



**Garden
Spot of
Colorado**

**MEETING OF THE TOWN BOARD
Town Board Room
807 Mountain Avenue
Town of Berthoud, Colorado
Tuesday, August 22, 2023, 6:30 p.m.**

This is an IN-PERSON meeting at the location and time noted above.
You may also join virtually using Zoom: Phone: 1-346-248-7799 or 301-715-8592
Web: www.zoom.us/join Use this Meeting ID: 210 035 9423

The Town Board may take action on any of the following agenda items as presented or modified prior to or during the meeting and items necessary or convenient to effectuate the agenda items.

1. Meeting Called To Order - Mayor William Karspeck
2. Pledge Of Allegiance - Mayor William Karspeck
3. Roll Call - Mayor William Karspeck
4. Citizen Participation
5. Scheduled Items And Estimated Time For Discussion
 - 5.I. Consent Agenda
Introduction By: Christian Samora

Documents:

MEMO RE CONSENT AGENDA.PDF
A. AUGUST 22 2023 MEETING AGENDA.PDF
B. AUGUST 8 2023 MEETING MINUTES.PDF
C. TOWN OF BERTHOUD COMMUNICATION PLANS.PDF
D. AUGUST 2023 BOARD REPORT.PDF
E. 348 MASSACHUSETTS AVE REQUEST.PDF
F. NEWELL FARM PROCLAMATION.PDF

- 5.II. Puppy Mill Awareness Proclamation
Introduction By: Town Board

Documents:

[PUPPY MILL AWARENESS PROCLAMATION.PDF](#)

5.III. Annual Committee Reports

Introduction By: Volunteer Committees

Documents:

[MEMO RE ANNUAL COMMITTEE REPORT.PDF](#)
[PORT ANNUAL REPORT.PDF](#)
[TAC ANNUAL REPORT.PDF](#)

5.IV. 2023 Supplemental Budget Appropriation - Public Hearing

Introduction By: Cindy Leach

Documents:

[MEMO RE SUPPLEMENTAL BUDGET APPROPRIATION.PDF](#)
[RESOLUTION 2023 18 SUPPLEMENTAL AND ROLLOVER 2023.PDF](#)
[2023 BUDGET-WITH SUPPLEMENTAL.PDF](#)
[2023 BUDGET SUPPLEMENT-ROLLOVER SUMMARY.PDF](#)
[2023 BUDGET SUPPLEMENT-ROLLOVER.PDF](#)

5.V. Broadband Development Request For Qualifications

Introduction By: Walt Elish

Documents:

[MEMO RE BROADBAND UPDATE.PDF](#)
[PRESENTATION_BERTHOUD BROADBAND_8.15.PDF](#)

5.VI. Westside Crossing Commercial Preliminary Plat - Public Hearing

Introduction By: Anne Johnson

Documents:

[1. MEMO RE WESTSIDE CROSSING.PDF](#)
[2. RESOLUTION 17 2023.PDF](#)
[3. RESOLUTION ATTACHMENT A.PDF](#)
[4. STAFF REPORT.PDF](#)
[5. TRAFFIC STUDY SUMMARY AND RECOMMENDATIONS 2023 08 15.PDF](#)
[6. DRAFT PC MINUTES 2023 08 11.PDF](#)
[7. OUTSTANDING STAFF COMMENTS.PDF](#)
[8. APPLICATION FORM.PDF](#)
[9. NEIGHBORHOOD MASTER PLAN - ILLUSTRATIVE MAP.PDF](#)
[10. PRELIMINARY PLAT.PDF](#)
[11. TRAFFIC IMPACT STUDY.PDF](#)
[12. PRELIMINARY DRAINAGE REPORT.PDF](#)
[13. WESTSIDE CROSSING PRELIMINARY PLAT COMMENTS.PDF](#)

5.VII. Tree Removals In Town Park

Introduction By: Jeremy Olinger

Documents:

[MEMO RE TREE REMOVAL.PDF](#)

5.VIII. Discussion To Set Mosquito Policy Study Session
Introduction By: Chris Kirk

Documents:

[MEMO RE MOSQUITO SPECIAL MEETING SCHEDULE.PDF](#)
[BOARD INFORMATION MEMO FROM MEETING HELD IN JULY 2018.PDF](#)
[BOARD INFORMATION MEMO FROM AUGUST 30, 2022.PDF](#)
[BOARD INFORMATION MEMO FROM JULY 18, 2023.PDF](#)
[BOARD MEETING MINUTES JULY 18, 2023.PDF](#)
[BOARD INFORMATION MEMO FROM JULY 25, 2023.PDF](#)
[BOARD MEETING MINUTES JULY 25, 2023.PDF](#)
[BOARD RESPONSES - MOSQUITO SPRAY POLICY.PDF](#)

6. Elected Official Reports

1. Town Board - Tim Hardy, May Albrecht, Mike Grace, Sean Murphy, Karl Ayers, and Jeff Butler.
2. Mayor - William Karspeck
3. Staff - Town Administrator, Attorney

7. Adjourn

The order of agenda items listed above is approximate and intended as a guideline for the

Town Board. Individuals needing special accommodation may request assistance by contacting the Town Clerk 807 Mountain Avenue, Berthoud, Colorado 80513, 970-532-2643 at least 24 hours in advance.

BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	August 22, 2023
Agenda Title/Subject:	Consent Agenda
Type of Item:	Regular Item
Purpose:	The Consent Agenda contains routine items that can be approved with a single action by the Board.
Presented by:	Christian Samora

ATTACHMENTS:

- a) August 22, 2023, Meeting Agenda
- b) August 8, 2023, Meeting Minutes
- c) Town of Berthoud Communications Plans
- d) August 2023 Board Report
- e) 328 Massachusetts Ave Request
- f) Newell Farm Proclamation

BACKGROUND:

"Consent Agenda" is a group of routine matters to be acted on with a single motion and vote. The mayor will ask if any Board Member wishes to remove an item for separate discussion. Items removed from the consent agenda should be considered immediately following adoption of the amended Consent Agenda.

UPDATE/NEXT STEPS:

Any updates or next steps for the items on the Consent Agenda will be articulated in the information sheet provided for each item on the Consent Agenda.

FISCAL IMPACT AND FUND SOURCE:

Any fiscal information for the items on the Consent Agenda will be articulated in the information sheet provided for each item on the Consent Agenda.

COMMUNITY TOUCHSTONES:

Any Community Touchstones for the items on the Consent Agenda will be articulated in the information sheet provided for each item on the Consent Agenda.

RECOMMENDED ACTION(S):

"Move to combine and approve the items on the Consent Agenda."

Followed by a second and a vote.



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The Town Board may take action on any of the following agenda items as presented or modified prior to or during the meeting and items necessary or convenient to effectuate the agenda items.

- I. REGULAR MEETING CALLED TO ORDER** – Mayor William Karspeck
- II. PLEDGE OF ALLEGIANCE** – Mayor William Karspeck
- III. ROLL CALL** – Mayor William Karspeck
- IV. CITIZEN PARTICIPATION**
- V. SCHEDULED ITEMS and ESTIMATED TIMES FOR DISCUSSION**
 - 1. Consent Agenda** (Christian Samora) (5 Min)
Consent Agenda items are considered to be routine by the Town Board and will be enacted with a single vote. There will be no separate discussion of these items. If discussion is deemed necessary, that item should be removed from the Consent Agenda and considered separately.
 - a) August 22, 2023, Meeting Agenda
 - b) August 8, 2023, Meeting Minutes
 - c) Town of Berthoud Communications Plans
 - d) August 2023 Board Report
 - e) 348 Massachusetts Ave Request
 - f) Newell Farm Proclamation
 - 2. Puppy Mill Awareness Proclamation** (Town Board) (5 Min)
 - 3. Annual Committee Reports** (Volunteer Committees) (30 Min)
 - 4. 2023 Supplemental Budget Appropriation – Public Hearing** (Cindy Leach) (30 Min)
 - 5. Broadband Development Request for Qualifications** (Walt Elish) (30 Min)
 - 6. Westside Crossing Preliminary Plat – Public Hearing** (Anne Johnson) (30 Min)
 - 7. Tree Removals in Town Park** (Jeremy Olinger) (15 Min)

August 22, 2023, Meeting Agenda

The order of agenda items listed above is approximate and intended as a guideline for the Town Board. Individuals needing special accommodation may request assistance by contacting the Town Clerk 807 Mountain Avenue, Berthoud, Colorado 80513, 970-532-2643 at least 24 hours in advance.

8. Discussion to set Mosquito Policy Study Session (Chris Kirk) (30 Min)

VI. ELECTED OFFICIAL REPORTS (10 Min)

1. Town Board – Tim Hardy, May Albrecht, Mike Grace, Sean Murphy, and Karl Ayers,
2. Mayor – William Karspeck
3. Staff – Town Administrator, Attorney

VII. ADJOURN

Town Clerk or Deputy Town Clerk

William Karspeck, Mayor

August 22, 2023, Meeting Agenda

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MEETING MINUTES OF THE TOWN BOARD

**Town Board Room
807 Mountain Avenue
Town of Berthoud, Colorado
Tuesday, August 8th, 2023, 6:30 p.m.**

8/8/2023 - Minutes

1. Meeting Called To Order - Mayor William Karspeck

Mayor Karspeck called the meeting to order at 6:32 pm.

2. Pledge Of Allegiance - Mayor William Karspeck

Mayor Karspeck led the Pledge of Allegiance.

3. Roll Call - Mayor William Karspeck

The following Board Members were present:

Karl Ayers, Trustee
Tim Hardy, Trustee
May Albrecht, Trustee
Will Karspeck, Mayor

The following Board Members were absent:

Mike Grace, Mayor Pro-Tem
Sean Murphy, Trustee

The following Staff Members were present:

Chris Kirk, Town Administrator
Alicia Garcia, Town Attorney
Christian Samora, Town Clerk
Lexi Weissman, Deputy Town Clerk
Theresa Morgan, Neighborhood Services Officer
Stephanie Horvath, Community Outreach Director
Jeremy Olinger, Deputy Town Administrator
Ken Matthews, Director of Water Utilities

4. Citizen Participation

Dr. George Garmany, Jeffrey Hoskin, and Dick Bailey spoke regarding mosquitos and West Nile, and weed control.

5. Scheduled Items And Estimated Time For Discussion

5.1. Consent Agenda

Trustee Hardy moved to approve the consent agenda. Trustee Albrecht seconded the motion. In a 4-0 roll call vote, THE MOTION CARRIED.

5.II. Appointment To Planning Commission

Trustee Hardy moved to appoint Nick Semedalas to the Planning Commission. Trustee Ayers seconded the motion. In a 4-0 roll call vote, THE MOTION CARRIED.

5.III. Staff Recognition Awards Presentation

Town Clerk, Christian Samora, gave an introduction on the Juan Eagle Award and presented a certificate of appreciation to Neighborhood Services Officer, Theresa Morgan.

5.IV. Town Communications Plans

Community Outreach Specialist, Stephanie Horvath, gave a presentation on the Town's Communication Plans.

Mayor Karspeck opened it up to public comment. There was no public participation.

The Board was supportive of the Communication Plans with the suggested addition of training for Town leadership.

5.V. Gateway Signage Concepts

Deputy Town Administrator, Jeremy Olinger gave an update on the Gateway Signage concepts.

Mayor Karspeck opened up to public comment.

Dick Bailey and George Garmany spoke during public participation.

Mayor Karspeck closed public comment.

The Board was supportive of a simple design and would like to see input from the community on the design style.

5.VI. 1st Street Interceptor Sewer Easement Plan

Director of Water Utilities, Ken Matthews, gave an introduction.

The Board was supportive of the 1st Street Interceptor Sewer Easement Acquisition plan.

5.VII. Town Trustee Vacancy

Town Clerk, Christian Samora gave an introduction.

The Board was supportive of opening up applications to members currently seated on Town Committees.

6. Elected Official Reports

Trustee Ayers:

Trustee Ayers reported on the PORT Committee's plans for Richardson Park and the pickleball courts at Pioneer Park.

Trustee Albrecht:

Trustee Albrecht requested the Board set a date to discuss the mosquito spraying policy. Administrator Kirk suggested a possible Study Session for August 29th.

Mayor Karspeck:

*Mayor Karspeck reported on the Behavioral Health Policy Council. He reported that he is still pushing for Berthoud to be included as a train stop in the commuter rail project that is being discussed at the Front Range Passenger Rail Meetings.

Administrator Kirk:

Administrator Kirk stated that he would like to get Trustee feedback on what the Board would like to see at the next discussion on mosquito spraying. Kirk reported that he would like to see two Board Members participate in an emergency policy exercise on November 2nd. The Board was supportive of scheduling a Work Session on August 29th to discuss the topic.

7. Adjourn

The meeting was adjourned at 8:18 pm.

BOARD OF TRUSTEES INFORMATION



SELECT DEPARTMENT

Meeting Date:	August 22, 2023
Agenda Title/Subject:	Crisis & General Communications Plans
Type of Item:	Consent Agenda
Purpose:	Final - Communications Plans
Presented by:	Stephanie Horvath

ATTACHMENTS:

- Crisis Communications Plan
- General Communications Plan

BACKGROUND:

These plans were formally presented on August 8, 2023.

UPDATE/NEXT STEPS:

- Update: Trustee feedback for training for senior officials on their role in supporting incident management has been added.

FISCAL IMPACT AND FUND SOURCE:

There is no fiscal impact

COMMUNITY TOUCHSTONES:

Emergency communications are a vital tool during an emergency to preserve the safety, sustainability, and security of the community. It also serves to aid in resilience after a disruption

RECOMMENDED ACTION(S):

Approve so the crisis communication plan can be put into practice.



Submitted August 8, 2023

Crisis Communications Plan DRAFT

STEPHANIE HORVATH

Contents

Contents.....	1
Introduction	2
Purpose	2
Objectives	3
Decision-Making (LCSO / BFPD)	3
Larimer County Sheriff's Office (LCSO)	3
Berthoud Fire Protection District (BFPD)	3
Public Information Officer (PIO) Responsibilities:	4
Crisis Communications Team	4
Response	4
Implementation	4
Immediate Response	5
Communication tools to disseminate messaging include:	5
Notifying Key Audiences	5
Determine Spokesperson(s).....	5
Developing a Fact Sheet.....	5
Alerting the Media	6
Monitor Traditional and Social Media	6
Approval of Outgoing Information.....	6
Activation of Emergency Operations Center	6
Joint Information System	6
End of Crisis.....	7
Education and Plan Maintenance	7



Crisis Communications Plan

Updated 5/16/2023

Introduction

In an emergency or other crisis, effective and timely communication helps to protect life, public safety, and property and provides timely guidance to the Berthoud community.

Emergency communications are a vital tool during an emergency to preserve the safety and security of the community. This plan outlines the different communication tools available and suggests use of each tool, and provides operational guidance for staff.

No one tool will enable the Town to fully warn everyone in a timely manner because each system has limitations. It is imperative to utilize multiple tools to effectively broadcast warning messages to the community and as many residents, employees, and visitors as possible.

All messages must be accurate, clear, and consistent. Within the constraints of the available tools, all messages should be accurate, with detailed information about the situation and what actions to take. During the course of the emergency, regular updates to the community are highly advisable.

The media also aids in warning dissemination. To maintain the accuracy of Town messages, the media should receive consistent information with warning messages. The Town Administrator's office will ensure that the media has access to updated information throughout the emergency as necessary to ensure the safety of the community, first responders, and other support personnel.

Purpose

The Crisis Communications Plan outlines the roles, responsibilities, and procedures of key Town officials and departments that will guide the Town in sharing information promptly and accurately with all audiences during a crisis.

A crisis or emergency is defined as a significant event or incident that disrupts or has the potential to disrupt, the Town's usual activities and operations. This could include a fire, earthquake, severe weather, crime, or other event that presents a threat and typically involves a response from police, fire, utilities, and/or emergency medical personnel.

This plan is to be flexible and used in conjunction with other emergency decision-making procedures of the Town. This plan solely describes the crisis communications roles, responsibilities, and procedures that will be followed by the Town's Crisis Communications Team and does not address other response and recovery procedures that will likely also be implemented.

Elements of this plan are tested periodically, as well as annually in conjunction with Town-wide emergency exercises and drills. Town leadership will also participate in annual training either online or in-person so they become familiar with their role in supporting incident management. All appendices are checked and updated for accuracy and completeness annually.

Objectives

The guiding principles of the Crisis Communications Plan are to communicate incident/event facts as accurately and quickly as possible, update information regularly as circumstances change, to ensure the safety of the Berthoud community, and continue operation of essential Town services. Objectives of the plan include:

- To understand the process for decision-making during an emergency
- To understand communications procedures for events that do not result in the activation of the Emergency Operations Center
- To understand communications procedures for events that result in the activation of the Emergency Operations Center
- To assemble the Crisis Communications Team to assess, implement and support the appropriate emergency communications from the incident.
- To factually assess the situation and determine whether emergency notification communications are warranted and the requisite urgency of the notification(s).
- Implement immediate actions to:
 - Define the immediate actions needed to inform the community about the situation.
 - Identify all key audiences that need to be notified of the situation.
 - Communicate in an accurate and timely manner about the situation.
 - Monitor all media (broadcast, print, radio, social media, etc.) coverage of the incident/event and manage rumors.
 - Restore a sense of confidence and order.

Decision-Making (LCSO / BFPD)

Larimer County Sheriff's Office (LCSO)

The **Berthoud Chief of Police** or their designee will make decisions regarding alerts/evacuations for the Town. If the emergency does not reach the Incident Management Team (IMT) activation level, the Town will determine appropriate communications for key audiences. If an alert/evacuation is determined to be necessary, the Town will follow directions from the Berthoud Squad's Police Chief or their designee. Alerts will be sent via NOCO Alert. The request for the Emergency Notification will be made to LCSO Dispatch. The request can be made by any on-duty LCSO Deputy, the Police Chief, or their designee.

Berthoud Fire Protection District (BFPD)

Depending on the type of incident, the **Berthoud Fire Department** may be in command and have an incident commander (IC) and/or PIO that would be the single point of contact for media and/or other agencies. With large incidents, an Incident Management Team (IMT) may be brought in, and "Unified Command" may be used, which could be multiple department heads or their designees.

In the event of a large incident that requires evacuation or public notification, It should be coordinated with the IC, at which point the dispatch center would use both Everbridge (essentially a reverse 911 system that reaches out to designated areas) and/or contact Larimer Emergency Telephone Authority (LETA) to send a NOCO Alert.

Public Information Officer (PIO) Responsibilities:

During an incident, the Agency Having Jurisdiction (AHJ) Public Information Officer (PIO) is responsible for ensuring that the media receives consistent and accurate information. This includes developing and disseminating public information messages, maintaining regular contact with the media, and providing periodic updates that have been verified by the Incident Commander. The AHJ PIO must also coordinate with other agencies and organizations involved in the response to ensure that all messaging is consistent and accurate. Additionally, the PIO may be responsible for coordinating public meetings, community briefings, and other events to provide information and answer questions from the public. The PIO plays a critical role in ensuring that accurate and timely information is provided to the public during an incident.

Crisis Communications Team

Any member of the Crisis Communications Team (CCT) may activate this plan in order to begin the initial group assessment of the incident/event. Each time the plan is activated, the CCT member whose department has the lead response role is responsible for notifying the appropriate members of the Town's senior leadership of the status of the incident and provide ongoing status reports.

Given the urgency of communicating critical information to the community and the media, the CCT will be convened as quickly as possible. Based on the timing, location, and severity of the incident, this may occur either in person or virtually through a conference call. The initiator of the conference call will determine when a sufficient number of the team members have joined the call before discussions begin. A log will be maintained to record the proceedings and activities of each call.

The CCT is comprised of employees from several Town departments. These individuals play a critical role in communicating information about the crisis. The CCT will develop and regularly update a list of key team members and their 24/7 contact information. Each essential department must have at least two designated and trained individuals to ensure adequate 24/7 coverage. This confidential contact information will be maintained as part of the notification procedures.

Response

Implementation

The CCT will implement some or all of the steps outlined below based on the circumstances, coordinating with all key personnel. Throughout a crisis, the team will meet frequently to review changing facts, assess whether key messages are reaching audiences and determine whether strategies need to change.

Immediate Response

Based on the available crisis information and after conducting a situation assessment, the CCT will determine what, if any, public messaging should be sent out. Messaging may address:

- What happened?
- To whom did it happen?
- When did it happen?
- Where did it happen?
- How did it happen?
- Is there an immediate call to action to communicate?

Communication tools to disseminate messaging include:

- Mass notification system (Everbridge/NOCO Alert – managed by Larimer County)
- Town's website (news item/eNotification/emergency banner)
- Town staff notification (Alert Media)
- Social media (Facebook/Instagram/NextDoor/Twitter)
- Press release/conference.

Notifying Key Audiences

The CCT will determine which groups need to be informed first. It is important to keep in mind that people will seek and trust other sources of information (news reports, social media, word of mouth, etc.) in the absence of official communication. Effective communication will help quell rumors, maintain trust, and ensure public safety. Key audiences include:

- Residents
- Employees
- Visitors
- Parents
- Students
- Town/regional leaders
- News media
- State/federal officials
- HOA / Metro Districts

Determine Spokesperson(s)

This can either be the Public Information Officer (PIO), their designated alternate, a senior leader of the Town, or a member of the CCT who has knowledge of the crisis and has been assigned to provide key messages and emerging facts to the public/media. The individuals selected will manage briefings, media questions, and formal press gatherings.

Developing a Fact Sheet

As soon as possible after the incident, a fact sheet will be prepared to supplement communication with key audiences and information provided to the media by the spokesperson. It will be approved by senior leadership and checked for accuracy by those with direct knowledge of the crisis.

Alerting the Media

The spokesperson will determine the best approach for coordinating with news media. A news media briefing center may be opened to coordinate the information flow and ensure that the correct people are involved in collecting and disseminating information. Consideration will be given to appropriate media staging locations that can accommodate vehicles such as satellite trucks. Communication with the media must occur frequently as new information is known.

Monitor Traditional and Social Media

To anticipate any problems in the way information is flowing to the news media and to social media, the CCT will have members monitor media and provide listening reports if the incident is anticipated to be of longer duration than a typical working day. Additional resources may be needed to assist in media monitoring by request.

Approval of Outgoing Information

Typically, the CCT should use a collegial approach of multiple approvals before distributing communications, including emails and press releases. That system may not work in a crisis. The Town is committed to trying to meet these expectations. It recognizes the need for unusually fast decision-making during a crisis to enable rapid, accurate communication. Final approval of all communications rests with the spokesperson.

Activation of Emergency Operations Center

If an emergency reaches the level of Emergency Operations Center (EOC) activation by the Larimer Office of Emergency Management, additional coordination with partner agencies will be required. The spokesperson should contact the responsible office of emergency management. Please keep in mind that emergency alerts will likely be going out quickly and the phone line may not be initially answered. If this happens, the spokesperson should work with Police/Fire to determine the best point of contact at the EOC.

The spokesperson should coordinate with the LCSO PIO on any content or messaging that the Town wants pushed out on the NOCO Alert system. LCSO will provide LCSO Dispatch with the Polygon(s) to initiate the Emergency Notification. Alerts and warnings will be coordinated among multiple jurisdictions with the Police Chief and other incident commanders involved in the alerting process. As LCSO Dispatch issues the Emergency Notification, the alert is automatically posted to the NOCO ALERT website.

The EOC may establish a Joint Information System to provide a mechanism to organize, integrate and coordinate information to ensure timely, accurate, accessible and consistent messaging across multiple jurisdictions and/or disciplines with nongovernmental organizations and the private sector.

Joint Information System

The Joint Information System (JIS) incorporates PIOs from multiple agencies. This structure is sustainable because recovery will be a long commitment in duration and require integrating public information activities to ensure coordinated and consistent message development, verification and dissemination.

PIOs may be asked to identify key information that needs to be communicated to the public, craft messaging, prioritize communications to ensure timely delivery of information, verify accuracy of information, vet public messages, coordinate releases and schedule and coordinate

all media activities. Members of the JIS may include Larimer County, Weld County, Larimer County Office of Emergency Management, Weld County Office of Emergency Management, State of Colorado, FEMA, and neighboring jurisdictions.

Public messaging that involves other agencies or jurisdictions should be shared with the JIS and approved by all members before issuing. Likewise, communications from other partners should be shared with the Town and approved before being issued.

The lead coordinator of the JIS is the PIO of the lead agency of the incident. Any questions or concerns should be directed to this point of contact.

End of Crisis

When an incident has ended, the CCT will provide an “All Clear” message to the key audiences and routine communications processes can resume.

Within one week of the crisis, the spokesperson will convene the CCT for a formal review of lessons learned and suggested improvements. This discussion will result in the Town developing a formal after-action report that can be shared with the CCT and other senior leadership as necessary.

Education and Plan Maintenance

It is the responsibility of the CCT to provide education to the Berthoud community about how and when they will get messages in an emergency. The procedure may be similar to those used to educate the community in emergency preparedness and other safety protocols.

This plan shall be updated at least annually. The PIO will update this plan and conduct a review by the CCT. The PIO will also oversee updates to the contact information for the CCT.

Berthoud Board Update

August 2023



FORESTRY & OPEN SPACE

Submitted By Paul Furnas, Town Forester

The primary objectives for the Forestry and Open Space departments for the month of July were planting the last of the ornamental beds and pots around town, checking and fixing irrigation lines, and cleaning out vegetation on the east cell of the reservoir. Forestry staff worked on trimming tree limbs above sidewalks and roads to meet Town clearance codes. Open space staff are keeping up with mowing and weed mitigation at open spaces, as well as helping with weed mitigation efforts at other Town-owned properties.





Both members of the Forestry department attended classes hosted by the International Society of Arboriculture to receive an extra qualification to add to their Certified Arborist qualification. This course trains arborists how to identify, quantify, and communicate risks that trees pose to people and property. Topics covered were identifying factors that affect trees overall health and stability, consequences of inadequate tree structure, considering 'targets' the tree poses a risk to, and probabilities of failure.

Forestry Water Truck: The Forestry department had final touches put on their new water truck. The new water truck can carry 300 more gallons than the old water truck and has a pump to deliver water through a 300 ft hose directly to plants and trees. The hose has a shower head attachment that is great for watering ornamental beds, and a deep root watering spike for delivering water directly to tree roots without water runoff. The old water truck only had a 20 ft hose and was a gravity fed watering system. The rig on the back of the new truck is also removable in the winter for overwinter storage.



Forestry Department's new water truck

Forestry and Open Space staff helped with clearing unwanted brush around the Eastern cell of Berthoud Reservoir and completed the final installations of ornamental beds and pots throughout town.





RECREATION DEPARTMENT

Submitted by Amanda Gustafson, Director of Recreation & Cultural Services

Operations, Memberships & Marketing

Registration opened for the Winter Craft Show, and on the first day of registration, we had over 40 vendors sign up. For reference, our facility can hold 55 vendors during this event. We also held our annual 3rd of July event, where more than 8,700 community members attended. This was an amazingly successful event, and it wouldn't have been possible without the joint efforts of many Town departments.

Aerial view of
3rd of July event



Sports & Programs - Baseball season wrapped up after a season full of fun, development, and unpredictable weather. Families expressed that the coaches have been amazing and that skill development has gone great this summer for many of our participants.

CARA Track finished with the state meet in Lakewood at Jeffco Stadium. Our track athletes finished the season strong finishing in first place for the 4x100 relay, 6x50 relay, the 100 meter dash, and the 200 meter dash among other accomplishments.

Tennis also finished with participants competing against various partner agencies to show off their skills this summer.

Berthoud aquatics staff spent July supporting almost 40 swim lesson classes for all ages and abilities of swimmers. The aquatics management team was most excited about the 98% turn out at staff training and the strong participation during this time. In partnership with an outside organization, an outside party was brought in as a secret shopper to evaluate the aquatics operations and skills. The initial response to this evaluation showed the team met the expectations and was successful in the surprise live drills that were conducted.



The social hour for our 50+ Active Adults group is consistently gathering 8-12 members each Monday and Tuesday for a few tables of Sevens and Euchre. Outside of this time, members ask to borrow cards and playing cards to use on the patio area in front of the rec center. Each week members in the Social Hour thank us for starting this group and tell us how it has really brought them a reason to get out of their house and connect with new friends.



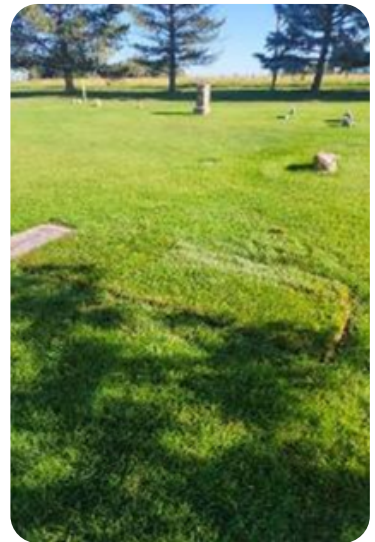
PARKS & CEMETERY

Submitted by Sami Kouns, Parks Supervisor

The month of July marked the end of the event season for the Parks and Cemetery Staff and presented the opportunity to return to the normal, routine maintenance of these areas. Repairs to irrigation systems took off this month as it was quite hot and became more apparent when a park had an issue. For example, dry spots, over-saturated spots, missing sprinkler heads, and visible breaks were all problems that were found and addressed. Going hand in hand with irrigation repairs and the water necessary to make the sprinkler systems run, ditches had to be cleared to get non-potable water from the east side of town to the Pioneer Pond on the west side of town. A fountain was installed in Pioneer pond to keep all the additional water clean and usable by the non-pot system at Pioneer Park and the nearby neighborhood. In addition to the usual maintenance that takes place in the parks, the Parks Department addressed some low areas located in various Town Parks. These areas were filled with dirt and then either seeded or sodded to help them grow and blend with the existing grass. This work was also done at the cemetery where graves were leveled and sodded.



The month of July was quiet at the Greenlawn Cemetery when it came to burials (one total), which gave staff the time to work on leveling uneven graves and sodding to create the look of a lush green carpet.



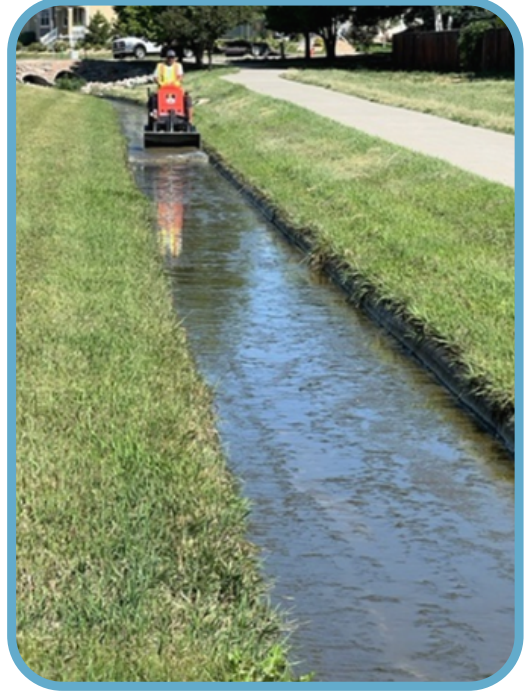
During the summer months, mowing is the most prevalent job the Parks Department must take care of each week. Some parks get mowed only once a week, while others require more maintenance and must be mowed up to three times a week. July was no different other than we had to rely on irrigation to keep the grass green instead of just the rain.

STREETS DEPARTMENT

Submitted by Brandon Keegan

The Streets Department's mission for the month of July was roadside mowing, street sweeping, and ditch maintenance. The Streets crew has also spent many hours repairing sections of roadway damaged by heavy rainfall.

Nielsen Drainage ditch- Streets crew performs monthly maintenance on the ditch to keep the moss from building up



Pioneer Park- Streets crew jetting the irrigation line that goes into Pioneer Pond



Bike Park- Streets Department mowed all the tall grass around the perimeter of the bike park. Streets crew mowing around the property with our new Erskine mower attachment



County Road 7- Streets Crew is installing delineators along the roadway where the new culverts were installed



WATER

Safety inspection on the Berthoud Reservoir

On July 25, Ken Matthews met with John Batka with the State Engineer's office to perform a safety inspection on the Berthoud Reservoir dam and the Loveland Lake dam. Both facilities were deemed safe and in good condition with minor work needed on vegetation clean-up and such. Jean Lever, our local water commissioner also attended the field meeting.



In July, Bison Ridge Construction (BRC) began and completed a major project in the Vantage subdivision. BRC installed 2 butterfly valves that allow the Town to isolate the 16" AC line between Water Ave. and Longs Peak Avenue. This is a huge improvement. Prior to this, the Town had to turn the valves off at Lake Avenue and CR 10E. BRC also connected the eastern half of the Vantage subdivision to the 16" AC line, allowing both sides to be connected to one another.



PLANNING DEVELOPMENT

2023 has been a developmental year for the Community Development Team, and it is now fully staffed with the addition of Teri Reger. Teri joins the Community Development Team as a Planning Technician. Teri is a Berthoud resident and has worked for the downtown development authority in Pasadena, California and most recently for an attorney in northern Colorado. She will be responsible for architectural and block diversity programming as well as home occupations and sign permitting. You will also find Teri at Planning Commission meetings/hearings as she will be organizing public notice and the first step of the public hearing process.



The Community Development Team was also featured in this month's InFocus newsletter



CEMETERY

Administrative staff has worked to completely update the information for Greenlawn Cemetery on the Town website. Information regarding pricing, plot availability, and FAQs are now easily accessible by visiting Berthoud.org/cemetery. A notable change is the addition of real-time plot availability and updated cemetery maps. Staff is in the process of updating map details to include additional plot information.



WELCOME



Armo Cervantes
Street Department



Teri Reger
Planning Development Department



John Schachterle
Parks Department



BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	August 22, 2023
Agenda Title/Subject:	348 Massachusetts Ave Special Request
Type of Item:	Consent Agenda
Purpose:	Approve the special request to allow the originally proposed doors.
Presented by:	Brian Dubois

ATTACHMENTS:

- Request from Property Owner

BACKGROUND:

Town staff has received a special request from the owners of 348 Massachusetts Avenue to reconsider allowing the originally requested doors for the lower-level units. As the Board will recall, the Board previously approved the application with conditions that the foundation stone would be block style and that street-facing doors would be craftsman style with vertical elements as opposed to horizontal.

Town staff and HPAC members have reviewed the new request and acknowledge the change in foundation stone to a block as conditioned. **Staff and HPAC members also recommend the Town Board approve the request to keep the originally requested doors** based on the appreciation for the amount of work and care being put into a Historical Property that was in need of repair.

UPDATE/NEXT STEPS:

- No further steps will need to be taken.

FISCAL IMPACT AND FUND SOURCE:

None

COMMUNITY TOUCHSTONES:

Community Identity as this is a centrally located historic property that has been in rough shape for many years. Preserving and updating the building will create a stronger sense of historic downtown identity.

RECOMMENDED ACTION(S):

Recommend the Town Board approve the applicant to keep the originally requested doors.

Dear HPAC and Town Board:

Thank you for your consideration of allowing us to revisit keeping the 5 entry doors at 348 Massachusetts Ave.

- The dark gray Raven 5 panel doors that were designed for this beautiful grand old building were custom-made to fit the existing building door openings. These are pre-painted doors with black hardware which bring a very modern accent to the building while the tall windows and vaulted interior ceilings reflect the old-time charm. The building has been through many changes over the last 130 years and these doors enable us to bring classic modern design to a historic brick building.
- A copy of the receipt from Lowes for the door purchases has been included. The 5 doors were approximately \$3614.74 apiece or a total of \$18,073. These doors were a special order and Lowe's will not take them back or give us a refund. This will be an immense cost to find replacements doors. They were purchased in April 2023 before the Board's decision.
- The design concept was to allow light into the apartments but also provide safety for the future tenants and guests. By embracing the old turn of the century charm of the beautiful brick building, while adding a refreshing modern touch (see pics attached).
- Our tenants of all ages will be charmed by the old original interior tall ceilings and windows while the 5 panel doors will also match the interior pre-painted doors to each of the apartments and closets. These units will support a younger demographic workforce as well as older community members that wish for simple living. Much like the door/building combination of bringing old/new together.

Regards,

Beth Foster

Proclamation

NEWELL FARM

WHEREAS, Newell Farm is named for Ernest and Rose Newell who resided on the place for nearly 60 years, from the late 1800s to the mid-1900s.; and

WHEREAS, The Farm was purchased by Sarah and Butch Hause in the early 2000s. Along with farming it was also used for audio recording and became the home of the annual Farm Concert; and

WHEREAS, Since the late 1990's The Newell Farm property was slated for development as part of the Towns long-term comprehensive plan; and

WHEREAS, Due to the work of Sarah and Butch Hause, other residents, town elected officials and staff, and many others, in 2018 the process of preserving the property in perpetuity began; and

WHEREAS, in 2023 the finalization of the property's preservation was complete, and Newell Farm Park was established; and

WHEREAS, Newell Farm Park will house the Farm Concert, and the numerous world-class artists it features, and beyond that will be an area of respite on the east end of our community for all to enjoy, hold events, and walk around in Berthoud's farming history, and beholding the breathtaking views of the Front Range; and

NOW THEREFORE, pursuant to the powers vested in me as Mayor of the Town of Berthoud, I encourage the residents of Berthoud to participate in and enjoy the events hosted at Newell Farm, now and in the years to come.

Given under my hand in these free United States in the Town of Berthoud, on this 22nd day of August 2023, and to which I have caused the Seal of the Town of Berthoud to be affixed and have made this proclamation public.

William Karspeck, Mayor

Proclamation

PUPPY MILL AWARENESS DAY

WHEREAS, the Humane Society of the United States, has determined that puppy mills are inhumane commercial breeding facilities which disregard the animals' health – both physical and emotional – in order to maximize profits; and

WHEREAS, the worldwide use of dogs as companion animals, as vital partners in law-enforcement and military duty, for therapeutic situations, as service animals for the disabled and blind or visually impaired, and in other noble roles is a testimony to the intelligence, devotion, and value of these animals and to the respectful treatment they deserve; and

WHEREAS, commonly known as puppy mills, there are more than 10,000 such breeding operations, fewer than 3,000 of which are regulated by the U.S Department of Agriculture; and

WHEREAS, dogs from puppy mills are often underdeveloped, sick, or suffer from genetic deformities or behavioral defects as a result of poor socialization and mistreatment, and some may even die only days or weeks after purchase; and

WHEREAS, many pets purchased as holiday gifts come from puppy mills, and animal welfare organizations see increased numbers of rejected and unwanted dogs following the holidays; and

WHEREAS, tolerating the inhumane treatment of adult breeding dogs, where profit is put above the welfare of the dogs, and the sale of unhealthy puppies to consumers constitutes an abdication of the responsibilities of good citizenship and good stewardship; and

WHEREAS, greater transparency within and oversight of this industry will yield a better outcome for dogs, responsible dog breeders, and adopters of animals; and

WHEREAS, Berthoud residents are encouraged to observe Puppy Mill Awareness Month by supporting efforts to raise awareness of puppy mills, support rescue organizations, and promote responsible dog breeding and responsible pet adoption; now, therefore, be it

NOW THEREFORE, pursuant to the powers vested in me as Mayor of the Town of Berthoud, I do hereby proclaim the second Saturday of September of each year Puppy Mill Awareness Day in the Town of Berthoud and encourage every citizen seek responsible avenues of pet adoption.

Given under my hand in these free United States in the Town of Berthoud, on this 22nd day of August 2023, and to which I have caused the Seal of the Town of Berthoud to be affixed and have made this proclamation public.

William Karspeck, Mayor

BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	August 22, 2023
Agenda Title/Subject:	Annual Committee Reports
Type of Item:	Presentation
Purpose:	Present 2022 Committee Reports
Presented by:	Tim Grover – PORT Lynn Larson - TAC

ATTACHMENTS:

- PORT 2022 Annual Report
- TAC 2022 Annual Report

BACKGROUND:

The Parks, Open Space, Recreation and Trails (P.O.R.T.) advisory committee advises and provides recommendations to the Town staff regarding developing and utilizing parks and recreation amenities. This includes providing input on areas to be preserved as open space, establishing bikeways and trail systems, identifying new areas for parks, completing, and updating the parks master plan, current park upgrades, and suggesting options for park and open space utilization.

The Town of Berthoud Tree Advisory Committee (T.A.C) was formed in 1980 to study, investigate, counsel, and develop and/or update annually a written plan for the care, preservation, trimming, planting, re-planting, removal or disposition of trees and shrubs in public way streets and alleys.

At the conclusion of the year, an annual report is created by the committee chair and shared with the Board of Trustees

COMMUNITY TOUCHSTONES:

Berthoud's volunteer commissions and committee's allow residents a chance to serve our growing community and offer vital input into the many ongoing projects that enhance our **Community Identity** and improve our town's **Sustainability**.

FISCAL IMPACT AND FUND SOURCE:

N/A

RECOMMENDED ACTION(S): Informational Only – No Board Action Required

**Berthoud Parks, Open Space, Recreation and Trails (PORT) Advisory Committee
Annual Report for Calendar 2022**

The Parks, Open Space, Recreation and Trails Advisory Committee (PORT) conducted monthly meetings in 2022, except in January, July, and August. This summary reflects the variety of topics discussed by the committee.

PORT Membership (* = served on committee throughout 2022)

Tim Grover*	Lauren Roth*
Jose Cabrera*	Carolyn Hobson*
Colleen Dodge (through September)	Marc Millet (through September)
Phil Klein (through September)	Callie West (since October)
Anna Murphy (since October)	

Youth Advisor: Daniel Hatton

Trustee Liaison: Jeff Hindman (through April), Karl Ayers (since May)

Staff Representative: Keith Knoll

Officers from January – September: Klein (chair); Grover (vice-chair); Dodge (secretary)

Officers since October 2021: Grover (chair); Roth(vice-chair); Murphy (secretary)

Summary of 2022 PORT Activities and Discussions

* Public comment received during the year reflected three concerns:

- Pickleball amenities at Town Park and Waggener Farm
- Potential uses for the Jaskowski Property
- Substrate for soft trails should be suitable for bike riding
- Richardson Park design

Parks and Recreation

- * Reviewed plans and provided input of proposed pickleball courts at the Waggener Farm Rec Center
- * Reviewed plans for the development of a small recreation area around Robert's Lake
- * Received periodic updates on progress of Recreation Center and its staffing throughout the year
- * Had numerous discussions regarding potential uses for the Jaskowski property
- * Reviewed several plans for the redesign of Town Park
- * Reviewed and provided feedback to staff plans for biking amenities at Richardson Park

Trails

- * Reviewed Unified Trails Master Plan
- * Improving trail connectivity an ongoing focus in PORT, looking now toward Heron Lakes and Loveland
- * Signage: improvements are needed, and standardizing the appearance of signs is recommended

Open Space

- * PORT continues to encourage the town to:
 - Work towards retaining the agricultural heritage and viewsheds surrounding Town
 - Focus on improving connectivity of trails to and through major open-space corridors
 - Prioritize obtaining conservation easements, especially along Hwy 56

Expectations for 2023

- * Progress on the Richardson bike park

- * Progress on the Town Park redesign
- * Further discussion of amenities in Richardson Park
- * Progress on connecting bike trails the north and further integration with new neighborhoods

Acknowledgments

The PORT Committee wishes to acknowledge the work of all the citizens who served on the Committee or provided public comment this past year. We greatly appreciate the leadership of Keith Knoll and the support of his staff, and the professionalism of the planning consultants retained by the Town. We also acknowledge and appreciate the hard work, creativity, and vision of Amanda Gustafson and the Berthoud Recreation Staff. We are pleased to see all of the improvements the Town has been able to provide with the dedicated revenue stream to support recreation and look forward to see how we can help this continued growth in 2023. Please feel free to direct any questions to the email below.

Respectfully submitted on behalf of the PORT Committee,

Tim Grover
PORT Chair, 2022-2023
352 Nebraska Ave.
twgrover@gmail.com

Berthoud Tree Advisory Committee (BTAC)
Annual Report for Calendar 2022
For presentation to the Board of Trustees
22 August 2023

Purpose: The Town of Berthoud Tree Advisory Committee (BTAC) was formed in 1980 to study, investigate, counsel and develop and/or update annually a written plan for the care, preservation, trimming, planting, re-planting, removal or disposition of trees and shrubs in public way streets and alleys.

A 2011 Resolution by the Berthoud Board of Trustees (Resolution 2011.04 [Res. No. 4-11 adopted March 8, 2011]) states that “The Tree Advisory Committee shall make recommendations to staff of the Town of Berthoud concerning policies, rules, regulations and specifications...” pertaining to a multiple number of activities and issues about trees and other plants in public rights-of-way and other public places.

The BTAC is assigned to work with the Town staff on these and other matters relating to the Berthoud tree canopy.

Membership: For the first time in several years the BTAC was fully staffed, although membership and leadership did change/rotate during the course of the year.

January 2022

Bob Schneider, Chair
Dale Freund, Vice-Chair
Toni Baker, Secretary
Allen Owen
Joe Nesvara
Amy Lentz
Lynn Larsen
Will Karspeck, Trustee Liaison
Josh Embrey, Staff Liaison-Town Forester

December 2022

Toni Baker, Chair
Amy Lentz, Vice Chair
Randy Niece, Secretary
Kathy Mitchell
Joe Nesvara
Hannah Daniels
Lynn Larsen
Sean Murphy, Trustee Liaison
Paul Furnas, Staff Liaison-Town Forester

Summary of Activities for 2022

Almost all of the activities and discussions of the BTAC during 2022 can be coalesced under two headings: “Communications” and “Support and Advice.” A few of these efforts are summarized below.

Communications

A big concern of the Committee throughout the year was how information and messages about our tree canopy and its care can be communicated to Berthoud citizens and organizations. To that end, the BTAC:

- Developed a 5-point communication strategy, which was presented to the Board of Trustees on August 23. See illustration below.
- Began implementing the first item in the strategy by working with the Town Forester and Community Outreach Specialist to provide monthly posts to various social media outlets and through other mechanisms.
- Drafted a spreadsheet compilation of Berthoud neighborhoods that includes a list of contacts for neighborhood organizations (e.g., HOAs, Metro Districts, etc.) as a means of disseminating information into the hands of homeowners about tree care and maintenance.
- Participated with the Town Forester in staffing a Town booth at Berthoud Day and Oktoberfest.
- Addressed public concerns and comments about issues with the Berthoud tree canopy.



Support and Advice

A major function of the BTAC is to support and advise the Town Forester. The BTAC fulfilled this function in 2022, in part, by:

- Helping plan and participate in the 2022 Arbor Day Celebration for the Town of Berthoud at the Waggener Recreation Center with a planting of two trees, and educational activities for the public.
- Working with the Town Forester to maintain our Tree City USA designation. This designation by the National Arbor Day Foundation has been granted to Berthoud annually since 1983.
- Working with the Town Forester to achieve, in addition, the National Arbor Day Foundation growth award.
- Attending a tree care workshop hosted by Berthoud Local.
- Advising on possible new programs to increase the ease of availability of trees to homeowners that might be looking for assistance.
- Digging deeper into possible causes of tree die-off in newer developments. The BTAC also discussed possible ways to address the causes.
- Supporting and advising the Town Forester on the Town's efforts to prevent tree damage by emerald ash borers (EAB) and other pests.
- Discussing and commenting on the design of a second tree nursery at Roberts Park.
- Discussing and commenting on sources of grants to fund tree acquisition and distribution.
- Discussing and commenting on tree plantings in new Berthoud developments.

Respectfully submitted on behalf of the BTAC

Lynn Larsen, BTAC member

205 Hubbell Street

BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	August 22, 2023
Agenda Title/Subject:	Supplemental Appropriation to 2023 Budget
Type of Item:	Presentation
Purpose:	To present supplements to the 2023 Budget
Presented by:	Chris Kirk and Cindy Leach

ATTACHMENTS:

- Resolution 2023 18 Supplemental and Rollover Appropriation
- 2023 Budget with Supplemental Appropriations
- Itemized list of Supplemental Appropriations with Summary

BACKGROUND: The 2023 Budget was adopted on November 22, 2022. The 2023 budget was prepared using estimated totals for 2022. Since that time, the annual audit of the 2022 financials has been completed and actual totals for 2022 have been realized. One purpose of the Budget Supplement is to correct fund balances based on actual numbers versus the estimates that were originally used. A second purpose of the Budget Supplement is to rollover any 2022 budgeted items that were not completed in 2022 and re-appropriate them for 2023. The third purpose of the Budget Supplement is to add or adjust items that have been realized and deemed necessary for 2023 adding supplemental appropriations and adopting an amended budget for 2023. These 3 categories of changes are explained and reflected on the attached documents.

UPDATE/NEXT STEPS: Staff will use the updated fund balances and budgeted items to begin preparation of the 2024 Budget which will be presented in draft form in October 2023.

FISCAL IMPACT AND FUND SOURCE: All funds, revenues, and expenditures are reviewed for this project.

COMMUNITY TOUCHSTONES: Sustainability and Resiliency are most pertinent to this project.

RECOMMENDED ACTION(S): Move to approve Resolution 2023-18 making a supplemental appropriation of funds and adopting budget amendments to account for rollovers and supplemental items and making a supplemental appropriation.

**TOWN OF BERTHOUD
RESOLUTION NO. 2023-18**

**A RESOLUTION MAKING A SUPPLEMENTAL APPROPRIATION OF FUNDS
AND ADOPTING BUDGET AMENDMENTS TO ACCOUNT FOR ROLL OVER
AND SUPPLEMENTAL ITEMS, AND MAKING A SUPPLEMENTAL
APPROPRIATION**

WHEREAS the Town of Berthoud has previously adopted its Budget for 2023, as required by law;
and

WHEREAS a number of items budgeted for calendar year 2022 were not completed, resulting in
such items needing to be rolled over into the 2023 budget and amending such Budget as set forth
on **Attachment A**, attached hereto; and

WHEREAS additional expenses necessary to the productivity of the Town and its staff have been
identified as set forth in Attachment A to this Resolution, which together with roll over items
require a total supplemental appropriation in the amount of \$8,184,990.

**NOW THEREFORE BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE
TOWN OF BERTHOUD, COLORADO AS FOLLOWS:**

1. The 2022 budget for The Town of Berthoud, as amended by the roll over items set
forth on **Attachment A** to this Resolution, is hereby approved;
2. A supplemental appropriation in the amount of \$24,336,500 which includes the
roll over items, allocated as set forth on **Attachment A** is hereby approved.

PASSED, ADOPTED AND APPROVED THIS 22nd day of August 2023.

TOWN OF BERTHOUD

BY: _____
William Karspeck, Mayor

ATTEST:

Christian Samora, Town Clerk

TOWN OF BERTHOUD
BUDGET YEAR ENDING DECEMBER 31, 2023

GENERAL FUND TOTALS		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
	DESCRIPTION	2021	2022	2022	2022	2023	2023	2023
	BEGINNING FUND BALANCE	11,259,871	18,410,765	18,410,765	18,410,765	18,410,765	5,004,474	23,415,239
	REVENUES							
1	Total Taxes	9,363,123	6,527,750	7,597,200	9,259,465	7,485,600	-	7,485,600
2	Total Licenses and Permits	178,194	132,000	248,700	273,262	244,000	-	244,000
3	Total Intergovernmental Rev.	1,868,450	1,553,884	1,574,884	1,627,920	391,084	-	391,084
4	Total Charges for Services(Rec,Pool,Pks)	145,258	172,780	151,220	155,345	163,555	-	163,555
5	Total Fines and Forfeits	16,026	16,000	20,100	24,127	15,500	-	15,500
6	Total Interest & Fee Revenue	553,365	460,000	660,000	874,880	600,000	-	600,000
7	Total Transfers In	384,053	343,699	355,000	349,240	356,313	-	356,313
8	Total Building Fees	2,203,838	1,120,000	1,400,000	1,547,004	960,000	-	960,000
9	Total Miscellaneous Revenue	126,403	-	15,450	16,306	-	-	-
11	Total Planning Fees	25,570	5,000	38,700	90,112	8,000	-	8,000
12	Total Town Hall Lease Income	107,962	97,100	100,200	99,009	90,510	-	90,510
	TOTAL OPERATING REVENUES	14,972,242	10,428,213	12,161,454	14,316,670	10,314,562	-	10,314,562
13	MISCELLANEOUS REVENUE	22	0	41,500	75,898	0	0	-
	TOTAL REVENUES	14,972,264	10,428,213	12,202,954	14,392,568	10,314,562	0	10,314,562
	EXPENSES							
100	Total General Government	1,830,368	3,630,300	2,524,900	2,219,434	4,671,689	(2,285,775)	2,385,914
200	Total Public Safety	1,650,208	2,012,373	2,017,830	1,862,495	2,423,116	-	2,423,116
300	Total Streets	784,704	1,033,532	1,049,900	747,860	1,078,266	40,000	1,118,266
400	Total Recreation	275,421	430,272	434,582	374,093	515,457	-	515,457
500	Total Pool	50,154	300,000	600,000	595,881	-	-	-
600	Total Economic Development	180,308	320,146	326,846	201,830	311,166	-	311,166
700	Total Parks	746,567	1,468,037	1,491,137	1,156,745	1,463,667	15,000	1,478,667
800	Total Building Department	1,235,511	826,784	981,700	992,677	761,969	-	761,969
1100	Total Planning	436,601	544,102	543,802	502,259	453,478	240,000	693,478
1200	Total Town Hall Lease Expense	77,296	95,300	90,300	79,183	83,100	-	83,100
1300	Total Community Outreach	-	-	-	-	105,996	-	105,996
1500	Contributions	45,400	97,900	79,500	23,146	135,400	-	135,400
	TOTAL OPERATING EXPENSES	7,312,538	10,758,746	10,140,497	8,755,603	12,003,304	(1,990,775)	10,012,529
1000	TOTAL CAPITAL PROJECTS	508,832	758,700	1,079,900	632,491	5,778,000	3,902,775	9,680,775
	TOTAL EXPENSES	7,821,370	11,517,446	11,220,397	9,388,094	17,781,304	1,912,000	19,693,304
	EMERGENCY RESERVES	-	-	-	-	309,437	-	309,437
	ENDING FUND BALANCE	18,410,765	17,321,532	19,393,322	23,415,239	10,634,586	3,092,474	13,727,060
	MINIMUM EFB		1,613,812	1,521,075	1,313,340	1,800,496	(298,616)	1,501,879

GENERAL FUND REVENUES								
11-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
	<u>Taxes</u>							
4101	0 General property	1,447,664	1,415,000	1,415,000	1,401,407	1,600,000		1,600,000
4102	0 Specific Ownership	374,142	300,000	440,000	511,649	400,000		400,000
4103	0 General Sales Tax	4,399,494	3,000,000	3,700,000	5,021,128	3,600,000		3,600,000
4103	1 Building Permit Use Tax	2,210,809	974,750	1,100,000	1,306,883	835,500		835,500
4103	2 Colorado Excise Tax	127,457	75,000	100,000	142,632	100,000		100,000
4104	0 Cigarette	15,914	8,000	9,000	12,084	10,000		10,000
4105	0 Franchise Taxes	110,342	90,000	90,000	127,697	90,000		90,000
4106	0 Severance Tax	14,925	15,000	92,900	92,979	70,000		70,000
4107	0 General property (police)	651,221	640,000	640,000	631,651	770,000		770,000
4108	0 Occupation Tax	10,900	10,000	10,000	10,682	10,000		10,000
4109	0 Lodging Tax	255	-	300	673	100		100
4100	Total Taxes	9,363,123	6,527,750	7,597,200	9,259,465	7,485,600	-	7,485,600
	<u>Licenses & Permits</u>							
4201	0 Permits & Liquor Licenses	77,085	70,000	100,000	107,387	100,000		100,000
4201	1 Drug Education MMJ transaction fee \$1	23,848	16,000	17,000	21,676	17,000		17,000
4202	0 Animal Licenses	1,240	1,000	3,200	3,250	2,000		2,000
4203	0 Passports	21,926	20,000	70,000	76,995	70,000		70,000
4206	0 Farm Leases	36,780	-	33,500	38,714	30,000		30,000
4207	0 Rental Property	16,000	24,000	24,000	24,280	24,000		24,000
4208	0 Records Requests	1,315	1,000	1,000	960	1,000		1,000
4200	Total Licenses & Permits	178,194	132,000	248,700	273,262	244,000	-	244,000
	<u>Intergovernmental Revenue</u>							
4265	0 CRVF Coronavirus Relief Funds (DOLA)	164,812	-	-	-	-		-
4265	1 DOLA-Non Entitlement Units	1,142,887	1,142,800	1,142,800	1,142,887	-		-
4303	0 Highway User Tax Fund	351,181	280,000	280,000	365,232	280,000		280,000
4304	0 Road & Bridge	77,750	120,000	100,000	66,202	100,000		100,000
4305	0 Utility Road Cut Permit	10,103	5,000	26,000	27,515	5,000		5,000
4307	2 DOLA Grant for CR 7 project	-	-	-	-	-		-
4307	3 State of Colorado-Grant	42,898	-	-	-	-		-
4307	5 CDOT Grant for Parklets	43,556	-	-	-	-		-
4307	6 Grant-Misc	21,500	-	20,000	20,000	-		-
4311	0 GOCO Grant for Roberts Dock	-	-	-	-	-		-
4314	0 CDOT Snow Removal	6,084	6,084	6,084	6,084	6,084		6,084
4316	0 DOLA Grant for Berthoud Market Analysis	7,679	-	-	-	-		-
4300	Total Intergovernmental	1,868,450	1,553,884	1,574,884	1,627,920	391,084	-	391,084
	<u>Charges For Services</u>							
4401	0 Recreation (see page 4)	140,567	168,230	141,620	144,123	155,855		155,855
4402	0 Swimming Pool Fees (see page 4)	(236)	-	-	-	-		-
4404	0 Park Fees (see page 4)	4,927	4,550	9,600	11,222	7,700		7,700
4400	Total Charges for Services	145,258	172,780	151,220	155,345	163,555	-	163,555

GENERAL FUND REVENUES CONT									
11-00			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
		<u>Fines</u>							
4500	0	Fines & Forfeitures	7,866	10,000	5,500	7,130	5,000		5,000
4501	0	Court Fees	7,230	5,000	14,000	16,292	10,000		10,000
4502	0	Surcharges	930	1,000	600	705	500		500
4500		Total Fines & Forfeits	16,026	16,000	20,100	24,127	15,500	-	15,500
		<u>Interest & Fees</u>							
4601	0	Interest	85,789	40,000	140,000	304,247	80,000		80,000
4603	0	Municipal Fees	467,576	420,000	520,000	570,633	520,000		520,000
4600		Total Interest & Fees	553,365	460,000	660,000	874,880	600,000	-	600,000
		<u>Building Department</u>							
4620	0	Building and Planning Fees	2,203,838	1,120,000	1,400,000	1,547,004	960,000		960,000
4600		Total Building Department	2,203,838	1,120,000	1,400,000	1,547,004	960,000	-	960,000
		<u>Planning Department</u>							
4651	0	Application Fees	19,578	5,000	36,000	35,800	5,000		5,000
4653	0	Electric Charging Vehicle Fees	-	-	2,700	2,721	3,000		3,000
4654	0	Development Review Fees	5,092	-	-	53,463	-		-
4655	0	Sign Deposit	900	-	-	(1,872)	-		-
4600		Total Planning Department	25,570	5,000	38,700	90,112	8,000	-	8,000
		<u>Transfers</u>							
4701	0	Water	214,430	210,000	210,000	210,000	220,500		220,500
4702	0	Wastewater	107,215	100,000	100,000	100,000	105,000		105,000
4705	0	Road Impact Fees	51,892	23,699	35,000	29,240	20,313		20,313
4709	0	BATS	-	-	-	-	-		-
4711	0	Storm Water	10,516	10,000	10,000	10,000	10,500		10,500
4700		Total Transfers	384,053	343,699	355,000	349,240	356,313	-	356,313
		<u>Miscellaneous Revenues</u>							
4209	0	Restitution	175	-	-	197	-		-
4310	0	Loss Control Rebate/Insurance Claims	45,395	-	13,000	13,659	-		-
4607	0	Donations	57,672	-	-	-	-		-
4901	0	Sale of Equipment	23,161	-	2,450	2,450	-		-
		Total Miscellaneous Revenues	126,403	-	15,450	16,306	-	-	-
		<u>Miscellaneous Revenues</u>							
4610	0	Oil and Gas	22	-	41,500	75,898	-		-
		Total Miscellaneous Revenues	22	-	41,500	75,898	-	-	-

