH2210-0183	10/13/2022	500	1219 14TH AVE	MECHANICAL	GAS TEST	Pressure Test	AIR X-TREME	2	91	FOREST PARK		0	0
MECH2210-0220	10/14/2022	10,320	1836 HOMESTEAD RD	MECHANICAL	FURNACE AND AIR CONDITIONING	direct replacement Furnace and AC	TRA MAR MECHANICAL AKA WESTERN COMFORT					0	0
MECH2210-0228	10/14/2022	13,951	533 36TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	remove existing furn/ac and replace with new like furn/ac	ALLEN PLUMBING & HEATING	11	13	EDWARDS HOMES 6TH ADD		0	0
MECH2210-0229	10/14/2022	6,755	5415 6TH ST	MECHANICAL	FURNACE	remove existing furn and replace with new like furn	ALLEN PLUMBING & HEATING	15	3	WEST POINT SUB 6TH FG		0	0
MECH2210-0230	10/14/2022	4,000	4507 6TH ST	MECHANICAL	FURNACE AND AIR CONDITIONING	Replace Furnace and AC	AMERICAN AIR HEATING & A/C	28	12	WESTMOOR ACRES 1ST FG		0	0
MECH2210-0237	10/17/2022	14,000	5030 PAWNEE DR	MECHANICAL	FURNACE	Remove and install 120K BTU 97% Furnace	One Hour Heating and Air	9	5	ARROWHEAD SUB 1ST FG		0	0
MECH2210-0242	10/17/2022	10,584	331 52ND AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	Remove existing and install ac, condenser, furnace	IMS HEATING & AIR INC	45	1	GLEN EDEN AT KELLY FARM SUB		0	0
MECH2210-0244	10/17/2022	7,244	8423 18TH STREET RD	MECHANICAL	FURNACE	remove existing furn and replace with new like furn	ALLEN PLUMBING & HEATING	8	5	MOUNTAIN SHADOWS SUB 3RD FG		0	0
MECH2210-0248	10/17/2022	3,225	435 N 35TH AVE 321	MECHANICAL	FURNACE	replace furnace with new 95% AFUE furnace 45,000 btuh	Energy Resource Center	1	1	STONEYBROOK SUB FG#1		0	0
MECH2210-0264	10/18/2022	1,200	3576 21ST STREET RD	MECHANICAL	FURNACE	Replacing existing furnace	GREELEY FURNACE CO LLC	15	3	MEADOWS PUD		0	0
MECH2210-0273	10/18/2022	5,130	4220 ARCHES ST	MECHANICAL	AIR CONDITIONING	60,0000 BTU Furnace	AFFORDABLE HEATING & A/C	14	14	WEST HILL N PARK 1ST FG 1ST RPLT		0	0
MECH2210-0280	10/19/2022	10,000	4215 MT RAINIER CT	MECHANICAL	FURNACE	Remove and install 60K BTU 80% Furnace in Mobile home	One Hour Heating and Air	2	11	WEST HILL N PARK 4TH FG		0	0
MECH2210-0307	10/19/2022	3,000	1612 102ND AVE	MECHANICAL	AIR CONDITIONING	1612 102nd Ave	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2210-0308	10/19/2022	3,000	1604 104TH AVENUE PL	MECHANICAL	AIR CONDITIONING	1604 104th Ave Pl	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2210-0310	10/19/2022	8,068	3206 66TH AVE	MECHANICAL	FURNACE	Remove existing furnace and replace with new like furnace	ALLEN PLUMBING & HEATING	1	24	ST MICHAELS SUB		0	0
MECH2210-0312	10/19/2022	13,598	2430 9TH ST	MECHANICAL	FURNACE AND AIR CONDITIONING	removed existing furn/ac and replaced with new like furn/ac	ALLEN PLUMBING & HEATING	8	2	HOUSTON HEIGHTS 1ST ADD		0	0
MECH2210-0314	10/19/2022	5,481	1828 26TH AVENUE PL	MECHANICAL	FURNACE AND AIR CONDITIONING	Install a 80k BTU 80% ng Furnace and a 2.5 ton B cab	JMP HEAT dba LION HOME SERVICE	12	15	ROLLING HILLS		0	0
MECH2210-0317	10/20/2022	1,175	1242 49TH AVE	MECHANICAL	AIR CONDITIONING	Installing mini split	GREELEY FURNACE CO LLC	18	4	COUNTRY CLUB WEST SUB		0	0
MECH2210-0325	10/20/2022	1,804	709 42ND ST	MECHANICAL	FURNACE	INSTALL FUNACE	A-1 HEATING AND AIR CONDITIONING	19	P32	EVANS CITY		0	0
MECH2210-0334	10/20/2022	5,464	177 20TH AVENUE CT	MECHANICAL	FURNACE	80,000 BTU FURNACE	AFFORDABLE HEATING & A/C	11	NONE	TOWN NORTH 1ST FG		0	0
MECH2210-0335	10/20/2022	15,990	2103 60TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	HVAC Replacement	MCCREERY AND SUN	19	1	ALLISON FARM 1ST FG		0	0
MECH2210-0338	10/20/2022	4,759	1842 22ND ST	MECHANICAL	FURNACE	80,000 BTU Furnace		27	NONE	WEAVER HEIGHTS SUB RPLT		0	0

