

Greeley City Council Agenda

Regular Meeting
October 19, 2021 at 6:00 p.m.

City Council Chambers at City Center South, 1001 11th Ave, Greeley, CO 80631
Zoom Webinar link: <https://greeleygov.zoom.us/j/91910136877>

NOTICE:

Regular meetings of the City Council are held on the 1st and 3rd Tuesdays of each month in the City Council Chambers. Meetings are conducted in a hybrid format, with a Zoom webinar in addition to the in person meeting in Council Chambers.

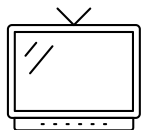
City Council members may participate in this meeting via electronic means pursuant to their adopted policies and protocol.

Members of the public are also invited to choose how to participate in Council meetings in the manner that works best for them.

Watch Meetings:



Meetings are open to the public and can be attended in person by anyone.



Meetings are televised live on GTV8 on cable television.



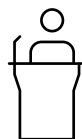
Meetings are livestreamed on the City's website, greeleygov.com as well as YouTube at youtube.com/CityofGreeley

For more information about this meeting or to request reasonable accommodations, contact the City Clerk's Office at 970-350-9740 or by email at cityclerk@greeleygov.com.

Meeting agendas, minutes, and archived videos are available on the City's meeting portal at greeley-co.municodemeetings.com/

Comment in real time:

During the public input portion of the meeting and public hearings:



In person attendees can address the Council in the Chambers.

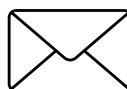


The public can join the Zoom webinar and comment from the remote meeting.

Submit written comments:



Email comments about any item on the agenda to cityclerk@greeleygov.com



Written comments can be mailed or dropped off at the City Clerk's Office at City Hall, at 1000 10th St, Greeley, CO 80631





Mayor

John Gates

Councilmembers

Tommy Butler
Ward I

Brett Payton
Ward II

Michael Fitzsimmons
Ward III

Dale Hall
Ward IV

Kristin Zasada
At-Large

Ed Clark
At-Large

A City Achieving Community Excellence

Greeley promotes a healthy, diverse economy and high quality of life responsive to all its residents and neighborhoods, thoughtfully managing its human and natural resources in a manner that creates and sustains a safe, unique, vibrant and rewarding community in which to live, work, and play.

City Council Agenda

October 19, 2021 at 6:00 PM

City Council Chambers, City Center South, 1001 11th Ave &
via Zoom at <https://greeleygov.zoom.us/j/91910136877>

1. Call to Order
2. Pledge of Allegiance
3. Roll Call
4. Approval of the Agenda
5. Recognitions and Proclamations
6. Citizen Input
7. Reports from Mayor and Councilmembers
8. Initiatives from Mayor and Councilmembers

Consent Agenda

The Consent Agenda is a meeting management tool to allow the City Council to handle several routine items with one action.

Council Members may request an item be pulled off the Consent Agenda and considered separately under the next agenda item in the order they were listed.

9. Consideration of a Resolution to support an application for grant funding from the State of Colorado Department of Natural Resources Land & Water Conservation Fund program for the acquisition and development of the ShurView property for open space and outdoor recreation
10. Consideration of a Resolution of the City of Greeley Council authorizing the City to enter into a Memorandum of Understanding between the City of Greeley and the State of Colorado Department of Public Safety, Division of Fire Prevention and Control, prequalifying the City of Greeley Building Inspection Division to perform public school construction related inspection services
11. Consideration of a Resolution establishing the 2021 tax levy and directing the certification of the same to the Board of County Commissioners

- [12.](#) Consideration of a Resolution of the Greeley City Council urging voters to vote “No” on ballot questions 2G and 2H

End of Consent Agenda

13. Pulled Consent Agenda Items
- [14.](#) Public hearing and second reading of an Ordinance adopting the budget for 2022
- [15.](#) Public hearing and second reading to consider a change of zone from I-H (Industrial High Intensity), I-M (Industrial Medium Intensity) and C-D (Conservation District) to I-M (Industrial Medium Intensity) for approximately 25.759 acres of property located at 300 E. 8th Street known as the City of Greeley Wastewater Treatment Facility Rezone, and final reading of an ordinance changing the official zoning map to reflect the same
- [16.](#) Public hearing to consider a request for approval of a combined Preliminary/Final PUD (Planned Unit Development) for the Westgate First Filing, Westgate Preliminary PUD 2nd Amendment and Final PUD, for approximately 84.436 acres located north of US 34, west of 71st Avenue, and east of 83rd Avenue for a mixed-use community
- [17.](#) Public hearing and second reading of an Ordinance amending Article VI, Chapter 3, Title 20 of the Greeley Municipal Code, relating to Industrial Pretreatment
- [18.](#) Public hearing and second reading of an Ordinance adopting the 2021 Non-Potable Water Master Plan and amending the 2018 Comprehensive Plan to include the same by reference
- [19.](#) Public Hearing to consider adoption of the Annual Action Plan for Program Year 2022 for Community Development Block Grant and HOME Investment Partnership Program Grant with Recommended Budgets
- [20.](#) Appointment of applicants to the Greeley Art Commission, Historic Preservation Commission, and Human Relations Commission
- [21.](#) Scheduling of Meetings, Other Events
- [22.](#) Consideration of a motion authorizing the City Attorney to prepare any required resolutions, agreements, and ordinances to reflect action taken by the City Council at this meeting and at any previous meetings, and authorizing the Mayor and City Clerk to sign all such resolutions, agreements and ordinances
23. Adjournment

Council Agenda Summary

Title

Recognitions and Proclamations

Summary

Council Member Payton will present the *What's Great about Greeley* Report.

Mayor Gates will present a proclamation declaring October 23, 2021 *Greeley Philharmonic Orchestra Day*

Attachments

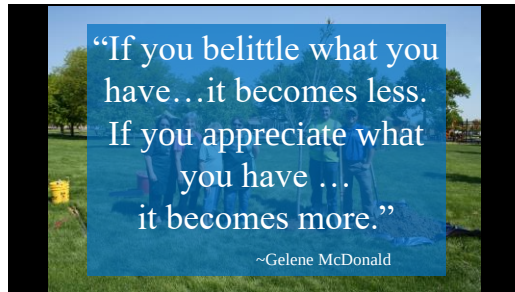
What's Great about Greeley Report

Proclamation declaring October 23, 2021 *Greeley Philharmonic Orchestra Day*

Slide 1



Slide 2



At each Council Meeting, we recognize the people, organizations and businesses that make Greeley Great.

Tonight it's my turn to announce the recognitions. I'll start with a quote, "If you belittle what you have, it becomes less. If you appreciate what you have, it becomes more." With these announcements we are appreciating the good work of our residents, showing support for their efforts, and encouraging everyone to share the word that Greeley is Great.

Slide 3



University of Northern Colorado graduate linebacker Xander Gagnon and defensive lineman David Hoage have earned Big Sky Defensive Player of the Week awards.

Slide 4



The Northern Colorado Regional Economic Development Initiative has won a bronze Excellence in Economic Development Award from the International Economic Development Council. The award recognizes the partnerships, collaboration, data dissemination, communication, and regional marketing initiatives among NoCo REDI's partners throughout Weld and Larimer counties, including the City of Greeley.

Slide 5



Congrats to former Greeley West cross country stand-out, Layne Hammer, who took first place in the women's OKC Memorial Marathon finishing in 2 hours, 54 minutes and 38 seconds. For all those runners out there, that's an average of six minutes and 40 seconds per mile.

Slide 6



Sophomore Lauren Strain has received the Big Sky offensive player of the week for her efforts in women's volleyball. Lauren is the third player this season to earn a Big Sky weekly honor. Seniors Kailey Jo Ince and Kyndall Feather received the recognition last month.

Slide 7



Congratulations to the City of Greeley's finance department for receiving the Distinguished Budget Presentation Award from the Government Financial Officers Association for its budget. The award reflects the commitment of the finance staff in meeting the highest principles of governmental budgeting.

Slide 8



And that's What's Great about Greeley.



Greeley Philharmonic Day

WHEREAS, the Greeley Philharmonic Orchestra, in existence for 110 years, is one of the few professional orchestras to have reached the century mark; and

WHEREAS, the Greeley Philharmonic Orchestra creates hundreds of jobs annually by hiring professional musicians along the Front Range and I-25 Corridor; and

WHEREAS, the Greeley Philharmonic Orchestra has served the City of Greeley for generations and continues to lead the way in the arts as it forges new partnerships, collaborations, and presents world-class programs and concerts, under the direction of Greeley native Maestro Lowell Graham and Executive Director Nick Kenny.

NOW, THEREFORE, I, do hereby proclaim October 23, 2021, as Greeley Philharmonic Day in the City of Greeley.

IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the official seal of the City of Greeley, Colorado, this 19th day of October, 2021.

John Gates
Mayor

Council Agenda Summary

Title

Citizen Input

Summary

During this 15 minute portion of the meeting, anyone may address the Council on any item of City Business appropriate for Council consideration that is not already listed as a public hearing on this evening's agenda.

As this meeting is being conducted in a hybrid format, citizen input will be accepted first from those in the City Council Chambers, and then from the virtual meeting audience via the meeting's webinar.

Written comments submitted for any item on the agenda will be placed in the public record and provided to the Council for their review and should include the name and city of residence of the person submitting the comments for the record.

Council Agenda Summary

Title

Reports from Mayor and Councilmembers

Summary

During this portion of the meeting any Councilmember may offer announcements or reports on recent events and happenings. These reports should be a summary of the Councilmember's attendance at assigned board/commission meetings and should include key highlights and points that may require additional decision and discussion by the full Council at a future time.

Council Agenda Summary

Title

Initiatives from Mayor and Councilmembers

Summary

During this portion of the meeting any Councilmember may bring before the Council any business that the member feels should be deliberated upon by the Council. These matters need not be specifically listed on the Agenda, but formal action on such matters shall be deferred until a subsequent Council meeting.

Initiatives will generally fall into three categories:

- 1) A policy item for Council deliberation and direction for a future Worksession, Committee meeting, or regular/special Council meeting;
- 2) A request to the City Manager for information or research;
- 3) A request involving administrative processes or procedures.

At the close of this portion of the meeting, the Mayor will confirm Council's consensus that the individual requests be pursued.

Attachments

Status Report of Council Initiatives and Related Information

Greeley City Council

Status Report of Council Initiatives

Initiative No.	Council Member Initiating	Council Request	Council Meeting or Work Session Date Requested	Status or Disposition (After completion, item is shown one time as completed and then removed.)	Assigned to:
03-2021	Hall	Request for formation of a committee, to be chaired by Council Member Hall, regarding the section of the Poudre River Trail known as the Narrows. This section is facing increasing risks of erosion, with some portions in danger of falling into the river, and no available alternative areas for trail placement in that vicinity. The School of Mines will do a project to work on some engineering solutions for the area, in addition to other engineering studies that have already been done. The committee will review and determine options to move forward in addressing this with the assistance of City staff. City Manager Otto added information about potential Capital Improvement Projects through this area, and Council Member Hall provided information about existing potential rough cost estimates.	February 2, 2021 Council Meeting	Update: 04/20/2021 Council Member Hall reported the committee had its first meeting and he is pleased with engagement from City staff and the community. A committee, chaired by Council Member and Poudre River Trail Corridor Chairman Hall, has been formed with representatives from the Poudre Trail Corridor Board, Culture, Parks and Recreation/Natural Areas and Trails, Public Works, Water and Sewer, the Poudre River Run Master HOA, a member of the Parks and Recreation Advisory Board, and a representative from the Ditch #3 Board. Committee Chairman Hall has also referenced initial communications with Otak Engineering, a consulting firm who produced a study of this area in 2018 for the City of Greeley, as well as the Colorado School of Mines engineering students who will conduct a capstone project this semester towards a suggested course of action and suggested funding mechanism(s). An initial assessment with design parameters, recommended	Andy McRoberts

Initiative No.	Council Member Initiating	Council Request	Council Meeting or Work Session Date Requested	Status or Disposition (After completion, item is shown one time as completed and then removed.)	Assigned to:
				course(s) of action including recommended funding sources, is expected in June, 2021 post consultation with the Mines student project and engineering consultants. Although this project will carry on in practicality through committee work	
10-2021	Butler	Request to restart the conversation about recycling, and for staff to research the cost and feasibility of doing a drop off facility for recycling, including potentially in partnership with other communities	July 20, 2021 Council Meeting	There was a presentation on this topic at the October 12, 2021, Work Session with consensus from Council to pursue ongoing public-private partnerships.	Paul Trombino
11-2021	Clark	Request for a report on the status of resolving issues with the City's ERP implementation.	September 7, 2021 Council Meeting	City Manager's Office will have a work session on the subject matter on Oct. 26, 2021.	Raymond Lee
12-2021	Butler	Request that staff prepare a resolution for the Council's consideration urging a no vote on ballot questions 2G and 2H to amend the City Charter prior to ballots being mailed out	September 21, 2021 Council Meeting	Staff is preparing a resolution to come before Council at the Oct. 19, 2021 Council Meeting	Doug Marek
13-2021	Payton	Request for information to return to a work session regarding impact and process for any changes to the criteria for providing bonus payments to front line workers	September 21, 2021 Council Meeting	This subject matter was part of the agenda of the Oct. 12, 2021 Work Session with consensus for staff to implement its recommendation.	Raymond Lee

Council Agenda Summary

October 19, 2021

Key Staff Contact: Andy McRoberts, Culture, Parks and Recreation Director, 970-350-9425

Title:

Consideration of a Resolution to support an application for grant funding from the State of Colorado Department of Natural Resources Land & Water Conservation Fund program for the acquisition and development of the ShurView property for open space and outdoor recreation

Summary:

The City of Greeley, in partnership with The Trust for Public Land, is under contract to acquire a property known as the ShurView property in western Greeley (see attachment 1). While the City has committed \$5 million from Quality of Life/Imagine Greeley funds to the project, other partner contributions and additional grant funds will be required to complete the acquisition. As such, Natural Areas & Trails staff have submitted a Land & Water Conservation Fund grant application to the State Department of Natural Resources for \$1.25 million for the acquisition of the ShurView property. The grant program requires a resolution from the local governing body supporting the grant application.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	Yes
If yes, what is the initial, or, onetime impact?	\$5 million which is previously approved and budgeted through Quality of Life/Imagine Greeley capital funds.
What is the annual impact?	Annual maintenance costs could approach \$250k dependent upon future public access and improvements to the site. Currently, this is not budgeted and is subject to future management priorities.
What fund of the City will provide Funding?	Fund 318 - Quality of Life/Imagine Greeley
What is the source of revenue within the fund?	Sales tax and external grants
Is there grant funding for this item?	Yes
If yes, does this grant require a match?	Yes
Is this grant onetime or ongoing?	One-time

Additional Comments:	
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Legal Issues:

None

Other Issues and Considerations:

None

Strategic Work Program Item or Applicable Council Priority and Goal:

Image: Reinforce Greeley's vision as an attractive and vibrant community in which to live, learn, work and play.

and

Infrastructure & Growth: Establish the capital and human infrastructure to support and maintain a safe, competitive, appealing and successful community.

Decision Options:

- 1) Adopt the resolution as presented; or
- 2) Amend the resolution and adopt as amended; or
- 3) Deny the resolution; or
- 4) Continue consideration of the resolution to a date certain.

Council's Recommended Action:

A motion to adopt the Resolution.

Attachments:

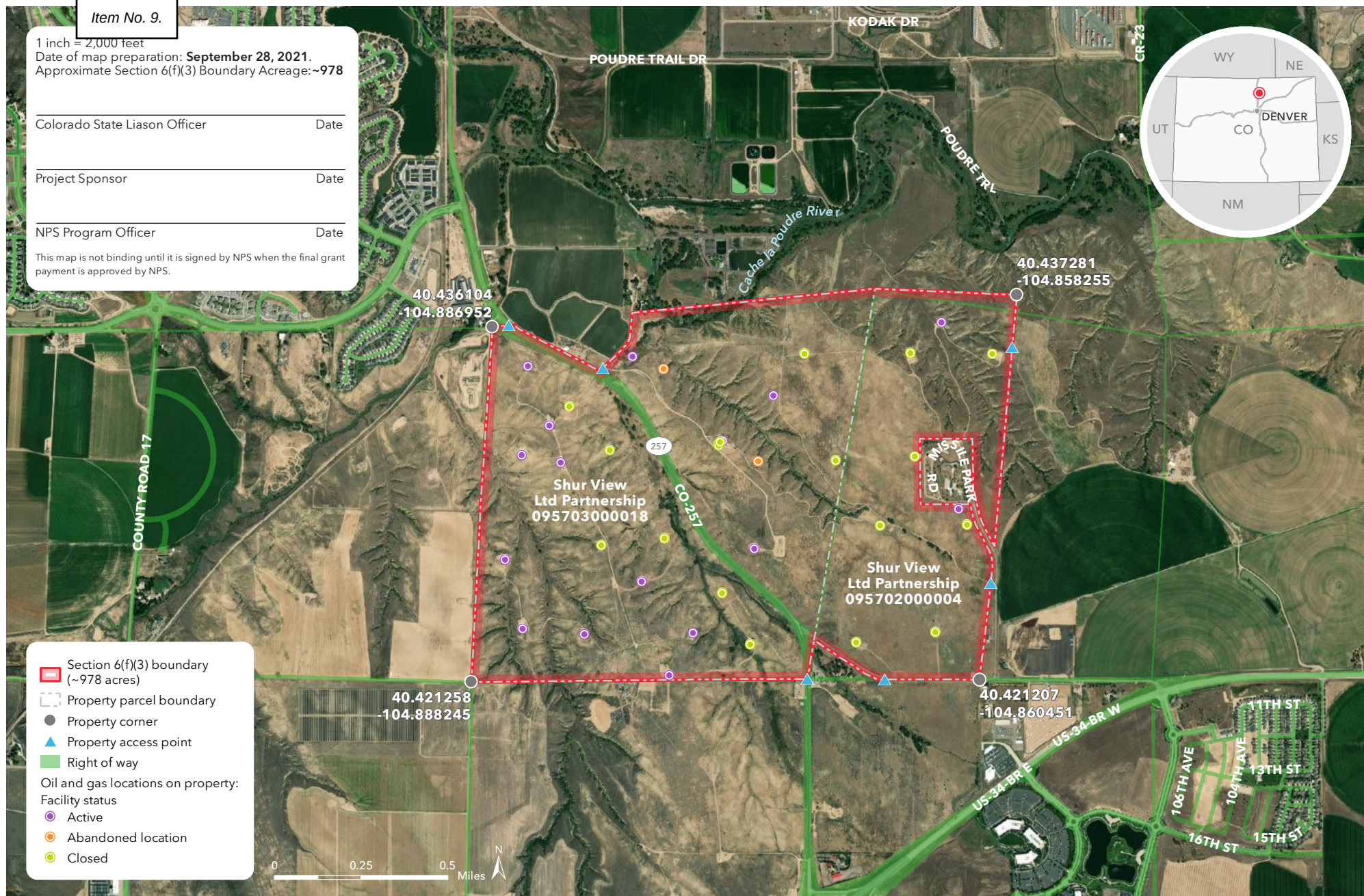
Site Maps of area
Draft Resolution

1 inch = 2,000 feet
Date of map preparation: **September 28, 2021.**
Approximate Section 6(f)(3) Boundary Acreage: **~978**

Project Sponsor
Date

NPS Program Officer
Date

This map is not binding until it is signed by NPS when the final grant payment is approved by NPS.



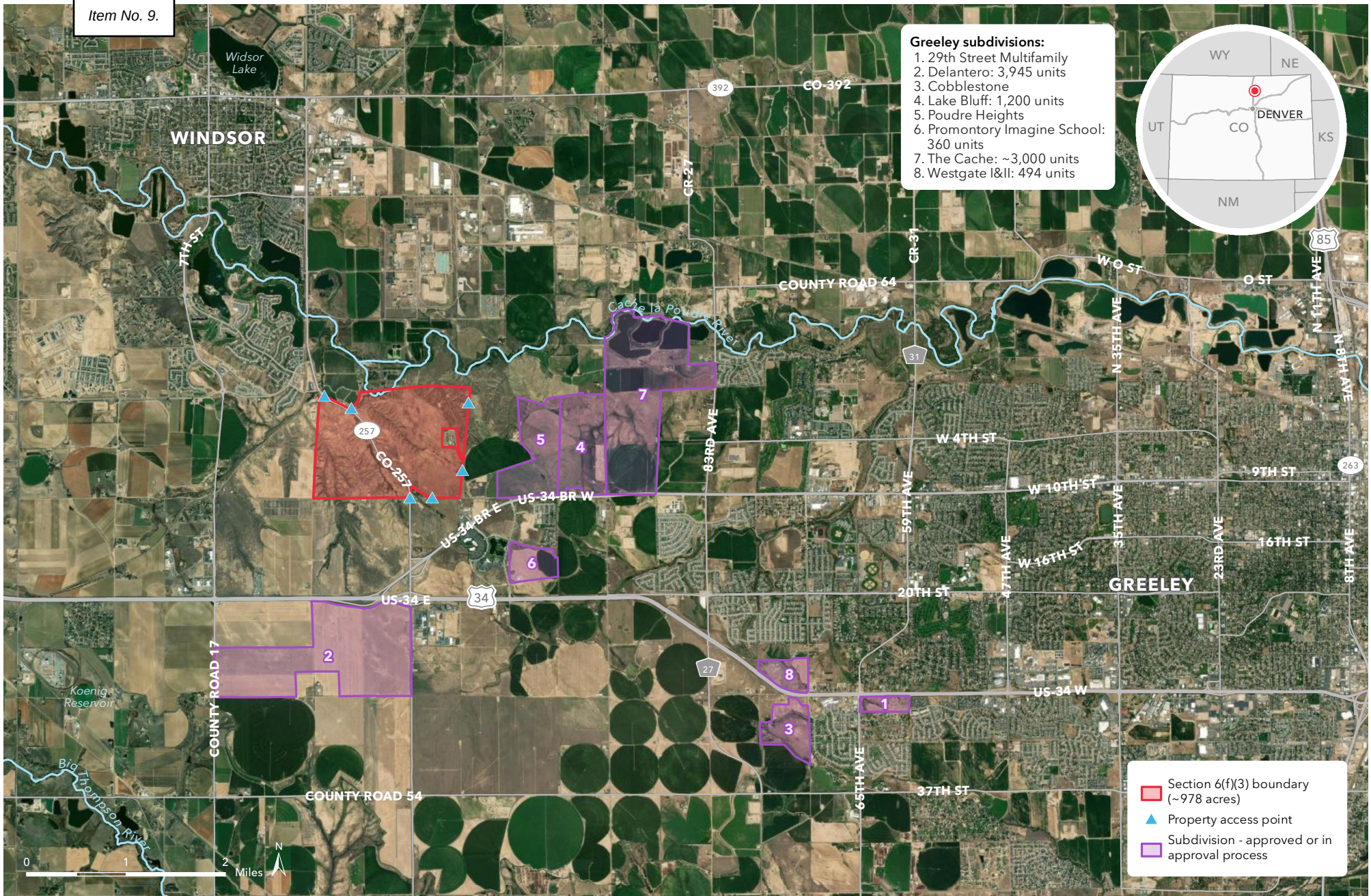
SHUR VIEW, WELD COUNTY, COLORADO

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THE
TRUST
FOR
PUBLIC
LAND

Page 16



LWCF Section 6(f)(3) vicinity

SHUR VIEW, WELD COUNTY, COLORADO

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**CITY OF GREELEY
RESOLUTION NO. _____, 2021**

A RESOLUTION TO SUPPORT AN APPLICATION FOR GRANT FUNDING FROM THE STATE OF COLORADO DEPARTMENT OF NATURAL RESOURCES LAND & WATER CONSERVATION FUND PROGRAM FOR ACQUISITION AND DEVELOPMENT OF THE SHURVIEW PROPERTY FOR OPEN SPACE AND OUTDOOR RECREATION.

WHEREAS, the City of Greeley has budgeted \$5 million for acquisition of the ShurView property; and

WHEREAS, the cost of acquisition is estimated to cost \$8.5 million for which City funds are not adequate to complete the project without additional funding sources; and

WHEREAS, supplemental grant funding opportunities are available through the State of Colorado State Trails Program utilizing the Land and Water Conservation Fund (LWCF); and

WHEREAS, a grant in the amount of \$1,250,000 from LWCF requires a minimum 100% match of the grant funds; and

WHEREAS, grant funding will subsequently be used to acquire the property and develop management plans for public access and outdoor recreation; and

WHEREAS, the property where this project will occur will be under the control of the City of Greeley for 25 years or more and conserved for public outdoor recreation and open space in perpetuity; and

WHEREAS, it is in the best interest of the residents of Greeley to receive this grant funding and to complete the project.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF GREELEY, COLORADO:

1. The Greeley City Council hereby supports and authorizes a submission of grant application to the Colorado Department of Natural Resources.
2. The City Council authorizes the Director of Culture, Parks and Recreation Department to execute any document or submit any electronic response that is necessary to obtain the grant funding.
3. This Resolution shall become effective immediately upon its passage.

PASSED AND ADOPTED, SIGNED AND APPROVED THIS 19TH DAY OF OCTOBER, 2021.

ATTEST:

THE CITY OF GREELEY

City Clerk

Mayor

Council Agenda Summary

October 19, 2021

Key Staff Contact: Becky Safarik, Deputy City Manager, 970-350-9785

Tim Swanson, Chief Building Official, 970-350-9853

Title:

Consideration of a Resolution of the City of Greeley Council authorizing the City to enter into a Memorandum of Understanding between the City of Greeley and the State of Colorado Department of Public Safety, Division of Fire Prevention and Control, prequalifying the City of Greeley Building Inspection Division to perform public school construction related inspection services

Summary:

In November of 2008, the City of Greeley first entered into a Memorandum of Understanding (MOU) with the State of Colorado allowing the City's Building Inspection Division to become a Prequalified Building Department. This MOU was renewed variously since then, most recently in October of 2018. This agenda item and request would again renew this agreement for another three years.

The MOU allows the Building Inspection Division to perform plan review, issue permits, perform public school inspections, and issue Certificates of Occupancy as needed on public schools. School District #6 has confirmed that it wants to continue this permitting process through the City. The necessary paperwork has been submitted with the State, and, if approved by Council, the renewed MOU would be signed by Tim Swanson, Chief Building Official. The City Attorney's Office had previously reviewed the MOU in 2015 and determined that Mr. Swanson could sign on behalf of the City.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	
What is the annual impact?	
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	
Is there grant funding for this item?	No
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	
Additional Comments:	

Legal Issues:

Consideration of this matter is a legislative process.

Other Issues and Considerations:

None noted.

Strategic Work Program Item or Applicable Council Priority and Goal:

Safety: Manage the health, safety and welfare in a way that promotes a sense of security and well-being for residents, businesses and visitors.

Decision Options:

- 1) Adopt the resolution as presented; or
- 2) Amend the resolution and adopt as amended; or
- 3) Deny the resolution; or
- 4) Continue consideration of the resolution to a date certain.

Council's Recommended Action:

A motion to adopt the Resolution.

Attachments:

Draft Resolution

Memorandum of Understanding

**THE CITY OF GREELEY, COLORADO
RESOLUTION NO. _____, 2021**

A RESOLUTION AUTHORIZING THE CITY TO ENTER INTO A MEMORANDUM OF UNDERSTANDING BETWEEN THE CITY OF GREELEY AND THE STATE OF COLORADO DEPARTMENT OF PUBLIC SAFETY, DIVISION OF FIRE PREVENTION AND CONTROL, PREQUALIFYING THE CITY OF GREELEY BUILDING INSPECTION DIVISION TO PERFORM PUBLIC SCHOOL CONSTRUCTION RELATED INSPECTION SERVICES

WHEREAS, public schools have historically relied upon the State of Colorado to perform limited construction related inspections of those facilities; and

WHEREAS, Colorado Revised Statute §§22-32-124 and 23-71-122 requires that all buildings and structures be constructed in conformity with the building and fire codes adopted by the Director of the Division of Fire Prevention and Control in the Department of Public Safety ("State Division"); and

WHEREAS, the State Division may issue and execute a Memorandum of Understanding between the local jurisdiction and the State Division to conduct the necessary plan reviews, issue building permits, conduct inspections, issue certificates of occupancy, issue temporary certificates of occupancy, and take enforcement action in relation to the building and fire codes adopted by the Division to ensure that a building or structure has been constructed in conformity with Public School Construction Regulations; and

WHEREAS, the State Division has determined the City of Greeley Building Inspection Division meets said criteria to qualify as a Prequalified Building Department (PBD) to which such inspections may be delegated; and

WHEREAS, School District No. 6 has indicated its continued interest in utilizing the Greeley Building Inspection services under the state 's program and authority; and

WHEREAS, the City finds the opportunity to provide schools with inspection services as a valuable benefit to the community, areas schools and the City in furtherance of public health, safety and welfare.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF GREELEY, COLORADO:

1. The City Council hereby authorizes the City to enter into a Memorandum of Understanding with the State Division as attached hereto as Exhibit 1 and incorporated herein by reference.
2. This Resolution shall become effective immediately upon its passage, as provided by the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED THIS 19TH DAY OF OCTOBER, 2021.

ATTEST:

THE CITY OF GREELEY

City Clerk

Mayor

**MEMORANDUM OF UNDERSTANDING
FOR PREQUALIFIED BUILDING DEPARTMENTS
FOR PUBLIC SCHOOL CONSTRUCTION**

Pursuant to C.R.S. §§ 22-32-124 and 23-71-122

DFPC Reference # City of Greeley-2021

THIS MEMORANDUM OF UNDERSTANDING (“MOU”) is entered into this ____ day of _____ 2021, between the Colorado Department of Public Safety, Division of Fire Prevention and Control (“Division”), 690 Kipling Street, Lakewood, Colorado 80215 and the City of Greeley (“PBD”), collectively referred to as the (“Parties”).

1. RECITALS

1.1 Background

- A. Colorado Revised Statutes (“C.R.S.”) §§ 22-32-124 and 23-71-122 require that all buildings and structures be constructed in conformity with the building and fire codes adopted by the Director of the Division of Fire Prevention and Control in the Department of Public Safety (“Division”). To assure that a building or structure is constructed pursuant to the above, the Division shall conduct the necessary plan reviews and inspections, except at the request of the affected board of education, the state charter school institute, the charter school, or the affected junior college district, the Division may delegate this responsibility to the appropriate prequalified building department of a county, town, city or city and county or to the appropriate fire department, in the location of the building or structure.
- B. After the Division has reviewed the application and determined that the appropriate building department has plan reviewers and inspectors that have the necessary education, training, and experience; the Division may issue and execute a Memorandum Of Understanding (“MOU”) between the local jurisdiction and the Division to conduct the necessary plan reviews, issue building permits, conduct inspections, issue certificates of occupancy, issue temporary certificates of occupancy, and take enforcement action in relation to the building and fire codes adopted by the Division to ensure that a building or structure has been constructed in conformity with Public School Construction Regulations, 8 Code of Colorado Regulations Title (“C.C.R.”) 1507-30.

1.2 Purpose

The purpose of this MOU is:

- a) For the Division to prequalify the building department to conduct necessary plan reviews, issue building permits, conduct inspections, issue certificates of occupancy, and issue temporary certificates of occupancy to ensure that a building or structure constructed pursuant to C.R.S. §§ 22-32-124 (1) and (1.5), and 23-71-122 (1) (v) (I) through (VII) has

been constructed in conformity with the building and fire codes adopted by the director of the Division.

- b) For the prequalified building department (“PBD”) to perform code reviews on building and mechanical plans, issue building permits, perform building inspections and issue certificates of occupancy for school construction projects.
- c) To identify each Party’s responsibilities for ensuring the construction of safe schools within the State of Colorado through compliance with C.R.S. §§ 22-32-124 and 23-71-122, and promulgated rules and regulations;
- d) To formalize the cooperative working relationships between the Parties; and,
- e) To provide procedures for communications, exchange of information and resolution of problems, as necessary, to carry out this MOU and the provisions of promulgated rules and regulations.

2. DEFINITIONS

2.1 “Director” means the Director of the Division of Fire Prevention and Control within the Department of Public Safety, or the Director’s designee.

2.2 Authority Having Jurisdiction (“AHJ”) means a city, county, Colorado political subdivision, or city and county or any other local government entity having authority to regulate building construction within its jurisdictional territory.

2.3 Prequalified Building Department (“PBD”) means an AHJ or an agent thereof that has met the Division’s certification standards for prequalification as a building department to conduct the necessary plan reviews, issue building permits, conduct inspections, issue certificates of occupancy, and issue temporary certificates of occupancy, and has executed this MOU with the Division.

2.4 “Certificate of Occupancy” means an official document issued by the Division or the PBD for a Public School allowing use or occupancy of the building or structure by the school district or by the institute charter school or junior college district.

3. RESPONSIBILITIES

The responsibilities of the Parties are as follows:

3.1 Responsibilities of the Division:

The Division shall:

- a) Adopt nationally recognized codes and standards as promulgated by Rules in 8 CCR 1507-30.

- b) Ensure that the necessary plan reviews, inspections, quality control, and quality assurance checks are performed in compliance with the statutes, rules, and regulations of the Division.
- c) Prequalify the building department as having executed an MOU and has met the required certification standards in 8 CCR 1507-30.
- d) Issue and maintain a list of persons the Division has approved as authorized to conduct plan reviews, inspections, and issue certificates of occupancy for public school construction projects. This list of authorized PBD persons is included and incorporated herein by reference as Appendix A of this MOU.
- e) Ensure that copies of the PBD building plans are sent to the appropriate fire department and the Division for review of fire safety issues.
- f) Rescind this “prequalified” status and terminate the terms of the MOU if the PBD fails to comply with this MOU, C.R.S. § § 22-32-124 and 23-71-122, or the rules and regulations of the Division.
- g) Allow the PBD to take enforcement action against a board of education, state charter school institute, charter school or junior college district in relation to the nationally recognized codes and standards adopted in 8 CCR 1507-30.

3.2 Responsibilities of the PBD.

The PBD shall:

- a) Conduct the necessary plan reviews and inspections, issue building permits, perform all necessary inspections including final inspections, and issue certificates of occupancy to a building or structure that has been constructed in conformity with the nationally recognized codes and standards adopted in 8 CCR 1507-30. The affected board of education, state charter school institute, charter school or junior college district, at its own discretion may opt to use the PBD that has entered into this MOU with the Division.
- b) Take enforcement action against a board of education, state charter school institute, charter school or junior college district that has violated the nationally recognized codes and standards adopted in 8 CCR 1507-30.
- c) Verify that the construction project is inspected by a state electrical inspector, per § 12-23-116 C.R.S., notwithstanding the fact that any incorporated town or city, any county, or any city and county in which a public school is located or is to be located has its own electrical code and inspection authority, any electrical installation in any new construction or remodeling or repair of a public school.

- d) Verify that the construction project is inspected by a state plumbing inspector, per § 12-58-114.5 C.R.S., notwithstanding the fact that any incorporated town or city, any county, or any city and county in which a public school is located or is to be located has its own plumbing code and inspection authority, any plumbing or gas piping installation in any new construction or remodeling or repair of a public school.
- e) Only use persons within their building department that are listed as authorized by the Division to work on board of education, state charter school institute, charter school or junior college district construction projects. This authorized list of persons is attached as Appendix A.
- f) Cause copies of the building plans to be sent to the certified fire department and the Division for review of fire safety issues.
- g) Issue the necessary Certificate of Occupancy prior to use of the building or structure by the board of education, state charter school institute, charter school or junior college district, if the building or structure is in conformity with the building and fire codes and standards adopted in 8 CCR 1507-30, and if the affected fire department or the Division certifies that the building or structure is in compliance with the fire code adopted by the Division in 8 CCR 1507-30.
- h) Issue a Temporary Certificate of Occupancy to allow the board of education, state charter school institute, charter school or junior college district to occupy the buildings and structures, if all inspections are not completed and the building requires immediate occupancy, and if the board of education, state charter school institute, charter school or junior college district has passed the appropriate inspections that indicate there are no life safety issues.
- i) Verify that inspections are complete and all known violations are corrected before the board of education, state charter school institute, charter school or junior college district is issued a Certificate of Occupancy. Inspection records shall be retained by the PBD for two years after the Certificate of Occupancy is issued.
- j) Set reasonable fees and may collect these fees to offset actual, reasonable, and necessary costs of plan review and inspection of board of education, state charter school institute, charter school or junior college district construction projects. The board of education, state charter school institute, charter school or junior college district shall be notified of any adjustment of fees a minimum of thirty (30) days prior to the effective date of the change.
- k) In conjunction with the Division set a date for a hearing as soon as practicable before the board of appeals in accordance with section § 24-33.5-1213.7, C.R.S., and the rules adopted by the Division pursuant to § 24-4-105, C.R.S., if the PBD and the board of trustees of a board of education, state charter school institute, charter school or junior college district disagree on the interpretation of the codes and standards of the Division.

- l) Comply with the written Final Agency decision of the appeals board for the purposes of § 24-4-106, C.R.S.
- m) Have the sole discretion whether to accept a public school construction project submitted to the PBD by the school district for plan reviews, inspections, issuance of building permits and certificates of occupancy, and other duties as set forth in this MOU.

4. ACCESS TO INFORMATION

Each Party shall, to the extent allowed by law, make available to each other, at no cost, information regarding board of education, state charter school institute, charter school or junior college district construction projects within its possession. Requests for information shall not impose an unreasonable resource burden on the other Party.

5. EFFECTIVE DATE AND TERM

This MOU shall be effective upon signature by the Director of the Division and shall be valid for **three (3)** years from the effective date, unless previously modified or terminated in writing by one of the Parties pursuant to the terms of this MOU.

6. TERMINATION

Either party may terminate the MOU upon 30 days written notice; however, if the PBD accepts a public school construction project for review pursuant to this MOU, the PBD may not terminate this MOU until project completion and issuance of a Certificate of Occupancy. If the PBD fails to comply with the terms and conditions of this MOU or the rules and regulations of the Division, the Division may take enforcement action, pursuant to C.R.S. 24-33.5-1213 and terminate this MOU immediately. An amendment may be mutually agreed upon in writing by the parties prior to the termination date of this MOU to allow for project completion and issuance of a Certificate of Occupancy.

7. MODIFICATIONS AND AMENDMENTS.

This MOU is subject to such modifications as may be required by changes in applicable federal or state law, or federal or state implementing rules, regulations, or procedures of that federal or state law. Any such required modification shall be automatically incorporated into, and be made a part of, this MOU as of the effective date of such change as if that change was fully set forth herein. Except as provided above, no modification of this MOU shall be effective unless such modification is agreed to in writing by both parties in an amendment to this MOU that has been previously executed and approved in accordance with applicable law.

8. ADDITIONAL PROVISIONS

8.1 Legal Authority

The Parties warrant that each possesses actual, legal authority to enter into this MOU. The Parties further warrant that each has taken all actions required by its applicable law, procedures,

rules, or by-laws to exercise that authority, and to lawfully authorize its undersigned signatory to execute this MOU and bind that Party to its terms. The person or persons signing this MOU, or any attachments or amendments hereto, also warrant(s) that such person(s) possesses actual, legal authority to execute this MOU, and any attachments or amendments hereto, on behalf of that Party.

8.2 Notice of Pending Litigation

Unless otherwise provided for in this MOU, the PBD shall notify the Division within five (5) working days after being served with a Summons, Complaint, or other pleading in a case which involves any services provided under this MOU and which has been filed in any federal or state court or administrative agency. The PBD shall immediately deliver copies of any such documents in accordance with Notice Procedures in Section 8.5. of this MOU.

8.3 Assignment and Successors

The PBD agrees not to assign rights or delegate duties under this MOU, or subcontract any part of the performance required under the MOU without the express, written consent of the State.

8.4 Adherence to Applicable Laws

At all times during the term, performance, or execution of this MOU, the PBD shall comply with all applicable federal and state laws, regulations, rules, or procedures, as these provisions currently exist or may hereafter be amended, all of which are incorporated herein by reference and made a part of the terms and conditions of this MOU.

8.5 Notice Procedure

All notices required or permitted to be given pursuant to this MOU shall be in writing and shall be deemed given when personally served or three (3) days after deposit in the United States Mail, certified mail, return receipt requested, and addressed to the following parties or to such other addressee(s) as may be designated by a notice complying with the foregoing requirements.

APPROVED PBD:

Timothy H. Swanson
Chief Building Official
City of Greeley
1100 10th Street, Suite 1109
Greeley, CO 80631
970-350-9853

And:

DEPARTMENT OF PUBLIC SAFETY:

Tammy Lichvar
Procurement Director
Colorado Department of Public Safety
700 Kipling St, 3rd Floor
Lakewood, CO 80215
(303) 239-5888

DFPC:

Michael Morgan
Director

Division of Fire Prevention and Control
690 Kipling Street, Suite 2000
Denver, CO 80215
(303) 239-4600

8.6 Entire Understanding

This MOU is the complete integration of all understandings between the parties. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein in writing. No subsequent notation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a written contract executed and approved by the Parties.

8.7 Independent Contractor

No principal, agent, or employees of one Party shall be nor shall be deemed an agent or employee of the other Party.

8.8 Governmental Immunity Act

No term or condition of this MOU shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protection, or other provisions, of the Colorado Governmental Immunity Act, C.R.S. 24-10-101 et seq., or the Federal Tort Claims Act, 28 U.S.C. 2671 et seq., as applicable, as now or hereafter amended.

8.9 Insurance

If the PBD is a "public entity" within the meaning of the Colorado Governmental Immunity Act, CRS 24-10-101, et seq., as amended ("Act"), the PBD shall at all times during the term of this MOU maintain only such liability insurance, by commercial policy or self-insurance, as is necessary to meet its liabilities under the Act. Upon request by the Division, the PBD shall show proof of such insurance satisfactory to the Division.

9. APPROVALS

***Persons signing for the PBD hereby swear and affirm that they are authorized to act on the PBD's behalf and acknowledge that the Division is relying on their representations to that effect.**

Department of Public Safety
Division of Fire Prevention and Control

PBD Name City of Greeley,
Building Inspection Division

Michael Morgan
Director,
Division of Fire Prevention and Control
Date: _____

Timothy H. Swanson
Chief Building Official
City of Greeley, Building Inspection Division
Date: September 27, 2021

Council Agenda Summary

October 19, 2021

Key Staff Contact: John Karner, Finance Director, 970-350-9732

Title:

Consideration of a Resolution establishing the 2021 tax levy and directing the certification of the same to the Board of County Commissioners

Summary:

This resolution establishes the 2021 tax levy for taxes to be collected in 2022 at 11.274 mills and authorizes the City Clerk to certify to the Board of County Commissioners that the tax levy has been established for 2021.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	Yes
If yes, what is the initial, or, onetime impact?	Property tax revenue collected in 2022
What is the annual impact?	\$16,989,630
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	
Is there grant funding for this item?	No
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	
Additional Comments:	

Legal Issues:

City Charter requires the City Council to establish the tax levy and authorize the City Clerk to certify to the Board of County Commissioners that the tax levy for 2021 has been established.

Other Issues and Considerations:

None

Strategic Work Program Item or Applicable Council Priority and Goal:

Your Home is Here: In 2040, Greeley is a distinctive, character-rich community known for its high quality standard of living. Residents have access to an amazing variety of housing options including style, price, and location. Our unique neighborhoods are built around the village concept, featuring entertainment, retail, parks, and dining options within a central, walkable location.

Decision Options:

- 1) Adopt the resolution as presented; or
- 2) Amend the resolution and adopt as amended; or
- 3) Deny the resolution; or
- 4) Continue consideration of the resolution to a date certain.

Council's Recommended Action:

A motion to adopt the Resolution.

Attachments:

Draft Resolution with Certification of Tax Levy and Notice of Tax Levy for 2021
Certification of Valuation

**CITY OF GREELEY
RESOLUTION NO. _____, 2021**

RESOLUTION ESTABLISHING THE 2021 TAX LEVY AND DIRECTING THE CERTIFICATION OF THE SAME TO THE BOARD OF COUNTY COMMISSIONERS.

WHEREAS, the Charter of the City of Greeley, Colorado, as well as the laws of the State of Colorado, require the City Council to establish the tax levy so as to fix the rate of taxation by the City of Greeley upon property subject to the ad valorem property tax; and,

WHEREAS, the City Council has considered a proposed budget, and has considered the certificate from the Weld County Assessor showing that the total assessed valuation of property subject to the ad valorem property tax by the City of Greeley for the year of 2021 is \$ 1,506,974,482; and,

WHEREAS, based upon consideration of the data referred to above, the City Council has determined that the rate of taxation necessary to produce the required tax revenues for the 2022 budget is 11.274 mills.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. The tax levy to be applied to the valuation for assessment of property subject to taxation by the City of Greeley, Colorado, is hereby established at 11.274 mills.

Section 2. The City Clerk is hereby authorized and directed to sign a statement certifying to the Board of County Commissioners that the tax levy for 2021 has been established at 11.274 mills.

PASSED AND ADOPTED, SIGNED AND APPROVED THIS 19TH DAY OF OCTOBER, 2021.

ATTEST:

THE CITY OF GREELEY

City Clerk

Mayor

CITY OF GREELEY
CERTIFICATION OF TAX LEVY
FOR 2021

STATE OF COLORADO)
COUNTY OF WELD)
CITY OF GREELEY)

The undersigned Mayor of the City of Greeley, Colorado hereby certifies that the City Council of the City of Greeley, on October 19, 2021, established by resolution that the 2021 tax levy by the City of Greeley will be 11.274 mills. All steps and hearings required to be conducted and completed prior to the establishment of the tax levy were in fact taken and concluded, in accordance with law. A true copy of the resolution establishing said levy is attached hereto.

Dated this 19th day of October, 2021.

City Clerk

Mayor

NOTICE OF TAX LEVY FOR 2021

STATE OF COLORADO)
COUNTY OF WELD)
CITY OF GREELEY)

Whereas, at the regular meeting of the Council of the City of Greeley held at 1001 11th Avenue, in the City of Greeley, on the 19th day of October, 2021, the following resolution was unanimously adopted:

"Be it Resolved and Ordered by the City Council, that upon valuation of assessable property in Greeley as certified by the County Assessor the current year, there be and is hereby levied for:

Ordinary Purposes	11.274 mills
Interest	mills
Payment of Bonds	mills
Outstanding Warrants	mills
Special Improvements	mills
Parks	mills
Library	mills
Streets and Alleys	mills
Contingent	mills
TOTALS	11.274 mills

Passed by the City Council of Greeley, Colorado and approved this 19th day of October, 2021.

ATTEST:

City Clerk

Mayor

(Seal) Note: The Clerk or Secretary will immediately upon passage of this resolution deliver or cause to be delivered to the County Commissioners of the County and State aforesaid, a certified copy of said resolution with the seal thereto attached; also signed by the Mayor or President and Clerk or Secretary of Board.

CERTIFICATION OF VALUATION BY WELD COUNTY ASSESSOR

NAME OF TAX ENTITY: GREELEY CITY

USE FOR STATUTORY PROPERTY TAX REVENUE LIMIT CALCULATION ("5.5%" LIMIT) ONLY

IN ACCORDANCE WITH 39-5-121(2)(a) and 39-5-128(1), C.R.S., AND NO LATER THAN AUGUST 25, THE ASSESSOR CERTIFIES THE TOTAL VALUATION FOR ASSESSMENT FOR THE TAXABLE YEAR 2021 :

1.	PREVIOUS YEAR'S NET TOTAL TAXABLE ASSESSED VALUATION:	1.	\$ 1,474,013,871
2.	CURRENT YEAR'S GROSS TOTAL TAXABLE ASSESSED VALUATION: ‡	2.	\$ 1,686,750,440
3.	LESS TOTAL TIF AREA INCREMENTS, IF ANY:	3.	\$ 179,775,958
4.	CURRENT YEAR'S NET TOTAL TAXABLE ASSESSED VALUATION:	4.	\$ 1,506,974,482
5.	NEW CONSTRUCTION: *	5.	\$ 15,547,352
6.	INCREASED PRODUCTION OF PRODUCING MINE: ≈	6.	\$
7.	ANNEXATIONS/INCLUSIONS:	7.	\$ 54,930
8.	PREVIOUSLY EXEMPT FEDERAL PROPERTY: ≈	8.	\$ 0
9.	NEW PRIMARY OIL OR GAS PRODUCTION FROM ANY PRODUCING OIL AND GAS LEASEHOLD OR LAND (29-1-301(1)(b), C.R.S.): Φ	9.	\$ 126,299,964
10.	TAXES RECEIVED LAST YEAR ON OMITTED PROPERTY AS OF AUG. 1 (29-1-301(1)(a), C.R.S.). Includes all revenue collected on valuation not previously certified:	10.	\$ 17,202.44
11.	TAXES ABATED AND REFUNDED AS OF AUG. 1 (29-1-301(1)(a), C.R.S.) and (39-10-114(1)(a)(I)(B), C.R.S.):	11.	\$ 149,691.14

- ‡ This value reflects personal property exemptions IF enacted by the jurisdiction as authorized by Art. X, Sec. 20(8)(b), Colo. Constitution
* New Construction is defined as: Taxable real property structures and the personal property connected with the structure.
≈ Jurisdiction must submit to the Division of Local Government respective Certifications of Impact in order for the values to be treated as growth in the limit calculation; use Forms DLG 52 & 52A.
Φ Jurisdiction must apply to the Division of Local Government before the value can be treated as growth in the limit calculation; use Form DLG 52B.

USE FOR TABOR "LOCAL GROWTH" CALCULATION ONLY

IN ACCORDANCE WITH ART.X, SEC.20, COLO. CONSTUTION AND 39-5-121(2)(b), C.R.S., THE ASSESSOR CERTIFIES THE TOTAL ACTUAL VALUATION FOR THE TAXABLE YEAR 2021 :

1.	CURRENT YEAR'S TOTAL ACTUAL VALUE OF ALL REAL PROPERTY: ¶	1.	\$ 12,269,255,181
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ADDITIONS TO TAXABLE REAL PROPERTY

2.	CONSTRUCTION OF TAXABLE REAL PROPERTY IMPROVEMENTS: *	2.	\$ 152,252,048
3.	ANNEXATIONS/INCLUSIONS:	3.	\$ 189,425
4.	INCREASED MINING PRODUCTION: §	4.	\$
5.	PREVIOUSLY EXEMPT PROPERTY:	5.	\$ 1,490,563
6.	OIL OR GAS PRODUCTION FROM A NEW WELL:	6.	\$ 144,342,816
7.	TAXABLE REAL PROPERTY OMITTED FROM THE PREVIOUS YEAR'S TAX WARRANT: (If land and/or a structure is picked up as omitted property for multiple years, only the most current year's actual value can be reported as omitted property.):	7.	\$

DELETIONS FROM TAXABLE REAL PROPERTY

8.	DESTRUCTION OF TAXABLE REAL PROPERTY IMPROVEMENTS:	8.	\$ 844,451
9.	DISCONNECTIONS/EXCLUSIONS:	9.	\$ 0
10.	PREVIOUSLY TAXABLE PROPERTY:	10.	\$ 1,477,885

- ¶ This includes the actual value of all taxable real property plus the actual value of religious, private school, and charitable real property.
* Construction is defined as newly constructed taxable real property structures.
§ Includes production from new mines and increases in production of existing producing mines.

IN ACCORDANCE WITH 39-5-128(1), C.R.S., AND NO LATER THAN AUGUST 25, THE ASSESSOR CERTIFIES TO SCHOOL DISTRICTS:
TOTAL ACTUAL VALUE OF ALL TAXABLE PROPERTY \$

IN ACCORDANCE WITH 39-5-128(1.5), C.R.S., THE ASSESSOR PROVIDES:

HB21-1312 ASSESSED VALUE OF EXEMPT BUSINESS PERSONAL PROPERTY (ESTIMATED): ** \$ 1,950,020

** The tax revenue lost due to this exempted value will be reimbursed to the tax entity by the County Treasurer in accordance with 39-3-119.5(3), C.R.S.

Council Agenda Summary

October 19, 2021

Key Staff Contact: Doug Marek, City Attorney, 970-350-9755

Title:

Consideration of a Resolution of the Greeley City Council urging voters to vote "No" on ballot questions 2G and 2H

Summary:

On August 23, 2021, the City Clerk certified to the City Council two petitions for initiated amendments to the Greeley Home Rule Charter. The City Council set the ballot titles on August 31, 2021. The Weld County Clerk and Recorder numbered the ballot questions upon setting the ballot. The two ballot questions are as set forth below.

Ballot Question 2G

Shall the Greeley Home Rule Charter be amended to further restrict the City's power to sell or lease excess water or infrastructure, including limiting the normal practice of temporary leasing to agricultural or industrial users, and likely increasing water costs and affecting the quality of service, by requiring an outside engineering study for such action, then voter approval by a majority of all registered electors, regardless of turnout, in a special election?

Ballot Question 2H

Shall the Greeley Home Rule Charter be amended to restrict the City's acquisition and use of water and its responses to drought and other emergencies, likely increasing water costs and affecting the quality of service, by requiring that the purchase, lease or use of critical portions of Greeley's existing and future water supply be subject to additional outside engineering analysis and then voter approval by a majority of all registered voters, regardless of turnout, in a special election?

At the City Council meeting on September 21, 2021, Councilmember Butler requested that staff prepare a Resolution for Council's consideration encouraging voters to Vote "No" on ballot questions 2G and 2H.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	
What is the annual impact?	
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	

Is there grant funding for this item?	No
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	
Additional Comments:	

Legal Issues:

Section 1-45-117(1)(b)(III) of the Colorado Revised Statutes allows the Greeley City Council to pass a resolution taking a position on any ballot issue.

Other Issues and Considerations:

No

Strategic Work Program Item or Applicable Council Priority and Goal:

Infrastructure & Growth: Establish the capital and human infrastructure to support and maintain a safe, competitive, appealing and successful community.

Decision Options:

- 1) Adopt the resolution as presented; or
- 2) Amend the resolution and adopt as amended; or
- 3) Deny the resolution; or
- 4) Continue consideration of the resolution to a date certain.

Council's Recommended Action:

A motion to adopt the Resolution.

Attachments:

Resolution

**THE CITY OF GREELEY, COLORADO
RESOLUTION NO. _____, 2021**

**A RESOLUTION OF THE GREELEY CITY COUNCIL URGING
VOTERS TO VOTE "NO" ON BALLOT QUESTIONS 2G AND 2H**

WHEREAS, citizens of the City of Greeley ("City") will have the opportunity on November 2, 2021 to vote on two proposed amendments to the Greeley Home Rule Charter, titled Ballot Question 2G and Ballot Question 2H; and

WHEREAS, Ballot Question 2G proposes to amend the Greeley Home Rule Charter to require the City to hire a consulting engineer to conduct a comprehensive study before excess water or infrastructure is sold or leased, and to require such sale or lease to be approved by a majority of all registered electors in the City; and

WHEREAS, Ballot Question 2H proposes to amend the Greeley Home Rule Charter to require the City to hire a consulting engineer to conduct a comprehensive study, and to hold an election prior to using recycled wastewater or groundwater for drinking or non-potable purposes; and

WHEREAS, Section 1-45-117(1)(b)(III) of the Colorado Revised Statutes allows the Greeley City Council to pass a resolution taking a position on any ballot issue, and therefore the Greeley City Council has passed this resolution urging Greeley voters to vote against Ballot Questions 2G and 2H; and

WHEREAS, if approved by the electorate, the proposed changes to the Charter will have a devastating and detrimental effect on the City's ability to provide quality water services to the citizens at reasonable rates now and in the future; and

WHEREAS, if passed, Ballot Questions 2G and 2H will require expensive and time consuming changes to existing operational practices that have been managed successfully by the City for more than 50 years; and

WHEREAS, if the initiated Ballot Questions are passed, the City will be the only city in Colorado to require elections to approve routine water service decisions including purchasing, leasing and distributing water and infrastructure; and

WHEREAS, Ballot Questions 2G and 2H require that all items required to go to an election to receive approval of the majority of all registered voters in the City, regardless of voter turnout at the election; and

WHEREAS, the heightened approval standard required by Ballot Questions 2G and 2H makes it extremely unlikely that any measure required to go to an election will be approved; and

WHEREAS, requiring elections to approve routine operational decisions regarding water supply and service will require substantial increases in the rates charged to Greeley citizens and customers due various factors, including increased costs for consultants, the

costs to acquire additional water supplies and infrastructure if voters do not authorize the use of existing supplies, and the costs to fund multiple elections per year; and

WHEREAS, the City Council firmly believes that it is in the best interests of the citizens of the City for all eligible voters to vote "No/Against" Ballot Questions 2G and 2H on the upcoming November 2, 2021 ballot.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. The City Council opposes Ballot Questions 2G and 2H which will be presented to voters on November 2, 2021.

Section 2. The City Council urges eligible voters to vote against Ballot Questions 2G and 2H on November 2, 2021.

Section 3. This Resolution shall become effective immediately upon its passage.

PASSED AND ADOPTED, SIGNED AND APPROVED THIS _____ day of _____, 2021.

ATTEST:

THE CITY OF GREELEY, COLORADO

City Clerk

Mayor

Council Agenda Summary

October 19, 2021

Key Staff Contact: John Karner, Finance Director, 970-350-9732

Title:

Public hearing and second reading of an Ordinance adopting the budget for 2022

Summary:

This ordinance authorizes the appropriations for the fiscal year 2022 (January 1, 2022 through December 31, 2022).

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	Yes
If yes, what is the initial, or, onetime impact?	\$486,302,286
What is the annual impact?	None
What fund of the City will provide Funding?	All Funds
What is the source of revenue within the fund?	All Sources
Is there grant funding for this item?	Yes
If yes, does this grant require a match?	Yes
Is this grant onetime or ongoing?	Ongoing & Onetime
Additional Comments:	

Legal Issues:

Consideration of this matter is a legislative process which includes the following public hearing steps:

- 1) City staff presentation
- 2) Council questions of staff
- 3) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
- 4) Council discussion
- 5) Council decision

Other Issues and Considerations:

Based upon input from the public hearing, the budget ordinance can be amended prior to final adoption.

Strategic Work Program Item or Applicable Council Priority and Goal:

Applies to All Priorities and Goals

Decision Options:

- 1) Adopt the ordinance as presented; or
- 2) Amend the ordinance and adopt as amended; or
- 3) Deny the ordinance; or
- 4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:

A motion to adopt the ordinance and publish with reference to title only.

Attachments:

Budget Transmittal Letter
Draft Ordinance
Presentation Deck



City Manager's Fiscal Year 2022 Recommended Budget Message

There's no question that we are living in and through historical times. For over 21 months now, the world has been jolted by the unthinkable. The challenges we've faced, and those that lie in front of us, require perseverance, adaptability and strong stewardship. Without question, Greeley has demonstrated those skills. It's because of those strengths that I can share a cautiously optimistic forecast for Greeley's 2022 budget. As we set our sights to the future, there are far more unknowns than certainties. Still, because of Greeley's prudent planning, decisive decisions, and thoughtful approach to the impact of COVID-19, I remain hopeful that we are on a positive trend toward recovery.

As you'll see, Greeley is on relatively solid financial footing thanks to strategic planning and an intentional response to an unforeseen pandemic that's rippled through nearly every sector of the economy since Fiscal Year 2020 (FY20). As the economy shows many positive signs of recovery, including the restoration of city operations reduced during the height of the pandemic, the City Manager's Recommended Budget for Fiscal Year 2022 (FY22) was developed with a "cautious yet confident" approach in light of ongoing uncertainty.

While the trajectory of the city's revenue streams is headed in the right direction, the reality is that funding has not returned to pre-pandemic levels. In response, city expenditures have followed suit, with 2021 spending down 4% from FY20, which was already reduced by 21% from FY19. Injections of one-time federal stimulus dollars have helped ameliorate a portion of the losses, but the city should not assume a full recovery until city revenue streams return to pre-pandemic levels.

When it comes to expenditures, the city manager's recommended budget proposes to prioritize investments that are critical to the city's long-term success. It includes investing in employees, the city's greatest asset, with cost-of-living increases for FY22. It also includes strategic investments in:

- **Public Safety:**
Additional first responders, police officers, upgraded equipment and multi-year contract extensions for both Fire and Police union membership.
- **Community Vitality/Quality of Life:**
Culture, Parks and Recreation returning the department facilities, programming, and operations to pre-COVID levels.

- **Mobility & Sustainable Infrastructure:**

Utilities - Water, sewer, and storm water capital investments focused on preparing for Greeley's long-term growth trajectory.

- **High-Performance Government:**

Organizational assessments - Several departments have already undergone a review that's an established best practice and that leads to recommendations to implement for optimizing resources to deliver high-quality service. Assessments will continue into 2022 and provide valuable insight to the City Manager's Office in organizational planning and resource allocation.

Job classification and compensation - A project that will lead to consistent job descriptions across the organization and competitive salary ranges to ensure the city is able to recruit and retain staff as part of the city's goal to be a municipal employer of choice.

The proposed budget also recommends staying the course with strategic investments that include fulfilling capital improvement projects (CIP), totaling about \$160 million in FY22. Infrastructure, transportation and mobility make up the lion's share of the CIP budget based on our master plan and priorities. Highlights for FY22 include:

- Over \$6.5 million in quality of life improvements – including Centennial Park upgrades
- Over \$11 million in road development – including continued intersection improvement and road widening
- Nearly \$80 million in water-funded projects – nearly half of which is early construction of the Terry Ranch water development
- About \$20 million in storm water funded projects, which would include the first phases of a multiyear effort to improve drainage in areas prone to flooding during heavy rainfall

The city will continue to monitor economic conditions and forecasts and make appropriate adjustments as the economic recovery becomes clearer. Pending the economic recovery continues and Greeley is able to avoid a setback from a future wave of COVID-19, the city will be on track to explore additional strategic initiatives in Fiscal Year 2023.

Raymond C. Lee III

Interim City Manager

CITY OF GREELEY
ORDINANCE NO. _____, 2021

AN ORDINANCE ADOPTING THE BUDGET FOR 2022 AND MAKING APPROPRIATIONS FOR 2022.

WHEREAS, by virtue of the provisions contained in the Greeley Charter Sections 3-15 and 5-15 of the City of Greeley, Colorado, the City Council is required to adopt each annual budget and make the necessary appropriations by Ordinance; and

WHEREAS, the City Manager has submitted to the City Council the proposed budget in accordance with Section 5-12 of the Greeley Charter; and

WHEREAS, the City Council of Greeley, Colorado, on October 19, 2021, held a public hearing in accordance with Section 5-13 of the Greeley Charter on said proposed budget, after first giving proper notice of said public hearing.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. There is hereby adopted and approved for fiscal 2022 (January 1, 2022 to December 31, 2022) an annual budget, which consists of a document designated as such and a tax levy of 11.274 mills.

Section 2. The annual budget for the year 2022, as adopted and approved, shall be on file in the City Clerk's office for public inspection during office hours of such office for the entire year of 2022:

Section 3. There are hereby appropriated from the General Fund for fiscal year 2022 the following amounts:

Fund Description	Amount	Transfers	Total
General (100)	115,431,208	8,444,235	123,875,443

Section 4. There are hereby appropriated from the Special Revenue Funds for fiscal year 2022 the following amounts:

Fund Description	Amount	Transfers	Total
Convention & Visitors (102)	152,250	569,700	721,950
Community Development (103)	846,118	-	846,118
Streets & Roads (104)	11,519,068	-	11,519,068
Conservation Trust (105)	2,250	1,000,000	1,002,250
Sales & Use Tax (106)	356,100	86,217,962	86,574,062
Conference Center Development (110)	764,500	-	764,500
Downtown Development Authority TIF (111)	325,000	210,000	535,000
Designated Revenue (120)	238,344	4,901,819	5,140,163
Museum (140)	2,118	-	2,118
Senior Citizen (141)	50	-	50
Senior Center Clubs (142)	21,675	-	21,675
Community Memorials (143)	1,095	-	1,095

Section 5. There are hereby appropriated from the Debt Service Funds for fiscal year 2022 the following amounts:

Fund Description	Amount	Transfers	Total
General Debt Service (200)	6,711,467	-	6,711,467

Section 6. There are hereby appropriated from the Capital Projects Funds for fiscal year 2022 the following amounts:

Fund Description	Amount	Transfers	Total
Public Improvement (301)	844,291	-	844,291
Public Art (303)	645,443	-	645,443
Food Tax (304)	7,141,489	2,710,000	9,851,489
Softball Improvement (305)	200	-	200
Fire Equip & Acquisition Replacement (306)	1,397,528	205,611	1,603,139
Quality of Life/Imagine Greeley (318)	5,517,400	1,029,911	6,547,311
FASTER (320)	515,700	-	515,700
Keep Greeley Moving (321)	13,568,466	3,600,000	17,168,466
2016 City Center (322)	2,001,076	-	2,001,076
Fire Protection Development (331)	2,800	-	2,800
Police Development (332)	201,225	-	201,225
Island Grove Development (333)	100,200	-	100,200
Transportation Development (334)	11,051,245	93,315	11,144,560
Park Development (335)	500	1,581,930	1,582,430
Trails Development (336)	101,100	-	101,100

Section 7. There are hereby appropriated from the Permanent Funds for fiscal year 2022 the following amounts:

Fund Description	Amount	Transfers	Total
Cemetery Endowment (601)	1,000	40,000	41,000
Petriken Memorial (603)	10	-	10
Memorials (605)	33,500	32,800	66,300

Section 8. There are hereby appropriated from the Enterprise Funds for fiscal year 2022 the following amounts:

Fund Description	Amount	Transfers	Total
Cemetery (400)	683,463	-	683,463
Municipal Golf Courses (401)	2,224,094	-	2,224,094
Downtown Parking (402)	337,395	-	337,395
Sewer (411)	7,078,651	783,585	7,862,236
Sewer Construction (412)	1,914,502	168,102	2,082,604
Sewer Capital Replacement (413)	6,528,973	-	6,528,973
Sewer Debt Service (414)	1,378,844	-	1,378,844
Water (421)	21,621,107	2,892,210	24,513,317
Water Construction (422)	45,493,147	537,042	46,030,189
Water Capital Replacement (423)	24,647,011	-	24,647,011
Water Rights Acquisition (424)	8,640,432	-	8,640,432
Water Debt Service (425)	10,925,681	-	10,925,681
Stormwater (431)	2,872,007	573,591	3,445,598
Stormwater Construction (432)	16,502,749	416,824	16,919,573
Stormwater Replacement (433)	2,658,809	-	2,658,809
Stormwater Debt Service (434)	548,050	-	548,050

Section 9. There are hereby appropriated from the Internal Service Funds for fiscal year 2022 the following amounts:

Fund Description	Amount	Transfers	Total
Health (500)	17,669,553	-	17,669,553
Workers' Compensation (501)	1,777,137	-	1,777,137
Liability (502)	2,332,743	-	2,332,743
Communications (503)	204,200	-	204,200
Equipment Maintenance (511)	3,051,946	-	3,051,946
Fleet Replacement (512)	3,344,162	553,446	3,897,608
Equipment Replacement (513)	1,236,686	-	1,236,686
Information Technology (521)	6,391,737	-	6,391,737
Information Technology Acquisition (522)	182,708	-	182,708

Section 10. The appropriation made by this ordinance includes \$369,740,203 for expenditures and \$116,562,083 for transfers resulting in a total of \$486,302,286.

Section 11. The City Council finds that all appropriations from the Public Art Reserve Accounts within the Water, Sewer, and Stormwater Utilities Enterprise Funds for the Public Art Program do provide a betterment to those utilities, and the City Council further determines that the acquisition and lease of works of art, and maintenance, repair, and display of works of art, supports specific utility purposes beneficial to the ratepayers of such utilities.

Section 12. This ordinance shall become effective five (5) days after its final publication as provided in Sections 3-16 and 3-17 of the Greeley Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED, THIS ____ DAY OF _____, 2021.

ATTEST:

CITY OF GREELEY

City Clerk

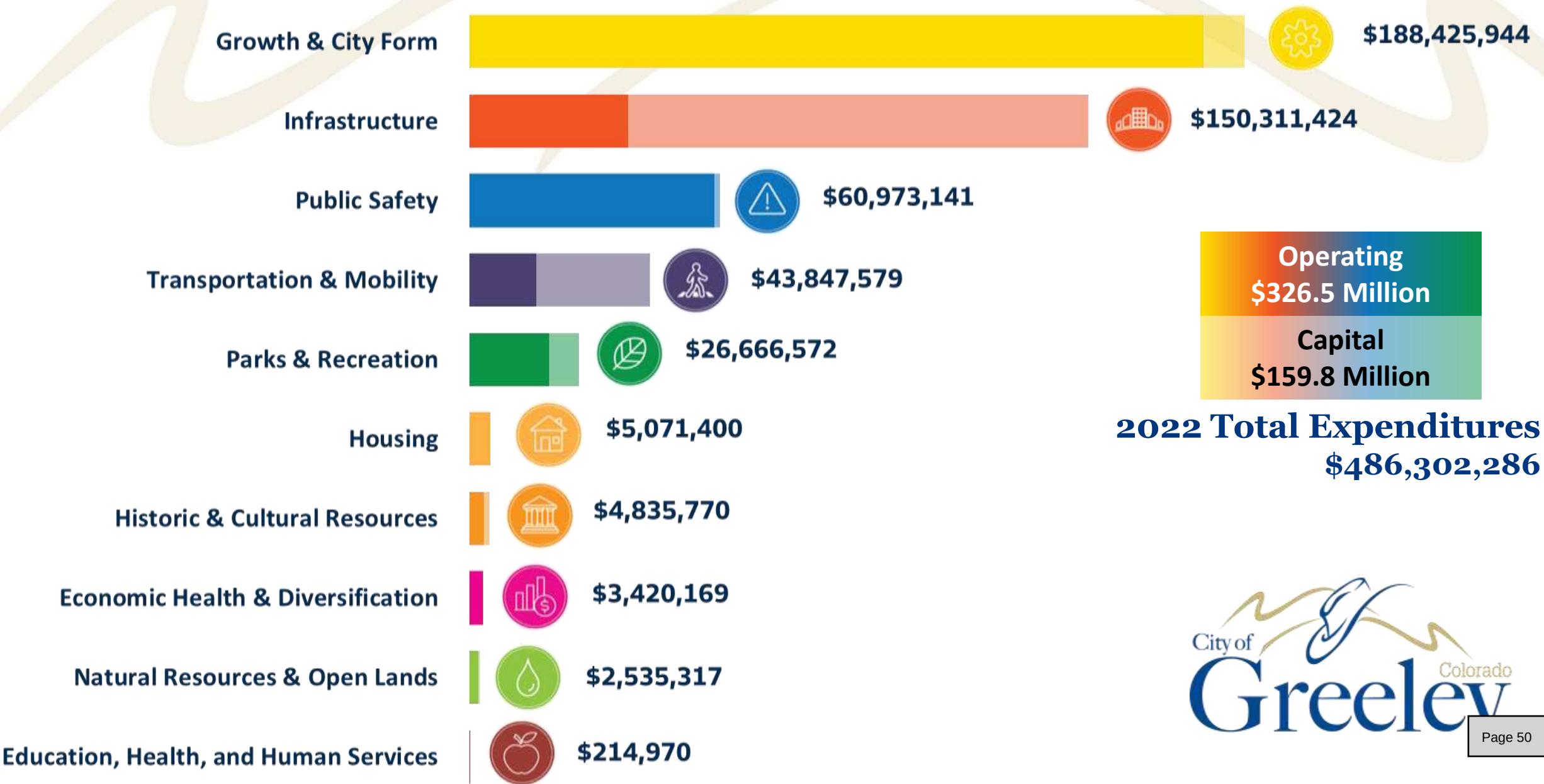
Mayor

Oct 19th, 2021
Second Reading and Public
Hearing

City of Greeley 2022 Proposed Budget

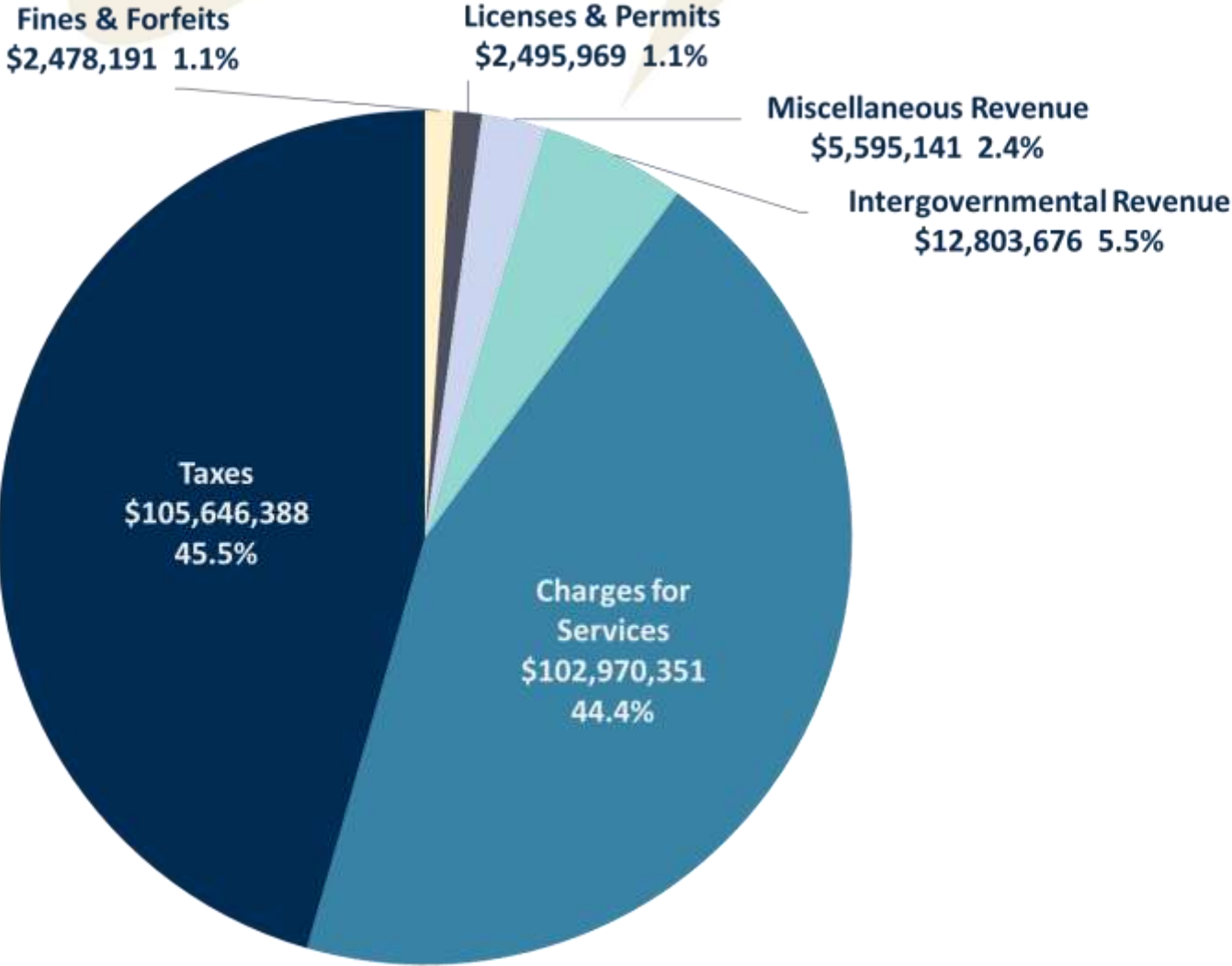


2022-2026 Total Budget Comprehensive Plan Categories

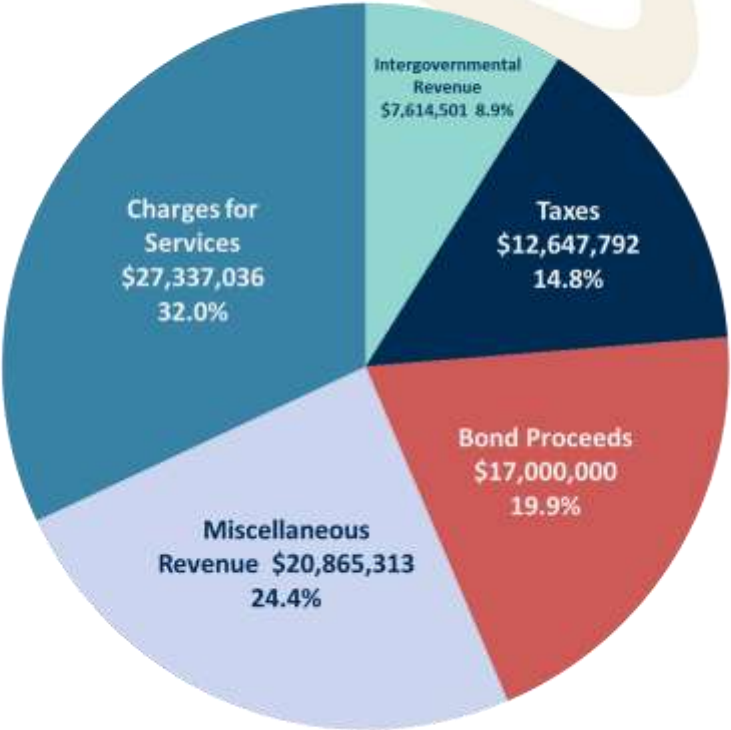


2022 Forecasted Revenue

Operating, \$231,989,716



Capital, \$85,464,642



2022 Budget Highlights

- **\$486M one year budget**
 - \$326M operating
 - \$160M capital
- **\$18.6M new funding**
 - \$7,614,826 | ongoing requests
 - \$6,062,445 | onetime requests
 - \$4,924,195 | Salary & Benefit Increases

Restoring Services | \$1,227,003

- Reopening of City recreation centers
- Programming returning to Union Colony Civic Center

Investment in Staff | \$4,924,195

- New positions, equipment
- Across-the-board employee raises

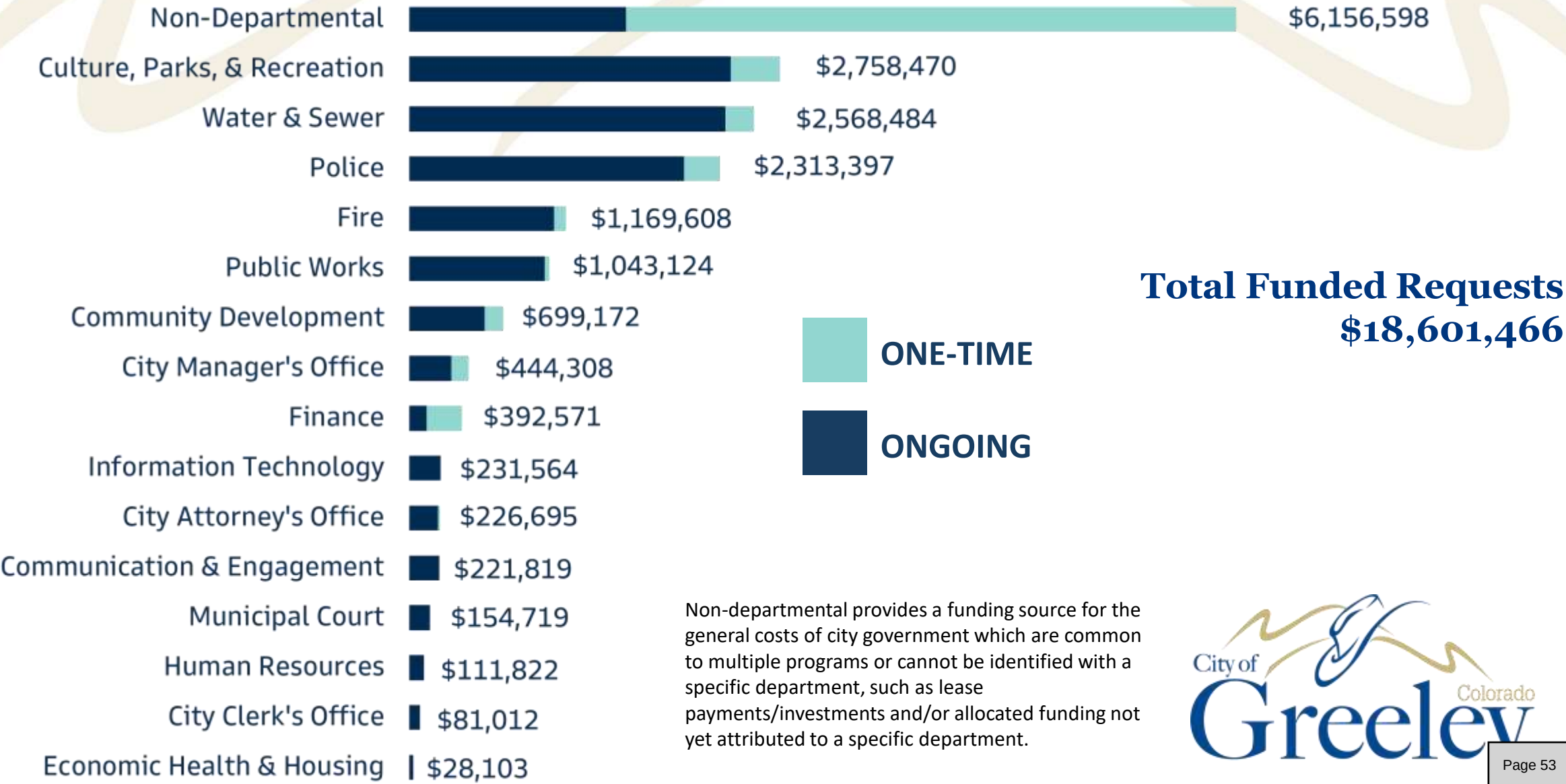
Organizational Investments | \$6,387,823

- Department assessments and staffing adjustments | \$1,640,000
- Compensation and class analysis | \$500,000
- Public safety | \$821,073

One-time Investments | \$6,062,445

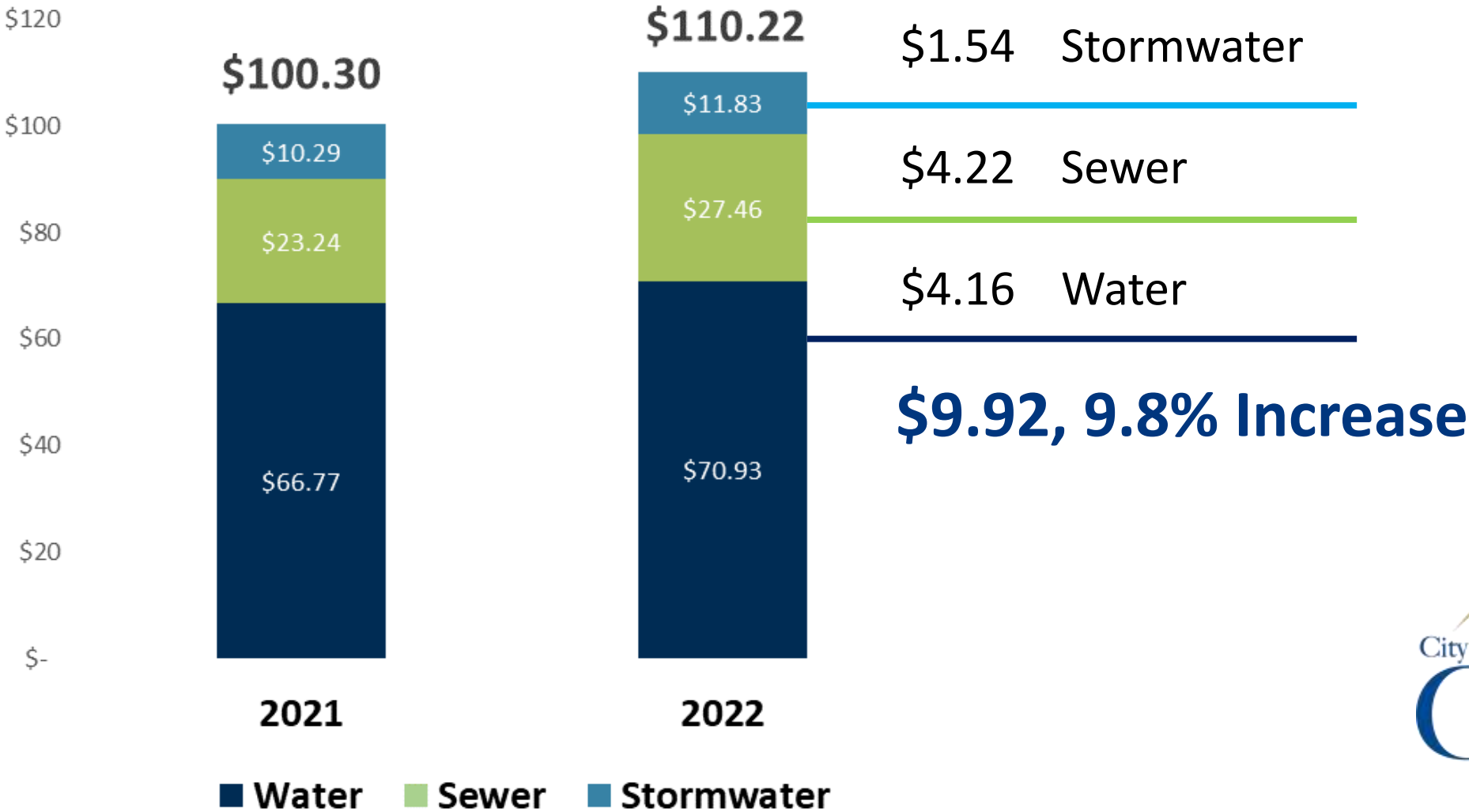
- Program management and system support | \$3,000,000
- Equipment Replacement Fund | \$500,000

2022 Budget Increases: Department



Utility Rate Changes

Average Monthly Bill Estimate - Single Family

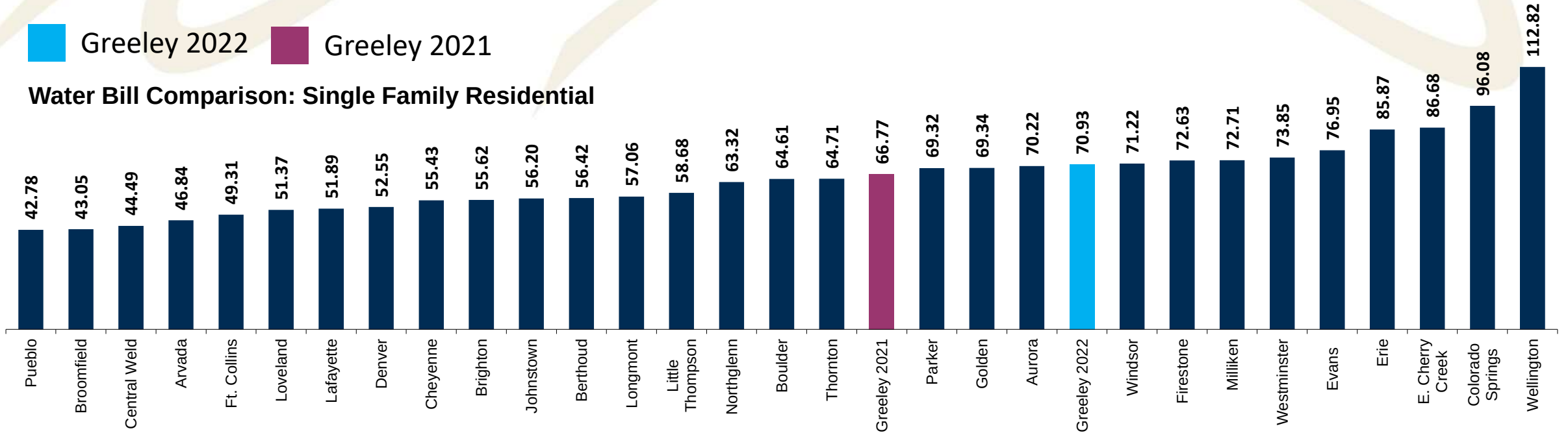


Regional Water Bill Comparison

Item No. 14.

 Greeley 2022  Greeley 2021

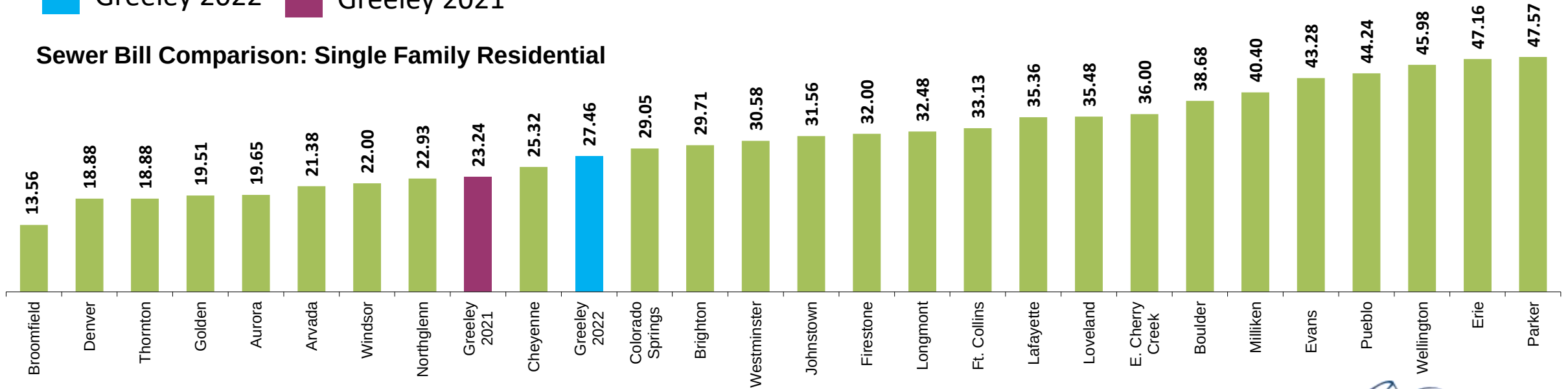
Water Bill Comparison: Single Family Residential



Regional Sewer Bill Comparison

■ Greeley 2022 ■ Greeley 2021

Sewer Bill Comparison: Single Family Residential

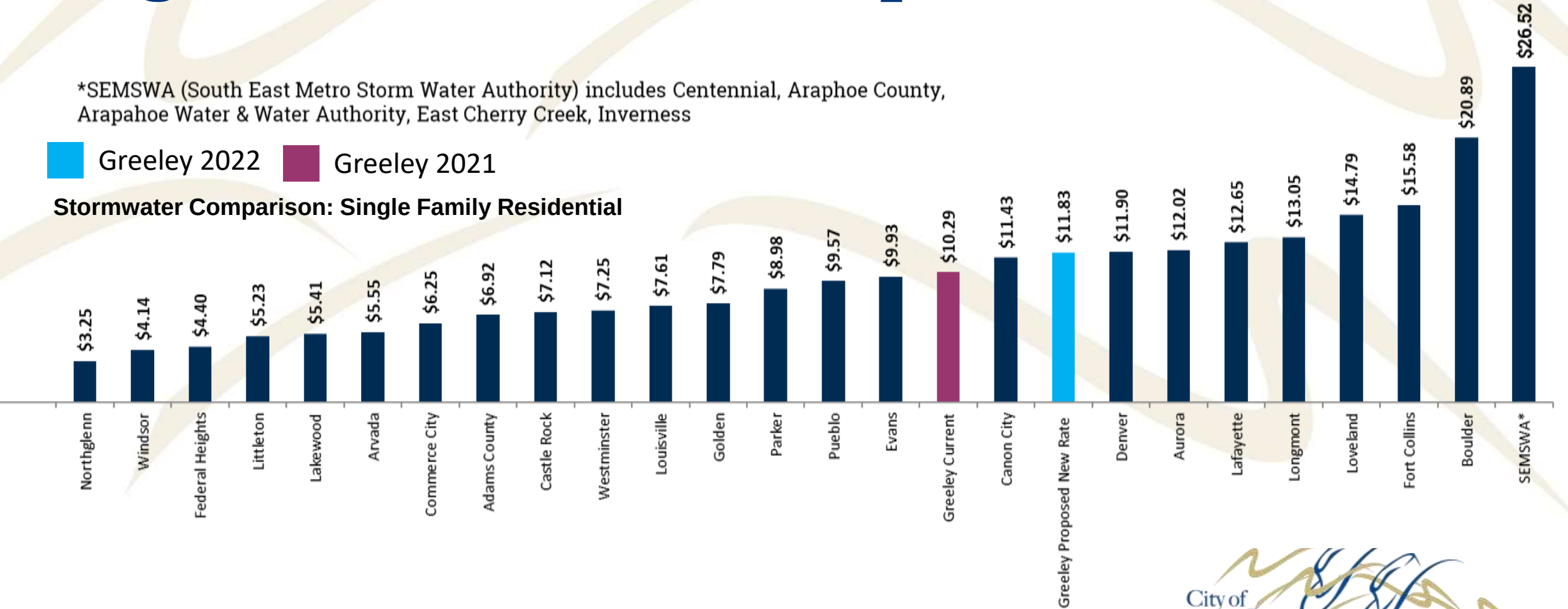


Regional Stormwater Comparison

*SEMSWA (South East Metro Storm Water Authority) includes Centennial, Araphoe County, Arapahoe Water & Water Authority, East Cherry Creek, Inverness

■ Greeley 2022 ■ Greeley 2021

Stormwater Comparison: Single Family Residential



2022 Budget Development Principles



Ensure Balanced
2022 Budget



Maintain Healthy
Reserves



Focus on Core City
Services



Invest in our
People



Strategic Investments
for Growth

2022 Budget Development Principles



Ensure Balanced 2022 Budget

- Fully balanced budget.
- Aligned one time vs. ongoing increases with revenue forecast



Maintain Healthy Reserves

- Fully funded reserves
- \$10.5M of additional federal stimulus dollars expected.



Focus on Core City Services

- Restore City Services, programming, and operations to Pre-COVID operations.



Invest in our People

- Step increase and COL for union employees
- Restore merit based wage increase for non union staff
- No increase in employee health care contribution



Strategic Investments for Growth

- Additional first responders, police officers, upgraded equipment and multi-year contract for both Fire and Police union membership.
- Ensured utility rates remain competitive
- \$160M in capital investment in City infrastructure

Questions

Council Agenda Summary

October 19, 2021

Key Staff Contact: Becky Safarik, Interim Community Development Director, 970-350-9786

Darrell Gesick, Planner, 970-350-9822

Title:

Public hearing and second reading to consider a change of zone from I-H (Industrial High Intensity), I-M (Industrial Medium Intensity) and C-D (Conservation District) to I-M (Industrial Medium Intensity) for approximately 25.759 acres of property located at 300 E. 8th Street known as the City of Greeley Wastewater Treatment Facility Rezone, and final reading of an ordinance changing the official zoning map to reflect the same

Summary:

The City of Greeley is considering a request by the City of Greeley Water and Sewer Department to rezone approximately 25.759 acres from the C-D (Conservation District), I-M (Industrial Medium Intensity) and I-H (Industrial High Intensity) Zone District to the I-M (Industrial Medium Intensity) Zone District.

The site was developed in the early 1930's, with a treatment facility for the City of Greeley Wastewater. Over the years, improvements have been made, and it is anticipated that additional improvements would need to be made to keep the facility up to state and federal standards.

In 2015, the Federal Emergency Management Agency (FEMA) adopted new floodplain and floodway regulations for the Cache la Poudre Floodway. The City Council approved a Digital Flood Insurance Rate Map (DFIRM) on January 5, 2016, which modified the City's official floodplain overlay. In accordance with the revised floodplain map, a majority of the area requested for the rezone was removed from the floodway boundaries. Now that the majority of the property is out of the floodway, the applicant would like to have the site rezoned.

The Planning Commission considered this request on September 28, 2021 and unanimously recommended approval to City Council. This item was introduced on first reading at the City Council's October 5th regular meeting.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	
What is the annual impact?	
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	
Is there grant funding for this item?	N/A
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	

Additional Comments:	
----------------------	--

Legal Issues:

Consideration of this matter is a quasi-judicial process which includes the following public hearing steps:

- 1) City staff presentation
- 2) Council questions of staff
- 3) Applicant presentation
- 4) Council questions of applicant
- 5) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
- 6) Rebuttal, if requested
- 7) Council discussion
- 8) Council decision

Other Issues and Considerations:

None noted.

Strategic Work Program Item or Applicable Council Priority and Goal:

Consistency with Comprehensive Plan and Development Code standards.

Decision Options:

- 1) Adopt the ordinance as presented; or
- 2) Amend the ordinance and adopt as amended; or
- 3) Deny the ordinance; or
- 4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:

Two motions are recommended:

- A) A motion that, based on the application received and the preceding analysis, the proposed rezone from C-D (Conservation District), I-M (Industrial Medium Intensity), and I-H (Industrial High Intensity) to I-M (Industrial Medium Intensity) meets Development Code Section 24-625(c)(3) a, b, d, e, f, g and h; and, therefore, the rezoning is approved.
- B) A motion to adopt the ordinance and publish with reference to title only.

Attachments:

Draft Ordinance

Planning Commission Minutes-Draft (September 28, 2021)

Planning Commission Summary (Staff Report) with Attachments A-G (September 28, 2021)

PowerPoint Presentation

**CITY OF GREELEY, COLORADO
ORDINANCE NO. ____, 2021
CASE NO. ZON2021-0001**

AN ORDINANCE CHANGING THE OFFICIAL ZONING MAP OF THE CITY OF GREELEY, COLORADO, FROM I-H (INDUSTRIAL HIGH INTENSITY), I-M (INDUSTRIAL MEDIUM INTENSITY) AND C-D (CONSERVATION DISTRICT) TO I-M (INDUSTRIAL MEDIUM INTENSITY FOR APPROXIMATELY 25.759 ACRES OF PROPERTY LOCATED AT 300 E. 8TH STREET KNOWN AS THE CITY OF GREELEY WASTEWATER TREATMENT FACILITY REZONE

BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. The following described property located in the City of Greeley is hereby changed from the zoning district referred to as I-H (Industrial High Intensity), I-M (Industrial Medium Intensity) and C-D (Conservation District) to I-M (Industrial Medium Intensity for approximately 25.759 acres of property in the City of Greeley, County of Weld, State of Colorado:

See attached legal description in Appendix A

Section 2. The boundaries of the pertinent zoning districts as shown on the official zoning map are hereby changed so as to accomplish the above-described zoning changes, and the Mayor and City Clerk are hereby authorized and directed to sign and attest an entry which shall be made on the official zoning map to reflect this change.

Section 3. This ordinance shall become effective five (5) days after its final publication as provided by the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED, THIS ____ DAY OF _____, 2021.

ATTEST:

CITY OF GREELEY

City Clerk

Mayor

Appendix A
CITY OF GREELEY, COLORADO
ORDINANCE NO. _____, 2021
CASE NO. ZON2021-0001

Legal Description

A parcel of land, being part of Lots 1, 2, 3 and 4 of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) of Section Four (4), part of Lot 3 of the Northwest Quarter of the Southwest Quarter (NW1/4 SW1/4) of said Section 4, part of Lot 1 of the Southeast Quarter (SE1/4) of Section Five (5) and part of Lot 4 of the Northwest Quarter of the Northwest Quarter (NW1/4 NW1/4) of Section Nine (9), all in Township Five North (T.5N.), Range Sixty-five West (R.65W.) and in accordance with the subdivision of lands by the Union Colony of Colorado as shown on the map recorded April 17, 1891 in Book 2 at Page 41, as Reception No. 39743 of the records of the Weld County Clerk and Recorder, part of Blocks 126, 133 and 134, 1st Avenue, 10th Street and 11th Street, all of the City of Greeley, and all of Lot 1, Minor Subdivision No. 0961-4-3-MS-8, recorded October 19, 1972 as Reception No. 1599948 of the records of the Weld County Clerk and Recorder, said parcel of land located in the West Half of the Southwest Quarter (W1/2 SW1/4) of said Section 4, the Southeast Quarter of the Southeast Quarter (SE1/4 SE1/4) of said Section 5, the Northeast Quarter of the Northeast Quarter (NE1/4 NE1/4) of Section Eight (8) and the Northwest Quarter of the Northwest Quarter (NW1/4 NW1/4) of said Section 9, all in 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:

COMMENCING at the Southwest corner of said Section 4 and assuming the West line of the Southwest Quarter (SW1/4) of said Section 4, being monumentalized by a #6 rebar with a 2 ½" diameter aluminum cap stamped "LS28285, 2013" in a monument box at the South end and by a #6 rebar with a 2 ½" diameter aluminum cap stamped "LS28285, 2013" at the North end, as bearing North 00°22'27" West being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, a distance of 2693.79 feet, with all other bearings contained herein relative thereto;

THENCE South 89°16'01" East along the South line of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) of said Section 4, being monumentalized by a #5 rebar with a 2" diameter aluminum cap stamped "LS25372, 1991" in a monument box at the East end, a distance of 30.01 feet to the West line of Lot 1, Ash Minor Subdivision, recorded July 30, 2012 as Reception No. 3862189 of the records of the Weld County Clerk and Recorder, said point being the POINT OF BEGINNING;

THENCE South 00°23'43" East along the West line of said Lot 1 a distance of 199.89 feet to the Easterly extension of the South line of the North Half (N1/2) of said Block 134;
 THENCE South 89°58'24" West along said Easterly extension and along the South line of the North Half (N1/2) of said Block 134 a distance of 229.83 feet to an Easterly Right-of-way line of US Highway 85;

The following Seven (7) courses and distances are along Easterly Right-of-way lines of said US Highway 85:

THENCE North 13°48'48" East a distance of 324.32 feet;
 THENCE North 08°10'05" East a distance of 35.00 feet;
 THENCE North 02°28'52" East a distance of 451.37 feet;
 THENCE North 00°15'44" West a distance of 128.70 feet;
 THENCE South 86°03'29" East a distance of 24.65 feet;
 THENCE North 00°15'44" West a distance of 212.20 feet;

North 17°11'31" East a distance of 499.47 feet to a Southerly Right-of-way line of State Highway 263, also known as East 8th Street, established by that Special Warranty Deed recorded May 9, 1956 in Book 1450 at Page 128, as Reception No. 1230147, of the records of the Weld County Clerk and Recorder;

The following Two (2) courses and distances are along Southerly Right-of-way lines of said State Highway 263, also known as East 8th Street:

THENCE North 86°30'06" East a distance of 171.61 feet to a Point of Curvature (PC);

THENCE along the arc of a curve, which is concave to the North, a distance of 379.53 feet to the Northeast corner of Lot 1, said Minor Subdivision No. 0961-4-3-MS-8, said curve having a radius of 7680.00 feet, a central angle of 02°49'53" and a long chord bearing North 85°05'09" East a distance of 379.49 feet;

THENCE South 05°23'00" East along the East line of Lot 1, said Minor Subdivision No. 0961-4-3-MS-8, a distance of 208.42 feet to the Southeast corner of Lot 1, said Minor Subdivision No. 0961-4-3-MS-8, also being the Southwest corner of Lot 2, said Minor Subdivision No. 0961-4-3-MS-8, said point being the beginning point of a curve, said curve being non-tangent to aforesaid line.

THENCE along the Southerly line of Lot 2, said Minor Subdivision No. 0961-4-3-MS-8, also being along the arc of said curve, a distance of 126.62 feet to the Northwest corner of Lot 3, said Ash Minor Subdivision, said curve having a radius of 8461.08 feet, a central angle of 00°51'27" and a long chord bearing North 83°14'02" East a distance of 126.62 feet;

THENCE South 01°23'46" West, non-tangent to aforesaid curve and along the West lines of Lot 3, Lot 2 and Outlot A, said Ash Minor Subdivision a distance of 1063.68 feet;

The following Four (4) courses and distances are along Northerly lines of said Outlot A:

THENCE South 69°06'55" West a distance of 93.34 feet;

THENCE North 41°25'56" West a distance of 211.65 feet;

THENCE South 45°30'34" West a distance of 58.30 feet;

THENCE South 00°25'06" East a distance of 269.13 feet;

THENCE North 89°16'12" West continuing along a Northerly line of said Outlot A and along a Northerly line of Lot 1, said Ash Minor Subdivision, a distance of 446.24 feet to the Northwest corner of Lot 1, said Ash Minor Subdivision;

The following Two (2) courses and distances are along the West line of Lot 1, said Ash Minor Subdivision:

THENCE South 00°22'27" East a distance of 24.47 feet;

THENCE South 00°23'43" East a distance of 0.59 feet to the POINT OF BEGINNING.

Said described parcel of land contains 25.759 acres, more or less (±)

City of Greeley, Colorado
PLANNING COMMISSION PROCEEDINGS

September 28, 2021

Commissioner Romulo nominated Christian Schulte to act as Chair Pro Tem.
Commissioner Modlin seconded the motion. Motion carried 5-0.

1. Call to Order

Chair Pro Tem Schulte called the virtual meeting to order at 1:15 p.m.

2. Roll Call

The hearing clerk called the roll.

PRESENT

Commissioner Jeff Carlson
Commissioner Brian Franzen
Commissioner Larry Modlin
Commissioner Chelsie Romulo
Commissioner Christian Schulte

ABSENT

Chair Justin Yeater
Commissioner Erik Briscoe

3. Approval of Agenda

Ms. Safarik advised that there were no additions or corrections to the agenda.
Commissioner Romulo moved to approve the agenda as presented. Commissioner Franzen seconded the motion. Motion carried 5-0.

4. Approval of September 14, 2021 Minutes

Commissioner Romulo moved to approve the minutes dated September 14, 2021.
Commissioner Franzen seconded the motion. Motion carried 5-0.

EXPEDITED AGENDA

5. Public hearing to consider a request to rezone 25.759 acres of land located at 300 E. 8th Street from I-H (Industrial High Intensity), I-M (Industrial Medium Intensity), C-D (Conservation District) to I-M (Industrial Medium Intensity) (Project No. ZON2021-0001)

Chair Pro Tem Schulte introduced the item and asked whether any member of the Commission or public requested a presentation. Hearing no request for a presentation, the public hearing was opened at 1:21 p.m. There were no emails or members of the virtual audience requesting to speak and the public hearing was closed at 1:21 p.m. Chair Pro Schulte advised that the report was entered into record.

Commissioner Romulo moved that, based on the application received and the staff report and accompanying attachments, the Planning Commission finds that the proposed rezoning from I-H (Industrial High Intensity), I-M (Industrial Medium Intensity) and C-D (Conservation District) to I-M (Industrial Medium Intensity) zone district meets Development Code Section 24-625(c)(3) a, b, d, e, f, g and h; and, therefore, recommends approval of the rezone to the City Council. Commissioner Franzen seconded the motion. Motion carried 5-0.

END OF EXPEDITED AGENDA

PLANNING COMMISSION SUMMARY

ITEMS: Rezone from C-D (Conservation District), I-M (Industrial Medium Intensity), and I-H (Industrial High Intensity) Zone District to I-M (Industrial Medium Intensity) Zone District

FILE NUMBER: ZON2021-0001

PROJECT: City of Greeley Wastewater Treatment Facility Rezone

LOCATION: 300 and 306 E. 8th Street, 1001, 1131, 1060, and 1040 1st Avenue, and Parcel Number 0961054118001 and 096104302038; South of E. 8th Street, East of Highway 85 Bypass, and West of Ash Avenue

APPLICANT: Cadee Oakleaf, on behalf of the City of Greeley Water and Sewer Department

CASE PLANNER: Darrell Gesick, Planner III

PLANNING COMMISSION HEARING DATE: September 28, 2021

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 24-625(c)(3) of the Development Code.

EXECUTIVE SUMMARY

The City of Greeley is considering a request by the City of Greeley Water and Sewer Department to rezone approximately 25.759 acres from the C-D (Conservation District), I-M (Industrial Medium Intensity) and I-H (Industrial High Intensity) Zone District to the I-M (Industrial Medium Intensity) Zone District (see Attachments A, B, C & D).

A. REQUEST

The applicant is requesting approval of a rezone (see Attachment C).

B. STAFF RECOMMENDATION

Approval

C. LOCATION

The subject property is located at 300 and 306 E. 8th Street, 1001, 1131, 1060, and 1040 1st Avenue, and Parcel Number 0961054118001 and 096104302038; South of E. 8th Street, East of Highway 85 Bypass, and West of Ash Avenue.

Abutting Zoning:

North: I-M

South: I-M

East: I-M and C-D

West: I-M and C-D

Surrounding Land Uses:

North: 8th Street/Farm Equipment Implement Sales

South: Leprino Foods

East: Wastewater Treatment Facility for Leprino Foods

West: Highway 85 Bypass

Site Characteristics:

The site is currently developed and is used as the City of Greeley Wastewater Treatment Facility. There are several buildings on the subject site for the purpose of treating wastewater. The Cache la Poudre River runs through the middle of the property (see Attachments E and F).

D. BACKGROUND

The majority of the subject parcels were annexed as part of the Greeley Annexation and zoned I-2 (Medium Industrial) in 1967, (Reception No. 1502070). A smaller portion of the subject parcels were annexed and zoned I-2 in 1988 as part of The Great Western Sugar Company Annexation (Reception No. 2130514). The zoning classifications were changed in 1998, when the Development Code was revised. The existing zoning of I-M is the modern equivalent to I-2.

In 1979, the City Council adopted Ordinance No. 29, 1979, which was intended to regulate development activities in the floodway areas; and within the ordinance, the C-D (Conservation District) was created. On June 17, 1982, the City Council directed the Planning Commission to initiate a zone change on all floodway properties. Over the years, staff has rezoned several sites, including the subject parcels which a portion of was rezoned from I-M to C-D in 2000 (Z 9:00).

In 2015, the Federal Emergency Management Agency (FEMA) adopted new floodplain and floodway regulations for the Cache la Poudre Floodway. The City Council approved a Digital Flood Insurance Rate Map (DFIRM) on January 5, 2016, which modified the City's official floodplain overlay. In accordance with the revised floodplain map, a majority of the area requested for the rezone was removed from the floodway boundaries; however, a portion of the subject site, where the Cache la Poudre River flows, is still in the floodway. A majority of the site remains within the FEMA floodplain, which can still be developed (Resolution No. 3, 2016).

According to Section 24-625(c)(6) of the City of Greeley's Development Code "Property zoned as C-D (Conservation District) which is determined to no longer be in a floodway (flood study accepted and approved by the City and the federal government), and no longer meets the criteria, the Planning Commission or City Council shall initiate a rezoning based on the

following criteria: consult with the property owner and consider current legal uses, adjacent zoning and legal land uses, the history of the City's zoning ordinances and amendments and other relevant factors. Based on the requirements outlined above, staff has consulted with the property owner, considered area land uses and adjacent zoning, and reviewed the City's zoning ordinances and amendments. After review, staff recommends that the subject site be rezoned to I-M (Industrial Medium Intensity).

The site was developed in the early 1930's, with a treatment facility for the City of Greeley Wastewater. Over the years, improvements have been made, and it is anticipated that additional improvements would need to be made to keep the facility up to state and federal standards. Now that the majority of the property is out of the floodway, the applicant would like to have the site rezoned to facilitate future permits more efficiently. The current zoning district could prohibit or delay any further development on the subject site.

The property is also located in an area identified as "high ecological significance" due to its proximity to the Cache la Poudre River. Typically, as part of an administrative site plan process, the applicant would be required to submit a biologist report, which would evaluate any possible impacts to the wildlife in the area. In accordance with Section 24-1217(b)(9) of the City of Greeley's Development Code, a biologist report, unless waived by the City, must develop recommendations to mitigate the negative impacts of development proposals. Such recommendations shall consider the intentions of the applicant for the development of the property in determining the type of mitigation measures, including the following: avoidance, minimizing potential impacts, repairing, rehabilitating, restoring areas, and replacing or providing substitute resources and/or environment, among others. Because the site is already developed, and no impacts to wildlife would occur, a biologist report would be waived for any site plan process.

APPROVAL CRITERIA

Development Code Section 24-625(c)(3) Rezoning Procedures

For the purpose of establishing and maintaining sound, stable and desirable development within the City, the rezoning of land is to be discouraged and allowed only under circumstances provided for in this Section [of the Code]. This policy is based on the opinion of the City Council that the City's zoning map is a result of a detailed and comprehensive appraisal of the City's present and future needs regarding land use allocation and other zoning considerations, and, as such, should not be amended unless to correct manifest errors or because of changed or changing conditions in a particular area of the City in general.

The review criteria found in Section 24-625(c)(3)a-h of the Development Code shall be used to evaluate the zoning amendment application.

- a) Has 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: As mentioned in the Section D above, a portion of the site has recently been removed from the floodway boundaries, which would allow the property to be rezoned and potentially developed or redeveloped in accordance with the City and Federal floodplain regulations.

This request complies with this criterion.

b) Has the existing zoning been in place for at least fifteen (15) years without substantial development resulting and does the existing zoning appear to be obsolete, given development trends?

Staff Comment: The industrial zone district has been in place for over 50 years. As stated above, a portion of the subject site was zoned C-D in 2000, which limits development activity on the property. Since the floodway boundaries have recently changed, the site would be eligible to be rezoned.

Since a majority of the property is no longer within the Cache la Poudre River Floodway, the C-D zoning would be considered obsolete. To simplify, it is recommend to have entire property under one zone district versus multiple districts.

This request complies with this criterion.

c) Are there clerical or technical errors to correct?

Staff Comment: There are no clerical or technical errors to correct. This criterion is not applicable to this request.

d) Are there detrimental environmental impacts, such as flood plains, inadequate drainage, slopes, unstable soils, etc., that may affect future development of this site and which may not have been considered during the original zoning of the property?

Staff Comment: The majority of the property is located entirely within the 100-year floodplain and the portion where the Cache la Poudre River flows is located in the floodway. Any development proposed within the designated floodplain would be required to comply with all local, state and federal regulations. The area within the property that is designated floodway would not allow further development.

Because the site is already developed, there does not appear to be any issues that would impact future development or redevelopment of the site.

This request complies with this criterion.

- e) Is the proposed rezoning necessary in order to provide land for a community related use which was not anticipated at the time of adoption of the City’s Comprehensive Plan; or have the policies of the City changed to the extent that a rezoning is warranted?**

Staff Comment: The proposed rezoning is not necessary in order to provide land for a community-related use, the land is already being used as community use. The need for the rezone is to remove an obsolete zoned area, which would avoid any future impacts to development or redevelopment of the site.

The request complies with this criterion.

- f) What is the potential impact of the proposed rezoning upon the immediate neighborhood and the city as a whole (including potential noise and environmental impacts, visual impacts, the provision of City services such as police, fire, water, sewer, and pedestrian systems and parks and recreational facilities)?**

Staff Comment: It is not anticipated that the proposed rezoning would create significant impacts on the property or adjacent land uses. The site is already developed and the surrounding area is primarily industrial in character.

Any potential noise created by future development will be regulated by the Municipal Code. During any site plan process, the appropriate buffering would be required to be provided, which lessens any potential visual impacts. City services should not be impacted, since the surrounding area is already served by municipal services such as water and sewer. Police and Fire are already serving this area, since it is within the City of Greeley.

The proposal complies with this criterion.

- g) Is there clear and convincing evidence that the proposed rezoning will be consistent with the policies and goals of the City’s Comprehensive Plan and comply with the applicable zoning overlay requirements?**

There is one zoning overlay requirement for the subject property (see Section E). The following City of Greeley Imagine Greeley Comprehensive Plan policies apply to this request.

Comprehensive Plan Policy Objective GC-3.3, Design of Public Facilities

Lead by example in meeting or exceeding the Development Code design standards in the construction of all public facilities, including parking lots, public buildings, landscape areas and parks, buffer yards, and related projects:

Comprehensive Plan Policy Objective IN-1.12, Infrastructure Operations

Ensure that City infrastructure is safe, well-managed, and efficiently operated:

Staff Comment: Approving the rezone would allow the Water and Sewer Department the ability to enhance the site with new buildings or update existing buildings. The only reason the C-D Zoning exists is due to the floodway overlay that covered the subject site, until recently. Since the floodway boundary no longer impacts the site, the site is eligible to be rezoned. If the rezone is not approved, the current zoning district could prohibit or delay any further development or redevelopment of the property.

This request complies with these Comprehensive Plan policies.

h) What is the potential impact of the proposed rezoning upon an approved Zoning Suitability Plan for the property?

Staff Comment: Currently, there is not an approved Zoning Suitability Plan for the subject property. The proposed Zoning Suitability Plan submitted with this application demonstrates, on a conceptual level, that the site should be able to develop or redeveloped in accordance with the Development Code (see Attachment F).

This request complies with this criterion.

E. OVERLAY DISTRICTS

1. FLOODPLAIN OVERLAY DISTRICT

A majority of the property is located within the Cache la Poudre River 100-year floodplain and a small portion is within the floodway. The property would be subject to the regulations found in Section 24-717 of the City of Greeley's Development Code for floodplains, along with all other local, state and federal regulations.

F. PHYSICAL SITE CHARACTERISTICS

1. SUBDIVISION HISTORY

The property is part of the Union Colony Lands plat. A subdivision is not required as part of the rezoning process, but it is recommended that the City consolidate the multiple parcels into one lot in the future.

2. HAZARDS

Since the site is within the FEMA designed floodplain, flooding hazards may exist from time to time.

3. WILDLIFE

The site is located in an area identified as “high ecological significance” due to its proximity to the Cache la Poudre River. Typically, as part of the administrative site plan process, the applicant would be required to submit a biologist report, which would evaluate any possible impacts to the wildlife in the area. Because the site has already been developed, this requirement has been waived for any future development.

4. FLOODPLAIN

The property is located within the 100-year floodplain and a small area within the floodway, according to the adopted Federal Emergency Management Administration (FEMA) flood data.

5. DRAINAGE AND EROSION

This rezone application did not require a drainage report to be submitted. The current drainage patterns would not change as a result of the rezone. Any future development or redevelopment would require a drainage report to be completed and submitted to the City of Greeley for review and approval, as part of the administrative Site Plan Review process.

6. TRANSPORTATION

At this time, staff does not anticipate any significant changes that would negatively impact the roadway system as part of the rezone request.

A conceptual traffic report was not required to be submitted with the rezone. If the rezone is approved, a traffic memo or study will be required to be submitted with the administrative Site Plan Review process. The Public Works Department would review the traffic memo to determine if any modifications to the existing roadways would be warranted.

G. SERVICES**1. WATER**

Water services are available and can adequately serve the subject property. There is a water line located in E. 8th Street.

2. SANITATION

Sanitation services are available and can adequately serve the subject property. There are sewer lines that enter the site at various locations around the property.

3. EMERGENCY SERVICES

The subject site is currently, and will continue to be, served by the City of Greeley Police Department and the City of Greeley Fire Department. Fire Stations #1 and #4 are located approximately one and three-quarter miles to the south and west of the subject site.

4. PARKS / OPEN SPACES

No public parks or additional public open space areas are proposed with this request and the request would not be creating 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 were mailed to a total of 83 surrounding property owners on September 9, 2021, per Development Code requirements (see Attachment G). A sign was posted on the site on September 10, 2021. To date, no comments have been received.

J. MINERAL ESTATE OWNER NOTIFICATION

Mineral notice is not required for a rezone request.

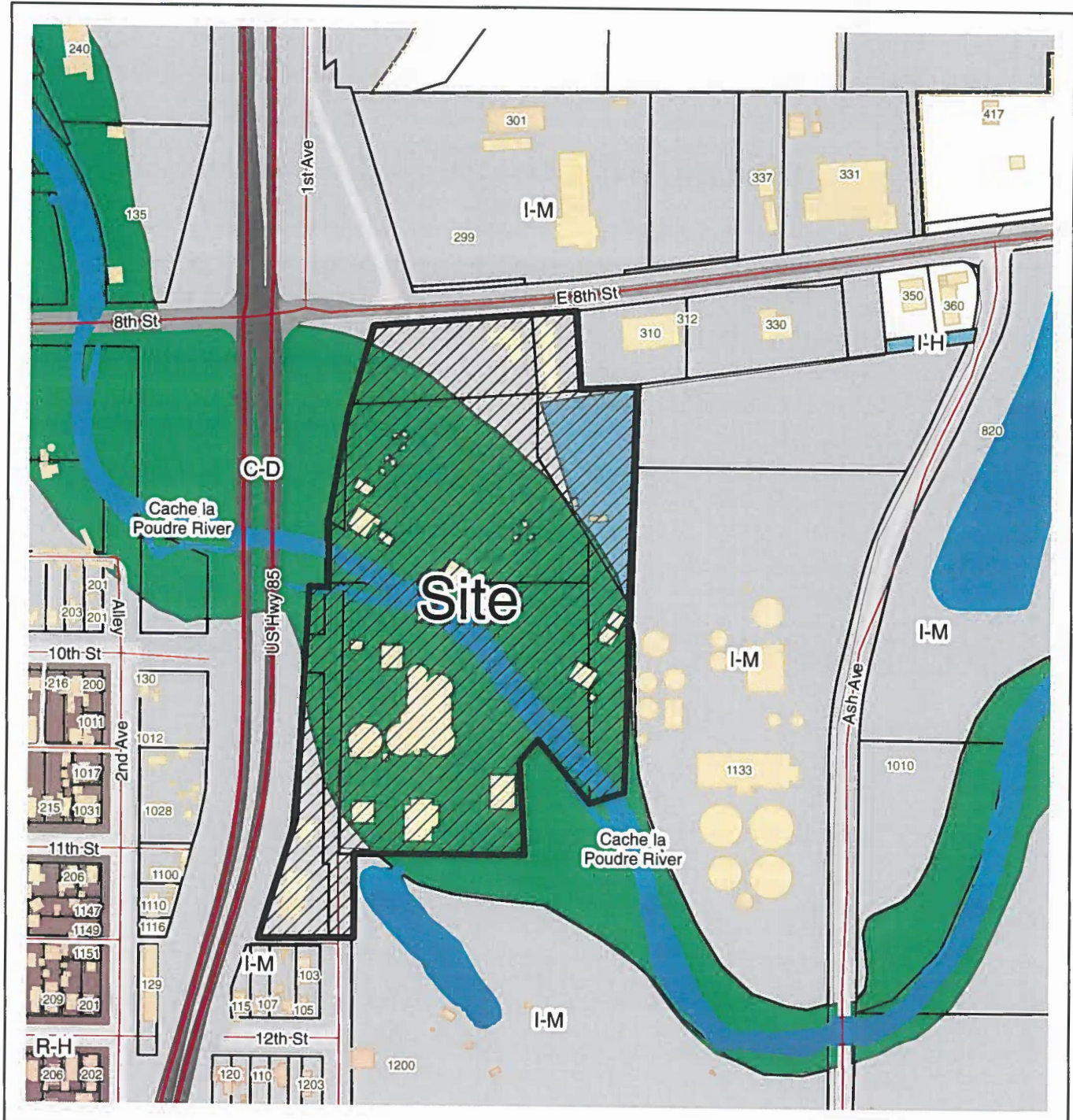
K. PLANNING COMMISSION RECOMMENDED MOTION

Based on the application received and the preceding analysis, the Planning Commission finds that the proposed rezoning from C-D (Conservation District) Zone District, I-M (Industrial Medium Intensity), and I-H (Industrial High Intensity) to I-M (Industrial Medium Intensity) Zone District meets Development Code Section 24-625(c)(3) a, b, d, e, f, g, and h; and therefore, recommend approval 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 Wastewater Treatment Facility



Legend

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

ZON2021-0001

0 250 500
Feet



Item No. 15.



Photo Aerial Map Wastewater Treatment Facility



ZON2021-0001

Legend

-  Weld Parcels
-  Road Centerline
-  Origin Cache Mask

0 250 500
Feet



Page 77

Wastewater Reclamation and Treatment Facility Rezone Application

Introduction and Purpose

The purpose of this rezone application is to bring zoning of the City of Greeley's Water Reclamation and Treatment Facility (WRTF) consistent with the current land use. As currently zoned, the WRTF property spans Conservation District (C-D), Industrial Medium Intensity (I-M) and Industrial High Intensity (I-H). The intent of this rezone application is to apply a I-M zone district over the entire WRTF property which spans multiple parcels over approximately 27 acres.

A separate minor subdivision application will combine the multiple parcels into a single WRTF property.

Location and Property

Property Owner:	City of Greeley – Water and Sewer Department
Address:	300 E. 8 th Street Greeley, CO 80631

Legal Description and Survey of Land

The subject property is south of E. 8th Street, east of SH 85 and north of 12th Street. 1st Avenue terminates into the WRTF property immediately south of the Poudre River. The Poudre River bisects the WRTF parcels creating two distinct areas of the WRTF operations.

Legal Description

Part of Lots 1, 2, 3 and 4 of the SW1/4 SW1/4 of Section 4, Part of Lot 3 of the NW1/4 SW1/4 of Section 4, Part of Lot 1 of the SE1/4 of Section 5, Part of Lot 4 of the NW1/4 NW1/4 of Section 9, all of the Union Colony of Colorado and Part of Blocks 126, 133, 134, 1st Avenue, 10th Street and 11th Street, all of the City of Greeley, and All of Lot 1, Minor Subdivision No. 0961-4-3-MS-8 Situate in the Sections 4, 5, 8 and 9, Township 5 North, Range 65 West of the 6th P.M., City of Greeley, County of Weld, State of Colorado

Action Requested

- a. Has 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?
 - *Ans. No. The area is being rezoned to bring the land use consistent with the City's zoning criteria.*
- b. Has the existing zoning been in place for at least fifteen (15) years without substantial development resulting and does the existing zoning appear to be obsolete, given development trends?
 - *Ans. The existing zoning has been in place for over 15 years but is inconsistent with the use. The resulting zoning of I-M will be consistent with the use.*
- c. Are there clerical or technical errors to correct?
 - *Ans. The technical error to correct is the application of C-D zoning to the WRTF property. This zoning appears to have been applied during a remapping effort of the floodplain and a concurrent rezoning effort.*
- d. Are there detrimental environmental conditions, such as flood plains, presence of irrigation ditches, inadequate drainage, slopes, unstable soils, etc., that may affect future development of this site and which may not have been considered during the original zoning of the property?
 - *Ans. No. Future development of the property will not be affected by environmental conditions. Floodplain, drainage and other issues are, and will be, addressed by individual projects pursued at the WRTF.*
- e. Is the proposed rezoning necessary in order to provide land for a community-related use which was not anticipated at the time of adoption of the City's Comprehensive Plan; or have the policies of the City changed to the extent that a rezoning is warranted?
 - *Ans. Yes. Zoning the WRTF to a consistent I-M zone district will allow for current and future expansions and redevelopment of the WRTF property.*

- f. What is the potential impact of the proposed rezoning upon the immediate neighborhood and the City as a whole (including potential noise and environmental impacts, visual impacts, the provision of City services such as police, fire, water, sewer, street and pedestrian systems and parks and recreation facilities)?
- *Ans. There will be no adverse effect of the proposed rezoning on the City or adjacent neighborhoods as the rezoning is over property which currently functions at the proposed I-M use.*
- g. Is there clear and convincing evidence that the proposed rezoning will be consistent with the policies and goals of the City's Comprehensive Plan and comply with applicable zoning overlay requirements?
- *Ans. Yes. The proposed rezoning is entirely consistent with the City's Comprehensive Plan. This rezoning request simply corrects prior zoning errors across the property and applies a consistent zoning designation across the entire property. Primarily, this rezoning application would align with Comprehensive Plan Goal IN-1 – Ensure developed areas in Greeley are served by adequate public facilities and services. The proposed rezone is also entirely consistent with the Land Use Guidance Map. Below is a comparison of the Land Use Guidance Map to the existing Zoning Map. The existing Zoning shows the majority of the WRTF designated as C-D.*



Land Use Guidance Map (magenta = industrial use)



Existing Zoning Map

- h. What is the potential impact of the proposed rezoning upon an approved zoning suitability plan for the property?
- *Ans. There is no impact of the proposed rezoning. The rezoning designation (I-M) is entirely suitable for the project.*
- i. Signatures of all owners of record.
- *Ans. See attached application materials. This is a City initiated rezone application.*
- j. Zoning suitability plan.
- *Ans. The zoning suitability plan is attached to the application as [Exhibit A](#).*
- k. List of property owners within area of influence.
- *Ans. The applicant has provided a list of property owners within a 1,000-ft radius of the exterior boundary of the property. This list is attached to this application as [Exhibit B](#).*

REZONE PROPERTY BOUNDARY MAP WASTEWATER RECLAMATION AND TREATMENT FACILITY

A Rezone of Multiple Parcels of Land, Situate in the Sections 4, 5, 8 and 9, Township 5 North, Range 65 West of the 6th P.M., City of Greeley, County of Weld, State of Colorado

PROPERTY DESCRIPTION

A parcel of land, being part of Lots 1, 2, 3 and 4 of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) of Section Four (4), part of Lot 3 of the Northwest Quarter of the Southwest Quarter (NW1/4 SW1/4) of said Section Four (4), part of Lot 1 of the Southwest Quarter (SE1/4) of Section Five (5) and part of Lot 4 of the Northwest Quarter of the Northwest Quarter (NW1/4 NW1/4) of Section Nine (9), all in Township Five North (T.5N.), Range Sixty-five West (R.65W.) and in accordance with the subdivision of lands by the Union Colony of Colorado as shown on the map recorded April 17, 1891 in Book 2 at Page 41, as Recession No. 28743 of the records of the Weld County Clerk and Recorder, part of Block 126, 133 and 134, 1st Avenue, 10th Street and 11th Street, all of the City of Greeley; and all of Lot 1, Minor Subdivision No. 0961-4-3-M5-B, recorded October 18, 1972 as Recession No. 1589948 of the records of the Weld County Clerk and Recorder, said parcel of land located in the West Half of the Southwest Quarter (W1/2 SW1/4) of said Section 4, the Southwest Quarter of the Southwest Quarter (SE1/4 SW1/4) of said Section 5, the Northwest Quarter of the Northwest Quarter (NW1/4 NW1/4) of Section Eight (8) and the Northwest Quarter of the Northwest Quarter (NW1/4 NW1/4) of said Section 9, all in 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:

COMMENCING at the Southwest corner of said Section 4 and commencing the West line of the Southwest Quarter (SW1/4) of said Section 4, being monumented by a 6" rebar with a 2 1/2" diameter aluminum cap stamped "1528285, 2013" in a monument box at the South end and by a 6" rebar with a 2 1/2" diameter aluminum cap stamped "1528285, 2013" at the North end, as bearing North 00°22'27" West being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, a distance of 2893.79 feet, with all other bearings contained herein relative thereto;

THENCE South 89°18'01" East along the South line of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) of said Section 4, being monumented by a 6" rebar with a 2" diameter aluminum cap stamped "1525372, 1991" in a monument box at the East end, a distance of 30.07 feet to the West line of Lot 1, said Minor Subdivision, recorded July 30, 2012 as Recession No. 3882189 of the records of the Weld County Clerk and Recorder, said point being the POINT OF BEGINNING;

THENCE South 00°22'43" East along the West line of said Lot 1 a distance of 199.89 feet to the Easterly extension of the South line of the North Half (N1/2) of said Block 134;
THENCE South 89°58'24" West along said Easterly extension and along the South line of the North Half (N1/2) of said Block 134 a distance of 229.83 feet to an Easterly Right-of-way line of US Highway 85;
The following Seven (7) courses and distances are along Easterly Right-of-way lines of said US Highway 85:
THENCE North 13°48'48" East a distance of 324.32 feet;
THENCE North 08°10'05" East a distance of 35.00 feet;
THENCE North 02°28'52" East a distance of 451.37 feet;
THENCE North 00°15'44" West a distance of 128.70 feet;
THENCE South 86°13'29" East a distance of 24.85 feet;
THENCE North 00°15'44" West a distance of 212.20 feet;
THENCE North 17°11'31" East a distance of 499.47 feet to a Southerly Right-of-way line of State Highway 263, also known as East 8th Street, established by that Special Warranty Deed recorded May 9, 1986 in Book 1450 at Page 128, as Recession No. 1230147, of the records of the Weld County Clerk and Recorder;
The following Two (2) courses and distances are along Southerly Right-of-way lines of said State Highway 263, also known as East 8th Street:
THENCE North 86°30'06" East a distance of 171.61 feet to a Point of Curvature (PC);
THENCE along the arc of a curve, which is concave to the North, a distance of 379.53 feet to the Northwest corner of Lot 1, said Minor Subdivision No. 0961-4-3-M5-B, also being the Southwest corner of Lot 2, said Minor Subdivision No. 0961-4-3-M5-B, said point being the beginning point of a curve, said curve being non-tangent to aforesaid line;
THENCE along the Southerly line of Lot 2, said Minor Subdivision No. 0961-4-3-M5-B, also being along the arc of said curve, a distance of 126.62 feet to the Northwest corner of Lot 3, said Ash Minor Subdivision, said curve having a radius of 8461.08 feet, a central angle of 00°51'27" and a long chord bearing North 83°14'02" East a distance of 126.62 feet;
THENCE South 01°23'46" West, non-tangent to aforesaid curve and along the West line of Lot 3, Lot 2 and Outlet A, said Ash Minor Subdivision a distance of 1063.68 feet;
The following Four (4) courses and distances are along Northerly lines of said Outlet A:
THENCE South 89°08'53" West a distance of 93.34 feet;
THENCE North 41°25'56" West a distance of 211.65 feet;
THENCE South 45°30'34" West a distance of 58.30 feet;
THENCE South 00°25'06" East a distance of 289.13 feet;
THENCE North 89°18'12" West continuing along a Northerly line of said Outlet A and along a Northerly line of Lot 1, said Ash Minor Subdivision, a distance of 448.24 feet to the Northwest corner of Lot 1, said Ash Minor Subdivision;
The following Two (2) courses and distances are along the West line of Lot 1, said Ash Minor Subdivision:
THENCE South 00°22'27" East a distance of 24.47 feet;
THENCE South 00°23'43" East a distance of 0.58 feet to the POINT OF BEGINNING.