GENERAL FUND REVENUES (CHARGES FOR SERVICES)								
11-04			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT
			2021	2022	2022	2022	2023	2023
		RECREATION						
4450	1	Tennis	5,411	7,700	6,420	6,420	7,700	7,700
4450	2	Active Net Credit	(13,682)	-	-	-	-	-
4450	3	British Soccer	390	450	675	675	675	675
4450	5	Concession Stand Receipts	678	680	-	-	680	680
4450	8	Flag Football	12,938	14,900	18,000	16,766	17,000	17,000
4450	9	Track Fees	4,058	3,900	3,400	3,403	3,900	3,900
4450	11	Adult Basketball	(15)	-	-	-	-	-
4450	12	Youth Basketball	3,247	-	-	-	-	-
4450	21	Adult Softball	-	4,800	325	325	4,800	4,800
4450	22	Youth Baseball	20,274	22,000	24,000	23,841	23,000	23,000
4450	23	Youth Softball	10,199	19,500	15,200	14,907	15,000	15,000
4450	31	Adult Volleyball	2,705	-	-	-	-	-
4450	32	Youth Volleyball	2,003	-	-	-	-	-
4450	34	Youth Sponsorships	27,915	15,400	4,400	6,975	12,000	12,000
4450	35	Field Fees	8,480	4,000	4,000	4,536	4,000	4,000
4450	37	School District Fees	-	-	-	-	-	-
4450	45	Adult Kickball	3,051	4,000	3,000	3,007	4,000	4,000
4450	50	Soccer	36,314	39,000	40,000	38,646	39,000	39,000
4450	51	Sport Camps	14,102	22,800	15,900	15,736	15,000	15,000
4450	52	Tournaments	468	-	-	-	-	-
4450	55	Additional Programs Fees	2,031	9,100	6,300	8,886	9,100	9,100
4450		Total Recreation Revenue	140,567	168,230	141,620	144,123	155,855	-
11-05								
		SWIMMING POOL						
4451	0	Lessons	(236)	-	-	-	-	-
4463	0	Daily Admissions	-	-	-	-	-	-
4464	0	Season Passes	-	-	-	-	-	-
4466	0	Pool Rental	-	-	-	-	-	-
4467	0	Swim Team	-	-	-	-	-	-
4469	0	Concessions	-	-	-	-	-	-
4460		Total Swimming Pool Revenue	(236)	-	-	-	-	-
11-07								
		PARKS						
4468	0	Shooting Range	340	100	200	320	200	200
4469	0	Park Reservations	4,357	4,200	8,400	9,777	7,000	7,000
4470	0	Banners	230	250	1,000	1,125	500	500
		Total Parks Revenue	4,927	4,550	9,600	11,222	7,700	-
		TOTAL GENERAL FUND OPERATING REVENUES	14,864,280	10,331,113	12,061,254	14,217,661	10,224,052	-
		Total Miscellaneous Revenue	22	-	41,500	75,898	-	-
		TOTAL GENERAL FUND REVENUES	14,864,302	10,331,113	12,102,754	14,293,559	10,224,052	-

GENERAL GOVERNMENT EXPENSE									
11-01			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
5001		Salaries	827,176	1,049,780	1,049,000	977,045	1,105,056		1,105,056
5002		Employer Contributions	193,854	280,131	280,000	216,626	297,350		297,350
5003		Pension	37,258	51,489	51,400	43,741	55,253		55,253
5009	5	Travel-Trans-Educ-Finance	1,738	10,000	3,000	732	10,000		10,000
5009	12	Travel-Clerk/Deputy Clerk	3,998	10,000	5,000	3,399	10,000		10,000
5009	14	Travel-Trans-Educ-Administration	6,326	10,000	12,000	10,853	15,000		15,000
5009	41	Travel-Trans-Educ Board	6,055	17,500	15,000	11,115	17,500		17,500
5010	1	Office Supplies-admin	47,604	45,000	50,000	51,027	45,000		45,000
5010	3	Office Supplies-court				988	2,500		2,500
5010	4	Office Supplies-board				2,882	2,500		2,500
5011	1	Telephone	9,447	10,000	12,000	10,998	12,000		12,000
5012	1	Utilities	29,855	30,000	30,000	32,433	30,000		30,000
5013	1	Vehicle Maintenance	174	1,000	1,000	396	1,000		1,000
5014	1	Gasoline	224	600	600	533	600		600
5015	1	Insurance	109,246	120,000	122,000	120,537	130,000		130,000
5017	7	Town Hall Building Maintenance	26,355	40,000	30,000	18,750	78,000		78,000
5018	4	Publications/Legal Notices	5,480	5,000	5,000	4,683	5,000		5,000
5019	4	Recording Fees	6	100	100	-	100		100
5020	1	Professional Fees (IT Services)	120,953	90,000	120,000	107,687	30,000		30,000
5021	3	Municipal Judge	4,245	18,000	18,000	16,765	18,000		18,000
5022	2	Election Judge	-	2,000	2,200	2,089	-		-
5023	2	Election Supplies	2,213	104,000	104,000	65,132	-		-
5024	2	Election Publications	-	5,000	5,000	133	-		-
5027	1	Codification	-	7,000	7,000	3,947	7,000		7,000
5028	1	Records Management	13,271	32,000	32,000	18,907	20,000		20,000
5036	1	Regional Meetings	399	5,000	5,000	-	5,000		5,000
5038	0	Administrative Expense	3,010	6,000	6,500	8,170	8,000		8,000
5038	1	Passport Expense	1,069	1,500	2,000	1,794	2,000		2,000
5039	1	Dues and Subscriptions	22,068	24,000	24,000	11,552	24,000		24,000
5040	1	Attorney-admin	120,591	130,000	130,000	53,452	82,000		82,000
5040	2	Attorney-elections				1,535	6,000		6,000
5040	3	Attorney-court				25,258	17,000		17,000
5040	4	Attorney-board				49,703	25,000		25,000
5041	3	Court Expense	-	5,000	2,000	7	5,000		5,000
5045	1	Safety Committee (CPR)	3,076	3,000	3,000	3,192	3,000		3,000
5046	1	Uniforms	-	-	-	-	4,655		4,655
5048	1	Wellness Committee	3,341	30,000	28,000	25,862	30,000		30,000
5050	1	Employee Recognition	(131)	12,000	12,000	3,810	12,000		12,000
5089	7	Janitorial Service & Supplies	30,436	30,000	28,000	20,500	28,000		28,000
5090	5	Auditing (1/3)	8,333	10,000	8,400	8,400	10,000		10,000
5091	1	Parking Lot Lease	100	100	100	100	100		100
5095	1	Computer Equipment Maintenance/Replacement	41,721	50,000	72,000	89,161	40,000		40,000
5096	1	Internet	2,365	3,000	3,000	3,053	3,000		3,000
5097	1	Webpage (redesign)	8,589	50,000	50,000	34,001	9,000		9,000
5246	4	Audio/visual Equipment	85	5,000	8,000	7,826	14,000		14,000
5247	1	Software (Caselle)	9,158	25,000	15,000	9,726	22,000		22,000
5247	3	Software (Caselle)-Court	1,260	1,300	1,400	1,281	1,300		1,300
5249	1	Public Outreach	35,039	50,000	50,000	17,883	-		-
5252	1	Community Events	44,053	58,000	70,000	69,145	90,000		90,000
5256	7	Clean-Up Day	3,783	5,000	4,200	4,029	5,000		5,000
5257	7	Spring/Fall Clean Up-Branches	2,250	2,000	2,000	-	2,000		2,000
5265	1	CRVF Coronavirus Relief Funds (DOLA) Related Expenses	-	-	-	-	-		-
5265	6	COVID 19 Berthoud Recovery Programs	-	1,142,800	-	-	2,285,775	(2,285,775)	-
5280	0	Transfer to Cemetery Fund	20,000	20,000	20,000	20,000	20,000		20,000
5300	1	Bank Fees	24,295	23,000	26,000	28,596	26,000		26,000
		TOTAL GENERAL GOVERNMENT	1,830,368	3,630,300	2,524,900	2,219,434	4,671,689	(2,285,775)	2,385,914

PUBLIC SAFETY EXPENSE								
11-02		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
5001	4	Salaries-Code Enforcement	41,796	44,580	44,580	44,706	48,211	48,211
5002	4	Employer Contributions-Code Enforcement	17,716	14,914	20,000	18,775	25,797	25,797
5003	4	Pension-Code Enforcement	925	2,229	2,000	1,292	2,763	2,763
5009	4	Training-Code Enforcement	706	2,000	2,000	45	2,000	2,000
5010	1	Office Supplies-LCSO	2,186	1,800	2,400	581	800	800
5010	4	Office Supplies-Code Enforcement				2,056	1,000	1,000
5011	4	Telephone/Mobile-Code Enforcement	663	800	800	659	800	800
5013	4	Vehicle Maintenance-Code Enforcement	529	1,000	1,000	290	1,000	1,000
5014	4	Gasoline-Code Enforcement	463	1,800	1,000	584	1,800	1,800
5018	1	Public Events (Safety Fair, NNO, LETA)	6,276	6,500	6,300	6,276	6,500	6,500
5034	4	Animal Control	3,483	35,000	35,000	30,141	46,000	46,000
5039	1	Dues & Memberships	-	200	200	-	200	200
5046	4	Uniforms-Code Enforcement	552	1,200	1,200	745	1,445	1,445
5095	4	Computer-Code Enforcement	-	1,800	1,800	-	1,800	1,800
5218	0	Traffic Control	-	1,000	1,000	-	1,000	1,000
5222	7	School Safety/Education	-	16,000	17,000	19,440	17,000	17,000
5228	1	LARIMER COUNTY SHERIFFS DEPT	1,574,913	2,096,550	2,096,550	1,951,905	2,265,000	2,265,000
		Fund 41 Retail MJ participation		(150,000)	(150,000)		-	-
		Fund 33 Public Facilities participation for LSCO vehicle		(65,000)	(65,000)		0	-
		TOTAL PUBLIC SAFETY DEPARTMENT	1,650,208	2,012,373	2,017,830	1,862,495	2,423,116	2,423,116

STREETS EXPENSE								
11-03		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
5001		Salaries	271,444	321,420	321,000	249,814	336,809	336,809
5002		Employer Contributions	93,099	122,941	123,000	80,032	147,117	147,117
5003		Pension	10,176	16,071	16,000	8,554	16,840	16,840
5008	1	Employee Physicals-Background	524	800	800	461	800	800
5009	1	Training	5,243	6,500	6,500	3,536	6,500	6,500
5010	1	Office Supplies	4,159	6,000	6,000	5,303	6,000	6,000
5011	1	Telephone	5,187	7,200	6,000	4,404	6,200	6,200
5012	2	Street Lighting-utilities only	132,437	115,000	130,000	159,204	116,000	116,000
5012	6	Utilities-Shop	3,147	4,500	4,500	1,142	4,500	4,500
5012	7	Street Light Repairs	11,173	15,000	15,000	6,200	15,000	15,000
5014	6	Gasoline	23,083	23,000	26,000	28,459	25,000	30,000
5018	1	Publications	-	500	500	-	500	500
5020	1	Professional Fees (Contracting)	-	15,000	15,000	15,743	15,000	50,000
5021	6	Vehicle and Equipment Maintenance - Light Duty	10,697	40,000	40,000	12,919	40,000	40,000
5036	2	Vehicle and Equipment Maintenance - Heavy Duty	22,184	50,000	50,000	29,220	50,000	50,000
5037	2	Material for Maintenance	16,187	75,000	75,000	11,121	75,000	75,000
5039	1	Dues	50	500	500	421	500	500
5040	7	Contracting	23,435	50,000	50,000	39,502	50,000	50,000
5041	2	Equipment Rental	2,941	10,000	10,000	460	10,000	10,000
5042	5	Snow & Ice Removal	55,871	65,000	65,000	17,623	65,000	65,000
5044	3	Weed Control Chemicals and Supplies	425	3,000	2,000	-	3,000	3,000
5045	6	Shop Operations	13,212	15,000	16,000	18,502	18,000	18,000
5046	1	Uniforms	2,567	5,100	5,100	2,790	4,500	4,500
5047	4	Signs & Signage	36,799	35,000	35,000	32,926	40,000	40,000
5048	2	Safety Equipment	5,359	8,500	8,500	8,323	8,500	8,500
5049	5	Storm Costs	-	-	-	-	-	-
5095	1	Computer Maintenance/Replacement	1,044	5,000	5,000	2,513	5,000	5,000
5247	1	Software	4,810	3,000	3,000	-	3,000	3,000
5251	6	Tools	6,166	9,500	9,500	5,213	9,500	9,500
5255	0	Removal of old streets building	23,285	5,000	5,000	3,475	-	-
		TOTAL STREETS DEPARTMENT	784,704	1,033,532	1,049,900	747,860	1,078,266	1,118,266

RECREATION EXPENSE								
11-04								
		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
		ADMINISTRATION						
5001	2	Salaries	71,363	185,400	185,400	205,942	240,541	240,541
5002	2	Employer Contributions	20,734	49,087	49,087	57,641	94,461	94,461
5003	2	Pension	2,722	9,270	9,270	2,662	12,027	12,027
5009	2	Training/Professional Dev/Membership	1,030	8,000	8,000	4,810	5,000	5,000
5010	2	Office Supplies	3,032	7,500	7,500	730	3,000	3,000
5011	2	Telephone	3,566	2,000	2,000	1,052	2,000	2,000
5012	2	Utilities	1,664	-	-	-	-	-
5013	2	Vehicle Maintenance	746	2,500	2,500	472	2,500	2,500
5014	2	Gasoline	1,484	2,000	2,000	1,678	2,000	2,000
5020	1	Officiating Administrative Fee	4,410	8,000	8,000	7,110	8,300	8,300
5046	2	Uniforms	2,161	4,000	4,000	159	980	980
5048	1	School District Charges	1,392	4,000	4,000	-	1,200	1,200
5049	1	Ballfield Maintenance and Repair	17,618	-	-	-	-	-
5052	2	First Aid Supplies-Safety	1,995	1,800	1,800	1,908	1,800	1,800
5053	1	Porta john	225	-	-	-	-	-
5054	2	Trash	714	-	-	-	-	-
5056	1	Brochures/Advertising	15,843	28,000	28,000	18,110	23,300	23,300
5058	1	Equipment Maintenance	1,647	-	-	-	-	-
5059	1	Coach Certification-Background checks	1,395	2,000	2,000	1,560	2,000	2,000
5060	1	Rec registration/tracking software	2,141	10,600	10,600	8,705	10,600	10,600
5071	1	Scholarships	-	2,500	2,500	-	2,500	2,500
5095	2	Computer Equipment Maintenance/Replacement	-	1,800	1,800	-	1,800	1,800
		CONCESSION STAND						
5001	5	Salaries	667	3,500	3,500	-	1,000	1,000
5002	5	Employer Contributions	53	350	350	-	100	100
5063	5	Supplies	452	3,000	3,000	-	2,000	2,000
		FLAG FOOTBALL						
5001	8	Salaries	4,426	1,600	1,600	914	1,500	1,500
5002	8	Employer Contributions	732	160	160	72	150	150
5003	8	Pension	114	-	-	-	-	-
5020	8	Officials	1,417	2,880	2,880	1,780	3,900	3,900
5046	8	Uniforms/Shirts	5,385	5,200	6,500	6,017	6,200	6,200
5050	8	Equipment	292	250	250	320	800	800
5055	8	Clinics	-	-	-	-	-	-
		TRACK						
5001	9	Salaries	3,910	3,000	3,000	-	3,100	3,100
5002	9	Employer Contributions	482	300	300	-	310	310
5003	9	Pension	47	-	-	-	-	-
5046	9	Uniforms/Shirts	449	800	800	325	500	500
5048	9	Dues/Team Fees	621	700	700	375	700	700
5050	9	Equipment	11	200	200	-	200	200
		TENNIS						
5001	10	Salaries	5,595	5,800	5,800	1,490	5,800	5,800
5002	10	Employer Contributions	445	580	580	117	580	580
5003	10	Pension	-	-	-	-	-	-
5046	10	Uniforms/Shirts	478	900	900	531	800	800
5048	10	Dues/Team Fees	-	600	600	-	600	600
5050	10	Equipment	719	800	800	-	800	800

RECREATION EXPENSE CONT			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
11-04			2021	2022	2022	2022	2023	2023	2023
		<u>ADULT BASKETBALL</u>							
5001	11	Salaries	35	-	-	-	-		-
5002	11	Employer Contributions	8	-	-	-	-		-
5003	11	Pension	2	-	-	-	-		-
5020	11	Officials	-	-	-	-	-		-
5050	11	Equipment	-	-	-	-	-		-
		<u>YOUTH BASKETBALL</u>							
5001	12	Salaries	724	-	-	-	-		-
5002	12	Employer Contributions	170	-	-	-	-		-
5003	12	Pension	23	-	-	-	-		-
5020	12	Officials	560	-	-	-	-		-
5046	12	Uniforms/Shirts	582	-	-	-	-		-
5048	12	Dues/Team Fees	-	-	-	-	-		-
5050	12	Equipment	1,261	-	-	-	-		-
5055	12	Clinics	-	-	-	-	-		-
		<u>ADULT SOFTBALL</u>							
5001	21	Salaries	165	1,500	1,500	-	1,400		1,400
5002	21	Employer Contributions	43	150	150	-	140		140
5003	21	Pension	8	-	-	-	-		-
5020	21	Officials	-	2,500	2,500	-	2,700		2,700
5048	21	Dues/Team Fees	-	-	-	-	-		-
5050	21	Equipment	-	350	350	-	900		900
		<u>YOUTH BASEBALL</u>							
5001	22	Salaries	8,486	3,500	3,500	2,145	3,000		3,000
5002	22	Employer Contributions	1,457	350	350	168	300		300
5003	22	Pension	254	-	-	-	-		-
5020	22	Officials	3,045	3,200	3,200	3,740	3,400		3,400
5046	22	Uniforms/Shirts	6,408	7,000	7,000	5,880	8,000		8,000
5048	22	Dues/Team Fees	350	900	900	706	900		900
5050	22	Equipment	2,034	2,100	2,100	2,435	2,100		2,100
5055	22	Clinics	-	-	-	-	-		-
		<u>YOUTH SOFTBALL</u>							
5001	23	Salaries	1,950	750	750	283	780		780
5002	23	Employer Contributions	398	75	75	22	78		78
5003	23	Pension	76	-	-	-	-		-
5020	23	Officials	670	1,500	1,500	1,545	1,400		1,400
5046	23	Uniforms/Shirts	2,205	2,800	2,800	909	2,500		2,500
5048	23	Dues/Team Fees	4,045	5,000	5,000	3,275	3,600		3,600
5050	23	Equipment	1,026	2,100	2,100	1,017	2,100		2,100
5055	23	Clinics	-	200	200	-	200		200

RECREATION EXPENSE CONT									
11-04			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
		<u>ADULT VOLLEYBALL</u>							
5001	31	Salaries	1,533	-	-	-	-		-
5002	31	Employer Contributions	262	-	-	-	-		-
5003	31	Pension	32	-	-	-	-		-
5020	31	Officials	1,510	-	-	-	-		-
5050	31	Equipment	100	-	-	-	-		-
		<u>YOUTH VOLLEYBALL</u>							
5001	32	Salaries	611	-	-	-	-		-
5002	32	Employer Contributions	133	-	-	-	-		-
5003	32	Pension	-	-	-	-	-		-
5020	32	Officials	80	-	-	-	-		-
5046	32	Uniforms/Shirts	374	-	-	-	-		-
5050	32	Equipment	-	-	-	-	-		-
5055	32	Clinics	-	-	-	-	-		-
		<u>ADULT KICKBALL</u>							
5001	45	Salaries	939	1,200	1,200	823	1,200		1,200
5002	45	Employer Contributions	117	120	120	65	120		120
5003	45	Pension	10	-	-	-	-		-
5020	45	Officials	1,225	1,500	1,500	1,680	2,400		2,400
5050	45	Equipment	-	100	100	-	100		100
		<u>SOCCER</u>							
5001	50	Salaries	9,762	6,500	6,500	2,565	6,100		6,100
5002	50	Employer Contributions	1,727	650	650	201	610		610
5003	50	Pension	259	-	-	-	-		-
5020	50	Officials	3,262	4,100	4,100	3,255	6,200		6,200
5046	50	Uniforms/Shirts	7,122	7,200	9,000	8,868	7,000		7,000
5048	50	Dues/Team Fees	-	850	850	112	850		850
5050	50	Equipment	3,035	400	400	298	400		400
5055	50	Clinics	250	400	400	-	400		400
		<u>SPORTS CAMPS</u>							
5001	51	Salaries	11,222	2,000	3,100	3,043	1,500		1,500
5002	51	Employer Contributions	1,501	200	310	239	150		150
5003	51	Pension	62	-	-	-	-		-
5020	51	Officials	-	-	-	-	-		-
5046	51	Uniforms/Shirts	1,291	1,800	1,800	787	1,900		1,900
5050	51	Equipment	1,679	2,000	2,000	1,098	2,000		2,000
5055	51	Clinics	-	-	-	-	-		-
		<u>TOURNAMENTS</u>							
5001	52	Salaries	-	500	500	-	500		500
5002	52	Employer Contributions	-	50	50	-	50		50
5020	52	Officials	-	-	-	-	-		-
5050	52	Equipment	-	200	200	-	200		200
		<u>ADDITIONAL PROGRAMS</u>							
5001	55	Salaries	4,528	2,500	2,500	914	2,300		2,300
5002	55	Employer Contributions	683	250	250	72	230		230
5003	55	Pension	74	-	-	-	-		-
5046	55	Uniforms/Shirts	-	-	-	-	-		-
5048	55	Dues/Team Fees/Printing	-	-	-	-	-		-
5050	55	Equipment	2,046	500	500	84	500		500
5055	55	Martial Arts	1,830	4,200	4,200	3,384	4,200		4,200
		TOTAL RECREATION DEPARTMENT	275,421	430,272	434,582	374,093	515,457	-	515,457

SWIMMING POOL EXPENSE								
11-05			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT
			2021	2022	2022	2022	2023	2023
								ADJUSTED TOTAL
								2023
5001	1	Salaries	-	-	-	-	-	-
5002	1	Employer Contributions	-	-	-	-	-	-
5003	1	Pension	-	-	-	-	-	-
5009	1	Training, certifications	-	-	-	-	-	-
5010	1	Office Supplies	-	-	-	-	-	-
5011	1	Telephone	107	-	-	-	-	-
5012	2	Utilities	1,159	-	-	(85)	-	-
5046	1	Uniforms	-	-	-	-	-	-
5054	2	Trash	233	-	-	-	-	-
5057	2	Boiler Room Maintenance	-	-	-	-	-	-
5057	2	Pool Repairs-concrete pad, guard house, bathroom, filter	-	-	-	-	-	-
5057	3	Pool Supplies/Maintenance	181	-	-	-	-	-
5059	4	Swim Team	-	-	-	-	-	-
5060	3	Chemicals	-	-	-	-	-	-
5062	4	First Aid-Safety	990	-	-	-	-	-
5063	4	Concession Supplies	-	-	-	-	-	-
5080	0	Town Park pool removal and redesign	47,484	300,000	600,000	595,966	-	-
5095	1	Computer Equipment Maintenance/Replacement	-	-	-	-	-	-
		TOTAL SWIMMING POOL	50,154	300,000	600,000	595,881	-	-

ECONOMIC DEVELOPMENT								
11-06			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT
			2021	2022	2022	2022	2023	2023
								ADJUSTED TOTAL
								2023
5001	6	Salaries	99,762	113,700	113,700	114,229	124,292	124,292
5002	6	Employer Contributions	19,494	23,481	23,481	19,755	24,159	24,159
5003	6	Pension	4,988	5,685	5,685	5,711	6,215	6,215
5009	6	Education	1,254	3,000	3,000	803	3,000	3,000
5011	6	Telephone	1,680	2,400	2,400	2,163	2,400	2,400
5039	6	Dues & Subscriptions	1,260	1,145	1,145	1,011	1,145	1,145
5046	6	Uniforms	-	-	-	-	245	245
5095	6	Computer Equipment Maintenance/Replacement	-	-	-	-	-	-
5101	6	Memberships	6,510	18,535	18,535	18,560	18,560	18,560
5102	6	Office Supplies	104	1,000	1,000	113	500	500
5103	6	Printing	-	2,500	2,500	-	2,500	2,500
5106	6	Business Prospecting-Travel	8,685	26,300	20,000	6,773	16,300	16,300
5107	6	Table/ Events	-	-	-	-	-	-
5108	6	Business Development	18,135	61,150	61,150	11,936	32,100	32,100
5110	6	Professional Services-Consultants	2,855	7,000	20,000	16,687	26,000	26,000
5112	6	Marketing/Advertising/Giveaways	-	4,250	4,250	1,040	3,750	3,750
5120	6	Grants for Business Facade Improvements	15,581	50,000	50,000	3,049	50,000	50,000
		TOTAL BUSINESS DEVELOPMENT	180,308	320,146	326,846	201,830	311,166	311,166

BUILDING DEPARTMENT EXPENSE									
11-08			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
5001	1	Salaries	129,973	148,800	148,800	155,779	163,577		163,577
5002	1	Employer Contributions	31,668	41,544	41,500	41,231	49,478		49,478
5003	1	Pension	6,317	7,440	7,400	7,789	8,179		8,179
5009	3	Travel-Trans-Educ	135	800	800	1,098	800		800
5010	3	Office Supplies	2,496	6,000	2,000	1,295	5,000		5,000
5011	3	Telephone	1,600	1,800	1,800	2,026	1,800		1,800
5046	3	Uniforms	-	-	-	-	735		735
5095	3	Computer Equipment Maintenance/Replacement	-	3,600	3,600	994	3,600		3,600
5185	3	Internet Access	441	800	800	507	800		800
5215	2	Contract Inspections	1,062,881	616,000	775,000	781,958	528,000		528,000
5248	1	Permit Program	-	-	-	-	-		-
		TOTAL BUILDING DEPARTMENT	1,235,511	826,784	981,700	992,677	761,969	-	761,969

PLANNING DEPARTMENT EXPENSE									
11-11			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
5001	1	Salaries	152,197	182,760	182,760	178,288	199,346		199,346
5002	1	Employer Contributions	42,585	52,604	52,604	45,155	58,575		58,575
5003	1	Pension	7,554	9,138	9,138	8,869	9,967		9,967
5009	6	Travel-Trans-Educ	50	3,000	3,000	3,000	3,000		3,000
5010	6	Office Supplies	3,104	6,000	6,000	8,191	6,000		6,000
5011	6	Telephone	1,599	2,300	2,300	2,026	2,300		2,300
5018	3	Legal Notices/Recording Fees	320	1,500	-	-	1,500		1,500
5022	1	Planning Commission Support	322	1,000	1,000	376	1,500		1,500
5023	1	Historical Preservation Support	3,275	3,000	3,000	1,014	5,000		5,000
5024	1	Youth Advisory	1,227	2,000	2,000	988	2,000		2,000
5025	1	PORT Committee	-	-	-	-	1,500		1,500
5026	1	Tree Committee					1,500		1,500
5036	3	Mapping Updates	-	1,000	1,000	680	1,000		1,000
5038	3	Supplies-Tools-Maps	-	500	500	-	500		500
5039	6	Dues & Subscriptions	632	1,000	1,000	455	1,000		1,000
5040	3	Attorney	50,044	60,000	60,000	57,920	60,000		60,000
5046	6	Uniforms	-	-	-	-	490		490
5058	6	Equipment-Software-Hardware-Plotter	-	1,000	1,000	-	1,000		1,000
5095	6	Computer Equipment Maintenance/Replacement	1,329	1,800	3,000	2,316	1,800		1,800
5184	6	Regional Fees and Support	3,487	4,500	4,500	4,430	4,500		4,500
5185	6	Internet Access	441	1,000	1,000	507	1,000		1,000
5186	3	Development Code Update (Architectural Guidelines)(Landscape)	50,070	25,000	25,000	29,132	5,000	100,000	105,000
5187	3	Bike/Pedestrian Plan	-	-	-	-	-		-
5188	3	Comp Plan (2022 1st Street Overlay)	98,831	125,000	125,000	89,261	25,000		25,000
5189	2	Development Review	19,534	60,000	60,000	69,651	60,000	140,000	200,000
		TOTAL PLANNING DEPARTMENT	436,601	544,102	543,802	502,259	453,478	240,000	693,478

LEASE								
11-12								
		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
		REVENUES						
4401	0	Lease-Guaranty Bank	63,209	64,800	64,800	63,209	66,420	66,420
4402	0	Lease-Edward Jones	19,234	19,700	19,700	19,634	20,190	20,190
4501	0	Lease-Triton	3,000	3,000	3,000	3,000	750	750
4502	0	Lease-Ashley Fisher	-	-	-	-	-	-
4503	0	Lease-Tax Credit Connection	9,769	-	-	-	-	-
4504	0	Lease-United Waste	5,400	5,400	5,400	5,400	1,350	1,350
4505	0	Lease-Archinger	3,150	-	700	700	-	-
4506	0	Lease-A Little Help	4,200	4,200	4,200	4,200	1,050	1,050
4507	0	Lease-Berthoud Feed	-	-	-	-	-	-
4508	0	Lease-ProClean	-	-	2,400	2,615	750	750
4509	0	Lease-RAFT	-	-	-	251	-	-
		TOTAL REVENUES	107,962	97,100	100,200	99,009	90,510	90,510
		EXPENDITURES						
5012	1	Utilities (XCEL)	4,353	5,000	5,000	7,566	1,250	1,250
5013	1	Trash	965	1,200	1,200	1,048	300	300
5015	1	Insurance	-	3,000	-	-	3,000	3,000
5017	1	Building Maintenance-Janitor	2,609	3,600	3,600	2,365	750	750
5017	2	Building Maintenance-Maintenance	486	1,000	1,000	253	300	300
5017	3	Building Maintenance-Repairs	-	3,000	2,000	136	-	-
5019	1	Elevator Maintenance	2,923	4,500	4,500	4,978	4,500	4,500
5020	1	Property Tax	24,079	25,000	25,000	24,111	25,000	25,000
5021	1	Purchase Expense (Berthoud Feed Supply)	-	-	-	-	-	-
5039	1	HOA Fees	41,881	48,000	48,000	38,726	48,000	48,000
5112	1	Lease Expense	-	1,000	-	-	-	-
		TOTAL EXPENDITURES	77,296	95,300	90,300	79,183	83,100	83,100
		TOTAL NEW TOWN HALL DEPARTMENT	30,666	1,800	9,900	19,826	7,410	7,410

COMMUNITY OUTREACH								
11-13								
		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
5001	1	Salaries	-	-	-	45,749		45,749
5002	1	Employer Contributions	-	-	-	15,615		15,615
5003	1	Pension	-	-	-	2,287		2,287
5009	1	Education/Travel	-	-	-	2,500		2,500
5010	1	Office Supplies	-	-	-	500		500
5011	1	Telephone	-	-	-	1,200		1,200
5018	1	Advertising/Promotional	-	-	-	2,500		2,500
5020	1	Professional Services	-	-	-	27,000		27,000
5039	1	Memberships/Dues/Subscriptions	-	-	-	3,000		3,000
5046	1	Uniforms	-	-	-	245		245
5103	1	Printing	-	-	-	3,000		3,000
5247	1	Software	-	-	-	2,400		2,400
			-	-	-			
			-	-	-			
			-	-	-			
			-	-	-			
		TOTAL COMMUNITY OUTREACH	-	-	-	105,996	-	105,996

CONTRIBUTION EXPENSE									
11-15			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
5150	0	Chamber of Commerce	30,000	30,000	10,000	3,680	30,000		30,000
5151	0	RAFT							-
5152	0	Farmers Market							-
5154	0	House of Neighborly Service utility assistance	-	-	-	-	30,000		30,000
5166	0	Historical Society	15,000	17,500	17,500	17,500	25,000		25,000
5167	0	Contributions-Fee Waivers							-
5168	0	Contributions-Other (RAQC)	400	400	2,000	1,966	400		400
5169	0	Municipal Shareback	-	50,000	50,000	-	50,000		50,000
		TOTAL CONTRIBUTIONS	45,400	97,900	79,500	23,146	135,400	-	135,400
		TOTAL GENERAL FUND OPERATING EXPENSES	7,312,538	10,758,746	10,140,497	8,755,603	12,003,304	(1,990,775)	10,012,529
		Total Capital Projects Expense	508,832	758,700	1,079,900	632,491	5,778,000	3,902,775	9,680,775
		TOTAL GENERAL FUND EXPENSES	7,821,370	11,517,446	11,220,397	9,388,094	17,781,304	1,912,000	19,693,304

WATER FUND-SOURCE OF SUPPLY								
20-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
	BEGINNING FUND BALANCE	16,912,218	24,481,494	24,481,494	24,481,494	24,481,494	5,428,794	29,910,288
	REVENUES							
4450	2	Cash in Lieu-Water Dedication	8,386,055	2,310,000	9,300,000	9,456,917	1,980,000	1,980,000
4451	2	Raw Water System Fee	125,195	85,750	50,000	54,145	73,500	73,500
4452	1	Transfer from Water Fund	100,000	-	-	-	-	-
4300	2	Donated Revenue	-	-	-	-	-	-
4601	2	Interest	126,220	40,000	190,000	411,846	40,000	40,000
	TOTAL REVENUE	8,737,470	2,435,750	9,540,000	9,922,908	2,093,500	-	2,093,500
	EXPENSES							
5015	2	Insurance	-	10,000	-	-	10,000	10,000
5040	2	Attorney Fees	88,906	100,000	150,000	196,038	190,000	230,000
5080	2	Payments Richardson Property (til 2028)	67,456	67,640	67,450	67,456	67,640	67,640
5101	2	Reservoir Design and Construction	-	250,000	250,000	14,489	50,000	50,000
5101	3	Reservoir Management/Maintenance	6,398	80,000	80,000	2,036	84,000	84,000
5101	4	Reservoir Aeration Maintenance	-	8,000	5,000	-	8,400	8,400
5102	2	Video Inspect Dam Outlets	-	-	-	-	-	-
5103	2	Consultant Fees	165,904	100,000	100,000	111,293	105,000	125,000
5104	2	Water Resource Management Plan	98,735	20,000	20,000	-	21,000	21,000
5104	2	Non-Pot Master Plan	-	40,000	40,000	-	150,000	150,000
5106	2	Ditchwide Study	39,322	115,000	115,000	116,002	50,000	120,000
5107	0	New Water Storage Reservoir (design)	5,566	250,000	250,000	295,456	3,750,000	3,750,000
5108	0	Water Conservation Program	-	25,000	25,000	19,595	26,250	26,250
5123	2	Water Purchases	691,000	7,000,000	6,800,000	3,541,283	3,000,000	24,425,000
5208	2	Raw Line Maintenance and Improvements (design)	6,152	300,000	300,000	131,504	1,000,000	1,000,000
5209	2	Boat/Tractor Maintenance	-	2,000	2,000	-	2,100	2,100
5278	2	Southern Water Supply Pipeline (SWSP2)	(1,320)	-	(1,000)	(1,098)	-	-
5300	2	Bank Fees	75	60	60	60	60	60
	TOTAL EXPENSES	1,168,194	8,367,700	8,203,510	4,494,114	8,514,450	21,555,000	30,069,450
	SOURCE OF SUPPLY FUND BALANCE	24,481,494	18,549,544	25,817,984	29,910,288	18,060,544	(16,126,206)	1,934,338

WATER FUND-OPERATIONS & MAINTENANCE								
21-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
	BEGINNING FUND BALANCE	4,223,070	5,086,329	5,086,329	5,086,329	5,086,329	1,658,082	6,744,411
	REVENUES							
4410	0 Sale of Water	3,295,123	3,100,000	3,500,000	3,823,424	3,600,000	(1,000,000)	2,600,000
4411	0 Water Meters	566,100	385,000	140,000	142,780	330,000		330,000
4412	0 Berth. Lake Ranchettes Pump Fee	63,180	-	58,000	67,830	-		-
4413	0 Heron Lakes Pump Fee	-	-	-	-	-		-
4416	0 Water Share Rental	-	8,000	-	-	-		-
4420	0 Property Rental	-	-	-	-	-		-
4601	0 Interest	25,097	10,000	40,000	88,239	12,000		12,000
4602	0 Transfer loan from Water Capital	-	-	-	-	-		-
	TOTAL REVENUES	3,949,500	3,503,000	3,738,000	4,122,273	3,942,000	(1,000,000)	2,942,000
	EXPENSES							
5001	Salaries	277,992	238,560	238,560	225,870	519,712		519,712
5002	Employer Contributions	85,405	87,033	87,000	57,834	206,463		206,463
5003	Pension	12,357	11,928	10,000	3,547	25,986		25,986
5007	1 License and Examinations	168	200	300	300	600		600
5008	1 Employee Physicals-Background	-	100	150	92	100		100
5009	1 Travel, Trans. & Education	632	4,500	5,000	4,841	5,000		5,000
5010	1 Office Supplies-admin	19,928	41,000	41,000	31,827	34,400		34,400
5010	5 Office Supplies-billing				7,090	6,600		6,600
5011	1 Telephone/pager	7,471	8,500	8,500	6,814	8,500		8,500
5012	3 Utilities	119,213	125,000	180,000	126,680	150,000		150,000
5013	1 Vehicle Maintenance	929	4,000	4,000	3,210	4,500		4,500
5014	1 Gasoline	4,899	5,000	5,000	3,583	5,000		5,000
5015	1 Insurance	89,397	110,000	112,000	111,952	120,000		120,000
5018	1 Publications/Legal Notices	2,950	9,000	9,000	4,181	9,000		9,000
5020	4 Professional Fees	128,984	567,000	567,000	468,184	520,000		520,000
5021	4 Prof Fees: Engineer	2,293	20,000	10,000	-	20,000		20,000
5022	4 GIS Data Mapping	1,025	5,000	5,000	2,674	5,000		5,000
5039	1 Dues	-	1,000	3,400	3,552	5,000		5,000
5040	4 Attorney	102,694	35,000	20,000	2,874	35,000		35,000
5041	2 Equipment Rental	-	1,000	1,000	-	1,000		1,000
5044	2 Weed Spray	65	-	-	-	-		-
5046	1 Uniforms	1,651	800	800	1,111	2,800		2,800
5047	1 Rental Property Expenses	-	-	-	-	-		-
5048	2 Safety Equipment	1,722	2,000	2,000	1,228	2,000		2,000
5054	1 Trash	1,265	4,500	3,500	1,439	1,500		1,500
5056	1 Facility Maintenance	6,059	15,000	5,000	1,864	6,000		6,000
5057	2 Repair/Maint/Supplies-distribution	74,430	105,000	105,000	18,577	25,000	25,000	50,000
5057	3 Repair/Maint/Supplies-treatment				63,158	90,000		90,000
5060	3 Chemicals	217,874	295,000	350,000	331,334	320,000		320,000
5081	3 SCADA/Software	8,810	15,000	15,000	15,747	30,000	10,000	40,000
5082	2 Lab Software	2,050	30,000	30,000	-	15,000		15,000
5090	4 Auditing (1/3)	8,333	10,000	8,300	8,300	10,000		10,000

WATER FUND-OPERATIONS & MAINTENANCE, CONT			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
21-00			2021	2022	2022	2022	2023	2023	2023
5106	3	Lab Equipment & Supplies	3,473	11,000	8,000	2,225	3,000		3,000
5107	1	Transfer to General Fund	214,430	210,000	210,000	210,000	220,500		220,500
5108	2	Lab Testing	25,312	30,000	30,000	19,307	32,000		32,000
5109	2	Meters repairs, replacement, moves	215,531	225,000	225,000	38,042	225,000		225,000
5109	5	Meters - New	332,718	330,000	200,000	47,972	450,000		450,000
5110	2	Permits	940	2,500	2,500	940	2,600		2,600
5111	2	Water Breaks	44,551	50,000	50,000	9,174	54,000		54,000
5116	2	Carriage Agreement(BUREC)	78,203	80,000	80,000	43,014	80,000		80,000
5124	1	Water Assessments (CBT)	201,549	200,000	200,000	205,031	205,000	50,000	255,000
5189	4	Development Review	-	-	-	-	-		-
5232	1	2006 Bond Refinance (97 & 82)	-	-	-	-	-		-
5269	4	Water Rate Study	-	25,000	25,000	-	5,000		5,000
5273	1	Bond Payment (2007)	-	-	-	-	-		-
5273	1	2007 Bond Payoff	-	-	-	-	-		-
5274	1	Bond Payment (2012)	-	-	-	-	-		-
5274	1	2012 Bond Payoff	-	-	-	-	-		-
5274	7	Transfer loan to Water Capital	382,584	325,982	325,982	325,982	439,384		439,384
5276	1	Computer Maintenance/Computer/Caselle-admin	4,356	23,000	25,000	3,570	5,400		5,400
5276	5	Computer Maintenance/Computer/Caselle-billing				6,637	6,600		6,600
5284	3	Contract Water Treatment (Little T)	26,782	60,000	60,000	21,417	200,000	(100,000)	100,000
5300	1	Bank fees	13,850	18,000	18,000	18,017	18,000		18,000
5416	2	Water Leasing	27,360	45,000	45,000	-	45,000		45,000
		TOTAL EXPENSES	2,750,235	3,386,603	3,330,992	2,459,191	4,175,645	(15,000)	4,160,645
		WATER OPERATING BALANCE	\$ 5,422,335	\$ 5,202,726	\$ 5,493,337	\$ 6,749,411	\$ 4,852,684	\$ 673,082	\$ 5,525,766

WATER FUND-OPERATIONS & MAINTENANCE CONT			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
21-00			2021	2022	2022	2022	2023	2023	2023
		OPERATIONS CAPITAL EXPENSES							
5277	3	Booster Station (power supply to booster station)							
5277	2	Distribution System Improvements (upgrade pipe)		550,000	550,000	5,000	550,000		550,000
5277	3	Plant Improvements		100,000	100,000	0	100,000		100,000
5277	4	Filter Plant (Media,valves)					200,000		200,000
5278	0	New Vehicle					50,000		50,000
5280	0	Loveland Reservoir Ditch pump							0
5285	0	New Equipment (Vac Trailer 1/3)							0
5401	6	Pretreatment Building (addition to building)							0
5402	6	Bunyan Avenue Water Main Replacement							0
5410	6	Treatment Plant Backwash Improvements (1/2)	336,006		50,000	0			0
		TOTAL OPERATIONS CAPITAL EXPENSES	336,006	650,000	700,000	5,000	900,000	-	900,000
		TOTAL WATER FUND EXPENSES	3,086,241	4,036,603	4,030,992	2,464,191	5,075,645	(15,000)	5,060,645
		ENDING OPERATIONS FUND BALANCE	5,086,329	4,552,726	4,793,337	6,744,411	3,952,684	673,082	4,625,766

WATER FUND-CAPITAL IMPROVEMENTS								
22-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
	BEGINNING FUND BALANCE	7,163,865	10,595,924	10,595,924	10,595,924	10,595,924	449,823	11,045,747
	<u>WATER CAPITAL REVENUES</u>							
4412	1 System Investment Fees	3,097,917	2,215,500	1,650,000	1,805,949	1,899,000	(500,000)	1,399,000
4414	0 Wilson Ranch for I-25	-	10	10	-	10		10
4414	0 Love's for I-25	-	-	-	-	-		-
4422	1 Sale of Assets	-	-	33,890	33,892	-		-
4425	1 Grant (Larimer County - ultrasonic bouy)	-	-	35,000	35,000	-		-
4601	1 Interest-System Investment Fees	46,411	10,000	70,000	141,099	10,000		10,000
4601	3 Interest-Rate Stability	5,157	1,000	7,000	15,678	1,000		1,000
4602	1 Transfer from Water Fund	382,584	325,982	325,982	325,982	439,384		439,384
	TOTAL CAPITAL REVENUE	3,532,069	2,552,492	2,121,882	2,357,600	2,349,394	(500,000)	1,849,394
	<u>WATER CAPITAL EXPENSES</u>							
5014	0 I-25 Water Infrastructure							-
5020	1 Professional Fees							-
5105	1 Pump Station NW area		150,000	150,000	0			-
5130	1 Master Meter (CR17)							-
5140	1 16" Pipeline - ALFA water line						125,000	125,000
5151	1 Meter Reading Equipment					400,000	(300,000)	100,000
5152	1 Town Hall Building							-
5201	0 Pressure Sustaining Valve Vault at Berthoud Ranchettes							-
5202	0 PRV Stations		30,000	30,000	0			-
5203	0 West Berthoud Water Main Loop					250,000	(250,000)	-
5204	0 Treatment Plant Transmission Line/Storage Tank Pipeline	100,000	100,000	100,000	92,071			-
5205	0 North Berthoud Booster Station (Phase 2)							-
5206	0 Potable Water Storage (1 MG)							-
5207	0 Loveland Reservoir Ditch pump					100,000		100,000
5273	1 Transfer to Water Fund for Bond Payoff							-
5276	0 Master Plan Update		185,000	185,000	88,187	50,000	50,000	100,000
5277	1 Plant Improvements for capacity		200,000	200,000	208,225	250,000	(200,000)	50,000
5300	1 Bank Fees	10	60	60	10	60		60
5410	0 Treatment Plant Backwash Improvements (1/2)		2,000,000	2,000,000	1,519,284	150,000		150,000
	CAPITAL EXPENSES	100,010	2,665,060	2,665,060	1,907,777	1,200,060	(575,000)	625,060
	ENDING CAPITAL FUND BALANCE	10,595,924	10,483,356	10,052,746	11,045,747	11,745,258	524,823	12,270,081

WASTEWATER FUND-OPERATIONS & MAINTENANCE								
23-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
	BEGINNING FUND BALANCE	3,973,123	4,772,837	4,772,837	4,772,837	4,772,837	1,080,610	5,853,447
	REVENUES							
4410	0 Wastewater Charges	3,093,222	2,800,000	2,800,000	3,367,742	3,000,000		3,000,000
4410	2 Hillsdale Lift Station Fees	1	-	-	(1)	-		-
4410	3 Mary's Farm Lift Station Fees	5,274	-	7,000	8,084	-		-
4433	0 Bomar Lift Station Maint.	2,125	2,000	2,000	2,123	2,000		2,000
4433	1 Campton Lift Station Maint	15,051	15,000	15,000	14,947	15,000		15,000
4434	0 Riverghen Lift Station Maint.	4,026	3,500	3,500	4,070	3,500		3,500
4601	0 Interest	25,191	8,000	35,000	75,656	10,000		10,000
	TOTAL WASTEWATER REVENUES	3,144,890	2,828,500	2,862,500	3,472,621	3,030,500	-	3,030,500
	EXPENSES							
5001	Salaries	32,866	66,840	80,000	91,761	120,463		120,463
5002	Employer Contributions	8,406	25,128	25,000	20,400	45,459		45,459
5003	Pension	1,145	3,342	3,000	800	6,023		6,023
5007	4 License and Examinations	-	500	500	-	500		500
5008	4 Employee Physicals-Background	-	500	500	-	500		500
5009	4 Travel, Trans. & Education	-	1,500	1,500	63	1,600		1,600
5010	4 Office Supplies-admin	25,107	20,000	24,000	19,402	13,400		13,400
5010	5 Office Supplies-billing				7,090	6,600		6,600
5011	1 Telephone/pager-main plant	5,733	6,000	5,000	2,168	1,250		1,250
5011	2 Telephone/pager-regional plant				2,109	1,250		1,250
5012	1 Utilities-main plant	224,304	260,000	260,000	233,978	235,000		235,000
5012	2 Utilities-regional plant				14,541	20,000		20,000
5012	3 Utilities-lift stations				1,527	5,000		5,000
5013	3 Vehicle Maintenance	600	1,500	1,500	340	1,500		1,500
5014	3 Gasoline	484	1,000	1,000	-	1,000		1,000
5015	4 Insurance	87,776	110,000	112,000	111,952	120,000		120,000
5018	4 Publications	3,683	1,000	1,000	-	1,000		1,000
5020	4 Professional Fees	334,648	465,000	465,000	442,959	490,000	100,000	590,000
5022	4 GIS Data Mapping	1,025	10,000	8,000	1,907	15,000		15,000
5039	4 Dues	1,127	2,000	2,000	-	2,000		2,000
5040	4 Attorney	14,026	20,000	20,000	2,950	21,000		21,000
5041	1 Equipment Rental	-	1,500	1,500	-	1,500		1,500
5046	4 Uniforms	-	-	-	-	1,130		1,130
5048	4 Safety	-	500	500	164	500		500
5054	1 Trash	2,139	2,500	2,500	2,442	2,500		2,500
5057	1 Repair, Maint. & Supplies-main plant	80,012	175,000	175,000	68,811	120,000		120,000
5057	2 Repair, Maint. & Supplies-regional plant				9,695	10,000		10,000
5057	3 Repair, Maint. & Supplies-lift stations				26,253	45,000		45,000
5060	1 Chemicals-main plant	53,121	80,000	80,000	52,552	55,000		55,000
5060	2 Chemicals-regional plant				22,832	25,000		25,000
5081	1 Plant SCADA	3,715	145,000	95,000	8,268	30,000		30,000
5090	4 Auditing (1/3)	8,333	10,000	8,300	8,300	10,000		10,000
5107	4 Transfer to General Fund	107,215	100,000	100,000	100,000	105,000		105,000
5108	1 Lab Tests-main plant	35,728	45,000	45,000	28,337	30,000		30,000
5108	2 Lab Tests-regional plant				4,578	10,000		10,000
5109	3 Generator Maintenance	13,687	15,000	15,000	14,030	15,000		15,000
5110	4 Plant Permit	9,896	12,000	12,000	10,458	12,000		12,000
5111	3 Sewer Incidents	1,500	10,000	10,000	-	10,000		10,000
5114	1 Sludge Hauling-main plant	72,758	85,000	75,000	61,535	65,000		65,000
5114	2 Sludge Hauling-regional plant				3,541	20,000		20,000
5116	1 Lab Equipment	1,979	8,500	8,500	4,585	4,500		4,500
5119	5 Meter Replacements	49,846	50,000	50,000	-	-		-
5129	3 Lift Station Maint	12,529	30,000	80,000	86,313	40,000		40,000
5130	3 Electric Maintenance	-	25,000	25,000	-	-		-
5138	3 T.V. Lines/Line Cleaning	71,073	80,000	50,000	32,109	85,000		85,000
5182	1 Repair & Calibration-Lab Equip.	-	1,000	1,000	-	1,000		1,000

WASTEWATER FUND-OPERATIONS & MAINTENANCE CON'T		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
23-00		2021	2022	2022	2022	2023	2023	2023
5189	4	-	-	-	-	-		-
5214	4	4,353	17,000	12,000	2,575	10,400		10,400
5214	5				4,637	6,600		6,600
5231	4	7,014	5,000	5,000	205	5,000		5,000
5266	0	-	-	-	-	-		-
5267	0	-	-	-	-	-		-
5268	0	824	100,000	100,000	61,124	-		-
5269	4	-	25,000	25,000	-	15,000		15,000
5274	4	523,100	742,100	742,100	740,834	908,350		908,350
5300	4	14,100	18,000	18,000	18,267	18,000		18,000
								-
		TOTAL EXPENSES	1,813,852	2,777,410	2,746,400	2,326,392	100,000	2,870,025
		WASTEWATER OPERATING BALANCE	5,304,161	4,823,927	4,888,937	5,919,066	980,610	6,013,922

WASTEWATER FUND-OPERATIONS & MAINTENANCE CON'T		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
23-00		2021	2022	2022	2022	2023	2023	2023
		CAPITAL PROJECTS						
5264	0							-
5285	0							-
5420	6		350,000	350,000	-	350,000		350,000
5430	6		50,000	50,000	2,092	500,000		500,000
5431	6		300,000	300,000	0	350,000		350,000
5450	6					85,000		85,000
5451	6	531,324	750,000	700,000	63,527	400,000		400,000
5452	6		20,000	20,000	0	20,000		20,000
								-
								-
								-
								-
								-
		TOTAL CAPITAL PROJECTS	531,324	1,470,000	1,420,000	1,705,000	-	1,705,000
		TOTAL WASTEWATER EXPENSE	2,345,176	4,247,410	4,166,400	2,392,011	100,000	4,575,025
		TOTAL WASTEWATER FUND BALANCE	4,772,837	3,353,927	3,468,937	5,853,447	980,610	4,308,922

WASTEWATER CAPITAL FUND								
24-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
	BEGINNING FUND BALANCE	11,829,857	14,692,607	14,692,607	14,692,607	14,692,607	1,426,277	16,118,884
	<u>CAPITAL FACILITY REVENUES</u>							
4412	0 System Investment Fees	2,804,056	1,925,000	1,320,000	1,423,021	1,650,000	(400,000)	1,250,000
4414	0 Wilson Ranch for I-25	-	10	10	-	10		10
4414	0 Love's for I-25	-	-	-	-	-		-
4415	0 Heron Lakes Developer contribution	-	-	-	-	-		-
4419	0 ALFA Line	171,050	220,000	220,000	113,772	220,000		220,000
4463	0 DOLA Grant	-	-	-	-	-		-
4463	1 CR 17 Project	-	-	-	-	-		-
4601	0 Interest	78,565	25,000	105,000	222,923	30,000		30,000
	TOTAL CAPITAL FACILITY REVENUE	3,053,671	2,170,010	1,645,010	1,759,716	1,900,010	(400,000)	1,500,010
	<u>CAPITAL FACILITY EXPENSES</u>							
5014	0 I-25 Waste Water Plant		175,000	175,000	-	175,000		175,000
5014	0 I-25 Waste Water Collection System							-
5015	0 Heron Lakes Lift Station							-
5019	0 ALFA Line Reimbursement	171,050	220,000	220,000	113,772	140,000	80,000	220,000
5134	0 UV System							-
5148	0 CR 17 Sewer project							-
5172	0 Town Hall Building							-
5271	0 1st Street Sanitary Sewer Upgrade	16,251	1,200,000	1,200,000	51,580	1,750,000		1,750,000
5273	0 WW Master Plan Update		185,000	185,000	88,187	100,000	40,000	140,000
5278	4 WW System Improvements for Capacity	3,610	395,000	395,000	79,890	500,000		500,000
5278	4 Plant Improvements		60,000	60,000	-	1,600,000	(1,000,000)	600,000
5300	0 Bank Fees	10	60	60	10	60		60
	Regional Plant Expansion to .25 MGD and Headworks							-
	Chemical Feed System							-
	Biological N Removal							-
	Clarifier-Addition of 3rd							-
	TOTAL CAP FACILITY EXPENSES	190,921	2,235,060	2,235,060	333,439	4,265,060	(880,000)	3,385,060
	ENDING CAP FAC FUND BALANCE	14,692,607	14,627,557	14,102,557	16,118,884	12,327,557	1,906,277	14,233,834

STORM WATER CAPITAL FUND								
28-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
4999	BEGINNING FUND BALANCE	2,318,301	3,356,579	3,356,579	3,356,579	3,356,579	514,064	3,870,643
	REVENUES							
4410	0 Storm Water Impact Fees	1,075,687	529,200	450,000	491,328	453,600	(150,000)	303,600
4420	0 Developers-CR 17	-	-	-	-	-		-
4601	0 Interest	17,040	3,000	25,000	52,458	3,000		3,000
	TOTAL REVENUE	1,092,727	532,200	475,000	543,786	456,600	(150,000)	306,600
	STORM WATER CAPITAL EXPENSES							
5020	0 Professional Fees		45,000	45,000	-			-
5101	0 CR 17 Trunk Main	54,449	100,000	100,000	-			-
5102	0 Service Center (10%)							-
5103	0 Bacon Lake Outfall							-
5104	0 Berthoud Reservoir Stormwater Outfall Improvements (design)		500,000	500,000	29,722	500,000		500,000
5300	0 Bank Fees		60	60	-	60		60
	1st Street Storm Culvert							-
	1st and Welch							-
	3rd and Welch							-
	Clayton Plaza Regional Water Quality Pond							-
	TOTAL CAPITAL EXPENSES	54,449	645,060	645,060	29,722	500,060	-	500,060
5999	ENDING STORM WATER FUND BALANCE	3,356,579	3,243,719	3,186,519	3,870,643	3,313,119	364,064	3,677,183

STORM WATER OPERATIONS FUND								
29-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
4999	BEGINNING FUND BALANCE	938,434	1,256,206	1,256,206	1,256,206	1,256,206	590,081	1,846,287
	REVENUES							
4410	0 Storm Water Fees	557,928	450,000	505,000	611,539	480,000		480,000
4601	0 Interest	5,914	1,000	10,000	22,891	1,000		1,000
	TOTAL REVENUE	563,842	451,000	515,000	634,430	481,000	-	481,000
	EXPENSES							
5001	Salaries	8,810	15,720	10,000	5,142	-		-
5002	Employer Contributions	2,650	7,531	5,000	320	-		-
5003	Pension	312	786	500	-	-		-
5009	5 Travel, Training	-	750	750	-	750		750
5020	4 Professional Fees	16,405	25,000	25,000	870	25,000		25,000
5022	4 GIS Data Mapping	197	5,000	5,000	-	5,000		5,000
5042	1 Snow & Ice Removal	17,535	25,000	25,000	4,625	25,000		25,000
5057	3 Repair & Maint: culverts, drain pans, gutters	19,355	40,000	40,000	5,610	40,000	10,000	50,000
5059	5 Computer Maint/Replacement/Caselle	-	2,000	2,000	-	2,000		2,000
5060	3 Drainage Parts	391	2,000	2,000	1,287	2,000		2,000
5107	5 Transfer to General Fund	10,516	10,000	10,000	10,000	10,500		10,500
5110	4 Permit	-	10,000	10,000	355	10,000		10,000
5190	0 Master Drainage Plan	-	-	-	-	50,000		50,000
5261	2 Sweeper Parts	19,899	17,000	17,000	16,140	18,000		18,000
5269	0 Rate Study	-	25,000	25,000	-	-		-
5300	5 Bank Fees	-	60	60	-	60		60
	TOTAL EXPENSES	96,070	185,847	177,310	44,349	188,310	10,000	198,310
	STORM WATER CAPITAL EXPENSES							
5058	0 Street Sweeper (40% GF & 60% Drainage)	150,000						-
5084	0 Skid Steer							-
5125	0 Crackfilling machine-roadside mower (50% streets)							-
5172	0 Excavator (50% streets, 50% storm water)							-
5201	0 Harben Trailer and inspection camera							-
5202	0 Serenity Ridge Drainage Project							-
5285	0 New Equipment (Vac Trailer 1/3)							-
5401	6 Culverts-drain pans-gutters		75,000	75,000	-			-
	TOTAL CAPITAL EXPENSES	150,000	75,000	75,000	-	-		-
	TOTAL STORM WATER OPERATION EXPENSES	246,070	260,847	252,310	44,349	188,310	10,000	198,310
5999	ENDING STORM WATER FUND BALANCE	1,256,206	1,446,359	1,518,896	1,846,287	1,548,896	580,081	2,128,977

PARK DEVELOPMENT								
31-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
4999	BEGINNING FUND BALANCE	1,469,514	2,471,918	2,471,918	2,471,918	2,471,918	81,381	2,553,299
	REVENUES							
4601	0 Interest	14,390	300	19,000	38,605	5,000		5,000
4607	0 Grant Revenue	40,000	-	-	-	-		-
4607	0 CDOT Funding for Berthoud Parkway Trail	-	500,000	500,000	-	-		-
4700	0 Park Development	1,837,216	762,300	760,000	833,709	653,400		653,400
	TOTAL REVENUES	1,891,606	1,262,600	1,279,000	872,314	658,400	-	658,400
	EXPENSES							
5020	1 Professional Fees							-
5021	0 Impact Fee Study							-
5022	0 Park Development Master Plan							-
5022	1 Skate Park at Waggener Plan	720,789	12,000	20,000	13,320			-
5022	2 Bike Park at Richardson	108,839	1,500,000	500,000	606,523	1,200,000		1,200,000
5203	0 Batting Cages at Bein (40% in GF)	30,522						-
5204	0 Town Park							-
5205	0 Parks Building Garage Bay and Restroom							-
5207	1 Pioneer Park		330,000	330,000	-		330,000	330,000
5207	2 Pioneer Park Community Garden	889	1,000	1,000	631			-
5209	1 Skate Park Equipment							-
5210	0 Dog Park		3,000	3,000	47,177			-
5220	0 Waggener Farm Park Construction		55,000	55,000	-			-
5246	1 Heron Lakes (shelter, parking lot, bathrooms)		300,000	280,000	-			-
5247	1 Hillsdale				-			-
5248	1 Berthoud Reservoir (trails)	10,523			647			-
5249	0 Roberts Lake east field development (design)		15,000	15,000	8,213			-
5250	0 North Berthoud Parkway trail	17,640	650,000	650,000	47,698		600,000	600,000
5251	0 Richardson Park (design)		530,000	530,000	66,724			-
5300	1 Bank Fees		60	60	-	60		60
	TOTAL EXPENSES	889,202	3,396,060	2,384,060	790,933	1,200,060	930,000	2,130,060
5998	EMERGENCY RESERVES	-	-	-	-	19,752	-	19,752
5999	ENDING PARK FUND BALANCE	2,471,918	338,458	1,366,858	2,553,299	1,910,506	(848,619)	1,061,887

PARK LAND ACQUISITION AND DEDICATION									
32-00			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
4999		BEGINNING FUND BALANCE	1,503,754	1,873,536	1,873,536	1,873,536	1,873,536	(1,210,737)	662,799
		<u>REVENUES</u>							
4601	0	Interest	10,067	700	13,000	24,583	5,000		5,000
4700	0	Park Dedication	416,613	227,500	180,000	200,709	195,000		195,000
		TOTAL REVENUES	426,680	228,200	193,000	225,292	200,000	-	200,000
		<u>EXPENSES</u>							
5020	0	Professional Fees			1,700	1,700			-
5021	0	Impact Fee Study							-
5022	0	Open Space Master Plan	56,898	5,000	5,000	4,602			-
5041	0	Welch Trail Easement		50,000	48,000	25,901			-
5171	0	Park Expansion Property Purchase (Newell Farm)		1,350,000	50,000	1,403,801	1,390,500	(1,390,500)	-
5171	1	Park Expansion-transfer to open space acquisition					150,000		150,000
5300	0	Bank Fees		60	60	25	60		60
		TOTAL EXPENSES	56,898	1,405,060	104,760	1,436,029	1,540,560	(1,390,500)	150,060
5998		EMERGENCY RESERVES	-	-	-	-	6,000	-	6,000
5999		ENDING DEDICATION FUND BALANCE	1,873,536	696,676	1,961,776	662,799	526,976	179,763	706,739