MECH2210-0339	10/20/2022	4,759	1842 22ND ST	MECHANICAL	FURNACE	btu furnace- pulled the permit twice for the same add		27	NONE			0	0
MECH2210-0348	10/21/2022	6,251	2522 51ST AVE	MECHANICAL	FIREPLACE-GAS STOVES	New Fireplace with Gas Line Install	UNI DESIGN	2	5			0	0
MECH2210-0349	10/21/2022	4,125	149 63RD AVE	MECHANICAL	AIR CONDITIONING	INSTALL 17 SEER 3.5 TON A/C	SWAN HEATING & A/C OF DENVER	22	1			0	0
MECH2210-0352	10/21/2022	656	1711 35TH AVENUE CT	MECHANICAL	GAS TEST	Inspect new gas line installation and air test	MCCREERY AND SUN	3	5			0	0
MECH2210-0355	10/21/2022	2,745	2739 22ND STREET LN	MECHANICAL	FURNACE AND AIR CONDITIONING	Replacing existing furnace and condenser	GREELEY FURNACE CO LLC	12	1			0	0
MECH2210-0367	10/24/2022	3,000	10201 16TH STREET RD	MECHANICAL	AIR CONDITIONING	10201 16th St Rd	Journey Homes, LLC					0	0
MECH2210-0368	10/24/2022	3,000	10334 17TH ST	MECHANICAL	AIR CONDITIONING	10334 17th St	J&J Construction of Northern Colorado, LLC					0	0
MECH2210-0376	10/24/2022	3,000	10522 17TH ST	MECHANICAL	AIR CONDITIONING	10522 17th St	J&J Construction of Northern Colorado, LLC					0	0
MECH2210-0377	10/24/2022	3,000	1629 104TH AVENUE PL	MECHANICAL	AIR CONDITIONING	1629 104th Ave Pl	J&J Construction of Northern Colorado, LLC					0	0
MECH2210-0378	10/24/2022	3,000	10307 16TH STREET RD	MECHANICAL	AIR CONDITIONING	10307 16th St Rd	Journey Homes, LLC					0	0
MECH2210-0379	10/24/2022	3,000	1706 101ST AVENUE CT	MECHANICAL	AIR CONDITIONING	1706 101st Ave Ct	Journey Homes, LLC					0	0
MECH2210-0404	10/25/2022	4,500	1324 6TH ST	MECHANICAL	FURNACE AND AIR CONDITIONING	Furnace replacement and New AC	AMERICAN AIR HEATING & A/C	2	32			0	0
MECH2210-0405	10/25/2022	2,000	1402 28TH STREET RD	MECHANICAL	FURNACE	replace existing furnace, 80K, 80%		21	1			0	0
MECH2210-0415	10/25/2022	13,727	2201 12TH STREET RD	MECHANICAL	FURNACE AND AIR CONDITIONING	HVAC REPLACEMENT	MCCREERY AND SUN	5	3			0	0
MECH2210-0421	10/25/2022	500	1110 6TH ST	MECHANICAL	GAS TEST	Pressure Test 1108 & 1108.5 6th St	AIR X-TREME	2	34			0	0
MECH2210-0424	10/25/2022	5,747	3120 52ND AVE	MECHANICAL	FURNACE	Replaced Furnace	AIRTECH HVAC SERVICES (AIR SOLUTION	32	8			0	0
MECH2210-0431	10/26/2022	4,500	2528 29TH AVE	MECHANICAL	FIREPLACE-GAS STOVES	Install of Wood burning insert	FIREPLACE WAREHOUSE LLC	19	12			0	0
MECH2210-0432	10/26/2022	16,032	7212 23RD STREET RD	MECHANICAL	AIR CONDITIONING	Replaced Furnace and AC		24	6			0	0
MECH2210-0433	10/26/2022	4,625	208 21ST AVE	MECHANICAL	FURNACE	80,000 BTU furnace	AFFORDABLE HEATING & A/C	2	1			0	0
MECH2210-0434	10/26/2022	2,850	1116 33RD AVE	MECHANICAL	FURNACE	replace furnace with new 95% AFUE furnace 40,000 btu	Energy Resource Center	19	3			0	0
MECH2210-0438	10/26/2022	8,450	4541 1ST STREET RD	MECHANICAL	FURNACE AND AIR CONDITIONING	INSTALL 45K BTU 96% EFFICIENT FURNACE AND 2 TON 17 SEER	SWAN HEATING & A/C OF DENVER	10	3			0	0
MECH2210-0458	10/26/2022	4,221	224 N 53RD AVE	MECHANICAL	FURNACE	Install a 110k BTU 80%ng Furnace	JMP HEAT dba LION HOME SERVICE	8	6			0	0
MECH2210-0463	10/27/2022	4,000	5707 5TH STREET RD	MECHANICAL	FURNACE AND AIR CONDITIONING	Replacing existing furnace and condenser	GREELEY FURNACE CO LLC	4	4			0	0
MECH2210-0466	10/27/2022	3,850	1705 67TH AVE	MECHANICAL	FURNACE	Replace Furnace	AIR X-TREME	23	7			0	0
MECH2210-0466	10/27/2022	16,960	3311 26TH ST	MECHANICAL	FURNACE AND AIR CONDITIONING	replace furnace ac and furnace	BALANCE POINT HEATING & AIR	10	4			0	0
MECH2210-0486	10/27/2022	4,899	1639 104TH AVENUE CT	MECHANICAL	AIR CONDITIONING	Remove existing and install 16 seer 2.5 ton ac and condenser	IMS HEATING & AIR INC					0	0
MECH2210-0488	10/27/2022	1,595	3300 13TH ST	MECHANICAL	FURNACE	Replace 3 Ton 80,000 BTU Furnace Building 3300 Apt 303		NONE	14			0	0
MECH2210-0503	10/28/2022	6,395	1613 68TH AVE	MECHANICAL	FURNACE	replace 90,000 BTU gas furnace	IMS HEATING & AIR INC	10	3			0	0
MECH2210-0533	10/31/2022	2,850	819 35TH AVE	MECHANICAL	FURNACE	replace furnace with new 95% AFUE furnace 60,000 btu	Energy Resource Center	5	5			0	0
PLB2210-0004	10/02/2022	800	4519 6TH ST	PLUMBING	WATER,SEWER SERVICE LINE	Sewer line repair	Gold Star Excavation	25	12			0	0
PLB2210-0005	10/03/2022	3,250	2200 O ST	PLUMBING	WATER,SEWER SERVICE LINE	10' long repair on grease trap	THE ELITE PIPE MD	A	NONE			0	0
PLB2210-0021	10/03/2022	1,328	1226 10TH ST	PLUMBING	GAS PIPING	repair gas line	ALLEN PLUMBING & HEATING	4	73			0	0
PLB2210-0022	10/04/2022	450	5151 29TH ST 1309	PLUMBING	GAS TEST	gas leak test	TOP NOTCH PLUMBING	1309	NONE			0	0
PLB2210-0037	10/04/2022	4,800	1606 22ND AVE	PLUMBING	WATER SEWER REPAIR	10' SPOT REPAIR IN FRONT YARD AND INSTALL CLEANOUTS	TRENCH RIGHT LLC	5	NONE			0	0
PLB2210-0049	10/05/2022	1,900	134 E 24TH ST	PLUMBING	WATER HEATER BOILER	install water heater	TOP NOTCH PLUMBING					0	0
PLB2210-0062	10/06/2022	4,800	2344 9TH ST	PLUMBING	WATER SEWER REPAIR	8' SPOT REPAIR IN BACK YARD AND INSTALL CLEANOUTS	TRENCH RIGHT LLC	11	17			0	0
PLB2210-0063	10/06/2022	4,800	202 N 43RD AVENUE CT	PLUMBING	WATER SEWER REPAIR	8' SPOT REPAIR IN FRONT YARD AND INSTALL CLEANOUTS	TRENCH RIGHT LLC	4	1			0	0
PLB2210-0066	10/06/2022	5,800	4507 22ND ST	PLUMBING	WATER SEWER REPAIR	8' SPOT REPAIR IN FRONT YARD AND INSTALL CLEANOUTS	TRENCH RIGHT LLC	21	3			0	0
PLB2210-0077	10/06/2022	3,600	706 18TH AVE	PLUMBING	WATER SEWER REPAIR	Sewer repair in the yard up to 25 feet	Robert Arteaga	4	9			0	0
PLB2210-0084	10/07/2022	800	1430 12TH AVE	PLUMBING	WATER HEATER BOILER	Replace old water heater	Jeff W Huskerson	1	156			0	0
PLB2210-0088	10/07/2022	49	1823 12TH ST	PLUMBING	WATER HEATER BOILER	Inspect hot water heater that was installed 2020		10	2			0	0
PLB2210-0095	10/07/2022	2,191	3251 2ND ST	PLUMBING	WATER HEATER BOILER	Install a40 gal ng WH	JMP HEAT dba LION HOME SERVICE	16	1			0	0
PLB2210-0106	10/10/2022	1,910	624 37TH AVENUE CT	PLUMBING	WATER HEATER BOILER	50 gal gas, 38K BTU, replacement like for like	COLORADO DELTA MECHANICAL INC	22	18			0	0
PLB2210-0126	10/11/2022	2,635	213 18TH ST	PLUMBING	WATER HEATER BOILER	Remove existing and install new 009 backflow preventer	Paul's Anytime Plumbing and Heating					0	0
PLB2210-0166	10/12/2022	200	315 12TH AVE	PLUMBING	GAS TEST	Test for leaks as to Atmos	PAUL ROHRIG PLUMBING & HEATING	1	8			0	0
PLB2210-0193	10/13/2022	4,500	5415 11TH ST	PLUMBING	WATER SEWER REPAIR	sanitary sewer repair in private property, install grease	Elite Rooter	7	1			0	0
PLB2210-0234	10/17/2022	600	304 53RD AVE	PLUMBING	WATER HEATER BOILER	replace water heater	Star Plumbing LLC	37	1			0	0
PLB2210-0270	10/18/2022	4,500	1616 13TH AVE	PLUMBING	WATER SEWER REPAIR	8 FOOT SPOT REPAIR 5 FEET DEEP IN FRONT YARD.	TRENCH RIGHT LLC	8	6			0	0
PLB2210-0283	10/19/2022	6,800	510 10TH ST	PLUMBING	WATER SEWER REPAIR	6 FOOT SPOT REPAIR 6 FEET DEEP ON WEST SIDE OF PROPER	TRENCH RIGHT LLC	3	80			0	0
PLB2210-0299	10/19/2022	0	925 B ST	PLUMBING	GAS TEST	pressure gas line		34	32			0	0
PLB2210-0302	10/19/2022	1,292	1005 E 24TH STREET LN	PLUMBING	WATER HEATER BOILER	Install a 40 gal ng WH	JMP HEAT dba LION HOME SERVICE	33	5			0	0
PLB2210-0315	10/19/2022	1,200	1006 31ST AVE	PLUMBING	GAS TEST	almost shut off meter, said they had a leak in the gas pipe	MANNY'S QUALITY PLUMBING	2	2			0	0
PLB2210-0340	10/20/2022	2,191	312 34TH AVE	PLUMBING	WATER HEATER BOILER	Install a 40 gal direct vent WH	JMP HEAT dba LION HOME SERVICE	4	3			0	0
PLB2210-0342	10/20/2022	1,292	2924 11TH STREET RD	PLUMBING	WATER HEATER BOILER	Install a 50 gal ng Water Heater	JMP HEAT dba LION HOME SERVICE	3	5			0	0
PLB2210-0347	10/21/2022	1,500	815 E 20TH STREET RD	PLUMBING	WATER HEATER BOILER	Install a 50 gallon gas hot water heater	wayne volack	6A	2			0	0
PLB2210-0369	10/24/2022	2,000	1305 29TH ST	PLUMBING	WATER SEWER REPAIR	10' spot repair in front yard of private property	Elite Rooter	1	2			0	0
PLB2210-0371	10/24/2022	1,670	2410 APPLE AVE	PLUMBING	WATER HEATER BOILER	40 gal gas, 36K BTU, replacement like for like	COLORADO DELTA MECHANICAL INC	24	5			0	0
PLB2210-0382	10/24/2022	1,500	2523 14TH AVE	PLUMBING	WATER SEWER REPAIR	20' sewer line repair within backyard	Elite Rooter	21	16			0	0
PLB2210-0398	10/25/2022	1,400	3775 25TH ST BLDG D #101-108, 201-208, 301-308	PLUMBING	WATER HEATER BOILER	Apt# D 201-40 gallon water heater replacement	PD GREEN'S PLUMBING	1	PT			0	0
PLB2210-0399	10/25/2022	1,400	3775 25TH ST BLDG F #101-108, 201-208, 303-306	PLUMBING	WATER HEATER BOILER	Apt #F303-40 gallon water heater replacement	PD GREEN'S PLUMBING	1	PT			0	0
PLB2210-0400	10/25/2022	1,400	3775 25TH ST BLDG F #101-108, 201-208, 303-306	PLUMBING	WATER HEATER BOILER	Apt #F205-40 gallon water heater replacement	PD GREEN'S PLUMBING	1	PT			0	0
PLB2210-0401	10/25/2022	1,400	3775 25TH ST BLDG D #101-108, 201-208, 301-308	PLUMBING	WATER HEATER BOILER	Apt# D201-40 gallon water heater replacement	PD GREEN'S PLUMBING	1	PT			0	0
PLB2210-0416	10/25/2022	2,000	916 22ND ST	PLUMBING	WATER HEATER BOILER	replace water heater	TOP NOTCH PLUMBING	19	3			0	0
PLB2210-0430	10/26/2022	150	500 23RD AVE	PLUMBING	GAS TEST	Gas test for Atmos to turn gas back on to the property	TRUE PLUMBING LLC	1	5			0	0
PLB2210-0435	10/26/2022	5,250	1357 43RD AVE 5	PLUMBING	WATER SEWER REPAIR	8' SPOT REPAIR 10 FEET DEEP	TRENCH RIGHT LLC	5	NONE			0	0
PLB2210-0440	10/26/2022	2,016	1620 21ST AVE	PLUMBING	WATER HEATER BOILER	Install a 50 gal ng Water Heater	JMP HEAT dba LION HOME SERVICE	9	11			0	0
PLB2210-0443	10/26/2022	1,670	218 N 22ND AVE	PLUMBING	WATER HEATER BOILER	40 gal gas, 36K BTU, replacement like for like	COLORADO DELTA MECHANICAL INC	3	2			0	0
PLB2210-0454	10/26/2022	5,500	609 24TH ST	PLUMBING	WATER SEWER REPAIR	17 FOOT SPOT REPAIR 5 FEET DEEP IN FRONT YARD	TRENCH RIGHT LLC	NONE	2			0	0
PLB2210-0461	10/26/2022	1,500	614 16TH ST	PLUMBING	WATER SEWER REPAIR	10' spot repair with cleanouts	Elite Rooter	1	1			0	0
PLB2210-0462	10/26/2022	800	711 13TH AVE	PLUMBING	WATER SEWER REPAIR	sewer line repair	tran pacheco	4	49			0	0
PLB2210-0464	10/27/2022	200	2310 9TH AVE	PLUMBING	WATER SEWER REPAIR	Open basement floor and tie in rerouted sink drain		22	5			0	0
PLB2210-0469	10/27/2022	1,000	3550 24TH ST 3 A-D	PLUMBING	WATER HEATER BOILER	40 gallon standard natural gas water heater	LT PLUMBING LLC	3	1			0	0
PLB2210-0520	10/31/2022	1,500	2143 73RD AVE	PLUMBING	WATER HEATER BOILER	Install a 75 gallon gas hot water heater		12	6			0	0
PLB2210-0522	10/31/2022	6,200	3822 8TH ST	PLUMBING	WATER SEWER REPAIR	8 FOOT SPOT REPAIR 9 FEET DEEP IN FRONT YARD. INSTALL CL	TRENCH RIGHT LLC	11	4			0	0
ROOF2210-0003	10/02/2022	5,000	1315 11TH AVE	ROOFING		tear off and reroof	A & M ROOFING	1	107			0	0
ROOF2210-0007	10/03/2022	6,800	1418 8TH ST	ROOFING		R&R Asphalt roof, overlay sheathing 7/16", felt, drip edge,	SANCHEZ BROS CUSTOM EXTERIORS	7	51			0	0
ROOF2210-0020	10/03/2022	9,900	5701 31ST ST	ROOFING		Reroof; Install 33 sq of OC Storm on 1 story res	ANCHOR ROOFING LLC	1	6			0	0
ROOF2210-0023	10/04/2022	40,000	1200 11TH AVE	ROOFING		Install new roof	C & E ROOFING	2	95			0	0
ROOF2210-0024	10/04/2022	3,400	2120 17TH ST	ROOFING		Only replacing front half of roof	SUMMIT ROOFING SOLUTIONS LLC	8	NONE			0	0
ROOF2210-0030	10/04/2022	8,001	8627 15TH ST	ROOFING		Tear off & re-roof	Sweet Roofing					0	0
ROOF2210-0031	10/04/2022	11,550	616 41ST AVE	ROOFING		Remove & replace with new all roofing material and flashings	FAITHFUL ROOFING LLC	33	8			0	0
ROOF2210-0040	10/04/2022	318,084	2311 16TH ST 101-102, 104-112, 201-212, 301-312, 401-412	ROOFING		Tear off existing roofing and replace with new roofing.	Amanda Rose-Gallagher					0	0
ROOF2210-0043	10/04/2022	8,200	4301 6TH ST	ROOFING		re roof	ARROYO'S ROOFING LLC	15	7			0	0
ROOF2210-0047	10/05/2022	14,701	714 20TH ST	ROOFING		Re-roofing detached shop/carport roof in Modified Bitumen	BLUE FROG ROOFING LIMITED	1	1			0	0
ROOF2210-0051	10/05/2022	2,600	2313 8TH ST	ROOFING		Re- Roof, tear down to deck, replace with laminate comp shin	SUMMIT ROOFING SOLUTIONS LLC	21	9			0	0
ROOF2210-0067	10/06/2022	4,700	225 12TH ST	ROOFING		Re- Roof, tear down to deck, replace with laminate comp shin	SUMMIT ROOFING SOLUTIONS LLC	3	135			0	0
ROOF2210-0071	10/06/2022	7,200	1913 76TH AVENUE CT	ROOFING		Remove and replace Shingles with Owens Corning Duration (Dri	LR CONTRACTING INC	21	4			0	0
ROOF2210-0087	10/07/2022	11,400	1823 12TH ST	ROOFING		Reroof; install 38 sq of OC Storm on res dwelling	ANCHOR ROOFING LLC	10	2			0	0
ROOF2210-0101	10/10/2022	4,500	308 25TH AVE	ROOFING		removing existing shingles		2	1			0	0
ROOF2210-0123	10/11/2022	3,600	2412 33RD AVE	ROOFING		Tear off 18 sq of asphalt shingle to deck and reroof to code	SEVERE WEATHER ROOFING	4	1			0	0
ROOF2210-0133	10/11/2022	20,000	7108 10TH ST	ROOFING		Re-roof	RC HOME IMPROVEMENT LLC					0	0
ROOF2210-0178	10/12/2022	5,000	1716 3RD AVE	ROOFING		remove and install a new shingel roof	C & E ROOFING					0	0
ROOF2210-0195	10/13/2022	6,439	2410 ASPEN AVE	ROOFING		Reroof	Bob Behrends Roofing	39	2			0	0
ROOF2210-0219	10/14/2022	7,500	526 36TH AVENUE CT	ROOFING		Re- Roof, tear down to deck, replace with laminate comp shin	SUMMIT ROOFING SOLUTIONS LLC	13	13			0	0
ROOF2210-0235	10/17/2022	9,358	1430 7TH ST	ROOFING		Reroof	Bob Behrends Roofing	15	2			0	0
ROOF2210-0250	10/17/2022	5,400	4502 5TH ST	ROOFING		Roof Replacement	SLAUGHTER ROOFING	7	12			0	0
ROOF2210-0265	10/18/2022	10,500	412 41ST AVE	ROOFING		Re- Roof, tear down to deck, replace with laminate comp shin	SUMMIT ROOFING SOLUTIONS LLC	26	8			0	0
ROOF2210-0290	10/19/2022	12,870	2342 33RD AVE	ROOFING		remove and replace 19.12 sq shingles	CUSTOM EXTERIORS LLC	14	2			0	0
ROOF2210-0293	10/19/2022	5,250	1207 12TH AVE	ROOFING		Remove old roof covering & install asphalt shingles	ANCHOR ROOFING LLC	1	93			0	0
ROOF2210-0294	10/19/2022	6,750	1815 12TH ST	ROOFING		Remove old roof covering & install asphalt shingles	ANCHOR ROOFING LLC	13	2			0	0
ROOF2210-0295	10/19/2022	7,500	1524 11TH AVE	ROOFING		re-roof, 30 sq OC Storm; 1 story; 6/12	ANCHOR ROOFING LLC	6	162			0	0
ROOF2210-0296	10/19/2022	5,750	1222 15TH AVE	ROOFING		re-roof; 23sq OC Storm; 1 story; 5/12	ANCHOR ROOFING LLC	13	2			0	0
ROOF2210-0297	10/19/2022	9,750	730 19TH AVE	ROOFING		re-roof; 39sq OC Storm; 2 story; 4/12	ANCHOR ROOFING LLC	3	2			0	0
ROOF2210-0298	10/19/2022	21,500	2105 19TH AVE	ROOFING		re-roof; 86 sq CS Storm; 2 story; 5/12	ANCHOR ROOFING LLC	1	1			0	0
ROOF2210-0322	10/20/2022	5,400	5631 16TH STREET RD	ROOFING		Roof Replacement	SLAUGHTER ROOFING	36	4			0	0
ROOF2210-0353	10/21/2022	6,770	708 8TH ST A	ROOFING		Reroof	Bob Behrends Roofing	4	58			0	0
ROOF2210-0372	10/24/2022	5,400	4218 20TH STREET RD	ROOFING		Roof Replacement	SLAUGHTER ROOFING	11	6			0	0
ROOF2210-0386	10/24/2022	3,800	3112 GRAND VIEW DR	ROOFING		Roof Replacement	SLAUGHTER ROOFING	9	NONE			0	0
ROOF2210-0391	10/24/2022	12,000	225 DUNDEE AVE 3	ROOFING		Replacing roof covering of a residential building	Janice Murphy	3	NONE			0	0
ROOF2210-0397	10/25/2022	8,900	2901 13TH ST	ROOFING		Re-roof using Owens Corning Class 4 shingle	Dustin Petterich *Black Belt Roofing	6	1			0	0
ROOF2210-0410	10/25/2022	5,700	812 E 20TH STREET RD	ROOFING		Reroof 19 sq Owens Corning on res dwelling	ANCHOR ROOFING LLC	2A	3			0	0
ROOF2210-0411	10/25/2022	12,513	421 E 28TH STREET RD	ROOFING		Complete tear off and reroof	PRO EXTERIORS	39	1			0	0
ROOF2210-0413	10/25/2022	6,600	826 E 21ST ST	ROOFING		Reroof 22 sq OC Storm on res dwelling	ANCHOR ROOFING LLC	6	6			0	0
ROOF2210-0436	10/26/2022	2,400	1415 5TH ST	ROOFING		replace		6	1			0	0
ROOF2210-0457	10/26/2022	6,800	717 47TH AVENUE CT	ROOFING		Re- Roof, tear down to deck, replace with laminate comp shin	SUMMIT ROOFING SOLUTIONS LLC	27	10			0	0
ROOF2210-0459	10/26/2022	5,100	577 E 19TH ST	ROOFING		tear off existing roof install new to code	GREATER FRONT RANGE ROOFING	4	4			0	0
ROOF2210-0467	10/27/2022	9,800	2111 9TH AVE	ROOFING		Re Roof	Robert D Tomlinson	3	4			0	0
ROOF2210-0468	10/27/2022	6,395	119 48TH AVENUE CT	ROOFING		Reroof using OCF Tru Def Duration Storm asphalt shingles	INDEPENDENT ROOFING	18	9			0	0
ROOF2210-0476	10/27/2022	5,400	404 E 23RD STREET RD	ROOFING		Replace the roofing	EO roofing	17	1			0	0
ROOF2210-0494	10/28/2022	4,500	2842 16TH AVE	ROOFING		Reroof	A & M ROOFING					0	0
ROOF2210-0521	10/31/2022	7,355	4014 11TH ST	ROOFING		Re- Roof, tear down to deck, replace with laminate comp shin	SUMMIT ROOFING SOLUTIONS LLC	14	5			0	0
SIGN2206-0432	10/06/2022	10,858	1702 30TH ST 1	SIGN	MAJOR AND ELECTRICAL	freestanding monument sign with internal illumination	Biltrite Sign Service Inc.	NONE	NONE			0	0
SIGN2209-0077	10/05/2022	50	4239 CENTERPLACE DR	SIGN	TEMPORARY	FLU SHOT BANNER		4	1			0	0
SIGN2209-0161	10/05/2022	4,500	2385 27TH ST	SIGN	MAJOR AND ELECTRICAL	install new illuminated letters - electrical existing	APEX SIGNS & GRAPHICS					0	0
SIGN2209-0265	10/27/2022	27,285	2450 29TH ST	SIGN	MINOR AND FACE REPLACEMENT	Install 2 new wall signs	Judith Cruz				GUARDIAN STORAGE GREELEY 29TH STREET	0	0
SIGN2209-0557	10/13/2022	30	2305 27TH ST	SIGN	TEMPORARY	red state farm banner with "state farm (R)" in white letters						0	0
SIGN2209-0596	10/24/2022	13,288	1540 8TH AVE	SIGN	MAJOR AND ELECTRICAL	Front lit channel letters & logos on South & West elevations	ACTION SIGNS & BANNERS LLC	25	165		BLOCK 165 SOUTH MADISON	0	0
SIGN2210-0019	10/31/2022	125	1706 9TH ST	SIGN	TEMPORARY	Feather Flag east side of building		1	8		PACKARDS SUB	0	0
SIGN2210-0090	10/25/2022	0	2863 35TH AVE A	SIGN	TEMPORARY	Trick or Treat Event at IBMC College		H	NONE		ELK LAKES SHOPPING CENTER PUD 1ST RPLT	0	0
SIGN2210-0181	10/18/2022	13,824	134 E 22ND ST	SIGN	MAJOR AND ELECTRICAL	Install (1) new wall sign & refurbish existing monument sign	BROOMFIELD SIGN COMPANY INC	2	2		PARKVIEW MIXED USE 1ST RPLT	0	0
SIGN2210-0241	10/27/2022	9,118	2600 36TH AVE	SIGN	MINOR AND FACE REPLACEMENT	Install one new illuminated wall sign	BROOMFIELD SIGN COMPANY INC	6	1		GATEWAY PARK FG#3 1ST RPLT	0	0
SPV2206-0016	10/10/2022	29,000	2632 13TH AVE	PHOTOVOLTAIC		ROOF MOUNT, FLUSH MOUNT, GRID-TIED: 5.44kW Solar PV	SUNRUN INSTALLATION SERVICES INC	7	22		FARRS 5TH ADD	0	0
SPV2206-0030	10/10/2022	40,000	627 51ST AVE	PHOTOVOLTAIC		New residential Solar install	NORTHERN CONSTRUCTION SEVICES DBA SMART WIRE	3	5		WEST POINT 2ND FG	0	0
SPV2207-0163	10/19/2022	23,976	535 E 26TH ST	PHOTOVOLTAIC		Roof Mounted Solar	GENERATION SOLAR	14	3		PARKVIEW SOUTH	0	0
SPV2208-0040	10/13/2022	32,383	2924 ARBOR AVE	PHOTOVOLTAIC		Roof Mounted Solar 6.66kW 18 REC	GENERATION SOLAR	39	5		RIVERVIEW FARM SUB	0	0