Said described parcel of land contains 25.759 Acres, more or less (±).

BASES OF BEARINGS AND LINEAL UNIT DEFINITION

Assuming the West line of the Southwest Quarter of said Section 4, T.5N., R.65W., being monumented by a 6" rebar with a 2 1/2" diameter aluminum cap stamped "1528285, 2013" in a monument box at the South end and by a 6" rebar with a 2 1/2" diameter aluminum cap stamped "1528285, 2013" at the North end, as bearing North 00°22'27" West being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, a distance of 2893.79 feet, with all other bearings contained herein relative thereto.

The lineal dimensions as contained herein are based upon the "U.S. Survey Feet."

TITLE COMMITMENT NOTE

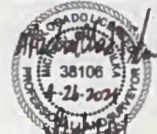
This survey does not constitute a title search by King Surveyors to determine ownership or easements of record. For all information regarding easements, rights-of-way and title of records, King Surveyors relied upon Title Commitment Number 5558-3265398, dated June 17, 2018 as prepared by First American Title Insurance Company to delineate the aforesaid information.

NOTICE

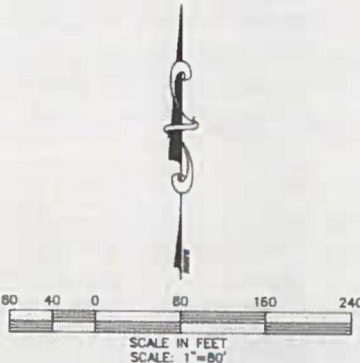
According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown herein. (13-BD-100 C.R.S. 2012)

SURVEYOR'S STATEMENT

I, Michael Chad Dille, a Colorado Licensed Professional Land Surveyor, do hereby state that this Rezoning Plat was prepared under my personal supervision, and that the foregoing plat is an accurate representation thereof, all this to the best of my knowledge, information, belief, and in my professional opinion.



Michael Chad Dille - On Behalf Of King Surveyors
Colorado Licensed Professional Land Surveyor #38106



LEGEND

- SECTION LINE
- - - RIGHT OF WAY LINE
- BOUNDARY LINE
- FOUND ALIQUOT MONUMENT AS DESCRIBED
- CALCULATED POSITION

LINE TABLE

LINE	BEARING	LENGTH
L1	N08°10'05"E	35.00'
L2	N00°15'44"W	128.70'
L3	S86°13'29"E	24.85'
L4	S89°08'53"W	93.34'
L5	S45°30'34"W	58.30'
L6	S00°22'27"E	24.47'
L7	S00°23'43"E	0.58'

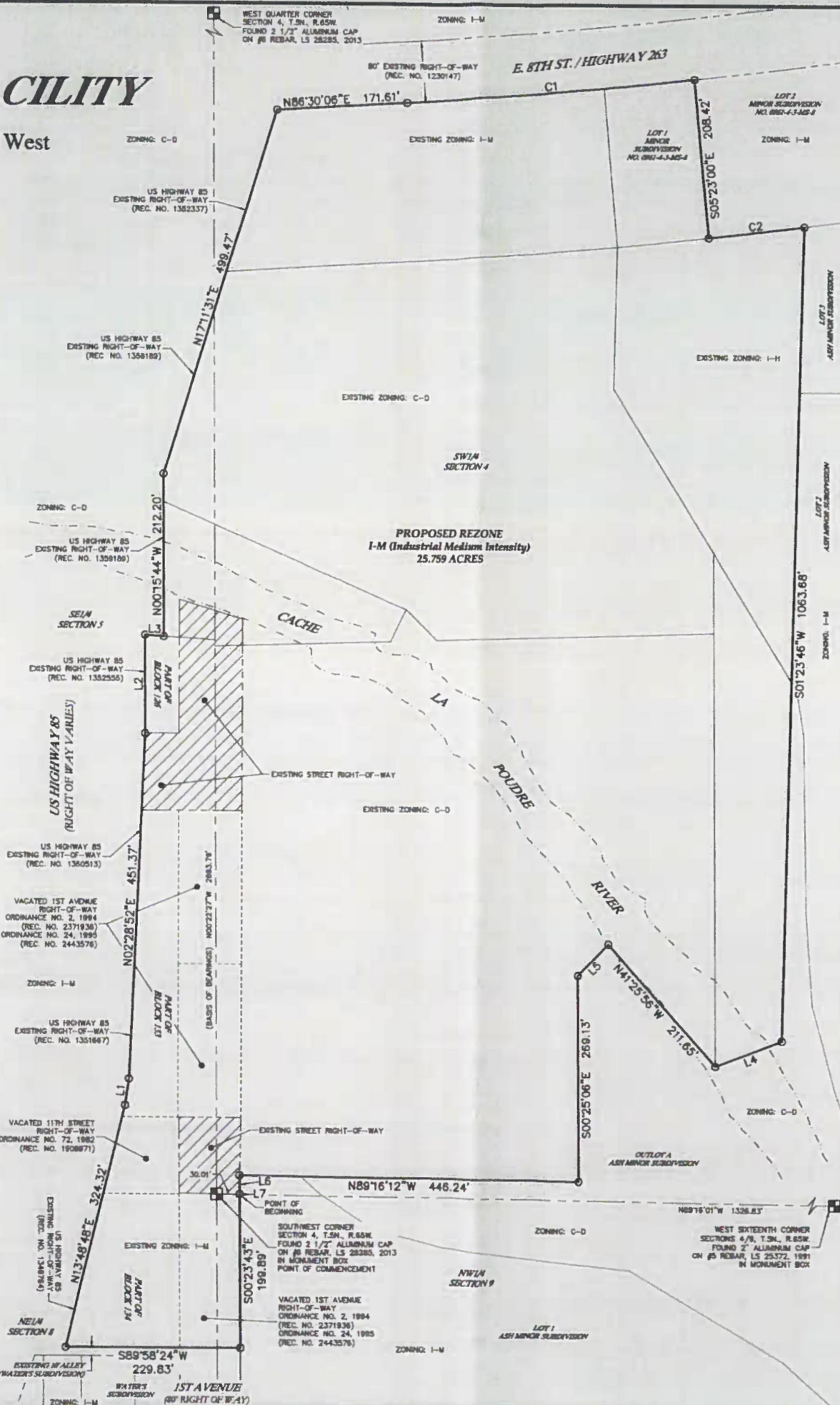
CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	CHORD	CH BEARING
C1	379.53'	7680.00'	2°48'53"	379.44'	N89°05'08"E
C2	126.62'	8461.08'	0°51'27"	126.62'	N83°14'02"E



VICINITY & ZONING MAP

SCALE: 1"=500'



DATE: 4/8/2021
FILE NAME: 20190027-A-RZN
SCALE: 1"=80'
DRAWN BY: CSK
CHECKED BY: MCD

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



DATE: 4-8-21
DRAWN BY: CSK
CHECKED BY: MCD
REVISIONS:
ADDRESS CITY COMMENTS

REZONE PROPERTY BOUNDARY MAP
WASTEWATER RECLAMATION AND TREATMENT FACILITY
FOR
CITY OF GREELEY
1001 11TH AVENUE, 2ND FLOOR, GREELEY, CO 80631

PROJECT # 20190027-A

1
SHEET 1 OF 1

REZONE SITE ANALYSIS MAP WASTEWATER RECLAMATION AND TREATMENT FACILITY

A Rezone of Multiple Parcels of Land, Situate in the Sections 4, 5, 8 and 9, Township 5 North, Range 65 West of the 6th P.M., City of Greeley, County of Weld, State of Colorado

BASE OF BEARINGS AND LINEAL UNIT DEFINITION

Assuming the West line of the Southeast Quarter of said Section 4, T.5N., R.65W., being monumented by a 60 rebar with a 2 1/2" diameter aluminum cap stamped "1528285, 2013" at the South end and by a 60 rebar with a 2 1/2" diameter aluminum cap stamped "1528285, 2013" at the North end, as bearing North 00°22'27" West being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, a distance of 2693.75 feet, with all other bearings contained herein relative thereto.

The lineal dimensions as contained herein are based upon the "U.S. Survey Foot."

TITLE COMMITMENT NOTE

This survey does not constitute a title search by King Surveyors to determine ownership or easements of record. For all information regarding easements, rights-of-way and title of records, King Surveyors relied upon Title Commitment Number 5609-3285399, dated June 17, 2019 as prepared by First American Title Insurance Company to delineate the aforesaid information.

NOTICE

According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown herein. (13-80-103 C.R.S. 2013)

FLOOD PLAIN NOTE

The subject property is in flood zones as follows per FEMA flood map 08123C1541E revised January 20, 2016. Floodplain lines indicated herein are approximate only.

- flood zone "X", "areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood"
- flood zone "AE", "areas of 1% chance flood (100-year flood), base flood elevations determined."
- The floodway in the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood height."

VERTICAL DATUM

NORTH AMERICAN VERTICAL DATUM OF 1988. VERTICAL CONTROL BASED UPON CITY OF GREELEY WATER POLLUTION CONTROL FACILITY BENCHMARK "BENCHMARK #2" (ELEVATION=4640.41).

HORIZONTAL DATUM

COLORADO STATE PLANE COORDINATE SYSTEM, NORTH ZONE, NORTH AMERICAN DATUM 1983/2011 SCALED TO GROUND USING A COMBINED FACTOR OF 0.99973183 (1.00026817) ABOUT 0.0.

LEGEND

—	EDGE OF ASPHALT	cc	CURB CUT	04	SANITARY MANHOLE	---	SECTION LINE
—	EDGE OF CONCRETE	00	MONITORING WELL	00	CLEAN OUT	---	RIGHT OF WAY LINE
—	BUILDING	00	UNKNOWN MANHOLE	00	SANITARY VALVE	---	BOUNDARY LINE
—	BUILDING OVERHANG	00	AIR CONDITIONER UNIT	00	MAILBOX	---	FOUND ALIQUOT MONUMENT AS DESCRIBED
—	METAL HANDRAIL	00	DRAINAGE MANHOLE	00	SIGN	---	CALCULATED POSITION
—	EDGE OF LANDSCAPING	00	ELECTRIC BOX	00	REFLECTOR POST	---	
—	EDGE OF GRAVEL ROAD	00	ELECTRIC MANHOLE	00	TELEPHONE PEDESTAL	---	
—	FLOWLINE	00	POWER POLE	00	TELEPHONE MANHOLE	---	
—	CHAIN LINK FENCE	00	LIGHT POLE	00	TELEPHONE MARKER	---	
—	FENCE LINE	00	GAS VALVE	00	SPIGOT	---	
—	FENCE GATE	00	GAS MARKER	00	FIRE HYDRANT	---	
—	PIPE	00	IRRIGATION VALVE BOX	00	WATER VALVE	---	
—	GAS LINE	00	PINE TREE	00	GATE VALVE	---	
—	OVERHEAD POWER LINE	00	DECIDUOUS TREE	00	AIR VALVE	---	
—	DRAINAGE LINE	00	STEEL POST	00	WATER SHUTOFF	---	
—		00		00	WATER METER	---	

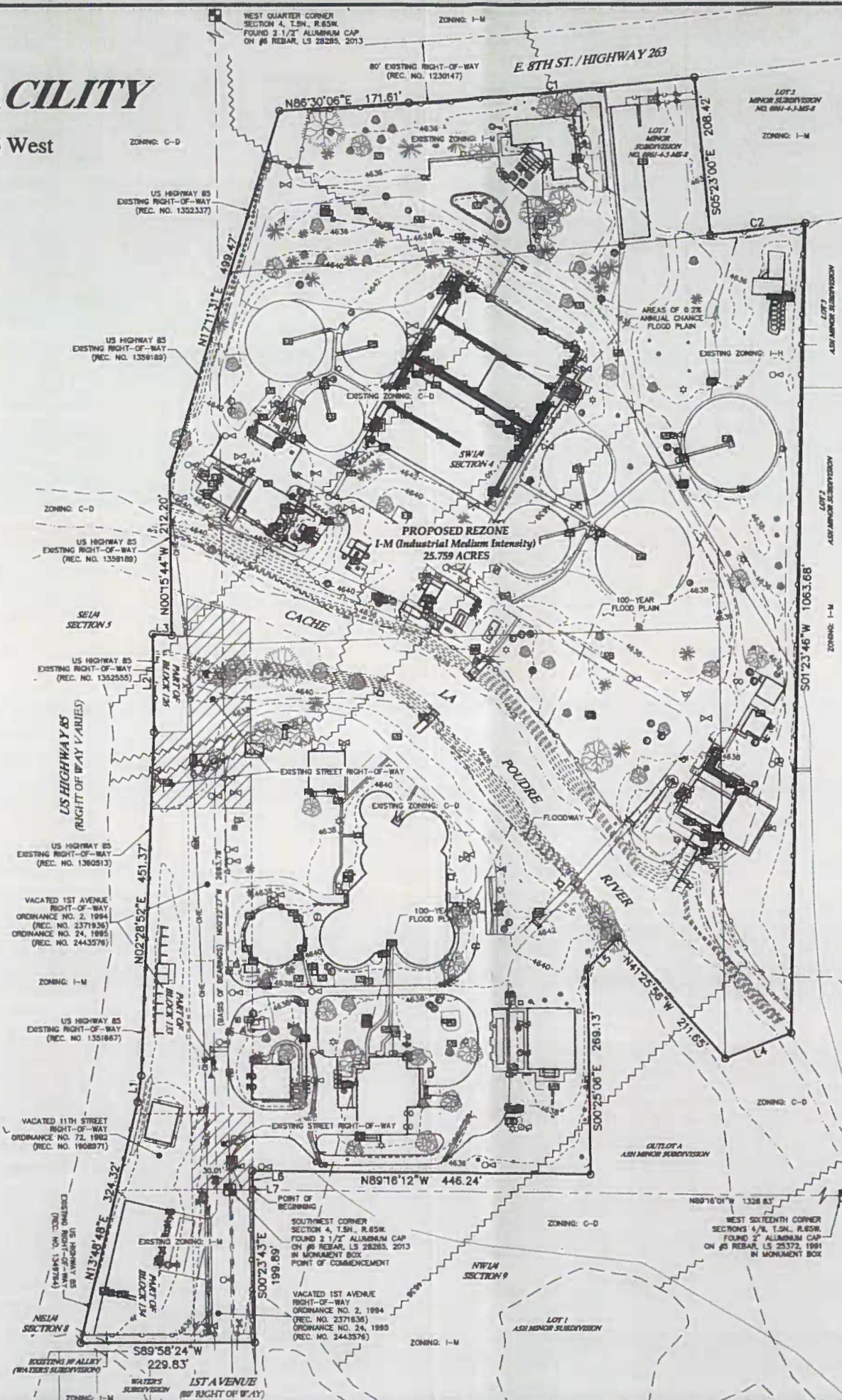
80 40 0 80 160 240
SCALE IN FEET
SCALE: 1"=80'

LINE TABLE

LINE	BEARING	LENGTH
L1	N08°10'05"E	33.00'
L2	N00°15'44"W	128.70'
L3	S86°03'29"E	24.85'
L4	S89°08'35"W	83.34'
L5	S45°30'34"W	58.30'
L6	S00°22'27"E	24.47'
L7	S00°23'43"E	0.96'

CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	CHORD	CH BEARING
C1	379.53'	7680.00'	2°48'53"	379.49'	N83°05'09"E
C2	128.62'	8461.00'	0°51'27"	128.62'	N83°14'02"E



DATE:	4/8/2021
FILE NAME:	20190027-A-RZN
SCALE:	1"=80'
DRAWN BY:	CSK
CHECKED BY:	MCD

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



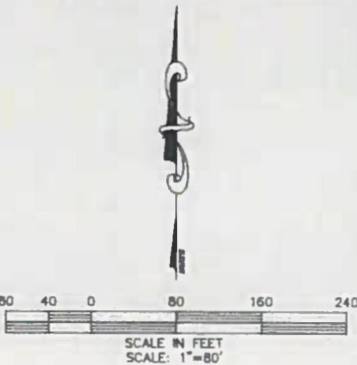
DATE:	
REVISIONS:	

REZONE SITE ANALYSIS MAP
WASTEWATER RECLAMATION AND TREATMENT FACILITY
FOR
CITY OF GREELEY
1001 11TH AVENUE, 2ND FLOOR, GREELEY, CO 80631

PROJECT #:
20190027-A

ZONING SUITABILITY MAP WASTEWATER RECLAMATION AND TREATMENT FACILITY

A Rezone of Multiple Parcels of Land, Situate in the Sections 4, 5, 8 and 9, Township 5 North, Range 65 West
of the 6th P.M., City of Greeley, County of Weld, State of Colorado

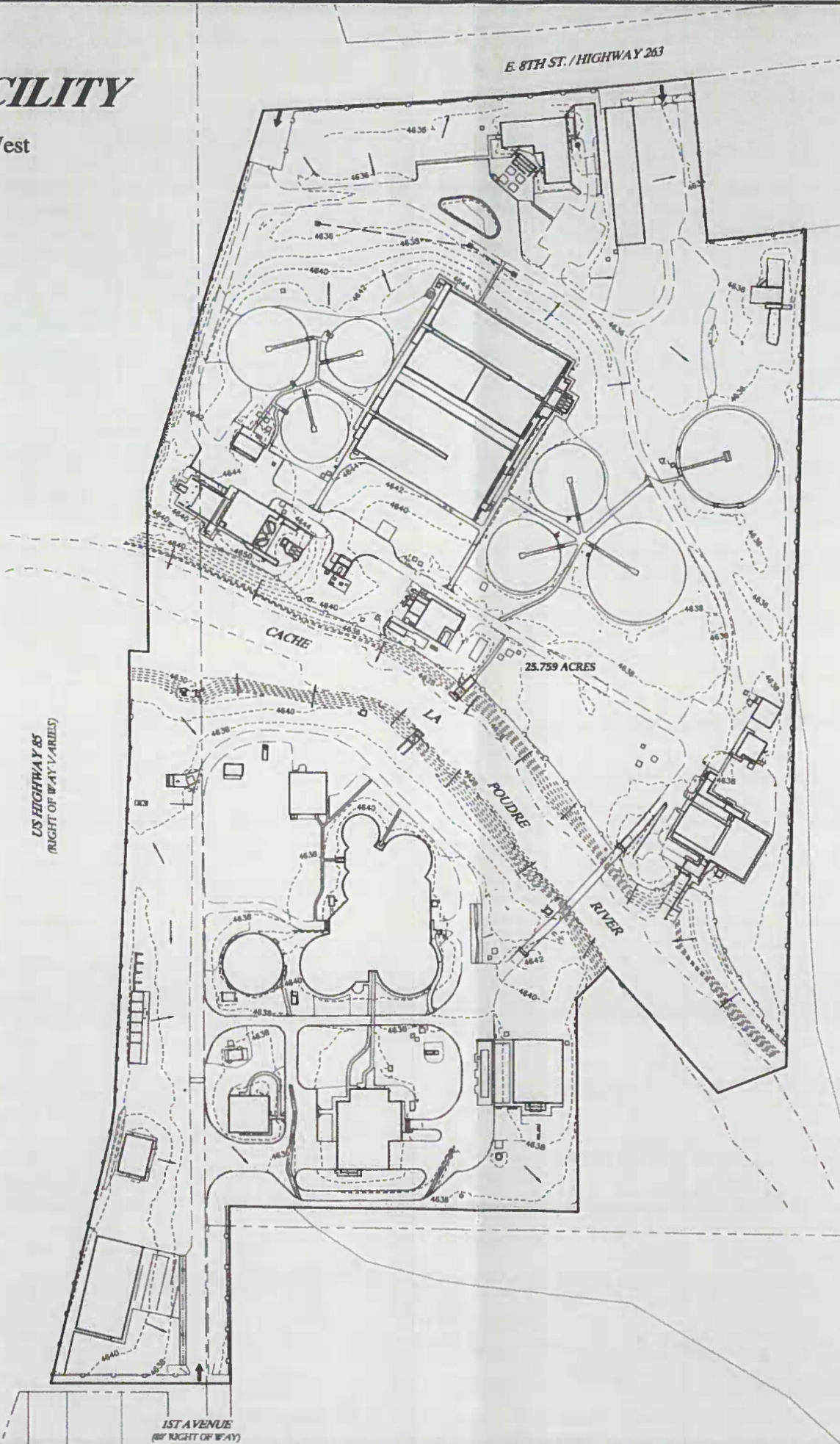


LEGEND

---	EDGE OF ASPHALT
---	EDGE OF CONCRETE
---	BUILDING
---	BUILDING OVERHANG
---	METAL HANDRAIL
---	EDGE OF LANDSCAPING
---	EDGE OF GRAVEL ROAD
---	FLOWLINE
---	CHAIN LINK FENCE
---	FENCE LINE
---	PIPE
---	SECTION LINE
---	QUARTER SECTION LINE
---	RIGHT OF WAY LINE
---	BOUNDARY LINE
→	EXISTING ACCESS POINT

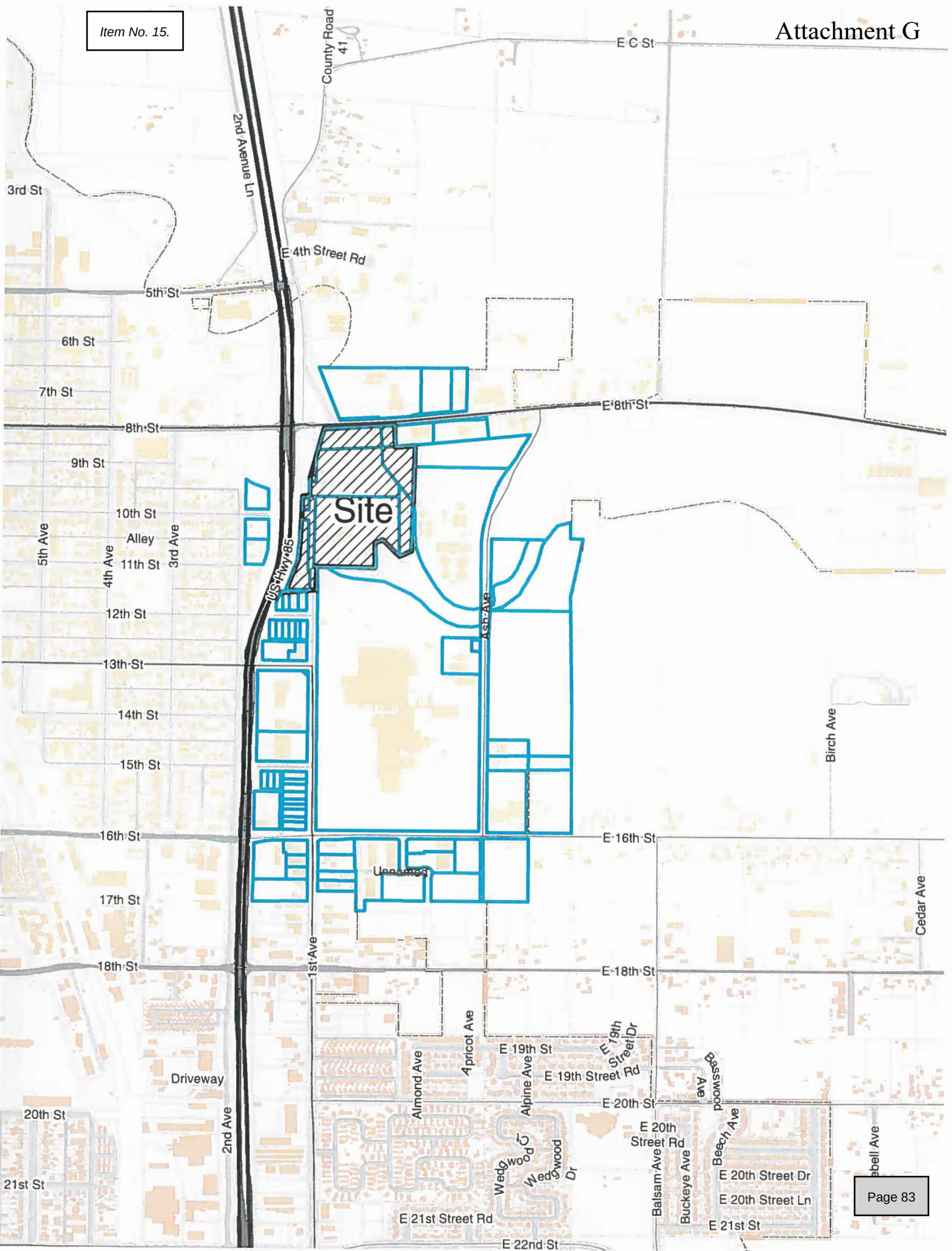
NOTICE

According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon. (13-60-105 C.R.S. 2012)



DATE:	4/8/2021
FILE NAME:	20190027-A-RZN
SCALE:	1"=80'
DRAWN BY:	CSK
CHECKED BY:	MCD
KING SURVEYORS 650 E. Garden Drive Windsor, Colorado 80550 phone: (970) 686-5011 email: contact@Kingsurveyors.com	
DATE:	4-8-21
REVISIONS:	
ADDRESSED CITY COMMENTS	
ZONING SUITABILITY MAP WASTEWATER RECLAMATION AND TREATMENT FACILITY FOR CITY OF GREELEY 1001 11TH AVENUE, 2ND FLOOR, GREELEY, CO 80631	
PROJECT #	20190027-A
1	Page 82
SHEET 1 OF 1	

2:30 PM 04/08/2021 1:13:17 AM 1:1



City of Greeley Wastewater Treatment Facility Rezone ZON2021-0001

City Council

October 19, 2021

Darrell Gesick, Planner III

Location

- **South of E 8th Street and East of Highway 85 Bypass**
- **Surrounding Zoning and Land Uses:**
 - **North: I-M – E. 8th Street and Farm Implement Sales**
 - **East: I-M and C-D – Leprino Foods Wastewater Treatment Facility**
 - **South: I-M – Leprino Foods**
 - **West: I-M and C-D – Highway 85 Bypass**



Site Analysis and Zoning Suitability Map

Existing Conditions:

- Several existing structures on the parcels
- River runs through the center of the property



Request & Site Background

- **Request:**

- **Rezone 25.759 acres to I-M (Industrial Medium Intensity)**
- **Parcels currently developed with the City of Greeley Wastewater Treatment Facility**

- **Background:**

- **1979, the C-D district was created to regulate development in the floodway**
- **1982, the City initiated rezone changes on all floodway properties**
- **2015, new floodplain and floodway boundaries, parcels were removed from the floodway boundary**

Approval Criteria

Rezone Criteria – 24-625(C)(3) – Eight criteria used to evaluate rezone applications

- **The proposed rezone is consistent with the criteria as outlined in the Summary**

Notification

- **A total of 83 notice letters were mailed to property owners within 500 feet**
- **Signs posted on the property**
- **Received one phone call**

Recommendation

- **Planning Commission recommends approval**

Council Agenda Summary

October 19, 2021

Key Staff Contact: Becky Safarik, Assistant City Manager, 970-350-9785

Brittany Hathaway, Planner III, 970-350-9823

Title:

Public hearing to consider a request for approval of a combined Preliminary/Final PUD (Planned Unit Development) for the Westgate First Filing, Westgate Preliminary PUD 2nd Amendment and Final PUD, for approximately 84.436 acres located north of US 34, west of 71st Avenue, and east of 83rd Avenue for a mixed-use community

Summary:

The applicant is requesting approval of a Preliminary PUD Amendment and Final PUD to plat 191 single family lots, one multi-family lot, two commercial lots, and 12 tracts for parkland dedication, open space, trails, drainage, utilities, landscape buffering, and future development. This request includes a Preliminary Plat and Final Plat, of which are processed as a combined Preliminary and Final PUD.

On November 17, 2020, the City Council approved the Westgate Preliminary PUD First Amendment. This request for a subdivision is in substantial conformance with the approved Preliminary PUD Plan. All proposed land uses and densities are permitted in the prescribed planning areas. General road layouts are also in conformance with the approved Master Plan.

Per Section 24-671, combined Preliminary and Final PUD Plans shall be processed and reviewed as a Preliminary Plan under the provisions of Section 24-699, and upon approval, shall be deemed a Final Plan for the purposes of the provisions of Section 24-673. Combined submittals may be reviewed as separate decisions on both the Preliminary and Final Plans by the City Council.

The Planning Commission considered the request on September 28, 2021 and unanimously recommended approval to City Council.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	
What is the annual impact?	
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	
Is there grant funding for this item?	N/A
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	
Additional Comments:	

Legal Issues:

Consideration of this matter is a quasi-judicial process which includes the following public hearing steps:

- 1) City staff presentation
- 2) Council questions of staff
- 3) Applicant presentation
- 4) Council questions of applicant
- 5) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
- 6) Rebuttal, if requested
- 7) Council discussion
- 8) Council decision

Other Issues and Considerations:

None noted.

Strategic Work Program Item or Applicable Council Priority and Goal:

Consistency with the Comprehensive Plan and Development Code standards.

Decision Options:

- 1) Approve the proposal as presented; or
- 2) Amend the proposal and approve as amended; or
- 3) Deny the proposal; or
- 4) Continue consideration of the proposal to a date certain.

Council's Recommended Action:

A motion that, based on the project summary and accompanying analysis, the proposed combined Preliminary and Final PUD for Westgate First Filing, Westgate Preliminary PUD 2nd Amendment and Final PUD, are in compliance with the Development Code and are therefore approved.

Attachments:

Planning Commission Minutes – Draft (September 28, 2021)

Planning Commission Summary (Staff Report) with attachments A-E (September 28, 2021)

Public Correspondence

PowerPoint Presentation

Chair Pro Tem Schulte introduced the item and asked whether any member of the Commission or public requested a presentation. Hearing no request for a presentation, the public hearing was opened at 1:21 p.m. There were no emails or members of the virtual audience requesting to speak and the public hearing was closed at 1:21 p.m. Chair Pro Schulte advised that the staff report would be entered into the record.

Commissioner Romulo moved that, based on the application received and the staff report and accompanying attachments, the Planning Commission finds that the proposed rezoning from I-H (Industrial High Intensity), I-M (Industrial Medium Intensity) and C-D (Conservation District) to I-M (Industrial Medium Intensity) zone district meets Development Code Section 24-625(c)(3) a, b, d, e, f, g and h; and, therefore, recommends approval of the rezone to the City Council. Commissioner Franzen seconded the motion. Motion carried 5-0.

END OF EXPEDITED AGENDA

6. Public hearing to consider a request for a Combined Preliminary and Final Planned Unit Development Plan for a 194-lot residential and commercial subdivision located north of US 34, west of 71st Avenue, and east of 83rd Avenue, known as the Westgate First Filing, Westgate Preliminary PUD 2nd Amendment and Final PUD (Project No. PUD2020-0002 and PUD2020-0003)

Mike Garrott addressed the Commission and introduced the item as a request for a combined Preliminary and Final PUD. Mr. Garrott stated that the proposal included 191 single-family lots, one lot for multi-family use, two commercial lots and 12 tracts for parkland dedication, open space, trail, drainage, utilities, landscape buffering and future development. He presented photographs of the site and a map showing the location of the undeveloped site that includes the Boomerang Ditch through the eastern portion of the property. Mr. Garrott presented a layout of the proposed subdivision and pointed out the single-family lots and areas for multi-family and commercial as well as an area designated for a future park and detention pond.

Mr. Garrott reviewed the approval criteria and stated that the proposal meets the criteria found in Development Code Section 24-625 and is in substantial conformance with the approved Preliminary PUD plan. He invited Thomas Gilbert from Engineering Development Review (EDR) to address some of the emailed from citizens.

Mr. Gilbert addressed the Commission and responded to concerns raised by citizens about the proposed 25th Street Road [sic] that runs along the northern boundary. He advised that a Preliminary PUD approved in 2016 allowed for townhomes, condominiums and multi-family use in the area. Mr. Gilbert added 25th Street access was previously accepted by the Planning Commission and City Council. He reported that development of this property does not impose requirements on any adjacent land owners, noting that there will be a half section of 25th Street built to provide connectivity to the multi-family site and to meet City criteria. Mr. Gilbert stated that in the event the property to the north is

developed, the owner would be required to provide adequate connectivity to the surrounding street network or discuss other options with the City at that time.

Mr. Garrott stated that proper notice of the hearing was accomplished. Staff recommended approval of the request. Mr. Garrott noted that there were two separate motions and offered to answer any questions.

Commissioner Modlin observed that a few of the lots seemed to back up closely to Highway 34 Bypass and asked whether any landscaping or buffering would be in place to create a separation between the homes and Highway 34. Mr. Garrott reported that there is a significant setback between the highway and the lots that provides buffering, adding that the plans will be finalized as part of the final landscape plan.

Commissioner Romulo asked for clarification about reference to build out of half of the 25th Street expansion and asked whether it would become a one-lane road with just the south lane. Mr. Garrott advised that it would be a two-lane road, or a half section road, which meets the standards for access.

Commissioner Schulte confirmed that the Commission is voting on both the Preliminary and Final PUD. Mr. Garrott stated that the layout and other factors of the Preliminary and Final PUD are very similar and it made sense to process both of them together. He added that the Code does not require a waiting period between Preliminary and Final PUD approval and that the PUD standards allow for a combined Preliminary and Final PUD. Upon question by Commissioner Romulo about opportunities for public involvement, Mr. Garrott reported that approval by the Commission is contingent upon City Council approving the Preliminary PUD, adding that members of the public will have an opportunity to attend the City Council meeting.

Mr. Garrott presented a landscape plan showing the area along Highway 34 and pointed out a future trail easement and landscape buffering area. Commissioner Modlin stated that he could not discern any berming that might mitigate traffic noise or slow any vehicles that might swerve from the highway onto the site. Mr. Garrott stated that the applicant could further address the question.

Marc Savela, Broe Real Estate Group, 252 Clayton Street, Denver, Colorado, addressed the Commission on behalf of the applicant, WRD4 Greeley Property, LLC. He provided a brief presentation along with a conceptual site plan that was part of an application in December of 2020, pointing out a couple of changes from the previous site plan. In response to Commissioner Modlin's question, Mr. Savela advised that the PUD calls for a minimum 25-foot setback and landscape area and stated that the applicant revised and relocated one of the tracts to push some of the lots a little further from Highway 34. He added that there is a fair amount of grade coming down from Highway 34 to the lots that also provides protection from noise and traffic. Mr. Savela described a revision to the conceptual site plan that relocated the park area toward the east to allow access from single-family, multi-family and future commercial areas.

Commissioner Modlin expressed that landscaping did not seem to provide sufficient buffering from traffic along Highway 34 and asked if there were plans to create berms that might mitigate noise and slow any traffic that might exit the highway. Mr. Savela described the setbacks and buffering detailed on the site plan. Mark Nemger, architect on the project, added that the landscape plan includes a buffer between residential and commercial and requires several trees and shrubs providing intense buffering along that area. Mr. Nemger noted that the corner of the project drops below the highway and that trees will be planted close to the highway to provide screening of homes. Commissioner Franzen suggested that part of the concern expressed by Commissioner Modlin was to include berming for safety. Commissioner Modlin agreed and asked whether trees would provide enough of a buffer for an automobile that might come down the embankment. Mr. Savela pointed out an area within the Highway 34 right-of-way that has a slight elevation before moving down toward the proposed subdivision.

Commissioner Carlson observed that the multi-family portion backs to a detention area and asked the applicant to describe any safety features around the detention pond. Mr. Savela advised that the multi-family project is part of the next item on the agenda and could be addressed during that presentation. He stated that the pond has a trail around it and is currently envisioned as an open tract.

Chair Pro Tem Schulte opened the public hearing at 1:48 p.m.

Jim Ells, 6919 23rd Street, Greeley, addressed the Commission and noted that he also resides part time at the farm located at 2436 71st Avenue just north of the project. Mr. Ells requested confirmation that materials he provided to staff had been forwarded to the Commission. He provided a brief history and stated that he provided a water and sewer easement to Westgate Development in 2015. Mr. Ells stated that the information provided at that time showed single-family development where multi-family is now proposed. Mr. Ells reported a conversation with Planning staff where he was advised that the proposal was to amend density and building heights with no mention of multi-family on the site. He stated that a conversation about 25th Street began several months ago and was not part of the original proposal. Mr. Ells also expressed concerns about safety due to increased traffic at 71st Avenue and Highway 34 and disagreed with the analysis in the traffic report. He asserted and articulated his rights as a property owner and asked the Commission to grant a delay before making a decision.

Cortney Walker, 2430 71st Avenue, addressed the Commission and echoed some of the statements made by Mr. Ells. He also disagreed with the traffic analysis and expressed concerns about increased traffic along 71st Avenue. Mr. Walker asked about plans for pedestrian access along 71st Avenue.

The public hearing was closed at 1:57 p.m.

Chair Pro Tem Schulte invited staff to address the questions and concerns raised during the public hearing. Mr. Gilbert acknowledged the concerns and advised that the plans had been reviewed by the Colorado Department of Transportation (CDOT), the City Traffic Division, and EDR per the City design criteria and specifications. Regarding construction of 25th Street, he advised that there is no requirement to develop the property to the north of the site, adding that if and when development occurs, the owner would be required to meet City design criteria and specifications. Mr. Gilbert stated that 71st Avenue is a minor arterial that would be connected to by a collector road. He reiterated that once the property to the north is developed, discussions with the owner would take place at that time and options would be explored, adding that completion of the road is just one of several possible options.

Mr. Gilbert reported that in the 2016 transportation impact study, Tract F was envisioned as townhomes, condominiums and multi-family, adding that the Preliminary PUD approved in 2020 was accepted by the Commission and City Council. Mr. Gilbert reported that the current plan generates less site traffic than what was estimated in 2016. He also addressed the comments made about traffic on 28th Street, adding that the Traffic Division has made some improvements at 65th Avenue and 28th Street and that CDOT has plans to develop this intersection in the future.

Regarding a statement about current and future plans, Commissioner Romulo asked Mr. Gilbert to separate the two and asked whether anything being considered today obligates Mr. Ells to complete a roadway or perform any other improvements to his property. Mr. Gilbert acknowledged that there is nothing required of Mr. Ells at this time. Commissioner Romulo referenced a one-page document provided as part of the public comment titled "Westgate Preliminary P.U.D." with a handwritten notation at the top that read "Ells Property" and "No Street." She noted that a table on the document includes notations regarding the property owner's dedicated responsibility and road costs and observed that it could have created confusion about an obligation to pay for a portion of the road. Mr. Gilbert stated that he had not seen anything on the plat being proposed today requiring payment from the property owner to the north. Commissioner Romulo asked Mr. Gilbert to confirm that any future development of the property north of the site would be a decision of the property owner and any requirements as part of any future development would be proposed and discussed at that time. Mr. Gilbert stated that was correct.

Addressing comments about adding multi-family to the proposed plan, Commissioner Romulo noted that the same document provided as part of public comment indicates that it is a Final Plat, adding that some confusion may have been created. Mr. Garrott stated that the next agenda item is for approval of a site plan for the multi-family lot, adding that the current item addresses a second amendment to the original PUD approval. He added that zoning is not changing with the current proposal and that the property has always been envisioned to include some level of multi-family. Mr. Garrott stated that he was not aware of plat notes requiring any obligation by Mr. Ells, adding that any obligations would only come into play in the event Mr. Ells developed his property and wanted to use the road for access.

Upon question by Chair Pro Tem Schulte, Mr. Garrott confirmed that there are no condemnation proceedings taking place with respect to the Ells property for roads or other infrastructure. In response to a question about pedestrian traffic along 71st Avenue, Mr. Gilbert reported that the entire frontage of the property along 71st Avenue will have a detached sidewalk that will act as a trail connecting to the Boomerang Ditch Trail.

Mr. Savela addressed the Commission and acknowledged that 71st Avenue and Highway 34 is a tough intersection. He added that part of developing the site includes a \$1 million capital investment on the west side of 71st that will allow for additional turn lanes. Mr. Savela reported that the proposal is projected to generate approximately \$2 million in traffic impact fees that the City could utilize to improve the intersection. He also noted that the developer had previously estimated some potential costs and communicated those to Mr. Ells in the event he decided to develop his property in the future.

Chair Pro Tem Schulte observed that some of the comments and materials provide by Mr. Ells referenced previous conversations with the applicant and confirmed that the Commission is being asked to determine whether the proposal today meets the City's criteria.

Upon question by Commissioner Franzen, Mr. Garrott stated that no easements are in place on the north or south properties regarding 25th Street Road [sic]. He added that there are no setback restrictions on 25th Street Road [sic] for adjacent properties.

Commissioner Romulo asked what might happen if actual traffic patterns exceed the traffic projections. Mr. Gilbert stated that the traffic analysis provides a conservative estimate and that if actual patterns change in the future, the City would look into it. Becky Safarik, Interim Community Development Director, added that even the best plans are based on best estimates and that many factors can cause things to change over time. She stated that the City is ultimately responsible to make sure that roads are safe and travelable and would address issues as necessary.

Commissioner Franzen moved that, based on the application received and the preceding analysis, the Planning Commission finds that the proposed Westgate Preliminary PUD, Second Amendment meets the requirements in Development Code Section 24-669; and, therefore, recommends approval to City Council. Commissioner Romulo seconded the motion. Motion carried 5-0.

Commissioner Franzen moved that, based on the application received and the preceding analysis, the Planning Commission finds that the proposed Westgate First Filing Final PUD meets the requirements in Development Code Section 24-673; and, therefore, recommends approval to City Council. Commissioner Romulo seconded the motion. Motion carried 5-0.

From: KARTER ELLS <kells2@greeleyschools.org>

Sent: Monday, September 27, 2021 10:00 PM

To: CD Admin Team <CD_Admin_Team@Greeleygov.com>

Subject: [EXTERNAL] West gate development item 6 and 7 unfairness

Hi my name is Karter Ells, And I a 14 years of age

And I would like to voice my objections to what the city is trying to force on my grandpa and plan on my grandpas Jim's farm (Jim Ells's property to the north of the west gate property), And I want to complain about the road because he has to pay a lot of money just for you guys to put a road there, So for you to put a road there would interfere with a lot of plans we had and I would greatly appreciate it if you moved the road to a different spot off his farm. Also, I feel it is unfair to decide to put a road on his farm if you have not bought that land, Or even got his ok to do that. So I feel it is unfair for him, and me as his grandson.

sincerely, Karter Ells

From: KASH ELLS <kells1@greeleyschools.org>

Sent: Monday, September 27, 2021 9:27 PM

To: CD Admin Team <CD_Admin_Team@Greeleygov.com>

Subject: [EXTERNAL] West Gate Development item 6 and 7, Complaint

Hi my name is Kash Ells and I am 15 years old,

I am concerned about the road you are trying to put on my Grampa jims farm(Jim Ells, north of the west gate property), even if it is in the future he still has to pay for it. I spend a lot of time on that farm helping my grandpa grow crops and helping him with other things, and for you to decide that he needs a road on his farm, which at this time he is not planning on building houses or apartments on his property like the people to the south, I feel is very unfair and possibly illegal without his approval. If you would like to continue with this road I think it would only be fair for you to buy the ground that you need or move it off his property.

From: John Sandoval <bear_bouncer@yahoo.com>
Sent: Monday, September 27, 2021 8:46 PM
To: CD Admin Team <CD_Admin_Team@Greeleygov.com>
Subject: [EXTERNAL] The choices...

I'm writing this because I feel that the city has and is over stepping. They (city) come out here and push the people around like bullies. I live out here and my weeds got a little high out by the street. But yet the city let's the weeds just grow at the corner of Hwy 34 and 65th (like a jungle). Why is that?

Now they want to try and push for a road at 2435 71st Ave. (items 6 and 7 on hearing). Be bullies, that is the property of Jim Ells. Which has owned and farmed that property for 26 + years. Why would it be forced upon him to build a road? Now or in the future. Then from my understanding, to have him pay for it.... What? That does not sound right.

John Sandoval

Hello My name is Jim Ells owner of property north of westgate project 2435 71 ave for past 26 years

Timeline

Aug 5 2015 Signed a agreement for water and sewer easements with Westrange Development across my property to feed their project and development with understanding mostly single family land use ,stated in letter Dec 16 2015 and copy of plat also in filing . After which plans had been on hold for years

Sep 23 2020 Received letter from city (Carol Kuhn) followed up with phone call about letter stated it was for amendment to densities listed in approved planning area and increase the building height for commercial ,Carol stated would be many times to review and attend later , because of this statement and covid and state of my health did not attend meeting of Oct 13 2020 planning ,and also city Council Nov 17 2020.

April 13 2021 Jason Ells Had reached out to me to contract Marc Savela (new planner for westgate project) which westrange had all my contracts from past agreements and follow ups that had been send to me in past about everything as if was progressing. Learned about new plans From Marc about new plans that City greeley wanted Road on my property line (south edge) and They would be age to built with just half road on their property and I would have to pay for half on my property in future , which to say least find very unfair and illegal.

Had been in contact with Tom Gilbert with a email dated May 5 2021 voicing my concerns, so He set up a meeting with other city staff Alison Baxter , Tomas , on Zoom was Brittany Hathaway, Mike Garrett and spent a Hour Discussing issues, and what I felt was a better and safer Alternative with use of 74 ave and to be built sooner to route Traffic away 71 ave and hwy 34 which is very Dangerous .

Reasons to Protest plans and Westgate Approval

Law states . Bundle of Legal Rights of a property Owner upon Purchase of a piece property. These include Possession ,Control ,Exclusion, Derivation of income and Disposition .

It had been stated to me Single family would be built next to me or I would have never sold Utility easements to West Range or Now Westgate Development.

Copy of plans first filing 2015 showed that . Multifamily use devalues my property ,

If A road is to be planned or built on My property, My Property needs to be Purchased or go thru Eminent Domain and at this time Does not meet thoses Requirements

With Reguard to My Water Rights and Easement , That run across westgate property the Last 30 years or more I am requesting at this time To Do NOT remove or Alter or change without my Written approval Per Water Rights and Water Laws .

Respectfully Jim Ells

Owner of property At 2435 71 ave , Greeley Colo 80634

email Jime2435@gmail.com

Phone 970- 534-0280

From: Mark Kiefer <mkiefers@gmail.com>

Sent: Tuesday, September 28, 2021 11:20 AM

To: CD Admin Team <CD_Admin_Team@Greeleygov.com>

Subject: [EXTERNAL] Westgate PUD

Hello Commissioners,

In regards to the Westgate PUD that you are reviewing today, I have the following questions and comments.

Why is the adjacent landowner being asked to contribute to a road that the developer needs to complete this project? How will he get a return on his cost?

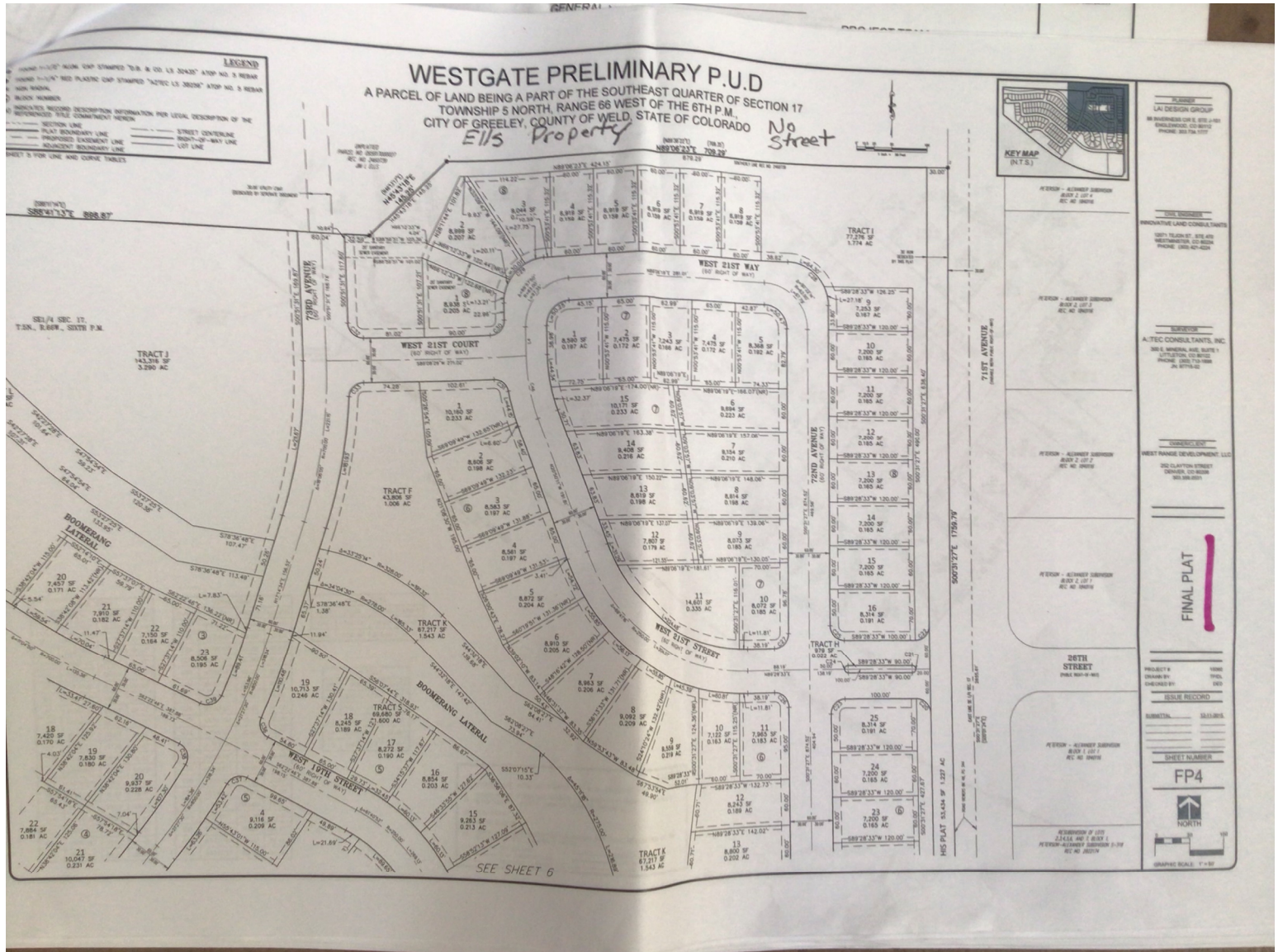
As a resident of Greeley, I object to this plan, because it unfairly puts a burden on a neighbor that does not stand to gain from this development.

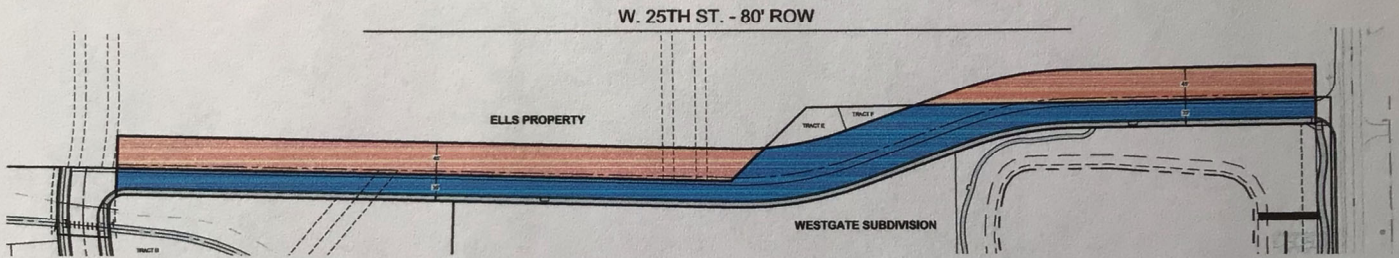
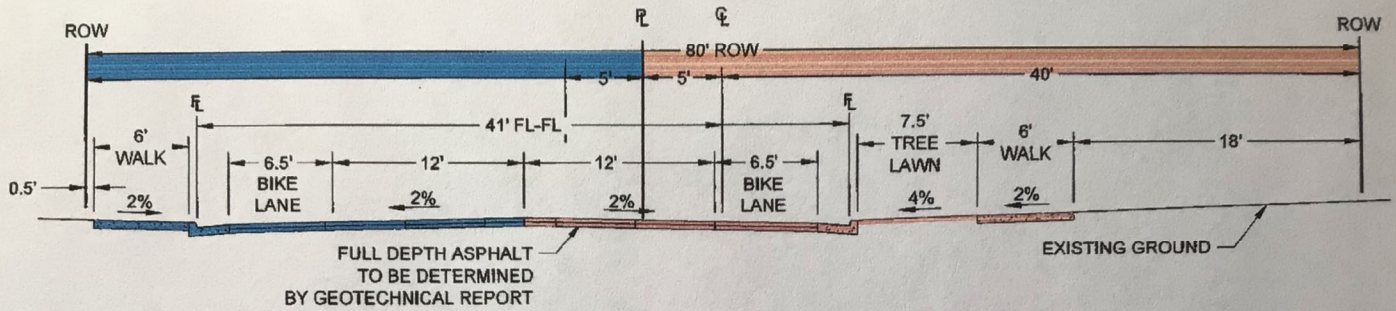
Thank you for your consideration.

Mark Kiefer

970-397-7587

Simplify, Amplify





- ROW ON ELLS PROPERTY
- ROW ON WESTGATE PROPERTY

WEST 25TH ST. - 80' ROW			
PROPERTY OWNER	DEDICATED (SF)	RESPONSIBILITY (%)	ROAD COST (\$)*
Westgate	71,546	55%	\$ 611,954
Ells	59,227	45%	\$ 370,148
TOTAL	130,773	100%	\$ 982,102

ELLS ROAD COST INCLUDE: EARTHWORK, CONCRETE, ASPHALT & LANDSCAPE IN ROW
 WESTGATE COST INCLUDE: GESC, UTILITIES, EARTHWORK, CONCRETE, ASPHALT & LANDSCAPE IN ROW

WESTGATE SUBDIVISION FILING NO. 1

TYPICAL COLLECTOR STREET - ROW ANALYSIS (80'-0" WIDE)

PLANNING COMMISSION SUMMARY

ITEMS: Preliminary/Final PUD (Planned Unit Development)

FILE NUMBER: PUD2020-0002 & PUD2020-0003

PROJECT: Westgate First Filing, Westgate Preliminary PUD 2nd Amendment and Final PUD

LOCATION: Northwest corner of the intersection of US 34 Bypass and 71st Avenue

APPLICANT: Marc Savela on behalf of WRD4 Greeley Property, LLC

CASE PLANNER: Brittany Hathaway, Planner III

PLANNING COMMISSION HEARING DATE: September 28, 2021

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 Section 24-669 and Section 24-673 of the Development Code.

EXECUTIVE SUMMARY

The City of Greeley is considering a request by Marc Savela on behalf of WRD4 Greeley Property, LLC for a Preliminary PUD Amendment and Final PUD on approximately 84.436 acres located north of US 34, west of 71st Avenue, and east of 83rd Avenue for a mixed-use community.

A. REQUEST

The applicant is requesting approval of a Preliminary PUD Amendment and Final PUD to plat 191 single family lots, one multi-family lot, two commercial lots, and 12 tracts for parkland dedication, open space, trails, drainage, utilities, landscape buffering, and future development. This request includes a Preliminary Plat and Final Plat, of which are processed as a combined Preliminary and Final PUD.

Per Section 24-671, combined Preliminary and Final PUD Plans shall be processed and reviewed as a Preliminary Plan under the provisions of Section 24-699, and upon approval, shall be deemed

a Final Plan for the purposes of the provisions of Section 24-673. Combined submittals may be reviewed as separate decisions on both the Preliminary and Final Plans by the City Council.

For the purposes of this staff report, Staff has combined the two projects, which will require two separate motions for a recommendation to City Council.

On November 17, 2020, the City Council approved the Westgate Preliminary PUD First Amendment (see Attachment E). This request for a subdivision is in substantial conformance with the approved Preliminary PUD Plan. All proposed land uses and densities are permitted in the prescribed planning areas. General road layouts are also in conformance with the approved Master Plan.

Minor deviations from the approved Preliminary PUD conceptual plan layout include expansion of the neighborhood park to include a programmed park area, a dog park, ball courts, picnic areas, and a trail. Additionally, one lot located northeast of Tract D was absorbed into the tract to allow for greater spacing between the 34 Bypass, this was in response to concerns expressed from City Council at the time of the Preliminary PUD Amendment. Lastly, Lot 2, a commercial lot, was enlarged to be parallel with Lots 40-46. Buffering would be required at time of development per the approved Preliminary PUD Plan.

Approximately 10.58 acres of parkland would be dedicated to the City of Greeley with the final plat. The remaining required parkland dedication of approximately 2.03 acres would be provided by cash-in-lieu at time of final plat filing.

B. STAFF RECOMMENDATION

Approval

C. LOCATION Abutting Zoning/Land Use:

North: H-A (Holding Agricultural)

South: H-A (Holding Agricultural)

R-E (Residential Estate)

C-L (Commercial Low)

East: H-A (Holding Agricultural)

R-E (Residential Estate)

West: H-A (Holding Agricultural)

Site Characteristics:

The site is largely vacant farm land. The Boomerang Ditch bisects the land running from the northwest toward the southeast, and many trees are present

along its banks. In general, the highest part of the land starts along the US 34 Bypass and then slopes downward toward the northeast. The site is relatively flat on the south and is hilly, with small bluffs on the north.

Surrounding Land Uses:

North: Vacant/Agriculture/Residential

South: Agriculture/Highway

East: Church/Residential

West: Vacant

D. BACKGROUND

The site was originally annexed as part of the West Ridge Area Annexation in 2004. It has historically been used for Agricultural purposes. A small, but active oil and gas facility was previously operating, but has since ceased operations and is now completely abandoned. In 2016, the property was rezoned from Holding Agriculture (H-A) to PUD (Planned Unit Development). The 2016 approved PUD was approved with approximately 80 acres of mixed residential uses and 4 acres of commercial, along with open space and a portion of the regional trail system.

In November 2020, Council approved an amendment to the PUD of which reconfigured the planning area boundaries and allowed for residential uses in PA-4. It also set a maximum number of residential units to 494 where the previous iteration did not specify. Other modifications included the abandonment of oil and gas storage, increased open space requirements, increased parking requirements, and clarified uses and procedures.

The Westgate Metropolitan District was approved in September 2018 (MD2018-0006). The metro district was needed in order to undertake the planning, design, acquisition, construction and financing of public improvements, including external infrastructure.

E. APPROVAL CRITERIA

In reaching recommendations and decisions on Preliminary PUD Plans, the Planning Commission and the City Council shall determine if the rezoning criteria and procedures of Section 24-625 applicable to the rezoning of land have been met.

As this proposal for a Preliminary PUD Amendment is to allow for a subdivision of which is in substantial compliance with the approved Preliminary PUD Plan (Westgate Preliminary PUD 1st Amendment) and not to rezone, this criteria is not applicable.

In reaching recommendations and decisions on Final PUD Plans, the Planning Commission and the City Council shall determine if the Final PUD Plan is in substantial conformance with the approved Preliminary Plan.

This proposal meets this criterion as the Final PUD Plan is in substantial conformance with the approved Preliminary PUD Plan and the proposed Preliminary PUD Plan Amendment (Preliminary Plat).

F. PHYSICAL SITE CHARACTERISTICS

HAZARDS

Staff is unaware of any hazards on the property.

WILDLIFE

The subject site is identified on the Areas of Ecological Significance Map, as an area that could be moderately impacted by development. A biologist report was provided and identified potential development impacts that could be mitigated through a designated open space and park corridor which has been centrally located within the development. This park would contain the Boomerang Ditch and associated riparian areas, along with a large portion of the ecologically significant area.

No threatened or endangered species were found on the site. Overall the site was determined to provide low functioning wetlands and native vegetation.

Although no prairie dog burrows were identified, any found prairie dog colony cannot be removed during the burrowing owl nesting season of May 15 to September 15, without professional confirmation concluding no burrowing owl activity is occurring. Additionally any raptor nests found during construction would result in a halt of said activities until fall or winter, or appropriate protections are enforced.

Development would occur largely outside of the wildlife corridor. Wildlife and areas of ecological significance should not be greatly impacted by the development as currently proposed.

FLOODPLAIN

The property is not located within the 100-year floodplain, according to the adopted Federal Emergency Management Administration (FEMA) flood data.

DRAINAGE AND EROSION

A final drainage report was provided and reviewed by the City.

Increases in stormwater flows from development would be addressed with an on-site detention pond, which would be designed to limit runoff to historical flows. Erosion control measures would be designed by the developer and reviewed by the City at time of construction to ensure that best management practices as utilized as the site is developed.

TRANSPORTATION

The subject property has frontage along the US Highway 34 Bypass and 71st Avenue. No direct access to US Highway 34 Bypass would be allowed; ingress and egress to this site will occur via 71st Avenue. The proposed 27th Street alignment would be designed to eventually connect to the north via 74th Avenue. It is anticipated that connectivity would ultimately extend to the Homestead Heights subdivision (to the north), at which time a potential connection westward could be contemplated.

The applicant has proposed an additional east/west connection (25th Street), on the northern property boundary and has proposed an alternative, interim road cross section. This modified roadway section would function in the interim condition until the property to the north is developed. The applicant has also included the ultimate roadway design for 25th Street in the PUD.

71st Avenue would be widened and a turn lane, along with curb, gutter, and sidewalk improvements would be provided to serve development.

The City of Greeley's Transportation Planner and Traffic Engineer along with CDOT have reviewed the Traffic Study and have no remaining comments.

G. SERVICES

WATER

The City of Greeley provides water services to the area. The applicant proposes to connect to an existing 10" water main located in 71st Avenue to the east and an existing 12" water main located in 74th Avenue to the north.

SANITATION

The City of Greeley provides sanitary sewer services to the area. The applicant proposes to connect to an existing 18" sewer main located in 71st Avenue to the east and an existing 8" sewer main located in 74th Avenue to the north.

EMERGENCY SERVICES

The property is served by the City of Greeley's Police and Fire Departments. Fire Station #5 is located along 47th Avenue approximately 2.7 miles west of Westgate.

PARKS AND OPEN SPACES

A portion of Boomerang Trail would be constructed by the applicant as part of the Westgate Development. The applicant would also provide an easement for future trail construction along Highway 34 Bypass.

SCHOOLS

This proposed development is expected to impact nearby schools in the Weld County School District #6. These include Montfort Elementary (~2.25 miles east), Prairie Heights Middle School (~1.25 miles south), and Greeley Central High School (~5.5 miles east). The applicant would be required to provide cash-in-lieu of land dedication for schools directly to the School District at time of final platting.

METROPOLITAN DISTRICT

The applicant intends to finance many of the on- and off-site improvements for the development by means of a Metropolitan District. This district was approved in 2018.

H. NEIGHBORHOOD IMPACTS

VISUAL

Visual impacts would be mitigated by the use of perimeter landscape treatments and setbacks from the US Highway 34 Bypass. Because the site is adjacent to the Bypass, a major corridor into the City, the applicant would provide an open space tract along Highway 34 Bypass which would also help mitigate the visual impacts.

Buffer yards would be required on the commercial area at the time it is developed. The applicant has proposed tracts to be dedicated for buffer yards with this proposal.

NOISE

Any potential noise created by future development will be regulated by the Municipal Code.

I. PUBLIC NOTICE AND COMMENT

Neighborhood courtesy notices for this meeting were mailed to surrounding property owners within 500 feet on September 17, 2021 and a notice was published in the newspaper per Development Code requirements. A sign was posted on the site on September 16, 2021. As of the finalization of this report no written comments have been received.

J. PLANNING COMMISSION RECOMMENDED MOTIONS

1. Based on the application received and the preceding analysis, the Planning Commission finds that the proposed Westgate Preliminary PUD, Second Amendment meets the requirements in Development Code Section 24-669 and therefore recommends approval to City Council.
2. Based on the application received and the preceding analysis, the Planning Commission finds that the proposed Westgate First Filing Final PUD meets the requirements in Development Code Section 24-673 and therefore recommends approval to City Council.

ATTACHMENTS

Attachment A – Zoning/Vicinity Map

Attachment B – Project Narrative

Attachment C – Westgate Preliminary PUD – 2nd Amendment (Preliminary Plat)

Attachment D – Westgate Final PUD – First Filing (Final Plat)

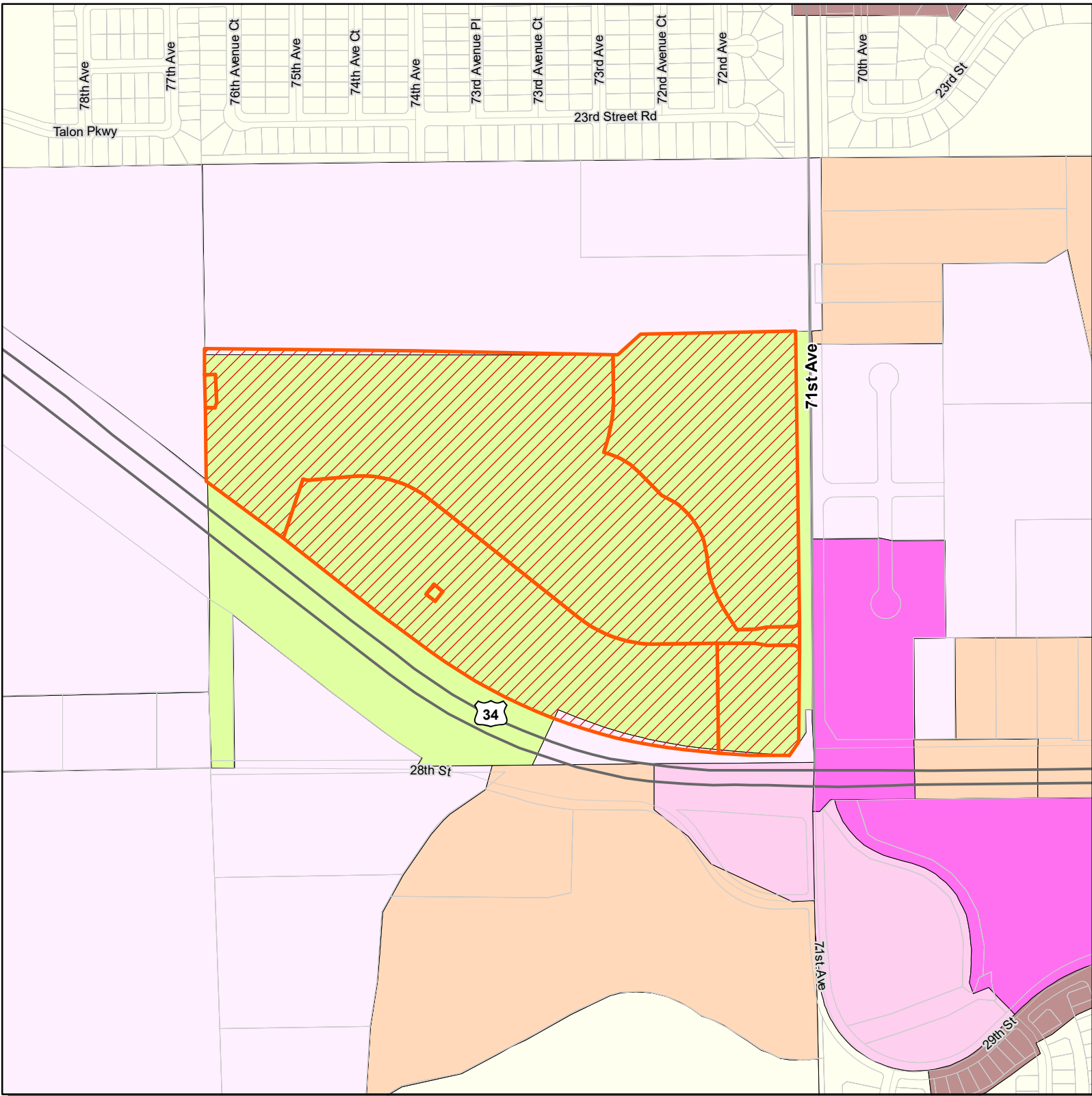
Attachment E – Westgate Preliminary PUD – 1st Amendment (PUD Document)

Vicinity Map Westgate Preliminary and Final PUD (Subdivision)



PUD2020-0002/PUD2020-0003

Zoning Map Westgate Preliminary and Final PUD (Subdivision)



PUD2020-0002/PUD2020-0003

WESTGATE First Filing, Westgate Preliminary PUD 2nd Amendment and Final PUD**File Number: PUD2020-002 & PUD2020-0003**

9.17.21

Project Narrative**Existing Conditions**

The Westgate PUD is located northwest of the intersection of US Highway 34 and 71st Avenue in the City of Greeley, Colorado. It is in the southeast corner of Section 17, Township 5 North, Range 66 West of the Sixth Principal Meridian, City of Greeley, Weld County, Colorado. The project is bounded to the north by undeveloped farmland (Ells property). North of this farmland (Ells Property) is Homestead Heights, a single-family residential development. The west and south are bounded by US Highway 34 with 71st Avenue to the east of the project. The property generally slopes from the south to the north and east with the greatest relief of approximately 70 feet in the northeast corner. The Boomerang Irrigation Ditch flows from southeast corner of the property to the northwest corner.

Zoning/Platting

The site is currently zoned as PUD, pursuant to the Westgate Preliminary PUD 1st Amendment Prelim.

This Preliminary PUD 2nd Amendment (Preliminary Plat) and Final PUD (Final Plat) establish detailed locations with PA's 1-4 of lots, tracts, and public rights of way. The plats request the approval of 191 single family lots (located within PA 1 and PA 3), 1 lot for multi-family (located within PA 2) and two lots for commercial development (Located with PA 3 and PA 4). The lot sizes and uses are consistent with the approved uses and criteria established by the 1st Amendment. Additionally, the plats request approval of 12 tracts for parkland dedications, open space, trail, drainage, utilizes, landscape buffering, and future development.

Minor deviations from the approved Preliminary PUD conceptual plan layout include expansion of the neighborhood park, which is located in the center of the project and would be programmed with a dog park, ball courts, picnic areas, and a trail. Additionally, one lot located north of Tract D was absorbed into the tract to allow for greater spacing between the 34 Bypass, this was in response to concerns expressed from City Council. Lastly, Lot 2, a commercial lot, was enlarged to be parallel with Lots 30-40. Buffering would be required at time of development per the approved Preliminary PUD Plan.

Approximately 10.58 acres of parkland would be dedicated to the City of Greeley with the final plat. The remaining required parkland dedication of approximately 2.03 acres would be provided by cash-in-lieu at time of final plat filing

WESTGATE FIRST FILING
PRELIMINARY PLAT AND 2ND PUD AMENDMENT
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS. AND 12 TRACTS
PUD2020-0002

Attachment C

LEGAL DESCRIPTION:

WRD4 GREELEY PROPERTY LLC, BEING THE SOLE OWNER(S) IN FEE OF THE FOLLOWING DESCRIBED PARCEL,
COMMENCING AT THE SOUTHEAST CORNER OF SAID SECTION 17 AND CONSIDERING THE EAST LINE OF SAID SOUTHEAST QUARTER TO BEAR NORTH 00°31'27" WEST, BETWEEN MONUMENTATION AS SHOWN HEREON, WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO:

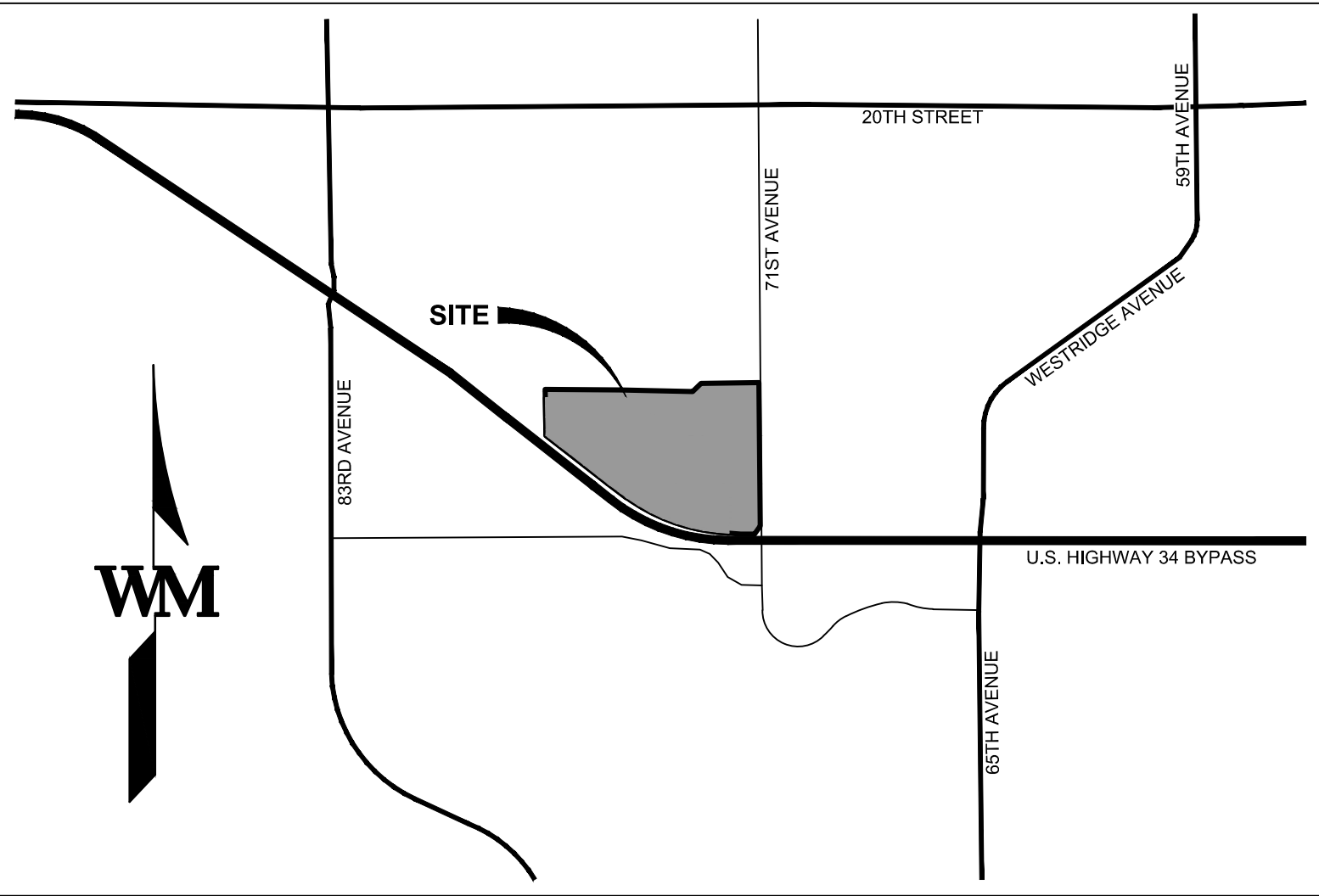
THENCE NORTH 13°32'21" WEST, A DISTANCE OF 133.21 FEET TO THE NORTHERLY RIGHT-OF-WAY LINE OF U.S. HIGHWAY 34 RECORDED AT RECEPTION NUMBER 1514421 IN THE RECORDS OF THE WELD COUNTY CLERK AND RECORDER'S OFFICE; NORTHERLY **POINT OF BEGINNING**;

THENCE ALONG SAID NORTHERLY RIGHT-OF-WAY THE FOLLOWING SIX COURSES:

- 1) SOUTH 34°32'08" WEST, A DISTANCE OF 122.00 FEET;
- 2) SOUTH 89°25'42" WEST, A DISTANCE OF 169.15 FEET;
- 3) NORTH 85°28'06" WEST, A DISTANCE OF 297.41 FEET TO A NON-TANGENT CURVE TO THE RIGHT;
- 4) ALONG SAID NON-TANGENT CURVE HAVING A CENTRAL ANGLE OF 29°57'28", A RADIUS OF 2,292.00 FEET, AN ARC LENGTH OF 1,198.40 FEET AND A CHORD THAT BEARS NORTH 68°57'58" WEST, A DISTANCE OF 1,184.79 FEET TO A POINT OF NON-TANGENCY;
- 5) NORTH 53°28'54" WEST, A DISTANCE OF 293.39 FEET;
- 6) NORTH 51°54'28" WEST, A DISTANCE OF 955.00 FEET TO SAID WESTERLY LINE OF SAID SOUTHEAST QUARTER;

THENCE NORTH 00°53'35" WEST ALONG SAID WEST LINE, A DISTANCE OF 566.68 FEET
THENCE SOUTH 89°20'07" EAST DEPARTING SAID WESTERLY LINE, A DISTANCE OF 908.84 FEET;
THENCE SOUTH 88°41'32" EAST, A DISTANCE OF 898.95 FEET;
THENCE NORTH 45°45'24" EAST, A DISTANCE OF 144.90 FEET;
THENCE NORTH 89°04'34" EAST, A DISTANCE OF 709.53 FEET TO A LINE 30 FEET WESTERLY OF AND PARALLEL WITH THE EAST LINE OF SAID SOUTHEAST QUARTER;
THENCE SOUTH 00°31'27" EAST ALONG SAID PARALLEL LINE, A DISTANCE OF 1,760.06 FEET TO THE **POINT OF BEGINNING**;

SAID PARCEL CONTAINS AN AREA OF 3,678.033 SQUARE FEET, OR 84.436 ACRES, MORE OR LESS.



VICINITY MAP
1" = 2000'

STANDARD NOTES:

STREET MAINTENANCE: IT IS MUTUALLY UNDERSTOOD AND AGREED THAT THE DEDICATED ROADWAYS SHOWN ON THIS PLAT WILL NOT BE MAINTAINED BY THE CITY UNTIL AND UNLESS THE STREETS ARE CONSTRUCTED IN ACCORDANCE WITH THE SUBDIVISION REGULATIONS IN EFFECT AT THE DATE CONSTRUCTION PLANS ARE APPROVED, AND PROVIDED THAT CONSTRUCTION OF SAID ROADWAY(S) IS STARTED WITHIN ONE (1) YEAR OF THE CONSTRUCTION PLAN APPROVAL. THE OWNER(S), DEVELOPER(S) AND/OR SUBDIVIDERS, THEIR SUCCESSORS AND/OR ASSIGNS IN INTEREST, SHALL BE RESPONSIBLE FOR STREET MAINTENANCE UNTIL SUCH TIME AS THE CITY ACCEPTS THE RESPONSIBILITY FOR MAINTENANCE AS STATED ABOVE.

DRIVES, PARKING AREAS AND UTILITY EASEMENTS MAINTENANCE: THE OWNERS OF THIS SUBDIVISION, THEIR SUCCESSORS AND/OR ASSIGNS IN INTEREST, THE ADJACENT PROPERTY OWNER(S), HOMEOWNERS' ASSOCIATION OR OTHER ENTITY OTHER THAN THE CITY IS RESPONSIBLE FOR MAINTENANCE AND UPKEEP OF ANY AND ALL DRIVES, PARKING AREAS AND EASEMENTS (CROSS-ACCESS EASEMENTS, DRAINAGE EASEMENTS, ETC.)

DRAINAGE MAINTENANCE: THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR MAINTENANCE OF ALL DRAINAGE FACILITIES INSTALLED PURSUANT TO THE DEVELOPMENT AGREEMENT. REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO, MAINTAINING THE SPECIFIED STORM WATER DETENTION/RETENTION VOLUMES, MAINTAINING OUTLET STRUCTURES, FLOW RESTRICTION DEVICES AND FACILITIES NEEDED TO CONVEY FLOW TO SAID BASINS. THE CITY SHALL HAVE THE RIGHT TO ENTER PROPERTIES TO INSPECT SAID FACILITIES AT ANY TIME. IF THESE FACILITIES ARE NOT PROPERLY MAINTAINED, THE CITY SHALL NOTIFY THE PROPERTY OWNER IN WRITING AND SHALL INFORM THE OWNER THAT CORRECTIVE ACTION BY THE OWNER SHALL BE REQUIRED WITHIN TEN (10) WORKING DAYS OF RECEIPT OF NOTIFICATION BY THE CITY, UNLESS AN EMERGENCY EXISTS, IN WHICH CASE CORRECTIVE ACTION SHALL BE TAKEN IMMEDIATELY UPON RECEIPT OF NOTIFICATION BY THE CITY. IF THE OWNER FAILS TO TAKE CORRECTIVE ACTION WITHIN TEN (10) WORKING DAYS, THE CITY MAY PROVIDE THE NECESSARY MAINTENANCE AND ASSESS THE MAINTENANCE COST TO THE OWNER OF THE PROPERTY.

DRAINAGE LIABILITY: THE CITY DOES NOT ASSUME ANY LIABILITY FOR DRAINAGE FACILITIES IMPROPERLY DESIGNED OR CONSTRUCTED. THE CITY REVIEWS DRAINAGE PLANS BUT CANNOT, ON BEHALF OF ANY APPLICANT, OWNER OR DEVELOPER, GUARANTEE THAT FINAL DRAINAGE DESIGN REVIEW AND APPROVAL BY THE CITY WILL RELIEVE SAID PERSON, HIS SUCCESSORS AND ASSIGNS, FROM LIABILITY DUE TO IMPROPER DESIGN. CITY APPROVAL OF A FINAL PLAT DOES NOT IMPLY APPROVAL OF THE DRAINAGE DESIGN WITHIN THAT PLAT.

LANDSCAPE MAINTENANCE: THE OWNERS OF THIS SUBDIVISION, THEIR SUCCESSORS AND/OR ASSIGNS IN INTEREST, THE ADJACENT PROPERTY OWNER(S), HOMEOWNERS' ASSOCIATION OR ENTITY OTHER THAN THE CITY IS RESPONSIBLE FOR MAINTENANCE AND UPKEEP OF PERIMETER FENCING OR WALLS, LANDSCAPING AND LANDSCAPED AREAS AND SIDEWALKS BETWEEN THE PROPERTY LINE AND ANY PAVED ROADWAYS. THE OWNERS OF THIS SUBDIVISION, THEIR SUCCESSORS AND/OR ASSIGNS IN INTEREST OR AN ENTITY OTHER THAN THE CITY, AGREE TO THE RESPONSIBILITY OF MAINTAINING ALL OTHER OPEN SPACE AREAS ASSOCIATED WITH THIS DEVELOPMENT.

SIGHT DISTANCE: THE CLEAR VISION ZONE OF A CORNER LOT, AS DETERMINED BY SECTION 18.44.090(B)(1) OF THE DEVELOPMENT CODE, SHALL BE FREE FROM SHRUBS, GROUND COVERS, BERMS, FENCES, SIGNS, STRUCTURES, PARKED VEHICLES OR OTHER MATERIALS OR ITEMS GREATER THAN THIRTY-SIX (36) INCHES IN HEIGHT FROM THE STREET LEVEL.

PUBLIC SAFETY: ACCESS, WHETHER FOR EMERGENCY OR NONEMERGENCY PURPOSES, IS GRANTED OVER AND ACROSS ALL ACCESS WAYS FOR POLICE, FIRE AND EMERGENCY VEHICLES. IF ANY OR ALL OF THE ACCESS WAYS IN THIS SUBDIVISION ARE PRIVATE, THE HOMEOWNERS' ASSOCIATION WILL BE RESPONSIBLE FOR ENSURING THAT SUCH ACCESS WAYS ARE PASSABLE, AT ALL TIMES, FOR POLICE, FIRE AND EMERGENCY VEHICLES.

DRAINAGE MASTER PLAN: THE POLICY OF THE CITY REQUIRES THAT ALL NEW DEVELOPMENT AND REDEVELOPMENT SHALL PARTICIPATE IN THE REQUIRED DRAINAGE IMPROVEMENTS AS SET FORTH BELOW:

- 1) DESIGN AND CONSTRUCT THE LOCAL DRAINAGE SYSTEM AS DEFINED BY THE FINAL DRAINAGE REPORT AND PLAN AND THE STORM WATER MANAGEMENT PLAN.
- 2) DESIGN AND CONSTRUCT THE CONNECTION OF THE SUBDIVISION DRAINAGE SYSTEM TO A DRAINAGE WAY OF ESTABLISHED CONVEYANCE CAPACITY, SUCH AS A MASTER PLANNED OUTFALL STORM SEWER OR MASTER PLANNED MAJOR DRAINAGE WAY. THE CITY WILL REQUIRE THAT THE CONNECTION OF THE MINOR AND MAJOR SYSTEMS PROVIDE CAPACITY TO CONVEY ONLY THOSE FLOWS (INCLUDING OFFSITE FLOWS) LEAVING THE SPECIFIC DEVELOPMENT SITE. TO MINIMIZE OVERALL CAPITAL COSTS, THE CITY ENCOURAGES ADJACENT DEVELOPMENTS TO JOIN IN DESIGNING AND CONSTRUCTING CONNECTION SYSTEMS. ALSO, THE CITY MAY CHOOSE TO PARTICIPATE WITH A DEVELOPER IN THE DESIGN AND CONSTRUCTION OF THE CONNECTION SYSTEM.
- 3) EQUITABLE PARTICIPATION IN THE DESIGN AND CONSTRUCTION OF THE MAJOR DRAINAGE WAY SYSTEM THAT SERVES THE DEVELOPMENT AS DEFINED BY ADOPTED MASTER DRAINAGE WAY PLANS OR AS REQUIRED BY THE CITY AND DESIGNATION IN THE FINAL DRAINAGE REPORT AND THE STORM WATER MANAGEMENT PLAN.

MAINTENANCE EASEMENTS: A MAINTENANCE EASEMENT IS REQUIRED FOR DEVELOPMENTS WITH ZERO SIDE SETBACKS, IF ONE (1) STRUCTURE IS BUILT ON THE LOT LINE. IN ORDER TO MAINTAIN THE STRUCTURE WITH THE ZERO SIDE SETBACK, A MAINTENANCE EASEMENT MAY BE REQUIRED ON THE ADJACENT LOT TO ENABLE MAINTENANCE TO BE PERFORMED ON SAID STRUCTURE FROM THE ADJOINING PROPERTY. EACH LOT OWNER AGREES TO ALLOW ADJACENT LOT OWNERS ACCESS ACROSS THEIR LOT, WITHIN FIVE (5) FEET OF THE COMMON LOT LINE, AS MAY BE NEEDED TO MAINTAIN AND REPAIR THE ADJACENT OWNER'S PRINCIPAL STRUCTURE. EACH ADJACENT OWNER AGREES TO REPAIR ANY DAMAGE WHICH MAY BE CAUSED TO THE LOT OWNER'S PROPERTY FROM THE ADJACENT OWNER'S USE OF THIS MAINTENANCE EASEMENT AND TO TAKE ALL NECESSARY STEPS TO AVOID CAUSING SUCH DAMAGE.

STREET LIGHTING: ALL LOTS ARE SUBJECT TO AND BOUND BY TARIFFS WHICH ARE NOW AND MAY IN THE FUTURE BE FILED WITH THE PUBLIC UTILITIES COMMISSION OF THE STATE OF COLORADO RELATING TO STREET LIGHTING IN THIS SUBDIVISION, TOGETHER WITH RATES, RULES AND REGULATIONS THEREIN PROVIDED AND SUBJECT TO ALL FUTURE AMENDMENTS AND CHANGES THERETO. THE OWNERS OR THEIR SUCCESSORS AND/OR ASSIGNS IN INTEREST, SHALL PAY, AS BILLED, A PORTION OF THE COST OF PUBLIC STREET LIGHTING IN THE SUBDIVISION IN ACCORDANCE TO APPLICABLE RATES, RULES AND REGULATIONS, INCLUDING FUTURE AMENDMENTS AND CHANGES ON FILE WITH THE PUBLIC UTILITIES COMMISSION.

WATER OR SEWER MAIN EASEMENTS: THERE SHALL BE NO PERMANENT STRUCTURES, FENCES, DETENTION PONDS, LANDSCAPING (PLANTINGS OR BERMS) GREATER THAN THREE (3) FEET TALL MATURE GROWTH, OR OTHER ENCUMBRANCES LOCATED IN WATER OR SEWER MAIN EASEMENTS.

WATER OR SEWER MAINS IN PRIVATE ROADS OR EASEMENTS: FOR PUBLIC WATER AND SEWER MAINS LOCATED IN PRIVATE ROADS OR EASEMENTS, FUTURE REPAIR OF PAVING OR OTHER IMPROVED SURFACES SUBSEQUENT TO THE REPAIR OF A WATER OR SEWER MAIN SHALL BE THE RESPONSIBILITY OF THE HOMEOWNERS' OR CONDOMINIUM ASSOCIATION. THE WATER AND SEWER DEPARTMENT WILL SAFELY BACKFILL THE TRENCH TO THE SURFACE, BUT NOT REBUILD ANY SURFACE IMPROVEMENTS.

MINIMUM WATER PRESSURE: PART OF THIS PROPERTY SITS IN CITY OF GREELEY WATER PRESSURE ZONE 4. AS SUCH, ADDITIONAL REQUIREMENTS MAY BE NECESSARY TO ENSURE THAT MINIMUM WATER PRESSURE, MINIMUM FIRE FLOWS, AND ALL OTHER PERTINENT CITY OF GREELEY CRITERIA ARE MET.

VEGETATED MEDIAN: MAINTENANCE OF VEGETATED MEDIAN IS THE RESPONSIBILITY OF THE METRO DISTRICT.

RAW WATER DEDICATION: THE RAW WATER DEDICATION FOR THE RESIDENTIAL PORTION OF THIS PLAT HAS BEEN SATISFIED. TRACTS J, K AND L ARE ALLOCATED 3 AC-FT/PER ACRE TOTALLING 1.56 AC-FT. BLOCK 8, LOT 1 AND LOT 2 ARE ALLOCATED 3.86 AC-FT/PER ACRE TOTALLING 25.6 AC-FT

PRELIMINARY PLANNED UNIT DEVELOPMENT CERTIFICATION BLOCK

THIS PRELIMINARY PLANNED UNIT DEVELOPMENT (PUD) HAS BEEN REVIEWED AND FOUND TO BE COMPLETE AND IN ACCORDANCE WITH THE CITY OF GREELEY DEVELOPMENT CODE REGULATIONS. THIS PRELIMINARY PLANNED UNIT DEVELOPMENT APPROVAL SHALL BE VALID FOR 3 YEARS FROM THE DATE OF THE APPROVAL BY CITY COUNCIL.

WRD4 GREELY PROPERTY, LLC, A COLORADO LIMITED LIABILITY COMPANY

BY: _____
(SIGNATURE)

TITLE: _____

DATE: _____

ENGINEERING DEVELOPMENT REVIEW AND CIVIL INSPECTIONS MANAGER CERTIFICATE:

CONSTRUCTION MUST BE IN ACCORDANCE WITH APPLICABLE CITY OF GREELEY CONSTRUCTION STANDARDS. THE CITY'S ACCEPTANCE SHALL NOT RELIEVE THE DESIGN ENGINEER'S RESPONSIBILITY FOR ERRORS, OMISSIONS, OR DESIGN DEFICIENCIES FOR WHICH THE CITY IS HELD HARMLESS

ACCEPTED BY: _____
ENGINEERING DEVELOPMENT REVIEW/CIVIL INSPECTIONS MANAGER DATE _____

CITY COUNCIL APPROVAL

APPROVED BY THE GREELEY CITY COUNCIL ON THIS ____ DAY OF _____, 20____.

PLANNING COMMISSION RECOMMENDATION

RECOMMENDED / NOT RECOMMENDED BY THE CITY OF GREELEY PLANNING COMMISSION, THIS ____ DAY OF _____, 20____.

COMMUNITY DEVELOPMENT DIRECTOR

DIRECTOR OF COMMUNITY DEVELOPMENT DATE _____

TRACT SUMMARY

TRACT	PURPOSE	AREA (SF)	AREA (AC)	MAINTENANCE	OWNER
A	DRAINAGE, PARK & OPEN SPACE	121,637	2.79	CITY OF GREELEY	CITY OF GREELEY
B	PARK AND OPEN SPACE	399,148	7.79	CITY OF GREELEY	CITY OF GREELEY
C	OPEN SPACE	13,108	0.30	METRO DISTRICT	METRO DISTRICT
D	DRAINAGE, OPEN SPACE	231,643	5.32	METRO DISTRICT	METRO DISTRICT
E	FUTURE DEVELOPMENT	3,424	0.08	METRO DISTRICT	METRO DISTRICT
F	FUTURE DEVELOPMENT	1,715	0.04	METRO DISTRICT	METRO DISTRICT
G	DRAINAGE, TRAIL & NON-POTABLE WATER STORAGE	206,525	4.74	CITY OF GREELEY	CITY OF GREELEY
H	LANDSCAPE BUFFER	15,313	0.35	DEVELOPER	DEVELOPER
J	LANDSCAPE BUFFER	15,858	0.36	DEVELOPER	DEVELOPER
K	LANDSCAPE BUFFER	2,310	0.05	DEVELOPER	DEVELOPER
L	LANDSCAPE BUFFER	4,486	0.10	DEVELOPER	DEVELOPER
M	LANDSCAPE BUFFER	2,202	0.05	METRO DISTRICT	METRO DISTRICT
12 TRACTS		1,017,369	21.97		

NOTE: TRACT "I" INTENTIONALLY OMITTED

OWNER/SUBDIVIDER:
WRD4 GREELEY PROPERTY LLC
252 CLAYTON STREET
DENVER, COLORADO 80206

ENGINEER:
WARE MALCOMB
990 SOUTH BROADWAY, SUITE 230
DENVER, COLORADO 80209

SURVEYOR:
WARE MALCOMB
990 SOUTH BROADWAY, SUITE 230
DENVER, COLORADO 80209

990 south broadway
suite 230
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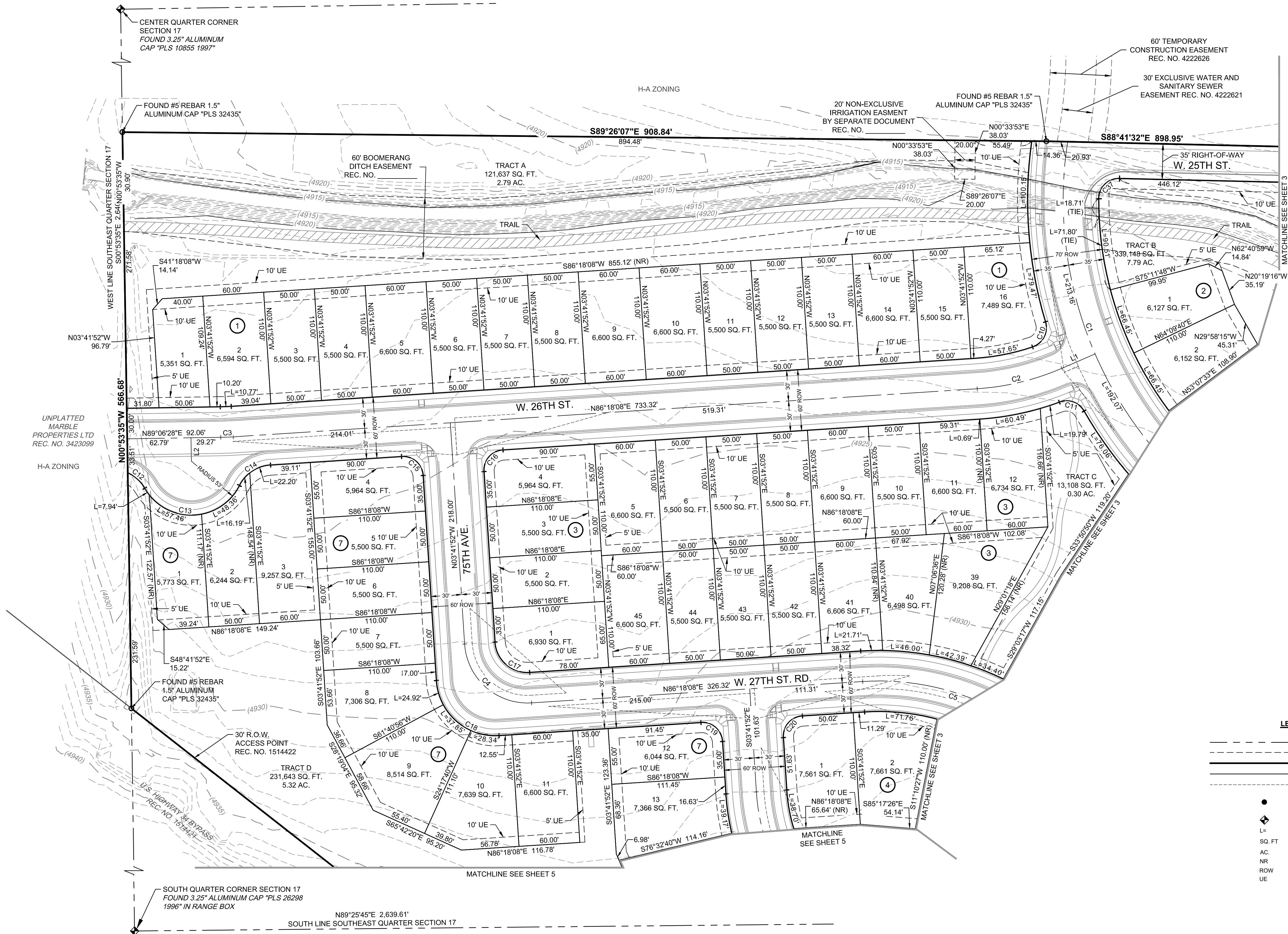
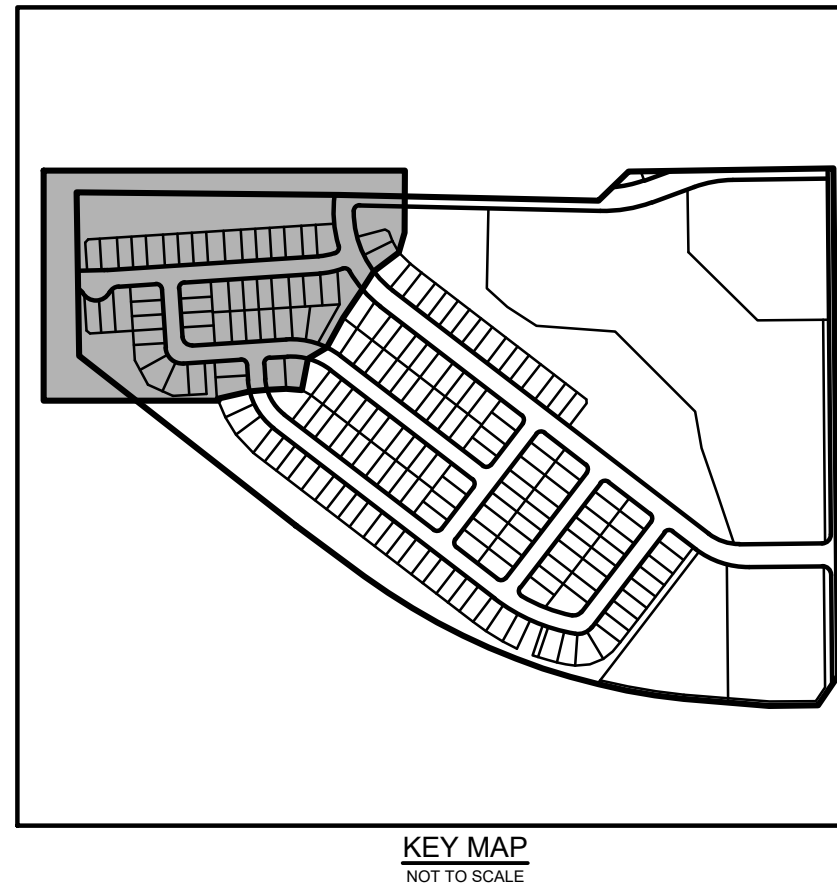
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CIVIL ENGINEERING & SURVEYING

NO.	DATE	REMARKS	NO.	DATE	REMARKS
1	04/23/2021	CITY COMMENTS	5	09/20/2021	CITY COMMENTS
2	07/02/2021	CITY COMMENTS			
3	07/20/2021	UPDATED BENCHMARKS			
4	08/04/2021	CITY COMMENTS			

JOB NO.	DCS19-4021
PA/PM:	JCS
DRAWN:	AJ
DATE:	02/23/2021
SCALE:	

WESTGATE FIRST FILING PRELIMINARY PLAT
AND 2ND PUD AMENDMENT

WESTGATE FIRST FILING
PRELIMINARY PLAT AND 2ND PUD AMENDMENT
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS. AND 12 TRACTS
PUD2020-0002



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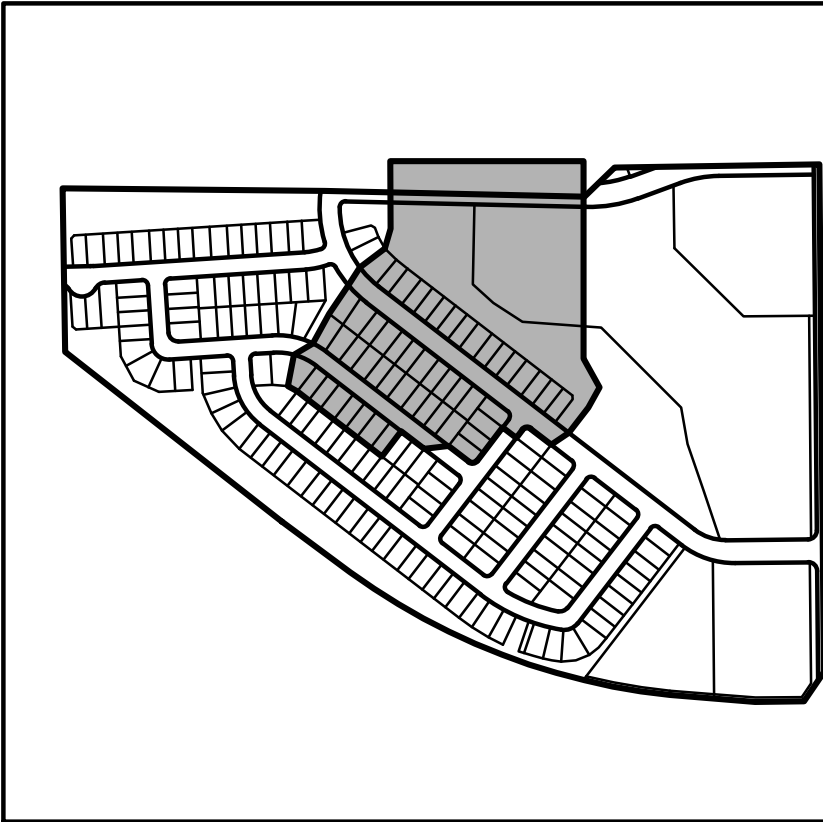
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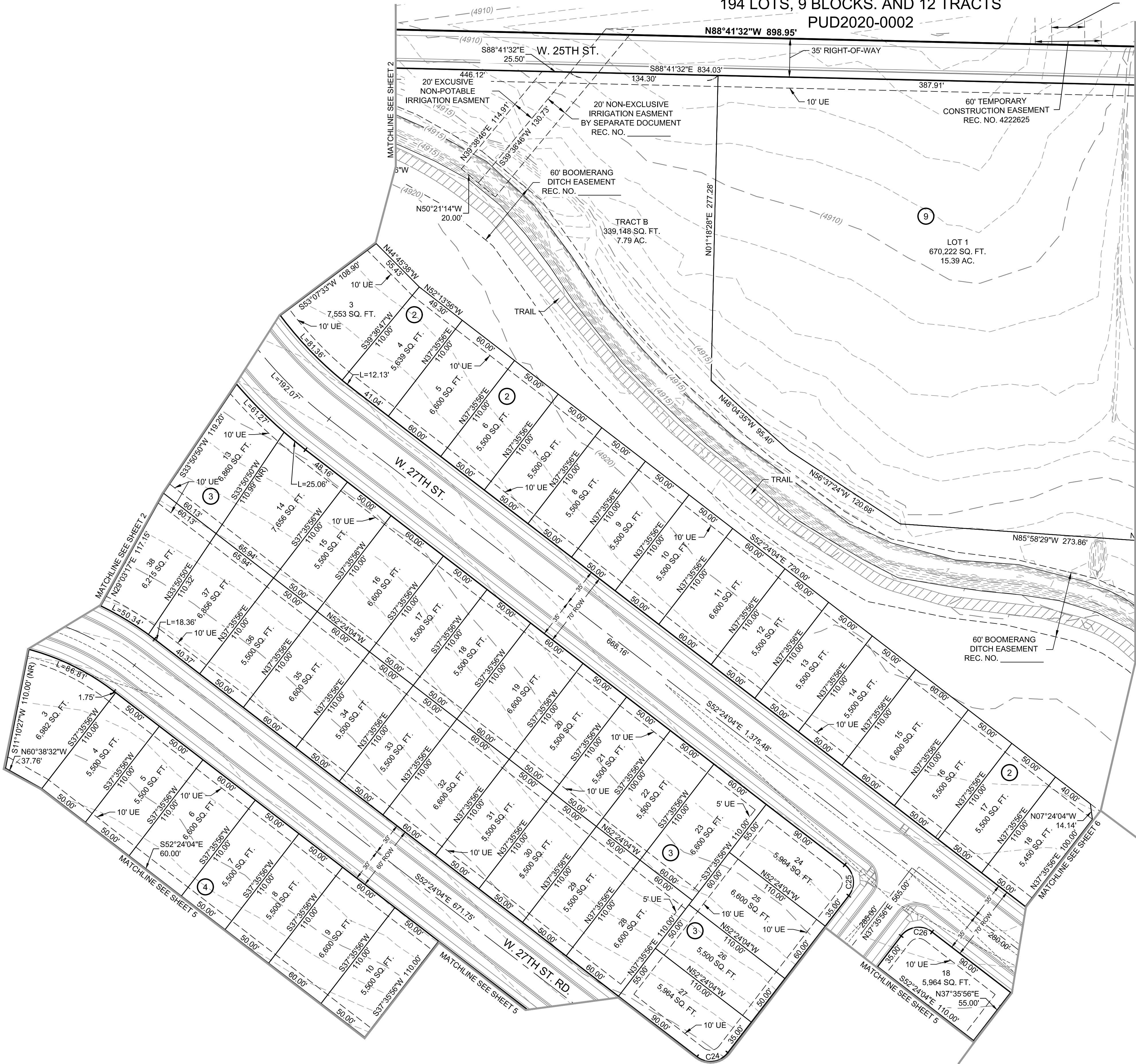
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A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
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194 LOTS, 9 BLOCKS. AND 12 TRACTS
PUD2020-0002

30' EXCLUSIVE SANITARY
SEWER AND WATER
EASEMENT REC. NO.
4222622

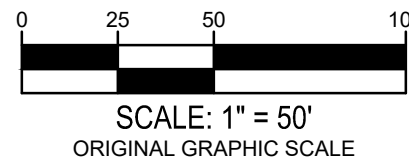
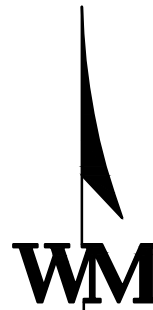


KEY MAP
NOT TO SCALE



LEGEND

- SECTION LINE
- EASEMENT LINE
- SITE BOUNDARY
- PROPOSED LOT LINE
- PROPOSED SITE TRIANGLE
- FOUND NO. 5 REBAR WITH 1.5" ALUMINUM CAP "PLS 32435" UNLESS OTHERWISE NOTED
- SECTION CORNER AS DESCRIBED
- L= DISTANCE OF CURVE
- SQ. FT SQUARE FEET
- AC. ACRES
- NR NON-RADIAL
- ROW RIGHT-OF-WAY
- UE UTILITY EASEMENT



SCALE: 1" = 50'
ORIGINAL GRAPHIC SCALE

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DRAWN: AJ
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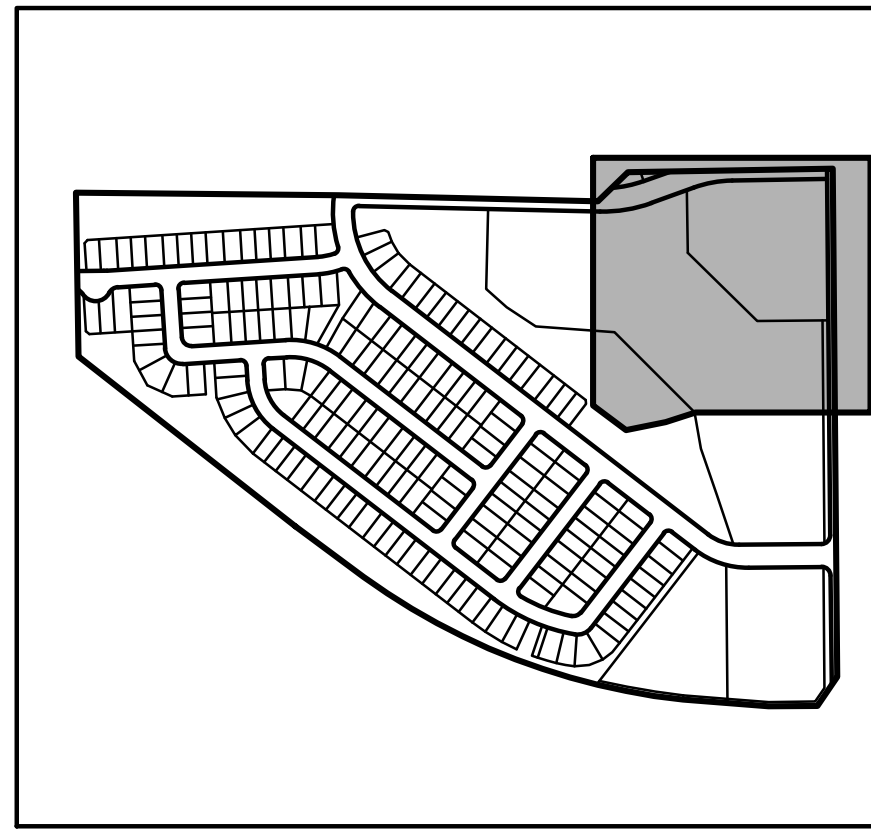
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AND 2ND PUD AMENDMENT

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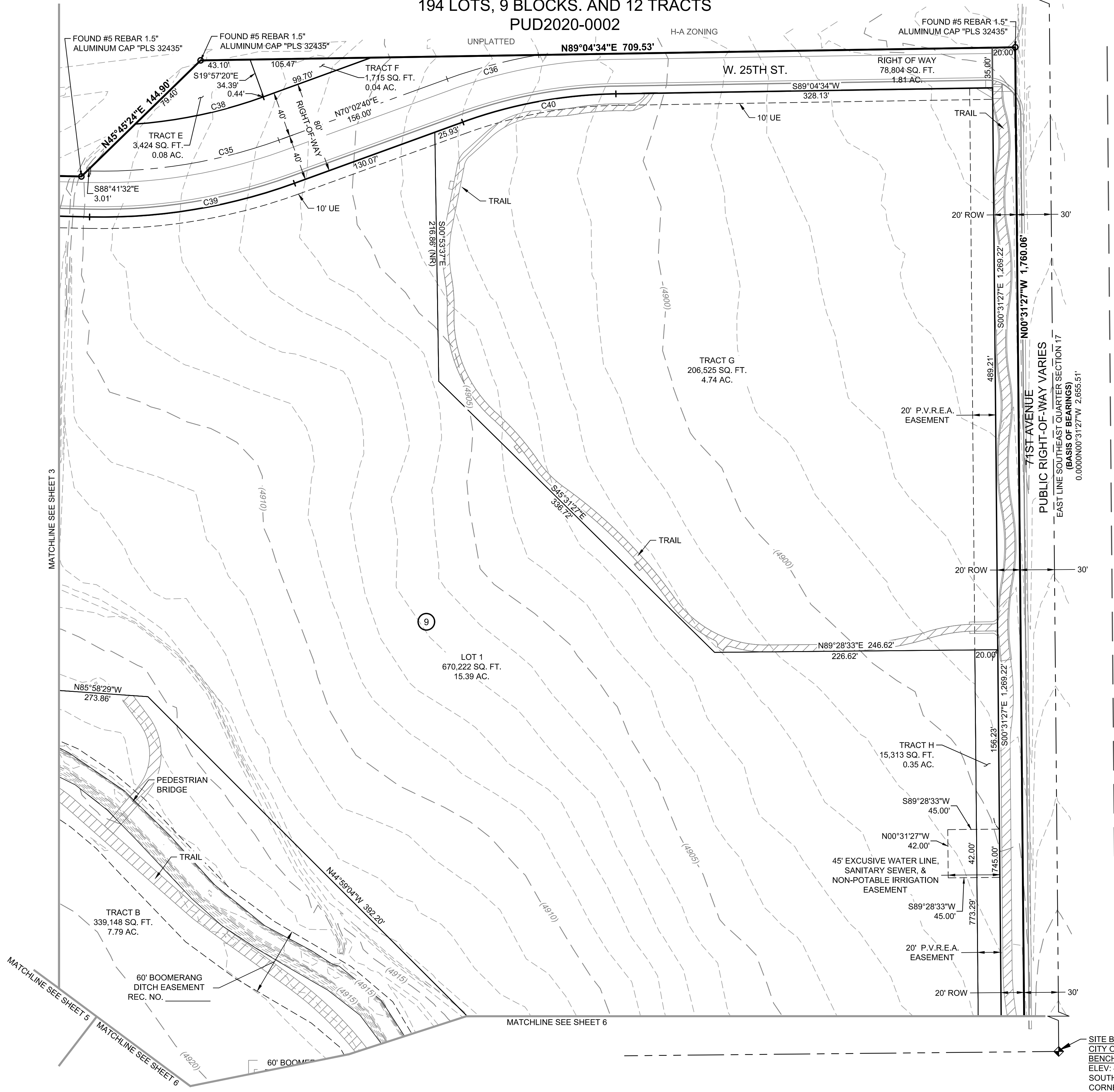
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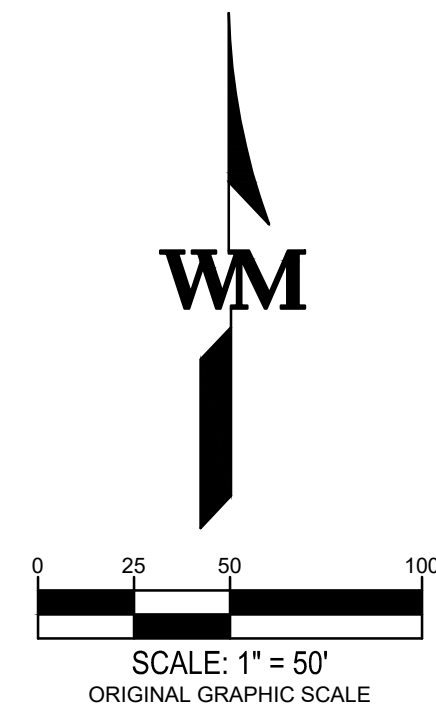
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A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS. AND 12 TRACTS
PUD2020-0002



KEY MAP
NOT TO SCALE



- LEGEND**
- SECTION LINE
 - EASEMENT LINE
 - SITE BOUNDARY
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 - PROPOSED SITE TRIANGLE
 - FOUND NO. 5 REBAR WITH 1.5" ALUMINUM CAP "PLS 32435" UNLESS OTHERWISE NOTED
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 - AC. ACRES
 - NR. NON-RADIAL
 - ROW RIGHT-OF-WAY
 - UE UTILITY EASEMENT



SITE BENCHMARK:
CITY OF GREELEY
BENCHMARK NO. 145
ELEV: 4922.56'
SOUTHEAST QUARTER
CORNER SECTION 17

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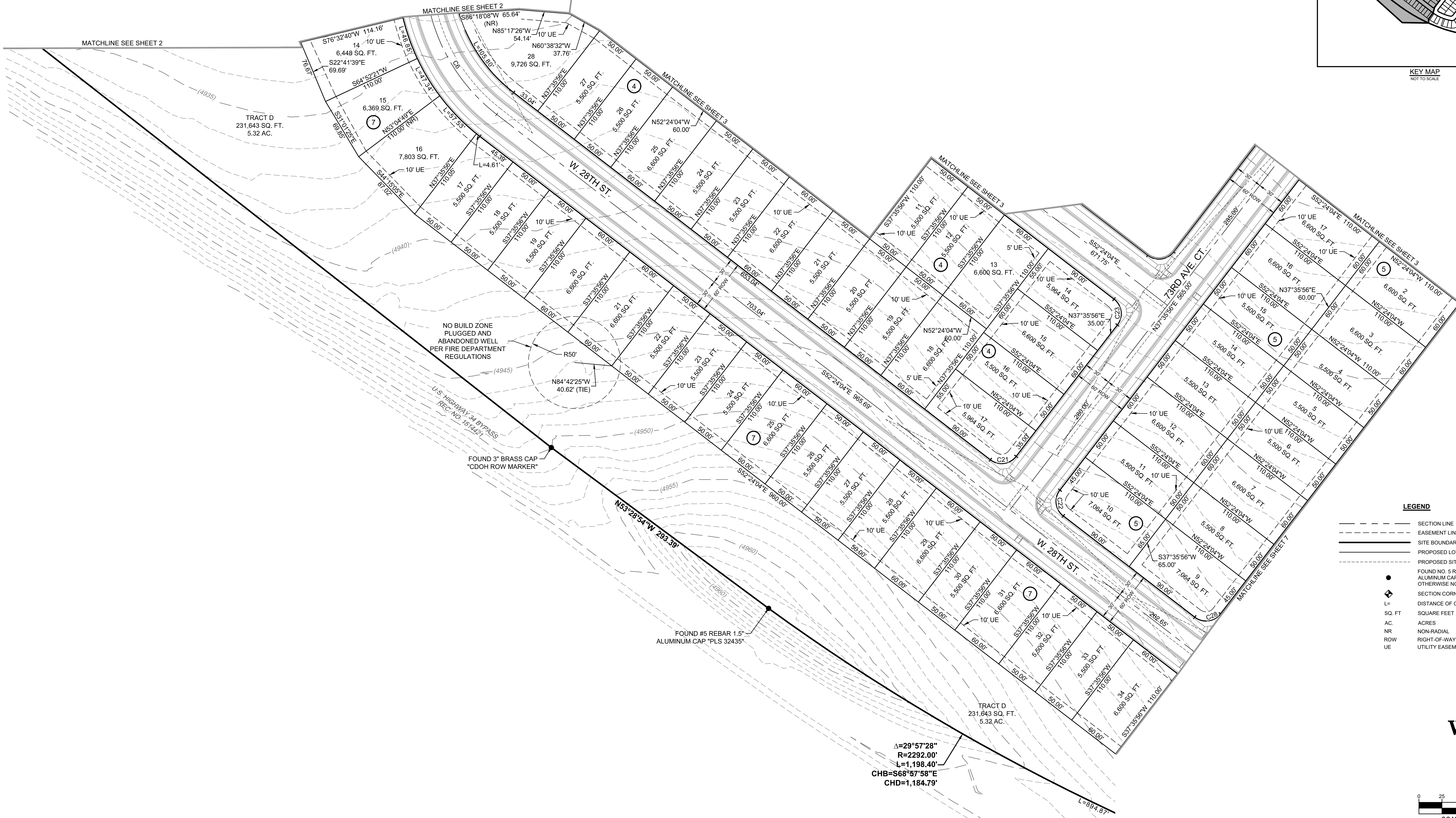
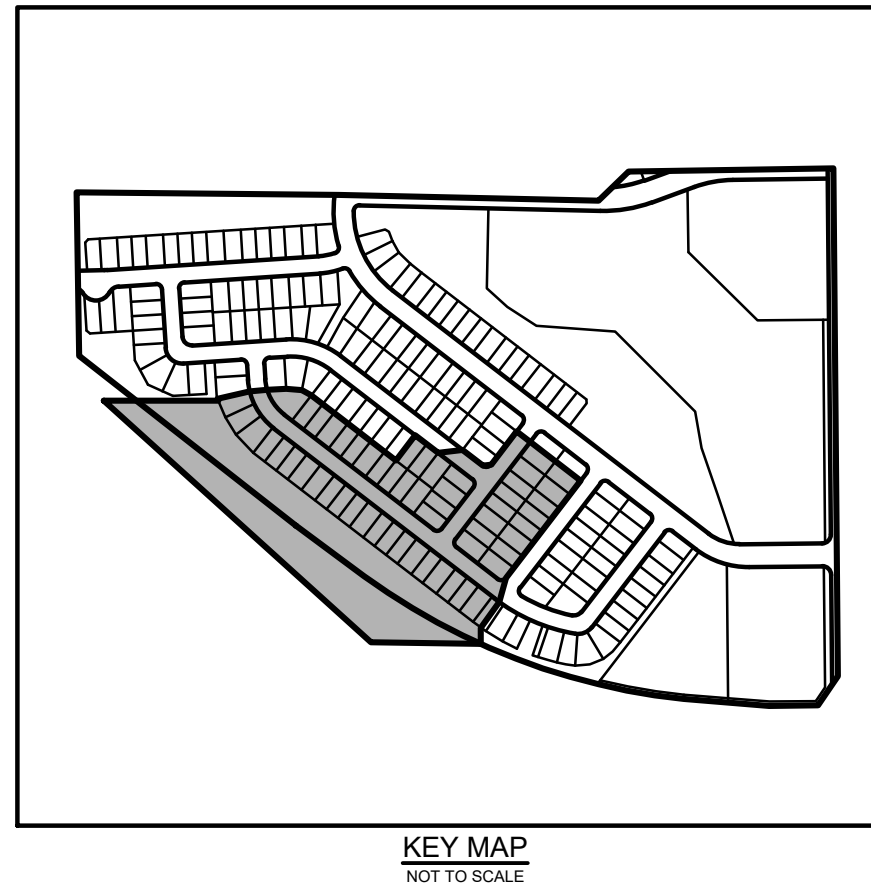
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JOB NO. DCS19-4021
PA/PM: JCS
DRAWN: AJ
DATE: 02/23/2021
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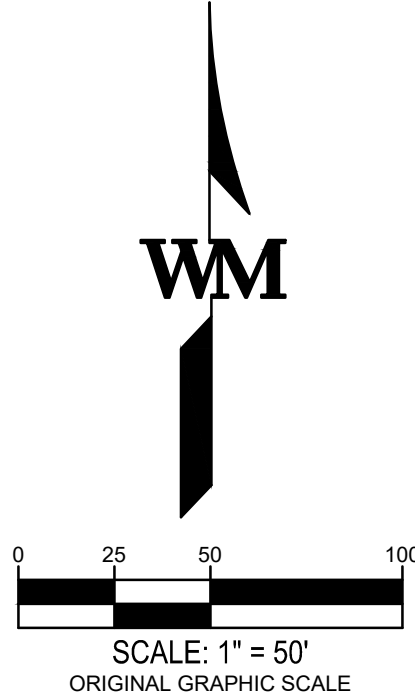
WESTGATE FIRST FILING PRELIMINARY PLAT
AND 2ND PUD AMENDMENT

SHEET
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Sheet 4 of 8
Page 116

WESTGATE FIRST FILING
PRELIMINARY PLAT AND 2ND PUD AMENDMENT
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS. AND 12 TRACTS
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- LEGEND**
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 - SECTION CORNER AS DESCRIBED
 - DISTANCE OF CURVE
 - SQ. FT.
 - AC.
 - NR
 - ROW
 - UE



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JOB NO.	DCS19-4021
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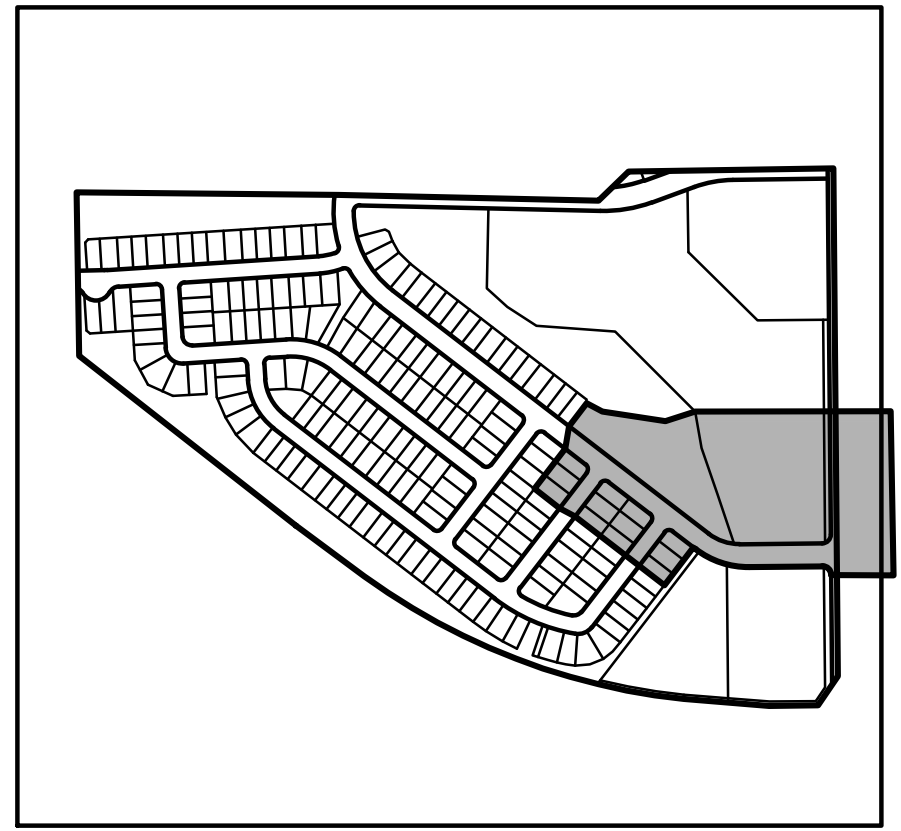
WESTGATE FIRST FILING PRELIMINARY PLAT
AND 2ND PUD AMENDMENT

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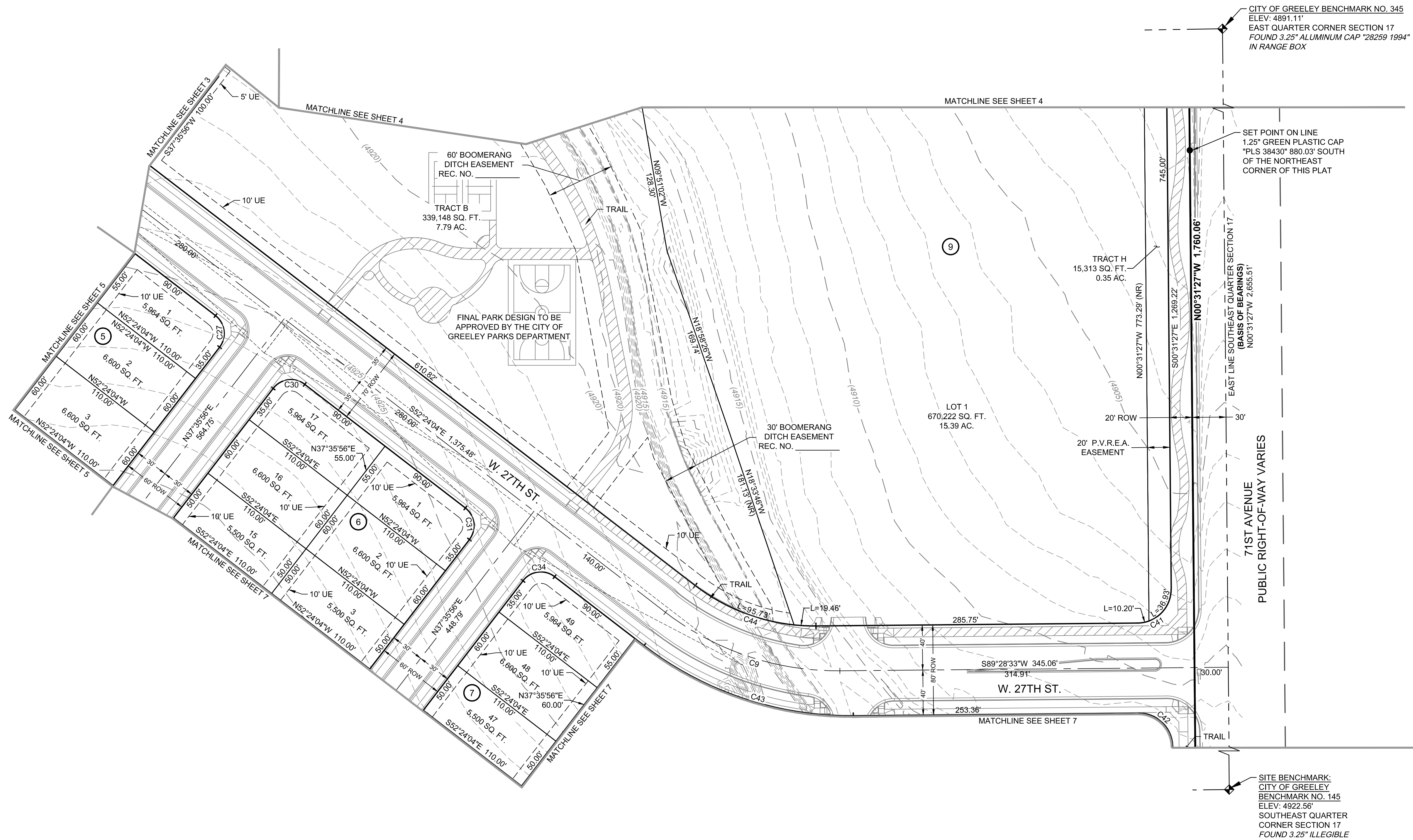
Sheet 5 of 9

Page 117

WESTGATE FIRST FILING
PRELIMINARY PLAT AND 2ND PUD AMENDMENT
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
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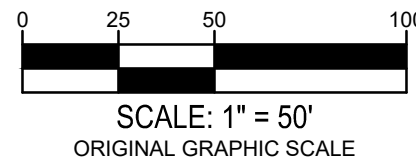
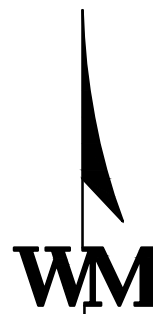


KEY MAP
NOT TO SCALE



LEGEND

- SECTION LINE
- EASEMENT LINE
- SITE BOUNDARY
- PROPOSED LOT LINE
- PROPOSED SITE TRIANGLE
- FOUND NO. 5 REBAR WITH 1.5" ALUMINUM CAP "PLS 32435" UNLESS OTHERWISE NOTED
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- AC. ACRES
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SCALE: 1" = 50'
ORIGINAL GRAPHIC SCALE

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SCALE:	