<u>PUBLIC FACILITIES FUND</u>									
33-00			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
4999		BEGINNING FUND BALANCE	1,620,006	2,353,419	2,353,419	2,353,419	2,353,419	270,518	2,623,937
		<u>REVENUES</u>							
4601	0	Interest	11,412	2,500	16,500	35,902	5,000		5,000
4700		Public Facilities	733,220	533,400	290,000	304,646	457,200		457,200
									-
		TOTAL REVENUES	744,632	535,900	306,500	340,548	462,200	-	462,200
		<u>EXPENSES</u>							
5020	0	Professional Fees					350,000		350,000
5021	0	Impact Fee Study							-
5153	0	Service Center (90%/ 10% from storm water)	9,719	30,000	30,000	-			-
5155	0	Parks/Forestry Storage Building at Service Center	1,500	325,000	325,000	-			-
5156	0	Parks/Forestry Storage Building at Waggener Farm		40,000	40,000	5,030			-
5176	0	LCISO Vehicle (transfer to general fund)		65,000	65,000	65,000			-
5300	0	Bank Fees		60	60	-	60		60
		TOTAL EXPENSES	11,219	460,060	460,060	70,030	350,060	-	350,060
5998		EMERGENCY RESERVES	-	-	-	-	13,866	-	13,866
5999		ENDING FACILITY FUND BALANCE	2,353,419	2,429,259	2,199,859	2,623,937	2,451,693	270,518	2,722,211

CONSERVATION TRUST FUND								
34-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
4999	BEGINNING FUND BALANCE	158,927	230,599	230,599	230,599	230,599	138,135	368,734
	REVENUES							
4301	0 Conservation Trust Distribution	108,532	60,000	98,000	134,329	90,000		90,000
4364	0 Transfer from General Fund	195,000	500,000	500,000	500,000	500,000		500,000
4601	0 Interest	1,080	250	2,000	4,457	500		500
	TOTAL REVENUES	304,612	560,250	600,000	638,786	590,500	-	590,500
	GENERAL PARK							
5001	Salaries	-	-	-	-	-		-
5002	Employer Contributions	-	-	-	-	-		-
5003	Pension	-	-	-	-	-		-
5095	1 Computer Equipment Maintenance/Replacement	-	-	-	-	-		-
5096	1 GIS Software	-	-	-	-	-		-
5140	1 Park Building - Grounds - Sprinklers	1,628	3,000	3,000	-	3,000		3,000
5141	1 Roberts Park (concrete entry and pavilion)(nursery)	6,175	70,000	70,000	65,451	30,000		30,000
5142	0 Picnic tables and benches	-	15,000	15,000	6,712	-		-
5143	0 Trail Signage	-	-	-	-	10,000		10,000
5177	1 Fickel Park	-	1,200	1,200	-	-		-
5270	1 Tennis Court Repair	2,500	6,000	6,000	-	6,000		6,000
	GENERAL EXPENSE SUBTOTAL	10,303	95,200	95,200	72,163	49,000	-	49,000
	FORESTRY and OPEN SPACE							
5001	Salaries	114,075	222,060	222,000	197,728	228,809		228,809
5002	Employer Contributions	32,935	117,827	110,000	54,234	92,709		92,709
5003	Pension	3,652	11,103	11,000	2,747	11,440		11,440
5009	1 Travel, Education	2,595	3,500	3,500	3,330	3,500		3,500
5010	1 Office Supplies	335	750	750	564	750		750
5011	1 Telephone	25	750	750	519	750		750
5013	1 Vehicle Maintenance	706	5,500	5,500	3,339	5,500		5,500
5014	1 Gasoline	4,053	5,500	5,500	5,166	5,500		5,500
5046	1 Uniforms	1,353	3,200	3,200	1,981	2,950		2,950
5058	1 Equipment Maintenance	2,233	5,000	5,000	2,025	5,000		5,000
5072	2 Tree Maintenance	28,256	40,000	40,000	35,428	40,000		40,000
5076	2 Educational Materials	-	2,500	2,500	452	2,500		2,500
5077	3 Tree Replacement	18,732	38,000	38,000	11,199	20,000		20,000
5077	4 EAB Tree Replacement (combined in 2020)	-	-	-	-	-		-
5079	2 Supplies	3,080	7,000	7,000	5,406	7,000		7,000
5080	4 EAB Response-Treatment	10,607	30,000	30,000	36,849	45,000		45,000
5085	4 EAB Cost Share	-	-	-	-	-		-
5095	1 Computer Equipment Maintenance/Replacement	-	1,800	1,800	2,003	1,800		1,800
5263	0 New Vehicle and water tank	-	77,000	77,000	65,518	-		-
5266	0 Arboretum at Waggener Farm Park Master Plan - concept plan	-	-	-	-	40,000		40,000
5300	1 Bank Fees	-	60	60	-	60		60
	FORESTRY EXPENSE SUBTOTAL	222,637	571,550	563,560	428,488	513,268	-	513,268
	TOTAL EXPENSES	232,940	666,750	658,760	500,651	562,268	-	562,268
5998	EMERGENCY RESERVES	-	-	-	-	17,715	-	17,715
5999	ENDING CONSERV FUND BALANCE	230,599	124,099	171,839	368,734	241,116	138,135	379,251

LARIMER COUNTY OPEN SPACE TAX FUND								
36-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
4999	BEGINNING FUND BALANCE	953,816	855,107	855,107	855,107	855,107	446,285	1,301,392
	REVENUES							
4306	0 Revenues	322,925	220,000	300,000	403,689	220,000		220,000
4307	0 CDOT Funding for Berthoud Parkway Trail	-	200,000	200,000	79,130	-		-
4310	1 Transfer from Park Dedication Fund	-	-	-	-	150,000		150,000
4310	2 Transfer from 1998 1% Fund	-	-	-	-	150,000		150,000
4601	0 Interest	6,173	1,500	6,500	15,354	3,000		3,000
	TOTAL REVENUES	329,098	421,500	506,500	498,173	523,000	-	523,000
	EXPENSES							
5020	0 Professional Fees							-
5220	0 Waggener Farm Construction (Pickleball)					850,000	450,000	1,300,000
5257	0 Trail System & Improvements- HERON LAKES							-
5257	0 Trail System & Improvements- Master Plan	27,548						-
5257	1 Trail System & Improvements- South Berthoud Parkway Trail	363,997	75,000	75,000	31,452		45,000	45,000
5259	0 Hillsdale-regular maintenance		10,000	9,000	6,764	10,000		10,000
5260	0 Pioneer Park-lake bank seed, trail around lake,pavillion	5,702						-
5265	0 Jaskowski property maintenance	6,316	7,000	7,000	7,058	10,000		10,000
5265	1 Jaskowski trail connection			1,000	(162)			-
5266	0 Richardson property maintenance	4,120	10,000	10,000	433	10,000		10,000
5267	0 Heron Lakes maintenance		20,000	20,000	-			-
5268	0 Berthoud Reservoir Park/Trail maintenance	20,124	30,000	30,000	6,343	45,000		45,000
5300	0 Bank Fees		60	60	-	60		60
	EXPENSES	427,807	152,060	152,060	51,888	925,060	495,000	1,420,060
5171	0 Open Space Acquisition	0	0	0	0	200,000		200,000
	LAND ACQUISITION EXPENSES	-	-	-	-	200,000	-	200,000
	TOTAL EXPENSES	427,807	152,060	152,060	51,888	1,125,060	495,000	1,620,060
5998	EMERGENCY RESERVES	-	-	-	-	15,690	-	15,690
5999	ENDING LARIMER FUND BALANCE	855,107	1,124,547	1,209,547	1,301,392	237,357	(48,715)	188,642

CEMETERY ENDOWMENT FUND								
37-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
4999	BEGINNING FUND BALANCE	122,260	157,044	157,044	157,044	157,044	41,260	198,304
	REVENUES							
4280 0	Transfer from General Fund	20,000	20,000	20,000	20,000	20,000		20,000
4601 0	Interest	827	150	1,200	2,708	500		500
4710 0	Lot Sales	33,250	25,000	40,000	42,860	25,000		25,000
4711 0	Opening & Closing	37,740	25,000	20,000	23,315	25,000		25,000
4712 0	Perpetual Care Fees	-	-	-	-	-		-
4713 0	Marker Sales	165	-	145	145	-		-
	TOTAL REVENUES	91,982	70,150	81,345	89,028	70,500	-	70,500
	EXPENSES							
5001	Salaries	35,382	53,820	53,820	29,030	55,987		55,987
5002	Employer Contributions	8,769	13,804	13,804	3,903	5,806		5,806
5003	Pension	1,631	2,691	1,500	304	2,799		2,799
5012 2	Utilities	568	3,000	3,000	485	3,000		3,000
5014 2	Gasoline	2,102	2,200	2,200	1,952	2,200		2,200
5020 1	Professional Fees (funerals)	-	-	1,200	1,200	3,000		3,000
5020 0	Professional Fees - concept plan for Cemetery improvements	-	-	-	-	35,000		35,000
5046 2	Uniforms	-	-	-	-	850		850
5057 2	Repair & Maintenance	6,946	10,000	13,000	10,894	15,000		15,000
5059 2	Marker Sales	-	2,500	500	-	2,500		2,500
5081 0	Mower-UTV	-	-	-	-	-		-
5082 0	Maint Shop & Storage Building (gutters, roof)	-	4,000	2,900	-	4,000		4,000
5083 0	Columbarium	-	-	-	-	-		-
5083 1	Cremains Vaults	1,800	-	-	-	-		-
5084 0	Traveling sprinkler	-	-	-	-	-		-
5300 2	Bank Fees	-	60	60	-	60		60
	TOTAL EXPENSES	57,198	92,075	91,984	47,768	130,202	-	130,202
5998	EMERGENCY RESERVES	-	-	-	-	2,115	-	2,115
5999	ENDING CEMETERY FUND BALANCE	157,044	135,119	146,405	198,304	95,227	41,260	136,487

BERTHOUD AREA TRANSPORTATION FUND								
39-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
4999	BEGINNING FUND BALANCE	546,666	514,853	514,853	514,853	514,853	(74,458)	440,395
	REVENUES							
4101	0 Donations	-	-	-	-	-		-
4106	0 OOA	24,285	20,000	25,500	30,430	20,000		20,000
4107	0 Client Contributions	4,257	2,500	3,000	3,625	2,500		2,500
4108	0 Transfer from 1% Fund	90,000	50,000	50,000	50,000	50,000		50,000
4109	0 City of Ft. Collins	9,727	40,000	-	57,993	-		-
4601	0 Interest	3,002	700	3,000	5,855	2,000		2,000
								-
	TOTAL REVENUE	131,271	113,200	81,500	147,903	74,500	-	74,500
	EXPENSES							
5001	Salaries	63,010	69,600	69,600	68,238	78,948		78,948
5002	Employer Contributions	14,363	16,890	16,890	14,572	18,935		18,935
5003	Pension	2,598	3,480	3,480	2,659	3,947		3,947
5008	2 Employee Physicals-Background	-	500	500	-	500		500
5009	1 Travel, Training, Education	-	1,000	1,000	-	1,000		1,000
5010	1 Office Supplies	115	800	800	142	800		800
5011	2 Telephone	1,172	1,200	1,200	1,271	1,200		1,200
5013	2 Vehicle Maintenance	5,235	4,000	12,000	8,566	15,000		15,000
5017	2 Insurance Deductibles	-	5,000	5,000	758	5,000		5,000
5020	0 Consultant - Transit Study	19,675	70,000	70,000	60,327	-	20,000	20,000
5021	1 Admin. Expenses	-	100	100	-	100		100
5022	1 Flex Bus Service	27,137	45,000	33,500	33,258	45,000		45,000
5023	1 RAFT Contribution	22,000	22,000	22,000	22,000	41,000		41,000
5039	1 CASTA Dues	315	350	350	247	350		350
5040	1 Attorney	-	500	500	-	500		500
5044	1 Advertising	672	500	500	-	500		500
5045	2 Driver Drug Testing	130	600	600	685	1,000		1,000
5046	1 Uniforms	-	-	-	-	245		245
5059	0 New Vehicle	-	-	-	-	-		-
5095	1 Computer Equipment Maintenance/Replacement	-	3,000	3,000	1,487	-		-
5107	1 Transfer to General Fund	-	-	-	-	-		-
5114	2 Gasoline	5,662	5,000	8,500	7,151	7,000		7,000
5247	1 Software	1,000	1,500	1,000	1,000	1,500		1,500
5300	1 Bank Fees	-	60	60	-	60		60
	TOTAL EXPENSES	163,084	251,080	250,580	222,361	222,585	20,000	242,585
5998	EMERGENCY RESERVES	-	-	-	-	2,235	-	2,235
5999	ENDING BATS FUND BALANCE	514,853	376,973	345,773	440,395	364,533	(94,458)	270,075

ROAD IMPACT FEES								
40-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
		BEGINNING FUND BALANCE	2,688,275	4,295,079	4,295,079	4,295,079	626,695	4,921,774
		REVENUES						
4250	0	Flood Recovery	-	-	-	-		-
4401	0	Road Impact Fees	1,729,723	789,950	930,000	978,317	677,100	677,100
4402	0	MPO funding	-	-	-	-	-	-
4404	0	CDOT/FHWA Flood Recovery	-	-	-	-	-	-
4601	0	Interest	21,118	8,000	32,000	68,308	8,000	8,000
		TOTAL REVENUES	1,750,841	797,950	962,000	1,046,625	685,100	685,100
		EXPENSES						
5020	0	Professional Fees	18,783					-
5021	0	Impact Fee Study						-
5087	0	Plow Truck/Steel V box				98,963	155,000	155,000
5087	0	Dump truck/Snowplow Tandem						-
5101	0	Transfer to General Fund (3%)	51,892	23,699	35,000	29,240	20,313	20,313
5106	0	Transportation Master Plan Update						-
5107	0	Flood Repairs-CR 44 permanent repair						-
5108	0	Van Metre Purchase and Demo	1,175	53,000	53,000	52,960		-
5110	0	Berthoud Parkway widening					1,200,000	250,000
5111	0	CR 7 Project (30% for widening)	8,843				(950,000)	-
5112	0	CDOT-FASTLANE						-
5113	0	LCR 10E Bridge Widening						-
5114	0	Spartan Design and Crossing	63,344	800,000	780,000	238,344	150,000	150,000
5116	0	Highway 287 & 10E Ramps	-	-	2,000	423		-
5117	0	Intersection Improvements at Hwy 14 & Berthoud Pkwy - design					55,000	55,000
5220	0	Waggener Farm Construction						-
5300	0	Bank Fees		60	60	-	60	60
		TOTAL EXPENSES	144,037	876,759	870,060	419,930	1,275,373	630,373
		EMERGENCY RESERVES	-	-	-	-	20,553	20,553
		ENDING ROAD IMPACT FUND BALANCE	4,295,079	4,216,271	4,387,019	4,921,774	1,271,695	4,955,948

RECREATIONAL MJ TAX 7%								
41-00			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT
			2021	2022	2022	2022	2023	2023
		BEGINNING FUND BALANCE	501,969	1,105,948	1,105,948	1,105,948	1,105,948	359,854
		REVENUES						
4601	0	Interest	4,548	300	8,000	17,907	2,000	2,000
4604	0	Sales Tax	594,431	380,000	490,000	665,252	400,000	400,000
4606	0	Quick Win Grant (MPO)	5,000	-	-	-	-	-
		TOTAL REVENUES	603,979	380,300	498,000	683,159	402,000	-
		EXPENSES						
5200	0	Street Projects	-	-	-	-		-
5201	0	Bike Lane Striping	-	-	-	-		-
5210	0	Youth Projects	-	-	-	-		-
5211	0	Carnival	-	30,000	30,000	23,125	30,000	30,000
5220	0	Sidewalk Projects	-	-	-	-		-
5221	0	Downtown Sidewalk Replacement	-	150,000	150,000	90,180	150,000	150,000
5222	0	Quick Win Pedestrian Crosswalk at Welch/3rd	-	-	-	-		-
5223	0	Sidewalk Maintenance Plan	-	-	-	-	30,000	30,000
5240	0	Law Enforcement Projects	-	150,000	150,000	150,000	-	-
5260	0	Park Projects	-	-	-	-		-
5261	0	Bike Park Scope expansion	-	-	-	-	1,000,000	1,000,000
5280	0	Recreation Projects	-	-	-	-		-
5281	0	Wildfire arts provider	-	60,000	60,000	60,000	60,000	60,000
5300	0	Bank Fees	-	60	60	-	60	60
		TOTAL EXPENSES	-	390,060	390,060	323,305	1,270,060	-
		EMERGENCY RESERVES	-	-	-	-	12,060	-
		ENDING SALES TAX FUND BALANCE	1,105,948	1,096,188	1,213,888	1,465,802	225,828	585,682

Use of collected Tax Revenues: The designated revenues shall be segregated to a fund which is to be used solely for youth activities and services, streets and sidewalk improvements, law enforcement, and parks and recreation.

1998 1% SALES TAX FUND*								
51-00		ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
		2021	2022	2022	2022	2023	2023	2023
	BEGINNING FUND BALANCE	1,167,278	2,309,405	2,309,405	2,309,405	2,309,405	2,174,429	4,483,834
	REVENUES							
4601	0 Interest	11,279	3,500	23,000	51,336	8,000		8,000
4235	0 Safe Routes to School Grant	-	-	284,000	284,621	-		-
4610	0 Sales Tax	2,199,747	1,500,000	1,850,000	2,510,564	1,800,000		1,800,000
4610	1 Sales Tax-building permits	1,105,405	487,375	550,000	653,442	417,750		417,750
	TOTAL REVENUES	3,316,431	1,990,875	2,707,000	3,499,963	2,225,750	-	2,225,750
	EXPENSES							
5038	0 Sidewalks/ADA	143,492	350,000	350,000	192,934	500,000		500,000
5233	0 Pavement Maintenance Plan	10,215		10,000	11,759			-
5235	0 Safe Routes to School	438,052	20,000	20,000	17,740			-
5237	0 Transportation (BATS)-Transfer	90,000	50,000	50,000	50,000	50,000		50,000
5239	0 Street Improvements	725,010	1,000,000	1,000,000	818,729	1,000,000	400,000	1,400,000
5240	0 Waggener Farm Park Construction (transfer)	570,000						-
5241	0 Round-a-bout Reconstruction	191,686	120,000	130,000	124,557			-
5242	0 Open Space/Trail Acquisition					150,000		150,000
5244	0 I-25 Design, Art and Landscaping	5,849	500,000	480,000	109,815	750,000	370,000	1,120,000
5245	0 Town Park					1,500,000		1,500,000
5300	0 Bank Fees		60	60	-	60		60
	TOTAL EXPENSES	2,174,304	2,040,060	2,040,060	1,325,534	3,950,060	770,000	4,720,060
	EMERGENCY RESERVES	-	-	-	-	66,773	-	66,773
	ENDING SALES TAX FUND BALANCE	2,309,405	2,260,220	2,976,345	4,483,834	518,323	1,404,429	1,922,752

There is established a special fund of the Town to be known as the Town of Berthoud Sales and Use Tax Special Fund ("fund"). The 1% increase in each of the sales and use taxes shall be used exclusively for: Maintenance, improvements, paving, overlaying and repairing of streets; for the purchase of land and construction of a building for a municipal recreation center; for the purchase of land to be used as open space and as buffer areas; operation, maintenance, repairs and improvements to the Berthoud Public Library; and for the operation, maintenance, repair and improvements of the Berthoud Area Transportation System.

Effective 1/1/2019: Revenues from the tax increase approved on November 4, 1997, by the qualified electors of the Town of Berthoud may be utilized exclusively for uses presently allowed and for the construction, operation, and maintenance of capital improvements to parks, open spaces, recreation facilities, and trails.

2019 1% SALES TAX FUND									
52-			ACTUALS	BUDGET	ESTIMATE	ACTUALS	BUDGET	SUPPLEMENT	ADJUSTED TOTAL
			2021	2022	2022	2022	2023	2023	2023
		BEGINNING FUND BALANCE	21,894,066	6,190,072	6,190,072	6,190,072	6,190,072	(104,804)	6,085,268
00		REVENUES							
4400	0	Sales Tax	2,225,447	1,500,000	1,850,000	2,537,812	1,800,000		1,800,000
4400	1	Sales Tax-building permits	1,081,572	487,375	550,000	653,442	417,750		417,750
4450	52	COP Advance-GRANT	-	-	-	12,500	-		-
4500	1	Recreation Center Memberships	407,955	468,000	630,000	916,932	675,000		675,000
4500	70	Recreation Center Memberships-Corporate	3,212	30,000	-	935	15,000		15,000
4500	2	Recreation Center Daily Fees	54,499	155,000	240,000	279,949	240,500		240,500
4500	3	Recreation Center Rentals	7,285	20,000	40,000	48,761	45,000		45,000
4500	60	Recreation Center Sponsorships	-	25,000	25,000	11,026	25,000		25,000
4500	4	Activity Fee-Senior Activities	-	5,600	5,600	170	3,000		3,000
4500	5	Activity Fee-Aquatics	10,513	51,000	51,000	66,446	58,500		58,500
4500	6	Activity Fee-Fitness	3,515	52,000	52,000	49,258	45,600		45,600
4500	7	Activity Fee-Class/Program	840	10,000	10,000	23,565	27,000		27,000
4500	8	Activity Fee-Youth Futsal	868	2,700	2,700	1,195	2,700		2,700
4500	11	Activity Fee-Adult Basketball	4,016	9,000	9,000	6,034	9,000		9,000
4500	12	Activity Fee-Youth Basketball	10,392	12,600	12,600	15,655	12,600		12,600
4500	15	Activity Fee-Senior Pickleball	15	1,400	1,400	1,825	1,400		1,400
4500	16	Activity Fee-Youth Multi Sport Class	-	1,800	1,800	-	1,800		1,800
4500	31	Activity Fee-Adult Volleyball	5,168	11,700	11,700	12,618	11,700		11,700
4500	32	Activity Fee-Youth Volleyball	1,095	5,200	5,200	4,611	5,200		5,200
4500	40	Activity Fee-Senior Volleyball/Basketball	-	-	-	-	1,500		1,500
4500	45	Activity Fee-Senior Travel	-	-	-	-	2,000		2,000
4500	54	Activity Fee-Adult Additional Sports	(90)	-	-	1,395	1,500		1,500
4500	55	Activity Fee-Youth Additional Sports	850	-	-	497	-		-
4500	75	Special Events Fee	-	5,400	5,400	7,674	7,000		7,000
4563	0	Vending/Inventory Sales	264	16,000	16,000	3,811	5,000		5,000
4564	0	Contract Arts Activities	-	-	-	-	25,750		25,750
4550	31	Transfer from Park Development	-	-	-	-	-		-
4550	36	Transfer from Larimer Open Space	-	-	-	-	-		-
4550	40	Transfer from Road Impact	-	-	-	-	-		-
4550	51	Transfer from 1998 1%	570,000	-	-	-	-		-
4601	0	Interest	56,612	2,000	35,000	76,980	2,000		2,000
		TOTAL REVENUES	4,444,028	2,871,775	3,554,400	4,733,091	3,441,500	-	3,441,500

		RECREATION CENTER OPERATING EXPENSES							
01		Recreation Center Administration/Operations							
5001	1	Salaries	262,081	183,840	183,840	210,843	199,535		199,535
5002	1	Employer Contributions	74,797	69,288	69,288	69,083	74,324		74,324
5003	1	Pension	3,164	9,192	9,192	8,132	9,977		9,977
5001	2	Salaries-PART TIME/SEASONAL	21,669	181,500	145,000	146,278	170,000		170,000
5002	2	Employer Contributions-PART TIME/SEASONAL	1,717	18,150	14,500	11,483	17,000		17,000
5007	1	Employee license/certifications	-	500	500	-	1,500		1,500
5008	1	Background/Physicals	673	500	500	312	500		500
5009	1	Training/Education/Travel	160	3,500	3,500	437	3,500		3,500
5010	1	Office Supplies	8,929	5,000	5,000	2,659	4,000		4,000
5011	1	Telephone/Internet	3,257	5,000	5,000	4,897	5,500		5,500
5012	1	Utilities	34,804	174,000	174,000	163,800	170,000		170,000
5013	1	Vehicle Maintenance	-	-	-	-	-		-
5014	1	Gasoline	-	-	-	-	-		-
5015	1	Insurance	8,051	38,000	38,000	38,000	40,000		40,000
5018	1	Publications/Subscriptions/Job Postings	1,461	2,000	2,000	810	2,000		2,000
5020	4	Recreation Center Management Expense	129	-	-	-	-		-
5020	4	Purchased Services	3,125	11,500	11,500	7,008	9,500		9,500
5039	1	Dues/memberships	-	1,000	1,000	-	1,000		1,000
5040	1	Attorney	3,346	5,000	5,000	616	3,500		3,500
5046	1	Uniforms	6,289	6,500	6,500	4,327	4,225		4,225
5048	1	Safety/First Aid	-	3,000	3,000	1,233	2,500		2,500
5053	1	Postage	206	3,400	3,400	27	2,500		2,500
5054	4	Trash Service	462	2,000	2,000	2,266	2,700		2,700
5056	1	Brochures/Advertising/Printing	7,104	16,000	16,000	8,316	16,000		16,000
5057	1	Equipment Maintenance/Repair	-	1,000	1,000	-	1,000		1,000
5063	5	Pro Shop Inventory	327	8,000	8,000	1,365	4,000		4,000
5095	1	Computer/Maintenance/Replacement	32,364	3,600	3,600	-	3,600		3,600
5102	1	Supplies (non-office)/Equipment (non-dep)	18,350	25,000	25,000	3,572	15,000		15,000
5110	1	Permits/building license	-	2,000	2,000	-	1,000		1,000
5247	1	Computer Software	8,816	14,100	14,100	16,782	29,640		29,640
5300	1	Bank Fees	10,456	52,000	52,000	52,343	54,000		54,000
		01 SUBTOTAL	511,737	844,570	804,420	754,589	848,001	-	848,001
02		Events							
5001	1	Salaries	322	-	-	-	-		-
5002	1	Employer Contributions	144	-	-	-	-		-
5003	1	Pension	12	-	-	-	-		-
5001	2	Salaries-PART TIME/SEASONAL	-	3,500	3,500	543	3,500		3,500
5002	2	Employer Contributions-PART TIME/SEASONAL	-	350	350	43	350		350
5020	4	Purchased Services	-	7,600	7,600	3,496	7,600		7,600
5102	1	Supplies (non-office)/Equipment (non-dep)	12,541	5,500	5,500	1,717	5,500		5,500
		02 SUBTOTAL	13,019	16,950	16,950	5,799	16,950	-	16,950
03		Recreation Center Maintenance							
5001	1	Salaries	11,510	53,640	53,640	57,131	57,996		57,996
5002	1	Employer Contributions	925	4,977	4,977	4,516	5,986		5,986
5003	1	Pension	-	2,682	2,682	1,486	2,900		2,900
5001	2	Salaries-PART TIME/SEASONAL	1,675	18,635	18,635	9,414	21,840		21,840
5002	2	Employer Contributions-PART TIME/SEASONAL	133	1,863	1,863	839	2,184		2,184
5014	1	Fuel	36	250	250	-	250		250
5017	1	Building Maintenance/Repair	-	20,000	20,000	3,193	15,000		15,000
5020	4	Purchased Services	-	2,500	2,500	1,737	9,500		9,500
5041	1	Equipment Rental	-	5,000	5,000	668	5,000		5,000
5057	1	Equipment Maintenance/Repair	-	5,000	5,000	773	18,000		18,000
5089	4	Janitorial Service	7,500	60,000	60,000	60,000	60,000		60,000
5102	1	Supplies (non-office)/Equipment (non-dep)	22,616	22,000	22,000	13,703	22,000		22,000
5251	1	Tools	2,935	1,200	1,200	415	1,200		1,200
		03 SUBTOTAL	47,330	197,747	197,747	153,875	221,856	-	221,856

[illegible]

05	Recreation Center Aquatics							
5001	1	Salaries	12,484	67,680	67,680	77,655	116,705	116,705
5002	1	Employer Contributions	3,161	16,717	16,717	28,374	48,930	48,930
5003	1	Pension	-	3,200	3,200	-	5,835	5,835
5001	2	Salaries-PART TIME/SEASONAL	38,230	341,400	341,400	293,926	298,140	298,140
5002	2	Employer Contributions-PART TIME/SEASONAL	3,026	34,140	34,140	23,073	29,814	29,814
5001	3	Salaries-Programs-PART TIME/SEASONAL				-	30,096	30,096
5002	3	Employer Contributions-Programs-PART TIME/SEASONAL				-	3,009	3,009
5007	1	Employee license/certifications	800	3,100	3,100	816	2,250	2,250
5007	3	Employee license/certifications-programs				-	3,650	3,650
5008	1	Background/Physicals	33	800	800	395	800	800
5009	1	Training/Education/Travel	245	2,000	2,000	835	2,000	2,000
5010	1	Office Supplies	145	500	500	2,826	500	500
5018	1	Publications/Subscriptions/Job Postings	25	2,000	2,000	129	1,000	1,000
5020	4	Purchased Services	-	7,000	7,000	-	10,000	10,000
5039	1	Dues/memberships	-	1,200	1,200	857	500	500
5046	1	Uniforms	-	1,500	1,500	-	2,990	2,990
5048	1	Safety/First Aid	1,528	1,000	1,000	446	1,000	1,000
5057	1	Equipment Maintenance/Repair	-	12,000	12,000	4,730	12,000	12,000
5057	3	Boiler Equipment Maintenance/Repair	256	3,500	3,500	209	3,500	3,500
5060	1	Chemicals	3,162	30,000	30,000	15,114	30,000	30,000
5102	1	Supplies (non-office)/Equipment (non-dep)	87,136	3,500	3,500	4,178	3,500	3,500
5102	3	supplies (non-office)/Equipment (non-dep)-programs				-	1,400	1,400
5048	3	Team Fees/Dues				-	700	700
5110	1	Permits/building license	645	2,000	2,000	1,991	2,000	2,000
		05 SUBTOTAL	150,876	533,237	533,237	455,554	610,319	610,319
06	Recreation Center Fitness							
5001	1	Salaries	9,132	47,040	47,040	51,420	52,229	52,229
5002	1	Employer Contributions	4,806	22,779	22,779	22,434	26,061	26,061
5003	1	Pension	-	2,352	2,352	1,222	2,611	2,611
5001	2	Salaries-PART TIME/SEASONAL	8,292	72,600	72,600	69,477	73,935	73,935
5002	2	Employer Contributions-PART TIME/SEASONAL	657	7,260	7,260	5,454	7,393	7,393
5020	4	Purchased Services	-	3,000	3,000	3,685	3,000	3,000
5057	1	Equipment Maintenance/Repair	-	3,000	3,000	230	3,000	3,000
5102	1	Supplies (non-office)/Equipment (non-dep)	3,206	5,000	5,000	4,577	5,000	5,000
		06 SUBTOTAL	26,093	163,031	163,031	158,499	173,229	173,229
07	Recreation Center Classes/Programs							
5001	1	Salaries	144	17,880	17,880	5,663	-	-
5002	1	Employer Contributions	52	5,825	5,825	1,416	-	-
5003	1	Pension	-	894	894	96	-	-
5001	2	Salaries-PART TIME/SEASONAL	25	1,700	1,700	-	5,350	5,350
5002	2	Employer Contributions-PART TIME/SEASONAL	2	170	170	-	535	535
5020	4	Purchased Services	-	7,000	7,000	18,479	10,000	10,000
5021	4	Contract Arts Activities	-	-	-	-	25,000	25,000
5102	1	Supplies (non-office)/Equipment (non-dep)	42	2,000	2,000	1,630	6,200	6,200
		07 SUBTOTAL	265	35,469	35,469	27,284	47,085	47,085

08		Recreation Center Adult Sports							
		General Administration							
5001	1	Salaries	816	11,520	11,520	6,632	10,174		10,174
5002	1	Employer Contributions	104	2,567	2,567	1,540	4,945		4,945
5003	1	Pension	11	576	576	112	509		509
5008	1	Background/Physicals	-	100	100	54	100		100
5009	1	Training/Education/Travel	-	-	-	-	-		-
5010	1	Office Supplies	-	250	250	2	250		250
5018	1	Publications/Subscriptions/Job Postings	-	250	250	129	250		250
5020	1	Purchased Services	-	-	-	-	-		-
5048	1	Safety/First Aid	-	100	100	-	100		100
5055	1	Clinics/Tournaments	-	750	750	-	750		750
		Subtotal	931	16,113	16,113	8,469	17,078	-	17,078
		Adult Basketball							
5001	11	Salaries-PART TIME/SEASONAL	-	1,800	1,800	959	1,800		1,800
5002	11	Employer Contributions-PART TIME/SEASONAL	-	180	180	75	180		180
5020	11	Officials	-	7,600	7,600	4,558	7,600		7,600
5046	11	Uniforms	-	-	-	-	-		-
5048	11	Team Fees/Dues	-	-	-	-	-		-
5050	11	Equipment/Awards	-	400	400	165	400		400
		Subtotal	-	9,980	9,980	5,757	9,980	-	9,980
		Adult Volleyball							
5001	31	Salaries-PART TIME/SEASONAL	314	3,300	3,300	1,656	3,300		3,300
5002	31	Employer Contributions-PART TIME/SEASONAL	25	330	330	130	330		330
5020	31	Officials	-	3,780	3,780	5,480	7,500		7,500
5046	31	Uniforms	-	-	-	-	-		-
5048	31	Team Fees/Dues	-	-	-	-	-		-
5050	31	Equipment/Awards	584	1,000	1,000	415	1,000		1,000
		Subtotal	923	8,410	8,410	7,681	12,130	-	12,130
		Additional Adult Sports							
5001	54	Salaries-PART TIME/SEASONAL	-	500	500	151	500		500
5002	54	Employer Contributions-PART TIME/SEASONAL	-	50	50	12	50		50
5020	54	Officials	-	1,000	1,000	-	1,000		1,000
5046	54	Uniforms	-	-	-	-	-		-
5048	54	Team Fees/Dues	-	-	-	-	-		-
5050	54	Equipment/Awards	-	200	200	66	200		200
		Subtotal	-	1,750	1,750	229	1,750	-	1,750
		08 SUBTOTAL	1,854	36,253	36,253	22,136	40,938	-	40,938

09		Recreation Center Youth Sports						
		<u>General Administration</u>						
5001	1	Salaries	4,351	11,520	11,520	7,439	10,174	10,174
5002	1	Employer Contributions	592	2,567	2,567	1,718	4,945	4,945
5003	1	Pension	14	576	576	112	509	509
5008	1	Background/Physicals	-	750	750	27	750	750
5009	1	Training/Education/Travel	-	-	-	100	700	700
5010	1	Office Supplies	-	250	250	-	250	250
5018	1	Publications/Subscriptions/Job Postings	-	250	250	258	250	250
5020	1	Purchased Services	-	-	-	-	-	-
5048	1	Safety/First Aid	-	100	100	-	100	100
5055	1	Clinics	-	600	600	-	600	600
		Subtotal	4,957	16,613	16,613	9,654	18,278	- 18,278
		<u>Youth Futsal</u>						
5001	8	Salaries-PART TIME/SEASONAL	-	500	500	-	500	500
5002	8	Employer Contributions-PART TIME/SEASONAL	-	50	50	-	50	50
5020	8	Officials	-	-	-	-	-	-
5046	8	Uniforms	-	400	400	-	500	500
5048	8	Team Fees/Dues	-	-	-	-	-	-
5050	8	Equipment/Awards	7,579	200	200	-	300	300
		Subtotal	7,579	1,150	1,150	-	1,350	- 1,350
		<u>Youth Basketball</u>						
5001	12	Salaries-PART TIME/SEASONAL	958	2,700	2,700	1,619	2,800	2,800
5002	12	Employer Contributions-PART TIME/SEASONAL	76	270	270	127	280	280
5020	12	Officials	-	3,500	3,500	1,930	3,900	3,900
5046	12	Uniforms	-	2,500	2,500	3,045	2,900	2,900
5048	12	Team Fees/Dues	-	-	-	35	-	-
5050	12	Equipment/Awards	69	2,000	2,000	905	1,600	1,600
		Subtotal	1,103	10,970	10,970	7,661	11,480	- 11,480
		<u>Youth Multi Sport Class</u>						
5001	16	Salaries-PART TIME/SEASONAL	-	700	700	-	600	600
5002	16	Employer Contributions-PART TIME/SEASONAL	-	70	70	-	60	60
5020	16	Officials	-	-	-	-	-	-
5046	16	Uniforms	-	400	400	179	450	450
5048	16	Team Fees/Dues	-	-	-	-	-	-
5050	16	Equipment/Awards	-	200	200	-	200	200
		Subtotal	-	1,370	1,370	179	1,310	- 1,310
		<u>Youth Volleyball</u>						
5001	32	Salaries-PART TIME/SEASONAL	-	1,000	1,000	210	1,000	1,000
5002	32	Employer Contributions-PART TIME/SEASONAL	-	100	100	17	100	100
5020	32	Officials	-	500	500	200	450	450
5046	32	Uniforms	-	900	900	493	900	900
5048	32	Team Fees/Dues	-	-	-	-	-	-
5050	32	Equipment/Awards	-	1,000	1,000	-	1,000	1,000
		Subtotal	-	3,500	3,500	920	3,450	- 3,450
		<u>Additional Youth Sports</u>						
5001	55	Salaries-PART TIME/SEASONAL	49	1,000	1,000	-	1,000	1,000
5002	55	Employer Contributions-PART TIME/SEASONAL	4	100	100	-	100	100
5020	55	Officials	-	-	-	-	-	-
5046	55	Uniforms	-	-	-	-	-	-
5048	55	Team Fees/Dues	-	-	-	-	-	-
5050	55	Equipment/Awards	400	250	250	-	250	250
		Subtotal	453	1,350	1,350	-	1,350	- 1,350
		09 SUBTOTAL	14,092	34,953	34,953	18,414	37,218	- 37,218

30		Recreation Center Capital Expenditures/Improvements							
5101	0	Office Furniture	110,490	-	-	-	-	-	-
5102	0	Copier	10,500	-	-	-	-	-	-
5301	0	Security System	-	-	-	-	-	-	-
5302	0	Maintenance Equipment	-	13,770	13,770	13,771	-	-	-
5501	0	Robotic Pool Cleaner	5,034	-	-	-	-	-	-
5601	0	Fitness Equipment	16,484	33,000	33,000	32,953	40,000	-	40,000
5602	0	Equipment Replacement	-	20,000	-	-	40,000	-	40,000
5801	0	Bleachers	9,483	-	-	-	-	-	-
			-	-	-	-	-	-	-
			-	-	-	-	-	-	-
			-	-	-	-	-	-	-
		30 SUBTOTAL	151,991	66,770	46,770	46,724	80,000	-	80,000
		RECREATION CENTER OPERATIONS TOTAL EXPENDITURES	919,417	1,934,770	1,874,620	1,643,435	2,084,586	-	2,084,586
35		CERTIFICATES OF PARTICIPATION							
5201	0	Waggener Farm Park Construction	18,102,849	2,100,000	2,100,000	2,061,980	-	-	-
5254	0	COP Payment	1,123,000	1,130,400	1,130,400	1,130,400	1,132,000	-	1,132,000
5255	0	COP Fee	2,756	2,000	2,000	2,080	2,000	-	2,000
		COP TOTAL EXPENDITURES	19,228,605	3,232,400	3,232,400	3,194,460	1,134,000	-	1,134,000
		OTHER EXPENSES							
40		Park Improvements							
5245	0	Town Park	-	-	-	-	3,000,000	-	3,000,000
50		Trail Improvements							
60		Athletic Fields							
5101	0	Athletic Complex Study	-	-	-	-	-	-	-
70		Aquatics Other							
		TOTAL OTHER EXPENSES	-	-	-	-	3,000,000	-	3,000,000
		TOTAL RECREATION CENTER OPERATING AND OTHER EXPENSES	20,148,022	5,167,170	5,107,020	4,837,895	6,218,586	-	6,218,586
		EMERGENCY RESERVES	-	-	-	-	103,245	-	103,245
		ENDING SALES TAX FUND BALANCE	6,190,072	3,894,677	4,637,452	6,085,268	3,309,741	(104,804)	3,204,937

1/1/2019: Authorization of new 1% sales tax to finance recreation improvements; for the purpose of funding parks and recreation needs within the town; such tax to consist of a rate increase in the town sales and use tax of 1%; restricted as to use solely for parks and recreation purposes including, but not limited to, expanding and improving the existing town trail system, renovating or replacing existing aquatic facilities, developing constructing and equipping a recreation center and related facilities, and developing constructing and equipping athletic fields; and to the extent that funds are available for the purpose of constructing acquiring equipping and operating park and recreation improvements.

	2021	2022	2022	2022	2023	SUPPLEMENT 2023	ADJUSTED TOTAL 2023
BEGINNING BALANCE	91245270	105009721	105009721	105009721	105009721	18900763	123910484
REVENUE	53081593	34133865	43869591	49980784	33901016	-2050000	31851016
EXPENSE	39317142	48872380	45928253	31080021	59844789	22286500	82131289
EMERGENCY RESERVES	0	0	0	0	589440	0	589440
ENDING BALANCE	105009721	90271206	102951059	123910484	78476508	-5435737	73040771
ENDING BALANCE VERIFICATION	105009721	90271206	102951059	123910484	78476508	-5435737	73040771
	2021	2022			2023		
Valuation	211,195,697	214,167,051			237,792,724		
GENERAL FUND	6.636	6.636			6.629		
POLICE SERVICES	3.000	3.000			3.000		
REFUND & ABATEMENT	0.033	0.020			0.019		
TOTAL MILL LEVY	9.669	9.656			9.648		
ACTUALS SF BUILDING PERMITS	511	350			300		

2023 BUDGET	Original Ending Fund Balance	2022 Actuals Adjustment	Subtotal	Rollover	Subtotal	Supplemental	Subtotal	Emergency Reserves Adjustment (3% Revenues)	Ending Fund Balance	Difference From Original Budget
General Fund	11,617,143	4,021,917	15,639,060	-162,000	15,477,060	-1,750,000	13,727,060	0	13,727,060	2,109,917
Water Source of Supply	19,397,034	4,092,304	23,489,338	0	23,489,338	-21,555,000	1,934,338	0	1,934,338	-17,462,696
Water Operations	3,659,692	1,951,074	5,610,766	0	5,610,766	-985,000	4,625,766	0	4,625,766	966,074
Water Capital Improvements	11,202,080	993,001	12,195,081	-50,000	12,145,081	125,000	12,270,081	0	12,270,081	1,068,001
Wastewater Operations	2,024,412	2,384,510	4,408,922	0	4,408,922	-100,000	4,308,922	0	4,308,922	2,284,510
Wastewater Capital Improvements	11,737,507	2,016,327	13,753,834	-40,000	13,713,834	520,000	14,233,834	0	14,233,834	2,496,327
Storm Water Operations	1,811,586	327,391	2,138,977	0	2,138,977	-10,000	2,128,977	0	2,128,977	317,391
Storm Water Capital Improvements	3,143,059	684,124	3,827,183	0	3,827,183	-150,000	3,677,183	0	3,677,183	534,124
Park Development	805,446	1,186,441	1,991,887	-930,000	1,061,887	0	1,061,887	0	1,061,887	256,441
Park Land Dedication	615,216	-1,298,977	-683,761	0	-683,761	1,390,500	706,739	0	706,739	91,523
Public Facilities	2,298,133	424,078	2,722,211	0	2,722,211	0	2,722,211	0	2,722,211	424,078
Conservation Trust	182,356	196,895	379,251	0	379,251	0	379,251	0	379,251	196,895
Larimer County Open Space	591,797	91,845	683,642	-45,000	638,642	-450,000	188,642	0	188,642	-403,155
Cemetery	84,588	51,899	136,487	0	136,487	0	136,487	0	136,487	51,899
BATS	195,453	94,622	290,075	-20,000	270,075	0	270,075	0	270,075	74,622
Road Impact	3,776,192	534,755	4,310,947	-150,000	4,160,947	795,000	4,955,947	0	4,955,947	1,179,755
MMJ Excise Tax	333,768	251,914	585,682	0	585,682	0	585,682	0	585,682	251,914
1998 1% Sales Tax	1,185,263	1,507,489	2,692,752	-370,000	2,322,752	-400,000	1,922,752	0	1,922,752	737,489
2019 1% Sales Tax	1,757,121	1,447,816	3,204,937	0	3,204,937	0	3,204,937	0	3,204,937	1,447,816
	76,417,846	20,959,425	97,377,271	-1,767,000	95,610,271	-22,569,500	73,040,771	0	73,040,771	-3,377,075

ATTACHMENT A		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
General Fund	2023 Original Budget Beginning Balance (based on estimate)	19,393,322			
	2023 Revenue Budget	10,314,562			
	2023 Expenditure Budget	-17,781,304			
	emergency reserve	-309,437			
	2023 Original Budget Ending Balance	11,617,143			
	2022 Actuals vs Estimate Adj-Revenues		2,189,614		
	2022 Actuals vs Estimate Adj-Expense		1,832,303		
	Adjusted Ending Fund Balance for 2023		15,639,060		
	Rollover Expenditures				
	11-10-5086-00 Admin Vehicle			-35,000	
	11-10-5084-00 Parks ATV Plow			-23,000	
	11-10-5101-00 Parks Plow/Dump Truck			-104,000	
				-162,000	
	Supplement Expenditures				
	11-03-5014-06 Gasoline underestimate				-5,000
	11-03-5020-01 ROW inspections				-35,000
	11-07-5055-03 Park restroom maint				-15,000
	11-11-5186-03 Develop Code updates				-100,000
	11-11-5189-02 Development Review				-140,000
	11-01-5265-06 COVID Recovery Program				2,285,775
	11-10-5085-00 Town Hall roof				-75,000
	11-10-5104-00 I-25 Interchange				-630,000
	11-10-5708-00 Town Park underestimate				-750,000
	11-10-5128-00 3rd & Massachusetts				-2,285,775
					-1,750,000
	NEW ENDING FUND BALANCE				13,727,060

[illegible]

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
Water Operations	2023 Original Budget Beginning Balance (based on estimate)	4,793,337			
	2023 Revenue Budget	3,942,000			
	2023 Expenditure Budget	-5,075,645			
	2023 Original Budget Ending Balance	3,659,692			
	2022 Actuals vs Estimate Adj-Revenues		384,273		
	2022 Actuals vs Estimate Adj-Expense		1,566,801		
	Adjusted Ending Fund Balance for 2023		5,610,766		
	Supplement Revenue	21-00-4410-00 Sale of Water overestimate			-1,000,000
	Supplement Expenditures	21-00-5057-02 Repair/Maintenance underestimate			-25,000
		21-00-5081-03 SCADA Software underestimate			-10,000
		21-00-5124-01 Water Assessments underestimate			-50,000
		21-00-5284-03 Contract Water overestimate			100,000
					15,000
	NEW ENDING FUND BALANCE				4,625,766
Water Capital Improvements	2023 Original Budget Beginning Balance (based on estimate)	10,052,746			
	2023 Revenue Budget	2,349,394			
	2023 Expenditure Budget	-1,200,060			
	2023 Original Budget Ending Balance	11,202,080			
	2022 Actuals vs Estimate Adj-Revenues		235,718		
	2022 Actuals vs Estimate Adj-Expense		757,283		
	Adjusted Ending Fund Balance for 2023		12,195,081		
	Rollover Expenditures	22-00-5276-00 Master Plan Update		-50,000	
	Supplement Revenue	22-00-4412-01 System Investment Fees overestimate			-500,000
	Supplement Expenditures	22-00-5140-01 ALFA Water Line			-125,000
		22-00-5151-01 Meter Reading equipment overestimate			300,000
		22-00-5203-00 Water Main Loop removal			250,000
		22-00-5277-01 Plant Improvements overestimate			200,000
					625,000
	NEW ENDING FUND BALANCE				12,270,081

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
Wastewater Operations	2023 Original Budget Beginning Balance (based on estimate)	3,468,937			
	2023 Revenue Budget	3,030,500			
	2023 Expenditure Budget	-4,475,025			
	2023 Original Budget Ending Balance	2,024,412			
	2022 Actuals vs Estimate Adj-Revenues		610,121		
	2022 Actuals vs Estimate Adj-Expense		1,774,389		
	Adjusted Ending Fund Balance for 2023		4,408,922		
	Supplement Expenditures	23-00-5020-04 Professional fee underestimate			-100,000
					-100,000
	NEW ENDING FUND BALANCE				4,308,922
Wastewater Capital Improvements	2023 Original Budget Beginning Balance (based on estimate)	14,102,557			
	2023 Revenue Budget	1,900,010			
	2023 Expenditure Budget	-4,265,060			
	2023 Original Budget Ending Balance	11,737,507			
	2022 Actuals vs Estimate Adj-Revenues		114,706		
	2022 Actuals vs Estimate Adj-Expense		1,901,621		
	Adjusted Ending Fund Balance for 2023		13,753,834		
	Rollover Expenditures	24-00-5273-00 Master Plan update		-40,000	
	Supplement Revenue	24-00-4412-00 System Investment fees overestimate			-400,000
	Supplement Expenditures	24-00-5019-00 ALFA Line correction			-80,000
		24-00-5278-04 Plant improvements overestimate			1,000,000
					920,000
	NEW ENDING FUND BALANCE				14,233,834

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
Storm Water Operations	2023 Original Budget Beginning Balance (based on estimate)	1,518,896			
	2023 Revenue Budget	481,000			
	2023 Expenditure Budget	-188,310			
	2023 Original Budget Ending Balance	1,811,586			
	2022 Actuals vs Estimate Adj-Revenues		119,430		
	2022 Actuals vs Estimate Adj-Expense		207,961		
	Adjusted Ending Fund Balance for 2023		2,138,977		
	Supplement Expenditure	29-00-5057-03 Repair/Maintenance underestimate			-10,000
	NEW ENDING FUND BALANCE				2,128,977
		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
Storm Water Capital Improvements	2023 Original Budget Beginning Balance (based on estimate)	3,186,519			
	2023 Revenue Budget	456,600			
	2023 Expenditure Budget	-500,060			
	2023 Original Budget Ending Balance	3,143,059			
	2022 Actuals vs Estimate Adj-Revenues		68,786		
	2022 Actuals vs Estimate Adj-Expense		615,338		
	Adjusted Ending Fund Balance for 2023		3,827,183		
	Supplement Revenue	28-00-4410-00 System Investment fee overestimate			-150,000
	NEW ENDING FUND BALANCE				3,677,183

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
Park Development	2023 Original Budget Beginning Balance (based on estimate)	1,366,858			
	2023 Revenue Budget	658,400			
	2023 Expenditure Budget	-1,200,060			
	emergency reserve	-19,752			
	2023 Original Budget Ending Balance	805,446			
	2022 Actuals vs Estimate Adj-Revenues		-406,686		
	2022 Actuals vs Estimate Adj-Expense		1,593,127		
	Adjusted Ending Fund Balance for 2023		1,991,887		
	Rollover Expenditures	31-00-5207-01 Pioneer Park		-330,000	
		31-00-5250-00 North Berthoud Parkway Trail		-600,000	
				-930,000	
	NEW ENDING FUND BALANCE				1,061,887
Park Land Dedication	2023 Original Budget Beginning Balance (based on estimate)	1,961,776			
	2023 Revenue Budget	200,000			
	2023 Expenditure Budget	-1,540,560			
	emergency reserve	-6,000			
	2023 Original Budget Ending Balance	615,216			
	2022 Actuals vs Estimate Adj-Revenues		32,292		
	2022 Actuals vs Estimate Adj-Expense		-1,331,269		
	Adjusted Ending Fund Balance for 2023		-683,761		
	Supplement Expenditures	32-00-5171-01 Newell Farm purchase (2022)			1,390,500
					1,390,500
	NEW ENDING FUND BALANCE				706,739

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
Public Facilities	2023 Original Budget Beginning Balance (based on estimate)	2,199,859			
	2023 Revenue Budget	462,200			
	2023 Expenditure Budget	-350,060			
	emergency reserve	-13,866			
	2023 Original Budget Ending Balance	2,298,133			
	2022 Actuals vs Estimate Adj-Revenues		34,048		
	2022 Actuals vs Estimate Adj-Expense		390,030		
	Adjusted Ending Fund Balance for 2023		2,722,211		
	NEW ENDING FUND BALANCE				2,722,211
Conservation Trust	2023 Original Budget Beginning Balance (based on estimate)	171,839			
	2023 Revenue Budget	590,500			
	2023 Expenditure Budget	-562,268			
	emergency reserve	-17,715			
	2023 Original Budget Ending Balance	182,356			
	2022 Actuals vs Estimate Adj-Revenues		38,786		
	2022 Actuals vs Estimate Adj-Expense		158,109		
	Adjusted Ending Fund Balance for 2023		379,251		
	NEW ENDING FUND BALANCE				379,251

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
Larimer County Open Space Tax	2023 Original Budget Beginning Balance (based on estimate)	1,209,547			
	2023 Revenue Budget	523,000			
	2023 Expenditure Budget emergency reserve	-1,125,060 -15,690			
	2023 Original Budget Ending Balance	591,797			
	2022 Actuals vs Estimate Adj-Revenues		-8,327		
	2022 Actuals vs Estimate Adj-Expense		100,172		
	Adjusted Ending Fund Balance for 2023		683,642		
	Rollover Expenditures	36-00-5257-01 South Berthoud Parkway Trail		-45,000	
	Supplement Expenditures	36-00-5220-00 Pickleball Court			-450,000
	NEW ENDING FUND BALANCE				188,642
Cemetery	2023 Original Budget Beginning Balance (based on estimate)	146,405			
	2023 Revenue Budget	70,500			
	2023 Expenditure Budget emergency reserve	-130,202 -2,115			
	2023 Original Budget Ending Balance	84,588			
	2022 Actuals vs Estimate Adj-Revenues		7,683		
	2022 Actuals vs Estimate Adj-Expense		44,216		
	Adjusted Ending Fund Balance for 2023		136,487		
	NEW ENDING FUND BALANCE				136,487

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
BATS	2023 Original Budget Beginning Balance (based on estimate)	345,773			
	2023 Revenue Budget	74,500			
	2023 Expenditure Budget emergency reserve	-222,585 -2,235			
	2023 Original Budget Ending Balance	195,453			
	2022 Actuals vs Estimate Adj-Revenues		66,403		
	2022 Actuals vs Estimate Adj-Expense		28,219		
	Adjusted Ending Fund Balance for 2023		290,075		
	Rollover Expenditures	39-00-5020-00 Transit Study		-20,000	
	NEW ENDING FUND BALANCE				270,075
Road Impact	2023 Original Budget Beginning Balance (based on estimate)	4,387,019			
	2023 Revenue Budget	685,100			
	2023 Expenditure Budget emergency reserve	-1,275,373 -20,553			
	2023 Original Budget Ending Balance	3,776,193			
	2022 Actuals vs Estimate Adj-Revenues		84,625		
	2022 Actuals vs Estimate Adj-Expense		450,130		
	Adjusted Ending Fund Balance for 2023		4,310,948		
	Rollover Expenditures	40-00-5114-00 Spartan Crossing		-150,000	
	Supplement Expenditures	40-00-5087-00 Snowplow			-155,000
		40-00-5110-00 Berthoud Pkwy Widening overestimate			950,000
					795,000
					4,955,948

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
MMJ Excise Tax	2023 Original Budget Beginning Balance (based on estimate)	1,213,888			
	2023 Revenue Budget	402,000			
	2023 Expenditure Budget	-1,270,060			
	emergency reserve	-12,060			
	2023 Original Budget Ending Balance	333,768			
	2022 Actuals vs Estimate Adj-Revenues		185,159		
	2022 Actuals vs Estimate Adj-Expense		66,755		
	Adjusted Ending Fund Balance for 2023		585,682		
	NEW ENDING FUND BALANCE				585,682
1998 1% Sales Tax	2023 Original Budget Beginning Balance (based on estimate)	2,976,345			
	2023 Revenue Budget	2,225,750			
	2023 Expenditure Budget	-3,950,060			
	emergency reserve	-66,772			
	2023 Original Budget Ending Balance	1,185,263			
	2022 Actuals vs Estimate Adj-Revenues		792,963		
	2022 Actuals vs Estimate Adj-Expense (street paving project)		714,526		
	Adjusted Ending Fund Balance for 2023		2,692,752		
	Rollover Expenditures	51-00-5244-00 I-25 Art/Landscaping		-370,000	
	Supplemental Expenditures	51-00-5239-00 Street Improvements/Bike Lane			-400,000
NEW ENDING FUND BALANCE					1,922,752

		Approved Budget	Adjust 2022 Estimate with Actuals	Roll-Over	Supplemental
2019 1% Sales Tax	2023 Original Budget Beginning Balance (based on estimate)	4,637,452			
	2023 Revenue Budget	3,441,500			
	2023 Expenditure Budget	-6,218,586			
	emergency reserve	-103,245			
	2023 Original Budget Ending Balance	1,757,121			
	2022 Actuals vs Estimate Adj-Revenues		1,178,691		
	2022 Actuals vs Estimate Adj-Expense		269,125		
	Adjusted Ending Fund Balance for 2023		3,204,937		
NEW ENDING FUND BALANCE					3,204,937

BOARD OF TRUSTEES INFORMATION



BUSINESS DEVELOPMENT DEPARTMENT

Meeting Date:	August 22, 2023
Agenda Title/Subject:	Broadband Feasibility Analysis Update
Type of Item:	Presentation
Purpose:	• Update the Board on the RFP process and propose a P3 option.
Presented by:	Walt Elish

ATTACHMENTS:

- Broadband Presentation

BACKGROUND:

After the presentation of Larimer County and Loveland Pulse at the May 9, 2023, Board Meeting, the Trustees directed staff to develop a Request for Proposals (RFP) to solicit responses from interested parties to develop a fiber network throughout the Town. While staff was developing the RFP, we became aware of another option to fund and operate fiber infrastructure throughout the Town. We were not aware of this option prior to now since this is relatively new in the Broadband industry but gaining momentum as more and more communities look to have fiber deployed throughout their communities but may not be able to finance the significant upfront costs that would be required. This option is commonly known as Public-Private Partnership (P3). Although the P3 option is relatively new to the Broadband industry it has and is being used throughout the country by governments to fund other types of infrastructure projects like roads and airports for example.

After learning more about the P3 option, staff felt it was our responsibility to bring this option to the Board for consideration since we believe it is a viable opportunity to deploy quality fiber infrastructure throughout the Town, while still having some control in the installation and operation, at a fraction of the cost of other models. By having quality fiber installed throughout the Town, any Broadband company, including Hilltop Broadband, Loveland Pulse, Lumen, Allo or anyone else, would have the opportunity to serve Berthoud residents and businesses on an open access fiber network.

FISCAL IMPACT AND FUND SOURCE:

A fiscal impact analysis has not been completed at this time. However, based on preliminary estimates completed previously and most recently with Loveland Pulse, it is estimated that the cost to deploy broadband throughout the Town is about \$19 million. The

P3 option would most likely require a significant less investment by the Town. The exact amount would be negotiated with the selected company through the RFQ process.

COMMUNITY TOUCHSTONES:

The project has the potential to impact Berthoud's overall quality of life and place since most everyone relies on high-speed quality internet service. Whether a person has a home-based business, working out of their home, taking online courses or using the internet for personal entertainment or needs, having reliable and affordable internet service is paramount in maintaining Berthoud's attractiveness as a desirable location to live and work. Also, with the Town's involvement, efforts would be made to facilitate the availability of an affordable product for Berthoud's low-income residents.

RECOMMENDED ACTION(S):

Authorize staff to issue a Request for Qualifications (RFQ) to solicit information from interested partners, to install and operate a quality fiber network throughout the Town, about their (1) ability and qualifications to meet the Town's objectives, (2) ability to finance, (3) past and proven experience, and (4) preferred partnership model.



Community Broadband



Agenda



- Project Purpose and Goals
- Lessons Learned and Work Completed to Date
- Public-Private Partnership (PPP) Models
- Staff Recommendation
- Next Steps and Questions

Purpose and Goals



Why should the Town of Berthoud pursue community broadband?

- Create an open access system that:
 - Increases competition, resulting in lower consumer prices and/or increased quality of services
 - Adds critical fiber infrastructure to the town that will be necessary to the community's quality of life in the future
 - Provides high-quality, reliable, and affordable internet service to all community members in Berthoud
 - Offers options for financial support to low income residents through Affordable Connectivity Program (ACP)

Work Completed to Date



Partnership Models



Public-private partnerships (PPPs) are a common tool used by public entities to achieve community outcomes through an agreement with a private entity. Generally, there are obligations of both parties, whereas a traditional agreement with a private vendor only obligates the vendor to meet requirements.

Three common types of PPP models to deliver community broadband:

Option A	Option B	Option C
Town pays for and owns infrastructure; contracts with a partner to operate	Town and partner pay for and own infrastructure; partner operates	Partners pays for, owns, and operates infrastructure

Public Private Partnership



Broadband PPPs tend to have common principles:

- The more that the public entity can contribute, either in capital or infrastructure, the stronger its ability to negotiate ownership and guaranteed outcomes
- PPPs are mutually beneficial for the public to benefit from the private market expertise, and the private market benefits from the public being a reliable entity with potentially lower risks.
- Private partners are willing to take on risk with a public entity to invest their own capital and dedicate resources in exchange for a return that is suitable to their business model.