SPV2208-0079	10/27/2022	50,500	410 SAGE AVE	PHOTOVOLTAIC		Solar PV installation, roof mount, 12.54 kW DC	Apollo Energy	3	5	POUDRE RIVER RANCH 3RD FG		0	0
SPV2208-0117	10/18/2022	38,970	1121 74TH AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 7.04KW	GENERATION SOLAR	3	5	KNAUS SUB 3RD FG		0	0
SPV2208-0118	10/31/2022	69,903	1812 80TH AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 12.32KW	GENERATION SOLAR	2	1	MOUNTAIN VISTA FG#3		0	0
SPV2208-0133	10/28/2022	35,621	170 48TH AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 6.60KW	GENERATION SOLAR	12	7	WEBER WEST SUB		0	0
SPV2208-0198	10/28/2022	46,277	8726 19TH STREET RD	PHOTOVOLTAIC		Roof Mounted Solar Project with 8.36KW	GENERATION SOLAR	3	15	MOUNTAIN SHADOWS SUB 2ND FG		0	0
SPV2208-0205	10/28/2022	50,000	2723 23RD ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 9.68KW	GENERATION SOLAR	17	4	CASCADE PARK SOUTH		0	0
SPV2208-0245	10/28/2022	67,407	4305 14TH STREET DR	PHOTOVOLTAIC		Roof Mounted Solar Project with 11.88KW	GENERATION SOLAR	13	NONE	COUNTRY CLUB ESTATES PUD TRACT B AM PLAT		0	0
SPV2208-0347	10/28/2022	48,713	1207 53RD AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 8.80KW	GENERATION SOLAR	6	6	COUNTRY CLUB WEST FG#2		0	0
SPV2208-0348	10/28/2022	39,336	2616 22ND ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 7.48KW	GENERATION SOLAR	11	2	CASCADE PARK 4TH ADD		0	0
SPV2208-0350	10/28/2022	49,857	7525 PLATEAU RD	PHOTOVOLTAIC		Roof Mounted Solar Project with 9.24KW	GENERATION SOLAR	18	4	POUDRE RIVER RANCH 2ND FG		0	0
SPV2208-0351	10/28/2022	57,847	1905 66TH AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 11.00KW	GENERATION SOLAR	20	NONE	WESTRIDGE VILLAGE II RPLT A		0	0
SPV2208-0352	10/28/2022	31,663	282 32ND AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 5.72KW	GENERATION SOLAR	6	5	NORTHVIEW SUB FG#1		0	0
SPV2208-0353	10/06/2022	47,312	1634 34TH AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 9.24KW	GENERATION SOLAR	7	11	WOODBRIAR 3RD FG		0	0
SPV2208-0453	10/28/2022	48,591	8436 13TH ST RD	PHOTOVOLTAIC		Roof Mounted Solar Project with 9.24KW	GENERATION SOLAR			TRAILS AT SHEEP DRAW		0	0
SPV2208-0492	10/05/2022	45,064	106 50TH AVE	PHOTOVOLTAIC		Installation of a 8.075kW DC roof-mounted PV solar array	Freedom Solar	7	12	WEBER WEST SUB		0	0
SPV2208-0505	10/10/2022	23,645	441 46TH AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 3.96KW	GENERATION SOLAR	7	1	CENTER PARK MINOR SUB		0	0
SPV2208-0511	10/31/2022	50,000	4944 C ST	PHOTOVOLTAIC		Roof Mounted Solar Mounted 8.8KW	GENERATION SOLAR	1	19	WEBER WEST SUB		0	0
SPV2208-0563	10/19/2022	39,580	2883 41ST AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 8.14KW	GENERATION SOLAR	17	2	GATEWAY ESTATES FG#1		0	0
SPV2208-0566	10/19/2022	24,864	169 49TH AVENUE CT	PHOTOVOLTAIC		5.18 kWDC, Rooftop, Flush Mount, PV Solar System, Grid Tied	Klick Solar LLC	17	11	WEBER WEST SUB		0	0
SPV2208-0577	10/28/2022	27,710	601 E 22ND STREET RD	PHOTOVOLTAIC		Roof Mounted Solar Project with 4.07KW, MPU project	GENERATION SOLAR	45	3	PARKVIEW		0	0
SPV2208-0636	10/10/2022	33,000	2311 45TH AVE	PHOTOVOLTAIC		New residential solar install	NORTHERN CONSTRUCTION SERVICES DBA SMART WIRE	16	4	FOXHILL SUB		0	0
SPV2208-0663	10/05/2022	44,538	1815 14TH AVE	PHOTOVOLTAIC		Schlagel PV System 6.48 kw	BLUE RAVEN SOLAR	2	18	MOORES 2ND ADD		0	0
SPV2209-0008	10/05/2022	20,328	1107 E 25TH ST	PHOTOVOLTAIC		Installation of a 3.96kW dc system	LGCY INSTALLATION SERVICES LLC	25	6	EAST MEADOWS SUB 1ST FG		0	0
SPV2209-0011	10/31/2022	37,234	130 20TH AVENUE CT	PHOTOVOLTAIC		Roof Mounted Solar Project with 6.66KW	GENERATION SOLAR	19	NONE	TOWN NORTH 1ST FG		0	0
SPV2209-0029	10/05/2022	52,727	3141 19TH AVE	PHOTOVOLTAIC		Installation of a 6.15kW dc system	LGCY INSTALLATION SERVICES LLC	3	4	SOUTHMOOR VILLAGE 2ND FG		0	0
SPV2209-0030	10/05/2022	38,810	320 53RD AVE	PHOTOVOLTAIC		Installation of a 7.38kW dc system	LGCY INSTALLATION SERVICES LLC	33	1	GLEN EDEN AT KELLY FARM SUB		0	0
SPV2209-0032	10/13/2022	37,789	5142 32ND ST	PHOTOVOLTAIC		Installation of a 7.38kW dc system	LGCY INSTALLATION SERVICES LLC	3	7	T BONE RANCH SUB 2ND FG		0	0
SPV2209-0034	10/31/2022	32,228	2626 6TH ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 6.56KW	GENERATION SOLAR	6	6	BROADVIEW ACRES 3RD ADD		0	0
SPV2209-0038	10/31/2022	63,570	7242 MELBOURNE ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 12.76KW	GENERATION SOLAR	21	3	BOOMERANG RUN		0	0
SPV2209-0052	10/31/2022	75,000	4409 7TH ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 14.52KW	GENERATION SOLAR	18	11	WESTMOOR ACRES 1ST FG		0	0
SPV2209-0062	10/27/2022	39,360	4220 8TH ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 5.92KW	GENERATION SOLAR	1	2	WESTMOOR ACRES 1ST FG		0	0
SPV2209-0083	10/18/2022	20,892	1735 FAIRACRE RD	PHOTOVOLTAIC		Installation of solar panels onto existing residential roof.	ION DEVELOPER LLC	12	3	FAIRACRES		0	0
SPV2209-0104	10/14/2022	20,390	114 57TH AVE	PHOTOVOLTAIC		6 kW grid-tied, flush roof mounted PV system	SANDBOX SOLAR	7	1	CROSIERS CORNER AT KELLY FARM SUB		0	0
SPV2209-0270	10/26/2022	40,162	183 20TH AVENUE CT	PHOTOVOLTAIC		Roof Mounted Solar with 6.29kW	GENERATION SOLAR	10	NONE	TOWN NORTH 1ST FG		0	0
SPV2209-0303	10/19/2022	32,000	6212 B STREET RD	PHOTOVOLTAIC		5.55 kw Solar System; roof mount	Apollo Energy			NORTHRIDGE ESTATES 1ST REPLAT		0	0
SPV2209-0402	10/24/2022	19,384	2513 28TH AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 4.07KW	GENERATION SOLAR	7	12	CASCADE PARK SOUTH		0	0
SPV2209-0426	10/06/2022	34,595	1604 106TH AVE	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2209-0428	10/06/2022	27,040	4311 22ND ST	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC	22	3	VIRGINIA HILLS RPLT L18-24 B3		0	0
SPV2209-0429	10/06/2022	27,040	5219 16TH ST	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC	1	8	COUNTRY CLUB WEST 4TH FG		0	0
SPV2209-0433	10/06/2022	17,871	2317 8TH ST	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC	20	9	HOUSTON HEIGHTS		0	0
SPV2209-0438	10/06/2022	40,974	1730 29TH AVENUE PL	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC	8	6	WOODBRIAR 2ND FG 2ND RPLT		0	0
SPV2209-0509	10/05/2022	28,627	706 26TH AVE	PHOTOVOLTAIC		Install a 6.000 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	4	NONE	BARR SUB		0	0
SPV2209-0545	10/05/2022	44,927	2818 ASPEN AVE	PHOTOVOLTAIC		Install a 9.250 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	21	4	RIVERVIEW FARM SUB		0	0
SPV2209-0548	10/05/2022	33,104	160 50TH AVENUE PL	PHOTOVOLTAIC		Install a 8.140 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	9	14	WEBER WEST SUB		0	0
SPV2209-0578	10/05/2022	42,588	7133 CANBERRA ST	PHOTOVOLTAIC		Rooftop Photovoltaic installation on residential home.	LGCY INSTALLATION SERVICES LLC	10	3	CANBERRA COMMONS		0	0
SPV2209-0580	10/03/2022	31,119	2564 19TH AVE	PHOTOVOLTAIC		Du Bray PV Solar Array 4.8 KW	BLUE RAVEN SOLAR	37	5	HILLSIDE ADD		0	0
SPV2209-0585	10/14/2022	34,100	527 58TH AVE	PHOTOVOLTAIC		install 10kW grid-tied flush roof mounted pv system.	SANDBOX SOLAR	2	5	WEST POINT SUB 6TH FG		0	0
SPV2209-0594	10/05/2022	8,434	2623 APPLE AVE	PHOTOVOLTAIC		ROOF MOUNT, FLUSH MOUNT, GRID-TIED: 3.2kW Solar PV	SUNRUN INSTALLATION SERVICES INC	22	NONE	PARKVIEW SOUTH 2ND FG		0	0
SPV2209-0601	10/06/2022	51,504	1831 26TH AVENUE CT	PHOTOVOLTAIC		10.73 kWDC, Rooftop, flush Mount, PV Solar System, Utility I	Klick Solar LLC	10	14	COTTONWOOD VILLAGE		0	0
SPV2209-0605	10/24/2022	50,960	733 67TH AVE	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC			CITY CENTER WEST RESIDENTIAL 2ND FG		0	0
SPV2209-0607	10/06/2022	30,429	108 N 50TH AVE	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC	3	12	WEBER WEST SUB		0	0
SPV2209-0618	10/10/2022	47,192	3939 18TH ST LN	PHOTOVOLTAIC		Install 15.6kW roof mounted solar PV system with 13.5kWh ESS	TESLA ENERGY OPERATIONS INC			PINE RIDGE ESTATES PUD		0	0
SPV2209-0638	10/10/2022	43,122	1727 30TH AVENUE CT	PHOTOVOLTAIC		Rooftop Photovoltaic System 8.2 KW Installation	LGCY INSTALLATION SERVICES LLC	11	5	WOODBRIAR 2ND FG 1ST RPLT		0	0
SPV2209-0666	10/27/2022	42,958	1731 27TH AVE	PHOTOVOLTAIC		PV Solar installation; 7.200 kW system with 18 panels.	Fluent Solar LLC	8	3	ROLLING HILLS 1ST ADD		0	0
SPV2209-0670	10/13/2022	17,460	4625 2ND ST	PHOTOVOLTAIC		Installation of 6kw DC roof solar system w/ Line Side Tap	TITAN SOLAR POWER CO INC	35	10	PHEASANT RUN SUB 2ND FG		0	0
SPV2209-0678	10/13/2022	35,742	120 49TH AVENUE PL	PHOTOVOLTAIC		7.77 kWDC, Rooftop, Flush Mount, PV Solar System, Grid Tied	Klick Solar LLC	10	11	WEBER WEST SUB		0	0
SPV2209-0681	10/10/2022	12,464	5263 9TH STREET DR	PHOTOVOLTAIC		Roof mounted 3.04kW PV	PHOTON BROTHERS	13	NONE	WEST POINT 5TH FG		0	0
SPV2210-0001	10/13/2022	55,096	3312 26TH ST	PHOTOVOLTAIC		Rooftop Photovoltaic System 11.48 KW Installation	LGCY INSTALLATION SERVICES LLC	3	5	WEST LAKE PARK 3RD FG		0	0
SPV2210-0014	10/25/2022	37,260	105 N 66TH AVE	PHOTOVOLTAIC		Installation of a 8.51kW DC solar PV system, roof mounted.	NEXT ENERGY SOLAR			NORTHRIDGE ESTATES 1ST REPLAT		0	0
SPV2210-0032	10/18/2022	13,164	500 26TH AVENUE CT	PHOTOVOLTAIC		Flush Mount, Roof Mount, Grid-Tied 4.0 kW , PV Solar	SUNRUN INSTALLATION SERVICES INC	22	3	BROADVIEW ACRES 2ND ADD		0	0
SPV2210-0034	10/13/2022	27,235	3154 51ST AVE	PHOTOVOLTAIC		Installation of a 4.92kW dc system / Main Panel Upgrade	LGCY INSTALLATION SERVICES LLC	22	5	T BONE RANCH SUB 2ND FG		0	0
SPV2210-0035	10/13/2022	28,423	6929 POUDRE RIVER RD 3	PHOTOVOLTAIC		Installation of a 5.33kW dc system	LGCY INSTALLATION SERVICES LLC	3	1	POUDRE RIVER RANCH 1ST FG 3RDRPLT PUD IB		0	0
SPV2210-0038	10/18/2022	65,854	301 N 25TH AVE	PHOTOVOLTAIC		Installation of roof-mounted solar system. 11.78 kW	ION DEVELOPER LLC	16	2	NORWOOD SUB		0	0
SPV2210-0041	10/13/2022	45,962	9115 18TH ST	PHOTOVOLTAIC		Install a 9.990 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	18	2	PEBBLE BROOK SUB		0	0
SPV2210-0057	10/14/2022	25,516	2533 18TH AVE	PHOTOVOLTAIC		5.2kW PV Solar Panel Installation on Roof	BLUE RAVEN SOLAR	7	5	HILLSIDE ADD		0	0
SPV2210-0068	10/19/2022	22,716	2409 15TH AVENUE CT	PHOTOVOLTAIC		Installation of roof-mounted solar system. 4.56 kW	ION DEVELOPER LLC	18	9	FARRS 2ND ADD		0	0
SPV2210-0078	10/19/2022	39,401	3324 26TH ST	PHOTOVOLTAIC		Installation of a 8.2kW dc system	LGCY INSTALLATION SERVICES LLC	6	5	WEST LAKE PARK 3RD FG		0	0
SPV2210-0079	10/19/2022	34,725	2406 15TH AVE	PHOTOVOLTAIC		Installation of a 6.97kW dc system	LGCY INSTALLATION SERVICES LLC	2	8	FARRS 2ND ADD		0	0
SPV2210-0080	10/19/2022	20,581	3413 17TH ST	PHOTOVOLTAIC		Installation of a 3.69kW dc system	LGCY INSTALLATION SERVICES LLC	11	12	WOODBRIAR 3RD FG		0	0
SPV2210-0081	10/19/2022	53,903	2306 45TH AVE	PHOTOVOLTAIC		Installation of a 10.25kW dc system	LGCY INSTALLATION SERVICES LLC	8	4	FOXHILL SUB		0	0
SPV2210-0082	10/19/2022	40,133	2758 24TH ST	PHOTOVOLTAIC		Installation of a roof-mounted Solar PV system	LGCY INSTALLATION SERVICES LLC	5	7	CASCADE PARK SOUTH		0	0
SPV2210-0108	10/19/2022	26,054	1937 24TH AVE	PHOTOVOLTAIC		Installation of a 4.92kW dc system / Main Panel Upgrade	LGCY INSTALLATION SERVICES LLC	65	5	ROLLING HILLS		0	0
SPV2210-0122	10/24/2022	61,686	1234 49TH AVE	PHOTOVOLTAIC		10.44KW dc flush roof-mounted PV solar energy system.	Freedom Solar	17	4	COUNTRY CLUB WEST SUB		0	0
SPV2210-0172	10/31/2022	28,693	717 35TH AVE	PHOTOVOLTAIC		Installation of 3.96 KW-DC solar system/MPU Upgrade	LGCY INSTALLATION SERVICES LLC	5	4	EDWARDS HOMES SUB		0	0
SPV2210-0173	10/31/2022	75,000	180 45TH AVE	PHOTOVOLTAIC		Installation of 13.53 KW-DC solar system	LGCY INSTALLATION SERVICES LLC	3	5	PHEASANT RUN SUB 2ND FG		0	0
SPV2210-0174	10/24/2022	68,801	4465 PIONEER DR 76	PHOTOVOLTAIC		Installation of 16.4kw DC roof solar system w/ Line Side Tap	TITAN SOLAR POWER CO INC	76	A	COLLEGE GREEN 1ST FG 2ND AM PLT		0	0
SPV2210-0177	10/31/2022	46,277	5711 17TH ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 8.36KW	GENERATION SOLAR	4	2	HILAND KNOLLS SUB		0	0
SPV2210-0179	10/27/2022	47,434	2844 E ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 8.36KW	GENERATION SOLAR	16	1	CLOVER CREEK SUB		0	0
SPV2210-0180	10/31/2022	33,326	135 20TH AVENUE CT	PHOTOVOLTAIC		Installation of 4.84 KW-DC solar system	LGCY INSTALLATION SERVICES LLC	18	NONE	TOWN NORTH 1ST FG		0	0
SPV2210-0184	10/24/2022	74,928	801 36TH AVE	PHOTOVOLTAIC		Residential Solar Permit. 9,855W System	TRUSUN ENERGY LLC	1	11	EDWARDS HOMES 4TH ADD		0	0
SPV2210-0212	10/25/2022	98,994	424 HORIZON CIR	PHOTOVOLTAIC		Install a 21.830 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	4	2	POUDRE RIVER RANCH 3RD FG		0	0
SPV2210-0239	10/27/2022	28,139	1913 24TH AVENUE CT	PHOTOVOLTAIC		Installation of a 6.40kW dc flush roof-mounted PV system	Freedom Solar	2	5	ROLLING HILLS		0	0
SPV2210-0253	10/31/2022	33,259	1900 14TH STREET RD	PHOTOVOLTAIC		Installation of 5.74KW-DC solar system	LGCY INSTALLATION SERVICES LLC	1	9	MAPLEWOOD 1ST ADD		0	0
SPV2210-0254	10/26/2022	34,550	2714 26TH ST	PHOTOVOLTAIC		Pv Solar install of 14 panels; 5.6 kW and main panel upgrade	Fluent Solar LLC	37	2	SOUTHRIDGE SUB		0	0
SPV2210-0261	10/31/2022	45,500	203 N 49TH AVENUE CT	PHOTOVOLTAIC		Flush Mount, Roof Mount, Grid-Tied 12.4 kW , PV Solar	SUNRUN INSTALLATION SERVICES INC	11	19	WEBER WEST SUB		0	0
SPV2210-0262	10/27/2022	17,597	10517 16TH STREET RD	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2210-0266	10/26/2022	32,706	1902 31ST ST	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC	4	3	SOUTHMOOR VILLAGE 1ST FG RPLT		0	0
SPV2210-0271	10/31/2022	49,892	3355 19TH STREET DR	PHOTOVOLTAIC		Installation of a roof mounted PV solar system/MPU	LGCY INSTALLATION SERVICES LLC	43	4	ROLLING HILLS 3RD ADD		0	0
SPV2210-0275	10/31/2022	34,197	4523 30TH STREET RD	PHOTOVOLTAIC		28 MODULES ROOF MOUNTED PHOTOVOLTAIC SYSTEM 10.360 k	FREEDOM FOREVER COLORADO LLC	19	7	GATEWAY ESTATES 3RD FG		0	0
SPV2210-0276	10/31/2022	42,280	615 51ST AVE	PHOTOVOLTAIC		22 MODULES ROOF MOUNTED PHOTOVOLTAIC SYSTEM 8.690 k	FREEDOM FOREVER COLORADO LLC	5	5	WEST POINT 2ND FG		0	0
SPV2210-0287	10/31/2022	40,876	737 67TH AVE	PHOTOVOLTAIC		PV solar installation	Fluent Solar LLC			CITY CENTER WEST RESIDENTIAL 2ND FG		0	0
SPV2210-0301	10/27/2022	30,818	10503 18TH ST	PHOTOVOLTAIC		Installation of roof-mounted solar system. 6.08 kW	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2210-0304	10/31/2022	35,142	6143 B ST	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC			NORTHRIDGE ESTATES 1ST REPLAT		0	0
SPV2210-0305	10/31/2022	28,929	1619 103RD AVENUE CT	PHOTOVOLTAIC		Installation of solar panels on existing residential roof.	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2210-0306	10/31/2022	26,489	2433 15TH AVENUE CT	PHOTOVOLTAIC		Roof Mounted Solar with MPU	Powur PBC	12	9	FARRS 2ND ADD		0	0
SPV2210-0321	10/31/2022	39,960	2310 2ND ST	PHOTOVOLTAIC		18 panels, 9 inverter, 6.66 kW, Roof mounted	SOLCIUS LLC	11	1	PRAIRIEVIEW WEST		0	0
SPV2210-0326	10/31/2022	37,000	117 49TH AVENUE PL	PHOTOVOLTAIC		7.4 kWDC, Rooftop, Flush Mount, PV Solar System, Grid Tied	Klick Solar LLC	27	12	WEBER WEST SUB		0	0
SPV2210-0345	10/31/2022	34,671	2221 APPLE AVE	PHOTOVOLTAIC		PV solar installation	Fluent Solar LLC	6	5	PARKVIEW		0	0
SPV2210-0351	10/31/2022	35,768	912 E 25TH ST	PHOTOVOLTAIC		6.800 kW Rooftop Solar PV	1SOLAR	3	7	EAST MEADOWS SUB 1ST FG		0	0
SPV2210-0362	10/31/2022	32,706	10424 19TH ST	PHOTOVOLTAIC		Installation of roof-mounted solar system. 6.46 kW	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
		76,714,170											