WESTGATE FIRST FILING PRELIMINARY PLAT
AND 2ND PUD AMENDMENT

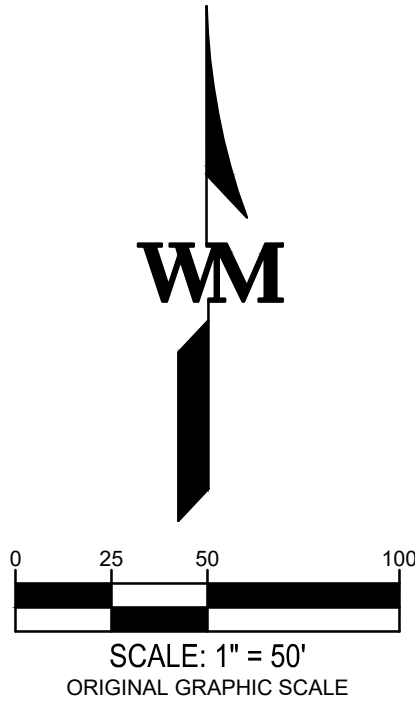
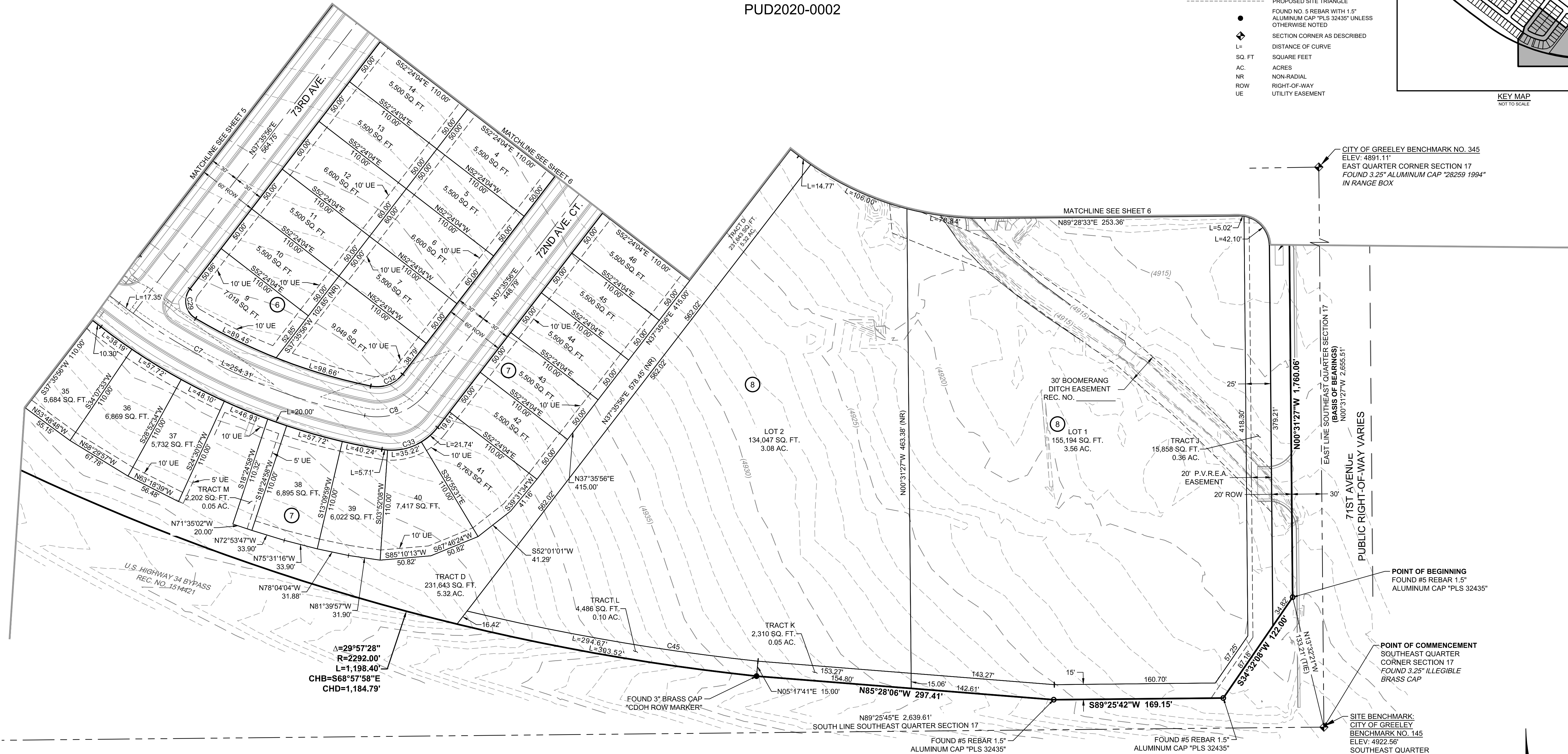
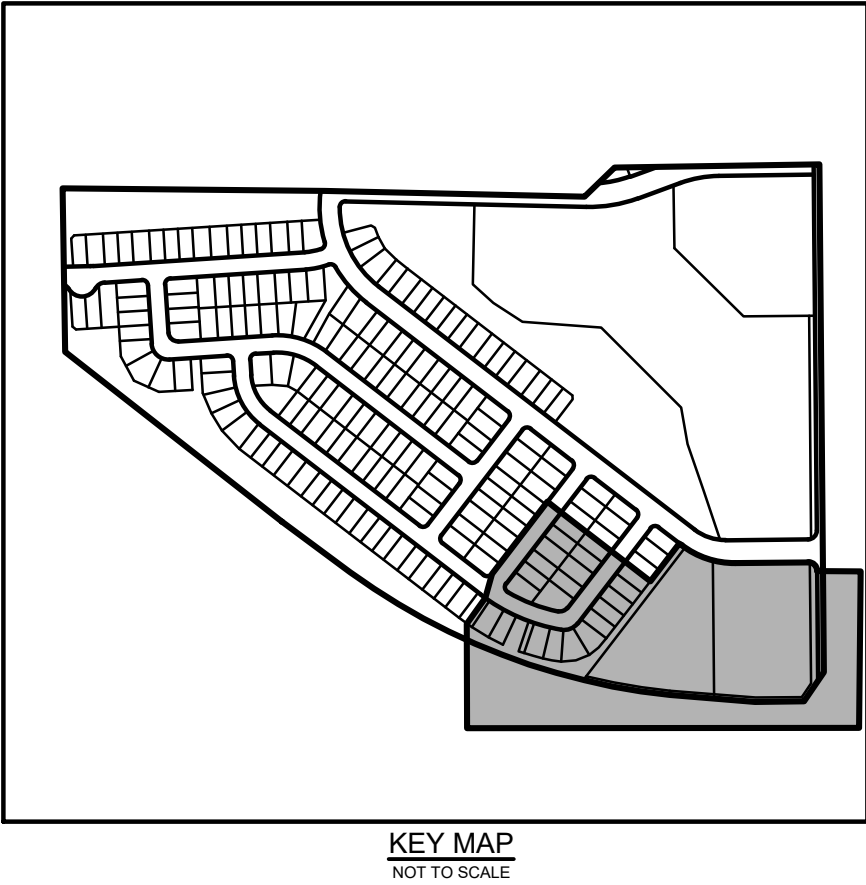
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Sheet 6 of 8

WESTGATE FIRST FILING
PRELIMINARY PLAT AND 2ND PUD AMENDMENT
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS. AND 12 TRACTS
PUD2020-0002

- LEGEND**
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 - FOUND NO. 5 REBAR WITH 1.5" ALUMINUM CAP "PLS 32435" UNLESS OTHERWISE NOTED
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WESTGATE FIRST FILING PRELIMINARY PLAT
AND 2ND PUD AMENDMENT

WESTGATE FIRST FILING

PRELIMINARY PLAT AND 2ND PUD AMENDMENT

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,

RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,

CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO

194 LOTS, 9 BLOCKS. AND 12 TRACTS

PUD2020-0002

CURVE TABLE					
CURVE #	DELTA	RADIUS	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C1	61°05'58"	380.00'	405.23'	S21°51'05"E	386.30'
C2	19°44'35"	250.00'	86.15'	N76°25'50"E	85.72'
C3	2°48'20"	250.00'	12.24'	N87°42'18"E	12.24'
C4	90°00'00"	62.00'	97.39'	S48°41'52"E	87.68'
C5	41°17'48"	250.00'	180.19'	N73°02'58"W	176.32'
C6	48°42'12"	200.00'	170.01'	S28°02'58"E	164.93'
C7	25°56'30"	600.00'	271.66'	S65°22'19"E	269.35'
C8	64°03'30"	62.00'	69.32'	N69°37'41"E	65.76'
C9	38°07'24"	250.00'	166.34'	N71°27'45"W	163.29'
C10	88°02'19"	20.00'	30.73'	N27°16'08"E	27.80'
C11	80°17'05"	20.00'	28.02'	N70°07'21"W	25.79'
C12	35°34'57"	37.00'	22.98'	S47°57'04"E	22.61'
C13	122°58'40"	53.00'	113.76'	N88°21'05"E	93.14'
C14	59°28'23"	37.00'	38.38'	N56°34'56"E	36.69'
C15	90°00'00"	20.00'	31.42'	S48°41'52"E	28.28'
C16	90°00'00"	20.00'	31.42'	S41°18'08"W	28.28'
C17	90°00'00"	32.00'	50.27'	S48°41'52"E	45.25'
C18	90°00'00"	58.00'	91.11'	S48°41'52"E	82.02'
C19	90°00'00"	20.00'	31.42'	S48°41'52"E	28.28'
C20	90°00'00"	20.00'	31.42'	S41°18'08"W	28.28'

CURVE TABLE					
CURVE #	DELTA	RADIUS	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C21	90°00'00"	20.00'	31.42'	N82°35'56"E	28.28'
C22	90°00'00"	20.00'	31.42'	S07°24'04"E	28.28'
C23	90°00'00"	20.00'	31.42'	N07°24'04"W	28.28'
C24	90°00'00"	20.00'	31.42'	N82°35'56"E	28.28'
C25	90°00'00"	20.00'	31.42'	N07°24'04"W	28.28'
C26	90°00'00"	20.00'	31.42'	S82°35'56"W	28.28'
C27	90°00'00"	20.00'	31.42'	N07°24'04"W	28.28'
C28	90°00'00"	20.00'	31.42'	N82°35'56"E	28.28'
C29	97°02'02"	20.00'	33.87'	S10°55'05"E	29.97'
C30	90°00'00"	20.00'	31.42'	S82°35'56"W	28.28'
C31	90°00'00"	20.00'	31.42'	N07°24'04"W	28.28'
C32	64°03'30"	32.00'	35.78'	N69°37'41"E	33.94'
C33	61°54'28"	58.00'	62.67'	N68°33'10"E	59.66'
C34	90°00'00"	20.00'	31.42'	N82°35'56"E	28.28'
C35	21°15'48"	450.00'	167.00'	N80°40'34"E	166.05'
C36	10°28'58"	450.00'	82.33'	N75°17'09"E	82.22'
C37	91°04'44"	20.00'	31.79'	S45°46'06"W	28.55'
C38	15°57'06"	410.00'	114.15'	N78°01'13"E	113.78'
C39	21°15'48"	490.00'	181.85'	N80°40'34"E	180.81'
C40	19°01'55"	410.00'	136.19'	S79°33'37"W	135.56'

CURVE TABLE					
CURVE #	DELTA	RADIUS	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C41	90°00'00"	30.00'	47.12'	S44°28'33"W	42.43'
C42	89°59'59"	30.00'	47.12'	N45°31'27"W	42.43'
C43	38°07'24"	300.00'	199.61'	S71°27'45"E	195.95'
C44	38°07'24"	173.12'	115.19'	S71°27'45"E	113.08'
C45	7°24'53"	2277.00'	294.67'	N80°13'57"W	294.46'

LINE TABLE		
LINE #	BEARING	DISTANCE
L1	N66°33'32"E	35.55'
L2	S00°53'32"E	23.00'

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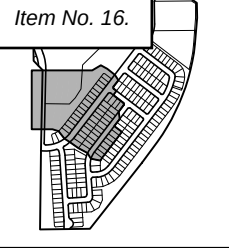
CIVIL ENGINEERING & SURVEYING

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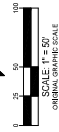
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A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS, AND 12 TRACTS
30" EXCLUSIVE SANITARY
SEWER AND WATER
EASEMENT REC. NO.
4223652
PUD2020-0003



KEY MAP

	SECTION LINE
	EASEMENT LINE
	SITE BOUNDARY
	PROPOSED SETBACK LINE
	PROPOSED SETBACK TRIANGLE
	ALUMINUM CAP PLUS
	OTHER THAN LISTED
	SECTION CORNER AS DESCRIBED
	DISTANCE OF CURVE
	SQUARE FEET
	ACRES
	NORTH ARROW
	UTILITY EASEMENT



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2	07/02/2021	CITY COMMENTS			
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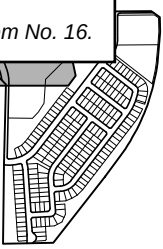
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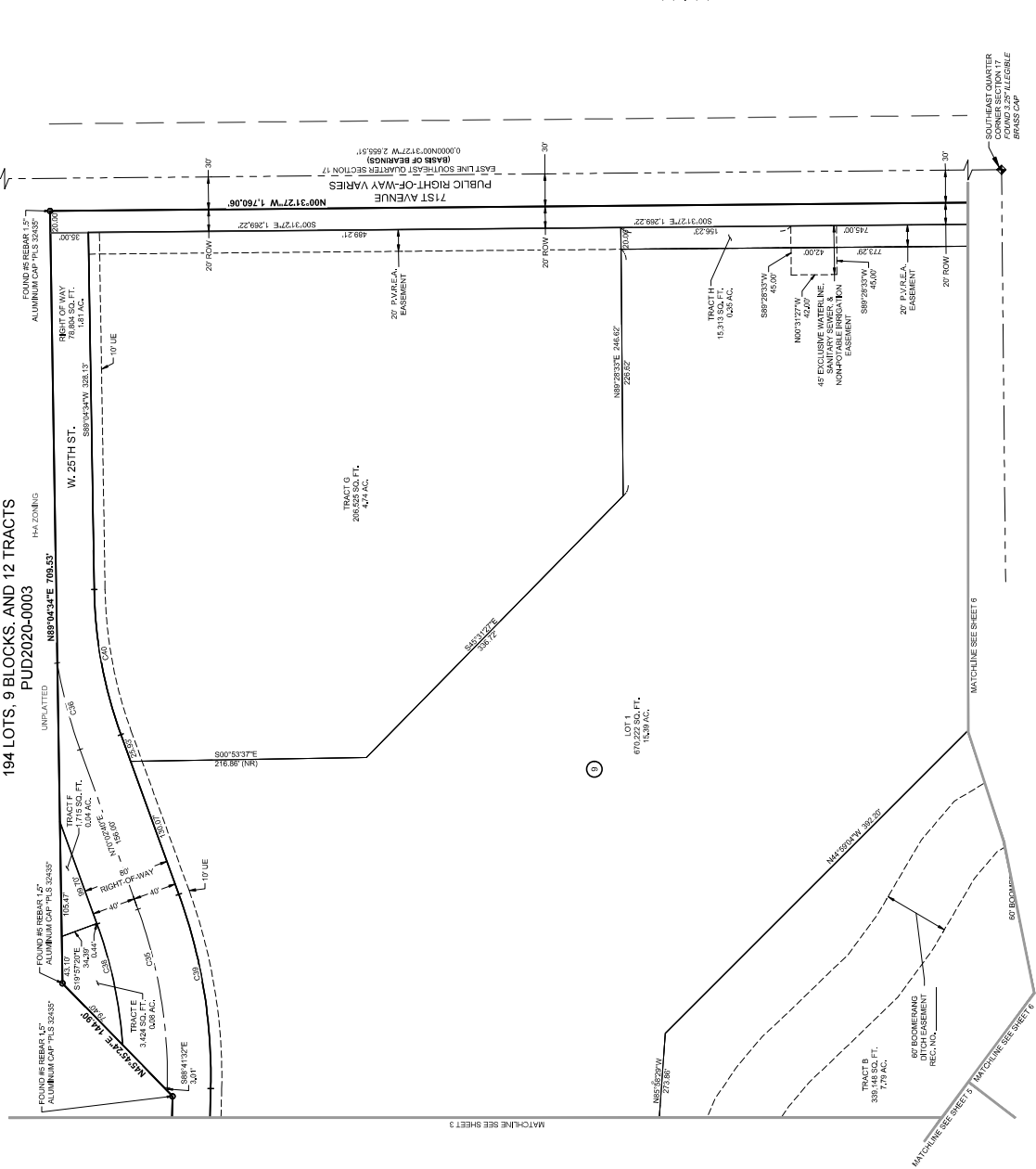
Sheet 3 of 8

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS, AND 12 TRACTS

EAST QUARTER CORNER SECTION 17
ROUND 3.25" ALUMINUM CAP *28259 1994
RANGE BOX

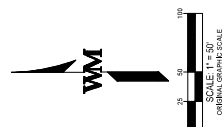


KEY MAP



LEGEND

-----	SECTION LINE
-----	EASEMENT LINE
-----	SITE BOUNDARY
=====	PROPOSED LOT LINE
●	FOUND NO. 5 FEMUR WITH 1 1/2" ALUMINUM CAP PLS 2435' UNLESS OTHERWISE NOTED
◆	SECTION CORNER AS DESCRIBED
-----	DISTANCE OF CURVE
SQ. FT	SQUARE FEET
L=	
AC.	ACRES
NK	NON-HAVAL
NOV	NON-VALUABLE
UTL	UTILITY EASEMENT



WESTGATE FIRST FILING

JOB NO.		JOB NO.		JOB NO.	
NO.	DATE	NO.	DATE	NO.	DATE
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2	07/02/2021	2	07/02/2021	2	07/02/2021
3	09/26/2021	3	09/26/2021	3	09/26/2021
REMARKS		REMARKS		REMARKS	
PAPRI		PAPRI		PAPRI	
JCS		JCS		JCS	
DRAWN		DRAWN		DRAWN	
DATE		DATE		DATE	
SCALE		SCALE		SCALE	

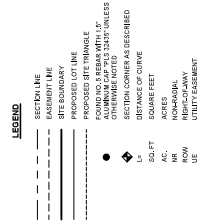
WARE MALCOMB
CIVIL ENGINEERING & SURVEYING

990 south broadway
suite 230
denver, co 80209
p 303.561.3333
waremailcomb.com

4
SHEET

Sheet 4 of 8

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS, AND 12 TRACTS
PUD2020-0003



WESTGATE FIRST FILING

5
SHEET

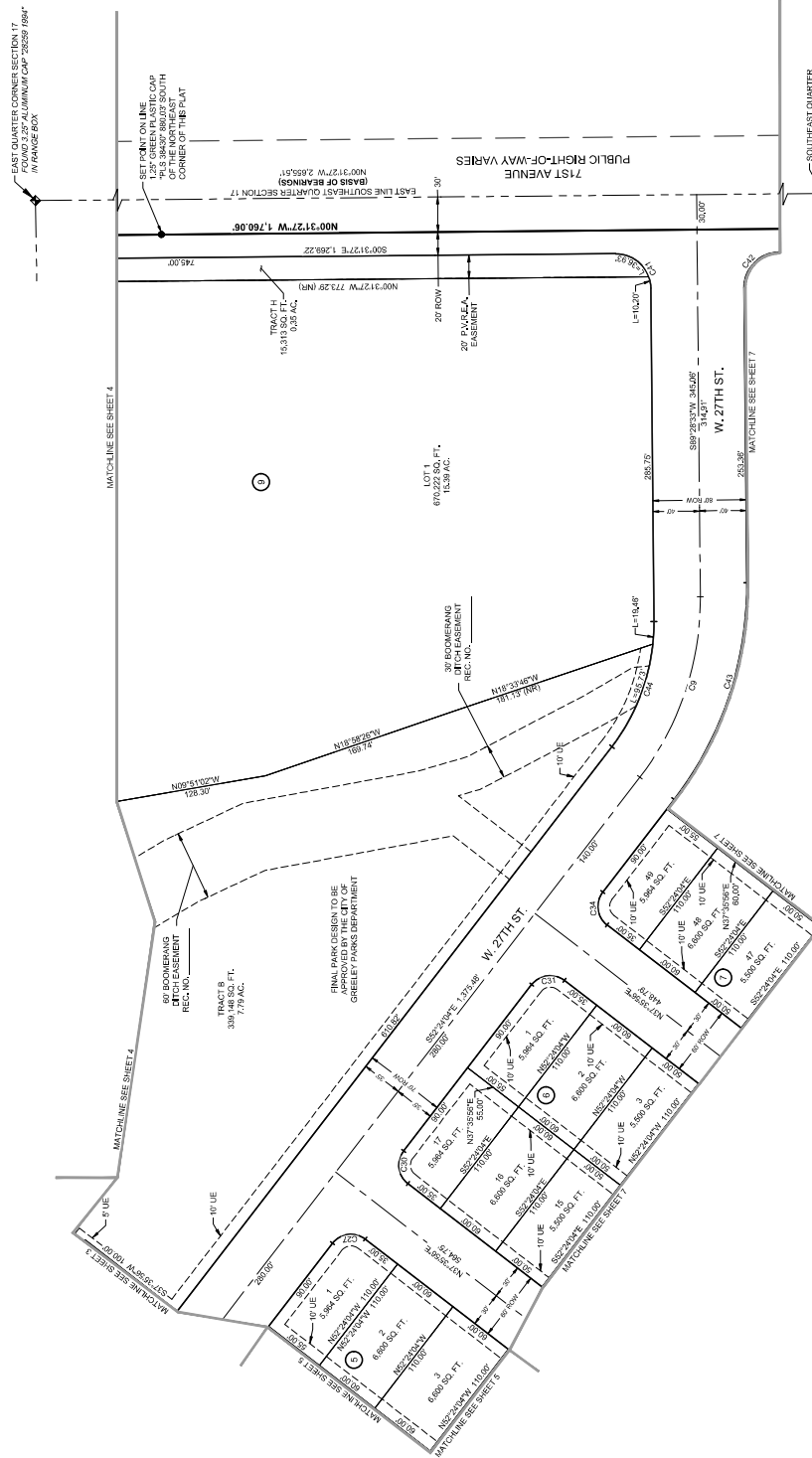
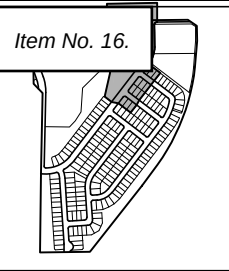
Sheet 5 of 8

NO.	DATE	REMARKS	NO.	DATE	REMARKS
1	04/22/2021	CITY COMMENTS			
2	07/02/2021	CITY COMMENTS			
3	09/20/2021	CITY COMMENTS			

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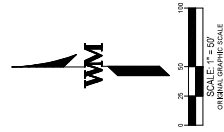
990 south broadway
suite 230
denver, co 80209
p 303.561.3333
www.arena1.com

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS, AND 12 TRACTS
PUD2020-0003



LEGEND

—●—	SECTION LINE
- - - -	EASEMENT LINE
=====	SITE BOUNDARY
=====	PROPOSED LOT LINE
-----	FINDING SITE TRIANGLE FOUND NO. 5 BEARS WITH 1.5" ALUMINUM CAP "PLS 32-95" UNLESS OTHERWISE NOTED
◊	SECTION CORNER AS DESCRIBED
L=	DISTANCE OF CURVE
SQ. FT.	SQUARE FEET
AC.	ACRES
RG.	NON-RADIAL
IR.	RADIUS
WY.	WIDTH
HT.	HEIGHT
UTLTY.	UTILITY EASEMENT



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CIVIL ENGINEERING & SURVEYING

3590 south Broadway
Suite 230
Denver, CO 80209
303.561.3333
waremalcomb.com

JOB NO. DCS14-021

PAPRI JCS

DRAWN: AJ

DATE: 09/22/2021

SCALE:

NO.	DATE	REMARKS
1	04/23/2021	CITY COMMENTS
2	07/02/2021	CITY COMMENTS
3	09/22/2021	CITY COMMENTS

WESTGATE FIRST FILING

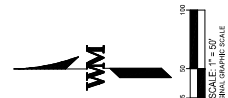
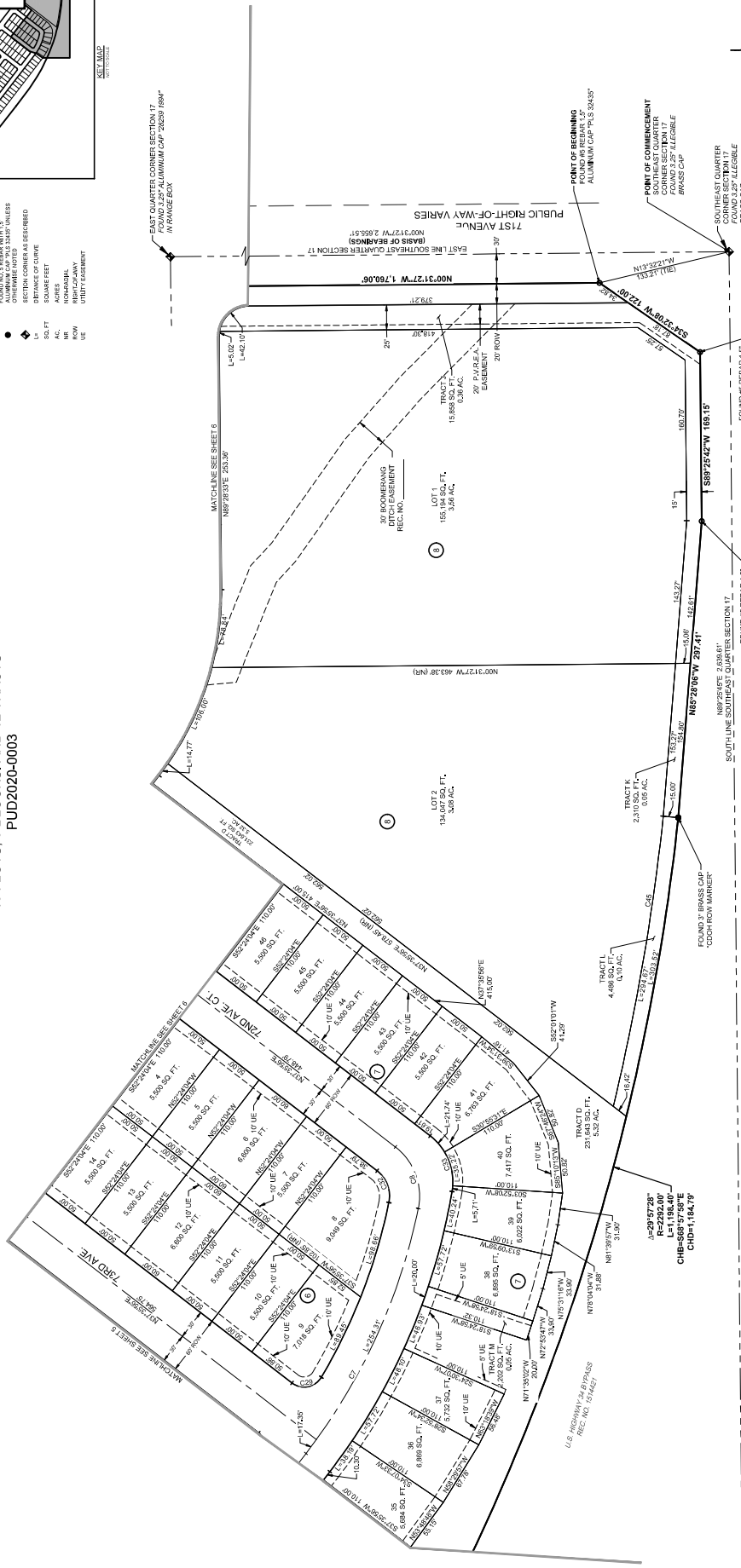
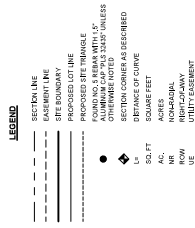
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A PORTION OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
194 LOTS, 9 BLOCKS, AND 12 TRACTS
PUD2020-0003

LEGEND

-----	SECTION LINE
-----	EASEMENT LINE
-----	STE. BOUNDARY
-----	PROPOSED LOT LINE
-----	PROPOSED SETTING TRIANGLE
●	FOUND NO. 5 REBAR WITH 1.5" ALUMINUM CAP 7/16" 32453 UNLESS OTHERWISE NOTED
◆	SECTION CORNER AS DESIGNED
-----	DISTANCE OF CURVE
-----	SQUARE FEET
SQ. FT.	SQ. FT.
AC.	ACRES
INCHES	INCHES
FEET	FEET
NEW	RECONSTRUCTION
UE	UTILITY EASEMENT



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suite 230
denver, co 80209
p 303.561.3333
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NO.	DATE	REMARKS	NO.	DATE	REMARKS
1	04/23/2021	QTY COMMENTS			
2	05/26/2021	QTY COMMENTS			
3	05/26/2021	QTY COMMENTS			

WESTGATE FIRST FILING

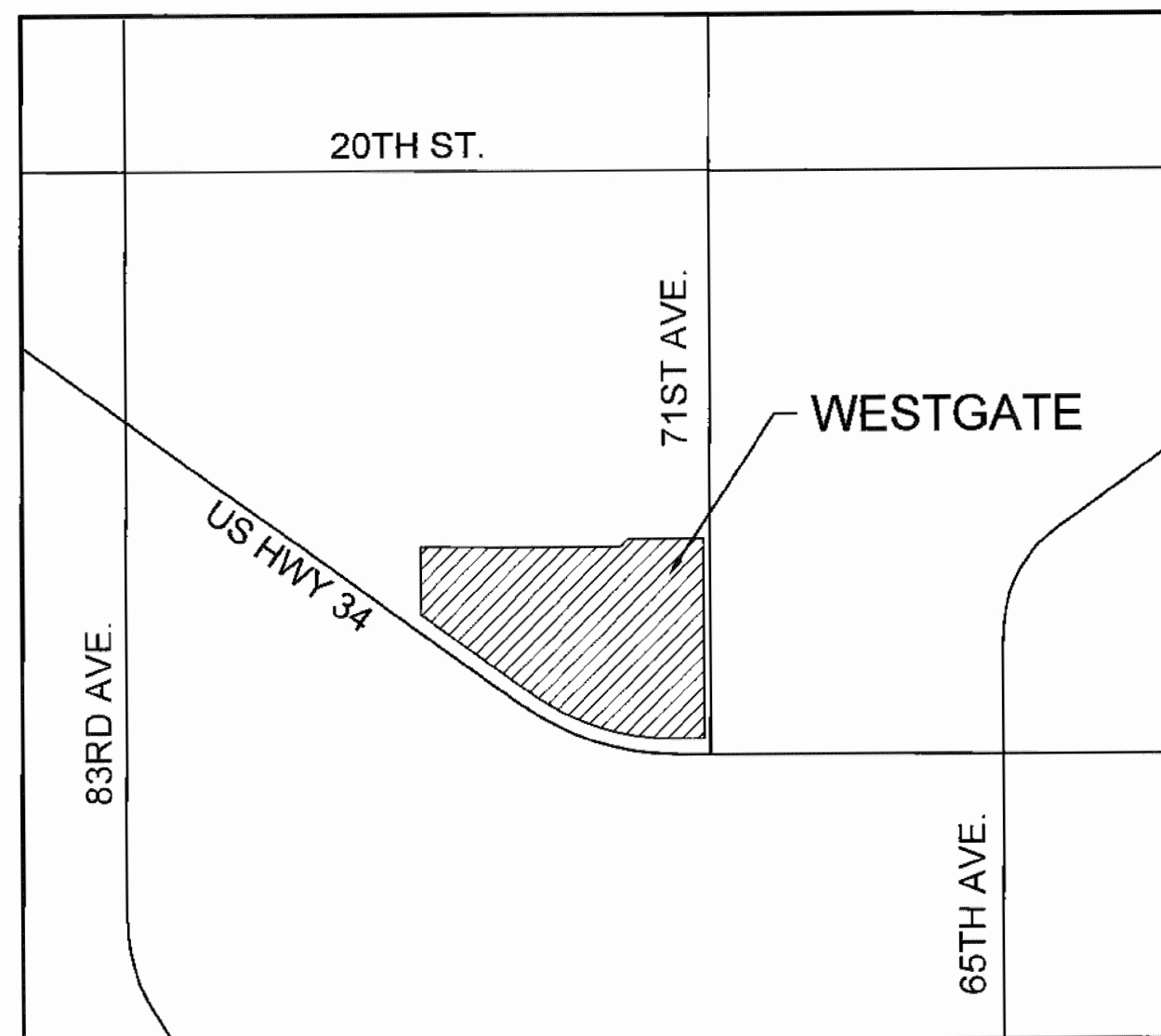
7

Sheet 7 of 8

CURVE TABLE					
CURVE #	DELTA	RADIUS	ARC LENGTH	CHORD DIRECTION	CHORD LENGTH
C41	50°00'00"	300.0'	41.12'	S44°28'37"W	42.43'
C42	50°00'00"	300.0'	41.12'	S44°28'37"W	42.43'
C43	89°39'00"	300.0'	61.12'	N40°31'27"W	62.43'
C44	38°07'24"	300.0'	106.61'	S17°17'46"E	108.95'
C45	38°07'24"	300.0'	106.61'	S17°17'46"E	108.95'
C46	38°07'24"	173.12'	173.12'	S17°17'46"E	110.50'
C47	7°24'03"	2277.00'	234.10'	N89°37'07"W	204.46'

LINE TABLE		
LINE #	BEARING	DISTANCE
1.1	N66°33'32"E	36.26'
1.2	S00°53'32"E	23.00'

VICINITY MAP



Scale 1"=1500'

LEGAL DESCRIPTION

A PARCEL OF LAND IN THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE CENTER QUARTER CORNER OF SECTION 17 AND CONSIDERING THE WEST LINE OF SAID SOUTHEAST QUARTER OF SECTION 17 TO BEAR SOUTH 00°53'32" EAST, WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO:

THENCE SOUTH 00°53'32" EAST ALONG SAID WEST LINE A DISTANCE OF 807.69 FEET TO THE POINT OF BEGINNING;
THENCE SOUTH 89°28'24" EAST A DISTANCE OF 908.92 FEET;
THENCE SOUTH 88°41'13" EAST A DISTANCE OF 898.87 FEET;
THENCE NORTH 45°43'18" EAST A DISTANCE OF 145.25 FEET;
THENCE NORTH 89°06'23" EAST A DISTANCE OF 709.29 FEET TO THE WESTERLY RIGHT-OF-WAY LINE OF 71ST AVENUE;
THENCE SOUTH 00°31'27" EAST ALONG SAID WESTERLY RIGHT-OF-WAY LINE A DISTANCE OF 1,759.79 FEET TO THE NORTHERLY RIGHT-OF-WAY LINE OF U.S. HIGHWAY 34 BYPASS;
THENCE ALONG SAID NORTHERLY RIGHT-OF-WAY LINE THE FOLLOWING SIX (6) COURSES:
1. SOUTH 34°22'22" WEST A DISTANCE OF 122.10 FEET;
2. SOUTH 89°25'51" WEST A DISTANCE OF 169.30 FEET;
3. NORTH 85°27'50" WEST A DISTANCE OF 297.34 FEET TO A POINT OF CURVATURE, THE RADIUS POINT OF WHICH BEARS NORTH 06°03'18" EAST;
4. ALONG A NON-TANGENT CURVE TO THE RIGHT HAVING A CENTRAL ANGLE OF 29°57'28", A RADIUS OF 2,292.00 FEET, AN ARC LENGTH OF 1,198.40 FEET AND A CHORD THAT BEARS NORTH 68°57'58" WEST A DISTANCE OF 1,184.80 FEET;
5. NORTH 53°28'36" WEST ALONG A NON-TANGENT LINE A DISTANCE OF 293.40 FEET;
6. NORTH 51°54'13" WEST A DISTANCE OF 955.01 FEET TO THE WEST LINE OF SAID SOUTHERLY QUARTER OF SECTION 17;
THENCE NORTH 00°53'32" WEST ALONG SAID WEST LINE A DISTANCE OF 566.55 FEET TO THE POINT OF BEGINNING;

SAID PARCEL CONTAINS AN AREA OF 3,677,992 SQUARE FEET, OR 84.435 ACRES, MORE OR LESS.

THE LINEAL DISTANCE UNIT USED IN THE PREPARATION OF THIS LEGAL DESCRIPTION IS THE UNITED STATES SURVEY FOOT. THE UNITED STATES DEPARTMENT OF COMMERCE, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY DEFINES THE UNITED STATES SURVEY FOOT AS 1200/3937 METERS.

I, THOMAS D. STAAB, A SURVEYOR LICENSED IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THE ABOVE LEGAL DESCRIPTION AND ATTACHED EXHIBIT WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CHECKING, IS BASED ON MY KNOWLEDGE, INFORMATION AND BELIEF, AND IS IN ACCORDANCE WITH APPLICABLE STANDARDS OF PRACTICE, AND DOES NOT REPRESENT A GUARANTY OR WARRANTY, EITHER EXPRESSED OR IMPLIED.

THOMAS D. STAAB, P.L.S. 25965
FOR AND ON BEHALF OF
WARE MALCOMB
990 SOUTH BROADWAY
SUITE 230
DENVER, COLORADO 80209
P 303.561.3333

PROJECT TEAM

OWNER

WRD4 GREELEY PROPERTY
252 CLAYTON STREET
DENVER, CO 80208
CONTACT: BOB ECK
EMAIL: beck@westrangedev.com
PHONE: (303) 398-0401

DEVELOPER

BROE REAL ESTATE GROUP
252 CLAYTON STREET
DENVER, CO 80208
CONTACT: MARC SAVELA
EMAIL: msavela@broe.com
PHONE: 303.398.4575

LAND PLANNER

PLANMARK DESIGN
P.O. BOX 202411
DENVER, CO 80220
CONTACT: MARK NEMGER
EMAIL: marknemger@gmail.com
PHONE: (720) 232-5081

ENGINEERS

WARE MALCOMB
990 S. BROADWAY SUITE 230
DENVER, CO 80209
CONTACT: TOM JANSEN
EMAIL: tjansen@waremalcomb.com
PHONE: (303) 561-3333

WESTGATE PRELIMINARY P.U.D. - FIRST AMENDMENT

A PARCEL OF LAND BEING A PART OF THE SOUTHEAST QUARTER OF SECTION 17

TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.

CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO

PUD2019-0014

P.U.D. JUSTIFICATION

THE WESTGATE P.U.D. IS DESIGNED TO PROMOTE A MIXED USE PLANNED DEVELOPMENT WHICH DRAWS FROM THE CITY'S CURRENT UNDERLYING ZONING DISTRICTS AND ENHANCES THEM TO CREATE A HARMONIOUS SITE WITH THE OPPORTUNITY FOR A MIX OF SINGLE FAMILY, MULTI-FAMILY AND COMMERCIAL USES. THE FLEXIBILITY OF THIS PUD ALLOWS FOR CREATIVE DESIGN SOLUTIONS TO ENHANCE THE OVERALL APPEARANCE OF THIS SITE, WHICH IS A PROMINENT GATEWAY TO THE CITY.

THE P.U.D. INCLUDES FOUR PLANNING AREAS. PLANNING AREA 1 IS PROPOSED SINGLE FAMILY RESIDENTIAL WITH LOT SIZE MINIMUMS AND SETBACKS TO PROMOTE A NEIGHBORHOOD OF SINGLE FAMILY UNITS, OFFER VARIETY AND ADDRESS MARKET DEMANDS. PLANNING AREAS 2 AND 3 HAVE A RANGE OF ALLOWABLE RESIDENTIAL USES THAT INCLUDE: SINGLE FAMILY; TWO-FAMILY; TOWNHOUSES; AND MULTI-FAMILY. THE FLEXIBILITY OF RESIDENTIAL USES FOR PLANNING AREAS 2 AND 3 IN COMBINATION WITH VARIABLE LOT SIZES AND SETBACKS PROVIDES GREATER OPPORTUNITY TO DELIVER PRODUCTS THAT MEET THE NEEDS OF A VARIETY OF HOMEOWNERS. PLANNING AREA 3 WILL ALSO ALLOW FOR COMMERCIAL USES SHOULD THE DEMAND EXCEED WHAT CAN BE PROVIDED IN PLANNING AREA 4. THE P.U.D. ALSO ENCOURAGES DIVERSITY BY REQUIRING ONE ADDITIONAL HOUSE MODEL BEYOND THE CODE (AS AMENDED) REQUIREMENT. PLANNING AREA 4 IS PROPOSED RESIDENTIAL / COMMERCIAL WHICH WILL OFFER THE FLEXIBILITY FOR A VARIETY OF RESIDENTIAL AND COMMERCIAL USES TO BENEFIT THE NEIGHBORING RESIDENTS.

PLANNING AREAS WILL HAVE SIDEWALK AND TRAIL NETWORKS THAT ALLOW FOR PEDESTRIAN CONNECTIONS BETWEEN PLANNING AREAS AND DEVELOPED FEATURES. FOR PEDESTRIANS, A REGIONAL TRAIL SYSTEM RUNNING EAST TO WEST THROUGH THE SITE IS PROPOSED TO COORDINATE WITH OPEN SPACE AND AMENITY FEATURES. FOR VEHICULAR ACCESS, THERE IS AN ENHANCED MAIN ENTRANCE DRIVE TO THE COMMUNITY WITH A MEDIAN, PRIMARY MONUMENT FEATURE, AND INCREASED LANDSCAPING. IN ADDITION, ALTERNATIVE STREET 'KNUCKLE' DESIGNS ARE PROPOSED TO CREATE A DESIRABLE FEEL FOR THE COMMUNITY AND PROMOTE SLOWER TRAFFIC SPEEDS. THERE WILL BE CONTINUITY OF SITE ELEMENTS SUCH AS FENCING, MONUMENTS, AND BENCHES. THIS CONTINUITY IS IMPORTANT IN CREATING THE NEIGHBORHOOD IDENTITY AND MAKING IT FEEL LIKE A UNIQUE PLACE. PHYSICAL SITE FEATURES SUCH AS THE EXISTING BOOMERANG DITCH CREATE OPPORTUNITY FOR OPEN SPACE AND A SITE AMENITIES CORRIDOR WHICH LINKS THE WESTGATE COMMUNITY TO ADJACENT FUTURE NEIGHBORHOODS.

THE P.U.D. INCORPORATES ENHANCED LANDSCAPE BUFFER STANDARDS. THESE BUFFERS ARE BETWEEN DIFFERING USES AND ADJACENT TO SOME PUBLIC RIGHT-OF-WAYS. ADDITIONALLY, THE P.U.D. INCLUDES SUGGESTED FENCING TYPES FOR SINGLE FAMILY LOTS AND FOR BUFFERING BETWEEN CERTAIN USES. THE PROPOSED OPEN FENCING TYPES FOR SINGLE FAMILY ADJACENT TO THE OPEN SPACE CORRIDOR CREATES A MORE OPEN FEEL IN THE COMMUNITY AND PROVIDES BETTER VIEWS FOR THE RESIDENTS ADJACENT TO THE OPEN SPACE. THE PROPOSED OPAQUE FENCING WITH ENHANCED COLUMN DETAILS PROVIDES AN ATTRACTIVE SCREEN FOR SEPARATION BETWEEN CERTAIN USES AND PRIVACY ADJACENT TO RIGHT-OF-WAYS. THESE ENHANCED LANDSCAPE BUFFERS (WITH REQUIRED MINIMUMS GREATER THAN THE DEVELOPMENT CODE, AS AMENDED) IN COMBINATION WITH COORDINATED FENCING STANDARDS THROUGHOUT THE P.U.D. WILL PROVIDE A COORDINATED, CONSISTENT, COHESIVE AND ATTRACTIVE LOOK THROUGHOUT THE COMMUNITY.

OVERALL, THIS PROPOSED PUD IS DESIGNED TO BE AN ASSET TO THE CITY'S WESTERN GATEWAY BY PROVIDING DESIRED COMMERCIAL SPACE AND THE DEVELOPMENT OPPORTUNITY FOR DIVERSIFIED RESIDENTIAL HOUSING PRODUCTS TO MEET A VARIETY OF MARKET DEMANDS.

DEVELOPMENT SUMMARY

ZONING

CURRENT ZONING _____ PLANNED UNIT DEVELOPMENT (PUD)
PROPOSED ZONING _____ PLANNED UNIT DEVELOPMENT (PUD)

EXISTING SITE ACREAGE _____ 84.44 AC 3,677,992 SF

PUD SITE DEVELOPMENT

AREA	USE	ACRES	MAX. DU / AC	MAX. COMM
PA-1	RESIDENTIAL	36.32 AC	6.0	
PA-2	RESIDENTIAL	24.66 AC	19.0	
PA-3	RESIDENTIAL / COMMERCIAL	18.07 AC	8.0	
PA-4	COMMERCIAL / RESIDENTIAL	4.16 AC	8.0	
71ST AVE	REQUIRED DEDICATED R.O.W.	1.23 AC		
TOTAL		84.44 AC	494 UNITS	150,000 SF

PUD OPEN SPACE REQUIREMENTS

MIN. 30% OF PA-1, PA-2 AND PA-3 AREAS (79.05 AC) 23.72 AC
REQUIRED (SEE NOTES 1 AND 2)

MIN. 50% OF REQUIRED OPEN SPACE SHALL BE USABLE OPEN SPACE (SEE NOTES 1 AND 2) 11.88 AC

NOTES:

- ALL REQUIRED OPEN SPACE IS CALCULATED BASED ON RESIDENTIAL PORTIONS OF PUD ONLY. A MINIMUM OF 30% OPEN SPACE IS REQUIRED, AND A MINIMUM OF 50% OF THE REQUIRED 30% OPEN SPACE SHALL BE USABLE OPEN SPACE (CODE SECTION 18.32.060)
- QUALIFYING OPEN SPACE THROUGHOUT ALL AREAS OF THE PUD CAN BE USED TO COUNT TOWARDS REQUIRED OPEN SPACE CALCULATIONS. SEE PUD OPEN SPACE SCENARIO CONCEPT IN NARRATIVE.
- PLANNING AREA BOUNDARIES MAY VARY UP TO 20% OF THEIR AREA AT THE TIME OF FINAL PUD AND PLATTING BASED ON ADJUSTMENT TO ROAD NETWORK AND LOT CONFIGURATIONS.
- MAXIMUM DWELLING UNITS PER PLANNING AREA IS DEFINED BY THE MAXIMUM DENSITY SET PER PLANNING AREA; HOWEVER, THE OVERALL PUD AREA CANNOT EXCEED 494 DWELLING UNITS WITHOUT AMENDING THE PLAN. TRANSFERRING UNITS BETWEEN PLANNING AREAS IS PERMITTED AT FINAL PUD AND FINAL PLAT AS LONG AS TOTAL MAXIMUM DENSITY OF PLANNING AREA IS NOT EXCEEDED AND THE TOTAL PERMITTED UNITS FOR THE OVERALL PUD IS NOT EXCEEDED. AN OVERALL DENSITY AND UNIT COUNT TABLE SHALL BE SUBMITTED WITH EACH PHASE OF THE PROJECT.
- TOTAL FLOOR AREA OF COMMERCIAL USES WITHIN THE PUD AREA IS LIMITED TO 150,000 SQUARE FEET.

AMENDMENT HISTORY

WESTGATE PRELIMINARY PUD - APPROVED SEPTEMBER 13, 2016 (PROJECT PUD 11-15)
WESTGATE PRELIMINARY PUD - EXTENSION APPROVED THROUGH SEPTEMBER 13, 2020
WESTGATE PRELIMINARY PUD - FIRST AMENDMENT (PROJECT PUD2019-0014)

- RECONFIGURES PLANNING AREAS
- SETS A MAXIMUM NUMBER OF UNITS AND COMMERCIAL AREA (SQUARE FEET)
- REMOVE OIL / GAS FACILITIES AND OUTLOTS
- SHIFTS DETAILED ENGINEERING PLANS TO PLAT PROCESS
- INCREASES BUILDING HEIGHT FOR COMMERCIAL USES
- INCREASE AMOUNT OF PREVIOUSLY APPROVED PARKING FOR MULTI-FAMILY

GENERAL NOTES

- ALL REFERENCES TO CITY OF GREELEY DEVELOPMENT CODE SHALL REFERENCE THE CODE ENACTED DECEMBER 18, 2018 AND AMENDED THROUGH APRIL 2019 AND ANY FUTURE AMENDMENTS.
- PHASING WILL BE ALLOWED WITHIN THIS P.U.D. THE SPECIFICS FOR BOUNDARY AND TECHNICAL CRITERIA TO BE DEFINED WITHIN FINAL P.U.D.
- CITY OF GREELEY REGIONAL TRAIL
 - A CITY OF GREELEY REGIONAL TRAIL SHALL BE PROVIDED THROUGH THIS P.U.D. SITE, IN ACCORDANCE WITH THE CITY MASTER TRAILS PLAN. A PUBLIC ACCESS EASEMENT SHALL BE GRANTED FOR THE TRAIL CORRIDOR. THE EASEMENT SHALL GENERALLY BE LOCATED ADJACENT TO AND ON ONE SIDE OF THE BOOMERANG LATERAL DITCH. THE EASEMENT SHALL BE OF A TYPICAL MINIMUM WIDTH OF 50', PROVIDED HOWEVER THAT THE WIDTH MAY BE LESS WHERE THERE IS NOT A 50' DISTANCE BETWEEN THE BOOMERANG LATERAL DITCH AND THE SITE PROPERTY LINE. A PORTION OF THE EASEMENT MAY BE LOCATED WITHIN PUBLIC STREET RIGHT-OF-WAY IN CERTAIN AREAS AS MAY BE APPROVED BY THE CITY.
 - SEE PUBLIC IMPROVEMENTS COMMITMENTS MATRIX BELOW FOR SPECIFIC BOOMERANG TRAIL TIMING, CONSTRUCTION AND MAINTENANCE RESPONSIBILITIES.
- RAW WATER DEDICATION. THE RESIDENTIAL DOMESTIC RAW WATER DEDICATION REQUIREMENT FOR THE WESTGATE P.U.D IS THREE (3) ACRE-FEET PER GROSS ACRE OF RESIDENTIAL LAND, PLUS 50% OF THE ACREAGE OF THE ADJACENT RIGHT OF WAYS. FOR THE COMMERCIAL COMPONENT OF THE WESTGATE P.U.D THE RAW WATER DEDICATION REQUIREMENT WILL BE BASED ON THE WATER TAP SIZES SELECTED DURING DEVELOPMENT DESIGN AND SHALL BE DUE WITH THE COMMERCIAL BUILDING PERMITS. RAW WATER FOR THE WESTGATE P.U.D. FROM A SOURCE AND IN A FORM ACCEPTABLE TO THE CITY OF GREELEY, HAS BEEN DEDICATED TO THE CITY OF GREELEY PURSUANT TO THE AMENDED AND RESTATED RESTRICTIVE COVENANTS (NO IRRIGATION) AT RECEPTION NUMBER 4441912, WELD COUNTY, AS AMENDED AND REVISED. AS A RESULT, GREELEY HAS CREDITED THE WESTGATE P.U.D. WITH 258 ACRE-FEET OF WATER DEDICATION, WHICH FULLY SATISFIES THE RESIDENTIAL DOMESTIC WATER DEDICATION REQUIREMENT FOR THE ENTIRE WESTGATE P.U.D. THE PORTION OF SUCH 258 ACRE-FEET THAT IS IN EXCESS OF THE WESTGATE P.U.D. RESIDENTIAL DOMESTIC RAW WATER DEDICATION REQUIREMENT SHALL BE CREDITED TO THE WESTGATE P.U.D. COMMERCIAL WATER DEDICATION REQUIREMENT.
- BOOMERANG DITCH
 - ANY RELOCATION OR PIPING OF THE BOOMERANG LATERAL DITCH WITHIN OR ADJACENT TO ALL PLANNING AREAS SHALL BE CONDUCTED IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE BOOMERANG IRRIGATION DITCH RELOCATION AGREEMENT THAT HAS BEEN EXECUTED BETWEEN OWNER AND BOOMERANG LATERAL DITCH COMPANY, PER THE CONDITIONS OF THAT AGREEMENT. A DEFINED IRRIGATION DITCH EASEMENT SHALL BE GRANTED IN CONJUNCTION WITH THE DEVELOPMENT OF PA-3 AND/OR PA-4.
 - ANY OTHER PROPOSED CROSSINGS OF OR IMPACTS TO THE EXISTING DITCH BY STREET, UTILITY, OR OTHER IMPROVEMENTS (AND ANY ASSOCIATED MINOR PLACEMENT OF THE DITCH IN PIPE OR CULVERTS) SHALL BE DONE IN ACCORDANCE WITH THE STANDARD DITCH CROSSING POLICY AND PROCEDURES OF THE BOOMERANG LATERAL DITCH COMPANY.
- MAJOR AMENDMENTS TO AN APPROVED PRELIMINARY OR FINAL PUD SHALL REQUIRE WRITTEN NOTICE TO ALL PROPERTY OWNERS WITHIN THE PUD.
- A NON-POTABLE WATER SYSTEM WILL BE USED FOR IRRIGATION OF ALL COMMON AREAS. SERVICE TO INDIVIDUAL HOME FOR IRRIGATION WILL BE PROVIDED UNLESS NOT FEASIBLE.
- DRAINAGE & DETENTION FOR THIS DEVELOPMENT ARE PER THE ACCEPTED PRELIMINARY DRAINAGE REPORT DATED JULY 21, 2020.

Public Improvements Commitments Matrix					
Area / Improvement	Plan Preparation and Approval	Construction Timing*	Construction Responsibility	Maintenance Responsibility	Ownership
Boomerang Regional Trail Corridor	Area to be dedicated will be determined in conjunction with the final plan / final plat for each phase or planning area.	Prior to 25% of building permits issued in Phase continuing the trail	Developer and/or Westgate Metropolitan District and reimbursed by City of Greeley	City of Greeley	City of Greeley
Neighborhood Park	Area to be dedicated will be determined in conjunction with the final plan / final plat for each phase or planning area.	The Neighborhood Park in PA-1 shall be constructed prior to issuance of 25% of the building permits in the Phase containing the park.	Developer and/or Westgate Metropolitan District	City of Greeley or Metropolitan District / HOA	City of Greeley or Metropolitan District / HOA
71st Avenue Improvements	Area to be dedicated and extent of improvements will be determined in with the final plan / final plat.	Prior to the first CO in PA-1 and/or 25% of COs issued in first phase of PA-2.	Developer and/or Westgate Metropolitan District	City of Greeley	City of Greeley
Water & Sewer Improvements	Determined at Final Plan/Final Plat	Prior to issuance of first building permit	Developer and/or Westgate Metropolitan District	City of Greeley	City of Greeley
Public Streets & Sidewalks	R.O.W dedicated at Subdivision Plat	Prior to construction of first lot in filing.	Developer and/or Westgate Metropolitan District	City of Greeley	City of Greeley
Non-potable Pond	Pond will be portion of detention pond in Filing No.1 plat.	Prior to construction of first lot in filing.	Developer and/or Westgate Metropolitan District and reimbursed by City of Greeley	City of Greeley	City of Greeley/Metropolitan District
Hwy. 34 Trail	Public access to open space tract along highway to be granted should trail be needed.	Construction Timing based on City need.	City of Greeley	City of Greeley	City of Greeley

* A development agreement will be drafted at the time of the final plat, which may supercede these commitments.

PRELIMINARY PLANNED UNIT DEVELOPMENT CERTIFICATION BLOCK

THIS PRELIMINARY PLANNED UNIT DEVELOPMENT (PUD) HAS BEEN REVIEWED AND FOUND TO BE COMPLETE AND IN ACCORDANCE WITH THE CITY OF GREELEY DEVELOPMENT CODE REGULATIONS. THIS PRELIMINARY PLANNED UNIT DEVELOPMENT APPROVAL SHALL BE VALID FOR 3 YEARS FROM THE DATE OF THE APPROVAL BY CITY COUNCIL.

WRD4 GREELEY PROPERTY

BY: [Signature]
(OWNER)

TITLE: Manager

DATE: 12/13/2020

CLERK & RECORDER

THIS PLAN WAS FILED FOR RECORD IN THE OFFICE OF THE WELD

COUNTY CLERK AND RECORDER THIS _____ DAY OF

_____, 20____ AND WAS RECORDED PER

RECEPTION NUMBER _____

WELD COUNTY CLERK AND RECORDER BY _____

CITY COUNCIL APPROVAL

APPROVED BY THE GREELEY CITY COUNCIL ON THIS 17th DAY OF November, 2020.

PLANNING COMMISSION RECOMMENDATION

RECOMMENDED NOT RECOMMENDED BY THE CITY OF GREELEY

PLANNING COMMISSION, THIS 13th DAY OF

October, 2020.

COMMUNITY DEVELOPMENT DIRECTOR

[Signature] 12/14/20
DIRECTOR OF COMMUNITY DEVELOPMENT DATE

SHEET INDEX

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MASTER PLAN	2
DEVELOPMENT STANDARDS	3 - 5
CONCEPT PLANS	6
OVERALL GRADING PLAN	7
OVERALL UTILITY PLAN	8

OWNER

WRD4 GREELEY PROPERTY
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-0401

DEVELOPER

BROE REAL ESTATE GROUP
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-4575

CIVIL ENGINEER
WARE MALCOMB
WARE MALCOMB
990 S. BROADWAY SUITE 230
DENVER, CO 80209
PHONE: (303) 561-3333

PLANNER

PLANMARK
DESIGN LLC
PLANMARK DESIGN
P.O. BOX 202411
DENVER, CO 80220
PHONE: (720) 232-5081

P.U.D. MASTER PLAN

DRAWN BY: AL
REVIEWED BY: MN
PROJECT NO:
ISSUE DATE: 9/12/2019

REVISIONS:

#	DATE	DESC
1	11/22/2019	CITY COMMENTS
2	03/10/2020	CITY COMMENTS
3	05/12/2020	CITY COMMENTS
4	08/07/2020	CITY COMMENTS
5	09/22/2020	CITY COMMENTS
6	11/24/2020	CITY COMMENTS

COVER SHEET / SUMMARY

1 OF 8

WESTGATE PRELIMINARY P.U.D. - FIRST AMENDMENT

A PARCEL OF LAND BEING A PART OF THE SOUTHEAST QUARTER OF SECTION 17

TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.

CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO

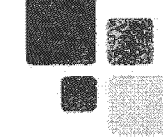
PUD2019-0014

APPROVAL CERTIFICATE	
ENGINEERING	INITIALS / DATE BPM 12/14/20
PLANNING	INITIALS / DATE WAS 12/15/20
OWNER	INITIALS / DATE

OWNER
WRD4 GREELEY PROPERTY
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-0401

DEVELOPER
BROE REAL ESTATE GROUP
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-4575

CIVIL ENGINEER
WARE MALCOMB
WARE MALCOMB
990 S. BROADWAY SUITE 230
DENVER, CO 80209
PHONE: (303) 561-3333

PLANNER

PLANMARK
DESIGN LLC
PLANMARK DESIGN
P.O. BOX 202411
DENVER, CO 80220
PHONE: (720) 232-5081

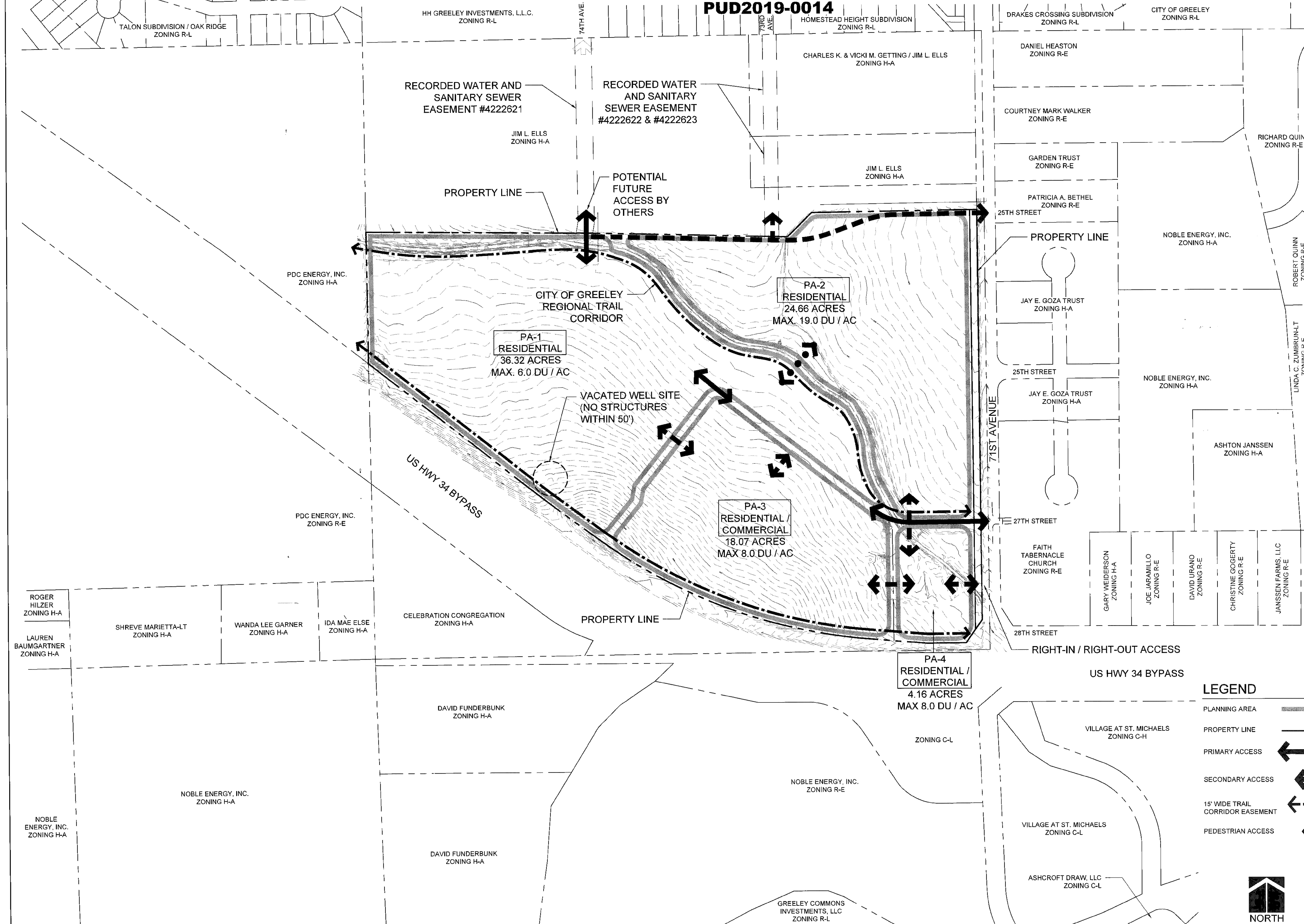
P.U.D. MASTER PLAN

DRAWN BY: AL
REVIEWED BY: MN
PROJECT NO:
ISSUE DATE: 9/12/2019

REVISIONS:		
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MASTER
PLAN

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WESTGATE PRELIMINARY P.U.D. - FIRST AMENDMENT
A PARCEL OF LAND BEING A PART OF THE SOUTHEAST QUARTER OF SECTION 17
TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
PUD2019-0014

PUD DEVELOPMENT STANDARDS

DEVELOPMENT IN THIS P.U.D. SHALL MEET THE FOLLOWING STANDARDS HEREIN ESTABLISHED, IN ADDITION TO OTHER SECTIONS OF THE GREELEY DEVELOPMENT CODE AS APPLICABLE. WHERE CONFLICT OCCURS, OR THE CODE IS SILENT, THE MORE RESTRICTIVE REGULATION APPLIES.

1.0 DEVELOPMENT STANDARDS CHART

AREA	LOT MINIMUMS	MINIMUM BUILDING SETBACKS						ADDITIONAL REQUIREMENTS		
USE	SIZE	FRONT	TO GARAGE	REAR / GARAGE	SIDE	SIDE ADJ. TO ROW*	INTERNAL LOT LINE	MAX. BLDG. HT.	MAX. LOT COVERAGE	MIN. PARKING SPACES / UNIT
PLANNING AREA 1 SINGLE FAMILY	5,000 SF	15 FT	20 FT	15 FT / 5 FT	5 FT	10 FT	N/A	30 FT	70% (NOTE 2)	2 SPACES
PLANNING AREA 2 SINGLE FAMILY	3,200 SF	15 FT	20 FT	15 FT / 5 FT	5 FT	10 FT	N/A	30 FT	80%	2 SPACES
FRONT-LOADED TWO-FAMILY TOWNHOUSE **	2,500 SF	15 FT	20 FT	10 FT	5 FT	10 FT	0 FT	40 FT	80%	2 SPACES
	N/A	15 FT	20 FT	10 FT	7.5 FT	15 FT	0 FT	40 FT	N/A	2 SPACES
REAR-LOADED TWO-FAMILY TOWNHOUSE **	2,500 SF	15 FT	N/A	5 FT	5 FT	15 FT	0 FT	40 FT	80%	2 SPACES
	N/A	15 FT	N/A	5 FT	7.5 FT	15 FT	0 FT	40 FT	N/A	2 SPACES
MULTI-FAMILY	N/A	15 FT. R.O.W.	20 FT	N/A	N/A	25 FT	0 FT.	40 FT	80%	SEE SEC. 3.0
PLANNING AREA 3 & 4 SINGLE FAMILY	3,200 SF	15 FT	20 FT	15 FT	5 FT	10 FT	N/A	30 FT	80%	2 SPACES
FRONT-LOADED TWO-FAMILY TOWNHOUSE **	2,500 SF	15 FT	15 FT	10 FT	5 FT	15 FT	0 FT	40 FT	80%	2 SPACES
	N/A	15 FT	20 FT	10 FT	7.5 FT	15 FT	0 FT	40 FT	N/A	2 SPACES
REAR-LOADED TWO-FAMILY TOWNHOUSE **	2,500 SF	15 FT	N/A	5 FT	5 FT	15 FT	0 FT	40 FT	80%	2 SPACES
	N/A	15 FT	N/A	5 FT	7.5 FT (NOTE 2)	15 FT	0 FT	40 FT	N/A	2 SPACES
COMMERCIAL	N/A	25 FT	N/A	N/A	PER CODE	25 FT*	0 FT	50 FT (NOTE 5)	80%	SEE SEC. 3.0

*AND EXTERNAL P.U.D. BOUNDARY

**** TOWNHOUSE NOTES**

- SEE PRIVATE ALLEY REQUIREMENTS IN SECTION 2.0 OF THIS P.U.D.
- PARKING SETBACK FOR ATTACHED RESIDENTIAL OR TOWNHOUSE PRODUCT IS 3 FEET FROM PROPERTY LINES.
- SHOULD TOWNHOUSES BE DESIGNED WITH BOTH PUBLIC R.O.W. AND PRIVATE ALLEY, THEN MINIMUM SETBACKS FOR REAR-LOADED TOWNHOUSES IN DEVELOPMENT STANDARDS CHART APPLY.
- SIDE YARD SETBACKS ONLY APPLY TO END UNITS OF TOWNHOUSE BUILDINGS. INTERNAL LOTS HAVE 0' LOT LINE SETBACKS OR MINIMUM SEPARATION PER BUILDING CODE.

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252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-0401

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252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-4575

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990 S. BROADWAY SUITE 230
DENVER, CO 80209
PHONE: (303) 561-3333

PLANNER
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DESIGN LLC
PLANMARK DESIGN
P.O. BOX 202411
DENVER, CO 80220
PHONE: (720) 232-5081

P.U.D. MASTER PLAN

1.0 DEVELOPMENT STANDARDS CHART NOTES

THE FOLLOWING NOTES REFERENCE THE DEVELOPMENT STANDARDS CHART.

- THE PLANNING AREAS FOLLOW THE NOTED ZONING DISTRICTS IN THE CITY OF GREELEY DEVELOPMENT CODE (AS AMENDED). WHERE THIS CHART OR OTHER NOTES IN THIS P.U.D. DO NOT ADDRESS AN ITEM, REFER TO ZONING CODE. CHART LISTS BASE STANDARDS FOR P.U.D. PERFORMANCE OPTIONS MAY STILL APPLY WHERE NECESSARY. SHOULD FUTURE ALTERATIONS BE MADE TO THIS P.U.D. AFFECTING THE LOCATION OF THE PLANNING AREA TYPES AND THEIR BOUNDARIES, THIS CHART MAY NEED TO BE ALTERED TO ACCOMPLISH THE INTENT OF THIS P.U.D. WITH THE PROPOSED CHANGES.
- MAXIMUM COVERAGE FOR A CUL-DE-SAC BULB LOT IS 75% PER CODE SECTION 18.40.100, AS AMENDED. LOT COVERAGE IS THE RATIO OF THE TOTAL FOOTPRINT AREA OF ALL STRUCTURES ON A LOT TO THE NET LOT AREA, TYPICALLY EXPRESSED AS A PERCENTAGE. THE FOOTPRINTS OF ALL PRINCIPAL AND ACCESSORY STRUCTURES, INCLUDING GARAGES, CARPORTS, COVERED PATIOS, AND ROOFED PORCHES, SHALL BE SUMMED IN ORDER TO CALCULATE LOT COVERAGE.
- IF A DRIVEWAY IS TO BE USED TO SATISFY GUEST PARKING REQUIREMENTS FOR ANY RESIDENTIAL UNIT, THEN MINIMUM SETBACK TO THE GARAGE FACE ON THE DRIVEWAY SIDE OF THE UNIT (FRONT OR REAR) IS 20 FEET. SEE SECTION 3.0 PARKING STANDARDS IN THIS P.U.D.
3.1. DRIVEWAYS CAN COUNT TOWARDS GUEST PARKING REQUIREMENTS SO LONG AS TWO-CAR GARAGE IS PROVIDED AND MINIMUM DEPTH OF DRIVEWAY IS MET.
- FOR INTERIOR REAR AND SIDE SETBACKS ON MULTI-FAMILY AND COMMERCIAL BUILDINGS, REFER TO THE INTERNATIONAL BUILDING CODE AND/OR CITY CODE REQUIREMENTS, AS AMENDED.
- COMMERCIAL BUILDING HEIGHT MEANS THE VERTICAL DISTANCE AT ANY POINT FROM NATURAL GROUND LEVEL TO THE UPPERMOST PART OF THE BUILDING STRUCTURE INCLUDING PARAPET. FOR COMMERCIAL USES, IT DOES NOT INCLUDE ELEVATOR PENTHOUSES, MECHANICAL EQUIPMENT, MECHANICAL SCREENS, CONDENSERS, EXHAUST FANS AND OTHER MINOR PROJECTIONS ABOVE 50'. ONE FOOT OF ADDITIONAL BUILDING HEIGHT PERMITTED FOR EACH ADDITIONAL 3 FOOT INCREMENT OF SETBACK FROM ALL PARCEL BOUNDARIES.

1.1 PLANNING AREA 1 - RESIDENTIAL

IN ADDITION TO THE PUD DEVELOPMENT STANDARDS, PLANNING AREA 1 SHALL FOLLOW CITY OF GREELEY MUNICIPAL CODE AND R-L ZONING EXCEPT FOR THE CHANGES NOTED IN THE DEVELOPMENT STANDARDS CHART.

1.2 PLANNING AREA 2 - RESIDENTIAL

IN ADDITION TO THE PUD DEVELOPMENT STANDARDS, PLANNING AREA 2 SHALL FOLLOW CITY OF GREELEY MUNICIPAL CODE AND R-H ZONING EXCEPT FOR THE CHANGES NOTED IN THE DEVELOPMENT STANDARDS CHART.

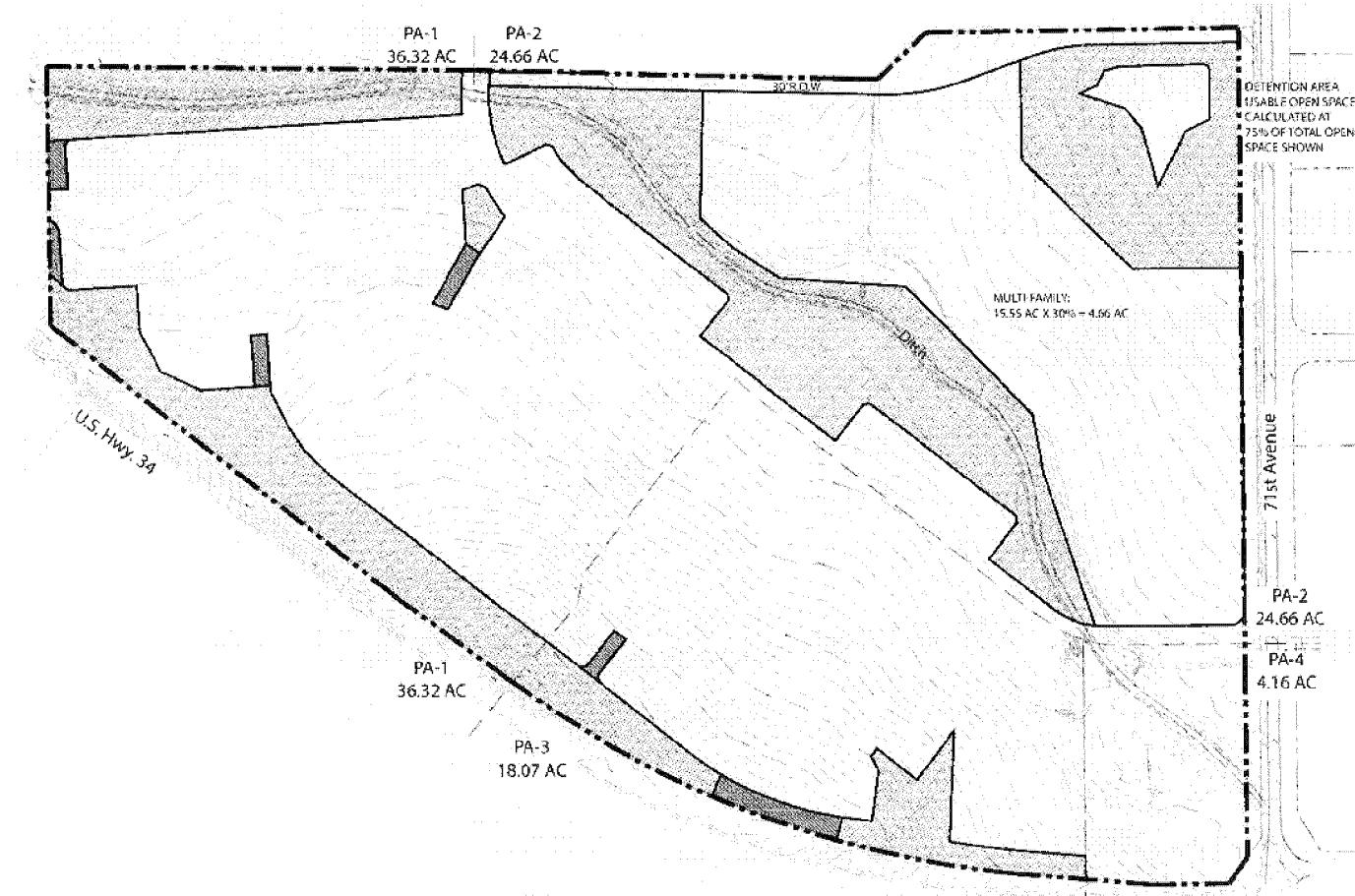
1.3 PLANNING AREAS 3 & 4 - RESIDENTIAL / COMMERCIAL

IN ADDITION TO THE PUD DEVELOPMENT STANDARDS, PLANNING AREAS 3 & 4 SHALL FOLLOW CITY OF GREELEY MUNICIPAL CODE AND R-H ZONING AND C-H ZONING INCLUDING USES SUCH AS ASSISTED LIVING, MEMORY CARE AND MEDICAL OFFICE / CLINIC. EXCEPTIONS ARE LISTED IN THE DEVELOPMENT STANDARDS CHART AND PROHIBITED USES ARE LISTED BELOW.

- A. PROHIBITED USES:
- A.1. AUTO RENTAL
 - A.2. AUTO REPAIR / SALES
 - A.3. COMMERCIAL TRUCK WASH
 - A.4. TOWING SERVICES
 - A.5. BINGO HALLS & PARLORS
 - A.6. BUILDERS, CONTRACTORS SUPPLY, OFFICES & YARDS
 - A.7. EMISSION TESTING CENTERS
 - A.8. MORTUARIES, FUNERAL HOMES
 - A.9. PARKING STRUCTURES (MULTI-LEVEL PARKING DECKS) AND PAY PARKING LOTS
 - A.10. PAWN SHOPS
 - A.11. SELF SERVE STORAGE UNITS
 - A.12. LAUNDROMATS
- B. THE FOLLOWING USES ARE NOT SPECIFICALLY DEFINED IN SECTION 18.30.070 OF THE CITY ZONING CODE; HOWEVER, THEY ARE PROHIBITED IN THIS P.U.D.:
- B.1. THRIFT / SECOND HAND STORES
- B.1.a DEFINITIONS
- THRIFT STORE - A PLACE WHERE GOODS CAN BE DONATED OR SOLD TO BE REFURBISHED AND RESOLD AT REDUCED PRICES.
- SECOND HAND STORE - A SHOP WHICH SELLS GOODS THAT ARE NOT NEW
- B.2. TATTOO AND/OR BODY PIERCING ESTABLISHMENT
- B.2.a. DEFINITION: A PLACE WHERE PERMANENT TATTOOS AND/OR BODY PIERCING ARE GIVEN.
- B.3. MARIJUANA ESTABLISHMENTS

PUD OPEN SPACE

CONCEPTUAL SCENARIO - DOES NOT REPRESENT FINAL PLAN



RESIDENTIAL PLANNING AREAS (1, 2, 3) = 79.05 AC
OPEN SPACE REQUIRED (30%) = 23.72 AC
OPEN SPACE PROVIDED IN CONCEPT = 24.81 AC

USABLE OPEN SPACE: 19.41 AC (78%)
ADDITIONAL OPEN SPACE: 5.40 AC (22%)

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DEVELOPMENT STANDARDS

3 OF 8

WESTGATE PRELIMINARY P.U.D. - FIRST AMENDMENT

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TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.

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DENVER, CO 80208
PHONE: (303) 398-0401

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WARE MALCOMB
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DEVELOPMENT
STANDARDS

4 OF 8

PUD DEVELOPMENT STANDARDS

DEVELOPMENT IN THIS P.U.D. SHALL MEET THE FOLLOWING STANDARDS HEREIN ESTABLISHED, IN ADDITION TO OTHER SECTIONS OF THE GREELEY DEVELOPMENT CODE (AS AMENDED) AS APPLICABLE. WHERE CONFLICT OCCURS, OR THE CODE (AS AMENDED) IS SILENT, THE MORE RESTRICTIVE REGULATION APPLIES.

2.0 DESIGN STANDARDS

P.U.D. SITE PLAN MUST MEET THE FOLLOWING SITE DESIGN STANDARDS.

- A. ARCHITECTURAL VARIETY - SINGLE FAMILY DETACHED RESIDENTIAL AREAS OF THE P.U.D. SHALL PROVIDE A MIX OF RESIDENTIAL HOUSE MODELS IN ORDER TO AVOID MONOTONOUS STREETSCAPES.
- A.1. THE NUMBER OF HOUSE MODELS REQUIRED IN A PLANNING AREA SHALL BE THE NUMBER REQUIRED BASED ON THE NUMBER OF LOTS THAT THE ACCOMPANYING PLAT INDICATES AND AS DEFINED IN SECTION 18.40.100 OF THE CITY OF GREELEY DEVELOPMENT CODE (AS AMENDED) PLUS ONE ADDITIONAL HOUSE MODEL. THE DEFINITION OF HOUSE MODEL SHALL BE THAT GIVEN WITHIN CITY CODE, PROVIDED THAT IT IS EXPLICITLY UNDERSTOOD THAT A SPECIFIC HOUSE MODEL DOES NOT NECESSARILY MEAN A COMPLETELY UNIQUE FLOOR PLAN. A DIFFERING HOUSE MODEL MAY BE A UNIQUELY DESIGNED AND FINISHED FRONT ELEVATION ON THE SAME FLOOR PLAN. DEVELOPER TO PROVIDE ROSTER OF HOUSE MODELS.
- A.2. THE FRONT FACADE OF THE DWELLING HAS AT LEAST ONE (1) CHANGE OF BUILDING PLANE, EXCLUSIVE OF THE GARAGE, PORCHES, ADDITIONAL SHED ROOF LINES, OVERSIZED TWO (2) CAR GARAGES, AND THIRD (3RD) CAR GARAGES SHALL BE APPROVED AS CHANGE OF BUILDING PLANES. NO MORE THAN 60% OF THE GROUND FLOOR FRONT FACADE SHALL BE OCCUPIED BY A GARAGE FRONT.
- A.3. WINDOW AND DOORWAY OPENINGS COVERING AT LEAST TWENTY PERCENT (20%) OF ANY FACADE FACING A PUBLIC STREET (EXCLUSIVE OF GARAGE OPENINGS AND GARAGE AREA), ON THE SIDE STREET FACADES OF CORNER LOTS, WINDOW AND DOORWAY OPENINGS MAY BE REDUCED TO FIVE PERCENT (5%) OF THE SIDE STREET FACADE (EXCLUSIVE OF GARAGE OPENINGS AND GARAGE AREA). REAR FACADES SHALL BE EXCLUDED FROM REQUIRED WINDOW AND DOORWAY OPENINGS.
- A.4. A PARTICULAR HOUSE MODEL SHALL BE USED FOR NO MORE THAN TWO-THIRD (2/3) OF THE LOTS IN A DEVELOPMENT. IN SOME CASES, SIMILARITY OF DESIGN MAY BE DESIRABLE IN SINGLE-FAMILY AND TWO-FAMILY DEVELOPMENTS DUE TO THE SIZE OR SCALE OF THE DEVELOPMENT, OR THE PROPOSED HOUSING UNIT TYPE. IN THIS CASE, ALTERNATIVE COMPLIANCE, AS PROVIDED FOR IN SECTION 18.38.140, MAY BE USED TO ADDRESS SUCH DEVELOPMENT PROPOSALS.
- A.5. THE FRONT ENTRANCE TO THE DWELLING SHALL HAVE EITHER:
- A.5.1. A COVERED PORCH AT LEAST SIX (6) FEET BY SIX (6) FEET IN SIZE, OR
- A.5.2. THE FRONT ENTRANCE IS WELL-DEFINED WITH A COVERED OR GABLED ENTRY, DISTINCT CHANGE IN ROOF LINE OR COLUMNS.
- B. CONTINUITY OF SITE ELEMENTS / PRODUCTS - SITE ELEMENTS / PRODUCTS SUCH AS BENCHES, RAILINGS, FENCING, ENCLOSURES, BIKE RACKS, TRASH RECEPTACLES, RETAINING WALLS, MONUMENTS, SIGNAGE, ETC. SHALL BE COORDINATED THROUGHOUT THE P.U.D. IT IS PREFERRED THAT THE SAME PRODUCT BE USED CONSISTENTLY THROUGHOUT THE P.U.D.; HOWEVER, IF USING THE SAME PRODUCT IS NOT POSSIBLE, THEN THE ALTERNATE PRODUCT SHALL BE SIMILAR IN MATERIAL, COLOR, AND STYLE. ALL ELEMENTS TO BE OWNED AND MAINTAINED BY THE METROPOLITAN DISTRICT.
- C. SITE MONUMENTS / SIGNAGE
- C.1. SITE MONUMENT / SIGNAGE THROUGHOUT THE P.U.D. SHOULD HAVE CONTINUITY ON MATERIALS, COLORS, AND OVERALL DESIGN. PRIMARY AND SECONDARY MONUMENTS, DECORATIVE COLUMNS, AND ANY OTHER PERMANENT CORRESPONDING SIGNAGE RELATING TO THE P.U.D. ARE SUBJECT TO THESE STANDARDS. FOR ALL OTHER SIGNAGE, INCLUDING ANY INDIVIDUAL COMMERCIAL TENANT SIGNS REFER TO CODE (AS AMENDED).
- C.1.1. PRIMARY MONUMENTS - SIGNAGE USED TO ENHANCE THE PRIMARY ENTRANCES TO THE P.U.D. THESE SIGNS MARKET THE P.U.D. AS A WHOLE.
- C.1.2. SECONDARY MONUMENTS - SIGNAGE USED TO ENHANCE INDIVIDUAL PLANNING AREAS AND THEIR USES, WHETHER RESIDENTIAL (INCLUDING MULTI-FAMILY COMMUNITY IDENTITY AT 71ST AND HWY 34), COMMERCIAL, OR RELATED FEATURES SUCH AS PARKS.
- C.2. MATERIALS - SHOULD BE PRIMARILY OF STONE, BRICK, OR STUCCO WITH ADDED FEATURES OF WOOD AND/OR METAL.
- C.3. HEIGHT - MAXIMUM HEIGHT FOR MONUMENTS SHALL BE NINE (9) FEET HIGH FROM TOP OF MONUMENT FOUNDATION.
- C.4. LETTERING
- C.4.1. PRIMARY MONUMENTS SHALL NOT EXCEED 60 PERCENT OF THE TOTAL SIGN AREA.
- C.4.2. SECONDARY MONUMENTS FOR RESIDENTIAL SHALL NOT EXCEED 50 PERCENT OF THE TOTAL SIGN AREA.
- C.4.3. SECONDARY MONUMENTS FOR COMMERCIAL SHALL NOT EXCEED 70 PERCENT OF THE TOTAL SIGN AREA.
- C.5. LIGHTING - PRIMARY MONUMENTS SHALL HAVE SUFFICIENT LIGHTING TO FULLY ILLUMINATE TEXT ON THE FACE OF THE SIGN.
- C.6. LOCATION
- C.6.1. MONUMENTS AND SIGNS ARE TO REMAIN OUTSIDE OF ANY PUBLIC OR PRIVATE UTILITY EASEMENTS OR SIGHT DISTANCE TRIANGLES.
- C.6.2. MONUMENTS AND SIGNS CANNOT BE LOCATED IN OR ENCRDACHING INTO A PUBLIC RIGHT-OF-WAY UNLESS A R.O.W. ENCROACHMENT AGREEMENT IS APPROVED BY THE CITY.
- C.7. SIGN PERMITS ARE REQUIRED FOR ALL MONUMENTS AND SIGNS.
- C.8. BUILDING MOUNTED SIGNAGE IS PERMITTED FOR COMMERCIAL USES VISIBLE FROM ALL PUBLIC RIGHT-OF-WAYS AND SHALL COMPLY WITH THE CITY'S SIGN CODE REGULATIONS.
- D. BLOCK LENGTH - MAXIMUM ALLOWABLE PUBLIC R.O.W. BLOCK LENGTH IS 1,450 FEET, MEASURED BETWEEN INTERSECTIONS OR TRACTS.
- E. PRIVATE ALLEYS - PRIVATE ALLEYS ARE PERMITTED IN PLANNING AREAS 2, 3 AND 4. PUBLIC UTILITIES MAY BE LOCATED IN PRIVATE ALLEYS AS LONG AS APPROPRIATE EASEMENTS ARE PROVIDED.
- E.1. PRIVATE ALLEY ROW / EASEMENT TO BE MINIMUM 20 FEET IN WIDTH.
- F. USABLE OPEN SPACE - IF REQUIRED AMOUNT OF USABLE OPEN SPACE CANNOT BE MET ON PROPOSED PLAN, ADDITIONAL NEIGHBORHOOD IDENTITY FEATURES, ABOVE AND BEYOND THE MINIMUM REQUIRED, SHALL COUNT TOWARDS USABLE OPEN SPACE AT ONE (1) FEATURE TO 1,000 SF OF REQUIRED USABLE OPEN SPACE. SEVENTY-FIVE PERCENT OF ON-SITE DETENTION BASIN AREAS WILL COUNT TOWARDS USABLE OPEN SPACE CALCULATIONS.
- G. NEIGHBORHOOD IDENTITY FEATURES (SECTION 18.40.100) - THE NUMBER OF FEATURES REQUIRED IS BASED ON THE TOTAL NUMBER OF SINGLE FAMILY DETACHED AND SINGLE FAMILY ATTACHED RESIDENTIAL UNITS WITHIN THE ENTIRE P.U.D. AREA. THE FEATURES MAY BE LOCATED THROUGHOUT THE PLANNING AREAS AND WILL BE ACCESSIBLE BY ALL RESIDENTS. ONE HALF IDENTITY FEATURE CREDIT WILL BE GIVEN FOR INCREASING LANDSCAPE BUFFERS TO THE NEXT LEVEL. MULTI-FAMILY DEVELOPMENTS WILL REQUIRE SEPARATE ADDITIONAL RECREATIONAL AMENITIES BASED ON TOTAL MULTI-FAMILY UNITS AND WILL BE ACCESSIBLE ONLY TO MULTI-FAMILY RESIDENTS.
- H. STREET TREES ALONG LOCAL RESIDENTIAL STREETS WITH ADJACENT PRIVATE RESIDENTIAL LOTS TO BE PROVIDED AT A RATE OF ONE TREE PER RESIDENTIAL LOT. LOTS WHICH SIDE TO LOCAL RESIDENTIAL STREET RIGHT-OF-WAY TO PROVIDE TWO ADDITIONAL STREET TREES ALONG SIDE.

3.0 PARKING STANDARDS

THE FOLLOWING PARKING STANDARDS APPLY TO THIS P.U.D. IN ADDITION TO THE DEVELOPMENT SUMMARY CHART REQUIREMENTS. REFERENCE CITY CODE FOR ITEMS NOT ADDRESSED IN THIS P.U.D.

OFF-STREET PARKING

- A. PARKING REQUIREMENTS:
- NUMBER OF PARKING SPACES FOR MULTI-FAMILY DWELLINGS:
- EFFICIENCY UNITS 1.25 SPACE PER UNIT
 - ONE-BEDROOM UNITS 1.50 SPACE PER UNIT
 - TWO-BEDROOM UNITS 1.75 SPACES PER UNIT
 - THREE+ BEDROOM UNITS 2.0 SPACES PER UNIT
- ASSISTED LIVING / MEMORY CARE / GROUP HOME:
- 1 SPACE PER 2 BEDS
 - 1 SPACE PER EMPLOYEE BASED ON PEAK SHIFT PLUS 10% ADDITIONAL SPACES FOR OVERLAP BETWEEN SHIFTS
- B. DRIVEWAYS FOR GARAGES FOR SINGLE FAMILY RESIDENTIAL AND TOWNHOMES MAY COUNT TOWARDS REQUIRED PARKING SO LONG AS THE DRIVEWAYS HAVE A MINIMUM DEPTH OF 20 FEET FROM RIGHT-OF-WAY OR ALLEY. NO PARKING IN ALLEYS UNLESS IN FULL DEPTH (20') OF DRIVEWAY. AT NO TIME MAY VEHICLES PARKED IN THE DRIVEWAYS OVERLAP OR OVERHANG THE SIDEWALKS.

4.0 LANDSCAPE BUFFERS

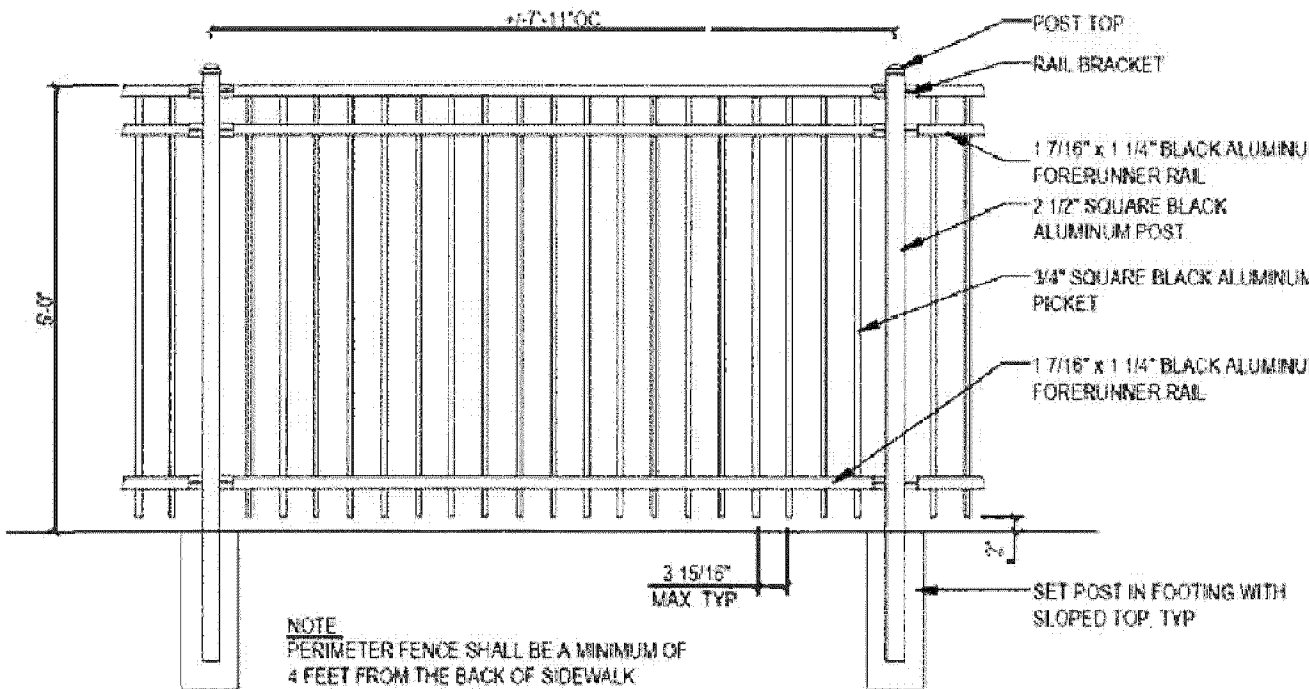
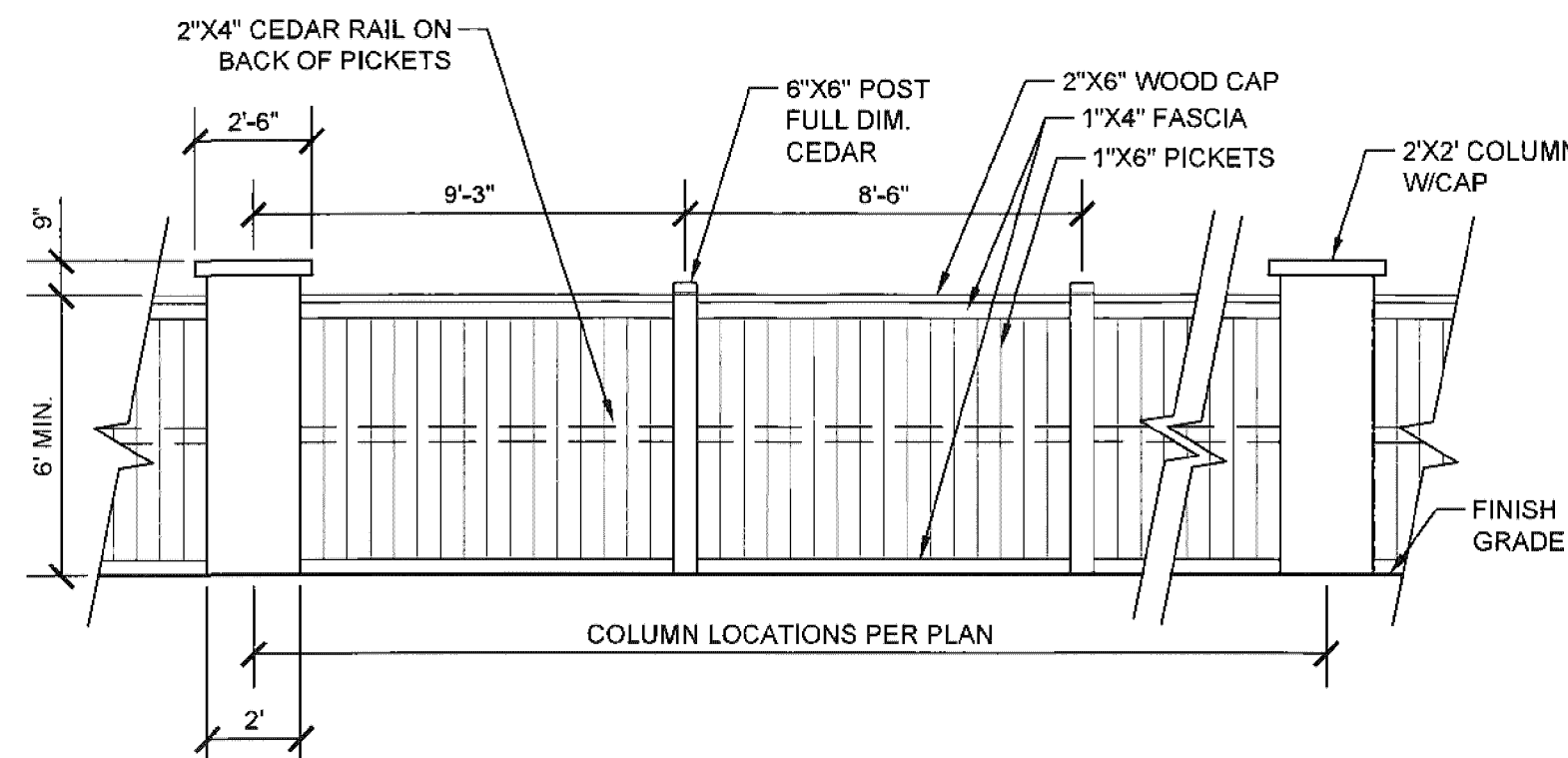
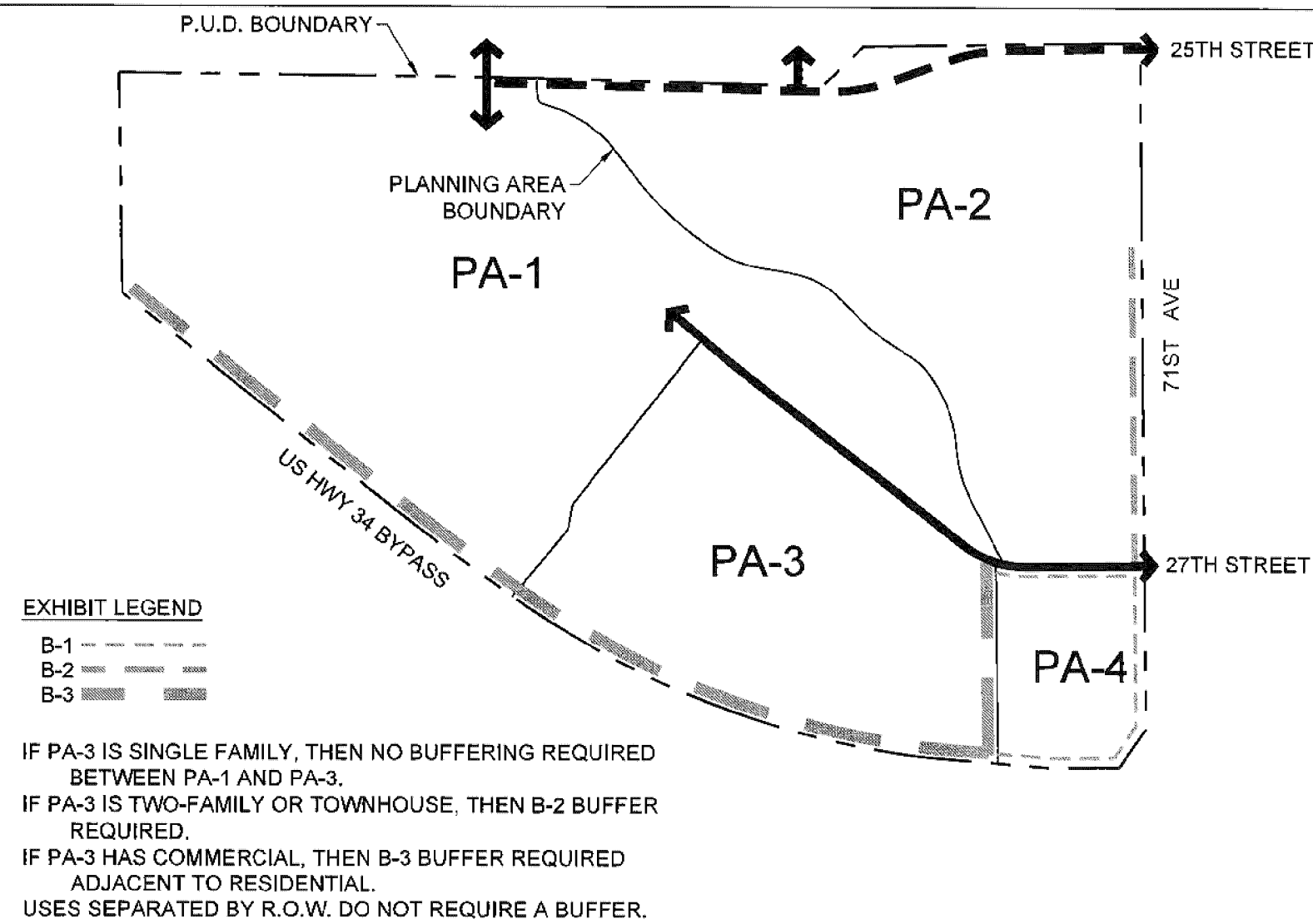
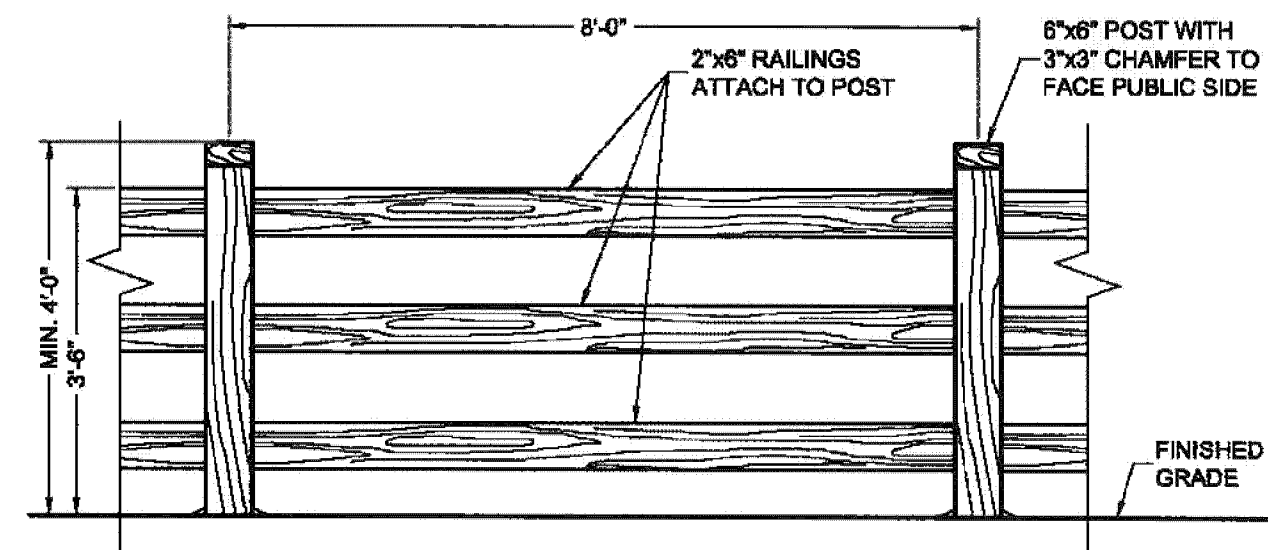
THE FOLLOWING LANDSCAPE BUFFERS CORRESPOND TO THE REQUIREMENTS LISTED IN GREELEY CODE 18.44.

- A. BUFFERS LISTED BELOW SERVE AS BOTH BUFFERS AND PERIMETER TREATMENTS FOR THE P.U.D. AND PLANNING AREAS.
- B. THE FOLLOWING BUFFER LEVELS ARE MINIMUMS, HOWEVER, IF PLANT QUANTITIES ARE INCREASED AT FINAL PUD, THEN NEIGHBORHOOD IDENTITY FEATURE FOR EVERY (1/4) MILE OF INCREASED BUFFER. PLANTINGS CAN BE CLUSTERED AND DO NOT NEED TO BE EVENLY SPACED.
- B-1: 15' WIDE MINIMUM. FOR EVERY 100 LINEAR FEET OF BUFFER THE FOLLOWING PLANTS ARE REQUIRED:
- 2 SHADE TREES
 - 2 ORNAMENTAL TREE
 - 5 SHRUBS (TYPE 1 - SMALL)
- B-2: 20' WIDE MINIMUM. FOR EVERY 100 LINEAR FEET OF BUFFER THE FOLLOWING PLANTS ARE REQUIRED:
- 2 SHADE TREES
 - 2 ORNAMENTAL TREES
 - 1 EVERGREEN TREE
 - 8 SHRUBS (TYPE 1 - SMALL)
- B-3: 25' WIDE MINIMUM. BERMING MAY BE INCORPORATED IN BUFFER. FOR EVERY 100 LINEAR FEET OF BUFFER THE FOLLOWING PLANTS ARE REQUIRED:
- 3 SHADE TREES
 - 2 ORNAMENTAL TREES
 - 2 EVERGREEN TREES
 - 12 SHRUBS (TYPE 1 - SMALL)
- C. IF A PORTION OF A BUFFER IS IMPACTED BY EXISTING OR PROPOSED UTILITIES, IRRIGATION DITCH, OR DRAINAGE SUCH THAT TREES ARE NOT ALLOWED TO BE PLANTED WITHIN THAT AREA, THE FOLLOWING SUBSTITUTIONS ARE ALLOWED:
- C.1. THREE (3) SHRUBS (TYPE 3-LARGE) FOR EVERY SHADE TREE AND/OR EVERGREEN TREE.
- C.2. FIVE (5) SHRUBS (TYPE 2-MEDIUM) FOR EVERY ORNAMENTAL TREE.
- C.3. REFER TO CODE (APPENDIX 18-D) FOR APPROVED PLANT LIST.
- D. BUFFERING FOR A P.U.D. PLANNING AREA TO BE CONSTRUCTED AT TIME OF DEVELOPMENT OF EACH INDIVIDUAL PLANNING AREA. BUFFERS WITHIN A GIVEN PLANNING AREA MAY BE PHASED PROVIDED THAT A FINANCIAL GUARANTEE IS PROVIDED FOR THE LATER PHASED PORTION IN ACCORDANCE WITH GREELEY CODE SECTION 18.04.1180(a)(3):
- D.1. PLANNING AREA 4 (COMMERCIAL): THE BUFFERING FOR PLANNING AREA 4 CAN BE CONSTRUCTED IN PHASES WITHOUT THE REQUIREMENT TO FINANCIALLY GUARANTEE THE ENTIRE BUFFER PROVIDED THAT THE AREA IS DEVELOPED IN SEPARATE PHASES / SEPARATE SITES, AND EACH SEPARATE SITE BUILDER / DEVELOPER CONSTRUCTS THE NECESSARY BUFFER ADJACENT TO THEIR INDIVIDUAL SITE PLANS.

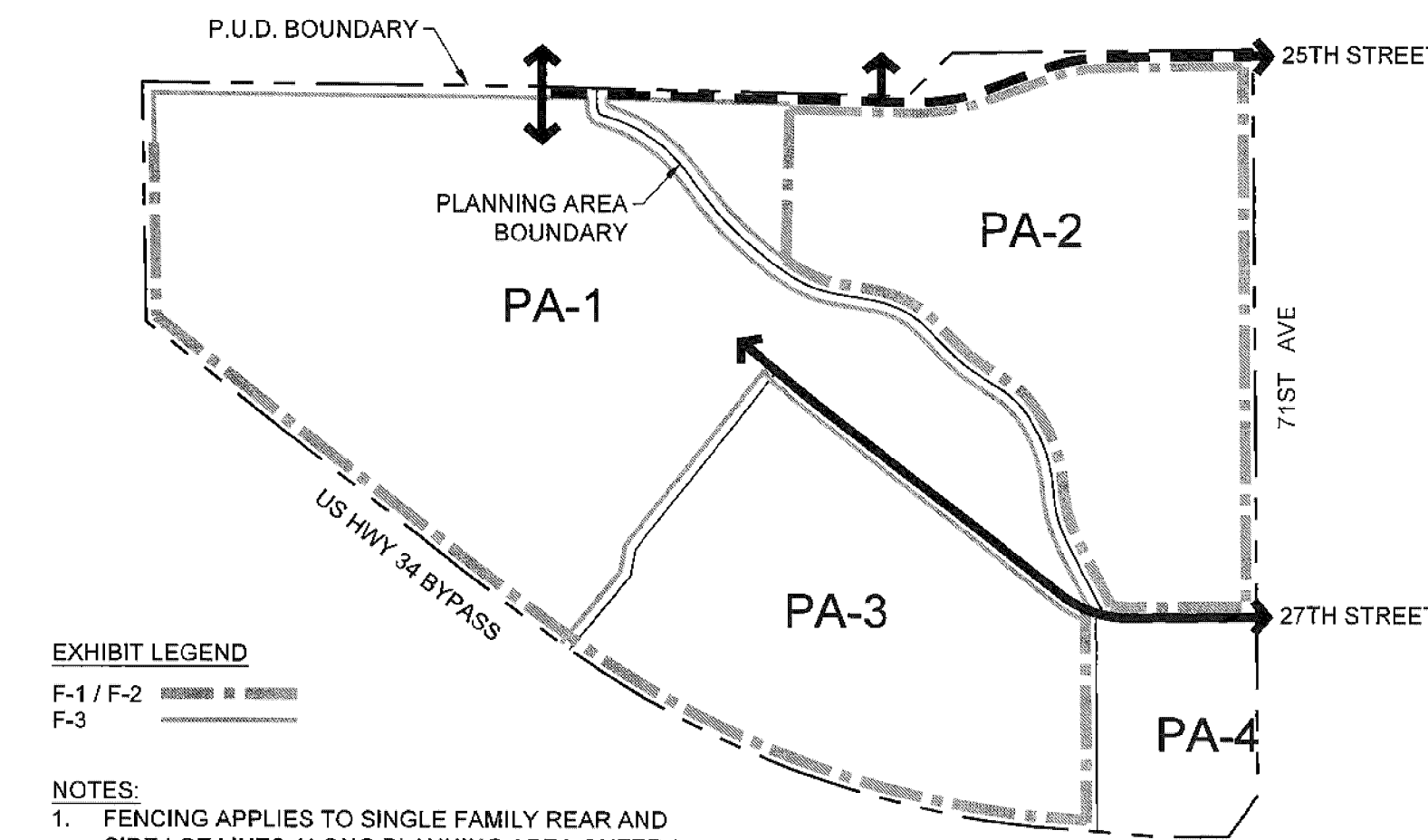
5.0 FENCING

THE FOLLOWING SUGGESTED FENCING TYPES REPRESENT GENERAL EXAMPLES WITH OTHER TYPES THAT MAY BE PERMITTED AT FINAL PUD.

- F-1: MAXIMUM SIX (6) FOOT TALL DECORATIVE IRON FENCING.
- F-2: MAXIMUM SIX (6) FOOT TALL OPAQUE FENCE / WALL (WOOD, STONE, BRICK, STUCCO, COMPOSITE MATERIAL, DECORATIVE CONCRETE OR SIMILAR MATERIAL) WITH DECORATIVE COLUMNS OF STONE, BRICK STUCCO, DECORATE CONCRETE OR SIMILAR MATERIAL.
- F-3: MINIMUM FOUR (4) FOOT TALL OPEN RAIL FENCE (WOOD, COMPOSITE OR CONCRETE). OPTIONAL WIRE MESH (NO CHICKEN WIRE OR CHAINLINK) CAN BE ADDED TO THE LOT SIDE OF THE FENCE

EXAMPLES OF FENCING TYPES**F-1 IRON FENCING****F-2 SOLID FENCING****4.1 LANDSCAPE BUFFERS EXHIBIT****F-3 OPEN RAIL FENCING****5.1 FENCING EXHIBIT**

CONCEPTUAL LOCATIONS & TYPES TO BE FINALIZED AT FINAL PLAT



- NOTES:
1. FENCING APPLIES TO SINGLE FAMILY REAR AND SIDE LOT LINES ALONG PLANNING AREA OUTER / PERIMETER LOTS AND TO PERIMETER OF PLANNING AREA FOR ALL MULTI-FAMILY USES. FENCING ALIGNMENT DOES NOT NEED TO BE ON TRACT BOUNDARY BUT MAY FOLLOW SHAPE OF INDIVIDUAL LOTS.

WESTGATE PRELIMINARY P.U.D. - FIRST AMENDMENT

A PARCEL OF LAND BEING A PART OF THE SOUTHEAST QUARTER OF SECTION 17

TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.

CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO

PUD2019-0014

APPROVAL CERTIFICATE	
ENGINEERING	INITIALS / DATE
PLANNING	8/2/20 12/14/20
OWNER	WBS 12/5/20
	INITIALS / DATE

OWNER
WRD4 GREELEY PROPERTY
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-0401

DEVELOPER

BROE REAL ESTATE GROUP
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-4575

CIVIL ENGINEER
WARE MALCOMB
WARE MALCOMB
990 S. BROADWAY SUITE 230
DENVER, CO 80209
PHONE: (303) 561-3333

PLANNER

PLAN MARK
DESIGN LLC
PLANMARK DESIGN
P.O. BOX 202411
DENVER, CO 80220
PHONE: (720) 232-5081

P.U.D. MASTER PLAN

PUD DEVELOPMENT STANDARDS (Continued)

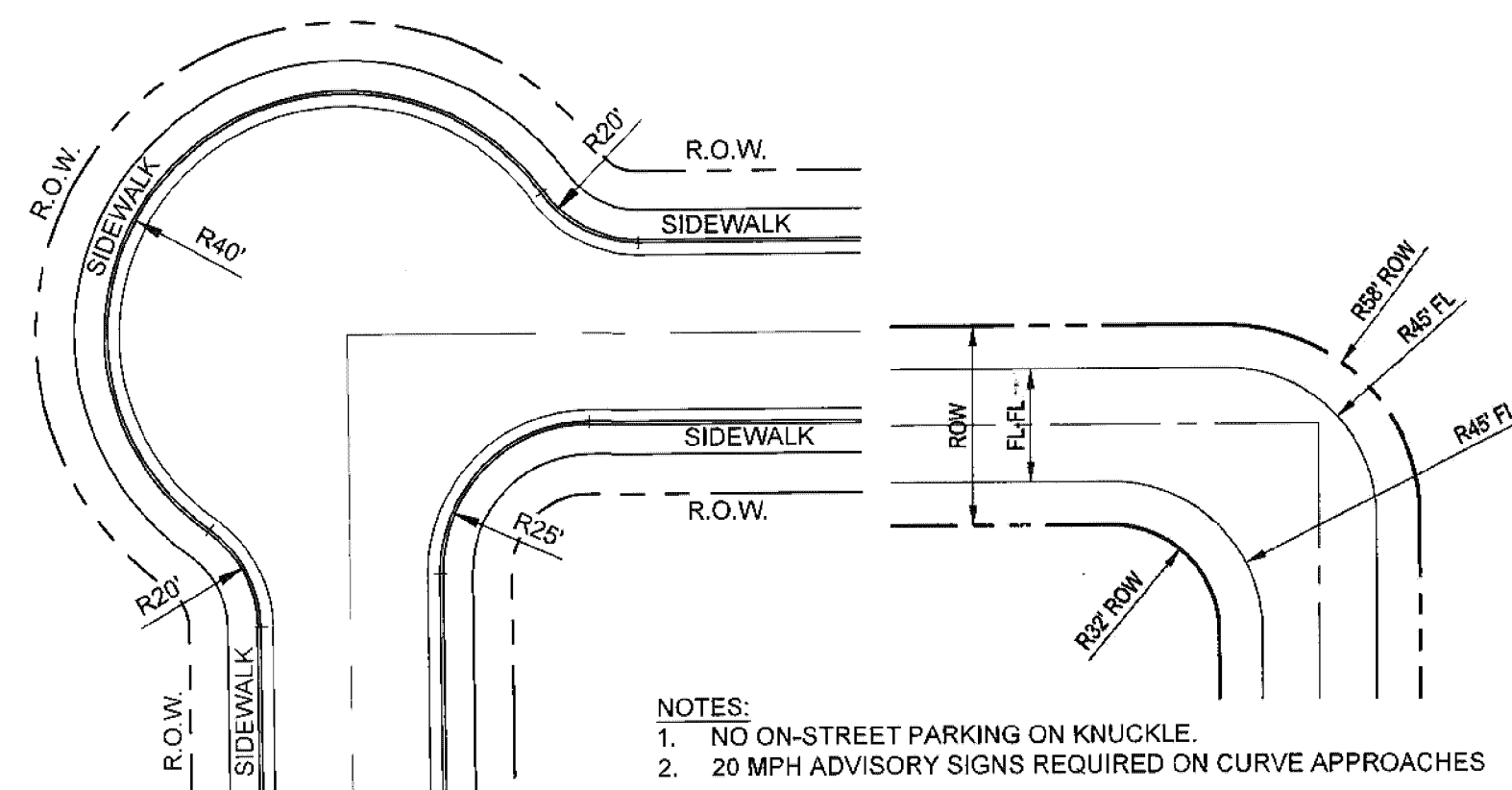
DEVELOPMENT IN THIS P.U.D. SHALL MEET THE FOLLOWING STANDARDS HEREIN ESTABLISHED, IN ADDITION TO OTHER SECTIONS OF THE GREELEY DEVELOPMENT CODE (AS AMENDED) AS APPLICABLE. WHERE CONFLICT OCCURS, OR THE CODE (AS AMENDED) IS SILENT, THE MORE RESTRICTIVE REGULATION APPLIES.

6.0 STREET DESIGN

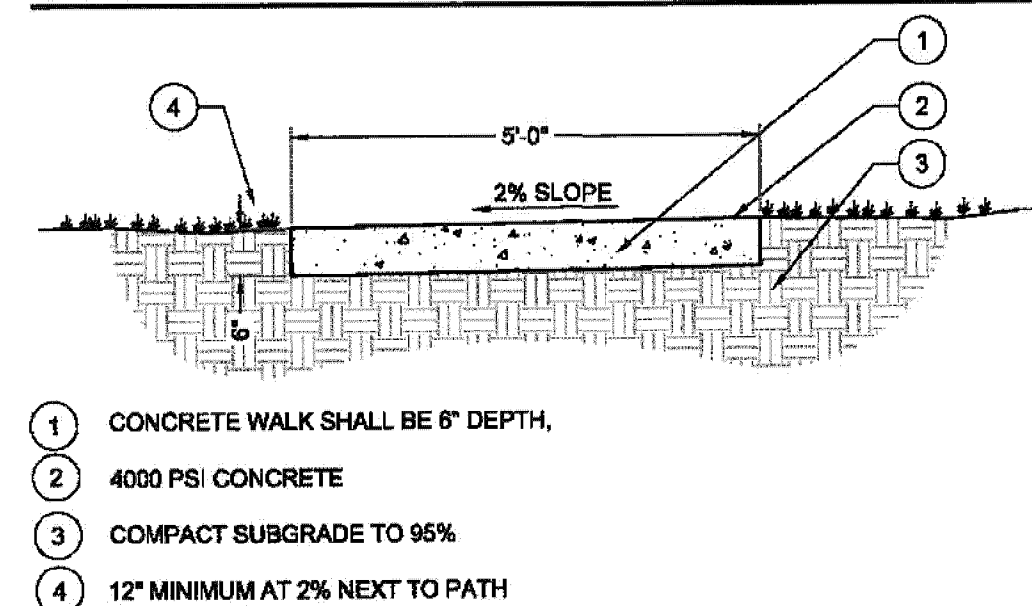
THE FOLLOWING STREET DESIGN DETAILS MAY BE USED IN ADDITION TO THE APPROVED STANDARD STREET DETAILS IN THE CITY CODE.

6.1 KNUCKLE DETAIL

THESE DETAILS MAY BE APPLIED TO LOCAL RESIDENTIAL STREETS.

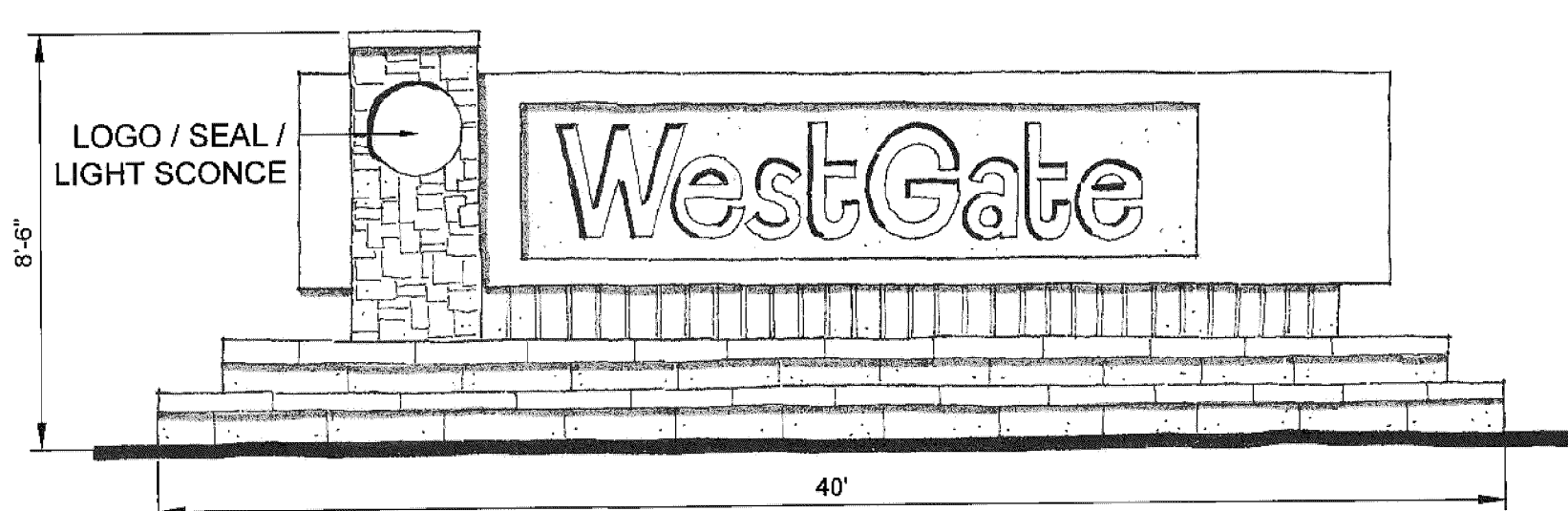
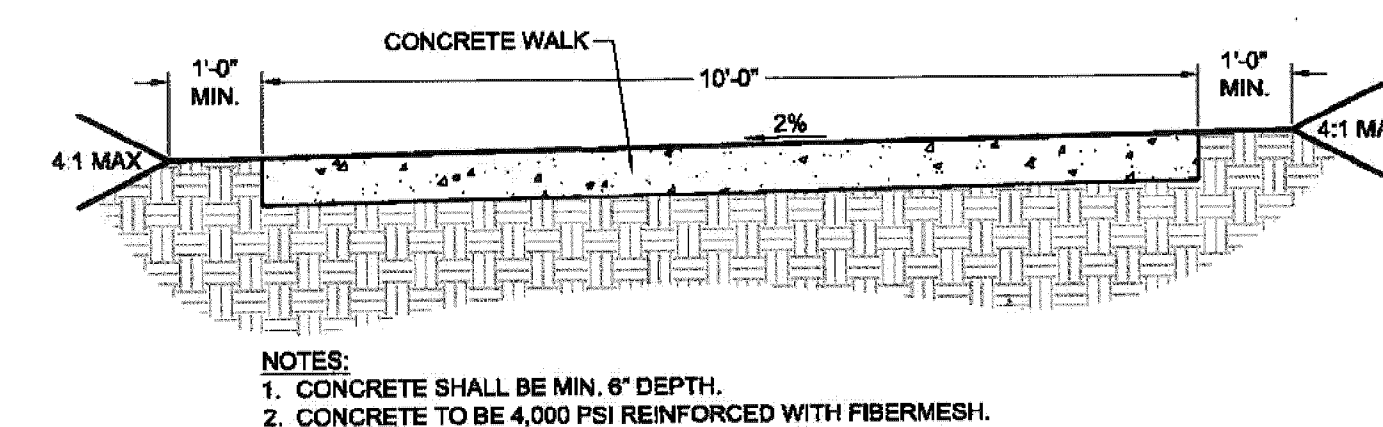


CONCRETE WALK



10' REGIONAL TRAIL

SCALE: 1/2" = 1'-0"



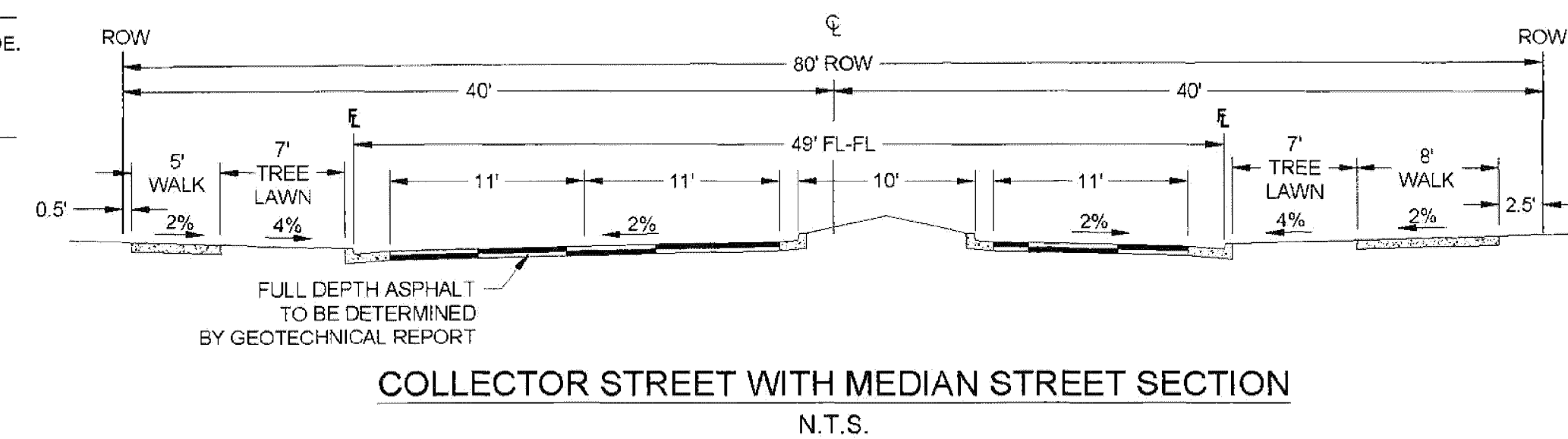
PRIMARY MONUMENT SIGN

NTS

MAIN ENTRANCE / INTERSECTION WITH HWY. 34
MATERIALS: STONE, BRICK, METAL, STUCCO

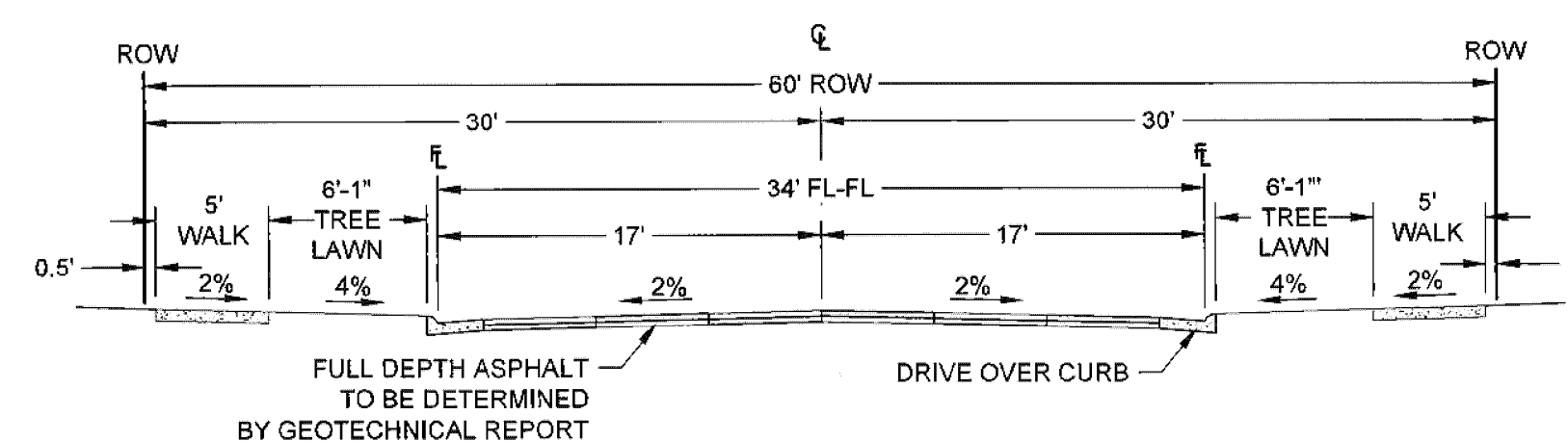
SIGNAGE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEPARATE SIGN PERMIT REQUIRED.

6.2 80 FT COLLECTOR STREET WITH MEDIAN (27TH STREET)



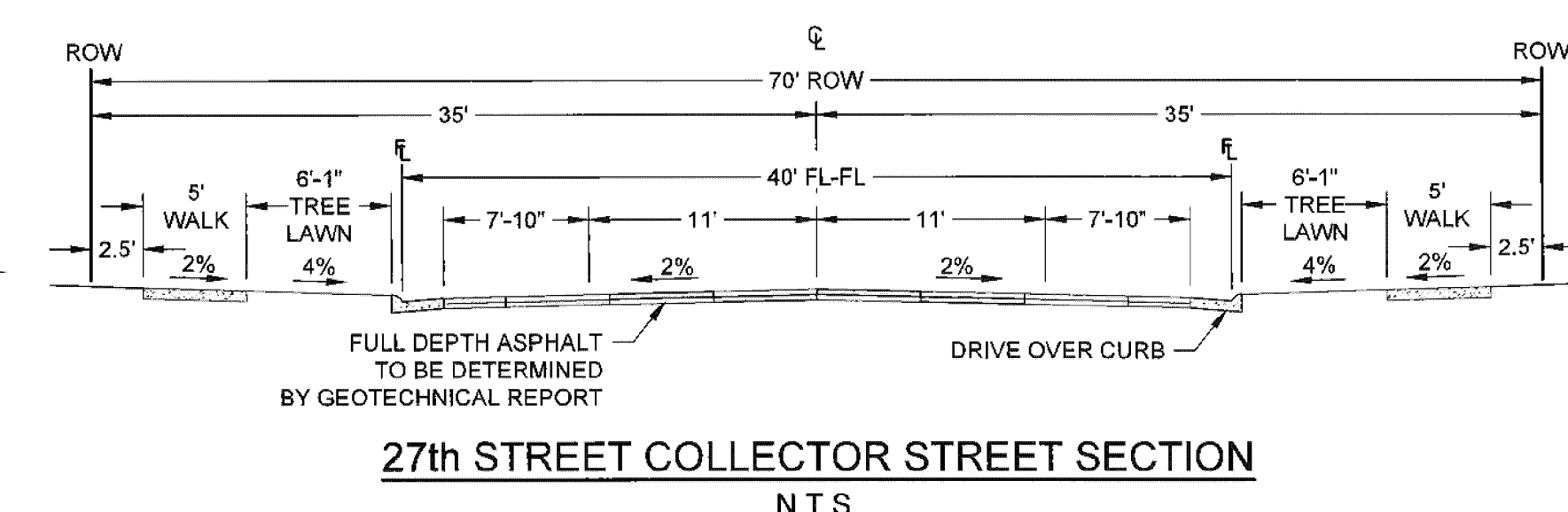
COLLECTOR STREET WITH MEDIAN STREET SECTION
N.T.S.

6.4 TYPICAL LOCAL STREET

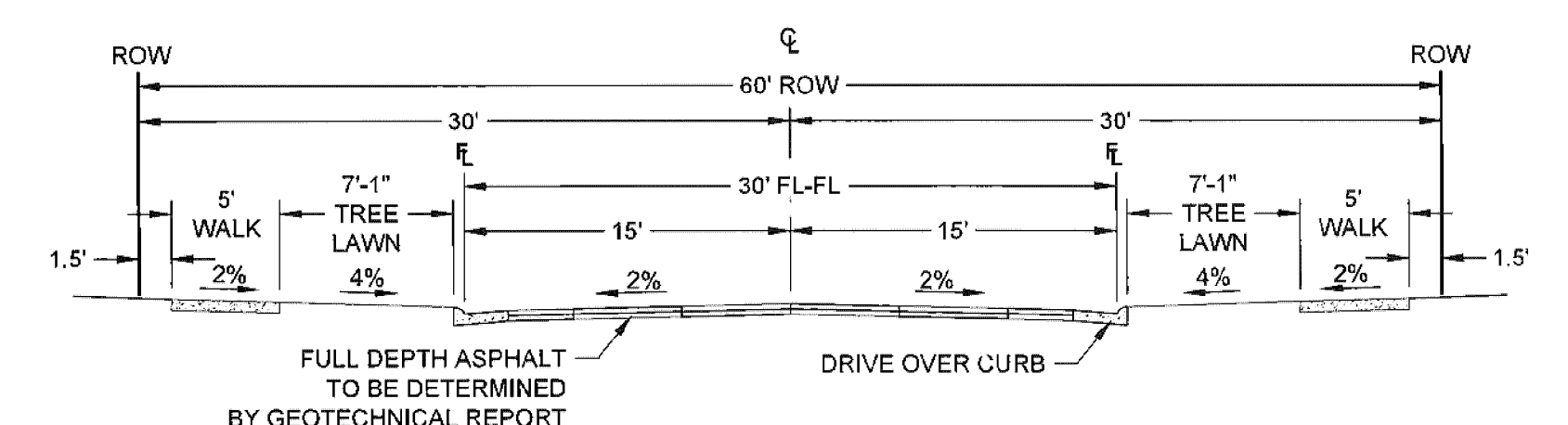


TYPICAL LOCAL RESIDENTIAL STREET SECTION
(UP TO 1,500 VEHICLES PER DAY) - N.T.S.