Public Private Partnership



	<u>Option A</u>	<u>Option B</u>	<u>Option C</u>
	Town pays for and owns infrastructure; contracts with a partner to operate	Town and partner establish Special Purpose Vehicle (SPV); partner operates	Partners pays for, owns, and operates infrastructure
Pays for infrastructure	Town	Town and Partner (majority)	Partner
Owens infrastructure	Town	Town	Partner
Builds infrastructure	Town or partner	Partner	Partner
Operates service	Partner	Partner	Partner
Earns revenue	Partner (potential revenue-share to Town)	Partner (eventual revenue-share to Town possible)	Partner

Public Private Partnership - Option B



Considerations of a Special Purpose Vehicle (SPV) Model:

- Modest capital participation grants active involvement with the project entity (SPV) and ensures oversight to uphold community policies
- Establishes a framework for service provider competition and promotes open access, fostering a competitive service landscape.
- Community gains comprehensive access to a fully developed fiber network
- Project entity (SPV) receives operational, support, and maintenance rights via a licensing agreement for the network's term (typically 30 years) – synchronized with essential infrastructure funding
- After the designated period, the community secures 100% ownership rights to the network to encompass self-operation or sustained collaboration with the project entity (SPV)
- Model offers a strategic avenue for potential Town investment recovery

Public Private Partnership



Town Staff propose to issue a Request for Qualifications (RFQ) to solicit information from the partnership market about:

- Their ability and qualifications to meet the Town's objectives
- Ability to finance
- Past and proven experience
- Preferred partnership model

Public Private Partnership



Key questions to answer through RFQ proposal evaluation:

- How does the partnership increase competition and improve services for the community?
- Will the service be available to everyone in the community and in what timeframe?
- How will the infrastructure be built, and will it be built for the future?
- How will pricing be determined to provide affordable services for the community?
- Who owns which risks?
- What are the mechanisms to ensure success?

Next Steps

Does the Town Board support this approach?

If so,

Develop and distribute RFQ



**Garden
Spot of
Colorado**

BOARD OF TRUSTEES INFORMATION



COMMUNITY DEVELOPMENT DEPARTMENT

Meeting Date:	August 10, 2023
Agenda Title/Subject:	Public Hearing to consider a request for a Preliminary Plat known as Westside Crossing Replat #2 located north of Mountain Avenue and west of Meadowlark Drive
Type of Item:	Public Hearing
Purpose:	Request for approval of a Preliminary Plat for Westside Crossing Replat #2 to provide commercial properties
Presented by:	Anne Johnson, Community Development Director

ATTACHMENTS:

- Staff Report
- Resolution 17 (Series 2023)
- Application materials
- Planning Commission draft minutes
- Surrounding Property Owner comments

BACKGROUND:

The 11.9-acre property is zoned C-2 for Commercial uses. The location of this proposal is within the greater Gateway development and more specifically located north of Mountain Avenue and west of Meadowlark Drive. The property is within the Mountain Avenue Overlay District. The applicants are proposing seven commercial lots.

UPDATE/NEXT STEPS:

After the Planning Commission public hearing, the Board of Trustees will hear the request in on August 22, 2023. If approved, Conditions of Approval will be met before the Final Plat materials will be ready for acceptance and public hearing. Each individual lot within the proposed development will be required to apply for a Special Use Permit (public hearings) or a Site Plan (administrative review) for future land uses proposed for the property.

FISCAL IMPACT AND FUND SOURCE:

There is no negative impact to the Town in consideration of this request.

COMMUNITY TOUCHSTONES:

Consideration of this request does not negatively impact community touchstones. The property was zoned C-2 and this proposal is requesting a subdivision to accommodate commercial land uses.

RECOMMENDED ACTION(S):

Planning Commission recommended conditional approval of the request.

RESOLUTION NUMBER 17

(SERIES 2023)

A RESOLUTION OF THE TOWN OF BERTHOUD BOARD OF TRUSTEES APPROVING A
PRELIMINARY PLAT FOR WESTSIDE CROSSING REPLAT NO. 2 FOR A
COMMERCIAL DEVELOPMENT IN THE TOWN OF BERTHOUD.

WHEREAS, the property under consideration is known as the “Westside Commercial” development; and

WHEREAS, the Town of Berthoud (“Town”) approved a Neighborhood Master Plan and Zoning change to Commercial; and

WHEREAS, the Preliminary Plat attached herein as Exhibit A has been reviewed by referral agencies to ensure the proposed development does not present a burden on service provision; and

WHEREAS, notice was properly posted in the manner required by law and a public hearing was conducted on August 3, 2023; a legal ad was published on August 3, 2023 and affected property owners within 500 feet of the site were notified by first-class mail before the Berthoud Planning Commission hearing on August 10, 2023; and

WHEREAS, after the public hearing, the Berthoud Planning Commission made a unanimous recommendation to the Town Board of Trustees to approve the Preliminary Plat with conditions; and

WHEREAS, based on the testimony and evidence presented at the public hearing, the Board of Trustees determines and finds that compliance with the Neighborhood Master Plan review criteria as provided in Section 30-6-107(B) of the Berthoud Municipal Code has been demonstrated.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE TOWN OF BERTHOUD, COLORADO:

Section 1. Preliminary Plat Approval. The Preliminary Plat is hereby approved with the following Condition of Approval. This condition shall be met prior to submittal of the Final Plat application.

1. The preliminary plat materials shall be revised to address all outstanding staff comments attached to the Staff Report.

Section 2. Interpretation: This Resolution shall be interpreted and construed to effectuate its general purpose.

Section 3. Effective Date: The provisions of this Resolution shall take effect upon adoption.

APPROVED AND ADOPTED this 22nd day of August, 2023.

TOWN OF BERTHOUD

By _____

William Karspeck, Mayor

ATTEST:

By: _____

Christian Samora, Town Clerk

Exhibit A: Preliminary Plat

O:\20220491-A\dwg\20220491A-SUB.dwg, sh(1), 7/6/2023 8:29:33 AM, 1:1

PRELIMINARY PLAT
WESTSIDE CROSSING REPLAT #2

Being a Replat of Tract A, Westside Crossing,
Situate in the South Half of the Southwest Quarter of Section 15, Township 4 North, Range 69 West of the 6th P.M.,
Town of Berthoud, County of Larimer, State of Colorado

LEGAL DESCRIPTION:

KNOW ALL MEN BY THESE PRESENTS: That the undersigned, being the owners of a portion of the Southwest Quarter Section Fifteen (15), Township Four North (T.4N.), Range Sixty-nine West (R.69W.) of the 6th Principal Meridian, Town of Berthoud, County of Larimer, State of Colorado, more particularly described as follows:

Tract A, Westside Crossing, recorded July 5, 2022 as Reception No. 20220042194 of the Records of Larimer County.

Said described parcel of land contains 11.901 Acres, more or less (±).

Have laid out, platted, and subdivided the above described land, under the name and style of WESTSIDE CROSSING REPLAT #2, and by these presents do dedicate to the Town of Berthoud in fee simple the street and public "rights-of-way" as shown on the plats, and grants to the Town of Berthoud such easements as are created hereby and depicted or, by note, referenced hereon, along with the right to install, maintain, and operate mains, transmission lines, service lines, and appurtenances, either directly or through the various public utilities, as may be necessary to provide such utility, cable television, and sanitary services within this subdivision or property contiguous thereto, through, over, under, and across streets, utility and other easements, and other public places as shown on the plat.

OWNER: Berthoud Gateway LLC, a Colorado limited liability company

By: _____ As: _____

NOTARIAL CERTIFICATE

STATE OF _____)
ss
COUNTY OF _____)

The foregoing dedication was acknowledged before me this _____ day of _____, 20 ____
by _____ as _____

Witness my hand and official seal. (SEAL)

My commission expires _____

Notary Public

LEINHOLDER: Westland Holdings, Inc.

By: _____ As: _____

NOTARIAL CERTIFICATE

STATE OF _____)
ss
COUNTY OF _____)

The foregoing dedication was acknowledged before me this _____ day of _____, 20 ____
by _____ as _____

Witness my hand and official seal. (SEAL)

My commission expires _____

Notary Public

LEINHOLDER: Camco LLC

By: _____ As: _____

NOTARIAL CERTIFICATE

STATE OF _____)
ss
COUNTY OF _____)

The foregoing dedication was acknowledged before me this _____ day of _____, 20 ____
by _____ as _____

Witness my hand and official seal. (SEAL)

My commission expires _____

Notary Public

BASIS OF BEARINGS AND LINEAL UNIT DEFINITION

Assuming the East line of the South Half of the Southwest Quarter of Section 15, T.4N., R.69W, being monumentalized by a #6 rebar with a 2" Aluminum Cap stamped "LS 27936" on the North end and by a #6 rebar with a 3 1/4" aluminum cap stamped "LS 16415" on the South end, as bearing South 00°34'48" East, being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, a distance of 1330.11 feet with all other bearings contained herein relative thereto.

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

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. (13-80-105 C.R.S. 2012)

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 FC25193574.1-6, dated June 22, 2023 as prepared by Land Title Guarantee Company to delineate the aforesaid information.

SURVEYOR'S CERTIFICATE:

I, Paul B. Groves, a Registered Land Surveyor in the State of Colorado, do hereby certify that the survey of WESTSIDE CROSSING REPLAT #2 was made under my supervision and the accompanying plat accurately and properly shows said subdivision and is in compliance with the Subdivision Regulations of the Town of Berthoud.

PRELIMINARY

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

RIGHT TO FARM STATEMENT:

The Town of Berthoud has adopted a "Right to Farm" policy. All new and existing residents are expected to read and understand the policy. For a copy of the policy, please contact the Town of Berthoud.

APPROVAL CERTIFICATES:

Approved by the Town of Berthoud, Colorado,

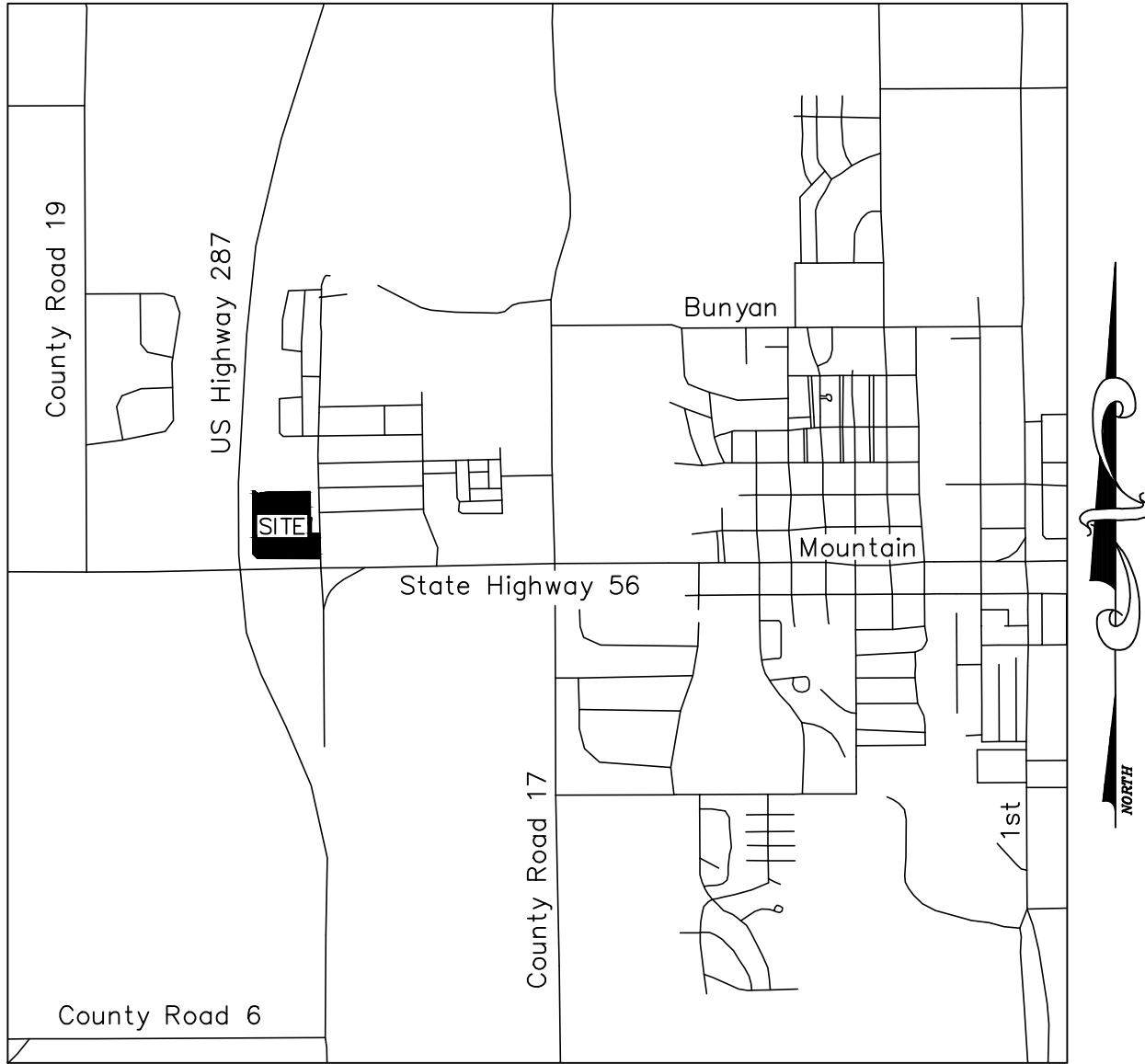
this _____ day of _____, A.D., 20 ____.

Mayor

The foregoing plat is approved for filing and accepted by the Town of Berthoud, Colorado,

this _____ day of _____, A.D., 20 ____.

ATTEST: _____
Town Clerk



VICINITY MAP

SCALE: 1"=2000'

DATE:	12/13/2022
FILE NAME:	20220491A-SUB
SCALE:	1"=30'
DRAWN BY:	CSK
CHECKED BY:	PG

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



REVISIONS:	DATE:
REVISED ESMIS & LOTS	CSK 5/1/23
REVISED ESMIS & LOTS	CSK 7/6/23

WESTSIDE CROSSING REPLAT #2
FOR
BERTHOUD GATEWAY LLC
8340 LOUDEN CIRCLE
WINDSOR, CO 80528

PROJECT #:
20220491-A

1
SHEET 1 OF 2

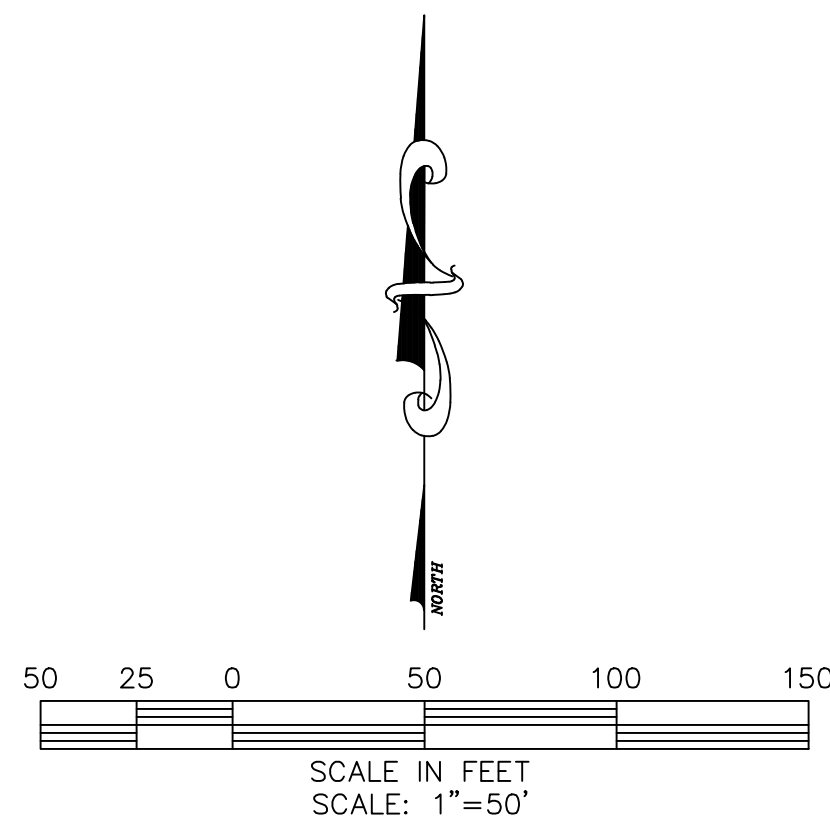
PRELIMINARY PLAT
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Town of Berthoud, County of Larimer, State of Colorado

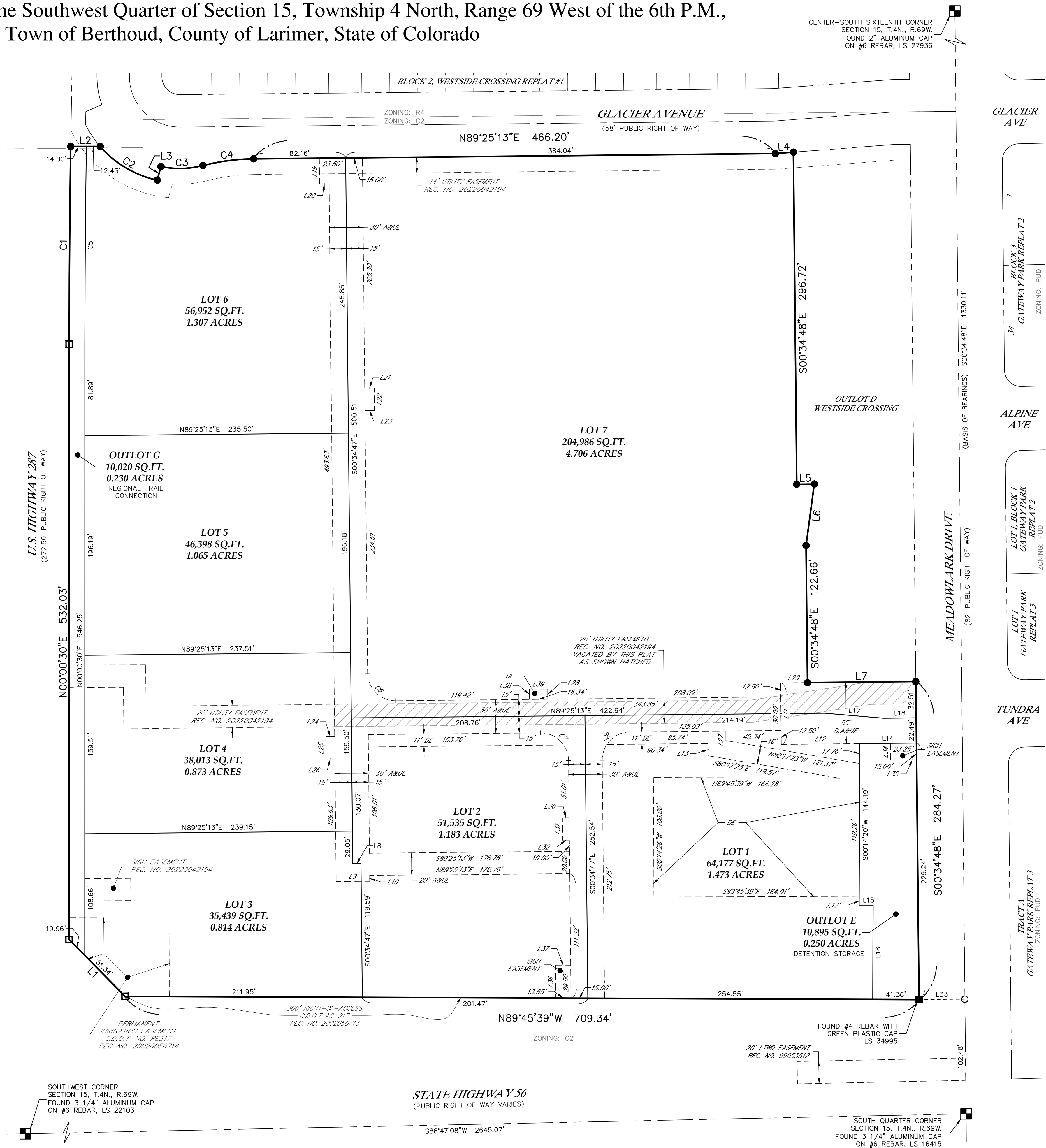
CURVE TABLE					
CURVE	LENGTH	RADIUS	DELTA	CHORD	CH BEARING
C1	176.56'	11862.50'	0°51'10"	176.56'	N00°26'05"E
C2	60.06'	94.50'	36°24'51"	59.05'	S59°25'52"E
C3	37.80'	82.00'	26°24'53"	37.47'	N88°38'43"E
C4	45.88'	188.00'	13°58'56"	45.77'	N82°25'45"E
C5	176.56'	11848.50'	0°51'14"	176.56'	S00°26'07"W
C6	39.27'	25.00'	90°00'00"	35.36'	S45°34'47"E
C7	39.27'	25.00'	90°00'00"	35.36'	N45°34'47"W
C8	39.27'	25.00'	90°00'00"	35.36'	S44°25'13"W

LINE TABLE		
LINE	BEARING	LENGTH
L1	N44°32'38"W	71.30'
L2	N90°00'00"E	26.43'
L3	N15°41'54"E	12.52'
L4	N85°37'33"E	16.04'
L5	N89°25'50"E	15.68'
L6	S07°37'15"W	55.26'
L7	N89°25'13"E	96.80'
L8	S89°25'13"W	7.31'
L9	N89°25'13"E	30.00'
L10	N00°34'47"W	5.00'
L11	N00°34'54"W	55.00'
L12	N89°25'13"E	70.24'
L13	S00°00'00"E	10.91'
L14	S89°25'13"W	50.55'
L15	S89°45'39"E	12.46'
L16	S00°14'21"W	84.33'
L17	S85°09'21"E	52.95'
L18	N89°25'13"E	28.98'
L19	S00°34'47"E	23.06'
L20	N89°25'13"E	8.50'

LINE TABLE		
LINE	BEARING	LENGTH
L21	N89°25'13"E	8.50'
L22	S00°34'47"E	20.00'
L23	S89°25'13"W	8.50'
L24	N89°25'13"E	8.00'
L25	N00°34'47"W	20.00'
L26	S89°25'13"W	8.00'
L27	N00°00'00"E	8.58'
L28	S00°34'58"E	9.06'
L29	N89°25'13"E	24.00'
L30	N89°25'13"E	6.00'
L31	N00°34'47"W	20.00'
L32	S89°25'13"W	6.00'
L33	N89°25'12"E	41.00'
L34	N00°34'47"W	15.00'
L35	S89°25'13"W	23.25'
L36	N00°06'27"W	29.41'
L37	N89°53'36"E	13.44'
L38	N00°34'47"W	9.22'
L39	N90°00'00"E	16.34'



LEGEND	
	EASEMENT LINE
	CENTERLINE
	SECTION LINE
	RIGHT OF WAY LINE
	BOUNDARY LINE
	FOUND ALIQUOT CORNER AS DESCRIBED
	FOUND MONUMENT AS DESCRIBED
	FOUND #6 REBAR WITH 3 1/4" ALUMINUM CAP LS 22103
	SET 24" OF #4 REBAR WITH A BLUE PLASTIC CAP STAMPED KS, LS 38209
	CALCULATED POSITION
A&UE	ACCESS & UTILITY EASEMENT
DE	DRAINAGE EASEMENT
D,A&UE	DRAINAGE, ACCESS & UTILITY EASEMENT



PRELIMINARY

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

DATE:	12/13/2022
FILE NAME:	20220491A-SUB
SCALE:	1"=30'
DRAWN BY:	CSK
CHECKED BY:	PG

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REVISIONS:	DATE:	
REVISED ESMT & LOTS	CSK	5/1/23
REVISED ESMT & LOTS	CSK	7/6/23

WESTSIDE CROSSING REPLAT #2
FOR
BERTHOUD GATEWAY LLC
8340 LOUDEN CIRCLE
WINDSOR, CO 80528

PROJECT #:
20220491-A

2
SHEET 2 OF 2



STAFF REPORT: WESTSIDE CROSSING REPLAT #2 PRELIMINARY PLAT

DATE: August 22, 2023

GENERAL INFORMATION

Applicant:	Scott Charpentier	Size: 11.90 acres
Site Location:	The property is located at the NE corner of Mountain Avenue and US Highway 287	
Applicant's Request:	The Applicant is requesting a preliminary plat for the creation of 7 commercial lots.	
Current Zoning:	C2 General Commercial District	

ZONING DISTRICT INFORMATION

	<u>C2</u>
Max Density	20 per acre
Min. Lot Area	N/A
Min. Lot Width	50'
Front Setback	25'
Side Setback	0'/25' depending on adjacent land uses
Rear Setback	0'/35' depending on adjacent land uses
Max Building Height:	50'

SURROUNDING ZONING, LAND USE AND REQUIRED BUFFERS

	<u>Adjacent Zoning</u>	<u>Adjacent Land Uses</u>	<u>Setbacks for Adjacent Zoning</u>
North	R4	Single/Multi Family	N/A
South	C2	Commercial	N/A
East	PUD	Single Family / Vacant	N/A
West	PUD	Vacant	N/A

Proposal

The applicant proposes to subdivide the existing parcel into 7 lots. The preliminary plat, if approved, would allow the applicant to apply for a final plat that would formally subdivide the lots.

Background

This property is part of the Westside Crossing development. In April of 2021, a neighborhood masterplan and rezoning was approved for this commercial area of the site, as well as the residential neighborhood directly to the North that is currently under construction. Additionally, in March of 2022 a preliminary plat was approved for this area that had a slightly different lot configuration to what is currently being proposed. Due to development interests in the property, the lot configuration has been adjusted to work with end user designs.

Preliminary Plat Review Criteria

In addition to all provisions of this Code, the Town shall use the following criteria to evaluate the applicant's request:

30-6-107(B) Review Criteria	Finding	Rationale
1. The preliminary plat represents a functional system of land use and is consistent with the rationale and criteria set forth in this Code.	Yes	The preliminary plat is a functional system of land use that connects with the existing road network. The proposed subdivision meets the standards of the C2 zone district.
2. The application is consistent with the approved concept plan and incorporates the Town's recommendations and any conditions of approval.	Yes	The plan is consistent with the approved neighborhood master plan. The neighborhood masterplan showed multiple commercial pad sites along HWY 287 and Mountain Avenue with one larger site in the North East corner of the site.
3. The land use mix within the project conforms to Berthoud's Zoning District Map and Preferred Land Use Map and furthers the goals and policies of the Comprehensive Plan and PORT Plan.	Yes	The proposed land use for this area is commercial, which conforms to the C2 General Commercial District. The future land use map identifies this area as Suburban Business which allows for development like what is proposed. Lastly, the project will be bordered by public sidewalks and have multiple pedestrian access points to allow walkability of the site, and connections to the neighboring residential areas.
4. The utility and transportation design is adequate, given existing and planned capacities of those systems.	Yes	Plans were reviewed by Town Staff as well as outside referral agencies. The applicant has provided adequate plans for utilities and transportation designs.
5. Negative impacts on adjacent land uses including, but not limited to: solar access, heat, dust, glare, traffic and noise have been identified and satisfactorily mitigated.	Yes	The application is consistent with the overall plan for the area.

30-6-107(B) Review Criteria	Finding	Rationale
6. There is a need or desirability within the community for the applicant's development and the development will help achieve a balance of land use and/or housing types within Berthoud.	Yes	The future land use map anticipates this area to be developed as suburban business. This development is consistent with the goals of the Comprehensive Plan, and provides additional commercial areas at a major intersection.
7. How the applicant has addressed comments received from the public, during the Public Comment portion of the process.	Yes	All comments received were provided to the applicant and are attached. Public comments have been satisfactorily addressed during the public comment process.

PUBLIC NOTICE AND COMMENT

Notice of the Board of Trustees Public Hearing was mailed to property owners within 500 feet of the subject property on August 3rd, and a legal ad published on August 3rd, as required by the Development Code. In addition, the application was sent out to all property owners within 500 feet, with an invitation to comment on the request within three weeks of receipt. Comments received are attached to this submittal.

FINDINGS AND RECOMMENDATIONS

- **At their public hearing on August 10, Planning Commission made a motion to recommend approval to the Town Board of Trustees due to the findings in the Staff Report, the Criteria for Approval of a Preliminary Plat, and adherence to the approved Neighborhood Master Plan and 2021 Comprehensive Plan for the Town of Berthoud subject to the following conditions:**
 - **Revise the preliminary plat to address outstanding staff comments attached to this staff report.**
 - **A Traffic Summary shall be provided to the Town Board of Trustees that elaborates on traffic to-and-from the site, as well as commercial traffic within the site. The Planning Commissioners would also strongly urge the Applicant to make sure the traffic engineer is available for conversation and discussion with the Town Board of Trustees.**

Attachments

1. Outstanding Staff Comments
2. Draft Planning Commission hearing Minutes from August 11, 2023
3. Technical Memorandum dated August 15, 2023 – Traffic Study Summary and Recommendations
4. Application form
5. Neighborhood Master Plan – Illustrative Masterplan
6. Preliminary Plat
7. Traffic Impact Study
8. Preliminary Drainage Report
9. Surrounding Property Owner Comments



ALDRIDGE TRANSPORTATION CONSULTANTS, LLC

Advanced Transportation Planning and Traffic Engineering

John M.W. Aldridge, P.E.
Colorado Licensed Professional Engineer

1082 Chimney Rock Road
Highlands Ranch, CO 80126
303-703-9112
Mobile: 303-594-4132

August 15, 2023

Technical Memorandum
Westside Crossing - Berthoud, Colorado
Traffic Study Summary and Recommendations

This technical memorandum provides a summary of the traffic study that this firm prepared in January of this year and the roadway and intersection improvements it recommends. The traffic study conforms to the Larimer County traffic impact study guidelines and requirements. It also conforms to the requirements of the State Highway Access Code.

The traffic study is based on the site plan that proposes to construct 56 single family homes and a variety of commercial uses including potentially a gas station, retail strip plaza, grocery store, tire store, and restaurants. Overall, the project will generate 9,717 daily trips. The bulk of the trips are generated by commercial uses. Residential use will generate 528 daily trips. The study found that the level of service (LOS) impacts of the project are acceptable and compliant with the Larimer County and CDOT standards.

The study determined that the residential trip generation alone will not warrant a traffic signal at the intersection of CO-56 and Meadowlark Dr. However, a traffic signal will be warranted with the residential component and approximately 50 percent of the commercial uses in place. The traffic signal is currently in the design process. The signal system will include full pedestrian accommodation including pedestrian signal heads (countdown type), push buttons, and ADA ramps on all four corners. Crosswalk markings will be installed across each approach including the east west approaches on CO-56. The pedestrian signals will be pedestrian actuated and provide sufficient time for a safe crossing of disabled and wheelchair users.

Prior to the traffic signal installation, the site will be constructed with full width sidewalks, ADA ramps where appropriate, and crosswalk markings across Meadowlark Dr. and the right in/right out access on CO-56. Stop signs will be placed at each access to the site.

If allowed, mid-block pedestrian crossings across Meadowlark Dr. should consist of W11-2 with W16-7 placards. The signs should be mounted at the roadside. Advanced yield lines (20-50 feet in advance as identified by the MUTCD) and R1-5 signs are optional (typically placed on multilane streets) but could work well in this situation. This option is dependent on engineering judgement as determined by the Town's Traffic Engineer.



W11-2



W16-7p



R1-5



Respectfully submitted,

Aldridge Transportation Consultants, LLC

John M.W. Aldridge, P.E.
Principal

ATC is professional service firm specializing in traffic engineering and transportation planning. ATC's principal, John M.W. Aldridge, is a Colorado licensed professional engineer. In the past 20 years, ATC has prepared over 1,000 traffic impact studies, designed over 100 traffic signals, and has provided expert witness testimony on engineering design and access issues on multi-million-dollar interchange and highway projects in Kansas and Colorado.



Planning Commission Minutes – August 10, 2023

1. **Call to Order** – The Planning Commission convened a regular meeting on August 10, 2023. Commissioner Anderson called the meeting to order at 6:00 p.m.

2. **Pledge of Allegiance**

3. **Roll Call** – Members present:

Karen Anderson	(Chairperson)
Chris Kurtz	(Vice Chairperson)
Jon Van Benthem	(Secretary)
Melissa Feldbush	(Commissioner)
Abigail Smith	(Commissioner)
Brett Wing	(Commissioner)

Staff present:	Christian Samora	(Town Clerk)
	Tawn Hillenbrand	(Senior Planner)
	Will Charles	(Baseline – Principal Planner)
	Jonathan Mitchell	(Permit Technician)
	Teri Regar	(Planning Technician)
	Erin Smith	(Town Attorney)

4. **Approval of Minutes** – Minutes from the June 22, 2023 and July 27, 2023 Planning Commission Meetings.
MOTION made by Commissioner Van Benthem to APPROVE the Minutes for June 22, 2023 and July 27, 2023.
SECONDED by Commissioner Kurtz.
With those all in favor, THE MOTION CARRIED.

5. **Public Hearing: Ludlow Sliver Annexation and Rezoning**

Senior Planner Hillenbrand introduced the Applicant's request for rezoning to Suburban Residential (SR) from Larimer County Rural Residential (RR-2) in conjunction with an annexation request.

Public Comment was opened at 6:07 p.m.

Public Comment was closed at 6:07 p.m.

MOTION made by Commissioner Kurtz to forward a MOTION OF APPROVAL of the request to zone the 0.436-acre property to SR—Suburban Residential to the Town Board of Trustees should they agree to the Annexation request. The motion of approval is due to the findings in the Staff Report including compliance with the Land Use Code, the Criteria for Approval found in Section 30-3-110(D), and the Comprehensive Plan.

SECONDED by Commissioner Wing.

With all in favor, THE MOTION CARRIED.

6. Public Hearing: Vantage 7th Filing Final Plat

Will Charles (Baseline) introduced the Applicant's request for a Final Plat for the creation of 60 residential lots intended for Single Family Attached (duplexes) residential. This would create 60 units total.

Public Comment was opened at 6:18 p.m.

Public Comment was closed at 6:18 p.m.

MOTION made by Commissioner Wing to APPROVE the Final Plat application for the 7th Filing of Vantage due to the findings in the Staff Report including compliance with the Land Use Code, the Criteria for Approval found in Section 30-3-108(C), the Vantage Neighborhood Master Plan, and the Comprehensive Plan.

SECONDED by Commissioner Van Benthem.

With all in favor, THE MOTION CARRIED.

7. Public Hearing: Westside Crossing Commercial Preliminary Plat

Will Charles (Charles) introduced the Applicant's request for approval of a Preliminary Plat for the creation of seven (7) commercial lots.

Public Comment was opened at 6:57 p.m.

John Terrell shared concerns about the traffic and crosswalks from the project.

Public Comment was closed at 7:01 p.m.

MOTION made by Commissioner Van Benthem to forward a MOTION FOR APPROVAL of the Preliminary Plat for Westside Crossing (Commercial) Replat 2 to the Town Board of Trustees. The motion for approval is due to the findings in the Staff Report including compliance with the Land Use Code, the Criteria for Approval found in Section 30-6-107(B), and the Comprehensive Plan. As stated in the Staff Report, this motion is conditional upon two conditions:

- 01. The applicant addresses outstanding staff comments found as attachments to the Staff Report prior to recording the Preliminary Plat.**
- 02. A request that a Traffic Summary be provided to the Town Board of Trustees that elaborates on traffic to-and-from the site, as well as commercial traffic within the site. The Planning Commissioners would also strongly urge the Applicant to make sure the traffic engineer is available for conversation and discussion with the Town Board of Trustees.**

SECONDED by Commissioner Smith.

With all in favor, THE MOTION CARRIED.

8. Reports by Staff

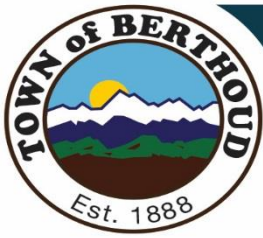
Commissioner Anderson announced there will be a new Planning Commissioner at the next Planning Commission meeting on August 24. Please welcome Nick Semedallas!

9. Adjourn –

The meeting was adjourned at 7:34 p.m.

CHAIRPERSON

SECRETARY



Town of Berthoud
807 Mountain Ave.
P.O. Box 1229
Berthoud, CO 80513
970.532.2643

REVIEW COMMENTS

DATE: July 27, 2023

Note: A Technical Review Committee Meeting is required prior to moving forward in the process.

Project Name: Westside Crossing Phase 2

Project Type: Preliminary Plat

Location: NE Corner of US HWY 287 and HWY 56

Project Applicant: Scott Charpentier

It has been approximately four weeks since your submittal. As promised, the Town of Berthoud is providing comments to you at this time to advance the development review process.

THE FOLLOWING AGENCIES RECEIVED OR WERE MAILED THIS SUBMITTAL AND THEIR RESPONSES ARE PROVIDED ON THE FOLLOWING PAGES:

TOWN OF BERTHOUD

- ☐ Engineer/Public Works Director
- ☐ Project Planner
- ☐ Town Attorney
- ☐ Town Arborist
- ☐ Traffic Consultant

OTHER AGENCIES

- ☐ Berthoud Fire Protection District
- ☐ Little Thompson Water District
- ☐ Ditch Companies
- ☐ CDOT
- ☐ Larimer County Engineering
- ☐ Larimer County Health Dept.
- ☐ Larimer County Planning

Specific and complete comments are provided under each individual agency's section. Please read the entire report and address each comment. If you have any questions or concerns regarding any comment, contact the Planning Department or the individual agency to clarify the statement and reach an understanding. It is in your interest to do so in order to streamline the review process.

"NO RESPONSE" indicates an agency has not sent any comments to the project planner before the writing of this summary.

If you have any questions concerning comments on your project or the development review process, please feel free to contact the Planning Department at 281.352.2709.

TECHNICAL REVIEW COMMITTEE COMMENTS

DATE: July 27, 2023

Project Name: Westside Crossing

PLANNING
Community Development Department
281-352-2709 will.charles@baselinecorp.com

Response received: 07/27/2023

1. Preliminary Plat is scheduled for PC on 8/10. Any outstanding comments will be added as conditions of approval.

LTWD
Clayton Orback corback@ltwd.org

Response received: 07/25/2023

See attached.

BASELINE ENGINEERING
Luke Seeber luke.seeber@baselinecorp.com; Noah Nemmers noah@baselinecorp.com

Response received: 07/26/2023

See attached.

2023-07-25 LTWD Comments

Please Note: Comments noted in these plans and/or project documents may be applicable in many locations. Please address all comments consistently throughout all project plans and/or documents.

TOWN OF BERTHOUD	ALL COMMENTS ARE TO BE ADDRESSED BY THE TOWN ENGINEER. THE TOWN ENGINEER SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE PROJECT. THE TOWN ENGINEER SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE PROJECT. THE TOWN ENGINEER SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE PROJECT.
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17. THE RESPONSIBLE PARTY SHALL FURNISH REASONABLE AID AND ASSISTANCE REQUIRED BY THE TOWN ENGINEER FOR THE PROPER EXAMINATION OF THE MATERIALS AND WORK. WORK SHALL BE PERFORMED WITH ACCEPTED WORKMANSHIP PRACTICES, AND THE TOWN OF BERTHOUD STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC AND PRIVATE IMPROVEMENTS. ANY WORK NOT ACCEPTED BY THE TOWN ENGINEER SHALL BE REDONE UNTIL COMPLIANCE WITH THESE STANDARDS IS ACHIEVED. INSTRUCTIONS GIVEN BY THE TOWN ENGINEER RELATING TO QUALITY OF MATERIALS AND WORKMANSHIP MUST BE OBEYED AT ONCE BY THE RESPONSIBLE PARTY. THE TOWN SHALL NOT SUPERVISE SET OUT WORK, OR GIVE LINE AND GRADE STAKES.	17. THE RESPONSIBLE PARTY SHALL FURNISH REASONABLE AID AND ASSISTANCE REQUIRED BY THE TOWN ENGINEER FOR THE PROPER EXAMINATION OF THE MATERIALS AND WORK. WORK SHALL BE PERFORMED WITH ACCEPTED WORKMANSHIP PRACTICES, AND THE TOWN OF BERTHOUD STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC AND PRIVATE IMPROVEMENTS. ANY WORK NOT ACCEPTED BY THE TOWN ENGINEER SHALL BE REDONE UNTIL COMPLIANCE WITH THESE STANDARDS IS ACHIEVED. INSTRUCTIONS GIVEN BY THE TOWN ENGINEER RELATING TO QUALITY OF MATERIALS AND WORKMANSHIP MUST BE OBEYED AT ONCE BY THE RESPONSIBLE PARTY. THE TOWN SHALL NOT SUPERVISE SET OUT WORK, OR GIVE LINE AND GRADE STAKES.
18. THE MATERIALS USED IN PROJECTS SHALL BE NEW AND SUBJECT TO THE INSPECTION AND APPROVAL OF THE INSPECTOR AT ALL TIMES. THE INSPECTOR HAS THE RIGHT TO PERFORM ANY TESTING DEEMED NECESSARY TO ENSURE COMPLIANCE OF THE MATERIAL WITH THESE STANDARDS. NO MATERIAL SHALL BE USED BEFORE BEING INSPECTED AND APPROVED BY THE INSPECTOR. FAILURE OR NEGLIGENCE ON THE PART OF THE INSPECTOR TO CONDEMN OR REJECT INFERIOR MATERIALS OR WORK SHALL NOT BE CONSTRUED TO IMPLY THEIR ACCEPTANCE SHOULD THEIR INFERIORITY BECOME EVIDENT AT ANY TIME PRIOR TO FINAL ACCEPTANCE OF THE WORK. INSPECTORS HAVE THE AUTHORITY TO REJECT DEFECTIVE OR INFERIOR MATERIALS AND/OR DEFECTIVE WORKMANSHIP AND TO SUSPEND WORK UNTIL SUCH TIME AS THE RESPONSIBLE PARTY SHALL CORRECT THE DISCREPANCIES IN QUESTION.	18. THE MATERIALS USED IN PROJECTS SHALL BE NEW AND SUBJECT TO THE INSPECTION AND APPROVAL OF THE INSPECTOR AT ALL TIMES. THE INSPECTOR HAS THE RIGHT TO PERFORM ANY TESTING DEEMED NECESSARY TO ENSURE COMPLIANCE OF THE MATERIAL WITH THESE STANDARDS. NO MATERIAL SHALL BE USED BEFORE BEING INSPECTED AND APPROVED BY THE INSPECTOR. FAILURE OR NEGLIGENCE ON THE PART OF THE INSPECTOR TO CONDEMN OR REJECT INFERIOR MATERIALS OR WORK SHALL NOT BE CONSTRUED TO IMPLY THEIR ACCEPTANCE SHOULD THEIR INFERIORITY BECOME EVIDENT AT ANY TIME PRIOR TO FINAL ACCEPTANCE OF THE WORK. INSPECTORS HAVE THE AUTHORITY TO REJECT DEFECTIVE OR INFERIOR MATERIALS AND/OR DEFECTIVE WORKMANSHIP AND TO SUSPEND WORK UNTIL SUCH TIME AS THE RESPONSIBLE PARTY SHALL CORRECT THE DISCREPANCIES IN QUESTION.
19. WHENEVER DEFECTIVE MATERIALS AND WORK ARE REJECTED, THE RESPONSIBLE PARTY SHALL PROMPTLY REMOVE SUCH DEFECTIVE MATERIALS AND CONSTRUCTION FROM THE JOB SITE AND REPLACE ALL DEFECTIVE PORTIONS TO THE SATISFACTION OF THE TOWN ENGINEER. IN THE EVENT THE RESPONSIBLE PARTY FAILS TO REMOVE REJECTED ITEMS FROM THE JOB SITE WITHIN A REASONABLE LENGTH OF TIME, THE TOWN ENGINEER MAY ARRANGE FOR SUCH REMOVAL AT THE EXPENSE OF THE RESPONSIBLE PARTY.	19. WHENEVER DEFECTIVE MATERIALS AND WORK ARE REJECTED, THE RESPONSIBLE PARTY SHALL PROMPTLY REMOVE SUCH DEFECTIVE MATERIALS AND CONSTRUCTION FROM THE JOB SITE AND REPLACE ALL DEFECTIVE PORTIONS TO THE SATISFACTION OF THE TOWN ENGINEER. IN THE EVENT THE RESPONSIBLE PARTY FAILS TO REMOVE REJECTED ITEMS FROM THE JOB SITE WITHIN A REASONABLE LENGTH OF TIME, THE TOWN ENGINEER MAY ARRANGE FOR SUCH REMOVAL AT THE EXPENSE OF THE RESPONSIBLE PARTY.
20. INSPECTION SHALL NOT RELIEVE THE RESPONSIBLE PARTY FROM ANY OBLIGATION TO PERFORM THE WORK STRICTLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS OR ANY MODIFICATIONS THEREOF. WORK NOT SO CONSTRUCTED SHALL BE REMOVED AND CORRECTED BY THE RESPONSIBLE PARTY AT HIS SOLE EXPENSE, WHENEVER SO ORDERED BY THE TOWN ENGINEER, WITHOUT REFERENCE TO ANY PREVIOUS ERROR OR OVERSIGHT IN INSPECTION.	20. INSPECTION SHALL NOT RELIEVE THE RESPONSIBLE PARTY FROM ANY OBLIGATION TO PERFORM THE WORK STRICTLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS OR ANY MODIFICATIONS THEREOF. WORK NOT SO CONSTRUCTED SHALL BE REMOVED AND CORRECTED BY THE RESPONSIBLE PARTY AT HIS SOLE EXPENSE, WHENEVER SO ORDERED BY THE TOWN ENGINEER, WITHOUT REFERENCE TO ANY PREVIOUS ERROR OR OVERSIGHT IN INSPECTION.
21. EXCEPT IN CASES OF EMERGENCY, MAINTENANCE, OR PROTECTION OF WORK ALREADY COMPLETED, NO WORK SHALL BE ALLOWED BETWEEN THE HOURS OF 7 P.M. AND 7 A.M.; NOR ON SATURDAY, SUNDAY, OR LEGAL HOLIDAYS UNLESS APPROVED BY THE TOWN ENGINEER IN EACH CASE. WHEN ANY INSPECTOR IS REQUIRED TO WORK OUTSIDE THE HOURS OF 7 A.M. TO 4 P.M. ON REGULAR TOWN BUSINESS DAYS, OVERTIME SHALL BE CHARGED TO THE RESPONSIBLE PARTY. HOWEVER, SUCH INSPECTORS SHALL REMAIN EMPLOYEES OF THE TOWN FOR ALL PURPOSES. REMOTE WORK SHALL BE MADE TO THE TOWN ENGINEER AT LEAST 48 HOURS IN ADVANCE. PAYMENT FOR SUCH OVERTIME WORK SHALL BE MADE TO THE TOWN PRIOR TO FINAL ACCEPTANCE.	21. EXCEPT IN CASES OF EMERGENCY, MAINTENANCE, OR PROTECTION OF WORK ALREADY COMPLETED, NO WORK SHALL BE ALLOWED BETWEEN THE HOURS OF 7 P.M. AND 7 A.M.; NOR ON SATURDAY, SUNDAY, OR LEGAL HOLIDAYS UNLESS APPROVED BY THE TOWN ENGINEER IN EACH CASE. WHEN ANY INSPECTOR IS REQUIRED TO WORK OUTSIDE THE HOURS OF 7 A.M. TO 4 P.M. ON REGULAR TOWN BUSINESS DAYS, OVERTIME SHALL BE CHARGED TO THE RESPONSIBLE PARTY. HOWEVER, SUCH INSPECTORS SHALL REMAIN EMPLOYEES OF THE TOWN FOR ALL PURPOSES. REMOTE WORK SHALL BE MADE TO THE TOWN ENGINEER AT LEAST 48 HOURS IN ADVANCE. PAYMENT FOR SUCH OVERTIME WORK SHALL BE MADE TO THE TOWN PRIOR TO FINAL ACCEPTANCE.
22. IN THE EVENT ONE OR MORE INSPECTORS REPRESENTING PRIVATE CONSULTING ENGINEERING FIRMS ARE ALSO INSPECTING A PROJECT ALONG WITH THE TOWN ENGINEER, THE INSTRUCTIONS GIVEN BY THE TOWN ENGINEER SHALL PREVAIL IN THE EVENT OF CONFLICTING INSTRUCTIONS.	22. IN THE EVENT ONE OR MORE INSPECTORS REPRESENTING PRIVATE CONSULTING ENGINEERING FIRMS ARE ALSO INSPECTING A PROJECT ALONG WITH THE TOWN ENGINEER, THE INSTRUCTIONS GIVEN BY THE TOWN ENGINEER SHALL PREVAIL IN THE EVENT OF CONFLICTING INSTRUCTIONS.
23. PROTECT ALL TREES AND VEGETATION. PLACE CONSTRUCTION FENCING AT DRIP LINE OF TREES AND PLANTS NEAR THE WORK ZONE. DEEP WATER TREES WEEKLY HAND EXCAVATION REQUIRED AT ROOT ZONES WHERE PROPOSED PAVING OR UTILITY WORK IS WITHIN DRIPLINE OF TREES. REPAIR OF ANY DAMAGE TO EXISTING IMPROVEMENTS OR LANDSCAPING IS THE RESPONSIBILITY OF THE CONTRACTOR.	23. PROTECT ALL TREES AND VEGETATION. PLACE CONSTRUCTION FENCING AT DRIP LINE OF TREES AND PLANTS NEAR THE WORK ZONE. DEEP WATER TREES WEEKLY HAND EXCAVATION REQUIRED AT ROOT ZONES WHERE PROPOSED PAVING OR UTILITY WORK IS WITHIN DRIPLINE OF TREES. REPAIR OF ANY DAMAGE TO EXISTING IMPROVEMENTS OR LANDSCAPING IS THE RESPONSIBILITY OF THE CONTRACTOR.
24. THE WORK SHALL BE SURVEYED AND STAKED UNDER THE SUPERVISION OF A LICENSED LAND SURVEYOR IN ACCORDANCE WITH THE APPROVED PLANS.	24. THE WORK SHALL BE SURVEYED AND STAKED UNDER THE SUPERVISION OF A LICENSED LAND SURVEYOR IN ACCORDANCE WITH THE APPROVED PLANS.
25. RIM AND GRATE ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE ONLY AND ARE NOT TO BE TAKEN AS FINAL ELEVATIONS. THE CONTRACTOR SHALL ADJUST RIMS AND OTHER IMPROVEMENTS TO MATCH FINAL PAVEMENT AND FINISHED GRADE ELEVATIONS.	25. RIM AND GRATE ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE ONLY AND ARE NOT TO BE TAKEN AS FINAL ELEVATIONS. THE CONTRACTOR SHALL ADJUST RIMS AND OTHER IMPROVEMENTS TO MATCH FINAL PAVEMENT AND FINISHED GRADE ELEVATIONS.
26. THE CONTRACTOR SHALL FURNISH THE ENGINEER OF RECORD A COMPLETE SET OF CONSTRUCTION RECORD DRAWINGS ("AS-BUILTS"), FOR THE CONSTRUCTED IMPROVEMENTS. THE PLANS SHALL SHOW SUFFICIENT DIMENSION TIES TO PERMANENT SURFACE FEATURES FOR ALL BURIED FACILITIES TO ALLOW FOR FUTURE LOCATING. THE PLANS SHALL SHOW FINAL PAVEMENT, FLOW LINE ELEVATIONS, CONTOURS AT POND/DRAINAGE FEATURES (AS SURVEYED AND CERTIFIED BY A COLORADO P.L.S.), MANHOLE, PIPE, AND INLET LOCATIONS, INVERTS, GRATE ELEVATIONS, SIZES OF ALL UTILITIES, AND ANY VARIATIONS FROM THE APPROVED PLAN. FINAL AS-BUILT PLANS PREPARED BY THE ENGINEER OF RECORD SHALL BE PROVIDED TO THE TOWN OF BERTHOUD.	26. THE CONTRACTOR SHALL FURNISH THE ENGINEER OF RECORD A COMPLETE SET OF CONSTRUCTION RECORD DRAWINGS ("AS-BUILTS"), FOR THE CONSTRUCTED IMPROVEMENTS. THE PLANS SHALL SHOW SUFFICIENT DIMENSION TIES TO PERMANENT SURFACE FEATURES FOR ALL BURIED FACILITIES TO ALLOW FOR FUTURE LOCATING. THE PLANS SHALL SHOW FINAL PAVEMENT, FLOW LINE ELEVATIONS, CONTOURS AT POND/DRAINAGE FEATURES (AS SURVEYED AND CERTIFIED BY A COLORADO P.L.S.), MANHOLE, PIPE, AND INLET LOCATIONS, INVERTS, GRATE ELEVATIONS, SIZES OF ALL UTILITIES, AND ANY VARIATIONS FROM THE APPROVED PLAN. FINAL AS-BUILT PLANS PREPARED BY THE ENGINEER OF RECORD SHALL BE PROVIDED TO THE TOWN OF BERTHOUD.
27. IF A FOUNDATION UNDERDRAIN SYSTEM IS INSTALLED IN THE PUBLIC RIGHT-OF-WAY, THE FOLLOWING STATEMENT SHALL BE INCLUDED IN THE DRAWINGS: "A FOUNDATION UNDERDRAIN SYSTEM IS THE RESPONSIBILITY OF THE OWNER/DEVELOPER OR ITS ASSIGNS. THE TOWN IS NOT RESPONSIBLE FOR THE MAINTENANCE OR REPAIR OF SAID SYSTEM."	27. IF A FOUNDATION UNDERDRAIN SYSTEM IS INSTALLED IN THE PUBLIC RIGHT-OF-WAY, THE FOLLOWING STATEMENT SHALL BE INCLUDED IN THE DRAWINGS: "A FOUNDATION UNDERDRAIN SYSTEM IS THE RESPONSIBILITY OF THE OWNER/DEVELOPER OR ITS ASSIGNS. THE TOWN IS NOT RESPONSIBLE FOR THE MAINTENANCE OR REPAIR OF SAID SYSTEM."

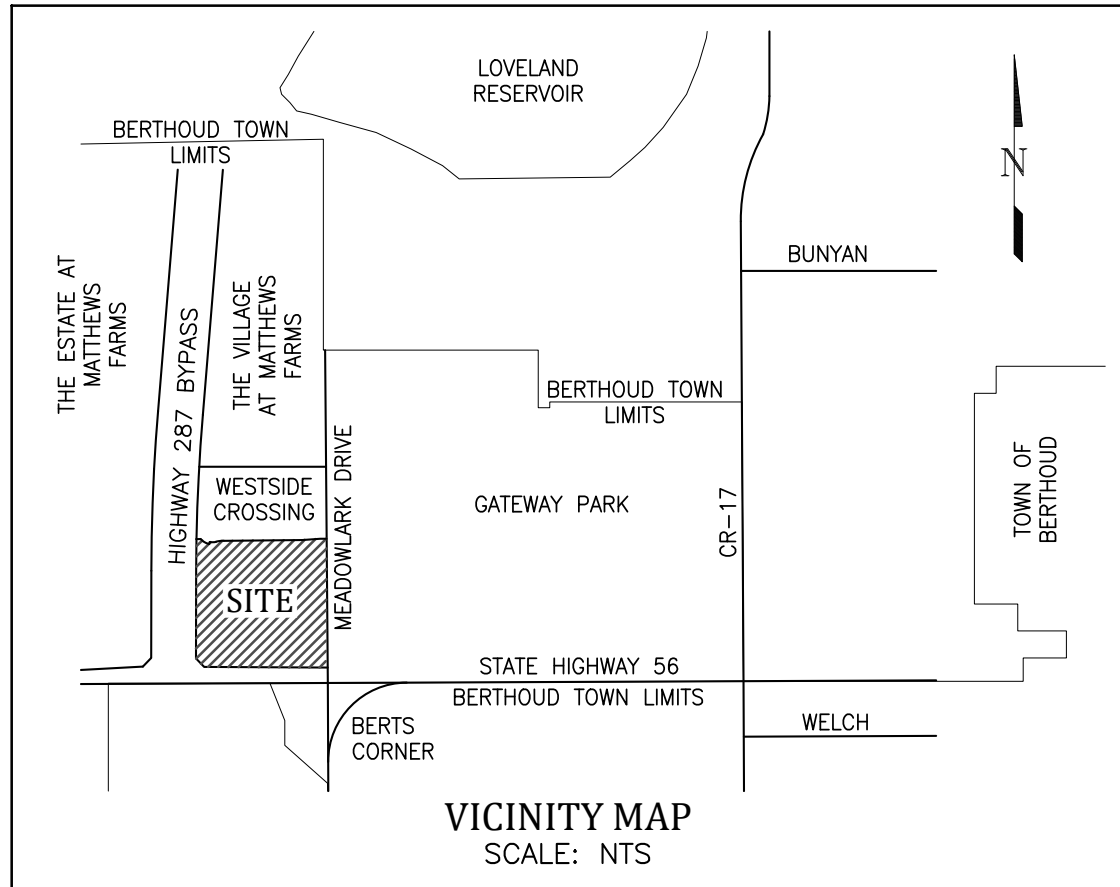
PRELIMINARY PLAT PLANS WESTSIDE CROSSING IN THE SOUTH HALF OF THE SOUTHWEST QUARTER SECTION 15, TOWNSHIP 4 RANGE 69 WEST OF THE 6TH P.M., CITY OF BERTHOUD, COUNTY OF LARIMER, STATE OF COLORADO

- GRADING NOTES:
- CONSTRUCTION SHALL ADHERE TO THE FOLLOWING SEQUENCE UNLESS OTHERWISE SPECIFIED BY THE TOWN ENGINEER: SANITARY SEWER INSTALLATION, WATER MAIN INSTALLATION, CURB AND GUTTER INSTALLATION, WATER SERVICE INSTALLATION.
 - COMPACTION OF ALL TRENCHES MUST BE ATTAINED AND COMPACTION TEST RESULTS SUBMITTED TO THE ENGINEER AND THE TOWN OF BERTHOUD PRIOR TO FINAL ACCEPTANCE.
 - ALL WORK, INCLUDING CORRECTION WORK, SHALL BE INSPECTED BY A TOWN REPRESENTATIVE WHO SHALL HAVE THE AUTHORITY TO HALT CONSTRUCTION WHEN STANDARD CONSTRUCTION PRACTICES ARE NOT BEING ADHERED TO.
 - DEVELOPER AND BUILDER SHALL REGULARLY PATROL THE PUBLIC LANDS ADJACENT TO THE DEVELOPMENT TO REMOVE CONSTRUCTION DEBRIS AND KEEP THE SITE CLEAN AND SAFE.
 - ALL SITE GRADING (EXCAVATION, EMBANKMENT, AND COMPACTION) SHALL CONFORM TO THE RECOMMENDATIONS OF THE LATEST SOILS INVESTIGATION FOR THIS PROPERTY AND SHALL FURTHER BE IN CONFORMANCE WITH THE TOWN OF BERTHOUD STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC AND PRIVATE IMPROVEMENTS, LATEST EDITION. A CDPS GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES SHALL BE OBTAINED PRIOR TO ANY GRADING BEING PERFORMED ON SITES ONE (1) ACRE OR LARGER IN SIZE. THESE PERMITS CAN BE OBTAINED FROM THE STATE WATER QUALITY CONTROL DIVISION.
 - NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHEREVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATION AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.
 - TOPSOIL SHALL BE STOCKPILED TO THE EXTENT PRACTICABLE ON THE SITE FOR USE ON AREAS TO BE REVEGETATED. ANY AND ALL STOCKPILES SHALL BE LOCATED AND PROPER MEASURES TAKEN TO CONTROL EROSION AND SEDIMENT MOVEMENT.
 - AT ALL TIMES, THE PROPERTY SHALL BE MAINTAINED AND/OR WATERED TO PREVENT WIND-CAUSED EROSION. EARTHWORK OPERATIONS SHALL BE DISCONTINUED WHEN DUST SIGNIFICANTLY IMPACTS ADJACENT PROPERTY. IF EARTHWORK IS COMPLETE OR DISCONTINUED AND DUST FROM THE SITE CONTINUES TO CREATE PROBLEMS, THE OWNER/DEVELOPER SHALL IMMEDIATELY INSTITUTE MITIGATIVE MEASURES AND SHALL CORRECT DAMAGE TO ADJACENT PROPERTY.
 - PERMANENT SLOPES SHALL NOT EXCEED 4:1 (H:V) IN AREAS TO BE SEEDED OR SOODED. RETAINING WALLS SHALL BE REVIEWED AND APPROVED BY SEPARATE APPLICATION TO THE TOWN OF BERTHOUD.
 - THIS EROSION AND SEDIMENT CONTROL PLAN HAS BEEN SUBMITTED TO THE TOWN OF BERTHOUD AND IS IN GENERAL CONFORMANCE WITH THE TOWN'S EROSION CONTROL STANDARDS. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURE MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEM OR IF THE PROPOSED EROSION CONTROL MEASURES DO NOT FUNCTION AS INTENDED. THE REQUIREMENTS OF THIS EROSION CONTROL PLAN AND THE OBLIGATION OF THE LANDOWNER SHALL RUN WITH THE LAND UNTIL SUCH TIME AS THE EROSION CONTROL PLAN IS PROPERLY COMPLETED, OFFICIALLY MODIFIED, OR VOIDED.