Monthly Construction Report

November 2022

Community Development

BUILDING INSPECTION

This report is two-sided to conserve our natural resources.

CONSTRUCTION ACTIVITY SUMMARY
November 2022

TOTAL PERMIT ACTIVITY

	No. of Permits	Valuation
New Residential, Commercial, Addition & Remodel, Footing and Foundations and Misc.:	341	$15,654,022

RESIDENTIAL

	No. of Permits/Buildings	No. Units	Valuation
Single Family Dwelling:	4	4	$ 15,534,729
Multi-Family (Buildings)	0	0	$ 0
Remodel and Addition Work:	24	n/a	$ 817,590

COMMERCIAL

	No. of Permits	Valuation
New Commercial Projects:	0	$ 0

Commercial projects valued over $100,000 are summarized.

Building Inspection Division
Construction Activity Comparative Analysis

		Nov 2022	Nov 2021	YTD 2022	YTD 2021
New Single Family Dwelling Units*	**# of Permits** **# of Units** **Valuation**	4 4 1,534,729	97 97 27,931,359	332 332 102,829,092	221 221 68,550,912
Single Family Footing & Foundation Only	**# of Permits** **Valuation**	0	1 30,604	13 353,027	20 506,491
New Multi-Family Dwellings Units*	**# of Permits** **# of Buildings** **# of Units** **Valuation**	0	2 1 2 648,053	101 74 1,578 238,865,746	252 91 612 104,820,118
Multi-Family Footing & Foundation Only	**# of Permits** **Valuation**	0	0	15 5,233,515	52 1,284,172
Residential Additions and Remodels	**# of Permits** **Valuation**	24 817,590	27 752,859	338 8,752,823	370 8,400,264
New Commercial Projects	**# of Permits** **Valuation**	0	2 110,000	61 106,712,157	25 147,967,534
Commercial Footing & Foundation Only	**# of Permits** **Valuation**	0	0	2 276,136	0
Commercial Additions and Remodels	**# of Permits** **Valuation**	7 6,622,000	5 974,000	135 83,744,339	110 15,133,834
Miscellaneous Permits	**# of Permits** **Valuation**	252 6,435,703	215 2,983,708	2,555 39,870,733	2,489 31,788,172
Mobile Home Permits	**# of Permits** **Valuation**	54 244,000	0	100 571,000	3 18,500
TOTALS	**# of Permits** **Valuation**	341 15,654,022	349 33,430,583	3,652 587,208,568	3,542 378,469,997

***Number of units and number of permits will differ due to some multiple unit dwellings being issued under one permit.**