6.3 TYPICAL COLLECTOR STREET (27TH STREET)

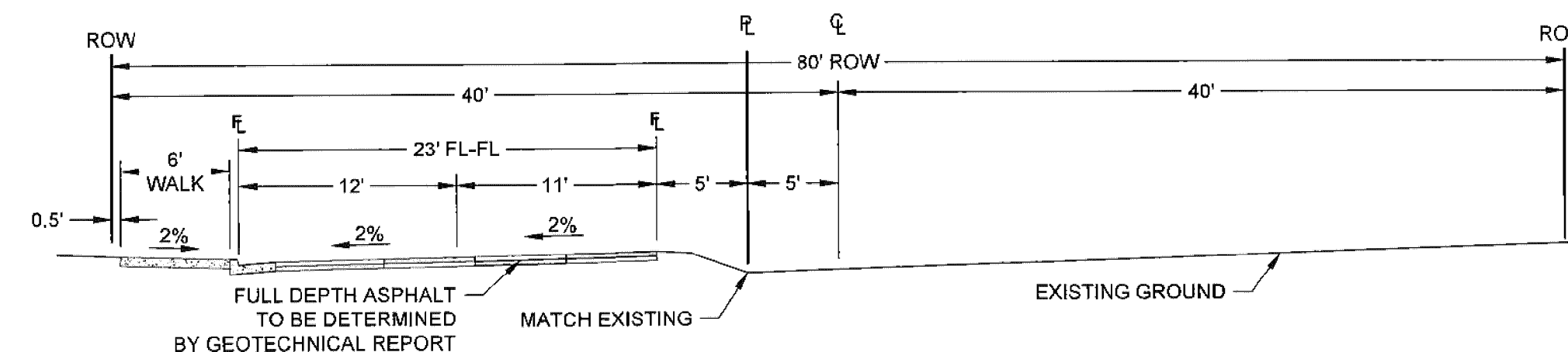


27th STREET COLLECTOR STREET SECTION
N.T.S.

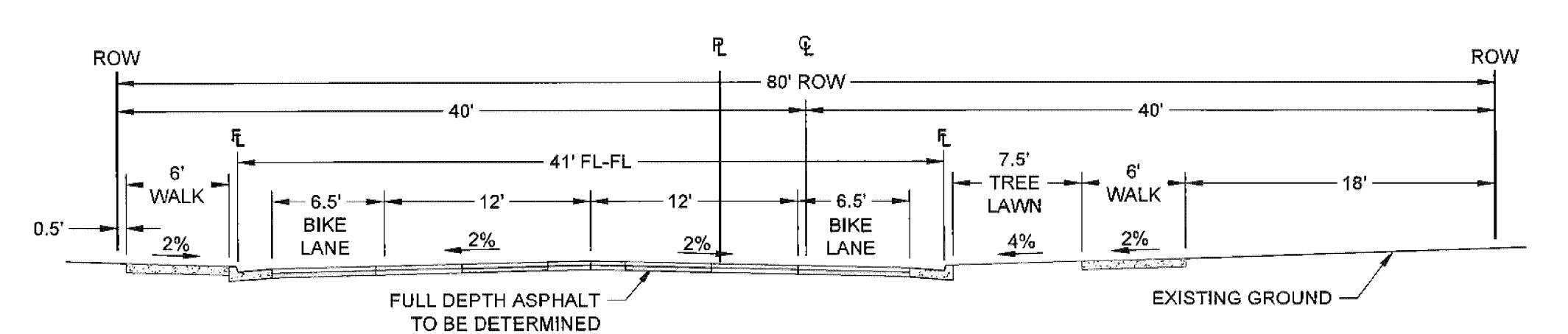


TYPICAL LOCAL RESIDENTIAL STREET SECTION
(UP TO 750 VEHICLES PER DAY) - N.T.S.

6.5 TYPICAL COLLECTOR STREET (25TH STREET)

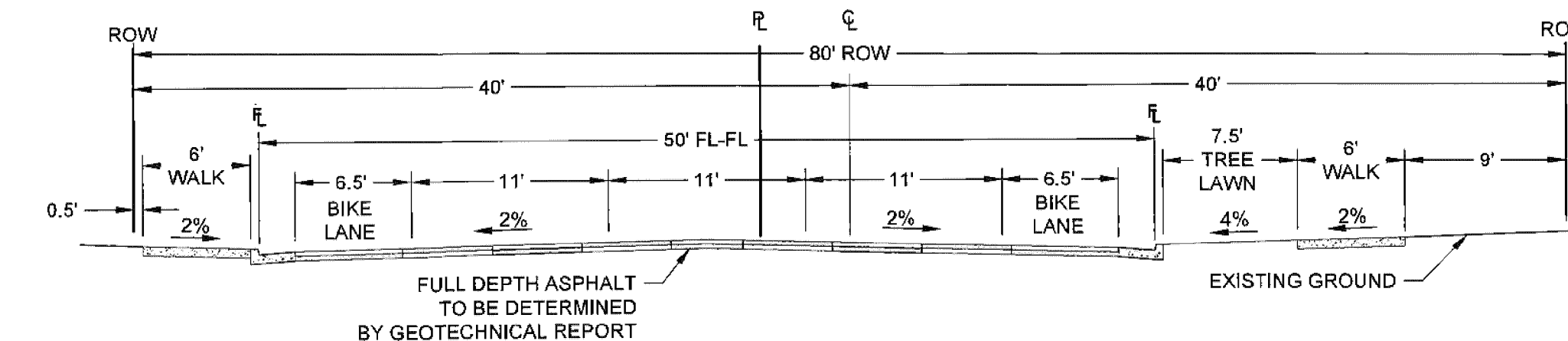


25th STREET COLLECTOR STREET SECTION - INTERIM
N.T.S.

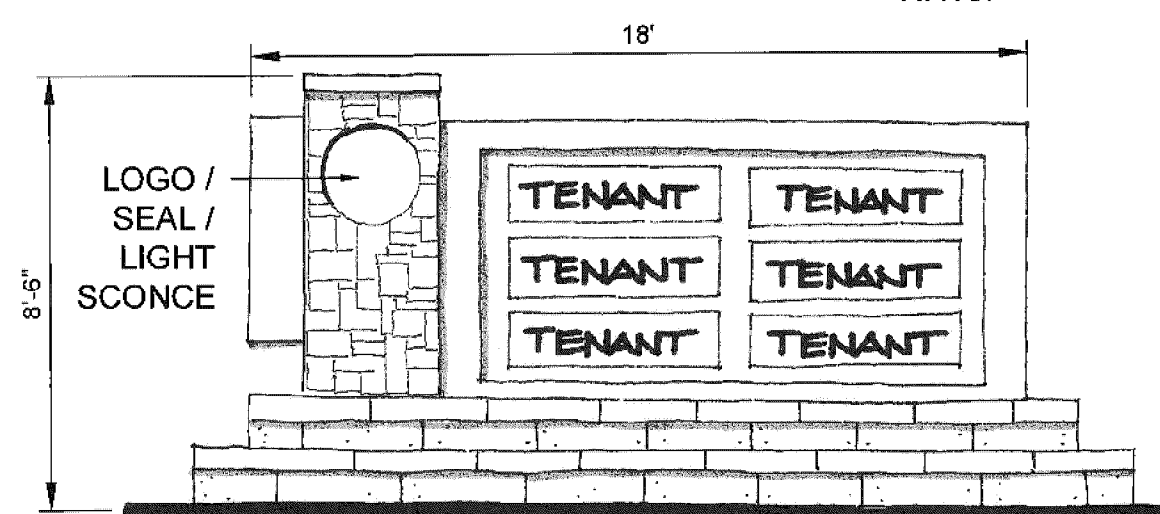


25th STREET COLLECTOR STREET SECTION - ULTIMATE
N.T.S.

6.6 TYPICAL COLLECTOR STREET (25TH STREET - ULTIMATE AT 71ST AVE)



25th STREET COLLECTOR STREET SECTION - ULTIMATE AT 71st AVENUE
N.T.S.

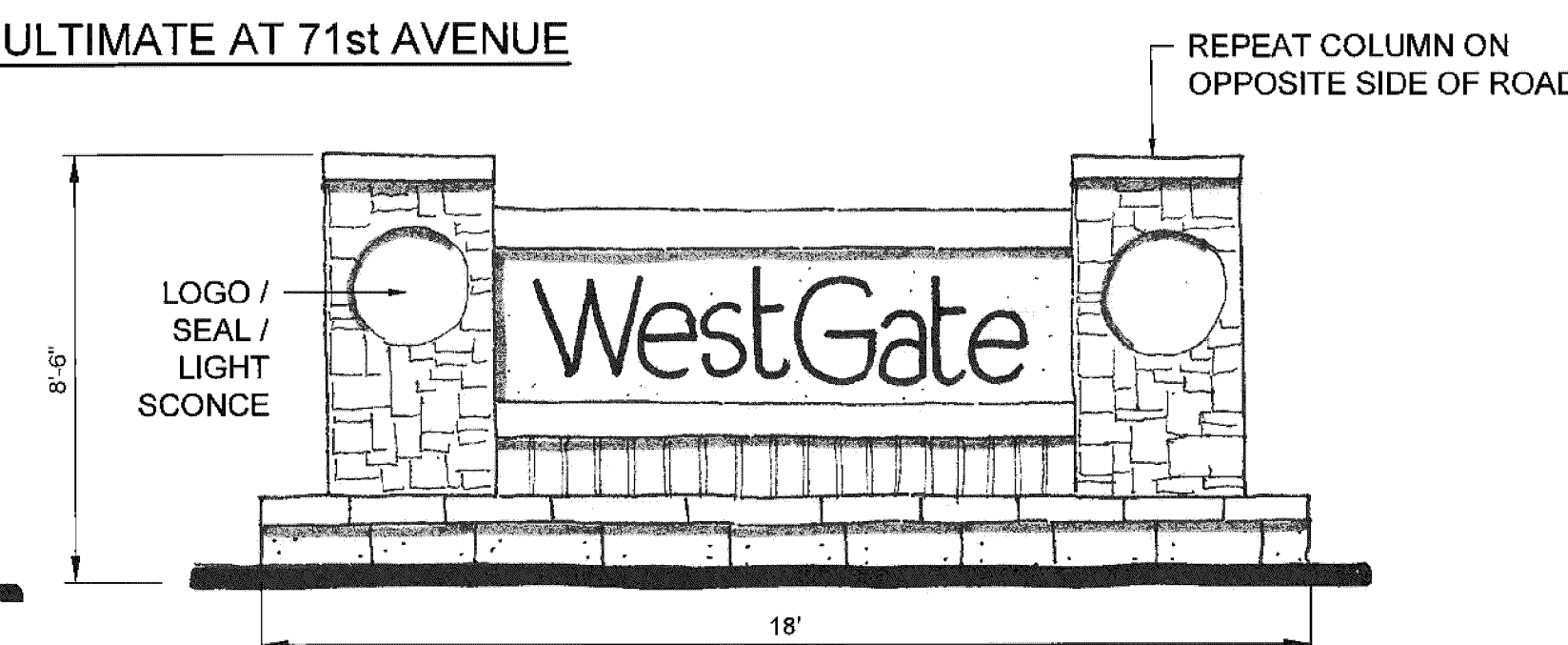


SECONDARY MONUMENT SIGN (COMMERCIAL)

NTS

L-SHAPED LAYOUT FOR VISIBILITY FROM TWO DIRECTIONS

SIGNAGE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEPARATE SIGN PERMIT REQUIRED.



SECONDARY MONUMENT SIGN (RESIDENTIAL)

NTS

SIGNAGE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEPARATE SIGN PERMIT REQUIRED.

DRAWN BY: AL
REVIEWED BY: MN
PROJECT NO:
ISSUE DATE: 9/12/2019

REVISIONS:		
#	DATE	DESC
1	11/22/2019	CITY COMMENTS
2	03/10/2020	CITY COMMENTS
3	08/12/2020	CITY COMMENTS
4	08/07/2020	CITY COMMENTS
5	09/22/2020	CITY COMMENTS

DEVELOPMENT STANDARDS

5 OF 8

WESTGATE PRELIMINARY P.U.D. - FIRST AMENDMENT
A PARCEL OF LAND BEING A PART OF THE SOUTHEAST QUARTER OF SECTION 17
TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO
PUD2019-0014

APPROVAL CERTIFICATE	
ENGINEERING	INITIALS / DATE
PLANNING	INITIALS / DATE
OWNER	INITIALS / DATE

OWNER
WRD4 GREELEY PROPERTY
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-0401

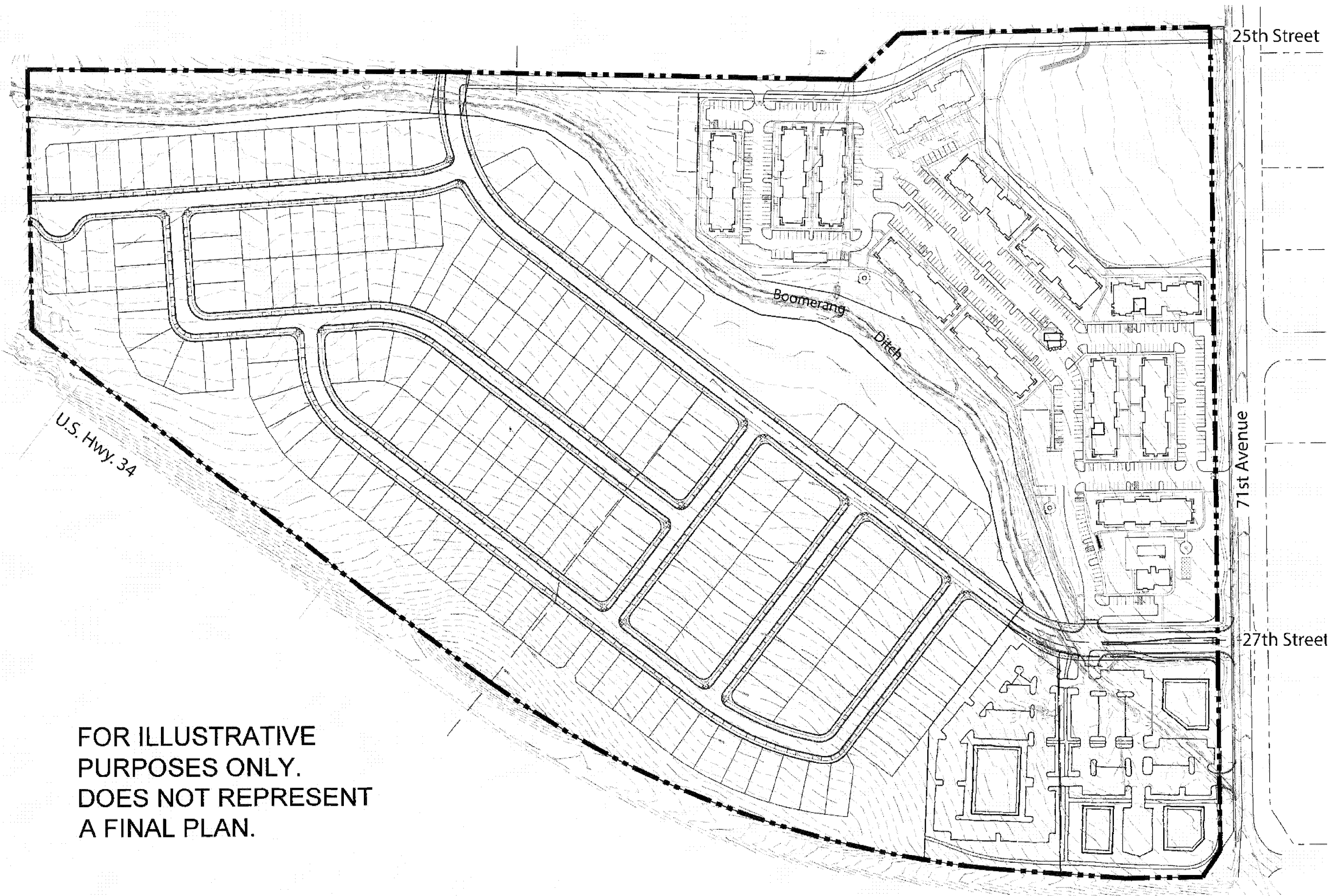
DEVELOPER
BROE REAL ESTATE GROUP
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-4575

CIVIL ENGINEER
WARE MALCOMB
WARE MALCOMB
990 S. BROADWAY SUITE 230
DENVER, CO 80209
PHONE: (303) 561-3333

PLANNER
PLAN MARK
DESIGN LLC
PLANMARK DESIGN
P.O. BOX 202411
DENVER, CO 80220
PHONE: (720) 232-5081

CONCEPT PLAN

1" = 200'



FOR ILLUSTRATIVE
PURPOSES ONLY.
DOES NOT REPRESENT
A FINAL PLAN.

ARCHITECTURAL CHARACTER

MULTI-FAMILY

THE WESTGATE MULTI-FAMILY COMMUNITY WILL FEATURE TWO- STORY OR THREE-STORY RESIDENTIAL APARTMENT STRUCTURES WITH PRIVATE, GROUND LEVEL, DIRECT ENTRIES TO EACH UNIT. EXTERIOR ELEVATIONS PROVIDE ARCHITECTURAL INTEREST THROUGH VARIED ROOF LINES AND FAÇADE PROJECTIONS/RECESSIONS. ROOF ACCENTS OVER UNIT ENTRIES WILL BRING ADDITIONAL ARTICULATION TO THE BUILDINGS. QUALITY BUILDING MATERIALS, SUCH AS LP SMART SIDING MAY BE INCORPORATED INTO THE BUILDING ELEVATIONS FOR GREATER DURABILITY. ALONGSIDE A COMPLEMENTARY COLOR PALETTE (PROVIDED AT FINAL PLAT), ROOF ACCENTS OVER UNIT ENTRIES BRING ADDITIONAL ARTICULATION TO THE BUILDINGS. LARGE-SCALE WINDOWS SHALL BE PROVIDED IN EACH UNIT TO PROMOTE NATURAL LIGHTING, ALONG WITH CREATING OPPORTUNITIES TO OPTIMIZE PASSIVE SOLAR HEATING AND COOLING. EACH BUILDING PROVIDES ARTICULATION TO BREAK UP THE STRUCTURE'S MASSING AND PROVIDE HUMAN SCALE BY INCORPORATING PATIOS, COVERED DOORWAYS, AND UNIT PROJECTIONS TO CREATE VARIATION WITH EACH FAÇADE. THE TWO-STORY AND THREE-STORY STRUCTURES PROVIDES A GOOD TRANSITIONAL BUILDING STYLE BETWEEN COMMERCIAL AND RESIDENTIAL LAND USES.



CONCEPTUAL ELEVATION DESIGN - SCHEME A FRONT ELEVATION



CONCEPTUAL ELEVATION DESIGN - SCHEME A FRONT ELEVATION

SINGLE-FAMILY

THE SINGLE FAMILY RESIDENTIAL NEIGHBORHOODS WILL BE PREDOMINATELY DETACHED UNITS THAT WILL LIKELY BE FRONT LOADED DUE TO THE CONFIGURATION OF THE SITE AND OPEN SPACE AREAS. ALTHOUGH ALLEY LOADED PRODUCT IS PERMITTED. THE NEIGHBORHOOD LAYOUT WILL OFFER A NUMBER OF DIRECT CONNECTIONS TO REGIONAL TRAILS ALONG THE BOOMERANG DITCH. THERE WILL ALSO BE A NEIGHBORHOOD PARK ALONG THE DITCH THAT OFFERS OPEN PLAY AREA, PLAYGROUND, AND PICNIC AREAS. THE PUD SPECIFIES A MIX OF HOUSE MODELS AND ELEVATIONS IN ORDER TO AVOID A MONOTONOUS STREETSCAPE. SOME CONCEPTUAL IMAGERY IS PROVIDED TO ILLUSTRATE THE ARCHITECTURAL CHARACTER, THE MASSING OF ARCHITECTURAL ELEMENTS AND THE VARIETY OF MATERIAL. ONE ADDITIONAL HOUSE MODEL/ELEVATION ABOVE THE CODE REQUIREMENT WILL APPLY TO THE SINGLE FAMILY NEIGHBORHOOD MODELS TO BE USED. THE BUILDER WILL PROVIDE COLOR SCHEMES THAT WILL HAVE A VARIETY OF EARTH TONES AND THAT WILL BE COMPLIMENTARY TO THE SURROUNDING NEIGHBORHOODS. ARCHITECTURE STYLES AND ROOF LINES MAY DIFFER THROUGHOUT THE COMMUNITY AND REPRESENT SOME STYLES, FOR EXAMPLE MODERN FARMHOUSE, COLORADO RANCH AND TRADITIONAL PRAIRIE ELEVATIONS.



P.U.D. MASTER PLAN

DRAWN BY: AL
REVIEWED BY: MN
PROJECT NO:
ISSUE DATE: 9/12/2019

REVISIONS:		
#	DATE	DESC
1	11/22/2019	CITY COMMENTS
2	03/10/2020	CITY COMMENTS
3	09/12/2020	CITY COMMENTS
4	08/07/2020	CITY COMMENTS
5	09/22/2020	CITY COMMENTS

CONCEPT
PLANS

6 OF 8

WESTGATE PRELIMINARY P.U.D. - FIRST AMENDMENT

A PARCEL OF LAND BEING A PART OF THE SOUTHEAST QUARTER OF SECTION 17
TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.
CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO

APPROVAL CERTIFICATE	
ENGINEERING	INITIALS / DATE BPM / 12/14/20
PLANNING	INITIALS / DATE
OWNER	INITIALS / DATE AKS / 12/14/20

OWNER

WRD4 GREELEY
PROPERTY
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-0401

DEVELOPER

BROE REAL ESTATE GROUP
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-4575

CIVIL ENGINEER

WARE MALCOMB
WARE MALCOMB
990 S. BROADWAY SUITE 230
DENVER, CO 80209
PHONE: (303) 561-3333

PLANNER

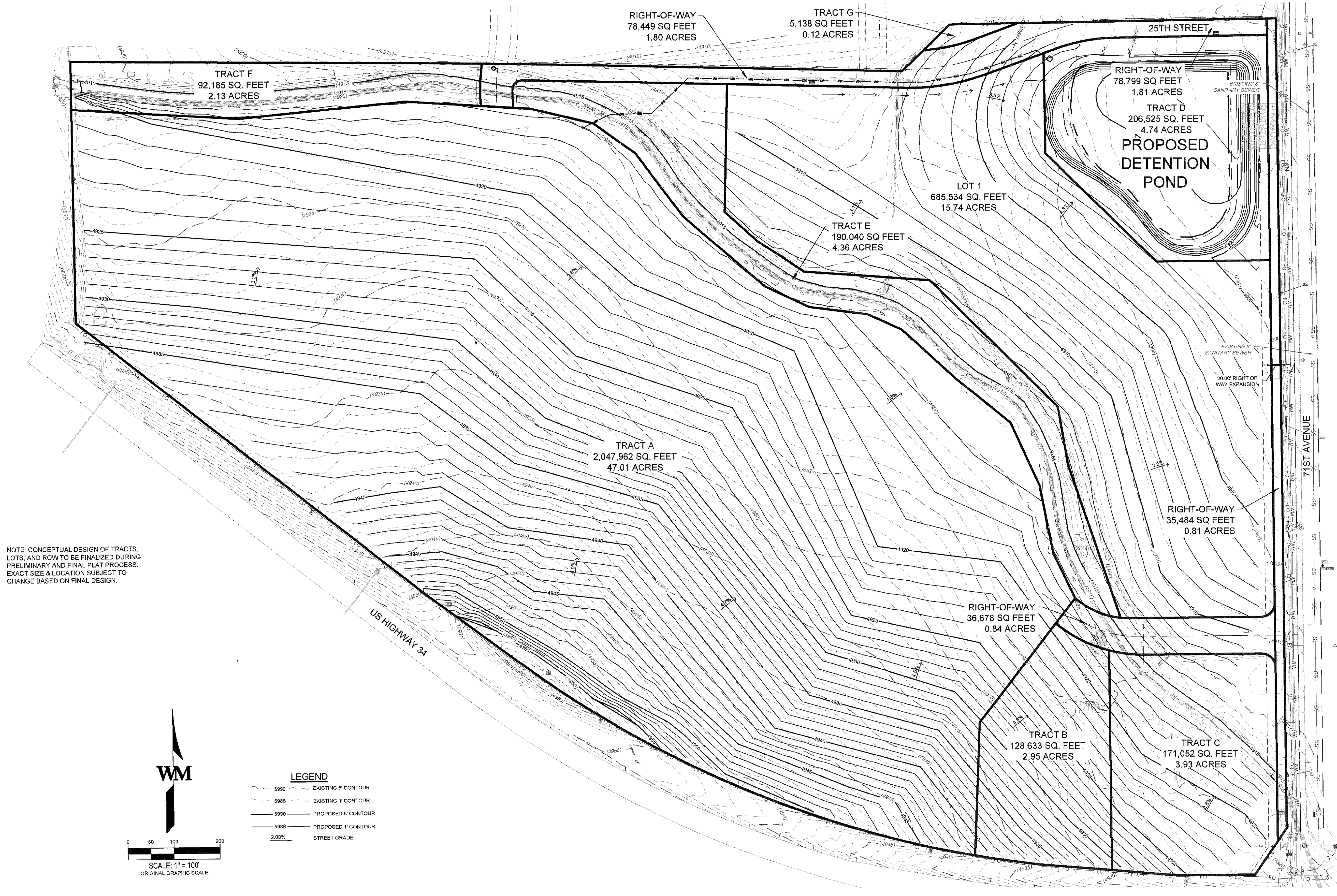
PLAN MARK
DESIGN LLC
PLANMARK DESIGN
P.O. BOX 202411
DENVER, CO 80220
PHONE: (720) 232-5081

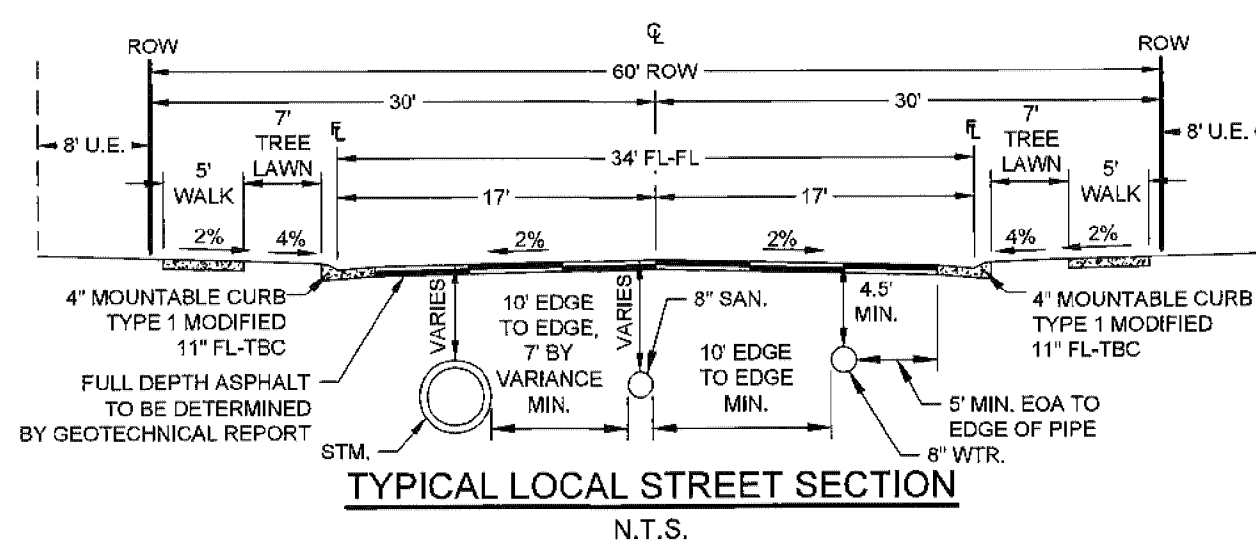
P.U.D. MASTER PLAN

DRAWN BY: SL
REVIEWED BY: GB
PROJECT NO: 19-4021
ISSUE DATE: 9/03/2019

REVISIONS:	#	DATE	DESC
	1	11/22/19	CITY COMMENT
	2	02/20/20	CITY COMMENT
	3	06/12/20	CITY COMMENT
	4	08/10/20	CITY COMMENT
	5	09/22/20	CITY COMMENT

OVERALL
GRADING
PLAN
7 OF 8





WESTGATE PRELIMINARY P.U.D. - FIRST AMENDMENT

A PARCEL OF LAND BEING A PART OF THE SOUTHEAST QUARTER OF SECTION 17

TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M.

CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO

APPROVAL CERTIFICATE	
ENGINEERING	INITIALS / DATE 3892 12/14/20
PLANNING	INITIALS / DATE
OWNER	INITIALS / DATE WAS 12/15/20

OWNER

WRD4 GREELEY
PROPERTY
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-4401

DEVELOPER

BROE REAL ESTATE GROUP
252 CLAYTON STREET
DENVER, CO 80208
PHONE: (303) 398-4575

CIVIL ENGINEER

WARE MALCOMB
WARE MALCOMB
990 S. BROADWAY SUITE 230
DENVER, CO 80208
PHONE: (303) 561-3333

PLANNER

PLAN MARK
DESIGN LLC
PLANMARK DESIGN
P.O. BOX 202411
DENVER, CO 80220
PHONE: (720) 232-5081

P.U.D. MASTER PLAN

DRAWN BY: SL
REVIEWED BY: GB
PROJECT NO: 19-4021
ISSUE DATE: 9/03/2019

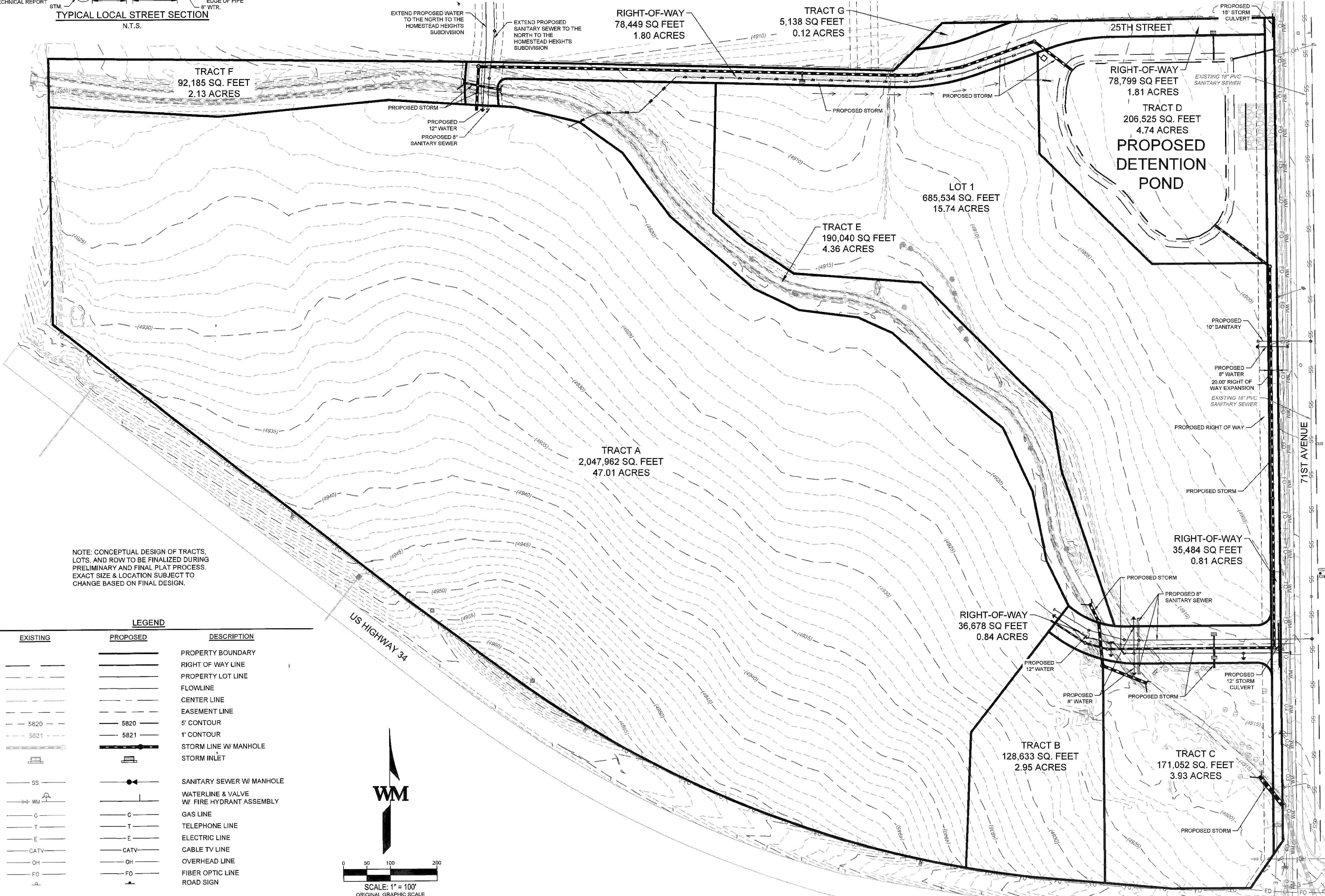
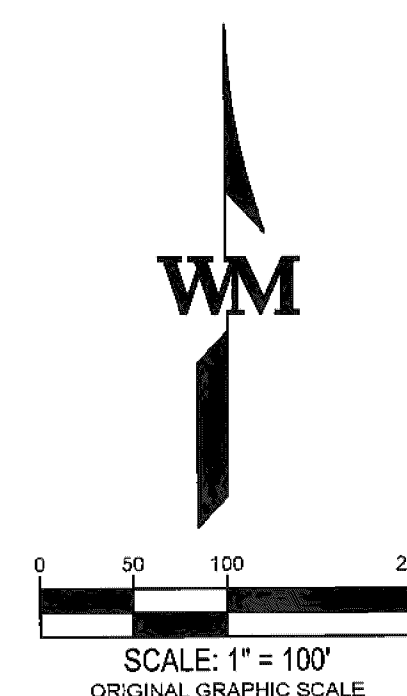
REVISIONS:	#	DATE	DESC
	1	11/22/19	CITY COMMENT
	2	02/20/20	CITY COMMENT
	3	06/12/20	CITY COMMENT
	4	08/10/20	CITY COMMENT
	5	09/22/20	CITY COMMENT

OVERALL
UTILITY
PLAN
8 OF 8

NOTE: CONCEPTUAL DESIGN OF TRACTS, LOTS, AND ROW TO BE FINALIZED DURING PRELIMINARY AND FINAL PLAT PROCESS. EXACT SIZE & LOCATION SUBJECT TO CHANGE BASED ON FINAL DESIGN.

LEGEND

EXISTING	PROPOSED	DESCRIPTION
---	---	PROPERTY BOUNDARY
---	---	RIGHT OF WAY LINE
---	---	PROPERTY LOT LINE
---	---	FLOWLINE
---	---	CENTER LINE
---	---	EASEMENT LINE
---	---	5' CONTOUR
---	---	1' CONTOUR
---	---	STORM LINE W/ MANHOLE
---	---	STORM INLET
SS	---	SANITARY SEWER W/ MANHOLE
WM	---	WATERLINE & VALVE
---	---	W/ FIRE HYDRANT ASSEMBLY
G	---	GAS LINE
T	---	TELEPHONE LINE
E	---	ELECTRIC LINE
CATV	---	CABLE TV LINE
OH	---	OVERHEAD LINE
FO	---	FIBER OPTIC LINE
R	---	ROAD SIGN



From: KARTER ELLS <kells2@greeleyschools.org>

Sent: Monday, September 27, 2021 10:00 PM

To: CD Admin Team <CD_Admin_Team@Greeleygov.com>

Subject: [EXTERNAL] West gate development item 6 and 7 unfairness

Hi my name is Karter Ells, And I a 14 years of age

And I would like to voice my objections to what the city is trying to force on my grandpa and plan on my grandpas Jim's farm (Jim Ells's property to the north of the west gate property), And I want to complain about the road because he has to pay a lot of money just for you guys to put a road there, So for you to put a road there would interfere with a lot of plans we had and I would greatly appreciate it if you moved the road to a different spot off his farm. Also, I feel it is unfair to decide to put a road on his farm if you have not bought that land, Or even got his ok to do that. So I feel it is unfair for him, and me as his grandson.

sincerely, Karter Ells

From: KASH ELLS <kells1@greeleyschools.org>

Sent: Monday, September 27, 2021 9:27 PM

To: CD Admin Team <CD_Admin_Team@Greeleygov.com>

Subject: [EXTERNAL] West Gate Development item 6 and 7, Complaint

Hi my name is Kash Ells and I am 15 years old,

I am concerned about the road you are trying to put on my Grampa jims farm(Jim Ells, north of the west gate property), even if it is in the future he still has to pay for it. I spend a lot of time on that farm helping my grandpa grow crops and helping him with other things, and for you to decide that he needs a road on his farm, which at this time he is not planning on building houses or apartments on his property like the people to the south, I feel is very unfair and possibly illegal without his approval. If you would like to continue with this road I think it would only be fair for you to buy the ground that you need or move it off his property.

From: John Sandoval <bear_bouncer@yahoo.com>
Sent: Monday, September 27, 2021 8:46 PM
To: CD Admin Team <CD_Admin_Team@Greeleygov.com>
Subject: [EXTERNAL] The choices...

I'm writing this because I feel that the city has and is over stepping. They (city) come out here and push the people around like bullies. I live out here and my weeds got a little high out by the street. But yet the city let's the weeds just grow at the corner of Hwy 34 and 65th (like a jungle). Why is that?

Now they want to try and push for a road at 2435 71st Ave. (items 6 and 7 on hearing). Be bullies, that is the property of Jim Ells. Which has owned and farmed that property for 26 + years. Why would it be forced upon him to build a road? Now or in the future. Then from my understanding, to have him pay for it.... What? That does not sound right.

John Sandoval

Hello My name is Jim Ells owner of property north of westgate project 2435 71 ave for past 26 years

Timeline

Aug 5 2015 Signed a agreement for water and sewer easements with Westrange Development across my property to feed their project and development with understanding mostly single family land use ,stated in letter Dec 16 2015 and copy of plat also in filing . After which plans had been on hold for years

Sep 23 2020 Received letter from city (Carol Kuhn) followed up with phone call about letter stated it was for amendment to densities listed in approved planning area and increase the building height for commercial ,Carol stated would be many times to review and attend later , because of this statement and covid and state of my health did not attend meeting of Oct 13 2020 planning ,and also city Council Nov 17 2020.

April 13 2021 Jason Ells Had reached out to me to contract Marc Savela (new planner for westgate project) which westrange had all my contracts from past agreements and follow ups that had been send to me in past about everything as if was progressing. Learned about new plans From Marc about new plans that City greeley wanted Road on my property line (south edge) and They would be age to built with just half road on their property and I would have to pay for half on my property in future , which to say least find very unfair and illegal.

Had been in contact with Tom Gilbert with a email dated May 5 2021 voicing my concerns, so He set up a meeting with other city staff Alison Baxter , Tomas , on Zoom was Brittany Hathaway, Mike Garrett and spent a Hour Discussing issues, and what I felt was a better and safer Alternative with use of 74 ave and to be built sooner to route Traffic away 71 ave and hwy 34 which is very Dangerous .

Reasons to Protest plans and Westgate Approval

Law states . Bundle of Legal Rights of a property Owner upon Purchase of a piece property. These include Possession ,Control ,Exclusion, Derivation of income and Disposition .

It had been stated to me Single family would be built next to me or I would have never sold Utility easements to West Range or Now Westgate Development.

Copy of plans first filing 2015 showed that . Multifamily use devalues my property ,

If A road is to be planned or built on My property, My Property needs to be Purchased or go thru Eminent Domain and at this time Does not meet thoses Requirements

With Reguard to My Water Rights and Easement , That run across westgate property the Last 30 years or more I am requesting at this time To Do NOT remove or Alter or change without my Written approval Per Water Rights and Water Laws .

Respectfully Jim Ells

Owner of property At 2435 71 ave , Greeley Colo 80634

email Jime2435@gmail.com

Phone 970- 534-0280

From: Mark Kiefer <mkiefers@gmail.com>

Sent: Tuesday, September 28, 2021 11:20 AM

To: CD Admin Team <CD_Admin_Team@Greeleygov.com>

Subject: [EXTERNAL] Westgate PUD

Hello Commissioners,

In regards to the Westgate PUD that you are reviewing today, I have the following questions and comments.

Why is the adjacent landowner being asked to contribute to a road that the developer needs to complete this project? How will he get a return on his cost?

As a resident of Greeley, I object to this plan, because it unfairly puts a burden on a neighbor that does not stand to gain from this development.

Thank you for your consideration.

Mark Kiefer

970-397-7587

Simplify, Amplify

Westgate First Filing Westgate Preliminary PUD 2nd Amendment and Final PUD (PUD2020-0002 & PUD2020-0003)

City Council
October 19, 2021
Brittany Hathaway, Planner III

Request

- **Preliminary PUD Amendment and Final PUD (Subdivision)**
 - **191 single family lots**
 - **1 lot for multi-family**
 - **2 lots for commercial**
 - **12 tracts for parkland dedication, open space, trail, drainage, utilities, landscape buffering, and future development**

Item No. 16.



Vicinity

Site Photos

**Looking north
from US 34**



**Looking west from
71st Avenue**



**Looking southeast
from the ditch road**



Layout

Single-family

Multi-family

Commercial

Approval Criteria

- **Section 24-625 applicable to the rezoning of land:**
 - *Rezoning criteria does not apply as this is for subdivision.*
- **City Council shall determine if the Final PUD Plan is in substantial conformance with the approved Preliminary Plan.**
 - *Final PUD Plan is in substantial conformance with the approved Preliminary PUD Plan and the proposed Preliminary PUD Plan Amendment (Preliminary Plat).*

Notice & Feedback

- **Letters sent to property owners within 500 feet**
- **Sign posted on property**
- **Notice in the newspaper**
- **5 citizen comments received**

Recommendation

Planning Commission unanimously recommended approval on September 28, 2021.

Council Agenda Summary

October 19, 2021

Key Staff Contact: Sean Chambers, Water & Sewer Director, 970-350-9815

Title:

Public hearing and second reading of an Ordinance amending Article VI, Chapter 3, Title 20 of the Greeley Municipal Code, relating to Industrial Pretreatment Chapter

Summary:

Following a routine audit of the City's Industrial Pretreatment Program, the United States EPA (Environmental Protection Agency) made a list of recommended ordinance modifications and best practices for Greeley to implement. City staff and City Attorney's environmental law counsel worked with the EPA Pretreatment Program advisors to develop the program modifications that meet EPA requirements and expectations. The adoption of those modifications to the Industrial Pretreatment Program must be codified amendments to the Municipal Code.

In summary, the code changes amend the definitions to better align with Federal definitions and align the ordinance with current program processes such as permitting, procedures for enforcement and corrects minor clerical errors. Further, the amendments will provide consistency and increased clarity for industrial pretreatment violation enforcement actions.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	NA
What is the annual impact?	NA
What fund of the City will provide Funding?	NA
What is the source of revenue within the fund?	Sewer Rates
Is there grant funding for this item?	No
If yes, does this grant require a match?	NA
Is this grant onetime or ongoing?	NA
Additional Comments:	

Legal Issues:

Consideration of this matter is a legislative process.

Other Issues and Considerations:

EPA requires City Council approval and a 30 public notice. This item was noticed to the public through its Water & Sewer Board approval process, and was published for first reading before City Council on September 7, 2021.

Strategic Work Program Item or Applicable Council Priority and Goal:

Safety: Manage the health, safety and welfare in a way that promotes a sense of security and well-being for residents, businesses and visitors.

Infrastructure & Growth: Establish the capital and human infrastructure to support and maintain a safe, competitive, appealing and successful community.

Decision Options:

- 1) Adopt the ordinance as presented; or
- 2) Amend the ordinance and adopt as amended; or
- 3) Deny the ordinance; or
- 4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:

A motion to adopt the ordinance and publish with reference to title only.

Attachments:

Ordinance Amending Article VI, Chapter 3, Title 20 of the Greeley Municipal Code
Appendix A
Presentation Deck

CITY OF GREELEY, COLORADO
ORDINANCE _____, 2021

AN ORDINANCE AMENDING ARTICLE VI, CHAPTER 3, TITLE 20 OF THE GREELEY MUNICIPAL CODE (INDUSTRIAL PRETREATMENT CHAPTER)

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, the City is required to develop, implement, and administer an industrial pretreatment program pursuant to 40 CFR §403.8; and

WHEREAS, from August 10-19, 2020, the Environmental Protection Agency ("EPA") conducted a Pretreatment Compliance Inspection ("PCI") of Greeley's Wastewater Treatment and Reclamation Facility; and

WHEREAS, on September 30, 2020, EPA transmitted to Greeley a Pretreatment Compliance Inspection Report (the "Compliance Report") prepared after the PCI, identifying program components that the City was recommended or required to implement, including amendments to Article VI, Chapter 3, Title 20 of the Greeley municipal code (the "Pretreatment Chapter"), in order to effectively implement the industrial pretreatment program and to meet its regulatory requirements; and

WHEREAS, in accordance with the Compliance Report and further recommendations by EPA, staff has prepared the necessary amendments to the Pretreatment Chapter; and

WHEREAS, on May 19, 2021, the Greeley Water and Sewer Board reviewed the proposed amendments to the Pretreatment Chapter and recommended that City Council adopt the same; and

WHEREAS, Water and Sewer staff recommends that City Council adopt the proposed amendments to Article VI, Chapter 3, Title 20, of the Greeley Municipal Code.

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. That Section 20-393 contained in Chapter 3, Article VI, Industrial Pretreatment, shall be amended to read as shown on Appendix A, attached hereto and incorporated herein.

Section 2. That Section 20-395 of the above-entitled ordinance shall be deleted and the section reserved as shown on Appendix A.

Section 3. That Section 20-396 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 4. That Section 20-421 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 5. That Section 20-422 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 6. That Section 20-423 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 7. That Section 20-424 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 8. That Section 20-428 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 9. That Section 20-432 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 10. That Section 20-433 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 11. That Section 20-434 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 12. That Section 20-435 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 13. That Section 20-456 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 14. That Section 20-457 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 15. That Section 20-458 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 16. That Section 20-459 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 17. That Section 20-460 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 18. That Section 20-462 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 19. That Section 20-463 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 20. That Section 20-464 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 21. That Section 20-465 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 22. That Section 20-466 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 23. That Section 20-467 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 24. That Section 20-468 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 25. That Section 20-470 of the above-entitled ordinance shall be deleted and reserved as shown on Appendix A.

Section 26. That Section 20-473 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 27. That Section 20-475 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 28. That Section 20-476 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 29. That Section 20-478 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 30. That Section 20-480 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 31. That Section 20-481 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 32. That Section 20-482 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 33. That Section 20-484 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 34. That Section 20-485 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 35. That Chapter 3, Article VI, Industrial Pretreatment, shall be amended by adding thereto a new Section 20-487 to read as shown on Appendix A.

Section 36. That Section 20-511 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 37. That Section 20-514 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 38. That Section 20-515 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 39. That Section 20-516 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 40. That Section 20-517 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 41. That Section 20-518 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 42. That Section 20-519 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 43. That Chapter 3, Article VI, Industrial Pretreatment, shall be amended by adding thereto a new Section 20-520 to read as shown on Appendix A.

Section 44. That Section 20-520 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 45. That Section 20-521 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 46. That Section 20-522 of the above-entitled ordinance shall be deleted to read as shown on Appendix A.

Section 47. That Section 20-523 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 48. That Section 20-524 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 49. That Chapter 3, Article VI, Industrial Pretreatment, shall be amended by adding thereto a new Section 20-525 to read as shown on Appendix A.

Section 50. That Section 20-525 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 51. That Section 20-526 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 52. That Section 20-527 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 53. That Section 20-528 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 54. That Section 20-529 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 55. That Section 20-530 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 56. That Section 20-531 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 57. That Section 20-532 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 58. That Section 20-533 of the above-entitled ordinance shall be amended to read as shown on Appendix A.

Section 59. That Section 20-534 of the above-entitled ordinance shall be deleted to read as shown on Appendix A.

Section 60. Except as explicitly modified on Exhibit A, all other provisions of Chapter 3, Title 20 of the Greeley Municipal Code shall remain in full force and effect.

Section 61. 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 _____, 2021.

ATTEST

CITY OF GREELEY, COLORADO

City Clerk

Mayor

APPENDIX A
ORDINANCE AMENDING ARTICLE VI, CHAPTER 3, TITLE 20
GREELEY MUNICIPAL CODE

Section 1. Section 20-393 contained in Chapter 3, Article VI, Industrial Pretreatment, shall be amended to read as follows:

Sec. 20-393. Purpose and policy.

This article establishes uniform requirements for ~~Dischargers~~ users of ~~to~~ the city's publicly owned treatment works (POTW) and enables the city to comply with relevant state and federal laws, including the Federal Water Pollution Control Act (33 USC 1251—1387) and the General Pretreatment Regulations (40 CFR 403). The objectives of this article are:

- (1) To prevent the introduction of pollutants into the city's POTW that will interfere with the POTW's operation;
- (2) To prevent the introduction of pollutants into the city's POTW that will pass through the POTW, inadequately treated, into receiving waters, or that will otherwise be incompatible with the POTW;
- (3) To protect both city personnel who may be affected by wastewater and biosolids in the course of their employment, and the general public;
- (4) To promote reuse and recycling of wastewater and biosolids from the city's POTW;
- (5) To establish and distribute equitably fees for the cost of operating, maintaining and improving the city's POTW; and
- (6) To enable the city to comply with its Colorado discharge permit system (CDPS) permit conditions, biosolids use and disposal requirements, and other relevant federal and state laws.

Section 2. Section 20-395 of the above-entitled ordinance shall be deleted and the section reserved as follows:

Sec. 20-395. Reserved. ~~Citation to federal regulations.~~

~~All citations in this article to the Code of Federal Regulations are to those federal regulations in effect on the date this article becomes law. This article does not incorporate later amendments or editions of the cited material.~~

Section 3. Section 20-396 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-396. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Act means the Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 USC 1251—1387.

Administrative appeal means a petition to reconsider an order issued or a penalty or fine imposed by the director pursuant to this chapter in accordance with section 20-530.

Approval authority means the EPA Regional Administrator for Region VIII; or the state, if and when the state obtains primacy to administer its own pretreatment program under the Act.

Authorized representative of the user means:

- (1) If the user is a corporation: the president, secretary, treasurer or a vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation;
- (2) If the user is a partnership or sole proprietorship: a general partner or proprietor, respectively; or
- (3) If the user is a federal, state or local governmental entity: a director or highest level official appointed or designated to oversee the operation and performance of the activities of the government entity.

The individuals described in subsections (1) through (3) of this definition may designate another authorized representative of the user if the authorization is in writing and is submitted to the ~~city director~~. The authorization shall specify either an individual or a position having responsibility for the overall operation of the facility from which the discharge originates, such as the position of plant manager or a position of equivalent responsibility or having overall responsibility for environmental matters for the company.

Best management practices or *BMPs* means schedules of activities, maintenance policies and other management procedures that prevent or reduce the discharge of pollutants into the POTW, and that implement the prohibitions listed in section 20-421. ~~Best management practices BMPs~~ include pretreatment standards and requirements, operating procedures and practices to control plant site runoff, spills, leaks, waste disposal and drainage from raw material storage.

Biochemical oxygen demand or *BOD* means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure for five days at 20 degrees Celsius, usually expressed as a concentration (e.g., mg/l).

Bypass means the intentional diversion of wastestreams from any portion of a user's treatment facility into the POTW.

Categorical industrial user or *CIU* means a user subject to a categorical pretreatment standard or categorical standard.

Categorical pretreatment standard or *categorical standard* means any regulation containing discharge limits promulgated by EPA in accordance with sections 307(b) and (c) of the Act (33 USC 1317(b) and (c)), which applies to a specific category of users, and which appears in 40 CFR 405—471. ~~The term "categorical pretreatment standard" or "categorical standard" includes prohibited discharge standards.~~

Chain of custody means an accurate written record that, at a minimum, lists the outfall location, sample date, sample time, sample type, type of sample preservation, and name of sample collector and can be used to trace the possession and handling of the sample from the moment of its collection through its analysis.

Chapter or Greeley pretreatment chapter means article vi, chapter 3, title 20 of this code.

Composite sample means a sampling procedure defined in 40 CFR 403, Appendix E—Sampling Procedures, I. Composite Method.

Control authority means the POTW.

Daily or day means a calendar day unless otherwise specified. Any time period set forth in this chapter that commences, expires or is determined from a date which falls on a Saturday, Sunday or legal holiday of the state of Colorado, the date of such commencement, performance, expiration or determination shall automatically be extended to the next business day which is not a Saturday, Sunday or legal holiday of the state of Colorado.

Daily maximum means the arithmetic average of all effluent samples for a pollutant collected during a day.

Daily maximum limit means the maximum allowable discharge of a pollutant during a day. Where daily maximum limitations are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where daily maximum limits are expressed in terms of a concentration, the daily discharge is the arithmetic average measurement of the pollutant concentration derived from all measurements taken that day.

Department means the city water and sewer department.

Director means the director of the city water and sewer department or his authorized designee.

Discharge or indirect discharge means the introduction of pollutants into the POTW from any nondomestic source regulated under section 307(b), (c) or (d) of the Act.

Domestic wastewater means a combination of liquid wastes (sewage) which may include household chemicals, household wastes, human excreta, animal or vegetable matter in suspension or solution or other solids in suspension or solution which are discharged from a dwelling, building or other structure. The term "domestic wastewater" does not include commercial or industrial wastewater, or grease removed from a restaurant grease trap.

Environmental Protection Agency or EPA means the United States Environmental Protection Agency.

Existing source means any source of indirect discharge that is not a new source.

General permit means an authorization to discharge, ~~pollutants to the POTW~~ which covers multiple users within a specific sector in accordance with the requirements of the Act and this chapter.

Grab sample means a sampling procedure defined in 40 CFR 403, Appendix E—Sampling Procedures, II. Grab Method.

Hauled portable toilet wastewater means the liquid or solid material removed from a portable toilet that holds only domestic wastewater (not the portable toilet chemicals or matrix itself).

~~*Indirect discharge or discharge* means the introduction of pollutants into the POTW from any nondomestic source.~~

Industrial wastewater or nondomestic wastewater means water carrying wastes from any process or activity of industry, manufacturing, trade or business, from development of any natural resource, or from animal operations, or contaminated stormwater or leachate from solid waste facilities.

Instantaneous maximum allowable discharge limit means the maximum concentration of a pollutant allowed to be discharged at any time, determined from the analysis of any grab or composite sample, independent of the industrial flow rate and the duration of the sampling event.

Interference means a discharge that, alone or in conjunction with a discharge or discharges from other sources, both:

- (1) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- (2) Contributes to a violation of any requirement of the city's CDPS permit (including an increase in the magnitude or duration of a violation), or of the prevention of sewage sludge use or disposal in compliance with any of the following statutory/regulatory provisions or permits issued thereunder, or any more stringent state or local regulations: section 405 of the Act; the Solid Waste Disposal Act (SWDA), including title II, commonly referred to as the Resource Conservation And Recovery Act (RCRA); any state regulations contained in any state sludge management plan prepared pursuant to subtitle D of the ~~Solid Waste Disposal Act (SWDA)~~; the Clean Air Act; and the Toxic Substances Control Act.

Maximum allowable headworks loading or MAHL means the estimated maximum loading of a pollutant that can be received at a POTW's headworks without causing pass through or interference.

Maximum allowable industrial loading or MAIL means the estimated maximum loading of a pollutant that can be received at a POTW's headworks from all permitted users and other controlled sources without causing pass through or interference. The mail is usually calculated by applying a safety factor to the MAHL and discounting for uncontrolled sources, hauled waste and growth allowance.

Medical waste means isolation wastes, infectious agents, pathological wastes, sharps, body parts, contaminated bedding, surgical wastes, potentially contaminated laboratory wastes, and dialysis wastes.

Monthly or month means a calendar month unless otherwise specified.

Monthly average limit means the highest allowable average of daily discharges over a month, calculated as the sum of all daily discharges measured during a month divided by the number of daily discharges measured during that month.

New source.

- (1) The term "new source" means any building, structure, facility or installation from which there is (or may be) a discharge, the construction of which commenced after the publication of proposed pretreatment standards under section 307(c) of the Act that will apply to such source if such standards are thereafter promulgated in accordance with that section, provided that:
 - a. The building, structure, facility or installation is constructed at a site at which no other source is located;
 - b. The building, structure, facility or installation totally replaces the process or production equipment that causes the discharge at an existing source; or
 - c. The production or wastewater generating processes of the building, structure, facility or installation are substantially independent of an existing source at the same site. In determining whether these are substantially independent, the city director will consider such factors as the extent to which the new facility is integrated with the existing plant, and the extent to which the new facility is engaged in the same general type of activity as the existing source.
- (2) Construction on a site at which an existing source is located results in a modification rather than a new source if the construction does not create a new building, structure, facility or installation meeting the criteria of subsection (1)a or (1)c of this definition, but otherwise alters, replaces, or adds to existing process or production equipment.
- (3) Construction of a new source as defined under this subsection has commenced if the owner or operator has:
 - a. Begun, or caused to begin, as part of a continuous onsite construction program:
 1. Any placement, assembly or installation of facilities or equipment; or
 2. Significant site preparation work including clearing, excavating or removing existing buildings, structures or facilities that is necessary to place, assemble or install new source facilities or equipment; or
 - b. Entered into a binding contract for the purchase of facilities or equipment intended for use in its operation within a reasonable time. Options to purchase or contracts that can be terminated or modified without substantial loss, and contracts for feasibility, engineering and design studies do not constitute a binding contract for the purpose of this subsection.

Notice of violation or NOV means an order issued pursuant to section 20-515, based on a finding that a user has violated or continues to violate a provision of this

chapter, a wastewater discharge permit, any order issued pursuant to this chapter, or any other pretreatment standard or requirement.

Non-significant categorical industrial user means a CIU that the director has determined to be a non-significant categorical industrial user rather than a significant industrial user based on a finding that the CIU has never discharged more than one hundred (100) gpd of total categorical wastewater (excluding sanitary, noncontact cooling and boiler blowdown wastewater, unless specifically included in the pretreatment standard) and that the following conditions have been met:

- (1) The CIU, prior to the director's finding, has consistently complied with all applicable categorical pretreatment standards and requirements;
- (2) The CIU annually submits the certification statement required in section 20-487 (b), together with additional information necessary to support the certification statement; and
- (3) The CIU never discharges any untreated concentrated wastewater.

Noncontact cooling water means water used for cooling that does not directly contact any raw material, intermediate product, waste product or finished product.

Pass through means a discharge from the POTW into state waters in quantities or concentrations that, alone or in conjunction with a discharge or discharges from other sources, causes or contributes to a violation of any requirement of the city's CDPS permit, including an increase in the magnitude or duration of a violation.

Person means an individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity or any other legal entity; or their legal representatives, agents or assigns. This definition includes all federal, state and local government entities.

pH means a measure of the acidity or alkalinity of a solution, expressed in standard units.

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, medical waste, chemical waste, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, municipal, agricultural and industrial waste and certain characteristics of wastewater (such as pH, temperature, TSS, turbidity, color, BOD, toxicity or odor).

Pretreatment means the reduction in the amount of pollutants, the elimination of pollutants or the alteration of the nature of pollutant properties in wastewater prior to introducing such pollutants into the POTW. The user may obtain this reduction or alteration by physical, chemical or biological processes; by process changes; or by other means, except by diluting the concentration of the pollutants allowed by an applicable pretreatment standard. Appropriate pretreatment technology includes control equipment such as equalization tanks or facilities for protection against surges or slug loads that might interfere with or otherwise be incompatible with the POTW. Where wastewater from a regulated process is mixed with unregulated wastewater or with wastewater from another regulated process, the effluent from the equalization facility

must meet an adjusted pretreatment limit calculated limit using the combined waste stream formula in 40 CFR 403.6(e).

Pretreatment requirement or requirement means any substantive or procedural requirement related to pretreatment imposed on a user, other than a pretreatment standard.

Pretreatment standard or standard means ~~any prohibited discharge standard~~ any regulation containing pollutant discharge limits promulgated by the EPA in accordance with section 307 (b) and (c) of the Act, which applies to users. this term includes prohibitive discharge limits established pursuant to §403.5, categorical pretreatment standard, best management practices, or local limit.

Pretreatment ~~supervisor~~ coordinator means the individual who oversees and administers the pretreatment program for the POTW.

Prohibited discharge standard or prohibited discharge means an absolute prohibition against the discharge of certain substances; these prohibitions appear in section 20-421.

Publicly-owned treatment works or POTW means the treatment works, as defined by section 212 of the Act (33 USC 1292), that is owned by the city. The definition of the term "publicly-owned treatment works" or "POTW" includes any devices or systems used in the collection, storage, treatment, recycling or reclamation of domestic or nondomestic wastewater and any conveyances that carry such wastewater. ~~POTW also means the city.~~ The term "publicly-owned treatment works" or "POTW" also means the municipality as defined in section 502(4) of the Act, which has jurisdiction over the indirect discharges to and the discharges from such a treatment works.

Satellite waste dump site means a designated location directly connected to the POTW that is permitted to accept hauled portable toilet wastewater or nonhazardous wastewater and nondomestic wastewater.

Sector means users that engage in similar activities and discharge similar pollutants. Examples of similar activities that produce similar pollutants may include, but are not limited to, food service establishments or processors that commonly discharge fats, oils and grease; transportation vehicle repair, maintenance and washing facilities that commonly discharge petroleum oil, grease and sand; photographic or x-ray processing facilities or operations that commonly discharge silver; dental offices that commonly discharge mercury; and healthcare facilities that often have new or emerging contaminants.

Severe property damage means substantial physical damage to property, damage to the user's treatment facility that renders it inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

Significant industrial user or SIU means:

- (1) ~~A user subject to a categorical pretreatment standard under 40 CFR 403.6 and 40 CFR chapter I, subchapter N-CIU, except for a CIU that the director has designated as a non-significant categorical industrial user; or~~

- (2) A user that:
- a. Discharges an average of 25,000 gpd or more of process wastewater to the POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater);
 - b. Contributes a process waste stream that makes up five percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or
 - c. Is designated as such by the city on the basis that the user has a reasonable potential to adversely affect the POTW's operation or to violate any pretreatment standard or requirement.
- (3) ~~The city may determine that an industrial user subject to a categorical pretreatment standard under 40 CFR 403.6 and 40 CFR chapter I, subchapter N, is a nonsignificant categorical industrial user rather than a significant industrial user on a finding that the industrial user never discharges more than 100 gpd of total categorical wastewater (excluding sanitary, noncontact cooling and boiler blowdown wastewater, unless specifically included in the pretreatment standard) and the following conditions are met:~~
- ~~a. The industrial user, prior to the city's finding, has consistently complied with all applicable categorical pretreatment standards and requirements;~~
 - ~~b. The industrial user annually submits the certification statement required in section 20-534(b), together with additional information necessary to support the certification statement; and~~
 - ~~c. The industrial user never discharges any untreated concentrated wastewater.~~
- (4) Upon a finding that a user meeting the criteria in subsection (3) of this definition has no reasonable potential to adversely affect the POTW's operation or to violate any pretreatment standard or requirement, the city director may at any time, on ~~its~~ their own initiative or in response to a petition received from a user, and in accordance with procedures in 40 CFR 403.8(f)(6), determine that such user should not be considered a significant industrial user.

Slug load or slug means any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or non-customary batch discharge at a flow rate or concentration that could violate the prohibited discharge standards of section 20-421 or the local limits of section 20-424, permit conditions, or which has the reasonable potential to cause interference or pass through.

Slug discharge control plan means a written plan prepared in accordance with section 20-433 and implemented by a user to control slug discharges.

Stormwater means any flow occurring during or following any form of natural precipitation, and resulting from such precipitation, including snowmelt.

Total suspended solids (TSS) means the total suspended matter that floats on the surface of, or is suspended in, water, wastewater or other liquid and which is removable by laboratory filtering.

Upset means an exceptional incident that results in unintentional and temporary noncompliance with a categorical pretreatment standard because of factors beyond the reasonable control of the user. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance or careless or improper operation.

~~User or industrial user~~ means a person who is a source of indirect discharge.

Wastewater means liquid and water-carried industrial and domestic waste from residential dwellings, commercial buildings, industrial and manufacturing facilities and institutions, whether treated or untreated, that is contributed to the POTW.

Wastewater discharge permit means an individual ~~wastewater discharge~~ permit or a general permit giving authorization to discharge pollutants to the POTW in accordance with the requirements of the Act and this chapter.

Wastewater treatment plant or treatment plant means that portion of the POTW designed to treat wastewater.

Section 4. Section 20-421 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-421. Prohibited discharge standards.

(a) The following general and specific prohibitions apply to all users of the POTW, whether or not they are subject to categorical pretreatment standards, or any other national, state or local pretreatment standard or requirement.

- (1) *General prohibition.* No user shall introduce or cause to be introduced into the POTW any pollutant or wastewater that causes pass through or interference.
- (2) *Specific prohibitions.* No user shall introduce or cause to be introduced into the POTW the following pollutants, substances or wastewater:
 - a. Any liquid, solid or gas that creates, singly or by interaction with other substances, a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit (60 degrees Celsius) using the test methods specified in 40 CFR 261.21;
 - b. Wastewater having a pH less than 5.5 or greater than 11.5, or that may otherwise corrode POTW structures or equipment;
 - c. Solid or viscous substances in amounts that will obstruct the flow in the POTW, hinder POTW operations or cause POTW interference;
 - d. Wastewaters containing sand or other inorganic particulate matter that will result in a settleable solids concentration greater than 25 milliliters per liter in the user's discharge;

- e. Pollutants, including oxygen-demanding pollutants (BOD, etc.), discharged at a flow rate and/or pollutant concentration that, either singly or by interaction with other pollutants, will cause interference;
- f. Wastewater of a temperature sufficient to damage the POTW collection system, or inhibit biological activity in the POTW treatment plant (resulting in interference) or that causes the temperature of the entire wastewater stream to exceed 104 degrees Fahrenheit (40 degrees Celsius) at the entry point to the treatment plant;
- g. Petroleum oil, nonbiodegradable cutting oil or products of mineral oil origin, in amounts that will cause interference or pass through;
- h. Pollutants that cause toxic gases, vapors or fumes within the POTW in a quantity that may cause worker health or safety problems;
- i. Trucked or hauled pollutants, except at a discharge point designated by the director in accordance with section 20-434;
- j. Noxious or malodorous liquids, gases, solids or other wastewaters that, either singly or by interaction with other wastes, create a public nuisance or a human health hazard, or prevent entry into the sewers for maintenance or repair;
- k. Wastewater that imparts color that cannot be removed by the treatment process (such as, but not limited to, dye wastes and vegetable tanning solutions), which consequently imparts color to the POTW's effluent, thereby violating the city's CDPS permit;
- l. Wastewater containing any radioactive wastes or isotopes except in compliance with applicable state or federal regulations;
- m. Stormwater, surface water, groundwater, artesian well water, roof runoff and subsurface drainage, unless specifically authorized in writing by the director;
- n. Sludges, screenings or other residues from the pretreatment of industrial wastes;
- o. Wastewater causing, alone or in conjunction with other sources, the POTW's effluent to fail a toxicity test;
- p. Detergents, surface-active agents or other substances that may cause excessive foaming in the POTW;
- q. Fats, oils or greases of animal or vegetable origin in concentrations that cause blockages, flow obstructions or interference;
- r. Wastewater causing two readings on a combustible gas detection meter at any point in the POTW, of more than five percent, or any single meter reading over ten percent of the lower explosive limit;
- s. Chemical treatments used for controlling solidified grease in sewer lines or grease interceptors that cause pass through of grease or obstruction of

flow in the POTW, except in accordance with written authorization from the director;

- t. Unused or expired pharmaceuticals, including, but not limited to, prescription and over-the-counter medications, in amounts that cause or contribute to pass through or interference.
- (b) No person shall process or store any pollutant, substance or wastewater prohibited by this article in such a manner that it could be discharged to the POTW.

Section 5. Section 20-422 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-422. National categorical pretreatment standards.

- (a) The categorical pretreatment standards found at 40 CFR 405—471 are hereby incorporated in this article. Users must comply with applicable categorical pretreatment standards and requirements.
- (b) Where a categorical pretreatment standard is expressed only in terms of either the mass or the concentration of a pollutant in wastewater, the director may impose, on their own initiative or at the request of a user, equivalent concentration or mass limits in accordance with 40 CFR 403.6(c) and subsections (b)(1) - (3) and (c) of this section 20-422.
- (1) To be eligible for equivalent mass limits, the user must:
 - a. employ, or demonstrate that it will employ, water conservation methods and technologies that substantially reduce water use during the term of its individual wastewater discharge permit;
 - b. currently use control and treatment technologies adequate to achieve compliance with the applicable categorical pretreatment standard, and not have used dilution as a substitute for treatment;
 - c. provide sufficient information to establish the facility's actual average daily flow rate for all wastestreams, based on data from a continuous effluent flow monitoring device, as well as the facility's long-term average production rate. both the actual average daily flow rate and the long-term average production rate must be representative of current operating conditions;
 - d. not have daily flow rates, production levels, or pollutant levels that vary so significantly that equivalent mass limits are not appropriate to control the discharge; and
 - e. have consistently complied with all applicable categorical pretreatment standards during the period prior to the user's request for equivalent mass limits.
 - (2) An user subject to equivalent mass limits must:
 - a. maintain and effectively operate control and treatment technologies adequate to achieve compliance with the equivalent mass limits;

- b. continue to record the facility's flow rates through the use of a continuous effluent flow monitoring device;
 - c. continue to record the facility's production rates and notify the director whenever production rates are expected to vary by more than 20 percent from its baseline production rates determined in subsection (b)(1)c of this section. upon notification of a revised production rate, the director will reassess the equivalent mass limit and revise the limit as necessary to reflect changed conditions at the facility; and
 - d. continue to employ the same or comparable water conservation methods and technologies as those implemented pursuant to subsection (b)(1)a of this section so long as it discharges under an equivalent mass limit.
- (3) When developing equivalent mass limits, the director:
- a. will calculate the equivalent mass limit by multiplying the actual average daily flow rate of the regulated process(es) of the user by the concentration-based daily maximum and monthly average standard for the applicable categorical pretreatment standard and the appropriate unit conversion factor;
 - b. upon notification of a revised production rate, will reassess the equivalent mass limit and recalculate the limit as necessary to reflect changed conditions at the facility; and
 - c. may retain the same equivalent mass limit in subsequent individual wastewater discharger permit terms if the user's actual average daily flow rate was reduced solely as a result of the implementation of water conservation methods and technologies, and the actual average daily flow rates used in the original calculation of the equivalent mass limit were not based on the use of dilution as a substitute for treatment pursuant to section 20-426. the user must also be in compliance with section 20-533 regarding the prohibition of bypass.
- (c) The director may convert the mass limits of the categorical pretreatment standards of 40 CFR Parts 414, 419, and 455 to concentration limits for purposes of calculating limitations applicable to users. The conversion is at the discretion of the director.
- (d) Once included in its permit, the user must comply with the equivalent limitations developed in this section in lieu of the promulgated categorical standards from which the equivalent limitations were derived.
- (e) ~~(c)~~When wastewater subject to a categorical pretreatment standard is mixed with wastewater not regulated by the same standard, the director shall impose an alternate limit using the combined waste stream formula in 40 CFR 403.6(e).
- (f) ~~(d)~~A user may obtain a variance from a categorical pretreatment standard if the user can prove, pursuant to the procedural and substantive provisions in 40 CFR 403.13, that factors relating to its discharge differ fundamentally from the factors that EPA considered in developing the categorical pretreatment standard.

- (g) ~~(e)~~ A user may obtain a net/gross adjustment to a categorical pretreatment standard in accordance with 40 CFR 403.15.
- (h) ~~(f)~~ Each user shall be knowledgeable of all regulations applicable to the user. The director shall make reasonable efforts to notify all affected users of applicable standards and reporting requirements under 40 CFR 403.12. Failure of the director to notify an affected user, however, does not relieve the user of complying with appropriate categorical pretreatment standards or applicable reporting requirements.

Section 6. Section 20-423 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-423. Deadline for compliance with applicable pretreatment requirements and standards.

Existing sources shall comply with applicable categorical pretreatment standards within three years of the effective date for the standard unless the standard specifies a shorter compliance period. The ~~city director~~ shall establish a final compliance deadline for any existing user not covered by categorical pretreatment standards, or for any ~~categorical user~~ CIU whose local limits are more restrictive than the categorical pretreatment standards. new sources and new users must comply with applicable pretreatment standards and requirements upon initial discharge. new sources and new users shall install, have operable and start up all pollution control equipment required to meet applicable pretreatment standards and requirements before beginning to discharge.

Section 7. Section 20-424 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-424. Local limits.

- (a) The city has established the following local limits to prevent pass through and interference and to protect beneficial use of biosolids:

Table 14.11 ~~20-424~~ A. Total Metals and Conventional Pollutants

Pollutant/Pollutant Property	Daily Maximum Allowable Industrial Loading, lbs./day
Arsenic, Total	0.527
Cadmium, Total	0.316
Chloride	17,082.000
Chromium, Hexavalent	7.978
Copper, Total	6.241
Cyanide, Total	1.170
Lead, Total	1.528
Mercury, Total	0.009
Molybdenum, Total	1.354

Nickel, Total	4.728
Selenium, Total	1.114
Silver, Total	4.436
Zinc, Total	11.711
BOD	14,173.000
TSS	13,176.000

Table 14.11-20-424 B. Total BTEX (Benzene, Toluene, Ethylbenzene and Xylenes) and Benzene

Pollutant/Pollutant Property	Instantaneous Grab, ug/L
BTEX	750
Benzene	50

- (b) The ~~city~~ director will allocate the daily maximum allowable industrial loading among significant industrial users through wastewater discharge permits. The total mass of pollutants allocated to significant industrial users shall not exceed the maximum allowable industrial loading. Allocation of the POTW's maximum allowable industrial loading among all significant industrial users shall be based upon consideration of discharge volume, flow rate or equitable but feasible distribution.
- (c) In addition, the director may develop specific discharge limitations for any other toxic or inhibiting pollutant as necessary to prevent interference, pass through, danger to the health and safety of ~~POTW city~~ POTW personnel or the general public, environmental harm, a POTW permit violation, or to avoid rendering the POTW's biosolids unacceptable for economical reclamation, disposal or use.

Section 8. Section 20-428 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-428. Sector control programs.

The director may establish sector control programs to control specific pollutants as necessary to meet the objectives of this article for users that engage in similar activities and discharge similar pollutants. The director shall establish policies for each sector control program. users subject to these sector control programs may be required to install and operate wastewater pretreatment systems and/or implement ~~best management practices~~ BMPS and may be required to apply for a wastewater discharge permit.

Section 9. Section 20-432 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-432. Additional pretreatment measures.

- (a) Whenever the director finds it necessary to protect the POTW or to accurately assess a user's compliance with this article, he may require a user to restrict its

discharge during peak flow periods, discharge only into specific sewers, relocate and/or consolidate points of discharge, separate sewage waste streams from industrial waste streams or take other relevant measures.

- (b) The director may require users to install and maintain on their property a suitable storage and flow-control facility to ensure equalization of flow. The city director may issue a wastewater discharge permit solely for flow equalization.
- (c) The user shall install grease, oil and sand interceptors when, in the opinion of the director, they are necessary to properly handle wastewater containing excessive amounts of grease, oil or sand. All interceptors shall be of the type and capacity specified in the city's building code. users shall locate all interceptors so they are easily accessible for cleaning and inspection. The user shall inspect, clean, maintain and repair as needed all interceptors at its expense. The user shall make available for inspection by the director all cleaning and maintenance records for a minimum of three years.
- (d) The director may require users with the potential to discharge flammable substances to install and maintain an approved combustible gas detection meter at a point prior to discharge to the POTW.
- (e) The user shall calibrate all devices used to measure wastewater flow for billing purposes to ensure their accuracy as outlined in the city's wastewater flow meter accuracy verification guidelines. A copy of such guidelines is available from the director.

Section 10. Section 20-433 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-433. ~~Accidental discharge/s~~Slug discharge control plans.

- (a) The director shall evaluate whether an ~~industrial~~ user needs an ~~accidental discharge/slug~~ discharge control plan. Such evaluations must be documented in the administrative file. The director may require any user to develop, submit for approval and implement such a plan. Any requirement to develop and implement a slug discharge control plan shall be included in the user's wastewater discharge permit. An ~~accidental discharge/slug~~ discharge control plan shall contain, at a minimum, the following:
 - (1) A description of discharge practices including non-routine batch discharges;
 - (2) A description of stored chemicals;
 - (3) Procedures for immediately notifying the director of any ~~accidental or~~ slug discharge, as required by section 20-478(a); and
 - (4) Procedures to prevent adverse impact from any ~~accidental or~~ slug discharge. Such procedures must address inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, containment structures or equipment, measures for containing toxic organic pollutants (including solvents) and measures and equipment for emergency response.

- (b) An SIU shall notify the director immediately of any changes at its facility affecting the potential for a slug discharge.

Section 11. Section 20-434 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-434. Hauled portable toilet wastewater.

- (a) A user may introduce hauled portable toilet wastewater into the POTW only in accordance with its wastewater discharge permit.
- (b) Hauled portable toilet wastewater shall comply with all relevant provisions of this chapter, including, but not limited to, section 20-421.
- (c) All portable toilet wastewater haulers shall obtain wastewater discharge permits. Portable toilet wastewater haulers must submit a waste manifest form for every load.

Section 12. Section 20-435 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-435. Satellite waste dump sites.

- (a) Satellite waste dump site operators must obtain a wastewater discharge permit prior to introducing wastewater to the POTW.
- (b) Satellite waste dump site operators shall comply with all relevant provisions of this chapter, including, but not limited to, section 20-421.
- (c) Satellite waste dump site operators must maintain records for all loads disposed of at their site. Such records shall include, at a minimum, the name of the hauler, the hauler's vehicle, the license number, the volume of waste and the hauler's certification that the waste is not RCRA hazardous. satellite waste dump site operators shall submit such records to the director as required by their wastewater discharge permit.

Section 13. Section 20-456 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-456. Requirement to obtain wastewater discharge permit.

- (a) All SIUs and CIUs shall obtain a wastewater discharge permit from the director ~~prior to any discharge to the POTW.~~
- (b) The director may require other users to obtain a wastewater discharge permit as necessary to accomplish the purposes of this article.
- (c) Any violation of the terms and conditions of a wastewater discharge permit shall constitute a violation of this article. Obtaining a wastewater discharge permit does not relieve a permittee of its obligation to comply with all applicable federal and state pretreatment standards or requirements, or with any other applicable requirements of federal, state and local law.

Section 14. Section 20-457 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-457. Wastewater discharge permitting; existing connections.

An existing ~~discharger~~ user that becomes newly subject to permitting requirements under this article, and that does not currently have a wastewater discharge permit, may continue to discharge to the POTW until its timely wastewater discharge permit application is processed, provided that its discharge does not cause interference or pass through. In order to qualify under this provision, the ~~discharger~~ user must submit its application within ten business days of notification by the director of the permitting requirement.

Section 15. Section 20-458 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-458. Wastewater discharge permitting; new connections.

Any user required to obtain a wastewater discharge permit that proposes to begin or recommence discharging into the POTW shall obtain such wastewater discharge permit prior to beginning or recommencing its discharge. The user shall file an application for a wastewater discharge permit in accordance with section 20-459 at least 90 days prior to the date upon which such discharge will begin or recommence.

Section 16. Section 20-459 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-459. Wastewater discharge permit application.

All users required to obtain a wastewater discharge permit must submit a permit application. Users that are eligible may request a general permit under section 20-460. Such application shall include the following information for the premises from which the discharge will occur:

- (1) All information required by section 22-237(b);
- (2) A description of activities, facilities and plant processes, including a list of all raw materials and chemicals used or stored on the premises that will, or could accidentally or intentionally, be discharged to the POTW;
- (3) The number and type of employees and proposed or actual hours of operation;
- (4) Each product to be produced by type, amount, process or processes and rate of production;
- (5) The type and amount of raw materials to be processed (average and maximum per day);
- (6) Site plans, floor plans, mechanical and plumbing plans and details to show all sewers, floor drains and appurtenances by size, location and elevation, and all points of discharge;
- (7) Facility contact information;
- (8) Time and duration of the discharge; ~~and~~

- (9) Any requests for a monitoring waiver (or a renewal of an approved monitoring waiver) for a pollutant neither present nor expected to be present in the discharge based on section 20-476(e);
- (10) Any request to be covered by a general permit based on section 20-460; and
- (11) (9) Any other information that the director deems necessary to evaluate the wastewater discharge permit application. The director will return unprocessed to the user all incomplete or inaccurate applications.

Section 17. Section 20-460 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-460. Wastewater discharge permitting; general permits.

- (a) At the discretion of the director, the director may use general permits to control ~~industrial user~~ discharges to the POTW if the following conditions are met. All facilities to be covered by a general permit must:
 - (1) Involve the same or substantially similar types of operations;
 - (2) Discharge the same types of wastes;
 - (3) Require the same effluent limitations;
 - (4) Require the same or similar monitoring; and
 - (5) In the opinion of the director are facilities more appropriately controlled under a general permit than under individual wastewater discharge permits.
- (b) To be covered by ~~the a~~ general permit, ~~the a~~ user must file a written request for coverage that identifies its contact information, production processes, the types of wastes generated, the location for monitoring all wastes covered by the general permit, any requests in accordance with section 20-473(b) for a monitoring waiver for a pollutant neither present nor expected to be present in the discharge, and any other information the POTW director deems appropriate. A monitoring waiver for a pollutant neither present nor expected to be present in the discharge is not effective in the general permit until after the director has provided written notice to the user that such a waiver request has been granted in accordance with section 20-473(b).
- (c) The director will retain a copy of the general permit, documentation to support the POTW's determination that a specific user meets the criteria in subsections (a)(1) through (5) of this section and applicable state regulations, and a copy of the user's written request for coverage for three years after the expiration of the general permit.
- (d) The director may not control an ~~SCIU~~ through a general permit where the facility is subject to production-based categorical pretreatment standards or categorical pretreatment standards expressed as mass of pollutant discharged per day or for Users whose limits are based on the combined waste stream formula in section 20-422(c) or net/gross calculations in section 20-422(e).

Section 18. Section 20-462 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-462. Issuance of draft wastewater discharge permits.

If the director determines that a wastewater discharge permit is appropriate, he will first issue a draft wastewater discharge permit for review. Notice of the availability of the draft shall be posted in the same manner as other public notices. The user and the public shall have 30 days to submit written comments on the draft wastewater discharge permit. The director shall issue a wastewater discharge permit within 15 days of the close of the 30-day comment period.

Section 19. Section 20-463 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-463. Wastewater discharge permit decision appeals.

- (a) Any person, including the user, may petition the director to reconsider the terms of a wastewater discharge permit ~~(administrative appeal)~~ within 30 days of the effective date of the final wastewater discharge permit or the decision not to issue a wastewater discharge permit. ~~(4)~~ Failure to submit a written petition for review within such 30-day period shall constitute a waiver of the right to ~~the administrative appeal~~ the terms of a wastewater discharge permit or the decision not to issue a wastewater discharge permit.
- ~~(2)~~ (1) In its written petition for review, the appealing party must indicate the wastewater discharge permit provisions or the basis for the decision not to issue a wastewater discharge permit that it is objecting to, the reasons for ~~this~~ its objection and the alternative condition, if any, it seeks to place in the wastewater discharge permit. Except for provisions that change from the draft to the final wastewater discharge permit, the ~~petitioner~~ appealing party may only appeal those issues ~~#~~ that the appealing party raised during the public comment period.
- ~~(3)~~ (2) Only the challenged portions of the final wastewater discharge permit shall be stayed pending ~~an~~ the appeal.
- ~~(4)~~ (3) The director must issue their final decision within 20 days of receiving the written petition for review. ~~Failure of the director's failure to act within 20 days of receiving a written petition for review shall constitute denial of the petition for review. The director's decision not to reconsider, issue or modify a wastewater discharge permit shall be considered the director's final decision for purposes of this section.~~
- ~~((5))~~ ~~Aggrieved parties may seek review of the director's wastewater discharge permit decision by filing a request with the director within 30 days of the date of his final decision asking that the director's written decision be sent to the water and sewer board. The director shall submit his written decision to the water and sewer board within 30 days of receiving the request. The water and sewer board shall make its decision based on the administrative record.~~
- ~~(6)~~ ~~Aggrieved~~ (b) (1) The appealing parties, or the user, if not the appealing party, may seeking review of the water and sewer board's wastewater discharge permit director's decision on the petition for review must do so by filing a request for hearing with the administrative hearing officer, as authorized by the city Charter,

within 30 days ~~after of the date of the director's final decision of the board.~~ the administrative hearing officer shall conduct the hearing in accordance with the procedures set forth in chapter 12 of title 2 of this code and the administrative hearing officer rules and regulations. Such ~~review~~ hearing shall be de novo, and the administrative hearing officer's decision shall be considered final administrative action for purposes of subsection (c).

(2) The administrative hearing officer's decision to deny a request for hearing shall be considered final administrative action for purposes of subsection (c).

(3) To the extent this chapter is inconsistent with chapter 12 of title 2 of this code or the administrative hearing officer rules and regulations, this chapter shall govern. Chapter 10 of title 1 of this code does not apply to this chapter.

(Zc) Any appeal from the decision of the administrative hearing officer shall be to the appropriate court pursuant to C.R.C.P. 106.

Section 20. Section 20-464 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-464. Wastewater discharge permit contents.

The director shall include such conditions in the wastewater discharge permit that he determines are reasonably necessary to prevent pass through or interference, protect the quality of the water body receiving the treatment plant's effluent, protect ~~POTW worker~~ city personnel health and safety, facilitate biosolids management and disposal and protect against damage to the POTW.

(1) Wastewater discharge permits shall:

- a. Identify the permit term, which in no event shall exceed five years;
- b. Contain a statement that the wastewater discharge permit is nontransferable without prior notification to the director in accordance with section 20-467, and provisions for furnishing the new owner or operator with a copy of the existing wastewater discharge permit;
- c. Contain effluent limits, including BMPs, based on applicable pretreatment standards and requirements;
- d. Contain self-monitoring, sampling, reporting, notification and record-keeping requirements, which shall include the pollutants or BMP to be monitored, sampling location, sampling frequency, sample type and analysis method based on federal, state and local law;
- e. Contain requirements to control slug discharges, if determined by the director to be necessary;
- f. Contain a statement of applicable civil and criminal penalties for violating pretreatment standards and requirements; and
- g. Contain any applicable compliance schedule, which shall not extend the time for compliance beyond that required by applicable federal, state or local law.

- (2) Wastewater discharge permits may contain the following:
- a. Limits on the average and/or maximum rate of discharge, time of discharge and/or requirements for flow regulation and equalization;
 - b. Requirements to install, operate and maintain pretreatment technology, pollution control or containment devices to reduce, eliminate or prevent the introduction of pollutants into the POTW;
 - c. Requirements to develop and implement spill control plans or other special conditions necessary to prevent accidental, unanticipated or no routine discharges;
 - d. Requirements to develop and implement waste minimization plans to reduce the amount of pollutants discharged to the POTW;
 - e. The unit charge or schedule of user charges and fees for treating wastewater discharged to the POTW;
 - f. Requirements to install and maintain inspection and sampling facilities or other equipment, including flow measurement devices;
 - g. A statement that compliance with the wastewater discharge permit does not relieve the permittee of responsibility to comply with all applicable federal and state pretreatment standards, including those that become effective during the term of the wastewater discharge permit; and
 - h. Other conditions that the director deems necessary to ensure compliance with this chapter and state and federal requirements.

Section 21. Section 20-465 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-465. Wastewater discharge permit duration.

A wastewater discharge permit shall be issued for a specified term, not exceeding five years from the effective date of the wastewater discharge permit. The director may issue a wastewater discharge permit for a term less than five years.

Section 22. Section 20-466 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-466. Wastewater discharge permit modification.

- (a) The director may modify a wastewater discharge permit for good cause, including, but not limited to, the following reasons:
- (1) To incorporate any new or revised federal, state or local pretreatment standards or requirements;
 - (2) To address significant alterations or additions to the user's operation, processes or wastewater volume or character since the time of wastewater discharge permit issuance;
 - (3) A change in the POTW that requires either a temporary or permanent reduction or elimination of the permitted discharge;

- (4) Information indicating that the permitted discharge may threaten the POTW, human health or the environment;
 - (5) Violation of any terms or conditions of the wastewater discharge permit;
 - (6) Misrepresentations or failure to fully disclose all relevant facts in the wastewater discharge permit application or in any required reporting;
 - (7) Revision of categorical pretreatment standards, or a variance there from under 40 CFR 403.13;
 - (8) To correct typographical or other errors in the wastewater discharge permit; or
 - (9) To reflect a transfer of facility ownership or operation to a new owner or operator.
- (b) A user may petition the director and seek review of any wastewater discharge permit modification ~~and request an administrative appeal hearing~~ within ten days following issuance of the wastewater discharge permit with modifications. ~~The administrative appeal hearing shall be conducted according pursuant to procedures described in section 20-463.~~

Section 23. Section 20-467 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-467. Wastewater discharge permit transfer.

- (a) A wastewater discharge permit holder may transfer its wastewater discharge permit to a new owner or operator only if the permittee gives ~~at least 60 days' advance~~ written notice to the director, no less than 30 days in advance of the date of transfer, and the director approves the wastewater discharge permit transfer in writing. The notice to the director must include a written certification by the new owner or operator that:
- (1) The new owner and/or operator acknowledges receipt of a copy of the existing wastewater discharge permit;
 - (2) The new owner and/or operator has fully read and understands the wastewater discharge permit conditions and accepts full responsibility for complying with the existing wastewater discharge permit;
 - (3) The new owner and/or operator has no immediate intent to change the facility's operations and processes; and
 - (4) Identifies the specific date of transfer.
- (b) Upon approval of the wastewater discharge permit transfer, the director shall reissue the transferred wastewater discharge permit in the name of the new owner and/or operator.

Section 24. Section 20-468 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-468. Wastewater discharge permit suspension, ~~or revocation~~, or termination.

- (a) The director may suspend or revoke a wastewater discharge permit for good cause, including, but not limited to, the following reasons:
- (1) Failure to provide prior notification to the director of changed conditions pursuant to section 20-477;
 - (2) Misrepresentation or failure to fully disclose all relevant facts in the wastewater discharge permit application;
 - (3) Falsifying monitoring reports;
 - (4) Tampering with monitoring equipment;
 - (5) Refusing to allow the director timely access to the facility premises and records;
 - (6) Failure to pay fines;
 - (7) Failure to pay sewer charges;
 - (8) Failure to meet compliance schedules;
 - (9) Failure to complete a wastewater survey or timely permit renewal application;
 - (10) Failure to provide advance notice of the transfer of business ownership of a permitted facility as required by section 20-467; or
 - (11) Violation of any pretreatment standard or requirement, or any terms of the permit or this article.
- (b) A user may file a petition to reconsider the suspension or revocation of its wastewater discharge permit and request an administrative appeal within ten days following issuance of the notice of suspension or revocation. The administrative appeal shall be conducted according to the procedures described in section 20-530.
- (c) All Wastewater Discharge Permits shall be voidable terminate upon (1) the cessation of operations; ~~All Wastewater Discharge Permits are void upon~~ (2) the issuance of a new replacement Wastewater Discharge Permit; (3) THE EXPIRATION OF THE WASTEWATER DISCHARGE PERMIT TERM; OR (4 THE REQUEST OF THE PERMITTEE. The permittee may file a petition to reconsider the appeal the voiding termination of a wastewater discharge permit pursuant to section 20-463 within ten days of notice that the wastewater discharge permit is void has terminated. This appeal may be taken pursuant to section 20-463.

Section 25. Section 20-470 of the above-entitled ordinance shall be deleted and reserved:

Sec. 20-470. Reserved. ~~Suspension or revocation of permit; appeal; emergency suspension.~~

- ~~(a) Upon determination by the director of just cause under the terms of this chapter to suspend or revoke a wastewater discharge permit, the user shall be sent, by~~

~~certified mail or personal delivery service, written notice of termination of POTW service.~~

- ~~(b) The user may elect to appeal such determination, in which event such user shall, within ten days of the date of mailing or service, notify in writing, the director of intent to appeal, specifying the particular section of the determination contested and the basis thereof. The appeal shall be conducted according to procedures described in section 20-463.~~
- ~~(c) The suspension or revocation of the permit shall be stayed pending the appeal hearing unless the director determines that the suspension is necessary to prevent an imminent danger to the public health, safety or welfare, or interference with the operation or treatment abilities of the POTW. The director may include in the temporary suspension reasonable orders or conditions with which the permittee shall comply to protect the public health and safety.~~
 - ~~(1) Any user notified to suspend its discharge shall immediately stop or eliminate its contribution. If a user fails to immediately comply voluntarily with the suspension order, the director may take all necessary steps, including immediate severance of the water or sewer connection, to prevent or minimize damage to the POTW, its receiving stream or danger to any individuals. The director may allow the user to recommence its discharge when the user demonstrates to the director that the threat has been satisfactorily resolved, unless the director initiates termination proceedings against the user under section 20-519.~~
 - ~~(2) A user wholly or partly responsible for any discharge that is ordered suspended under this section shall, within five days of receiving such order, submit to the director a detailed written report describing the causes of the harmful situation and the measures taken to prevent any future occurrence.~~
- ~~(d) Any breach of the conditions or orders of an emergency suspension is an independent ground for revocation of the permit, assessment of a penalty or both.~~

Section 26. Section 20-473 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-473. Baseline monitoring reports.

- (a) *Generally.* Within either 180 days after the effective date of a categorical pretreatment standard, or the final administrative decision on a category determination under 40 CFR 403.6(a)(4), whichever is later, existing categorical users currently discharging to or scheduled to discharge to the POTW shall submit to the director a report containing the information listed in subsection (b) of this section. At least 90 days prior to commencing their discharge, new sources, and sources that become categorical users subsequent to the promulgation of an applicable categorical standard, shall submit to the director a report containing the information listed in subsection (b) of this section. A new source shall report the method of pretreatment it intends to use to meet applicable categorical standards. A new source also shall estimate the anticipated flow and quantity of pollutants it will discharge.

(b) *Required information of report.* Each user described in subsection (a) of this section shall submit a report containing the following information:

- (1) *Identifying information.* The name and address of the facility, including the name of the operator and owner.
- (2) ~~*Contact information, description of activities, facilities, etc.*~~ *Contact information, description of activities, facilities and plant production processes on the premises.*
- ~~(3) *Environmental permits.*~~ A list of all environmental control permits held by or for the facility.
- (43) *Description of operations.* A brief description of the user's operations and average production rates, including identification of all applicable North American Industry Classification System Codes. This description should include a schematic process diagram that indicates points of discharge to the POTW from the regulated processes.
- (54) *Flow measurement.* The measured average daily and maximum daily flow, in gpd, to the POTW from regulated process streams and other streams, as necessary, to allow use of the combined waste stream formula set out in 40 CFR 403.6(e).
- (65) *Measurement of pollutants.*
 - a. The categorical pretreatment standards applicable to each regulated process.
 - b. The results of sampling and analysis identifying the nature and concentration, and/or mass where required by the categorical standard or by the director, of regulated pollutants in the discharge from each regulated process. The information shall include a chain of custody record ~~that lists the outfall location, sample date, sample time, sample type and name of sample collector.~~
 - c. Instantaneous, daily maximum and long-term average concentrations, or mass where required.
 - d. The sample shall be representative of daily operations and shall be analyzed according to procedures set out in section 20-483. Where the standard requires compliance with a BMP or pollution prevention alternative, the user shall submit documentation as required by the director or the applicable standards to determine compliance with the standard.
 - e. The user must sample according to the procedures set out in section 20-484.
 - f. The user shall take a minimum of one representative sample to compile that data necessary to comply with the requirements of this subsection.
 - g. The user should take samples immediately downstream from pretreatment facilities if such exist or immediately downstream from the regulated process if no pretreatment exists. If other wastewaters are mixed with the

regulated wastewater prior to pretreatment, the user should measure the flows and concentrations necessary to allow use of the combined waste stream formula in 40 CFR 403.6(e) to evaluate compliance with the pretreatment standards. Where an alternative concentration or mass limit has been calculated in accordance with 40 CFR 403.6(e), the user shall submit this adjusted limit along with supporting data to the POTW.

- h. The director may allow the user to submit a baseline report that utilizes only historical data so long as the data provides information sufficient to determine the need for industrial pretreatment measures.
 - i. The baseline report shall indicate the time, date and place of sampling and methods of analysis, and shall certify that such sampling and analysis accurately represent normal work cycles and expected pollutant discharges to the POTW.
- (76) *Certification.* A statement, reviewed by the authorized representative of the user and certified by a qualified professional, indicating whether pretreatment standards are being met on a consistent basis, and, if not, whether additional O&M and/or additional pretreatment is required to meet the pretreatment standards and requirements.
- (87) *Compliance schedule.* If additional pretreatment and/or O&M is required to meet the categorical pretreatment standards, the shortest schedule by which the user will provide such additional pretreatment and/or O&M shall be submitted. The completion date in this schedule shall not be later than the compliance date established for the applicable pretreatment standard. A compliance schedule pursuant to this chapter must meet the requirements set out in section 20-474 and, when applicable, submitted in accordance with 40 CFR. § 403.12 (b)(7)(i-ii).
- (98) *Signature and report certification.* All baseline monitoring reports must be signed and certified in accordance with section ~~20-534(a)~~ 20-487(a).

Section 27. Section 20-475 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-475. Reports on compliance with categorical pretreatment standard deadline.

Within 90 days following the date for final compliance with applicable categorical pretreatment standards or, in the case of a new source, following commencement of the introduction of wastewater into the POTW, any user subject to such pretreatment standards and requirements shall submit to the director a report containing the information described in section 20-473(b)(4) through (6). For users subject to equivalent mass or concentration limits established according to the procedures in 40 CFR 403.6(c), this report shall contain a reasonable measure of the user's long-term production rate. For all other users subject to categorical pretreatment standards expressed in terms of allowable pollutant discharge per unit of production (or other measure of operation), this report shall include the user's actual production during the appropriate sampling period. All compliance reports must be signed and certified according to section ~~20-534(a)~~ 20-487(a).

Section 28. Section 20-476 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-476. Periodic self-monitoring compliance reports.

- (a) An SIU shall submit periodic reports that indicate the nature and concentration of pollutants in its discharge that are limited by a pretreatment standard, along with the measured daily flows. The information shall include a chain of custody record ~~that lists the outfall location, sample date, sample time, sample type and name of sample collector.~~ The director shall establish the schedule for such reporting in the SIU's wastewater discharge permit. Such schedule shall require submittal of the reports at a frequency of no less than every six months. In cases where the pretreatment standard requires compliance with a BMP or pollution prevention alternative, the user must submit documentation as required by the director or the applicable Standard to determine the compliance status of the user. All periodic compliance reports must be signed and certified according to section ~~20-534(a)~~ 20-487(a).
- (b) All reports under this section are due 30 days following the end of the reporting period stated in the SIU's permit.
- (c) All wastewater samples required under this section must be representative of the SIU's discharge. The SIU shall properly operate and maintain all wastewater monitoring and flow measurement facilities. Failure of an SIU to keep its monitoring facility in good working order shall not be grounds for the SIU to claim that sample results are unrepresentative of its discharge.
- (d) If an SIU subject to the reporting requirement in this section monitors any pollutant more frequently than required by the director using the procedures prescribed in section 20-484, the SIU shall include the results of this monitoring in the periodic compliance report.
- (e) the director may authorize a user subject to a categorical pretreatment standard to forego sampling of a pollutant regulated by a categorical pretreatment standard if the user has demonstrated through sampling and other technical factors that the pollutant is neither present nor expected to be present in the discharge, or is present only at background levels from intake water and without any increase in the pollutant due to activities of the industrial user. (see 40 CFR 403.12(e)(2)) this authorization is subject to the following conditions:
 - (1) the waiver may be authorized where a pollutant is determined to be present solely due to sanitary wastewater discharged from the facility provided that the sanitary wastewater is not regulated by an applicable categorical standard and otherwise includes no process wastewater.
 - (2) the monitoring waiver is valid only for the duration of the effective period of the individual wastewater discharge permit, but in no case longer than five years. The user must submit a new request for the waiver before the waiver can be granted for each subsequent individual wastewater discharge permit. See section 20-459 (9).

- (3) in making a demonstration that a pollutant is not present, the user must provide data from at least one sampling of the facility's process wastewater prior to any treatment present at the facility that is representative of all wastewater from all processes.
- (4) the request for a monitoring waiver must be signed in accordance with section 20-487 and include the certification statement in section 20-487(c).
- (5) non-detectable sample results may be used only as a demonstration that a pollutant is not present if the EPA approved method from 40 CFR part 136 with the lowest minimum detection level for that pollutant was used in the analysis.
- (6) any grant of the monitoring waiver by the director must be included as a condition in the user's permit. The reasons supporting the waiver and any information submitted by the user in its request for the waiver must be maintained by the director for 3 years after expiration of the waiver.
- (7) upon approval of the monitoring waiver and revision of the user's permit by the director, the user must certify on each report with the statement in section 20-487(c), that there has been no increase in the pollutant in its wastestream due to activities of the user.
- (8) in the event that a waived pollutant is found to be present or is expected to be present because of changes that occur in the user's operations, the user must immediately: comply with the monitoring requirements of section 20-476(a), or other more frequent monitoring requirements imposed by the director, and notify the director
- (9) this provision does not supersede certification processes and requirements established in categorical pretreatment standards, except as otherwise specified in the categorical pretreatment standard.

Section 29. Section 20-478 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-478. Reports of potential problems.

- (a) In the case of any discharge that may cause potential problems for the POTW, including, but not limited to, accidental discharges, discharges of a nonroutine episodic nature, a noncustomary batch discharge or a slug load, the user shall immediately notify the POTW director by telephone of the incident. This notification shall include the location of the discharge, type of waste, duration, concentration and volume, if known, and corrective actions taken by the user.
- (b) Within five days following such discharge, the user shall, unless waived by the director, submit a detailed written report describing the cause of the discharge and the measures the user will take to prevent similar future occurrences. Such report shall not relieve the user of any expense, loss, damage or other liability that it may incur as a result of damage to the POTW, natural resources or other persons or property; nor shall such report relieve the user of any fines, penalties or other liability that may be imposed pursuant to this chapter or other applicable law.

- (c) A user shall permanently post on its bulletin board or other prominent place information advising employees whom to call in the event of a discharge described in subsection (a) of this section. The ~~City~~ user shall ensure that all employees who may cause such a discharge to occur are advised of the emergency notification procedure.

Section 30. Section 20-480 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-480. Reporting of violations and repeat sampling.

If sampling performed by a user indicates a violation, the user must notify the director in writing or by telephone within 24 hours of becoming aware of the violation. The user shall also repeat the sampling and analysis and submit the results of the repeat analysis to the director within 30 days after becoming aware of the violation. Where the city director has performed sampling and analysis in lieu of the user, the city director must perform the repeat sampling and analysis unless it notifies the user of the violation and requires the user to perform the repeat analysis. Where the city director finds a violation as a result of its compliance monitoring event, then the user shall perform repeat sampling and analysis within 30 days after becoming notified of the violation.

Section 31. Section 20-481 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-481. Bypass reporting.

Users must report all bypasses in accordance with section 20-5323(c).

Section 32. Section 20-482 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-482. Notification of the discharge of hazardous waste.

- (a) A user shall notify in writing the director, the EPA Region VIII Waste Management division and the state hazardous materials and waste management division of any discharge into the POTW of a substance which, if otherwise disposed of, would be a hazardous waste under 40 CFR 261. Such notification must include the name of the hazardous waste as set forth in 40 CFR 261, the EPA hazardous waste number and the type of discharge (continuous, batch or other).
- (1) If the user discharges more than 100 kilograms of such waste per ~~calendar~~ month to the POTW, to the extent such information is known and readily available to the user, the notification shall also identify the hazardous constituents contained in the waste stream; estimate the mass and concentration of such constituents in the waste stream discharged during that ~~calendar~~ month; and estimate the mass and concentration of such constituents in the waste stream the user expects to discharge during the following 12 months.
- (2) The user shall provide such notification no later than 180 days after the discharge commences. Any notification under this subsection need be submitted only once for each hazardous waste discharged. (However, the

user must notify the ~~POTW~~ director of any changed conditions under section 20-477). The notification requirement in this subsection does not apply to pollutants already reported by users subject to categorical pretreatment standards under the self-monitoring requirements of sections 20-473, 20-475 and 20-476.

- (b) Users are exempt from the requirements of subsection (a) of this section during a ~~calendar~~ month in which they discharge no more than 15 kilograms of hazardous wastes, unless the wastes are acute hazardous wastes as specified in 40 CFR 261.30(d) and 261.33(e). Discharge of more than 15 kilograms of non-acute hazardous wastes in a ~~calendar~~ month, or of any quantity of acute hazardous wastes as specified in 40 CFR 261.30(d) and 261.33(e), requires a one-time notification. Subsequent months during which the user discharges more than such quantities of any hazardous waste do not require additional notification. (However, the user must notify the ~~POTW~~ director of any changed conditions under section 20-477.)
- (c) If EPA or the state issues any new regulations under section 3001 of RCRA identifying any additional characteristic of a hazardous waste or listing any additional substance as a hazardous waste, the user must notify the director, the EPA Region VIII Waste Management division and the state hazardous materials and waste management division of the discharge of such substance within 90 days of the effective date of such regulations.
- (d) In the case of any notification made under this chapter, the user shall certify that it has a program in place to reduce the volume and toxicity of hazardous wastes generated to the degree it has determined to be economically practicable.
- (e) This provision does not create a right to discharge any substance not otherwise permitted to be discharged by this chapter, a wastewater discharge permit issued hereunder or any applicable federal or state law.

Section 33. Section 20-484 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-484. Sample collection.

Reports required in sections 20-473, 20-475 and 20-476 must be based on data obtained through appropriate sampling and analysis performed during the period covered by the report, based on data that is representative of conditions occurring during the reporting period.

- (1) Except as indicated in subsections (2) and (3) of this section, the user must collect wastewater samples using 24-hour flow-proportional composite sampling techniques, unless time-proportional composite sampling or grab sampling is authorized by the director. Where time-proportional composite sampling or grab sampling is authorized by the ~~city~~ director, the samples must be representative of the discharge. Using protocols (including appropriate preservation) specified in 40 CFR 136 and appropriate EPA guidance, multiple grab samples collected during a 24-hour period may be composited prior to the analysis as follows: for cyanide, total phenols and sulfides, the samples may

be composited in the laboratory or in the field; for volatile organics and oil and grease, the samples may be composited in the laboratory. Composite samples for other parameters unaffected by the compositing procedures as documented in approved EPA methodologies may be authorized by the ~~city~~ director, as appropriate. In addition, grab samples may be required to show compliance with instantaneous limits.

- (2) Samples for oil and grease, temperature, pH, cyanide, total phenols, sulfides and volatile organic compounds must be obtained using grab collection techniques unless specified otherwise in a wastewater discharge permit or otherwise approved by the ~~city~~ director.
- (3) For sampling required in support of baseline monitoring and 90-day compliance reports required in sections 20-473 and 20-475, a minimum of four grab samples must be used for pH, cyanide, total phenols, oil and grease, sulfide and volatile organic compounds for facilities for which historical sampling data do not exist; for facilities for which historical sampling data are available, the director may authorize a lower minimum. For the reports required by section 20-476, the ~~industrial~~ user is required to collect the number of grab samples necessary to assess and ensure compliance with applicable pretreatment standards and requirements.

Section 34. Section 20-485 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-485. Timely submittal of reports.

For written reports required by this article or a wastewater discharge permit:

- (1) The date of the postmark shall constitute submittal for reports sent postage prepaid by U.S. Mail;
- (2) The date of receipt by the director shall constitute submittal for reports sent by other means, including but not limited to private courier.

Section 35. Chapter 3, Article VI, Industrial Pretreatment, shall be amended by adding thereto a new Section 20-487 to read as follows:

Sec. 20-487. Signatories and certification.

- (a) General. All wastewater discharge permit applications and user reports must be signed by an authorized representative of the user and contain the following certification statement:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false

information, including the possibility of fine and imprisonment for knowing violations.

- (b) Annual certification for nonsignificant categorical industrial users. A facility that the director determines is a nonsignificant categorical industrial user must annually submit to the POTW the following certification signed by an authorized representative of the user. This certification must accompany an alternative report required by the director:

Based on my inquiry of the person or persons directly responsible for managing compliance with the categorical pretreatment standards under 40 CFR _____, I certify that, to the best of my knowledge and belief that during the period from _____, _____, to _____, _____, [months, days, year]:

(1) The facility described as _____ [facility name] met the definition of a nonsignificant categorical industrial user.

(2) The facility complied with all applicable pretreatment standards and requirements during this reporting period; and

(3) The facility never discharged more than one hundred (100) gallons of total categorical wastewater on any given day during this reporting period.

This compliance certification is based upon the following information:

_____ official signature

- (c) Certification of pollutants not present. Users that have an approved monitoring waiver based on section 20-476 (e) must certify on each report with the following statement that there has been no increase in the pollutant in its wastestream due to activities of the user.

Based on my inquiry of the person or persons directly responsible for managing compliance with the pretreatment standard for 40 CFR _____ [specify applicable national pretreatment standard part(s)], I certify that, to the best of my knowledge and belief, there has been no increase in the level of _____ [list pollutant(s)] in the wastewaters due to the activities at the facility since filing of the last periodic report under section sec. 20-476 (a).

Section 36. Section 20-511 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-511. Right of entry; inspection and sampling.

Upon presentation of proper credentials, the director may enter the premises of any user to determine the user's compliance with this article and any wastewater discharge permit or order issued hereunder. Users shall allow the director ready access to all parts of the premises to inspect, sample, examine and copy records, and to perform any additional duties related to such compliance issues.

- (1) Where a user has security measures in force that require proper identification and clearance before entry into its premises, the user shall make necessary arrangements with its security personnel so that, upon presentation of suitable identification, the director will be permitted to enter without delay for the purpose of performing specific responsibilities.
- (2) The director shall have the right to set up on the user's property, or require installation of, any devices necessary to sample and/or measure the user's operations.
- (3) The director may require the user to install, in accordance with local construction standards and specifications, such sampling and monitoring equipment and facilities as necessary to ensure compliance with applicable requirements. The user shall maintain sampling and monitoring equipment at all times in a safe and proper operating condition at its own expense.
- (4) The director may require the user to install and maintain sampling and monitoring facilities independent of the user's sampling and monitoring facilities to enable the director to independently monitor the user's discharge activities.
- (5) At the request of the director, the user shall promptly remove any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled. The user shall bear any costs of clearing such access.
- (6) In the event that the director is refused admission to the ~~discharger's premises~~ user's property, the director may discontinue water or wastewater service to the premises until the director has been afforded reasonable access to the premises to accomplish inspection or sampling.

Section 37. Section 20-514 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-514. Publication of users in significant noncompliance.

The director shall publish annually, in a newspaper of general circulation that provides meaningful public notice within the jurisdiction served by the POTW, a list of the users that, at any time during the previous 12 months-calendar year, were in significant noncompliance with applicable pretreatment standards and requirements. A user is in The term "significant Noncompliance" shall mean if a user committed a violation that meets one or more of the following criteria:

- (1) Chronic violations of any wastewater discharge limits, defined ~~herein~~ as those violations in which 66 percent or more of all of the wastewater measurements

- taken for the same pollutant parameter during a six-month period exceed by any ~~amount~~ magnitude, a numeric pretreatment standard or requirement, including instantaneous maximum allowable discharge limits;
- (2) Technical review criteria (TRC) violations, defined ~~herein~~ as those violations in which 33 percent or more of all of the wastewater measurements taken for ~~each the same~~ pollutant parameter during a six-month period equal or exceed the product of the numeric pretreatment standard or requirement, including the instantaneous maximum allowable discharge limit, multiplied by the applicable ~~criteria~~ TCR (1.4 for BOD, TSS, fats, oils and grease, and 1.2 for all other pollutants except pH);
 - (3) Any other violation of pretreatment standards or requirements (daily maximum, long-term average, instantaneous maximum allowable discharge limit or narrative standard) that the director determines (a) has caused, alone or in combination with other discharges, interference or pass through, ~~or that~~ (b) has endangered the health of ~~POTW~~ city personnel or the general public;
 - (4) Any discharge ~~of a pollutant~~ that (a) caused imminent endangerment to human health or welfare or the environment, or resulted in the director's exercise of his emergency authority under section 20-520 to halt or prevent such a discharge;
 - (5) Failure to meet, within 90 days of the scheduled date, a compliance schedule milestone contained in a wastewater discharge permit or ~~enforcement~~ compliance order for starting construction, completing construction or attaining final compliance;
 - (6) Failure to provide within ~~45~~ 30 days after the due date, any required reports, including baseline monitoring reports, reports on compliance with categorical pretreatment standard deadlines, periodic self-monitoring reports and reports related to compliance schedules;
 - (7) Failure to accurately report noncompliance; or
 - (8) Any other violation, including a violation of a sector control program or BMP, that the director determines will adversely affect the operation or implementation of the local pretreatment program.

Section 38. Section 20-515 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-515. Notice of violation.

When the director finds that a user has violated or continues to violate any provision of this article, a wastewater discharge permit, an order issued ~~hereunder~~ this chapter or any other pretreatment standard or requirement, the director may serve that user a written notice of violation. ~~Within 30 days of the receipt of such notice, the user shall submit in writing to the director an explanation of the violation and a plan with specific steps to correct the violation and prevent its recurrence. Submission of this plan~~ A notice of violation only applies to the violation(s) identified therein and in no way relieves the user of liability for any violations occurring before or after receipt of the notice of violation. Issuance of a notice of violation shall not be a bar against, or a

prerequisite for, taking any other action against the user. ~~A user may seek review of a notice of violation and request an administrative appeal hearing within ten days following issuance of the notice of violation. The administrative appeal hearing shall be conducted according to procedures described in section 20-529.~~

Section 39. Section 20-516 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-516. Compliance orders.

When the director finds that a user has violated or continues to violate any provision of this article, a wastewater discharge permit, an order issued ~~hereunder~~ this chapter or any other pretreatment standard or requirement, the director may order the user responsible for the discharge to attain compliance within a specified time. Compliance orders also may contain other requirements to address the noncompliance, including prohibiting discharge, requiring treatment, additional self-monitoring and other management practices designed to minimize the amount of pollutants discharged to the POTW. Compliance orders may ~~also assess fines and administrative costs include the assessment of administrative fines~~ against the user in accordance with section 20-521. A compliance order ~~may~~ shall not extend the deadline for compliance established for a pretreatment standard or requirement, nor does a compliance order relieve the user of liability for any violation, including any continuing violation. Issuance of a compliance order shall not be a bar against, or a prerequisite for, taking any other action against the user. A User may ~~seek review~~ file a petition to reconsider the issuance of a compliance order and request an administrative appeal Hearing within ten ~~(10)~~ days following issuance of a compliance order. The administrative appeal ~~Hearing~~ shall be conducted according to the procedures described in section 20-~~529~~530. A user's petition to reconsider will not stay any condition of a compliance order that is not challenged by the user. The user shall be liable for all continuing violations.

Section 40. Section 20-517 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-517. Show cause hearing.

The director may order a user that has violated, or continues to violate, any provision of this article, a wastewater discharge permit, ~~or an order issued~~ this chapter or any other pretreatment standard or requirement, to appear before the director and show cause why the city should not take the proposed enforcement action, including the assessment of administrative fines and costs. The director shall serve notice on the user specifying the time and place for the hearing, the proposed enforcement action, the reasons for such action, and requesting that the user show cause why the proposed enforcement action should not be taken. The director shall serve notice of the hearing by ~~certified mail (return receipt requested)~~ personal service or first class U.S. mail at least ~~five~~ ten days prior to the hearing. The director may serve such notice on any authorized representative of the user. A show cause hearing shall not be a bar against, or prerequisite for, taking any other action against the user. ~~A user may seek review of a show cause hearing determination and request an administrative appeal hearing~~

~~within ten days following receipt of show cause hearing decision. The administrative appeal hearing shall be conducted according to procedures described in section 20-529.~~

Section 41. Section 20-518 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-518. Consent orders.

The ~~director~~ city may enter into a consent order, an assurance of voluntary compliance or other similar document establishing an agreement with any user responsible for noncompliance. Such ~~documents~~ agreement shall include specific action for the user to take to correct the noncompliance within a specified time period and may include administrative fines, stipulated penalties, supplemental environmental projects, or other conditions and requirements as agreed to by and between the city and the user. Such ~~documents~~ agreement shall have the same force and effect as the compliance orders issued pursuant to section 20-516, ~~may contain an agreement as to payment of fines and costs~~ and shall be judicially enforceable.

Section 42. Section 20-519 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-519. Cease and desist orders.

- (a) When the director determines: that a user has violated, or continues to violate, any provision of this chapter, a wastewater discharge permit, ~~or an order issued hereunder~~ this chapter, or any other pretreatment standard or requirement and; that the user's past violations are likely to recur; ~~or that the user's discharge endangers the environment or threatens to interfere with the operation of the POTW;~~ then the director may, ~~after formal notice to the user and an opportunity to be heard under section 20-517,~~ order the user to cease and desist all such violations and direct the user to:
- (1) Immediately comply with all requirements; and
 - (2) Take such appropriate remedial or preventive action necessary to properly address a continuing or threatened violation, including halting operations and/or terminating the discharge.
- (b) ~~When the director determines that a user's discharge imminently threatens human health or welfare, the director may, after informal notice to the user, order the user to cease and desist such threat and direct the user to:~~
- ~~(1) Immediately comply with all requirements; and~~
 - ~~(2) Take such appropriate remedial or preventive action necessary to properly address the imminent threat, including halting operations and/or terminating the discharge.~~
- ~~(c)~~ A user may file a petition to reconsider the issuance seek review of a cease and desist order according to procedures described in section 20-529530. A user's petition to reconsider will not stay any condition of a cease and desist order that is not challenged by the user. The user shall be liable for all continuing violations.

Issuance of a cease and desist order shall not be a bar against, or a prerequisite for, taking any other action against the user.

Section 43. Chapter 3, Article VI, Industrial Pretreatment, shall be amended by adding thereto a new Section 20-520 to read as follows:

Sec. 20-520. Emergency suspension of service.

- (a) Endangerment to human health or welfare. The director, without written notice to the responsible user, may immediately halt or prevent any discharge into the POTW or sanitary sewer system of a connecting jurisdiction by any available means to the city, including but not limited to physical disconnection from the POTW, whenever it reasonably appears that a user's discharge presents an imminent endangerment to human health or welfare.
- (b) Endangerment to environment or treatment works. The director, after written notice to the responsible user, may halt or prevent any discharge into the POTW or sanitary sewer system of a connecting jurisdiction by any available means to the city, including but not limited to physical disconnection from the POTW, whenever a user's discharge presents or may present an endangerment to the environment or threatens to interfere with the operation of the POTW.
- (c) Suspension of service and elimination of non-complying discharge. Any user notified of a suspension of its wastewater discharge permit and/or its wastewater treatment service shall immediately stop or eliminate the discharge. In the event that a user fails to comply with the suspension order, the director may take any measure they deems necessary, including but not limited to immediate physical disconnection of the sewer connection, to prevent or minimize harm to human health or the environment or damage to the POTW. The director may reinstate the user's wastewater discharge permit and/or its wastewater treatment service upon proof that the user has eliminated the non-complying discharge.
- (d) Statement of cause and preventative measures. Within five days after receiving the notice of a suspension, the responsible user shall submit a detailed written statement to the director describing the cause of the harmful discharge and the measures taken to prevent any reoccurrence. Suspension of service shall not be a bar against, or a prerequisite for, taking any other action against the user.

Section 44. Section 20-520 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5201. Administrative fines.

- (a) ~~Following the issuance of a notice of violation, a compliance order or order to show cause, the director may fine a user in an amount not to exceed \$1,000.00 per violation. The director shall determine the applicable fine using the city's administrative penalty evaluation form and administrative penalty matrix. When the director determines that a user has violated, or continues to violate, any provision of this chapter, a wastewater discharge permit, an order issued under this~~

chapter or any other pretreatment standard or requirement, the director may assess an administrative fine against such user in an amount not to exceed one thousand dollars (\$1,000.00) per violation per day.

- (1) Each day on which ~~noncompliance~~ a violation occurs, or continues, shall constitute a separate and distinct violation. In the case of monthly or other long-term average discharge limits, the director may assess an administrative fines for each day during the period of violation. The director may add the costs of preparing administrative enforcement actions, such as notices and orders, to the administrative fine.
- (12) The director may add unpaid charges and fines to the user's next scheduled sewer service charge or utilize other collection remedies. All unpaid fines and charges shall constitute a lien against the user's property. ~~In that case, the director of finance shall file such lien to protect the city's interest. Fines and charges remaining unpaid for 60 calendar days shall accrue interest at the rate set forth in section 6-197 on the unpaid balances.~~
- (23) ~~The assessment~~ issuance of an administrative ~~penalty~~ fine shall not be a bar against, or a prerequisite for, taking any other action against the user.
- (b) A user may file a petition to reconsider the assessment of an administrative fine according to procedures described in section 20-530. A user's petition to reconsider will not stay any enforcement action that is not challenged by the user. The user shall be liable for all continuing violations.

Section 45. Section 20-521 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-521.2. Delinquent payment of administrative fines ~~and costs~~; notice before collection action.

Before filing a civil action to collect one or more delinquent ~~penalty~~ assessments, the director shall send a notice to the responsible ~~party or parties~~ user, which advises the ~~party or parties~~ user of the nature of the violation that resulted in ~~a civil penalty~~ the assessment of an administrative fine, the dates on which violations occurred, the original due date of the ~~penalty~~ delinquent assessment and the total amount due ~~of the penalty~~, including any delinquency charges. The notice shall further advise the responsible ~~party or parties~~ user that, unless payment of ~~all assessments~~ the total amount due is made to the city within ten days of the date of the notice, civil action to collect the delinquent amounts may be filed in a court of competent jurisdiction for collection of such assessments.

Section 46. Section 20-522 of the above-entitled ordinance shall be deleted to read as follows:

~~Sec. 20-522. Delinquent payment of administrative fines and costs; collection action initiation.~~

~~If the city does not receive full payment of all fines and costs following the notice provided for in section 20-521, the city attorney shall file civil action for collection in the~~

~~appropriate court. Any inaccuracy or omission in the notice under section 20-521 shall not bar or serve as a defense to the civil action. Any such defect may result in the disallowance of interest until the city perfects notice.~~

Section 47. Section 20-523 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-523. Liability for expenses and fines.

Any user violating this article shall be liable for any expense, loss or damage ~~caused to the POTW caused by reason of~~ such violation, including increased costs for sewage treatment, biosolids treatment and disposal, and POTW operation and maintenance expenses resulting from the user's discharge. If a user's discharges ~~pollutants that causes the state or EPA to assess a fine against the city for violating any condition of its CDPS permit or its approved pretreatment program, then the discharger user shall be fully liable for the total amount of the fine assessed against the city by the state or EPA indemnify the city for the total cost of the fine, including, without limitation, all legal, sampling, analytical and other associated costs and expenses.~~

Section 48. Section 20-524 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-524. Injunctive relief.

When the director finds that a user has violated, or continues to violate, any provision of this article, a wastewater discharge permit, an order issued ~~hereunder~~ this chapter or any other pretreatment standard or requirement, the ~~director city~~ may petition the appropriate court, ~~through the city attorney,~~ to issue a temporary or permanent injunction, as appropriate, to restrain or compel the specific performance of the wastewater discharge permit, order or other requirement imposed by this chapter on activities of the user. The ~~director city~~ may also seek such other action appropriate for legal and/or equitable relief, including requiring the user to conduct environmental remediation. A petition for injunctive relief shall not be a bar against, or a prerequisite for, taking any other action against a user.

Section 49. Chapter 3, Article VI, Industrial Pretreatment, shall be amended by adding thereto a new Section 20-525 to read as follows:

Sec. 20-525. Civil penalties

(a) A user who has violated, or continues to violate, any provision of this chapter, a wastewater discharge permit, an order issued pursuant to this chapter, or any other pretreatment requirement or standard shall be liable to the city for a civil penalty not to exceed one thousand dollars (\$1,000.00) per day per violation. In the case of a monthly or other long-term average discharge limit, penalties shall accrue for each day during the period of violation.

- (b) The city may recover reasonable attorneys' fees, court costs, and other expenses associated with enforcement activities, including sampling and monitoring expenses, and the cost of any actual damages incurred by the city.
- (c) Filing a suit for civil penalties shall not be a bar against, or a prerequisite for, taking any other action against a user.
- (d) In determining the amount of civil liability, the court shall take into account all relevant circumstances, including, but not limited to, the extent of harm caused by the violation, the magnitude and duration of the violation, any economic benefit gained through the user's violation, corrective actions by the user, the compliance history of the user, and any other factor as justice requires.

Section 50. Section 20-525 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5256. Criminal prosecution.

- (a) A user who knowingly or negligently violates any provision of this chapter, a wastewater discharge permit, an ~~or~~ order issued ~~here~~under this chapter, or any other pretreatment standard or requirement, shall, upon conviction, be guilty of a misdemeanor offense, punishable by a fine of not more than \$1,000.00 per violation per day or imprisonment for not more than one year, or both. Each day, or portion thereof, that a ~~person~~ user commits, continues or allows a violation of any provision of this article, wastewater discharge permit, an ~~or~~ order issued ~~here~~under this chapter, or any other pretreatment standard or requirement, shall constitute a separate offense and ~~is~~ be punishable accordingly.
- (b) A user who knowingly makes any false statements, representations or certifications in any application, record, report, plan or other documentation filed or required to be maintained pursuant to this chapter, a wastewater discharge permit, ~~or an~~ order issued ~~here~~under this chapter, or who falsifies, tampers with or knowingly renders inaccurate any monitoring device or method required under this chapter shall, upon conviction, be punished by a fine of not more than \$1,000.00 per violation per day, or imprisonment of not more than one year, or both.
- (c) The city may refer violations that may warrant criminal prosecution to the U.S. attorney, state attorney general, EPA criminal investigations division, or other appropriate agency. Such referral shall not be a bar against, or a prerequisite for, taking any other action against a user.

Section 51. Section 20-526 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5267. Remedies nonexclusive.

The remedies provided for in this article are not exclusive of any other remedies that the city may have under Colorado law. The ~~director~~ city may take any, all or any combination of ~~these~~ actions described in this chapter against a ~~noncompliant~~ user who violates any provision of this chapter, a wastewater discharge permit, an order issued pursuant to this chapter, or any other pretreatment requirement as permitted by

~~law. The city may seek damages from any user whose discharge causes damage or detrimental effects on the POTW or otherwise causes the city to expend resources to respond to such discharge. The city's enforcement response guide will direct enforcement of pretreatment violations. However, the director may take other action against any user when the circumstances warrant, interested parties may obtain copies of the city's enforcement response guide from the director.~~

Section 52. Section 20-527 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5278. Performance bonds.

The director may decline to issue or reissue a wastewater discharge permit to any user who has failed to comply with any provision of this article, a previous wastewater discharge permit ~~or an order issued hereunder~~ this chapter, or any other pretreatment standard or requirement, unless such user first files a bond or other financial instrument acceptable to the director of finance and payable to the city, in a sum not to exceed a value that the director determines to be necessary to achieve consistent compliance.

Section 53. Section 20-528 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5289. Water supply severance.

The director may discontinue water service to any user who has violated or continues to violate any provision of this article, a wastewater discharge permit, ~~or an order issued hereunder~~ this chapter, or any other pretreatment standard or requirement. Service will only recommence, at the user's expense, after it has satisfactorily demonstrated its ability to comply. Within ten days following discontinuance of water service, the user may request a hearing which shall be held in accordance with section 20-~~529~~530.

Section 54. Section 20-529 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-52930. Administrative appeal hearings.

(a) Any user ("appealing party") may petition the director to reconsider ("administrative appeal") an ~~notice of violation, order issued under this chapter, penalty or any other enforcement action~~ fine imposed pursuant to in this chapter within ten days of the receipt of the ~~notice of violation or other enforcement action order, penalty or fine.~~ (1) failure to submit a written petition for ~~review~~ reconsideration within such ten-day period shall constitute a waiver of the right to the administrative appeal.

(2) In its written petition, the appealing party must indicate the enforcement actions objected to, the reasons for ~~this its~~ objection, and any proposed alternative action. (3) Only the challenged portions of the final enforcement action shall be stayed pending an appeal.

- (42) The director shall serve the appealing party with notice of the hearing on the administrative appeal, including the location, date and time by certified first class U.S. mail (return receipt requested) of the location, date and time of the administrative appeal hearing at least five ten days prior to the hearing.
- (35) The director shall issue a written decision on the ~~petition~~ administrative appeal within 20 days after the ~~administrative appeal~~ hearing. The director's written decision shall be considered the director's final decision for purposes of this section.
- ~~(6) Aggrieved parties may seek review of the director's decision by filing a written request with the director within 30 days of the date of such final decision, asking that the director's written decision be sent to the water and sewer board. The director shall submit his written decision to the water and sewer board within 30 days of receiving the request. The water and sewer board shall make its decision based on the administrative record. The water and sewer board may elect to decline to issue a decision on the user's appeal. If the water and sewer board so elects, the user's appeal shall be directed to the administrative hearing officer.~~
- ~~(b7)(1) aggrieved parties~~ the appealing party may seeking review of the water and sewer board ~~director's decision on the petition for reconsideration on the administrative record must do so by filing a request and fee for hearing with the administrative hearing officer, as authorized by the city charter within 30 days of the date of the director's~~ after the decision of the board. The administrative hearing officer shall conduct the hearing in accordance with the procedures set forth in chapter 12 of title 2 of this code and the administrative hearing officer rules and regulations. Such review hearing shall be de novo-, and the administrative hearing officer may assess fines and issue orders consistent with the provisions of this chapter. The administrative hearing officer's decision shall be considered final administrative action for purposes of subsection (c).
- (2) The administrative hearing officer's decisions not to deny a request for hearing ~~reconsider an enforcement action shall be considered the final administrative action for the purposes of judicial review subsection c. The administrative hearing officer shall conduct the hearing in accordance with the procedures set forth in chapter 12 of title 2 of this Code and in the administrative hearing officer rules and regulations. The administrative hearing officer may assess fines and issue orders consistent with the provisions of this chapter.~~
- (3) To the extent this chapter is inconsistent with chapter 12 of title 2 of this Code or the administrative hearing officer rules and regulations, this chapter shall govern. chapter 10 of title 1 of this code does not apply to this chapter.
- (8c) Any appeal from the decision of the administrative hearing officer shall be to the appropriate court pursuant to C.R.C.P. 106.

Section 55. Section 20-530 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5301. Upset.

- (a) ~~For the purposes of this section, the term "upset" means an exceptional incident that results in unintentional and temporary noncompliance with a categorical pretreatment standard because of factors beyond the reasonable control of the user. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance or careless or improper operation.~~
- (a**b**) An upset shall constitute an affirmative defense to an action brought for noncompliance with categorical pretreatment standards, provided that the user immediately notifies the director upon discovery of the upset and meets the requirements of subsection (c) of this section.
- (b**e**) A user who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that:
- (1) An upset occurred and the user can identify its cause;
 - (2) The facility was, at the time, being operated in a prudent and professional manner and in compliance with applicable operation and maintenance procedures; and
 - (3) In addition to the immediate notice required in subsection (b) of this section, the user submitted the following information to the director within 24 hours of becoming aware of the upset:
 - a. A description of the indirect discharge and cause of noncompliance;
 - b. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue;
 - c. Steps the user is taking or plans to take to reduce, eliminate and prevent recurrence of the noncompliance; and
 - d. If the user initially provided the foregoing information orally, the user must submit it in writing within five days.
- (c**d**) In any enforcement proceeding, the user seeking to establish the affirmative defense of an upset shall have the burden of proof.
- (d**e**) A user will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with categorical pretreatment standards.
- (e**f**) A user shall control all discharges to the extent necessary to maintain compliance with categorical pretreatment standards upon reduction, loss or failure of its treatment facility until restoring the facility or providing an alternative method of treatment. This requirement applies in the situation, among others, where the user partially or completely loses power to its treatment facility.

Section 56. Section 20-531 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5312. Affirmative defense. Lack of knowledge.

A user shall have an affirmative defense to an enforcement action brought against it for noncompliance with the general prohibition in section 20-421 (b) or the specific prohibitions in section 20-421 (c), if it can prove that it did not know, or have reason to know, that its discharge, alone or in conjunction with discharges from other sources, would cause pass through or interference and that either:

- (1) A local limit exists for each pollutant discharged, and the user complied with each limit directly prior to and during the pass through or interference; or
- (2) No local limit exists, but the discharge did not change substantially in nature or constituents from the user's prior discharge when the city was regularly in compliance with its CDPS permit and, in the case of interference, was in compliance with applicable sludge use or disposal requirements.

Section 57. Section 20-532 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5323. Bypass.

~~(a) Definitions. The following words, terms and phrases, when used in this section, shall have the meanings ascribed to them in this subsection, except where the context clearly indicates a different meaning:~~

~~Bypass means the intentional diversion of waste streams from any portion of a user's treatment facility.~~

~~Severe property damage means substantial physical damage to property, damage to the treatment facility that renders it inoperable or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. The term "severe property damage" does not mean economic loss caused by delays in production.~~

~~(a)~~ A user may allow any bypass to occur that does not violate a pretreatment standard or requirement, but only if such bypass is necessary for essential maintenance to ensure efficient operation. These bypasses are not subject to subsections ~~(d)~~ and ~~(e)~~ of this section.