- WATER NOTES:
- ALL WATER MATERIALS, CONSTRUCTION, AND TESTING SHALL MEET THE REQUIREMENTS OF BERTHOUD STANDARDS AND SPECIFICATIONS AND THE BERTHOUD FIRE PROTECTION DISTRICT SPECIFICATIONS.
 - FIRE HYDRANT SPECIFICATIONS:
 - ALL FIRE HYDRANTS WILL BE MUELLER.
 - ALL HYDRANTS WILL HAVE A FIVE AND ONE-QUARTER (5-1/4) INCH OR LARGER VALVE OPENING, TWO (2) TWO AND ONE-HALF (2-1/2) INCH HOSE NOZZLES, ONE (1) PUMPER NOZZLE AND SIX (6) INCH OR LARGER MECHANICAL JOINT INLET.
 - ALL NOZZLES SHALL HAVE NATIONAL STANDARD THREADS.
 - THE HYDRANT SHALL BE OF TRAFFIC HAZARD TYPE WITH SAFETY FEATURES WHICH WILL PREVENT BARREL BREAKAGE.
 - SPECIFICATIONS FOR THE OPERATING NUT AND STUBS AND CUPS SHALL BE ONE (1) INCH SQUARE OR PENTAGON AND OPEN RIGHT.
 - WATER SERVICE LINE SPECIFICATIONS:
 - CORPORATION STOPS SHALL HAVE INLET THREADED CC TYPE, OUTLET COPPER COMPRESSION OR FLARE, NO SOLDERING WILL BE ALLOWED.
 - SERVICE SADDLES SHALL BE "O" RING GASKET, DOUBLE BAND, OR HINGE PIN CC THREAD, 3/4 INCH - 2 INCH COPPER.
 - CURB STOP STYLE SHALL BE COMPRESSION OR FLARED COPPER BOTH ENDS, MINNEAPOLIS PATTERN VALVE-THREADS AROUND TO ALLOW MINNEAPOLIS STYLE CURB BOX.
 - CURB BOX SHALL HAVE MINNEAPOLIS BASE EXTENSION TYPE CURB BOXES, CAST IRON LID AND BASE WITH BRASS PENTAGON HEAD PLUG USING A 1 1/2 INCH UPPER SECTION.
 - ALL WATER VALVES SHALL OPEN LEFT.
 - THE MINIMUM COVER OVER THE WATER LINE IS 5 FEET AND THE MAXIMUM COVER IS 6 FEET UNLESS OTHERWISE NOTED IN THE PLANS AND APPROVED BY THE TOWN.
 - PRIOR TO INSTALLATION OF WATER MAINS, ROAD/DRIVE CONSTRUCTION MUST HAVE PROGRESSED TO AT LEAST THE "SUB-GRADE" STATE. SUB-GRADE IS DEFINED AS AN ELEVATION OF NO MORE THAN SEVEN (7) INCHES BELOW THE FINISHED STREET GRADE. ALL VALVE BOXES AND FIRE HYDRANTS WILL BE ADJUSTED TO THE FINAL FINISHED GRADE BY THE CONTRACTOR.
 - BEFORE ANY TAPS ARE MADE FROM MAINS, APPLICATIONS FOR THE TAPS MUST BE RECEIVED AND APPROVED BY THE TOWN.
 - TRACER WIRE SHALL BE USED FOR ALL NON-METALLIC WATER MAINS. TRACER WIRE SHALL BE BROUGHT UP TO TEST STATIONS AT ALL FIRE HYDRANTS.
 - PVC WATER MAINS SHALL BE AWWA C900, DR 18
 - ALL WATER SERVICES SHALL BE TYPE K COPPER.
 - CONTRACTOR TO CONTACT BUILDING DEPARTMENT PRIOR TO INSTALLATION OF METER SETTER.

- SANITARY NOTES
- MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE TOWN OF BERTHOUD STANDARDS AND SPECIFICATIONS AND WORK SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY AUTHORIZED TOWN OF BERTHOUD PERSONNEL.
 - NEW SEWER MAINS SHALL BE POLYVINYL CHLORIDE (PVC) ASTM D3034 SDR-35 PIPE AND IN ACCORDANCE WITH THE ABOVE REFERENCED SPECIFICATIONS.
 - CONTRACTOR TO VERIFY LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES PRIOR TO COMMENCING ANY CONSTRUCTION.
 - THE CONTRACTOR SHALL NOTIFY THE TOWN A MINIMUM OF 48 HOURS AND A MAXIMUM OF 96 HOURS PRIOR TO STARTING CONSTRUCTION OR PRIOR TO RESUMING CONSTRUCTION AFTER A BREAK.
 - MAINTAIN A MINIMUM OF 10 FEET HORIZONTAL SEPARATION OUTSIDE DIAMETER TO OUTSIDE DIAMETER BETWEEN WATER MAINS AND ALL SEWER MAINS AND MANHOLES.
 - ALL SEWER MAINS CROSSING WATER MAINS WITH LESS THAN 18 INCHES OF SEPARATION SHALL BE ENCASED IN CONCRETE.
 - RIM ELEVATIONS SHOWN ARE APPROXIMATE AND SHOULD NOT BE TAKEN AS FINAL. ALL MANHOLES SHALL BE FINAL ADJUSTED AFTER PAVING SUCH THAT THE RIM IS 1/4 TO 1/2 INCH BELOW FINISHED ASPHALT. MANHOLES IN UNPAVED AREAS SHALL BE SET SO THAT THE RIM IS 0.5' ABOVE FINISHED GRADE. BURIED MANHOLES ALLOWED IN CULTIVATED FIELDS AS APPROVED BY TOWN ENGINEER. AS-BUILTS SHALL ALLOW FINAL NORTHING/EASTING AND RIM ELEVATION OF ALL BURIED MANHOLES.
 - INVERT (AS-BUILT) DATA SHALL BE COLLECTED BY A LICENSED SURVEYOR ON EACH PIPE INVERT IN A MANHOLE. CENTER OF MANHOLE SURVEYING IS NOT ACCEPTABLE FOR SLOPE CALCULATIONS. RECORD DRAWINGS (AS-BUILTS) MUST DEMONSTRATE CONFORMANCE TO TOWN STANDARDS.
 - THE CONTRACTOR SHALL HAVE A SET OF APPROVED PLANS ON SITE AT ALL TIMES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING ACTUAL RECORD DRAWING DIMENSIONS AND DISTANCES AS WELL AS SERVICE LOCATIONS ON THESE PLANS AND SUBMITTING THEM TO THE ENGINEER FOR PREPARATION OF RECORD DRAWINGS. THESE DRAWINGS SHALL BE KEPT CURRENT AT ALL TIMES.

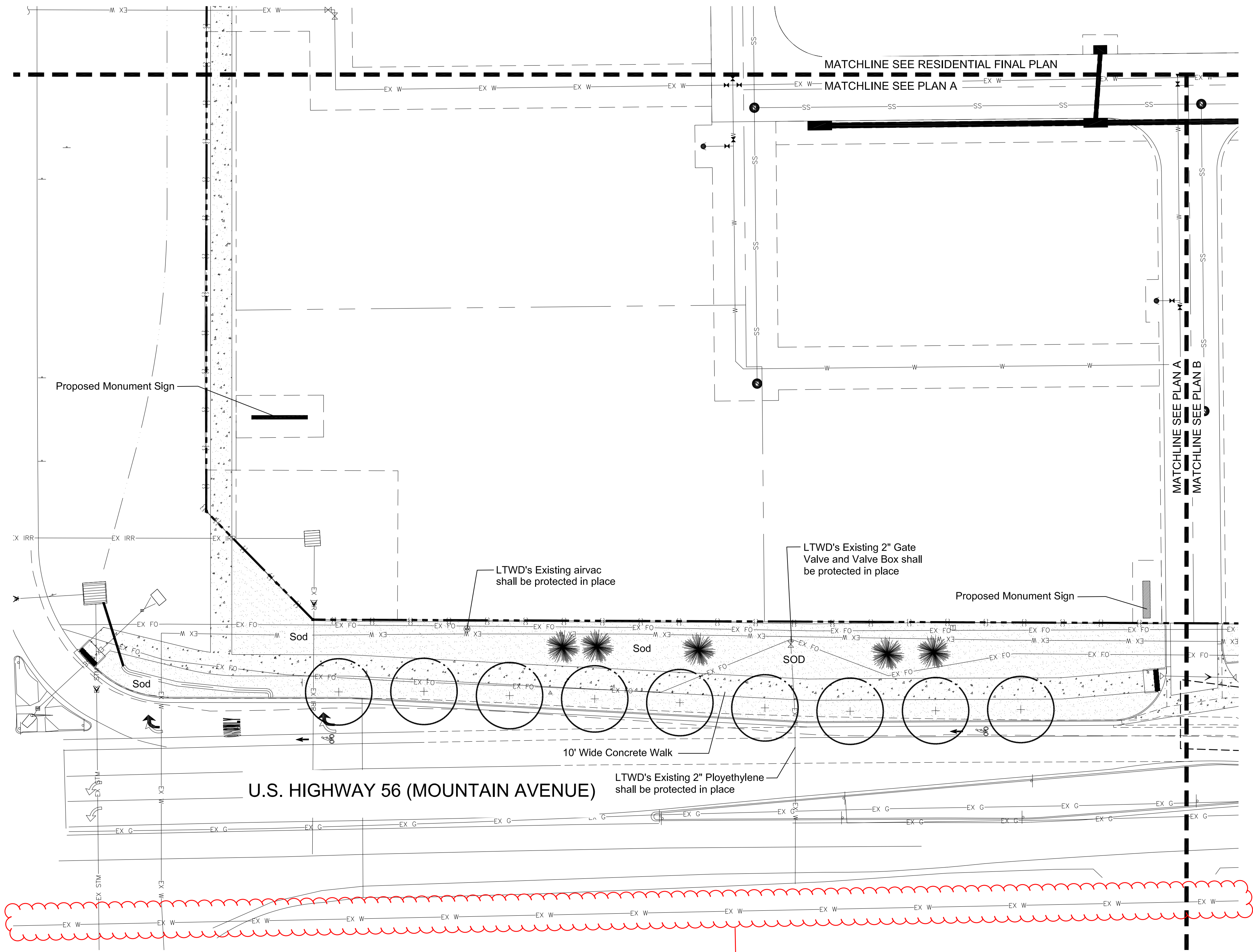
- BEFORE ANY CONSTRUCTION COMMENCES, A PLUG SHALL BE INSTALLED TO PREVENT DRAINAGE THROUGH THE NEW SEWER LINE FROM ENTERING THE EXISTING SEWER LINE. THIS PLUG WILL BE INSTALLED IN THE MANHOLE, WHICH CONNECTS NEW WORK WITH THE EXISTING AND MAY NOT BE REMOVED UNTIL SUBSTANTIAL ACCEPTANCE.
- UNDERDRAINS, IF INSTALLED, ARE THE RESPONSIBILITY OF THE DEVELOPER. THE TOWN ASSUMES NO LIABILITY FOR ANY PORTION OF OR ANY DAMAGE CAUSED BY UNDERDRAINS. ABSOLUTELY NO PART OF AN UNDERDRAIN SYSTEM, INCLUDING CLEAN OUTS, WILL BE ALLOWED INSIDE OF SANITARY SEWER MANHOLES. ALL UNDERDRAINS SHALL BE INSTALLED BELOW THE SANITARY SEWER AND OFFSET TO THE SIDE. PIPE MATERIAL SHALL BE DIFFERENT COLOR THAN SANITARY SEWER.
- NO SERVICE LATERALS SMALLER THAN 8-INCH IN DIAMETER SHALL ENTER MANHOLES.
- SERVICE CROSSINGS OF CURB SHALL BE MARKED WITH A CUT "S" IN CURB FACE. PAINT IS NOT ACCEPTABLE. SERVICE SHALL BE EXTENDED INTO THE LOT A MINIMUM OF 10 FEET.
- CONTRACTOR SHALL MARK THE END OF ALL SEWER SERVICES AND MAIN STUBS WITH A CARBONITE COMPOSITE UTILITY MARKER WITH MINIMUM OF FOUR FEET ABOVE GRADE, PAINTED GREEN.
- ALL 8-INCH PIPES SHALL HAVE SQUEEGEE (CDOT #8 BEDDING) UNLESS OTHERWISE SHOWN OR THE TOWN MAY APPROVE AN ALTERNATE BEDDING IN SPECIAL CASES. LARGER PIPES REQUIRE WASHED OR CRUSHED ROCK AS SHOWN IN THE CONSTRUCTION SPECIFICATIONS.
- PRIOR TO APPROVAL, ALL SANITARY SEWER PIPES SHALL BE PRESSURE TESTED PER ASTM C924. ALL MANHOLES SHALL BE VACUUM-TESTED PER UNIB-98.
- PRIOR TO REMOVAL OF PLUGS AT MANHOLES, PIPE SHALL BE JET-CLEANED AND VACUUMED TO REMOVE DEBRIS AND VIDEOED. NOTICE SHALL BE GIVEN TO THE TOWN INSPECTOR ONE (1) WEEK PRIOR TO CLEANING. INSPECTOR MUST BE PRESENT DURING THE OPERATION. ONCE APPROVAL HAS BEEN GIVEN BY INSPECTOR, PLUGS MAY ONLY BE REMOVED AFTER CONDITIONAL ACCEPTANCE BY THE TOWN.
- THE FINAL RECORDED PLAT AND RECORDED ADDRESS PLAT SHALL BE PROVIDED TO THE TOWN FOR CONDITIONAL ACCEPTANCE.
- TWENTY (20) MONTHS AFTER CONSTRUCTION AND PRIOR TO THE EXPIRATION OF WARRANTY, THE DEVELOPER SHALL CAMERA/VIDEO THE SANITARY SEWER LINES AND PROVIDE A DVD TO THE TOWN FOR REVIEW.



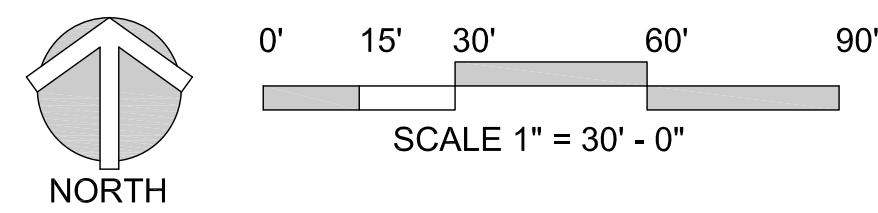
INDEX OF SHEETS	
1	COVER
2	PRELIMINARY SITE PLAN
3	PRELIMINARY UTILITY PLAN
4	PRELIMINARY GRADING PLAN
5	PRELIMINARY DETAIL SHEET AND STREET SECTIONS
6	L1.1 OVERALL LANDSCAPE PLAN
7	L1.2 PRELIMINARY LANDSCAPE PLAN 'A'
8	L1.3 PRELIMINARY LANDSCAPE PLAN 'B'
9	L1.4 LANDSCAPE NOTES & PLAN MATERIAL SCHEDULE
10	L1.5 LANDSCAPE DETAILS

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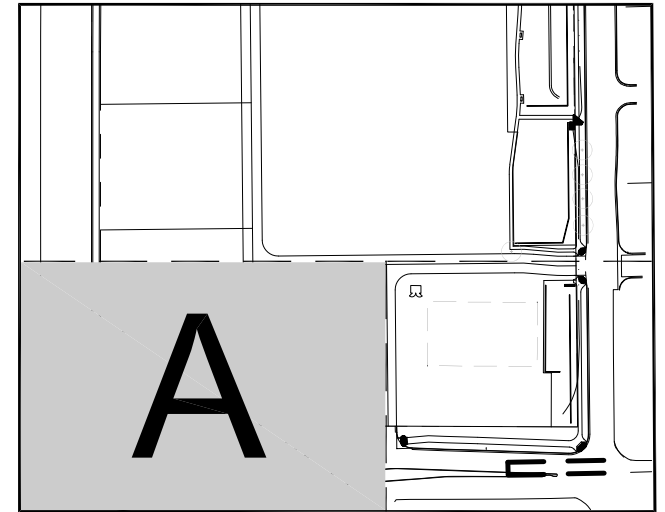
ABBREVIATIONS	
ASSY = ASSEMBLY	NTS = NOT TO SCALE
BNDY = BOUNDARY	OD = OUTSIDE DIAMETER
BOP = BOTTOM OF PIPE	PC = POINT OF HORIZONTAL CURVATURE
C&G = CURB & GUTTER	PLBG = PLUMBING
CL = CENTERLINE	POC = POINT OF CONNECTION
CO = CLEAN OUT	PP = PROPOSED
CRA = CONCRETE REVERSE ANCHOR	PRC = POINT OF REVERSE CURVE
OR = POINT OF CURB RETURN	PROP = PROPERTY
CS = CROSS SLOPE	PRT = PRIVATE
CTB = CONCRETE THRUST BLOCK	PT = POINT OF HORIZONTAL TANGENCY
DIP = DUCTILE IRON PIPE	PVC = POLY VINYL CHLORIDE PIPE
DETAL = DETAIL	PWC = POINT OF VERTICAL CURVATURE
EL = ELEVATION	PVI = POINT OF VERTICAL INTERSECTION
EOA = EDGE OF ASPHALT	PVT = POINT OF VERTICAL TANGENCY
ESMT = EASEMENT	R = RADIUS
EX = EXISTING	R = RIGHT
FC = FACE OF CURB	RCP = REINFORCED CONCRETE PIPE
FES = FLARED END SECTION	RD = ROOF DRAIN (STORM LINE)
FLG = FLANGE	RIG = RIGIDITY OF WAY
FL = FLOWLINE	RT = RIGHT
GB = GRADE BREAK	SHT = SHEET
GI = GREASE INTERCEPTOR	SOI = SAND OIL INTERCEPTOR
HP = HIGH POINT	SS = SANITARY SEWER
HORIZ= HORIZONTAL	STA = STATION
HYD = HYDRANT	STD = STANDARD
ID = INSIDE DIAMETER	TA = TOP OF ASPHALT
L = LEFT	TB = THRUST BLOCK
LT = LEFT	TC = TOP OF CURB
LF = LINEAR FEET	TD = TOP OF ASPHALT
LP = LOW POINT	TDC = TOP OF CONCRETE
MAX = MAXIMUM	TOP = TOP OF PIPE
MH = MANHOLE	TYP = TYPICAL
MIN = MINIMUM	VC = VERTICAL CURVE



PRELIMINARY LANDSCAPE PLAN A



LTWD does not have a waterline here.
Revise / call out ownership.



KEYMAP SCALE 1" = 300' - 0"

LEGEND:

- EXISTING SANITARY SEWER MANHOLE
- EXISTING TELEPHONE PEDESTAL
- EXISTING CABLE TV PEDESTAL
- EXISTING LIGHT POLE
- EXISTING ELECTRIC BOX
- EXISTING ELECTRIC MANHOLE
- EXISTING EASEMENT
- PROPOSED EASEMENT
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING UNDERGROUND ELECTRIC LINE
- EXISTING OVERHEAD UTILITY LINE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING UNDERGROUND TELEPHONE LINE
- EXISTING FIBER OPTIC LINE
- EXISTING GAS LINE
- PROPOSED SANITARY SERVICE
- PROPOSED WATER LINE OR SERVICE
- PROPOSED STORM LINE
- PROPOSED FIRE HYDRANT
- PROPOSED STORM SEWER PIPE AND MANHOLE
- PROPOSED CONTOUR
- DECIDUOUS TREES
- ORNAMENTAL TREES
- EVERGREEN TREE
- SHRUBS
- ORNAMENTAL GRASSES
- LOCALLY AVAILABLE FESCUE SOD MIX
- NON - IRRIGATED NATIVE GRASS MIX MIX RATIO:
 - 23% BLUE GRAMA
 - 10% BUFFALO GRASS
 - 20% GREEN NEEDLEGRASS
 - 20% SIDE OATS GRAMA
 - 25% WESTERN WHEATGRASS
 - 2% SAND DROPSEED
- NOTE: EROSION CONTROL BLANKET TO BE INSTALLED WHERE APPLICABLE
- SHREDDED CEDAR MULCH
- STEEL EDGING WITH PROTECTIVE CAP
- MATCHLINE
- PROPERTY LINE

Westside Crossing
Preliminary Plat

Preliminary Landscape Plan A

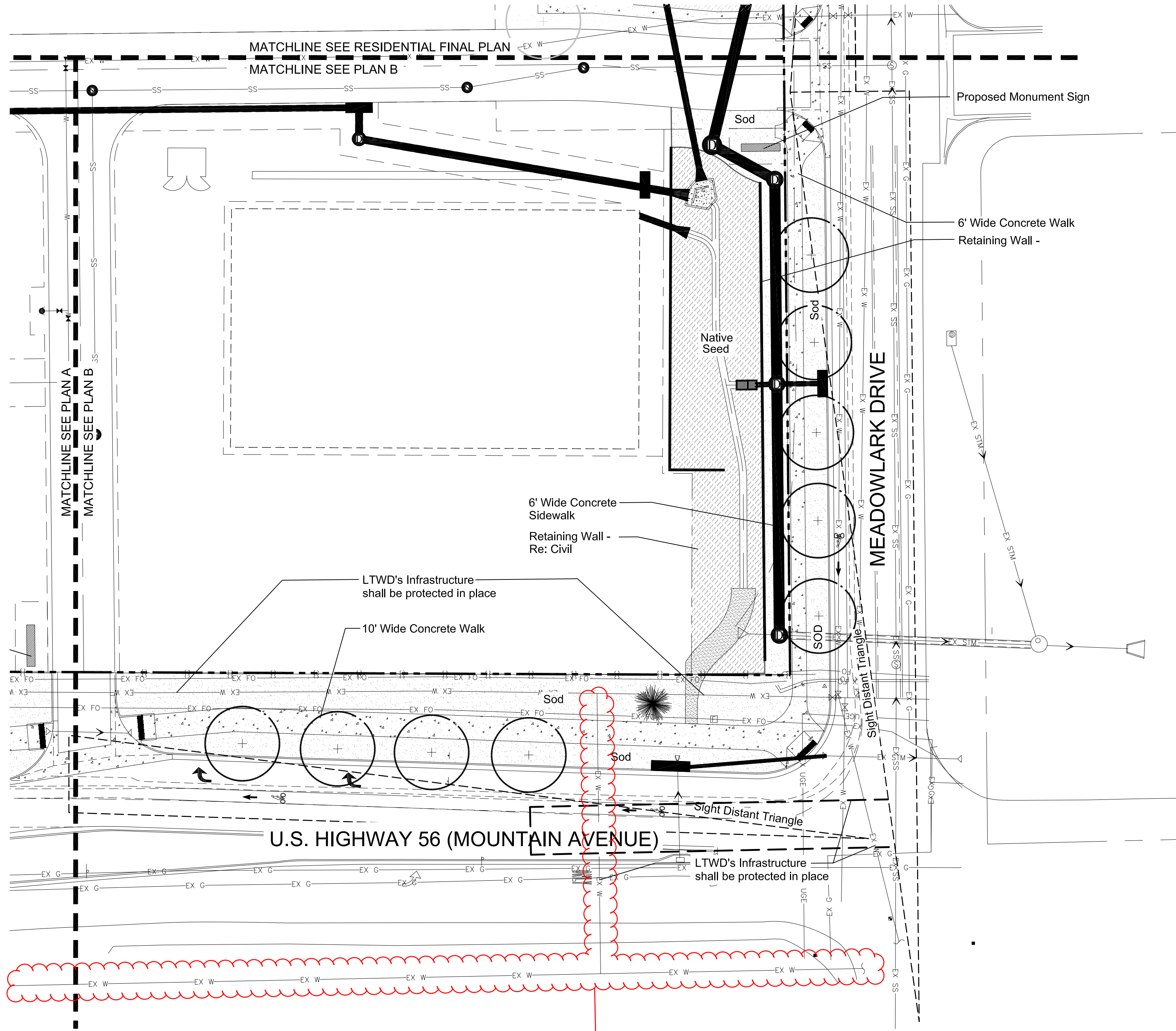
DATE:	REVISION:	Project Mgr:	JAH
4/28/23	Second Submittal	Drawn By:	SDW
6/28/23	Third Submittal	Checked By:	JAH
7/5/23	Fourth Submittal	Date:	1/5/23
		Scale:	1" = 30'

SHEET

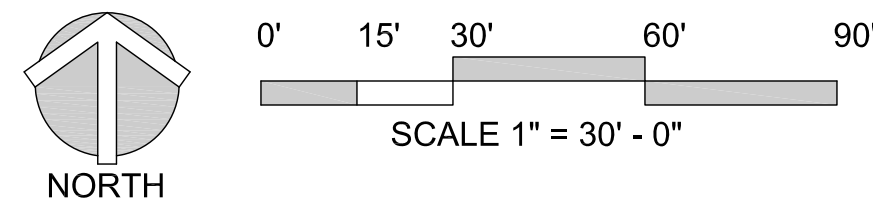
L1.2
2 of 5

STACKlot

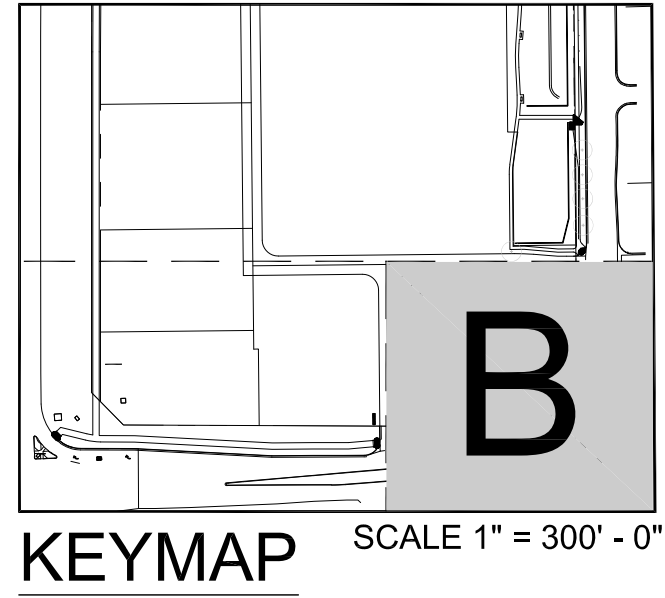
5639 south curcise street littleton, colorado 80120
p. 303.608.4523



PRELIMINARY LANDSCAPE PLAN B



LTWD does not have a waterline here.
Revise / call out ownership.



LEGEND:

- EXISTING SANITARY SEWER MANHOLE
- EXISTING TELEPHONE PEDESTAL
- EXISTING CABLE TV PEDESTAL
- EXISTING LIGHT POLE
- EXISTING ELECTRIC BOX
- EXISTING ELECTRIC MANHOLE
- EXISTING EASEMENT
- PROPOSED EASEMENT
- EXISTING WATER LINE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING UNDERGROUND ELECTRIC LINE
- EXISTING OVERHEAD UTILITY LINE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING UNDERGROUND TELEPHONE LINE
- EXISTING FIBER OPTIC LINE
- EXISTING GAS LINE
- PROPOSED SANITARY SERVICE
- PROPOSED WATER LINE OR SERVICE
- PROPOSED FIRE HYDRANT
- PROPOSED STORM SEWER PIPE AND MANHOLE
- PROPOSED CONTOUR
- PROPOSED RETAINING WALL
- SIGHT DISTANT TRIANGLE
- DECIDUOUS TREES
- ORNAMENTAL TREES
- EVERGREEN TREE
- SHRUBS
- ORNAMENTAL GRASSES
- LOCALLY AVAILABLE FESCUE SOD MIX
- NON - IRRIGATED NATIVE GRASS MIX MIX RATIO:
 - 23% BLUE GRAMA
 - 10% BUFFALO GRASS
 - 20% GREEN NEEDLEGRASS
 - 20% SIDE OATS GRAMA
 - 25% WESTERN WHEATGRASS
 - 2% SAND DROPSEED
- NOTE: EROSION CONTROL BLANKET TO BE INSTALLED WHERE APPLICABLE
- SHREDDED CEDAR MULCH
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Westside Crossing
Preliminary Plat

Preliminary Landscape Plan B

DATE:	REVISION:	Project Mgr:	JAH
4/28/23	Second Submittal	Drawn By:	SDW
6/28/23	Third Submittal	Checked By:	JAH
7/5/23	Fourth Submittal	Date:	1/5/23
		Scale:	1" = 30'

Preliminary Drainage Report.pdf Markup Summary

Iseeber (1)



Subject: Engineer
Page Label: 6
Author: Iseeber
Date: 7/26/2023 10:20:19 AM
Status:
Color: ■
Layer:
Space:

If flooding of Meadowlark did not happen prior to the proposed development, an additional solution will need to be proposed so that flooding does not occur



Town of Berthoud
807 Mountain Ave.
P.O. Box 1229
Berthoud, CO 80513
970.532.2643

DEVELOPMENT REVIEW APPLICATION

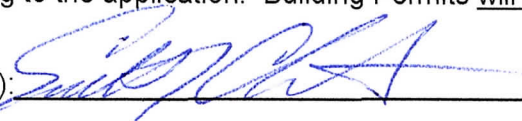
All required information must be provided before submittal will be accepted and deemed complete.
To be complete, the application must include all items identified on the submittal checklist.
Please complete both sides of application form.

Parcel Number(s):		
Site Address: Northeast corner of US HWY 287 Bypass and HWY 56		
Project Name: Westside Crossing		
Brief description of project: Retail, commercial development on +/- 11.9 acres		
APPLICATION TYPE (Check as appropriate):		
☐ Annexation	☒ Preliminary Subdivision Plat	☐ Final Site Plan
☐ Rezoning	☐ Final Subdivision Plat	☐ PUD Amendment
☐ Concept Plan	☐ Plat Amendment	☐ PUD Preliminary Development Plan
☐ Minor Subdivision	☐ Oil and Gas	☐ PUD Final Development Plan
☐ Special Use Review	☐ ROW Vacation	☐ Other _____
APPLICANT		
Name: Scott Charpentier		
E-mail: scott@fcmoney.com	Mailing Address: 8340 Loudon Circle	
Phone: 970-484-5626	City/State/Zip: Windsor, CO 80528	
CONTACT PERSON (will receive correspondence from Town Staff/Referral Agencies)		
Name: Jay Stoner (Land Developers, Inc.)		
E-mail: jay@ldcolorado.com	Mailing Address: 5655 Bridlespur Ridge Place	
Phone: 970-484-5626	City/State/Zip: Colorado Springs, CO 80918	
OWNER(S) (If different than applicant)		
Name:		
E-mail:	Mailing Address:	
Phone:	City/State/Zip:	
CONSULTANT (Engineer, Surveyor, or Planner)		
Name: Steve Wiens		
E-mail: steve@stacklot.com	Mailing Address: 5639 South Curtice St	
Phone: 303-808-4523	City/State/Zip: Littleton, CO 80120	

LAND USE INFORMATION							
Existing Use: Vacant Land Proposed Use: Commercial Existing Zoning: C2 Proposed Zoning: (if applicable): Number of acres: 11.9+ Proposed Access: HWY 56 and Meadowlark	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center; background-color: #e0f0ff;">Adjacent zoning / land use:</th> </tr> </thead> <tbody> <tr> <td style="width: 50%;">East Side: Residential and Commercial</td> <td style="width: 50%;">North Side: Residential</td> </tr> <tr> <td>West Side: HWY 287</td> <td>South Side: HWY 56</td> </tr> </tbody> </table>	Adjacent zoning / land use:		East Side: Residential and Commercial	North Side: Residential	West Side: HWY 287	South Side: HWY 56
Adjacent zoning / land use:							
East Side: Residential and Commercial	North Side: Residential						
West Side: HWY 287	South Side: HWY 56						
UTILITY SERVICE INFORMATION							
Water: Berthoud	Sewer: Berthoud						
PROJECT INFORMATION							
Number of proposed units: N/A Number of phases: N/A Number of Units per phase: N/A Number of lots proposed: N/A Lot size minimum: N/A Lot size maximum: N/A Lot size average: N/A Gross density (units/acre): N/A Net density (units/acre): N/A Area and percent open space: N/A	Non-Residential Building Area (Sq. Ft.) Proposed: +/- 125,000 Non-Residential Construction Floor Area Ratio Proposed: 15%-25% Total Number of Parking Spaces: Per Code <u>Acreage of Site:</u> a. Gross: 11.9 commercial b. Right-of-Way: N/A c. Net (a-b) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center; background-color: #e0f0ff;">Type of Housing Proposed (please check):</th> </tr> </thead> <tbody> <tr> <td style="width: 50%; vertical-align: top;"> ☐ Future Single Family ☐ Duplex ☐ Multi-family (# of units:) </td> <td style="width: 50%; vertical-align: top;"> ☐ Townhouse ☐ Condominium </td> </tr> </tbody> </table>	Type of Housing Proposed (please check):		☐ Future Single Family ☐ Duplex ☐ Multi-family (# of units:)	☐ Townhouse ☐ Condominium		
Type of Housing Proposed (please check):							
☐ Future Single Family ☐ Duplex ☐ Multi-family (# of units:)	☐ Townhouse ☐ Condominium						

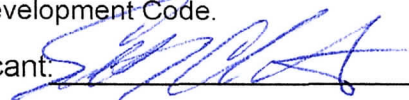
Signatures are required for ALL Property Owners and the Applicant

I hereby certify that I am the lawful owner of the parcel(s) of land that this application concerns and consent to the action. I hereby permit Town of Berthoud staff to enter upon the property for the purposes of inspection relating to the application. Building Permits will not be accepted while this application is in process.

Property Owner(s):  Date: 1-3-23

Property Owner(s): _____ Date: _____

In submitting the application materials and signing this application agreement, I acknowledge and agree that the application is subject to the applicable processing and public hearing requirements set forth in the Development Code.

Applicant:  Date: 1-3-23

FOR OFFICE USE ONLY

Received By:

Date:

DISCLAIMER: Drawing represents an illustrative masterplan, identifying proposed uses, buildings, parking and site circulation. This drawing is subject to change at time of final plat and site plan submittal.



Scale: 1" = 60'



O:\20220491-A\dwg\20220491A-SUB.dwg, sh(1), 7/6/2023 8:29:33 AM, 1:1

PRELIMINARY PLAT
WESTSIDE CROSSING REPLAT #2

Being a Replat of Tract A, Westside Crossing,
Situate in the South Half of the Southwest Quarter of Section 15, Township 4 North, Range 69 West of the 6th P.M.,
Town of Berthoud, County of Larimer, State of Colorado

LEGAL DESCRIPTION:

KNOW ALL MEN BY THESE PRESENTS: That the undersigned, being the owners of a portion of the Southwest Quarter Section Fifteen (15), Township Four North (T.4N.), Range Sixty-nine West (R.69W.) of the 6th Principal Meridian, Town of Berthoud, County of Larimer, State of Colorado, more particularly described as follows:

Tract A, Westside Crossing, recorded July 5, 2022 as Reception No. 20220042194 of the Records of Larimer County.

Said described parcel of land contains 11.901 Acres, more or less (±).

Have laid out, platted, and subdivided the above described land, under the name and style of WESTSIDE CROSSING REPLAT #2, and by these presents do dedicate to the Town of Berthoud in fee simple the street and public "rights-of-way" as shown on the plats, and grants to the Town of Berthoud such easements as are created hereby and depicted or, by note, referenced hereon, along with the right to install, maintain, and operate mains, transmission lines, service lines, and appurtenances, either directly or through the various public utilities, as may be necessary to provide such utility, cable television, and sanitary services within this subdivision or property contiguous thereto, through, over, under, and across streets, utility and other easements, and other public places as shown on the plat.

OWNER: Berthoud Gateway LLC, a Colorado limited liability company

By: _____ As: _____

NOTARIAL CERTIFICATE

STATE OF _____)
ss
COUNTY OF _____)

The foregoing dedication was acknowledged before me this _____ day of _____, 20 ____
by _____ as _____

Witness my hand and official seal. (SEAL)

My commission expires _____

Notary Public

LEINHOLDER: Westland Holdings, Inc.

By: _____ As: _____

NOTARIAL CERTIFICATE

STATE OF _____)
ss
COUNTY OF _____)

The foregoing dedication was acknowledged before me this _____ day of _____, 20 ____
by _____ as _____

Witness my hand and official seal. (SEAL)

My commission expires _____

Notary Public

LEINHOLDER: Camco LLC

By: _____ As: _____

NOTARIAL CERTIFICATE

STATE OF _____)
ss
COUNTY OF _____)

The foregoing dedication was acknowledged before me this _____ day of _____, 20 ____
by _____ as _____

Witness my hand and official seal. (SEAL)

My commission expires _____

Notary Public

BASIS OF BEARINGS AND LINEAL UNIT DEFINITION

Assuming the East line of the South Half of the Southwest Quarter of Section 15, T.4N., R.69W, being monumentalized by a #6 rebar with a 2" Aluminum Cap stamped "LS 27936" on the North end and by a #6 rebar with a 3 1/4" aluminum cap stamped "LS 16415" on the South end, as bearing South 00°34'48" East, being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, a distance of 1330.11 feet with all other bearings contained herein relative thereto.

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

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. (13-80-105 C.R.S. 2012)

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 FC25193574.1-6, dated June 22, 2023 as prepared by Land Title Guarantee Company to delineate the aforesaid information.

SURVEYOR'S CERTIFICATE:

I, Paul B. Groves, a Registered Land Surveyor in the State of Colorado, do hereby certify that the survey of WESTSIDE CROSSING REPLAT #2 was made under my supervision and the accompanying plat accurately and properly shows said subdivision and is in compliance with the Subdivision Regulations of the Town of Berthoud.

PRELIMINARY

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

RIGHT TO FARM STATEMENT:

The Town of Berthoud has adopted a "Right to Farm" policy. All new and existing residents are expected to read and understand the policy. For a copy of the policy, please contact the Town of Berthoud.

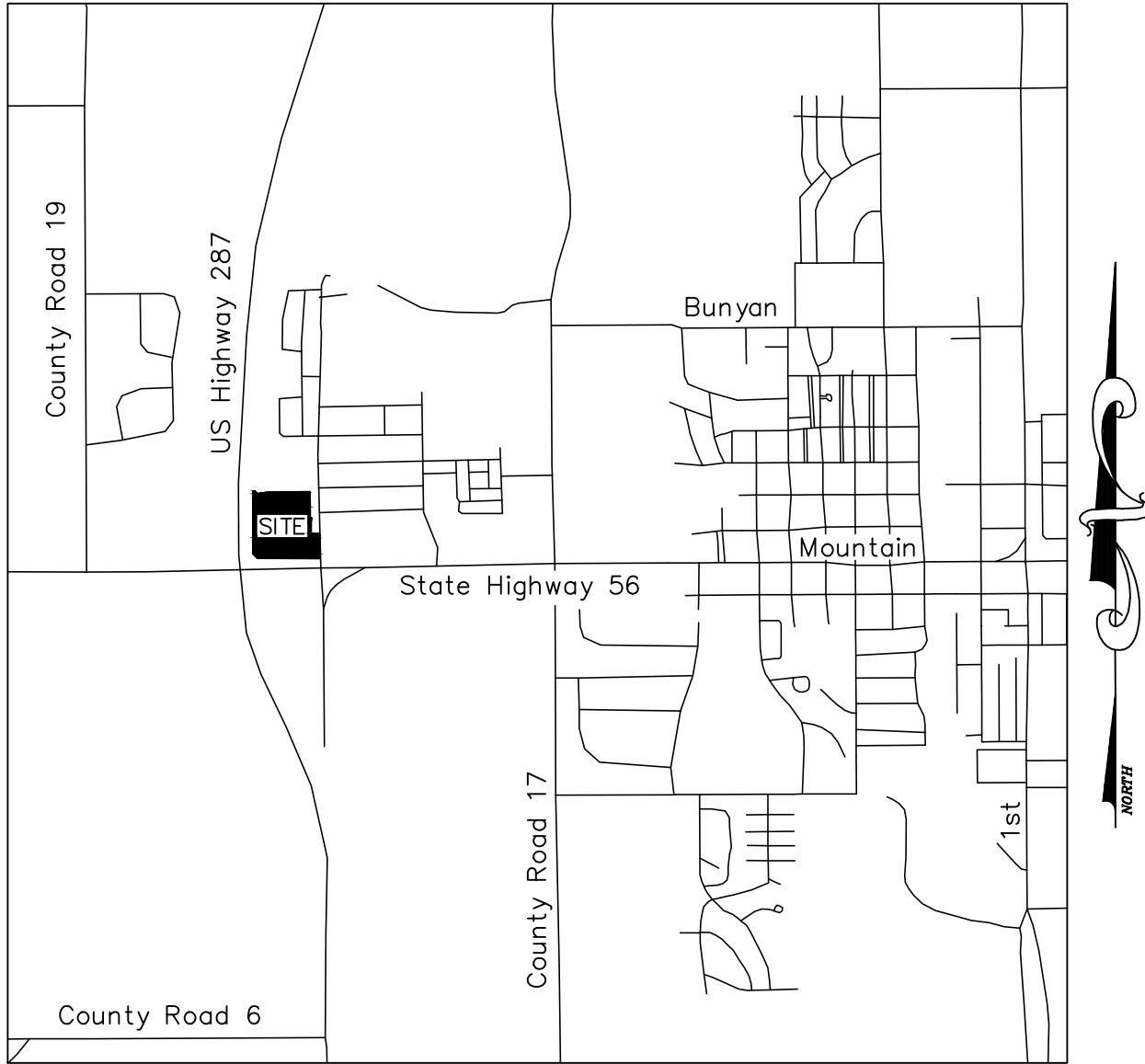
APPROVAL CERTIFICATES:

Approved by the Town of Berthoud, Colorado,
this _____ day of _____, A.D., 20 ____.

Mayor

The foregoing plat is approved for filing and accepted by the Town of Berthoud, Colorado,
this _____ day of _____, A.D., 20 ____.

ATTEST: _____
Town Clerk



VICINITY MAP
SCALE: 1"=2000'

DATE:	12/13/2022
FILE NAME:	20220491A-SUB
SCALE:	1"=30'
DRAWN BY:	CSK
CHECKED BY:	PG

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



REVISIONS:	DATE:
REVISED ESMTS & LOTS	CSK 5/1/23
REVISED ESMTS & LOTS	CSK 7/6/23

WESTSIDE CROSSING REPLAT #2
FOR
BERTHOUD GATEWAY LLC
8340 LOUDEN CIRCLE
WINDSOR, CO 80528

PROJECT #:
20220491-A

1
SHEET 1 OF 2

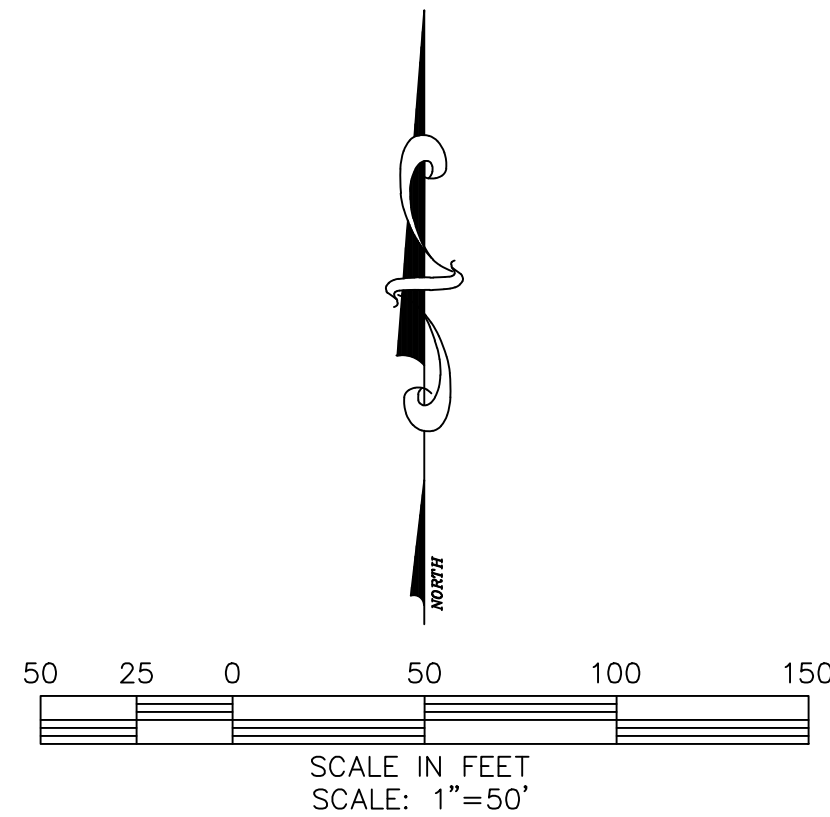
PRELIMINARY PLAT
WESTSIDE CROSSING REPLAT #2

Being a Replat of Tract A, Westside Crossing,
Situate in the South Half of the Southwest Quarter of Section 15, Township 4 North, Range 69 West of the 6th P.M.,
Town of Berthoud, County of Larimer, State of Colorado

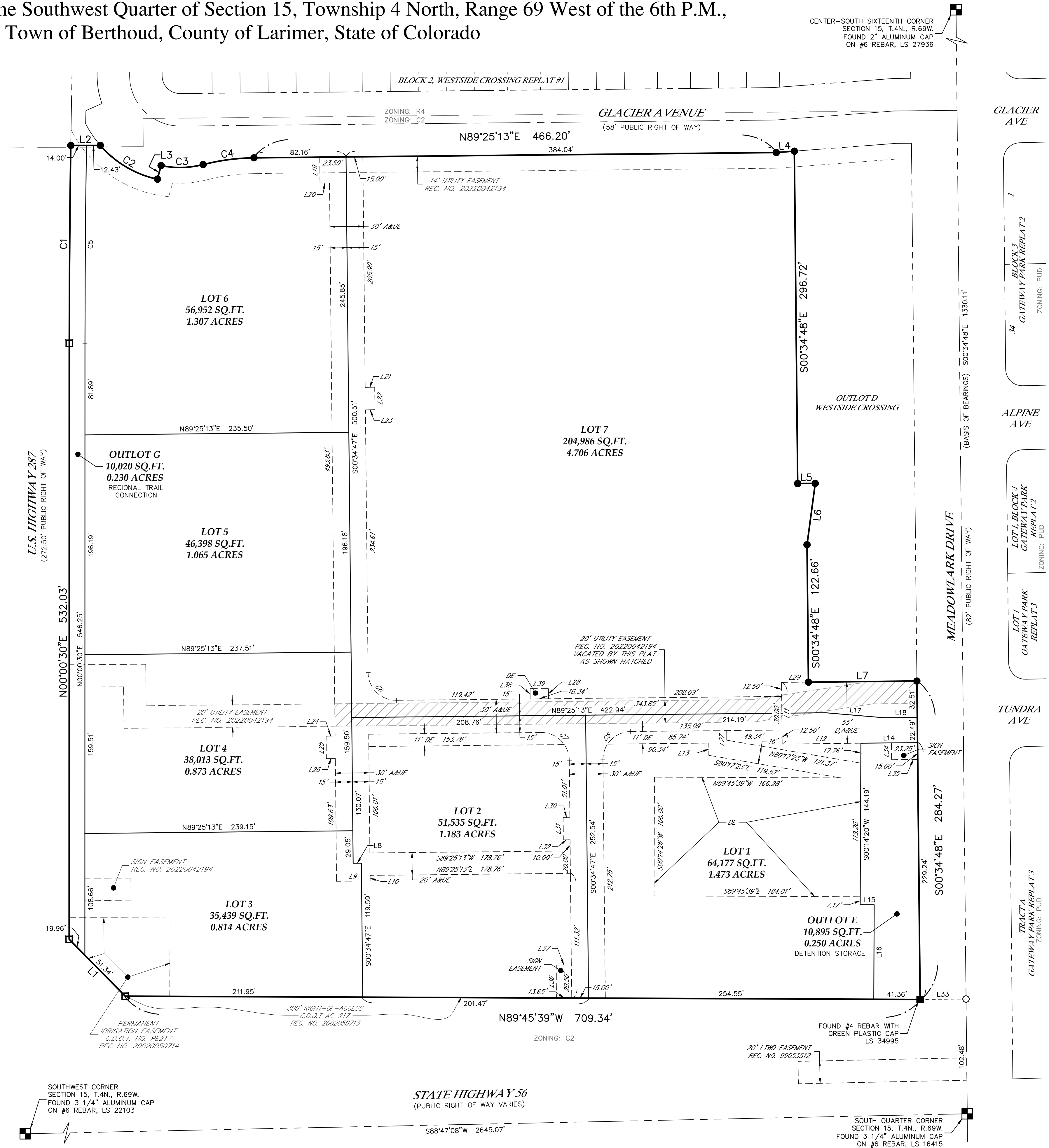
CURVE TABLE					
CURVE	LENGTH	RADIUS	DELTA	CHORD	CH BEARING
C1	176.56'	11862.50'	0°51'10"	176.56'	N00°26'05"E
C2	60.06'	94.50'	36°24'51"	59.05'	S59°25'52"E
C3	37.80'	82.00'	26°24'53"	37.47'	N88°38'43"E
C4	45.88'	188.00'	13°58'56"	45.77'	N82°25'45"E
C5	176.56'	11848.50'	0°51'14"	176.56'	S00°26'07"W
C6	39.27'	25.00'	90°00'00"	35.36'	S45°34'47"E
C7	39.27'	25.00'	90°00'00"	35.36'	N45°34'47"W
C8	39.27'	25.00'	90°00'00"	35.36'	S44°25'13"W

LINE TABLE		
LINE	BEARING	LENGTH
L1	N44°32'38"W	71.30'
L2	N90°00'00"E	26.43'
L3	N15°41'54"E	12.52'
L4	N85°37'33"E	16.04'
L5	N89°25'50"E	15.68'
L6	S07°37'15"W	55.26'
L7	N89°25'13"E	96.80'
L8	S89°25'13"W	7.31'
L9	N89°25'13"E	30.00'
L10	N00°34'47"W	5.00'
L11	N00°34'54"W	55.00'
L12	N89°25'13"E	70.24'
L13	S00°00'00"E	10.91'
L14	S89°25'13"W	50.55'
L15	S89°45'39"E	12.46'
L16	S00°14'21"W	84.33'
L17	S85°09'21"E	52.95'
L18	N89°25'13"E	28.98'
L19	S00°34'47"E	23.06'
L20	N89°25'13"E	8.50'

LINE TABLE		
LINE	BEARING	LENGTH
L21	N89°25'13"E	8.50'
L22	S00°34'47"E	20.00'
L23	S89°25'13"W	8.50'
L24	N89°25'13"E	8.00'
L25	N00°34'47"W	20.00'
L26	S89°25'13"W	8.00'
L27	N00°00'00"E	8.58'
L28	S00°34'58"E	9.06'
L29	N89°25'13"E	24.00'
L30	N89°25'13"E	6.00'
L31	N00°34'47"W	20.00'
L32	S89°25'13"W	6.00'
L33	N89°25'12"E	41.00'
L34	N00°34'47"W	15.00'
L35	S89°25'13"W	23.25'
L36	N00°06'27"W	29.41'
L37	N89°53'36"E	13.44'
L38	N00°34'47"W	9.22'
L39	N90°00'00"E	16.34'



LEGEND	
---	EASEMENT LINE
---	CENTERLINE
---	SECTION LINE
---	RIGHT OF WAY LINE
---	BOUNDARY LINE
■	FOUND ALIQUOT CORNER AS DESCRIBED
■	FOUND MONUMENT AS DESCRIBED
□	FOUND #6 REBAR WITH 3 1/4" ALUMINUM CAP LS 22103
●	SET 24" OF #4 REBAR WITH A BLUE PLASTIC CAP STAMPED KS, LS 38209
○	CALCULATED POSITION
A&UE	ACCESS & UTILITY EASEMENT
DE	DRAINAGE EASEMENT
D,A&UE	DRAINAGE, ACCESS & UTILITY EASEMENT



PRELIMINARY

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

DATE:
12/13/2022

FILE NAME:
20220491A-SUB

SCALE:
1"=30'

DRAWN BY:
CSK

CHECKED BY:
PG

KING SURVEYORS

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

REVISIONS:

DATE:	CSK	5/1/23
REVISED ESMT & LOTS	CSK	7/6/23
REVISED ESMT & LOTS	CSK	

WESTSIDE CROSSING REPLAT #2

FOR
BERTHOUD GATEWAY LLC
8340 LOUDEN CIRCLE
WINDSOR, CO 80528

PROJECT #:

20220491-A

2

SHEET 2 OF 2



ALDRIDGE TRANSPORTATION CONSULTANTS, LLC

Advanced Transportation Planning and Traffic Engineering

John M.W. Aldridge, PE
Colorado Licensed Professional Engineer

1082 Chimney Rock Road
Highlands Ranch, CO 80126
303-703-9112
Mobile: 303-594-4132
Email: john@atceng.com

January 2, 2023

Mr. Jay D. Stoner
President
Land Developers, Inc.
1035 37th Avenue Court
Greeley, CO 80634

Re: Transportation Impact Study with Comprehensive Signal Warrant Analysis
Westside Crossing - Berthoud, CO

Dear Mr. Stoner:

Aldridge Transportation Consultants (ATC) is pleased to present this Traffic Impact Study regarding the proposed development of Westside Crossing in Berthoud.

ATC is professional service firm specializing in traffic engineering and transportation planning. ATC's principal, John M.W. Aldridge, is a Colorado licensed professional engineer. In the past 20 years, ATC has prepared over 1,000 traffic impact studies, designed over 100 traffic signals, and has provided expert witness testimony on engineering design and access issues on multi-million dollar interchange and highway projects in Kansas and Colorado.

ATC appreciates the opportunity to be of service. Please call if you have any questions. We can be reached at 303-703-9112.



Respectfully submitted,

Aldridge Transportation Consultants, LLC

John M.W. Aldridge, P.E.
Principal



1. PROJECT DESCRIPTION

Land Developers, Inc. is proposing to construct a mixed-use development on the northeast corner of CO-287 and CO-56 in Berthoud, Colorado. The development includes a residential component, retail shops, restaurants, grocery store, and a gas station with a convenience store. Figure 1 shows the location of the site, site plan, and the adjacent streets and intersections. Note that the site plan is subject to changes.



Figure 1



2. GENERAL EXISTING CONDITIONS

CO-287 is a state highway categorized as F-W (Freeway) in this section. It currently carries 23,000 per CDOT OTIS data. The speed limit is 65 mph. SH-56 is a two-lane Arterial. Currently it carries 8,000 ADT and is posted at 45 mph in this section. Meadowlark Dr. is two-lane Collector that currently carries approximately 1,200 ADT. It is posted at 35 mph. The traffic signal at CO-287 and CO-56 is fully actuated and features protected/permitted left turn phasing on the north/south approaches and protected only on the east/west approaches. The intersection of CO-56 and Meadowlark Dr. is two-way stop sign controlled.

The AM and PM peak hours at intersections of CO-287/CO-56 and CO-56/Meadowlark were counted on October 15, 2019, by All Traffic Data. The counts are attached.

Both sides will be accessible from CO-56 at two locations. A full movement access at Meadowlark Dr. and a right in/right out access approximately 300 feet west of Meadowlark Dr. No access is allowed on CO-287.

3. DEVELOPMENT SITE CHARACTERISTICS

The trip generation for the residential development is defined in Table 1. It is based on the rates and values found in the ITE Trip Generation Manual, 11th Edition. Shown are the Average Daily Traffic and the AM and PM peak hours.

Table 1

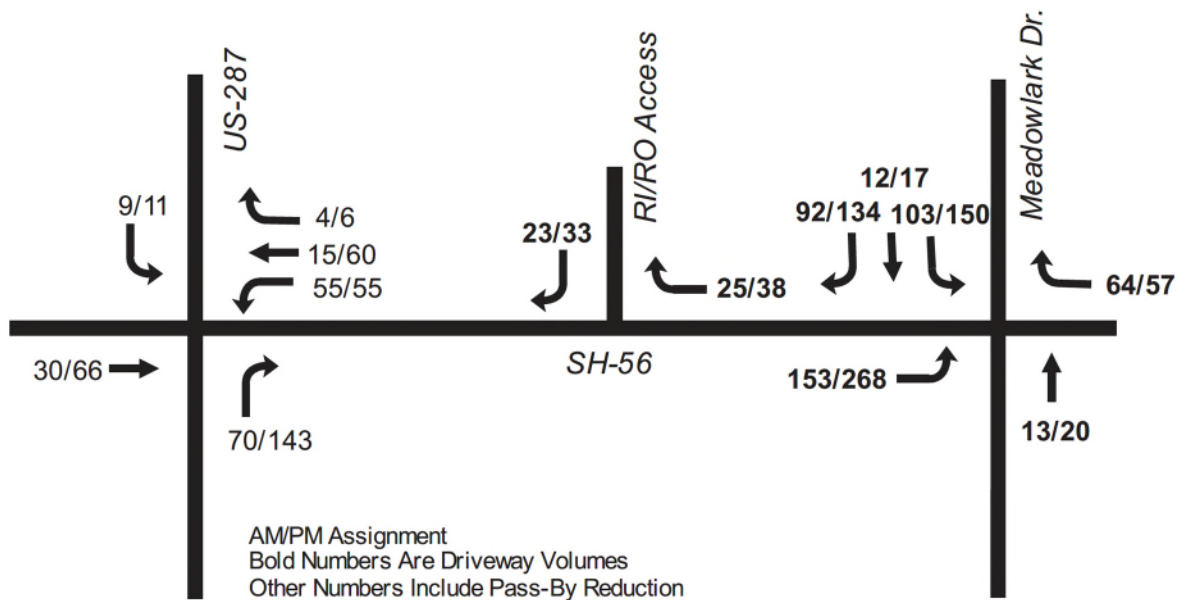
Trip Generation Tabulation								
ITE CODE	LAND USE	UNIT	QUANTITY	ADT	AM		PM	
					IN	OUT	IN	OUT
945	Gas Station w/ Convenience	Fueling	12	265.12	8.03	8.03	9.21	9.21
		Positions		3181	96	96	111	111
210	Single Family Detached	DU	56	9.43	0.18	0.52	0.59	0.35
				528	10	29	33	20
822	Strip Retail Plaza	KSF	29.7	54.45	1.42	0.94	3.30	3.30
				1617	42	28	98	98
850	Grocery Store	KSF	25.0	93.84	1.69	1.17	4.48	4.48
				2346	42	29	112	112
848	Tire Store	KSF	11.9	27.69	1.67	0.94	1.61	2.14
				330	20	11	19	25
932	Restaurants	KSF	16.0	107.20	5.26	4.31	5.52	3.53
				1715	84	69	88	56
Internal Trip Capture Reduction (13% AM) (19% PM)					38	34	88	80
Total Trips				9717	257	229	373	342



The average pass-by trip percentage is 56 percent per the ITE Trip Generation Manual, 11th Edition. The pass-by trips were taken at the intersections and on the mainline. Shown in Table 1 is the internal trip capture. These are trips that stay inside the development i.e., a trip from the residential area to the grocery store. The internal trip capture was determined by using the NCHRP 684 Internal Trip Capture Estimation Tool. It is attached for reference.

The PM peak hour is the heaviest time of traffic on the highway and the development. It is considered the design hour volume (DHV) for operations and geometric design purposes.

The distribution and assignment of the site generated trips is shown in the following graphic. The distribution is based on the current percent movement splits at CO-56/Meadowlark Dr. and CO-287/CO-56.



4. FUTURE CONDITIONS

The CDOT OTIS 20-year growth factor for US-287 is 1.44 and for SH-56 it is 1.13. The 5-year growth factor is 1.10 for US-287 and 1.03 for SH-56. Although likely inclusive of this development, the growth factors were applied as background growth and the site generated traffic was added on for the total growth conditions.



5. PROJECT IMPACTS

ATC uses Synchro v.11 for operations analyses. The Synchro v.11 methodologies are based on the **Highway Capacity Manual, 6th Edition** (HCM). The Synchro HCM reports in the appendix are for reference. LOS is letter rating from A to F. LOS A indicates free-flow traffic conditions and no delay at intersections. LOS F is heavy traffic congestion with significant delay. LOS is provided for the overall operations at signalized intersections. LOS D is generally the benchmark for acceptable signalized intersection operations during the weekday peak hours. The critical movement, not the overall, provides the LOS rating for unsignalized intersections. The critical movement is generally a left turn from the minor approach. Caution is advised when evaluating the LOS at unsignalized intersections particularly when LOS F shows. In cases of a LOS F, the HCM suggests that other evaluation measures should be considered such as the volume over capacity ratio and the 95th percentile queue length to make the most effective traffic control decision. LOS F at unsignalized intersections is considered normal for the weekday peak hour particularly when the v/c ratio and the 95th percentile queue length are acceptable.

The Synchro operations analysis revealed that the intersection at US-287 would operate at no worse than LOS D with little to no delay or queuing in the left turn storage bays. The 20-year growth factor of 1.44 when applied to the mainline volumes shows that the intersection will continue to operate at LOS B again with little to no delay or queuing in the left turn storage bays.

The intersection at Meadowlark Dr. and SH-56 currently operates at LOS C and would continue to do so in the background 2025 and 2040 AM and PM peak hour. The additional site generated traffic will cause significant delay and LOS F operations.

The right turn only entrance will operate at LOS B in all conditions. The Synchro graphics and reports are attached.

Traffic Signal Warrant Analysis

To determine the need for a traffic signal at CO-56/Meadowlark Dr. we have prepared a warrant analysis based on the procedures and methodology promulgated by the Manual on Uniform Traffic Control Devices (MUTCD) that has been adopted as Colorado Law. The analysis worksheets and an explanation summary are provided in the appendix.