Permit Number	ISSUED	JOBVALUE	SITE_ADDR	PERMITTYPE	PERMITSUBTYPE	DESCRIPTION	CONTRACTOR_NAME	SITE_LOT_NO	SITE_BLOCK	SITE_SUBDIVISION	MODELNUMBER	BLDG_SQFT	BALANCE_DUE
2211-0001	11/14/2022	7,500	468 26TH AVE	MECHANICAL	FURNACE	replace 60,000 BTU 95% gas furnace	IMS HEATING & AIR INC	6	2	BROADVIEW ACRES 1ST ADD		0	0
2211-0198	11/14/2022	27,000	1915 28TH ST	ROOFING		Remove and replace existing roof system w/ 60MIL TPO.	Bryan Jensen	16	1	HILLSIDE 2ND ADD		0	0
2211-0200	11/14/2022	10,000	634 47TH AVENUE CT	ROOFING		Residential Re-roof asphalt shingles	Colorado Native G.C LLC	19	1	WESTMOOR WEST		0	0
2211-0217	11/15/2022	4,500	409 9TH ST	ELECTRICAL	SERVICE	Electrical service upgrade (200A)	Thomas Clark	27	123	BARBERS SUB		0	0
BCX2204-0509	11/09/2022	195,000	1722 30TH ST	COMMERCIAL EXISTING	REMODEL	Renovating clubhouse building and surrounding deck	303 CONSTRUCTION & DEVELOPMENT SERVICES	NONE	NONE	SOUTHMOOR VILLAGE 2ND FG		1386.00	0.00
BCX2205-0302	11/18/2022	3,000,000	1515 14TH AVE	COMMERCIAL EXISTING	ADDITION	Greeley Central High School Secure Vestibule Addition	SAMPSON CONSTRUCTION CO INC	1	7	MOORES ADD		400.00	0.00
BCX2209-0250	11/29/2022	3,250,000	2560 29TH ST	COMMERCIAL EXISTING	ADDITION	2 classroom addition and renovation of school buildings	SAMPSON CONSTRUCTION CO INC			GALLERY GREEN ANNEX		73333.00	0.00
BCX2209-0628	11/03/2022	9,000	1619 8TH AVE	COMMERCIAL EXISTING	SIDING SOFFIT FASCIA	Stucco over existing exterior of building	Total Fix It - Erik Zamora	5	NONE	NORMAL PLACE 1ST ADD		1041.00	0.00
BCX2210-0100	11/21/2022	74,000	5699 20TH ST	COMMERCIAL EXISTING	REMODEL	Adding new overhead, man doors, exterior lights, riser room	CREATIVE CONSTRUCTION COMPANY	5	7	KNOLLS WEST		27080.00	0.00
BCX2210-0260	11/02/2022	4,000	2124 35TH AVE	COMMERCIAL EXISTING	REMODEL	Interior demolition permit	BVB General Contractors	1	NONE	WESTLAKE VILLAGE CENTRE STREET AND EASEMENT DEDICATION PLAT, 1ST RPLT		1164.00	0.00
BCX2210-0523	11/03/2022	90,000	2263 GREELEY MALL	COMMERCIAL EXISTING	DEMOLITION	Demo existing 4700Sf building	MEGEN CONSTRUCTION COMPANY INC	1	NONE	GREELEY MALL MINOR SUB		4753.00	0.00
BRN2205-0375	11/23/2022	415,564	6521 A ST	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC No Bsmt Incl Lwn Sprklr Crwl Spc	DR HORTON	74	6	NORTHRIDGE ESTATES 1ST REPLAT	X429	2,652.00	0.00
BRN2206-0270	11/23/2022	265,119	6105 1ST ST	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC No Bsmt Incl Lwn Sprklr Crwl Spc	DR HORTON	14	3	NORTHRIDGE ESTATES 1ST REPLAT	X450	1,635.00	0.00
BRN2210-0218	11/15/2022	428,447	6606 6TH ST	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC 811 sf Finish Bsmt Incl Lwn Sprkl	HARTFORD CONSTRUCTION LLC	113		CITY CENTER WEST RESIDENTIAL 2ND FG	PLAN 5 ROWLING	2,451.00	0.00
BRN2210-0309	11/02/2022	5,500	2280 1ST AVE SPC 88	RESIDENTIAL NEW	MOBILE HOME	Install new mobile home with Xi2 foundation system	CLAYTON HOMES	88	NONE	COUNTRYSIDE MOBILE HOME PARK		1568	0
BRN2210-0437	11/28/2022	425,599	6610 6TH ST	RESIDENTIAL NEW	SINGLE FAMILY DWELLING	New SFD Cvrd Prch Incl AC 811 sf Finish Bsmt Incl Lwn Sprklr	HARTFORD CONSTRUCTION LLC			CITY CENTER WEST RESIDENTIAL 2ND FG	PLAN 5 ROWLING	2,451.00	0.00
BRN2210-0444	11/10/2022	4,500	431 N 35TH AVE SPC 21	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0471	11/10/2022	4,500	431 N 35TH AVE SPC 22	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Grant Hall			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0472	11/10/2022	4,500	431 N 35TH AVE SPC 20	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Grant Hall			STONEYBROOK FG #1 1ST RPLT AMD #1		1152	0
BRN2210-0474	11/10/2022	4,500	431 N 35TH AVE SPC 23	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Grant Hall			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0477	11/10/2022	4,500	431 N 35TH AVE SPC 24	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1120	0
BRN2210-0479	11/10/2022	4,500	431 N 35TH AVE SPC 25	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0481	11/10/2022	4,500	431 N 35TH AVE SPC 26	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0482	11/10/2022	4,500	431 N 35TH AVE SPC 27	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0484	11/10/2022	4,500	431 N 35TH AVE SPC 28	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0485	11/10/2022	4,500	431 N 35TH AVE SPC 29	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0489	11/10/2022	4,500	431 N 35TH AVE SPC 30	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0490	11/10/2022	4,500	431 N 35TH AVE SPC 31	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0491	11/10/2022	4,500	431 N 35TH AVE SPC 32	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0492	11/10/2022	4,500	431 N 35TH AVE SPC 33	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0493	11/10/2022	4,500	431 N 35TH AVE SPC 34	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0517	11/10/2022	4,500	431 N 35TH AVE SPC 35	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0519	11/14/2022	4,500	431 N 35TH AVE SPC 36	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0527	11/14/2022	4,500	431 N 35TH AVE SPC 37	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0528	11/14/2022	4,500	431 N 35TH AVE SPC 38	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2210-0529	11/10/2022	4,500	431 N 35TH AVE SPC 39	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0014	11/10/2022	4,500	431 N 35TH AVE SPC 40	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1056	0
BRN2211-0015	11/10/2022	4,500	431 N 35TH AVE SPC 57	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0016	11/10/2022	4,500	431 N 35TH AVE SPC 51	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0018	11/10/2022	4,500	431 N 35TH AVE SPC 86	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0019	11/10/2022	4,500	431 N 35TH AVE SPC 110	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0046	11/10/2022	4,500	431 N 35TH AVE SPC 41	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0047	11/10/2022	4,500	431 N 35TH AVE SPC 43	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0048	11/10/2022	4,500	431 N 35TH AVE SPC 58	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0052	11/10/2022	4,500	431 N 35TH AVE SPC 64	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0053	11/10/2022	4,500	431 N 35TH AVE SPC 66	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0055	11/10/2022	4,500	431 N 35TH AVE SPC 73	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0056	11/10/2022	4,500	431 N 35TH AVE SPC 76	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0057	11/14/2022	4,500	431 N 35TH AVE SPC 79	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0058	11/10/2022	4,500	431 N 35TH AVE SPC 81	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0059	11/10/2022	4,500	431 N 35TH AVE SPC 83	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0060	11/10/2022	4,500	431 N 35TH AVE SPC 84	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0062	11/10/2022	4,500	431 N 35TH AVE SPC 95	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0063	11/10/2022	4,500	431 N 35TH AVE SPC 96	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0064	11/10/2022	4,500	431 N 35TH AVE SPC 97	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0066	11/10/2022	4,500	431 N 35TH AVE SPC 98	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0067	11/10/2022	4,500	431 N 35TH AVE SPC 99	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0068	11/11/2022	4,500	431 N 35TH AVE SPC 100	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0069	11/14/2022	4,500	431 N 35TH AVE SPC 105	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0070	11/11/2022	4,500	431 N 35TH AVE SPC 116	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0074	11/11/2022	4,500	431 N 35TH AVE SPC 122	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0075	11/11/2022	4,500	431 N 35TH AVE SPC 123	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0076	11/11/2022	4,500	431 N 35TH AVE SPC 127	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0077	11/11/2022	4,500	431 N 35TH AVE SPC 128	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0079	11/11/2022	4,500	431 N 35TH AVE SPC 133	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0108	11/14/2022	4,500	431 N 35TH AVE SPC 53	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0109	11/14/2022	4,500	431 N 35TH AVE SPC 78	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0110	11/14/2022	4,500	431 N 35TH AVE SPC 120	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRN2211-0127	11/14/2022	4,500	431 N 35TH AVE SPC 69	RESIDENTIAL NEW	MOBILE HOME	Mobile Home Installation	Better by Design			STONEYBROOK FG #1 1ST RPLT AMD #1		1216	0
BRX2208-0683	11/07/2022	241,392	1120 30TH STREET RD	RESIDENTIAL EXISTING	ADDITION	Building addition on existing house.	ALL HOME CONSTRUCTION LLC	31	NONE	LANDMARK SUB		1/0/1900	1/0/1900
BRX2209-0550	11/28/2022	45,000	1303 9TH AVE	RESIDENTIAL EXISTING	PATIO DECK COVER AWNING	support existing roof- remove damaged beams, pillars,railing	QUALITY RENOVATIONS AND RESTORATIONS	1	105	GREELEY CITY		1/0/1900	1/0/1900
BRX2209-0589	11/09/2022	2,565	2531 9TH AVENUE CT	RESIDENTIAL EXISTING	FIRE OR FLOOD RESTORATION	fire restoration of a bedroom	Norma Nunez	14	NONE	WHEELERS ADD		1/0/1900	1/0/1900
BRX2210-0010	11/11/2022	9,677	2500 13TH ST	RESIDENTIAL EXISTING	STORAGE SHED	12'x16'x14'5" above ground, no utilities shed	TUFF SHEDS INC	45	8	WESTVIEW 3RD ADD		1/0/1900	1/0/1900
BRX2210-0192	11/16/2022	25,000	3920 6TH ST	RESIDENTIAL EXISTING	FIRE OR FLOOD RESTORATION	2nd floor Bathroom fire, No structural damage,	Tara Eyer	1	7	WESTMOOR 1ST FG		1/0/1900	1/0/1900
BRX2210-0243	11/01/2022	8,000	511 58TH AVE	RESIDENTIAL EXISTING	PATIO DECK COVER AWNING	12x24 attached cedar pergola	NORTHCO FENCE & DECK LLC	6	5	WEST POINT SUB 6TH FG		1/0/1900	1/0/1900
BRX2210-0365	11/09/2022	16,672	6545 18TH STREET RD	RESIDENTIAL EXISTING	BASEMENT FINISH	Partial basements-2 bedrooms, living room, sauna	Brock Riutta	2	3	WESTRIDGE VILLAGE RPLT A		1/0/1900	1/0/1900
BRX2210-0390	11/02/2022	22,777	8621 18TH STREET RD	RESIDENTIAL EXISTING	BASEMENT FINISH	Finishing basement	Ivan Vazquez	2	12	MOUNTAIN SHADOWS SUB 1ST FG		1/0/1900	1/0/1900
BRX2210-0447	11/11/2022	27,112	3301 67TH AVENUE PL	RESIDENTIAL EXISTING	BASEMENT FINISH	Basement Finish Framing, Plumbing, Electrical, HVAC, Drywall	Elkstone Inc	4	10	ST MICHAELS SUB		1/0/1900	1/0/1900
BRX2210-0534	11/14/2022	40,500	2150 75TH AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Finish basement of primary residence. One bedroom one bath.	Tyson's Construction Services	5	9	HOMESTEAD HEIGHTS 4TH FG		1/0/1900	1/0/1900
BRX2211-0024	11/03/2022	53,482	1121 78TH AVENUE CT	RESIDENTIAL EXISTING	BASEMENT FINISH	Basement finish including drywall, electrical, and plumbing	Charisma Construction	7	7	BOOMERANG RANCH 2ND FG		1/0/1900	1/0/1900
BRX2211-0030	11/10/2022	5,000	2124 5TH AVE	RESIDENTIAL EXISTING	DECK	Deck and stair remodel. Replace stringers. Swap deck boards	Nathan Gould	NONE	NONE	SIMPSON MULTIFAMILY MINOR SUB		1/0/1900	1/0/1900
BRX2211-0034	11/10/2022	13,000	1215 19TH ST	RESIDENTIAL EXISTING	BASEMENT FINISH	Add Kitchen and living room to finished basement	Jordan Roseland	1	9	CRANFORDS 2ND ADD		1/0/1900	1/0/1900
BRX2211-0111	11/09/2022	40,956	3021 43RD AVE	RESIDENTIAL EXISTING	SIDING SOFFIT FASCIA	Install 39 sq vinyl siding, soffit, fascia, capping. No stru	POWER HOME REMODELING GROUP	57	13	GATEWAY ESTATES 3RD FG		1/0/1900	1/0/1900
BRX2211-0118	11/28/2022	50,000	5710 5TH ST	RESIDENTIAL EXISTING	BASEMENT FINISH	Finish approx 323sf in basement - 1 BDRM / 1 BATH	BELFIORE CONSTRUCTION	8	4	WEST POINT SUB 6TH FG		1/0/1900	1/0/1900
BRX2211-0120	11/09/2022	15,262	7224 CANBERRA STREET DR	RESIDENTIAL EXISTING	BASEMENT FINISH	Finishing 1/2 of basement	Alan Price	15	1	CANBERRA COMMONS		1/0/1900	1/0/1900
BRX2211-0121	11/11/2022	16,980	8751 15TH ST RD	RESIDENTIAL EXISTING	BASEMENT FINISH	Framing, Electrical, HVAC, Drywall	Elkstone Inc			TRAILS AT SHEEP DRAW		1/0/1900	1/0/1900
BRX2211-0126	11/21/2022	11,000	1700 33RD AVE	RESIDENTIAL EXISTING	PATIO DECK COVER AWNING	Building a 12'x20' Porch Cover	DECKS OF DISTINCTION LLC	13	9	WOODBRIAR 2ND FG 2ND RPLT		1/0/1900	1/0/1900
BRX2211-0142	11/10/2022	15,709	1714 68TH AVE	RESIDENTIAL EXISTING	REMODEL	Bathroom remodel with plumbing and electrical	UNI DESIGN	4	7	CEDARWOODS SUB		1/0/1900	1/0/1900
BRX2211-0147	11/10/2022	70,000	230 N 54TH AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	1422sf Basement Finish - 1 bed, Living Rm, Workout & Wet Bar	HOME REVITALIZERS, LLC	18	1	FOREST GLEN AT KELLY FARM SUB 2ND FG		1/0/1900	1/0/1900
BRX2211-0156	11/11/2022	29,500	5512 A ST	RESIDENTIAL EXISTING	PATIO DECK COVER AWNING	Building new deck with Flat roof over the new deck	ROCKY MOUNTAIN FENCE & DECK	26	1	FOREST GLEN 1ST MINOR SUB		1/0/1900	1/0/1900
BRX2211-0159	11/29/2022	12,000	1809 103RD AVENUE CT	RESIDENTIAL EXISTING	PATIO DECK COVER AWNING	Extending patio and adding a patio cover	rosemary santamaria			PROMONTORY IMAGINE SCHOOL 3RD FG		1/0/1900	1/0/1900
BRX2211-0264	11/21/2022	24,506	5506 27TH ST	RESIDENTIAL EXISTING	REMODEL	Kitchen remodel with plumbing/electrical/hvac and structure	UNI DESIGN	11	12	HIGHLAND PARK WEST 2ND RPLT		1/0/1900	1/0/1900
BRX2211-0286	11/28/2022	21,500	208 N 66TH AVE	RESIDENTIAL EXISTING	BASEMENT FINISH	Partial basement finish	R.C. DESIGN & CONSTRUCTION			NORTHRIDGE ESTATES 1ST REPLAT		1/0/1900	1/0/1900
ELEC2211-0013	11/01/2022	5,995	1134 34TH AVE	ELECTRICAL	SERVICE	Exterior service change & interior panel change.	LEADING EDGE ELECTRIC	16	4	WESTWOOD 2ND ADD		0	0
ELEC2211-0017	11/01/2022	6,870	2522 17TH AVENUE CT	ELECTRICAL	SERVICE	Exterior service change & interior panel change.	LEADING EDGE ELECTRIC	23	3	HILLSIDE ADD		0	0
ELEC2211-0032	11/01/2022	3,900	424 HORIZON CIR	ELECTRICAL	SERVICE	upgrade panel to 200 amps	charles thermidor	4	2	POUDRE RIVER RANCH 3RD FG		0	0
ELEC2211-0033	11/01/2022	3,500	1910 14TH STREET RD	ELECTRICAL	SERVICE	upgrade panel to 200 amps	charles thermidor	3	9	MAPLEWOOD 1ST ADD		0	0
ELEC2211-0035	11/02/2022	6,700	1215 19TH ST	ELECTRICAL	SERVICE	Upgrade Service to 200 amps and install subpanel in the gar	STEWART ELECTRICAL AND CONSTRUCTION LLC	1	9	CRANFORDS 2ND ADD		0	0
ELEC2211-0041	11/02/2022	1,000	2633 23RD AVE	ELECTRICAL	SERVICE	install new 100-meter main combo	BENCHMARK ELECTRICAL SOLUTIONS INC	NONE	NONE	BRENTWOOD PARK SOUTH 1ST RPLT		0	0
ELEC2211-0061	11/02/2022	16,000	7700 28TH ST	ELECTRICAL	SERVICE	USR2018-0023	JAMM Power Service					0	0
ELEC2211-0095	11/04/2022	3,000	1725 22ND AVE	ELECTRICAL	SERVICE	Rebuild/update electrical service		5	2	HAYS SUB		0	0
ELEC2211-0098	11/04/2022	2,500	2531 9TH AVENUE CT	ELECTRICAL	SERVICE	Service/ fire repairs	AC/DC ELECTRIC INC	14	NONE	WHEELERS ADD		0	0
ELEC2211-0107	11/05/2022	1,000	4355 24TH STREET RD 3704	ELECTRICAL	SERVICE	NEMA 6-50R outlet in garage				CENTERPLACE NORTH 4TH FG 2ND RPLT		0	0
ELEC2211-0175	11/11/2022	71,831	1130 8TH AVE	ELECTRICAL	SERVICE	power, lighting general electrical	Weifield Group Contracting INC	5	83	BLOCK 83 FIRESTONE RETAIL CENTER		0	0
ELEC2211-0223	11/16/2022	100	2350 29TH ST	ELECTRICAL	SERVICE	relocation of J Boxes	Kyle Torska	1	NONE	ROBCO MINOR SUB		0	0
ELEC2211-0226	11/16/2022	2,500	1444 24TH AVE	ELECTRICAL	SERVICE	Upgrade main electrical panel, 200 amp, overhead service	COPPER CONNECTION	13	1	WESTVIEW 1ST FG		0	0
ELEC2211-0231	11/16/2022	3,500	10306 20TH ST	ELECTRICAL	SERVICE	Install 240volt single phase service to water pump	KITZMAN ELECTRIC			PROMONTORY IMAGINE SCHOOL 2ND FG 1ST RPLT TRACT B		0	0
ELEC2211-0233	11/16/2022	8,000	10435 17TH ST	ELECTRICAL	SERVICE	New Electric Service for Greely Water & Sewer Department	FISKE ELECTRICAL			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
ELEC2211-0302	11/22/2022	3,900	2210 ALPINE AVE	ELECTRICAL	SERVICE	upgrade panel to 200 amps	charles thermidor	28	5	PARKVIEW		0	0
ELEC2211-0310	11/23/2022	4,525	2403 9TH ST	ELECTRICAL	SERVICE	Install new 200A surface mount meter socket.	BRS Field Ops, LLC	7	1	HOUSTON HEIGHTS 1ST ADD		0	0
ELEC2211-0328	11/25/2022	3,000	917 5TH AVE	ELECTRICAL	SERVICE	Rebuild service	LOOS ELECTRIC INC	24	61	GREELEY CITY		0	0
FLAT2209-0389	11/15/2022	15,000	5699 20TH ST	FLATWORK		A replacement ramp to comply with ADA	Dennis Sytsma	5	7	KNOLLS WEST		0	0
FLAT2210-0518	11/16/2022	2,000	225 43RD AVE	FLATWORK		extend driveway	Jesus Martinez	8	2	LARSON SUB 3RD FG 1ST RPLT L7-10 B2		0	0
FLAT2211-0181	11/21/2022	1,092	200 N 35TH AVE 184	FLATWORK		I need a permit for due a concrete driveway for parking.						0	0
MECH2210-0341	11/01/2022	6,000	3950 12TH ST 17	MECHANICAL	FIREPLACE-GAS STOVES	Fireplace addition	THE HEARTH HOUSE	17	NONE	VILLAGE AT BITTERSWEET		0	0
MECH2211-0004	11/01/2022	14,000	3324 19TH ST	MECHANICAL	FURNACE AND AIR CONDITIONING	Remove and install 60K BTU 96% Furnace and 2 Ton AC	One Hour Heating and Air	12	2	ROLLING HILLS 3RD ADD		0	0
MECH2211-0028	11/01/2022	5,000	4017 13TH ST	MECHANICAL	AIR CONDITIONING	New AC / Furnace replacement	MCCORMICK MECHANICAL INC.	5	11	BITTERSWEET SUB		0	0
MECH2211-0029	11/01/2022	4,000	2425 15TH AVENUE CT	MECHANICAL	AIR CONDITIONING	2 ton AC addition and Furnace replacement	MCCORMICK MECHANICAL INC.	14	9	FARRS 2ND ADD		0	0
MECH2211-0040	11/02/2022	3,000	1707 101ST AVENUE CT	MECHANICAL	AIR CONDITIONING	AC	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0072	11/03/2022	13,365	664 51ST AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	install replacements	COOPER HEATING & COOLING	15	3	WEST POINT 2ND FG		0	0
MECH2211-0083	11/03/2022	5,980	2828 12TH STREET RD	MECHANICAL	FURNACE	60,000 BTU Furnace	AFFORDABLE HEATING & A/C	8	11	WILSHIRE 4TH ADD		0	0
MECH2211-0088	11/03/2022	2,200	431 N 35TH AVE SPC 1	MECHANICAL	AIR CONDITIONING	Install 2 1/2 air conditioner on lot 1	A QUALITY HOME SERVICE			STONEYBROOK FG #1 1ST RPLT AMD #1		0	0
MECH2211-0089	11/03/2022	2,200	431 N 35TH AVE SPC 2	MECHANICAL	AIR CONDITIONING	Install 2 1/2 air conditioner on Lot 2	A QUALITY HOME SERVICE			STONEYBROOK FG #1 1ST RPLT AMD #1		0	0
MECH2211-0090	11/03/2022	2,200	431 N 35TH AVE SPC 3	MECHANICAL	AIR CONDITIONING	Install 2 1/2 air conditioner on Lot 3	A QUALITY HOME SERVICE			STONEYBROOK FG #1 1ST RPLT AMD #1		0	0
MECH2211-0091	11/03/2022	2,200	431 N 35TH AVE SPC 4	MECHANICAL	AIR CONDITIONING	Install 2 1/2 air conditioner on Lot 4	A QUALITY HOME SERVICE			STONEYBROOK FG #1 1ST RPLT AMD #1		0	0
MECH2211-0092	11/03/2022	2,200	431 N 35TH AVE SPC 5	MECHANICAL	AIR CONDITIONING	Install 2 1/2 air conditioner on Lot 5	A QUALITY HOME SERVICE			STONEYBROOK FG #1 1ST RPLT AMD #1		0	0
MECH2211-0094	11/03/2022	800	1917 7TH AVE	MECHANICAL	GAS TEST	Gas pressure test on unit #2	CASTLE HEATING AND COOLING LLC	9	10	ERICKSON SUB		0	0
MECH2211-0101	11/04/2022	5,413	1604 105TH AVENUE CT	MECHANICAL	AIR CONDITIONING	Remove existing and install 16 seer 3.5 ton a/c and condense	IMS HEATING & AIR INC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0102	11/04/2022	7,046	3130 51ST AVE	MECHANICAL	AIR CONDITIONING	Remove existing and install 16 seer 2.5 ton ac and condenser	IMS HEATING & AIR INC	26	5	T BONE RANCH SUB 2ND FG		0	0
MECH2211-0114	11/07/2022	3,050	1975 28TH AVE 22	MECHANICAL	FURNACE	replace furnace with new 95% AFUE furnace 60000 btu	Energy Resource Center	2	NONE	COTTONWOOD CREEK CONDO		0	0
MECH2211-0119	11/07/2022	1,385	1722 14TH AVE	MECHANICAL	FURNACE	Replacing existing furnace	GREELEY FURNACE CO LLC	11	14	CRANFORDS 2ND ADD		0	0
MECH2211-0129	11/08/2022	13,185	1051 6TH ST	MECHANICAL	AIR CONDITIONING	Replace Walk In Cooler	AIR X-TREME	9	26	GREELEY CITY		0	0
MECH2211-0130	11/08/2022	13,037	1214 30TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	remove existing furn/ac and replace with new like furn/ac	ALLEN PLUMBING & HEATING	26	10	WILSHIRE 4TH ADD		0	0
MECH2211-0131	11/08/2022	7,280	5211 2ND ST	MECHANICAL	FURNACE	remove existing furn and replace with new like furn	ALLEN PLUMBING & HEATING	17	2	GLEN EDEN AT KELLY FARM SUB		0	0
MECH2211-0148	11/10/2022	2,500	3508 BOARDWALK	MECHANICAL	FURNACE AND AIR CONDITIONING	Replace existing furnace and ac	Thomas Beatty	28	7	BAY AT THE LANDINGS AM PLAT		0	0
MECH2211-0150	11/10/2022	4,527	8717 19TH STREET RD	MECHANICAL	FURNACE	Install a 80k BTU 80% ng Furnace	JMP HEAT dba LION HOME SERVICE	5	3	MOUNTAIN SHADOWS SUB 2ND FG		0	0
MECH2211-0152	11/10/2022	4,052	2044 27TH AVENUE CT	MECHANICAL	FURNACE	Install a 80k BTU 80% ng Furnace	JMP HEAT dba LION HOME SERVICE	8	NONE	CASCADE WEST SUB		0	0
MECH2211-0153	11/10/2022	11,133	3660 25TH ST 1-103	MECHANICAL	FURNACE AND AIR CONDITIONING	Install a 2.5 ton 15 Seer AC and a 80k BTU 80% ng Furnace	JMP HEAT dba LION HOME SERVICE	105	NONE	LONGSVIEW TOWNHOMES PHASE 1 BLDG 1 AND 2		0	0
MECH2211-0158	11/10/2022	6,400	1131 E 25TH ST	MECHANICAL	AIR CONDITIONING	60,000 BTU Furnace	AFFORDABLE HEATING & A/C	21	6	EAST MEADOWS SUB 1ST FG		0	0
MECH2211-0172	11/10/2022	5,905	4836 8TH ST	MECHANICAL	FIREPLACE-GAS STOVES	INSTALL A HEAT&GLO SUPREME-I25-IFT DIRECT VENT GAS FIREPLACE	WESTERN FIREPLACE SUPPLY	9	10	WESTMOOR WEST		0	0
MECH2211-0174	11/10/2022	200	1823 5TH ST 25	MECHANICAL	GAS TEST	Gas pressure test	CASTLE HEATING AND COOLING LLC					0	0
MECH2211-0179	11/11/2022	3,000	1702 101ST AVENUE CT	MECHANICAL	AIR CONDITIONING	Air Conditioning	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0180	11/11/2022	3,000	1705 102ND AVE	MECHANICAL	AIR CONDITIONING	1705 102nd Ave	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0