~~(b)~~ If a user knows in advance of the need for a bypass, it shall notify the director at least ten days before the date of the bypass or at the earliest possible time the user becomes aware of the bypass need if less than ten days prior to the bypass.

~~(c)~~ A user shall orally notify the director of an unanticipated bypass that exceeds applicable pretreatment standards immediately upon becoming aware of the bypass, but in no case later than 24 hours from the time it becomes aware of the bypass. The user must also submit a written report within five days of the time it becomes aware of the bypass. The report shall describe the bypass and its cause; state the duration of the bypass, including exact dates and times, and, if the bypass has not been corrected, its anticipated duration; and steps taken or planned to prevent reoccurrence of the bypass.

~~(d)~~ Bypass is prohibited, and the director may take enforcement action against a user for a bypass, unless:

- (1) The bypass was unavoidable to prevent loss of life, personal injury or severe property damage;
 - (2) There was no feasible alternative to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes or maintenance during normal periods of equipment downtime. (This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance); and
 - (3) The user submitted the notices required under subsection (d) of this section.
- (e) The director may approve an anticipated bypass, after considering its adverse effects, if the director determines that the bypass will meet the three conditions listed in subsection (e) of this section.

Section 58. Section 20-533 of the above-entitled ordinance shall be amended to read as follows:

Sec. 20-5334. Pretreatment charges and fees.

The city may assess reasonable fees and charges through rules or other means to recoup the costs of administering its pretreatment program, which may include:

- (1) Fees for wastewater discharge permit applications, including the cost of processing such applications;
- (2) Fees for monitoring, inspection and surveillance procedures, including the cost to collect and analyze a user's discharge samples and to review monitoring reports submitted by users;
- (3) Fees for reviewing accidental discharge procedures;
- (4) Fees for filing appeals; and
- (5) Other fees that the city may deem necessary to carry out the requirements contained herein.

These fees relate solely to the matters covered by this chapter and are separate from all other fees, fines and penalties chargeable by the city.

Section 59. Section 20-534 of the above-entitled ordinance shall be deleted as follows:

~~Sec. 20-534. Signatories and certification.~~

~~(a) All wastewater discharge permit applications and user reports must be signed by an authorized representative of the user and contain the following certification statement:~~

~~I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information~~

~~submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.~~

- ~~(b) Annual certification for nonsignificant categorical industrial users. A facility that the director determines is a nonsignificant categorical industrial user, as defined in section 20-396, must annually submit to the POTW the following certification signed by an authorized representative of the user. This certification must accompany an alternative report required by the director:~~

~~Based on my inquiry of the person or persons directly responsible for managing compliance with the categorical pretreatment standards under 40 CFR ____, I certify that, to the best of my knowledge and belief that during the period from _____, ____ to _____, ____, [months, days, year]:~~

- ~~a. The facility described as _____ [facility name] met the definition of a nonsignificant categorical industrial user as described in section 20-396;~~
- ~~b. The facility complied with all applicable pretreatment standards and requirements during this reporting period; and~~
- ~~c. The facility never discharged more than 100 gallons of total categorical wastewater on any given day during this reporting period.~~

~~This compliance certification is based upon the following information:~~

Official Signature

--

Industrial Pretreatment Program

**Second Reading and
Recommendation to
Adopt Amendments
to Title 20, Chapter
3, Article VI of the
City Code
(Industrial
Pretreatment)**



City of Greeley Wastewater Treatment & Reclamation Facility - Pre-Construction

Industrial Pretreatment Program

Required Program Modifications

- **Substantial Modifications to the Program required from EPA Audit in August 2020**
 - **Amend Pretreatment Chapter of the City Code (Industrial Pretreatment Ordinance)**
 - **Amend IPP Enforcement Response Plan**
 - **Ensure consistent enforcement between all user classes**



Industrial Pretreatment Program

Ordinance Modifications

- **Amend City Code Title 20, Article VI (Industrial Pretreatment) to achieve the following:**
 - **Better align Ordinance definitions with Federal definitions**
 - **Align the Ordinance with modified program procedures for permitting and enforcement practices**
 - **Simplify report submittal process**
 - **Correct minor clerical errors**



Industrial Pretreatment Program Ordinance Modification Timeline

- Develop Program Modification Package (*March 2021*)
- W&S Board Informational Presentation (*April 21, 2021*)
- Submit Substantial Program Modification Request to EPA (*May 24, 2021*)
- Received “Approvable Status” from EPA (*June 8, 2021*)
- Update EPA Enforcement Section on Program Modification Progress (*June 10, 2021*)
- W&S Board Approval (*May 19, 2021*)
- Staff conducted an informational workshop with permitted users (*July 13, 2021*)
- 1st Council Reading (*September 7, 2021*)
- 30 day public notice between Council readings (*started on September 8, 2021*)
- 2nd Council Reading (*October 19, 2021*)
- EPA Approval (*following Council motion to adopt*)

Recommended Council Action

- **A motion to adopt the ordinance and publish with reference to title only Title 20, Chapter 3, Article VI of the Greeley Municipal Code (Industrial Pretreatment Chapter)**



Questions?



Greeley WTRF Construction Progress as of August 23, 2021

Council Agenda Summary

October 19, 2021

Key Staff Contact: Sean Chambers, Water & Sewer Director, 970-350-9815

Title:

Public hearing and second reading of an Ordinance adopting the 2021 Non-Potable Water Master Plan and amending the 2018 Comprehensive Plan to include the same by reference

Summary:

Water and Sewer Department launched the process of completing a Non-Potable Water Master Plan in 2019 with CDM Smith. CDM has extensive master planning experience with Greeley completing work in 2008 and 2014. The two primary goals of the project are to reduce use of potable water for irrigation and increase non-potable use. The development of the master plan started with inventorying all 45 different wells and pump stations within the existing system. This critical step allowed the project team to evaluate the existing system for deficiencies and where the system has capacity for expansion. Next step in the project, development of the existing system model for all sites based on historical usage, piping configurations, and pumping capacity. The project progressed to utilizing the system model to look at existing conditions of the system and planning for the expansion of the system in the 5-year, 20-year, and full system build-out time frames. The expansion of the system was coordinated with the "Summary of RAS (Refined Alternative Screening) Demand Scenarios" report from BBC Research & Consulting and matched the middle scenario adoption rates. The adoption scenarios are dependent on final City policy's and should be developed to meet or enhance the adoption rates. The expansion of the system focused on expanding the non-potable system at existing and future parks as the hubs of the systems. The final steps included developing CIP projects throughout the system and making sure it was coordinated with the other two Water & Sewer master plan projects and other City Department CIP projects. The project team conducted work sessions with Westminster, Denver Water, Evans, and Windsor to learn about their systems and examine opportunities for collaboration. The final aspects of the project included coordinating outreach efforts to discuss the planned master plan with different community members and groups interested in participating in reviewing the City's draft master plan and providing critical input or comments. This different feedback and input has now been incorporated into the master plan final report completed in June 2021.

Article XVII, Section 17-7 of the Greeley Charter requires that the Water and Sewer Board recommend long rang plans to City Council for water and sanitary sewer improvements. On September 15, 2021, staff presented the 2021 Non-Potable Master Plan (the "Plan") to the Water and Sewer Board. By motion, the Water and Sewer Board recommended that City Council adopt the Plan and incorporate the same by reference as an amendment to the 2018 Comprehensive Plan.

Article XIX, Section 19-1 (b) of the Greeley Charter described the Planning Commission's role in providing advice on land use matters to the City Council. The

2018 Comprehensive Plan also requires the Planning Commission conduct a public hearing on any proposed amendment to the 2018 Comprehensive Plan, which includes a modification to policies contained within master plans adopted by reference, and provide a recommendation to City Council. On September 14, 2021, the Planning Commission held a public hearing on the Plan with a presentation by staff and opportunity for public comment. By motion, the Planning Commission recommended that City Council adopt the Plan and incorporate the same by reference as an amendment to the 2018 Comprehensive Plan.

The Plan provides the backbone infrastructure required for long term growth of the non-potable water system. The planning documents are essential to ensure future development in Greeley has adequate public facilities and services. This master plan address the City of Greeley Comprehensive Plan Action Plan items: IMP IN-1.5, IMP IN-1.6, IMP IN-1.7, IMP-IN-1.8, and IMP-IN-2.2 and as shown in Attachment C.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	
What is the annual impact?	
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	N/A
Is there grant funding for this item?	N/A
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	
Additional Comments:	

Legal Issues:

Consideration of this matter is a legislative process which includes the following public hearing steps:

- 1) City staff presentation (if requested)
- 2) Council questions of staff
- 3) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
- 4) Council discussion
- 5) Council decision

Other Issues and Considerations:

Strategic Work Program Item or Applicable Council Priority and Goal:

Economic Health & Development: Foster and maintain public and private investment in business development.

Infrastructure & Growth: Establish the capital and human infrastructure to support and maintain a safe, competitive, appealing and successful community.

Decision Options:

- 1) Adopt the ordinance as presented; or
- 2) Amend the ordinance and adopt as amended; or
- 3) Deny the ordinance; or
- 4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:

A motion to adopt the Ordinance to accept and adopt the Non-Potable Water Master Plan and amend the City of Greeley 2018 Comprehensive Plan to include by reference the 2021 Non-Potable Water Master Plan, and publish the ordinance with reference to title only.

Attachments:

Attachment A – Non-Potable Water Master Plan

Attachment B – City of Greeley Comprehensive Plan: Action Plan for Infrastructure

Attachment C – Ordinance adopting the Plan and amending the 2018 Comprehensive Plan to incorporate by reference.

Presentation Slide Deck



FINAL

Greeley Non-Potable Water Master Plan

June 2021



**CDM
Smith**

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Acronyms and Abbreviations

\$/LF	dollars per linear foot
AF	acre-feet
AFY	acre-feet per year
BBC report	City of Greeley Population and Water Demand Projections
cfs	cubic feet per second
CMMS	computerized maintenance management system
C-H	commercial high intensity
C-L	commercial low intensity
CIP	capital improvement plan or program
City's Specifications	City of Greeley Design Criteria and Construction Specifications
Dev	development
EDR	engineering development review
EPS	extended period simulation
ENR-CCI	Engineering News Record Cost Construction Index
fps	feet per second
ft	feet
GIS	Geographic Information System
gpm	gallons per minute
gpm/acre	gallons per minute per acre
gpd/acre	gallons per day per acre
GPS	Global Positioning System
GLIC	Greeley-Loveland Irrigation Company
GIC	Greeley Irrigation Company
HOA	homeowners association
HDD	horizontal direct drilling
in	inches
I-L	industrial low intensity
I-M	industrial medium intensity
I-H	industrial high intensity
LREGA	long-range expected growth area
MG	million gallons
MGD	million gallons per day
NPMP	Non-Potable Water System Master Plan
NP	non-potable
OPCC	opinion of probable construction cost
O&M	operations and maintenance
psi	pounds per square inch
Poudre Ponds	Poudre Ponds Complex Project
PLC	Programmable Logic Controller
RTU	Radio Telemetry Unit
R-E	residential estate
R-H	residential high density
R-L	residential low density

R-M	residential medium density
SA	Service Area
SSMP	Sanitary Sewer Master Plan
SCADA	supervisory control and data acquisition
VFD	Variable Frequency Drive
W/S	City of Greeley Water and Sewer Department
WTDMP	Water Transmission and Distribution Master Plan

Definitions

Adoption rate - an estimate of the amount of land that could potentially be irrigated that is expected to use NP irrigation; this value is based on customer type and should only be used for planning level estimates, not design

Buildout - the theoretical point in time where the City has experienced complete development within the LREGA, expected to be sometime after year 2090

Bulk area - the total area of a parcel, including both the irrigated area and the impermeable area (such as buildings and parking lots)

Capital improvement - a recommended construction project to improve or expand the water system, summarized in the capital improvement plan

Conversion area - a previously developed parcel that is currently irrigated by potable water, but may consider switching to NP irrigation in the future; the amount of irrigated area for this type of customer is typically known

Diurnal curve - a pattern of peaking factors applied to a base demand (the typical demand for an area) that shows how demands vary by pattern throughout the day; the diurnal curve typically includes the peak hour

Extended period simulation - a hydraulic modeling methodology that shows how the system performs over a set timescale, during which demands and operating conditions can vary

Flow factor - value used to estimate the water demand that a given amount of land will produce once it's developed, depending on its land use

Hub-and-spoke - methodology for NP infrastructure design where a future pond and pump station (usually located at a park) is not connected to other pump stations and becomes an individual system with distribution piping extending out from it

Irrigated area - the portion of a parcel that requires irrigation (i.e. only permeable area)

Long range expected growth area - the limits of the City's expected growth and where it plans to provide water and wastewater services

Non-potable water - raw (untreated) water from agricultural ditches used to irrigate certain areas within the City

North of the River - the geographic area north of the Poudre River and within the City's LREGA

Opinion of probable construction cost - the costs borne by the contractor to construct a capital project

Peak day demand - the maximum demand anticipated to occur during a one-day period expressed as the daily average

Peak hour demand - the average demand anticipated during a maximum one-hour period for a typical year; this is considered to be a conservative value for infrastructure sizing

Peak month demand - the average demand anticipated during a maximum one-month period for a typical year, typically experienced during July

Planning horizon - a timeframe used to estimate expected demands and infrastructure needs; for this master plan, the three planning horizons are 5-year (2025), 20-year (2040) and buildout

Service area - the general geographic area that is served by or expected to be served by an individual NP system

Shoulder month/season - the periods in early spring and late fall where NP customers begin to require some irrigation water, but the agricultural ditches are not yet operational, occasionally resulting in the NP system being supplied by potable water

Shoulder tap - locations where the NP system can take water from the potable water distribution system during the early spring and late fall shoulder months

Summer water use - the amount of water used in summer months, defined as July and August

Tier 1, 2 or 3 - tier of information used to distribute future flow parameters to currently undeveloped areas or areas of redevelopment

Undeveloped land - land that does not currently have development, but may be eligible for NP irrigation when construction is completed in the future; the amount of irrigated area for this type of customer is unknown and therefore estimated.

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Executive Summary

The City of Greeley, Colorado (the City) is in Weld County approximately 60 miles northeast of Denver, east of Fort Collins and Loveland. The City is the twelfth largest city in Colorado and has developed into a cultural and academic hub, hosting educational institutions such as the University of Northern Colorado 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 population of 108,175 in 2019. The City continues to experience strong growth in population through both infill and also through an expansion of residential, industrial, and commercial development within the City's defined service area.

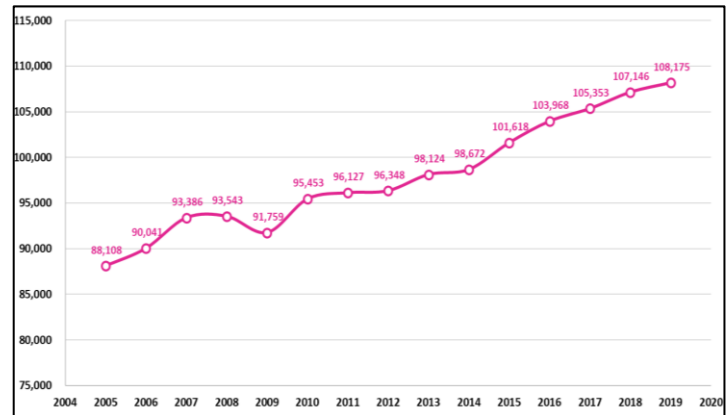


Figure ES-1 Historical Population for the City of Greeley

The 2020 Non-Potable Water System Master Plan (NPMP) is intended to plan for infrastructure growth and develop a capital improvement plan (CIP) for the City's non-potable (NP) irrigation system. The CIP plan will help the City plan for future development and costs both in the short-term and long-term. Continuing to grow and improve the NP system works in tandem with other water conservation efforts to decrease the total potable demand of the City as it experiences ongoing growth through buildout in a semi-arid environment.

ES.1 Greeley Master Plan Integration

To address existing and future system needs, the City developed their 2004 Non-Potable Water Master Plan to forecast water resources and infrastructure needs. The NPMP update occurred concurrently with updates to both the City's Sanitary Sewer Master Plan (SSMP) and the City's Water Transmission and Distribution Master Plan (WTDMP). This provided an ability to use consistent data for population and growth, common planning horizons and an integrated planning approach to CIP development. This approach to integrated master planning provides the City with a defensible and coordinated CIP and allows for the scheduling of CIP projects in ways that minimize the impacts to citizens.

Figure ES-2 illustrates the critical points of coordination between the three master plans.

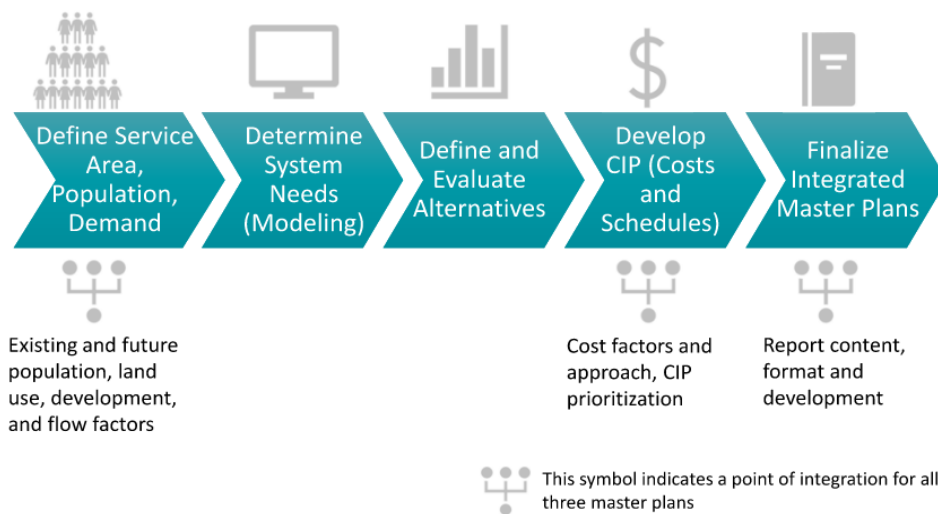


Figure ES-2 Master Plan Approach and Integration with Other Master Plans

ES.2 Existing System Information and Data Collection

The City's NP irrigation system is unique and advanced, particularly for raw water suppliers. In the current system, raw (untreated) water is supplied throughout the City via a system of agricultural ditches and gravity-fed pipes. The water typically flows from these ditches into an intermediate pond before entering a pumped distribution system, which includes 37 disconnected pump stations. This type of system is sometimes referred to as a hub-and-spoke layout. Through this system, the City is able to serve over 100 customers. Growing the NP system and offsetting more potable demands with NP irrigation water is a key goal for the City's water and sewer department.

City-provided data, including mapping, asset information, planning data, development plans, draft policy, and historic records, were used to inform the development of the NPMP. Additionally, a field inventory was conducted to supplement the City's existing geographic information system (GIS) database by geolocating key NP infrastructure, such as pumps, ponds, and valves. All of this information was compiled into a hydraulic model that accurately reflects the existing system. Existing demands were based on billing data and pumping records from July and August in 2018 and 2019 and were calibrated to available supervisory control and data acquisition (SCADA) data.

ES.3 Administrative Considerations

In addition to infrastructure construction and expansion efforts, certain administrative improvements can help the City continue to grow its NP system and act as a leader in potable water conservation and sustainable irrigation practices along the Front Range. The most significant change the City could make to promote NP irrigation would be implement and enforce the revised NP policy, included in **Appendix K**.

Historically, comprehensive data collection has been difficult for NP systems nationwide. Additional studies or data collection, along with more standardized record keeping practices, can

help the City keep track of the overall system. This can include enforcing standards related to construction record drawings, developing and maintaining an internal record-keeping system, creating a plan for regular updates to the GIS database, and/or implementing a computerized maintenance management system (CMMS) for NP infrastructure. Installing SCADA systems at new or rebuilt pump stations can also help with data collection and control.

ES.4 Service Area, Population, and Demand Projections

The City's Long-Range Expected Growth Area (LREGA) is the area where it plans to provide water and sewer 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* (BBC Research & Consulting 2018), referred to as the BBC report, as shown in **Figure ES-3**. 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.

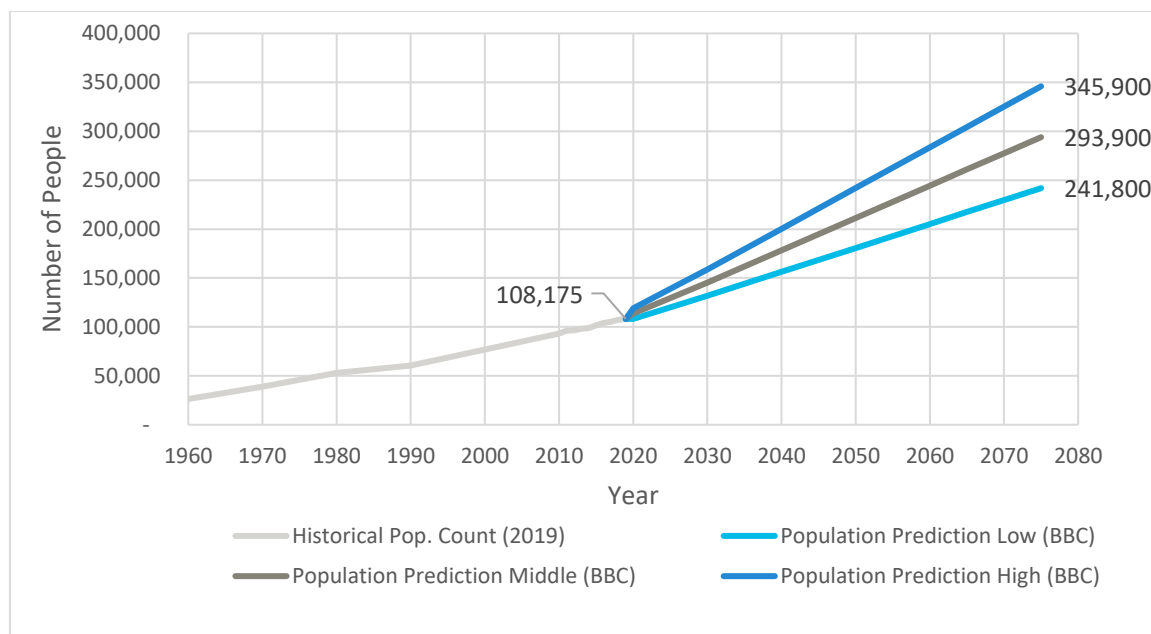


Figure ES-3 Historical and Projected Population

Future NP demand comes from two places: 1) undeveloped land that will use NP irrigation when it develops, and 2) existing areas that may switch from potable to NP irrigation, which are referred to as "conversion areas." Undeveloped land was identified and categorized by land use as part of the WTDMP and SSMP; these land use designations were used to predict NP demand in these areas. Conversion areas were based on the City's knowledge of potential customers; conversion areas are only potential areas that may benefit from NP irrigation but are currently not required to convert.

A set of flow factors were developed that show the expected demand per acre of a certain land use category, or customer type. There are flow factors for irrigated land (defined as the actual acreage of land that is irrigated on a given lot) and bulk land (defined as the total acreage of a

given parcel, including impervious areas). However, just because an area could use NP irrigation, it does not guarantee that it will. To account for this, an adoption rate was applied to each flow factor, which designated the amount of that land that is expected to actually use NP irrigation. The adoption rates were coordinated with the BBC report. It is therefore recommended to use this NPMP for infrastructure planning, and the BBC report for all water resources planning. The total demand projected for both the potable and NP water systems is shown by planning horizon in **Table ES-1**.

Table ES-1 Peak Month Demand by Planning Horizon

Planning Horizon	Total Water Demand (MGD)	Potable Water Demand (MGD)	Non-Potable Water Demand (MGD)
Existing	47.3	46.0	1.3
2025	51.8	49.4	2.4
2040	61.0	56.9	4.1
Buildout	106.3	93.5	12.8

While the NPMP is primarily focused on planning for infrastructure needs based on peak summer demands, it is also important for the City to plan for the total annual water demands through buildout. Water conservation methods, such as improved landscaping practices and the encouragement and adoption of NP water for irrigation, may help reduce the City's annual water demands. The BBC report focused on developing three alternative scenarios for annual water demands. The total annual demands developed for the WTDMP under the NP offsets demand scenario at buildout are captured in **Table ES-2**.

Table ES-2 NPMP Annual Demand Projections at Buildout

Demand	Total Water Demand (AFY) ²	Potable Water Demand (AFY)	NP Water Demand (AFY)
Existing	30,500	28,600	1,900
Future Demands	33,500	28,300	5,200
New I-H Users (6)	10,300	10,300	0
Total	74,300	67,200	7,100

¹ Potable demand shown in this table is for the NP offsets demand scenario.

² AFY = acre-feet per year

ES.5 Model Evaluation and Infrastructure Planning

The existing and future NP system was analyzed using both a hydraulic model (InfoWater) and various desktop analyses that used existing and projected future demands against the system requirements, as outlined in the City's Design Criteria and Construction Specifications, 2008 (City's Specifications). These requirements are summarized in **Table ES-3**.

Table ES-3 System Evaluation Criteria

Metric	Evaluation Criteria	Comments
Piping		
Pressure	70-100 pounds per square inch (psi)	
Velocity	< 5 feet per second (fps)	
Headloss	< 10 ft / 1,000 ft	
Minimum Main Size	8 inches	Not specified in the City's Specifications, City preference for future.
Maximum Inlet Pipe Headloss	6 inches	Not specified in the City's Specifications, but generally considered to be good practice.
Pumping		
Pumping Capacity	120% of peak hour	
Irrigation Window Assumed	10 hours / day	Not specified in the City's Specifications. For irrigation-only pumps, does not apply to transfer pumps.
Pump Station Layout	No standby pump, however low flow pump required	
Ponds		
Storage Volume	4 times peak day + losses	
Demands		
Daily Irrigation Application Rate	24 gallons per minute per acre (gpm/acre)	Peak season metric used in the design of irrigation systems per the City's Specifications. This value is appropriate for areas where the exact irrigated acreage is known but is not appropriate for planning-level estimates of bulk undeveloped land.

Table ES-4 summarizes the existing infrastructure and identified deficiencies by buildout. Typical deficiencies include a pump station being undersized by buildout, undersized inlet or outlet piping, or undersized taps.

Table ES-4 Summary of Existing System Analysis

Service Area	Pump Station	Existing Capacity (gpm)	Existing Peak Hour Demand (gpm)	Buildout Flow – Peak Hour (gpm)	Comments and Identified Deficiencies
Balsam Park	N/A	290	51	51	No deficiencies were identified for this pump station.
Bella Romero Elementary	N/A	330	109	109	No deficiencies were identified for this pump station.
Bittersweet Park	N/A	1,000	854	1,160	Small diameter pipes may be producing high headloss; limited data is available on pipe sizes. Bringing on all potential conversion areas may cause this pump station to be undersized after 2040. While no improvements are expected to be necessary before 2040, the system should be evaluated as each conversion area is brought on to ensure there is still sufficient capacity.

Executive Summary

Service Area	Pump Station	Existing Capacity (gpm)	Existing Peak Hour Demand (gpm)	Buildout Flow – Peak Hour (gpm)	Comments and Identified Deficiencies
Boomerang	Boomerang North	1,500	769	769	No deficiencies were identified for this pump station.
	Boomerang South	1,500	694	0	This system is being replaced by the Boomerang Regional Pump Station.
	Boomerang Transfer	1,800	951	621	Some of the Boomerang transfer lines are undersized; this issue will be resolved by the construction of the Boomerang Regional Pump Station.
	<i>Boomerang Regional Pump Station</i>	<i>3,260</i>	<i>N/A</i>	<i>2,716</i>	<i>This new pump station is part of a larger redevelopment project and will replace the existing Boomerang South pump station. This pump station is identified as a CIP project.</i>
	North Ridge Transfer	1,800	936	936	No deficiencies were identified for this pump station.
	North Ridge School	2,700	1,205	1,752	No deficiencies were identified for this pump station.
	Poudre River Ranch	175	205	205	The lines to Poudre River Ranch and the pump station do not meet hydraulic design criteria but do not appear to hinder system performance. While there are no recommended changes, additional demand should not be added to this area without upsizing.
Cottonwood Park	N/A	115	69	69	No deficiencies were identified for this pump station.
Delta Park	N/A	95	52	52	No deficiencies were identified for this pump station.
East Memorial	N/A	319	314	440	Bringing on all potential undeveloped and conversion areas may cause this pump station to be undersized after 2040. While no improvements are expected to be necessary before 2040, the system should be evaluated as each new area is brought on to ensure there is still sufficient capacity.
Glenmere Park	N/A	180	135	304	The inlet may be undersized; inlet pipe size data was not available for this system. Bringing on all potential conversion areas may cause this pump station to be undersized after 2040. While no improvements are expected to be necessary before 2040, the system should be evaluated as each conversion area is brought on to ensure there is still sufficient capacity.
Greeley West Park¹	N/A	2,000	72	861	No deficiencies were identified for this pump station.
Highland Hills Golf	N/A	2,001	1,792	1,792	No deficiencies were identified for this pump station.

Service Area	Pump Station	Existing Capacity (gpm)	Existing Peak Hour Demand (gpm)	Buildout Flow – Peak Hour (gpm)	Comments and Identified Deficiencies
Island Grove and Saddle Club	Island Grove West	600	605	605	No deficiencies were identified for this pump station.
	Island Grove East	700	401	401	No deficiencies were identified for this pump station.
	Saddle Club	300	72	138	No deficiencies were identified for this pump station.
Jackson Field Sports	N/A	400	258	317	No deficiencies were identified for this pump station.
Josephine Jones Park	N/A	115	106	161	Bringing on all potential conversion areas may cause this pump station to be undersized after 2040. While no improvements are expected to be necessary before 2040, the system should be evaluated as each conversion area is brought on to ensure there is still sufficient capacity.
Linn Grove Cemetery	N/A	350	95	122	No deficiencies were identified for this pump station.
Luther Park	N/A	530	492	498	The small pipe diameter (4") at the outlet does not meet hydraulic design criteria; while this does not hinder system performance, it should be monitored as demands on the system increase to ensure the wet well is still able to receive sufficient water.
Madison Elementary and Houston Gardens	Houston Gardens	125	310	310	While this system appears to be operating over the pump design capacity, it does not hinder system performance, as this system is designed for low pressures.
	Madison Elementary	500	90	93	No deficiencies were identified for this pump station.
Monfort	N/A	2,400	1,423	1,745	The inlet is slightly undersized (10" diameter); while this does not hinder system performance, it should be monitored as demands on the system increase to ensure the wet well is still able to receive sufficient water.
Peakview Park	Mosier Hill	800	681	681	The pipes at Peakview Park have a small diameter (as low as 4") and do not meet hydraulic design criteria. Although this does not appear to significantly hinder system performance, the City may consider upsizing if other work is already being done in this area.
Promontory Park	Main	2,100	1,270	1,866	No deficiencies were identified for this pump station.
	Transfer	1,600	1,651	1,651	While this pump station sometimes operates over its design flowrate, it is not significant enough to warrant upsizing. If additional demands in this area increase transfer station operations, expanding the length of time the transfer station operates each day will likely maintain an acceptable flowrate.

Executive Summary

Service Area	Pump Station	Existing Capacity (gpm)	Existing Peak Hour Demand (gpm)	Buildout Flow – Peak Hour (gpm)	Comments and Identified Deficiencies
Ramseier	N/A	450	734	739	Additional evaluation of this site is needed as outlet pipe size and SCADA data were not available. While current modeling shows that the system is operating over the design head, the peaking factor may be lower than the system-wide diurnal curve, resulting in lower peak demands.
Sanborn Park	N/A	500	268	289	Small diameter lines may be causing high headloss; limited data is available on pipe sizes.
St. Michaels	N/A	1,120	1,121	1,167	This pump station may be undersized. Additional evaluation should be conducted to determine if demand management is effective and whether the pumps can be upsized without replacing the entire station.
Tech Center	N/A	N/A	N/A	N/A	This area is currently only served by a shoulder tap. A pump station is necessary to transition it to NP irrigation (future service area SA-14).
Youth Sports Center	Youth Sports	1,200	941	941	The inlet line does not meet hydraulic design criteria but does not appear to hinder system performance. This line should be evaluated as each new area is brought on to ensure there is still sufficient capacity.
	Twin Rivers Park	4,200	1,314	1,692	No deficiencies were identified for this pump station.

¹ Greeley West Park is planned for replacement before 2025. The values shown in the table represent the design for the new pump station.

Table ES-5 summarizes anticipated future infrastructure through buildout. It is important to note that the majority of future infrastructure will be built by development as the City grows. Future infrastructure is expected to continue using a hub-and-spoke methodology, where future parks are equipped with ponds and pump stations to serve as the hubs of future NP systems.

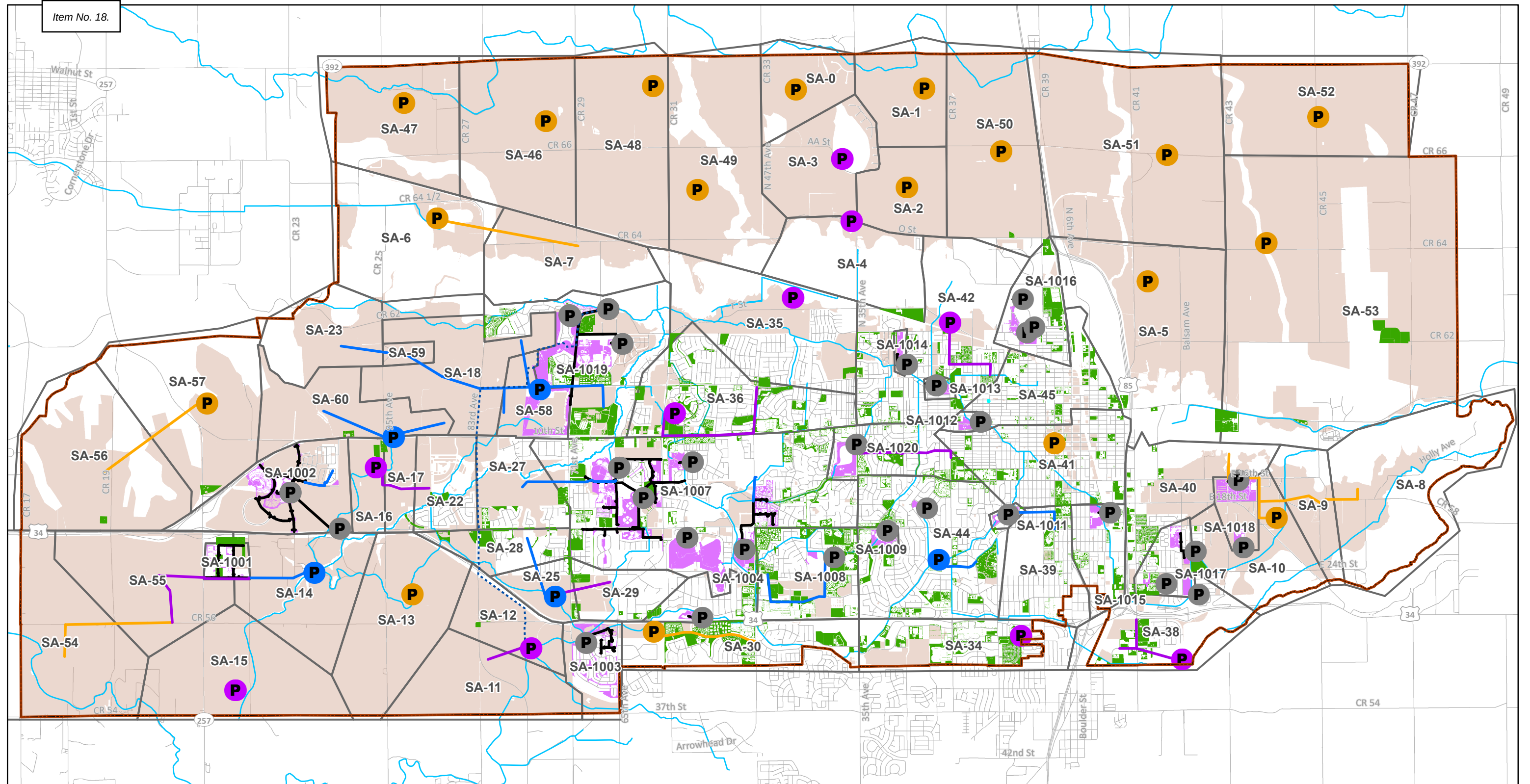
Table ES-5 Proposed Infrastructure by Planning Horizon

Planning Horizon	Pump Stations ¹	Storage in Ponds (AF) ²	New Pipeline (ft) by Diameter					Total
			8-inch	10-inch	12-inch	16-inch	30-inch	
Existing	37	Unknown	23,100	17,600	12,200	3,400 > 12"		90,000
2025	5	35.1	21,800	18,500	0	19,000	26,700	86,000
2040	10	28.1	26,900	11,500	0	8,200	0	46,600
Buildout	18	75.7	28,300	1,000	200	14,800	0	44,300
Total New	33	139.0	77,000	31,000	200	42,000	26,700	150,200

¹ All new pump stations are expected to have a pond.

² AF = acre-feet

Figure ES-4 shows both the existing and future system by planning horizon. Pump station locations and pipeline alignments are approximate and schematic.



Legend

 LREGA

 Existing NP Irrigated Areas

 Future NP Demand Parcels

 Greeley Ditch

 Existing Pump Station

 2025 Pump Station

 2040 Pump Station

 Buildout Pump Station

 Existing NP Pipes

 2025 Proposed NP Pipes

 2040 Proposed NP Pipes

 Buildout Proposed NP Pipes

 Upper Equalizer Project

 Conversion Areas

 Service Areas



NP System by Planning Horizon

Figure ES-4

Greeley Non-Potable Water System Master Plan

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ES.6 Capital Improvement Plan Projects and Schedule

The opinion of probable construction cost (OPCC) is the anticipated bid cost of a capital project. The project CIP costs include the OPCC and project implementation costs, such as planning and design, administration, and construction management. Assumptions made during CIP development can add to the variability of final bid project costs when compared to the planning level costs. The assumptions are necessary to capture the costs for project elements that cannot be defined at a planning level. Project costs were developed using modeled pipeline quantity estimates and data, then multiplied by unit cost estimates. During design development, the more specific data will be used to inform the design and the resulting project cost estimate. **Table ES-6** provides a breakdown of the different costing factor assumptions used for project implementation and contingency.

Table ES-6 Costing Factors for Construction Bid and Total CIP Project Costs

Category	Item	Costing Factor
Construction Bid Cost (includes infrastructure and contractor overhead, profit, bonds, and insurance)	Erosion Control/Stormwater Pollution Prevention ¹	2%
	Mobilization and Demobilization ¹	5%
	Contingency ²	35%
Project Implementation ³	Feasibility and Site Studies	9% for OPCC ≤ \$1 million 6% for OPCC of \$1 million to \$10 million 5% for OPCC > \$10 million
	Preliminary and Final Design	9% for OPCC ≤ \$1 million 6% for OPCC of \$1M to \$10 million 5% for OPCC > \$10 million
	Engineering Services During Construction	5%
Additional Project-Related Costs ³	Outside Construction Management - not used if OPCC is < \$1M	5%
	Outside Project Management - not used if OPCC value is < \$1M	3%

¹ Construction costing factors for erosion control/stormwater pollution prevention, mobilization, and demobilization are added to the subtotal of unit cost items.

² Contingency is 35% of the subtotal of the unit cost items and contractor born costs determined by costing factors.

³ Project implementation and additional project-related cost categories are determined as a percentage of the construction cost and part of the total CIP project costs.

ES.6.1 Identified CIP Projects

Table ES-7 summarizes the anticipated capital projects through the 5-year and 20-year planning horizons. Costs for some projects are shared proportionally across the City's water and sewer department, the City's parks department, and with development entities. The split shown in **Table ES-7** has been calculated from the anticipated total demands at buildout that each of these parties is responsible for. For each project these costs and splits will need to be refined during the development plan review process.

Executive Summary

Table ES-7 Summary of CIP Projects

Projects	Funding Source ¹	Planning Start Year ²	Design Start Year ²	Construction Start Year ²	Total Cost ³	City of Greeley Water/Sewer	City of Greeley Parks	Development
5-Year Planning Horizon								
SA-44 Centennial Park	Service Expansion	W/S, Parks, Dev	2021	2022	\$5,030,000	\$3,488,100	\$1,379,300	\$162,600
Boomerang Regional Pump Station	Service Expansion	W/S, Parks, Dev	2021	2022	\$6,920,000	\$221,300	\$694,000	\$6,004,700
Boomerang Regional Phase 2	Service Expansion	W/S, Parks, Dev	2021	2022	\$2,390,000	\$76,400	\$239,700	\$2,073,900
Greeley West PS Replace	Service Expansion	W/S, Dev	2022	2023	\$7,470,000	\$6,161,400	-	\$1,308,600
Upper Equalizer Project	Shoulder Season Extension	W/S	2023	2024	\$25,620,000	\$25,620,000	-	-
SA-14 Tech Center Supply	Service Expansion	W/S, Dev	2025	2026	\$5,930,000	\$17,100	-	\$5,912,900
Promontory Park Expansion	Service Expansion	Development	2025	2026	\$720,000	-	-	\$720,000
Monfort Expansion	Service Expansion	W/S, Parks, Dev	2025	2026	\$500,000	\$245,300	\$76,000	\$178,700
Twin Rivers Expansion	Service Expansion	W/S, Parks, Dev	2025	2026	\$2,390,000	\$1,172,400	\$363,300	\$854,300
SA-38 1st Ave Pond	Service Expansion	W/S, Dev	2025	2026	\$3,590,000	\$2,881,600	-	\$708,400
SA-25 Westgate Regional Pump Station	Service Expansion	W/S, Parks	2026	2027	\$2,670,000	\$2,038,415	\$631,585	-
SA-25 Westgate Regional Phase 1	Service Expansion	Dev	2026	2027	\$1,160,000	-	-	\$1,160,000
SA-60 Lake Bluffs	Service Expansion	W/S, Dev	2026	2027	\$6,050,000	\$57,000	-	\$5,993,000
5-Year Subtotal					\$70,440,000	\$41,979,015	\$3,383,885	\$25,077,100
20-Year Planning Horizon								
SA-34 30th St/17th Ave	Service Expansion	W/S, Parks, Dev	2028	2029	\$2,880,000	\$1,932,500	\$281,200	\$666,300
Boomerang Regional Phase 3	Service Expansion	W/S, Parks, Dev	2029	2030	\$8,000,000	\$255,900	\$802,300	\$6,941,800
SA-4 35th Ave/O St	Service Expansion	W/S, Dev	2029	2030	\$1,170,000	\$262,400	-	\$907,600
SA-3 35th Ave/AA St	Service Expansion	Development	2030	2031	\$2,190,000	-	-	\$2,190,000
Bittersweet Park Expansion	Service Expansion	W/S, Parks, Dev	2030	2031	\$3,160,000	\$2,475,181	\$684,819	-
SA-35 44th Ave/F St	Service Expansion	W/S, Parks, Dev	2031	2032	\$2,580,000	\$166,000	\$658,300	\$1,755,700
SA-36 59th Ave/10th St	Service Expansion	W/S, Parks, Dev	2032	2033	\$8,190,000	\$3,810,800	\$2,569,500	\$1,809,700
SA-16 95th Ave/16th St	Service Expansion	W/S, Dev	2035	2036	\$5,260,000	\$205,300	\$610,300	\$4,444,400
SA-14 Tech Center Expansion	Service Expansion	W/S, Parks, Dev	2036	2037	\$3,460,000	\$10,000	-	\$3,450,000

Projects	Funding Source ¹	Planning Start Year ²	Design Start Year ²	Construction Start Year ²	Total Cost ³	City of Greeley Water/Sewer	City of Greeley Parks	Development
SA-15 37th St/SH-257 Pump Station	Service Expansion	W/S, Dev	2037	2038	\$3,880,000	-	-	\$3,880,000
SA-12 Cobblestone Regional	Service Expansion	Development	2038	2039	\$4,260,000	\$48,500	-	\$4,211,500
Glenmere Park Expansion	Service Expansion	W/S, Parks, Dev	2038	2039	\$2,200,000	\$1,427,916	\$603,228	\$168,856
SA-25 Westgate Regional Phase 2	Service Expansion	W/S, Dev	2039	2040	\$1,220,000	\$857,400	-	\$362,600
SA-42 23rd Ave/NW C St	Service Expansion	W/S, Parks, Dev	2040	2041	\$6,030,000	\$2,513,300	\$1,421,100	\$2,095,600
20-Year Subtotal					\$54,480,000	\$13,965,198	\$7,630,746	\$32,884,056
Total					\$124,920,000	\$55,944,212	\$11,014,631	\$57,961,156

August 2020 dollars as adjusted by Engineering News Record Cost Construction Index (ENR-CCI) were used for project OPCCs, total costs, and project fund allocations

¹ W/S: City of Greeley Water and Sewer Department, Parks: City of Greeley Parks Department, Dev: Development

² Project planning, design, and construction years are subject to change pending future project updates, development of projects, and/or schedule changes.

³ OPCC and total costs per project are subject to change pending future project updates, development of projects, and/or schedule changes.

ES.6.2 CIP Implementation Schedule

The CIP schedule implementation process considered several factors that influence a project schedule in addition to the hydraulic evaluation. The City provided the Water and Sewer 10-year CIP, public works CIP, and parks CIP to integrate with projects identified in the WTDMP for developing CIP implementation schedules.

The growth-driven projects will be funded by either the City or developer (or combination), depending on the project driver. Based on the 5- and 20-year CIP schedule, annual funding requirements for City NP projects from 2021 through 2040 are shown in **Figure ES-5**.

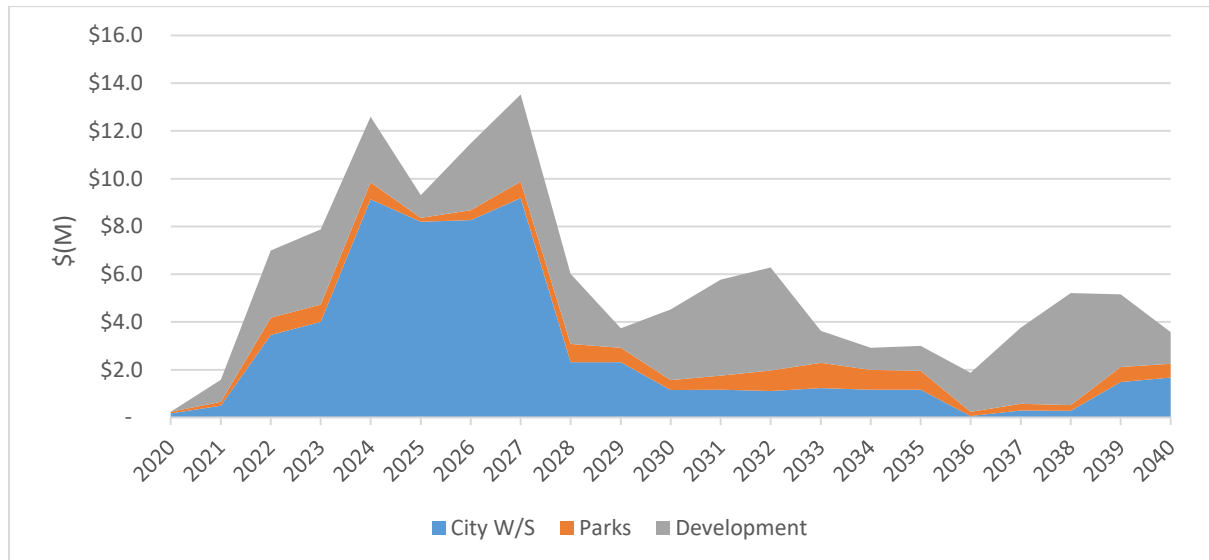


Figure ES-5 Annual NP Funding Projections by Fund

CIP costs are August 2020 dollars from ENR-CCI.

ES.7 Conservatism and Uncertainty in Planning

During master plan development, assumptions were made for existing and future conditions. These included population distribution and flow factors to develop water demand projections for growth and development under future conditions, along with considerations for extreme seasonal conditions that would emphasize higher demands while considering future water conservation planning to help reduce these impacts. The master planning assumptions trended toward conservative values to ensure the potable system was not undersized, which may result in the predicted demands being higher than actual. This NPMP analyzes the existing system and defines future needs, which should be validated by the City as new data becomes available.

The NP water system model, in conjunction with its potable water system companion model, is a tool for analyzing the existing system and defining future capacity needs. Detailed planning and timing of development will inevitably vary from the best planning projections and will result in the need to review areas where the model indicates system deficiencies.

Additional uncertainty can occur during the development of the CIP and, as a result, conservative planning assumptions are used. Planning level cost development considers the major categories

of capital projects but does not include the additional detail available during the preliminary and final design stages of projects. The CIP was developed based on anticipated growth, modeling results, and planning information and is subject to change if the planning information and forecasts shift over time. Prior to COVID-19, a global pandemic, cost inflation tools provided high confidence for predicting unit prices within a given year. However, during and after COVID-19, these cost inflation tools may not be as accurate.

ES.8 Key Findings and Recommendations

The findings and recommendations summarized in this section have been drawn from the planning and evaluation sections of this NPMP. The recommendations identify system needs, actions, and capital improvements through the buildout planning horizon; however, the actual implementation time frame will depend on actual growth rates, order of development, and the level of available capital funding. Additionally, the actual scope and implementation of these recommendations may vary with detailed planning and design.

ES.8.1 Key Findings

Key findings identified as part of the NPMP include the following:

- Discussions with other Front Range stakeholders showed that the City has a unique and advanced NP irrigation system, particularly for raw water suppliers.
- Historically, comprehensive data collection has been difficult for the NP system. Additional studies or data collection, along with more standardized record keeping practices, can help the City keep track of the overall system. Record keeping practices could include recording ditch laterals in GIS, updating and enforcing construction drawing standards, creating a system for regularly updating the NP GIS database, and/or installing SCADA systems.
- Review of historical demands showed that NP usage varied significantly on an annual basis. In particular, demand dropped significantly when parks began the transition process to improved control systems. Future NP demands are expected to come from two sources: 1) undeveloped lands that will use NP irrigation when they develop, and 2) existing areas that will convert to NP irrigation, defined as conversion areas. NP peak season demands are expected to increase by 1.1 million gallons per day (MGD) by 2025, 2.8 MGD by 2040, and 11.5 MGD by buildout. NP adoption is strongly influenced by policy, which is a key step for promoting conservation.
- Some of the existing systems were identified as needing improvement, but no critical deficiencies were identified. These include areas that are expected to have undersized inlet lines, pipes, taps, or pumps by buildout.
- New recommended CIP projects were identified. These primarily consist of new pump stations or expansions of existing pipe systems to serve new areas and customers. New pump stations will be primarily constructed by developers. It is estimated that the system will need 4 new pump stations by 2025, 12 new pump stations between 2025 and 2040, and 19 new pump stations between 2040 and buildout.

ES.8.2 Recommendations

The recommendations for the NPMP include the following:

- Implement and enforce an NP policy to promote and expand NP irrigation practices. It is recommended for this policy to mandate that new developments and redevelopments use NP irrigation and for the policy to generally encourage the growth of the NP system.
- Implement improved operational practices at existing pump stations as it becomes necessary. Also implement improved operational practices during other construction, such as rehabilitating a park irrigation system. Improved operational practices can include items such as increasing the watering window to reduce peak hour demands by decreasing the size of irrigation zones and implementing SCADA where not currently installed. It is recommended for customers to use a watering window of 10 hours a day, where possible, and to use the best landscaping practices included in **Appendix F**.
- Create new standards for data collection and record keeping. This can include enforcing standards related to construction record drawings, developing and maintaining an internal record-keeping system, creating a plan for regularly updating the GIS database, and/or implementing a CMMS for NP infrastructure. It is also recommended that the City conducts a study of ditches and laterals throughout the LREGA and requires developers to include this data in their plans.
- Implement and enforce requirements for the installation of SCADA systems at new or rebuilt pump stations. The City may consider including SCADA requirements in the City's Specifications.
- Continue monitoring and recording demands and pump station flows to identify major changes in operations that may impact system performance.
- Evaluate the St. Michaels pump station to determine whether additional construction is needed at this site to meet higher demands. This evaluation should determine whether demand management could be an effective solution, and whether the pumps can be upsized without replacing the entire pump station.
- Continue maintenance of the InfoWater model. This can include adding new pipes, deleting abandoned pipes, tracking open and closed valves, and reflecting operational changes as the system continues to expand.
- Coordinate this NPMP with other relevant planning documents, such as the WTDMP, SSMP, *Imagine Greeley Comprehensive Plan*, and BBC report. It is recommended to use this NPMP as a guide for infrastructure planning, and to use the BBC report as a guide for water resources planning.
- Continue building the NP system through a hub-and-spoke methodology, as defined earlier. Consider looping or connecting systems where systems are on similar hydraulic grade lines, as looping would improve operational flexibility.

- In areas with limited or interim development, require the construction of NP infrastructure, such as a piped irrigation system, even if a pump station will not be constructed until a later time.
- New pipe and pump station layouts are conceptual in nature and are primarily intended to show hydraulic feasibility for master planning purposes. Conduct a detailed evaluation of pipe alignment and size as well as pump station location and sizing as projects move into design and implementation stages when there is more certainty of development and design criteria. The InfoWater model, if regularly maintained, can be used as a tool to support future planning decisions.
- Complete the capital improvements recommended in **Section 6**, prioritizing the 5-year CIP recommended projects. Coordinate closely with the City's parks department, other utilities, and developers to regularly update the scheduling of these projects. The City should consider using the InfoWater model as a tool to inform developer plans while coordinating with them.
- Update the NPMP every 5 years, including reevaluating demand and population projections every 5 to 10 years. Planning assumptions made for the NP system in the next 20 years and beyond are subject to change with time.

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Section 1

Background Information and Project Purpose

Reliance on NP irrigation and improved irrigation practices is a key part of the City's water conservation plan. The NPMP covered in this report will help the City provide untreated irrigation water to large turf areas, which will help preserve potable water for other uses, reduce treatment costs for the City's water and sewer department, and lower irrigation costs for customers. This master plan update documents the approach and assumptions used to evaluate the system while defining the capital improvements needed for the long-range CIP for the NP system through the year 2040. To plan for the future NP needs of the City, background information was first collected on the historic and current NP water system and is described further below.

1.1 Master Planning Process and Organization

The NPMP was developed in conjunction with the City's SSMP and WTDMP. The City integrated the three master plans, creating a consistent approach to determining existing and future population and water demands and to defining capital projects and costs. A schematic of the City's integrated water system for water, wastewater, and non-potable water is shown in **Figure 1-1**.



Figure 1-1 Greeley's Integrated Water System

The future population projections and associated water demand, planning horizons, and approach to capital and project cost development are consistent between the three master plans, as shown in **Figure 1-2**. This figure also shows the critical points of coordination between the three master plans.

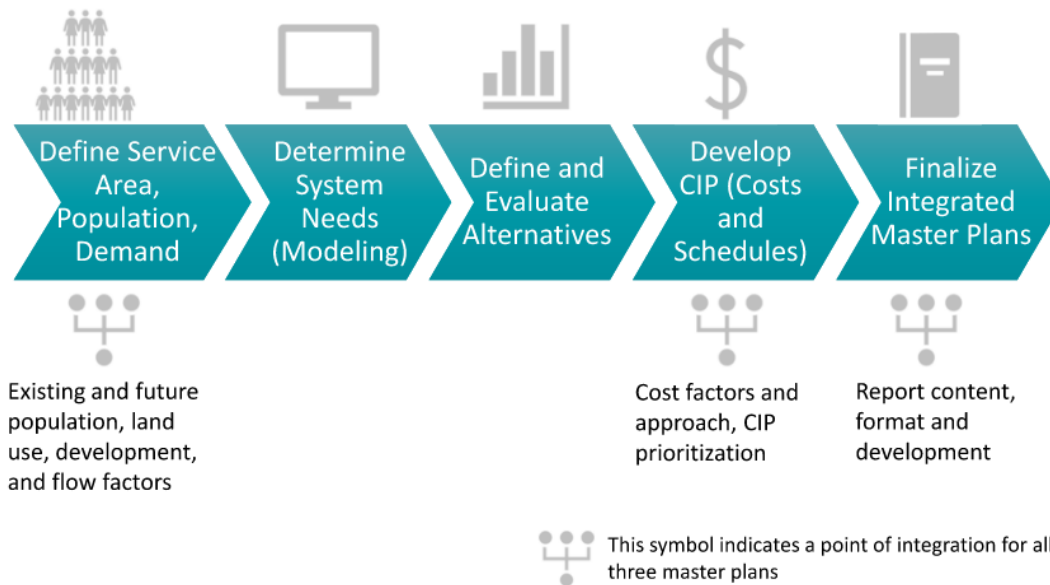


Figure 1-2 Master Plan Approach and Integration with other Master Plans

1.1.1 Report Organization

The NPMP is organized into the following sections:

- Section 1 – Background Information and Project Purpose
- Section 2 – Administrative Considerations
- Section 3 – Demand and Economics
- Section 4 – Development of the Non-Potable System Model
- Section 5 – Existing and Future System Model Evaluation
- Section 6 – Capital Improvement Plan
- Section 7 – Findings and Recommendations

1.2 Review of Existing Data and System

Before any other data gathering was initiated, information on the existing system was collected from the City files. This information primarily came from the two former NPMPs (dated 2002 and 2004), which provided overarching views of the City's goals, strategies, and specific plans for the NP system. These plans analyzed the then current and potential sources of supply and demand, established design and costing criteria for future projects, and examined options for the use of surplus NP water.

Part of the review of the existing system involved examining the records of existing infrastructure and construction projects. This data was checked by field visits and incorporated into the GIS. A new NP tagging and naming convention based on the City's standard naming scheme was established and will be used to describe the existing and future infrastructure. This naming system is included in **Appendix B**.

In general, the City's NP system operates using a "hub-and-spoke" approach, where a pump station (the hub) serves the irrigated areas (the spokes) without any connections to other pump stations or NP systems. Each of the individual systems has a unique setup, as described in **Section 4.1**. A typical NP system is shown in **Figure 1-3**. However, each individual system may differ in whether it pulls from a ditch or well, whether there is an intermediary pond, and how many pumps it has. Detailed descriptions of each system are included in **Table 4-1** and a map of all pump stations is included in **Figure 1-4**.

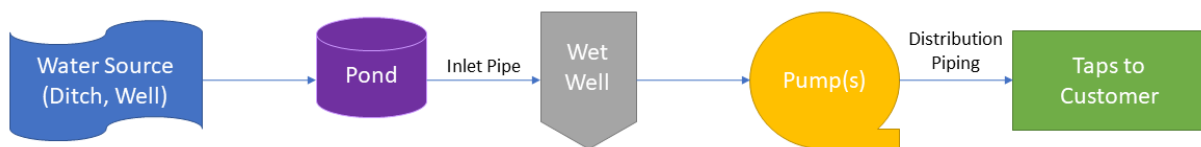
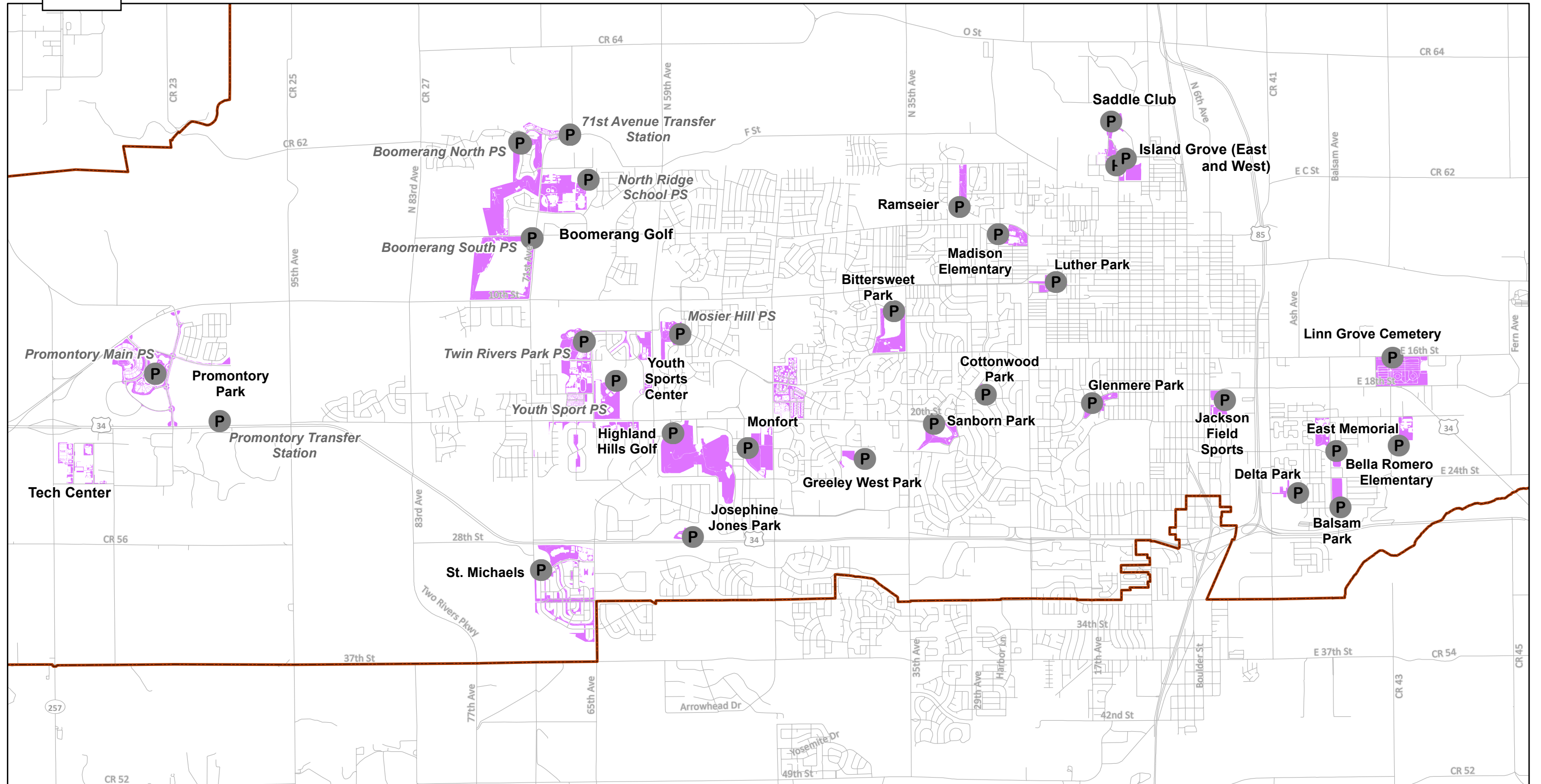


Figure 1-3 Typical NP System Schematic

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1.3 Field Visit Data

Field data was collected at each site and locations and elevations of features were recorded using a global positioning system (GPS) unit (Trimble Geo 7x). The GPS unit is accurate within a meter of the exact location. Along with the spatial data, specific operational information for each component was also recorded, as well as any of the operators' background knowledge on the specific item. Major system components visited included pump stations, meters, valves, wells, head gates, and storage ponds. For the pump stations, information that was collected included the number of pumps, the model numbers of the pumps and motors, the operating speed, the visual condition of the equipment, and the condition of the pump house. The unique meter number for each meter was also recorded, along with the transmitter number and diameter of the meter piping. The location and elevation of each valve was taken, and a note was made if the valve was equipped with a powered actuator. Notes were taken detailing the control logic for all actuating valves inventoried. The breakdown of components can be found in **Appendix A**. This information was compiled into a single database spreadsheet and used to update the NP GIS database.

1.4 GIS Mapping and System Inventory

Previously existing GIS data contained spatial locations for both point and linear NP water infrastructure. The point data included wells, pump stations, meters and valves. NP lines, ditches and irrigation areas were all contained in the linear data. Within the attribute table of each shapefile, there is additional information corresponding to each individual component within that infrastructure category. This information is summarized in **Table 1-1**.

Table 1-1 Previously Existing GIS Information

Type of Information	Number of Features	Relevant Attributes
Wells	51	Location, Type of well
NP pump stations	37	Names, Approximate addresses (incomplete)
NP meters	73	Customer number, Transmitter number, Meter number, Approximate addresses (incomplete)
Valves	383	Type of valve, R angle
NP irrigation areas	42	Name of well that supplies the area, Surface area
NP pipes	563	Length, Material, Installation year, Diameter
NP ditches	66	Name, Length, Above or below ground

Review of the GIS data with the operations team revealed that much of this information was either incomplete or out-of-date, especially the wells, ditches, and NP irrigation areas. The data from the field inventory was used for the wells, pump stations, and valves. The GIS data did not include a ponds shapefile; instead, information on ponds was included from the field data or historical documents and drawings. For the pump stations that were not included in the original GIS data, the data from the field inventory or historic documents was used. The NP GIS system should continue to be updated and maintained in the future. The NP pipelines are summarized by diameter in **Table 1-2**.

Table 1-2 Non-Potable Pipe Lengths from City GIS Data

Pipe Diameter (in)	Total Length (ft)
0 (Blank) ¹	4,296
1	17
2	4,022
3	739
4	5,114
6	19,515
8	23,094
10	17,616
12	12,238
14	706
15	370
18	2,106
20	140
24	49
Total	90,022

¹ Pipes with no diameter were reconciled as part of model connectivity updates, described in **Section 4.1.1**.

Review of the NP pipelines shapefile showed that the file was not fully representative of the current system. This shapefile was updated extensively to support model connectivity and an updated shapefile was provided to the City. The following assumptions and key fixes were used to support connectivity:

- Pipes that were within 3 feet of another feature, such as collected field data, were rerouted to connect through that point.
- Pipes without a diameter were assigned a diameter based on design drawings or the diameter of connected features, such as pumps or valves.
- Areas with other NP infrastructure, but no pipes, had pipes added based on design drawings, City operator knowledge, or typical layouts for NP pump stations.
- Two-inch lines were drawn from main lines to meters where relevant.
- Topology checks were used to reconcile pipes that were not connected to each other, identify duplicate features, etc.

Operations and Maintenance (O&M) data for each pump station, as available, was also reviewed. This included original constructions documents, O&M manuals (including pump curves), equipment details, photos of the site, and other historical information. Some of this data was outdated and reflected historic construction, not current conditions. The data provided also contained discrepancies and gaps, due to obsolete data mixed with current data. The data was further reviewed in team meetings to ensure that a comprehensive and accurate understanding of the system was being incorporated into the model.

Additionally, hourly SCADA data was used for the past five years (September 2015 to September 2020) to evaluate the accuracy of the model of the existing NP system and to create diurnal curves that reflect current system usage. SCADA data was not available for all sites. **Table 2-5** includes a list of available SCADA data collected by location.

1.5 Zoning and Land Use Information

Current and planned land use and zoning data in GIS format, along with maps of zoning and land use available through previous master plans, was used to map existing NP customers and irrigation areas, and to identify potential new customers, such as parks, golf courses, and cemeteries.

Additional sources of information included planned unit development reports, a revised version of Greeley's Comprehensive Plan map, as well as other information developed in conjunction with the City's planning department as a part of the water and sewer master plans that contained detailed land use information. This information was used to develop future potable water and sewer demands, which are the basis for the development of future NP demands.

Parks represent a crucial existing and future demand, so the 2016 Parks, Trails, and Open Lands Master Plan was used to address future park demands. This master plan provides information on current parks, as well as park service goals and potential locations for future parks. These details were used to establish park demands for the future planning scenarios.

Current potable water customers were evaluated to determine areas that would be suitable for conversion to NP irrigation. These areas, referred to as conversion areas, were provided on three shapefiles and two PDF maps that showed the names of many of the systems. Conversion areas are discussed in **Section 3** of this report.

The City's NP water system currently serves several areas of varying land use, which includes residential areas, golf courses, parks, and schools with a combined total irrigation area of 890 acres. The current irrigation areas, including areas that are irrigated by private systems, can be seen in **Figure 1-5**. Private systems were not addressed as part of the master plan, as the master plan focused solely on City-owned infrastructure.

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1.6 Review of Supply and Demand

To determine reasonable expectations for supply and demand projections, historic projections were examined. The BBC report was also considered for supply and demand projections. The BBC report projects the NP water demand for an assumed buildout year of 2065 under three scenarios: low, middle, and high. As noted in the report, the middle projection represents the most likely demand scenario. Notably, the middle scenario for total water consumption produces the highest NP consumption. The BBC report included total projected demand at five-year increments, as well as the likely adoption rates per customer type. The results of the NP water demand projections from the BBC report are summarized in **Figure 1-6**.

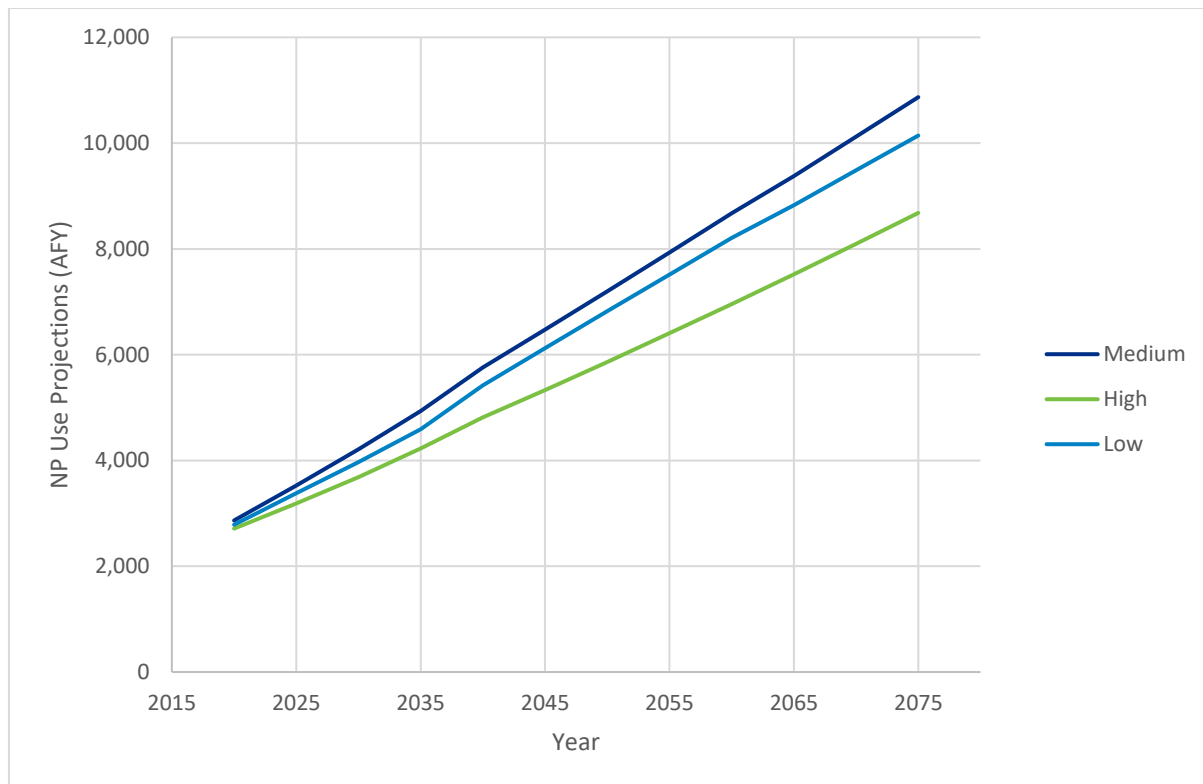


Figure 1-6 Non-Potable Use Projections (BBC Report, 2018)

To determine the actual NP water demand, the most recent water billing data was used. Billing data provided monthly demands from 2014 through 2019. The analysis of the provided data revealed a significant annual variation in demands, as shown in **Figure 1-7**. This annual variation could be due to changes in the City's irrigation control systems which significantly improved irrigation efficiency, especially in parks. As a result, only 2018 and 2019 billing data was used for the development of the models.

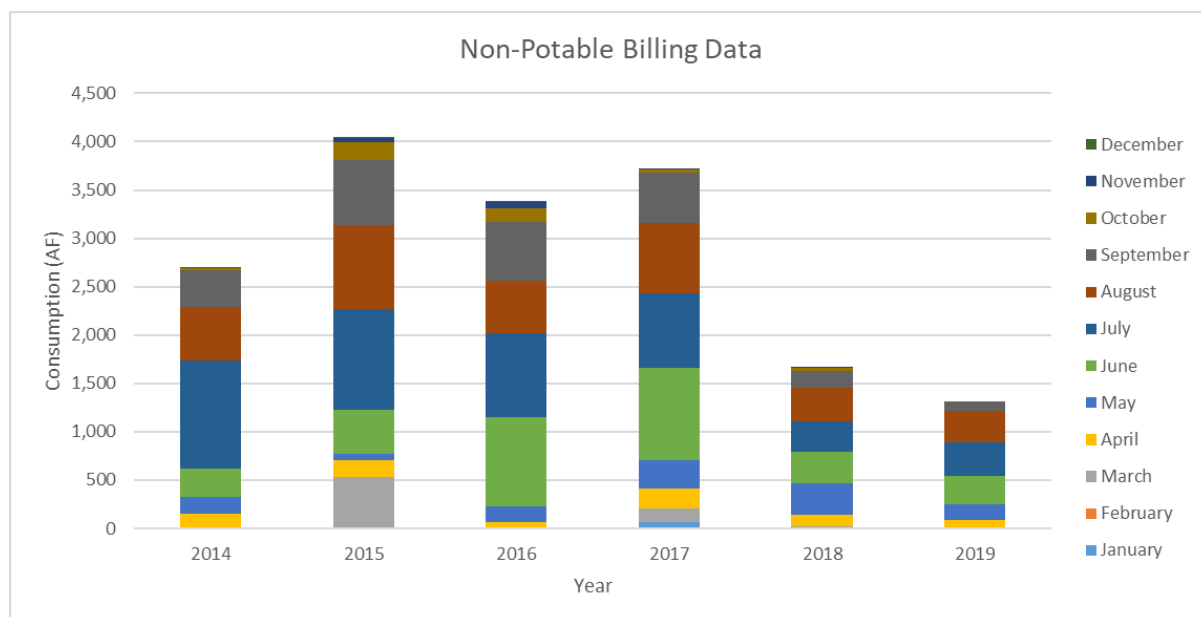


Figure 1-7 Non-Potable Demands (Billing Data)

The billing data was used to project NP demands through buildout. The demand that cannot be supplied by current NP infrastructure helped determine the necessary projects for the CIP. NP water demands were allocated with greater detail and are described further in **Section 3** of this report.

1.7 Costing

Data was collected for the pricing of CIP projects from several sources. This data was consistent across all three master plans. These sources included previous City bid tabs, City CIP databases (such as Greeley's CIP database for water, wastewater, and NP water projects), bid tabs from past CDM Smith projects along the Front Range and in Texas, as well as a consultant project cost estimator. Incorporating multiple data sources makes typical unit costs more robust. Analysis and selection of these line item unit costs are covered in **Section 6** of this report.

In the future, the City may consider mandating NP irrigation for new developments based on economic feasibility, and/or subsidizing NP infrastructure to make it economically feasible. Because of this, City policy could have a large impact on NP adoption. The City provided its draft policy, which was used as a basis for economic considerations. As of writing, the final policy has not been approved by the Water and Sewer Board. As a result, revisions to the draft policy may affect economic feasibility calculations. The final policy is attached in **Appendix K**.

1.8 Ongoing Projects

There are two ongoing projects considered in the NPMP: the Poudre Ponds Complex Project (Poudre Ponds) and the Upper Equalizer project. The information on both these projects is based on the 2016 City of Greeley Non-Potable Water Supply Upper Equalizer Infrastructure Feasibility Study. The Poudre Ponds project is also studied in greater depth in the 2021 Poudre Ponds

Reclamation and Restoration Improvements Project Mini Master Plan, which evaluated plans based on 2030 and 2065 demand scenarios.

The Poudre Ponds project seeks to expand an existing storage site by constructing a gravel pit pond and pump station on a newly acquired parcel. Project goals include improving water supply reliability, NP storage, and community assets via site enhancements for wildlife and recreation. This new pump station will convey 23 cubic feet per second (cfs) to the Greeley No. 3 Ditch or 27 cfs to the Poudre River, returning water back to its source as part of a water rights exchange.

The Upper Equalizer project seeks to expand an existing NP pump station, which currently provides irrigation to a golf course and high school. This project will transfer 31 cfs peak flow from the Greeley No. 3 Ditch to the Greeley-Loveland Irrigation Company (GLIC), which is 4 miles away, with about 200 feet in elevation gain. As 71st Avenue was paved since the writing of the feasibility report, the routing of the pipeline was changed to 83rd Avenue. The NPMP was coordinated with the ongoing design as available and the 31 cfs transfer was incorporated into the plan.

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Section 2

Administrative Considerations

In addition to the infrastructure construction and expansion, certain administrative improvements can help the City continue to grow its NP system and act as a leader in water conservation along the Front Range. This section describes recommendations related to policy, operations, monitoring, and data collection.

2.1 Stakeholder Engagement

Stakeholder engagement efforts were conducted with several local communities and municipalities in the Front Range to identify current system practices, user trends, planning recommendations, and economic considerations surrounding design and expansion of NP systems. These included the City of Westminster, Denver Water, the City of Evans, and the Town of Windsor. Through this process, it was discovered that the City's current NP system is more developed than many other surrounding raw-water suppliers.

Discussion topics during these meetings included factors for site selection, best practices for NP implementation, and potential challenges of NP use. Considerations for site selection include picking high acreage areas with a preference for larger customers, limitations based on pressure zones, economics (cost savings associated with cheaper irrigation water compared to potable), land use/zoning laws, and regulations regarding water reuse. Common best practices include the use of design standards to regulate construction, irrigating at night, use of subsidies to encourage implementation, and NP promotion through sustainability campaigns. Potential challenges with operating an NP system include the variability of supply of reuse water (raw water is less variable), water quality impacts on the distribution system and vegetation, additional education and focus on public perception, more training required for employees, and higher cost of treating NP water for communities that use potable reuse.

2.2 NP Policy Considerations

Modeling considerations and factors used for the hydraulic modeling of existing and future systems were developed with consideration of the City's current NP water supply policies. The City is currently working on drafting a policy related to NP adoption and standards. Policy-related decisions are a large driving force behind NP adoption, conversion, and expansion, and are a key part of the City's water resources conservation strategy. The NPMP is based on a draft version of the policy, and certain assumptions used throughout may be subject to change, depending on the final version. The following are key points to note from the draft policy and recommendations for the final policy:

- The final policy should mandate NP irrigation for new developments and redevelopments where technically and economically feasible. Mandating and enforcing NP irrigation will help promote sustainability for the potable water system and avoid unnecessary upsizing.

- The City should develop NP water rates based on a cost-of-service study to incentivize NP adoption by reducing the price of NP water compared to potable water.
- Growth should pay for growth. The policy should clarify how new developers participate in the construction of new NP infrastructure.
- Large users should be required to plan for at least an 8-hour watering window. The policy should clarify when this is required and should encourage users to use an even larger watering window, to reduce peak hour demands on NP infrastructure.
- The policy should require new developments to construct NP infrastructure, such as separate irrigation pipelines, even if an NP pump station will not be available until after construction is complete. Information should be included on when and how the City's water and sewer department will pay to upsize infrastructure to accommodate future demands.
- The City should develop an impact fee structure that encourages NP adoption and allows for City investment in upsizing the NP system to be repaid in the future.

2.3 Improved Operational Practices

The existing systems are operated efficiently and proactively. The pump stations are rebuilt on a timed cycle and maintenance is performed annually over the winter. The field inspection confirmed that the systems look and are reported to be well maintained and operated.

As the system expands in the future, some operational practices may need to be modified to expand with the system. Some improvements that would help minimize the operational needs of the future system may include:

- Improved SCADA control and monitoring. Generally, sites must be physically visited to monitor pond levels and check for operational issues. Improved SCADA could allow remote monitoring and automatic control of some processes allowing existing staff to operate additional sites. A suggested "default" SCADA system is listed in the next section.
- Implementing a CMMS to improve data and optimize maintenance activities. Adding NP infrastructure to an existing City CMMS will be considered in the future.
- The following systems have high peaking factors, or very high variability, which means the pump stations are limited by maximum flow but only operate for a short irrigation window. These systems could benefit from a longer watering window which would free up capacity for additional demands. Note that lengthening the water window in some cases may only require reprogramming the irrigation controller, but in many cases may require dividing the irrigation system into additional zones. Therefore, these modifications are likely best accomplished during major irrigation system maintenance or replacement. These systems include the following:
 - Mosier Hill (extremely varied)
 - Bittersweet Park

- Madison Elementary
- Saddle Club (extremely varied)
- Luther Park (extremely varied)
- Island Grove West
- Island Grove East
- Twin Rivers Park
- North Ridge School

2.4 Improved Monitoring Systems and Practices

The current NP system includes basic SCADA status communication. Each pump station is controlled by a vendor provided and programmed “island” programmable logic controller (PLC) that monitors pressure and flow. The PLC also monitors station health and protects the pumps from operating outside of safe ranges. Each station has a radio telemetry unit (RTU) that communicates limited status and data. **Table 2-1** summarizes the available data from each of the existing stations. Ultimately, it is recommended for the City to include SCADA for all existing and future pump stations, and eventually add ditch measurements and controls to the SCADA.

Table 2-1 Available SCADA Data from Existing Systems

Service Area	Pump Station	Flow	Pressure	Wet Well Level	Influent Flow
Promontory Park	Main	X	X	X	
	Transfer	X	X	X	
Greeley West Park	N/A				
St. Michaels	N/A	X	X	X	
Boomerang Golf	Boomerang North				
	Boomerang South				
	Boomerang Transfer	X	X		
	North Ridge Transfer	X			
	North Ridge School	X	X	X	
	Poudre River Ranch	X	X		
Youth Sports Center	Youth Sports	X	X	X	
	Twin Rivers Park	X	X	X	
Highland Hills Golf	N/A	X			
Josephine Jones Park	N/A				
Peakview Park	N/A	X	X	X	
Monfort	N/A	X	X	X	
Sanborn Park	N/A				
Cottonwood Park	N/A				
Bittersweet Park	N/A	X	X	X	
Ramseier	N/A	X	X	X	

Service Area	Pump Station	Flow	Pressure	Wet Well Level	Influent Flow
Madison Elementary and Houston Gardens	Madison Elementary	X	X		
	Houston Gardens	X	X		
Luther Park	N/A	X	X		
Glenmere Park	N/A				
Jackson Field Sports	N/A	X	X	X	
Delta Park	N/A	X			
Balsam Park	N/A	X			
East Memorial	N/A	X	X	X	
Bella Romero Elementary	N/A	X	X		
Linn Grove Cemetery	N/A				
Stoney Brook	N/A	X			
Poudre Ponds	N/A	X	X	X	X
Island Grove and Saddle Club	Island Grove West	X	X	X	
	Island Grove East	X	X	X	
	Saddle Club	X	X		

As existing pump stations are replaced and new pump stations are installed, a unified approach to SCADA communication should be followed to allow for future operations flexibility.

Newly installed or replaced stations should be capable of using the City's preferred Modbus TCP/IP communication protocol. It is anticipated that over time the City's fiber network (or at least broadband) will be extended to all pump stations. Broadband network connectivity will allow both data-rich SCADA, as well as the implementation of monitoring and security systems at each site. Alarms should be capable of custom alarm priorities and call-outs. Generally, any status or control available on the local operator interface should be accessible via SCADA. At a minimum, the datapoints for new equipment should include:

- Status to SCADA
 - Mode (local/off/remote)
 - Running (each pump)
 - Motor speed (each pump)
 - Setpoints (pressure, flow)
 - Station flow
 - Station pressure
 - Wet well level
 - Filter flush

- Alarms
 - All alarms available on the vendor package
 - Fault monitoring
 - Power monitoring
 - Communication lost (outside of vendor package, network side)
 - Intrusion (outside of vendor package)
 - Space temperature (may be outside of vendor package)
 - Smoke/fire (outside of vendor package)
- Control from SCADA
 - Mode (in auto)
 - Run
 - Percent speed
 - Setpoints (pressure, flow)
 - Filter flush interval

In some locations, additional information such as ditch level, pond level, headgate position, or other datapoints may be desirable for remote monitoring and operation.

The overall control philosophy will continue to be stations operated in “island” mode, with the local PLC controlling the system to maintain the operational setpoint and protect equipment. In the future, the capability should be retained for SCADA control and orchestration of multiple pump stations, while the local PLC continues to provide equipment protection.

2.5 Data Collection and Record-Keeping

Historically, comprehensive data collection has often been difficult or impossible for distributed NP systems that were built by multiple parties. However, the City’s unique and advanced system calls for improved data collection and record-keeping practices to be implemented. Master planning efforts revealed certain gaps in data that could be remedied with further studies. The following recommendations may help the City to efficiently keep track of its system, pass on important knowledge and history to future employees, and fill in missing datasets:

- Conduct a study of the ditches and laterals throughout the LREGA. This will help identify good locations for future pump stations in undeveloped areas. Additionally, update the current ditches dataset in GIS to capture all stormwater runoff systems that are actually NP ditches, and vice versa. The City may also suggest having developers provide information on existing ditch laterals in a proposed development area as part of the existing conditions report.

- Update and enforce standards related to construction drawings and record keeping after construction or upgrades of an NP pump station, or other infrastructure. Require that developers provide detailed drawings showing the pump station, irrigation pipelines, and pump curves. The City should also develop and maintain its own internal record-keeping system to identify which documents are the most up to date. A CMMS including NP infrastructure could meet this intent.
- Create a system for regularly updating the NP GIS database. While some NP systems have detailed GIS information, other NP systems are not represented in GIS at all. Designating specific staff members with the task of updating the database after a new project and providing them with standard operating procedures may help with this effort.
- Install SCADA systems at new pump stations and pump stations that do not currently have it, to allow for further monitoring of flows and pressures.

Section 3

Demand and Economics

To plan for the future NP needs of the City, existing and future demands were established, and an analysis of economic feasibility of future expansion was completed. The NP water demands established were used in the WTDMP to show how potable water demand can be lowered by meeting demands that do not require the quality of potable water quality with NP water (e.g., irrigation or construction).

3.1 Existing System Demands

The first step in allocating demands in the NP water model is to examine how the City currently uses NP water. NP water is currently used mostly for irrigation, although it may be possible to expand the system so that it can meet some other demands that do not require potable service, such as construction. Information on NP demands was primarily found in the billing data and GIS data, as discussed in **Section 1** of this report.

3.1.1 Review of Billing Data and GIS Data

The existing irrigated areas were examined in GIS and the existing billing data was geolocated and categorized by customer type. Through this process, 99.3% of the total NP demands from the 2019 billing data were allocated to a geolocated meter. Additionally, the City requested that one “customer” be removed from the total, as it is a shoulder tap that feeds other billed customers. Shoulder taps are locations where the NP system can take water from the potable water distribution system during the early spring and late fall shoulder months, when the ditches may not have water but there are still irrigation demands. **Table 3-1** summarizes the billing customers and their associated demands by their City-assigned category. Categories were subsequently adjusted to match water and sewer customer categories.

Table 3-1 Categorized Billing Customers

Customer Category	Number of Billed Meters	Peak Month Consumption ¹ (MG)	Percentage of Total Consumption
Church/Commercial	1	0.8	0.7%
Commercial	36	8.5	7.3%
Golf Course	5	41.4	35.9%
Multifamily Homeowners Association (HOA)	2	0.3	0.3%
Non-Potable	1	0.1	0.1%
Parks	16	34.4	29.9%
Residential	22	13.6	11.9%
School	13	16.0	13.9%
Total	96	115.1	

¹ Average of 2018 and 2019 billing data, in million gallons (MG)

Some NP irrigated sites, such as certain parks, were not included in the billing system. These demands were accounted for with historical pumping data collected weekly through most of August 2019. This data was used for 33 locations (including three wells) across 12 sites, where metered billing data was not available. **Table 3-2** contains the pumping data for these areas.

Table 3-2 Pumping Data

Site Name	Pumped Peak Month Demand ¹ (1,000 gal)
Balsam Park	2,171
Bittersweet Park	4,585
Cottonwood Park	719
Delta Park	712
Glenmere Park	1,401
Greeley West Park	745
Island Grove	3,459
Island Grove Ball Field	3,300
Josephine Jones Park	1,102
Linn Grove	8,328
Saddle Club	69
Sanborn Park	2,783

¹ Average of 2018 and 2019 recorded pumping data

3.1.2 Variability in Demand

NP demands are much more irregular than potable water and wastewater demands. They are largely influenced by seasonal weather patterns, since most NP water is used for irrigation. In general, NP demand is highest in the summer and lowest in the winter. Both potable and NP demands were allocated based on summer usage. However, these seasonal variations do not account for year-to-year variability. This year-to-year variability is shown in **Figure 3-1**, where consumption based on billing data can more than double in certain years. A comparison with annual rainfall did not show a strong correlation to account for the annual variation.

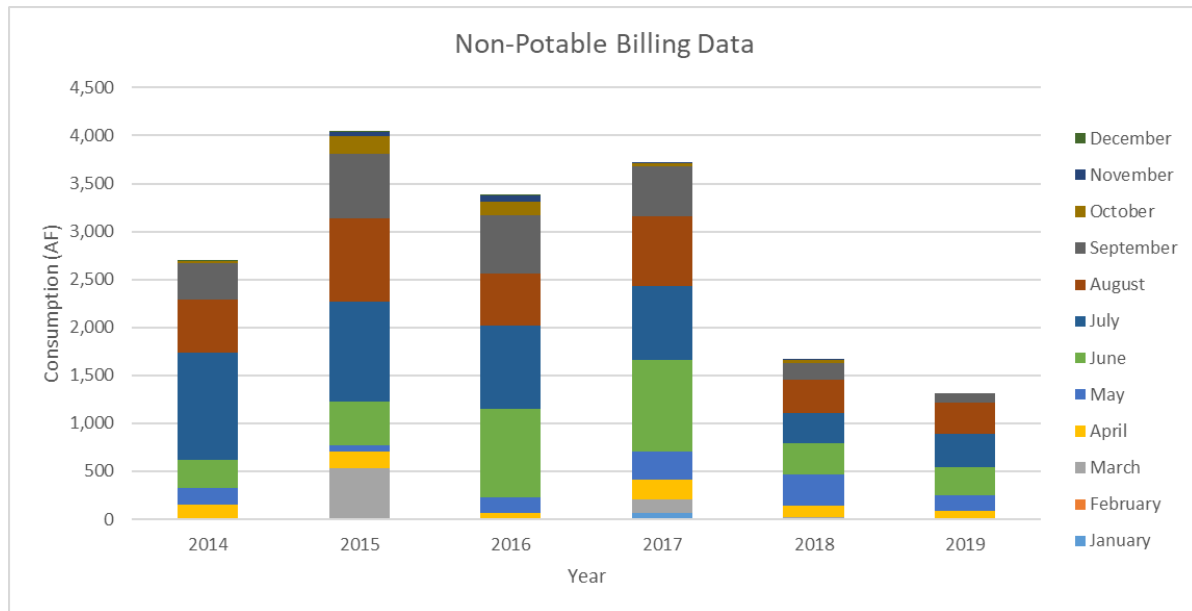


Figure 3-1 Variability in Annual Non-Potable Demand

Based on discussions with the City, it was determined that the reduction in annual demand was due to increased conservation efforts, especially the installation of water-efficient irrigation systems and smart irrigation controllers throughout City parks. To account for these changes, only billing data from 2018 and 2019 was considered for the development of this NPMP.

3.1.3 Flow Factor Development

To calculate future demand projections, it was necessary to establish flow factors. A flow factor is defined as the value used to estimate typical NP demand per acre for a given land use category. The historic billing data and the current NP irrigated areas shapefile were combined to produce flow factors by customer category. These flow factors were then used to estimate future NP demand scenarios through buildout based on land use projections established during the WTDMP.

Flow factors were calculated based on conversations with City staff to determine which areas were irrigated, and by which meters. The meters, and their associated area, had been previously categorized by the City, which was the basis for the flow factor categories. The peak month billed consumption by category was divided by the total irrigated acreage by category. This supplied the Irrigated Land peak month flow factor, as shown in **Table 3-3**. These values represent the amount of consumption for a site where the exact acreage being irrigated is known.

However, in undeveloped areas, the exact irrigated acreage is not known. To account for this, the percent of land that is irrigated out of a total parcel was estimated by category type. The total irrigated land by category was divided by the total (bulk) parcel area by category. These resulted in a Bulk Land peak month flow factor, also shown in **Table 3-3**. The flow factor calculation process is illustrated in **Figure 3-2**.

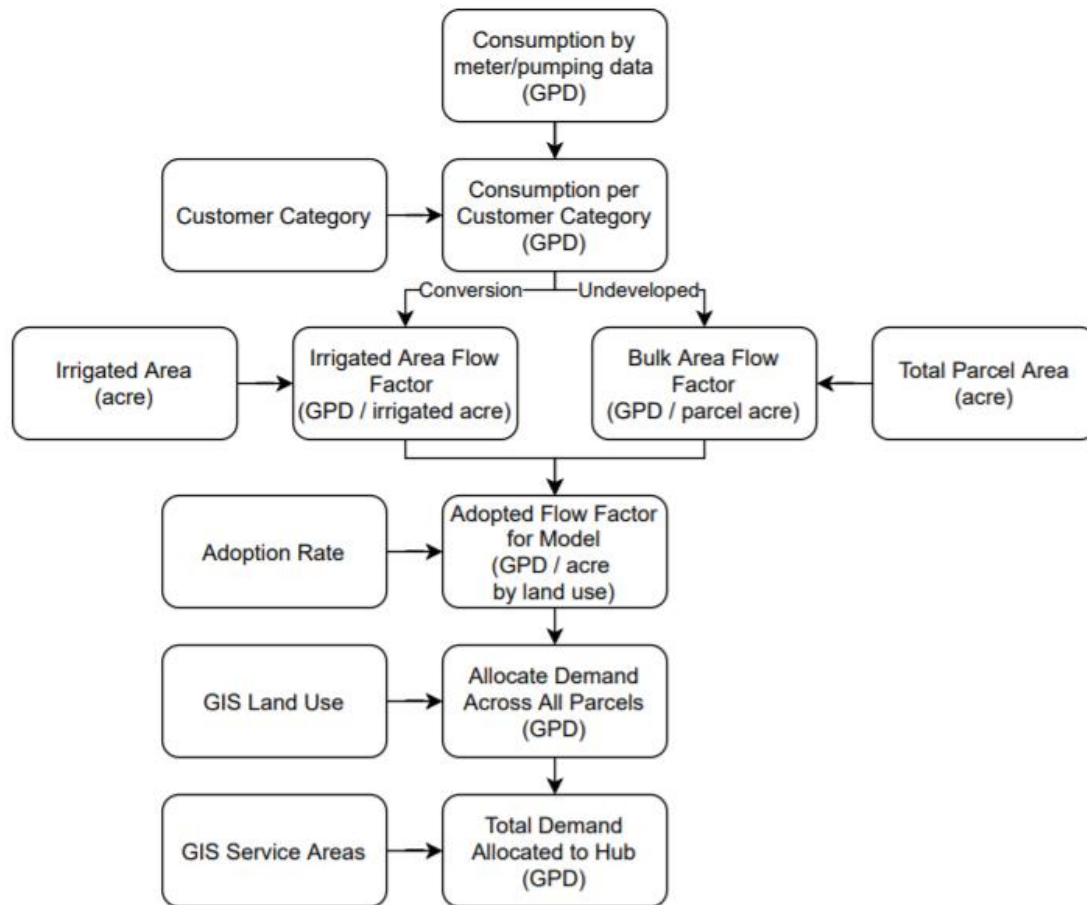


Figure 3-2 Flow Factor Calculation

These customer categories were coordinated with the WTDMP land use projections to examine areas throughout the LREGA. Generally, the Multifamily HOA category was associated with residential high density (R-H) land use category, the Residential customer category was associated with residential medium density (R-M), residential low density (R-L), and residential estate (R-E) land use categories, and the Commercial customer category was associated with commercial high intensity (C-H) and commercial low intensity (C-L) land use categories. However, because the existing NP system serves a limited number of areas, this process did not fully account for all types of land use within the City. The following changes were included in the final flow factors:

- Some land use types in the City do not currently have any examples of NP irrigation. This includes the industrial low intensity (I-L), industrial medium intensity (I-M), and R-E areas. For these areas, a flow factor was based on the difference between the summer and winter flow factors, as developed in the WTDMP and SSMP, respectively.
- Because schools are zoned as R-L, the R-L flow factor was based on a combination of the Residential and School flow factors.

- Because churches are considered commercial, the Commercial flow factor also includes churches. The Church category is used for conversion areas only. There are not many churches currently served by NP irrigation, so the Church flow factor also looks at existing churches that are only served by potable water and compares summer versus winter demand to determine an estimated flow factor.

Losses due to evaporation or seepage were not included in these calculations, as they primarily occur in the ponds and ditches rather than in the distribution system. These losses are estimated at 30%, based on operator knowledge, and are necessary for determining NP supply into ditches.

Table 3-3 Flow Factors

Category	Description	Peak Month Flow Factor for Irrigated Land (gpd/acre) ³	Percent Irrigated	Peak Month Flow Factor for Bulk Land (gpd/acre)	Peak Month Flow Factor for Irrigated Land (in/week)	Annual Flow Factor for Irrigated Land (in/year)	Adoption Rate ²
Church	For conversion areas only	2,000	63%	1,300	0.5	10.9	75%
Commercial	C-H and C-L; includes churches	3,200	42%	1,300	0.8	17.5	20%
Golf Course ¹	Golf course (NP category only)	5,000	87%	4,400	1.3	27.3	N/A
I-L	Industrial Low; Summer vs. winter flow factor	N/A	N/A	500	N/A	N/A	20%
I-M	Industrial Medium; Summer vs. winter flow factor	N/A	N/A	125	N/A	N/A	20%
Multifamily HOA	R-H	4,400	34%	1,500	1.1	24.0	15%
Parks	Parks (NP category only)	3,500	47%	1,600	0.9	19.1	90%
Residential	Single family residential; also used for R-M	5,200	17%	900	1.3	28.4	20%
R-E	Residential Estate; Summer vs. winter flow factor	N/A	N/A	80	N/A	N/A	15%
R-L	Residential Low; Residential and School average flow factor	4,700	26%	1,200	1.2	25.7	20%
School	For conversion areas only	4,300	48%	2,100	1.1	23.5	75%

¹ No additional golf courses are expected in the City through buildout.

² Adoption rates based on the BBC report; see **Section 3.2.1**.

³ gpd/acre = gallons per day per acre

3.2 Future Usage and Demand Projections

Using a combination of the City's planning data, land use projections from the WTDMP, and flow factors developed during the existing demands allocations, future NP demands through the buildout scenario were projected and allocated. This section captures the assumptions and calculations used to arrive at this value.

3.2.1 Adoption Rates

The adoption rates are the estimate of the amount of land that could potentially be irrigated that is expected to use NP irrigation. Future scenarios used the adoption rates, as shown in **Table 3-3**, for undeveloped land and most conversion areas. Undeveloped land had the factors applied per land use category including churches in Commercial and Schools in R-L. Conversion used the same factors, although schools and churches used a 75% adoption rate to account for a push to convert existing large irrigated areas to NP.

3.2.2 Infill and Conversion Areas

As the NP system expands, it may become both feasible and beneficial for some areas that are already developed to convert from potable to NP irrigation. These areas, referred to as conversion areas, were identified by the City based on knowledge of the individual customers, its current usage, and open irrigated acreages. The City identified over 400 individual areas that could be eligible for NP conversion. These areas were then categorized to identify which flow factors best fit them. The total acreage expected to convert to NP by category is summarized in **Figure 3-3** and shown in **Figure 3-4**. Areas that were identified as undeveloped land, roads, or non-irrigated areas were not included in the categorization. This is because undeveloped land is captured in the demand projections for undeveloped land, and roads or medians are too small to be accurately categorized.

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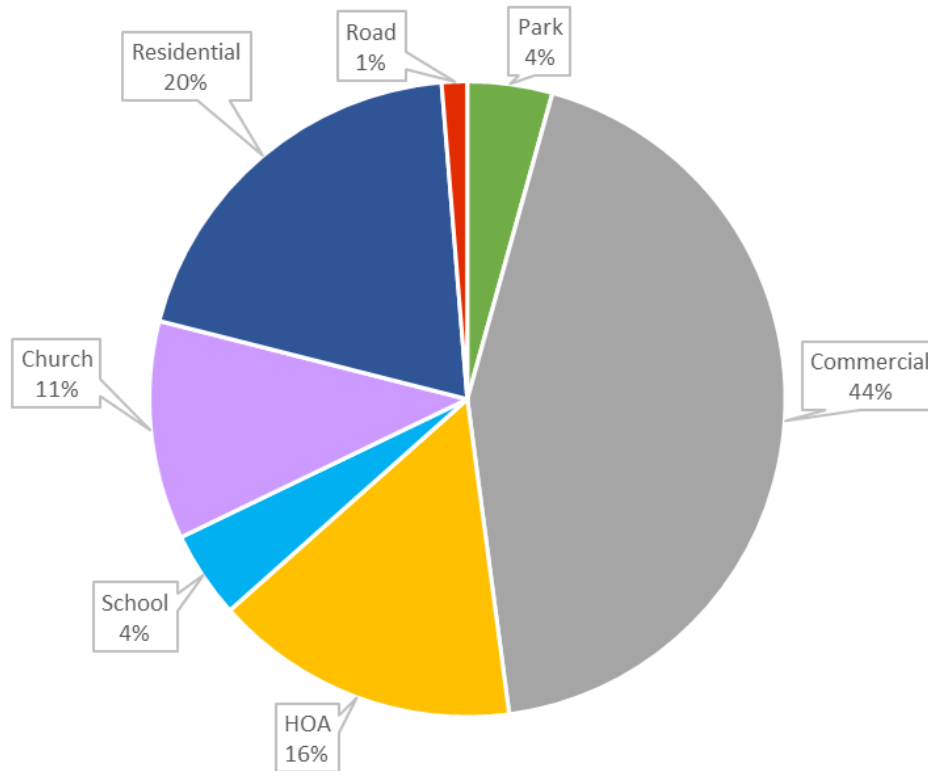
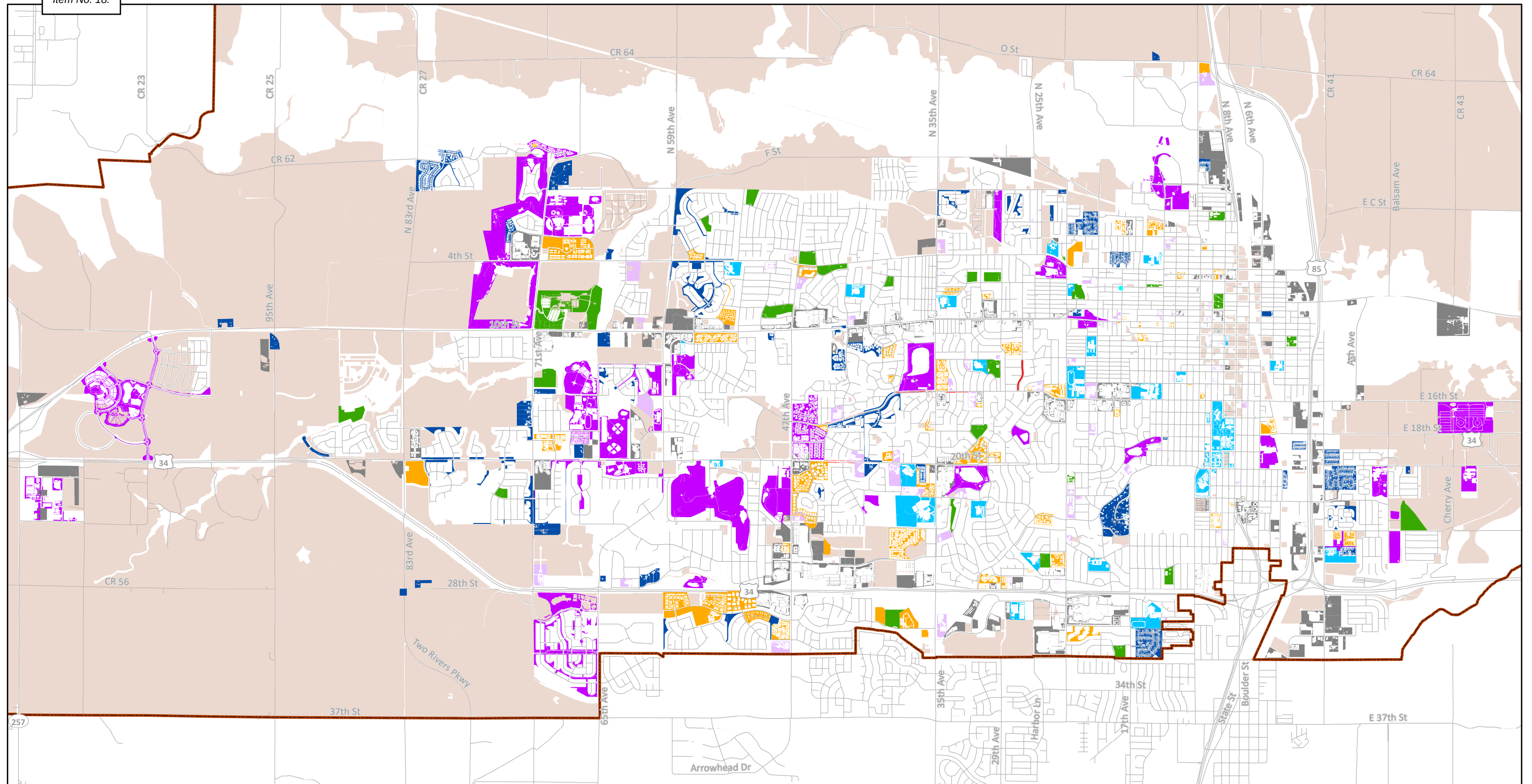


Figure 3-3 Conversion Area Categorization by Acreage

The conversion areas represent irrigable land; therefore the irrigable land flow factor was applied to each area for its category. It is not expected that all of these areas will convert to NP, and inclusion on this list is meant to identify a potential conversion, not set a requirement for conversion. To account for this, the adoption rates were applied to these areas.

Existing customers may be considered good candidates for potential conversion when they have a large irrigated area (greater than 15 acres), higher estimated demands (3,500 gallons per minute [gpm] per irrigated acre or higher), and/or are near existing or planned NP infrastructure. While a customer does not have to meet all these criteria to be eligible for conversion, the City should prioritize these properties. The City may also consider prioritizing customers that are public entities, such as parks and schools. Continued outreach to existing water customers can show them how NP irrigation can benefit them by lowering their water bill. For the purposes of the NPMP, it was assumed that all potential conversion areas will eventually convert to NP irrigation at the adoption rates noted above, regardless of whether they would be considered high priority or not.

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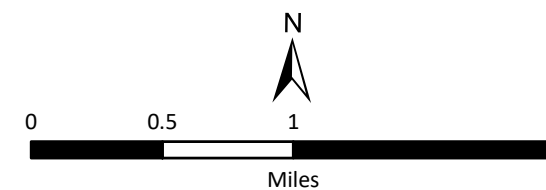


Legend

-  LREGA
-  Existing NP Irrigated Areas
-  Future Development

Conversion Areas

-  Church
-  Commercial
-  HOA
-  Park
-  Residential
-  Road
-  School



**Potential Conversion Areas
(Categorized)**

Figure 3-4

*Greeley Non-Potable Water
System Master Plan*



**CDM
Smith**
February 23, 2021

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3.2.3 Parks and Schools

Two land use types required special attention due to their high NP consumption: parks and schools.

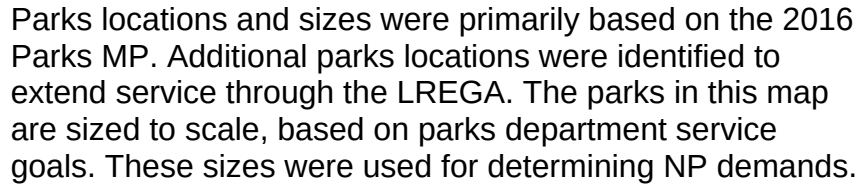
Park locations and sizes were primarily based on the City's Parks, Trails, and Open Lands Master Plan (2016). This document identified potential park locations for the next 20 years. These locations were supplemented by park locations included in this NPMP in order to extend parks service through the LREGA. It should be noted that the location and size of these parks is subject to change in future park master plans. The size of each park was based on population projections from the water and sewer master plans, and the park service goal of 8.25 acres/1,000 people from the 2016 Parks MP. This methodology was approved by the City's parks department.

Figure 3-5 shows all future park locations. Parks will serve as the hubs of the future NP system, and ponds serve both storage and aesthetic purposes.

Because schools represent large irrigable areas, it was desired to incorporate the location of future schools into the future demand projections. However, limited information is available as to the locations, numbers, and size of future schools. Because of this uncertainty, it was considered impractical to select a defensible number, and it was therefore decided to not include schools as a separate source of future demand projections. As schools are generally zoned as R-L, the R-L future flow factor was calculated as a weighted average between Residential and Schools flow factors. In this way, the NP demand from future schools is spread across the future land use areas where schools will eventually be planned.

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3.2.4 Other Land Uses through the LREGA

Outside of conversion areas and parks, NP demand projections for undeveloped land throughout the LREGA were coordinated with the water demand projections. The WTDMP and SSMP used a complex land use categorization methodology to identify around 60 different land uses within the City, which were used to categorize all currently undeveloped areas or areas of redevelopment. Based on discussions with the City and a review of the available information, three tiers were used for the potable water demands, as described below:

1. **Tier 1: Planned Developments.** This data was taken from development reports and planning documents for twelve known developments, which are in various stages of design. These areas represent the most detailed planning information available.
2. **Tier 2: City of Greeley Land Use (Sub-Areas) and Zoning Markup Map (Greeley Markup).** After review of this data, the City marked up 11 areas of growth to apply a specific growth distribution to each area, based on trends developed after the creation of the document. The City's planning department assigned percentages of land use type to each growth area. These areas were then split into sub-areas to better align with the density distribution of the original *Imagine Greeley Comprehensive Plan*.
3. **Tier 3: Zoning and Comprehensive Plan Information.** For all remaining areas, including infill areas, zoning and land use information was used to distribute future populations and water demands. This data was taken from the following sources:
 - a. Zoning from the *Annual Growth & Development Projections Report* (City of Greeley, 2019).
 - b. Land use guidance from the *Imagine Greeley Comprehensive Plan* (City of Greeley Community Development Department, 2018).

Using this data, each parcel in the City was assigned with a residential and nonresidential (i.e. commercial or industrial) future water demand based on its land use category. For detailed information on the potable demand calculations, please see the WTDMP.

The water and sewer land use types were then coordinated with the NP flow factor categorizations to develop separate NP and potable water flow factors for each land use type. These flow factors were applied throughout the LREGA to determine total NP demand.

3.2.5 Buildout Projections Summary

The conversion areas, parks, and undeveloped land were combined to produce a total NP demand set for peak month at buildout. This was incorporated into the future water model to aid in appropriately sizing infrastructure. The peak month buildout demand projections for potable vs. NP are summarized in **Table 3-4**. The NP demand density is shown in **Figure 3-6**. The NP demands comprise 19.5% of all future peak month water demands through buildout. NP demands may decrease if planning shows that it is not hydraulically or economically feasible to serve certain areas or, conversely, NP demands may increase if aggressive NP use policies are adopted.

Table 3-4 Peak Month Buildout Demands Summary

Development Type	Total Future Water Demand (MGD)	Future Potable Water Demand (MGD)	Future Non-Potable Water Demand (MGD)
Existing Demand	47.3	46.0	1.3
Future Development	56.7	47.5	9.2
Conversion Areas	2.3	0	2.3
Total	106.3	93.5	12.8

3.3 Demand Estimates by Planning Horizon

To distribute the future demand parameters in the model at each planning horizon, the percent to which each future development tier is built out at the end of each planning horizon was estimated. The basis for these estimates is the BBC report. At the 2025 and 2040 planning horizons, the calculated population is matched to the BBC report. The overall buildout population is assumed to exceed the 2075 BBC projected population. The total buildout population is projected to be 425,271. For more information on the percentages used, please see the WTDMP. The total phased potable and NP demands are shown in **Table 3-5**.

It is assumed that the Tier 1 projects will be completed first. For this reason, the majority of the Tier 1 projects are assumed to be complete at the 2025 planning horizon, and all of them complete at the 2040 planning horizon.

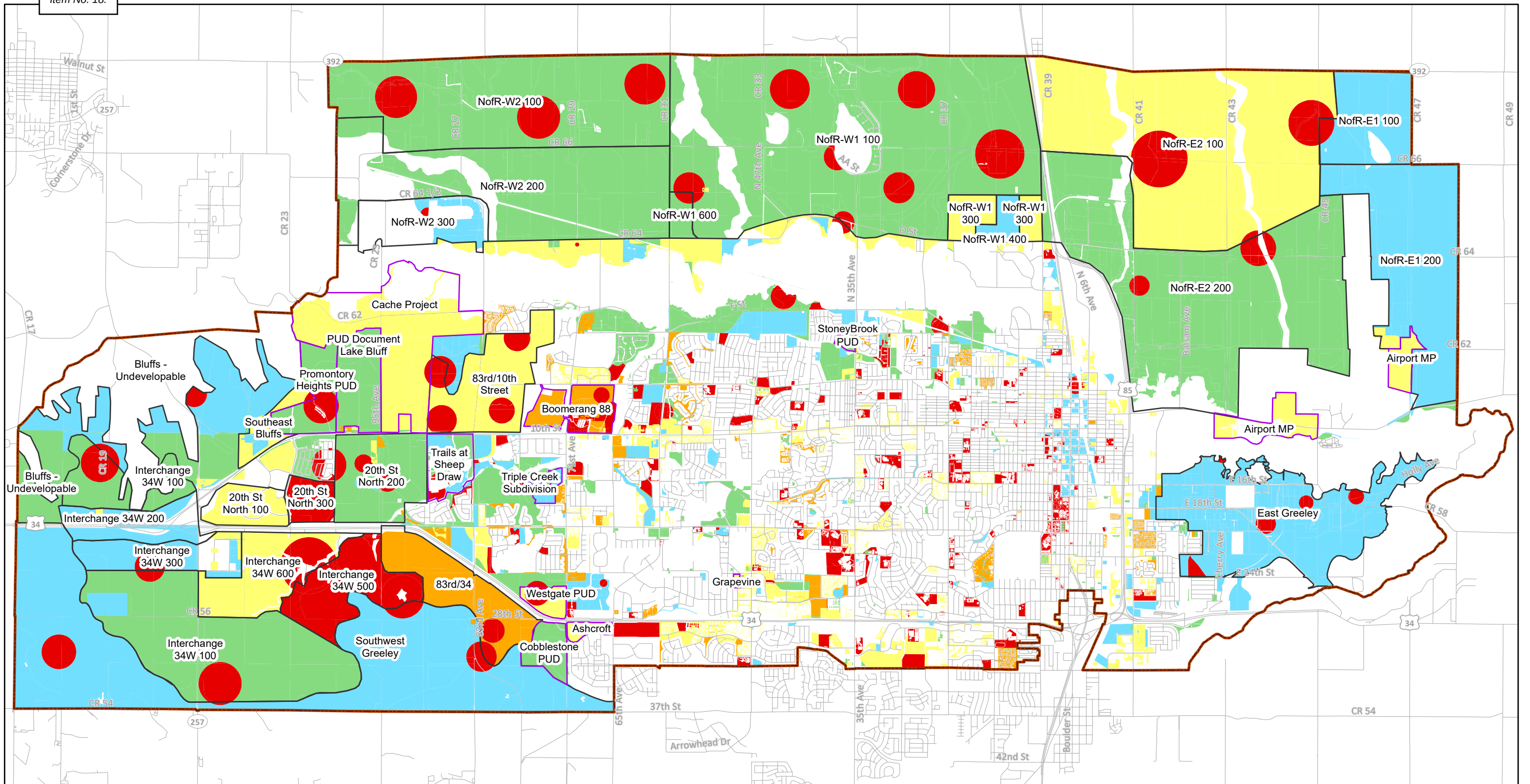
Because of the large areas within the Tier 2 projections category, the Tier 2 percent complete values for the 2025 and 2040 planning horizons have been developed through close discussions with the City. The Tier 2 areas identified for growth at the 2025 and 2040 planning horizons are the areas that the City's planning department have identified as the most likely growth areas.

The Tier 3 growth identified below for the 2025 planning horizon was chosen through discussions with the City. Tier 3 growth included in the 2040 planning horizon was assumed to include all of the infill around the Tier 1 and Tier 2 projected growth areas.

The rate at which existing developments will convert to NP irrigation will vary location-by-location based on economic feasibility, proximity to NP infrastructure, and the willingness of the owner to participate in conservation efforts. To estimate the rate of conversion areas, it was assumed that demand from conversion areas will increase at a similar rate to the total additional water projections. The percentage of water demands increase, as compared to the buildout projections, at each planning horizon was calculated, and this same percentage was applied uniformly to the conversion areas.

Table 3-5 Peak Month Demand by Planning Horizon

Planning Horizon	Total Future Water Demand (MGD)	Future Potable Water Demand (MGD)	Future Non-Potable Water Demand (MGD)
Existing	47.3	46.0	1.3
2025	51.8	49.4	2.4
2040	61.0	56.9	4.1
Buildout	106.3	93.5	12.8

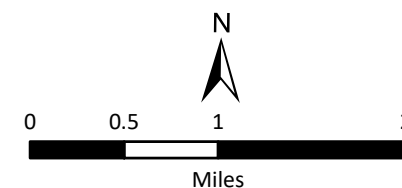


Legend

- LREGA
- Tier 1 (PUDs)
- Tier 2 (Comprehensive Plan)

NP Water Parcels Density

- <250 gpd/ac
- 250 - 500 gpd/ac
- 500 - 750 gpd/ac
- 750 - 1,000 gpd/ac
- >1,000 gpd/ac



Demand Density (Peak Month, Buildout)

Figure 3-6
Greeley Non-Potable Water
System Master Plan

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3.4 Economic Feasibility for Future Projects

In most developments, the decision on whether or not to use NP irrigation is based on economic feasibility, meaning whether the cost savings from using NP over potable outweighs the initial cost of infrastructure construction. This evaluation should consider the current cost of infrastructure against the long-term benefits of reducing potable system expansion, reduced cost of treatment, and freeing up more valuable treatable water rights for potable use. Long-term savings to the eventual owners/occupants of the property should also be considered when evaluating feasibility.

3.5 Water Resources Correlation

It is important for the City to plan for the total annual water demands through buildout. Water conservation methods, such as improved landscaping practices and the encouragement and adoption of NP water for irrigation, may help reduce the City's annual water demands. The City previously conducted a water resources planning study (BBC report), which focused on developing three alternative scenarios for annual water demands. The NPMP primarily focused on planning for future infrastructure needs based on peak summer demands. **Table 3-6** provides a comparison summary between the BBC report and the NPMP.

Table 3-6 NPMP and BBC Report Comparison

NPMP Approach	BBC Approach
Focused on infrastructure sizing, particularly during peak month demands	Focused on supply-side annual demands for water resources planning
Used a peak month: average month ratio of 1.8 for potable demands and 2.5 for NP demands to estimate annual demands from the calculated peak month demands	Only calculated annual demands, and did not calculate demands for peak seasons
Separated residential and nonresidential potable water demands to account for different customer diurnal curves and peak hours	Established a universal gpcd value that included commercial, industrial, and residential demands
Correlated population projections to the BBC report and other City planning department data	Developed three population projections (low, medium, high)
Geolocated demands based on land use to incorporate demand density for infrastructure planning	Used bulk demands for water resources planning, and did not spatially locate demands within the City
Estimated a single most-likely demand scenario for 2025, 2040, and buildout based on historic data and planning data	Provided detailed water resources planning for three scenarios every five years through 2075 and a less detailed buildout scenario

The total annual demands developed for the WTDMP under the NP offsets demand scenario at buildout are captured in **Table 3-7**. These demands are within the range established by the BBC report of 62,000 to 84,000 AFY for total water demands at buildout. Although the six industrial high intensity (I-H) users are included in these totals, these users were not used for modeling purposes, as their location is unknown and could lead to oversizing the system. Each large user's location will require a specific evaluation as to whether each additional user could use NP irrigation, and whether additional infrastructure would be necessary to supply this water.

Table 3-7 NPMP Annual Demand Projections at Buildout

Demand	Total Water Demand (AFY)	Potable Water Demand (AFY)	NP Water Demand (AFY)
Existing	30,500	28,600	1,900
Future Demands	33,500	28,300	5,200
New I-H Users (6)	10,300	10,300	0
Total	74,300	67,200	7,100

¹ Potable demand shown in this table is for NP offset scenario

It is recommended that The City rely on the BBC report for supply-side planning, and the WTDMP and NPMP for infrastructure and distribution system planning.

Section 4

Development of the Non-Potable System Model

Two system models, existing and future, were developed to plan for the future NP needs of the City. These two system models used the same inputs and assumptions as the existing system; projection growth rates and water demands, future service areas, and pipe and infrastructure sizing constraints.

The supply and demand data, asset and infrastructure inventory, and land use analysis were used to develop a model of the existing and future NP system. The future NP system model was created in line with the City's Specifications for NP systems.

4.1 Development of the Existing System Model

A hydraulic model of the existing NP system was developed in InfoWater to simulate current conditions and identify areas that may need short or long-term improvements.

The NP system currently consists of 32 pump stations, including transfer stations, serving over one hundred customers. Most of these pump stations operate independently from other stations, creating 24 individual service areas. The systems at each service area are described in **Table 4-1**, and are shown in **Figure 4-1**. In a typical system, water flows by gravity from an irrigation ditch into a pond. From there, the water enters the wet well of the pump station and is pumped throughout the rest of the pressurized irrigation system.

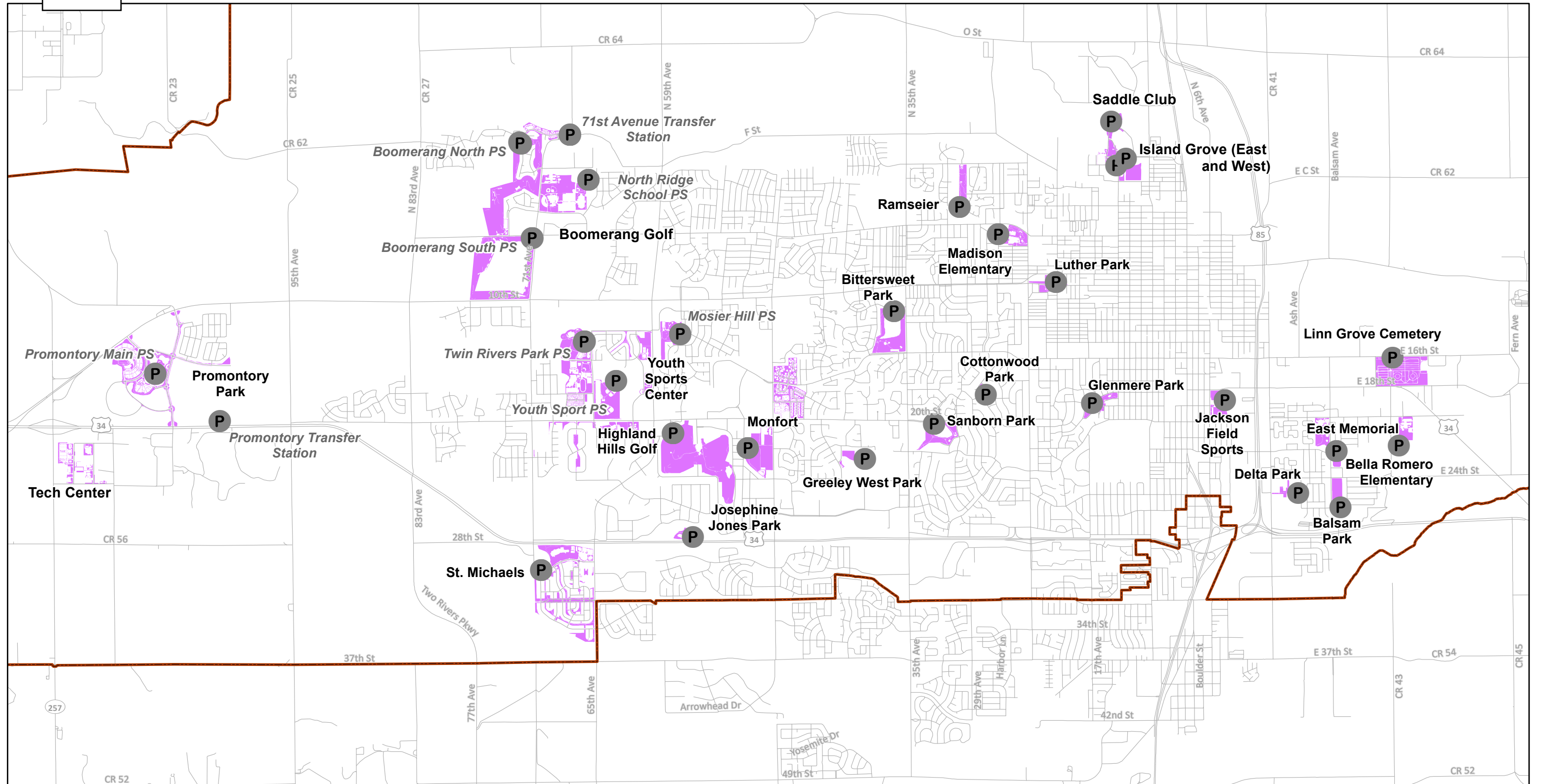
Table 4-1 NP System by Service Area

Service Area	General Description
Balsam Park	A single pump station irrigates this park. This pump station pulls directly from the ditch, without a pond.
Bella Romero Elementary	A single pump station irrigates this park. This pump station pulls directly from a well, without a pond.
Bittersweet Park	A single pump station irrigates this park.
Boomerang Golf	The 71 st Avenue Transfer Station provides water to Boomerang Golf Course (north and south), North Ridge High School, and Poudre River Ranch. The Boomerang Transfer pumps provide water specifically to Boomerang North and Boomerang South, while the North Ridge Transfer pumps provide water specifically to North Ridge High School. Boomerang North, Boomerang South, and North Ridge High School receive water from the 71 st Avenue station into ponds, and then pressure pump from there. Poudre River Ranch has a dedicated irrigation pump at the 71 st Avenue station.
Cottonwood Park	A single pump station irrigates this park.
Delta Park	A single pump station irrigates this park.
East Memorial	A single pump station irrigates this park. The pond can be filled by the ditch, a shoulder well, or a shoulder tap.
Glenmere Park	A single pump station irrigates this park.
Greeley West Park	A single pump station irrigates this park.
Highland Hills Golf	A single pump station irrigates this golf course.

Section 4 • Development of the Non-Potable System Model

Service Area	General Description
Island Grove and Saddle Club	Island Grove East, Island Grove West, and Saddle Club pump stations all pump from individual wells and irrigate separate areas. Saddle Club also has a truck filling station in addition to general irrigation.
Jackson Field Sports	A single pump station irrigates this park. This pump station pulls directly from the ditch, without a pond.
Josephine Jones Park	A single pump station irrigates this park.
Linn Grove Cemetery	A series of three wells pump either into the irrigation system directly or fill a pond. A pump station on the pond also serves the cemetery's pressurized irrigation system.
Luther Park	A single pump station irrigates this park. This pump station pulls directly from the ditch, without a pond.
Madison Elementary and Houston Gardens	A single pump station with two separate pumping systems irrigates this area, splitting into two pipes to serve the school and gardens. This pump station pulls directly from the ditch, without a pond.
Monfort	A single pump station irrigates this area, splitting into three pipes to serve the park, school, and residential/commercial areas.
Peakview Park	A single pump station (Mosier Hill Pump Station) irrigates this park.
Promontory Park	A transfer pump station moves water from the ditch into the main ponds. The main pump station provides irrigation to the park, offices, and residential area. A small water circulation pump at the main station moves water from the lowest pond to the highest pond (not included in the model), creating the water feature.
Ramseier	A single pump station irrigates this park. This pump station pulls directly from the ditch, without a pond.
Sanborn Park	A single pump station irrigates this park.
St. Michaels	A single pump station irrigates this development.
Tech Center	This area is currently fed by potable water at a shoulder tap and does not have an NP pump station. Eventually, it will be transferred to NP water service.
Youth Sports Center	Two pump stations operate independently, but in a similar area: Twin Rivers Park and Youth Sports. Together, they serve two major recreational areas, schools, businesses, and residential areas.

In addition to these areas, Poudre Ponds, Stonney Brook, and the future Upper Equalizer transfer water from one ditch into another. Because these systems do not represent demand, they were not analyzed in depth.



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4.1.1 Infrastructure Connectivity Updates

Before the existing system could be hydraulically modeled, the City's NP GIS data needed to be updated to reflect current infrastructure. As discussed in **Section 1**, a GIS field survey was conducted to document the existing system. This task identified the location of features such as valves, pumps, and ponds, but did not capture how these features were connected to each other, as most NP piping is underground.

To accurately represent the system, historic operational data was analyzed and translated into GIS updates. As discussed in **Section 1**, the City compiled O&M data for each pump station. The construction documents, photos of the site, and other O&M data was integrated with the GIS field data and the City's original GIS data to fully capture the system. These GIS updates do not represent the full extent of piping through areas such as parks. All GIS updates were verified with City staff. The following overarching assumptions were used to update the system connectivity:

- Where meters appeared to be offset from the main lines, 2-inch laterals were added.
- For areas where the pipe or valve diameter was unknown, the diameter was assigned based on adjacent infrastructure (pipes, pumps, valves, etc.).
- In areas where infrastructure was within a meter of a pipe, it was assumed that this was due to the one-meter accuracy of the GPS unit used to collect the field inventory data. Because the field inventory data is considered to be the most up to date information, the pipes were realigned to connect through the field data.

4.1.2 Modeling Inputs and Assumptions

In general, the NP modeling methodology attempted to follow the same methodology as the potable water system model, to facilitate future integration. However, because the NP system has unique features (such as ditches, shoulder taps, etc.) and because it represents a series of separate systems instead of one larger interconnected distribution system, a unique methodology was needed to accurately depict these features. This section discusses this methodology.

Ditches. When an NP system draws directly from a ditch without an intermediate storage pond, the ditch was modeled as a fixed head reservoir. Because transfer systems are not included in the model, there are no places where water flows into a ditch.

Pipes. All existing and future pipes have of roughness of $C = 130$, to represent PVC.

Ponds. For most systems, the distribution system begins at a pond. For these systems, the pond is modeled as a fixed head reservoir. The fixed head was based on the field inventory, construction drawings, or ground surface elevation, depending on what information was available. For the purposes of modeling, it was assumed that the ponds can supply water to meet the system demands at all times during peak season.

Shoulder Taps. Shoulder taps are locations where the NP system can take water from the potable water distribution system during the early spring and late fall shoulder months, when the ditches may not have water but there are still irrigation demands. These are modeled as a fixed head reservoir with a normally closed valve that prevents it from flowing. The head on the

reservoir is set at peak month operating head in the potable water distribution system model. Notably, the shoulder taps do not typically operate during peak month conditions; therefore, this setting is considered conservative.

Wells. Like ditches, when an NP system draws directly from a well without an intermediate storage pond, the well suction conditions are modeled as a fixed head reservoir. The fixed head is the design pumping depth, as found in the O&M documents. The above ground well pump was modeled using available well pump curves, and submerged well pumps were not included in the model.

Pumps. Where available, the pump curve for each existing pump was used in the model, as provided in the O&M documentation. For pumps without a curve, a design point (defined as design head and flow) was used. Many NP pump stations also include a maintenance pump to maintain pressure during low flow. These are not included in the model.

4.1.3 Existing Demands Allocation

Existing demands were based on historic billing data and pumping data, as discussed in **Section 3**. To establish the peak month base demands used for this model, an average of demands, either billed or pumped, was taken for July and August of 2018 and 2019. The base demand derived from billing data was allocated to the appropriate meter and included in the model. For areas with demand based on pumping data, the demand was allocated to a node directly downstream of the pump station.

4.2 Extended Period Simulation Setup

Both the existing and future models were evaluated under extended period simulation (EPS) to examine how they perform throughout the day, instead of at a single point in time. All model scenarios had a 48-hour time duration. This section describes the methodology used to simulate EPS, including SCADA data calibration, diurnal peaking curves, and the approach to pump controls.

4.2.1 SCADA Data Calibration

As mentioned in **Section 1**, hourly SCADA data from September 1, 2015 to September 5, 2020 was used to calibrate the model. Not all SCADA data was available at all sites, and some sites do not have any SCADA data. For both the overall system and individual systems, a peak week with the highest usage was selected from the July and August 2018 and 2019 dataset. This peak week was selected to align with billing data used for demand projections. The data from the peak week was used for model calibration and diurnal curve development for each system.