Three scenarios were prepared. 1) Existing Conditions, 2) Future Conditions with Residential Only, and 3) Future Conditions with Residential and 50% Build Out of the Commercial Development. The Traffic Signal Analysis reports are provided in the appendix. In summary, the results show in Scenario 1 Existing Conditions that a traffic signal is not warranted. In Scenario 2 Future Conditions with Residential Only a traffic signal is not warranted but it is very close to meeting Warrant #2 - Four-Hour Warrant. As it is very close additional traffic generated by the commercial area will probably push it over the top. Thus, the reason for Scenario 3 Future Conditions with Residential and 50% Build Out of the Commercial Development. In fact, with Scenario 3 the three volume warrants Warrant 1 – Eight-Hour Warrant, Warrant, 2 – Four Hour Warrant and Warrant 3 – Peak Hour Warrant are met. Note that Warrant 8 – Roadway Network permits signal installation up to five years from a projected warrant. A more comprehensive analysis including warrant worksheets is provided in the appendix.



Street Traffic Volumes

Table 2 provides a summary of the ACF traffic volume requirements for the primary roadway, SH-56.

Table 2

Street Traffic Volume Summary Table								
Street Segment	Existing Volume	Date of Existing Volume	Regional Traffic Growth	Traffic from Other Development	Site Generated Traffic	Total Traffic	ACF Traffic Threshold	ACF Compliance
1 SH-56 e/o US-287	447	10/15/2019	505	unk	115	620	920	YES

Peak Hour Link Volumes

Table 3 summarizes the ACF compliance for the individual roadway links in the peak hour.

Table 3

Peak Hour Link Volume Summary Table									
	Existing		AFC	2025		AFC	2040		AFC
Link	VPHPL	ACF Base	Compliant	VPHPL	ACF Base	Compliant	VPHPL	ACF Base	Compliant
SH-56 e/o B. Pkwy. (east link)	323	920	YES	490	920	YES	537	920	YES
SH-56 e/o B. Pkwy. (west link)	447	920	YES	537	920	YES	589	920	YES
ACF Base VPHPL adjusted per Attachments E & F									

Intersection Delay

The intersection operations were analyzed for the existing weekday AM and PM peak hour and the 2025 and 2040 scenarios with and without the site generated traffic. The signalized intersection analyses were performed with the current left turn phasing in the existing and 2025/2040 scenarios. The Synchro graphics and reports for each condition are attached for reference.

Table 4 provides a summary of the Peak Hour intersection Level of Service characteristics. The major intersection threshold for any movement at a signalized intersection is LOS E. LOS F is recorded on the EB leg/movements and WB left on US-287 in 2040. This can be mitigated with opening the dual left turn lanes that are currently striped in and signal timing improvements. Note that the Synchro program is for fixed cycle times. The signal is fully actuated, and each movement is optimized.

The traffic signal at SH-56/Meadowlark Dr. is ACF compliant in all conditions.

LOS F on the critical movement at an unsignalized intersection acceptable in urban conditions. The right in/right out access will operate at a high LOS B in all scenarios.



Table 4

Peak Hour Intersection Level of Service Summary												
Intersection	Traffic Control	Existing		2025 Background		2025 Total		2040 Background		2040 Total		ACF Compliant?
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
US-287/SH-56	Signalized											
EBL		E	E	E	E	E	E	E	E	E	F	NO
EBT		E	D	E	D	E	E	E	D	E	F	NO
WBL		E	D	E	D	E	E	E	E	F	F	NO
WBT		D	D	D	D	D	E	D	D	D	E	YES
NBL		B	A	B	A	B	B	C	A	C	B	YES
NBT		B	B	B	B	B	B	B	F	B	C	YES
SBL		A	B	B	B	B	B	B	B	B	C	YES
SBT		B	B	B	B	C	B	C	B	C	B	YES
Overall Intersection Delay		27.3	21.8	27.8	22.4	32.8	28.8	32.8	32.1	39.8	38.6	
Overall Intersection LOS		C	C	C	B	C	C	C	D	D	C	YES
SH-56/Meadowlark	TWSC											
NBLTR		C	C	C	C			C	D			YES
EBL		A	A	A	A			A	A			YES
WBL		A	A	A	A			A	A			YES
SBLTR		C	C	C	C			C	C			YES
Overall Intersection Delay		3.5	3.2	3.6	3.3			4.2	3.8	2.8	5.0	
SH-56/Meadowlark	Signalized											
EBL						D	D			D	E	YES
EBT						A	A			A	A	YES
EBR						D	D			D	D	YES
WBL						C	C			C	C	YES
WBT						A	A			A	A	YES
WBR						D	E			D	E	YES
NBL						C	C			C	C	YES
NBT						A	A			A	A	YES
NBR						C	C			C	C	YES
SBL						B	C			B	C	YES
SBT						B	B			B	C	YES
SBR						B	C			B	C	YES
Overall Intersection Delay						37.4	42.3			38.2	44.5	YES
Overall Intersection LOS						D	D			D	D	YES
SH-56/RIRO	TWSC											
SBR						B	B			B	B	YES
Overall Intersection Delay						0.3	0.3			0.3	0.3	



PEDESTRIAN and BICYCLE IMPACT EVALUATIONS

Presently there are no sidewalks or bike lanes on either side of SH-56 or US-287. Detached sidewalks are planned for frontage on US-287, SH-56, and Meadowlark Dr.

MITIGATION MEASURES

Based on the analysis herein, the primary improvement will be the reconstruction and signalization of the SH-56/Meadowlark intersection. The southbound approach should include exclusive left, through and right turn lanes. A right turn lane is needed for the right turn only access and this should be continuous to Meadowlark Dr. An acceleration lane is not required.

The non-compliance at the US-287/SH-56 intersection is on the eastbound leg/movement and the westbound left turn movement in the 2040 condition. The intersection, however, includes striped out areas for dual left turns on the eastbound, northbound, and southbound approaches which will improve the LOS and delay when put in use. Moreover, with real time adaptive signal control, the cycle time and phase splits will become considerably flexible. Note though that the current and future (with the current fixed timing) overall operation is acceptable.

CONCLUSIONS and RECOMMENDED IMPROVEMENTS SUMMARY

The study and operations analyses contained herein provides evidence that the recommended access locations and type will function within acceptable traffic engineering parameters promulgated by FHWA, AASHTO, MUTCD, CDOT, and LCUASS. The access locations and type are essential for safe and smooth transitions on and off the highway and to reduce to the greatest extent unnecessary on-site circulation.

ADEQUACY STATEMENT

In my professional opinion, the transportation facilities will be adequate and available to serve the proposed development within one year of the full build out of the project and that it meets or exceeds the applicable adopted level of service provided in Section 4.5 of the LCUASS standards.



APPENDIX



Traffic Signal Warrant Analysis

The need for a traffic signal can be projected using standard methodology and procedures recommended by the MUTCD, FHWA, and ITE. Of the nine warrants established in the MUTCD, three are what are known as volume warrants. Warrant 1 requires eight hours of traffic volume exceeding the threshold which is a combination of the intersection approaches on the major street and the approach volume on the minor street. Warrant 2 is the same combination but it is for four hours with a higher threshold requirement. Warrant 3 is the peak hour warrant where the same combination exceeds a threshold in just one hour during the peak hour. The peak hour warrant is designed to serve commercial developments that have a high discharge during a one-hour period. Warrants 1 and 2 are generally for residential applications and/or mixed-use developments. While it's easy to project the peak hour warrant, projecting the eight- and four-hour warrants requires an estimated daily volume (ADT) and time of day percentage of the ADT for the total of the major street approaches and the in and out movements of the minor street approach.

The warrant analysis herein is broken down into three scenarios; 1) Existing to test whether the current traffic entering the intersection satisfies a warrant. 2) Existing plus an increase in the background traffic and development of the residential section only. 3) Existing plus an increase in the background traffic, residential development and 50% of the commercial development. Note that the 50% commercial development was selected as the volume in the second scenario was close to meeting the four-hour warrant.

The ADT on the major street approaches is broken down into hourly volumes using Time of Day percentages published by the ITE Trip Generation Manual, 11th Edition. The ADT on the minor street approach likewise is determined using the same procedure. Note that on the minor street approach the right turn volume is typically reduced by 50% to account for right turn on red and ease of entering the major street stream particularly if an acceleration lane is present.

For the Existing scenario, the current volume of 8,000 ADT on CO-56 was input. The Meadowlark Dr. approach volume of 1,200 ADT was input. In this case, no warrant threshold was reached.

For the Existing plus the background and residential section only the volume on CO-56 was raised to 9,000 ADT and the Meadowlark Dr. ADT was raised to 2,000 ADT. In this case, three of the four hours needed to satisfy Warrant 2 were reached, but still fell short. Warrants 1 and 3 were not satisfied.

For the Existing plus the background, residential, and 50% of the commercial the volume on CO-56 was raised to 10,000 ADT, and the ADT on Meadowlark Dr. approach was raised to 5,000 ADT which included a 50% reduction of the right turn volume. In this case, all three volume warrants were satisfied.

Should 50% or more of the commercial development be anticipated within five years, then Warrant 8 - Roadway Network could warrant the traffic signal prior to meeting a warrant with actual traffic volumes. Note that CDOT generally requires actual traffic volumes to warrant a signal.

The following worksheets were developed by the Wisconsin DOT and conform to the MUTCD warrant analysis methodology and procedures. We use them as they are comprehensive and easy to use.

Wisconsin Department of Transportation Traffic Signal Warrant

Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: CO-56 and Meadowlark

County: Larimer

Town: Berthoud

Major Street: CO-56

Critical Approach Speed: 45 mph

Lanes: 1 lane

Minor Street: Meadowlark

Critical Approach Speed: 25 mph

Lanes: 1 lane

% Right Turns Included

From North (SB) 0%

From East (WB) 100%

From South (NB) 100%

From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No

Total number of approaches at intersection? 4 or more

If it is a "T" intersection, inflate minor threshold to 150%? No

Manually set volume level? 70%

Analysis based on PROJECTED volume data.

Forecast Year	Within 5 Years of Construction?	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2040	No	6	AM	10	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	No
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	No
Warrant 3: Peak Hour Volume	No
Warrant 4: Pedestrian Volume	N/A
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	N/A
Warrant 6: Coordinated Signal System	N/A
Warrant 7: Crash Experience	N/A
Warrant 8: Roadway Network	No
Warrant 9: Intersection Near a Grade Crossing	N/A

Warrant Analysis Conducted By:

Name: John Aldridge

Agency: Aldridge Transportation Consultants

Date: 12/30/2022

Warrant 1: Eight - Hour Vehicular Volume

70%

Warrant Evaluated? Yes

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	350	280
Minor Rd. Req	105	84
Number of Hours	0	1

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	525	420
Minor Rd. Req	53	42
Number of Hours	2	7

Satisfied? No

Condition C: Combination of A & B at 56%		
---	--	--

Satisfied? No

Warrant Satisfied? No

Manually Set To: No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			Total
Time Period	From	To	Major Road: Both App. (VPH)	Minor Road: High App. (VPH)	
1	6:00	7:00	254	40	294
2	7:00	8:00	525	82	607
3	8:00	9:00	618	87	705
4	9:00	10:00	436	53	489
5	10:00	11:00	373	38	411
6	11:00	12:00	449	48	497
7	12:00	13:00	482	37	519
8	13:00	14:00	387	33	420
9	14:00	15:00	449	41	490
10	15:00	16:00	436	32	468
11	16:00	17:00	595	44	639
12	17:00	18:00	757	42	799
13	18:00	19:00	707	48	755
14	19:00	20:00	436	24	460
15	20:00	21:00	347	24	371
16	21:00	22:00	235	10	245

Warrant 2: Four-Hour Volume

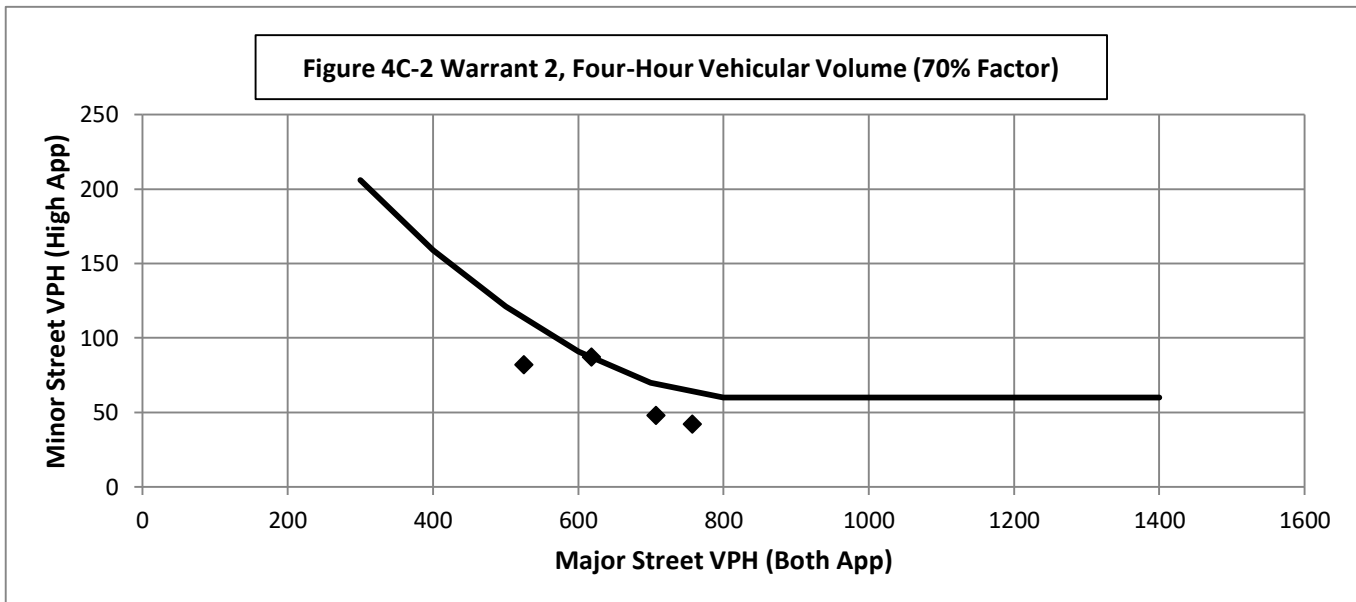
70%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To: No

Hour Start	8:00	17:00	18:00	7:00
Major Road Vol.	618	757	707	525
Minor Road Vol.	87	42	48	82



Warrant 3: Peak Hour Volume

70%

Warrant Evaluated? Yes

Warrant Satisfied? No

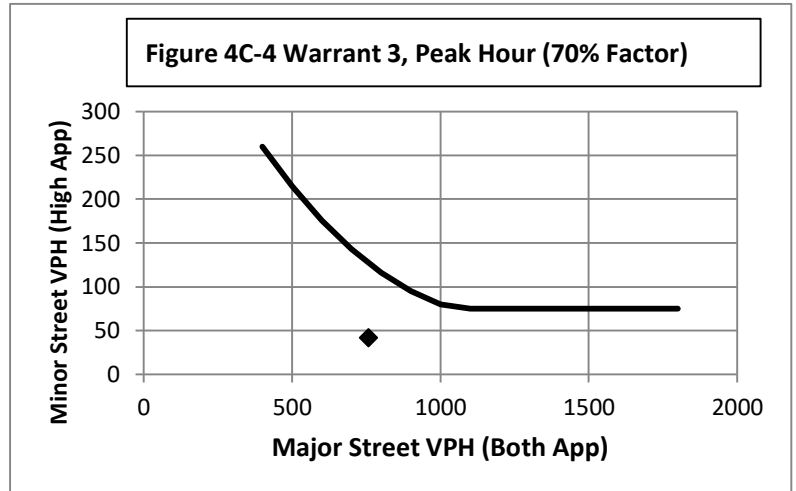
Manually Set To: No

Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	No
Volume on Minor Approach	100	
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour? No

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
17:00	757	42



Warrant 4: Pedestrian Volume

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
0:00	0	#N/A
0:00	0	#N/A
0:00	0	#N/A
0:00	0	#N/A

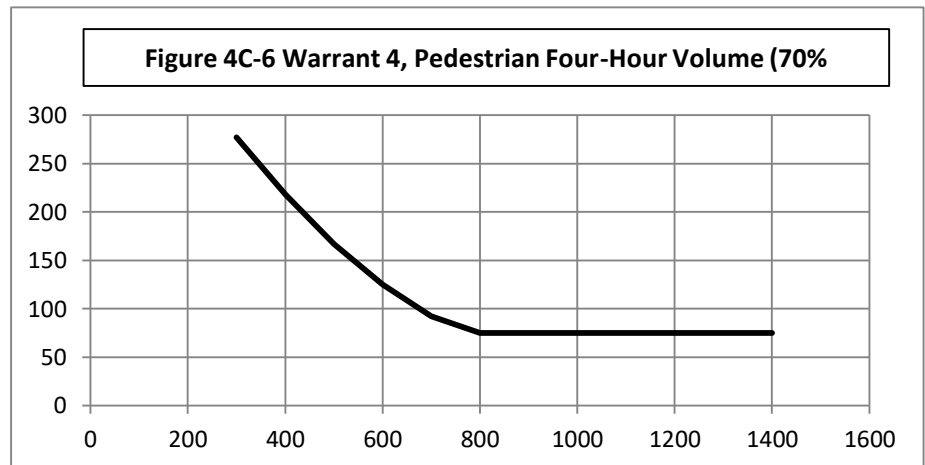
Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

No

No

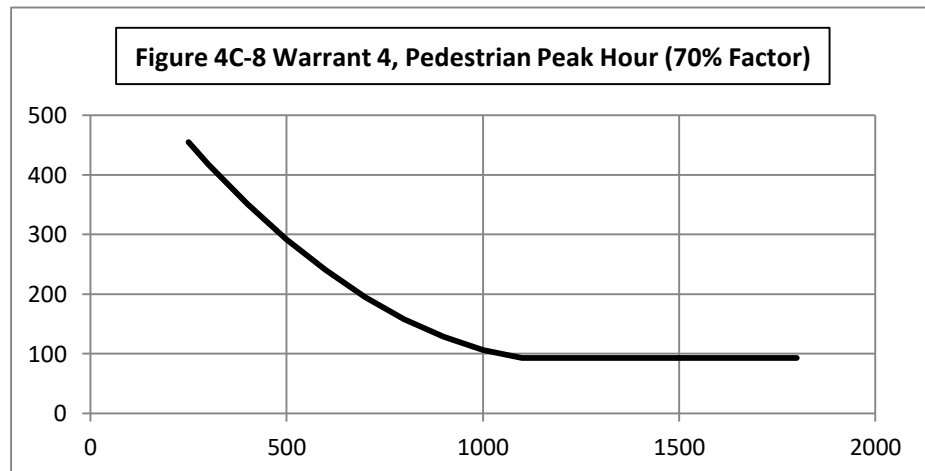
Criterion A Satisfied?



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
#N/A	#N/A	#N/A

Criterion B Satisfied?



Warrant 5: School Crossing

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria

Fulfilled?

1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria

Fulfilled?

1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria

Met?

Fulfilled?

1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.		# of crashes per 12 months	
3	Warrant 1, Condition A (80%)			No
	Warrant 1, Condition B (80%)			No
	Warrant 4, Criterion A (80%)			#N/A
	Warrant 4, Criterion B (80%)			#N/A

Warrant 8: Roadway Network

70%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria

Met?

Fulfilled?

1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour		799	No	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		2	Yes	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)				
	Hour				
	Volume				

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic

Fulfilled?

1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	Yes
2	Rural or suburban highway outside of, entering, or traversing a city	Yes
3	Appears as a major route on an official plan	Yes

Warrant 9: Intersection Near a Grade Crossing

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	17:00	757	42	14.07

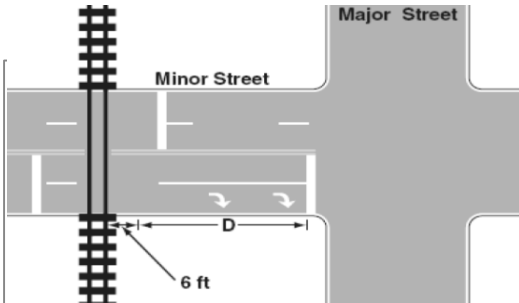
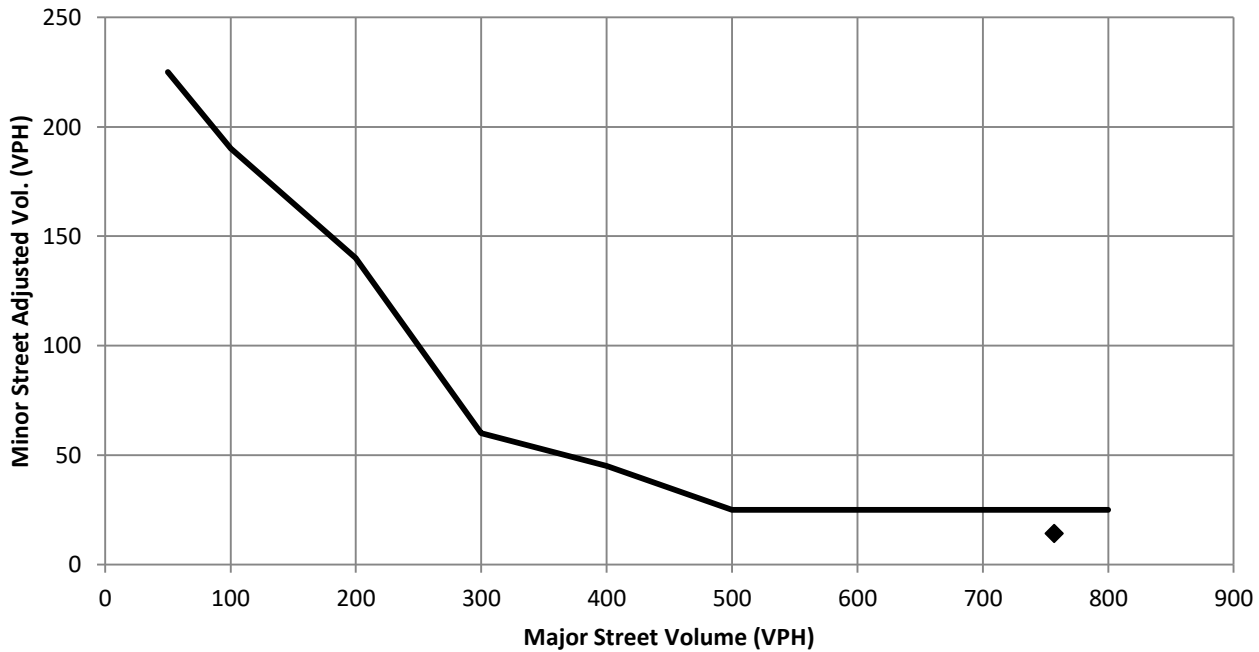


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017

Wisconsin Department of Transportation Traffic Signal Warrant

Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: CO-56 and Meadowlark

County: Larimer

Town: Berthoud

Major Street: CO-56

Critical Approach Speed: 45 mph

Lanes: 1 lane

Minor Street: Meadowlark

Critical Approach Speed: 25 mph

Lanes: 1 lane

% Right Turns Included

From North (SB) 0%

From East (WB) 100%

From South (NB) 100%

From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No

Total number of approaches at intersection? 4 or more

If it is a "T" intersection, inflate minor threshold to 150%? No

Manually set volume level? 70%

Analysis based on PROJECTED volume data.

Forecast Year	Within 5 Years of Construction?	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2040	No	6	AM	10	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	No
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	No
Warrant 3: Peak Hour Volume	No
Warrant 4: Pedestrian Volume	N/A
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	N/A
Warrant 6: Coordinated Signal System	N/A
Warrant 7: Crash Experience	N/A
Warrant 8: Roadway Network	No
Warrant 9: Intersection Near a Grade Crossing	N/A

Warrant Analysis Conducted By:

Name: John Aldridge

Agency: Aldridge Transportation Consultants

Date: 12/30/2022

Warrant 1: Eight - Hour Vehicular Volume

70%

Warrant Evaluated? Yes

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	350	280
Minor Rd. Req	105	84
Number of Hours	2	2

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	525	420
Minor Rd. Req	53	42
Number of Hours	5	12

Satisfied? No

Condition C: Combination of A & B at 56%		
---	--	--

Satisfied? No

Warrant Satisfied? No

Manually Set To: No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			Total
Time Period	From	To	Major Road: Both App. (VPH)	Minor Road: High App. (VPH)	
1	6:00	7:00	286	54	340
2	7:00	8:00	591	109	700
3	8:00	9:00	695	116	811
4	9:00	10:00	491	71	562
5	10:00	11:00	420	51	471
6	11:00	12:00	506	64	570
7	12:00	13:00	543	50	593
8	13:00	14:00	435	45	480
9	14:00	15:00	506	55	561
10	15:00	16:00	491	42	533
11	16:00	17:00	669	59	728
12	17:00	18:00	851	55	906
13	18:00	19:00	796	64	860
14	19:00	20:00	491	32	523
15	20:00	21:00	390	32	422
16	21:00	22:00	264	13	277

Warrant 2: Four-Hour Volume

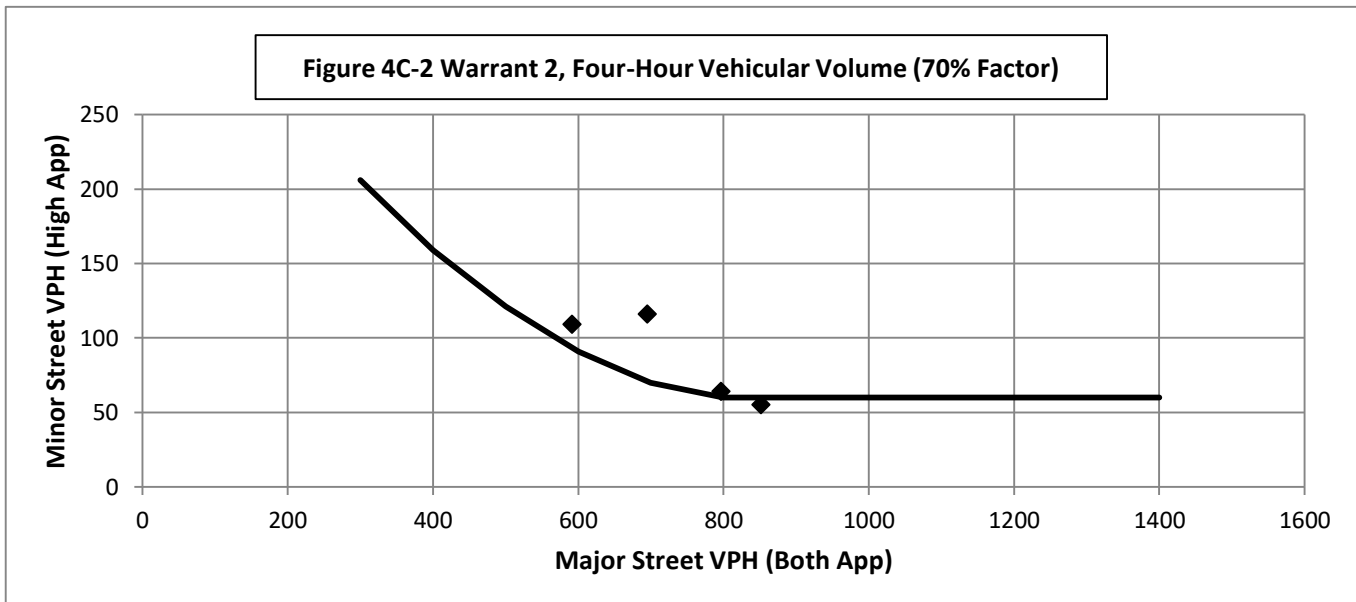
70%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To: No

Hour Start	18:00	8:00	7:00	17:00
Major Road Vol.	796	695	591	851
Minor Road Vol.	64	116	109	55



Warrant 3: Peak Hour Volume

70%

Warrant Evaluated? Yes

Warrant Satisfied? No

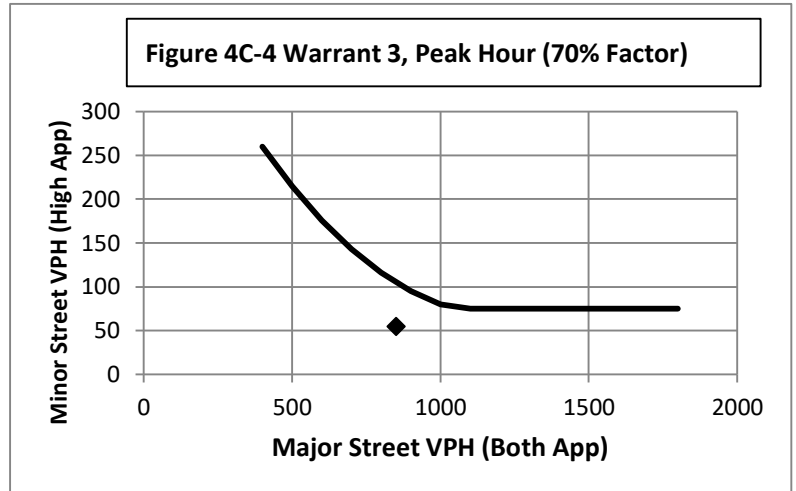
Manually Set To: No

Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	Yes
Volume on Minor Approach	100	
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour? No

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
17:00	851	55



Warrant 4: Pedestrian Volume

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
0:00	0	#N/A
0:00	0	#N/A
0:00	0	#N/A
0:00	0	#N/A

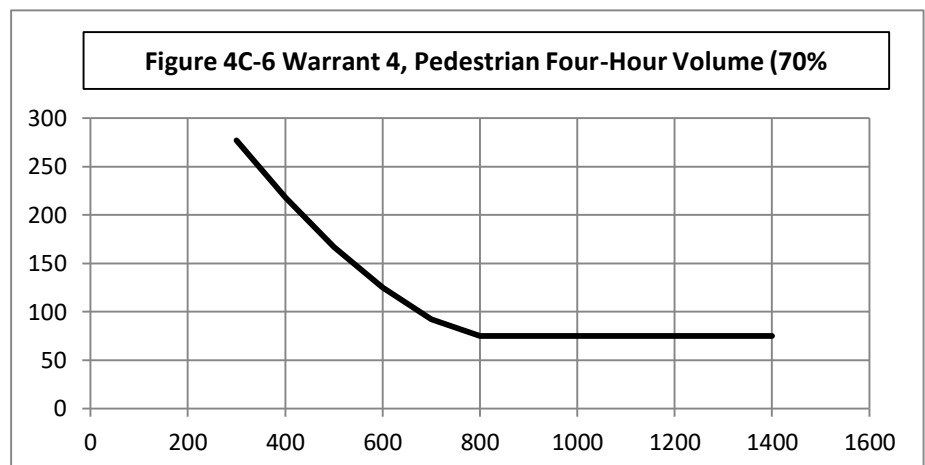
Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

No

No

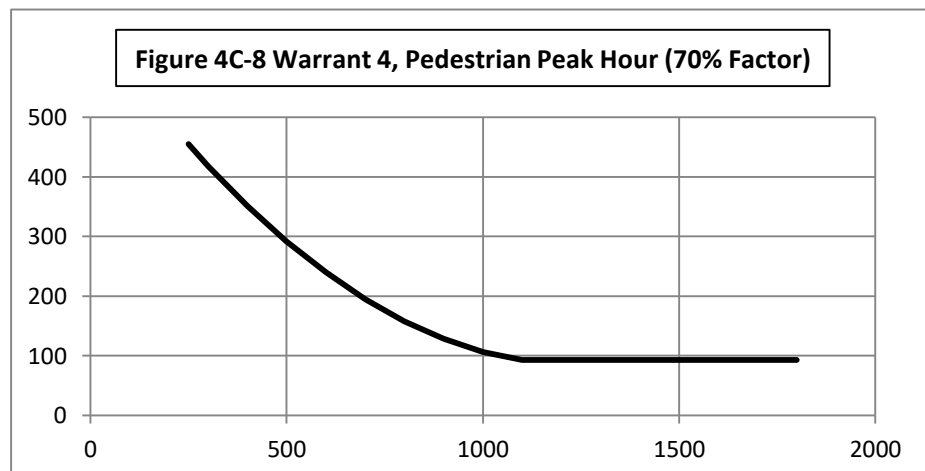
Criterion A Satisfied?



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
#N/A	#N/A	#N/A

Criterion B Satisfied?



Warrant 5: School Crossing

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria		Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria		Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.		
	Measures Tried:		
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months	
3	Warrant 1, Condition A (80%)	No	#N/A
	Warrant 1, Condition B (80%)	Yes	
	Warrant 4, Criterion A (80%)	#N/A	
	Warrant 4, Criterion B (80%)	#N/A	

Warrant 8: Roadway Network

70%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour	906	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.	2	Yes
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)		
	Hour		
	Volume		

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic		Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	Yes
2	Rural or suburban highway outside of, entering, or traversing a city	Yes
3	Appears as a major route on an official plan	Yes

Warrant 9: Intersection Near a Grade Crossing

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	17:00	851	55	18.425

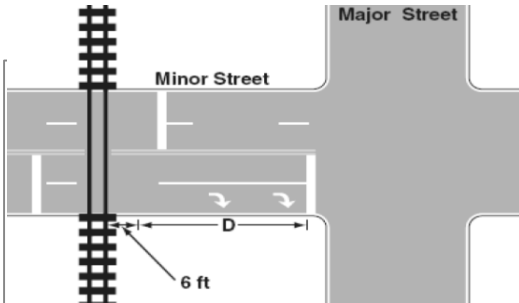
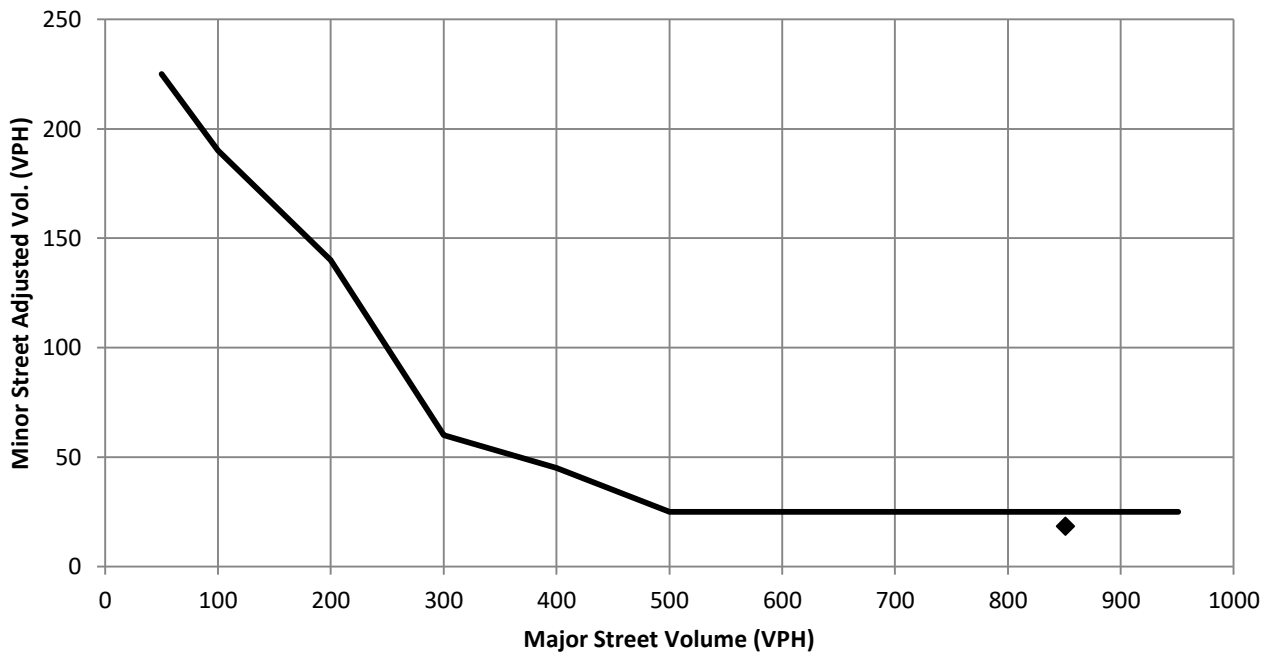


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017

Wisconsin Department of Transportation Traffic Signal Warrant

Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: CO-56 and Meadowlark

County: Larimer

Town: Berthoud

Major Street: CO-56

Critical Approach Speed: 45 mph

Lanes: 1 lane

Minor Street: Meadowlark

Critical Approach Speed: 25 mph

Lanes: 2 or more lanes

% Right Turns Included

From North (SB) 0%

From East (WB) 100%

From South (NB) 50%

From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No

Total number of approaches at intersection? 4 or more

If it is a "T" intersection, inflate minor threshold to 150%? No

Manually set volume level? 70%

Analysis based on PROJECTED volume data.

Forecast Year	Within 5 Years of Construction?	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2040	No	6	AM	10	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	Yes
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	Yes
Condition C: Combination: 80% of A and B	Yes
Warrant 2: Four-Hour Volume	Yes
Warrant 3: Peak Hour Volume	Yes
Warrant 4: Pedestrian Volume	N/A
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	N/A
Warrant 6: Coordinated Signal System	N/A
Warrant 7: Crash Experience	N/A
Warrant 8: Roadway Network	Yes
Warrant 9: Intersection Near a Grade Crossing	N/A

Warrant Analysis Conducted By:

Name: John Aldridge

Agency: Aldridge Transportation Consultants

Date: 12/30/2022

Warrant 1: Eight - Hour Vehicular Volume

70%

Warrant Evaluated? Yes

Warrant Satisfied? Yes

Manually Set To: Yes

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	350	280
Minor Rd. Req	140	112
Number of Hours	6	12

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	525	420
Minor Rd. Req	70	56
Number of Hours	11	14

Satisfied? Yes

Condition C: Combination of A & B at 56%		
---	--	--

Satisfied? Yes

6:00 AM		Enter Start Time (Military Time) (HH:MM)			Total
Time Period	From	To	Major Road: Both App. (VPH)	Minor Road: High App. (VPH)	
1	6:00	7:00	318	134	452
2	7:00	8:00	657	273	930
3	8:00	9:00	772	291	1063
4	9:00	10:00	545	178	723
5	10:00	11:00	467	128	595
6	11:00	12:00	562	161	723
7	12:00	13:00	603	124	727
8	13:00	14:00	483	112	595
9	14:00	15:00	562	136	698
10	15:00	16:00	545	105	650
11	16:00	17:00	743	147	890
12	17:00	18:00	946	138	1084
13	18:00	19:00	884	161	1045
14	19:00	20:00	545	81	626
15	20:00	21:00	434	81	515
16	21:00	22:00	293	33	326

Warrant 2: Four-Hour Volume

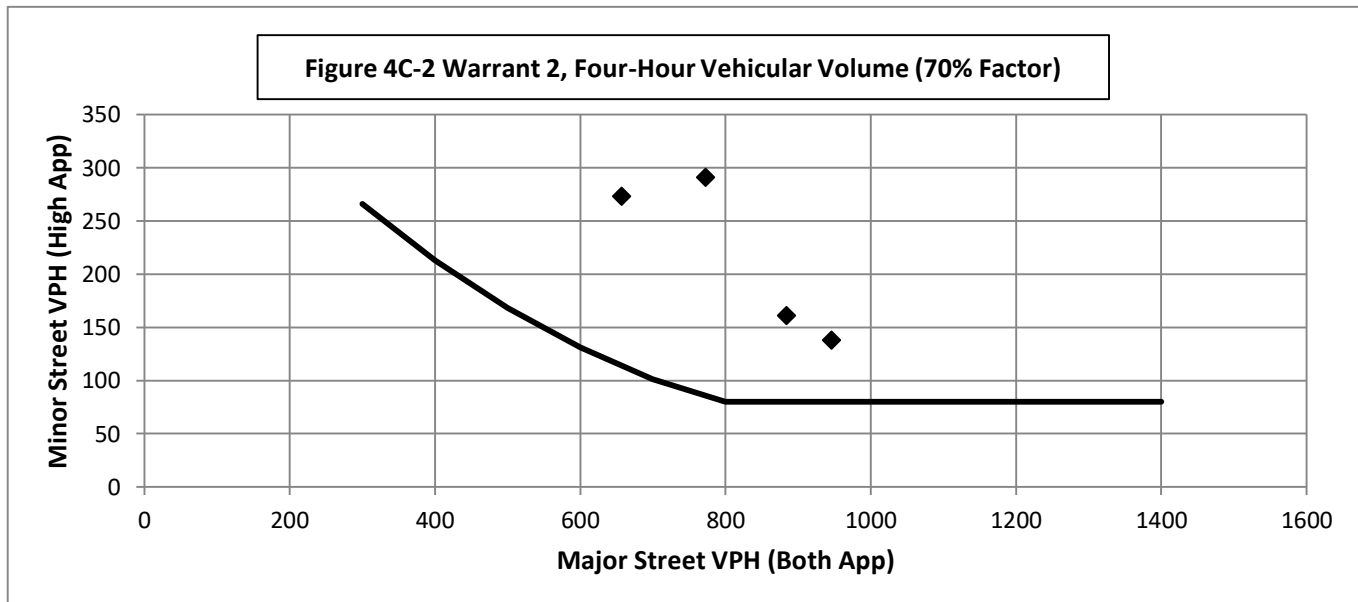
70%

Warrant Evaluated? Yes

Warrant Satisfied? Yes

Manually Set To: Yes

Hour Start	17:00	8:00	18:00	7:00
Major Road Vol.	946	772	884	657
Minor Road Vol.	138	291	161	273



Warrant 3: Peak Hour Volume

70%

Warrant Evaluated? Yes

Warrant Satisfied? Yes

Manually Set To: Yes

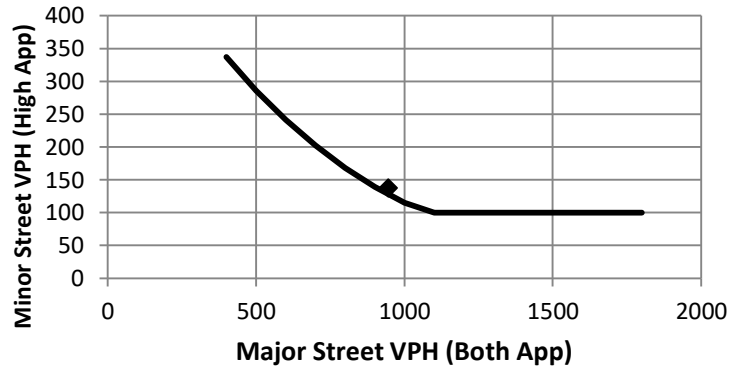
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	5	Yes
Volume on Minor Approach	150	
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour? No

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
17:00	946	138

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
0:00	0	#N/A
0:00	0	#N/A
0:00	0	#N/A
0:00	0	#N/A

Manually Set Major Rd Vol?

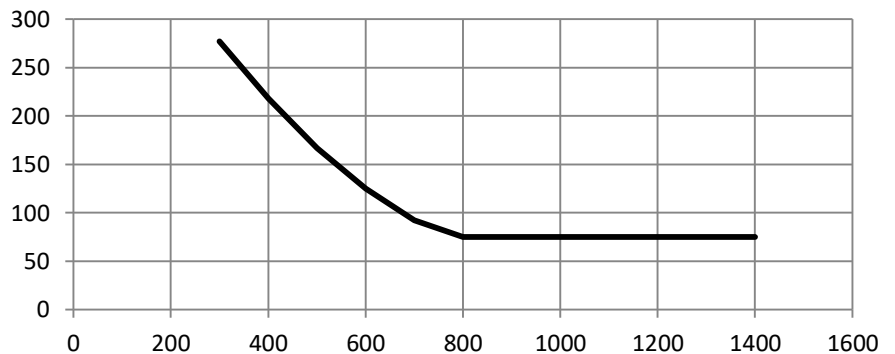
Avg. walk speed less than 3.5 ft/s?

No

No

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70%)

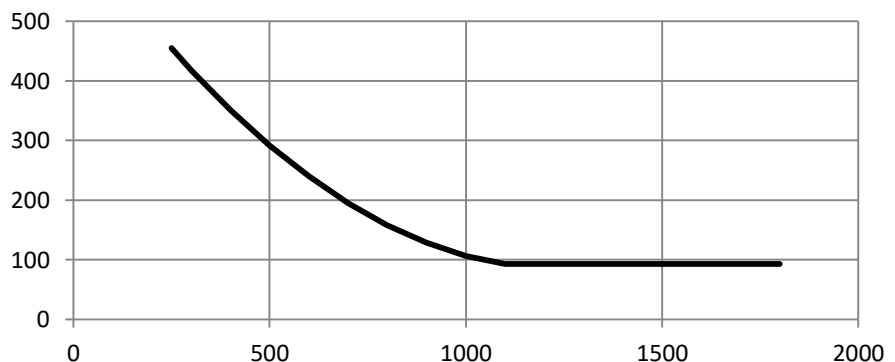


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
#N/A	#N/A	#N/A

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria

Fulfilled?

1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria

Fulfilled?

1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Criteria

Met?

Fulfilled?

1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.		# of crashes per 12 months	
3	Warrant 1, Condition A (80%)			Yes
	Warrant 1, Condition B (80%)			Yes
	Warrant 4, Criterion A (80%)			#N/A
	Warrant 4, Criterion B (80%)			#N/A

Warrant 8: Roadway Network

70%

Warrant Evaluated? Yes

Warrant Satisfied? Yes

Manually Set To: Yes

Criteria

Met?

Fulfilled?

1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour		1084	Yes	Yes
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		2	Yes	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)				
	Hour				
	Volume				

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic

Fulfilled?

1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	Yes
2	Rural or suburban highway outside of, entering, or traversing a city	Yes
3	Appears as a major route on an official plan	Yes

Warrant 9: Intersection Near a Grade Crossing

70%

Warrant Evaluated?

Warrant Satisfied? N/A

Manually Set To:

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	17:00	946	138	46.23

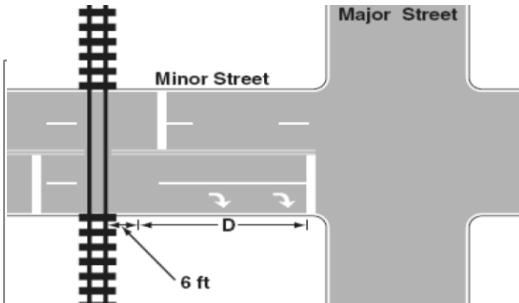
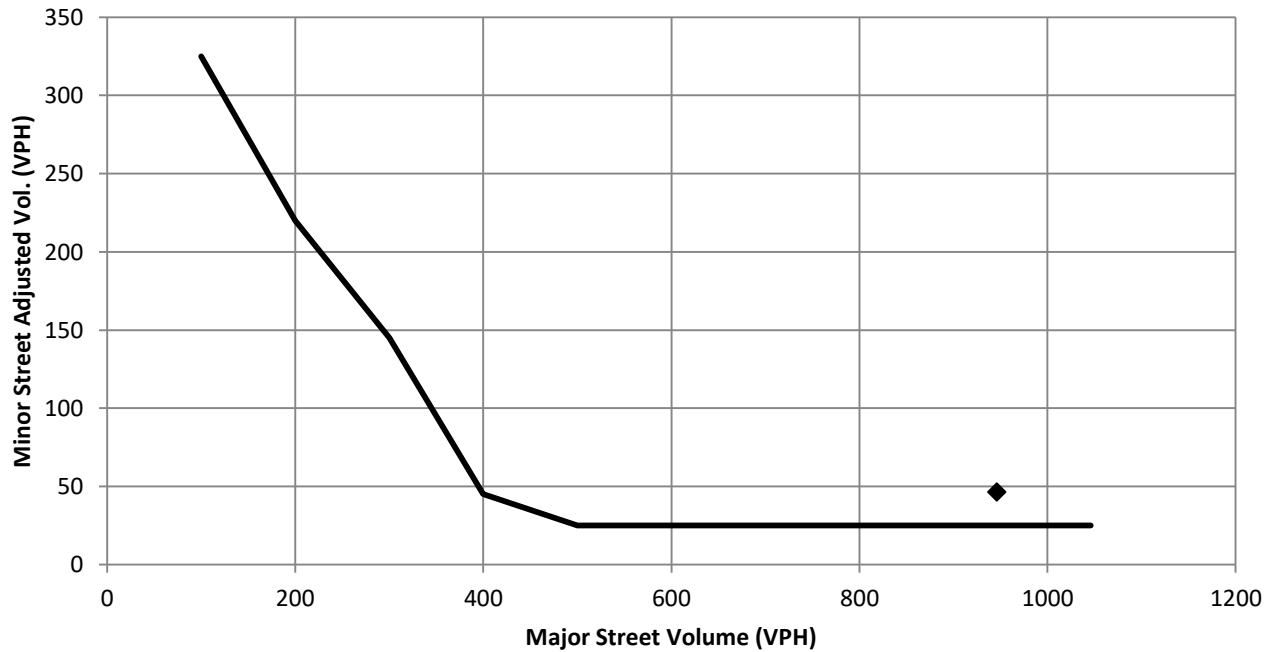


Figure 4C-10 Warrant 9, Intersection Near a grade Crossing
(Two or More Approach Lanes at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017



Aldridge Transportation Consultants, LLC

Advanced Transportation Planning and Traffic Engineering

John M.W. Aldridge, P.E.
Colorado Licensed Professional Engineer

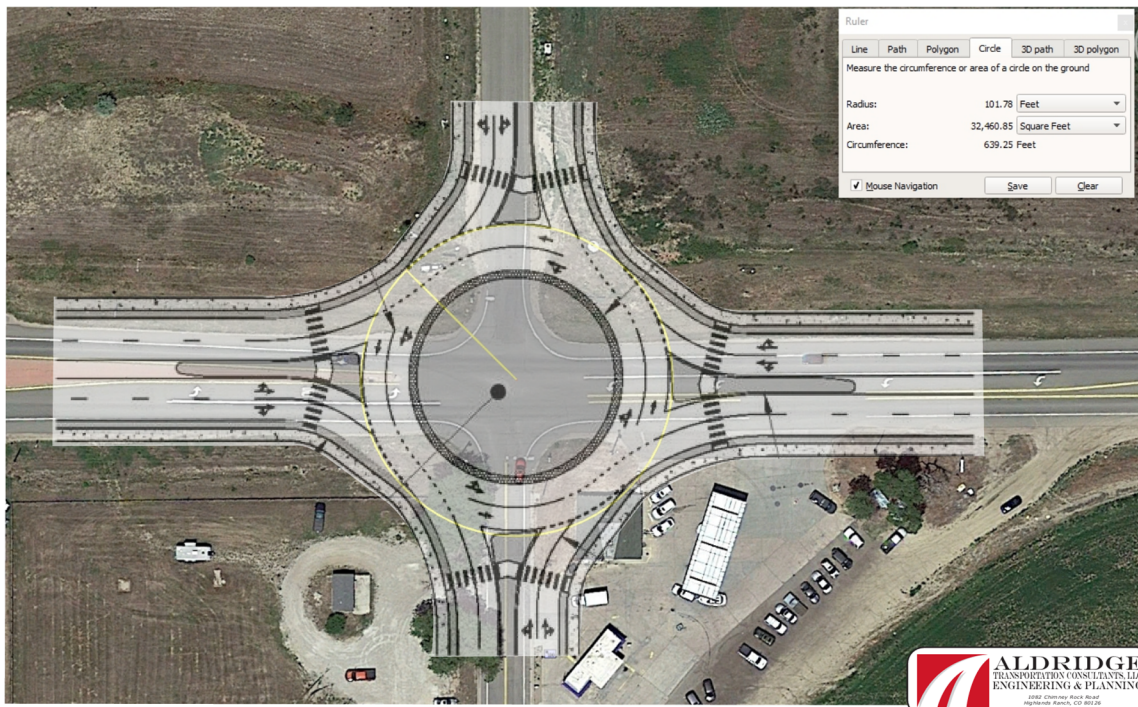
1082 Chimney Rock Road
Highlands Ranch, CO 80126
303-703-9112
Mobile: 303-594-4132

August 1, 2021

Technical Memorandum

Proposed Roundabout Alternative SH-56/Meadowlark Dr.

At the behest of the Town of Berthoud this technical memorandum provides an engineering review of a roundabout in lieu of a traffic signal-controlled intersection at SH-56 and Meadowlark Dr. which is about 1,000 feet west of US-287. The traffic impact study (revised July 25, 2021) prepared for the Westside Crossing mixed-use development projected that traffic signal warrants would be met with build out or before of the project. The Town prefers a roundabout instead of a traffic signal and while there are many advantages to roundabouts including safety, less vehicle delay and queuing, signal progression, environmental factors, traffic calming, and aesthetics there are however some disadvantages primarily spatial requirements.



Conceptual Dual Lane Roundabout

CDOT will require a 200' diameter inscribed circle (the yellow circle in the background) to manage the turning radius of a WB-67 design vehicle.



The graphic shows a CDOT standard 200-foot diameter roundabout (the yellow circle shows the 200-foot inscribed circle) which is necessary to manage a WB-67 design vehicle. The center of the roundabout is shown on center of the intersection. Note though center placement is not required and can be offset but the entering roadways would have to be offset as well. The roundabout shown has a two-lane circulating ring. The entry/exit roads on SH-56 are two-lane as well assuming that SH-56 will be improved to four-lanes in the future. The Meadowlark Dr. entry/exit lanes will remain as single lanes. The graphic includes bike lanes, sidewalks, and pedestrian crossings with raised refuge islands.

The inscribed circle is approximately 75 percent of an acre. Adding the other features such as bike lanes, sidewalks, and traffic channelizing islands raises the total property needed easily over an acre. As shown, all four corners of the intersection would be impacted with right of way taking. The southeast corner currently developed with a gas station and convenience store would be taken in its entirety.

Roundabouts are generally more expensive to construct than a traffic signal. A ballpark estimate for a multi-lane roundabout is about \$1.5 to \$2 million dollars. A traffic signal is around \$3-400,000.

We trust that this technical memorandum provides the Town with the information required to make an enlightened decision on the choice of a traffic signal vs. a roundabout.

ATC appreciates the opportunity to be of service. Please call if you have any questions. We can be reached at 303-703-9112.

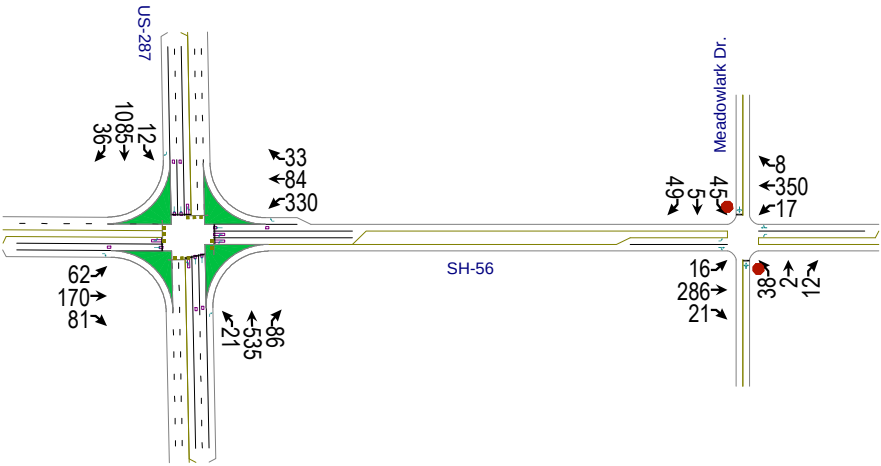
Respectfully submitted,

Aldridge Transportation Consultants, LLC

John M.W. Aldridge, P.E.
Principal

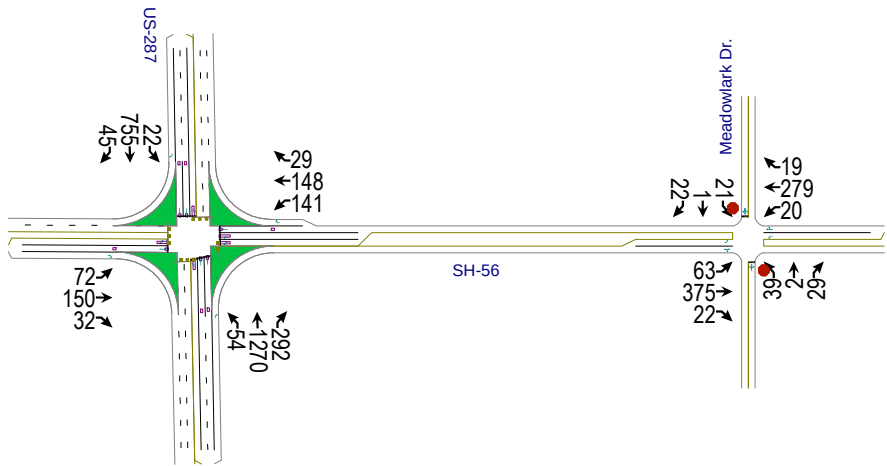
ATC is professional service firm specializing in traffic engineering and transportation planning. ATC's principal, John M.W. Aldridge, is a Colorado licensed professional engineer. In the past 20 years, ATC has prepared over 1,000 traffic impact studies, designed over 100 traffic signals, and has provided expert witness testimony on engineering design and access issues on multi-million-dollar interchange and highway projects in Kansas and Colorado.