MECH2211-0188	11/14/2022	2,850	1733 30TH AVENUE CT	MECHANICAL	FURNACE	replace furnace with new 95% AFUE furnace 60000 btu	Energy Resource Center	10	5	WOODBRIAR 2ND FG 2ND RPLT		0	0
MECH2211-0189	11/14/2022	3,360	3636 17TH AVE 1-4	MECHANICAL	FURNACE AND AIR CONDITIONING	INSTALL FURNACE AND AC UNIT	A-1 HEATING AND AIR CONDITIONING	5	NONE	EVANS CITY		0	0
MECH2211-0190	11/14/2022	3,300	2600 12TH STREET RD	MECHANICAL	FURNACE	Replacing existing boiler	GREELEY FURNACE CO LLC	2	NONE	GREELEY PLAZA 2ND RPLT		0	0
MECH2211-0208	11/15/2022	10,399	2216 10TH AVE	MECHANICAL	FURNACE	Qty 2 60,000 BTU furnaces	AFFORDABLE HEATING & A/C	16	3	ARLINGTON PARK		0	0
MECH2211-0209	11/15/2022	400	425 6TH ST	MECHANICAL	GAS TEST	repair for replacement meter		10	116	GREELEY CITY		0	0
MECH2211-0210	11/15/2022	3,000	1624 103RD AVENUE CT	MECHANICAL	AIR CONDITIONING	Air Conditioning	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0214	11/15/2022	12,102	5307 11TH STREET RD	MECHANICAL	FURNACE AND AIR CONDITIONING	80,000 BTU Furnace 2 Ton AC Unit + New Coil	AFFORDABLE HEATING & A/C	5	NONE	VILLA SERENA		0	0
MECH2211-0228	11/16/2022	7,380	2443 E 18TH ST	MECHANICAL	FURNACE	60,000 BTU Furnace	AFFORDABLE HEATING & A/C					0	0
MECH2211-0229	11/16/2022	12,330	393 E 24TH ST	MECHANICAL	FURNACE AND AIR CONDITIONING	16 Seer 2 ton single stage AC unit, 60,000 BTU Furnace	AFFORDABLE HEATING & A/C	25	1	PARKVIEW		0	0
MECH2211-0238	11/17/2022	3,000	10436 17TH ST	MECHANICAL	AIR CONDITIONING	Air Conditioning	J&J Construction of Northern Colorado, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0245	11/17/2022	1,200	2512 29TH AVE	MECHANICAL	FURNACE	replace furnace	Forrest Mechanical, LLC	15	12	CASCADE PARK SOUTH		0	0
MECH2211-0246	11/17/2022	4,489	512 E 29TH STREET RD	MECHANICAL	FURNACE	Install a 60k BTU 96% ng Furnace	JMP HEAT dba LION HOME SERVICE	11	9	RIVERVIEW FARM SUB		0	0
MECH2211-0257	11/18/2022	5,300	1715 57TH AVE	MECHANICAL	FURNACE	Install 90,000 BTU 96% Furnace	IMS HEATING & AIR INC	6	5	HILAND KNOLLS SUB		0	0
MECH2211-0258	11/18/2022	1,995	2322 9TH ST	MECHANICAL	FURNACE	Replacing existing furnace	GREELEY FURNACE CO LLC	6	17	HOUSTON HEIGHTS		0	0
MECH2211-0265	11/18/2022	3,000	1711 101ST AVENUE CT	MECHANICAL	AIR CONDITIONING	Air Conditioning	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0267	11/19/2022	24,669	621 35TH AVENUE CT	MECHANICAL	FURNACE AND AIR CONDITIONING	install replacement furnace and new ac	COOPER HEATING & COOLING	4	8	EDWARDS HOMES 3RD ADD		0	0
MECH2211-0278	11/21/2022	4,674	2916 RESERVOIR RD	MECHANICAL	FURNACE AND AIR CONDITIONING	REPLACE FURANCE AND ADD AIR CONDITIONER	NORTHERN COLORADO AIR INC	7	1	SOUTHRIDGE RPLT		0	0
MECH2211-0279	11/21/2022	3,000	10213 16TH STREET RD	MECHANICAL	AIR CONDITIONING	Ari Conditioning	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0282	11/21/2022	4,527	2210 69TH AVE	MECHANICAL	FURNACE	Install a 80k BTU 80% ng Furnace	JMP HEAT dba LION HOME SERVICE	19	11	DRAKES CROSSING		0	0
MECH2211-0283	11/21/2022	4,122	409 6TH ST	MECHANICAL	FURNACE	Install a 60k BTU 80% ng Furnace	JMP HEAT dba LION HOME SERVICE	14	116	STRUBLES SUB		0	0
MECH2211-0288	11/22/2022	5,895	1715 57TH AVE	MECHANICAL	AIR CONDITIONING	Install 3 ton 13 seer AC	IMS HEATING & AIR INC	6	5	HILAND KNOLLS SUB		0	0
MECH2211-0290	11/22/2022	5,525	212 57TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	INSTALL FURNACE AND AC	A-1 HEATING AND AIR CONDITIONING	4	1	CROSIERS CORNER AT KELLY FARM SUB		0	0
MECH2211-0291	11/22/2022	1,672	1309 12TH ST	MECHANICAL	FURNACE	NSTALL FURNACE	A-1 HEATING AND AIR CONDITIONING	4	89	GREELEY CITY		0	0
MECH2211-0293	11/22/2022	500	608 21ST ST	MECHANICAL	GAS TEST	Pressure Test	AIR X-TREME	1	9	ALTA VISTA ADD		0	0
MECH2211-0303	11/22/2022	200	1823 5TH ST 1	MECHANICAL	GAS TEST	Gas pressure test	CASTLE HEATING AND COOLING LLC					0	0
MECH2211-0307	11/23/2022	3,050	906 C ST	MECHANICAL	FURNACE	replace furnace with new 95% AFUE furnace 60000 btu	Energy Resource Center	1	32	CLAYTON PARK		0	0
MECH2211-0313	11/23/2022	7,071	2075 36TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	INSTALL 45K BTU 96% EFFICIENT FURNACE AND 16 SEER 2 TON A/C	SWAN HEATING & A/C OF DENVER	4	3	MEADOWS PUD		0	0
MECH2211-0314	11/23/2022	4,497	2705 19TH STREET RD	MECHANICAL	FURNACE	INSTALL 70K BTU 96% EFFICIENT FURNACE	SWAN HEATING & A/C OF DENVER	21	9	ROLLING HILLS 3RD ADD		0	0
MECH2211-0315	11/23/2022	4,497	2705 19TH STREET RD	MECHANICAL	FURNACE	INSTALL 70K BTU 96% EFFICIENT FURNACE	SWAN HEATING & A/C OF DENVER	21	9	ROLLING HILLS 3RD ADD		0	0
MECH2211-0332	11/28/2022	3,000	1608 102ND AVE	MECHANICAL	AIR CONDITIONING	Air Conditioning	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0337	11/28/2022	7,295	221 N 30TH AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	Install a 88k BTU 80% ng Furnace and 13 Seer 2 ton AC	JMP HEAT dba LION HOME SERVICE	68	NONE	NORTHVIEW ESTATES CONDOS 5TH SUPP		0	0
MECH2211-0340	11/28/2022	3,000	1611 105TH AVENUE CT	MECHANICAL	AIR CONDITIONING	Air Conditioning	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0341	11/28/2022	3,000	1611 105TH AVENUE CT	MECHANICAL	AIR CONDITIONING	Air Conditioning	Journey Homes, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
MECH2211-0342	11/28/2022	4,000	2903 58TH AVENUE CT	MECHANICAL	FURNACE	96% afue furnace install	MCCORMICK MECHANICAL INC.	23	5	WEST T BONE RANCH SUB 1ST FG		0	0
MECH2211-0352	11/29/2022	4,008	2117 44TH AVE	MECHANICAL	AIR CONDITIONING	Replaced AC	AIRTECH HVAC SERVICES (AIR SOLUTION	27	9	VIRGINIA HILLS		0	0
MECH2211-0354	11/29/2022	6,790	1927 43RD AVE	MECHANICAL	FURNACE	80% 110k btu FURNACE INSTALL	IMS HEATING & AIR INC	11	7	COLLEGE GREEN 3RD FG		0	0
MECH2211-0356	11/29/2022	4,699	2220 73RD AVE	MECHANICAL	FURNACE	INSTALL 96% EFFICIENT 70K BTU FURNACE	SWAN HEATING & A/C OF DENVER	3	4	HOMESTEAD HEIGHTS SUB FG#3		0	0
MECH2211-0358	11/29/2022	15,587	525 N BRISBANE AVE	MECHANICAL	FURNACE AND AIR CONDITIONING	100,000 BTU Furnace 4 ton AC	AFFORDABLE HEATING & A/C	14	1	BOOMERANG RUN		0	0
MECH2211-0359	11/29/2022	4,254	1900 68TH AVE 9-1	MECHANICAL	FURNACE	INSTALL 60K BTU 80% EFFICIENT FURNACE	SWAN HEATING & A/C OF DENVER	1	NONE	CEDARWOODS II CONDOS 15TH SUPP		0	0
MECH2211-0361	11/29/2022	11,000	413 HORIZON CIR	MECHANICAL	FIREPLACE-GAS STOVES	Install gas fireplace with approximately 60 feet of gas line	FYREPRO INC	8	3	POUDRE RIVER RANCH 3RD FG		0	0
MECH2211-0362	11/30/2022	1,223	2652 50TH AVE	MECHANICAL	FURNACE	Replacing existing furnace	GREELEY FURNACE CO LLC	1	6	HIGHLAND PARK		0	0
MECH2211-0367	11/30/2022	50	2531 9TH AVENUE CT	MECHANICAL	GAS TEST	Air test for gas leak	MCCREERY AND SUN	14	NONE	WHEELERS ADD		0	0
PLB2211-0008	11/01/2022	12,000	1836 26TH ST	PLUMBING	WATER SEWER REPAIR	8 FOOT SPOT REPAIR 8 FEET DEEP IN FRONT YARD. INSTALL C/O	TRENCH RIGHT LLC	1	6	HILLSIDE ADD		0	0
PLB2211-0023	11/01/2022	800	2137 26TH AVE	PLUMBING	GAS PIPING	Run a new gas line for a stove connection aprox 10'	ALLEN PLUMBING & HEATING	15	5	CASCADE PARK 2ND ADD		0	0
PLB2211-0039	11/02/2022	500	2513 13TH AVE	PLUMBING	GAS PIPING	relocating gas line survice	KB MECHANICAL	20	17	FARRS 4TH ADD		0	0
PLB2211-0043	11/02/2022	16,080	5948 23RD ST	PLUMBING	WATER SEWER REPAIR	Interior sewer replacement	JMP HEAT dba LION HOME SERVICE	44	NONE	WESTRIDGE 4TH FG		0	0
PLB2211-0071	11/02/2022	5,800	1219 30TH STREET RD	PLUMBING	WATER SEWER REPAIR	8 FOOT SPOT REPAIR 7 FEET DEEP IN FRONT YARD.	TRENCH RIGHT LLC	9	NONE	LANDMARK SUB 2ND FG		0	0
PLB2211-0073	11/03/2022	100	2280 1ST AVE 125	PLUMBING	WATER HEATER BOILER	Replaced a leaking gas line underground	CENTENNIAL STATE PLUMBING LLC	125	NONE	COUNTRYSIDE MOBILE HOME PARK		0	0
PLB2211-0082	11/03/2022	100	1919 13TH ST	PLUMBING	GAS TEST	home gas test, house has been empty for one year	TERRY'S PLUMBING	12	4	MAPLEWOOD		0	0
PLB2211-0112	11/07/2022	500	5551 29TH ST 2513	PLUMBING	GAS TEST	retest due to gas leak, meter is red tagged	Morgan Kidder			MOUNTAIN VIEW CONDOS PHASE 26 BLDG 25		0	0
PLB2211-0135	11/08/2022	6,457	712 26TH AVE	PLUMBING	WATER SEWER REPAIR	Install two way cleanouts on sewer line in yard	JMP HEAT dba LION HOME SERVICE	6	NONE	BARR SUB		0	0
PLB2211-0141	11/09/2022	500	1933 27TH ST	PLUMBING	WATER SEWER REPAIR	Fix a bubble in the sewer line	Newt Plumbing Heating and Air	11	2	HILLSIDE 1ST ADD		0	0
PLB2211-0149	11/10/2022	1,650	2602 12TH AVE	PLUMBING	WATER HEATER BOILER	Replace old heater and gas test		25	24	FARRS 5TH ADD		0	0
PLB2211-0151	11/10/2022	200	917 12TH ST	PLUMBING	GAS TEST	Located a lleak on the gas piping located outside of the bui	BIGHORN PLUMBING LLC	6	85	GREELEY CITY		0	0
PLB2211-0155	11/10/2022	1,505	2433 12TH ST	PLUMBING	WATER HEATER BOILER	Install a 50 gal ng WH	JMP HEAT dba LION HOME SERVICE	22	6	WESTVIEW 2ND ADD		0	0
PLB2211-0161	11/10/2022	1,940	2046 9TH AVE	PLUMBING	WATER HEATER BOILER	50 gal gas, 40K BTU, replacement like for like	COLORADO DELTA MECHANICAL INC	25	19	ARLINGTON HEIGHTS		0	0
PLB2211-0164	11/10/2022	1,830	100 N 16TH AVE	PLUMBING	WATER HEATER BOILER	50 gal gas, 38K BTU, replacement like for like	COLORADO DELTA MECHANICAL INC			HABITAT NORTH SUB		0	0
PLB2211-0168	11/10/2022	500	714 63RD AVE	PLUMBING	WATER SEWER REPAIR	We will be changing the shower valve to a new valve	Mark Whaley	4	10	PUMPKIN RIDGE SUB		0	0
PLB2211-0171	11/10/2022	800	203 21ST AVENUE PL	PLUMBING	WATER SEWER REPAIR	Main water line repair	LT PLUMBING LLC	1	2	COYS SUB NORTH		0	0
PLB2211-0176	11/11/2022	1,000	6613 4TH STREET RD 3	PLUMBING	GAS TEST	Gas Test	HARTFORD CONSTRUCTION LLC			CITY CENTER WEST RESIDENTIAL 2ND FG		0	0
PLB2211-0191	11/14/2022	500	1901 31ST STREET RD	PLUMBING	WATER SEWER SERVICE LINE	We will be changing the shower valve to a new valve	Dennis Stricker	1	3	SOUTHMOOR VILLAGE 1ST FG RPLT		0	0
PLB2211-0213	11/15/2022	5,000	920 49TH AVENUE PL	PLUMBING	WATER SEWER REPAIR	8 foot spot 9 feet deep in front yard. and install clean out	TRENCH RIGHT LLC	18	17	WESTMOOR WEST		0	0
PLB2211-0221	11/16/2022	1,920	2211 ASPEN AVE	PLUMBING	WATER HEATER BOILER	40 gal gas, 40K BTU, replacement like for like	COLORADO DELTA MECHANICAL INC	3	4	PARKVIEW		0	0
PLB2211-0224	11/16/2022	2,500	2350 29TH ST	PLUMBING	GAS PIPING	plumbing drain conversion, new plumbing rough in	Kyle Torska	1	NONE	ROBCO MINOR SUB		0	0
PLB2211-0234	11/17/2022	4,875	2428 15TH AVENUE CT	PLUMBING	WATER SEWER REPAIR	Sewer Service Spot Repair	THE ELITE PIPE MD	8	9	FARRS 2ND ADD		0	0
PLB2211-0235	11/17/2022	5,600	2280 1ST AVE 80	PLUMBING	GAS TEST	replace a furnace	lion home service	80	NONE	COUNTRYSIDE MOBILE HOME PARK		0	0
PLB2211-0239	11/17/2022	2,500	2116 7TH STREET RD	PLUMBING	WATER HEATER BOILER	install tankless water heater	PUREWATER PLUMBING AND WATER PURIFICATION	3	NONE	HERRMANN & OWEN SUB		0	0
PLB2211-0242	11/17/2022	3,193	229 N 52ND AVE	PLUMBING	WATER HEATER BOILER	INSTALL A TANKLESS WATER HEATER	SWAN HEATING & A/C OF DENVER	6	1	FOREST GLEN AT KELLY FARM SUB 3RD FG		0	0
PLB2211-0243	11/17/2022	3,948	2038 6TH AVE	PLUMBING	WATER SEWER REPAIR	spot repair and two way cleanouts on sewer line in yard	JMP HEAT dba LION HOME SERVICE	15	3	ALTA VISTA ADD		0	0
PLB2211-0247	11/17/2022	1,292	512 E 29TH STREET RD	PLUMBING	WATER HEATER BOILER	Install a 50 gal ng WH	JMP HEAT dba LION HOME SERVICE	11	9	RIVERVIEW FARM SUB		0	0
PLB2211-0249	11/17/2022	250	6906 22ND ST	PLUMBING	GAS PIPING	leak after installing new gas meter	Dyer Plumbing	27	11	DRAKES CROSSING		0	0