Hourly pressure data, where available, was used to set up pump controls. The pump controls were set up to match pressure ranges that are typical to a given system. Diurnal curves were used to derive simple time-based controls to match typical pressure ranges for each system. For areas without available pressure data, pump controls were set so that pressures stayed within the 70 – 100 psi pressure range required by the City's Specifications.

4.2.2 Peaking Factors and Diurnal Curves

Diurnal curves were created from the SCADA data described above to show how the demands change on an hourly basis. These diurnal curves include the peak hour, which is the primary point in time used to evaluate the capacity of pumps and pipes. Ponds are sized on peak day.

The hourly data from the peak week for each system was used to create diurnal curves based on peaking during each day. Individual curves were created for pump stations that had their own SCADA data. These individual curves are included in **Appendix C**. Many of these individual diurnal curves revealed operational inefficiencies, such as watering during the day instead of only at night. Inefficient irrigation practices can increase costs and counteract water conservation goals. For more information on NP best practices, please see the City's WaterWise Landscaping Best Practices Manual Criteria in **Appendix F**.

A system-wide diurnal curve, shown in **Figure 4-2**, was created as a more generalized curve. It was based on SCADA data from the following pump stations: Promontory Main (not transfer), St. Michaels, Youth Sports Center, Monfort, Mosier Hill, Madison Elementary, Ramseier, Island Grove East and West, Luther Park, Jackson Field Sports, Bella Romero Elementary, East Memorial, Balsam Park, Delta Park, Highland Hills Golf, Twin Rivers Park, and North Ridge School (not transfer). The curve average is 1.35, which represents the ratio from peak month to peak week based on SCADA data so that the curve can be applied directly to the peak month demands developed. The individual curves each have different averages based on their own peak week: peak month ratios.

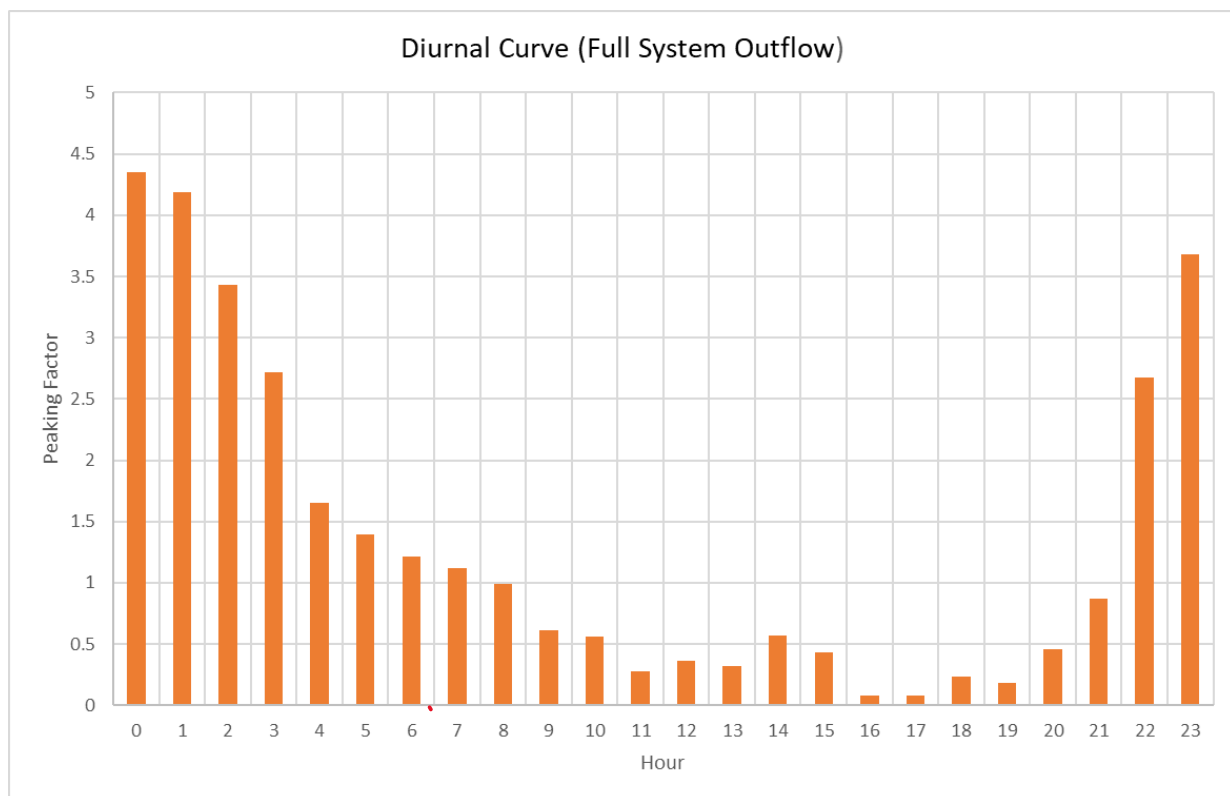


Figure 4-2 System-Wide Diurnal Curve

The peak hour of the system-wide diurnal curve occurs at midnight (hour 0) and has a peaking factor of 4.34. Limited watering appears to occur between 9 am and 8 pm, which aligns with the City's irrigation ordinances and best practices. This curve was applied to existing areas that do not have an individual curve, and to future developments.

For EPS modeling, these diurnal curves are repeated during a 48-hour runtime, in order to align with the potable water system model.

4.2.3 Pump Controls

Because each system is not connected and has unique demands and demand patterns, the modeled pump controls are also unique for each system. In general, pump controls are set by clock time based on the diurnal curve used by the system. For example, if demand drops to zero at hour 4, pumps will turn off or drop to a lower speed at hour 4 to accommodate this change. Because the NP pump stations use variable frequency drives (VFDs), the pumps may vary from 70% to 100% speed. At points where there is no demand in the system, the pumps are modeled as operating at the shutoff point; in real operations, this time period would likely be served by the maintenance pump. This methodology was used for both the existing system and the future system to ensure that appropriate pressures are maintained at all timesteps. This section is specific to modeling methodology; for more information on recommended operation of pump stations, see **Section 2.3** and **Section 2.4**.

4.3 Development of the Future System Model

Future infrastructure was projected throughout the LREGA to show how all areas through the City could be met with NP demand. This section discusses how future infrastructure, including pump stations and piping, was planned and modeled in InfoWater at each planning horizon. All planning horizons (2025, 2040, and buildout) were modeled using the same methodology.

4.3.1 Future Service Areas

In general, it is expected that the NP system will continue to operate as a set of independent systems using a hub-and-spoke methodology. The future parks, as shown in **Figure 4-3**, will serve as the hubs of the future system, as locating the pond and pump station in a park offers both recreational and aesthetic benefits, and provides the open space required for infrastructure.

Because of this, the land through the LREGA was divided into service areas based on the locations of the future parks and the existing NP system. The service areas were initially based on Thiessen polygons around the parks which were then reviewed and customized. The nearest source of NP water was identified, taking topography into account. This informed which areas should have their own pump station (those with a feasible NP source), and which should be served via pressure piping from another NP pump station. Final pump station and pond locations would ultimately be dependent on proximity to a ditch lateral or other water source during the design stage. The following assumptions were used to further refine the future service areas:

- Looping and connections between existing and future systems were attempted where possible. This can include systems with a similar hydraulic grade line or areas where it is less expensive to construct connecting pipe instead of installing new pumps or a new pump station.

- Railroad, river, and major road crossings were minimized where possible.
- NP water will flow by gravity into the ponds, located within parks, then will flow under pressurized conditions from the pump stations at the ponds.

A map of the future service areas, including future pump stations, is included in **Figure 4-3**.

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4.3.2 Model Inputs and Assumptions

The preliminary future model was setup for the buildout scenario, which involves setting up infrastructure through the LREGA to account for a more than 800% increase from existing demands. The current City limit is 31,346 acres, while the LREGA is 58,306 acres, representing an 86% increase in land area by buildout, along with those areas that may convert from potable to NP irrigation. While it is impossible to perfectly predict future development needs, the model should provide a roadmap for future pump station locations and sizing, main pipe sizing, and potential interconnections between key areas. Developers should work with the City's engineering development review (EDR) and water and sewer department to discuss how new developments fit into the City's overall plan to provide NP irrigation service at acceptable pressures in both new and existing areas.

In order to establish infrastructure through the LREGA, pump stations were added into the model at each of the locations identified in **Figure 4-3**. Each pump station draws from a pond, modeled as a reservoir, and has two identical pumps in parallel. A typical pump station is shown in **Figure 4-4**. It is expected that each pump station would also have a smaller maintenance pump, not included in the model. Per the City's Specifications, pumps are required to operate with at least 80% efficiency; therefore, the pumps were modeled uniformly as 80% efficient. Pumps are expected to operate using a lead/lag methodology.

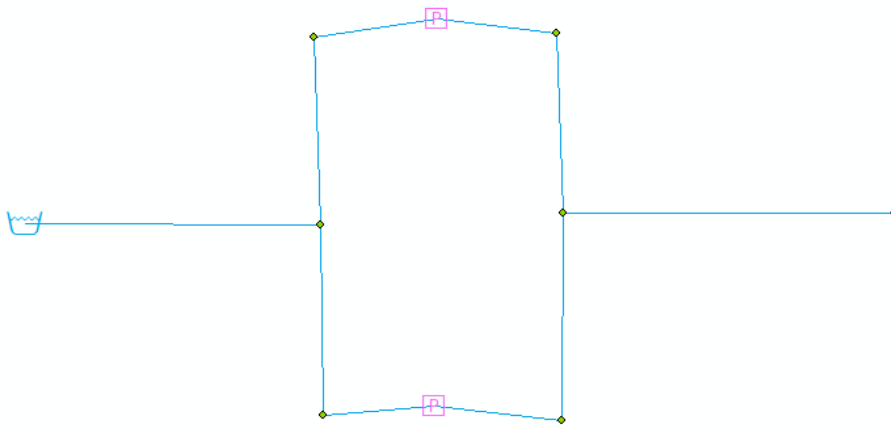


Figure 4-4 Typical Future Pump Station Configuration

In some areas, longer pipelines were drawn from the pump stations to serve undeveloped or conversion areas. These pipelines sometimes end at an anticipated parks location that is not expected to require its own pump station due to distance from a water source or proximity to another pump station. In other cases, the lines are expected to serve higher priority conversion areas, as described in **Section 3.2.2**. As with other infrastructure, these pipes do not represent final layout or sizing and should be reevaluated during the design stage.

The elevation of future nodes, including pumps and ponds, was based on ground surface elevation. Like the existing system, future pipes were modeled with a hydraulic roughness ("C") of 130.

4.3.3 Future Demand Allocation

After the piped network was established, the future demands were set up in the model for the new service areas. Details on demand projections through buildout can be found in **Section 3**.

Future demand datasets were created for each planning horizon, using the existing demand set with future peak month demands for both new developments and conversion areas. Existing and future demands were set as separate demands within the InfoWater demands database to allow for different diurnal curves for existing versus future demands. Each future demand point was tagged with the service area it is in, and all the demand was summed to produce a total demand per service area. This was allocated to the node downstream of the pumps. When there were multiple pump stations within a single service area, the demand was divided evenly between them.

4.3.4 Piping and Infrastructure Sizing Criteria

The hydraulic model is helpful in providing the preliminary sizing of infrastructure such as pump stations, storage ponds, and pipe sizes. These initial models are intended for planning purposes only, and do not constitute a preliminary design plan. Developers should work with the City's EDR and water and sewer department to discuss how new developments fit into the City's overall plan to provide NP irrigation service at acceptable pressures in both new and existing areas. All future infrastructure must comply with the City's Specifications.

As noted previously, each future pump station is modeled with two pumps in parallel. The City's Specifications state that NP pump stations must have a capacity of 120% of peak hour demand. All future pumps are therefore sized where the two pumps are identical, with a combined flow of 120% of the peak hour. An iterative process is used to identify the required design head for these pumps, so that pressure requirements are met downstream.

Per the City's Specifications, NP irrigation mains can be 4-, 6-, or 8-inch, and NP transmission mains can be 10 inch and larger. Per the City's direction, 8-inch will be the smallest pipe size recommended for the City's future NP system. After the meter, developers may use whatever size is required. Additionally, pressures are required to be 70 – 100 psi at each NP irrigation service meter and have a peak flow velocity less than 5 fps and headloss less than 10 ft/1,000 ft. Pipes within the model were sized large enough to meet these pressure and velocity requirements, without incurring extra costs by oversizing. Developers may use any line size that meets the hydraulic requirements described in the City's Specifications.

Ponds are designed to store four days of peak day flow, per the City's Specifications. Storage was calculated using peak day demand to provide preliminary pond sizes for the analysis phase of the project.

Section 5

Existing and Future System Model Evaluation

Existing and future system models were developed to plan for the future NP needs of the City. These models were analyzed for system-wide deficiencies and improvements for the current, the 2025, 2040, and buildout planning horizons. The NP model was incorporated into the potable models for evaluating overall potable and NP water system needs. This Section discusses the way the existing and future systems were analyzed.

5.1 Evaluation Criteria

The existing and future systems were analyzed through a combination of hydraulic modeling in InfoWater and desktop analyses, as discussed on **Section 4**. This section discusses how the various parts of the NP system (such as pipes, pumps, and storage) were evaluated to determine whether existing systems needed improvements and to determine project design points for future systems.

Because the NP system provides primarily irrigation waters, only the peak day was analyzed (which represents peak irrigation season during the summer), using EPS. This is discussed further in **Section 4.2**. Please see **Section 1** for more information on the development of the peak month demands, and **Section 3** for more information on their allocation in the model.

Per the City's Specifications, the NP system must generally provide a pressure between 70 – 100 psi at all meters, and must maintain a velocity of less than 5 fps and headloss of less than 10 ft/1,000 ft in all pipes. While the City's Specifications say that irrigation mains can be as small as 4 inches, it was determined after conversations with the City that all future systems will be designed with a minimum pipe diameter of 8 inches. Additionally, it is considered a best practice to upsize the inlet pipe, from pond to wet well, in order to account for any additional expected demands. A recommended but not required design criteria is to design for less than 6 inches of headloss throughout the length of the pipe. For this NPMP, the inlets were designed for the 10 ft/1,000 ft headloss criteria, which will ensure that the total headloss remains below 6 inches as long as the inlet is less than 50 ft long.

NP pump stations must have a capacity of 120% of the peak hour, per the City's Specifications. The design flow of the future pumps was based on this parameter, and the design head for the future pumps was based on the pressure requirements throughout the modeled system.

Also per the City's Specifications, "ponds shall be sized to accommodate a minimum four (4) days of supply during peak irrigation periods, plus losses." For the NPMP, this means that storage requirements will be 4 times the peak day flow determined, plus 10% for evapotranspiration losses. While 10% losses was used for master planning purposes, developers should ensure that they incorporate calculated losses into their own storage calculations for a design-level report.

Table 5-1 summarizes the evaluation criteria.

Table 5-1 System Evaluation Criteria

Metric	Evaluation Criteria	Comments
Piping		
Pressure	70-100 psi	
Velocity	< 5 fps	
Headloss	< 10 ft / 1,000 ft	
Minimum Main Size	8 inches	Not specified in design criteria, City preference for future
Maximum Inlet Pipe Headloss	6 inches	Not specified in design criteria, good practice
Pumping		
Pumping Capacity	120% of peak hour	
Irrigation Window Assumed	10 hours / day	Not specified in design criteria. For irrigation-only pumps, does not apply to transfer pumps.
Pump Station Layout	No standby pump, however low flow pump required	
Ponds		
Storage Volume	4 times peak day + losses	
Daily Irrigation Application Rate	24 gpm/acre	Peak season metric used in the design of irrigation systems per the City's Specifications. This value is appropriate for areas where the exact irrigated acreage is known but is not appropriate for planning-level estimates of bulk undeveloped land.

5.2 Existing System Evaluation

The existing model was evaluated in both the InfoWater model and through various desktop analyses. The existing model helped identify concerns with pressure and velocity, while desktop analyses helped identify pumps that are at or over capacity and the pond design storage requirements. Existing deficiencies are summarized in **Table 5-2**, and a description of the recommended upgrades and solutions can be found later in this section. For more detailed information on the analysis results for the existing system, including recommended pond sizing, please see **Appendix D**.

The existing system evaluation was limited to the available data on pipe diameters and SCADA data. Refer to **Section 1** for more information about the background data, including the system inventory and SCADA data. Existing pump capacity was based O&M data such as pump curves, along with information from City operators.

The identified deficiencies included possible undersized inlet lines at some areas. However, the inlet pipe size should be confirmed in the field. Another commonly identified deficiency was that in some areas, while the main NP pipelines are sized correctly, the individual taps off to the irrigation systems (which can have diameters as small as 1 inch) are undersized. This produces high velocities and headloss. However, because there is only monthly data available at these taps, rather than hourly data, they may not be experiencing the high peak hours predicted by modeling based on SCADA readings at the pump station and may actually be appropriately sized. (For example, the hourly flows from the pump station have higher peaking factors than the small

diameter tap). If a customer notices low pressure, they may consider upsizing the tap off the mainline to mitigate this issue. Most pump stations (26 out of 34) were found to have sufficient capacity, even through buildout. However, increased NP irrigation adoption may lead to pump stations reaching capacity sooner than expected; flows should be continually monitored to note when pumps are getting close to capacity.

Table 5-2 Summary of Existing System Analysis

Service Area	Pump Station	Existing Capacity (gpm)	Existing Peak Hour Demand (gpm)	Buildout Flow – Peak Hour (gpm)	Comments and Identified Deficiencies
Balsam Park	N/A	290	51	51	No deficiencies were identified for this pump station.
Bella Romero Elementary	N/A	330	109	109	No deficiencies were identified for this pump station.
Bittersweet Park	N/A	1,000	854	1,160	Small diameter pipes may be producing high headloss; limited data is available on pipe sizes. Bringing on all potential conversion areas may cause this pump station to be undersized after 2040. While no improvements are expected to be necessary before 2040, the system should be evaluated as each conversion area is brought on to ensure there is still sufficient capacity.
Boomerang	Boomerang North	1,500	769	769	No deficiencies were identified for this pump station.
	Boomerang South	1,500	694	0	This system is being replaced by the Boomerang Regional Pump Station.
	Boomerang Transfer	1,800	951	621	Some of the Boomerang transfer lines are undersized; this issue will be resolved by the construction of the Boomerang Regional Pump Station.
	Boomerang Regional Pump Station	3,260	N/A	2,716	<i>This new pump station is part of a larger redevelopment project and will replace the existing Boomerang South pump station. This pump station is identified as a CIP project.</i>
	North Ridge Transfer	1,800	936	936	No deficiencies were identified for this pump station.
	North Ridge School	2,700	1,205	1,752	No deficiencies were identified for this pump station.
	Poudre River Ranch	175	205	205	The lines to Poudre River Ranch and the pump station do not meet hydraulic design criteria but do not appear to hinder system performance. While there are no recommended changes, additional demand should not be added to this area without upsizing.
Cottonwood Park	N/A	115	69	69	No deficiencies were identified for this pump station.
Delta Park	N/A	95	52	52	No deficiencies were identified for this pump station.

Section 5 • Existing and Future System Model Evaluation

Service Area	Pump Station	Existing Capacity (gpm)	Existing Peak Hour Demand (gpm)	Buildout Flow – Peak Hour (gpm)	Comments and Identified Deficiencies
East Memorial	N/A	319	314	440	Bringing on all potential undeveloped and conversion areas may cause this pump station to be undersized after 2040. While no improvements are expected to be necessary before 2040, the system should be evaluated as each new area is brought on to ensure there is still sufficient capacity.
Glenmere Park	N/A	180	135	304	The inlet may be undersized; inlet pipe size data was not available for this system. Bringing on all potential conversion areas may cause this pump station to be undersized after 2040. While no improvements are expected to be necessary before 2040, the system should be evaluated as each conversion area is brought on to ensure there is still sufficient capacity.
Greeley West Park ¹	N/A	2,000	72	861	No deficiencies were identified for this pump station.
Highland Hills Golf	N/A	2,001	1,792	1,792	No deficiencies were identified for this pump station.
Island Grove and Saddle Club	Island Grove West	600	605	605	No deficiencies were identified for this pump station.
	Island Grove East	700	401	401	No deficiencies were identified for this pump station.
	Saddle Club	300	72	138	No deficiencies were identified for this pump station.
Jackson Field Sports	N/A	400	258	317	No deficiencies were identified for this pump station.
Josephine Jones Park	N/A	115	106	161	Bringing on all potential conversion areas may cause this pump station to be undersized after 2040. While no improvements are expected to be necessary before 2040, the system should be evaluated as each conversion area is brought on to ensure there is still sufficient capacity.
Linn Grove Cemetery	N/A	350	95	122	No deficiencies were identified for this pump station.
Luther Park	N/A	530	492	498	The small pipe diameter (4") at the outlet does not meet hydraulic design criteria; while this does not hinder system performance, it should be monitored as demands on the system increase to ensure the wet well is still able to receive sufficient water.
Madison Elementary and Houston Gardens	Houston Gardens	125	310	310	While this system appears to be operating over the pump design head, it does not hinder system performance, as this system is designed for low pressures.
	Madison Elementary	500	90	93	No deficiencies were identified for this pump station.

Service Area	Pump Station	Existing Capacity (gpm)	Existing Peak Hour Demand (gpm)	Buildout Flow – Peak Hour (gpm)	Comments and Identified Deficiencies
Monfort	N/A	2,400	1,423	1,745	The inlet is slightly undersized (10" diameter); while this does not hinder system performance, it should be monitored as demands on the system increase to ensure the wet well is still able to receive sufficient water.
Peakview Park	Mosier Hill	800	681	681	The pipes at Peakview Park have a small diameter (as low as 4") and do not meet hydraulic design criteria. Although this does not appear to significantly hinder system performance, the City may consider upsizing if other work is already being done in this area.
Promontory Park	Main	2,100	1,270	1,866	No deficiencies were identified for this pump station.
	Transfer	1,600	1,651	1,651	While this pump station sometimes operates slightly over its design flowrate, it is not significant enough to warrant upsizing. If additional demands in this area increase transfer station operations, expanding the length of time the transfer station operates each day will likely maintain an acceptable flowrate.
Ramseier	N/A	450	734	739	Additional evaluation of this site is needed as outlet pipe size and SCADA data were not available. While current modeling shows that the system is operating over the design head, the peaking factor may be lower than the system-wide diurnal curve, resulting in lower peak demands.
Sanborn Park	N/A	500	268	289	Small diameter lines may be causing high headloss; limited data is available on pipe sizes.
St. Michaels	N/A	1,120	1,121	1,167	This pump station may be undersized. Additional evaluation should be conducted to determine if demand management is effective and whether the pumps can be upsized without replacing the entire station.
Tech Center	N/A	N/A	N/A	N/A	This area is currently only served by a shoulder tap. A pump station is necessary to transition it to NP irrigation (future service area SA-14).
Youth Sports Center	Youth Sports	1,200	941	941	The inlet line does not meet hydraulic design criteria but does not appear to hinder system performance. This line should be evaluated as each new area is brought on to ensure there is still sufficient capacity.
	Twin Rivers Park	4,200	1,314	1,692	No deficiencies were identified for this pump station.

¹ Greeley West Park is planned for replacement before 2025. The values shown in the table represent the design for the new pump station.

5.3 Future System Evaluation by Planning Horizon

This section provides an overview of the preliminary results for sizing the pipes, pumps, and ponds to meet the design and evaluation criteria described above. For details on the sizing for each pump station, please see **Appendix E**. A map of all pump stations by planning horizon is shown in **Figure 5-1**. **Table 5-3** summarizes the proposed infrastructure (such as pipes and pump stations) by planning horizon. Only major piping (8 inches and larger) is accounted for in this plan. Detailed distribution piping will be per developer, City water and sewer department, and/or parks department plans. For some systems, it is expected that their pipelines will be expanded after construction as development occurs. For example, the pump station will be constructed to serve a smaller area, then the pipes will be expanded as development continues. It was assumed that pump stations will only be constructed after 20% of the potential buildout demand is met. The City should work with developers to determine best timing for construction of a new pump station as development projects become planned. All proposed projects described below were found feasible using the InfoWater methodology described in **Section 4**, but further design and confirmation is required for each system before construction.

Table 5-3 Proposed Infrastructure by Planning Horizon

Planning Horizon	Pump Stations ¹	Storage in Ponds (AF)	New Pipeline (ft) by Diameter					
			8-inch	10-inch	12-inch	16-inch	30-inch	Total
Existing	37	Unknown	23,100	17,600	12,200	3,400 > 12"		90,000
2025	5	35.1	21,800	18,500	0	19,000	26,700	86,000
2040	10	28.1	26,900	11,500	0	8,200	0	46,600
Buildout	18	75.7	28,300	1,000	200	14,800	0	44,300
Total New	33	139.0	77,000	31,000	200	42,000	26,700	150,200

¹ All new pump stations are expected to have a pond.

All existing and planned future pump stations are shown in **Figure 5-1**. Pump station locations and pipeline alignments are approximate and schematic.

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5.3.1 2025 System Evaluation

The 2025 planning horizon includes improvements to the existing system. The improvements include new pump stations in areas that are already developed (but may experience conversion or infill) and new pump stations in areas that are expected to develop by 2025, especially planned developments. In total, 4 new pump stations are expected by the 2025 planning horizon. Please see **Table 5-4** and **Appendix E** for detailed information on these pump stations. The following are notable projects that are expected to be completed by 2025:

- Upper Equalizer Project¹. This project will expand NP service further into the shoulder seasons by transferring water from the Greeley Irrigation Company (GIC) to the GLIC ditches. The proposed piping will be routed along 83rd Avenue.
- Boomerang Regional Pump Station. This project will be part of a larger project, which involves redevelopment of the southern 9 holes of the Boomerang Golf Course, construction of a new school, and residential development. The piping from the Boomerang Regional Pump Station is expected to serve far to the west, including past 95th Avenue.
- Upsizing of the Greeley West pump station to serve the Centerplace development, as well as other conversion and infill areas.
- Construction of a pump station to serve the Tech Center and adjacent undeveloped areas.
- Expansion of piping (new pipeline) from Glenmere Park along 8th Avenue to serve additional conversion and infill areas.
- Expansion of piping (new pipeline) from Promontory Park along 16th Street to serve newly developing areas.
- Expansion of piping (new pipeline) from Monfort along 47th Avenue to serve additional conversion and infill areas.
- Expansion of piping (new pipeline) from Twin Rivers Park to the west to serve additional conversion and infill areas.

5.3.2 2040 System Evaluation

The 2040 planning horizon includes 12 new pump stations, primarily in areas that are currently undeveloped. In particular, eight new pump stations are expected in the North of the River area due to potential NP demands through that area starting after 2025. However, very limited development is expected in this area until full buildout. The City may consider constructing the NP distribution pipe system but waiting to put in pump stations until there is further development in the area, similar to how the Tech Center was constructed. The following are notable projects that are expected to be completed between 2025 and 2040:

¹ Supply-side projects such as the Upper Equalizer Project were not studied as part of the NPMP, which was focused on the expansion of the distribution system.

- Westward expansion of pipelines from the Tech Center. It is expected that the southernmost 6 inch existing NP lines along the southern edge of the Tech Center are not sized large enough to handle the additional flows and will need to be either upsized or paralleled. The City may decide to complete this project when the new SA-14 pump station is constructed, depending on future development.
- Construction of a regional pump station west of St. Michaels (Cobblestone Regional).

Table 5-4 and **Appendix E** summarize these and other projects.

5.3.3 Buildout System Evaluation

The buildout planning horizon includes 19 new pump stations in areas that are either not expected to have any development, or have less than 20% development, until after the year 2040. The locations of these pump stations were based on even spacing throughout the LREGA, in coordination with the City's parks department. These locations are not final and should be coordinated with the construction of new parks or open spaces, where the ponds can serve as an amenity. **Table 5-4** and **Appendix E** summarize these and other projects.

Table 5-4 Future System Information

Pump Station Name	Planning Horizon	Pump Station Design		PS Outlet Size (in)	Pond Size (AF) ¹
		Flow (gpm)	Head (ft)		
SA-14	2025	3500	230	16	13.4
SA-25	2025	640	160	8	2.4
SA-44	2025	660	160	8	2.5
SA-60	2025	1120	200	10	4.2
Boomerang Regional PS	2025	3260	170	16	12.5
SA-3	2040	620	160	8	2.3
SA-4	2040	240	180	8	0.9
SA-12	2040	1160	210	10	4.4
SA-15	2040	1400	170	10	5.3
SA-16	2040	1040	180	10	4.0
SA-34	2040	560	170	8	2.1
SA-35	2040	620	160	8	2.3
SA-36	2040	900	170	8	3.4
SA-38	2040	160	180	8	0.5
SA-42	2040	720	180	8	2.7
SA-0	2075	780	170	8	3.0
SA-1	2075	780	170	8	3.0
SA-2	2075	660	180	8	2.5
SA-5	2075	620	170	8	2.4
SA-6	2075	360	180	8	1.4
SA-10	2075	1000	170	10	3.8
SA-13	2075	1220	170	10	4.6
SA-30	2075	440	155	8	1.7

Pump Station Name	Planning Horizon	Pump Station Design		PS Outlet Size (in)	Pond Size (AF) ¹
		Flow (gpm)	Head (ft)		
SA-41	2075	1120	160	10	4.3
SA-46	2075	1120	160	10	4.2
SA-47	2075	960	170	10	3.7
SA-48	2075	1040	170	10	4.0
SA-49	2075	1120	170	10	4.2
SA-50	2075	1540	170	12	5.9
SA-51	2075	2500	180	16	9.6
SA-52	2075	1300	170	10	5.0
SA-53	2075	1820	170	12	6.9
SA-57	2075	1480	200	16	5.7

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Section 6

Capital Improvement Plan

6.1 Approach to CIP Development

This Section builds on the capital improvement projects identified in **Section 5** at the 2025 and 2040 planning horizons and defines the approach for development of the 5-year and 20-year CIPs. The identified CIPs were developed with consideration of the City's current and long-range population as well as projected flows, using currently available information. Conditions will change with time and uncertainties will impact the accuracy of each plan in later years. As projects come closer to implementation, it is important that the City reevaluate each CIP to better reflect costs.

This section provides planning level cost estimates for capital improvement project scheduling. Major capital elements are itemized with unit prices. Information from past projects and outside resources, both locally and nationwide, were relied upon to develop unit prices for major capital categories. CIP projects were developed using pipeline quantity estimates and modeling data. GIS mapping was used to identify areas of interest, such as utilities and road crossings. The unit prices were then multiplied by the quantity of each element. Project elements that are difficult to estimate during the planning stage are included in the overall cost as either allowances or as a percentage of the total for the itemized project elements. During design development, the more specific data will be used to inform the design and resulting project cost estimate.

6.2 Cost Development

Unit costs were developed to aid in CIP budgeting, as described below. Cost estimating is considered Association for the Advancement of Cost Engineering (AACE) Class 5 – Conceptual engineering phase.

6.2.1 Project Implementation and Additional Project-Related Costs

Apart from the unit costs used to build-up project material costs (e.g., pipes, pumps, and ponds), several other elements were added as factors. Construction factors include items such as erosion control/stormwater pollution prevention and contractor mobilization and demobilization. These costs are estimated as a percentage of the construction unit costs. Contingency is applied to the subtotal of these construction cost elements to account for variations in unit prices or quantity estimates. Programmatic elements such as engineering, permitting, legal, and administration are estimated as a percentage of the construction cost. **Table 6-1** provides a breakdown of the assumptions used for project implementation and contingency.

Table 6-1 Costing Factors for Construction Bid and Total CIP Project Costs

Category	Item	Costing Factor
Construction Bid Cost (includes infrastructure and contractor overhead, profit, bonds, and insurance)	Erosion Control/Stormwater Pollution Prevention ¹	2%
	Mobilization and Demobilization ¹	5%
	Contingency ²	35%
Project Implementation ³	Feasibility and Site Studies	9% for OPCC ≤ \$1 million 6% for OPCC of \$1 million to \$10 million 5% for OPCC > \$10 million
	Preliminary and Final Design	9% for OPCC ≤ \$1 million 6% for OPCC of \$1 million to \$10 million 5% for OPCC > \$10 million
	Engineering Services During Construction	5%
Additional Project-Related Costs ³	Outside Construction Management - not used if OPCC value is < \$1M	5%
	Outside Project Management - not used if OPCC value is < \$1M	3%

¹ Construction bid cost costing factors erosion control/stormwater pollution prevention and mobilization and demobilization are applied to the subtotal of unit cost items.

² Contingency costing factor is 35% of the subtotal of the unit cost items, erosion control/stormwater pollution prevention, and mobilization and demobilization.

³ Project implementation and additional project-related cost factors are applied to the total construction cost.

6.2.1.1 Erosion Control/Stormwater Pollution Prevention

Project erosion control and stormwater pollution prevention includes the contractor's cost to manage the stormwater during construction through best management practices such as silt fences, rock socks, vehicle tracking, and silt prevention at storm inlets. This category is assumed as 2% of the unit costs and is based on estimator's judgement. This costing factor is added to calculate project OPCC totals.

6.2.1.2 Mobilization and Demobilization

Contractor Mobilization and Demobilization includes the contractor's start-up costs and close-out costs. Start-up costs include items such as moving equipment and personnel to the project location, obtaining permits and bonds, etc. Close-out costs include items such as project cleanup, moving equipment and personnel from the project location, etc. The mobilization and demobilization category is estimated as 5% of the unit costs and is based on estimator's judgement. This costing factor is added to calculate project OPCC totals.

6.2.1.3 Contingency

During the planning phase, the design and field work has not yet been completed for the projects. Therefore, the cost development relies on estimated quantities for each construction element. Project contingency provides for these uncertainties by adding additional costs to the project total. The contingency at the planning level is typically 35% of the OPCC subtotal after the erosion

control/stormwater pollution prevention and mobilization and demobilization costing factors have been included. Project contingency also provides for costs associated with items that are difficult to itemize at a planning level.

6.2.1.4 Feasibility and Site Studies

This cost element includes the planning and field investigations (such as geotechnical, survey, ground sampling, subsurface utility engineering [SUE] and locates, etc.) that are required to implement a project. These are estimated as a percentage of the subtotal of the previous elements and the percentage varies based on the OPCC, plus cost contingency.

6.2.1.5 Preliminary and Final Design

The preliminary and final design cost element includes the cost for engineering services to develop biddable plans and specifications in accordance with applicable standards. This cost is estimated using a percentage of the OPCC, plus cost contingency.

6.2.1.6 Engineering Services During Construction

Engineering services during construction includes the review of contractor submittals, requested changes, and design adjustments that may be required during construction. A percentage of the OPCC is used to estimate this cost element.

6.2.1.7 Additional Project-Related Costs

Outside construction and project management are estimated for projects that are not directly managed by the City. For purposes of this master plan, only projects in excess of \$1 million were assigned these cost elements.

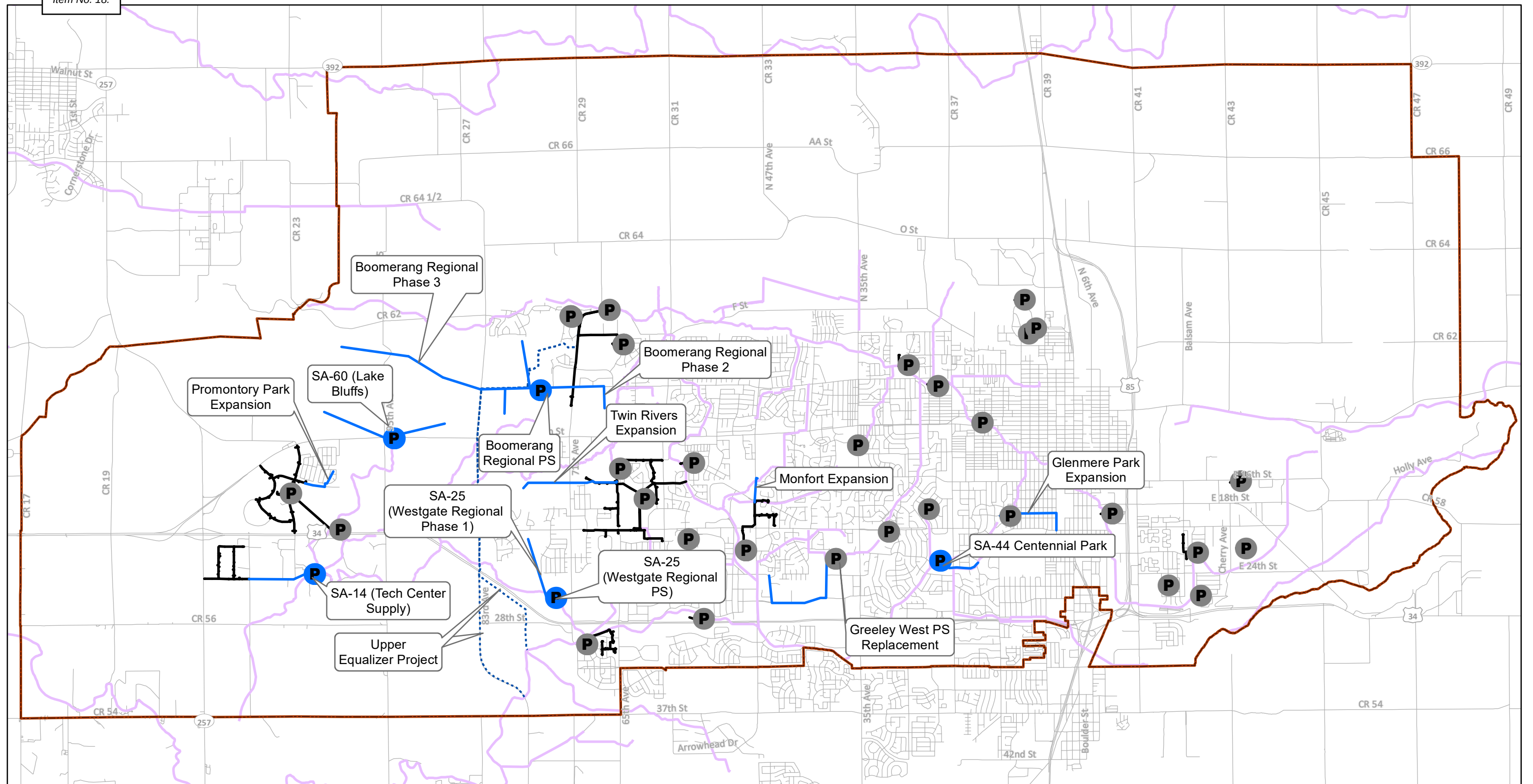
6.3 Identified CIP Projects

Projects are forecast over 5-years (for projects for 2022 through 2025) and 20-years (for projects for 2026 through 2040). Projects were named based on geographic location and service area number. Construction and total project costs were developed for the projects and are described in the following figures and tables.

Figures 6-1 and **6-2** illustrate the locations of the identified projects within the 5-year and 20-year CIPs respectively. For development driven projects, the City will negotiate with developers the cost difference for the installation of a larger pipe diameter or for additional pipe lengths to meet future needs versus the developer's needs.

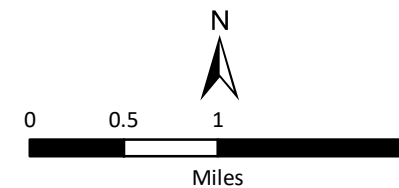
Table 6-2 provides a summary of project drivers. This summary identifies a driver as an existing deficiency or population growth driven, and also whether the project is proposed to be constructed by the City's water and sewer department, the City's parks department, or by developers. In many cases, project costs may be shared between some or all of these three entities. It is assumed that costs will be divided proportionately, based on future demands. Stakeholders for any given NP project should collaborate to develop cost sharing for projects that would mutually benefit all responsible parties.

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Legend

- LREGA
- P Existing Pump Station
- P 2025 Pump Station
- Existing NP Pipes
- 2025 Proposed NP Pipes
- Greeley Ditch
- Upper Equalizer Project

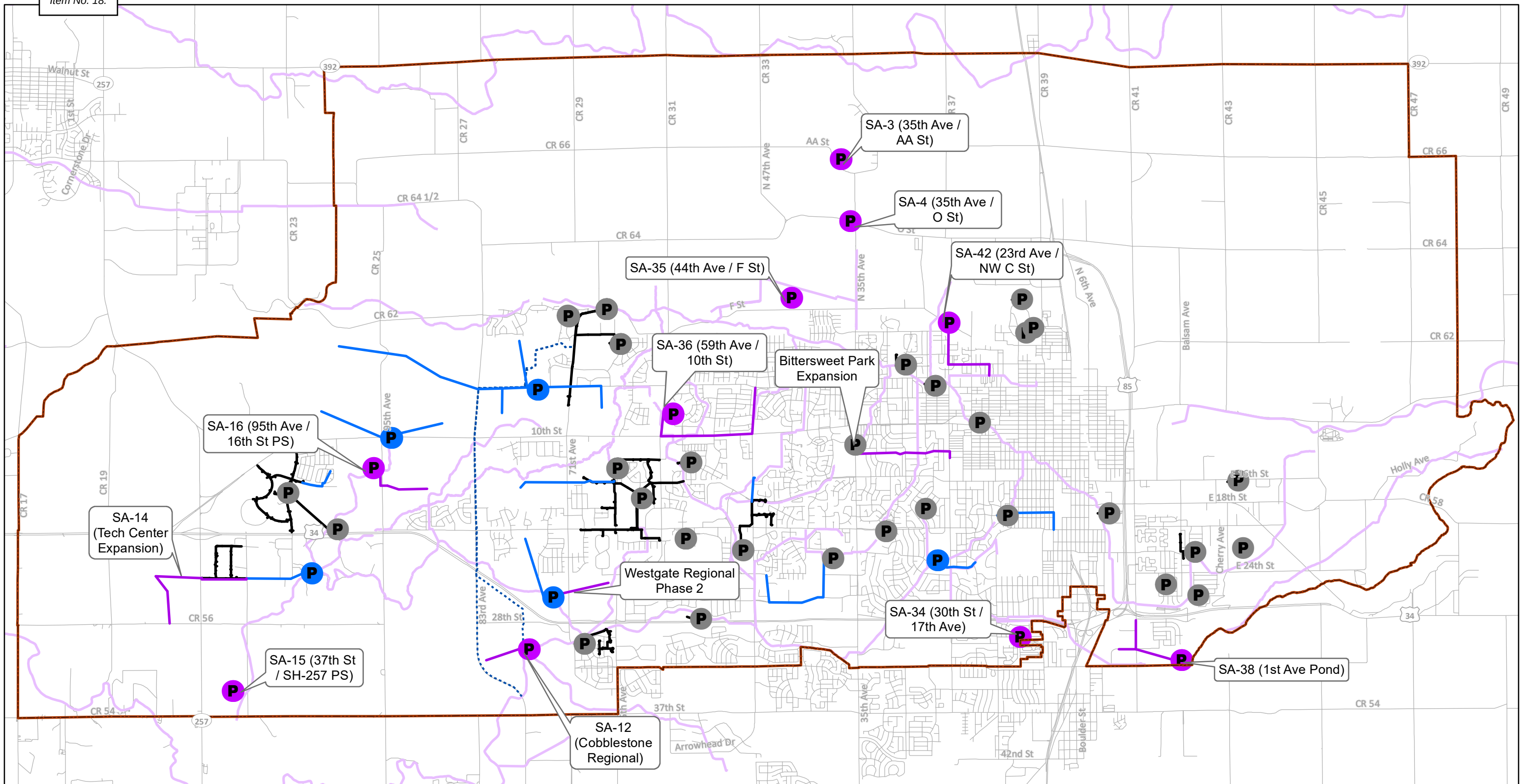


Recommended 5 Year Improvements

Figure 6-1

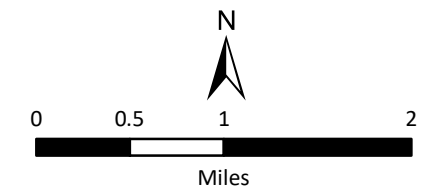
Greeley Non-Potable Water
System Master Plan

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Legend

- LREGA
- Existing Pump Station
- 2025 Pump Station
- 2040 Pump Station
- Existing NP Pipes
- 2025 Proposed NP Pipes
- 2040 Proposed NP Pipes
- Greeley Ditch
- Upper Equalizer Project



Recommended 20 Year Improvements
Figure 6-2
Greeley Non-Potable Water
System Master Plan

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Table 6-2 Project Information

Projects	Project Driver	Funding Source ¹	Planning Start Year ²	Design Start Year ²	Construction Start Year ²	OPCC ³	Total Cost ³	City of Greeley Water/Sewer	City of Greeley Parks	Development
5-Year Planning Horizon										
SA-44 Centennial Park	Service Expansion	W/S, Parks, Dev	2020	2021	2022	\$4,020,000	\$5,030,000	\$3,488,100	\$1,379,300	\$162,600
Boomerang Regional Pump Station	Service Expansion	W/S, Parks, Dev	2021	2021	2022	\$5,530,000	\$6,920,000	\$221,300	\$694,000	\$6,004,700
Boomerang Regional Phase 2	Service Expansion	W/S, Parks, Dev	2021	2021	2022	\$1,830,000	\$2,390,000	\$76,400	\$239,700	\$2,073,900
Greeley West Pump Station Replacement	Service Expansion	W/S, Dev	2021	2022	2023	\$5,970,000	\$7,470,000	\$6,161,400	-	\$1,308,600
Upper Equalizer Project	Shoulder Season Extension	W/S	2022	2023	2024	\$20,010,000	\$25,620,000	\$25,620,000	-	-
SA-14 Tech Center Supply	Service Expansion	W/S, Dev	2024	2025	2026	\$4,560,000	\$5,930,000	\$17,100	-	\$5,912,900
Promontory Park Expansion	Service Expansion	Development	2024	2025	2026	\$580,000	\$720,000	-	-	\$720,000
Monfort Expansion	Service Expansion	W/S, Parks, Dev	2024	2025	2026	\$400,000	\$500,000	\$245,300	\$76,000	\$178,700
Twin Rivers Expansion	Service Expansion	W/S, Parks, Dev	2024	2025	2026	\$1,830,000	\$2,390,000	\$1,172,400	\$363,300	\$854,300
SA-38 1st Ave Pond	Service Expansion	W/S, Dev	2024	2025	2026	\$2,760,000	\$3,590,000	\$2,881,600	-	\$708,400
SA-25 Westgate Regional Pump Station	Service Expansion	W/S, Parks	2025	2026	2027	\$2,130,000	\$2,670,000	\$2,038,415	\$631,585	-
SA-25 Westgate Regional Phase 1	Service Expansion	Dev	2025	2026	2027	\$900,000	\$1,160,000	-	-	\$1,160,000
SA-60 Lake Bluffs	Service Expansion	W/S, Dev	2025	2026	2027	\$4,650,000	\$6,050,000	\$57,000	-	\$5,993,000
5-Year Subtotal						\$55,170,000	\$70,440,000	\$41,979,015	\$3,383,885	\$25,077,100
20-Year Planning Horizon										
SA-34 30th St/17th Ave	Service Expansion	W/S, Parks, Dev	2027	2028	2029	\$2,300,000	\$2,880,000	\$1,932,500	\$281,200	\$666,300
Boomerang Regional Phase 3	Service Expansion	W/S, Parks, Dev	2028	2029	2030	\$6,150,000	\$8,000,000	\$255,900	\$802,300	\$6,941,800
SA-4 35th Ave/O St	Service Expansion	W/S, Dev	2028	2029	2030	\$1,000,000	\$1,170,000	\$262,400	-	\$907,600
SA-3 35th Ave/AA St	Service Expansion	Development	2029	2030	2031	\$1,750,000	\$2,190,000	-	-	\$2,190,000
Bittersweet Park Expansion	Service Expansion	W/S, Parks, Dev	2029	2030	2031	\$2,520,000	\$3,160,000	\$2,475,181	\$684,819	-
SA-35 44th Ave/F St	Service Expansion	W/S, Parks, Dev	2030	2031	2032	\$2,060,000	\$2,580,000	\$166,000	\$658,300	\$1,755,700
SA-36 59th Ave/10th St	Service Expansion	W/S, Parks, Dev	2031	2032	2033	\$6,550,000	\$8,190,000	\$3,810,800	\$2,569,500	\$1,809,700
SA-16 95th Ave/16th St	Service Expansion	W/S, Parks, Dev	2034	2035	2036	\$4,040,000	\$5,260,000	\$205,300	\$610,300	\$4,444,400
SA-14 Tech Center Expansion	Service Expansion	W/S, Dev	2035	2036	2037	\$2,660,000	\$3,460,000	\$10,000	-	\$3,450,000
SA-15 37th St/SH-257 Pump Station	Service Expansion	Development	2036	2037	2038	\$3,100,000	\$3,880,000	-	-	\$3,880,000
SA-12 Cobblestone Regional	Service Expansion	W/S, Dev	2037	2038	2039	\$3,270,000	\$4,260,000	\$48,500	-	\$4,211,500
Glenmere Park Expansion	Service Expansion	W/S, Parks, Dev	2037	2038	2039	\$1,690,000	\$2,200,000	\$1,427,916	\$603,228	\$168,856
SA-25 Westgate Regional Phase 2	Service Expansion	W/S, Dev	2038	2039	2040	\$950,000	\$1,220,000	\$857,400	-	\$362,600
SA-42 23rd Ave/NW C St	Service Expansion	W/S, Parks, Dev	2039	2040	2041	\$4,630,000	\$6,030,000	\$2,513,300	\$1,421,100	\$2,095,600
20-Year Subtotal						\$42,670,000	\$54,480,000	\$13,965,198	\$7,630,746	\$32,884,056
Total						\$97,840,000	\$124,920,000	\$55,944,212	\$11,014,631	\$57,961,156

August 2020 dollars as adjusted by ENR-CCI were used for project OPCCs, total costs, and project fund allocations – City of Greeley Water and Sewer Department, City of Greeley Parks Department, and Development.

¹ W/S: City of Greeley water and sewer department, Parks: City of Greeley parks department, Dev: Development

² Project planning, design, and construction years are subject to change pending future project updates, development of projects, and/or schedule changes.

³ OPCC and total costs per project are subject to change pending future project updates, development of projects, and/or schedule changes.

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6.4 CIP Implementation Schedule

Projects identified in the 5-year and 20-year planning horizons were given projected planning, design, and construction start years to help the City schedule project implementation. Annual fiscal requirements from 2021 through 2042 are shown in **Figure 6-3**.

For scheduling purposes, 5-year improvements were identified from 2022 through 2027, based on design start year, while 20-year improvements were identified from 2028 through 2042. NP projects are usually considered lower priority than water, sewer, or transportation projects so they were generally moved in time to match other nearby projects. It was assumed that each stage (planning, design, and construction) will take at least one year with the construction phase taking two, three, or four years if the total CIP cost for a project was greater than \$1 million, \$5 million, or \$10 million, respectively.

Estimated start years for each planning horizon were adjusted based on the following factors:

- **Water and Sanitary Sewer Improvements.** When applicable, start years of NP projects were adjusted to align with major water and sanitary sewer improvements.
- **Transportation Improvements.** When applicable, start years were adjusted to coincide with major transportation improvements identified as part of the City's Keep Greeley Moving Phase 2 initiative (City of Greeley, 2021).
- **Scheduling.** When applicable, start years were adjusted based on needed prioritization of projects.
- **Funding.** Projects were staggered as needed to balance funding requirements.

If a project start year was shifted, the project is left within its original 2025 or 2040 planning horizon for modeling and analysis purposes but will appear in the correct 5- or 20-year CIP total. Note that the Upper Equalizer Project has major outlays between 2024 and 2028 resulting in higher CIP budgets over that timeframe.

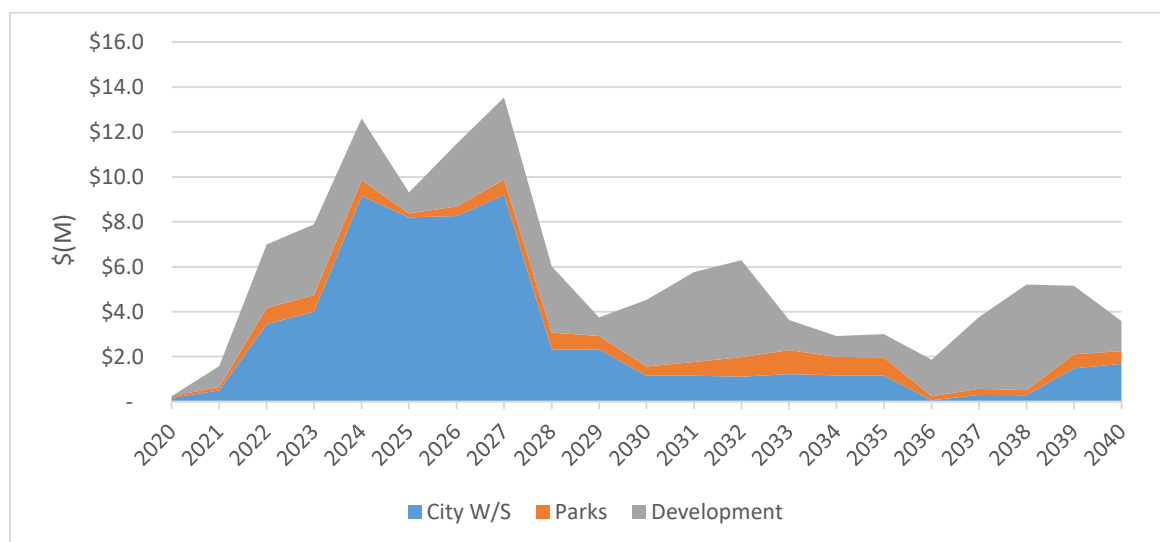


Figure 6-3 Annual NP Funding Projections by Fund

CIP costs are August 2020 dollars from ENR-CCI.

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Section 7

Findings and Recommendations

The findings and recommendations summarized in this section have been drawn from the planning and evaluation sections of this NPMP. The recommendations identify system needs, actions, and capital improvements through the buildout planning horizon. However, the actual implementation time frame will depend on actual growth rates, order of development, and the level of available capital funding. Additionally, the actual scope and implementation of these recommendations may vary with detailed planning and design.

7.1 Key Findings

Key findings identified as part of the NPMP include the following:

- Discussions with other Front Range stakeholders revealed that the City has a unique and advanced NP irrigation system, particularly for raw water suppliers. For more information, see **Section 2.1**.
- Historically, comprehensive data collection has often been difficult for the NP system. Additional studies or data collection, along with more standardized record keeping practices, can help the City keep track of the overall system. Record keeping practices could include recording ditch laterals in GIS, updating and enforcing construction drawing standards, creating a system for regularly updating the NP GIS database, and/or installing SCADA systems. For more information, see **Section 2.4** and **Section 2.5**.
- Review of historical demands showed that NP usage varies annually by significant amounts. In particular, demand dropped significantly as parks transitioned to improved control systems. Future NP demands are expected to come from two sources: 1) undeveloped lands that will use NP irrigation when they develop, and 2) existing areas that will convert to NP irrigation, referred to as conversion areas. NP peak season demands are expected to increase by 1.1 MGD by 2025, 2.8 MGD by 2040, and 11.5 MGD by buildout. NP adoption is strongly influenced by policy, which is a key conservation measure. For more information, see **Section 3**.
- Some of the existing systems were identified as needing improvement, but no critical deficiencies were identified. These include areas that are expected to have undersized inlet lines, pipes, or pumps by buildout. For more information, see **Section 5.2**.
- New recommended CIP projects were identified. These primarily consist of new pump stations or expansions of existing pipe systems to serve new areas and customers. New pump stations will be constructed primarily by development. It is estimated that the system will need 4 new pump stations by 2025, 12 new pump stations between 2025 and 2040, and 19 new pump stations between 2040 and buildout. For more information, see **Section 5.3**.

7.2 Recommendations

The recommendations for the NPMP include the following:

- Implement and enforce an NP policy to promote and expand NP irrigation practices. It is recommended for this policy to mandate that new developments and redevelopments use NP irrigation and for the policy to generally encourage the growth of the NP system.
- Consider implementing improved operational practices at existing pump stations either when it becomes necessary, or during other construction, such as rehabilitating a park irrigation system. This can include increasing the watering window to reduce peak hour demands by decreasing the size of irrigation zones and implementing SCADA where not currently installed. It is recommended for customers to use a watering window of 10 hours a day, where possible, and to use the best landscaping practices included in **Appendix F**.
- Create new standards for data collection and record keeping. This can include enforcing standards related to construction record drawings, developing and maintaining an internal record-keeping system, creating a plan for regularly updating the GIS database, and/or implementing a CMMS for NP infrastructure. It is also recommended for the City to conduct a study of ditches and laterals throughout the LREGA, and/or require developers to include this data in their plans.
- Implement and enforce requirements for the installation of SCADA systems at new or rebuilt pump stations. The City may consider including SCADA requirements in the City's Specifications.
- Continue monitoring and recording demands and pump station flows to identify major changes in operations that may impact system performance.
- Continue maintenance of the InfoWater model. This can include adding new pipes, deleting abandoned pipes, tracking open and closed valves, and reflecting operational changes as the system continues to expand.
- Evaluate the St. Michaels pump station to determine whether additional construction is needed at this site to meet higher demands. This evaluation should determine whether demand management could be an effective solution, and whether the pumps can be upsized without replacing the entire pump station.
- Coordinate this NPMP with other relevant planning documents, such as the WTDMP, SSMP, *Imagine Greeley Comprehensive Plan*, and BBC report. It is recommended to use this NPMP as a guide for infrastructure planning and to use the BBC report as a guide for water resources planning.
- Continue building the NP system through a hub-and-spoke approach. Consider looping or connecting systems where systems are on similar hydraulic grade lines and looping would improve operational flexibility.

- In areas with limited or interim development, require the construction of NP infrastructure, such as piped irrigation system, even if a pump station will not be constructed until later.
- New pipe and pump station layouts are conceptual in nature and are primarily intended to show hydraulic feasibility for master planning purposes. Conduct a detailed evaluation of pipe alignment and size, and pump station location and sizing as projects move into design and implementation stages when there is more certainty of development and design criteria. The InfoWater model can be used as a tool to support future planning decisions, if regularly maintained.
- Complete the capital improvements recommended in **Section 6**, prioritizing the 5-year CIP recommended projects. Coordinate closely with the City's parks department, other utilities, and developers to regularly update the scheduling of these projects. The City should consider using the InfoWater model as a tool to inform developer plans while coordinating with them.
- Update the NPMP every 5 years, including reevaluating demand and population projections every 5 to 10 years. Planning assumptions made for the NP system in the next 20 years and beyond is subject to change with time.

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Section 8

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Appendix A

Field Inventory Summaries

The following table summarizes the infrastructure identified and recorded as part of the field inventory conducted for the NPMP.

Asset Type	Number of Items Surveyed
Air release valve	19
Augmentation water discharge	1
Backflow preventer	1
Blow off	57
Control panel building	1
Curb stop valve	13
Ditch-point	14
Drain valve	7
Flume level sensor	1
Flush pit	3
Head gate	24
Manhole	4
Meter	131
Pond	20
Pressure release valve	1
Pump	71
Settling vault	1
Tracer wire	38
Truck fill	2
Valve	263
Weir	6
Well	9

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Appendix B

Naming System

The following table captures the naming system used to record infrastructure identified as part of the field inventory for the NPMP.

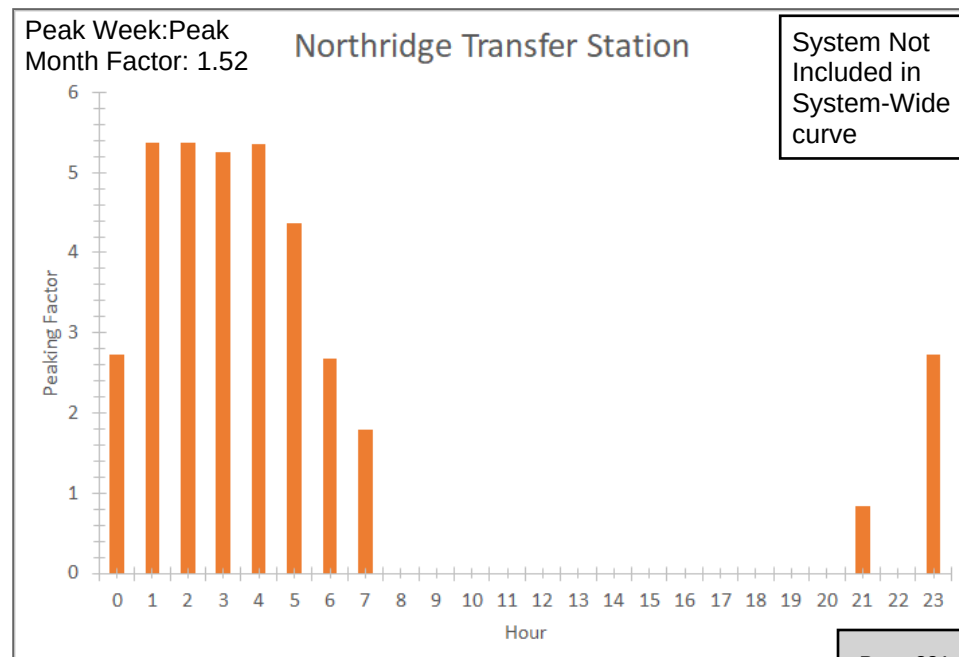
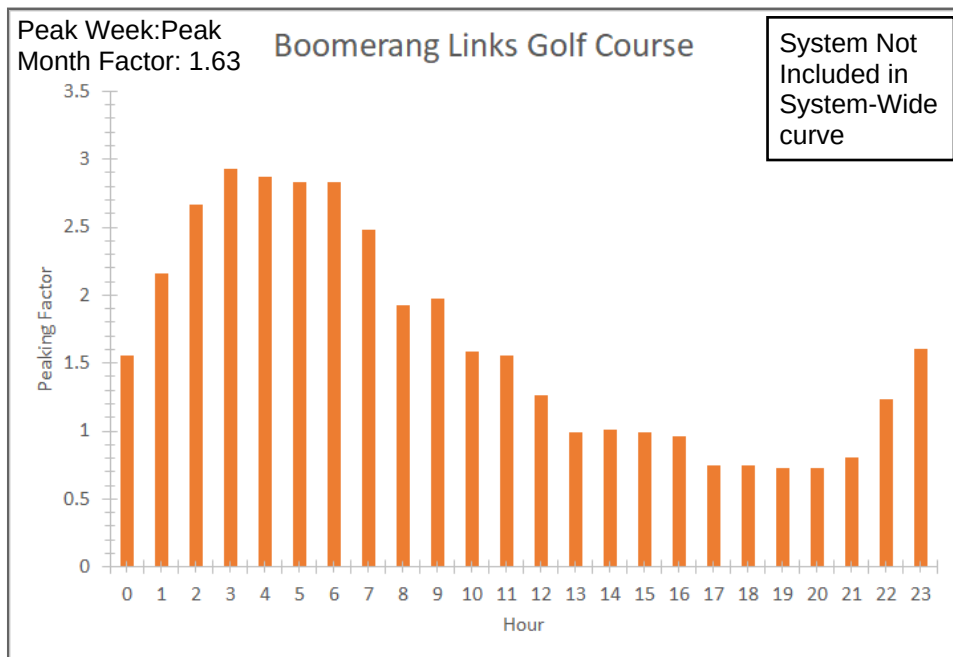
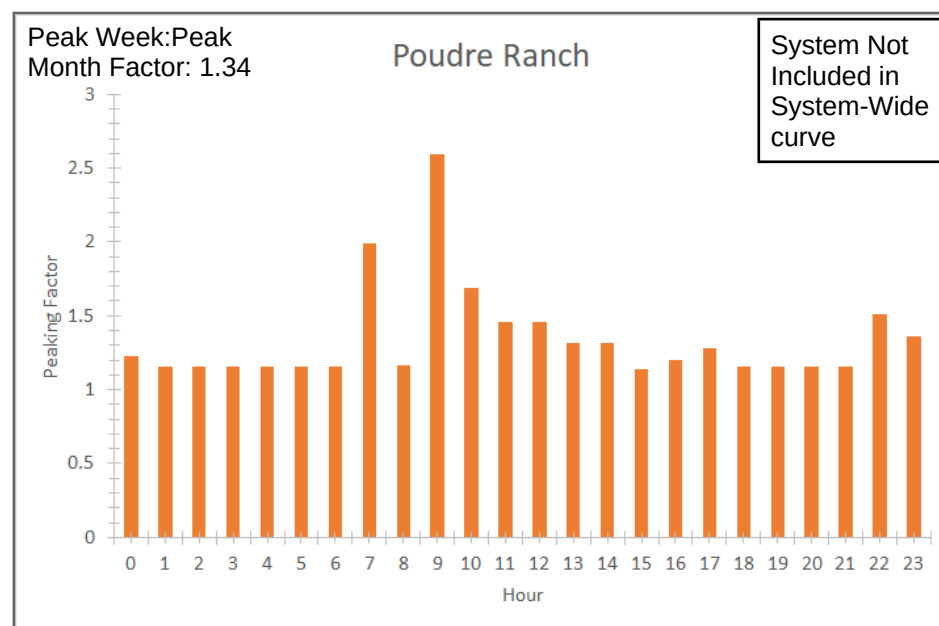
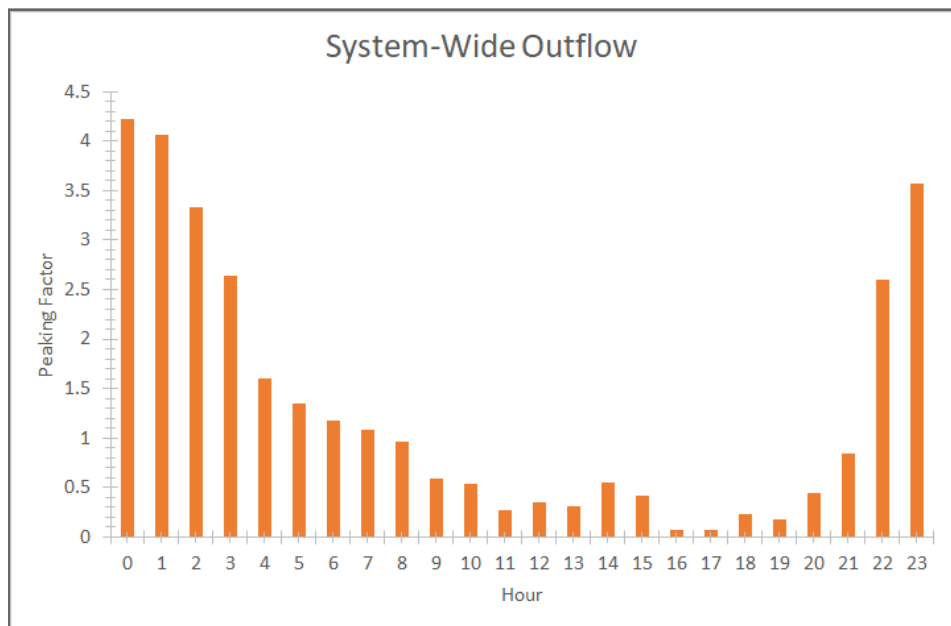
System	Location	Asset Type
NP-Non-Potable Water	BG-Boomerang Golf	WEL-Well
	BP-Bittersweet Park	MET-Meter
	BS-Balsam Sports	PMP-Pump
	CW-Cottonwood Park	VAL-Valve
	DP-Delta Park	FPT-Flush Pit
	EM- East Memorial	HGT-Head gate
	GM-Glenmere Park	MNH-Man Hole
	GW-Greeley West Park	FLF-Filter Flush
	HH-Highland Hills Golf	PND-Pond
	IG- Island Grove Park	PPL-Pump Panel
	JF-Jackson Field Sports	TKF-Truck Fill
	JJ-Josephine Jones Park	TRW-Tracer Wire
	LG-Linn Grove	SVT-Settling Vault
	LP-Luther Park	ARV-Air Relief Valve
	ME-Madison Elementary	CSV-Curb Stop Valve
	MF-Monfort Elementary	BOF-Blow Off
	NR-North Ridge School	PRV-Pressure reducing valve
	PM-Promontory Park	WER- Weir
	PP-Poudre Ponds	BFP-Backflow Preventor
	PV-Peak View Park	BDT-Boyd Ditch
	RE- Romero Elementary	ADS-Augmentation Discharge
	RP-Ramseier Park	
	SM-Saint Michaels	
	SP-Sanborn Park	
	TC-Tech Center	
	WP-Waggin Tail Dog Park	
	YS-Youth Sports Complex	
	TR-Twin Rivers Park	

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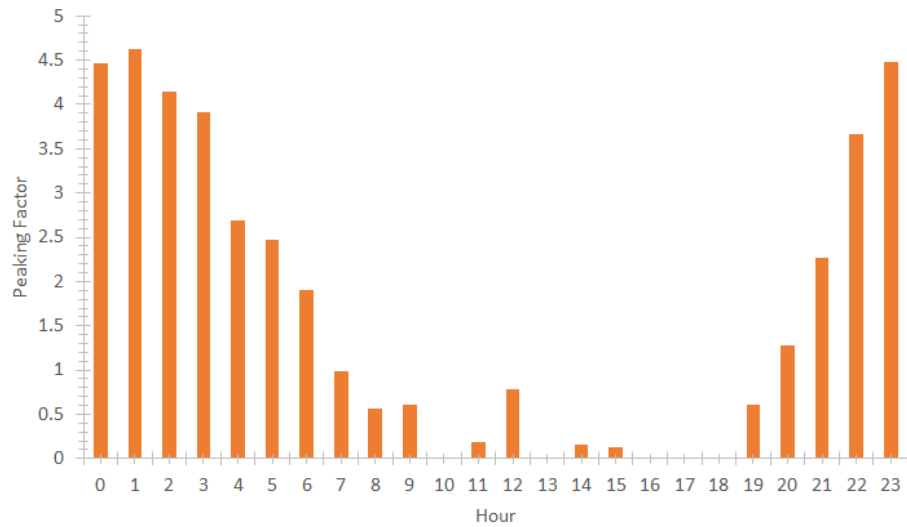
Appendix C

Individual Diurnal Curves

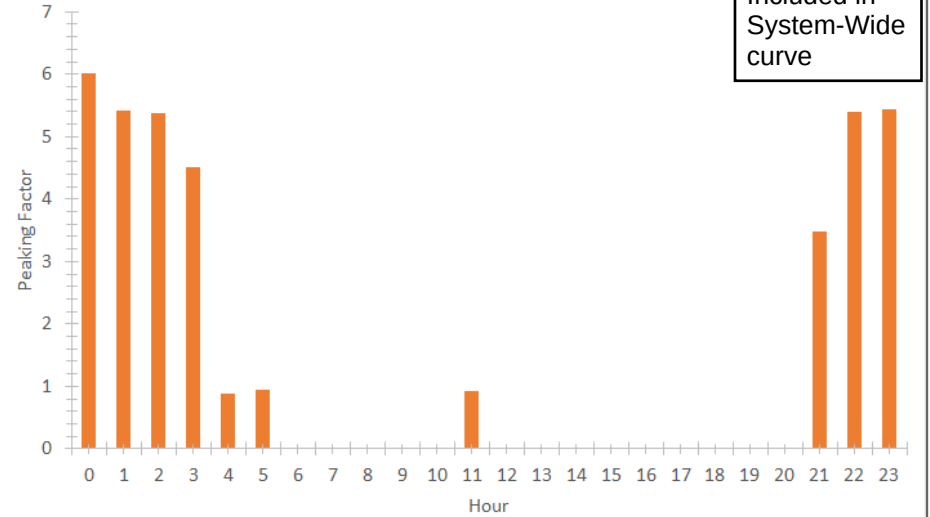
The graphs shown below are diurnal curves for each of the individual existing systems, where SCADA data was available. Each curve has a unique peak week : peak month factor and was based on the system's peak week (during July and August 2018 and 2019). Operational changes may improve individual system performance by flattening demand during periods of use while reducing peak demand factors. Such changes could result in downsizing future pipelines and pumps and potentially reducing future operating costs without changing future maximum month demands. It should be noted that current demand patterns are largely driven by end user choices, such as vegetation, watering schedule and duration, irrigation system configuration, and irrigation controls, as well as future weather conditions. Any or all of these factors could change in the future.



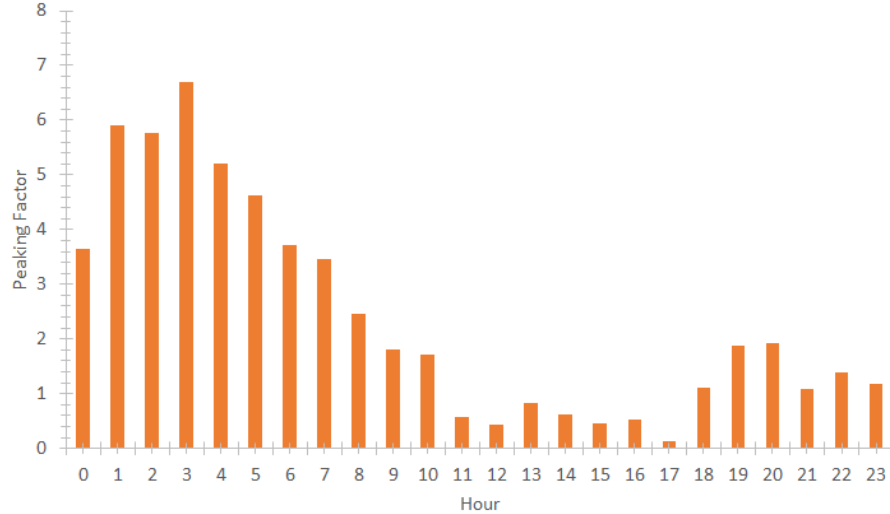
Peak Week:Peak
Month Factor: 1.66 Promontory Pump Station



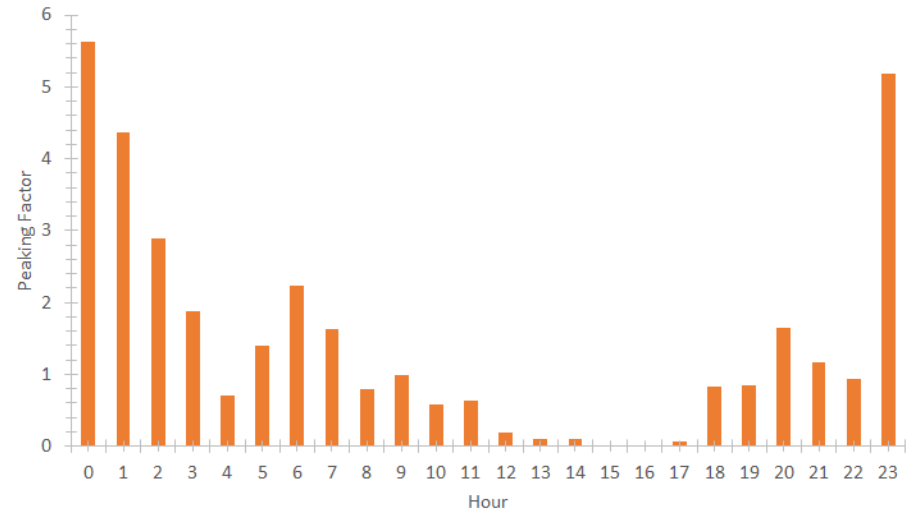
Peak Week:Peak
Month Factor: 1.60 Promontory Transfer Station



Peak Week:Peak
Month Factor: 2.38 St. Michaels

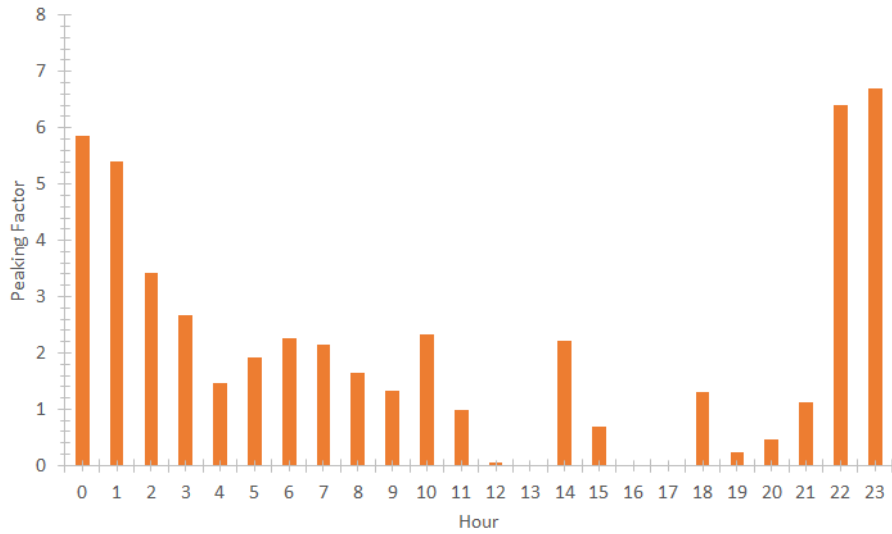


Peak Week:Peak
Month Factor: 1.45 Youth Sports



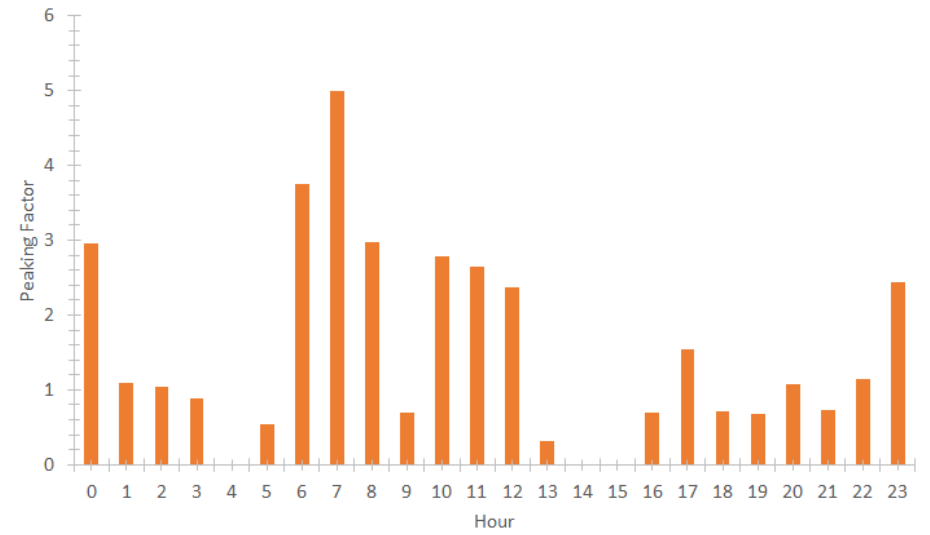
Peak Week:Peak
Month Factor: 2.11

Monforts



Peak Week:Peak
Month Factor: 1.50

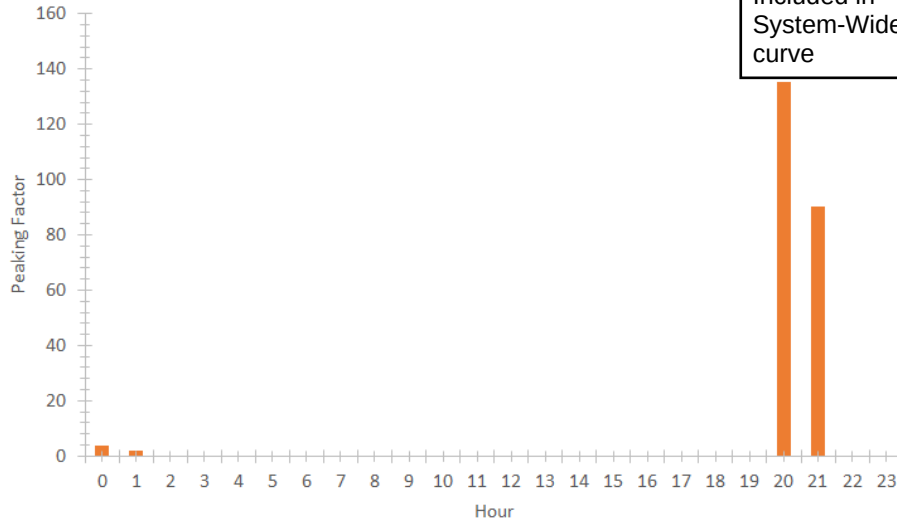
Mosier Hill



Peak Week:Peak
Month Factor: 9.64

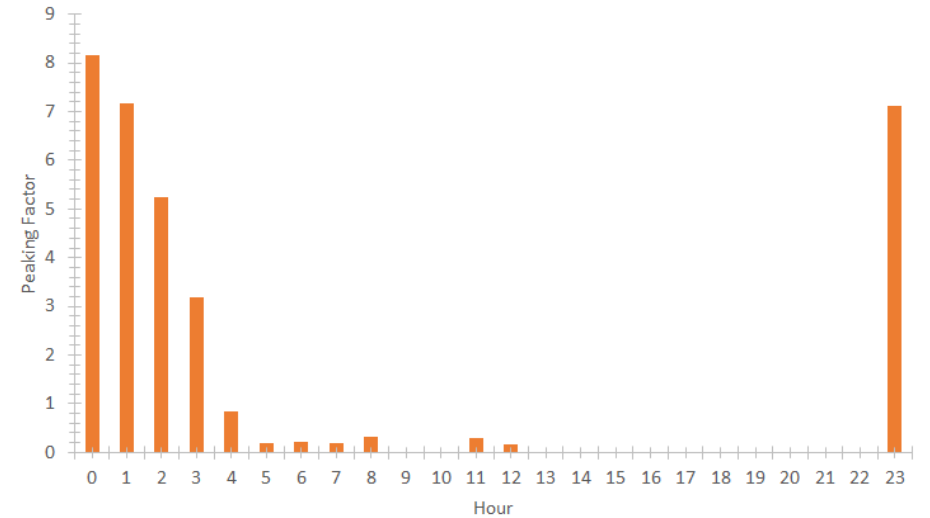
Stonney Brook

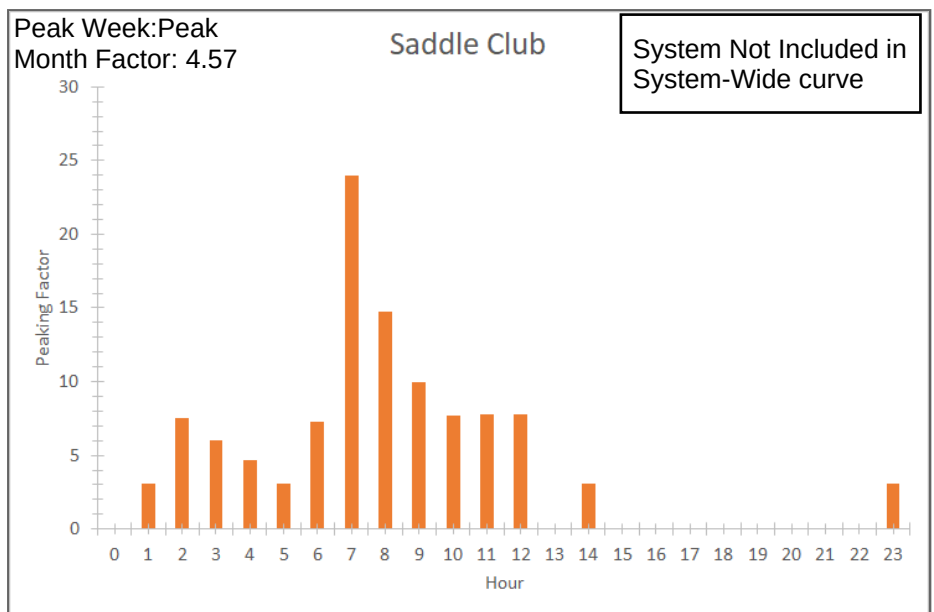
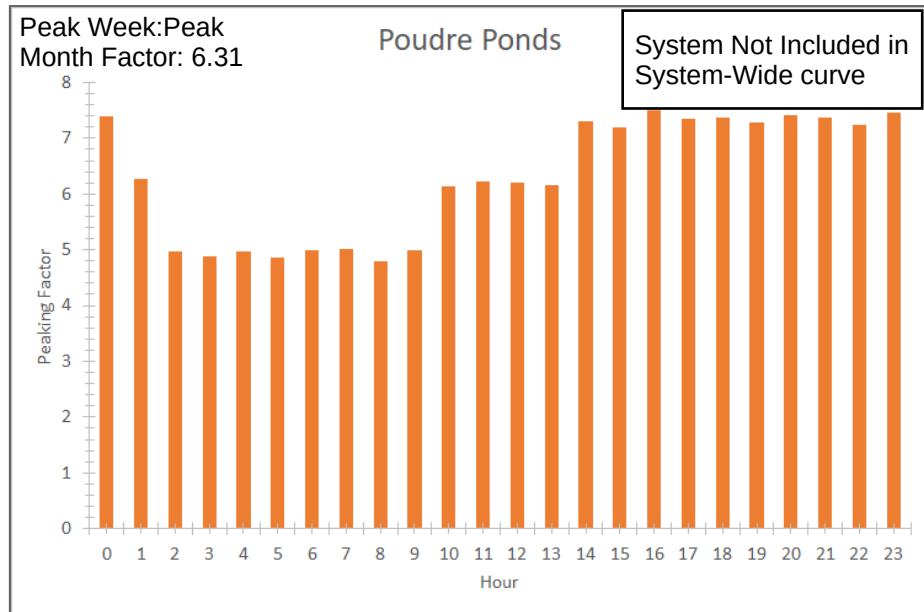
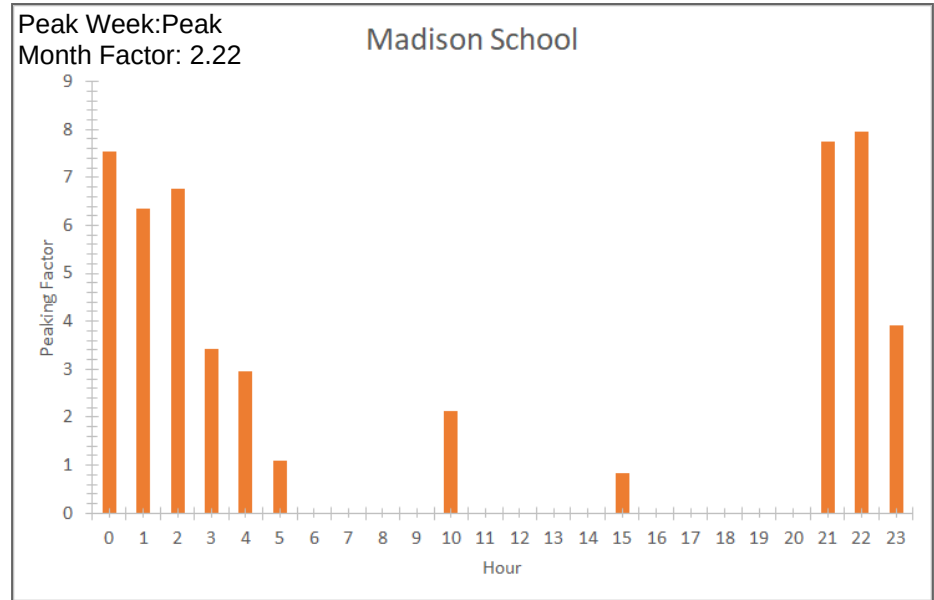
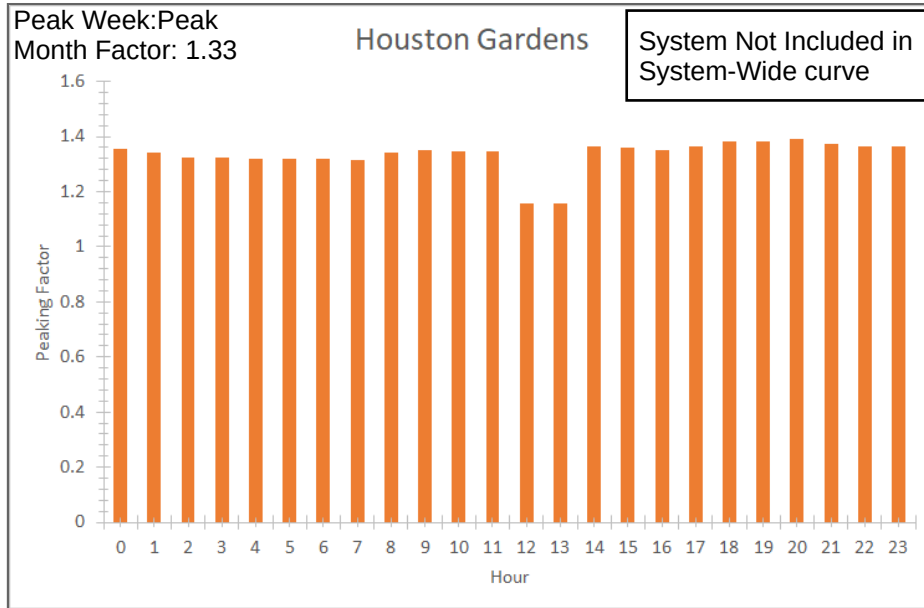
System Not
Included in
System-Wide
curve

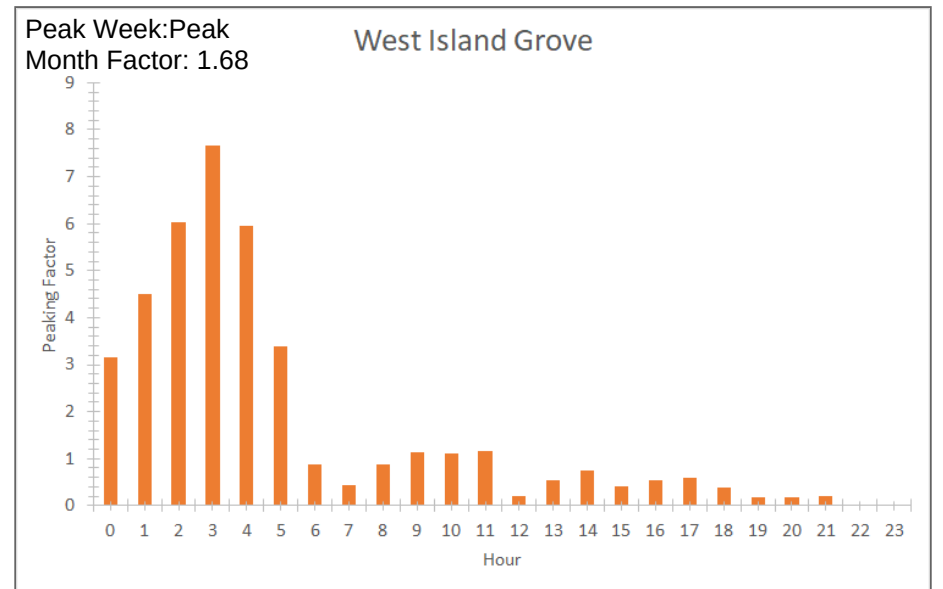
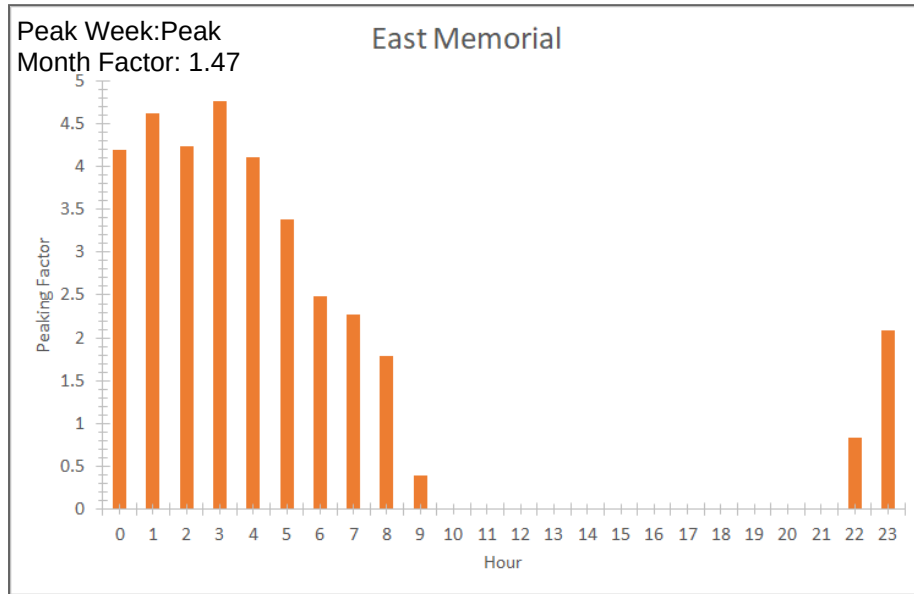
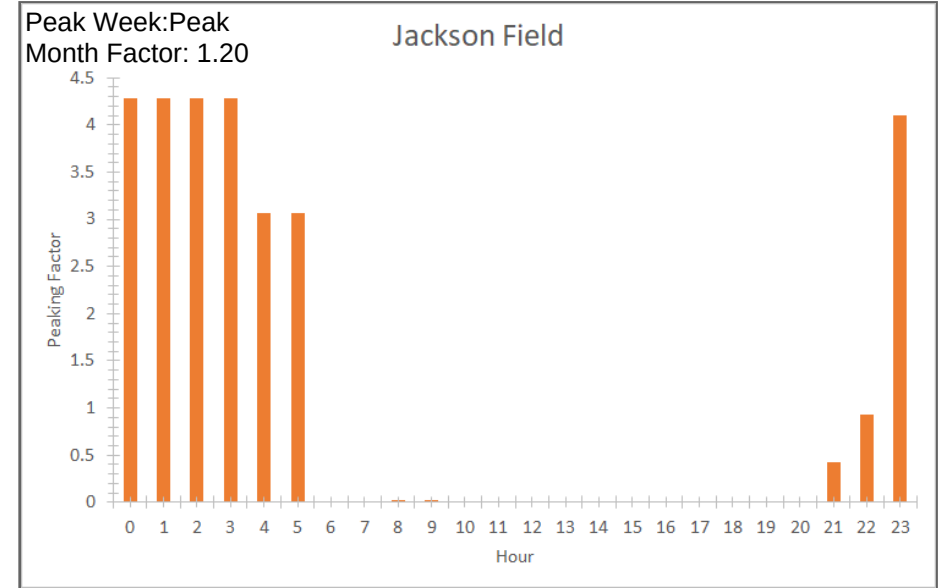
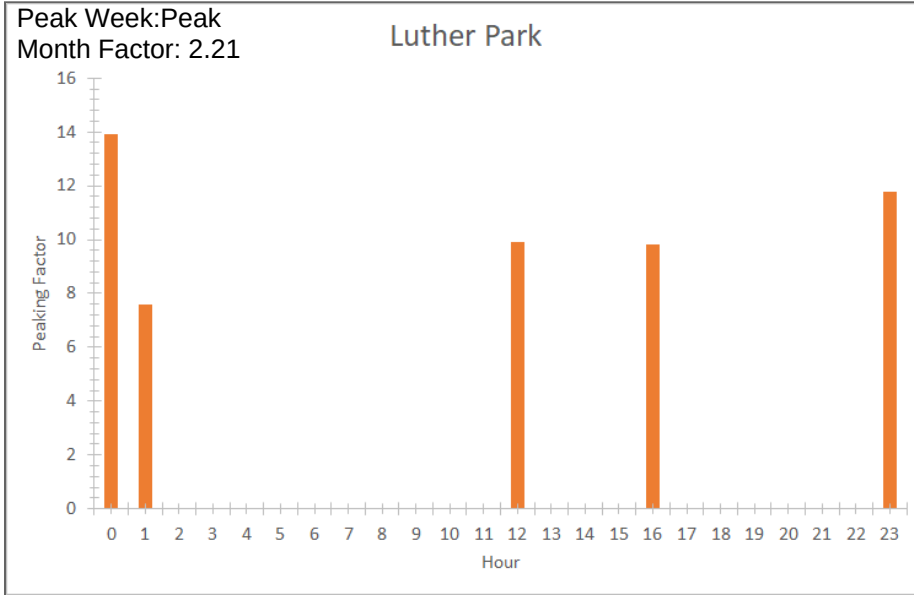


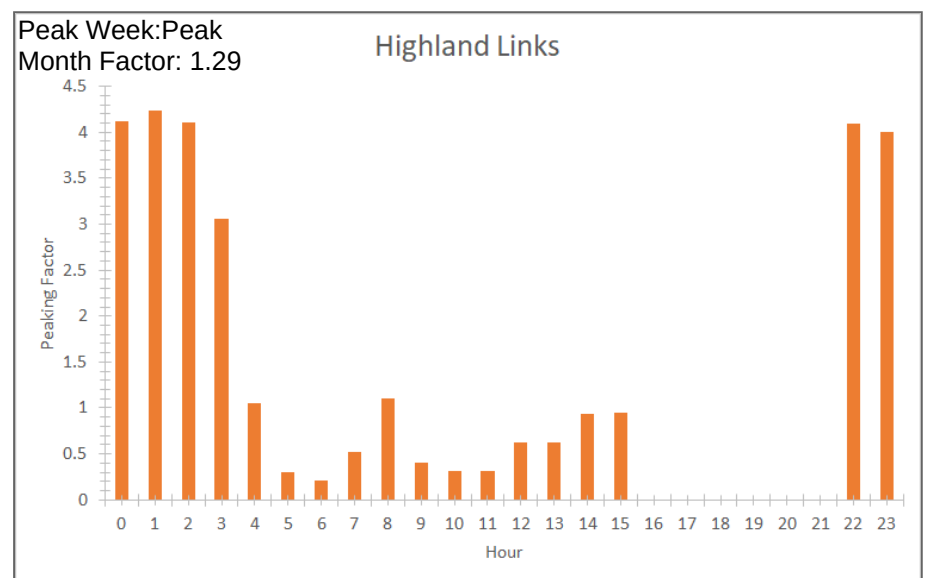
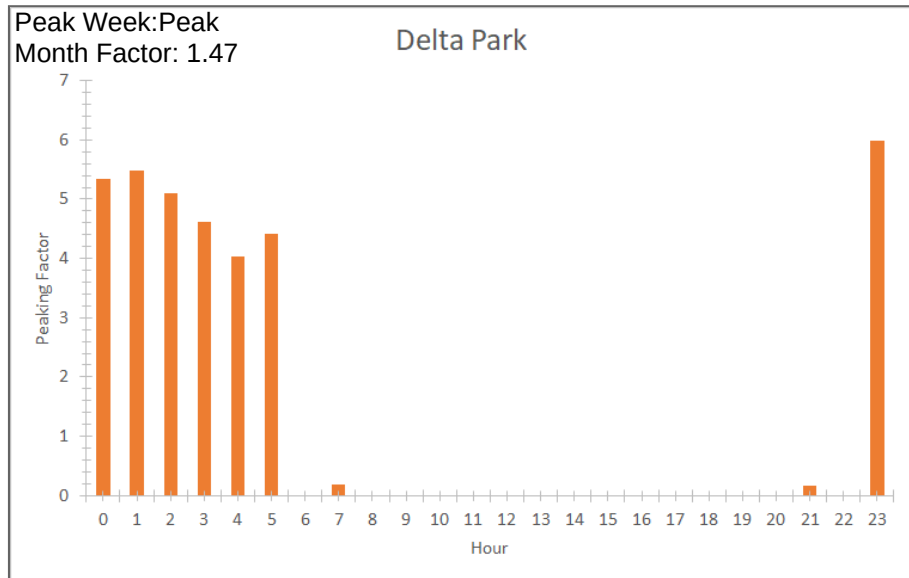
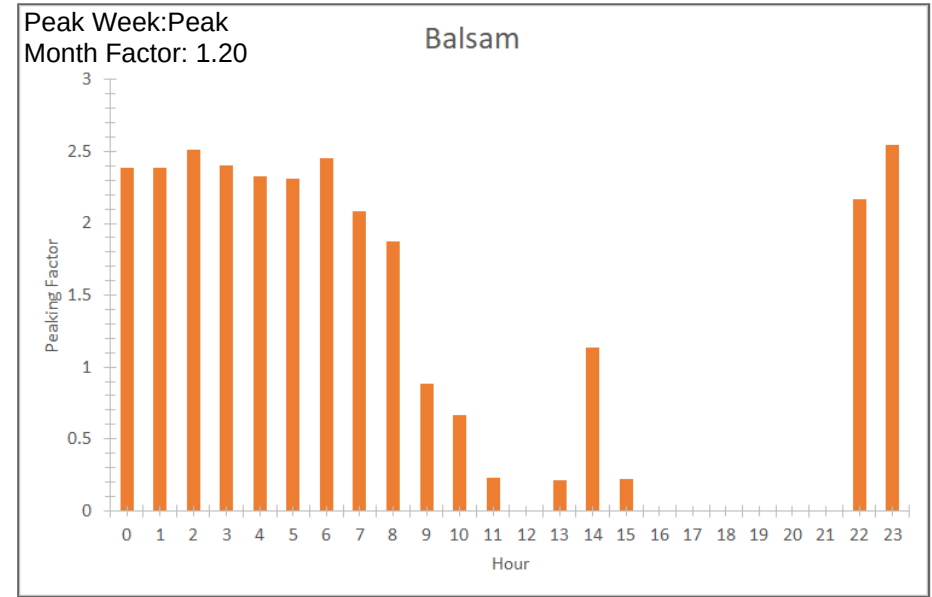
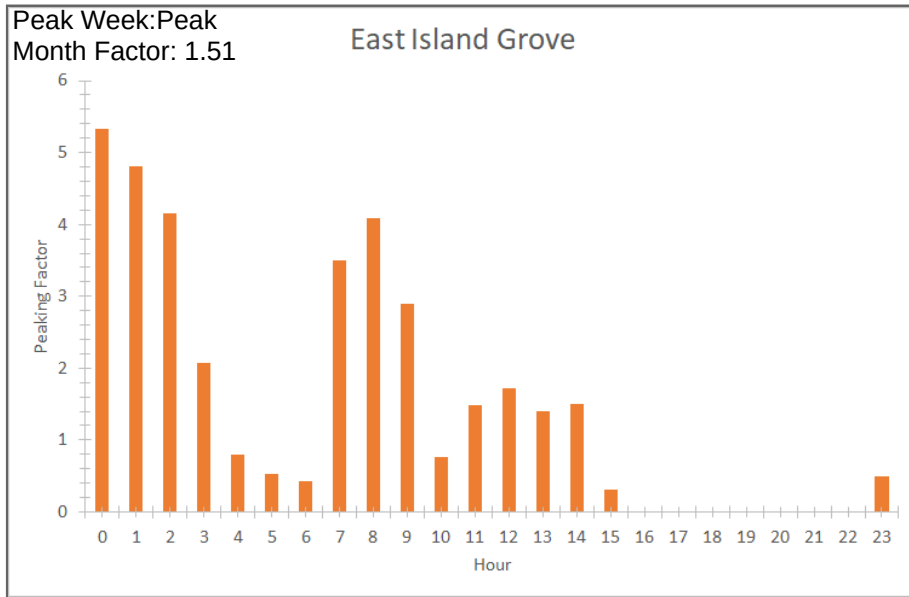
Peak Week:Peak
Month Factor: 1.38

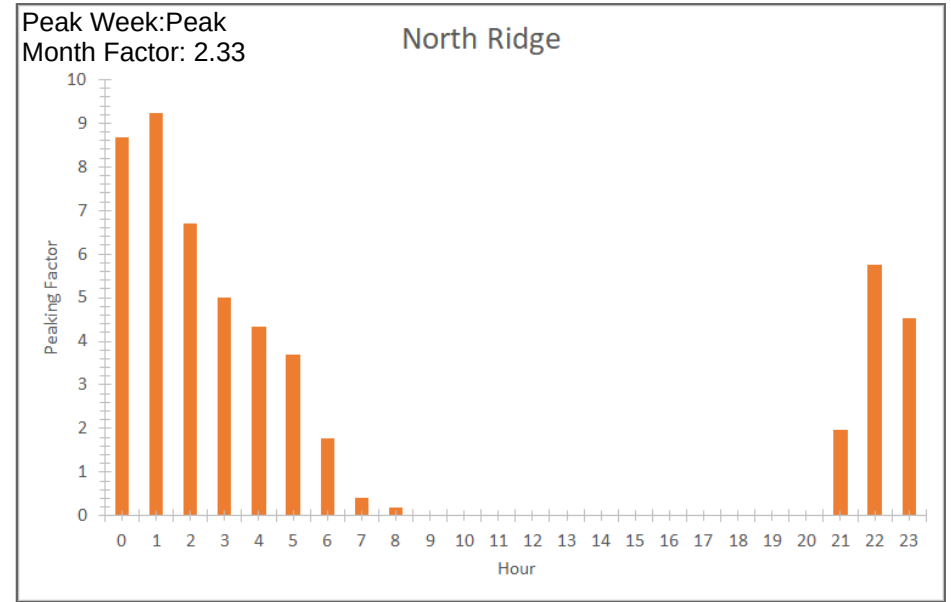
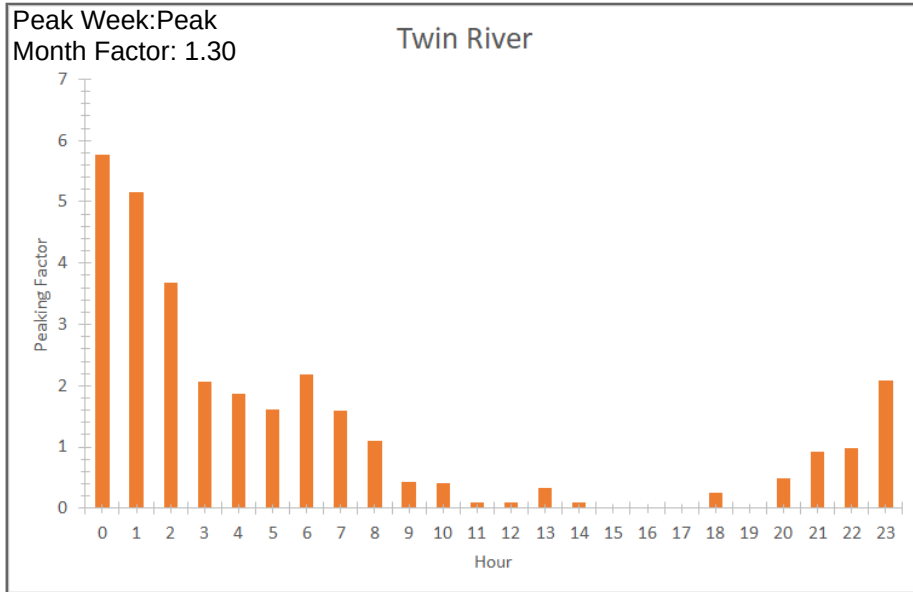
Bittersweet Park











Appendix D

Existing Station Details

The following table contains the results of the modeling and desktop analyses for the existing system. For more information on recommended improvements to the existing system, please see **Section 5.2**.

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Pump Station Name	Pump Name	Pump Design Capacity (gpm) Existing	Station Design Capacity (gpm) Existing	Pumping Head (ft) Existing	Inlet Diameter (Smallest) (in) Existing	Max Hour Demand (gpm) Existing	Max Hour Demand (gpm) Buildout	Max Day Demand (gpm) Buildout	Max Day Demand (gpd) Buildout	Max Hour % of Pumping Capacity Buildout	Max Day % of Pumping Capacity Buildout, 10hrs	Recommended Pond Capacity (AF) Buildout	Inlet Max Headloss at Buildout (ft/1000 ft)	Max Day Demand without Adoption (gpd) Buildout	Notes
Twin Rivers	NP-TR-PMP-01	1,000	4,200	259	10	1,314	2,004	544	782,942	48%	31%	10.6	21	783,205	
	NP-TR-PMP-02	200													
	NP-TR-PMP-03	1,000													
	NP-TR-PMP-04	1,000													
	NP-TR-PMP-05	1,000													
Youth Sports	NP-YS-PMP-06	600	1,200	250	6	941	941	257	370,109	78%	51%	5.0	19	370,109	
	NP-YS-PMP-07	600													
Highland Hills Golf	NP-HH-PMP-01	667	2,001	289	10	1,792	1,792	571	822,053	90%	68%	11.1	18	822,053	
	NP-HH-PMP-02	667													
	NP-HH-PMP-03	667													
Monfort	NP-MF-PMP-01	800	2,400	234	10	1,423	1,745	589	848,074	73%	59%	11.5	21	848,337	
	NP-MF-PMP-02	800													
	NP-MF-PMP-03	800													
Josephine Jones Park	NP-JJ-PMP-01	115	115	223	4	106	161	52	75,413	140%	109%	1.0	30	75,472	
St. Michaels	NP-SM-PMP-01	560	1,120	288	20	1,121	1,167	426	613,800	104%	91%	8.3	0	613,800	
	NP-SM-PMP-02	560													
Peakview Park	NP-PV-PMP-01	400	800	240	8	681	681	148	213,048	85%	44%	2.9	9	213,048	
	NP-PV-PMP-02	400													
Boomerang South	NP-BG-PMP-01	500	1,500	307	N/A	694	0	0	0	0%	0%	0.0	N/A	0	Being replaced by Boomerang Regional Pump Station
	NP-BG-PMP-02	500													
	NP-BG-PMP-03	500													
North Ridge High School	NP-NR-PMP-01	900	2,700	272	18	1,205	1,752	486	699,811	65%	43%	9.4	1	699,811	
	NP-NR-PMP-02	900													
	NP-NR-PMP-03	900													
Boomerang North	NP-BG-PMP-04	500	1,500	307	8	769	769	250	359,309	51%	40%	4.9	11	359,309	
	NP-BG-PMP-05	500													
	NP-BG-PMP-06	500													
Poudre River Ranch	NP-BG-PMP-09	175	175	226	24	205	205	84	120,830	117%	115%	1.6	0	120,830	Single inlet for all 71st Avenue Transfer pumps
Boomerang Transfer	NP-BG-PMP-07	900	1,800	272		951	621	346	498,010	35%	46%	6.7		498,010	
	NP-BG-PMP-08	900													
North Ridge Transfer	NP-BG-PMP-10	900	1,800	272		936	936	269	387,346	52%	36%	5.2		387,346	
	NP-BG-PMP-11	900													
Promontory Park - Transfer	NP-PM-PMP-01	800	1,600	157	12	1,651	1,651	464	668,765	103%	70%	9.0	7	668,765	
	NP-PM-PMP-02	800													
Promontory Park - Main	NP-PM-PMP-03	700	2,100	261	14	1,270	1,866	674	970,200	89%	77%	13.1	3	970,200	
	NP-PM-PMP-04	700													
	NP-PM-PMP-05	700													
Greeley West Park	NP-GW-PMP-01	1,000	2,000	236	4	72	861	280	402,610	43%	34%	5.4	1,150	402,946	Pump station being replaced, proposed inlet size unknown
	NP-GW-PMP-02	1,000													
Sanborn Park	NP-SP-PMP-01	250	500	256	4	268	289	94	135,158	58%	45%	1.8	60	135,168	
	NP-SP-PMP-02	250													
Cottonwood Park	NP-CW-PMP-01	115	115	212	4	69	69	23	32,414	60%	47%	0.4	4	32,414	
Glenmere Park	NP-GM-PMP-01	180	180	226	4	135	304	99	142,214	169%	132%	1.9	127	142,215	
Bittersweet Park	NP-BP-PMP-01	500	1,000	250	6	854	1,160	258	371,563	116%	62%	5.0	150	371,626	
	NP-BP-PMP-02	500													
Luther Park	NP-LP-PMP-01	265	530	224	10	492	498	89	127,469	94%	40%	1.7	2	127,474	
	NP-LP-PMP-02	265													
Madison Elementary and Houston Gardens	NP-ME-PMP-01	125	125	200	8	310	310	298	428,616	248%	571%	5.8	3	428,618	Single inlet for two pumps
	NP-ME-PMP-02	500	500	231		90	93	27	38,203	19%	13%	0.5		38,203	

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Pump Station Name	Pump Name	Pump Design Capacity (gpm) Existing	Station Design Capacity (gpm) Existing	Pumping Head (ft) Existing	Inlet Diameter (Smallest) (in) Existing	Max Hour Demand (gpm) Existing	Max Hour Demand (gpm) Buildout	Max Day Demand (gpm) Buildout	Max Day Demand (gpd) Buildout	Max Hour % of Pumping Capacity Buildout	Max Day % of Pumping Capacity Buildout, 10hrs	Recommended Pond Capacity (AF) Buildout	Inlet Max Headloss at Buildout (ft/1000 ft)	Max Day Demand without Adoption (gpd) Buildout	Notes
Ramseier	NP-RP-PMP-01	225	450	235	8	734	739	240	345,485	164%	128%	4.7	11	345,490	
	NP-RP-PMP-02	225													
Island Grove and Saddle Club	NP-IG-PMP-01	600	600	290	N/A	605	605	135	194,242	101%	54%	2.6	N/A	194,242	
	NP-IG-PMP-02	700	700	300	N/A	401	401	120	172,267	57%	41%	2.3	N/A	172,267	
	NP-IG-PMP-03	300	300	259	N/A	72	138	48	69,595	46%	39%	0.9	N/A	69,677	
Jackson Field Sports	NP-JF-PMP-01	200	400	236	14	258	317	95	137,074	79%	57%	1.9	0	137,132	
	NP-JF-PMP-02	200													
Linn Grove Cemetery	NP-LG-PMP-03	350	350	305	4	95	122	40	57,168	35%	27%	0.8	11	57,168	
Bella Romero Elementary	NP-RE-PMP-01	330	330	263	N/A	109	109	35	50,803	33%	26%	0.7	N/A	50,803	
East Memorial	NP-EM-PMP-01	34	319	189	10	314	440	146	210,600	138%	110%	2.8	2	210,651	
	NP-EM-PMP-02	285		213											
Delta Park	NP-DP-PMP-01	95	95	231	4	52	52	6	8,928	55%	16%	0.1	2	8,928	
Balsam Park	NP-BS-PMP-01	290	290	120	4	51	51	19	27,749	18%	16%	0.4	0	27,749	

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Appendix E

Future Pump Station Details

The following table contains the preliminary design points used to design all future pump stations through buildout. This information is for planning purposes only and does not constitute a full hydraulic design. Additional engineering work, as well as coordination between developers and the City, will be necessary to design all future NP infrastructure.

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Pump Station Name	Planning Horizon	Pump Station Elevation (ft)	HGL (ft) ³	Pump Station Demand (gpm) ²			% of Buildout			Max Day Demand, Unadopted (gpd) Buildout	# Pumps	Pump Design		PS Outlet Size (in)	Pond Size (acre-ft) ¹	Notes
				2025	2040	Buildout	2025	2040	Buildout			Flow (gpm)	Head (ft)			
SA-0	2075	4741	4930	0	0	641	0%	0%	100%		2	390	170	8	3.0	
SA-1	2075	4742	4929	0	0	646	0%	0%	100%		2	390	170	8	3.0	
SA-2	2075	4714	4915	0	0	534	0%	0%	100%		2	330	180	8	2.5	
SA-3	2040	4709	4887	0	118	505	0%	23%	100%		2	310	160	8	2.3	
SA-4	2040	4692	4895	0	110	187	0%	59%	100%		2	120	180	8	0.9	
SA-5	2075	4697	4885	0	0	516	0%	0%	100%		2	310	170	8	2.4	
SA-6	2075	4732	4933	0	0	300	0%	0%	100%		2	180	180	8	1.4	
SA-10	2075	4643	4831	0	0	833	0%	0%	100%		2	500	170	10	3.8	
SA-12	2040	4919	5150	0	284	963	0%	29%	100%		2	580	210	10	4.4	
SA-13	2075	4896	5091	0	0	1006	0%	0%	100%		2	610	170	10	4.6	
SA-14	2025	4898	5150	217	353	2915	7%	12%	100%		2	1750	230	16	13.4	Tech Center
SA-15	2040	4996	5184	0	1	1158	0%	0%	100%		2	700	170	10	5.3	
SA-16	2040	4906	5104	0	265	866	0%	31%	100%		2	520	180	10	4.0	
SA-25	2025	4921	5098	186	374	521	36%	72%	100%		2	320	160	8	2.4	
SA-30	2075	4880	5053	0	0	360	0%	0%	100%		2	220	155	8	1.7	
SA-34	2040	4752	4939	0	190	464	0%	41%	100%		2	280	170	8	2.1	
SA-35	2040	4681	4859	0	381	508	0%	75%	100%		2	310	160	8	2.3	
SA-36	2040	4790	4976	0	284	737	0%	38%	100%		2	450	170	8	3.4	
SA-38	2040	4636	4843	0	46	118	0%	39%	100%		2	80	180	8	0.5	
SA-41	2075	4663	4840	0	0	928	0%	0%	100%		2	560	160	10	4.3	
SA-42	2040	4663	4861	0	278	596	0%	47%	100%		2	360	180	8	2.7	
SA-44	2025	4835	5011	48	147	549	9%	27%	100%		2	330	160	8	2.5	
SA-46	2075	4749	4927	0	0	921	0%	0%	100%		2	560	160	10	4.2	
SA-47	2075	4761	4949	0	0	799	0%	0%	100%		2	480	170	10	3.7	
SA-48	2075	4757	4945	0	0	862	0%	0%	100%		2	520	170	10	4.0	
SA-49	2075	4712	4901	0	0	920	0%	0%	100%		2	560	170	10	4.2	
SA-50	2075	4741	4929	0	0	1275	0%	0%	100%		2	770	170	12	5.9	
SA-51	2075	4730	4928	0	0	2083	0%	0%	100%		2	1250	180	16	9.6	
SA-52	2075	4724	4912	0	0	1078	0%	0%	100%		2	650	170	10	5.0	
SA-53	2075	4686	4874	0	0	1500	0%	0%	100%		2	910	170	12	6.9	
SA-57	2075	4894	5114	0	0	1232	0%	0%	100%		2	740	200	16	5.7	
SA-60	2025	4894	5081	342	733	922	37%	80%	100%		2	560	200	10	4.2	
Boomerang Regional PS	2025	4791	4978	829	1650	2716	31%	61%	100%		2	1630	170	16	12.5	

Notes and Equations:

¹Pond size = ((peak hour demands, gpm) / (4.22 peak hour / peak month) * (1440 min / day) * (1 AF / 325851 gal)) * 1.1 (for ET losses)

²Peak hour demands

³Average head at downstream junction = (Elevation, ft) + (Downstream pressure @ max hour, psi)*(2.31 ft/1 psi)

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Appendix F

WaterWise Landscaping Best Practices Manual Criteria

The following manual was developed by the City of Greeley as a guide for implementing best practices for landscaping and irrigation to promote water conservation.

City of Greeley



WaterWise Landscaping Best Practices Manual Criteria

Draft

November 2019

*Water Conservation
Water Resources*

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<u>Principle #3</u> - Create practical turf areas.	
<u>Principle #4</u> - Use appropriate plants and group according to their water need.	
<u>Principle #5</u> - Water efficiently with a properly designed irrigation system.	
<u>Principle #6</u> - Use organic mulches to reduce surface evaporation of water and weeds.	
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WaterWise Landscaping Best Practices Manual

Section 1 – Introduction

Prevalent landscaping practices used in of development today have disregarded the long-term effects on the region's water supply. Nearly 75% of summer water use is consumed by outdoor vegetation. The drought in Colorado has highlighted the necessity of using WaterWise design practices in order to best use our limited water resources. Significant reductions can be gained through minor changes in the arrangement of plantings, alternative plant selection and soil preparation.

The City of Greeley has drafted criteria that includes WaterWise landscape practices that will be can be used to guide development in the design of landscaping. This criteria can also be used as a reference for existing landscapes and irrigation design. The purpose of the project is to:

1. move closer to use of landscaping that matches our semi-arid environment
2. include specific direction in choice of plant material
3. include illustrations
4. to the extent possible, make language easy to understand and apply
5. include both xeriscape requirements and aspirational practices

Besides requirements for new development, the process also includes this “Best Practices Manual” that all citizens can use in making choices about their home landscaping. These Best Practices for landscape design are derived from the seven principles of Xeriscaping, as well as GreenCo's Best Management Practices.

The intention for these Best Practices is to inform home and property owners about landscape and irrigation needs unique to Colorado, and to assist in creating responsible landscape and irrigation design decisions.

*WaterWise Landscaping**Best Practices**Section 2 – WaterWise Principles and Guidelines*

DSW, Sources: GreenCo BMPs, Xeriscape Principles

This section focuses on eight “principles” that act as goals for smart planting and irrigating in the Colorado region. Each principle offers a series of design recommendations and techniques in the form of “guidelines”. The guidelines function as steps to achieve the goals. Each guideline is not imperative but still important to ensure healthy plant growth, reduced water waste and increased cost savings over time. The following principles, if used properly, will help to create a useful, efficient and enjoyable WaterWise landscape.

*Principle #1 – Plan and design landscaping comprehensively.***Guidelines**

- A. Start with an inventory and analysis plan of the site that identifies “existing conditions.” Conditions such as drainage areas, sun exposure, soil types, good views, existing plants, etc. will affect how the site is used (Figure 1). Next develop a list of activities and areas, also called a “program,” expected to occur on the site. For example a backyard program might include a lawn play area, dog run, dining patio, barbecue grill, shade trees and shrub beds. Continue by diagramming possible locations for the program activities, while also providing access and traffic patterns or screening as needed. Finally, use this information to develop a plan that integrates plants into the overall scheme (Figure 2).
- B. Now with your overall plan, consider options on how you would like to conserve water. Several recommendations for water conservation are addressed throughout this document.
- C. Calculate the water requirements for your landscape using the Water Budget Worksheet provided in Section Seven of this manual. Try not to exceed an average total of 15 gallons per square foot annually.
- D. Incorporate trees into the landscape to provide shade, reduce stormwater runoff, stabilize soil and protect against wind. If considering the gross site area, a minimum goal of 20 percent tree canopy coverage (at trees’ maturity) for Front Range communities is recommended.
- E. When designing plant placement on slopes, place lower-water demand plants at the tops of slopes and higher-demand plants at the bottom.
- F. Artificial flowers and grass are discouraged. Exceptions may be granted for special use areas such as synthetic turf athletic fields.

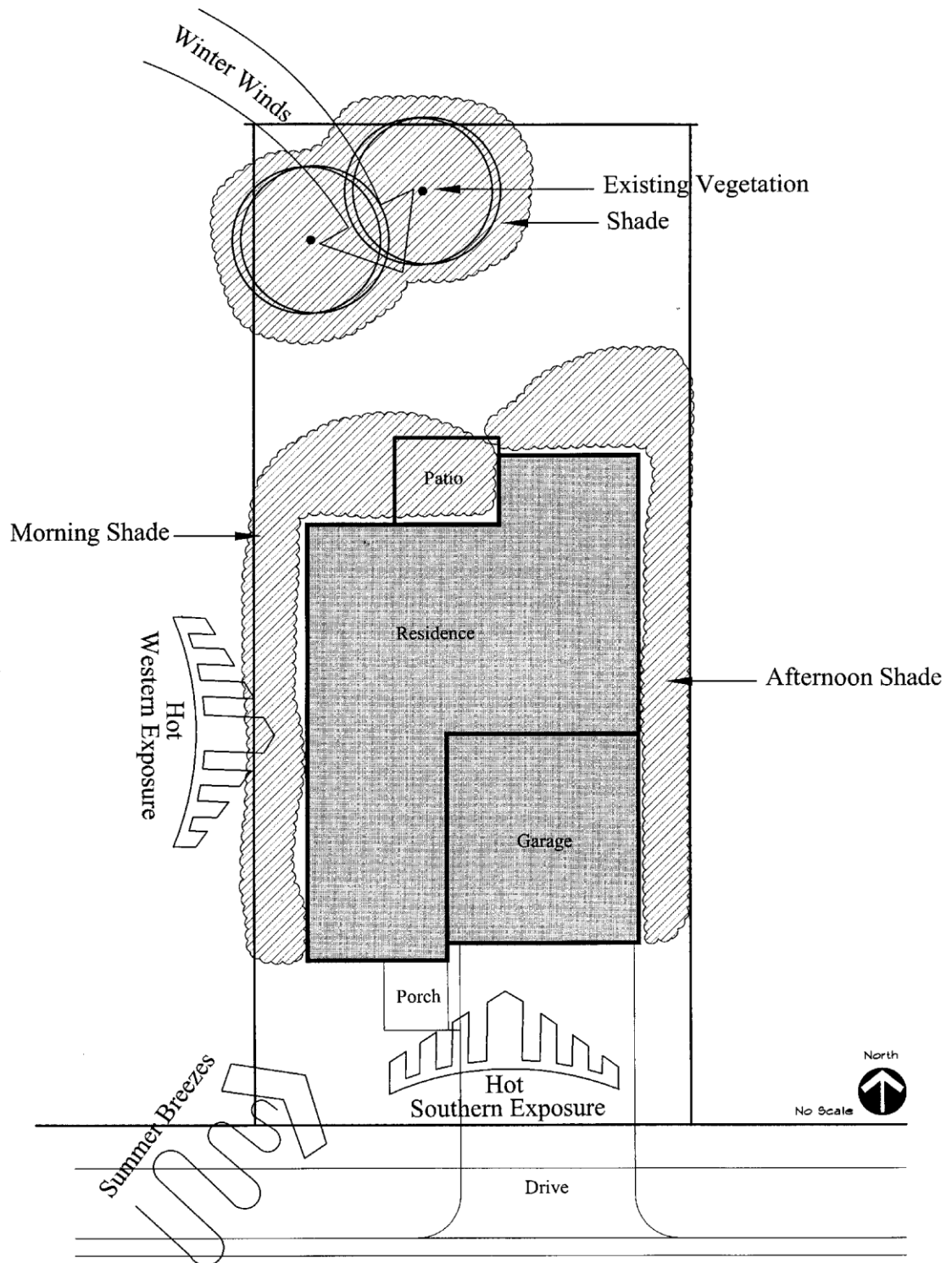


Figure 1. Inventory and Analysis Plan

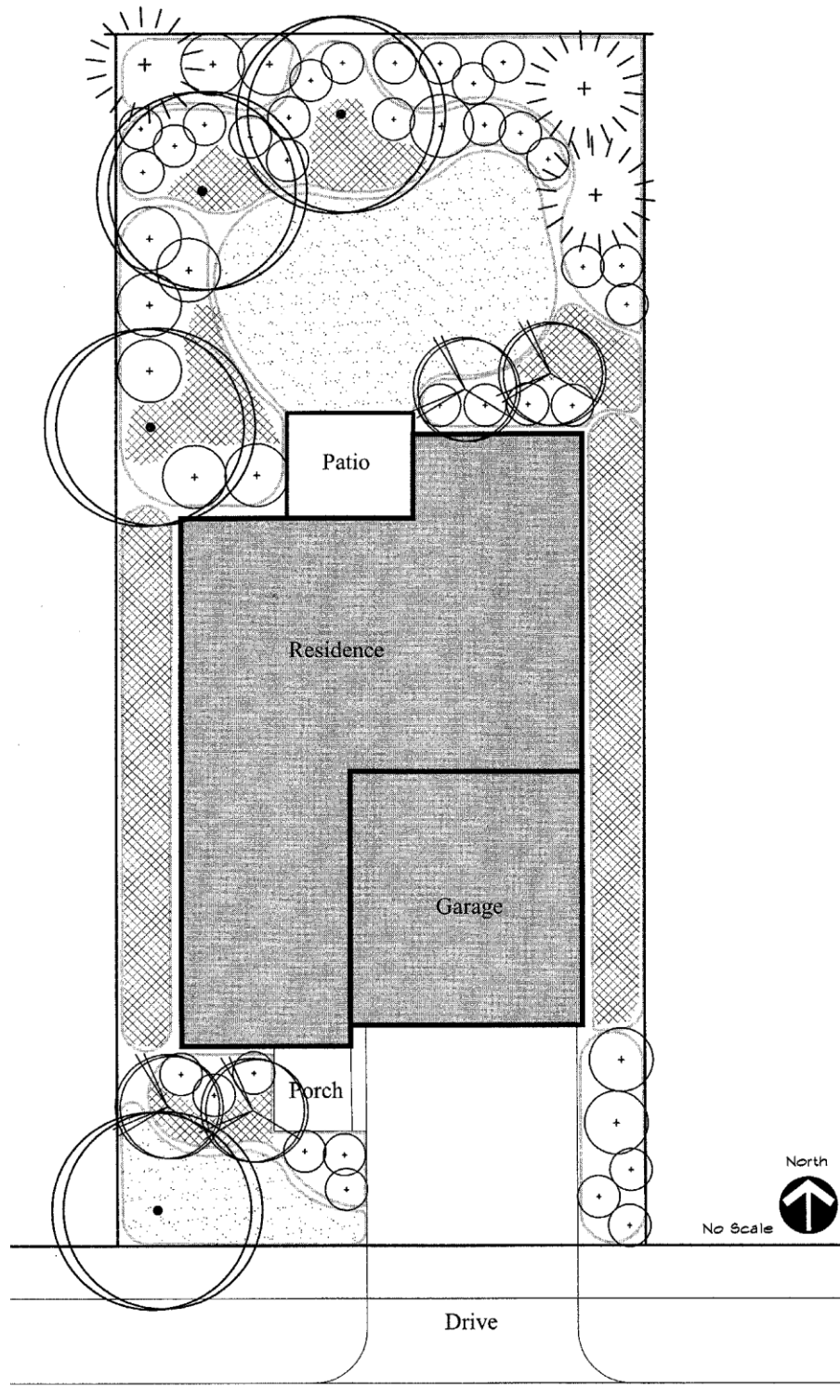


Figure 2. Overall Planting Plan

Principle #2 - Evaluate soil and improve, if necessary.

Guidelines

- A. Soil suitability for planting should be evaluated to identify potential soil amendments that may improve plant health and survival (see Section Five).
- B. Strip and stockpile existing topsoil prior to major site re-grading. Following completion of grading, replace topsoil and improve soil for planting with suitable soil amendments.
- C. Improve soil as suitable (see Section Five) before planting and installing the irrigation system. Soil improvement promotes better absorption of water, improved water-holding capacity and drainage of the soils. It also allows for better oxygen transfer within the root zone.
- D. Add organic material to the plant hydrozones, but only as needed. This typically means adding organic material for High and Moderate water zones, but not for Low and Very Low water zones. pH-balanced examples of organic materials are compost (from plants), sphagnum peat and animal manure (other than cow or horse).
- E. Soil preparation should include the breaking up and loosening, or scarification, of soil to 6 inches, with incorporation of organic amendments, fertilizer, etc. as specified by a landscape designer, landscape architect or soil analysis (Figure 3).

For more information please refer to Section 5, Understanding Soils and Soil Preparation.

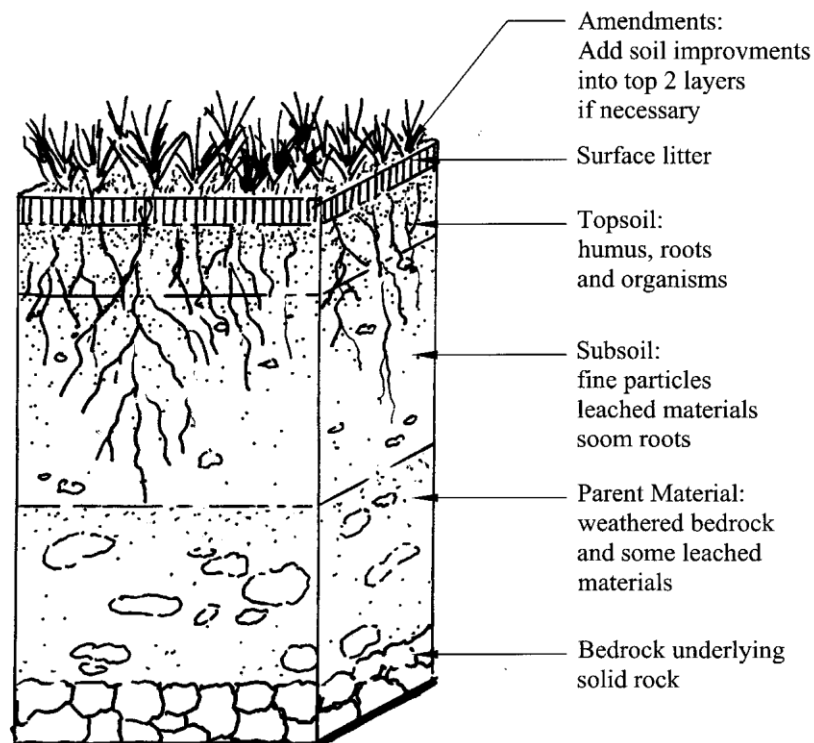


Figure 3. Soil Profile

Principle #3 - Create efficient turf areas.