												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	170	81	330	84	33	21	535	86	12	1085	36
Future Volume (veh/h)	62	170	81	330	84	33	21	535	86	12	1085	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	67	185	0	359	91	0	23	582	0	13	1179	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	220		428	361		281	2111		514	2084	
Arrive On Green	0.05	0.12	0.00	0.12	0.19	0.00	0.02	0.59	0.00	0.01	0.59	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	67	185	0	359	91	0	23	582	0	13	1179	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	4.5	11.6	0.0	12.2	5.0	0.0	0.6	9.5	0.0	0.4	24.6	0.0
Cycle Q Clear(g_c), s	4.5	11.6	0.0	12.2	5.0	0.0	0.6	9.5	0.0	0.4	24.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	86	220		428	361		281	2111		514	2084	
V/C Ratio(X)	0.78	0.84		0.84	0.25		0.08	0.28		0.03	0.57	
Avail Cap(c_a), veh/h	156	335		590	491		315	2111		563	2084	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.5	51.9	0.0	51.4	41.1	0.0	12.0	11.8	0.0	9.9	15.4	0.0
Incr Delay (d2), s/veh	13.9	11.2	0.0	7.6	0.4	0.0	0.1	0.3	0.0	0.0	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	6.0	0.0	5.6	2.3	0.0	0.2	3.4	0.0	0.1	9.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.3	63.0	0.0	59.0	41.4	0.0	12.1	12.2	0.0	10.0	16.5	0.0
LnGrp LOS	E	E		E	D		B	B		A	B	
Approach Vol, veh/h		252	A		450	A		605	A		1192	A
Approach Delay, s/veh		65.0			55.5			12.2			16.4	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.3	75.8	19.4	18.6	7.2	74.9	10.3	27.7				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	55.0	20.5	21.5	5.0	55.0	10.5	31.5				
Max Q Clear Time (g_c+I1), s	2.4	11.5	14.2	13.6	2.6	26.6	6.5	7.0				
Green Ext Time (p_c), s	0.0	3.7	0.7	0.5	0.0	8.5	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			27.3									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	286	21	17	350	8	38	2	12	45	5	49
Future Vol, veh/h	16	286	21	17	350	8	38	2	12	45	5	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	175	-	-	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	311	23	18	380	9	41	2	13	49	5	53
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	389	0	0	334	0	0	807	782	323	785	789	385
Stage 1	-	-	-	-	-	-	357	357	-	421	421	-
Stage 2	-	-	-	-	-	-	450	425	-	364	368	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1170	-	-	1225	-	-	300	326	718	310	323	663
Stage 1	-	-	-	-	-	-	661	628	-	610	589	-
Stage 2	-	-	-	-	-	-	589	586	-	655	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1170	-	-	1225	-	-	266	316	718	296	313	663
Mov Cap-2 Maneuver	-	-	-	-	-	-	266	316	-	296	313	-
Stage 1	-	-	-	-	-	-	651	619	-	601	580	-
Stage 2	-	-	-	-	-	-	529	577	-	632	612	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.4			19			16.9		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	313	1170	-	-	1225	-	-	409				
HCM Lane V/C Ratio	0.181	0.015	-	-	0.015	-	-	0.263				
HCM Control Delay (s)	19	8.1	-	-	8	-	-	16.9				
HCM Lane LOS	C	A	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	1				



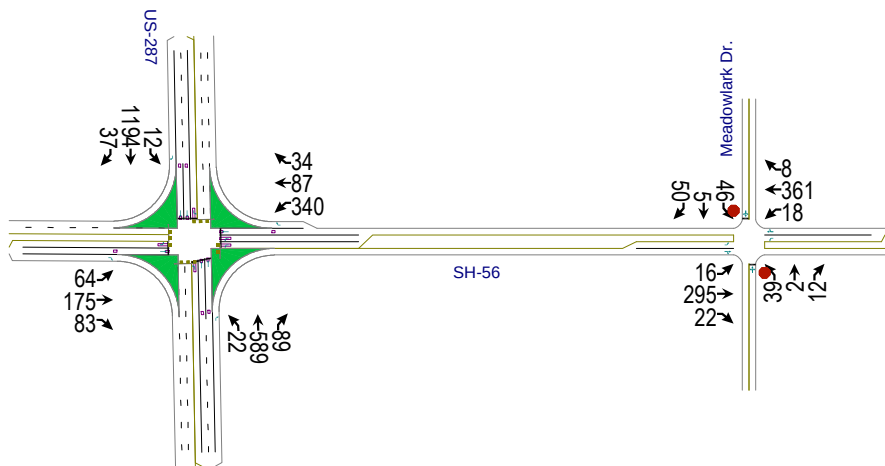
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	150	32	141	148	29	54	1270	292	22	755	45
Future Volume (veh/h)	72	150	32	141	148	29	54	1270	292	22	755	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	78	163	0	153	161	0	59	1380	0	24	821	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	198		210	207		485	2347		276	2301	
Arrive On Green	0.06	0.11	0.00	0.06	0.11	0.00	0.04	0.66	0.00	0.02	0.65	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	78	163	0	153	161	0	59	1380	0	24	821	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.2	10.2	0.0	5.2	10.1	0.0	1.3	25.9	0.0	0.5	12.7	0.0
Cycle Q Clear(g_c), s	5.2	10.2	0.0	5.2	10.1	0.0	1.3	25.9	0.0	0.5	12.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	100	198		210	207		485	2347		276	2301	
V/C Ratio(X)	0.78	0.82		0.73	0.78		0.12	0.59		0.09	0.36	
Avail Cap(c_a), veh/h	186	335		302	304		503	2347		316	2301	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.9	52.6	0.0	55.4	51.9	0.0	7.0	11.3	0.0	9.2	9.7	0.0
Incr Delay (d2), s/veh	12.5	8.3	0.0	5.0	7.4	0.0	0.1	1.1	0.0	0.1	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	5.1	0.0	2.4	5.0	0.0	0.4	8.6	0.0	0.2	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.5	60.9	0.0	60.3	59.3	0.0	7.1	12.4	0.0	9.4	10.1	0.0
LnGrp LOS	E	E		E	E		A	B		A	B	
Approach Vol, veh/h		241	A		314	A		1439	A		845	A
Approach Delay, s/veh		63.3			59.8			12.2			10.1	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	83.8	11.8	17.2	8.8	82.2	11.2	17.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.5	64.5	10.5	21.5	5.5	64.5	12.5	19.5				
Max Q Clear Time (g_c+I1), s	2.5	27.9	7.2	12.2	3.3	14.7	7.2	12.1				
Green Ext Time (p_c), s	0.0	11.5	0.1	0.5	0.0	5.6	0.1	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			21.2									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	375	22	20	279	19	39	2	29	21	1	22
Future Vol, veh/h	63	375	22	20	279	19	39	2	29	21	1	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	175	-	-	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	408	24	22	303	21	42	2	32	23	1	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	324	0	0	432	0	0	926	924	420	931	926	314
Stage 1	-	-	-	-	-	-	556	556	-	358	358	-
Stage 2	-	-	-	-	-	-	370	368	-	573	568	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1236	-	-	1128	-	-	249	269	633	247	269	726
Stage 1	-	-	-	-	-	-	515	513	-	660	628	-
Stage 2	-	-	-	-	-	-	650	621	-	505	506	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1236	-	-	1128	-	-	227	249	633	220	249	726
Mov Cap-2 Maneuver	-	-	-	-	-	-	227	249	-	220	249	-
Stage 1	-	-	-	-	-	-	487	485	-	624	615	-
Stage 2	-	-	-	-	-	-	615	609	-	451	478	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.5			20.3			17.4		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	310	1236	-	-	1128	-	-	339
HCM Lane V/C Ratio	0.245	0.055	-	-	0.019	-	-	0.141
HCM Control Delay (s)	20.3	8.1	-	-	8.3	-	-	17.4
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0.2	-	-	0.1	-	-	0.5



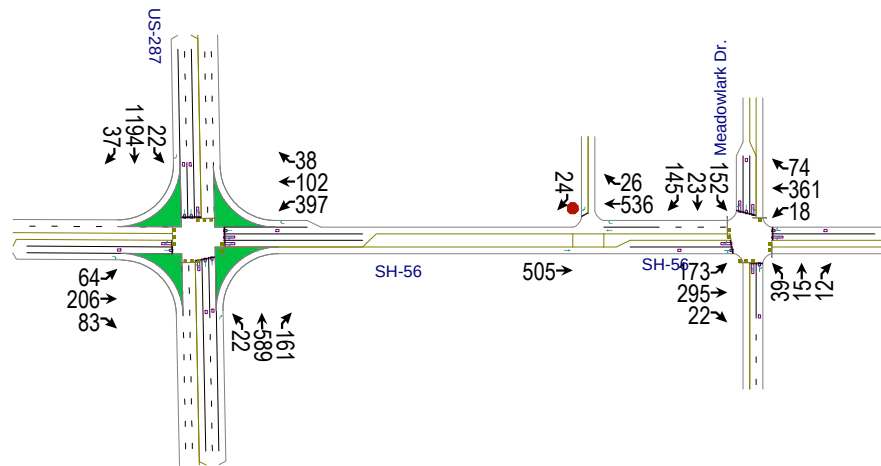
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	170	81	330	84	33	21	535	86	12	1085	36
Future Volume (veh/h)	62	170	81	330	84	33	21	535	86	12	1085	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	69	190	0	369	94	0	24	640	0	13	1297	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	89	225		438	369		245	2091		479	2062	
Arrive On Green	0.05	0.12	0.00	0.13	0.20	0.00	0.02	0.59	0.00	0.01	0.58	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	69	190	0	369	94	0	24	640	0	13	1297	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	4.6	11.9	0.0	12.5	5.1	0.0	0.7	10.8	0.0	0.4	29.0	0.0
Cycle Q Clear(g_c), s	4.6	11.9	0.0	12.5	5.1	0.0	0.7	10.8	0.0	0.4	29.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	89	225		438	369		245	2091		479	2062	
V/C Ratio(X)	0.78	0.85		0.84	0.25		0.10	0.31		0.03	0.63	
Avail Cap(c_a), veh/h	156	335		590	491		278	2091		527	2062	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.4	51.7	0.0	51.2	40.7	0.0	13.3	12.4	0.0	10.3	16.6	0.0
Incr Delay (d2), s/veh	13.6	12.0	0.0	8.2	0.4	0.0	0.2	0.4	0.0	0.0	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	6.2	0.0	5.8	2.3	0.0	0.2	3.9	0.0	0.1	10.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	63.7	0.0	59.4	41.1	0.0	13.5	12.8	0.0	10.4	18.1	0.0
LnGrp LOS	E	E		E	D		B	B		B	B	
Approach Vol, veh/h		259	A		463	A		664	A		1310	A
Approach Delay, s/veh		65.4			55.7			12.8			18.0	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.3	75.1	19.7	18.9	7.3	74.1	10.5	28.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	55.0	20.5	21.5	5.0	55.0	10.5	31.5				
Max Q Clear Time (g_c+I1), s	2.4	12.8	14.5	13.9	2.7	31.0	6.6	7.1				
Green Ext Time (p_c), s	0.0	4.1	0.7	0.5	0.0	9.2	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			27.8									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	286	21	17	350	8	38	2	12	45	5	49
Future Vol, veh/h	16	286	21	17	350	8	38	2	12	45	5	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	175	-	-	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	320	24	19	392	9	43	2	13	50	6	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	401	0	0	344	0	0	833	807	332	811	815	397
Stage 1	-	-	-	-	-	-	368	368	-	435	435	-
Stage 2	-	-	-	-	-	-	465	439	-	376	380	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1158	-	-	1215	-	-	288	315	710	298	312	652
Stage 1	-	-	-	-	-	-	652	621	-	600	580	-
Stage 2	-	-	-	-	-	-	578	578	-	645	614	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1158	-	-	1215	-	-	254	305	710	284	302	652
Mov Cap-2 Maneuver	-	-	-	-	-	-	254	305	-	284	302	-
Stage 1	-	-	-	-	-	-	642	611	-	590	571	-
Stage 2	-	-	-	-	-	-	516	569	-	621	604	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.4			19.9			17.6		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	300	1158	-	-	1215	-	-	396
HCM Lane V/C Ratio	0.194	0.015	-	-	0.016	-	-	0.28
HCM Control Delay (s)	19.9	8.2	-	-	8	-	-	17.6
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	1.1



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	200	81	385	99	37	21	535	156	21	1085	36
Future Volume (veh/h)	62	200	81	385	99	37	21	535	156	21	1085	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	69	224	0	431	111	0	24	640	0	24	1297	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	89	258		502	437		221	1933		451	1933	
Arrive On Green	0.05	0.14	0.00	0.05	0.08	0.00	0.02	0.54	0.00	0.02	0.54	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	69	224	0	431	111	0	24	640	0	24	1297	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	4.6	14.1	0.0	14.9	6.7	0.0	0.7	12.0	0.0	0.7	31.5	0.0
Cycle Q Clear(g_c), s	4.6	14.1	0.0	14.9	6.7	0.0	0.7	12.0	0.0	0.7	31.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	89	258		502	437		221	1933		451	1933	
V/C Ratio(X)	0.78	0.87		0.86	0.25		0.11	0.33		0.05	0.67	
Avail Cap(c_a), veh/h	151	335		590	496		254	1933		484	1933	
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.4	50.7	0.0	55.9	45.5	0.0	15.8	15.2	0.0	12.0	19.7	0.0
Incr Delay (d2), s/veh	13.6	17.2	0.0	10.8	0.3	0.0	0.2	0.5	0.0	0.0	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	7.6	0.0	7.6	3.2	0.0	0.3	4.5	0.0	0.3	11.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	67.8	0.0	66.7	45.8	0.0	16.0	15.7	0.0	12.1	21.5	0.0
LnGrp LOS	E	E		E	D		B	B		B	C	
Approach Vol, veh/h		293	A		542	A		664	A		1321	A
Approach Delay, s/veh		68.3			62.4			15.7			21.4	
Approach LOS		E			E			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	69.8	21.9	21.0	7.3	69.8	10.5	32.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	55.0	20.5	21.5	5.0	55.0	10.2	31.8				
Max Q Clear Time (g_c+I1), s	2.7	14.0	16.9	16.1	2.7	33.5	6.6	8.7				
Green Ext Time (p_c), s	0.0	4.1	0.6	0.5	0.0	8.7	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	32.8
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

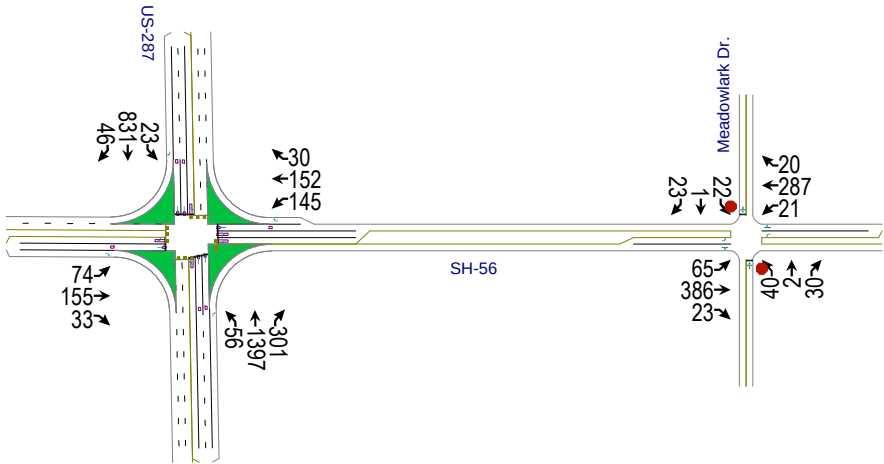
Gateway
6: SH-56 & Meadowlark Dr.

2025 AM Total
10/23/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	286	21	17	350	72	38	15	12	148	22	141
Future Volume (veh/h)	168	286	21	17	350	72	38	15	12	148	22	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	188	320	24	19	392	81	43	17	13	166	25	158
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	256	619	46	287	438	90	540	393	300	722	949	805
Arrive On Green	0.03	0.12	0.12	0.02	0.29	0.29	0.40	0.40	0.40	0.07	0.51	0.51
Sat Flow, veh/h	1781	1718	129	1781	1504	311	1201	983	752	1781	1870	1585
Grp Volume(v), veh/h	188	0	344	19	0	473	43	0	30	166	25	158
Grp Sat Flow(s), veh/h/ln	1781	0	1847	1781	0	1814	1201	0	1735	1781	1870	1585
Q Serve(g_s), s	8.4	0.0	21.0	0.9	0.0	30.0	2.7	0.0	1.3	6.3	0.8	6.5
Cycle Q Clear(g_c), s	8.4	0.0	21.0	0.9	0.0	30.0	2.7	0.0	1.3	6.3	0.8	6.5
Prop In Lane	1.00		0.07	1.00		0.17	1.00		0.43	1.00		1.00
Lane Grp Cap(c), veh/h	256	0	666	287	0	528	540	0	693	722	949	805
V/C Ratio(X)	0.73	0.00	0.52	0.07	0.00	0.90	0.08	0.00	0.04	0.23	0.03	0.20
Avail Cap(c_a), veh/h	343	0	947	334	0	764	540	0	693	782	949	805
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	43.1	29.5	0.0	40.8	22.4	0.0	22.0	17.5	14.7	16.2
Incr Delay (d2), s/veh	5.4	0.0	0.6	0.1	0.0	9.8	0.3	0.0	0.1	0.2	0.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	10.5	0.4	0.0	14.7	0.8	0.0	0.5	2.6	0.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.0	0.0	43.7	29.6	0.0	50.6	22.7	0.0	22.1	17.6	14.8	16.7
LnGrp LOS	D	A	D	C	A	D	C	A	C	B	B	B
Approach Vol, veh/h	532			492			73			349		
Approach Delay, s/veh	41.3			49.7			22.5			17.0		
Approach LOS	D			D			C			B		
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	3.0	52.5	6.8	47.7		65.4	15.2	39.4				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	12.5	22.5	5.5	61.5		39.5	16.5	50.5				
Max Q Clear Time (g_c+I), s	10.3	4.7	2.9	23.0		8.5	10.4	32.0				
Green Ext Time (p_c), s	0.2	0.2	0.0	2.3		0.6	0.3	2.9				
Intersection Summary												
HCM 6th Ctrl Delay				37.4								
HCM 6th LOS				D								

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑	↗		↗
Traffic Vol, veh/h	0	490	520	25	0	23
Future Vol, veh/h	0	490	520	25	0	23
Conflicting Peds, #/hr	0	0	0	25	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	549	582	28	0	26
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	607
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	496
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	484
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		12.9		
HCM LOS	B					
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	484		
HCM Lane V/C Ratio	-	-	-	0.053		
HCM Control Delay (s)	-	-	-	12.9		
HCM Lane LOS	-	-	-	B		
HCM 95th %tile Q(veh)	-	-	-	0.2		



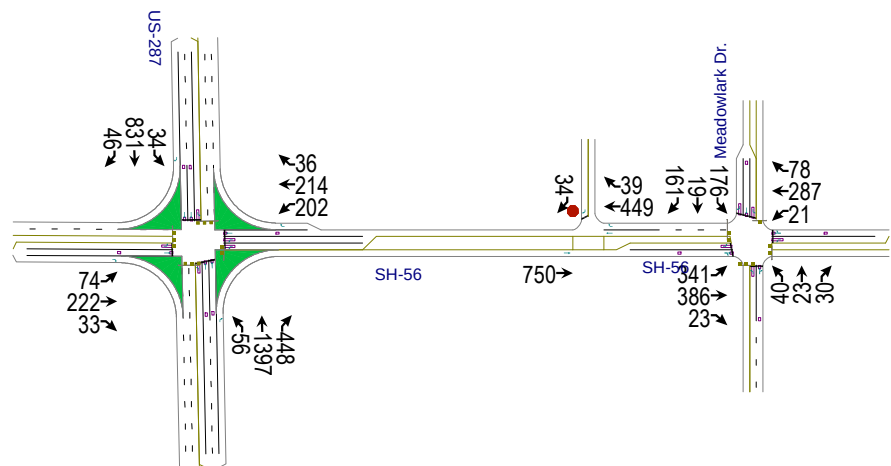
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	150	32	141	148	29	54	1270	292	22	755	45
Future Volume (veh/h)	72	150	32	141	148	29	54	1270	292	22	755	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	81	168	0	158	166	0	60	1518	0	25	903	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	203		215	211		446	2331		239	2286	
Arrive On Green	0.06	0.11	0.00	0.06	0.11	0.00	0.04	0.66	0.00	0.02	0.64	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	81	168	0	158	166	0	60	1518	0	25	903	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.4	10.6	0.0	5.4	10.4	0.0	1.3	30.8	0.0	0.6	14.6	0.0
Cycle Q Clear(g_c), s	5.4	10.6	0.0	5.4	10.4	0.0	1.3	30.8	0.0	0.6	14.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	103	203		215	211		446	2331		239	2286	
V/C Ratio(X)	0.79	0.83		0.73	0.79		0.13	0.65		0.10	0.39	
Avail Cap(c_a), veh/h	180	327		294	298		458	2331		272	2286	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.8	52.4	0.0	55.3	51.8	0.0	7.4	12.4	0.0	10.6	10.2	0.0
Incr Delay (d2), s/veh	12.3	9.1	0.0	6.1	8.9	0.0	0.1	1.4	0.0	0.2	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	5.3	0.0	2.5	5.3	0.0	0.4	10.4	0.0	0.2	4.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.1	61.5	0.0	61.4	60.7	0.0	7.5	13.8	0.0	10.8	10.7	0.0
LnGrp LOS	E	E		E	E		A	B		B	B	
Approach Vol, veh/h		249	A		324	A		1578	A		928	A
Approach Delay, s/veh		63.7			61.0			13.6			10.7	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	83.2	12.0	17.5	8.8	81.7	11.4	18.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	65.8	10.2	21.0	5.1	65.7	12.1	19.1				
Max Q Clear Time (g_c+l1), s	2.6	32.8	7.4	12.6	3.3	16.6	7.4	12.4				
Green Ext Time (p_c), s	0.0	12.9	0.1	0.4	0.0	6.4	0.1	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			21.8									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	375	22	20	279	19	39	2	29	21	1	22
Future Vol, veh/h	63	375	22	20	279	19	39	2	29	21	1	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	175	-	-	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	71	420	25	22	312	21	44	2	32	24	1	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	333	0	0	445	0	0	955	952	433	959	954	323
Stage 1	-	-	-	-	-	-	575	575	-	367	367	-
Stage 2	-	-	-	-	-	-	380	377	-	592	587	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1226	-	-	1115	-	-	238	259	623	237	259	718
Stage 1	-	-	-	-	-	-	503	503	-	653	622	-
Stage 2	-	-	-	-	-	-	642	616	-	493	497	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1226	-	-	1115	-	-	216	239	623	210	239	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	216	239	-	210	239	-
Stage 1	-	-	-	-	-	-	474	474	-	615	610	-
Stage 2	-	-	-	-	-	-	607	604	-	438	468	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.5			21.4			18		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	297	1226	-	-	1115	-	-	326
HCM Lane V/C Ratio	0.264	0.058	-	-	0.02	-	-	0.151
HCM Control Delay (s)	21.4	8.1	-	-	8.3	-	-	18
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1	0.2	-	-	0.1	-	-	0.5



Gateway
3: SH-56 & US-287

2025 PM Total
10/23/2019

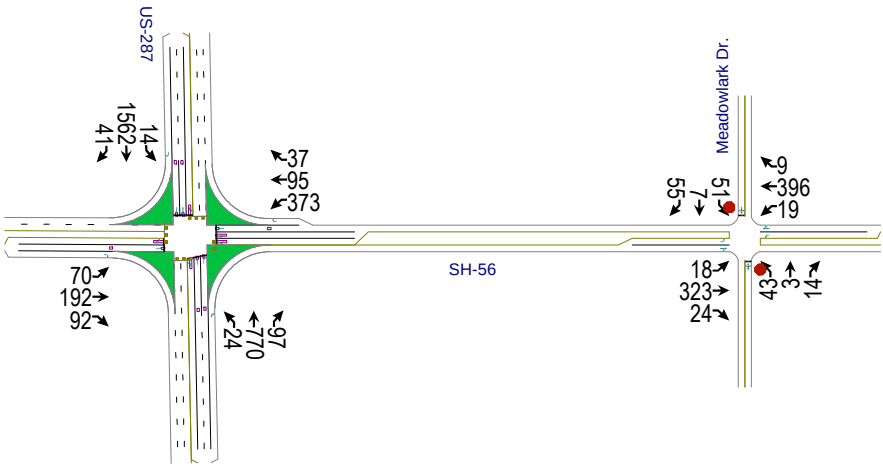
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	216	32	196	208	35	54	1270	435	33	755	45
Future Volume (veh/h)	72	216	32	196	208	35	54	1270	435	33	755	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	81	242	0	219	233	0	60	1518	0	37	903	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	276		279	319		398	2104		212	2081	
Arrive On Green	0.06	0.15	0.00	0.03	0.06	0.00	0.04	0.59	0.00	0.03	0.59	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	81	242	0	219	233	0	60	1518	0	37	903	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.4	15.2	0.0	7.6	14.7	0.0	1.6	36.5	0.0	1.0	16.9	0.0
Cycle Q Clear(g_c), s	5.4	15.2	0.0	7.6	14.7	0.0	1.6	36.5	0.0	1.0	16.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	103	276		279	319		398	2104		212	2081	
V/C Ratio(X)	0.79	0.88		0.79	0.73		0.15	0.72		0.17	0.43	
Avail Cap(c_a), veh/h	156	351		331	366		414	2104		233	2081	
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.8	50.1	0.0	57.4	53.9	0.0	10.2	17.4	0.0	15.0	13.8	0.0
Incr Delay (d2), s/veh	14.0	18.0	0.0	10.0	6.2	0.0	0.2	2.2	0.0	0.4	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	8.3	0.0	3.8	7.9	0.0	0.6	13.4	0.0	0.4	6.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.8	68.0	0.0	67.4	60.1	0.0	10.4	19.6	0.0	15.4	14.5	0.0
LnGrp LOS	E	E		E	E		B	B		B	B	
Approach Vol, veh/h		323	A		452	A		1578	A		940	A
Approach Delay, s/veh		68.5			63.6			19.3			14.5	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	75.6	14.2	22.2	8.8	74.8	11.4	25.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	63.0	11.5	22.5	5.4	62.6	10.5	23.5				
Max Q Clear Time (g_c+I1), s	3.0	38.5	9.6	17.2	3.6	18.9	7.4	16.7				
Green Ext Time (p_c), s	0.0	11.4	0.1	0.5	0.0	6.4	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			28.8									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Gateway
6: SH-56 & Meadowlark Dr.

2025 PM Total
10/23/2019

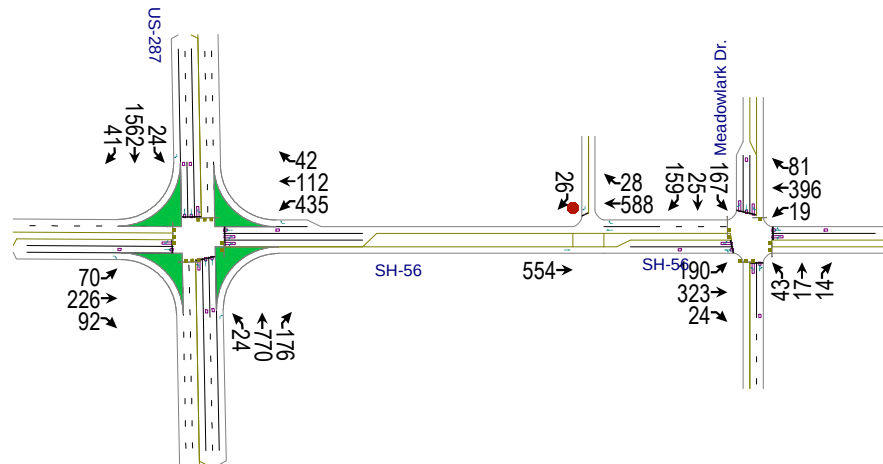
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	331	375	22	20	279	76	39	22	29	171	18	156
Future Volume (veh/h)	331	375	22	20	279	76	39	22	29	171	18	156
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	371	420	25	22	312	85	44	25	32	191	20	175
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	410	704	42	265	347	95	465	254	325	639	866	734
Arrive On Green	0.06	0.13	0.13	0.02	0.25	0.25	0.34	0.34	0.34	0.08	0.46	0.46
Sat Flow, veh/h	1781	1748	104	1781	1415	386	1188	745	954	1781	1870	1585
Grp Volume(v), veh/h	371	0	445	22	0	397	44	0	57	191	20	175
Grp Sat Flow(s),veh/h/ln	1781	0	1852	1781	0	1801	1188	0	1699	1781	1870	1585
Q Serve(g_s), s	18.6	0.0	27.2	1.1	0.0	25.6	3.0	0.0	2.7	8.0	0.7	8.0
Cycle Q Clear(g_c), s	18.6	0.0	27.2	1.1	0.0	25.6	3.0	0.0	2.7	8.0	0.7	8.0
Prop In Lane	1.00		0.06	1.00		0.21	1.00		0.56	1.00		1.00
Lane Grp Cap(c), veh/h	410	0	746	265	0	442	465	0	579	639	866	734
V/C Ratio(X)	0.90	0.00	0.60	0.08	0.00	0.90	0.09	0.00	0.10	0.30	0.02	0.24
Avail Cap(c_a), veh/h	544	0	986	302	0	578	465	0	579	681	866	734
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	0.0	42.9	32.9	0.0	43.8	27.1	0.0	27.0	21.0	17.5	19.4
Incr Delay (d2), s/veh	15.3	0.0	0.8	0.1	0.0	14.0	0.4	0.0	0.3	0.3	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.6	0.0	13.7	0.5	0.0	13.1	0.9	0.0	1.2	3.4	0.3	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.4	0.0	43.6	33.1	0.0	57.9	27.5	0.0	27.3	21.3	17.5	20.2
LnGrp LOS	D	A	D	C	A	E	C	A	C	C	B	C
Approach Vol, veh/h		816			419			101			386	
Approach Delay, s/veh		47.1			56.6			27.4			20.6	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.7	45.4	7.1	52.8		60.1	26.0	33.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	13.0	20.0	5.1	63.9		37.5	30.5	38.5				
Max Q Clear Time (g_c+l1), s	10.0	5.0	3.1	29.2		10.0	20.6	27.6				
Green Ext Time (p_c), s	0.1	0.3	0.0	3.1		0.7	0.9	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			42.3									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑	↗		↗
Traffic Vol, veh/h	0	728	436	38	0	33
Future Vol, veh/h	0	728	436	38	0	33
Conflicting Peds, #/hr	0	0	0	25	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	815	488	43	0	37
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	513
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	561
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	548
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		12		
HCM LOS				B		
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	548		
HCM Lane V/C Ratio	-	-	-	0.067		
HCM Control Delay (s)	-	-	-	12		
HCM Lane LOS	-	-	-	B		
HCM 95th %tile Q(veh)	-	-	-	0.2		



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	170	81	330	84	33	21	535	86	12	1085	36
Future Volume (veh/h)	62	170	81	330	84	33	21	535	86	12	1085	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	209	0	405	103	0	26	837	0	15	1698	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	240		459	387		151	2034		379	2007	
Arrive On Green	0.05	0.13	0.00	0.13	0.21	0.00	0.02	0.57	0.00	0.02	0.56	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	76	209	0	405	103	0	26	837	0	15	1698	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.1	13.2	0.0	13.8	5.5	0.0	0.7	15.8	0.0	0.4	47.8	0.0
Cycle Q Clear(g_c), s	5.1	13.2	0.0	13.8	5.5	0.0	0.7	15.8	0.0	0.4	47.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	97	240		459	387		151	2034		379	2007	
V/C Ratio(X)	0.78	0.87		0.88	0.27		0.17	0.41		0.04	0.85	
Avail Cap(c_a), veh/h	174	281		475	387		182	2034		424	2007	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.0	51.3	0.0	51.1	40.0	0.0	20.8	14.3	0.0	11.6	21.8	0.0
Incr Delay (d2), s/veh	12.8	21.9	0.0	17.1	0.4	0.0	0.5	0.6	0.0	0.0	4.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	7.5	0.0	6.9	2.5	0.0	0.3	5.8	0.0	0.2	18.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.8	73.3	0.0	68.2	40.3	0.0	21.3	15.0	0.0	11.6	26.4	0.0
LnGrp LOS	E	E		E	D		C	B		B	C	
Approach Vol, veh/h		285	A		508	A		863	A		1713	A
Approach Delay, s/veh		72.1			62.6			15.2			26.3	
Approach LOS		E			E			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.5	73.2	20.4	19.9	7.4	72.3	11.0	29.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	62.5	16.5	18.0	5.0	62.5	11.7	22.8				
Max Q Clear Time (g_c+I1), s	2.4	17.8	15.8	15.2	2.7	49.8	7.1	7.5				
Green Ext Time (p_c), s	0.0	5.8	0.1	0.2	0.0	8.5	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			32.8									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	286	21	17	350	8	38	2	12	45	5	49
Future Vol, veh/h	16	286	21	17	350	8	38	2	12	45	5	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	175	-	-	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	351	26	21	430	10	47	3	15	55	8	60
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	440	0	0	377	0	0	915	886	364	890	894	435
Stage 1	-	-	-	-	-	-	404	404	-	477	477	-
Stage 2	-	-	-	-	-	-	511	482	-	413	417	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1120	-	-	1181	-	-	253	284	681	264	280	621
Stage 1	-	-	-	-	-	-	623	599	-	569	556	-
Stage 2	-	-	-	-	-	-	545	553	-	616	591	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1120	-	-	1181	-	-	217	274	681	249	270	621
Mov Cap-2 Maneuver	-	-	-	-	-	-	217	274	-	249	270	-
Stage 1	-	-	-	-	-	-	612	588	-	559	546	-
Stage 2	-	-	-	-	-	-	476	543	-	589	580	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.4			23.4			20.5		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	260	1120	-	-	1181	-	-	354				
HCM Lane V/C Ratio	0.248	0.018	-	-	0.018	-	-	0.348				
HCM Control Delay (s)	23.4	8.3	-	-	8.1	-	-	20.5				
HCM Lane LOS	C	A	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	1	0.1	-	-	0.1	-	-	1.5				



Gateway
3: SH-56 & US-287

2040 AM Total
10/23/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	200	81	385	99	37	21	535	156	21	1085	36
Future Volume (veh/h)	62	200	81	385	99	37	21	535	156	21	1085	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	246	0	473	122	0	26	837	0	26	1698	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	275		504	445		134	1895		359	1895	
Arrive On Green	0.05	0.15	0.00	0.05	0.08	0.00	0.02	0.53	0.00	0.02	0.53	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	76	246	0	473	122	0	26	837	0	26	1698	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.1	15.5	0.0	16.4	7.4	0.0	0.8	17.3	0.0	0.8	51.3	0.0
Cycle Q Clear(g_c), s	5.1	15.5	0.0	16.4	7.4	0.0	0.8	17.3	0.0	0.8	51.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	97	275		504	445		134	1895		359	1895	
V/C Ratio(X)	0.78	0.90		0.94	0.27		0.19	0.44		0.07	0.90	
Avail Cap(c_a), veh/h	174	288		504	445		165	1895		390	1895	
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.0	50.3	0.0	56.6	45.5	0.0	24.0	17.1	0.0	13.2	25.0	0.0
Incr Delay (d2), s/veh	12.8	27.3	0.0	25.6	0.3	0.0	0.7	0.7	0.0	0.1	7.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	9.1	0.0	9.4	3.5	0.0	0.3	6.5	0.0	0.3	20.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.8	77.6	0.0	82.2	45.8	0.0	24.7	17.9	0.0	13.3	32.2	0.0
LnGrp LOS	E	E		F	D		C	B		B	C	
Approach Vol, veh/h		322	A		595	A		863	A		1724	A
Approach Delay, s/veh		75.5			74.7			18.1			31.9	
Approach LOS		E			E			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	68.5	22.0	22.1	7.4	68.5	11.0	33.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	61.0	17.5	18.5	5.0	61.0	11.7	24.3				
Max Q Clear Time (g_c+I1), s	2.8	19.3	18.4	17.5	2.8	53.3	7.1	9.4				
Green Ext Time (p_c), s	0.0	5.7	0.0	0.1	0.0	5.7	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			39.8									
HCM 6th LOS			D									

Notes

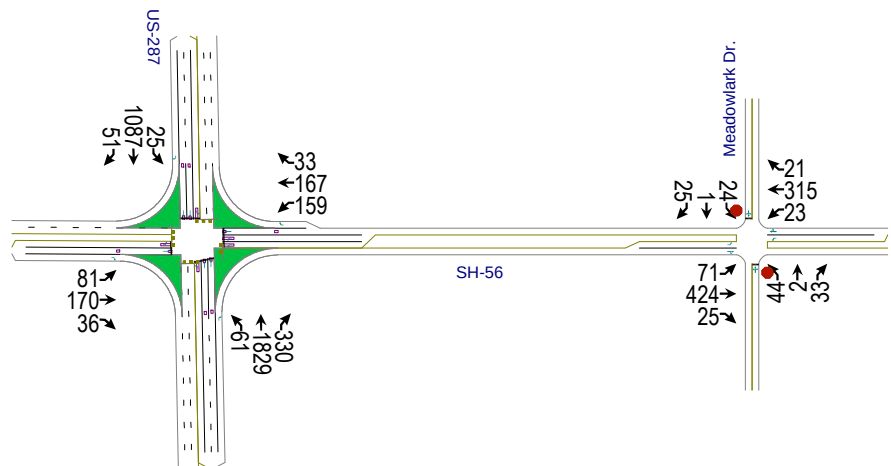
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Gateway
6: SH-56 & Meadowlark Dr.

2040 AM Total
10/23/2019

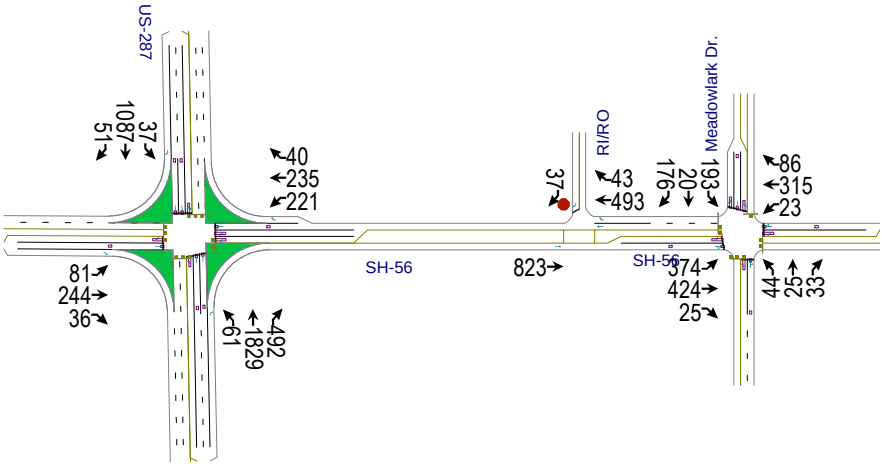
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	286	21	17	350	72	38	15	12	148	22	141
Future Volume (veh/h)	168	286	21	17	350	72	38	15	12	148	22	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	206	351	26	21	430	88	47	18	15	182	27	173
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	262	666	49	295	476	97	488	342	285	683	896	760
Arrive On Green	0.03	0.13	0.13	0.02	0.32	0.32	0.36	0.36	0.36	0.08	0.48	0.48
Sat Flow, veh/h	1781	1720	127	1781	1507	308	1182	943	786	1781	1870	1585
Grp Volume(v), veh/h	206	0	377	21	0	518	47	0	33	182	27	173
Grp Sat Flow(s),veh/h/ln	1781	0	1847	1781	0	1815	1182	0	1729	1781	1870	1585
Q Serve(g_s), s	8.9	0.0	22.9	0.9	0.0	32.8	3.2	0.0	1.5	7.4	0.9	7.7
Cycle Q Clear(g_c), s	8.9	0.0	22.9	0.9	0.0	32.8	3.2	0.0	1.5	7.4	0.9	7.7
Prop In Lane	1.00		0.07	1.00		0.17	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	262	0	716	295	0	573	488	0	626	683	896	760
V/C Ratio(X)	0.78	0.00	0.53	0.07	0.00	0.90	0.10	0.00	0.05	0.27	0.03	0.23
Avail Cap(c_a), veh/h	342	0	947	339	0	764	488	0	626	731	896	760
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.5	0.0	42.0	27.6	0.0	39.3	25.4	0.0	24.9	19.7	16.5	18.3
Incr Delay (d2), s/veh	8.6	0.0	0.6	0.1	0.0	11.6	0.4	0.0	0.2	0.2	0.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	11.5	0.4	0.0	16.3	1.0	0.0	0.6	3.1	0.4	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.2	0.0	42.6	27.7	0.0	50.9	25.8	0.0	25.0	19.9	16.6	19.0
LnGrp LOS	D	A	D	C	A	D	C	A	C	B	B	B
Approach Vol, veh/h		583			539			80			382	
Approach Delay, s/veh		41.4			50.0			25.5			19.2	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.0	48.0	7.0	51.0		62.0	15.6	42.4				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	12.8	22.2	5.5	61.5		39.5	16.5	50.5				
Max Q Clear Time (g_c+I1), s	9.4	5.2	2.9	24.9		9.7	10.9	34.8				
Green Ext Time (p_c), s	0.2	0.2	0.0	2.6		0.7	0.3	3.1				
Intersection Summary												
HCM 6th Ctrl Delay			38.2									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑	↗		↗
Traffic Vol, veh/h	0	490	520	25	0	23
Future Vol, veh/h	0	490	520	25	0	23
Conflicting Peds, #/hr	0	0	0	25	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	602	639	31	0	28
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	664
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	461
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	450
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		13.5		
HCM LOS	B					
Minor Lane/Major Mvmt		EBT	WBT	WBR	SBLn1	
Capacity (veh/h)		-	-	-	450	
HCM Lane V/C Ratio		-	-	-	0.063	
HCM Control Delay (s)		-	-	-	13.5	
HCM Lane LOS		-	-	-	B	
HCM 95th %tile Q(veh)		-	-	-	0.2	



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	150	32	141	148	29	54	1270	292	22	755	45
Future Volume (veh/h)	72	150	32	141	148	29	54	1270	292	22	755	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	184	0	173	182	0	66	1988	0	27	1182	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	237		216	237		322	1982		140	1912	
Arrive On Green	0.06	0.13	0.00	0.06	0.13	0.00	0.05	0.56	0.00	0.03	0.54	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	88	184	0	173	182	0	66	1988	0	27	1182	0
Grp Sat Flow(s), veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	3.9	7.6	0.0	4.0	7.5	0.0	1.3	44.6	0.0	0.5	18.4	0.0
Cycle Q Clear(g_c), s	3.9	7.6	0.0	4.0	7.5	0.0	1.3	44.6	0.0	0.5	18.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	111	237		216	237		322	1982		140	1912	
V/C Ratio(X)	0.79	0.78		0.80	0.77		0.21	1.00		0.19	0.62	
Avail Cap(c_a), veh/h	111	421		216	421		347	1982		201	1912	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.0	33.8	0.0	37.0	33.8	0.0	9.6	17.7	0.0	19.2	12.8	0.0
Incr Delay (d2), s/veh	30.9	5.5	0.0	19.0	5.2	0.0	0.3	20.9	0.0	0.7	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	3.6	0.0	2.1	3.5	0.0	0.4	18.8	0.0	0.2	5.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.8	39.3	0.0	56.0	39.0	0.0	9.9	38.6	0.0	19.9	14.3	0.0
LnGrp LOS	E	D		E	D		A	F		B	B	
Approach Vol, veh/h		272	A		355	A		2054	A		1209	A
Approach Delay, s/veh		48.5			47.3			37.7			14.4	
Approach LOS		D			D			D			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.8	49.1	9.5	14.6	8.3	47.5	9.5	14.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	34.0	5.0	18.0	5.0	34.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	2.5	46.6	6.0	9.6	3.3	20.4	5.9	9.5				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.5	0.0	6.2	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay			32.1									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	375	22	20	279	19	39	2	29	21	1	22
Future Vol, veh/h	63	375	22	20	279	19	39	2	29	21	1	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	175	-	-	300	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	77	461	27	25	343	23	48	2	36	26	1	27
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	366	0	0	488	0	0	1048	1045	475	1053	1047	355
Stage 1	-	-	-	-	-	-	629	629	-	405	405	-
Stage 2	-	-	-	-	-	-	419	416	-	648	642	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1193	-	-	1075	-	-	206	229	590	204	228	689
Stage 1	-	-	-	-	-	-	470	475	-	622	598	-
Stage 2	-	-	-	-	-	-	612	592	-	459	469	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1193	-	-	1075	-	-	184	209	590	177	208	689
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	209	-	177	208	-
Stage 1	-	-	-	-	-	-	439	444	-	582	584	-
Stage 2	-	-	-	-	-	-	573	578	-	401	439	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.5			25.7			20.7		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	259	1193	-	-	1075	-	-	283				
HCM Lane V/C Ratio	0.332	0.065	-	-	0.023	-	-	0.191				
HCM Control Delay (s)	25.7	8.2	-	-	8.4	-	-	20.7				
HCM Lane LOS	D	A	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	1.4	0.2	-	-	0.1	-	-	0.7				



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	216	32	196	208	35	54	1270	435	33	755	45
Future Volume (veh/h)	72	216	32	196	208	35	54	1270	435	33	755	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	265	0	241	255	0	66	1988	0	41	1182	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	104	282		274	321		304	2093		130	2072	
Arrive On Green	0.06	0.15	0.00	0.03	0.06	0.00	0.04	0.59	0.00	0.03	0.58	0.00
Sat Flow, veh/h	1781	1870	1585	3456	1870	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	88	265	0	241	255	0	66	1988	0	41	1182	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1870	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.9	16.8	0.0	8.3	16.2	0.0	1.8	62.6	0.0	1.1	24.9	0.0
Cycle Q Clear(g_c), s	5.9	16.8	0.0	8.3	16.2	0.0	1.8	62.6	0.0	1.1	24.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	104	282		274	321		304	2093		130	2072	
V/C Ratio(X)	0.85	0.94		0.88	0.79		0.22	0.95		0.32	0.57	
Avail Cap(c_a), veh/h	104	282		274	321		324	2093		149	2072	
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.0	50.4	0.0	57.9	54.5	0.0	12.0	23.0	0.0	28.1	15.6	0.0
Incr Delay (d2), s/veh	44.3	37.6	0.0	26.5	12.9	0.0	0.4	11.0	0.0	1.4	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	10.6	0.0	4.7	9.2	0.0	0.6	25.1	0.0	0.7	9.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	100.3	88.0	0.0	84.4	67.4	0.0	12.4	34.0	0.0	29.5	16.8	0.0
LnGrp LOS	F	F		F	E		B	C		C	B	
Approach Vol, veh/h		353	A		496	A		2054	A		1223	A
Approach Delay, s/veh		91.1			75.6			33.3			17.2	
Approach LOS		F			E			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	75.2	14.0	22.6	8.9	74.5	11.5	25.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	69.4	9.5	18.1	5.8	68.6	7.0	20.6				
Max Q Clear Time (g_c+l1), s	3.1	64.6	10.3	18.8	3.8	26.9	7.9	18.2				
Green Ext Time (p_c), s	0.0	4.1	0.0	0.0	0.0	9.3	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			38.6									
HCM 6th LOS			D									
Notes												
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	331	375	22	20	279	76	39	22	29	171	18	156
Future Volume (veh/h)	331	375	22	20	279	76	39	22	29	171	18	156
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	407	461	27	25	343	93	48	27	36	210	22	192
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	446	774	45	280	375	102	397	210	280	580	789	669
Arrive On Green	0.07	0.15	0.15	0.02	0.26	0.26	0.29	0.29	0.29	0.10	0.42	0.42
Sat Flow, veh/h	1781	1749	102	1781	1417	384	1167	727	969	1781	1870	1585
Grp Volume(v), veh/h	407	0	488	25	0	436	48	0	63	210	22	192
Grp Sat Flow(s), veh/h/ln	1781	0	1852	1781	0	1801	1167	0	1696	1781	1870	1585
Q Serve(g_s), s	21.2	0.0	29.6	1.2	0.0	28.2	3.7	0.0	3.3	9.6	0.8	9.6
Cycle Q Clear(g_c), s	21.2	0.0	29.6	1.2	0.0	28.2	3.7	0.0	3.3	9.6	0.8	9.6
Prop In Lane	1.00		0.06	1.00		0.21	1.00		0.57	1.00		1.00
Lane Grp Cap(c), veh/h	446	0	819	280	0	477	397	0	489	580	789	669
V/C Ratio(X)	0.91	0.00	0.60	0.09	0.00	0.91	0.12	0.00	0.13	0.36	0.03	0.29
Avail Cap(c_a), veh/h	556	0	986	313	0	563	397	0	489	580	789	669
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	0.0	41.2	31.1	0.0	42.8	31.7	0.0	31.5	24.5	20.3	22.8
Incr Delay (d2), s/veh	16.9	0.0	0.7	0.1	0.0	17.8	0.6	0.0	0.5	0.4	0.1	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ft	5.1	0.0	14.9	0.5	0.0	14.8	1.1	0.0	1.4	4.1	0.4	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	55.6	0.0	41.9	31.2	0.0	60.6	32.3	0.0	32.1	24.9	20.4	23.9
LnGrp LOS	E	A	D	C	A	E	C	A	C	C	C	C
Approach Vol, veh/h	895			461			111			424		
Approach Delay, s/veh	48.2			59.0			32.2			24.2		
Approach LOS	D			E			C			C		
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	6.0	39.1	7.3	57.6		55.1	28.6	36.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	1.5	21.5	5.1	63.9		37.5	31.5	37.5				
Max Q Clear Time (g_c+I1), s	1.6	5.7	3.2	31.6		11.6	23.2	30.2				
Green Ext Time (p_c), s	0.0	0.4	0.0	3.5		0.7	0.9	1.6				
Intersection Summary												
HCM 6th Ctrl Delay				44.5								
HCM 6th LOS				D								

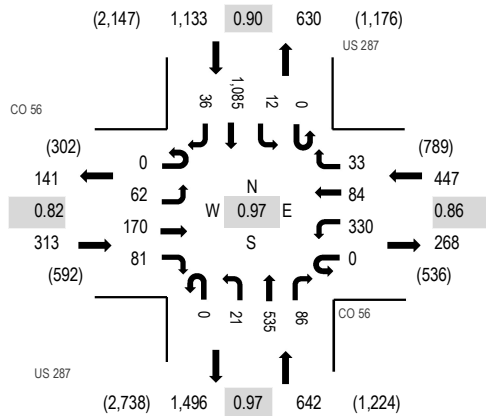
Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑	↗		↗
Traffic Vol, veh/h	0	728	436	38	0	33
Future Vol, veh/h	0	728	436	38	0	33
Conflicting Peds, #/hr	0	0	0	25	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	894	536	47	0	41
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	561
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	527
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	514
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		12.6		
HCM LOS	B					
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	514		
HCM Lane V/C Ratio	-	-	-	0.079		
HCM Control Delay (s)	-	-	-	12.6		
HCM Lane LOS	-	-	-	B		
HCM 95th %tile Q(veh)	-	-	-	0.3		



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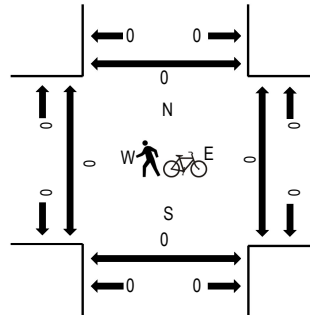
Location: 1 US 287 & CO 56 AM
Date: Tuesday, October 15, 2019
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO 56 Eastbound				CO 56 Westbound				US 287 Northbound				US 287 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	11	24	11	0	64	8	5	0	5	102	11	0	1	297	5	544	2,424	0	0	0	0
7:15 AM	0	16	36	25	0	80	13	8	0	3	139	15	0	4	303	10	652	2,535	0	0	0	0
7:30 AM	0	21	36	19	0	84	11	10	0	7	133	16	0	1	269	6	613	2,505	0	0	0	0
7:45 AM	0	12	51	21	0	80	23	8	0	6	133	30	0	2	241	8	615	2,435	0	0	0	0
8:00 AM	0	13	47	16	0	86	37	7	0	5	130	25	0	5	272	12	655	2,328	0	0	0	0
8:15 AM	0	18	69	16	0	58	26	7	0	4	129	35	0	4	241	15	622		0	0	0	0
8:30 AM	0	15	20	19	0	61	38	6	0	8	119	22	1	5	216	13	543		0	0	0	0
8:45 AM	0	20	43	13	0	43	22	4	0	7	109	31	0	3	203	10	508		0	0	0	0
Count Total	0	126	326	140	0	556	178	55	0	45	994	185	1	25	2,042	79	4,752		0	0	0	0
Peak Hour	0	62	170	81	0	330	84	33	0	21	535	86	0	12	1,085	36	2,535		0	0	0	0



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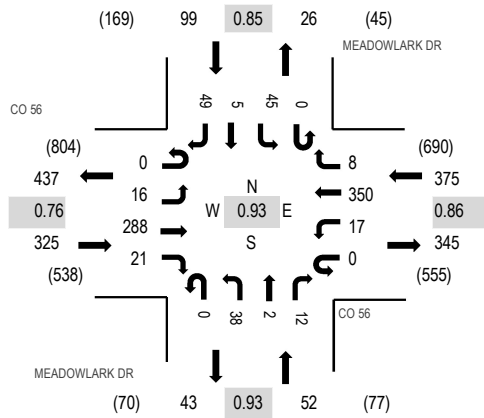
Location: 2 MEADOWLARK DR & CO 56 AM

Date: Tuesday, October 15, 2019

Peak Hour: 07:30 AM - 08:30 AM

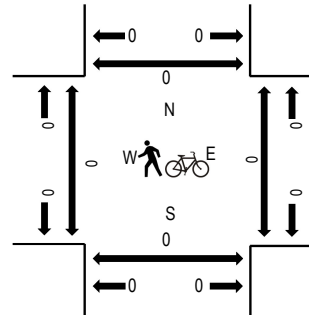
Peak 15-Minutes: 08:15 AM - 08:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

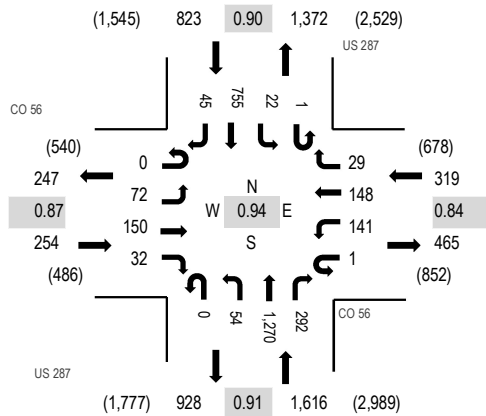
Interval Start Time	CO 56 Eastbound				CO 56 Westbound				MEADOWLARK DR Northbound				MEADOWLARK DR Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	34	1	0	1	67	1	0	3	0	1	0	4	1	11	124	697	0	0	0	0
7:15 AM	0	7	45	4	0	2	83	1	0	8	0	2	0	3	0	19	174	797	0	0	0	0
7:30 AM	0	3	48	4	0	5	73	1	0	10	0	2	0	7	1	21	175	851	0	0	0	0
7:45 AM	0	3	76	5	0	1	99	1	0	11	0	3	0	13	1	11	224	846	0	0	0	0
8:00 AM	0	8	67	4	0	5	107	3	0	8	2	3	0	7	2	8	224	777	0	0	0	0
8:15 AM	0	2	97	8	0	6	71	3	0	9	0	4	0	18	1	9	228		0	0	0	0
8:30 AM	0	2	43	3	1	5	88	5	0	6	0	1	0	5	0	11	170		0	0	0	0
8:45 AM	0	1	67	6	0	4	55	2	0	4	0	0	0	4	0	12	155		0	0	0	0
Count Total	0	26	477	35	1	29	643	17	0	59	2	16	0	61	6	102	1,474		0	0	0	0
Peak Hour	0	16	288	21	0	17	350	8	0	38	2	12	0	45	5	49	851		0	0	0	0



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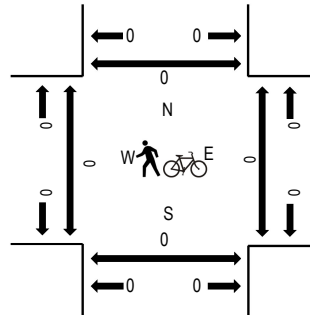
Location: 1 US 287 & CO 56 PM
Date: Tuesday, October 15, 2019
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO 56 Eastbound				CO 56 Westbound				US 287 Northbound				US 287 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	11	33	5	0	44	56	8	0	18	262	54	0	5	140	8	644	2,709	0	0	0	0
4:15 PM	0	21	40	8	0	43	35	5	0	18	272	47	0	6	152	14	661	2,793	0	0	0	0
4:30 PM	0	12	26	8	0	47	44	5	0	17	274	59	0	4	187	13	696	2,930	0	0	0	0
4:45 PM	0	23	37	13	0	34	38	5	0	16	280	81	0	3	166	12	708	3,012	0	0	0	0
5:00 PM	0	15	42	7	0	33	36	9	0	13	295	65	0	11	190	12	728	2,989	0	0	0	0
5:15 PM	0	15	43	7	0	46	39	6	0	11	358	75	0	4	184	10	798		0	0	0	0
5:30 PM	0	19	28	5	1	28	35	9	0	14	337	71	1	4	215	11	778		0	0	0	0
5:45 PM	0	20	36	12	0	29	36	7	0	20	260	72	0	5	174	14	685		0	0	0	0
Count Total	0	136	285	65	1	304	319	54	0	127	2,338	524	1	42	1,408	94	5,698		0	0	0	0
Peak Hour	0	72	150	32	1	141	148	29	0	54	1,270	292	1	22	755	45	3,012		0	0	0	0



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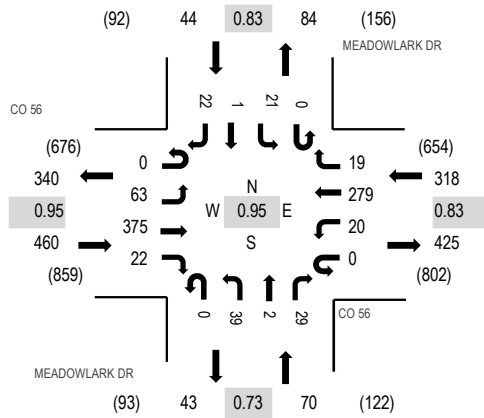
Location: 2 MEADOWLARK DR & CO 56 PM

Date: Tuesday, October 15, 2019

Peak Hour: 04:30 PM - 05:30 PM

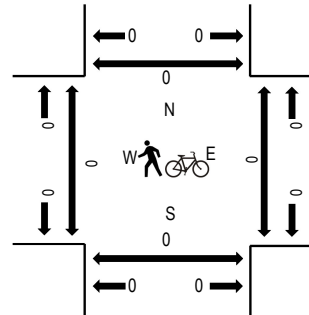
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO 56 Eastbound				CO 56 Westbound				MEADOWLARK DR Northbound				MEADOWLARK DR Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	1	10	77	6	0	4	94	6	0	5	0	7	0	10	0	4	224	847	0	0	0	0
4:15 PM	0	9	76	5	0	7	70	5	0	5	0	7	0	4	0	6	194	858	0	0	0	0
4:30 PM	0	10	78	4	0	5	83	4	0	9	0	5	0	5	0	4	207	892	0	0	0	0
4:45 PM	0	17	98	8	0	7	59	1	0	9	0	8	0	8	1	6	222	892	0	0	0	0
5:00 PM	0	20	97	6	0	5	67	8	0	15	0	9	0	3	0	5	235	880	0	0	0	0
5:15 PM	0	16	102	4	0	3	70	6	0	6	2	7	0	5	0	7	228		0	0	0	0
5:30 PM	0	9	83	7	0	6	70	4	0	4	4	5	0	6	1	8	207		0	0	0	0
5:45 PM	0	16	93	7	0	5	57	8	0	8	1	6	0	3	2	4	210		0	0	0	0
Count Total	1	107	704	47	0	42	570	42	0	61	7	54	0	44	4	44	1,727		0	0	0	0
Peak Hour	0	63	375	22	0	20	279	19	0	39	2	29	0	21	1	22	892		0	0	0	0

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Gateway		Organization:	ATC	
Project Location:	Berthoud		Performed By:	jmwa	
Scenario Description:			Date:	10/14/2019	
Analysis Year:	2024		Checked By:		
Analysis Period:	AM Peak Hour		Date:		

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (<i>For Information Only</i>)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0	0	0
Retail				337	190	148
Restaurant				159	87	72
Cinema/Entertainment				0	0	0
Residential				59	14	45
Hotel				0		
All Other Land Uses ²				0	0	0
				555	291	265

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00	0%	5%	1.00	0%	5%
Retail	1.50	0%	5%	1.50	0%	5%
Restaurant	1.50	0%	5%	1.50	0%	5%
Cinema/Entertainment	1.50	0%	5%	1.50	0%	5%
Residential						
Hotel						
All Other Land Uses ²	1.00			1.00		

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		29	0	0	0
Restaurant	0	15		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	9	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	805	430	375
Internal Capture Percentage	13%	13%	14%
External Vehicle-Trips ⁵	459	243	216
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	34	19	15

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	5%	13%
Restaurant	29%	15%
Cinema/Entertainment	N/A	N/A
Residential	7%	20%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Gateway
Analysis Period:	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.50	190	285	1.50	148	222
Restaurant	1.50	87	131	1.50	72	108
Cinema/Entertainment	1.50	0	0	1.50	0	0
Residential	1.00	14	14	1.00	45	45
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office	0	0	0	0	0	0
Retail	64	0	29	0	31	0
Restaurant	33	15	0	0	4	3
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	0	9	0	0	0
Hotel	0	0	0	0	0	0

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office	0	91	30	0	0	0
Retail	0	0	66	0	0	0
Restaurant	0	23	0	0	1	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	48	26	0	0	0
Hotel	0	11	8	0	0	0

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	15	270	285	171	0	14
Restaurant	38	93	131	59	0	5
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	13	14	13	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	29	193	222	122	0	10
Restaurant	16	92	108	58	0	5
Cinema/Entertainment	0	0	0	0	0	0
Residential	9	36	45	36	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Gateway			Organization:	ATC
Project Location:	Berthoud			Performed By:	JMWA
Scenario Description:				Date:	10/14/2019
Analysis Year:	2024			Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0	0	0
Retail				658	332	327
Restaurant				156	97	59
Cinema/Entertainment				0	0	0
Residential				72	45	27
Hotel				0		
All Other Land Uses ²				0	0	0
				886	474	413

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00	0%	5%	1.00	0%	5%
Retail	1.50	0%	5%	1.50	0%	5%
Restaurant	1.50	0%	5%	1.50	0%	5%
Cinema/Entertainment	1.50	0%	0%	1.50	0%	0%
Residential						
Hotel						
All Other Land Uses ²	1.00	1%	0%	1.00	1%	0%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		300	300		500	
Retail					500	
Restaurant					500	
Cinema/Entertainment					500	
Residential		500	500			
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		42	0	21	0
Restaurant	0	36		0	7	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	10	5	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,296	689	607
Internal Capture Percentage	19%	18%	20%
External Vehicle-Trips ⁵	678	366	312
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	51	28	23

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	9%	13%
Restaurant	32%	48%
Cinema/Entertainment	N/A	N/A
Residential	62%	56%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Gateway
Analysis Period:	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.50	332	498	1.50	327	491
Restaurant	1.50	97	146	1.50	59	89
Cinema/Entertainment	1.50	0	0	1.50	0	0
Residential	1.00	45	45	1.00	27	27
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office	0	0	0	0	0	0
Retail	10	0	142	20	128	25
Restaurant	3	36	0	7	16	6
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	10	5	0	0	1
Hotel	0	0	0	0	0	0

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office	0	39	3	0	2	0
Retail	0	0	42	0	21	0
Restaurant	0	249	0	0	7	0
Cinema/Entertainment	0	20	4	0	2	0
Residential	0	45	19	0	0	0
Hotel	0	10	7	0	0	0

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	46	452	498	286	0	23
Restaurant	47	99	146	63	0	5
Cinema/Entertainment	0	0	0	0	0	0
Residential	28	17	45	17	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	63	428	491	271	0	21
Restaurant	43	46	89	29	0	2
Cinema/Entertainment	0	0	0	0	0	0
Residential	15	12	27	12	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Table 7.1a Adjusted Internal Trip Capture Rates for Trip Origins within a Multi-Use Development			
Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
From OFFICE	To Office	0.0%	0.0%
	To Retail	28.0%	19.4%
	To Restaurant	63.0%	3.9%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	1.0%	2.0%
	To Hotel	0.0%	0.0%
From RETAIL	To Office	29.0%	2.0%
	To Retail	0.0%	0.0%
	To Restaurant	13.0%	29.0%
	To Cinema/Entertainment	0.0%	4.0%
	To Residential	14.0%	26.0%
	To Hotel	0.0%	5.0%
From RESTAURANT	To Office	31.0%	3.0%
	To Retail	14.0%	41.0%
	To Restaurant	0.0%	0.0%
	To Cinema/Entertainment	0.0%	8.0%
	To Residential	4.0%	18.0%
	To Hotel	3.0%	7.0%
From CINEMA/ENTERTAINMENT	To Office	0.0%	2.0%
	To Retail	0.0%	21.0%
	To Restaurant	0.0%	31.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	8.0%
	To Hotel	0.0%	2.0%
From RESIDENTIAL	To Office	2.0%	4.0%
	To Retail	1.0%	38.2%
	To Restaurant	20.0%	19.1%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	0.0%
	To Hotel	0.0%	3.0%
From HOTEL	To Office	75.0%	0.0%
	To Retail	14.0%	16.0%
	To Restaurant	9.0%	68.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	2.0%
	To Hotel	0.0%	0.0%

Table 7.2a Adjusted Internal Trip Capture Rates for Trip Destinations within a Multi-Use Development

Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
To OFFICE	From Office	0.0%	0.0%
	From Retail	4.0%	31.0%
	From Restaurant	14.0%	30.0%
	From Cinema/Entertainment	0.0%	6.0%
	From Residential	3.0%	57.0%
	From Hotel	3.0%	0.0%
To RETAIL	From Office	32.0%	7.8%
	From Retail	0.0%	0.0%
	From Restaurant	8.0%	50.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	17.0%	9.1%
	From Hotel	4.0%	2.0%
To RESTAURANT	From Office	23.0%	1.9%
	From Retail	50.0%	29.0%
	From Restaurant	0.0%	0.0%
	From Cinema/Entertainment	0.0%	3.0%
	From Residential	20.0%	12.7%
	From Hotel	6.0%	5.0%
To CINEMA/ENTERTAINMENT	From Office	0.0%	1.0%
	From Retail	0.0%	26.0%
	From Restaurant	0.0%	32.0%
	From Cinema/Entertainment	0.0%	0.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To RESIDENTIAL	From Office	0.0%	4.0%
	From Retail	2.0%	46.0%
	From Restaurant	5.0%	16.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To HOTEL	From Office	0.0%	0.0%
	From Retail	0.0%	17.0%
	From Restaurant	4.0%	71.0%
	From Cinema/Entertainment	0.0%	1.0%
	From Residential	0.0%	12.0%
	From Hotel	0.0%	0.0%

**Preliminary Drainage Report Amendment
Westside Crossing
Berthoud, Colorado**

Prepared for:
Berthoud Gateway, LLC
8040 Loudon Circle, Windsor, CO 80528
Phone Number: (970) 222-7268

Prepared by:



Kiowa
Engineering Corporation

7175 West Jefferson Avenue, Suite 2200
Lakewood, Colorado 80235
Ph: (303)692-0369

Kiowa Project No. 19043

July 7, 2023

TABLE OF CONTENTS

Table of Contents.....	i
Signature Page.....	ii
I. General Description.....	1
II. Soils Conditions	1
III. Drainage Criteria.....	1
IV. Existing Drainage Conditions	2
V. Proposed Drainage Conditions	3
VI. Water Quality and Detention Design	4
VII. Floodplain Statement.....	5
VIII. Summary.....	5
IX. References.....	5
Appendix Table of Contents	7

SIGNATURE PAGE

ENGINEER'S STATEMENT:

Kiowa Engineering Corporation hereby certifies that the drainage facilities for Westside Crossing Replat #2 will be constructed according to the design presented in this report. I understand that the Town of Berthoud does not and shall not assume liability for the drainage facilities designed and/or certified by me engineer. I understand that the Town of Berthoud reviews drainage plans but cannot, on behalf of Westside Crossing Replat #2 and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the Plat and/or Development Permit does not imply approval of my engineer's drainage design.