PLB2211-0252	11/17/2022	1,615	3405 16TH ST 6B	PLUMBING	WATER HEATER BOILER	Install a 40 gal ng WH	JMP HEAT dba LION HOME SERVICE	6	NONE	SHERWOOD VILLAGE CONDO		0	0
PLB2211-0260	11/18/2022	625	808 22ND ST	PLUMBING	GAS PIPING	Have a gas line run outside of building	Henry Kelsey	1	2	ARLINGTON PARK		0	0
PLB2211-0268	11/20/2022	4,000	2057 27TH AVE	PLUMBING	WATER HEATER BOILER	Supply and install Navien combi boiler/water heater	AQUA PLUMBING AND HEATING	10	7	CASCADE PARK 3RD ADD 2ND RPLT		0	0
PLB2211-0269	11/20/2022	2,700	1733 30TH AVENUE CT	PLUMBING	WATER HEATER BOILER	Supply and install AO Smith air source heat pump water heate	AQUA PLUMBING AND HEATING	10	5	WOODBRIAR 2ND FG 2ND RPLT		0	0
PLB2211-0271	11/20/2022	1,800	542 N 11TH AVE 33	PLUMBING	GAS TEST	main gas hasn a lik		NONE	37	CLAYTON PARK		0	0
PLB2211-0273	11/20/2022	2,800	1975 28TH AVE 22	PLUMBING	WATER HEATER BOILER	Supply and install Navien tankless water heater	AQUA PLUMBING AND HEATING	2	NONE	COTTONWOOD CREEK CONDO		0	0
PLB2211-0275	11/21/2022	6,110	621 35TH AVENUE CT	PLUMBING	WATER HEATER BOILER	install replacement tankless water heater	COOPER HEATING & COOLING	4	8	EDWARDS HOMES 3RD ADD		0	0
PLB2211-0276	11/21/2022	3,948	1402 32ND AVE	PLUMBING	WATER SEWER REPAIR	Spot repair and two way cleanouts on sewer line in yard	JMP HEAT dba LION HOME SERVICE	10	8	SHERWOOD PARK 3RD ADD		0	0
PLB2211-0289	11/22/2022	1,500	950 52ND AVENUE CT S-1	PLUMBING	WATER HEATER BOILER	Install a 40 gallon gas hot water heater		1	NONE	WEST POINT CONDOS SUPP#4 BLDG J,K,S&T		0	0
PLB2211-0297	11/22/2022	5,750	2227 13TH ST	PLUMBING	WATER SEWER SERVICE LINE	60' full sewer line replacement house to the tap in street	THE ELITE PIPE MD	12	3	MAPLEWOOD 3RD ADD		0	0
PLB2211-0308	11/23/2022	1,400	3775 25TH ST BLDG J #101-10	PLUMBING	WATER HEATER BOILER	Apt #J-204 - 40 gallon water heater replacement	PD GREEN'S PLUMBING	1	PT	GATEWAY PARK FG#2		0	0
PLB2211-0309	11/23/2022	1,400	3775 25TH ST BLDG J #101-10	PLUMBING	WATER HEATER BOILER	Apt #J-306 - 40 gallon water heater replacement	PD GREEN'S PLUMBING	1	PT	GATEWAY PARK FG#2		0	0
PLB2211-0326	11/25/2022	2,010	815 37TH AVE	PLUMBING	WATER HEATER BOILER	50 gal gas, 40K BTU, replacement like for like	COLORADO DELTA MECHANICAL INC	815	NONE	EDWARDS HEIGHTS CONDO 2ND SUPP		0	0
PLB2211-0327	11/25/2022	1,330	443 46TH AVE	PLUMBING	WATER HEATER BOILER	40 gal gas, 36K BTU, replacement like for like	COLORADO DELTA MECHANICAL INC	6	1	CENTER PARK MINOR SUB		0	0
PLB2211-0333	11/28/2022	7,800	2124 19TH AVE	PLUMBING	WATER SEWER REPAIR	8 foot spot 9 feet deep front yard. install clean out	TRENCH RIGHT LLC	2	2	ROYAL MANOR SUB		0	0
PLB2211-0336	11/28/2022	140	200 N 35TH AVE 124	PLUMBING	GAS TEST	gas pressure test	TOP NOTCH PLUMBING					0	0
PLB2211-0338	11/28/2022	4,390	220 N 30TH AVE	PLUMBING	WATER HEATER BOILER	Install a Navien Tankless WH	JMP HEAT dba LION HOME SERVICE			CLOVER MEADOWS 1ST RPLT		0	0
PLB2211-0351	11/29/2022	1,500	2519 6TH ST	PLUMBING	WATER SEWER REPAIR	10' spot repair in private property with cleanouts	Elite Rooter	10	NONE	ROOT SUB		0	0
PLB2211-0355	11/29/2022	3,193	2604 25TH AVE	PLUMBING	WATER HEATER BOILER	INSTALL TANKLESS WATER HEATER	SWAN HEATING & A/C OF DENVER	16	4	SOUTHRIDGE SUB		0	0
PLB2211-0372	11/30/2022	2,191	200 N 35TH AVE 182	PLUMBING	WATER HEATER BOILER	Install a 40 gal ng Water Heater	JMP HEAT dba LION HOME SERVICE					0	0
ROOF2211-0002	11/01/2022	50,000	1105 26TH AVE	ROOFING		Removal of old material down to decking	David Irvin					0	0
ROOF2211-0020	11/01/2022	6,650	711 46TH AVENUE WAY	ROOFING		REMOVE EXISTING SHINGLES AND REPLACE WITH NEW MALARKEY SHING	FAITHFUL ROOFING LLC	9	1	WESTMOOR ACRES 1ST FG OTLT D		0	0
ROOF2211-0021	11/01/2022	7,000	2211 MOUNTAIR LN	ROOFING		remove and install new shingle roof	WINDOW AND SIDING OUTLET	6	2	WEST LAKE PARK 1ST FG		0	0
ROOF2211-0031	11/01/2022	25,585	7400 POUDRE RIVER RD	ROOFING		Reroof 53 squares with Owens Corning Duration Storm Class 4	PREMIER SIDING & ROOFING INC.	4	NONE	POUDRE RIVER RANCH 1ST FG PUD		0	0
ROOF2211-0065	11/02/2022	9,100	3825 12TH STREET DR	ROOFING		remove and replace shingles with malarkey legacy	TICOS ROOFING	6	3	BITTERSWEET NORTH SUB		0	0
ROOF2211-0085	11/03/2022	7,779	4915 23RD STREET RD	ROOFING		Tear off and install new felt, accessories and OC shingles	MARTINEZ ROOFING INC LLC	7	1	LUNDVALL SUB 1ST ADD		0	0
ROOF2211-0096	11/04/2022	17,400	1910 56TH AVE	ROOFING		Commercial reroof; remove cement tiles and install 58 sq ML	ANCHOR ROOFING LLC	6	2	HILAND PARK		0	0
ROOF2211-0100	11/04/2022	81,000	2820 10TH ST	ROOFING		TPO roof .60 mil	Steve Miller	1	NONE	WILSHIRE COMMERCIAL REPLAT		0	0
ROOF2211-0105	11/04/2022	8,000	1019 49TH AVENUE CT	ROOFING		Reroof	ALL IN ROOFING LLC	20	1	COUNTRY CLUB WEST SUB		0	0
ROOF2211-0134	11/08/2022	8,050	2808 5TH ST	ROOFING		REMOVE EXISTING SHINGLES AND REPLACE WITH NEW GAF Timberline	FAITHFUL ROOFING LLC	2	9	BROADVIEW ACRES 5TH ADD		0	0
ROOF2211-0136	11/09/2022	4,400	1441 6TH ST A	ROOFING		REMOVE EXISTING SHINGLES AND REPLACE WITH NEW OWENS CORNING	FAITHFUL ROOFING LLC	3	NONE	PLAZA LAS GLORIAS SUB		0	0
ROOF2211-0165	11/10/2022	3,400	3321 13TH ST	ROOFING		replaced roof		4	10	SHERWOOD PARK 3RD ADD		0	0
ROOF2211-0197	11/14/2022	27,000	1905 28TH ST	ROOFING		Remove and replace existing roof system w/ 60MIL TPO.	Bryan Jensen	16	1	HILLSIDE 2ND ADD		0	0
ROOF2211-0199	11/14/2022	27,000	1915 28TH ST	ROOFING		Remove and replace existing roof system w/ 60MIL TPO.	Bryan Jensen	16	1	HILLSIDE 2ND ADD		0	0
ROOF2211-0262	11/18/2022	11,831	1905 GLENMERE BLVD	ROOFING		Reroof	Bob Behrends Roofing	1	NONE	ELLINGERS RPLT OF PT L650 GLENMERE PARK		0	0
SIGN2206-0228	11/11/2022	1,975	4751 29TH ST D	SIGN	MAJOR AND ELECTRICAL	Install Wall sign	COLORADO SIGNWORKS	1	NONE	GREELEY COMMONS MINOR		0	0
SIGN2210-0446	11/10/2022	12,500	7109 27TH ST	SIGN	MAJOR AND ELECTRICAL	Wall Signs / Monument signs	COLORADO SIGN LLC			WESTGATE 1ST FG		0	0
SIGN2210-0504	11/16/2022	500,000	4735 25TH ST	SIGN	TEMPORARY	Construction entrance sign	Elder Construction	4	NONE	GRAPEVINE MINOR 1ST RPLT		0	0
SIGN2211-0011	11/22/2022	375	2650 11TH AVE	SIGN	TEMPORARY	Install a Banner and Ground Flags at Dollar Tree for Grand O	ASAP Event Advertising	1	NONE	SUBURBAN SUB		0	0
SIGN2211-0183	11/21/2022	1,885	112 13TH ST	SIGN	MAJOR AND ELECTRICAL	New wall sign	DaVinci Sign Systems, Inc.	NONE	142	KENWORTH		0	0
SPV2203-0259	11/28/2022	51,490	2213 ASH AVE	PHOTOVOLTAIC		7.505 KW PV Roof Mounted Solar Project	Reborne Solar	4	1	PARKVIEW		0	0
SPV2207-0236	11/21/2022	31,250	113 N 47TH AVENUE CT	PHOTOVOLTAIC		ROOF MOUNT, FLUSH MOUNT, GRID-TIED: 8.84kW Solar PV	SUNRUN INSTALLATION SERVICES INC	13	23	WEBER WEST 5TH RPLT		0	0
SPV2207-0426	11/15/2022	34,892	502 E 28TH STREET RD	PHOTOVOLTAIC		Roof Mounted Solar 8.14kW 22 REC		1	4	RIVERVIEW FARM SUB		0	0
SPV2208-0035	11/16/2022	21,885	3109 56TH AVENUE CT	PHOTOVOLTAIC		Roof Mounted Solar 4.81kW 13 REC	GENERATION SOLAR	36	3	WEST T BONE RANCH SUB 1ST FG		0	0
SPV2208-0037	11/11/2022	25,950	6129 15TH ST	PHOTOVOLTAIC		Roof Mounted Solar 4.81kW 13 REC	GENERATION SOLAR					0	0
SPV2208-0373	11/03/2022	35,520	2201 17TH ST	PHOTOVOLTAIC		14 panels, 7 micro inverters, 5.18kW, Roof mounted	SOLCIUS LLC	6	1	HAYS SUB		0	0
SPV2208-0536	11/22/2022	21,257	6559 19TH ST	PHOTOVOLTAIC		Installation of roof-mounted solar system. 4.56 kW	ION DEVELOPER LLC	1	5	WESTRIDGE VILLAGE RPLT A		0	0
SPV2208-0654	11/04/2022	33,641	7718 11TH ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 5.2KW	GENERATION SOLAR	4	2	BOOMERANG RANCH 1ST FG		0	0
SPV2209-0013	11/02/2022	44,907	144 19TH AVENUE CT	PHOTOVOLTAIC		Roof Mounted Solar Project with 8.14KW	GENERATION SOLAR	41	NONE	TOWN NORTH 1ST FG		0	0
SPV2209-0036	11/10/2022	34,708	8402 17TH ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 6.60KW	GENERATION SOLAR	6	6	MOUNTAIN SHADOWS SUB 3RD FG		0	0
SPV2209-0037	11/10/2022	29,228	5033 2ND STREET RD	PHOTOVOLTAIC		Roof Mounted Solar Project with	GENERATION SOLAR	3	2	WEBER WEST 8TH RPLT		0	0
SPV2209-0059	11/02/2022	46,886	2716 23RD ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 9.68KW	GENERATION SOLAR	2	5	CASCADE PARK 4TH ADD		0	0
SPV2209-0116	11/02/2022	1,460,000	2901 1ST AVE	PHOTOVOLTAIC		Installation of PV system 804KW on commercial rooftop.	POWERFLEX	NONE	PT	GREELEY COMMERCE CENTER		0	0
SPV2209-0130	11/10/2022	38,970	4720 1ST ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 7.04KW	GENERATION SOLAR	4	7	WEBER WEST SUB		0	0
SPV2209-0223	11/02/2022	48,216	503 E 24TH STREET RD	PHOTOVOLTAIC		Roof Mounted Solar Project with 7.48KW	GENERATION SOLAR	14	1	PARKVIEW SOUTH		0	0
SPV2209-0258	11/02/2022	38,760	112 N 21ST AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 5.55 KW, MPU Project	GENERATION SOLAR	1	1	HABITAT NORTH SUB		0	0
SPV2209-0462	11/21/2022	16,000	6845 POUDRE RIVER RD 2	PHOTOVOLTAIC		Flush Mount, Roof Mount, Grid-Tied 3.6 kW , PV Solar	SUNRUN INSTALLATION SERVICES INC	2	NONE	POUDRE RIVER RANCH 1ST FG RPLT PUD IA		0	0
SPV2210-0109	11/16/2022	40,113	3408 4TH STREET RD	PHOTOVOLTAIC		Installation of a 6.97kW dc system/MPU	LGCY INSTALLATION SERVICES LLC	3	2	FRANKLIN SUB		0	0
SPV2210-0113	11/16/2022	49,804	1424 60TH AVE	PHOTOVOLTAIC		Installation of a 11.2kw roof mount solar pv system	VENTARA LLC	5	1	FOX RUN 4TH FG		0	0
SPV2210-0171	11/14/2022	46,034	1621 15TH AVE	PHOTOVOLTAIC		Installation of 9.24KW-DC solar system	LGCY INSTALLATION SERVICES LLC	5	1	FAIRACRES		0	0
SPV2210-0231	11/02/2022	73,999	2113 14TH ST	PHOTOVOLTAIC		Rooftop Photovoltaic System 11.48 KW Installation	LGCY INSTALLATION SERVICES LLC	8	1	MAPLEWOOD 2ND ADD		0	0
SPV2210-0267	11/14/2022	25,873	1745 27TH AVE	PHOTOVOLTAIC		Installation of a 4.92kW dc system	LGCY INSTALLATION SERVICES LLC	11	3	ROLLING HILLS 1ST ADD		0	0
SPV2210-0343	11/01/2022	42,500	1324 42ND AVE	PHOTOVOLTAIC		Installation of solar panels on existing roof: 7.6 kW	ION DEVELOPER LLC	1	1	COUNTRY CLUB ESTATES 2ND FG		0	0
SPV2210-0366	11/02/2022	37,872	1925 14TH ST	PHOTOVOLTAIC		7.200 kW Rooftop Solar PV	1SOLAR	8	3	MAPLEWOOD 1ST ADD		0	0
SPV2210-0373	11/10/2022	55,435	2906 43RD AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 8.80KW	GENERATION SOLAR	18	5	GATEWAY ESTATES FG#1		0	0
SPV2210-0380	11/10/2022	51,052	2121 24TH STREET RD	PHOTOVOLTAIC		Roof Mounted Solar with 7.92kW	GENERATION SOLAR	15	NONE	MILLERS 1ST RESUB OF L48 ALLES ACRES RPL		0	0
SPV2210-0385	11/01/2022	65,020	1954 19TH AVE	PHOTOVOLTAIC		Installation of PV solar panels on existing residential roof	ION DEVELOPER LLC	813	8	GLENMERE PARK		0	0
SPV2210-0388	11/01/2022	34,321	6111 B ST	PHOTOVOLTAIC		Installation of PV solar panels on existing residential roof	ION DEVELOPER LLC			NORTHRIDGE ESTATES 1ST REPLAT		0	0
SPV2210-0389	11/02/2022	25,152	1612 104TH AVE	PHOTOVOLTAIC		Installation of PV solar panels on existing residential roof	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2210-0392	11/10/2022	71,600	9003 19TH STREET RD	PHOTOVOLTAIC		Roof Mounted Solar Project with 14.00KW	GENERATION SOLAR	1	5	PEBBLE BROOK SUB		0	0
SPV2210-0393	11/11/2022	58,045	3100 49TH AVE	PHOTOVOLTAIC		Roof Mounted Solar Project with 6.66KW	GENERATION SOLAR	1	1	T BONE RANCH SUB 1ST FG		0	0
SPV2210-0394	11/21/2022	30,833	2406 15TH AVE	PHOTOVOLTAIC		Installation for 5.2kw Dc flush roof mounted pv solar system	Freedom Solar	2	8	FARRS 2ND ADD		0	0
SPV2210-0395	11/09/2022	22,710	127 16TH AVE	PHOTOVOLTAIC		installation of 3.96kw dc system	LGCY INSTALLATION SERVICES LLC	4	2	HOLMES SUB 2ND FG		0	0