Guidelines

- A. Include turf areas where they provide defined functions (i.e., recreation, traffic areas, etc.). Plantings of trees, shrubs, ground covers and flowers are best separated from grass so they can be watered separately. Often, portions of turf areas can be replaced with more water-efficient ground covers and mulches (Figure 4).
- B. When selecting turfgrass, consider the use, aesthetic and design goals of the site, estimated water use and maintenance budget. Alternative grass types, such as tall fescue, buffalograss, blue grama and wheat grass, may provide lower water and maintenance needs than bluegrass. In areas where irrigation is not planned for instance, a mix of mainly native bunch and sod-forming grasses might be used. (See Section Four for native seed mix options.)
- C. Avoid using turf in areas less than 8 feet wide and on slopes steeper than 3:1. These areas require inefficient irrigation sprays. Consider using drip-irrigated shrubs or groundcovers with Low or Very Low water requirements as alternatives. A special exception may be streetscape tree lawns, where turfgrass may be most appropriate with careful consideration and monitoring of potential irrigation inefficiencies.
- D. Some sites and turf areas with difficult irrigation or maintenance concerns may perform better with low water grass types or groundcovers. Consider street rights-of-way, industrial sites, drainageways and natural areas for such alternative grasses. (See Principle #8 below.)



Figure 4. Efficient Turf Area in Front Yard

Principle #4 - Use appropriate plants and group according to their water need, i.e. “hydrozoning”.

Guidelines

- A. Plants with lower water requirements, such as native species adapted to Colorado’s climate, should be considered. However, other plants can have a place in xeriscape designs, even if they require larger amounts of water. The key is to use those plants in appropriate locations and not to interplant them with others that have very different, lower water requirements. In effect, the grouping of plants into “hydrozones” based on their water requirements allows them to be irrigated efficiently. A detailed list of Colorado landscape plants and their respective water requirements by “hydrozone category” is included in Section Three.
- B. Group plants with like water needs together (Figure 5). Plants located within the drip line for large, mature trees and shrubs should have similar water requirements as the trees and shrubs. (A drip line is considered the outermost circle on the ground where water drips from the leaves of a tree or shrub canopy above.)
- C. Plants of any water need may be used in the landscape, providing the total annual water use does not exceed Water Allowance for the ET (Evapo-Transpiration) Reference Location. For example, this allowance is 15 gallons/square foot/season in the Denver metro area. (See Section Six below for Water Budget calculations.)
- D. High water zones should be separated from Low and Very Low water zones by Moderate water zones whenever possible.
- E. Select plants that are well adapted to the climate, topographic and geologic conditions of the site.
- F. Select plants with lower water requirements for areas with southern and western exposures.
- G. Strips less than 8 feet wide should be landscaped with Low or Very Low water plants. (See Principle #3 above.)

Principle #5 - Water efficiently with a properly designed irrigation system

Guidelines

- A. Irrigate according to the water need of each hydrozone, not solely on a fixed schedule (Figure 6). Well-planned sprinkler systems can save water when properly installed and operated. Turf areas should be watered separately from beds. Shrubs, flowers and ground covers can be watered more efficiently, by less frequent irrigation that is allowed to penetrate the root zone more deeply. (See Principle #4 above.)
- B. Consider plant water requirements in irrigation design schemes.
- C. Take into account the hydraulic principles when designing the irrigation system. Generally these principles deal with water volume, pressure and patterns of movement.

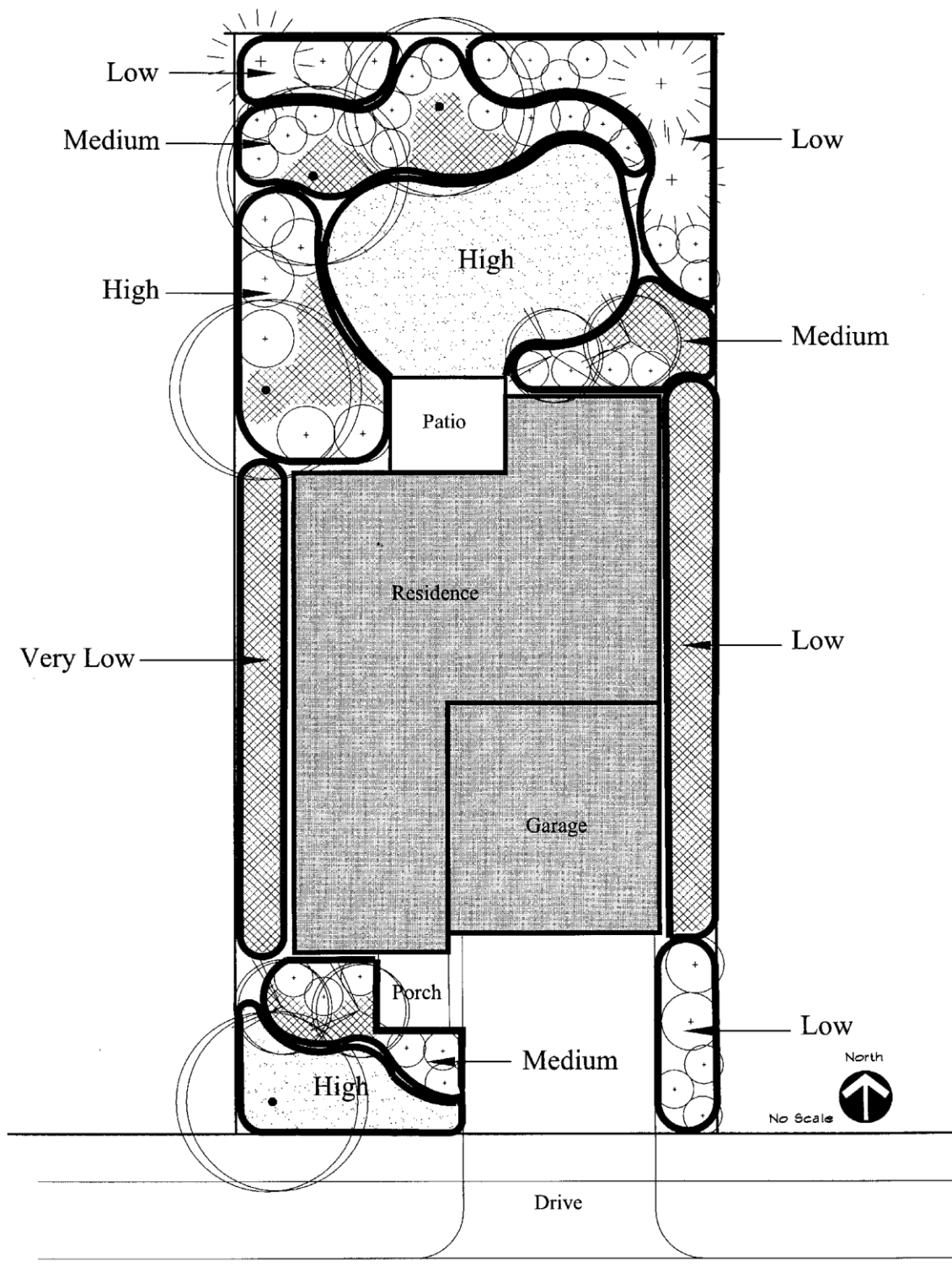


Figure 5. Hydrozone Outline Diagram with 4 water need types

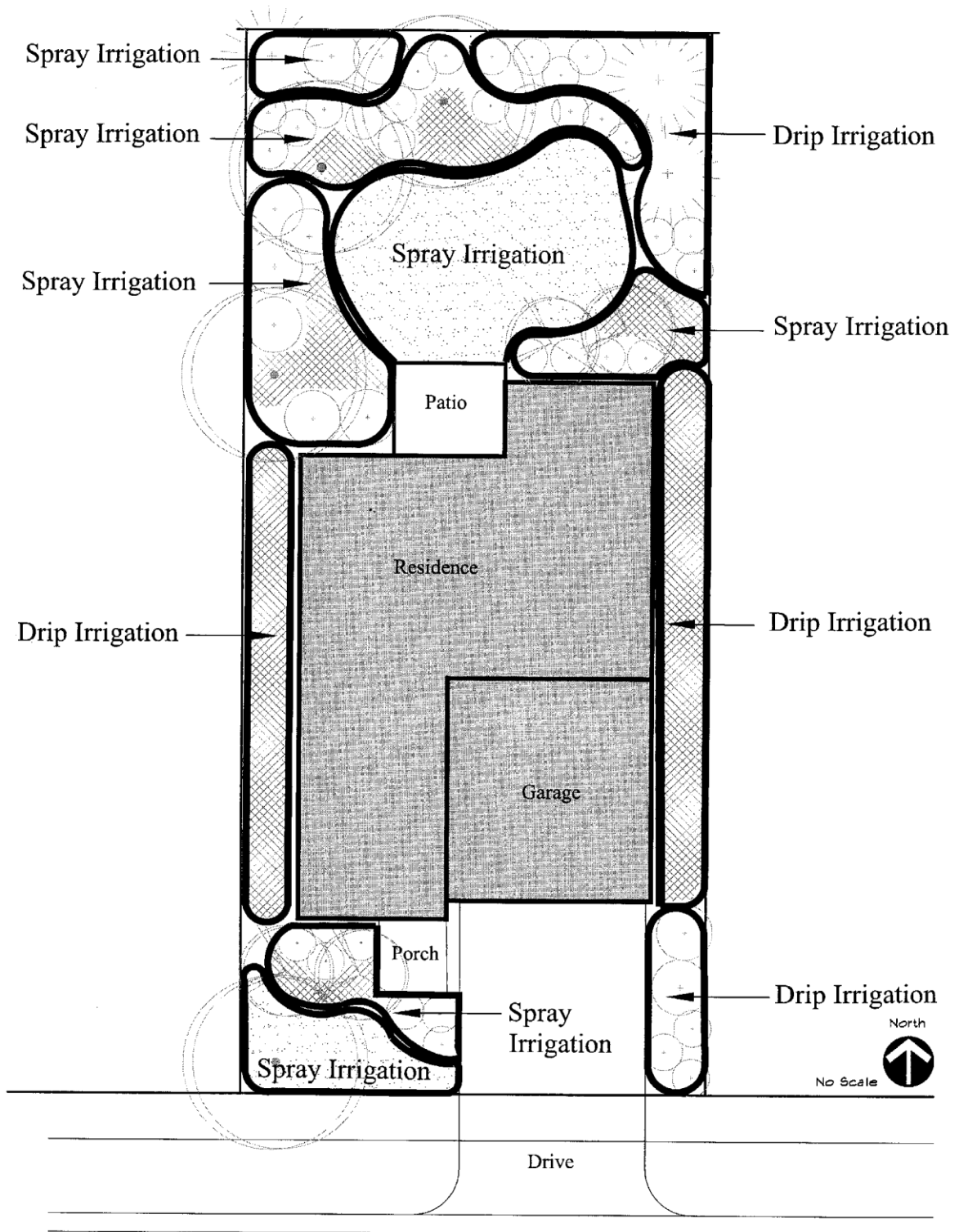


Figure 6. Irrigation Type Diagram

- D. Install an irrigation controller that offers flexible programming. Landscapes should not need as much supplemental watering during a rainy period. Rain or moisture sensors are available to coordinate with controllers, and some controllers are self-adjusting based on weather conditions.
- E. Ensure that the irrigation system is installed per plan and is accurate.
- F. Provide “as-built” drawings of irrigation system after installation with dimensions shown for irrigation components. Such drawings will help to find and correct problems in the future.
- G. Operate irrigation systems to maximize irrigation water efficiency.

For more information please refer to Section 6, Irrigation Design Techniques and Equipment.

Principle #6 - Use mulches to reduce surface evaporation of water and weeds.

Guidelines

- A. Mulched planting beds are an ideal replacement for expansive turf areas. Mulches protect and reduce temperature extremes in the soil, minimize evaporation, reduce weed growth and slow erosion. Mulches also provide landscape interest. Organic mulches are typically bark chips, wood grindings, chopped leaves or pole peelings. Inorganic mulches include rock and various gravel products.
- B. Organic mulches are generally recommended for the most benefit of the plants, but the roots of some plants perform better with inorganic mulch. Landscape professionals can help determine suitable mulches for selected plants. Inorganic mulches may also be preferred as more stable in especially windy locations, areas requiring high maintenance or those apt to erosion.
- C. Place mulch directly on the soil or on breathable fabric (Figure 7). Do not use solid sheet plastic beneath mulched areas, as these keep out water and air – both of which are vital to plant health.
- D. All plantable areas not covered with turf should be covered with a minimum of four inches (4”) of a suitable mulch to retain water, and inhibit weeds.
- E. Mulching exceptions for Low and Very Low hydrozones should be considered.

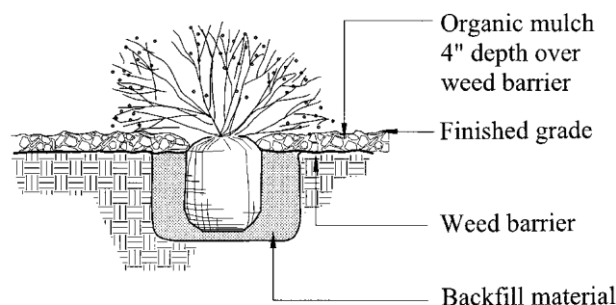


Figure 7. Shrub Planting in Mulch Bed

Principle #7 - Practice appropriate landscape maintenance.

Guidelines

- A. Proper pruning, weeding, mowing and fertilization, plus attention to the irrigation system, are needed to maximize water savings. Regular maintenance of planting and irrigation system preserves the intended beauty of the landscape, and saves water and maintenance costs through efficient operations. Always water according to hydrozone need and current soil moisture conditions, rather than according to a rigid schedule.
- B. Landscapes should be maintained to ensure water efficiency. A regular maintenance schedule should include but not be limited to checking, adjusting, and repairing irrigation equipment; resetting the automatic controller; aerating turf areas; replenishing mulch; fertilizing; pruning, and weeding in all landscaped areas.
- C. Whenever possible, repair of irrigation equipment should be done with the originally specified materials or their equivalents so that original performance and efficiency can be maintained for longer periods. (See Section Six for more Irrigation information.)



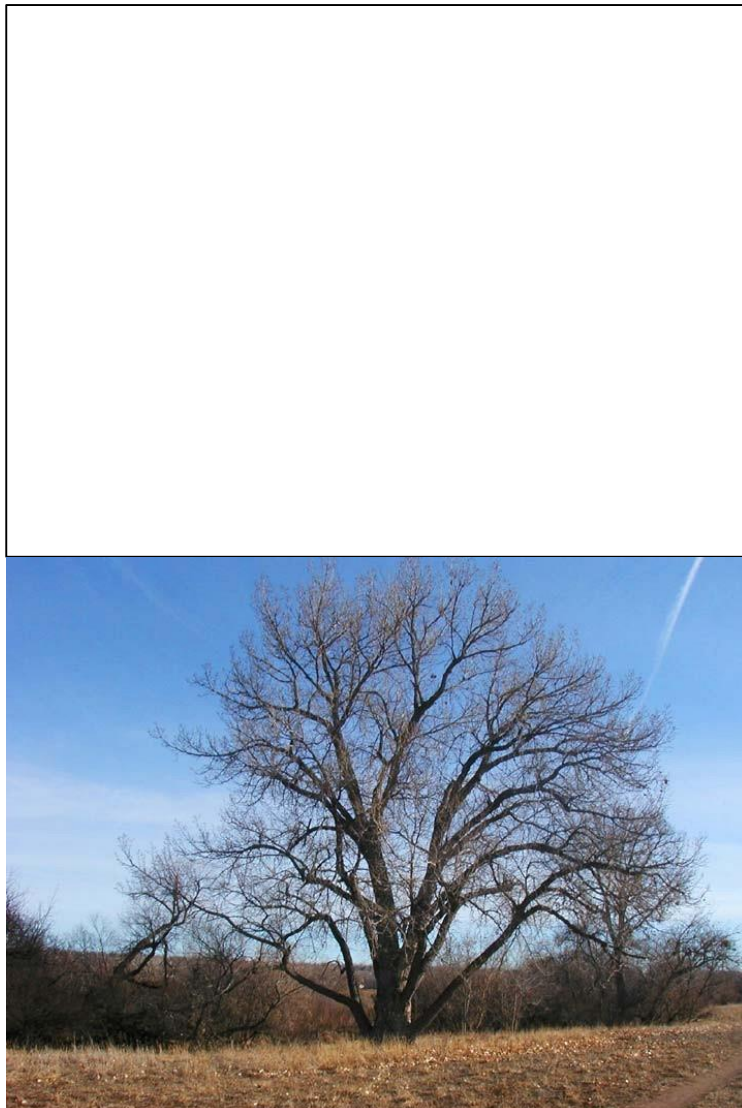
Garden Maintenance

Principle #8 – Preserve existing landscape and natural areas.**Guidelines**

- A. Where possible preserve existing native remnant plant communities and site conditions that support them.
- B. Where possible preserve healthy trees – established plants have often developed a root system that is adapted to lower water conditions.
- C. Local native plants and plants with documented lower water requirements should be given priority in landscape design. A native plant is a species that “occurs naturally in a particular region, state, ecosystem, and habitat without direct or indirect human action” (Federal Native Plant Conservation Committee, 1994). A local native plant is derived from “a population or ecotype of the native plant species that was grown from genetically local plant materials” (Colorado Native Plant Society).
- D. Use of native plants in the landscape supports local biodiversity, helps sustain local wildlife, enhances recreation experience, supports remnant native plant communities and reduces water consumption.

Natural Area

- E. All landscapes have the potential to impact native communities through transport of and plant propagules by wind and storm drainage.



have
plant
seeds
wind

- Landscapes adjacent to native sites are particularly critical due to the potential of direct spread, but all projects (public or private) should not harbor or install exotic horticultural plant species that are known to be invasive and therefore threaten natural areas. A complete list of threatening plants to avoid is provided by the Colorado Native Plant Society web site: <http://carbon.cudenver.edu/~shill/species_avoid.pdf>.
- F. Landscapes adjacent to native areas should emphasize the use of species with low fuel volume of low flammability. Mowing management can be used to limit build up of flammable plant materials. Information on the fire-resistance of some native plants can be found at <www.ext.colostate.edu/PUBS/NATRES/06307.html>.
- G. Remove species that are designated state noxious weeds, especially ornamental species such as purple loosestrife, oxeye daisy, tamarisk, myrtle spurge and yellow toadflax. See Section Four below for the 2003 list of noxious weeds for Colorado, or for more information see the “Noxious Weed List (Rules and Regulations)” at <www.ag.state.co.us/DPI/weeds/weed.html>.

For more information please refer to Section 4, Natural Areas and Native Plants.

WaterWise Landscaping Best Practices

Section 3 – WaterWise Plant Lists

A. The Four Hydrozones – WaterWise Plant Groupings

The key to WaterWise landscaping is to arrange plants in appropriate locations and not to interplant them with others that have very different, lower water requirements. This grouping of plants into “hydrozones” is based on their water requirements, and allows them to be irrigated efficiently. The following list shows how to group plants based their water needs.

Due to variability in plant water requirements due to location of the plant on a site, a range of hydrozone categories has been shown for many plants. For purposes of calculating the water budget for each hydrozone, the lowest hydrozone category for each plant shall be used.

High Water need

example: Bluegrass turf – always wet at the surface

uses 18-20 gals./ S.F./season = 3 waterings per week totaling 5 inches (in July)

Moderate Water need

example: turf-type Tall Fescue – ½ the water of Bluegrass turf

uses 10 gals./S.F./ season = ¾ inches of water, once per week

Low Water need

example: Buffalograss turf – needs rain and occasional watering

uses 0-3 gals./S.F./season = ½ inch of water per 2 weeks, optional

Very Low Water need

example: too dry for any turf grass (drier than Denver)

no irrigation required

B. Colorado WaterWise Plant List Summary

1. Shrubs (Deciduous, Rocky Mountain Natives)
2. Shrubs (Deciduous, Introduced to the region)
3. Trees (Deciduous, Rocky Mountain Natives)
4. Trees (Deciduous, Introduced to the region)
5. Evergreens (Coniferous Trees)
6. Evergreens (Coniferous Shrubs)
7. Evergreens (Non-coniferous)
8. Vines
9. Groundcovers (Including turf & meadow grasses)
10. Selected Perennials

The complete Plant Lists are provided on the following pages.

Copying and use of this list is encouraged, only if the following note, & the water needs of plants are included.

For more information see... **WaterWise Landscaping with Trees, Shrubs, and Vines**

Jim Knopf, Chamisa Books

SHRUBS

(Deciduous Rocky Mountain Natives)

[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based on their water needs.
Reference Location: Denver. Numbers illustrate typical conditions.

* = Plants with potential, but requiring caution due to limited history in Rocky Mountain landscaping.

HIGH WATER	MODERATE WATER	LOW WATER	VERY LOW WATER
Reference plant: Bluegrass turf (Always wet at surface)	Reference plant: Turf-type Tall Fescue (Half of Bluegrass turf)	Reference plant: Buffalograss turf (Like Denver without irrigation)	Reference plant: Too dry for any turf (drier than Denver)
18-20 gals./S.F./season July: 5" -- 3 times per week	10 gals./S.F./season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation

Acer•glabrum	Rocky Mountain Maple	(M-H)
Acer•grandidentatum	Bigtooth Maple, Wasatch Maple	(M)
Alnus•tenuifolia	Rocky Mountain Alder	(H)
Amelanchier•alnifolia	Rocky Mtn. Serviceberry	(M+/-)
Amelanchier•utahensis *	Utah Serviceberry	(VL- M)
Amorpha•canescens	Lead Plant	(L- M)
Amorpha•fruticosa	False Indigo	(M +/-)
Amorpha•nana	Dwarf Lead Plant	(L- M)
Atriplex•canescens	Four-wing Saltbush	(VL-L)
Atriplex•confertifolia	Shadscale	(VL-L)
Betula•fontinalis	Rocky Mtn. River Birch	(H)
Betula•glandulosa	Bog Birch	(H)
Ceratoides•lanata *	Winterfat	(L)
Cercocarpus•montanus	Deciduous Mountain Mahogany	(L- M)
Chamaebatiaria•millefolium	Fernbush	(VL-L)
Chrysothamnus•spp.	Rabbitbrush species	(VL-L)
Cornus•sericea (now C. stolonifera)		
Cornus•stolonifera	Redtwig Dogwood	(H)
Corylus•cornuta	Beaked Hazelnut	(H- M)
Crataegus•var.occidentalis *	Native Hawthorn	(M+/-)
Crataegus•erythropoda *	(syn.? C. s. var. occidentalis)	(M+/-)
Crataegus•succulenta•var. macrantha *	Native Hawthorn	(M+/-)
Fallugia•paradoxa	Apache Plume	(VL-L)
Fendlera•rupicola	Cliff Fendlerbush	(L- M)
Forestiera•neomexicana	New Mexico Privet	(M+/-)
Fraxinus•anomala	Singleleaf Ash	(L)
Holodiscus•dumosus	Rock Spray	(L- M)
Jamesia•americana	Jamesia	(M - H)
Lonicera•involucrata	Twinberry	(H)
Lycium•pallidum *	Pale Wolfberry	(L)
Ostrya•knowltonii *	Western Hop Hornbeam	(M+/-)

Parryella•filifolia *	Dunebloom	(M+/-)
Pentaphylloides•floribunda	= Potentilla•fruticosa	
Peraphyllum•ramosissimum *	Squaw Apple	(L - M)
Philadelphus•lewisii	Lewis's Mockorange	(M+/-)
Philadelphus•microphyllus	Littleleaf Mockorange	(M+/-)
Physocarpus•monogynus	Mountain Ninebark	(M+/-)
Poliomintha•incana *	Purple Sage	(VL-L)
Potentilla•fruticosa	Shrubby Potentilla	(M - H)
Prunus•americana	Wild Plum	(M+/-)
Prunus•besseyi	Sand Cherry	(L-M)
Prunus•pensylvanica *	Pin Cherry	(M+/-)
Prunus•pensylvanica•saximontana *	Dwarf Pin Cherry	(M+/-)
Prunus•virginiana	Chokecherry	(M - H)
Ptelea•trifoliata	Hoptree	(M+/-)
Purshia•tridentata	Bitterbrush	(L - H)
Quercus•gambelii	Gambel's Oak	(M+/-)
Quercus•turbinella *	Turbinella Oak	(L - M)
Quercus•undulata *	Wavyleaf Oak	(L - M)
Rhamnus•smithii *	-----	(M+/-)
Rhus•glabra	Smooth Sumac	(L - M)
Rhus•glabra•var. cismontana	Rocky Mountain Smooth Sumac	(L-M)
Rhus•glabra•'Laciniata'	Cutleaf Smooth Sumac	(L-M)
Rhus•microphylla *	Littleleaf Sumac	(L-M)
Rhus•trilobata	Three-leaf Sumac	(L - M)
Ribes•aureum	Golden Currant	(M+/-)
Ribes•cereum *	Squaw Currant	(M+/-)
Ribes•inerme	Whitestem Gooseberry	(M+/-)
Rosa•woodsii	Wood's Rose	(M+/-)
Rubus•deliciosus	Boulder Raspberry	(M+/-)
Rubus•idaeus•var. strigosus	Wild Raspberry	(M - H)
Rubus•parviflorus *	Thimbleberry	(M - H)
Salix•irrorata	Bluestem Willow	(H)
Sambucus•caerulea *	Blue Elderberry	(H)
Sambucus•melanocarpa *	Blackbead Elderberry	(H)
Sambucus•racemosa *	Red Elderberry	(H)
Sarcobatus•vermiculatus *	Greasewood	(VL-L)
Shepherdia•argentea	Silver Buffaloberry	(M+/-)
Shepherdia•canadensis *	Buffaloberry	(M+/-)
Sorbus•scopolina *	Rocky Mtn. Mountain Ash	(M - H)
Symphoricarpos•albus	Snowberry	(M+/-)
Symphoricarpos•orbiculatus *	Coralberry	(M+/-)
Tetradymia•canescens *	Gray Horsebrush	(L)

SHRUBS

(Deciduous, Introduced)
[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based their water needs.
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18-20 gals./ S.F./season July: 5" -- 3 times per week	10 gals./S.F./ season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation
Abelia•chinensis *	Chinese Abelia (China)	(M-H)	
Abelia•x•grandiflora *	Abelia (origin unknown)	(M-H)	
Abeliophyllum•distichum *	----- (Korea)	(M+/-)	
Acanthopanax•senticosus *	Syn. Elentherococcus s.		
Acanthopanax•sieboldianus *	= Elentherococcus•sieboldianus		
Acer•azimovii * (= A.•ovczimmikovii?)	Azimov Maple	(M+/-)	
Acer•campestre *	Hedge Maple (e. Europe & w. Asia)	(M-H)	
Acer•ginnala	= Acer•tataricum•ssp.•ginnala		
Acer•maximowiczianum *	----- (China-Mongolia-Korea)	(M-H)	
Acer•semenovii *	= Acer•tataricum•ssp.•semenovii		
Acer•tataricum	Tatarian Maple (A. Minor, se. Asia)	(L-M)	
Acer•tataricum•ssp.•ginnala	Ginnala Maple (c. Asia)	(L-M)	
Acer•tataricum•ssp.•semenovii *	Turkestan Maple (c. Asia)	(L-M)	
Aesculus•parviflora *	Bottlebrush Buckeye (Ga., Ala.)	(H)	
Aesculus•sylvatica *	----- (se. USA)	(H)	
Alnus•cordata *	Italian Alder (Corsica, s. Italy)	(H)	
Alnus•glutinosa *	European Alder (Eur., n. Africa, Turkey)	(H)	
Alnus•rubra (was A.•oregona) *	Oregon Alder (w. N. Am.)	(H)	
Amelanchier•stolonifera *	Running Serviceberry (ne. N. Am.)	(H)	
Aralia•elata *	Angelica Tree (Jap., Kor., Manch.)	(M-H)	
Aralia•spinosa *	Devil's Walkingstick (e. USA)	(M-H)	
Aronia•melanocarpa	Chokeberry (e. N. America)	(M+/-)	
Artemisia•abrotanum	Southernwood (s. Europe)	(M+/-)	
Atraphaxis•caucasica *	----- (Transcaucasica)	(M+/-)	
Atraphaxis•pyrifolia *	----- (c. Asia)	(L)	
Berberis•koreana *	Korean Barberry (Korea)	(M+/-)	
Berberis•oblonga *	----- (Turkestan)	(M-L)	
Berberis•thunbergii	Japanese Barberry (Jap.)	(M-H)	
Buddleja•alternifolia *	Butterflybush (nw. China)	(M+/-)	
Buddleja•davidii	Butterflybush (China)	(M+/-)	
Buddleja•globosa *	----- (Chile, Argentina, Peru)	(M+/-)	
Buddleja•x•Lochinch' *	----- (hort. hybrid)	(M+/-)	
Callicarpa•bodineri *	Beauty Berry (c. & w. China)	(M+/-)	
Callicarpa•dichotoma *	Korean Beautyberry (e. USA)	(H)	

<i>Calycanthus•occidentalis</i> *	California Allspice (sw. USA)	(H)
<i>Calycanthus•chinensis</i> *	----- (e. China)	(H)
<i>Calycanthus•floridus</i> *	Carolina Allspice (se. USA)	(H)
<i>Caragana•arborescens</i>	Siberian Peashrub (c. Asia - Mongolia)	(L-M)
<i>Caragana•aurantiaca</i> *	Dwarf Peashrub (Sib., Afghan., Turkestan)	(L-M)
<i>Caragana•frutex</i> *	Russian Peashrub (c. Asia, Siberia)	(L-M)
<i>Caragana•maximowicziana</i> *	----- (Tibet, n. China)	(L-M)
<i>Caragana•microphylla</i>	----- (nw. China, Sib.)	(L-M)
<i>Caragana•pygmaea</i> *	----- (nw. China)	(L-M)
<i>Caragana•sinica</i> *	Chinese Peashrub (n. China)	(L-M)
<i>Caryopteris•incana</i> *	----- (China, Jap.)	(L-M)
<i>Caryopteris•mongolica</i> *	----- (n. China, Mong.)	(L-M)
<i>Caryopteris•x•clandonensis</i>	Bluemist Spirea (hort. hybrid)	(L-M)
<i>Ceanothus•sanguineus</i> *	Oregon Tea (Cal. to BC)	(H)
<i>Cerasus•verrucosa</i> *	----- (Tajikistan)	(L-M)
<i>Cercis•griffithii</i> *	Griffith's Redbud (c. Asia)	(L-M)
<i>Chaenomeles•japonica</i> *	Dwarf Quince (Japan)	(M+/-)
<i>Chaenomeles•lagenaria</i>	= <i>C. speciosa</i>	
<i>Chaenomeles•speciosa</i> *	Flowering Quince (China, Japan)	(M+/-)
<i>Chamaecytisus•hirsutus</i> *	----- (Sib.-n. China)	(M+/-)
<i>Chilopsis•linearis</i> *	Desert Willow (desert southwest)	(L-M)
<i>Chimonanthus•praecox</i> *	Fragrant Wintersweet (China)	(H)
<i>Chionanthus•retusus</i>	Chinese Fringe Tree (China, Kor. Taiwan)	(H)
<i>Chionanthus•virginicus</i>	Fringe Tree (e. N. America)	(M-H)
<i>Clematis•heracleifolia</i> •var. <i>•davidiana</i> *	----- (e. China)	(M-H)
<i>Clerodendrum•trichotomum</i> *	Glory Bower (Japan)	(H)
<i>Clethra•alnifolia</i> *	Summer-sweet (e. N. America)	(H)
<i>Clethra•delavayi</i> *	Summer-sweet (w. China)	(M+/-)
<i>Cornus•alba</i> • <i>Elegantissima</i> '	Variegated R'twig Dog'd (Sib., n. Chi., Kor.)	(H)
<i>Cornus•alternifolia</i>	Pagoda Dogwood (e. N. America)	(H)
<i>Cornus•amomum</i> *	Silky Dogwood (e. N. America)	(M-H)
<i>Cornus•controversa</i> *	Giant Dogwood (Japan, China, Him.)	(H)
<i>Cornus•kousa</i> *	----- (Japan, Korea, China)	(M-H)
<i>Cornus•kousa</i> •var. <i>•chinensis</i> *	----- (China)	(H)
<i>Cornus•mas</i> *	Cornelian Cherry (c. Europe-w. Asia)	(M-H)
<i>Cornus•racemosa</i> *	Gray Dogwood (ne. N Am)	(M-H)
<i>Cornus•sericea</i> (now <i>C. stolonifera</i>)	(See: Native Rocky Mtn. deciduous shrubs)	
<i>Cornus•stolonifera</i> • <i>Flaviramea</i> '	Yellowtwig Dogwood (N. Am.)	(H)
<i>Coronilla•emerus</i> *	Scorpion Senna (s. Norway, Spain, Greece)	(M-H)
<i>Corylopsis•pauciflora</i> *	Winter Hazel (Japan, Taiwan)	(H)
<i>Corylopsis•sinensis</i> *	Chinese Winter Hazel (c. China)	(M+/-)
<i>Corylopsis•spicata</i> *	Japanese Winter Hazel (Japan)	(H)
<i>Corylus•avellana</i> *	European Hazel (Europe)	(M-H)
<i>Corylus•chinensis</i> *	Chinese Hazel (sw. China)	(H)
<i>Corylus•maxima</i> *	Filbert (se. Eur., A. Minor)	(H)
<i>Cotinus•coggygia</i>	Smoke Tree (s. Europe-Asia)	(M+/-)
<i>Cotinus•obovatus</i> *	American Smoketree (s. USA)	(M-H)
<i>Cotoneaster•actuifolius</i>	Peking Cotoneaster (n. China)	(M+/-)
<i>Cotoneaster•apiculatus</i>	Cranberry Cotoneaster (China)	(M+/-)
<i>Cotoneaster•bullatus</i> *	----- (w. China)	(M+/-)
<i>Cotoneaster•divaricatus</i>	Spreading Cotoneaster (China)	(M+/-)
<i>Cotoneaster•franchetii</i> *	----- (sw. China, Tibet)	(M-H)
<i>Cotoneaster•horizontalis</i>	Rock Cotoneaster (w. China)	(M+/-)
<i>Cotoneaster•ignavus</i> *	----- (e. Turkestan)	(M+/-)
<i>Cotoneaster•multiflorus</i> •	Many-flowered Cotoneaster (nw. China)	(M+/-)
<i>Cotoneaster•racemiflorus</i> • <i>songaricus</i> *	----- (c. Asia)	(M+/-)
<i>Cotoneaster•simonsii</i> *	----- (Himal., Sikkim, Nepal)	(M-H)
<i>Crataegus</i> • <i>x</i> • <i>mordanensis</i> • <i>Toba</i> '	Toba Hawthorn (hort. hybrid)	(M+/-)
<i>Cudrania•tricuspidata</i> *	Chinese Silkworm Thorn (China)	(H)
<i>Cydonia•oblonga</i> *	Quince (n. Persia)	(M+/-)
<i>Cydonia•sinensis</i> *	= <i>Pseudocydonia•sinensis</i>	

Cyrilla•racemiflora *	Leatherwood (e. N. America)	(H)
Cytisus•albus *	= Cytisus•multiflorus	
Cytisus•decumbens *	Prostrate Broom (s. Europe)	(L-M)
Cytisus•hirsutus	= Chamaecytisus•hirsutus	
Cytisus•multiflorus *	Portuguese Broom (se. Europe)	(L-M)
Cytisus•purgans *	----- (s. Eur. - n. Afr.)	(L-M)
Cytisus•scoparius *	Scotch Broom (c. & s. Europe)	(L-M)
Cytisus•x•praecox *	Warminster Broom (hort. hybrid)	(L-M)
Dalea•formosa *	Feather Plume (w. Tex., Okl., Colo.)(L	
Dalea•frutescens *	Black Dalea (w. Tex., Okla.)	(L)
Dalea•scoparia *	Broom Dalea (w. Tex., N. Mex., Az.)	(L)
Daphne•caucasica *	Caucasian Daphne (Caucasus)	(M+/-)
Daphne•genkwa *	----- (China)	(M+/-)
Daphne•giraldii *	Daphne (nw. China)	(M+/-)
Daphne•mezereum *	February Daphne (Europe, w. Asia)	(M+/-)
Decaisnea•fargesii *	----- Bluebean Shrub (w. China)	(M-H)
Deutzia•gracilis *	Slender Deutzia (Japan)	(M-H)
Deutzia•scabra *	Fuzzy Deutzia	(M-H)
Deutzia•x•lemoinei *	Lemoine Deutzia (Hort. hybrid)	(M-H)
Diervilla•lonicera *	----- (e. N. America)	(H)
Diervilla•sessilifolia *	Southern Bush-honeysuckle (se. USA)	(H)
Dipelta•floribunda *	----- (c. & w. China)	(M+/-)
Dipteronia•sinensis *	----- (China)	(M+/-)
Disanthus•cercidifolius *	----- (China, Jap.)	(H)
Elaeagnus•multiflora *	Cherry Elaeagnus (Jap., China)	(M-H)
Elentherococcus•sieboldianus *	----- (Jap., China)	(M+/-)
Eleutherococcus•senticosus *	Siberian Ginseng (ne. Asia)	(M-H)
Elsholtzia•stauntonii *	Mint Shrub (n. China)	(M+/-)
Euonymus•atropurpureus *	Wahoo (NY to Fla, Minn. to Tex.)	(M-H)
Euonymus•alatus	Burning Bush Euonymus (China, Jap., Kor.)	(M+/-)
Euonymus•bungeanus *	Winterberry (China, Korea, Manch., Jap.)	(M+/-)
Euonymus•europaeus *	Spindletree (Europe)	(M-H)
Euonymus•nanus•v.•turkestanicus *	Turkestan Euonymus (Caucasus - w. China)	(M+/-)
Euonymus•phellomanus *	----- (n. & w. China)	(M+/-)
Euonymus•sachalinensis *	Sakhalin Euonymus (ne. Asia)	(M+/-)
Exochorda•albertii (now E. korolkowii)		
Exochorda•giraldii *	Pearlbush (c. China)	(M+/-)
Exochorda•korolkowii *	Pearlbush (Uzbekistan, Tajikistan)	(M+/-)
Exochorda•racemosa *	Common Pearlbush (n. China)	(M-H)
Exochorda•serratifolia *	Pearlbush (Korea, Manchuria)	(M+/-)
Exochorda•x•macrantha *	Pearlbush (hort. hybrid)	(M+/-)
Fontanesia•phillyreoides•ssp.•fortunei *	----- (China)	(M+/-)
Forsythia•mandschurica *	Manchurian Forsythia (Manch.)	(M+/-)
Forsythia•ovata *	Early Forsythia (Korea)	(M+/-)
Forsythia•suspensa *	Forsythia (China)	(M+/-)
Forsythia•x•intermedia	Forsythia (hort. hybrid)	(M+/-)
Fothergilla•gardenii *	Fothergilla (Va. - Ga.)	(H)
Fothergilla•major *	----- (Allegheny Mts.)	(H)
Genista•tinctoria *	----- (Europe, w. Asia)	(L-M)
Halimodendron•halodendron *	Salt Tree (se. Russia-c. & w. Asia)	(VL-L)
Hamamelis•japonica *	Japanese Witch Hazel (Japan)	(H)

Hamamelis•mollis *	Chinese Witch Hazel (w. China)	(H)
Hamamelis•vernalis *	Witch Hazel (s.e. N. America)	(H)
Hamamelis•virginiana *	Common Witch Hazel (Canada to Georgia)	(H)
Heptacodium•miconioides *	----- (China)	(M+/-)
Hibiscus•syriacus	Rose-of-Sharon Hibiscus (China, India)	(M+/-)
Hippophaë•rhamnoides	Sea Buckthorn (Eurasia)	(M-H)
Holodiscus•discolor *	Rock Spirea (s. Ore.-s. Calif.)	(M+/-)
Hydrangea•arborescens	Hills-of-snow Hydrangea (e. USA)	(H)
Hydrangea•involucrata *	----- (Japan)	(H)
Hydrangea•paniculata	Peegee Hydrangea (China, Japan)	(H)
Hydrangea•quercifolia *	Oakleaf Hydrangea (se. USA)	(H)
Hydrangea•serrata *	----- (Jap., Korea)	(M-H)
Indigofera•amblyantha *	Pink Indigo (China)	(M+/-)
Indigofera•decora *	White Chinese Indigo (China)	(M+/-)
Indigofera•gerardiana *	= Indigofera•heterantha	
Indigofera•heterantha *	----- (Afghan.-w. China)	(M+/-)
Indigofera•incarnata *	= Indigofera•decora	
Indigofera•kirilowii *	----- (n. China, Korea)	(M+/-)
Indigofera•potaninii *	Potanin Indigo (nw. China)	(M+/-)
Itea•virginica *	Sweetspire (e. USA)	(H)
Jasminum•nudiflorum *	Winter Jasmine (China)	(M+/-)
Kerria•japonica	Kerria (Japan)	(M-H)
Kolkwitzia•amabilis	Beautybush (China)	(M+/-)
Leptodermis•oblonga *	----- (n. China)	(M+/-)
Lespedeza•bicolor *	----- (Japan)	(M+/-)
Lespedeza•thunbergii *	----- (Japan, China)	(M+/-)
Ligustrum•vulgare	Common Privet (Medit. region)	(M+/-)
Lindera•benzoin *	Spicebush (e. USA)	(M)
Lindera•obtusiloba *	----- (Kor., Jap., China)	(M-H)
Lonicera•spinosa *	----- (nw Him., Tibet, e. Turkestan)	(M+/-)
Lonicera•alberti *	----- (Turkestan, Tibet)	(M+/-)
Lonicera•caerulea *	----- (Tibet, e. Siberia)	(M+/-)
Lonicera•chrysantha *	----- (ne. Asia, c. Japan)	(M-H)
Lonicera•etrusca *	----- (Medit. to s. Switzerland)	(M+/-)
Lonicera•fragrantissima *	Winter Honeysuckle (China)	(M-H)
Lonicera•hispida *	----- (Turkestan)	(M+/-)
Lonicera•korolkowii	----- (Mts. c. Asia, Afghan. Pak.)	(M+/-)
Lonicera•maackia *	Amur Honeysuckle (e. Asia)	(M-H)
Lonicera•maximowiczii•v. sachalinensis *	Sakhalin Honeysuckle (Manch, China, Kor.)	(M-H)
Lonicera•microphylla *	----- (nw. Him., Tibet, Sib.)	(M+/-)
Lonicera•morrowii *	Morrow Honeysuckle (Jap.)	(M-H)
Lonicera•pileata *	----- (China)	(M+/-)
Lonicera•quinquelocularis *	----- (Afghan. to Yunnan)	(M+/-)
Lonicera•spinosa•var. alberti *	Fragrant Turkestan Honeysuckle (c. Asia)	(M+/-)
Lonicera•standishii *	Fragrant Winter Honeysuckle (China)	(M+/-)
Lonicera•syringantha	Lilac-scented Honeysuckle (China, Tibet)	(M-H)
Lonicera•tatarica•'Zabelii'	Zabel's Honeysuckle (c. Asia, Afghan.)	(M+/-)
Lonicera•thibetica *	Tibetan Honeysuckle (Tibet., w. China)	(M+/-)
Lonicera•xylostium *	European Fly Honeysuckle (Eurasia)	(M+/-)
Lonicera•x•Xylostoides *	----- (garden origin)	(M+/-)
Lycium•chinense *	Chinese Wolfberry (e. Asia)	(M-H)

Magnolia•sieboldii *	Oyama Magnolia (Jap., Korea, w. China)	(H)
Magnolia•stellata	Star Magnolia (c. Japan)	(H)
Myrica•pensylvanica *	Bayberry (e. N. America)	(H)
Neillia•thibetica *	----- (Himalaya Mts.)	(M+/-)
Neviusii•alambamensis *	----- (se. USA)	(H)
Orixa•japonica *	----- (Japan, China, Korea)	(M+/-)
Paeonia•lutea *	Tree Peony (China, Tibet)	(M+/-)
Paeonia•suffruticosa *	Tree Peony (China, Tibet)	(M+/-)
Parrotia•persica *	----- (Persia)	(M+/-)
Parrotiopsis•jacquemontiana *	----- (Himalaya)	(M-H)
Philadelphus•coronarius +	Sweet Mockorange (Europe, sw. Asia)	(M+/-)
Philadelphus•x•virginalis +	----- (Hort. Hybrid)	(M+/-)
Photinia•villosa *	Oriental Photinia (China, Korea, Jap.)	(M-H)
Physocarpus•opulifolius	Dwarf Ninebark (e. N. America)	(M+/-)
Poncirus•trifoliata *	Trifoliate Orange (c. & n. China)	(M-H)
Prinsepia•sinensis *	----- (Manchuria)	(M+/-)
Prinsepia•uniflora *	----- (nw. China)	(M+/-)
Prunus•andersonii *	Desert Peach (sw. U.S.A.)	(L-M)
Prunus•cerasifera	Cherry Plum (A. Minor, Cauc.)	(M+/-)
Prunus•cerasifera•'Newport'	Newport Plum (garden origin)	(M+/-)
Prunus•fruticosa *	European Dwarf Cherry (Eur., Siberia)	(M+/-)
Prunus•nigra *	Canada Plum (ne. N. Am.)	(M-H)
Prunus•padus *	Bird Cherry (Eurasia)	(M+/-)
Prunus•tomentosa	Nanking Cherry (n. w. China, Tib. Kashmir)	(M-H)
Prunus•x•cistena	Cistena Plum (hort. hybrid)	(M+/-)
Pseudocdonia•sinensis *	Quince (China)	(M+/-)
Purnus•fasciculata *	Desert Almond (sw. USA)	(VL-L)
x•Pyracomeles•vilmorinii *	(Pyracanthus•crenatoserrataXOsteomeles•subrotunda)	(M+/-)
Rhamnus•dahuricus *	Common Buckthorn (e. Russia to Japan)	(M+/-)
Rhamnus•frangula	Glossy Buckthorn (Eur., Turk., n. Afr.)	(M+/-)
Rhamnus•frangula•'Asplenifolia' *	----- (Hort. Cultivar)	(M+/-)
Rhodotypos•scandens *	Jetbead (Japan, China)	(H)
Rhus•punjabensis *	----- (c., w. China)	(M+/-)
Rhus•typhina	Staghorn Sumac (e. N. America)	(M+/-)
Rhus•typhina•'Laciniata'	Cutleaf Staghorn Sumac (?)	(M+/-)
Ribes•alpinum	Alpine Currant (w. Europe)	(M-H)
Ribes•nevadense *	Sierra Currant (Ore., Cal., Nev.)	(M+/-)
Rosa•banksiae *	Banksia Rose (w. & c. China)	(M+/-)
Rosa•davidii *	David's Rose (w. & c. China)	(M+/-)
Rosa•ecae *	----- (c. Asia)	(M+/-)
Rosa•filipes *	----- (w. China)	(M+/-)
Rosa•foetida•'Bicolor'	Austrian Copper Rose (c. Asia)	(M-L)
Rosa•foetida•'Persiana'	Persian Yellow Rose (s.w. Asia)	(M-L)
Rosa•glauca	Redleaf Rose (c. & s. Europe)	(M+/-)
Rosa•helenae *	Helen Wilson's Rose (c. China)	(M+/-)
Rosa•hugonis	= R. xanthira•f. hugonis	
Rosa•kokanica *	----- (c. Asia, China)	(M+/-)
Rosa•laxa *	----- (c. Asia, nw. China)	(M+/-)
Rosa•moyesii *	Moyes Rose (w. China)	(M+/-)
Rosa•moyesii *	Moyes Rose (w. China)	(M+/-)
Rosa•persica *	Persian Rose (Persia, Afghan., c. Asia)	(M+/-)
Rosa•pulverulenta *	----- (s. Eur. to Afghanistan)	(M+/-)
Rosa•rubrifolia (now R. glauca)		

Rosa•rugosa	Rugosa Rose (e. Russia)	(M+/-)
Rosa•sericea *	----- (c. Asia, w. China)	(M+/-)
Rosa•setigera *	Prairie Rose (e. & c. USA)	(M+/-)
Rosa•webbiana	----- (c. Asia, Afghan, Kashmir.)	(M+/-)
Rosa•wichuriana *	----- (e. Asia)	(M+/-)
Rosa•xanthina•f. hugonis	Father's Rose (c. China)	(M+/-)
Rosa•x•harisonii *	Harison's Yellow Rose (Hort. hybrid)	(M+/-)
Salix•discolor	Pussy Willow (e. N. America)	(H)
Salix•matsudana•'Tortuosa'	Corkscrew Willow (China, Japan)	(H)
Sambucus•canadensis	Elderberry (e. N. America)	(H)
Sibiraea•altaiensis *	----- (w. China to Balkans)	(L-M)
Sibireae•laevigata	= Siberaea•altaiensis	
Sophora•davidii *	Father David's Sophora (China)	(L-M)
Sorbaria•sorbifolia	Ural False Spirea (Sib., Manch., Korea, Jap.)	(M+/-)
Sorbaria•tomentosa•v. angustifolia *	----- (Afghan., Pak., Kashmir)	(L-M)
Spiraea•betulifolia•var. lucida *	----- (B.C., Ore., Wyo., Mon.)	(M+/-)
Spiraea•cantoniensis *	----- (China)	(M+/-)
Spiraea•douglasii *	----- (B.C. to n. Cal.)	(M+/-)
Spiraea•japonica *	----- (Japan, China)	(M+/-)
Spiraea•japonica•'Albiflora' *	----- (Japan)	(M+/-)
Spiraea•japonica•'Anthony•Waterer'	Anthony Waterer Spirea (garden origin)	(M+/-)
Spiraea•japonica•'Bumalda'	----- (Hort. cultivar)	(M+/-)
Spiraea•japonica•'Froebelii'	Froebel's Spirea (garden origin)	(M+/-)
Spiraea•nipponica *	----- (Japan)	(M+/-)
Spiraea•trilobata	----- (n. Sib., Turkestan, n. China)	(L-M)
Spiraea•wilsonii *	----- (c. & w. China)	(M+/-)
Spiraea•x•vanhouttei	Vanhoutte Spirea (hort. hybrid)	(M+/-)
Spiraea•x•arguta*	Garland Spirea (garden origin)	(M+/-)
Staphylea•trifolia*	Bladdernut (e. USA)	(M-H)
Staphylea•holocarpa *	Oriental Bladdernut (China)	(H)
Staphylea•pinnata *	European Bladdernut (c., se. Eur. A. Minor)	(H)
Stephanandra•incisa *	Lace Shrub (Jap., Korea, Taiwan)	(H)
Stephanandra•tanakae *	Lace Shrub (Japan)	(M-H)
Stephylea•bumalda *	Japanese Bladdernut (Japan)	(M-H)
Symphoricarpos•x•chenaultii•'Hancock' +	Hancock Coralberry (garden origin)	(M+/-)
Symplocos•paniculata *	Sapphireberry (Pakistan to Korea)	(M +/-)
Syringa•amurensis *	= Syringa•reticulata•v. mandschurica	
Syringa•joskiae *	Hungarian Lilac (Hungary)	(M+/-)
Syringa•meyerii *	----- (n. China)	(M+/-)
Syringa•microphylla *	Littleleaf Lilac (n. China)	(M+/-)
Syringa•oblata *	Early Lilac (n. China)	(M+/-)
Syringa•patula *	----- (Korea, China)	(M+/-)
Syringa•persica	Persian Lilac (Persia)	(M+/-)
Syringa•persica•'Laciniata' *	Cutleaf Persian Lilac (Persia ?)	(M+/-)
Syringa•reflexa *	Nodding Lilac (c. China)	(M+/-)
Syringa•reticulata•'Miss•Kim'	Miss Kim Lilac (hort. hybrid)	(M+/-)
Syringa•sweginzowii *	Chengtu Lilac (nw. China)	(M+/-)
Syringa•velutina *	Korean Lilac (Korea)	(M+/-)
Syringa•villosa	----- (China)	(M+/-)
Syringa•vulgaris	Common Lilac (s.e. Europe)	(M+/-)
Syringa•wolfii *	Wolf's Lilac (Korea, Manchuria)	(M+/-)
Syringa•x•chinensis	----- (hort. hybrid)	(M+/-)
Syringa•x•laciniata	Cutleaf Lilac (sw. Asia)	(M+/-)
Syringa•x•prestoniae *	----- (Canadian hort. origin)	(M+/-)
Viburnum•burejaeticum *	----- (n. China, Korea, Russia)	(M-H)
Viburnum•carlesii	Korean Spice Viburnum (Korea, Jap.)	(M-H)
Viburnum•cassinoides *	Witherod Viburnum (e. N. Am.)	(H)

Viburnum•dentatum	Arrowwood Viburnum (e. N. America)	(H-M)
Viburnum•dilatatum *	Linden Viburnum (China, Jap.)	(H)
Viburnum•farreri *	Fragrant Viburnum (n. China)	(H)
Viburnum•lantana	Wayfaring Vib. (Eur., n. Afr., Cauc. A. Minor)	(M+/-)
Viburnum•lentago	Nannyberry (e. N. America)	(M-H)
Viburnum•opulus	European Highbush Cranberry (Eurasia)	(H)
Viburnum•opulus•'Compactum'	----- (cultivar)	(H)
Viburnum•opulus•'Roseum'	European Snowball Viburnum	(H)
Viburnum•plicatum *	----- (Jap., China)	(H-M)
Viburnum•plicatum•'Sterile' *	Japanese Snowball Viburnum (Jap. China)	(H)
Viburnum•plicatum•form•'tomentosum' *	Doublefile Viburnum (Jap., China)	(H)
Viburnum•prunifolium	Black Haw (e. N. Am.)	(M-H)
Viburnum•sargentii *	Sargent's Vib. (e. Sib., n. & w. China, Jap.)	(M-H)
Viburnum•setigerum *	Tea Viburnum (c. & w. China)	(M+/-)
Viburnum•sieboldii *	----- (Japan)	(H)
Viburnum•trilobum	American Highbush Cranberry (N. America)	(H)
Viburnum•trilobum•'Compactum'	----- (cultivar)	(H)
Viburnum•x•bodnantense•'Pink•Dawn' *	----- (hort. hybrid)	(M-H)
Viburnum•x•carlcephalum	----- (hort. hybrid)	(M-H)
Vitex•agnus-castus•f. latifolia *	Hardy Chaste Tree (s. Europe to c. Asia)	(L-M)
Vitex•negundo•var. heterophylla *	Cutleaf Chaste Tree (n. China, Mongolia)	(M+/-)
Vitex•rotundifolia *	----- (Asia to Australia)	(M+/-)
Weigela•florida	Weigela (n. China, Korea, Jap.)	(H)
Weigela•middendorffiana *	Middendorff Weigela (n. China, Jap.)	(H)
Xanthocerus•sorbifolium	Yellowhorn (n. China)	(M+/-)
Zanthoxylum•piperitum *	Pepper Tree (China, Korea, Jap.)	(M+/-)
Zanthoxylum•schinifolium *	Pepper Tree (China, Korea, Jap.)	(M+/-)
Zanthoxylum•simulan *	----- (China, Taiwan)	(M-H)
Zenobia•pulverulenta *	Dusty Zenobia (N. Carolina-Florida)	

Trees

(Deciduous Rocky Mountain Natives)

[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based on their water needs.
Reference Location: Denver. Numbers illustrate typical conditions.

* = Plants with potential, but requiring caution due to limited history in Rocky Mountain landscaping.

HIGH WATER	MODERATE WATER	LOW WATER	VERY LOW WATER
Reference plant: Bluegrass turf (Always wet at surface)	Reference plant: Turf-type Tall Fescue (Half of Bluegrass turf)	Reference plant: Buffalograss turf (Like Denver without irrigation)	Reference plant: Too dry for any turf (drier than Denver)
18-20 gals./S.F./season July: 5" -- 3 times per week	10 gals./S.F./season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation
Celtis•occidentalis Celtis•reticulata	Hackberry Netleaf Hackberry		(M-H) (M-H)
Fraxinus•cuspidata * Fraxinus•pennsylvanica	Fragrant Ash Green Ash		(M+/-) (M-H)
Populus•angustifolia Populus•deltoides Populus•fremontii Populus•tremuloides Populus•x•acuminata	Narrowleaf Cottonwood Plains Cottonwood Fremont's Cottonwood Aspen Lanceleaf Cottonwood		(H) (H) (H) (H) (H)
Sapindus•drummondii *	Soapberry		(L-M)

Trees

(Deciduous, Introduced)

[Revised April '03]

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Acer•capillipes *	Snake-bark Maple (Japan)	(H)
Acer•cappadocicum *	Caucasian Maple (Cauc., A. Minor, n. India)	(M-H)
Acer•cissifolium *	Ivy-leaved Maple (c. China)	(M-H)
Acer•davidii *	Snake-bark Maple (n. China)	(M-H)
Acer•griseum *	Paperbark Maple (China)	(M-H)
Acer•heldreichii *	Greek Maple (Cauc., Balk., n. Turkey)	(M-H)
Acer•macrophyllum *	Oregon Maple (w. N. Am.)	(H)
Acer•mandschuricum *	Manchurian Maple (Korea, Manch.)	(M-H)
Acer•monspessulanum *	Montpelier Maple (Medit.- c. Asia)	(M+/-)
Acer•palmatum	Japanese Maple (Kor., Jap.)	(H)
Acer•pectinatum	----- (Tibet, w. & c. China)	(M-H)
Acer•platanoides	Norway Maple (Eur. to n. Persia)	(M-H)
Acer•platanoides•ssp. turkestanicum *	Turkestan Maple (c. Asia)	(M+/-)
Acer•pseudoplatanus *	Sycamore Maple (nw. c. Eur. to w. Asia)	(M-H)
Acer•pseudosieboldianum *	Korean Maple (Korea-Manch.)	(H)
Acer•rubrum	Red Maple (e. N. America)	(M-H)
Acer•saccharinum	Silver Maple (e. N. Am.)	(M-H)
Acer•saccharinum'•Laciniatum' +	Cutleaf Silver Maple (hort. cultivar)	(M-H)
Acer•saccharum	Sugar Maple (e. N. America)	(H)
Acer•triflorum *	Three-flowered Maple (Manch., Korea)	(M+/-)
Acer•truncatum *	Shantung Maple (n. China, Manch., Korea)	(H)
Acer•turkestanicum *	= A. platanoides ssp. turkestanicum	
Aesculus•flava	Sweet Buckeye (e. N. America)	(M-H)
Aesculus•glabra	Ohio Buckeye (e. N. America)	(M-H)
Aesculus•hippocastanum	Horse Chestnut (Eurasia)	(M-H)
Aesculus•octandra	= Aesculus•flava	
Aesculus•pavia *	Red Buckeye (se. USA)	(H)
Aesculus•turninata *	Japanese Horsechestnut (Japan)	(M-H)
Aesculus•x•carnea *	Red-flowered Horsechestnut (hort. hybrid)	(M+/-)
Ailanthus•altissima	Tree of Heaven (n. China)	(L-M-H)
Albizia•julibrissin*	Silk Tree (Iran-Japan)	(M+/-)
Amelanchier•asiatica *	Asiatic Serviceberry (China)	(M+/-)
Asimia•triloba *	Paw Paw (ec. USA)	(H?)
Betula•albosinensis *	Chinese Red Birch (c., w., nw. China)	(M-H)
Betula•ermanii *	Russian Rock Birch (ne. Asia)	(H)
Betula•mandshurica•var. japonica *	Japanese White Birch (Jap., Sakhalin Is.)	(H)
Betula•maximowicziana *	Monarch Birch (Jap.)	(H)
Betula•nigra	River Birch (e. USA)	(H)

Betula•papyrifera	Paper Birch (e. N. America)	(H)
Betula•pendula'•Lacinata'	Cutleaf Weeping Eur.. Birch (hort. hybrid)	(H)
Betula•pendula	European Birch (Eur.-w. Asia)	(H)
Betula•utilis•var. •jacquemantii *	Whitebarked Himal. Birch (Kash., c. Nepal)	(M-H)
Carpinus•betulus *	European Hornbeam (Eur.-w. Asia)	(H)
Carpinus•carolinana *	American Hornbeam (e. N. America)	(H)
Carpinus•cordata *	Heartleaf Hornbeam (China)	(M-H)
Carpinus•henryana *	----- (c. China)	(M-H)
Carpinus•japonica *	Japanese Hornbeam (Japan)	(H)
Carpinus•laxiflora *	----- (Jap., Kor., n. & w. China)	(M-H)
Carpinus•orientalis *	Oriental Hornbeam (se. Eur., A. Minor)	(M-H)
Carpinus•tschonoskii *	Yeddo Hornbeam (ne. & sw. China)	(M-H)
Carpinus•turczaninowii *	----- (w. China)	(M+/-)
Carya•illinoensis *	Pecan (Iowa s. to Mexico)	(M+/-)
Carya•laciniosa *	Shellbark Hickory (e. N. America)	(M-H)
Carya•ovata *	Shagbark Hickory (e. N. America)	(H)
Castanea•crenata *	Japanese Chestnut (Jap.)	(H)
Castanea•dentata	American Chestnut (e. N. America)	(H)
Castanea•mollissima *	Chinese Chestnut (China, Korea)	(M-H)
Catalpa•bignonioides *	Southern Catalpa (se. USA)	(H)
Catalpa•bungei *	----- (n. China)	(M+/-)
Catalpa•fargesii *	----- (w. China)	(M+/-)
Catalpa•ovata *	Chinese Catalpa (China)	(H)
Catalpa•speciosa	Catalpa (e. N. America)	(M-H)
Celtis•australis *	Mediterranean Hackberry (Medit., Mid East)	(M+/-)
Celtis•caucasica *	Caucasian Hackberry (Asia Minor-Afghan.)	(M+/-)
Celtis•laevigata	Sugarberry (se. USA)	(M-H)
Cercidiphyllum•japonicum *	Katsura Tree (Japan, w. China)	(H-M)
Cercis•canadensis	Eastern Redbud (e. N. America)	(M-H)
Cercis•reniformis *	Texas Redbud (N. Mex., Tex., Okla.)	(M+/-)
Chitalpa	= x•Chitalpa•tashkentensis	
Cladrastis•lutea *	Yellowwood (se. USA)	(H)
Cladrastis•platycarpa *	Japanese Yellowwood (Jap., China)(H)	
Cladrastis•sinensis *	Chinese Yellowwood (China)	(H)
Corlyus•columna	Turkish Hazel (se. Europe, w. Asia)	(M+/-)
Cornus•walteri *	Walter Dogwood (c. China)	(M-H)
Corylus•americana *	American Hazel (e. N. America)	(H)
Crataegus•altaica'•Hissarica' *	Hissar Hawthorn (Tajikistan)	(M+/-)
Crataegus•ambigua +	Russian Hawthorn (se. Russia)	(M+/-)
Crataegus•arnoldiana *	----- (New England)	(M+/-)
Crataegus•azarolus *	Red Azarole (s. Eur., n. Afr., w. Asia)	(M+/-)
Crataegus•crus-galli	Cockspur Hawthorn (se. N. America)	(M+/-)
Crataegus•laevigata *	English Hawthorn (Eur., n. Afr., India)	(M-H)
Crataegus•maximowiczii *	----- (ne. Asia)	(M±)
Crataegus•mollis	Downy Hawthorn (e. N. America)	(M+/-)
Crataegus•monogyna *	Singleseed Hawthorn (Eur., n. Afr., w. Asia)	(M+/-)
Crataegus•pedicellata *	----- (ne. USA)	(M+/-)
Crataegus•phaenopyrum	Washington Hawthorn (se. N. America)	(M+/-)
Crataegus•pinnatifida *	Chinese Hawberry (c. Asia, Korea)	(M+/-)
Crataegus•rivularis *	----- (Rocky Mtn. States)	(M+/-)
Crataegus•tianshanica *	Tien Shan Hawthorn (c. Asia)	(M+/-)
Crataegus•turkestanica *	Turkestan Hawthorn (Turkestan)	(M+/-)
Crataegus•viridis•Winter•King' *	Winter King Hawthorn (e. USA)	(M+/-)
Crataegus•x•nitida *	Shining Hawthorn (s. USA)	(M+/-)
Cyrrilla•racemiflora *	Leatherwood (e. N. Am. & e. S. Am.)	(H)
x•Chitalpa•tashkentensis *	Chitalpa (Catalpa•bignonioides X Chilopsis•linearis)	(M+/-)
Diospyros•virginiana *	American Persimmon (e. USA)	(M-H)

Eucommia•ulmoides *	Hardy Rubber Tree (c. China)	(M+/-)
Evodia•daniellii *	= Tetradium•daniellii *	
Evodia•hupehensis *	= Tetradium•hupehensis *	
Fagus•grandifolia *	American Beech (e. N. America)	(H)
Fagus•orientalis *	Oriental Beech (se. Eur.-Iran)	(M+/-)
Fagus•sylvatica	European Beech (Europe)	(H)
Fraxinus•americana	White Ash (e. N. America)	(M-H)
Fraxinus•americana•'Autumn•Purple'	Autumn Purple Ash (hort. cultivar)	(M-H)
Fraxinus•angustifolia•'Raywood' *	Raywood Ash (s. Europe-c. Asia, n. Afr.)	(M+/-)
Fraxinus•angustifolia•ssp.•syriaca *	Turkestan Ash (c. Asia, A. Minor)	(M+/-)
Fraxinus•chinensis *	Chinese Ash (China)	(M+/-)
Fraxinus•cuspidata *	Flowering Ash (N. Mex. to Mex.)	(L-M)
Fraxinus•excelsior *	European Ash (Europe, w. Asia)	(M+/-)
Fraxinus•latifolia *	Oregon Ash (w. US)	(M+/-)
Fraxinus•mandshurica *	Manchurian Ash (n. Asia)	(M+/-)
Fraxinus•nigra *	Black Ash (N. Am.)	(M+/-)
Fraxinus•ornus *	Flowering Ash (s. Europe-w. Asia)	(M+/-)
Fraxinus•oxycarpa•'Raywood' *	= F. angustifolia 'Raywood'	
Fraxinus•quadrangulata *	Blue Ash (Mich., to Ark.)	(M-H)
Fraxinus•sieboldiana *	----- (Japan, China)	(M-H)
Fraxinus•sogdiana *	= Fraxinus•angustifolia•ssp.•syriaca	
Fraxinus•velutina *	Velvet Ash (Ariz., N. Mex.)	(M+/-)
Ginkgo•biloba *	Ginkgo, Maidenhair Tree (se. China)	(M-H)
Gleditsia•caspica *	Caspian Honeylocust (Azerbaijan-n. Iran)	(M+/-)
Gleditsia•triacanthos•var.	Honeylocust varieties (c. & e. N. America)	(M-H)
Gymnocladus•dioica	Kentucky Coffeetree (c. & e. N. America)	(M-H)
Halesia•diptera *	Two-winged Silverbell (s. USA)	(H)
Halesia•tetraptera *	Silverbell Tree (se. USA)	(H)
Hemiptelea•davidii *	David Hemiptelea (n. China to Korea)	(M-H)
Hovenia•dulcis *		
Idesia•polycarpa *	----- (Sichuan)	(M-H)
Juglans•ailanthifolia *	Japanese Walnut (Jap.)	(M+/-)
Juglans•ailantifolia *	Heartnut (Japan)	(H)
Juglans•cinerea *	White Butternut (N. America)	(M+/-)
Juglans•mandshurica *	Manchurian Walnut (Manchuria, ne. China)	(M+/-)
Juglans•microcarpa *	Little Walnut (OK., N. Mex., Tex., Kan., Mex.)	(M+/-)
Juglans•nigra	Black Walnut (e. USA)	(M-H)
Juglans•regia•varieties *	Carpathian Walnut varieties (se. Eur. - China)	(M+/-)
Kalopanax•pictus *	= Kalopanax•septemlobus	
Kalopanax•septemlobus *	Castor-aralia (China, Korea, Japan)	(M-H)
Koelreuteria•paniculata	Golden Raintree (n.China, Korea)	(M+/-)
Laburnum•alpinum *	Alpine Golden Chaintree (sc. Europe)	(M-H)
Laburnum•anagyroides *	Common Laburnum (c. & s. Eur.)	(M+/-)
Laburnum•X•'Waterer' *	Waterer Laburnum (hort. hybrid)	(H)
Larix•decidua	European Larch (Alps, Carpathian Mts.)	(H)
Larix•gmelinii *	Dahurian Larch (e. Asia)	(H)

Larix•kaempferi *	Japanese Larch (Japan)	(H)
Larix•laricina	Tamarack (n. N. America)	(H)
Larix•leptolepis *	= Larix•kaempferi	
Larix•occidentalis *	Rocky Mtn. Larch (B.C. to Montana)	(M-H)
Liquidambar•styraciflua *	Sweetgum (e. N. America to c. America)	(H)
Liriodendron•tulipifera *	Tulip Tree (e. N. America)	(H)
Maackia•amurensis *	Amur Maackia (Manchuria, Korea)	(M+/-)
Maackia•chinensis *	----- (c. China)	(M+/-)
Maclura•pomifera *	Osage Orange (Ark., Tex.)	(M+/-)
Magnolia•acuminata *	Cucumber Tree (e. N. AM)	(H)
Magnolia•kobus *	Tree Star Magnolia (Japan)	(M-H)
Magnolia•x•soulangiana	Saucer Magnolia (hort. hybrid)	(H)
Malus•'Hopa'	Hopa Crabapple (hort. cultivar)	(M+/-)
Malus•'Radiant'	Radiant Crabapple (hort. cultivar)	(M+/-)
Malus•'Snowdrift'	Snowdrift Crabapple (hort. cultivar)	(M+/-)
Malus•baccata	Siberian Crabapple (Manchuria, China)	(M+/-)
Malus•dolgo	Dolgo Crabapple (Siberia ?)	(M+/-)
Malus•ioensis	Prairie Crabapple (c. USA)	(M+/-)
Malus•ioensis•'Plena'	Bechtel Crabapple (hort. cultivar)	(M+/-)
Malus•sp. •'Golden•Delicious'	Golden Delicious Apple (hort. cultivar)	(M+/-)
Malus•sp. •'Red•Delicious'	Red Delicious Apple (hort. cultivar)	(M+/-)
Malus•sp. •'Winesap'	Winesap Apple (hort. cultivar)	(M+/-)
Malus•spp.	Common Apple (se. Europe, c. Asia)	(M+/-)
Mespilus•germanica *	Medlar (Europe-Asia Minor)	(M+/-)
Metasequoia•glyptostroboides *	Dawn Redwood (w. China)	(M-H)
Morus•alba	White Mulberry (Asia)	(M+/-)
Morus•australis *	----- (e. Asia)	(M+/-)
Morus•nigra *	Black Mulberry (sw. Asia)	(M+/-)
Morus•rubra *	Red Mulberry (e. N. America)	(M+/-)
Nothofagus•antarctica *	Southern Beech (Chile, Argentina)	(H)
Nyssa•sylvatica *	Blackgum (Ontario, Texas)	(H)
Ostrya•carpinifolia *	European Hop Hornbeam (s. Eur., se. Asia)	(M)
Ostrya•virginiana *	American Hop Hornbeam (e. N. America)	(H)
Paulownia•fortunei*	----- (China, Japan)	(H)
Paulownia•kawakamii*	----- (s. China, Taiwan)	(H)
Paulownia•tomentosa *	Empress Tree (c. & w. China)	(M-H)
Phellodendron•amurense *	Amur Cork Tree (n. China, Jap., Manch.)	(M-H)
Phellodendron•chinese *	Chinese Cork Tree (c. China)	(M-H)
Phellodendron•Japonicum *	Japanese Cork Tree (c. Japan)	(H)
Phellodendron•sachalinense *	Sakhalin Cork Tree (w. China, n. Jap., Kor.)	(H)
Pistacia•chinensis *	Chinese Pistachio (China, Taiwan)	(L-M)
Pistacia•vera *	Edible Pistachio (Persia, c. Asia)	(L-M)
Platanus•occidentalis *	Eastern Plane Tree (la., to Tex. to Mex.)	(H)
Platanus•orientalis *	Oriental Plane Tree (se. Eur., sw. Asia)	(M+/-)
Platanus•x•acerifolia *	London Plane Tree (hort. hybrid)	(H)
Prunus•armeniaca	Apricot (c. & e. Asia)	(M+/-)
Prunus•armeniaca•var. •mandshurica *	= Prunus•mandshurica	
Prunus•avium *	Bird Cherry (Eur.-A. Minor-e. Sib.)	(H-M)
Prunus•cerasus *	Pie Cherry (se. Eur., Iran, n. India)	(M+/-)
Prunus•cerasus•'Meteor'	Meteor Pie Cherry (hort. cultivar)	(M+/-)
Prunus•cerasus•'Morello'	Morello Pie Cherry (hort. cult.)	(M+/-)
Prunus•cerasus•x•'Montmorency'	Montmorency Pie Cherry (hort. cultivar)	(M+/-)
Prunus•cerasus•x•'North•Star'	North Star Pie Cherry (hort. cultivar)	(M+/-)
Prunus•maackii	Manchurian Cherry (Kor. Manch.)	(M-H)

Prunus•mahleb *	St. Lucie Cherry (Eur.-Asia Minor)	(M+/-)
Prunus•mandshurica *	Manchurian Apricot (Manchuria, Korea)	(M+/-)
Prunus•persica	Peach (c. & e. Asia)	(M+/-)
Prunus•salicina *	Japanese Plum (China, Jap.)	(H-M)
Prunus•sp. •Green•Gage'	Green Gage Plum (hort. cultivar)	(M+/-)
Prunus•sp. •Stanley'	Stanley Plum (hort. cultivar)	(M+/-)
Prunus•spp.	Domestic Plums	(M+/-)
Prunus•x•dasycarpa * (P. •armenica x P. •cerasifera)	Black Apricot (c. Asia-Asia Minor)	(M-L)
Pseudolarix•kaempferi *	Golden Larch (e. China)	(H?)
Ptelea•polyadenia*	----- (sw. USA)	(M+/-)
Pterocarya•fraxinifolia *	Caucasian Walnut (Caucasus, Persia)	(M+/-)
Pteroceltis•tartarianovii *	Tartar Wingceltis (n., c. China)	(M+/-)
Pterostyrax•hispidula *	Fragrant Epaulette Tree (Japan, China)	(H?)
Pyrus•bucharica *	= Pyrus•korshinsky	
Pyrus•calleryana•Bradford'	Bradford Pear (China)	(M+/-)
Pyrus•communis +	Common Garden Pear (Europe, w. Asia)	(M+/-)
Pyrus•communis•Maxine'	Maxine Pear (hort. cultivar)	(M+/-)
Pyrus•communis•Moonglow'	Moonglow Pear (hort. cultivar)	(M+/-)
Pyrus•korshinsky *	Buchara Pear (Turkestan)	(L-M)
Pyrus•salicifolia *	Willow-leaved Pear (se. Europe, w. Asia)	(M+/-)
Quercus•acutissima *	Sawtooth Oak (Japan, China, Korea)	(M-H)
Quercus•alba	White Oak (e. USA)	(M+/-)
Quercus•bicolor	Swamp White Oak (ne. N. Am.)	(M+/-)
Quercus•douglasii *	California Blue Oak (w. US)	(M+/-)
Quercus•frainetto *	Hungarian Oak (s. Italy, Balk., Turkey)	(M+/-)
Quercus•glandulifera *	----- (Jap., Korea, China)	(M+/-)
Quercus•imbricaria *	Shingle Oak (e. & c. USA)	(M-H)
Quercus•kelloggii *	California Black Oak (w. US)	(M+/-)
Quercus•macrocarpa	Bur Oak (c., ne. N. America)	(M+/-)
Quercus•mongolica *	Mongolian Oak (ne. Asia)	(M+/-)
Quercus•muehlenbergii *	Chinquapin Oak (e. USA)	(M-H)
Quercus•palustris	Pin Oak (ne. N. America)	(M-H)
Quercus•phellos *	Willow Oak (se. USA)	(M-H)
Quercus•prinus *	Chestnut Oak (e. USA)	(M-H)
Quercus•robur	English Oak (Europe, n. Afr., w. Asia)	(M-H)
Quercus•rubra	Northern Red Oak (ne. USA)	(M-H)
Quercus•sadleriana *	Deer Oak (w. USA)	(M+/-)
Quercus•shumardii *	Shumard's Oak (c. USA)	(M-H)
Quercus•vacciniifolia *	Huckleberry Oak (w. US)	(M+/-)
Salix•pentandra *	Laurel-leaf Willow (Eur.)	(H)
Sassafras•albidum *	Sassafras (e. N. Am.)	(H)
Sophora•davidii *	David's Sophora (China)	(L-M)
Sophora•japonica (aka Styphnolobium•japonicum)	Japanese Pagoda Tree (China, Korea)	(M+/-)
Sorbus•tortuosa *	Chequer Tree (A. Minor, n. Africa, Eur. Asia)	(H)
Sorbus•alnifolia *	----- (Jap., Korea)	(H)
Sorbus•americana	American Mtn. Ash (ne. N. America)	(M-H)
Sorbus•aria*	Whitebeam Mtn. Ash (Eur.)	(H)
Sorbus•aucuparia	European Mtn. Ash (Eurasia)	(M-H)
Sorbus•cashmeriana *	Kashmir Mountain Ash (Himalaya)	(H)
Sorbus•commixta *	----- (Korea, Japan)	(M-H)
Sorbus•decora	Showy Mountain Ash (ne. N. America)	(M-H)
Sorbus•forrestii *	Forest's Mountain Ash (China)	(M-H)
Sorbus•hupehensis *	Hupeh Mtn. Ash (c., w. China)	(M-H)
Sorbus•intermedia *	Scandinavian Mtn. Ash (Scand.)	(H)
Sorbus•latifolia *	----- (Europe)	(M-H)
Sorbus•pohuashanensis *	----- (n. China)	(H)
Sorbus•prattii *	Pratt's Mountain Ash (w. China)	(M+/-)
Sorbus•tianschanica *	Tien Shan Mtn. Ash (c. Asian mtns.)	(H)

<i>Sorbus</i> • <i>x</i> • <i>hybrida</i> *	Oakleaf Mtn. Ash (hort. hybrid)	(H)
<i>Stranvaesia</i> • <i>davidiana</i> *	Chinese <i>Stranvaesia</i> (w. China)	(H)
<i>Styphnolobium</i> • <i>japonicum</i>	see <i>Sophora</i> • <i>japonica</i>	
<i>Styrax</i> • <i>japonicum</i> *	Japanese Snowball (Japan, China)	(H)
<i>Styrax</i> • <i>obassia</i> *	Fragrant Snowbell (Japan)	(H)
<i>Syringa</i> • <i>pekinensis</i>	Peking Tree Lilac (n. China)	(M+/-)
<i>Syringa</i> • <i>reticulata</i>	Japanese Tree Lilac (n. Japan)	(M-H)
<i>Syringa</i> • <i>reticulata</i> •var.• <i>mandschurica</i>	Manchurian Tree Lilac (Japan)	(M+/-)
<i>Taxodium</i> • <i>ascendens</i> *	Pond Cypress (se. USA)	(H)
<i>Taxodium</i> • <i>distichum</i>	Bald Cypress (se. N. America)	(H)
<i>Tetradium</i> • <i>danielii</i> *	Korean <i>Evodia</i> (China, Korea)	(H)
<i>Tetradium</i> • <i>hupehensis</i> *	Hupeh Bee Bee Tree (sw. China, Korea)	(M+/-)
<i>Tilia</i> • <i>americana</i>	Basswood (c., e. N. America)	(H)
<i>Tilia</i> • <i>amurensis</i> *	Amur Linden (Manch., Korea)	(M-H)
<i>Tilia</i> • <i>cordata</i>	Littleleaf Linden (Eur. to Caucasus)	(H)
<i>Tilia</i> • <i>mongolica</i> *	Mongolian Linden (Mon., e. Russia, n. China)	(M-H)
<i>Tilia</i> • <i>platyphyllos</i> *	Bigleaf Linden (se., Europe)	(M-H)
<i>Tilia</i> • <i>tomentosa</i> *	Silver Linden (se. Europe, w. Asia)	(M+/-)
<i>Tilia</i> • <i>x</i> • <i>euchlora</i> *	Crimean Linden (hort. hybrid)	(M-H)
<i>Toona</i> • <i>sinensis</i>	----- (China)	(M-H)
<i>Ulmus</i> • <i>parvifolia</i> *	Chinese Elm (China, Japan, Korea)	(M-H)
<i>Ulmus</i> • <i>americana</i> •cvs.	American Elm (DED resistant cultivars)	(L-M-H)
<i>Zelkova</i> • <i>carpinifolia</i> *	Caucasian <i>Zelkova</i> (Cauc.)	(M-H)
<i>Zelkova</i> • <i>serrata</i> *	Japanese <i>Zelkova</i> (Jap., Taiwan, e. China)	(H)
<i>Zelkova</i> • <i>sinica</i> *	Chinese <i>Zelkova</i> (e. China)	(H)
<i>Ziziphus</i> • <i>jujuba</i> *	Chinese Jujuba (temp. Asia)	(H-M)

EVERGREENS**(Coniferous Trees)**

[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based on their water needs.
Reference Location: Denver. Numbers illustrate typical conditions.

* = Plants with potential, but requiring caution due to limited history in Rocky Mountain landscaping.

HIGH WATER	MODERATE WATER	LOW WATER	VERY LOW WATER
Reference plant: Bluegrass turf (Always wet at surface)	Reference plant: Turf-type Tall Fescue (Half of Bluegrass turf)	Reference plant: Buffalograss turf (Like Denver without irrigation)	Reference plant: Too dry for any turf (drier than Denver)
18-20 gals./S.F./season July: 5" -- 3 times per week	10 gals./S.F./season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation
Abies•cilicica *		Cilician Fir (s. Turkey, nw. Syria, Lebanon)	(M-H)
Abies•concolor		White Fir (Colo. to Mex.)	(M-H)
Abies•holophylla *		Manchurian Fir (Manch., Korea)	(M-H)
Abies•homolepis *		Nikko Fir (Japan)	(H)
Abies•koreana *		Korean Fir (s. Korea)	(H)
Abies•lasiocarpa		Subalpine Fir (Rocky Mtns.)	(H)
Abies•nordmanniana *		Caucasian Fir (Greece, Cauc., Turkey)	(M)
Calocedrus•decurrens *		Incense Cedar (w. Ore.-Baja Calif.)	(M-H)
Cedrus•atlantica *		= Cedrus•libani•ssp. atlantica	
Cedrus•deodara *		Deodara Cedar (Himalaya Mts. Afghan.-w. Nepal)	(M-H)
Cedrus•libani *		Lebanon Cedar (nw. Syria, se Turkey)	(M-H)
Cedrus•libani•ssp. atlantica *		Atlas Cedar (Atlas Mts.)	(M-H)
Cedrus•libani•ssp. stenocoma *		Hardy Turkish Cedar (s. Turkey)	(M-H)
Cupressus•arizonica *		Arizona cypress (Ariz., N. Mex., Tex., Mex.)	(L-M)
Cupressus•bakeri *		Modoc Cypress (Calif., Oregon)	(M+/-)
Picea•abies		Norway Spruce (n. & c. Europe)	(H)
Picea•engelmannii		Engelmann Spruce (B.C. to N. Mex.)	(H)
Picea•glauca		White Spruce (n. N. Am.)	(M-H)
Picea•glauca•'Black•Hills'		Black Hills Spruce (Black Hills S.Dak.)	(M-/-)
Picea•glauca•'Conica'		Dwarf Alberta Spruce (hort. cultivar)	(H)
Picea•omorika *		Serbian Spruce (Balk.)	(M-H)
Picea•pungens		Colorado Spruce (Wyo., Colo., N. Mex., Utah)	(M-H)
Picea•schrenkiana•ssp. tianshanica *		----- (c. Asia)	(M+/-)
Pinus•heldreichii (was P. leucodermis) *		Bosnian Pine (w. Balkans - se. Italy - Greece)	(M+/-)
Pinus•aristata		Bristlecone Pine (Mts. Cal. to Colo.)	(M, H)
Pinus•bungeana *		Lacebark Pine (nw. China)	(M+/-)
Pinus•cembra *		Swiss Stone Pine (c. Eur. mtns.)	(M-H)
Pinus•contorta•ssp. latifolia		Lodgepole Pine (Alaska, Cal., to Colo.)	(M-H)
Pinus•densiflora *		Japanese Red Pine (Jap., Korea)	(M-H)
Pinus•flexilis		Limber Pine (Albt. to Cal. to Tex.)	(M-H)
Pinus•nigra		Austrian Pine (se. Eur., w. Asia, n. Afr.)	(M-H)
Pinus•peuce *		Macedonian Pine (Balk.)	(M-H)
Pinus•ponderosa		Ponderosa Pine (w. North America)	(M+/-)
Pinus•pumila *		Dwarf Siberian Pine (ne. Asia)	(H)
Pinus•strobiformis		Southwestern White Pine (Colo., Ariz., n. Mex.)	(M-H)

Pinus•strobus	Eastern White Pine (e. N. America)	(H)
Pinus•sylvestris	Scotch Pine (n. Eurasia)	(M-H)
Pinus•wallichiana *	Himalayan White Pine (Himalaya Mtns.)	(M-H)
Pseudotsuga•menziesii	Douglas Fir (B.C. to Mex. to Tex.)	(M-H)
Sequoiadendron•giganteum *	Giant Sequoia (Sierra Nevada Mts.)	(H)
Tsuga•canadensis	Canada Hemlock (ne. N. America)	(H)

EVERGREENS**(Coniferous Shrubs)**

[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based on their water needs.

Reference Location: Denver. Numbers illustrate typical conditions.

* = Plants with potential, but requiring caution due to limited history in Rocky Mountain landscaping.

HIGH WATER	MODERATE WATER	LOW WATER	VERY LOW WATER
Reference plant: Bluegrass turf (Always wet at surface)	Reference plant: Turf-type Tall Fescue (Half of Bluegrass turf)	Reference plant: Buffalograss turf (Like Denver without irrigation)	Reference plant: Too dry for any turf (drier than Denver)
18-20 gals./S.F./season July: 5" -- 3 times per week	10 gals./S.F./season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation
Chamaecyparis•pisifera *	----- (Japan)		(H)
Juniperus•chinensis	Chinese Juniper (e. Asia)		(L-M)
Juniperus•chinensis•'Hetzii•'Glauca'	Hetzi Juniper (hort. cultivar)		(L-M)
Juniperus•chinensis•'Pfitzeriana'	Pfitzer Juniper (hort. cultivar)		(L-M)
Juniperus•chinensis•'Pfitzeriana•'Compacta'	Compact Pfitzer Juniper (hort. cultivar)		(L-M)
Juniperus•chinensis•'Tortulosa' *	Hollywood Juniper (hort. cultivar)		(L-M)
Juniperus•chinensis•var. •sargentii	Sargent's Juniper (e. Asia)		(L-M)
Juniperus•communis•saxatilis	Mountain Common Juniper (circumboreal)		(L-M)
Juniperus•horizontalis	Horizontal Juniper (Nov. Sc. to Alaska, N J., to Mon.,)		(L-M)
Juniperus•horizontalis•'Bar•Harbor'	Bar Harbor Juniper (hort. cultivar)		(L-M)
Juniperus•horizontalis•'Blue•Chip'	Blue Chip Juniper (e. Asia)		(L-M)
Juniperus•horizontalis•'Plumosa'	Andorra Juniper (hort. cultivar)		(L-M)
Juniperus•horizontalis•'Prince•of•Wales'	Prince of Wales Juniper (hort. cultivar)		(L-M)
Juniperus•horizontalis•'Wiltonii'	Wilton Carpet Juniper (hort. cultivar)		(L-M)
Juniperus•monosperma	Oneseed Juniper (Colo., Utah, Tex., Mex.)		(VL-L)
Juniperus•osteosperma	Utah Juniper (sw. USA)		(VL-L)
Juniperus•procumbens var. & cv.	Japgarden Juniper varieties and cultivars		(M-H)
Juniperus•sabina	Savin Juniper (w. Asia)		(L-M)
Juniperus•sabina•'Buffalo'	Buffalo Juniper (hort. cultivar)		(L-M)
Juniperus•sabina•'Skandia'	Skandia Juniper (hort. cultivar)		(L-M)
Juniperus•sabina•var. •tamariscifolia	Tam Juniper (hort. cultivar)		(L-M)
Juniperus•scopulorum	Rocky Mtn. Juniper (B.C. to s. Ariz., to Tex.)		(L)
Juniperus•squamata	----- (India, Tibet, Taiwan)		(M+/-)
Juniperus•squamata•'Meyeri'	----- (hort. cultivar)		(M+/-)
Juniperus•virginiana	Eastern Redcedar (e. N. Am.)		(M-H)
Microbiota•decussata *	Siberian Cypress (Siberia)		(M+/-)
Pinus•edulis	Piñon Pine (Wyo., Cal., Mex.)		(VL-M)
Pinus•mugo	Mugo Pine (c. Eur. Balk.)		(M-H)
Platycladus•orientalis *	Oriental Arborvitae (China, Korea)		(M+/-)
Taxus•baccata *	English Yew (Eur., n. Afr., w. Asia)		(H)

Taxus•brevifolia *	Anticancer Yew (pnw. USA)	(H)
Taxus•cuspidata *	Japanese Yew (Jap., Kor., Manchuria)	(H)
Taxus•x•media *	----- (hort. hybrid)	(H)
Thuja•occidentalis•var.	Western Arborvitae varieties (e. N. Am.)	(H)
Thuja•orientalis (now Platycladus•orientalis)		
Thuyopsis•dolabrata *	False Arborvitae (Japan)	(H)

7. EVERGREENS

(Non-coniferous)

[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based on their water needs.
Reference Location: Denver. Numbers illustrate typical conditions.

* = Plants with potential, but requiring caution due to limited history in Rocky Mountain landscaping.

HIGH WATER	MODERATE WATER	LOW WATER	VERY LOW WATER
Reference plant: Bluegrass turf (Always wet at surface)	Reference plant: Turf-type Tall Fescue (Half of Bluegrass turf)	Reference plant: Buffalograss turf (Like Denver without irrigation)	Reference plant: Too dry for any turf (drier than Denver)
18-20 gals./S.F./season July: 5" -- 3 times per week	10 gals./S.F./season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation

Agave•parryi *	Parry's Agave (Cal., N.Mex., Mex.)	(VL-L)
Agave•utahensis *	Utah Agave (Cal., Nev. Utah, Ariz.)	(VL-L)
Allenrolfea•occidentalis *	Iodine Bush (sw. USA, deserts)	(L-VL)
Arctostaphylos•patula *	Greenleaf Manzanita (sw. USA)	(M+/-)
Artemisia•cana •(a.k.a. Seriphidium•canum)	Black Sage (w. USA)	(VL-M)
Artemisia•tridentata (a.k.a. S. tridentata)	Big Western Sage (intermtn. w. N. America)	(VL-M)
Aucuba•japonica *	Spotted Laurel (China, Taiwan, s. Japan)	(H)
Berberis•candidula *	Paleleaf Barberry (China)	(M+/-)
Berberis•julianae	Wintergreen Barberry (w. China)	(M+/-)
Berberis•triacanthophora *	= Berberis•X•wisleyensis	
Berberis•verruculosa *	Warty Barberry (w. China)	(M+/-)
Berberis•X•wisleyensis *	Threespike Barberry (hort. hybrid)	(M+/-)
Bruckenthalia•spiculifolia *	Spike Heath (se. Europe, Asia Minor)	(M+/-)
Buxus•microphylla•v.•koreana *	Korean Boxwood (Jap., Korea)	(M-H)
Buxus•sempervirens *	Common Boxwood (s. Eur., w. Asia, n. Afr.)	(M-H)
Ceanothus•fendleri	Fendler Ceanothus (Rocky Mtn. West)	(M+/-)
Ceanothus•integerrimus *	Deerbrush (sw. N. America)	(M+/-)
Ceanothus•sanguineus *	Oregon Tea (B.C. to Mont. to Calif.)	(M+/-)
Ceanothus•velutinus *	Snowbrush Ceanothus (Western Mtns., USA)	(M-H)
Cercocarpus•breviflorus	= Cercocarpus•ledifolius•v.•paucidentatus	
Cercocarpus•intricatus	= Cercocarpus•ledifolius•v.•intracatus	
Cercocarpus•ledifolius	Curlleaf Mtn. Mahogany (Intermtn. USA)	(VL-L)
Cercocarpus•ledifolius•v.•intracatus	Littleleaf Mtn. Mahogany (Intermtn. sw. USA)	(VL-L)
Cercocarpus•ledifolius•v.•paucidentatus	Hairy Mtn. Mahogany (Ariz., N. Mex., Mex.)	(VL-L)
Chamaebatiaria•millefolium	Fernbush (Ore., e. Cal., Wyo., Ariz.)	(VL-L)
Cistus•laurifolius *	Laurel Rock Rose (sw. Europe)	(M+/-)
Coronilla•emerus *	Scorpion senna (c. & s. Europe)	(L-M)
Cotoneaster•congestus *	Pyrenees Cotoneaster (Himalaya Mts.)	(M+/-)
Cotoneaster•conspicuus *	Wintergreen Cotoneaster (c. China, se. Tibet)	(M+/-)
Cotoneaster•dammeri *	Bearberry cotoneaster (c. China)	(M-/-)
Cotoneaster•glaucophyllus *	Brightbead Cotoneaster (w. China)	(L-M)
Cotoneaster•microphyllus *	Littleleaf Cotoneaster (mtns. Afghan. to China)	(L-M)
Cowania•mexicana (syn. Purshia•mexicana)	Cliff Rose (intermtn. sw. USA & Mex.)	(VL-L)
Cytisus•scoparius *	Scotch Broom (Europe)	(M+/-)

Cytisus•x•praecox *	Warminster Broom (hort. hybrid)	(M+/-)
Daphne•cneorum	Daphne (mnts. c. & s. Europe)	(M+/-)
Daphne•retusa *	= Daphne•tangutica	
Daphne•tangutica *	----- (nw. & w. China)	(M+/-)
Daphne•x•burkwoodii	-----	(M+/-)
Daphne•x•burkwoodii•'Carol•Mackie'	Carol Mackie Daphne (hort. cultivar)	(M+/-)
Daphne•pontica *	----- (A. Minor, se. Eur., Cauc.)	(M+/-)
Elaeagnus•pungens *	----- (Jap., China)	(VL, M)
Ephedra•americana•v. andina *+	----- (Andes, Ecuador. to Patagonia)	(VL-M)
Ephedra•equisetina +	----- (c. Asia, w. china)	(VL)
Ephedra•gerardiana *+	----- (China, Himalaya)	(VL-L)
Ephedra•glaucula *	----- (c. Asia-Seravshan Mts.)	(VL-L)
Ephedra•minima *+	----- (China)	(VL-L)
Ephedra•minuta *	----- (c. Asia-Seravshan Mts.)	(VL-L)
Ephedra•nevadensis *+	Nevada Ephedra (Great Basin)	(VL-L)
Ephedra•regaliana *	----- (c. Asia-Pamir Mts.)	(VL-L)
Ephedra•torreyana +	Torrey Ephedra (intermtn. sw. USA)	(VL-L)
Ephedra•viridis +	Green Ephedra, Mormon Tea (Intermtn. sw. USA)	(VL-L)
Euonymus•fortunei•'Vegetus'	Euonymus (c. & w. China)	(M-H)
Euonymus•kiautschovicus•'Manhattan'	Manhattan Euonymus (hort. cultivar)	(M-H)
Fargesia•murielae, A. m., Sinarundinaria m. (see Thamnocalamus•spathaceus) *		
Fargesia•nitida., Arundinaria n., Sinarundinaria n., Thamnocalamus•nitida (see Sinarundinaria•nitida) *		
Fargesia•spathacea, Arundinaria s. (see Thamnocalamus•spathaceus) *		
Fuchsia•magellanica *	Fuchsia (Peru, Chile, Argentina)	(H)
Garrya•flavescens *	Yellow Silktassel (e. Cal., w. Az., s. Utah, s. Nev.)	(L)
Garrya•fremontii *	Fremont's Silktassel (w. Wa., Ore., Cal.)	(M+/-)
Garrya•wrightii *	Wright's Silktassel (sw. AZ., s. N. Mex., w. Tex.)	(L)
Gelsemium•sempervirens *	Carolina Yellow Jasmine (s. USA to c. Am.)	(H)
Hesperaloe•parviflora +	Hesperaloe (sw. Texas)	(VL-M)
Iberis•sempervirens	Evergreen Candytuft (Eurasia)	(M-H)
Ilex•aquifolium *	English Holly (Eur., n. Afr., w. Asia)	(H)
Ilex•cornuta *	Chinese Holly (China, Korea)	(H)
Ilex•crenata *	Japanese Holly (Sakhalin Is., Jap., Korea)	(H)
Ilex•opaca *	American Holly (e. USA)	(H)
Ilex•wilsonii *	Wilson's Holly (c., w., e. China, Taiwan)	(M-H)
Ilex•x•meserveae var.	Blue Prince & Blue Princess Hollies etc. (hort. hybrids)	(H)
Jasminum•fruticans *	----- (Medit. Asia Minor)	(L-M)
Kalmia•angustifolia *	Lambkill Kalmia (Hudson Bay to Georgia)	(H)
Kalmia•latifolia *	Mountain Laurel (e. N. Am.)	(H)
Lavandula•angustifolia var.	English Lavender varieties (Medit.)	(VL-M)
Lavandula•stoechas *	Spanish Lavender (c. Spain, ne. Portugal)	(VL-M)
Leucophyllum•minus *	Cenzia, Texas Ranger (Texas, New Mexico)	(L)
Lonicera•nitida *	Boxleaf Honeysuckle (China)	(H)
Lonicera•pileata *	Privet Honeysuckle (China)	(H)

Mahonia•aquifolium +	Oregon Hollygrape (Cascade mtns.)	(M-H)
Mahonia•fremontii +	Fremont Mahonia (sw. USA)	(VL-L)
Mahonia•haematocarpa +	Redberry Mahonia (sw. USA)	(VL-L)
Mahonia•repens +	Creeping Mahonia (Rocky Mtn. West)	(L-H)
Mahonia•trifoliata *+	Three-leaf Mahonia, Algerita (Ariz., N. Mex., Tex., Mex.)	(L)
x•Mahoberberis•miethkeana *	----- (Berberis•julianae•X•Mahonia•aquifolium)	(M+/-)
Nandina•domestica *	Heavenly Bamboo (India to e. China)	(M-H)
Nolina•microcarpa *	Bear Grass (sw. USA)	(L)
Opuntia•imbricata	Cholla (Colo., Kan., Tex., & Mex., to Ariz.)	(VL-L)
Opuntia•polycantha ,etc.	Prickly Pear Cactus species (w. USA, Can., Mex.)	(VL-L)
Osmanthus•americanus *	Devilwood (se. USA)	(H)
Osmanthus•decorus•Baki•Kasapligil' *	----- (Caucasus)	(H)
Osmanthus•heterophyllus *	Holly Osmanthus (Japan, Taiwan)	(H)
Osmanthus•x•burkwoodii *	----- (garden origin)	(H)
Paxistima•canbyi	Eastern Mtn. Lover (e. N. America)	(M+/-)
Paxistima•mysinities	= Paxistima•myrtifolia	
Paxistima•myrtifolia *	Western Mtn. Lover (B.C. Cal., Mont., Colo., N. Mex.)	(M-H)
Phillyrea•vilmoriniana *	= Osmanthus•decorus	
Photina•villosa *	Oriental Photina (Japan, Korea, China)	(H)
Photinia•serrulata *	Chinese Photinia (China)	(H)
Photinia•x•fraseri *	Photina (hort. hybrid)	(H)
Phyllostachys•aureosulcata *	Yellow-groove Bamboo (ne. China)	(H)
Phyllostachys•nigra *	Black Bamboo (e., c. China)	(H)
Phyllostachys•nuda *	Bamboo (China)	(H)
Pieris•japonica *	Japanese Pieris (Jap., Taiwan, e. China)	(H)
Prunus•laurocerasus•'Schipkaensis' *	Schipkanensis Cherry Laurel (Bulgaria)	(M-H)
Prunus•laurocerasus•'Zabeliana'*	Zabeliana Cherry Laurel (garden origin)	(M-H)
Purshia•mexicana	= Cowania•mexicana	
Purshia•tridentata	Antelope Bitterbrush (Rocky Mtn. West)	(L-M)
Pyracantha•coccinea	Pyracantha (Eurasia)	(M+/-)
Quercus•grisea *	Gray Oak (Tex., N. Mex., Mex., s. Colo.)	(M+/-)
Quercus•turbinella *	Turban Oak (Cal., & n. Baja. Ca. to w. Tex. & se. Colo.)	(M+/-)
Quercus•vacciniifolia *	Huckleberry Oak (w. US)	(M+/-)
Quercus•virginiana•v. fusiformis *	Texas Shrub Live Oak (Ok., Tex., Mex.)	(L-M)
Rosmarinus•officinalis•'Arp' *	Rosemary 'Arp' (a hardy cultivar from Arp, Texas)	(L-M)
Santolina•chamaecyparissus	Santolina (w. & c. Medit.)	(VL-M)
Santolina•rosmarinifolia	Green Santolina (Portugal to France)	(L-M)
Santolina•viridis	= Santolina•rosmarinifolia	
Sasa•kurilensis *	Kurile Islands Bamboo (Jap. Kor.)	(H)
Sasa•palmata *	Palmate Bamboo (n. Japan)	(H)
Shepherdia•rotundifolia **	Roundleaf Buffaloberry (Az., Utah)	(L-M)
Sinarundinaria•nitida *	Fountain Bamboo (c. China)	(H)
Thamnocalamus•spathaceus *	Umbrella Bamboo (c. China)	(H)
Viburnum•davidii *	David's Viburnum (w. China)	(M-H)

Viburnum•farreri *	Fragrant Viburnum (China)	(M-H)
Viburnum•rhytidophyllum *	Leatherleaf Viburnum (c. & w. China)	(M-H)
Viburnum•x•burkwoodii	Burkwood Viburnum (hort. hybrid)	(M-H)
Viburnum•x•rhytidophylloides•'Mohican'	Mohican Lantanaphyllum Viburnum (garden origin)	(M-H)
Yucca•baccata +	Banana Yucca (Colo. Plateau)	(VL-L)
Yucca•elata +	Soaptree Yucca (Az., N. Mex., Mex.)	(VL-L)
Yucca•glauca +	Front Range Yucca (w. Great Plains)	(VL-L)
Yucca•harrimaniae +	Harriman Yucca (Colo. Plateau)	(VL-L)

VINES

[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based on their water needs.
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HIGH WATER	MODERATE WATER	LOW WATER	VERY LOW WATER
Reference plant: Bluegrass turf (Always wet at surface)	Reference plant: Turf-type Tall Fescue (Half of Bluegrass turf)	Reference plant: Buffalograss turf (Like Denver without irrigation)	Reference plant: Too dry for any turf (drier than Denver)
18-20 gals./S.F./season July: 5" -- 3 times per week	10 gals./S.F./season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation
Akebia•quinata *	Five-leaf Akebia (Japan, Korea, China)		(M-H)
Akebia•trifoliata *	Three-leaf Akebia (c. China, Jap.)		(M-H)
Akebia•x•pentaphylla *	(A. quinata x A. trifoliata) (Japan)		(M-H)
Ampelopsis•aconitifolia *	Monkshood Vine (n. China, Mong.)		(M+/-)
Ampelopsis•brevipedunculata *	Porcelain Vine (China, Jap., Korea)		(M+/-)
Ampelopsis•delavayana *	----- (w. China)		(M+/-)
Ampelopsis•humulifolia *	----- (n. China)		(M+/-)
Ampelopsis•megalophylla *	----- (w. China)		(M+/-)
Aristolochia•durior *	= Aristolochia•macrophylla		
Aristolochia•macrophylla *	Dutchman's Pipe (Appalachian Mts.)		(M-H)
Campsis•grandiflora *	Chinese Trumpet Creeper (Jap., China)		(M-H)
Campsis•radicans +	Trumpet Creeper (e. USA)		(M-H)
Celastrus•loeseneri *	Loesener Bittersweet (c. China)		(M-H)
Celastrus•orbiculatus *	Oriental Bittersweet (ne. Asia)		(M-H)
Celastrus•scandens	Bittersweet (e. N. America)		(M-H)
Clematis (hort. varieties & hybrids)	----- (hort. hybrids & varieties)		(M-H)
Clematis•alpina *	----- (Eurasia)		(M-H)
Clematis•brevicaudata *	----- (Jap., China., w. Mong.)		(M+/-)
Clematis•chrysocoma *	----- (sw. China)		(M+/-)
Clematis•crispa *	Curly Clematis (se. USA)		(H)
Clematis•fargesii *	----- (China)		(M+/-)
Clematis•flammula	----- (s. Eur., to Turkestan)		(M+/-)
Clematis•grata *	----- (China, Himalaya)		(M+/-)
Clematis•ligusticifolia	Western Virgin's Bower (Man. to B.C., Mo., to Calif.)		(M+/-)
Clematis•macropetala *	----- (Siberia, n. China, Mongolia)		(M+/-)
Clematis•maximowicziana	= Clematis•terniflora		
Clematis•montana var. *	----- (Afghanistan. to sw. & c. China, Himalaya)		(M+/-)
Clematis•paniculata *	New Zealand Clematis (New Zealand)		(H)
Clematis•paniculata	= Clematis•terniflora		
Clematis•rehderiana *	Rehder's Clematis (w. China)		(M+/-)
Clematis•tangutica	Golden Lantern Clematis (Mongolia, nw. China)		(M+/-)
Clematis•terniflora	Sweet Autumn Clematis (Korea, China, Japan)		(M+/-)
Clematis•texensis *	Texas Clematis (sw. USA)		(M+/-)
Clematis•tibetana *	----- (Tibet, China, n. India)		(M+/-)
Clematis•vernayi (now C. tibetiana)			
Clematis•viorna *	Leather Flower (s. N. Am.)		(M-H)

Clematis•vitalba *	Traveller's Joy (Eur., Cauc., c. Asia, n. Afr.)	(M+/-)
Clematis•viticella *	----- (s. Europe, w. Asia)	(M+/-)
Dicentra•scandens *	----- (Nepal, to se. China)	(M+/-)
Euonymus•fortunei var.	Wintercreeper varieties (China)	(M-H)
Hedera•colchica *	Persian Ivy (Cauc., Turkey)	(M+/-)
Humulus•americanus	= Humulus•lupulus	
Humulus•lupulus	Hop Vine (n. Temperate regions worldwide)	(M+/-)
Hydrangea•anomala *	Climbing Hydrangea (Himalaya, China)	(H)
Hydrangea•anomala•ssp. •petiolaris*	= Hydrangea•petiolaris	
Hydrangea•petiolaris *	Climbing Hydrangea (Japan, China, Korea, Taiwan)	(H)
Jasminum•beesianum *	----- (China)	(M+/-)
Lathyrus•latifolius	Perennial Sweetpea (c. & e. Europe)	(M+/-)
Lonicera•alesuosmoides *	Evergreen Honeysuckle (w. China)	(M+/-)
Lonicera•caprifolium *	Italian Honeysuckle (Eur., s. Asia)	(M+/-)
Lonicera•flava *	Yellow Honeysuckle (se. USA)	(H)
Lonicera•henryi *	----- (w. China)	(M+/-)
Lonicera•japonica•'Halliana'	Hall's Honeysuckle (e. Asia)	(M-H)
Lonicera•periclymenum	Woodbine Honeysuckle (Eur., w. Asia)	(M+/-)
Lonicera•periclymenum•Graham•Thomas'	Graham Thomas Honeysuckle (hort. cultivar)	(M+/-)
Lonicera•prolifera *	Grape Honeysuckle (c. USA)	(M+/-)
Lonicera•sempervirens	Scarlet Trumpet Honeysuckle (e. & s. USA)	(M-H)
Lonicera•sempervirens•'Alabama•Crimson'	-----	(M-H)
Lonicera•sempervirens•'Sulphurea'	-----	(M-H)
Lonicera•tragophylla *	Chinese Woodbine (w. China)	(M+/-)
Lonicera•x•brownii•'Dropmore•Scarlet' (L.s. x L. brownii)		(M+/-)
Lonicera•x•heckrottii	Heckrottii Honeysuckle (hort. hybrid)	(M-H)
Lycium•halimifolium *	Common Matrimony Vine (se. Europe, w. Asia)	(M+/-)
Mennispermum•canadense *	Moonseed Vine (e. N. America)	(M-H)
Parthenocissus•quinquefolia	Virginia Creeper (e. N. America to Rocky Mtns.)	(M-H)
Parthenocissus•tricuspidata	Boston Ivy (Japan, c. China)	(M-H)
Passiflora•incarnata *	Passion Flower (c. USA)	(H)
Polygonum•aubertii	Silver Lace Vine (w. China, Tibet, Tajikistan)	(M+/-)
Polygonum•baldschuanicum *	Buchara Fleeceflower (c. Asia, Tajikistan)	(M+/-)
Schisandra•chinensis *	Magnolia Vine (China)	(H)
Schizophragma•hydrangeoides *	Hydrangea Vine (Japan, Korea)	(M-H)
Smilax•rotundifolia *	Common Greenbrier (e. USA)	(H)
Tripterygium•regelii *	Regel's Tripterygium (Manchuria, Japan, Korea)	(M-H)
Vitis•amurensis *	Amur Grape (Manchuria)	(M+/-)
Vitis•arizonica	Arizona Grape (w. Tex.- Cal. & Mex.)	(M+/-)
Vitis•coignetiae *	Gloryvine (Japan, Korea)	(M+/-)
Vitis•riparia	Riverbank Grape (Nov. Sc. - Man., Tenn. & Tex. - Rocky Mts.)	(M-H)

Vitis•vinifera•varieties *	Eurasian Grape varieties (Eur., A. Minor, Cauc. Turkestan)	(M+/-)
Wisteria•floribunda *	Japanese Wisteria (Japan)	(M-H)
Wisteria•macrostachys *	Kentucky Wisteria (c. USA)	(H)
Wisteria•sinensis *	Chinese Wisteria (China)	(M-H)

GROUND COVERS

(Including turf & meadow grasses)

[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based on their water needs.

Reference Location: Denver. Numbers illustrate typical conditions.

* = Plants with potential, but requiring caution due to limited history in Rocky Mountain landscaping.

HIGH WATER	MODERATE WATER	LOW WATER	VERY LOW WATER
Reference plant: Bluegrass turf (Always wet at surface)	Reference plant: Turf-type Tall Fescue (Half of Bluegrass turf)	Reference plant: Buffalograss turf (Like Denver without irrigation)	Reference plant: Too dry for any turf (drier than Denver)
18-20 gals./S.F./season July: 5" -- 3 times per week	10 gals./S.F./season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation

Achillea•ageratifolia	Grecian Yarrow (Greece)	(L-M)
Achillea•serbica	Serbian Yarrow (Balkans)	(L-M)
Aegopodium•podagraria	Bishop's Weed (Europe)	(H)
Ajuga•reptans	Ajuga (Eur., Persia, Transcaucasia.)	(H)
Akebia•quinata *	Five-leaf Akebia (Jap., Korea, China)	(M-H)
Andropogon•scoparius	Little Blue Stem (syn. Schizachyrium•scoparium)	(L-M+/-)
Anemopsis•californica *	Yerba Mansa (sw. USA, Mex.)	(M-H)
Antennaria•parvifolia	Pussytoes (G. Plains, w. to B.C., Wash., Ariz.)	(M+/-)
Antennaria•rosea	Pussytoes (Alaska to Cal. & N. Mex.)	(M+/-)
Arabis•alpina *	Alpine Rock-cress (Europe, Siberia)	(M+/-)
Arctostaphylos•uva-ursi	Kinnikinnick (circumpolar)	(M+/-)
Arenaria•balearica *	Corsican Sandwort (Balearic Is. & Corsica)	(M+/-)
Aronia•melanocarpa	Chokeberry (e. N. Am.)	(M-H)
Asperula•odorata	= Galium•odoratum	
Astroturfoides•ultradeceptiverous	Astro Turf (Houston, Texas)	(L+/-M-)
Aurinaria•saxatilis	Basket-of-gold (c. & se. Europe)	(L-M)
Bouteloua•gracilis	Blue grama (N. America)	(L+/-)
Buchloë•dactyloides	Buffalograss (Great Plains)	(L)
Campanula•poscharskyana	Poscharsky Bellflower (Dalmatia)	(M-H)
Cerastium•tomentosum	Snow-in-summer (Eur. to w. Asia)	(L-M)
Ceratostigma•plumbaginoides	Plumbago (w. China)	(M+/-)
Convallaria•majalis	Lily-of-the-valley (Eurasia, e. N. America)	(M-H)
Cotoneaster•apiculatus *	Cranberry Cotoneaster (China)	(M+/-)
Cotoneaster•dammeri *	Creeping Cotoneaster (China)	(M+/-)
Cotoneaster•microphyllus *	Littleleaf Cotoneaster (Mts. Afghan., China)	(L-M)
Delosperma•cooperi	Hardy Pink Ice Plant (s. Africa)	(M+/-)
Delosperma•nubigenum	Hardy Yellow Ice Plant (s. Africa)	(M+/-)
Duchesnea•indica	Mock Strawberry (Korea, Jap., to India)	(M-H)
Epimedium•alpinum *	Alpine Epimedium (s. & c. Europe)	(M-H)
Epimedium•grandiflorum *	Longspur Epimedium (n. Japan, Korea, s. Manch.)	(M-H)
Euonymus•fortunei•'Coloratus'	Purpleleaf Wintercreeper (hort. cult.)	(M+/-)

Euonymus•obovatus *	Running Euonymus (e. USA)	(H)
Festuca•elator•cvs.	Turf-type Tall Fescue (Eur., Siberia)	(M+/-)
Galium•odoratum	Sweet Woodruff (Eurasia)	(M-H)
Genista•pilosa *	Dwarf Broom (Europe)	(M+/-)
Geranium•spp.	Hardy Geraniums	(M+/-)
Hosta•spp.	Host species (Jap., China, Korea)	(H)
Juniperus•spp. & cultivars +	Juniper species and cultivars	(L-M)
Lamium•maculatum	Spotted Deadnettle, Lamium (Eur., n. Afr., w. Asia)	(M-H)
Lathyrus•latifolius	Perennial Sweetpea (c. & e. Europe)	(M-H)
Lonicera•japonica•'Halliana'	Hall's Honeysuckle (e. Asia)	(M+/-)
Lonicera•sempervirens	Scarlet Trumpet Honeysuckle (e. & s. N. America)	(M-H)
Lonicera•x•heckrottii	Heckrottii Honeysuckle (hort. hybrid)	(M+/-)
Lysimachia•nummularia	Moneywort (Europe)	(H)
Mahonia•repens	Creeping Mahonia (Rocky Mtn. West)	(L-M-H)
Mazus•reptans *	----- (Himalayas)	(M-H)
Marrubium•rotundifolium	----- (Asia Minor)	(L-M)
Poa•pratensis	Kentucky Bluegrass (Eurasia, n. Africa)	(H)
Osteospermum•berberae	South African Daisy (S. Africa)	(M+/-)
Pachysandra•terminalis	Pachysandra (Japan, nc. China)	(M-H)
Parthenocissus•quinquefolia	Virginia Creeper (e. N. America to Rocky Mts.)	(M-H)
Phlox•stolonifera	Creeping Phlox (se. USA)	(M+/-)
Phlox•subulata	Moss Phlox (Penn. to Ga.)	(M+/-)
Polygonum•affine•'Border•Jewel'	Himalayan Border Jewel (Himalayas)	(M-H)
Polygonum•japonicum•var. •compactum	Fleece Flower (e. Asia)	(M-H)
Polygonum•reynoutria	= Polygonum•japonicum•var. •compactum	
Potentilla•nevadensis	----- (Spain)	(L-M)
Potentilla•verna•'Nana'	Creeping Potentilla (hort. cult.)	(M-H)
Rhus•trilobata	Three-leaf Sumac (w. N. Am.)	(L-M)
Saponaria•ocymoides	Saponaria (mtns. sw. & sc. Europe)	(M+/-)
Schizachyrium•scoparium	= Andropogon•scoparius	
Symphoricarpos•x•chenaultii•'Hancock'	Hancock Coralberry (hort. cult.)	(M+/-)
Teucrium•chamaedrys	Germander (c. & s. Europe, w. Asia)	(M+/-)
Thymus•spp.	Thyme species (Eurasia, N. Africa)	(L-M)
Waldsteinia•fragarioides	Barren Strawberry (e. USA)	(H)

Veronica•**liwanensis**
Veronica•**pectinata**
Vinca•**major**
Vinca•**minor**

Turkish Veronica (ne. Anatolia, Cauc.)
Woolly Veronica (e. Balkans, A. Minor)
----- (Italy, Balk.)
Vinca (Europe , w. Asia)

(M-H)
(L-M)
(M-H)
(H)

SELECTED PERENNIALS

[Revised April '03]

WATER NEEDS OF PLANTS

The following chart shows how to group plants based on their water needs.

Reference Location: Denver. Numbers illustrate typical conditions.

* = Plants with potential, but requiring caution due to limited history in Rocky Mountain landscaping.

HIGH WATER	MODERATE WATER	LOW WATER	VERY LOW WATER
Reference plant: Bluegrass turf (Always wet at surface)	Reference plant: Turf-type Tall Fescue (Half of Bluegrass turf)	Reference plant: Buffalograss turf (Like Denver without irrigation)	Reference plant: Too dry for any turf (drier than Denver)
18-20 gals./S.F./season July: 5" -- 3 times per week	10 gals./S.F./season .75" -- once per week	0-3 gals./S.F./season .5" per 2 weeks, optional	No irrigation No irrigation

Achillea x 'Coronation Gold'	Coronation Gold Yarrow	(VL)
Achillea x 'Moonshine'	Moonshine Yarrow	(VL-L-M)
Aesclepias•tuberosa	Butterfly Weed	M-H
Agastache cana	Double Bubble Mint	(M+/-)
Alchemilla•vulgaris	Lady's Mantle	M-H
Anthemis•tinctoria	Golden Marguerite	M-H
Aquilegia•spp.	Columbines	H
Arum•italicum	Italian Arum	M-H
Aster porteri	Porter's Aster	(VL-L)
Aster•novae-angliae	New England Aster	M-H
Aster•x•frikartii	Frikart's Aster	M-H
Aurinia saxatilis	Basket-of-gold	(L-M)
Baptisia•australis	Baptisia	M-H
Berlandiera lyrata	Chocolate Flower	(VL-L)
Boltonia•asteroides	Boltonia	H
Borago•laxiflora	Borage	M-H
Callirhoe involucrata	Poppy Mallow	(L-M)
Centranthus ruber	Centranthus	(L-M-H)
Cerastium tomentosum	Snow-in-summer	(L-M)
Chrysanthemum•x•morifolium	Chrysanthemums	H
Chrysanthemum•x•superbum	Shasta Daisy	M-H
Convallaria•majalis	Lily-of-the-valley	H
Crocsmia•x•crocsmiiflora	Crocsmia	H
Crocus spp. *	Crocus species	(L-M)
Datura meteloides	Sacred Datura	L-M
Delosperma cooperi	Hardy Pink Ice Plant	(M+/-)
Delphinium•x•elatum	Hybrid Delphiniums	H
Dianthus•spp.	Various Dianthus	L-M
Dicentra•eximia	Bleeding Heart	H
Dictamnus•albus	Gas Plant	L-M
Digitalis•purpurea	Common Foxglove	H
Echinacea•purpurea	Echinacea	M+/-
Echinops•ritro	Globe Thistle	H
Eremurus•spp.	Foxtail Lily	L-M
Eryngium•spp.	Sea Holly	L-M
Gaillardia aristata	Native Gaillardia	(L-M)
Geranium•spp.	Hardy Geraniums	M-H
Helianthemum•spp.	Sun-roses	M+/-
Helianthus maximiliani	Maximilian Sunflower	(M+/-)

Helianthus•spp.	Sunflowers	M+/-
Helleborus•spp.	Hellebores	M-H
Heimerocallis•spp.	Daylilies	M-H
Hosta•spp.	Hostas	H
Iberis•sempervirens	Candytuft	M+/-
Incarvillea•delavayii	Hardy Gloxinia	M+/-
Iris bucharica	Buchara Iris	(M+/-)
Iris germanica cvs..	Bearded Iris varieties	(L-M)
Kniphofia•spp.	Poker Plants	M-H
Lavandula spp.	Various Lavenders	(VL-M)
Liatris punctata	Dotted Gay Feather	(VL-L)
Liatris•punctata	Dryland Gayfeather	VL-L
Liatris•spicata	Wetland Gayfeather	H
Limonium•spp.	Sea Lavenders	L-M
Linum•perenne	Blue Flax	L-H
Lobelia•cardinalis	Cardinal Flower	H
Lobelia•syphilitica	Great Blue Lobelia	H
Lychnis•coronaria	Rose Campion	L-H
Malva•alcea	Hollyhocks	M+/-
Mirabilis multiflora	Native Four O'clock	(VL-L-M)
Monarda•spp.	Monardas	M-H
Narcissus spp.	Daffodils	(L-M)
Nepeta x faassenii	Faassen's Catnip	(L-M)
Paeonia•spp.	Peonies	M+/-
Papaver•orientale	Oriental Poppies	M-H
Penstemon pinifolius	Pineleaf Penstemon	(L-M)
Penstemon strictus	Rocky Mountain Penstemon	(L-M)
Perovskia atriplicifolia	Russian Sage	(VL-L)
Phlomis russeliana	Russel Phlomis	(M+/-)
Phlox subulata	Moss Phlox	(M+/-)
Phlox•paniculata	Garden Phlox	H
Platycodon•grandiflorus	Platycodon	H
Primula•spp.	Primroses	H
Ruta•graveolens	Rue	M+/-
Salvia azurea var. grandiflora	Pitcher Sage	(L-M)
Salvia officinalis	Cooking Sage	(L-M)
Salvia•spp.	Salvias	M+/-
Santolina chamaecyparissus	Santolina	(VL-M)
Saponaria ocymoides	Soapwort	(L-M-H)
Saponaria•ocymoides	Rock Soapwort	M+/-
Scabiosa ochroleuca	Yellow Pincushion Flower	(L-M)
Scabiosa•ochroleuca	Yellow Scabiosa	L-H
Secum•spp.	Sedums	M+/-
Silene laciniata	Mexican Campion	(M+/-)
Tanacetum niveum	Silver Tansy	(L-M)
Verbascum•chaxii	Nettle-leaf Mullein	M+/-
Zauschneria arizonica	Arizona Zauschneria	(L-M)
Zinnia grandiflora	Prairie Zinnia	(VL-L)

WaterWise Landscaping Best Practices

Section 4 – Natural Areas and Native Plants

A. Proactive Multi-Purpose Drainage Design

1. Introducing the Opportunity

The Front Range prairie is frequently characterized as a rolling grassy landscape folded into meandering wooded drainages. The natural processes that developed this landscape can support the erosion control goals of the drainage design while providing enhanced recreational open space and habitat value. Proactively planned multipurpose drainage design can deliver these goals while saving installation costs and maintenance effort by working with the natural processes.

2. Natural Landscape and Generative Processes

Expanding Front Range developments are covering upland prairies with homes and roads, but the regional landscape can still be seen in the natural drainages. The fundamental character of these drainage areas is defined by the distribution of the thickets of woody species. Wild Plum, Chokecherry, Golden Currant, Snowberry, Sandbar willow and Three-leaf sumac are scattered along the native drainages among occasional towering Plains cottonwoods and the smaller Peach-leaved willows. These species generally occupy the sub-irrigated zones intermediate between the moist central channel areas and the drier upland grasslands.

The natural processes by which woody vegetation expands into upland drainages depend upon a connection to the larger riparian systems below. (Remember: nature abhors a vacuum.) A shallow, young grassy drainage will eventually develop into a deeper, wooded channel. In natural systems normal precipitation cycles coupled with disturbance (grazing, fire, or drought), eventually will lead to erosion and deposition along the grassy channels. In development areas the process is accelerated by the installation of roads or trails, pipelines, and drainage features. Any action that weakens a grassland root system can provide an opening for change.

Seeds of woody species use either wind or wildlife to relocate into disturbed areas in drainages. Native deciduous trees such as the Plain cottonwood and Peach-leaved willow and the smaller Sandbar willows release seeds on the spring winds. When a newly exposed moist soil deposit occurs within a few miles of a well-vegetated river, stream or irrigation ditch, a few seeds from these species will blow into to the site. Once a tree has taken root, it will attract birds as well as raccoons, fox, coyote, and skunks. All these animals follow the drainages in their search for food. They eat the plums, chokecherries, currants, snowberries, hawthorns, sumac or any other wild fruits. As they travel, they rest in and under small trees. Seeds are dropped in these locations as the animals move

on. Droppings from animals are concentrated near existing trees. The shade and leaf litter beneath the trees provide a moist protected site favorable for establishment.

3. Choices

Engineers design channels for expected run off from the new paved surfaces (roofs and pavement) and existing or proposed vegetation. When a natural channel contains a well-developed woody plant community, the plans may accommodate the existing vegetation conditions, allowing the woody vegetation to remain. Woody vegetation supports to goals of the drainage program by decreasing peak flows, slowing flow rates, protecting slopes channel edges from excess erosion.

New developments, lacking historic drainage channels, must make decisions related to the establishment of woody vegetation. In a short time, windblown woody species will find suitable sites in new drainages. Heavier seeded plants will eventually follow. If plans do not create channels with adequate flow capacity for the natural process of woody plant establishment, they will predetermine a maintenance program including expensive woody vegetation control. The erosion control and recreational benefits possible from woody vegetation will be diminished in the battle to prevent the inevitable. Channels can be sized to accommodate woody vegetation to improve slope stabilization. If this is done well, the maintenance program will be able to allow the natural process of woody vegetation development to occur. This requires an approach acknowledging and working with the natural processes typical of these riparian corridors.

4. Cost effectiveness

Proactive, multipurpose drainage design is more cost effective than rigorous maintenance designed to remove all woody vegetation. The woody vegetation serves the underlying purpose of slope stability and erosion control, becoming an ally to the drainage program, instead of a problem. Installation costs of woody vegetation become part of the erosion control program. Costly maintenance aimed at prevention or removal of woody vegetation is no longer necessary. Mowing requirements may mostly be eliminated as perennial vegetation becomes well established. Multipurpose corridors can become more diverse, improving in habitat and passive recreational value, overtime.

5. Lower water usage

In the interest of developing a more water efficient landscape, multipurpose designed drainages within a development can provide a cool, shady wooded retreat area without requiring installation and maintenance of a supporting irrigation system. Properly selected and placed native woody species can be largely selfsufficient once installed.

6. Urban Drainage and Flood Control Support

UDFCD encourages the natural channel concept in drainage design (V. 1, MD-3-9). "Open channel planning and design objectives are often best met by using natural-like vegetated channels". Guidance for planning and execution of this concept is included within the Drainage Criteria manual (V. 2.) revegetation section. Native seed mixtures for a variety of soil types as well as recommended uses and installation methods for trees and shrubs within drainage designs, are included.

7. Success

During the spring of the drought year of 2002, a number of drainage improvement projects were installed. Native woody plantings of trees and shrubs were successfully established in spite of limited or no irrigation. Marcy Gulch at Highlands Ranch, Niver Creek in Thornton, Cottonwood Creek in Greenwood Village, and Lilly Gulch in Littleton were successfully established in spite of many days of unseasonably hot dry conditions.

B. Native Seed Mixes

1. Colorado Native Seed Mix Summary

- a. Short Grass Prairie (grasses & wildflowers)
- b. Mixed Grass Prairie (grasses & wildflowers)
- c. Tall Grass Prairie (grasses & wildflowers)
- d. Moist or Wetland Soils (grasses & wildflowers)
- e. Sandy Loam Soils (grasses & wildflowers)
- f. Clay Loam Soils (grasses & wildflowers)
- g. Select Shrubs and Trees for natural areas

The complete Native Seed lists are provided on the following pages.



Shortgrass prairie species Easter daisy/*Townsendia grandiflorus*



Heavily grazed native shortgrass prairie

Table 1. Native shortgrass mixture for loam to clay loam dry upland sites. Some taller species included. Fall broadcast seed, rake or harrow to cover 1/10 to 1/3 inch, mulch recommended.

COMMON NAME	SCIENTIFIC NAME	VARIETY	MATURE HEIGHT	SEEDS/LB	PLS LBS/ACRE	SUGGESTIONS
GRASSES AND GRASS-LIKE PLANTS						
Buffalograss	<i>Buchloe dactyloides</i>	Sharp's	4-6"	56000	6.5	
Sideoats grama	<i>Bouteloua curtipendula</i>	Butte	18"	191000	3.0	
Blue grama	<i>Chondrosum gracile</i>	Hachita	6-8"	825000	8.0	
Western wheatgrass	<i>Pascopyrum smithii</i>	Barton	18"	110000	4.0	
Sand dropseed	<i>Sporobolus cryptandrus</i>	Native	18"	5,200,000	2.0	
TOTAL POUNDS/ACRE					23.5	
						1 acre=43560 square feet. Divide this per acre seed quantity by 20 to 40 for each to 1000 square feet to be seeded.
ADAPTED NATIVE WILDFLOWERS					OUNCES /ACRE	Double wildflower seeding rate for more color.
Purple prairieclover	<i>Dalea purpurea</i>		12"	210000	3.0	
Blanket flower	<i>Gaillardia aristata</i>		12-18"	132000	4.0	
Golden aster	<i>Heterotheca villosa</i>		6-8"	920000	2.0	
Gayfeather	<i>Liatris punctata</i>		12-18"	138000	4.0	
Flax	<i>Linum lewisii</i>		18"	293000	2.0	
Bluemist penstemon	<i>Penstemon virens</i>		8"	850000	3.0	
Sidebells penstemon	<i>Penstemon secundiflorus</i>		18"	610000	2.0	
Scarlet globemallow	<i>Sphaeralcea coccinea</i>		6-8"	500000	3.0	
Easter daisy	<i>Townsendia grandiflora</i>		6-8"	1200000	0.5	
TOTAL OUNCES/ACRE					23.5	
AV - Arkansas Valley Seed 303-665-6642, WNS - Western Native Seed 719-942-3935. Prepared by The Restoration Group, Inc. 5/03.						

Shortgrass Prairie

This vegetation type is typical of high plains areas with 10- 16 inches on annual precipitation. In native areas shallow soil depth, clay soil, low precipitation, alkaline conditions, heavy grazing or compaction all may contribute to a



Prairie coneflower/*Ratibida columnifera* in restored mixed grass prairie



Restored mixed grass prairie with wildflowers.

Table 2. Native mixed grass for sandy loam, loam, clay loam upland sites. Fall broadcast seed, rake or harrow to cover 1/10 to 1/3 inch, mulch recommended.

COMMON NAME	SCIENTIFIC NAME	VARIETY	MATURE HEIGHT	SEEDS/LB	PLS LBS/ACRE	SUGGESTIONS
GRASSES AND GRASS-LIKE PLANTS						
Sideoats Grama	<i>Bouteloua curtipendula</i>	Butte	18"	191000	4.8	
Buffalograss	<i>Buchloe dactyloides</i>	Texoca	4-6"	56000	5.0	
Blue Grama	<i>Chondrosium gracile</i>	Hachita	6-8"	825000	4.5	
Switchgrass	<i>Panicum virgatum</i>	Blackwell	24-36"	389000	2.0	
Western wheatgrass	<i>Pascopyrum smithii</i>	Ariba	18"	110000	3.0	
Little bluestem	<i>Schyzachrium scoparium</i>	Pastura	18-24"	260000	2.0	
Sand dropseed	<i>Sporobolus cryptandrus</i>	native	18"	5,200,000	0.5	
Green needlegrass	<i>Stipa viridula</i>	native	24"		1.5	
TOTAL POUNDS PLS/ACRE					23.3	
						1 acre=43560 square feet. Divide this per acre seed quantity by 20 to 40 for each to 1000 square feet to be seeded.
ADAPTED NATIVE WILDFLOWERS					OUNCES /ACRE	Double wildflower seeding rate for more color.
Smooth aster	<i>Aster laevis</i>				2.0	
Purple prairieclover	<i>Dalea purpurea</i>			210000	3.0	
Blanket flower	<i>Gaillardia aristata</i>			132000	6.0	
Golden aster	<i>Heterotheca villosa</i>				2.0	
Gayfeather	<i>Liatris punctata</i>			138000	4.0	
Flax	<i>Linum lewisii</i>			293000	2.0	
Penstemon	<i>Penstemon angustifolia</i>		24"	590000	2.0	
Prairie coneflower	<i>Ratibida columnifera</i>			1230000	2.0	
TOTAL OUNCES/ACRE					23.0	

*AV - Arkansas Valley Seed 303-665-6642, WNS - Western Native Seed 719-942-3935. Prepared by The Restoration Group, Inc. 5/03.

Mixed grass midgrass Prairie

Native areas with richer clay-loam to loamy soil, 14-18 inches of precipitation, and less grazing impact may exhibit the taller grasses typical of mixed grass prairie. Restored mixed grass prairie is possible on sites withg



Purple prairie clover/*Dalea purpurea* in restored tallgrass prairie. Grasses will later become 36" or more in height.

Table 3. Native tallgrass mixture for north and east facing sites, low areas. Fall broadcast seed, rake or harrow to cover 1/10 to 1/3 inch, mulch recommended.