SPV2210-0396	11/09/2022	81,928	7914 SKYVIEW ST	PHOTOVOLTAIC		installation of 13.640 KW dc system	LGCY INSTALLATION SERVICES LLC	7	1	POUDRE RIVER RANCH 3RD FG		0	0
SPV2210-0408	11/14/2022	34,056	1806 44TH AVENUE CT	PHOTOVOLTAIC		installation of 7.92kw DC system	LGCY INSTALLATION SERVICES LLC	11	4	COLLEGE GREEN 3RD FG		0	0
SPV2210-0412	11/14/2022	25,571	1423 88TH AVE	PHOTOVOLTAIC		installation of 3.69kw dc system	LGCY INSTALLATION SERVICES LLC			TRAILS AT SHEEP DRAW		0	0
SPV2210-0414	11/09/2022	48,989	1810 25TH AVE	PHOTOVOLTAIC		installation of 8.8kw DC system	LGCY INSTALLATION SERVICES LLC	2	10	ROLLING HILLS		0	0
SPV2210-0417	11/14/2022	50,454	1354 57TH AVE	PHOTOVOLTAIC		installation of 8.61kw DC system	LGCY INSTALLATION SERVICES LLC	17	3	COUNTRY CLUB WEST 4TH FG		0	0
SPV2210-0418	11/09/2022	27,641	2827 40TH AVE	PHOTOVOLTAIC		installation of 3.96kw dc system	LGCY INSTALLATION SERVICES LLC	7	2	GATEWAY LAKES		0	0
SPV2210-0423	11/09/2022	29,329	304 N 49TH AVE	PHOTOVOLTAIC		installation of 5.72kw dc system	LGCY INSTALLATION SERVICES LLC	5	21	WEBER WEST 5TH RPLT		0	0
SPV2210-0425	11/09/2022	29,651	3157 50TH AVE	PHOTOVOLTAIC		installation of 4.4kw dc system	LGCY INSTALLATION SERVICES LLC	7	4	T BONE RANCH SUB 1ST FG		0	0
SPV2210-0426	11/02/2022	47,196	3114 19TH STREET RD	PHOTOVOLTAIC		installation of 7.48kw dc system	LGCY INSTALLATION SERVICES LLC	11	4	ROLLING HILLS 2ND ADD		0	0
SPV2210-0427	11/02/2022	67,682	2539 18TH AVE	PHOTOVOLTAIC		installation of 11.0kw dc system	LGCY INSTALLATION SERVICES LLC	8	5	HILLSIDE ADD		0	0
SPV2210-0428	11/09/2022	71,417	1823 26TH AVENUE PL	PHOTOVOLTAIC		installation of 11.89KW dc system	LGCY INSTALLATION SERVICES LLC	16	16	ROLLING HILLS		0	0
SPV2210-0429	11/09/2022	29,651	3911 7TH ST	PHOTOVOLTAIC		installation of 4.40kw dc system	LGCY INSTALLATION SERVICES LLC	12	7	WESTMOOR 1ST FG		0	0
SPV2210-0439	11/09/2022	31,005	110 N 49TH AVE	PHOTOVOLTAIC		installation of 5.72kw dc system	LGCY INSTALLATION SERVICES LLC	14	21	WEBER WEST 5TH RPLT		0	0
SPV2210-0441	11/09/2022	49,311	6307 13TH STREET RD	PHOTOVOLTAIC		installation of 7.48kw dc system	LGCY INSTALLATION SERVICES LLC	27	8	FOX RUN SUB 3RD FG		0	0
SPV2210-0442	11/09/2022	59,567	3036 42ND AVE	PHOTOVOLTAIC		installation of 9.24kw dc system	LGCY INSTALLATION SERVICES LLC	1	15	GATEWAY ESTATES 3RD FG		0	0
SPV2210-0445	11/09/2022	73,999	2113 14TH ST	PHOTOVOLTAIC		installation of 11.48kw dc system	LGCY INSTALLATION SERVICES LLC	8	1	MAPLEWOOD 2ND ADD		0	0
SPV2210-0448	11/09/2022	32,668	1921 MONTVIEW DR	PHOTOVOLTAIC		installation of 6.16kw dc system	LGCY INSTALLATION SERVICES LLC	10	2	GLENMERE PARK 1ST ADD RPLT		0	0
SPV2210-0449	11/14/2022	50,000	4918 23RD STREET RD	PHOTOVOLTAIC		installation of 7.48kw dc system	LGCY INSTALLATION SERVICES LLC	1	2	LUNDVALL SUB 1ST ADD		0	0
SPV2210-0450	11/09/2022	47,571	1215 7TH ST	PHOTOVOLTAIC		installation of 7.92kw dc system	LGCY INSTALLATION SERVICES LLC	7	33	GREELEY CITY		0	0
SPV2210-0475	11/22/2022	49,792	2435 13TH ST	PHOTOVOLTAIC		9.6kW dc PV system and new 100A main service disconnect		3	7	WESTVIEW 2ND ADD		0	0
SPV2210-0487	11/09/2022	50,630	2539 18TH AVE	PHOTOVOLTAIC		10 kW PV Solar Panel Installation on Roof	BLUE RAVEN SOLAR	8	5	HILLSIDE ADD		0	0
SPV2210-0496	11/09/2022	24,050	165 50TH AVENUE PL	PHOTOVOLTAIC		4.81 kWDC, Rooftop, Flush Mount, PV Solar System, Grid Tied	Klick Solar LLC	5	15	WEBER WEST SUB		0	0
SPV2210-0498	11/09/2022	24,164	10401 16TH STREET RD	PHOTOVOLTAIC		Installation of solar panels on existing roof: 4.94kW	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2210-0501	11/09/2022	46,989	1801 26TH AVENUE PL	PHOTOVOLTAIC		Installation of a 9.43kW dc system	LGCY INSTALLATION SERVICES LLC	20	16	ROLLING HILLS		0	0
SPV2210-0502	11/10/2022	23,820	10329 17TH ST	PHOTOVOLTAIC		Beran PV Solar Array 4KW	BRS Field Ops, LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2210-0507	11/28/2022	28,813	100 N 50TH AVE	PHOTOVOLTAIC		Install 6.8 kW grid tied, flush roof mounted PV system	SANDBOX SOLAR	5	12	WEBER WEST 7TH RPLT		0	0
SPV2210-0508	11/09/2022	41,181	1041 48TH AVE	PHOTOVOLTAIC		Install a 7.400 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	37	NONE	HILLTOP SUB 1ST ADD		0	0
SPV2210-0514	11/10/2022	36,945	2224 70TH AVE	PHOTOVOLTAIC		Install a 7.200 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	35	11	DRAKES CROSSING		0	0
SPV2210-0524	11/10/2022	34,960	2623 12TH AVENUE CT	PHOTOVOLTAIC		Installation of a 7.600 kW DC roof mounted solar system	TITAN SOLAR POWER CO INC	24	22	FARRS 5TH ADD		0	0
SPV2210-0535	11/10/2022	31,560	1121 E 24TH STREET RD	PHOTOVOLTAIC		6.000 kW Rooftop Solar PV	1SOLAR	20	1	EAST MEADOWS SUB 1ST FG		0	0
SPV2211-0022	11/15/2022	43,162	2618 22ND AVE	PHOTOVOLTAIC		Roof Mounted Solar 9.60kW 24 ZXM7	GENERATION SOLAR	29	5	HILLSIDE 1ST ADD		0	0
SPV2211-0045	11/10/2022	27,040	1618 105TH AVENUE CT	PHOTOVOLTAIC		Installation of roof-mounted solar system: 5.32 kW	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2211-0084	11/14/2022	22,200	4314 22ND ST	PHOTOVOLTAIC		4.44 kWDC, Rooftop, Flush Mount, PV Solar System, Grid Tied	Klick Solar LLC	24	2	VIRGINIA HILLS 1ST RPLT		0	0
SPV2211-0086	11/15/2022	34,240	2409 A ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 6.0KW	GENERATION SOLAR	13	2	ROYBEC SUB		0	0
SPV2211-0097	11/15/2022	49,852	2306 2ND ST	PHOTOVOLTAIC		Roof Mounted Solar Project with 9.20KW	GENERATION SOLAR	10	1	PRAIRIEVIEW WEST		0	0
SPV2211-0099	11/14/2022	32,031	1908 31ST STREET RD	PHOTOVOLTAIC		Installation of a 4.8 kW DC roof solar system with a MPU	TITAN SOLAR POWER CO INC	9	4	SOUTHMOOR VILLAGE 2ND FG		0	0
SPV2211-0117	11/28/2022	55,435	5708 27TH ST	PHOTOVOLTAIC		installation of 8.8kw dc system	LGCY INSTALLATION SERVICES LLC	1	13	HIGHLAND PARK WEST 2ND RPLT		0	0
SPV2211-0124	11/28/2022	29,260	2050 50TH AVENUE CT	PHOTOVOLTAIC		installation of 6.16 dc system	LGCY INSTALLATION SERVICES LLC	5	NONE	HIGHLAND HILLS SUB		0	0
SPV2211-0125	11/28/2022	38,742	416 25TH AVENUE CT	PHOTOVOLTAIC		installation of 6.15kw dc system	LGCY INSTALLATION SERVICES LLC	2	1	BROADVIEW ACRES 2ND ADD		0	0
SPV2211-0140	11/16/2022	28,988	5019 13TH ST	PHOTOVOLTAIC		Installation for 6.960 Dc flush roof mounted pv solar system	Freedom Solar	11	12	COUNTRY CLUB WEST FG#2		0	0
SPV2211-0144	11/21/2022	32,038	2210 ALPINE AVE	PHOTOVOLTAIC		Install a 4.440 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	28	5	PARKVIEW		0	0
SPV2211-0154	11/21/2022	55,416	4225 30TH STREET RD	PHOTOVOLTAIC		Install a 10.400 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	12	6	GATEWAY ESTATES 3RD FG		0	0
SPV2211-0157	11/21/2022	11,264	109 N 50TH AVE	PHOTOVOLTAIC		Install a 3.200 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	35	13	WEBER WEST SUB		0	0
SPV2211-0160	11/28/2022	36,708	2827 ASPEN AVE	PHOTOVOLTAIC		7.600 kW Rooftop Solar PV	1SOLAR	23	5	RIVERVIEW FARM SUB		0	0
SPV2211-0173	11/21/2022	21,242	141 49TH AVENUE PL	PHOTOVOLTAIC		Install a 5.600 kW grid tied, roof flush mount PV system	FREEDOM FOREVER COLORADO LLC	21	12	WEBER WEST SUB		0	0
SPV2211-0177	11/28/2022	44,235	427 8TH ST	PHOTOVOLTAIC		3.2 kW PV Solar Panel Installation on Roof	BLUE RAVEN SOLAR	NONE	122	GREELEY CITY		0	0
SPV2211-0178	11/22/2022	54,896	7708 11TH STREET RD	PHOTOVOLTAIC		Roof Mounted Solar Project with 9.60KW	GENERATION SOLAR	13	2	BOOMERANG RANCH 1ST FG		0	0
SPV2211-0192	11/21/2022	48,624	2207 69TH AVE	PHOTOVOLTAIC		Install 13.2kW roof mounted solar PV System w/ 27kWh ESS	TESLA ENERGY OPERATIONS INC	25	11	DRAKES CROSSING		0	0
SPV2211-0194	11/28/2022	29,156	1610 106TH AVE	PHOTOVOLTAIC		Installation of solar panels on existing roof: 5.32kW	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2211-0195	11/15/2022	37,550	6112 B ST	PHOTOVOLTAIC		Roof mount Solar, 7.66kW, 20 modules, & micro-inverters	ADT SOLAR LLC			NORTHRIDGE ESTATES 1ST REPLAT		0	0
SPV2211-0196	11/22/2022	29,129	1607 104TH AVE	PHOTOVOLTAIC		Installation of solar panels on existing roof: 5.7kW	ION DEVELOPER LLC			PROMONTORY IMAGINE SCHOOL 3RD FG		0	0
SPV2211-0204	11/28/2022	14,623	2107 TALON PKWY	PHOTOVOLTAIC		9.6 kW PV Solar Panel Installation on Roof	BLUE RAVEN SOLAR	43	4	OWL RIDGE MINOR SUB FINAL PLAT		0	0
SPV2211-0240	11/28/2022	48,238	2633 ARBOR AVE	PHOTOVOLTAIC		Roof Mounted Solar; 8.4 KW, 21 Modules, 1 Inverter	Powur PBC	43	NONE	PARKVIEW SOUTH 2ND FG		0	0
SPV2211-0248	11/29/2022	51,040	4712 6TH ST	PHOTOVOLTAIC		Installation for 8.700 Dc flush roof mounted pv solar system	Freedom Solar	10	5	WESTMOOR WEST		0	0

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