COMMONNAME	SCIENTIFIC NAME	VARIETY	MATURE HEIGHT	SEEDS/LB	TOTAL LBS PLS/ACRE	SUGGESTIONS
GRASSES AND GRASS-LIKE PLANTS						
Big bluestem	<i>Andropogon gerardi</i>	Pawnee	3-4'	130,000	1.5	
Sideoats grama	<i>Bouteloua curtipendula</i>	Butte	18"	191000	2.8	
Blue grama	<i>Chondrosum gracile</i>	Hachita	6-8"	825000	3.5	
Switchgrass	<i>Panicum virgatum</i>	Blackwell	36"	389000	3.0	
Western wheatgrass	<i>Pascopyrum smithii</i>	Ariba	18"	110000	6.0	
Little bluestem	<i>Schizachyrium scoparium</i>	Pastura	24"	26000	3.4	
Yellow Indiangrass	<i>Sorghastrum avenaceum</i>	Holt	3-4'	170000	2.1	
TOTAL POUNDSPLS/ACRE					22.3	
						1 acre=43560 square feet. Divide this per acre seed quantity by 20 to 40 for each to 1000 square feet to be seeded.
ADAPTED NATIVE WILDFLOWERS					OUNCES /ACRE	Double wildflower seeding rate for more color.
Showy milkweed	<i>Asclepias speciosa</i>	native				
Blue aster	<i>Aster laevis</i>	native	18"		2.0	
Blanket flower	<i>Gaillardia aristata</i>	native	12-18"	132000	2.0	
Prairie coneflower	<i>Ratibida columnifera</i>	native	18-24"	1230000	4.0	
Purple prairieclover	<i>Dalea (Petalostemum) purpurea</i>	native	12"	210000	4.0	
Flax	<i>Linum lewisii</i>	native	18"	293000	3.0	
Penstemon	<i>Penstemon strictus</i>	native	24"	590000	4.0	
TOTAL OUNCES/ACRE					19.0	

*AV - Arkansas Valley Seed 303-665-6642, WNS - Western Native Seed 719-942-3935. Prepared by The Restoration Group, Inc. 5/03.

Tallgrass seed mixture

The taller grasses are limited to areas of higher precipitation 16-18 inches along the foothills and moist bottomlands streams. Rocky soils may contribute to greater moisture availability and the presence of remnant tallgrass



Restored wetland area in small drainage on school grounds with outdoor classroom/boardwalk.



Restored floodplain meadow in Commons Park near downtown Denver.

Table 4. Native wetland mix for drainages, swales or detention ponds (soil is moist between precipitation events). Application rate 1/2 - 1 pound PLS/1000 ft. sq. Broadcast, harrow or rake to cover with 1/10 - 1/3 inch soil.						
COMMON NAME	SCIENTIFIC NAME	VARIETY	MATURE HEIGHT	SEEDS/LB	PLS LBS/ACRE	SUGGESTIONS
ADAPTED NATIVE GRASSES AND GRASS-LIKE PLANTS						
Woolly sedge	<i>Carex lanuginosa</i>	Native	18"	322,340	0.1	
Nebraska sedge	<i>Carex nebraskensis</i>	Native	12"	534,100	0.1	
Inland saltgrass	<i>Distichlis stricta</i>	Native	8"-10"	603,820	0.5	
Baltic rush	<i>Juncus balticus</i>	Native	12-18"	12,300,000	0.1	
Prairie cordgrass	<i>Spartina pectinata</i>	Native	24"+	183,000	9.5	
Switchgrass	<i>Panicum virgatum</i>	Blackwell	36"+	389,000	6.0	
Western wheatgrass	<i>Pascopyrum smithii</i>	Arriba	24"	110,000	8.0	
TOTAL POUNDS/ACRE					24.3	
					TOTAL OZ/ACRE	1 acre=43560 square feet. Divide this per acre seed quantity by 20 to 40 for each to 1000 square feet to be seeded.
ADAPTED NATIVE WILDFLOWERS						
Aster	<i>Aster laevis</i>	native	18"	1216000	3.0	
Showy milkweed	<i>Asclepias speciosa</i>	native	30"	58,112	2.0	
Swamp milkweed	<i>Asclepias incarnata</i>	native	36"	68,100	2.0	
Nuttall's sunflower	<i>Helianthus nuttallii</i>	native	6'+	250,000	1.0	
Wild Bergamot	<i>Monarda fistulosa</i>	native	24"	1,400,136	3.0	
TOTAL OUNCES/ACRE					11.0	
* AV - Arkansas Valley Seed 303-665-6642, WNS - Western Native Seed 719-942-3935. Prepared by The Restoration Group, Inc. 5/03.						
Moist wetland seed mixture						
Damp soils along streams, near seeps, and in drainage swales supports wet meadow vegetation. Drainage channels, areas where water flows or pools after a storm are good sites for these moisture loving species. Using such speci						



Scarlet globemallow/*Sphaeralcea coccinea* and Western wheatgrass/*Agropyron smithii* in mixed grass prairie remnant along Coal Creek in Erie.



Restored shortgrass prairie with Sidebells penstemon/*Penstemon secundiflorus*.

Table 5. Recommended native sand prairie for sandy to sandy loam soil. Fall broadcast seed, rake or harrow to cover 1/10 to 1/3 inch, mulch recommended.

COMMON NAME	SCIENTIFIC NAME	VARIETY	MATURE HEIGHT	SEEDS/LB	TOTAL PLS /ACRE	SUGGESTIONS
GRASSES AND GRASS-LIKE PLANTS						
Sand bluestem	<i>Andropogon hallii</i>	Garden	36"	113300	2.0	
Sideoats grama	<i>Bouteloua curtipendula</i>	Butte	18"	191000	3.2	
Prairie sandreed	<i>Calamovilfa longifolia</i>	Goshen	24-36"	273000	2.1	
Blue grama	<i>Chondrosium gracile</i>	Hachita	6-8"	825000	2.5	
Switchgrass	<i>Panicum virgatum</i>	Blackwell	36"	389000	2.0	
Western wheatgrass	<i>Pascopyrum smithii</i>	Arriba	18-24"	110000	6.5	
Little bluestem	<i>Schizachyrium scoparium</i>	Pastura	24"	26000	3.0	
Sand dropseed	<i>Sporobolus cryptandrus</i>		18"	1758000	0.5	
TOTAL POUNDS/ACRE					21.8	
						1 acre = 43560 square feet. Divide this per acre seed quantity by 20 to 40 for each 1000 square feet to be seeded.
ADAPTED NATIVE WILDFLOWERS					TOTAL OZ/ACRE	Double wildflower seeding rate for more color.
Blue aster	<i>Aster laevis</i>		18"		2.0	
Blanket flower	<i>Gaillardia aristata</i>		12-18"	132000	6.0	
Prairie coneflower	<i>Ratibida columnifera</i>		24"	1230000	3.0	
Purple prairieclover	<i>Dalea (Petalostemum) purpurea</i>		12"	210000	3.0	
Flax	<i>Linum lewisii</i>		18"	293000	4.0	
Penstemon	<i>Penstemon strictus</i>		18-24"	592000	4.0	
TOTAL OUNCES/ACRE					22.0	
* AV - Arkansas Valley Seed 303-665-6642, WNS - Western Native Seed 719-942-3935. Prepared by The Restoration Group, Inc. 5/03.						

Sandy loam seed mixture

Isolated areas of sandy soil are better suited to these deep rooted species. Some native shrubs such as Yucca/Yucca glauca, Rabbitbrush/Chrysothamnus nauseosus, and Sand sagebrush/Artemisia filifolia are well suited to these areas



Needle-and-threadgrass/*Stipa comata* with Blanketflower/*Gaillardia aristata* in mixedgrass prairie.

Table 6. Native seed mixture for use on clay loam soils. Application rate on clean seed bed 1/2-1 pound PLS/1000 sq. ft. Fall broadcast seed, rake or harrow to cover 1/10 to 1/3 inch, mulch recommended.

COMMON NAME	SCIENTIFIC NAME	VARIETY	MATURE HEIGHT	SEEDS/LB	PLS LBS/ACRE	SUGGESTIONS
GRASSES AND GRASS-LIKE PLANTS						
Buffalograss	<i>Buchloe dactyloides</i>	Sharp's	6"	56000	7.6	
Sideoats grama	<i>Bouteloua curtipendula</i>	Butte	18"	191000	3.5	
Blue grama	<i>Chondrosom gracile</i>	Hachita	6-8"	825000	6.0	
Western wheatgrass	<i>Pascopyrum smithii</i>	Barton	18"	110000	4.8	
TOTAL POUNDS/ACRE					21.9	
						1 acre=43560 square feet. Divide this per acre seed quantity by 20 to 40 for each to 1000 square feet to be seeded.
ADAPTED NATIVE WILDFLOWERS					OZ/ACRE	Double wildflower seeding rate for more color.
Purple prairieclover	<i>Dalea purpurea</i>		12"	210000	3.0	
Blanket flower	<i>Gaillardia aristata</i>		12-18"	132000	3.0	
Gayfeather	<i>Liatris punctata</i>		12-18"	138000	3.0	
Flax	<i>Linum lewisii</i>		18"	293000	4.0	
Prairie coneflower	<i>Ratibida columnifera</i>		18-24"		3.0	
Scarlet globemallow	<i>Sphaeralcea coccinea</i>		6"		4.0	
TOTAL OUNCES/ACRE					20.0	
* AV - Arkansas Valley Seed 303-665-6642, WNS - Western Native Seed 719-942-3935. Prepared by The Restoration Group, Inc. 5/03.						
Clay loam seed mixture						
The shortgrass prairie species are well adapted to clay loam soils.						



Native woody shrubs and trees stabilize stream channel in Front range open space area. Shade, habitat, and passive recreational value area also enhanced. No irrigation water is required for this amenity.

Table 7. Native shrub and tree species adapted to the Front Range high plains area. Little or no water is required for these species if properly located on landscape. Useful for erosion control, shade, and habitat improvement in drainages.

COMMON NAME	SCIENTIFIC NAME	VARIETY	MATURE HEIGHT	SEEDS/LB	PLS LBS/ACRE	LOCATION
NATIVE WOODY VEGETATION						
Rabbitbrush	<i>Chrysothamnus nauseosus</i>	Native	2-4'			Upland areas, establishment watering. Use smaller plants or seed for best results.
Plains Cottonwood	<i>Populus sargentii</i>	Native	45-60'			Naturally subirrigated lowlands, moist areas, open space drainages. Plant rootball 2-4' into saturated soil, monthly deep watering if planted in upland areas.
Chokecherry	<i>Padus virginiana</i>	Native	10-12'			Naturally subirrigated lowlands, shady sites, northfacing slopes, open space drainages. Deep water once a month in upland areas.
Wild plum	<i>Prunus americana</i>	Native	6-8'			Naturally subirrigated lowlands, shady sites, northfacing slopes, open space drainages. Deep water once a month in upland areas.
Golden current	<i>Ribes aureum</i>	Native	3-4'			Naturally subirrigated lowlands, shady sites, northfacing slopes, open space drainages. Deep water once a month in upland areas.
Three-leaf sumac	<i>Rhus trilobata</i>	Native	4-8'			Upland areas, water monthly 1 year to establish
Peachleaf willow	<i>Salix amygdaloides</i>	Native	15-35'			Naturally subirrigated lowlands, moist areas, open space drainages.
Sandbar willow	<i>Salix exigua</i>	Native	5-6'			Naturally subirrigated lowlands, moist areas, open space drainages.
Snowberry	<i>Symphoricarpos occidentalis</i>	Native	2'			Naturally subirrigated lowlands, shady sites, northfacing slopes, open space drainages.
Yucca	<i>Yucca glauca</i>	Native	2'			Upland areas, water 1 year to establish
TOTAL POUNDS PLS/ACRE					0	
WaterWise Landscaping						
* AV - Arkansas Valley Seed 303-665-6642, WNS - Western Native Seed 719-942-3935. Prepared by The Restoration Group, Inc. 5/03.						

Woody plants

Most native woody vegetation are adapted to drainages and sites with elevated moisture, such as springs or north-facing slopes. These species provide critical habitat for wildlife, shade and diversity, and erosion control in drainage areas.

Best Practices

Section 4 – Natural Areas and Native Plants

C. Plants to Avoid – The 2003 State Noxious Weed List

The following noxious weed listings have been excerpted from the Rules and Regulations Pertaining to the Administration and Enforcement of the Colorado Weed Management Act, as of May 2003. The full text and current listing are available at <www.ag.state.co.us/DPI/weeds/weed.html>.

"Noxious weed" means an alien plant or parts of an alien plant that have been designated by rule as being noxious or has been declared a noxious weed by a local advisory board, and meets one or more of the following criteria:

- (a) Aggressively invades or is detrimental to economic crops or native plant communities;
- (b) Is poisonous to livestock;
- (c) Is a carrier of detrimental insects, diseases, or parasites;
- (d) The direct or indirect effect of the presence of this plant is detrimental to the environmentally sound management of natural or agricultural ecosystems.

The following weed species, listed in alphabetical order, are identified as the State Noxious Weeds. They have been identified by individual counties as problem weeds in the county's area or have been recommended for management through public testimony. These weed species should be considered by each local advisory board and local governing body in the development, adoption and enforcement of their noxious weed list and noxious weed management plan. The State Noxious Weeds are:

Absinth wormwood (<i>Artemisia absinthium</i>)	Meadow knapweed (<i>Centaurea pratensis</i>)
African rue (<i>Peganum harmala</i>)	Mediterranean sage (<i>Salvia aethiopis</i>)
Black henbane (<i>Hyoscyamus niger</i>)	Medusahead rye (<i>Taeniatherum caput-medusae</i>)
Black nightshade (<i>Solanum nigrum</i>)	Moth mullein (<i>Verbascum blattaria</i>)
Blue mustard (<i>Chorispora tenella</i>)	Musk thistle (<i>Carduus nutans</i>)
Bouncingbet (<i>Saponaria officinalis</i>)	Myrtle spurge (<i>Euphorbia myrsinites</i>)
Bull thistle (<i>Cirsium vulgare</i>)	Orange hawkweed (<i>Hieracium aurantiacum</i>)
Camelthorn (<i>Alhagi pseudalhagi</i>)	Oxeye daisy (<i>Chrysanthemum leucanthemum</i>)
Canada thistle (<i>Cirsium arvense</i>)	Perennial pepperweed (<i>Lepidium latifolium</i>)
Chicory (<i>Cichorium intybus</i>)	Perennial sowthistle (<i>Sonchus arvensis</i>)
Chinese clematis (<i>Clematis orientalis</i>)	Plumeless thistle (<i>Carduus acanthoides</i>)
Coast tarweed (<i>Madia sativa</i>)	Poison hemlock (<i>Conium maculatum</i>)
Common burdock (<i>Arctium minus</i>)	Puncturevine (<i>Tribulus terrestris</i>)
Common crupina (<i>Crupina vulgaris</i>)	Purple loosestrife (<i>Lythrum salicaria</i>)
Common groundsel (<i>Senecio vulgaris</i>)	Quackgrass (<i>Elytrigia repens</i>)
Common mullein (<i>Verbascum thapsus</i>)	Redstem filaree (<i>Erodium cicutarium</i>)
Common St. Johnswort (<i>Hypericum perforatum</i>)	Rush skeletonweed (<i>Chondrilla juncea</i>)
Common tansy (<i>Tanacetum vulgare</i>)	Russian knapweed (<i>Centaurea repens</i>)
Common teasel (<i>Dipsacus fullonum</i>)	Russian-olive (<i>Elaeagnus angustifolia</i>)
Cypress spurge (<i>Euphorbia cyparissias</i>)	Russian thistle (<i>Salsola collina</i> and <i>S. iberica</i>)
Dalmatian toadflax, broad-leaved (<i>Linaria dalmatica</i>)	Saltcedar (<i>Tamarix parviflora</i> and <i>T. ramosissima</i>)
Dalmation toadflax, narrow-leaved (<i>L. genistifolia</i>)	Scentless chamomile (<i>Anthemis arvensis</i>)
Dame's rocket (<i>Hesperis matronalis</i>)	Scotch thistle (<i>Onopordum acanthium</i> and <i>O. tauricum</i>)
Diffuse knapweed (<i>Centaurea diffusa</i>)	Sericea lespedeza (<i>Lespedeza cuneata</i>)
Downy brome (<i>Bromus tectorum</i>)	Shepherdspurse (<i>Capsella bursa-pastoris</i>)
Dyer's woad (<i>Isatis tinctoria</i>)	Spotted knapweed (<i>Centaurea maculosa</i>)
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	Spurred anoda (<i>Anoda cristata</i>)
Field bindweed (<i>Convolvulus arvensis</i>)	Squarrose knapweed (<i>Centaurea virgata</i>)
Flixweed (<i>Descurainia sophia</i>)	Sulfur cinquefoil (<i>Potentilla recta</i>)
Giant salvinia (<i>Salvinia molesta</i>)	Swainsonpea (<i>Sphaerophysa salsula</i>)
Green foxtail (<i>Setaria viridis</i>)	Tansy ragwort (<i>Senecio jacobaea</i>)
Hairy nightshade (<i>Solanum sarrachoides</i>)	Velvetleaf (<i>Abutilon theophrasti</i>)

Halogeton (*Halogeton glomeratus*)
 Hoary cress (*Cardaria draba*)
 Houndstongue (*Cynoglossum officinale*)
 Hydrilla (*Hydrilla hydrilla*)
 Johnsongrass (*Sorghum halepense*)
 Jointed goatgrass (*Aegilops cylindrica*)
 Kochia (*Kochia scoparia*)
 Leafy spurge (*Euphorbia esula*)
 Mayweed chamomile (*Anthemis cotula*)

Venice mallow (*Hibiscus trionum*)
 Wild caraway (*Carum carvi*)
 Wild mustard (*Brassica kaber*)
 Wild oats (*Avena fatua*)
 Wild proso millet (*Panicum miliaceum*)
 Yellow foxtail (*Setaria glauca*)
 Yellow nutsedge (*Cyperus esculentus*)
 Yellow starthistle (*Centaurea solstitialis*)
 Yellow toadflax (*Linaria vulgaris*)

The following weed species are recognized as the top ten prioritized weed species for the State of Colorado. After analysis of a statewide survey of counties, these species are acknowledged to be the most widespread and to cause the greatest economic impact in the State of Colorado. These species shall be considered by each local advisory board and local governing body in the development, adoption and enforcement of their noxious weed list and noxious weed management plan. They are listed in alphabetical order:

Canada thistle (*Cirsium arvense*)
 Dalmation toadflax (*Linaria dalmatica* and *L. genistifolia*)
 Diffuse knapweed (*Centaurea diffusa*)
 Field bindweed (*Convolvulus arvensis*)
 Hoary cress (*Cardaria draba*)

Houndstongue (*Cynoglossum officinale*)
 Leafy spurge (*Euphorbia esula*)
 Musk thistle (*Carduus nutans*)
 Russian knapweed (*Centaurea repens*)
 Yellow toadflax (*Linaria vulgaris*)

The following weed species may not be present or are not yet widespread or causing great economic impact within the State of Colorado. However, counties and local advisory boards are encouraged to contain and eradicate these species before they proliferate and significantly impact the economic and environmental values of the lands of the State. They are listed in alphabetical order:

Absinth wormwood (*Artemisia absinthium*)
 African rue (*Peganum harmala*)
 Bouncingbet (*Saponaria officinalis*)
 Camelthorn (*Alhagi pseudalhagi*)
 Coast tarweed (*Madia sativa*)
 Common crupina (*Crupina vulgaris*)
 Common teasel (*Dipsacus fullonum*)
 Cypress spurge (*Euphorbia cyparissias*)
 Dyer's woad (*Isatis tinctoria*)
 Eurasian watermilfoil (*Myriophyllum spicatum*)
 Giant salvinia (*Salvinia molesta*)
 Hydrilla (*Hydrilla hydrilla*)

Meadow knapweed (*Centaurea pratensis*)
 Moth mullein (*Verbascum blattaria*)
 Myrtle spurge (*Euphorbia myrsinites*)
 Orange hawkweed (*Hieracium aurantiacum*)
 Rush skeletonweed (*Chondrilla juncea*)
 Sericea lespedeza (*Lespedeza cuneata*)
 Spurred anoda (*Anoda cristata*)
 Squarrose knapweed (*Centaurea virgata*)
 Sulfur cinquefoil (*Potentilla recta*)
 Tansy ragwort (*Senecio jacobaea*)
 Venice mallow (*Hibiscus trionum*)
 Yellow starthistle (*Centaurea solstitialis*)

WaterWise Landscaping
Best Practices**Section 5 – Understanding Soils and Soil Preparation****A. Introduction to Soils** (See Native Plant Revegetation Guide available at:
http://parks.state.co.us/cnap/revegetation-guide/reveg_index.html)

Prairie soils have developed over thousands of years. Native topsoil is a living material containing soil microorganisms, seeds, plant roots, and invertebrate animal in a matrix of minerals (derived from rocks) and dead organic matter (developed from the breakdown of dead plants and animals). Areas with adequate topsoil are better able to develop and support healthy vegetation. Native drought tolerant vegetation may be adapted to a broad or narrow range of soil types. Successful native and drought tolerant landscapes should consider soil properties when designing planting areas. Soil properties include texture, chemistry, and structure. Soil pH, salinity, and percent organic matter may be more critical to the establishment of native and drought tolerant vegetation than soil macronutrient levels (nitrogen, phosphorus, and potassium). In order to better plan for specific soils, consult the reference above.

Topsoil may be recognized in general by its darker color (very dark to deeper brownish earth tones). The distinct transition to brighter earth tones may mark the boundary with subsoil. Recent precipitation may color surface soils darker and should not be mistaken for topsoil. In general topsoil may be 6 to 12 inches deep, deeper in drainages and shallower on slopes and hilltops. Old agricultural fields may have less distinct boundaries due to years of mixing of upper soils and accelerated erosional loss. Pits may be dug to identify topsoil depths prior to removal

B. Salvage of Soils

Topsoil is a living material and must be handled carefully to preserve its quality. Planned developments are frequently re-graded. Topsoil should be salvaged from all areas and stockpiled prior to grading. Topsoil under roads and staging areas should also be removed and stock piled. All salvaged topsoil should be reapplied to the portions of the development site to be revegetated. Salvage topsoil in drainages before erosion of denuded upland areas can contaminate them.

Topsoil is best if it can be removed and hauled directly to the placement site. If storage is necessary it should be for as short a time as possible. The topsoil should be placed in a low mound, in a weed free area, with side slopes of 7:1 or less. A ditch and berm structure around the pile will help reduce loss to erosion. If the pile is to remain for more than four weeks, it should be seeded with a sterile hybrid wheatgrass such as “Regreen”. The depth of the pile should be no greater than 2-3 feet to minimize loss of living microbial components. In general it is best to move topsoil when it is moist. Avoid moving wet soils (may harden to brick-like consistency) or overly dry soils. Dormant hauled soils preserve residual native seed and propagules.

C. Topsoil Sources

If topsoil is to be imported to a site a soil sample or recent soil test should be obtained from the supplier. If possible the source site should be visited to check for weed contamination. Soil sources should be free of noxious weed species. If a prepared soil is to be used, the organic content should only be 2 percent for native seeding areas. (Conventional lawns and higher water usage areas may utilize higher organic matter.)

D. Topsoil Testing

Imported topsoil should be a sandy loam or loam soil as defined by the USDA Soil Conservation Service soil Classification system, as follows:

<u>Textural Class</u>	<u>% Total Weight</u>	<u>Average %</u>
Sand (0.05-2.0 mm dia. Range)	45 to 75	60
Silt (0.002-0.05 mm dia. range)	15 to 35	25
Clay (less than 0.002 mm dia. range)	5 to 25	15

Topsoil should be free of stones over 1" in diameter (lawns and gardens) or over 4" (native seeded areas). Topsoil should be free of debris and excessive plant litter.

Topsoil should have a pH of 6-7.5 and salinity less than 4 mmhos/cm.

Soil Testing is available through the **Colorado State University Extension Service:**

Contact Information: CSU Soil Testing Lab, Ft. Collins, Colorado
 Phone: 970-491-5061
 Fax: 970-491-2930
 Web: www.colostate.edu/Depts/SoilCrop/soillab.html
 Cost: Routine Analysis = \$18.00 (as of 6/03)
 Procedure: Application & Instruction Forms follow

E. Soil Amendments

It is best to plan native and drought tolerant vegetation around the existing soil conditions. If extreme soil conditions exist, some amendments may improve the soil conditions:

1. pH

If the pH is very high it may be possible to adjust by adding aluminum sulfate. Soil in the Front Range tends to have a high pH and thus, does not generally require the addition of lime, which would further elevate the pH value.

2. Texture

Soil texture effects water availability within soils. Very sandy soils do not retain water well. Very clayey soils do not allow water to penetrate or drain easily. Organic matter may improve both of these extreme soils. Native or to low water usage landscapes generally no more than 2 percent organic matter. Generally, if sandy or

clay soils are amended, 2 cubic yards of composted organic matter/1000 square feet is adequate. To improve deep root penetration in a heavy clay or sandy subsoil (under all water usage levels of landscape) apply 2 cubic yards of compost prior to re-application of topsoil. All compost should be deeply ripped into the soil at least 12 inches. This helps with root penetration into the deeper layers of the soil and makes all landscape types more drought tolerant. Avoid over-working the soil to preserve the soil structure.

3. Organic Amendment

Organic amendments should be composted. Compost may be a mixture of manures (not from stock yards, which may be high in salts), yard wastes (ground grass clippings, leaves and branches), organic byproducts such as brewery wastes, and sewage sludge (should not be used alone due to a high clay content.) Prepared topsoil companies maintain sanitary controlled compost production and are a good source of organic amendments.

4. Nutrient Amendment

Nutrient amendments may not be required for native vegetation. Macro nutrient (N,P,K) levels are low in native prairies. Addition of nutrients to native and drought tolerant planting areas may encourage weeds and damage root systems. If topsoil is very poor or lacking, a slow release organic amendment such as Biosol may be added at a rate of 800 to 1200 pounds per acre to improve plant growth.

SUGGESTED INSTRUCTIONS FOR SUBMITTING SOIL SAMPLES

Use the following steps to submit soil samples:

1. Obtain a spade, trowel, soil tube, or soil auger free of rust and soil.
2. Dig 5-10 samples (depending on the size of the area) from the soil depth where your plants will be rooting. The samples should represent a uniform area consisting of land that is similar in slope, texture, drainage, or other characteristics that make the soil the same. A front and back yard would most likely be very similar to each other, however a garden area may be different from a turf grass area.
3. Place all of the samples into a plastic container and mix well to get your final sample for submittal to the lab. If possible, air dry the sample by spreading it out on paper towels.
4. Remove about 1 1/2 - 2 pints of soil from the container and place it in a plastic bag or soil sample bag.
5. Seal the bag and label the sample with name, address and location of the sample.
6. Complete this soil sample information form as much as possible and include it with the soil sample.
7. Mail the sample to the lab using the following address:

**Soil, Water and Plant Testing Laboratory
Colorado State University
Room A 319 NESB
Fort Collins, CO 80523-1120**

8. Be sure to keep samples cool before mailing. If samples heat up; the nitrogen readings can change dramatically. Keeping the samples in the shade will prevent excessive heating.
9. **DO NOT PREPAY**, you will be billed for the analysis.
10. The lab **DOES NOT** do herbicide or pesticide analysis.
11. If you have additional questions please contact the lab at: (970) 491-5061 or your local county Cooperative Extension agent.

SOIL TESTS AVAILABLE	
TEST	COMMENTS
Routine- pH, soluble salts, organic matter, nitrate-nitrogen, phosphorus, potassium, zinc, iron, lime (estimate), texture, copper and manganese.	Basic evaluation for characterizing the soil fertility status for growing crops. a fertilizer recommendation is given. Normally this test is sufficient unless a special problem is suspected.
Subsoil Nitrate	Evaluation of nitrate supply below soil surface. Fertilizer nitrogen recommendation based on routine soil test of surface soil is adjusted if subsoil nitrate is unusually high.
Subsoil Salinity	It is important to determine the salt content of subsoil for crop management.
Sodium Evaluation - sodium adsorption ratio (ratio of sodium to calcium and magnesium), gypsum, and % lime.	Some Colorado soils contain excess sodium. This test determines whether or not chemical amendments such as gypsum or sulfur will be effective and the amounts of these materials needed.
Routine plus Sodium Evaluation	See above explanations. A recommendation for fertilizer and/or amendments for sodium reclamation is given.
Boron, Sulfate and Molybdenum	Colorado soils usually have sufficient quantities of these nutrients. However, in some soils near mine sites, boron or molybdenum may be found in toxic quantities.

Form from the CSU Soil-Water-Plant Laboratory website
<www.colostate.edu/Depts/SoilCrop/soillab.html>

SOIL SAMPLE INFORMATION FOR HORTICULTURAL APPLICATIONS - PLEASE PRINT IN
LANDSCAPE MODE:

See the reverse side for sampling information

DATE: _____
 FULL NAME: _____
 SSN: _____
 ADDRESS: _____
 CITY: _____ STATE: _____
 ZIP CODE: _____
 PHONE: _____ FAX: _____
 COUNTY: _____ SAMPLE ID: _____

The following information will help us give you a written
 explanation of the laboratory results:

PLEASE CIRCLE ALL THAT APPLY.

1. The sample is from:

- A. Lawn E. Golf course
 B. Vegetable garden F. Container plantings
 C. Flower bed G. Reclamation site
 D. Greenhouse H. Other (please specify) _____

2. What do you plan to grow at the site or what is currently growing at the site?

- A. Vegetables B. Flowers C. Turfgrass (How old is the lawn?) _____ D. Trees E. Other _____

If you are growing turf please answer the following:

Is this site to be _____ Seeded _____ Sodded?

Is it an existing lawn? _____

If the lawn is established was it:

Seeded _____ Sodded _____

3. Will this site be

irrigated/watered?

Yes _____ or No _____

4. If yes which method?

- A. Sprinkler C. Drip
 B. Flood D. Other please specify _____

5. If sprinkler is used is it:

- A. Automatic C. Hose end
 B. In ground D. Other _____

6. About how much water do you apply each time you irrigate/water?

- A. Less than 1 inch. B. 1-3 inches C. 4-6 inches D. More than 6 inches

7. How often do you irrigate/water? Daily _____ Once per week _____ Twice per week _____ Other _____

8. If possible, indicate the types of previous crops or plants that grew at this site. _____

9. What have you added or plan to add to the soil? _____

10. Is there a specific problem with this site? Yes _____ No _____

If yes, please describe the problem, what caused the problem and why you think it was the cause (use a separate sheet if necessary).

11. If you wish to have a fertilizer recommendation based on organic fertilizers please answer the following questions.

What is the type of material that will be used for organic fertilizer?

- A. Composted manure B. Composted sludge C. Other _____

Do you know the nutrient levels in the organic fertilizer? Yes _____ No _____

If so please supply the following information for the organic fertilizer.

% nitrogen	% phosphorus	% potassium	pH	Salts (mmhos/cm)

Additional Comments: _____

By accepting service or goods, I agree to submit payment in full to Colorado State University upon receipt of invoice
 or University Billing Statement. Late payment charges of 1.5% per month and other penalties specified may be
 assessed for late payment.

Please call lab for prices.

revised 10-11-2001

Form from the CSU Soil-Water-Plant Laboratory website
 <www.colostate.edu/Depts/SoilCrop/soillab.html>

WaterWise Landscaping

Best Practices**Section 6 – Irrigation Design Techniques and Equipment**

The following information builds upon some of the Guidelines described above in Section 2, Principle #5.

A. Consider plant water requirements in irrigation design schemes

1. Each valve should irrigate a landscape with similar site, slope and soil conditions and plant material with similar watering needs.
2. Soil types, infiltration rate & slopes should be considered in order to avoid runoff, & overspray, where water flows onto adjacent property, non-irrigated areas, walks, roadways, or structures. Proper irrigation equipment, schedules, and repeat cycles should be used to minimizing runoff.
3. Special attention should be given to avoid runoff from slopes, and to avoid overspray in planting areas with a width less than ten feet, like medians.
4. Turf and non-turf areas should be irrigated on separate valves.
5. Drip emitters and sprinklers should be place on separate valves.
6. Bubblers for trees should be placed on a separate valve. Bubbler selected should not exceed 1.5 gallons per minute (gpm) for each device.
7. Hand watering may be considered for Low and Very Low hydrozones.

B. Employ hydraulic principles when designing the irrigation system.

1. The irrigation system should be designed to provide peak season irrigation within a six night, six hour per night watering period.
2. The tap size should be based on the water demand of the site and will take into consideration the areas of each plant type (i.e., turf, native seed, perennials and annuals and shrubs), the evapotranspiration for the site, the water demand of each plant type at peak season, and the water window.
3. The maximum flow rate required for the site should be based on the tap size:

¾" meter	15 gallons per minute
1" meter	25 gpm
1.5" meter	50 gpm
2" meter	80 gpm
4. The mainline system should be designed such that velocities within the mainline piping do not exceed five feet per second.
5. A reduced pressure backflow preventer should be used on all systems. Where the irrigation point of connection is from the domestic water service, the irrigation tap and backflow preventer shall be installed after the water meter but before any backflow or pressure-reducing valve for the building.
6. A pressure-reducing valve should be used when the static water pressure exceeds the pressure needed by the system by 15 pounds per square inch (psi). Pressure reducing valves can be installed within the project, on the mainline or at the valve, if elevation changes require it.

7. Turf and grass area design principles:
 - a. No single zone should mix head types, such as rotors and pop-up spray heads on the same zone.
 - b. Sprinklers should be spaced for “head-to-head” coverage, where the spray pattern from one head will reach to the next head. (Another way to describe this is that all sprinkler heads should be spaced at a maximum of 50% of design performance diameter of the sprinkler.) Spacing should be reduced below 50% of design performance diameter when conditions demand.
 - c. No overhead sprinkler irrigation systems should be installed in strips less than 8 feet wide.
 - d. Small areas (25 ft wide or less) should be irrigated with fixed nozzle pop-up spray heads with matched precipitation nozzles. Nozzles should be sized to provide head to head coverage. Heads shall pop-up a minimum of 4” in turf areas. Heads can be specified with pressure reducing features, where needed.
 - e. Large areas (wider than 25 ft) should be irrigated with gear driven rotor heads with a minimum precipitation rate of 0.45” per hour for a full circle head. Heads should pop-up a minimum of 4” in turf areas.
 - f. Check valves should be included in heads or valves where low-head drainage will occur due to elevation changes. See irrigation head catalogs for elevation change tolerances.
8. Shrub bed areas with plant material one gallon in size or larger should be irrigated with a drip or subsurface system.
9. Perennial and annual beds should be spray irrigated with 12” pop-up spray heads with a maximum spacing of 10’ on center.
10. Booster pumps should be installed on systems where supply pressure does not meet minimum recommended pressure of the irrigation system, based on hydraulic calculations.
11. Where the water supplied will be from secondary or other non-potable water sources, the use of non-potable color indicators on the equipment is recommended. This includes purple handles on quick coupler valves and gate valve, caps for irrigation heads, valve box lids and marker tape buried above the mainline.
12. All systems should be equipped with an automatic rain shut-off device.
13. All wire connections should be made with watertight connectors and contained in a valve box.

C. Employ irrigation control systems that offer flexibility in programming.

1. All irrigation systems should include an electric automatic controller with multiple programs and multiple repeat and rest cycle capabilities and a flexible calendar program.
2. All controllers should be capable of temporarily shutting down the system by utilizing internal/external options such as rain and wind sensors.
3. The controller should have the ability to adjust run times based on a percentage of maximum ET (evapotranspiration) rate.
4. Each zone/valve should have its own station on the controller. The exception is drip valves, which can be doubled on the controller.

D. Ensure installation of irrigation system is per plan and is accurate.

1. Irrigation system should be installed per plans.

2. The irrigation system should be monitored during installation, especially to verify mainline and lateral line depth, spacing of irrigation heads and construction of valve clusters and quick coupler components.
 3. Mainline should be tested to ensure its ability to maintain required pressure for 2 hours.
 4. Before acceptance, each zone should be operated and each valve box opened to verify accurate installation.
- E. Provide “as-built” drawings of irrigation system after installation with dimensions shown for irrigation components.
1. The “as-built” drawings should show all points of connection, including tap size, line size and static water pressure of service. Dimensions that will be used to locate components shall be shown on plans. Components to be located include meters, backflow preventers, all valves, including quick coupler, control, gate, and manual drain valves, and controller locations.
 2. The drawings should also show zone number, valve size and gallons per minute.
- F. Operate systems to maximize irrigation waterefficiency.
1. Irrigation should be scheduled to operate between 10 PM and 8 AM to reduce water loss from wind and evaporation and to take advantage of the better water pressure.
 2. The target efficiency for rotor heads should be 70%, and 55% for spray heads.
 3. Program valves for multiple repeat cycles to reduce runoff, especially on slopes and with soils with slow infiltration rates.
 4. All zone run times should be determined based on the precipitation rate of the heads on that zone. The run times should be adjusted seasonally and at least once a month to accommodate the ET rate.
 5. System should be winterized in the fall using a compressor to remove water in the lines and components. System should be reopened and adjusted for proper operation in the spring.
 6. After each mowing, each zone should be operated for a very short period of time to verify the heads are operating as designed and no damage has occurred.
 7. When repairs are made, the new components installed should match exactly those damaged and removed.
 8. Run times for zones should be adjusted based on exposure (north and east vs. south and west), slope and soil types to reduce overwatering.

WaterWise Landscaping Best Practices

Section 7 – Water Budgeting

A. Calculating a Water Budget

A Water Budget is the target amount of water a landowner should use in a typical watering season. This target provides simple-to-achieve, realistic goals for landscape irrigation. Water Budgeting focuses less on watering time limits, and is more concerned with a user's water allotment and reducing over-watering. This form can help any user create a target Water Budget from which to work.

The information below will help guide you through the Water Budget Worksheet on the following page.

Step 1. ET Reference Location:

Because climate conditions vary throughout Colorado, the rate at which water evaporates (evaporation) and the rate at which plants use water (transpiration) varies in different areas of the state. Based on those climatic differences, it is important to identify the general Evapo-Transpiration (ET) Reference Locations in which you are located. The four largest regions can be categorized as: Denver, Colorado Springs, Grand Junction and Pueblo.

Step 2. Gallons of Water Needed by Plant Category:

Different plants have different water needs. A plant list that identifies the water needs of landscape plants (High, Moderate, Low, Very Low) is included in Section Three of this Best Practices Manual. The ET Rates are provided on the worksheet, and will need to be applied in the calculations in Step 4 below.

Step 3. Irrigation Areas (zones) based on Plant Water Need Category:

Both automatic irrigation systems and hand-placed yard sprinklers deliver water to plants by watering areas or "zones", and have set watering amounts determined by you, the user. If you have High water need plants within Low or Very Low water plant groupings, the entire area must be considered a High-water area and irrigated as such; however some plants may be over-watered if this occurs. The area of each watering zone can be determined by physically measuring the zone, and multiplying Length (in feet) by Width (in feet). The resulting areas (in square feet, or S.F.) can be entered in Step 4 below.

Step 4. Water-Use Calculations:

Fill in the blanks with area and water need per zone. For example, in the Denver region you might have an area of 300 S.F. in a High Water Zone that would require 20 gallons of water per S.F. After multiplying you would find that area requires 6,000 gallons of water per season.

After calculating the irrigation needs of all areas, determine your average overall water needs per season. To do this, add the total gallons needed for all zones, and divide by the total Square Footage for all zones. The average for the overall site needs to be no more than 15 gallons per S.F. per season. If your average is more than this, you might consider modifying your planting layout to create more Low/Very Low Water Zones that would balance your High/Moderate Water Zones, and reduce over-watering.

WaterWise Landscaping Best Practices

B. Water Budget Worksheet

1. ET Reference Location:

Identify the general Evapo-Transpiration (ET) Reference Location in which you are located. The four largest regions are listed below and include surrounding metropolitan areas:

___Denver ___Colorado Springs ___Grand Junction ___Pueblo

2. Gallons of Water Needed by Plant Category:

Determine the water needs of the various plants in your design. A plant list that identifies water needs (High, Moderate, Low, Very Low) is included in Section Three of this Best Practices Manual.

Plant	Water Need Category	Gallons of Water used (ET Rate)*
H =	High water plants	(20 gallons/SF/season -- Denver)
M =	Moderate water plants	(10 gallons/SF/season -- Denver)
L =	Low water plants	(0-3 gallons/SF/season -- Denver)
VL =	Very Low water plants	(no irrigation needed; typical rainfall is sufficient)

The ET Rates for regions other than Denver are not yet accurate. One might assume that the ETR for Colorado Springs is 10% less than Denver's, and those for Grand Junction and Pueblo may be as much as 25% higher than Denver's.

3. Irrigation Areas (zones) based on Plant Water Need Category:

Identify each zone requiring irrigation, and calculate the area (in square feet) of each zone. If plants are already installed and/or not grouped together by water need, pick the highest water need category included in each zone.

4. Water-Use Calculations:

HIGH WATER ZONES: _____ S.F. x (_____ gals./S.F.) = _____ gals / season

MODERATE WATER ZONES: _____ S.F. x (_____ gals. /S.F.) = _____ gals / season

LOW WATER ZONES: _____ S.F. x (_____ gals./S.F.) = _____ gals / season

VERY LOW WATER ZONES: _____ S.F. x (_____ gals./S.F.) = _____ gals / season TOTAL

gallons needed by ALL ZONES: = _____ gals / season

TOTAL Square Feet (S.F.) of ALL ZONES: = _____ S.F.

*AVERAGE GALS./S.F./SEASON, ALL ZONES: Total Gals / Total SF = _____ gals / season

**The average needs to be a maximum of 15 gals. / S.F. / season.*

WaterWise Landscaping
*Best Practices**Section 8 – Additional Resources**Water Conservation Internet Sources*

- Waterwiser, National Water Efficiency Clearinghouse, www.waterwiser.org
- Water Saver Home, www.h2ouse.org
- U.S. Geologic Survey, Water use in the United States, www.water.usgs.gov/watuse
- Western States Water Council, www.westgov.org/wswc
- Colorado Water Conservation Board, www.cwcb.state.co.us
- Colorado Nonpoint Source Program, www.ourwater.com
- Denver Water, www.water.denver.co.gov/indexmain.html
- WaterSaver from Denver Water, www.watersaver.org

WaterWise Landscaping Internet Sources

- GreenCO Best Management Practices, www.grennco.org/bmp_list.html
- National Association of Irrigation Design/ Certification, www.irrigation.org/certification.html
- American Nursery and Landscape Association, www.anla.org
- Associated Landscape Contractors of Colorado, www.alcc.com
- Smart Gardening, www.smartgardening.com
- Xeriscaping, www.xeriscape.org
- Colorado State University Horticulture Department, www.hla.agsci.coloradostate.edu
- CSU Cooperative Extension Service, www.ext.colostate.edu/garden
- Colorado Nurseries, www.colorado-nusery-assn.org

- Gardening Colorado, www.gardeningcolorado.com
- Xeriscape Gardening, www.xratedgardening.com

Seed and Plant Sources

- Garden Centers of Colorado, www.gardencentersofcolorado.org
- Colorado Native Plant Society, www.carbon.cudenver.edu/~shill/conps.html
- High Country Gardens, www.highcountrygardens.com
- Arkansas Valley Seed Solutions, www.seedsolutions.com
- Rocky Mountain Sod Growers Association, www.rockymountainsodgrowers.com

Demonstration Gardens

- Colorado Xeriscape Demonstration Gardens, www.xeriscape.org/demogardens.html

Waterwise Gardening Books

- *The Xeriscape Flower Gardener*, Jim Knopf, Boulder, CO, Johnson Books, 2003
- *Waterwise Landscaping with Trees, Shrubs, and Vines*, Jim Knopf
- *Xeriscape Plant Guide*, Rob Proctor/David Winger, Fulcrum Publishing, 1996
- *Xeriscape Handbook*, Gayle Weinstein/ David Winger, Fulcrum Publishing, 2003
- *Xeriscape Color Guide*, David Winger/Denver Water, Fulcrum Publishing, 1998
- *Western Garden Book*, Kathleen Norris Brenzel, Sunset Publishing, 2001
- *Water-Efficient Landscape Guidelines*, Richard E Bennett/ Michael S. Hazinski, American Water Works Association, 1993
- *The Rocky Mountain Perennial Plant Guide*, Colorado Nursery Association, 1995
- *Rocky Mountain Plant Guide*, Colorado Nursery Association, 1993

Appendix G

5-Year Opinion of Probable Construction and Capital Improvement Plan Costs

OPCCs and CIP total estimates for 5-Year recommended CIP Projects are presented below in **Table G-1** through **Table G-12**. The estimated cost for each line item, also known as the extended cost within a project is determined by multiplying the line item quantity times the unit cost. Each line item extended cost is added to the project total cost column to determine OPCC estimates. All costs are August 2020 dollars from ENR-CCI.

Table G-1 – SA-44 Centennial Park OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	3,520	\$172/LF	\$605,939	\$605,939
Water Distribution 8" (Trenchless J&B)	200	\$478/LF	\$95,617	\$95,617
Pump Station - 1,300 gpm	1	LS	\$1,734,548	\$1,734,548
New Pond	3	\$60,964/AF	\$154,330	\$154,330
Tier 1 Dewatering	1,800	\$105/LF	\$189,000	\$189,000
Unit Cost Subtotal				\$2,779,435
Erosion Control/Stormwater Pollution Prevention		2%		\$55,589
Mobilization & Demobilization		5%		\$138,972
Subtotal				\$2,973,995
Contingency		35%		\$1,040,900
Opinion of Probable Construction Cost (rounded)				\$4,020,000
Feasibility and Site Studies		6% of OPCC		\$242,000
Preliminary and Final Design		6% of OPCC		\$242,000
Engineering Services During Construction		5% of OPCC		\$201,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$201,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$121,000
Capital Improvement Plan Total				\$5,030,000

Table G-2 – Boomerang PS OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Pump Station - 3,100 gpm	1	LS	\$3,064,486	\$3,064,486
Pond Expansion	12.52	\$60,964/AF	\$763,000	\$763,000
Unit Cost Subtotal				\$3,827,486
Erosion Control/Stormwater Pollution Prevention		2%		\$76,550
Mobilization & Demobilization		5%		\$191,374
Subtotal				\$4,095,410
Contingency		35%		\$1,433,400
Opinion of Probable Construction Cost (rounded)				\$5,530,000
Feasibility and Site Studies		6% of OPCC		\$332,000
Preliminary and Final Design		6% of OPCC		\$332,000
Engineering Services During Construction		5% of OPCC		\$277,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$277,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$166,000
Capital Improvement Plan Total				\$6,920,000

Table G-3 – Boomerang Regional Phase 2 OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 10"	5,472	\$178/LF	\$974,896	\$974,896
Tier 2 Dewatering	5,472	\$52.50/LF	\$287,280	\$287,280
Unit Cost Subtotal				\$1,262,176
Erosion Control/Stormwater Pollution Prevention		2%		\$25,244
Mobilization & Demobilization		5%		\$63,109
Subtotal				\$1,350,528
Contingency		35%		\$472,690
Opinion of Probable Construction Cost (rounded)				\$1,830,000
Easement		5% of OPCC		\$92,000
Feasibility and Site Studies		6% of OPCC		\$110,000
Preliminary and Final Design		6% of OPCC		\$110,000
Engineering Services During Construction		5% of OPCC		\$92,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$92,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$55,000
Capital Improvement Plan Total				\$2,390,000

Table G-4 – Greeley West Pump Station Replacement OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 10"	6,993	\$178/LF	\$1,245,879	\$1,245,879
Pump Station - 2,000 gpm	1	LS	\$2,299,902	\$2,299,902
Pond Expansion	9.55	\$60,964/AF	\$582,203	\$582,203
Unit Cost Subtotal				\$4,127,984
Erosion Control/Stormwater Pollution Prevention		2%		\$82,560
Mobilization & Demobilization		5%		\$206,399
Subtotal				\$4,416,943
Contingency		35%		\$1,545,930
Opinion of Probable Construction Cost (rounded)				\$5,970,000
Feasibility and Site Studies		6% of OPCC		\$359,000
Preliminary and Final Design		6% of OPCC		\$359,000
Engineering Services During Construction		5% of OPCC		\$299,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$299,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$180,000
Capital Improvement Plan Total				\$7,470,000

Table G-5 – Upper Equalizer Project OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 36"	25,646	\$421/LF	\$10,805,334	\$10,805,334
Water Distribution 36" (Trenchless J&B)	850	\$1,960/LF	\$1,665,681	\$1,665,681
Water Distribution 36" (Trenchless HDD)	250	\$1,796/LF	\$449,047	\$449,047
Tier 1 Dewatering	350	\$105/LF	\$36,750	\$36,750
Tier 2 Dewatering	17,000	\$52.50/LF	\$892,500	\$892,500
Unit Cost Subtotal				\$13,849,313
Erosion Control/Stormwater Pollution Prevention		2%		\$276,986
Mobilization & Demobilization		5%		\$692,466
Subtotal				\$14,818,764
Contingency		35%		\$5,186,570
Opinion of Probable Construction Cost (rounded)				\$20,010,000
Easement		5% of OPCC		\$1,001,000
Feasibility and Site Studies		5% of OPCC		\$1,001,000
Preliminary and Final Design		5% of OPCC		\$1,001,000
Engineering Services During Construction		5% of OPCC		\$1,001,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$1,001,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$601,000
Capital Improvement Plan Total				\$25,620,000

Table G-6 – SA-14 Tech Center Supply OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 16"	3,286	\$224/LF	\$735,751	\$735,751
Pump Station - 1,120 gpm	1	LS	\$1,573,250	\$1,573,250
New Pond	13	\$60,964/AF	\$818,868	\$818,868
Tier 1 Dewatering	250	\$105/LF	\$26,250	\$26,250
Unit Cost Subtotal				\$3,154,120
Erosion Control/Stormwater Pollution Prevention		2%		\$63,082
Mobilization & Demobilization		5%		\$157,706
Subtotal				\$3,374,908
Contingency		35%		\$1,181,220
Opinion of Probable Construction Cost (rounded)				\$4,560,000
Easement		5% of OPCC		\$228,000
Feasibility and Site Studies		6% of OPCC		\$274,000
Preliminary and Final Design		6% of OPCC		\$274,000
Engineering Services During Construction		5% of OPCC		\$228,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$228,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$137,000
Capital Improvement Plan Total				\$5,930,000

Table G-7 – Promontory Park Expansion OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 10"	2,237	\$178/LF	\$398,546	\$398,546
Unit Cost Subtotal				\$398,546
Erosion Control/Stormwater Pollution Prevention		2%		\$7,971
Mobilization & Demobilization		5%		\$19,927
Subtotal				\$426,444
Contingency		35%		\$149,260
Opinion of Probable Construction Cost (rounded)				\$580,000
Feasibility and Site Studies		9% of OPCC		\$53,000
Preliminary and Final Design		9% of OPCC		\$53,000
Engineering Services During Construction		5% of OPCC		\$29,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$0
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$0
Capital Improvement Plan Total				\$720,000

Table G-8 – Monfort Expansion OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	1,458	\$172/LF	\$250,983	\$250,983
Tier 1 Dewatering	200	\$105/LF	\$21,000	\$21,000
Unit Cost Subtotal				\$271,983
Erosion Control/Stormwater Pollution Prevention		2%		\$5,440
Mobilization & Demobilization		5%		\$13,599
Subtotal				\$291,022
Contingency		35%		\$101,860
Opinion of Probable Construction Cost (rounded)				\$400,000
Feasibility and Site Studies		9% of OPCC		\$36,000
Preliminary and Final Design		9% of OPCC		\$36,000
Engineering Services During Construction		5% of OPCC		\$20,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$0
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$0
Capital Improvement Plan Total				\$500,000

Table G-9 – Twin Rivers Expansion OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	5,574	\$172/LF	\$959,519	\$959,519
Tier 1 Dewatering	256	\$105/LF	\$26,880	\$26,880
Tier 2 Dewatering	5,318	\$52.50/LF	\$279,195	\$279,195
Unit Cost Subtotal				\$1,265,594
Erosion Control/Stormwater Pollution Prevention		2%		\$25,312
Mobilization & Demobilization		5%		\$63,280
Subtotal				\$1,354,185
Contingency		35%		\$473,970
Opinion of Probable Construction Cost (rounded)				\$1,830,000
Easement		5% of OPCC		\$92,000
Feasibility and Site Studies		6% of OPCC		\$110,000
Preliminary and Final Design		6% of OPCC		\$110,000
Engineering Services During Construction		5% of OPCC		\$92,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$92,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$55,000
Capital Improvement Plan Total				\$2,390,000

Table G-10 – SA-38 1st Ave. Pond OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	4,558	\$172/LF	\$784,623	\$784,623
Water Distribution 8" (Trenchless HDD)	350	\$585/LF	\$204,582	\$204,582
Pump Station - 260 gpm	1	LS	\$604,548	\$604,548
New Pond	0.55	\$60,964/AF	\$33,253	\$33,253
Tier 1 Dewatering	807	\$105/LF	\$84,735	\$84,735
Tier 2 Dewatering	3,751	\$52.50/LF	\$196,928	\$196,928
Unit Cost Subtotal				\$1,908,669
Erosion Control/Stormwater Pollution Prevention		2%		\$38,173
Mobilization & Demobilization		5%		\$95,433
Subtotal				\$2,042,276
Contingency		35%		\$714,800
Opinion of Probable Construction Cost (rounded)				\$2,760,000
Easement		5% of OPCC		\$138,000
Feasibility and Site Studies		6% of OPCC		\$166,000
Preliminary and Final Design		6% of OPCC		\$166,000
Engineering Services During Construction		5% of OPCC		\$138,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$138,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$83,000
Capital Improvement Plan Total				\$3,590,000

Table G-11 – SA-25 Westgate Regional PS OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Pump Station - 860 gpm	1	LS	\$1,323,329	\$1,323,329
New Pond	2.40	\$60,964/AF	\$146,386	\$146,386
Unit Cost Subtotal				\$1,469,716
Erosion Control/Stormwater Pollution Prevention		2%		\$29,394
Mobilization & Demobilization		5%		\$73,486
Subtotal				\$1,572,596
Contingency		35%		\$550,410
Opinion of Probable Construction Cost (rounded)				\$2,130,000
Feasibility and Site Studies		6% of OPCC		\$128,000
Preliminary and Final Design		6% of OPCC		\$128,000
Engineering Services During Construction		5% of OPCC		\$107,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$107,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$64,000
Capital Improvement Plan Total				\$2,670,000

Table G-12 – SA-25 Westgate Regional Phase 1 OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	3,527	\$172/LF	\$607,144	\$607,144
Tier 1 Dewatering	100	\$105/LF	\$10,500	\$10,500
Unit Cost Subtotal				\$617,644
Erosion Control/Stormwater Pollution Prevention		2%		\$12,353
Mobilization & Demobilization		5%		\$30,882
Subtotal				\$660,880
Contingency		35%		\$231,310
Opinion of Probable Construction Cost (rounded)				\$900,000
Easement		5% of OPCC		\$45,000
Feasibility and Site Studies		9% of OPCC		\$81,000
Preliminary and Final Design		9% of OPCC		\$81,000
Engineering Services During Construction		5% of OPCC		\$45,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$0
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$0
Capital Improvement Plan Total				\$1,160,000

Table G-13 – SA-60 Lake Bluffs OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	3,424	\$172/LF	\$589,414	\$589,414
Water Distribution 8" (Trenchless J&B)	250	\$478/LF	\$119,521	\$119,521
Water Distribution 10"	3,786	\$178/LF	\$674,517	\$674,517
Pump Station - 1,120 gpm	1	LS	\$1,573,250	\$1,573,250
New Pond	4.25	\$60,964/AF	\$258,879	\$258,879
Unit Cost Subtotal				\$3,215,581
Erosion Control/Stormwater Pollution Prevention		2%		\$64,312
Mobilization & Demobilization		5%		\$160,779
Subtotal				\$3,440,672
Contingency		35%		\$1,204,240
Opinion of Probable Construction Cost (rounded)				\$4,650,000
Easement		5% of OPCC		\$233,000
Feasibility and Site Studies		6% of OPCC		\$279,000
Preliminary and Final Design		6% of OPCC		\$279,000
Engineering Services During Construction		5% of OPCC		\$233,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$233,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$140,000
Capital Improvement Plan Total				\$6,050,000

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Appendix H

20-Year Opinion of Probable Construction and Capital Improvement Plan Costs

OPCCs and CIP total estimates for 20-Year recommended CIP Projects are presented below in **Table H-1** through **Table H-11**. The estimated cost for each line item, also known as the extended cost within a project is determined by multiplying the line item quantity times the unit cost. Each line item extended cost is added to the project total cost column to determine OPCC estimates. All costs are August 2020 dollars from ENR-CCI.

Table H-1 – SA-34 30th St./17th Ave. OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Pump Station - 1,000 gpm	1	LS	\$1,460,713	\$1,460,713
New Pond	2.14	\$60,964/AF	\$130,246	\$130,246
Unit Cost Subtotal				\$1,590,959
Erosion Control/Stormwater Pollution Prevention		2%		\$31,819
Mobilization & Demobilization		5%		\$79,548
Subtotal				\$1,702,326
Contingency		35%		\$595,820
Opinion of Probable Construction Cost (rounded)				\$2,300,000
Feasibility and Site Studies		6% of OPCC		\$138,000
Preliminary and Final Design		6% of OPCC		\$138,000
Engineering Services During Construction		5% of OPCC		\$115,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$115,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$69,000
Capital Improvement Plan Total				\$2,880,000

Table H-2 Boomerang Regional Phase 3 OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 16"	15,382	\$224/LF	\$3,444,104	\$3,444,104
Tier 2 Dewatering	15,382	\$52.50/LF	\$807,555	\$807,555
Unit Cost Subtotal				\$4,251,659
Erosion Control/Stormwater Pollution Prevention		2%		\$85,033
Mobilization & Demobilization		5%		\$212,583
Subtotal				\$4,549,275
Contingency		35%		\$1,592,250
Opinion of Probable Construction Cost (rounded)				\$6,150,000
Easement		5% of OPCC		\$308,000
Feasibility and Site Studies		6% of OPCC		\$369,000
Preliminary and Final Design		6% of OPCC		\$369,000
Engineering Services During Construction		5% of OPCC		\$308,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$308,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$185,000
Capital Improvement Plan Total				\$8,000,000

Table H-3 – SA-4 35th Ave./O St. OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Pump Station - 280 gpm	1	LS	\$634,613	\$634,613
New Pond	0.86	\$60,964/AF	\$52,560	\$52,560
Unit Cost Subtotal				\$687,172
Erosion Control/Stormwater Pollution Prevention		2%		\$13,743
Mobilization & Demobilization		5%		\$34,359
Subtotal				\$735,274
Contingency		35%		\$257,350
Opinion of Probable Construction Cost (rounded)				\$1,000,000
Feasibility and Site Studies		6% of OPCC		\$60,000
Preliminary and Final Design		6% of OPCC		\$60,000
Engineering Services During Construction		5% of OPCC		\$50,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$0
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$0
Capital Improvement Plan Total				\$1,170,000

Table H-4 – SA-3 35th Ave./AA St. OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Pump Station - 620 gpm	1	LS	\$1,068,076	\$1,068,076
New Pond	2.33	\$60,964/AF	\$141,861	\$141,861
Unit Cost Subtotal				\$1,209,937
Erosion Control/Stormwater Pollution Prevention		2%		\$24,199
Mobilization & Demobilization		5%		\$60,497
Subtotal				\$1,294,633
Contingency		35%		\$453,130
Opinion of Probable Construction Cost (rounded)				\$1,750,000
Feasibility and Site Studies		6% of OPCC		\$105,000
Preliminary and Final Design		6% of OPCC		\$105,000
Engineering Services During Construction		5% of OPCC		\$87,500
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$87,500
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$53,000
Capital Improvement Plan Total				\$2,190,000

Table H-5 – Bittersweet Park Expansion OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	6,296	\$172/LF	\$1,083,805	\$1,083,805
Water Distribution 8" (Trenchless J&B)	600	\$478/LF	\$286,851	\$286,851
Tier 1 Dewatering	200	\$105/LF	\$21,000	\$21,000
Tier 2 Dewatering	6,696	\$52.50/LF	\$351,540	\$351,540
Unit Cost Subtotal				\$1,743,196
Erosion Control/Stormwater Pollution Prevention		2%		\$34,864
Mobilization & Demobilization		5%		\$87,160
Subtotal				\$1,865,220
Contingency		35%		\$652,830
Opinion of Probable Construction Cost (rounded)				\$2,520,000
Feasibility and Site Studies		6% of OPCC		\$152,000
Preliminary and Final Design		6% of OPCC		\$152,000
Engineering Services During Construction		5% of OPCC		\$126,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$126,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$75,600
Capital Improvement Plan Total				\$3,160,000

Table H-6 – SA-35 44th Ave./F St. OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Pump Station - 820 gpm	1	LS	\$1,282,689	\$1,282,689
New Pond	2.34	\$60,964/AF	\$142,566	\$142,566
Unit Cost Subtotal				\$1,425,256
Erosion Control/Stormwater Pollution Prevention		2%		\$28,505
Mobilization & Demobilization		5%		\$71,263
Subtotal				\$1,525,023
Contingency		35%		\$533,760
Opinion of Probable Construction Cost (rounded)				\$2,060,000
Feasibility and Site Studies		6% of OPCC		\$124,000
Preliminary and Final Design		6% of OPCC		\$124,000
Engineering Services During Construction		5% of OPCC		\$103,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$103,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$62,000
Capital Improvement Plan Total				\$2,580,000

Table H-7 – SA-36 59th Ave./10th St. OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	134	\$172/LF	\$23,067	\$23,067
Water Distribution 10"	8,754	\$178/LF	\$1,559,620	\$1,559,620
Water Distribution 10" (Trenchless J&B)	400	\$581/LF	\$232,590	\$232,590
Pump Station - 1,580 gpm	1	LS	\$1,970,903	\$1,970,903
New Pond	3.40	\$60,964/AF	\$207,115	\$207,115
Tier 1 Dewatering	900	\$105/LF	\$94,500	\$94,500
Tier 2 Dewatering	8,388	\$52.50/LF	\$440,370	\$440,370
Unit Cost Subtotal				\$4,528,165
Erosion Control/Stormwater Pollution Prevention		2%		\$90,563
Mobilization & Demobilization		5%		\$226,408
Subtotal				\$4,845,137
Contingency		35%		\$1,695,800
Opinion of Probable Construction Cost (rounded)				\$6,550,000
Feasibility and Site Studies		6% of OPCC		\$393,000
Preliminary and Final Design		6% of OPCC		\$393,000
Engineering Services During Construction		5% of OPCC		\$327,500
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$327,500
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$197,000
Capital Improvement Plan Total				\$8,190,000

Table H-8 – SA-16 95th Ave./16th St. OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 10"	4,640	\$178/LF	\$826,666	\$826,666
Pump Station - 1,220 gpm	1	LS	\$1,663,880	\$1,663,880
New Pond	3.99	\$60,964/AF	\$243,309	\$243,309
Tier 1 Dewatering	575	\$105/LF	\$60,375	\$60,375
Unit Cost Subtotal				\$2,794,230
Erosion Control/Stormwater Pollution Prevention		2%		\$55,885
Mobilization & Demobilization		5%		\$139,711
Subtotal				\$2,989,826
Contingency		35%		\$1,046,440
Opinion of Probable Construction Cost (rounded)				\$4,040,000
Easement		5% of OPCC		\$202,000
Feasibility and Site Studies		6% of OPCC		\$243,000
Preliminary and Final Design		6% of OPCC		\$243,000
Engineering Services During Construction		5% of OPCC		\$202,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$202,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$122,000
Capital Improvement Plan Total				\$5,260,000

Table H-9 – SA-14 Tech Center Expansion OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 16"	8,221	\$224/LF	\$1,840,722	\$1,840,722
Unit Cost Subtotal				\$1,840,722
Erosion Control/Stormwater Pollution Prevention		2%		\$36,814
Mobilization & Demobilization		5%		\$92,036
Subtotal				\$1,969,572
Contingency		35%		\$689,360
Opinion of Probable Construction Cost (rounded)				\$2,660,000
Easement		5% of OPCC		\$133,000
Feasibility and Site Studies		6% of OPCC		\$160,000
Preliminary and Final Design		6% of OPCC		\$160,000
Engineering Services During Construction		5% of OPCC		\$133,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$133,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$80,000
Capital Improvement Plan Total				\$3,460,000

Table H-10 – SA-15 37th St./SH-257 Pump Station OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Pump Station - 1,400 gpm	1	LS	\$1,820,808	\$1,820,808
New Pond	5.33	\$60,964/AF	\$325,186	\$325,186
Unit Cost Subtotal				\$2,145,994
Erosion Control/Stormwater Pollution Prevention		2%		\$42,920
Mobilization & Demobilization		5%		\$107,300
Subtotal				\$2,296,213
Contingency		35%		\$803,680
Opinion of Probable Construction Cost (rounded)				\$3,100,000
Feasibility and Site Studies		6% of OPCC		\$186,000
Preliminary and Final Design		6% of OPCC		\$186,000
Engineering Services During Construction		5% of OPCC		\$155,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$155,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$93,000
Capital Improvement Plan Total				\$3,880,000

Table H-11 – SA-12 Cobblestone Regional OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 10"	2,023	\$178/LF	\$360,419	\$360,419
Pump Station - 1,180 gpm	1	LS	\$1,627,947	\$1,627,947
New Pond	4.44	\$60,964/AF	\$270,436	\$270,436
Unit Cost Subtotal				\$2,258,802
Erosion Control/Stormwater Pollution Prevention		2%		\$45,176
Mobilization & Demobilization		5%		\$112,940
Subtotal				\$2,416,918
Contingency		35%		\$845,930
Opinion of Probable Construction Cost (rounded)				\$3,270,000
Easement		5% of OPCC		\$164,000
Feasibility and Site Studies		6% of OPCC		\$196,200
Preliminary and Final Design		6% of OPCC		\$196,200
Engineering Services During Construction		5% of OPCC		\$164,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$164,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$99,000
Capital Improvement Plan Total				\$4,260,000

Table H-12 – Glenmere Park Expansion OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	4,136	\$172/LF	\$711,979	\$711,979
Water Distribution 8" (Trenchless J&B)	100	\$478/LF	\$47,808	\$47,808
Pond Expansion	2.91	\$60,964/AF	\$177,404	\$177,404
Tier 1 Dewatering	143	\$105/LF	\$15,015	\$15,015
Tier 2 Dewatering	4,093	\$52.50/LF	\$214,883	\$214,883
Unit Cost Subtotal				\$1,167,089
Erosion Control/Stormwater Pollution Prevention		2%		\$23,342
Mobilization & Demobilization		5%		\$58,354
Subtotal				\$1,248,785
Contingency		35%		\$437,080
Opinion of Probable Construction Cost (rounded)				\$1,690,000
Easement		5% of OPCC		\$85,000
Feasibility and Site Studies		6% of OPCC		\$102,000
Preliminary and Final Design		6% of OPCC		\$102,000
Engineering Services During Construction		5% of OPCC		\$85,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$85,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$51,000
Capital Improvement Plan Total				\$2,200,000

Table H-13 – SA-25 Westgate Regional Phase 2 OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	3,782	\$172/LF	\$651,041	\$651,041
Unit Cost Subtotal				\$651,041
Erosion Control/Stormwater Pollution Prevention		2%		\$13,021
Mobilization & Demobilization		5%		\$32,552
Subtotal				\$696,613
Contingency		35%		\$243,820
Opinion of Probable Construction Cost (rounded)				\$950,000
Easement		5% of OPCC		\$48,000
Feasibility and Site Studies		9% of OPCC		\$86,000
Preliminary and Final Design		9% of OPCC		\$86,000
Engineering Services During Construction		5% of OPCC		\$48,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$0
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$0
Capital Improvement Plan Total				\$1,220,000

Table H-14 – SA-42 23rd Ave./Northwest C St. OPCC and CIP Total

Item	Quantity	Unit Cost	Extended Cost	Total Cost
Water Distribution 8"	5,924	\$172/LF	\$1,019,769	\$1,019,769
Water Distribution 8" (Trenchless J&B)	150	\$478/LF	\$71,713	\$71,713
Pump Station - 1,180 gpm	1	LS	\$1,627,947	\$1,627,947
New Pond	2.75	\$60,964/AF	\$167,555	\$167,555
Tier 1 Dewatering	41	\$105/LF	\$4,305	\$4,305
Tier 2 Dewatering	5,883	\$52.50/LF	\$308,858	\$308,858
Unit Cost Subtotal				\$3,200,146
Erosion Control/Stormwater Pollution Prevention		2%		\$64,003
Mobilization & Demobilization		5%		\$160,007
Subtotal				\$3,424,156
Contingency		35%		\$1,198,460
Opinion of Probable Construction Cost (rounded)				\$4,630,000
Easement		5% of OPCC		\$232,000
Feasibility and Site Studies		6% of OPCC		\$278,000
Preliminary and Final Design		6% of OPCC		\$278,000
Engineering Services During Construction		5% of OPCC		\$232,000
Outside Construction Management - not used if OPCC value is < \$1M		5% of OPCC		\$232,000
Outside Project Management - not used if OPCC value is < \$1M		3% of OPCC		\$139,000
Capital Improvement Plan Total				\$6,030,000

Appendix I

CIP Development

I.1.1 Variability in Data

Data was obtained from past contractor bidding information provided by the City and other Front Range communities, as well as national sources. This data included unit costs for different potential capital expenditures within wastewater, water, and NP projects. The data varied in level of detail and definition of each cost element. For example, pipeline costs may or may not include dewatering, restoration, or paving project sites. Pipe cost data from the different sources also varied by construction depth, ground conditions, and method of installation for pipeline. For example, one data source may have identified unit price for a given pipe diameter size at a given depth, while another data source provided unit costs for given pipe diameter sizes of various depths within developed or undeveloped land areas. Both data sources provide information regarding pipe installation costs but need to be considered based on the level of detail that is desired for project CIP development.

I.1.2 Unknown Elements and Assumptions

Assumptions made during CIP development mean planning level costs will vary from construction bid costs. The assumptions are necessary to capture costs for project elements that cannot be defined at the planning level. Examples of undefinable costs include dewatering areas, utility pipeline crossings, permitting for project implementation, final contractor bid quantities, seasonal soil and ground conditions, and stormwater management of project sites. Assumptions are also made for method of pipe installation, timing of projects, and materials of construction. During design development, additional field information including survey, geotechnical data, groundwater levels, traffic control requirements, and final pipe alignment of project areas should be available to help refine the project elements and construction methods.

Trendlines and linear interpolation were used to develop costs for project elements with insufficient data. For example, cost data was obtained for the trenchless installation of water distribution and transmission lines for 4 inch through 60-inch diameter pipe, however there was limited cost information for 36-inch pipe. Trend line equations for linear, polynomial, and logarithmic and their respective R² values were compared to identify the most probable estimation equation. In this case, the trendline equation with an R² value closest to 1 was selected as the most probable estimation equation. Because the trendline with the most pertinent R² value may not reflect the true cost, CDM Smith recommends the City readjust cost data throughout the planning horizon.

An example of comparing different trend line equations and their respective R² values for approximating missing data is shown in **Figure I-1**. This example highlights the jack and bore (J&B) trenchless installation of water distribution and transmission pipeline items. In this example, the second order polynomial trend line (shown by the purple dotted line below) has the closest R² value to 1 compared to the exponential and logarithmic trend lines (shown by the blue and green dotted lines below, respectively) based on available data. As a result, without

additional industry knowledge and experience, the linear trend line would be assumed to best approximate unit costs for J&B trenchless pipe installation for pipe diameter sizes not available from the given data set. This assumption may conflict with actual J&B trenchless pipe installation data trends known in industry, which may better be approximated by exponential or logarithmic trend lines. This would especially be true when predicting trenchless pipe installation for large pipe diameter sizes (i.e., greater than 24 inch) where predictions of data points of the trend lines begin to greatly diverge. At a planning level, this limitation is acceptable when a cushion of construction cost contingency (i.e., 30%) is added to help absorb this unit cost uncertainty. However, at an engineering design level, where construction cost contingency is lowered, the chosen trend line that best reflects industry data trends should be used to model trenchless pipe installation. This should also be used for all unit cost items where trendlines are used, regardless of if the chosen trend line has an R2 value closest to 1 in order to avoid unnecessary error.

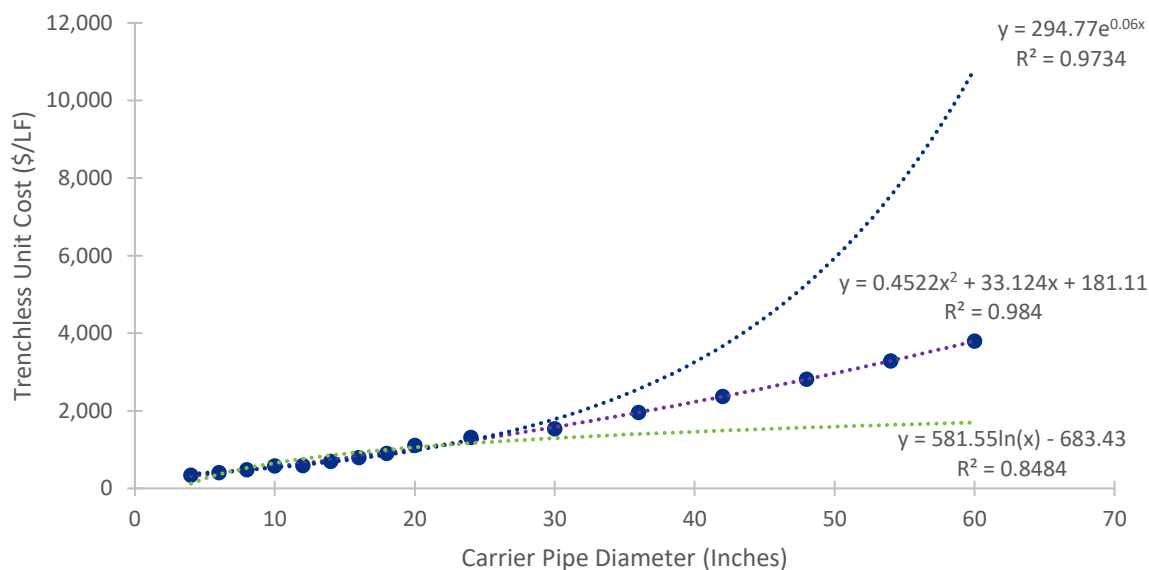


Figure I-1 Example of Different Trendlines for Finding Missing Data of a Line Item

I.1.3 Unpredictability

There is inherent unpredictability to consider during CIP development. This unpredictability is captured in the cost range that is provided for the overall CIP. Examples of unpredictability include future economic trends and inflation rates. Prior to COVID-19, a global pandemic, cost inflation tools provided high confidence for predicting unit prices within a given year. However, after COVID-19, these cost inflation tools may not prove to be as accurate.

I.1.4 Data Sources

Major sources for cost factors included city bid tabs and databases, past project data and contractor construction bid tabs, vendor quotes and cost estimates from CDM Smith's estimating department. A list of external sources that CDM Smith used to develop unit costs for the City's CIP water transmission and distribution cost estimates includes the following:

- City of Greeley Project Initiation Form (City of Greeley, 2021)
- Operation Rehab Project 2021 – 2025 Spreadsheet (City of Greeley, 2021)
- Water and Sewer Department 10 Year CIP 2021 – 2030 Spreadsheet (City of Greeley, 2021)
- Collection, Distributions, Transmission Projects Phase I – (CMAR) (City of Greeley, 2019)
- City of Greeley Pipe Rehabilitation Cost Estimating Template (City of Greeley, 2019)
- Keep Greeley Moving Phase 2 by Neighborhood 2023 – 2029 (City of Greeley, 2021)
- City of Aurora Wastewater Master Plan (AECOM, 2017)

The data was compiled in a single file with line item data reflected as unit costs (dollars per linear foot, dollars per each, etc.). When needed, unit costs for specific line items were calculated using trend line equations. Line items that were not specific or harder to estimate using specific unit cost quantity were reflected as a percentage addition to project costs (mobilization and demobilization, erosion control and stormwater pollution prevention, etc.).

The costs estimated for each project are in August 2020 dollars. Historical data was adjusted to the equivalent August 2020 data by using Engineering News Record's 20-City Construction Cost Index (ENR-CCI). ENR estimates a project each month in 20 different cities around the U.S. and calculates the composite index. Costs are adjusted by multiplying a cost element with the ratio of the current day 20-City ENR-CCI and date of data.

$$\text{Construction Unit Cost (T2)} = \text{Construction Cost (T1)} \times \frac{\text{CCI(T2)}}{\text{CCI(T1)}}$$

T2 and T1 reflect the desired projected year and month desired and the originally year and month of unit costs, respectively.

I.1.5 Major Cost Elements

NP water distribution system CIP costs were developed using five general cost element categories, as shown in **Figure I-2** and described below.

Construction Bid Cost

- Pipelines, Pump Stations & Ponds
- Major Crossings
- Land Considerations
- Dewatering
- Erosion Control
- Mobilization
- Contractor OH&P

Project Implementation

- Planning Studies
- Preliminary and Final Design
- Engineering Services during Construction

Additional Project Related Costs

- Significant Permitting (above typical)
- Outside Program Management
- Outside Construction Management

Figure I-2 CIP Categories for Cost Definition

Each of these cost elements is discussed in more detail in the following subsections. Unit priced line items, mobilization and demobilization, and stormwater pollution prevention and erosion control was rounded to the nearest whole dollar. Project contingency was rounded to the nearest \$10 and added to the OPCC subtotals to determine the OPCC project totals which were rounded to the nearest \$10,000. Subsequent costing factors were added to the OPCC project totals to determine CIP estimates used for high-level planning of water transmission and distribution, sewer, and NP master plans.

I.1.6 Pipeline, Pump Stations, & Ponds**Installation of Pipe**

NP water lines were generally assumed to be installed using open cut construction. Open cut construction is where contractors remove surface soils to insert pipe, except for arterial roadway and highway, railroad, irrigation ditch, river, and lake crossings. In such instances, trenchless pipe installation was assumed which inserts pipe through tunneling and boring, J&B, or horizontal direct drilling (HDD) methods. Open cut pipeline installation unit costs (in dollars per linear foot of pipe, \$/LF) include the pipe and bedding, excavation, installation including traffic control, tie-ins for service laterals, backfill, restoration, and flow and throttle control valves. Distribution pipelines were classified with pipe diameters up to 20 inch while transmission lines were classified with pipe diameters 24 inch and above.

The open cut installation was divided into developed and undeveloped categories. The developed category includes pipe installed in developed areas such as in neighborhoods, along major City streets, across two lane roads, through developed commercial property and designated agricultural land, and around City boundaries. The undeveloped category was assigned to pipe installed in permanent open space designated as city parks. It was assumed that all NP water lines were installed at less than 10 ft depth unless using trenchless installation for crossings.

Trenchless installation costs (in \$/LF of pipe) include the casing and carrier pipe, supports and grouting of the interstitial space, launching and receiving pits, and ground monitoring using J&B drilling or HDD. Unit prices were developed using bid tabs and CDM Smith's construction cost data base.

Table I-1 gives the unit cost breakdown for installation of NP water lines.

Table I-1 – Unit Costs for NP Lines

Pipe Diameter Size (In.)	Unit Cost (\$/LF of Pipe)			
	Undeveloped Land Designation	Developed Land Designation	Trenchless J&B (Crossings)	Trenchless HDD (River Crossings)
8	119	172	478	585
12	131	184	584	803
16	158	224	791	944
18	171	256	897	1,023
20	184	289	1,105	1,107
24	211	315	1,314	1,272
30	237	368	1,531	1,530
36	264	421	1,960	1,796
42	302	486	2,370	2,054
48	355	566	2,813	2,312
54	395	657	3,288	2,570
60	460	763	3,796	2,827

Pump Stations

Construction costs of new pump stations were developed using Chapter 29 of *Pumping Station Design, Revised 3rd Ed.* (Jones et al. 2006). High and low trend line estimates were averaged based on 2006 cost projections and then projected to the inflated August 2020 equivalents. The cost estimates only include construction of new pump station infrastructure including enclosures, wet wells, instrumentation, electrical, and pumps. The updated August 2020 high, low, and averaged pump station equations are shown below:

$$\text{Low Limit New PS Cost(\$)} = \$2,367 \times \text{PS Flow Rate (gpm)}^{0.77}$$

$$\text{High Limit New PS Cost(\$)} = \$33,648 \times \text{PS Flow Rate (gpm)}^{0.62}$$

$$\text{Averaged Limit New PS Cost(\$)} = \$15,844 \times \text{PS Flow Rate (gpm)}^{0.66}$$

Figure I-3 depicts the comparison of the three equations used for new pump station construction estimates. This master plan assumes all new pump stations costs using the averaged pump station equation.

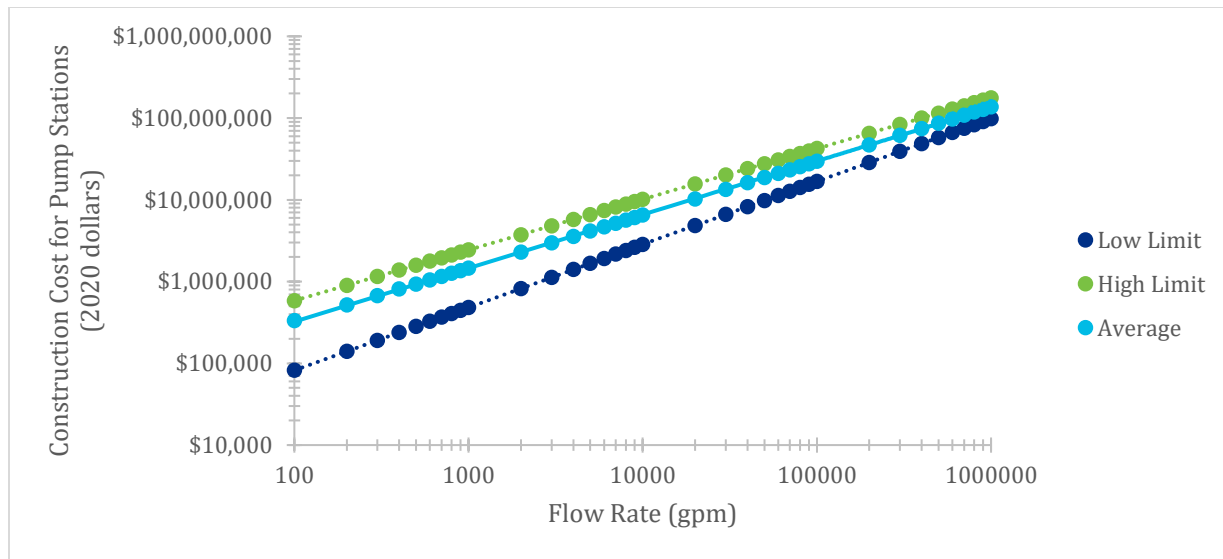


Figure I-3 Pump Station Design High, Low, and Averaged Estimated Construction Costs (Jones et al. 2006)

Ponds

Construction costs for either ponds to accommodate additional storage, or the installation of new ponds, assumed the installation cost of new ponds as a conservative estimate. Pond replacement and new pond installation in \$/AF included costs for pond excavation, subgrade, pond liners and fabric, covering of soil over lake bottom, rip rap, and aeration systems. Pond sizing (in AF) for each project was estimated on future buildout conditions identified in the future system model.

I.1.7 Crossings, Land Considerations, and Dewatering

Irrigation Ditch, River Crossings, and Lake Crossings

ArcMap GIS and City-provided information was used to identify irrigation ditch, river, and lake crossing locations. Irrigation ditch, river, and lake crossings were assumed as 100 ft in length, 250 ft in length, and estimated lake crossing length, respectively. Unit costs for irrigation ditch, river, and lake crossings were approximated by trenchless pipe installation, regardless of pipe depth, using J&B for ditch crossings and HDD drilling for river and lake crossings.

Utility, Roadway, and Railway Crossings

ArcMap GIS, the City's online GIS, and Google Maps were used to identify road, utility, and railroad crossings. Unit prices were developed assuming installation by J&B, where applicable, using the following assumptions:

- Roads were separated into typical (defined as: two to three lane roads located on side streets and in neighborhoods), arterial (defined as: major roadways of four lanes or more assumed at 200 ft wide), and highways (defined as: major roadways with Colorado Department of Transportation Right-of-way requirements at 250 ft wide). Widths were based on the U.S. Department of Transportation Federal Highway Administration (USDOT, 2014). Typical road crossings were included as part of overall open cut installation

described in **Section I.3.3**, while arterial road and highway crossings were accounted as a part of trenchless pipe installation costs described in **Section I.2.2**.

- Railway crossings were estimated as 150 ft in length included in trenchless installation costs, described in **Section I.2.2**.
- Other City and non-City utilities were not included as unit cost estimates but assumed to be covered under project contingency, described in **Section 5.3.5**.

Easements

Easement acquisition was assumed to be required for all new pipeline, not in a City right-of-way or on City-owned property. Easement acquisition was assumed as a costing factor multiplier of the total OPCC at 5%.

Dewatering

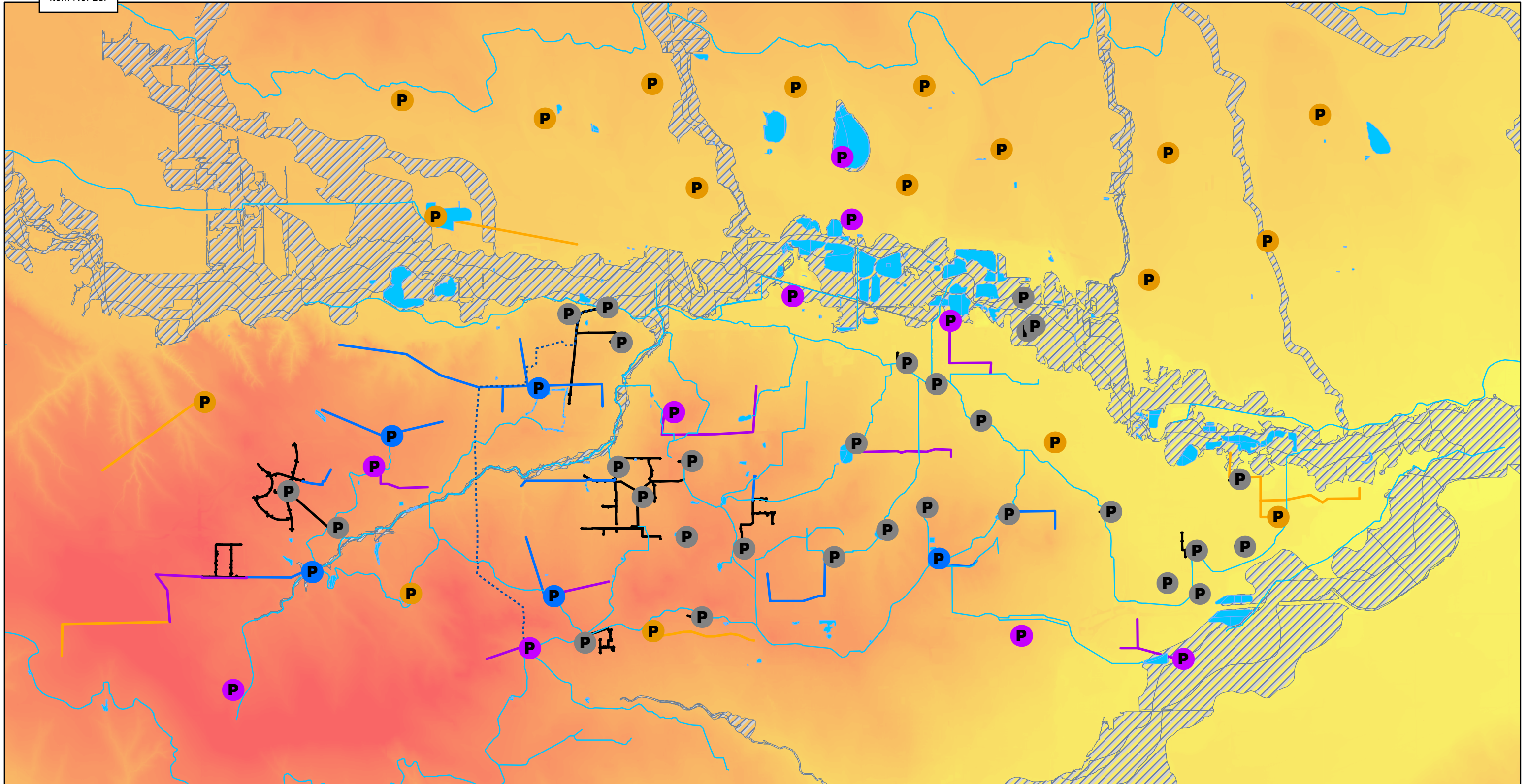
A three-tiered approach was used to determine projected dewatering. The three tiers used for unit cost estimation were developed considering land elevations in and around the City (between approximately 4,600 ft to 5,060 ft), 100-year floodplain maps, and proximity to irrigation ditches and water bodies. Tier 1 includes water distribution and transmission line construction within the 100-year floodplain or within 50 ft of an irrigation ditch, pond, or lake. Tier 2 includes pipe that is not in Tier 1, is below the median elevation of the City (4,828 ft), and is assumed to require 50% of the dewatering needed for Tier 1. Tier 3 includes pipe in areas above the median elevation and assumes no dewatering is required.

Figure I-4 illustrates the three-tiered dewatering profile. **Table I-2** lists the unit costs developed for the three-tiered dewatering categories in \$/LF of pipe.

Table I-2 – Unit Costs for Dewatering by Tier

Tier	Unit Cost (\$/LF of Pipe)
1	105
2	52.50
3	0

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Great. From the Ground Up.



June 02, 2021

Legend

Tier 1

- 100-yr FloodPlain
- Lake
- Greeley Ditch

Tier 2

- 4828 ft
- 4596 ft

Tier 3

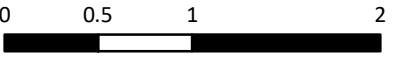
- 5059 ft
- 4828 ft

- Existing Pump Station
- 2025 Pump Station
- 2040 Pump Station
- Buildout Pump Station

- Existing NP Pipes
- 2025 Proposed NP Pipes
- 2040 Proposed NP Pipes
- Buildout Proposed NP Pipes
- Upper Equalizer Project



N



0 0.5 1 2 Miles

3-Tiered Dewatering Profile

Figure I-4

Greeley Non-Potable Water System Master Plan

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1.1.8 Project Implementation and Additional Project-Related Costs

Project elements considered part of project implementation as well as additional project related costs are difficult to quantify at the planning level. Construction elements include items such as erosion control and stormwater pollution prevention and contractor mobilization and demobilization. These costs are estimated as a percentage of the subtotal pipe, pump stations, ponds, and equipment. Contingency is applied to the subtotal of these construction cost elements to account for variations in unit prices or quantity estimates. Programmatic elements include engineering, permitting, legal and administration and are estimated as a percentage of the construction cost.

Table I-3 provides a breakdown of the different assumptions used for project implementation and contingency.

Table I-3 – Costing Factors for Construction Bid and Total CIP Project Costs

Category	Item	Costing Factor
Construction Bid Cost (includes infrastructure and contractor overhead, profit, bonds, and insurance)	Erosion Control/Stormwater Pollution Prevention ¹	2%
	Mobilization and Demobilization ¹	5%
	Contingency ²	35%
Project Implementation ³	Feasibility and Site Studies	9% for OPCC ≤ \$1M 6% for OPCC of \$1M to \$10 Mil. 5% for OPCC > \$10M
	Preliminary and Final Design	9% for OPCC ≤ \$1M 6% for OPCC of \$1M to \$10M 5% for OPCC > \$10M
	Engineering Services During Construction	5%
Additional Project-Related Costs ³	Outside Construction Management - not used if project value is < \$1M	5%
	Outside Project Management - not used if project value is < \$1M	3%

¹ Construction Bid Cost costing factors erosion control/stormwater pollution prevention and mobilization and demobilization are added to the subtotal of unit cost items.

² Contingency costing factor is 35% of the subtotal of the unit cost items and contractor born costs determined by costing factors.

³ Project Implementation and Additional Project-Related Cost categories are determined as a percentage of the construction cost and part of the total CIP project costs.

Project Erosion Control/Stormwater Pollution Prevention

The Project Erosion Control and Stormwater Pollution Prevention cost element includes the contractors cost to manage the stormwater during construction through best management practices. These best management practices include items such as silt fences, rock socks, vehicle tracking, and silt prevention at storm inlets. This category is assumed as 2% of the OPCC subtotal of the items that have unit costs and is based on estimator's judgement and prior reports. This costing factor is added to calculate project OPCC totals.

Mobilization and Demobilization

The Contractor Mobilization and Demobilization cost element includes the contractor's start-up costs and close-out costs. Start-up costs include items such as moving equipment and personnel to the project location, obtaining permits and bonds, etc. Close-out costs include items such as project cleanup, moving equipment and personnel from the project location, etc. The mobilization and demobilization category is assumed as 5% of the OPCC subtotal of the items that have unit costs and is based on estimator's judgement and prior reports. This costing factor is added to calculate project OPCC totals.

Contingency

During the planning phase, the field work and design have not yet been completed for the projects. Therefore, the cost development relies on estimated quantities for each construction element. Project contingency provides for these uncertainties by adding additional costs to the project total. The contingency at the planning level is typically 35% of the OPCC subtotal, after erosion control and stormwater pollution prevention and mobilization and demobilization costing factors have been included. Project contingency also provides for cost associated with items that are difficult to itemize at a planning level.

Feasibility and Site Studies

The Feasibility and Site Studies cost element includes the planning and field investigations (such as geotechnical, survey, ground sampling, utility locates, etc.) required to implement a project and is estimated as a percentage of the subtotal of the previous elements. The percentage varies based on the OPCC, plus cost contingency.

Preliminary and Final Design

The Preliminary and Final Design cost element includes the cost for engineering services to develop biddable plans and specifications in accordance with applicable standards. This cost is estimated using a percentage of the OPCC, plus cost contingency.

Engineering Services During Construction

The Engineering Services During Construction cost element includes a review of contractor submittals, requested changes, and design adjustments that may be required during construction. A flat percentage of the OPCC is used to estimate this cost element.

Additional Project-Related Costs

Outside construction and project management are estimated for projects that are not directly managed by the City. For purposes of this master plan, only projects in excess of \$1M were assigned these cost elements.

Appendix J

Annual Funding Requirements for City NP CIP Projects (2020 – 2043)

Annual funding requirements per identified City NP CIP project and fiscal year totals are shown in the following table. It was assumed that each project stage (planning, design, and construction) will take at least one year with the construction phase taking two, three, or four years if the total CIP cost for a project was greater than \$1 million, \$5 million, or \$10 million, respectively.

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Appendix J – Annual Funding Requirements for City NP CIP Projects (2020-2043)

W/S Expense		Planning Start Year	Design Start Year	Construction Start Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Project Names		Planning Start Year	Design Start Year	Construction Start Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
SA44 Centennial Park		2020	2021	2022	\$ 167,819	\$ 167,819	\$ 1,050,140	\$ 1,050,140	\$ 1,050,140	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Boomerang Regional PS		2021	2021	2022	\$ -	\$ 21,239	\$ 66,637	\$ 66,637	\$ 66,637	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Boomerang Regional Phase 2		2021	2021	2022	\$ -	\$ -	\$ 9,980	\$ 33,089	\$ 33,089	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Greeley West PS		2021	2022	2023	\$ -	\$ -	\$ 296,110	\$ 296,110	\$ 1,855,015	\$ 1,855,015	\$ 1,855,015	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Upper Equalizer		2022	2023	2024	\$ -	\$ -	\$ 2,002,000	\$ 2,002,000	\$ 2,002,000	\$ 5,653,000	\$ 5,653,000	\$ 5,653,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Tech Center Supply		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Prom Park Exp		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA38 1st Ave Pond		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ 244,011	\$ 133,243	\$ 1,251,763	\$ 1,251,763	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Twin Rivers Exp		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ 25,607	\$ 25,607	\$ 298,748	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Monfort Exp		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ 246,259	\$ 134,412	\$ 842,610	\$ 842,610	\$ 842,610	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA-25 Westgate Reg. Phase 1		2025	2026	2027	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA60 Lake Bluffs		2025	2026	2027	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,205	\$ 1,205	\$ 11,339	\$ 11,339	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA25 Westgate Reg. PS		2025	2026	2027	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 390,887	\$ 213,003	\$ 1,337,312	\$ 1,337,312	\$ 1,337,312	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA34 30st 17Ave		2027	2028	2029	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 92,599	\$ 92,599	\$ 871,972	\$ 871,972	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA4 35 Ave Ost		2028	2029	2030	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,457	\$ 13,457	\$ 117,747	\$ 117,747	\$ 117,747	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Boomerang Regional Phase 3		2028	2029	2030	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 21,654	\$ 21,654	\$ 74,100	\$ 74,100	\$ 74,100	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA3 35 Ave AA st		2029	2030	2031	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Bittersweet Park Exp.		2029	2030	2031	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 82,245	\$ 82,245	\$ 774,669	\$ 774,669	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA35 44ave Fst		2030	2031	2032	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,980	\$ 7,980	\$ 74,909	\$ 74,909	\$ 74,909	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA36 59 ave 10st		2031	2032	2033	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 182,863	\$ 182,863	\$ 1,148,049	\$ 1,148,049	\$ 1,148,049	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA16 9save 16st		2034	2035	2036	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 17,365	\$ 17,365	\$ 59,391	\$ 59,391	\$ 59,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA14 Tech Cent Exp		2035	2036	2037	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA15 37st SH257		2036	2037	2038	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA12 Cobblestone		2037	2038	2039	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,128	\$ 1,161	\$ 10,875	\$ 10,875	\$ -	\$ -	
Glenmere Park Exp		2037	2038	2039	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 234,308	\$ 127,863	\$ 1,199,450	\$ 1,199,450	\$ -	\$ -	
SA25 Westgate Reg. Phase 2		2038	2039	2040	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 60,438	\$ 350,683	\$ 350,683	\$ -	\$ -	
SA42 23ave Cst		2039	2040	2041	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 212,568	\$ 115,870	\$ 727,038	\$ 727,038	\$ 727,038	
Total					\$ 167,819	\$ 495,147	\$ 3,447,976	\$ 4,005,882	\$ 9,140,670	\$ 8,193,370	\$ 8,260,329	\$ 9,188,622	\$ 2,318,971	\$ 2,316,788	\$ 1,154,044	\$ 1,157,360	\$ 1,106,541	\$ 1,222,958	\$ 1,165,414	\$ 1,157,532	\$ 59,391	\$ 295,828	\$ 282,587	\$ 1,483,331	\$ 1,676,878	\$ 1,077,721	\$ 727,038	
Parks																												
Project Names		Planning Start Year	Design Start Year	Construction Start Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
SA44 Centennial Park		2020	2021	2022	\$ 66,361	\$ 66,361	\$ 415,257	\$ 415,257	\$ 415,257	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Boomerang Regional PS		2021	2021	2022	\$ -	\$ 66,595	\$ 208,945	\$ 208,945	\$ 208,945	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Boomerang Regional Phase 2		2021	2021	2022	\$ -	\$ 31,292	\$ 103,754	\$ 103,754	\$ 103,754	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Greeley West PS		2021	2022	2023	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Upper Equalizer		2022	2023	2024	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Tech Center Supply		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Prom Park Exp		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA38 1st Ave Pond		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Twin Rivers Exp		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Monfort Exp		2024	2025	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA-25 Westgate Reg. Phase 1		2025	2026	2027	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
SA60 Lake Bluffs		2025	20262																									

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Appendix K

Comprehensive Plan Action Item List

The City adopted the *Imagine Greeley Comprehensive Plan* in 2018, which is a policy guide that provides framework for public and private growth and development decisions made by the City over the next ten to twenty years. As a part of the Comprehensive Plan, a list of recommended actions was identified in Section 5 to assist in implementation of this plan. A summary of action items addressed with the development of this NPMP to ensure implementation of the Comprehensive Plan is summarized in the following table.



INFRASTRUCTURE (IN)

IMPLEMENTATION ACTION	NON-POTABLE MASTERPLAN ACTION ITEM RESPONSE
Goal IN-1: Ensure developed areas in Greeley are served by adequate public facilities and services.	
IMP IN-1.1 Annually review and update the City's Adequate Public Facilities Area (APFA) concurrent with annual growth and development projections to assist in the planning and funding of municipal infrastructure to accommodate growth. Prepare maps depicting the boundaries of existing and budgeted service areas for infrastructure included in the APFA requirements.	While the NPMP does not review or update the APFA, it identifies the critical infrastructure needed to serve all major developable areas within the LREGA (Section 5) and the anticipated CIP cost (Section 6). This masterplan will assist in planning and funding of municipal infrastructure and determine the anticipated infrastructure to meet the APFA requirements.
IMP IN-1.2 Continue to support timely and effective development in the Long Range Expected Growth Area as it relates to 208 Wastewater planning and treatment. Where possible and practical, look for opportunities to share and/or coordinate such capital improvements with other jurisdictions to efficiently use public resources.	Not Applicable
IMP IN-1.3 Through the annual Population Growth and Projections and Capital Improvements Plan, identify the location for new fire stations, parks and other public facilities commensurate with the City's expected growth.	Not Applicable
IMP IN-1.4 Complete and implement a basin-wide study that addresses drainage improvements through larger, shared, facilities which could also achieve an attractive, functional community or regional park use.	Not Applicable
IMP IN-1.5 Evaluate existing capacity within established areas of the city to understand where investments in expanding infrastructure will be needed in order to support the type and/or intensity of development envisioned in the Land Use Guidance Map	This masterplan has evaluated existing infrastructure to confirm sufficient capacity with the existing conditions, with future development of infill and densification of parcels, and full buildout as envisioned by the Land Use Guidance Map.

IMPLEMENTATION ACTION	NON-POTABLE MASTERPLAN ACTION ITEM RESPONSE
IMP IN-1.6 Update existing functional master plans for infrastructure and services as needed to account for changes in land uses and intensities that result from the adoption of this Comprehensive Plan and completion of implementation actions.	This masterplan incorporates improvements made to the NP water distribution system from the most recent masterplan completed in 2004. This masterplan has incorporated recent land use applications, utilized the Comprehensive Plan to update land uses and anticipated densities, and addressed areas outside of the 20-year plan through guidance and coordination with the Planning department.
IMP IN-1.7 Develop functional master plans detailing the maintenance, operation, and expansion of infrastructure and public facilities where such documents do not currently exist.	Not Applicable
IMP IN-1.8 Consider the extension of water lines to serve larger groups of users and along primary roadways to provide non-potable water to landscaped medians and parkways.	Not Applicable

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Appendix L

Greeley Policy for Non-Potable Irrigation

[Final NP policy will be appended here when approved by the City.]



INFRASTRUCTURE (IN)

IMPLEMENTATION ACTION	RESPONSIBILITY	TYPE	TIMEFRAME
Goal IN-1: Ensure developed areas in Greeley are served by adequate public facilities and services.			
IMP IN-1.1 Annually review and update the City's Adequate Public Facilities Area (APFA) concurrent with annual growth and development projections to assist in the planning and funding of municipal infrastructure to accommodate growth. Prepare maps depicting the boundaries of existing and budgeted service areas for infrastructure included in the APFA requirements.	Lead Community Development Partners Planning Commission Public Works Police Fire Water and Sewer Culture, Parks, and Recreation	Policies and Programs	Ongoing
IMP IN-1.2 Continue to support timely and effective development in the Long Range Expected Growth Area as it relates to 208 Wastewater planning and treatment. Where possible and practical, look for opportunities to share and/or coordinate such capital improvements with other jurisdictions to efficiently use public resources.	Lead Water and Sewer Partners Community Development	Policies and Programs	Ongoing
IMP IN-1.3 Through the annual Population Growth and Projections and Capital Improvements Plan, identify the location for new fire stations, parks and other public facilities commensurate with the City's expected growth.	Lead Community Development Partners Culture, Parks, and Recreation Police Department Fire Department	Policies and Programs	Ongoing
IMP IN-1.4 Complete and implement a basin-wide study that addresses drainage improvements through larger, shared, facilities which could also achieve an attractive, functional community or regional park use.	Lead Public Works Partners Culture, Parks, and Recreation	Plans	Near-Term



IMPLEMENTATION ACTION	RESPONSIBILITY	TYPE	TIMEFRAME
IMP IN-1.5 Evaluate existing capacity within established areas of the city to understand where investments in expanding infrastructure will be needed in order to support the type and/or intensity of development envisioned in the Land Use Guidance Map	Lead Water and Sewer Partners Public Works Culture, Parks, and Recreation Community Development	Policies and Programs	Near-Term
IMP IN-1.6 Update existing functional master plans for infrastructure and services as needed to account for changes in land uses and intensities that result from the adoption of this Comprehensive Plan and completion of implementation actions.	Lead All City Departments	Policies and Programs	Near-Term
IMP IN-1.7 Develop functional master plans detailing the maintenance, operation, and expansion of infrastructure and public facilities where such documents do not currently exist.	Lead All City Departments	Plans	Near-Term
IMP IN-1.8 Consider the extension of water lines to serve larger groups of users and along primary roadways to provide non-potable water to landscaped medians and parkways.	Lead Water and Sewer Partners Culture, Parks, and Recreation Community Development	Public Investments	Long-Term
Goal IN-2: Ensure the design, construction, and appearance of City infrastructure and facilities contributes to the character of the community.			
IMP IN-2.1 Evaluate current best practices in designing, developing, and constructing green infrastructure and incorporate appropriate practices into the City's approach to stormwater management.	Lead Public Works Partners Culture, Parks, and Recreation Community Development	Policies and Programs	Near-Term
IMP IN-2.2 Evaluate, and update as needed, existing design guidelines for infrastructure and public facilities to ensure aesthetics and considerations for the visual or quality of life impacts on surrounding neighborhoods are considered.	Lead Public Works Partners Water and Sewer Culture, Parks and Recreation Community Development	Regulatory Revisions	Long-Term

CITY OF GREELEY, COLORADO
ORDINANCE _____, 2021

AN ORDINANCE ADOPTING THE 2021 NON-POTABLE WATER MASTER PLAN AND AMENDING THE 2018 COMPREHENSIVE PLAN TO INCLUDE THE SAME BY REFERENCE

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 19-1 of the Greeley City Charter obligates City Council to adopt a comprehensive plan as a guide to land use and development; and

WHEREAS, on February 6, 2018, City Council adopted "Imagine Greeley: The City of Greeley Comprehensive Plan (2018)" (the "2018 Comprehensive Plan"); and

WHEREAS, from 2018 - 2021, the City, through it's the Water and Sewer Department and consultants, prepared a master plan for the City's non-potable water system; and

WHEREAS, The 2021 Non-Potable Water Master Plan (the "Plan") provides the backbone infrastructure required for long term growth of the City's non-potable water system. The planning documents are essential to ensure future development in the City has adequate public facilities and services; and

WHEREAS, the Plan address the 2018 Comprehensive Plan action plan items: IMP IN-1.2, IMP IN-1.5, IMP IN-1.6, IMP IN-1.7, and IMP-IN-1.8; and

WHEREAS, Section 17-7 of the Greeley City Charter requires that the Water and Sewer Board ("Board") recommend long rang plans to City Council for water and sanitary sewer improvements; and

WHEREAS, on September 15, 2021, City staff presented the Plan to the Board. By motion, the Board recommended that City Council adopt the Plan and incorporate the same by reference as an amendment to the 2018 Comprehensive Plan; and

WHEREAS, Section 19-1 of the Greeley City Charter describes the Planning Commission's role in providing advice on land use matters to City Council, and the 2018 Comprehensive Plan requires that the Planning Commission conduct a public hearing on any proposed amendment to the 2018 Comprehensive Plan, which includes a modification to policies contained within master plan adopted by reference, and provide a recommendation on the same to City Council; and

WHEREAS, on September 14, 2021, the Planning Commission held a public hearing on the Plan with an opportunity for public comment. By motion, the Planning Commission recommended that City Council adopt the Plan and incorporate the same by reference as an amendment to the 2018 Comprehensive Plan.

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. That the 2021 Non-Potable Water Master Plan is accepted and approved as presented.

Section 2. That "Imagine Greeley: The City of Greeley Comprehensive Plan (2018)" is amended to include by reference the 2021 Non-Potable Water Master Plan.

Section 3. 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 _____, 2021.

ATTEST

CITY OF GREELEY, COLORADO

City Clerk

Mayor

Non-Potable Water System Master Plan

Greeley City Council

October 19, 2021



**CDM
Smith**

Greeley Water: History, Heritage and Innovation

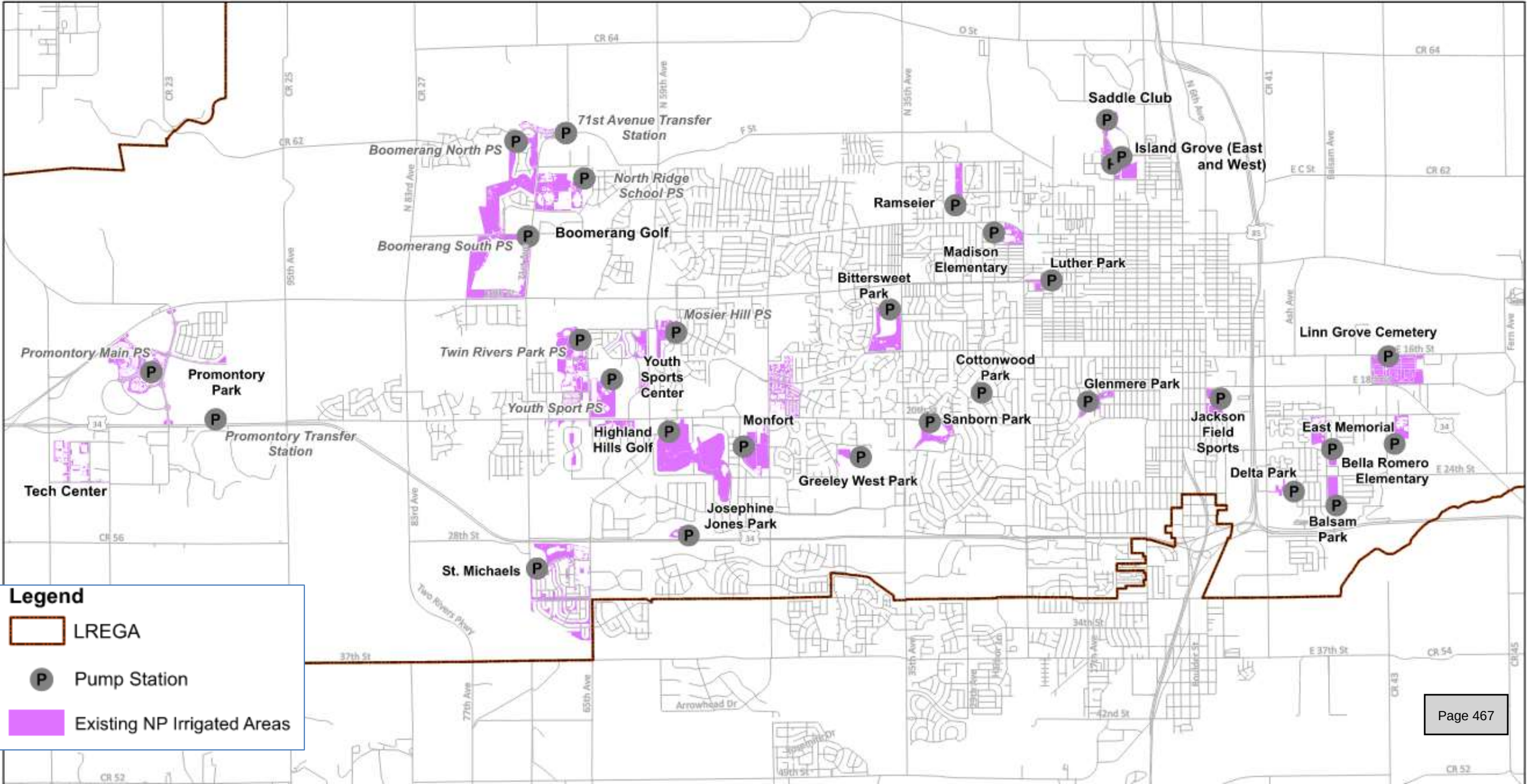
City Council Strategic Work Plan Priority No. 5:

☐ Implement a non-potable irrigation water system

- Non-potable water is an essential component of the city's long range water resource plan
 - Requires infrastructure for delivery
- Philosophy, the right type of water for each type of use
- Maximizing potable drinking water supplies and treatment capacity for current and future citizens



Existing Non-Potable COG Systems



Expanding Non-Potable System; Strategic Goals

Managing Risk and Controlling Costs

- Reduce use of potable drinking water for irrigation use
- Provide cheaper, lower river, untreatable water sources
 - \$30,000+ /AF for potable sources vs ~\$8,000/AF for non-potable sources
- Reduces future expansions to drinking water infrastructure

Long-Range Planning – Insuring Adequate Water Supply

- Increase non-potable use to over 10,000 AF per year
 - Current use: 2,500 AF per year
- Frees up potable sources for drinking use during droughts



Peak Month Flow Factors and Adoption Rates

Category	Bulk Land Flow Factor gpd/ac	Irrigated Land Flow Factor gpd/ac	Adoption Rate
Park	1,600	3,500	90%
Commercial	1,300	3,200	20%
Multifamily HOA	1,500	4,400	15%
School	2,100	4,300	75%
Church	1,300	2,000	75%
I-L	500	NA	20%
I-M	125	NA	20%
R-L	1,200	4,700	20%
Residential (R-M)	900	5,200	20%
R-E	80	NA	15%

Note: Future adoption rates are highly dependent on policy decisions

Demands Summary

- Existing non-potable demand is 6.3% of total water demand (AFY)
- Future development non-potable demand is 15.5% of total
- Projecting that at buildout, non-potable will be 11.1% of total

Development Type	Total Water Demand MGD (AFY)	Potable Water Demand MGD (AFY)	Non-Potable Water Demand, MGD (AFY)
Existing Demand	47.3 (30,500)	46.0 (28,600)	1.3 (1,900)
Future Development (Buildout)	56.4 (33,500)	47.2 (29,300)	9.2 (4,200)
Potable to NP Conversion	2.3 (0)	0 (-1,000)	2.3 (1,000)
Total	106.8 (64,000)	93.2 (56,900)	12.8 (7,100)



MGD is peak month, AFY is annual total

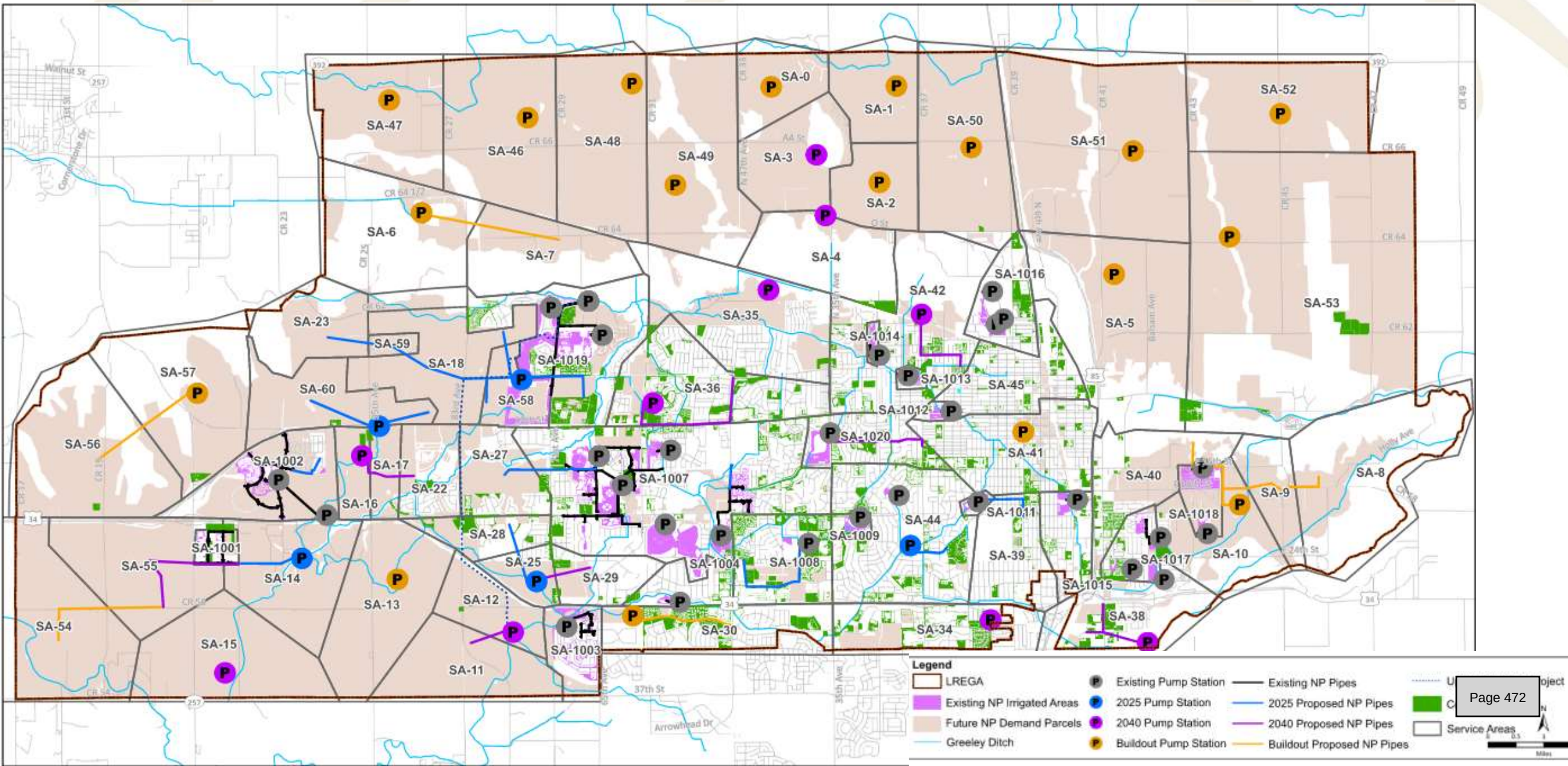
Note: Future non-potable usage is highly dependent on policy decisions

Capital Improvements Plan



Recommended Capital Improvements: Build Out

Item No. 18.



Recommendations

Recommend Approval and Incorporation into Greeley Comp Plan

Prior approvals and recommendations:

- **Recommended by City staff & CDM Smith**
- **Public Hearing, recommendation, approval from Planning Commission – Sept. 14th**
- **Recommendation & approval from Water & Sewer Board – Sept. 15th**



Questions



Council Agenda Summary

October 19, 2021

Key Staff Contact: Benjamin Snow, Economic Health & Housing Director, 970-350-9384

Title:

Public Hearing to consider adoption of the Annual Action Plan for Program Year 2022 for Community Development Block Grant and HOME Investment Partnership Program Grant with Recommended Budgets

Summary:

The City is entitled to receive federal grants from the U. S. Department of Housing and Urban Development, namely the Community Development Block Grant (CDBG) and HOME Investment Partnership Program (HOME) grant. HUD requires that recipients implement a new strategic plan every five years that details how they will prioritize federal grants during those five years. The strategic plan is part of the consolidated planning process, which serves as the framework for a community-wide dialogue that aligns housing and community development priorities with the noted federal formula grant programs.

The Council approved priorities for the 2020-2024 strategic plan in 2019 during the Consolidated Planning process. Those priorities were recommended to Council by the GURA Board of Commissioners and resulted from a Needs Assessment and Housing Market Analysis (part of the consolidated planning process). Two high priority needs were identified: greater support for the development and retention of affordable housing and support for low-moderate-income neighborhoods. It was expected that prioritizing those two needs would result in a commensurate reduction in funding for public facilities and services, which received low priority rankings. The 2020-2024 Consolidated Plan was developed based upon Council approved priorities and is available for review, if desired, on the City's website:

<https://greeleygov.com/services/ehh/greeley-urban-renewal-authority>.

Implementation of the priorities and goals of the 2020-2024 Consolidated Plan started with the 2020 Action Plan, which identified the expected resources and activities to utilize the resources during that program year. The 2022 Action Plan (Attachment E in this packet) is the 3rd year of implementing the priorities and goals of the Consolidated Plan. It becomes the application to HUD for both CDBG and HOME funds.

Annual funding requests considered by the GURA Board and recommended to Council are specific to the CDBG program. Throughout the year, the Board measures and manages HOME fund applications on behalf of the City, prioritizing projects that are consistent with the Council's priorities. HOME funds can only be used for housing programs; historically, these funds have supported new housing development with organizations such as Habitat for Humanity, Accessible Space, etc. Approval of the 2022 Action Plan does include approval of the HOME budget, as well.

Neighborhood meetings were not held in-person again this year, rather GURA continued CDBG exposure via the GURA web page, the Greeley Rising newsletter, and through greater distribution of Plans and notices to the public. Two members of the Citizens Committee for Community Development (CCCCD) did meet with GURA staff and provided input and recommendations to the GURA Board as residents within the Redevelopment District. Input was also solicited from non-profit partners working with low-moderate-income persons and (particularly) residents from low-moderate-income neighborhoods, and all (CCCCD, GURA Board, non-profit partners) were encouraged to share the Plans and notices with others.

Specific to the 2022 Action Plan applications, the GURA Board meeting on August 11, 2021 included a review of CDBG applications, formulation of the recommended budget that is a part of this packet, and a public hearing. Council's October 19, 2021 meeting also includes a public hearing. A 30-day public comment period on the 2022 Action Plan was originally posted as August 12, 2021-September 14, 2021, but due to the change in date for the budget presentation and public hearing, was extended past the 30 days to October 8, 2021.

While the City is required to develop its proposed annual action plan by November of each year, the exact amount of 2022 CDBG funding will not be known until congressional action in 2022 and the City's Finance Department closeout of fiscal year 2021 (for program income and revolving loan fund balances). Based upon experience, the funding will be confirmed and available by approximately June 2022, so as has been the practice, staff projected a level of funding that is an average of the funding received during the previous five years (\$840,000 for CDBG; \$300,000 for HOME). Program income and any prior years' unused grant funds are also a part of the proposed budget. If the 2022 allocation is more or less than expected, the GURA Board recommends that adjustments occur within the Redevelopment District (Phase I of 5th Street) Infrastructure budget line item, which has the greatest flexibility in project scope.

The GURA Board recommended funding at some level for all but two of the applications received. The two applications not recommended for CDBG funding were from non-profits that did not previously receive CDBG public service funding. The recommendation not to fund was based solely on the Board's direction to reduce the number/amount of funding and move back toward brick-and-mortar-type activities. Applicants were available on the Board's Zoom meeting to address Board questions and/or concerns. Other than the applicants, there was no one from the public in attendance at the GURA Board's budget public hearing. The enclosed funding recommendation from the GURA Board was consensus driven.

In addition to the information provided in the Consolidated Plan packet, supporting documents submitted with the applications are available upon request. That material includes such things as by-laws, audited financial statements, organizational charts, etc., in addition to full applications.

The 2022 Action Plan draft is posted on the City's website (web site address previously noted) and provided in this information packet. Any changes that Council recommends will be made to this document prior to submittal to HUD. Significant

changes (changes in funding, changes in agencies receiving funding, etc.) will result in a second 30-public comment period held after Council's formal approval of the budget tonight.

Staff provided a brief overview of the applications received and Greeley Urban Renewal Authority Board recommendations for the 2022 CDBG budget during the October 12, 2021 work session.

<https://meetings.municode.com/adaHtmlDocument/index?cc=GREELEY&me=830f54ad6fb74a9fa3a8f532fa0d6d9b&ip=True>

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	Yes. CDBG and HOME are annual entitlement grants available to the City.
If yes, what is the initial, or, onetime impact?	Estimated at \$840,000 CDBG and \$300,000 HOME
What is the annual impact?	N/A
What fund of the City will provide Funding?	N/A
What is the source of revenue within the fund?	U.S. Dept. of Housing & Urban Development
Is there grant funding for this item?	Yes. This is a HUD grant.
If yes, does this grant require a match?	No
Is this grant onetime or ongoing?	Ongoing
Additional Comments:	N/A

Legal Issues:

None.

Other Issues and Considerations:

None.

Strategic Work Program Item or Applicable Council Priority and Goal:

Economic Health & Development: Foster and maintain public and private investment in business development.

Infrastructure & Growth: Establish the capital and human infrastructure to support and maintain a safe, competitive, appealing and successful community.

Decision Options:

- 1) Approve the 2022 Annual Action Plan and associated budgets, as presented; or
- 2) Request changes to the 2022 Action Plan and/or associated budgets, and then adopt with changes; or
- 3) Continue consideration of the items to the next regular Council meeting, understanding the HUD deadline by which the 2022 Action Plan must be ready for HUD submittal.

Council's Recommended Action:

A motion to approve the 2022 Annual Action Plan and associated budgets, as presented.

Attachments:

The following attachments can be found in the work session link:

- CDBG Annual Funding Applications and Recommendations Packet with Supporting Documents
- 2022 Action Plan
- Presentation Slide Deck

Council Agenda Summary

October 19, 2021

Key Staff Contact: Anissa Hollingshead, City Clerk, 970-350-9742

Title:

Appointment of applicants to the Greeley Art Commission, Historic Preservation Commission, and Human Relations Commission

Summary:

Council appointment is needed to the above-mentioned boards and commissions due to vacancies and term expirations. Staff continues to actively recruit to fill all vacant positions.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	
What is the annual impact?	
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	
Is there grant funding for this item?	N/A
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	
Additional Comments:	

Legal Issues:

The City Attorney's Office reviewed the applications and advised of potential conflicts of interest.

It should be noted that there is a possibility that the applicants currently serve as a volunteer on a board or commission besides the one they are applying to. It is also important to point out to the applicants that there are always potential conflicts that exist with business and investments, current jobs or relatives and family members coming before the Board or Commission.

Should such conflicts arise, the Board or Commission member simply excuses themselves from that particular item but such a potential conflict does not preclude anyone from serving on a Board or Commission in general, just that particular agenda item.

Other Issues and Considerations:

Not applicable.

Applicable Council Priority and Goal:

Infrastructure & Growth: Establish the capital and human infrastructure to support and maintain a safe, competitive, appealing and successful community.

Decision Options:

- 1) Appoint or reappoint the individuals to serve on applicable board or commission;
or
- 2) Direct staff to re-advertise applicable vacancy.

Council's Recommended Action:

No motion is necessary. The City Council's Policies and Protocol authorize appointment of Board and Commission members by written ballot, which can be used in lieu of a motion or voice vote for individual or multiple appointments. This policy was adopted by Council as a time-savings measure. Accordingly, a ballot is attached for Council's use in making appointments. Candidates receiving a majority vote (at least 4 votes) are appointed with no further action needed by Council.

Attachments:

Ballot

October 2021 Boards and Commissions Transmittal Summary

eeley
Boards & Commissions
Appointment Ballot
October 19, 2021
Clerk's Tally



Applicants for the boards and/or commissions listed below are in alphabetical order
 and recommendations from the interview team are shown in bold.

***** BALLOT *****

Greeley Art Commission	
<i>1 Position</i>	
☐	EDDIE MIRICK (I)
☐	(Recruit For Additional Applicants)

Historic Preservation Commission	
<i>1 Position</i>	
☐	SEAN JAEHN
☐	(RECRUIT FOR ADDITIONAL APPLICANTS)

Human Relations Commission	
<i>1 Position</i>	
☐	JERRY HARVEY
☐	(RECRUIT FOR ADDITIONAL APPLICANTS)

Incumbent = (I)

Boards & Commissions Transmittal

October 8, 2021

Key Staff Contact: Casey Rogers, Assistant City Clerk, 350-9807

Interview Date

October 11, 2021

Council Interview Team

Council Members Fitzsimmons and Butler

Council Appointment Date

October 19, 2021

Boards and Commissions Being Interviewed

- **Greeley Art Commission**
- **Historic Preservation Commission**
- **Human Relations Commission**

Council's Recruitment and Qualifications Policy

General recruitment efforts shall be made with special measures being taken to balance ward representation and attract minority and special population applicants. Generally, volunteers will be limited to serving on one board or commission at a time. (14.2. (c)(2) City Council, Policies and Protocol)

Demographic information of existing board members and any specialty requirements are contained within the attached Membership Rosters.

Legal Issues

The City Attorney's Office reviewed the applications and the attached memorandum addresses any potential conflicts of interest.

It should be noted that there is a possibility that the applicants currently serve as a volunteer on a board or commission besides the one they are applying to. It is also important to point out to the applicants that there are always potential conflicts that exist with business and investments, current jobs or relatives and family members coming before the Board or Commission.

Should such conflicts arise, the Board or Commission member simply excuses themselves from that particular item but such a potential conflict does not preclude anyone from serving on a Board or Commission in general, just that particular agenda item.

Applicable Council Goal or Objective

Infrastructure & Growth – Establish the capital & human infrastructure to support & maintain a safe, competitive, appealing, and dynamic community.

Decision Options

1. Recommend candidates for appointment; or
2. Direct staff to re-advertise applicable vacancy.

Attachments

1. Interview Schedule
2. Conflict Memorandum from City Attorney's Office
3. Sample Ballot
4. Membership Rosters & Input from above mentioned Boards and Commissions
5. Applications of those being considered for interview and/or considered for appointment

Transmittal reviewed by:

^{DS}
RLU

Raymond Lee, Acting City Manager

^{DS}
AH

Anissa Hollingshead, City Clerk

Council Agenda Summary

Title

Scheduling of Meetings, Other Events

Summary

During this portion of the meeting the City Manager or City Council may review the attached Council Calendar or Worksession Schedule regarding any upcoming meetings or events.

The City Manager is recommending the scheduling of a Special Meeting on November 9, 2021 in place of the work session in order to swear in new members of the City Council.

If Council concurs, a motion to schedule this meeting would be in order under this item of business.

Attachments

Council Meetings and Other Events Calendar
Council Meeting and Work Session Schedule

October 18, 2021 - October 24, 2021

October 2021						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November 2021						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Monday, October 18

Tuesday, October 19

6:00pm - City Council Meeting - Council Master Calendar

Wednesday, October 20

2:00pm - 5:00pm Water & Sewer Board (Gates)

Thursday, October 21

7:30am - 8:30am DDA (Zasada/Butler)

3:30pm - 4:30pm Airport Authority (Clark/Payton)

Friday, October 22

Saturday, October 23

Sunday, October 24

October 25, 2021 - October 31, 2021

October 2021						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November 2021						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Monday, October 25

11:30am - 12:30pm Greeley Chamber of Commerce (Hall) 

6:00pm - 7:00pm Youth Commission (Butler) 

Tuesday, October 26

6:00pm - City Council Worksession Meeting - Council Master Calendar 

Wednesday, October 27

7:00am - 8:00am Upstate Colorado Economic Development (Gates/Hall) (Upstate Colorado Conference Room) - Council Master Calendar 

Thursday, October 28

7:30am - Poudre River Trail (Hall) 

Friday, October 29

Saturday, October 30

Sunday, October 31

November 1, 2021 - November 7, 2021

November 2021						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December 2021						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Monday, November 1

Tuesday, November 2

Wednesday, November 3

Thursday, November 4

3:30pm - IG Adv. Board (Butler) 

6:00pm - MPO (Gates/Payton) 

Friday, November 5

Saturday, November 6

Sunday, November 7

November 8, 2021 - November 14, 2021

November 2021						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December 2021						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Monday, November 8

Tuesday, November 9

 6:00pm - City Council Worksession Meeting - Council Master Calendar 

Wednesday, November 10

Thursday, November 11

 7:30am - Poudre River Trail (Hall) 

Friday, November 12

Saturday, November 13

Sunday, November 14

City Council Meeting Scheduling

Current as of 10/13/2021

This schedule is subject to change

Date	Description	Sponsor	Placement/Time
October 26, 2021 Worksession Meeting	COVID-19 Update	Raymond Lee	0.25
	ERP Update	Raymond Lee	0.50
	Opioid Lawsuit Update	Doug Marek	0.25
November 2, 2021 Council Meeting	Cancelled		
November 9, 2021 Worksession Meeting	Special Meeting - Tentative Swearing In of Mayor and Council Members		
November 16, 2021 Council Meeting	Ordinance - Intro - Changes to Amend Water Plant Investment fee & related to conform to policy	Sean Chambers	Consent
	Ordinance – Intro - Fourth Additional Appropriation	John Karner	Consent
	Ordinance - Intro - 2000 16th Street Rezone	Becky Safarik	Consent
	CDBG-CV Substantial Amendment	Ben Snow	Regular

Council Agenda Summary

Title

Consideration of a motion authorizing the City Attorney to prepare any required resolutions, agreements, and ordinances to reflect action taken by the City Council at this meeting and at any previous meetings, and authorizing the Mayor and City Clerk to sign all such resolutions, agreements and ordinances

Council's Recommended Action

A motion to approve the above authorizations.