Matthew W. Erichsen, PE, CFM (PE #36713)
Kiowa Engineering Corp.

I. GENERAL DESCRIPTION

The purpose of this Preliminary Drainage Report is to describe and discuss the drainage patterns and impacts associated with the proposed development. The Westside Crossing project is located on an undeveloped parcel at the northwest corner of State Highway 56 and Meadowlark Drive. The proposed development will consist of approximately 7.75 acres of residential multi-family use and 13.19 acres of commercial use. The total area of the site is 20.94 acres (ac). The residential use to the north consists of Lot 1, Block 2, Westside Crossing, and the commercial use on the southern portion of the site is comprised of Lots 1 thru 6, Block 1, Westside Crossing. The properties are situated in the South Half of the Southwest Quarter of Section 15, Township 4 North, Range 69 West of the 6th Principal Meridian, City of Berthoud, County of Larimer, State of Colorado. The property is bounded on the east by Meadowlark Drive, on the south by Highway 56, on the west by U.S. Highway 287 by-pass, and on the north by Village at Matthews Farm residential development. The location of the site is shown on the Vicinity Map (Figure 1).

The site is currently covered with native prairie grasses and sparse trees located on the southern boundary of the site along Highway 56.

The proposed development is planned to occur in two phases with the South commercial Lots being developed first and the North residential Lot(s) developed in the future. The development of the South Lot will include construction of the previously mentioned commercial buildings, parking lots, paved drives, landscaping, and associated stormwater quality and detention facilities. The development of the North Lot will include construction of multifamily residences, paved drives, landscaping and associated stormwater quality and detention facility.

II. SOILS CONDITIONS

The majority of soils within the property are classified to be within Hydrologic Soils Group C based on the NRCS Soil Survey for the Berthoud area. Soils on the site are predominantly Nunn Clay Loam (Soil Group C). For the site drainage calculations, the soils were assumed to be Hydrologic Soil Group C. The existing vegetative cover within the development is in fair condition with mostly grasses and scattered trees throughout the site. The existing ground slopes for the majority of the property range from 0.5 to 1.5 percent with the steepest slopes occurring near the southeast corner of the site at an existing soil mound. Steep slopes also parallel the northern and eastern property boundaries where existing drainage swales convey stormwater and irrigation water from the west side of Highway 287 and from northern residential development's detention facility release as well as minor undetained runoff.

III. DRAINAGE CRITERIA

Hydrologic Criteria

The hydrology for the site was performed using the methods outlined in the *Larimer County Stormwater Design Standards*, which is an addendum to the Mile High Flood District (MHFD) Criteria Manuals as well as Town of Berthoud Engineering and Infrastructure Design Standards and Construction Specifications. Existing topography for the site was surveyed and compiled using one-foot contour intervals and is presented on the Existing Conditions Drainage Plan (Exhibit A). The hydrological calculations were made for the proposed site conditions, which are depicted on the Proposed Conditions Drainage Plan (Exhibit B). Peak Flow Rates for the sub-basins were estimated using the Rational Method. The 10-Year (Minor Storm) and 100-Year (Major Storm) recurrence intervals were determined.

Rainfall intensity was determined using NOAA Atlas 14, Volume 8, Version 2 point-based precipitation frequency estimates. Per Town of Berthoud, Runoff Coefficients for the existing and proposed sub basins were determined by Table 600-2 of the Town of Berthoud Design and Construction Specifications.

Hydraulic Criteria

The preliminary design of the drainage system for this site has been designed in conformance with the Larimer County Stormwater Design Standards. Hydraulic calculations are provided for the proposed drainage facilities. MHFD spreadsheets were used to design the proposed inlet within Meadowlark Drive as well as determine the street capacity of Meadowlark Drive and design all on-site full spectrum detention facilities. The MHFD-Inlet spreadsheet was used for inlet and street capacity calculations and MHFD-Detention spreadsheet was used for water quality and detention design. UD-Sewer software has been used to analyze the outfall trunkline that parallels Meadowlark Drive and transfers all offsite stormwater and irrigation flows as well as developed site runoff. Due to excessively flat topography for the area, the outfall trunkline has been sized as large as possible and conveys the Minor Storm Runoff.

IV. EXISTING DRAINAGE CONDITIONS

Existing drainage conditions for the site are inclusive of both onsite sheet flow across the site in a southeasterly direction as well offsite pass thru flows. The pass thru flows as well as adjacent flows that bypass the project site have been identified by the *U.S Highway 287 Berthoud Bypass Segment #2, Final Hydrology & Hydraulics Report Prepared by URS Corporation, dated January 2002, Revised October 2002*, hereafter referred to as the 287 Report. Per the 287 Report, the construction of the U.S. Highway 287 bypass resulted in several changes in the nature of existing runoff conditions from sheet flow generally west-to-east across the project site to what are now concentrated flows directed under U.S. Highway 287 via culverts in order to maintain ultimate downstream uses of irrigation ditch water and transference of stormwater.

Two culverts located at the northwest corner of the site comprise the majority of pass thru flows and transfer both irrigation and stormwater flows from the west side of U.S. Highway 287, into an existing swale that parallels the northern property boundary (see Design Point 6 and I-6 located on the *Berthoud Bypass Segment #2 Drainage Map* extracted from the 287 Report located in the appendix). The 30-inch RCP storm water culvert transfers flows from the western portion of the Estate at Matthews Farms residential development along with remaining flows from Basin 2-U per the 287 Report (the western portion of the Estate at Matthews Farm residential development is inclusive of Basin 2-U and a max capacity of 31 cfs is assumed from this area during a 100-Year Event). The 24-inch irrigation culvert flows were originally designed to service the agricultural needs of the subject site and the property to the east (Gateway Park Subdivision). It is believed that this ditch has been abandoned as it does not appear that there are any downstream users receiving flows, however, this report accounts for the original flow as pass-thru and has been accounted for in the design calculations. These flows combine with flows identified by the *Final Drainage Report, The Village at Matthews Farms, Prepared by Gorton Scott Engineering, LLC* hereafter referred to as the Matthews Report at existing Design Point EX1 (see Existing Conditions Drainage Plan, Exhibit A, located in the appendix). Combined flows travel south within the roadside ditch that parallels the eastern site boundary adjacent to Meadowlark Drive until they reach Design Point EX2. Flows are then directed east under Meadowlark Drive via an existing 30-inch RCP culvert into a roadside ditch along the north side of Highway 56. Per the *Final Drainage Report, Gateway Park Prepared by Drexel, Barrel & Co.*, developed flows have been accounted for and have been used to size the culvert crossing under the intersection of Highway 56 and County Road 17 (Berthoud Pkwy). The ultimate outfall for these flows is the Little Thompson River located approximately 2.25 miles southeast of the project site.

A high point is located approximately one-quarter mile north of the intersection of U.S. Highway 287 and Highway 56. Flows north of the high point continue north and eventually outfall in the Loveland Reservoir. The majority of flows south of the highpoint and west of U.S. Highway 287 (Offsite Basin 2-OS-A and Basin 2-A per the 287 Report) are directed to a 60-inch culvert which directs flows east under U.S. Highway 287 at the intersection with Highway 56. Runoff from the eastern half of U.S. Highway 287 and west of the project site concentrate within a roadside ditch and are also transferred to the 60-inch culvert via existing storm inlet located at the northeast intersection of U.S. Highway 287 and Highway 56. The culvert turns south and crosses Highway 56 to outfall in a roadside swale that parallels the east side of U.S. Highway 287. The ultimate outfall for these flows is Dry Creek approximately 4,500 feet south of the project site.

The 30-inch RCP culvert under Meadowlark Drive does not have sufficient capacity to transfer 100-Year Event flows from the subject site to the drainage swale on the north side of Highway 56. Flows in excess of the 30-inch culvert capacity currently pond up near Design Point EX2 until overtopping Meadowlark Drive at a low point approximately 200-feet north of the intersection with Highway 56. Once flows have overtopped the low point within Meadowlark Drive, they continue eastward and eventually enter the existing drainage swale on the north side of Highway 56.

Following is a description of the existing drainage sub-basins.

Basins E1 & E2: These basins generally slope toward the southeast at approximately one percent. The existing runoff pattern is sheet flow to the east until entering the existing roadside swale along Meadowlark Drive as shown in Exhibit A. Once within the Meadowlark Drive roadside swale, concentrated flows are directed south to Design Point EX2.

Basins EOS3 & EOS4: Per the Matthews Report, these flows are released undetained from the southern extents of the eastern portion of the Estates at Matthews Farm residential development and are captured within the existing ditch that parallels the site's northern property boundary. Once collected within the swale, concentrated flows are directed eastward where they combine with existing Matthews Farm detention pond release flows at Design Point EX1. Flows combined at Design Point EX1 then travel south within the Meadowlark Drive roadside swale. The two off-site basins along with the Matthews Farm detention pond release generate a 10-Year and 100-Year Runoff of 10.2 and 20.3 cfs, respectively. (Note: 10-Year Runoff from Basins EOS3 & EOS4 were not identified in the Matthews Report so Rational Method Calculations were performed using impervious values and areas identified within the Matthews Report. Additionally, the 10-Year release from the Matthews Farm detention pond was not included in the Matthews Report so a conservative estimate was used).

Basin EOS1: Basin EOS1 is made up of the western half of Meadowlark Drive and sheet flows west into the Meadowlark Drive roadside swale. Once within the swale, concentrated flows are directed south to Design Point EX2.

All existing site sub-basins, as well as the aforementioned pass-thru flows (24-inch irrigation culvert and 30-inch storm water culvert located at the northwestern property corner) eventually reach Design Point EX2 and cross under Meadowlark Drive via 30-inch RCP culvert.

V. PROPOSED DRAINAGE CONDITIONS

The proposed drainage plan will follow the existing site drainage patterns and direct flows toward the southeast corner of the site. Runoff from the development will generally be conveyed as sheet flow through paved areas to curb and gutter that will direct flows either to inlets with storm sewer or directly to the detention basins along the eastern boundary of the site. All on-site drainage structures are designed for developed 100-Year flow capacity. Due to site design limitations, the detention basin at the southeast corner of the site has been designed to allow flows to back up into

grassed areas located to the north as well as underground detention located to the west. A storm culvert under the drive separating the two above ground detention areas will connect the basins. The underground detention will be connected to the rest of the detention areas via storm pipe penetration through the detention basin retaining walls. The three areas will function as one detention facility and collect runoff from all 'A' Basins and will hereafter be referred to as Detention Basin 'A'. Detention Basin B is located along the middle of the eastern property boundary and will collect storm runoff from all 'B' Basins. Detention Basin 'C' has been shown as the collection point for future Basin C developed residential runoff for the purposes of sizing the public trunkline outfall. The developed flows generated from all A, B and C Basins will be routed and detained to historic levels in the three Full Spectrum Detention Basins prior to being released to the proposed outfall trunkline. Pass-thru flows that previously travelled south along the Meadowlark Drive roadside swale will be collected and conveyed via the outfall trunkline as well, following historic patterns. Once collected within the Outfall Trunkline, flows will be conveyed directly to the existing 30-inch culvert at Meadowlark and Highway 56.

Basin OS10 is resultant from an existing low point along the north side of Highway 56, near the intersection with U.S. Highway 287. A drain pan with curb cut has been proposed at the low point in order to direct tributary flows out of the road section and into the existing storm inlet located just northwest of the end of the drain pan. In the existing condition, curb and gutter does not exist along the north side of Highway 56 and runoff from Basin OS10 enters this inlet via overland flow. The proposed condition will maintain historic drainage patterns for this area.

The storm sewer facilities to be constructed as part of this site will be both public and private facilities. Easements will be provided for the public facilities. Outlots will be created to encompass the proposed detention basins.

VI. WATER QUALITY AND DETENTION DESIGN

The development of the property will include storm water quality and detention measures meeting the requirements of the Town's Drainage Criteria. The water quality and detention measures to be instituted for the site will include:

All Full Spectrum Detention (FSD) Basins will include concrete low flow channels, FSD outlet structures with micropools, forebays, emergency spillways, outlet pipes and maintenance access trails. The outlet structures have been designed to release the WQCV, EURV and 100-Year flow at the allowable release rates as outlined by MHFD. All basins will include the water quality capture volume within the 100-Year detention volume. The emergency spillways will be constructed along the eastern edge of the detention basins to release flows in excess of the 100-Year Event and in an emergency situation to Meadowlark Drive. The MHFD-Detention workbook along with MHFD equations have been used to design each facility. Refer to the Appendix for associated calculations. The WQ/EURV orifice plate will be designed as a 3-hole plate sized to drain the WQCV in approximately 40 hours and to drain the EURV in approximately 72 hours. The detention basins have been designed to account for the development of all 'A' and 'B' Basins as well as the future development of Basin 'C', using MHFD standard Impervious and Runoff Coefficients. Due to depth constraints presented by the subject site, retaining walls have been proposed on slightly more than 50% of the perimeter of the southern portion of Detention Basin A in order to meet storage volume requirements dictated by current MHFD criteria. The walls are planned to extend above the exterior finished grade to maximize the volume and minimize the footprint.

Usable detention is planned for at least two of the detention basins to meet the Town requirements. Access to the bottom of the detention basins is planned for Detention Basin C and Detention Basin B.

VII. FLOODPLAIN STATEMENT

The site is located approximately three quarters of a mile North of Dry Creek and is well outside the floodplain shown on the Flood Insurance Rate Map No. 08069C1386H, revised January 15, 2021.

VIII. VARIANCES

A variance to Section 602.4.B.4.c regarding HGLs is being requested as part of this development. Section 602.4.B.4.c states that "The hydraulic grade line (HGL) for the routed design flow (Q) shall be at or below the final finished elevation of the manhole rims." This variance is being requested due to the following conditions:

- The subject site lies within the path of existing passthrough flows from multiple locations including (1) the existing West Detention Basin as reported in "The Estates at Matthews Farm Drainage Report", (2) an existing culvert designed as part of the "US HWY 287 Berthoud Bypass Segment 2 Final Hydrology and Hydraulics" report, and (3) existing detention basin release rates as reported within "The Village at Matthews Farm Drainage Report". The outfall for these flows are all currently passing through the subject site via roadside swale adjacent to Meadowlark Drive until entering an existing 30" RCP culvert at the southeast corner of the subject property which conveys these flows offsite.
- Both upstream and downstream elevations mentioned above are set and control the allowable slope through the subject property.
- The largest storm pipe possible has been proposed given site constraints, i.e., detention pond retaining walls are located immediately west of the storm outfall pipe along it's alignment through the subject property.

IX. SUMMARY

This Preliminary Drainage Report has been prepared in general conformance with the *Larimer County Stormwater Design Standards (Addendum to the Mile High Flood District Criteria Manual, Volumes 1, 2 and 3)* and the Town of Berthoud Engineering and Infrastructure Standards. The proposed Full Spectrum Detention facilities have been designed in accordance with the criteria set forth in the MHFD Manuals to provide detention and water quality for the WQCV, EURV, and 100-Year Storm Event. As previously mentioned, the Outfall Trunkline has been designed to convey the Minor Storm Event (10-Year), but due to site constraints the Trunkline does not have the capacity to convey the 100-Year Event. During a Major Storm Event, flows not able to enter the Outfall Trunkline will enter Meadowlark Drive and overtop the street crown at the low point within Meadowlark Drive and continue eastward to enter the drainage swale on the north side of Highway 56, following historic patterns. Meadowlark Drive has been analyzed for a half-street section to ensure that the 100-Year Event flows conform to Section 602.4.C of the Town of Berthoud Engineering and Infrastructure Standards. The proposed public drainage improvements associated with Westside Crossing have been designed with the intent to not cause adverse impacts to the downstream and surrounding developments while improving the existing drainage condition for the Minor Storm Event by releasing developed flows at a lower rate than that of the predeveloped condition. Major Storm Event Flows will follow historic patterns during the peak period of the Storm Event hydrograph.

X. REFERENCES

- 1) Final Drainage Report for The Village and Matthews Farms, Berthoud, Colorado, Gorton Scott Engineering, LLC July 14, 2002.

- 2) Final Drainage Report for The Estate and Matthews Farms, Berthoud, Colorado, Gorton Scott Engineering, LLC June 23, 2003.
- 3) Final Drainage Report for Collings Park P.U.D., Town of Berthoud, Colorado, Park Engineering, July, 2004.
- 4) Final Drainage Report for Gateway Park, Berthoud, Colorado, Drexel, Barrel & Co., January 2002.
- 5) Final Drainage and Erosion Control Study for Gateway Park 1st Filing Phase 2, North Star Design January 2006.
- 6) Town of Berthoud Engineering and Infrastructure Design Standards and Construction Specifications, October 2021.
- 7) Flood Insurance Rate Map No. 08069C1386H, Federal Emergency Management Administration, revised January 15, 2021.
- 8) Larimer County Stormwater Design Standards (Addendum to Urban Storm Drainage Criteria Manual volume 1-3), Larimer County, Colorado. June 20, 2005.
- 9) Mile High Flood District Criteria Manual - Volumes 1 and 2, Urban Drainage and Flood Control District, Denver, Colorado, June 2001 (with current revisions).
- 10) Mile High Flood District - Volume 3, Urban Drainage and Flood Control District, Denver, Colorado, June 2002 (with current revisions).
- 11) U.S. Highway 287 Berthoud Bypass Segment #2; Final Hydrology and Hydraulics Report, Colorado Department of Transportation October 2002

APPENDIX TABLE OF CONTENTS

APPENDIX A

Figure 1: Vicinity Map

Soils Map

FEMA Flood Insurance Rate Map

APPENDIX B

Hydrologic Calculations

Runoff Coefficient and Percent Impervious Calculations

Time of Concentration and Drainage Basin Runoff Calculations

APPENDIX B.1

Supporting Hydrologic Tables and Figures

APPENDIX C

Water Quality and Detention Calcs – Detention Basins A, B, & C

APPENDIX C.1

Hydraulic Calculations

Inlet and Street Capacity Calculations

UD-Sewer Results Summaries for Outfall Trunkline (10-Year & 100-Year)

APPENDIX D

Relevant Pages from other Drainage Studies

APPENDIX E

Exhibit A: Existing Conditions Drainage Plan

Exhibit B: Proposed Conditions Drainage Plan

APPENDIX A
Figure 1: Vicinity Map
Soils Map
FEMA Flood Insurance Rate Map



SCALE: NTS

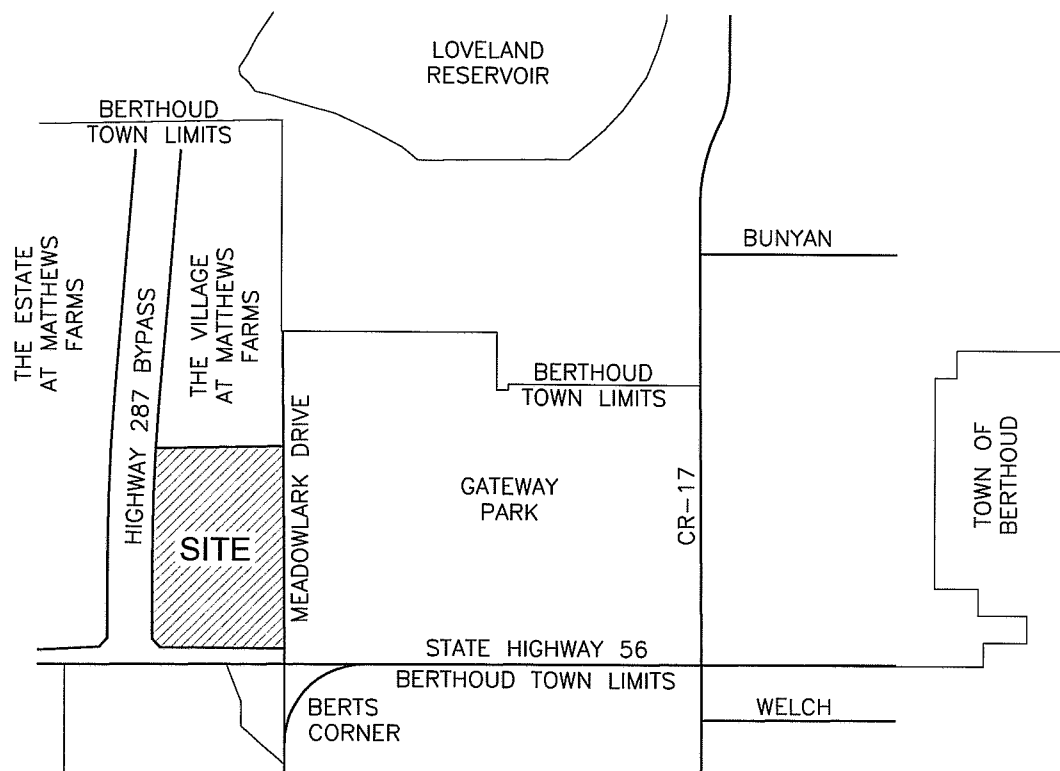
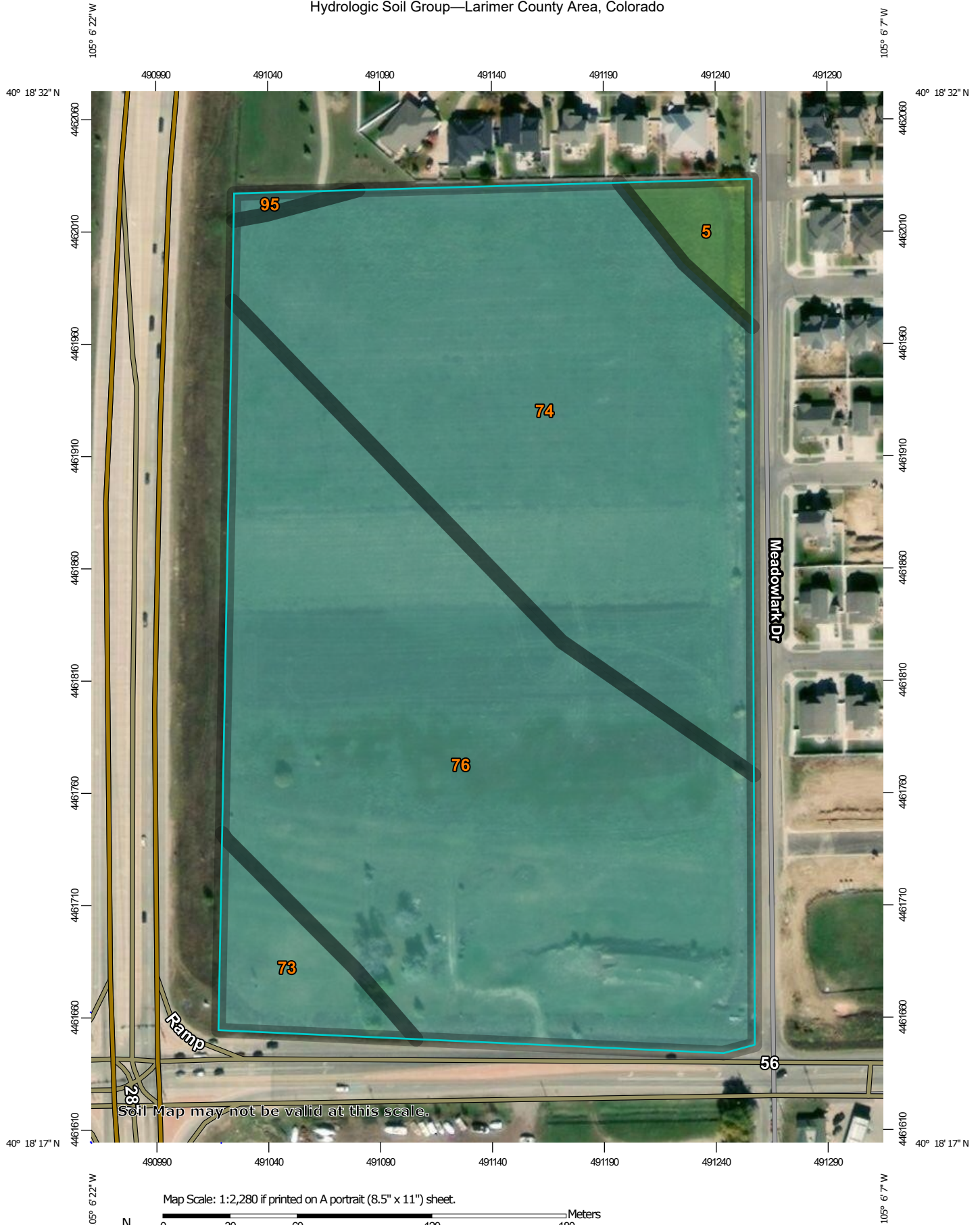


FIGURE 1
VICINITY MAP
BERTHOUD SAFEWAY

Hydrologic Soil Group—Larimer County Area, Colorado



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Larimer County Area, Colorado
 Survey Area Data: Version 13, Sep 10, 2018

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

Date(s) aerial images were photographed: Sep 20, 2015—Oct 21, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5	Aquepts, loamy	A/D	0.5	2.3%
73	Nunn clay loam, 0 to 1 percent slopes	C	1.0	4.4%
74	Nunn clay loam, 1 to 3 percent slopes	C	8.9	40.2%
76	Nunn clay loam, wet, 1 to 3 percent slopes	C	11.7	52.7%
95	Satanta loam, 1 to 3 percent slopes	C	0.1	0.4%
Totals for Area of Interest			22.3	100.0%

Description

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

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

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

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

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

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

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

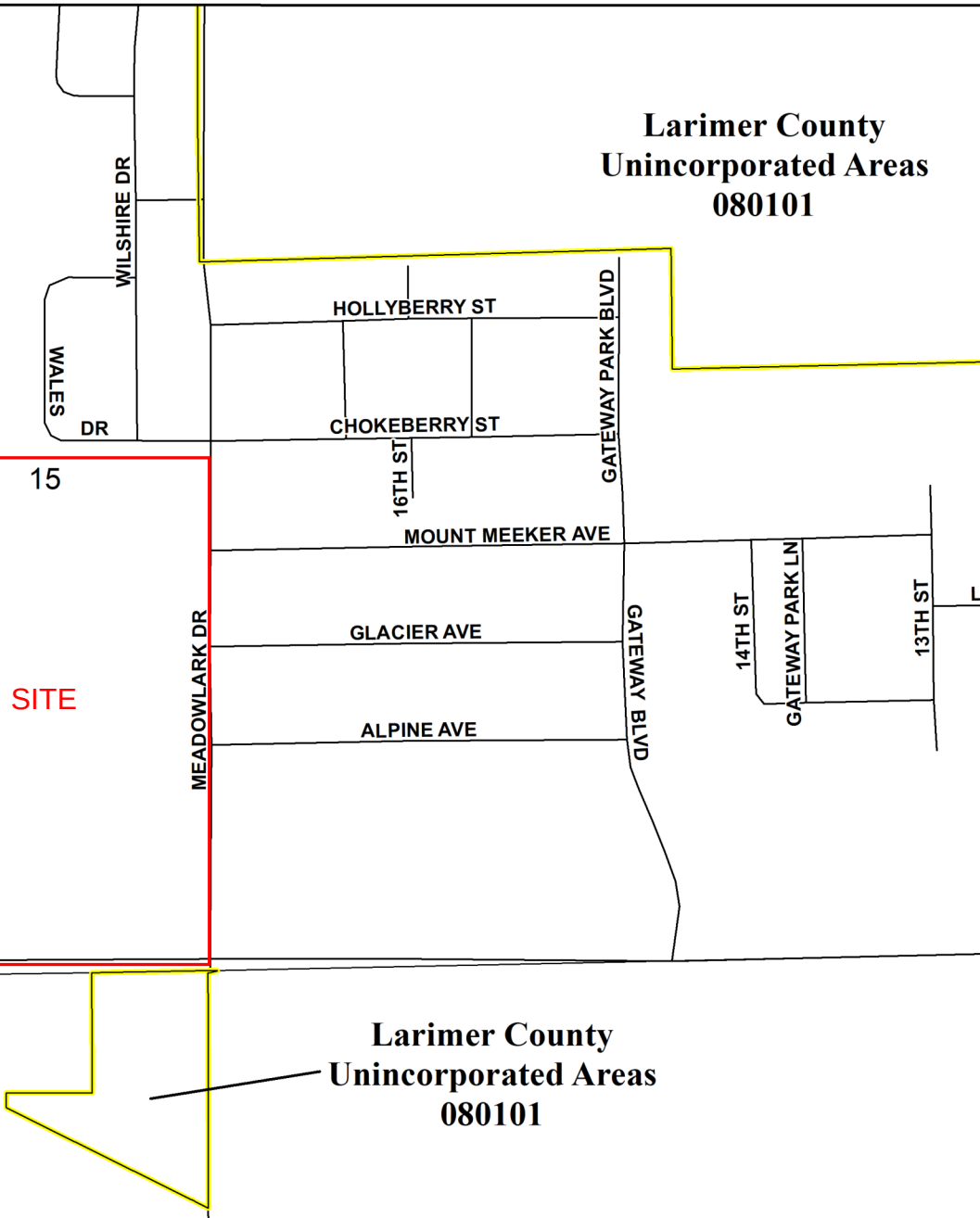
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

3110000 FT

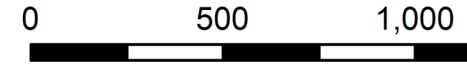


Larimer County
Unincorporated Areas
080101



Map Projection:
Universal Transverse Mercator (UTM) Zone 13N; No
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet



FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

LARIMER COUNTY, COLORADO
and Incorporated Areas

PANEL 1386 OF 1420



Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BERTHOUD, TOWN OF	080296	1386	H
LARIMER COUNTY	080101	1386	H



VERSION NUMBER
2.5.3.6

MAP NUMBER
08069C1386H

MAP REVISED
JANUARY 15, 2021

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at <https://msc.fema.gov>.

APPENDIX B

Hydrologic Calculations

**Runoff Coefficient and Percent Impervious Calculations
Time of Concentration and Drainage Basin Runoff Calculations**

Westside Crossing - Berthoud
Runoff Coefficient and Percent Impervious Calculation

				PV	Area 1 Land Use			LA	Area 2 Land Use			RO	Area 3 Land Use			APT	Area 4 Land Use			Basin Runoff Coefficient		
Basin / DP	Basin or DP Area (DP contributing basins)		Soil Type	% Imperv	Land Use Area	% Area	Comp Land Use % Imp	% Imperv	Land Use Area	% Area	Comp Land Use % Imp	% Imperv	Land Use Area	% Area	Comp Land Use % Imp	% Imperv	Land Use Area	% Area	Comp Land Use % Imp			
E1	300,118 sf	6.89ac	C	100%	0.00ac	0%	0%	2%	6.89ac	100%	2%	90%		0%	0%	75%		0%	0%	2.0%	0.15	0.49
E2	610,841 sf	14.02ac	C	100%	0.00ac	0%	0%	2%	14.02ac	100%	2%	90%		0%	0%	75%		0%	0%	2.0%	0.15	0.49
EOS1	51,297 sf	1.18ac	C	100%	0.47ac	40%	40%	2%	0.71ac	60%	1%	90%		0%	0%	75%		0%	0%	41.2%	0.44	0.65
OS1	66,703 sf	1.53ac	C	100%	1.12ac	73%	73%	2%	0.48ac	31%	1%	90%		0%	0%	75%		0%	0%	74.0%	0.68	0.79
OS2	19,218 sf	0.44ac	C	100%	0.30ac	67%	67%	2%	0.15ac	33%	1%	90%		0%	0%	75%		0%	0%	67.8%	0.63	0.76
OS3	19,581 sf	0.45ac	C	100%	0.35ac	79%	79%	2%	0.10ac	21%	0%	90%		0%	0%	75%		0%	0%	79.1%	0.72	0.81
OS4	26,658 sf	0.61ac	C	100%	0.38ac	62%	62%	2%	0.23ac	38%	1%	90%		0%	0%	75%		0%	0%	63.2%	0.60	0.74
EOS3		2.30ac	C	BASINS EOS3 & EOS4 RUNOFF VALUES ARE TAKEN FROM "THE ESTATES AT MATTHEWS FARM DRAINAGE REPORT"																16.0%	0.25	0.39
EOS4		0.17ac	C																	36.0%	0.40	0.63
OS10	16,023 sf	0.37ac	C	100%	0.33ac	89%	89%	2%	0.04ac	11%	0%	90%		0%	0%	75%		0%	0%	89.7%	0.80	0.85
A1	107,829 sf	2.48ac	C	100%	1.05ac	42%	42%	2%	0.94ac	38%	1%	90%	0.48ac	20%	18%	75%		0%	0%	60.8%	0.58	0.73
A2	26,799 sf	0.62ac	C	100%	0.36ac	58%	58%	2%	0.26ac	42%	1%	90%		0%	0%	75%		0%	0%	59.3%	0.57	0.73
A3	82,607 sf	1.90ac	C	100%	1.08ac	57%	57%	2%	0.44ac	23%	0%	90%	0.38ac	20%	18%	75%		0%	0%	75.2%	0.69	0.79
A4	71,932 sf	1.65ac	C	100%	1.08ac	65%	65%	2%	0.57ac	35%	1%	90%		0%	0%	75%		0%	0%	66.1%	0.62	0.75
A5	65,453 sf	1.50ac	C	100%	1.30ac	87%	87%	2%	0.20ac	13%	0%	90%		0%	0%	75%		0%	0%	86.8%	0.77	0.84
A6	46,198 sf	1.06ac	C	100%	0.56ac	52%	52%	2%	0.34ac	32%	1%	90%	0.16ac	15%	14%	75%		0%	0%	66.9%	0.63	0.76
B1	48,023 sf	1.10ac	C	100%	0.00ac	0%	0%	2%		0%	0%	90%	1.10ac	100%	90%	75%		0%	0%	90.0%	0.80	0.85
B2	57,708 sf	1.32ac	C	100%	0.77ac	58%	58%	2%	0.26ac	20%	0%	90%	0.29ac	22%	20%	75%		0%	0%	78.7%	0.71	0.81
B3	40,454 sf	0.93ac	C	100%	0.36ac	39%	39%	2%	0.25ac	27%	1%	90%		0%	0%	75%	0.31ac	33%	25%	64.7%	0.61	0.75
B4	61,360 sf	1.41ac	C	100%	0.69ac	49%	49%	2%	0.34ac	24%	0%	90%		0%	0%	75%	0.38ac	27%	20%	69.3%	0.64	0.77
B5	38,708 sf	0.89ac	C	100%	0.36ac	41%	41%	2%	0.53ac	60%	1%	90%		0%	0%	75%		0%	0%	41.7%	0.44	0.65
C	231,389 sf	5.31ac	C	100%	1.35ac	25%	25%	2%	0.66ac	12%	0%	90%		0%	0%	75%	3.30ac	62%	47%	72.3%	0.67	0.78
D	28,253 sf	0.65ac	C	100%	0.16ac	25%	25%	2%		0%	0%	90%		0%	0%	75%	0.49ac	75%	56%	81.2%	0.73	0.82
DP 4	A1-A6	9.20ac	C	100%	5.43ac	59%	59%	2%	2.75ac	30%	1%	90%	1.02ac	11%	10%	75%	0.00ac	0%	0%	69.6%	0.65	0.77
DP 11	B1-B5	5.65ac	C	100%	2.18ac	39%	39%	2%	1.38ac	24%	0%	90%	1.39ac	25%	22%	75%	0.69ac	12%	9%	70.4%	0.65	0.77

Basin Runoff Coefficient is based on Table 600-2, Berthoud Engineering and Infrastructure Standards

Runoff Coefficients and Percents Impervious (USDCM Table 6-3)

Hydrologic Soil Type:	C	Runoff Coef Calc Method							%Imp
Land Use	Abb	%	C ₂	C ₅	C ₁₀	C ₂₅	C ₅₀	C ₁₀₀	
Multi-Family (detached)	APT	75%	0.60	0.65	0.69	0.74	0.76	0.79	Weighted %Imp
Business: Neighborhood	BS	85%	0.69	0.73	0.76	0.80	0.81	0.83	
Drives and Walks	DR	90%	0.74	0.77	0.80	0.82	0.83	0.85	
Streets - Gravel (Packed)	GR	40%	0.30	0.36	0.43	0.54	0.59	0.65	
Historic Flow Analysis	HI	2%	0.01	0.05	0.15	0.33	0.40	0.49	
Lawns	LA	2%	0.01	0.05	0.15	0.33	0.40	0.49	
Off-site flow-Undeveloped	OF	45%	0.34	0.40	0.47	0.57	0.61	0.67	
Streets - Paved	PV	100%	0.83	0.86	0.87	0.88	0.88	0.89	
Roofs	RO	90%	0.74	0.77	0.80	0.82	0.83	0.85	
User Input 1	US1	80%	0.65	0.69	0.72	0.77	0.79	0.81	

Equations (% Impervious Calculation-USDCM Table 6-4):

$$\begin{aligned}
 C_A (2yr) &= 0.84i^{1.302} & C_A (50yr) &= 0.85i+0.025 \\
 C_B (2yr) &= 0.84i^{1.169} & C_B (50yr) &= 0.56i+0.328 \\
 C_{CD} (2yr) &= 0.83i^{1.122} & C_{CD} (50yr) &= 0.49i+0.393 \\
 C_A (5yr) &= 0.86i^{1.276} & C_A (100yr) &= 0.78i+0.110 \\
 C_B (5yr) &= 0.86i^{1.088} & C_B (100yr) &= 0.47i+0.426 \\
 C_{CD} (5yr) &= 0.82i+0.035 & C_{CD} (100yr) &= 0.41i+0.484 \\
 C_A (10yr) &= 0.87i^{1.232} & i &= \% \text{ imperviousness as a decimal} \\
 C_B (10yr) &= 0.81i+0.057 & C_A &= \text{Runoff coefficient for NRCS Type A Soils} \\
 C_{CD} (10yr) &= 0.74i+0.132 & C_B &= \text{Runoff coefficient for NRCS Type B Soils} \\
 C_A (25yr) &= 0.84i^{1.124} & C_{CD} &= \text{Runoff coefficient for NRCS Type C and D Soils} \\
 C_B (25yr) &= 0.63i+0.249 \\
 C_{CD} (25yr) &= 0.56i+0.319
 \end{aligned}$$

Westside Crossing - Berthoud
Time of Concentration Calculation

Sub-Basin Data					Time of Concentration Estimate										t _c (1st DP in Urban Catchments)		Final t _c
Basin / Design Point	Contributing Basins	Area	C ₅	i	Initial/Overland Time (t _i)			Travel Time (t _t)					Comp.	Chan. Flow	t _c (1st DP)		
					Length	Slope	t _i	Length	Slope	Land Type	K	Velocity	t _t			t _c	
E1		6.89ac	0.05	2.0%	25lf	43.0%	2.7 min.	1101lf	0.7%	SP	7	0.6 ft/sec	31.3 min.	34.1 min.	1101lf	49.3 min.	34.1 min.
E2		14.02ac	0.05	2.0%	405lf	1.1%	37.4 min.	832lf	1.0%	SP	7	0.7 ft/sec	19.8 min.	57.2 min.	832lf	40.6 min.	40.6 min.
EOS1		1.18ac	0.37	41.2%	56lf	10.8%	4.5 min.	377lf	0.2%	SP	7	0.3 ft/sec	20.1 min.	24.6 min.	377lf	28.5 min.	24.6 min.
OS1		1.53ac	0.64	74.0%	29lf	2.0%	3.6 min.	1079lf	0.5%	PV	20	1.4 ft/sec	12.7 min.	16.3 min.	1079lf	26.6 min.	16.3 min.
OS2		0.44ac	0.59	67.8%	30lf	2.0%	4.1 min.	340lf	0.8%	PV	20	1.8 ft/sec	3.2 min.	7.2 min.	340lf	17.9 min.	7.2 min.
OS3		0.45ac	0.68	79.1%	60lf	2.0%	4.7 min.	270lf	2.0%	PV	20	2.8 ft/sec	1.6 min.	6.3 min.	270lf	14.1 min.	6.3 min.
OS4		0.61ac	0.55	63.2%	80lf	2.0%	7.1 min.	350lf	1.3%	GW	15	1.7 ft/sec	3.4 min.	10.5 min.	350lf	18.1 min.	10.5 min.
EOS3		2.30ac	BASINS EOS3 & EOS4 RUNOFF VALUES ARE TAKEN FROM 'THE ESTATES AT MATTHEWS FARM DRAINAGE REPORT'														12.6 min.
EOS4		0.17ac															7.3 min.
OS10		0.37ac	0.77	89.7%	80lf	1.0%	5.4 min.	130lf	0.5%	PV	20	1.4 ft/sec	1.5 min.	6.9 min.	130lf	12.2 min.	6.9 min.
A1		2.48ac	0.53	60.8%	100lf	1.2%	9.8 min.	410lf	1.5%	PV	20	2.4 ft/sec	2.8 min.	12.5 min.	410lf	18.8 min.	12.5 min.
A2		0.62ac	0.52	59.3%	60lf	1.2%	7.7 min.	390lf	1.5%	PV	20	2.4 ft/sec	2.7 min.	10.4 min.	390lf	19.0 min.	10.4 min.
A3		1.90ac	0.65	75.2%	80lf	1.2%	6.9 min.	200lf	1.5%	PV	20	2.4 ft/sec	1.4 min.	8.3 min.	200lf	14.6 min.	8.3 min.
A4		1.65ac	0.58	66.1%	80lf	1.2%	8.1 min.	230lf	1.5%	PV	20	2.4 ft/sec	1.6 min.	9.6 min.	230lf	16.5 min.	9.6 min.
A5		1.50ac	0.75	86.8%	70lf	1.2%	5.1 min.	280lf	1.5%	PV	20	2.4 ft/sec	1.9 min.	7.0 min.	280lf	13.0 min.	7.0 min.
A6		1.06ac	0.58	66.9%	90lf	1.2%	8.4 min.	220lf	1.5%	PV	20	2.4 ft/sec	1.5 min.	9.9 min.	220lf	16.3 min.	9.9 min.
B1		1.10ac	0.77	90.0%	50lf	0.5%	5.3 min.	200lf	1.0%	PV	20	1.9 ft/sec	1.7 min.	7.0 min.	200lf	12.3 min.	7.0 min.
B2		1.32ac	0.68	78.7%	50lf	2.0%	4.3 min.	270lf	1.5%	PV	20	2.4 ft/sec	1.8 min.	6.2 min.	270lf	14.5 min.	6.2 min.
B3		0.93ac	0.57	64.7%	100lf	2.5%	7.2 min.	290lf	1.3%	PV	20	2.3 ft/sec	2.1 min.	9.3 min.	290lf	17.4 min.	9.3 min.
B4		1.41ac	0.60	69.3%	70lf	2.0%	6.0 min.	370lf	1.5%	PV	20	2.4 ft/sec	2.5 min.	8.6 min.	370lf	16.9 min.	8.6 min.
B5	0.89ac	0.38	41.7%	70lf	1.0%	11.1 min.	280lf	1.5%	PV	20	2.4 ft/sec	1.9 min.	13.0 min.	280lf	21.5 min.	13.0 min.	
C		5.31ac	0.63	72.3%	80lf	2.0%	6.1 min.	780lf	1.0%	NBG	10	1.0 ft/sec	13.3 min.	19.5 min.	780lf	20.7 min.	19.5 min.
D		0.65ac	0.70	81.2%	90lf	3.0%	4.8 min.	700lf	1.1%	NBG	10	1.0 ft/sec	11.1 min.	15.9 min.	700lf	17.6 min.	15.9 min.

Equations:

$$t_i (\text{Overland}) = 0.395(1.1 - C_5)L^{0.5} S^{-0.333} \text{ (USDCM Eqn 6-3)}$$

C₅ = Runoff coefficient for 5-year

L = Length of overland flow (ft)

S = Average slope of overland flow path (ft/ft)

$$t_c (1st DP) = (26 - 17i) + L_t / (60 (14i + 9)S^{0.5}) \text{ (USDCM Eqn 6-5)}$$

t_c (1st DP) = First DP Time of Concentration in urban catchments

L_t = Length of Channelized Flow Path

i = imperviousness (expressed as a decimal)

$$t_t = L_t / 60KS^{0.5} \text{ (USDCM Eqn 6-4)}$$

t_t = Channelized flow time (travel time)(min.)

L_t = Waterway length (ft)

K = Conveyance Factor (see Table 6-2)

S = Watercourse slope (ft/ft)

Table 6-2

Type of Land Surface	Land Type	K
Grassed Waterway	GW	15
Heavy Meadow	HM	2.5
Nearly Bare Ground	NBG	10
Paved Area	PV	20
Riprap (Not Buried)	RR	6.5
Short Pasture/Lawns	SP	7
Tillage/Fields	TF	5

Westside Crossing - Berthoud
Runoff Calculation

Design Storm: 10 Year

Basin ID/ Design Point	Direct Runoff							Total Runoff				Street/Chan		Pipe			Travel Time			Remarks
	Area Designation	Area	C	T _c	C*A (acre)	i (in/hr)	Q	T _c	Sum C*A	i (in/hr)	Q	Slope	Q	Q	Slope	Pipe Size	L (ft)	Vel (ft/s)	T _t	
E1	E1	6.89 ac	0.15	34.1min	1.01	2.0	2.0 cfs			---	---								---	
E2	E2	14.02 ac	0.15	40.6min	2.06	1.8	3.7 cfs													
EOS1	EOS1	1.18 ac	0.44	24.6min	0.51	2.4	1.2 cfs													
OS1	OS1	1.53 ac	0.68	16.3min	1.04	3.0	3.1 cfs													
OS2	OS2	0.44 ac	0.63	7.2min	0.28	4.2	1.2 cfs													
OS3	OS3	0.45 ac	0.72	6.3min	0.32	4.4	1.4 cfs													
OS4	OS4	0.61 ac	0.60	10.5min	0.37	3.6	1.3 cfs													
EOS3	EOS3	2.30 ac	0.25	12.6min	0.58	3.4	1.9 cfs					1.0%	3.9cfs				620'	4.4	2.3min	To DP20/EX1
EOS4	EOS4	0.17 ac	0.40	7.3min	0.07	4.2	0.3 cfs													
OS10	OS10	0.37 ac	0.80	6.9min	0.29	4.2	1.2 cfs													
Ex. Village at Matthews Farm Detention Basin Outfall (M):							8.0 cfs													
Ex. 30" Culvert under HWY 287 (C):							15.0 cfs					1.0%	15.0cfs				730'	5.5	2.2min	To DP20/EX1
Ex. Tri-Corner Holdings Irrig 24" Culvert under HWY 287 (I):							6.2 cfs													
EX2	EOS3, EOS4 add M+C+I	2.47 ac						14.9min	0.64	3.1	2.0 cfs	0.2%	35.8cfs				1180'	5.8	3.4min	To EX2
											31.2 cfs									
EX1	DP EX1, EOS1, E1, E2 add M+C+I	16.49 ac						18.3min	4.23	2.8	11.9 cfs									
											41.1 cfs									
A1	A1	2.48 ac	0.58	12.5min	1.44	3.4	4.9 cfs			---	---									
A2	A2	0.62 ac	0.57	10.4min	0.35	3.7	1.3 cfs			---	---									
A3	A3	1.90 ac	0.69	8.3min	1.31	4.0	5.2 cfs			---	---			5.2cfs	0.5%	18-in	430'	4.2	1.7min	To DP1
A4	A4	1.65 ac	0.62	9.6min	1.03	3.8	3.9 cfs			---	---									
A5	A5	1.50 ac	0.77	7.0min	1.16	4.2	4.9 cfs			---	---									
A6	A6	1.06 ac	0.63	9.9min	0.67	3.7	2.5 cfs			---	---			2.5cfs	0.5%	18-in	220'	4.2	0.9min	To DP2
B1	B1	1.10 ac	0.80	7.0min	0.88	4.2	3.7 cfs			---	---									
B2	B2	1.32 ac	0.71	6.2min	0.95	4.4	4.1 cfs			---	---									
B3	B3	0.93 ac	0.61	9.3min	0.57	3.8	2.2 cfs			---	---									
B4	B4	1.41 ac	0.64	8.6min	0.91	3.9	3.6 cfs			---	---			3.6cfs	0.5%	18-in	60'	4.2	0.2min	To DP10
B5	B5	0.89 ac	0.44	13.0min	0.39	3.3	1.3 cfs			---	---									
C	C	5.31 ac	0.67	19.5min	3.54	2.7	9.7 cfs			---	---									
D	D	0.65 ac	0.73	15.9min	0.48	3.0	1.4 cfs			---	---									
Detention Basin A Release Rate:							1.3 cfs													
Detention Basin B Release Rate:							0.9 cfs													
Detention Basin C Release Rate:							0.3 cfs													

Westside Crossing - Berthoud

Runoff Calculation

Design Storm: 10 Year

Basin ID/ Design Point	Direct Runoff							Total Runoff				Street/Chan		Pipe			Travel Time			Remarks
	Area Designation	Area	C	T _c	C*A (acre)	i (in/hr)	Q	T _c	Sum C*A	i (in/hr)	Q	Slope	Q	Q	Slope	Pipe Size	L (ft)	Vel (ft/s)	T _t	
1	A1-A3	4.99 ac						10.0min	3.10	3.7	11.5 cfs									
2	A5+A6	2.56 ac						10.8min	1.83	3.6	6.6 cfs			6.6cfs	0.5%	24-in	210'	5.1	0.7min	To DP3
3	DP2+A4	4.21 ac						11.5min	2.85	3.5	10.0 cfs	0.5%	10.0cfs				370'	3	2.1min	To DP4
4	DP3 +DP1	9.20 ac						13.5min	5.95	3.3	19.4 cfs									
10	B1+B2+B4	3.84 ac						8.8min	2.73	3.9	10.6 cfs	0.5%	10.6cfs	10.6cfs	0.5%	24-in	560'	5.1	1.8min	To DP6
11	DP10+B3+B5	5.65 ac						10.6min	3.30	3.6	11.9 cfs									
20	EOS3,EOS4,D	3.12 ac						15.9min	1.12	3.0	3.4 cfs									
	add M + C + I										32.6 cfs			32.6cfs	0.5%	36-in	310'	6.7	0.8min	To DP21
21	DP20							16.7min	1.12	3.0	3.3 cfs									
	add M+C+I+Detention C										32.8 cfs			32.8cfs	0.5%	36-in	390'	6.7	1.0min	To DP22
22	DP21							17.7min	1.12	2.9	3.2 cfs									
	add M+C+I+Detention C+Detention B										33.6 cfs			33.6cfs	0.5%	36-in	400'	6.7	1.0min	To DP23
23	DP22+OS1							18.7min	2.16	2.8	6.0 cfs									
	add M+C+I+Detention C+Detention B+Detention A										37.7 cfs			37.7cfs	0.5%	36-in	215'	6.7	0.5min	To DP24
24	DP23+OS2							19.2min	2.44	2.8	6.7 cfs									
	add M+C+I+Detention C+Detention B+Detention A										38.4 cfs									

Equations (UDFCD):

$$i_x = A * P1 / (B + T_c)^C \text{ [IDF Formula]}$$

A=28.5, B=10.00, C=0.786 for all return periods

P1=One-hour point rainfall depth (in.)

P1 from Figure RA-3: Rainfall Intensity-Duration Curve for Area II, Larimer County SDCM

P1	Inches
10 yr	1.37 in

$$Q = C i A$$

Q = Peak Runoff Rate (cubic feet/second)

C = Runoff coef representing a ration of peak runoff rate to ave rainfall intensity for a duration equal to the runoff time of concentration.

i = average rainfall intensity in inches per hour

A = Drainage area in acres

Westside Crossing - Berthoud
Runoff Calculation

Design Storm: 100 Year

Basin ID/ Design Point	Direct Runoff							Total Runoff				Street/Chan		Pipe			Travel Time			Remarks
	Area Designation	Area	C	T _c	C*A (acre)	i (in/hr)	Q	T _c	Sum C*A	i (in/hr)	Q	Slope	Q	Q	Slope	Pipe Size	L (ft)	Vel (ft/s)	T _t	
E1	E1	6.89 ac	0.49	34.1min	3.39	4.2	14.1 cfs			---	---								---	
E2	E2	14.02 ac	0.49	40.6min	6.90	3.7	25.8 cfs													
EOS1	EOS1	1.18 ac	0.65	24.6min	0.77	5.0	3.9 cfs													
OS1	OS1	1.53 ac	0.79	16.3min	1.21	6.3	7.5 cfs													
OS2	OS2	0.44 ac	0.76	7.2min	0.34	8.7	2.9 cfs													
OS3	OS3	0.45 ac	0.81	6.3min	0.36	9.1	3.3 cfs													
OS4	OS4	0.61 ac	0.74	10.5min	0.45	7.6	3.5 cfs													
EOS3	EOS3	2.30 ac	0.39	12.6min	0.90	6.6	5.9 cfs					1.0%	3.9cfs				620'	4.4	2.3min	To DP20/EX1
EOS4	EOS4	0.17 ac	0.63	7.3min	0.11	8.3	0.9 cfs													
OS10	OS10	0.37 ac	0.85	6.9min	0.31	9.3	2.9 cfs													
Ex. Village at Matthews Farm Detention Basin Outfall (M):							13.5 cfs													
Ex. 30" Culvert under HWY 287 (C):							31.0 cfs					1.0%	15.0cfs				730'	5.5	2.2min	To DP20/EX1
Ex. Tri-Corner Holdings Irrig 24" Culvert under HWY 287 (I):							6.2 cfs													
EX2	EOS3, EOS4 add M+C+I	2.47 ac						14.9min	1.00	6.5	6.6 cfs									
EX1	DP EX1, EOS1, E1, E2 add M+C+I	16.49 ac						18.3min	12.07	5.9	57.3 cfs	0.2%	35.8cfs				1180'	5.8	3.4min	To EX2
											71.2 cfs									
											121.9 cfs									
A1	A1	2.48 ac	0.73	12.5min	1.82	7.1	12.8 cfs			---	---									
A2	A2	0.62 ac	0.73	10.4min	0.45	7.7	3.4 cfs			---	---									
A3	A3	1.90 ac	0.79	8.3min	1.50	8.3	12.5 cfs			---	---			12.5cfs	0.3%	18-in	430'	4.2	1.7min	To DP1
A4	A4	1.65 ac	0.75	9.6min	1.25	7.9	9.8 cfs			---	---									
A5	A5	1.50 ac	0.84	7.0min	1.26	8.8	11.1 cfs			---	---									
A6	A6	1.06 ac	0.76	9.9min	0.80	7.8	6.3 cfs			---	---			6.3cfs	0.3%	18-in	220'	4.2	0.9min	To DP2
B1	B1	1.10 ac	0.85	7.0min	0.94	8.8	8.3 cfs			---	---									
B2	B2	1.32 ac	0.81	6.2min	1.07	9.2	9.8 cfs			---	---									
B3	B3	0.93 ac	0.75	9.3min	0.70	8.0	5.5 cfs			---	---									
B4	B4	1.41 ac	0.77	8.6min	1.08	8.2	8.9 cfs			---	---			8.9cfs	0.3%	18-in	60'	4.2	0.2min	To DP10
B5	B5	0.89 ac	0.65	13.0min	0.58	7.0	4.1 cfs			---	---									
C	C	5.31 ac	0.78	19.5min	4.15	5.7	23.7 cfs			---	---									
D	D	0.65 ac	0.82	15.9min	0.53	6.3	3.4 cfs			---	---									
Detention Basin A Release Rate:							14.0 cfs													
Detention Basin B Release Rate:							6.9 cfs													
Detention Basin C Release Rate:							8.0 cfs													

Westside Crossing - Berthoud

Runoff Calculation

Design Storm: 100 Year

Basin ID/ Design Point	Direct Runoff							Total Runoff				Street/Chan		Pipe			Travel Time			Remarks
	Area Designation	Area	C	T _c	C*A (acre)	i (in/hr)	Q	T _c	Sum C*A	i (in/hr)	Q	Slope	Q	Q	Slope	Pipe Size	L (ft)	Vel (ft/s)	T _t	
1	A1-A3	4.99 ac						10.0min	3.77	7.8	29.3 cfs									
2	A5+A6	2.56 ac						10.8min	2.07	7.5	15.6 cfs			15.6cfs	0.3%	24-in	210'	5.1	0.7min	To DP3
3	DP2+A4	4.21 ac						11.5min	3.31	7.3	24.3 cfs	0.5%	24.3cfs				370'	3	2.1min	To DP4
4	DP3 +DP1	9.20 ac						13.5min	7.08	6.8	48.3 cfs									
10	B1+B2+B4	3.84 ac						8.8min	3.09	8.2	25.2 cfs	0.5%	25.2cfs	25.2cfs	0.3%	24-in	560'	5.1	1.8min	To DP6
11	DP10+B3+B5	5.65 ac						10.6min	3.79	7.6	28.7 cfs									
20	EOS3,EOS4,D	3.12 ac						15.9min	1.53	6.3	9.7 cfs									
	add M + C + I										60.4 cfs			60.4cfs	0.3%	36-in	310'	6.7	0.8min	To DP21
21	DP20							16.7min	1.53	6.2	9.5 cfs									
	add M+C+I+Detention C										68.2 cfs			68.2cfs	0.3%	36-in	390'	6.7	1.0min	To DP22
22	DP21							17.7min	1.53	6.0	9.2 cfs									
	add M+C+I+Detention C+Detention B										74.8 cfs			74.8cfs	0.3%	36-in	400'	6.7	1.0min	To DP23
23	DP22+OS1							18.7min	2.74	5.9	16.0 cfs									
	add M+C+I+Detention C+Detention B+Detention A										95.6 cfs			95.6cfs	0.3%	36-in	215'	6.7	0.5min	To DP24
24	DP23+OS2							19.2min	3.08	5.8	17.7 cfs									
	add M+C+I+Detention C+Detention B+Detention A										97.3 cfs									

Equations (UDFCD):

$$i_x = A * P1 / (B + T_c)^C \text{ [IDF Formula]}$$

A=28.5, B=10.00, C=0.786 for all return periods

P1=One-hour point rainfall depth (in.)

P1 from Figure RA-3: Rainfall Intensity-Duration Curve for Area II, Larimer County SDCM

P1	Inches
100 yr	2.87 in

$$Q = CiA$$

Q = Peak Runoff Rate (cubic feet/second)

C = Runoff coef representing a ration of peak runoff rate to ave rainfall intensity for a duration equal to the runoff time of concentration.

i = average rainfall intensity in inches per hour

A = Drainage area in acres

APPENDIX B.1
Supporting Hydrologic Tables and Figures



NOAA Atlas 14, Volume 8, Version 2
Location name: Berthoud, Colorado, USA*
Latitude: 40.3064°, Longitude: -105.1039°
Elevation: 5076.98 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.233 (0.183-0.299)	0.276 (0.216-0.354)	0.369 (0.288-0.475)	0.467 (0.363-0.605)	0.635 (0.492-0.897)	0.789 (0.589-1.12)	0.965 (0.693-1.40)	1.17 (0.801-1.74)	1.47 (0.965-2.24)	1.72 (1.09-2.63)
10-min	0.341 (0.268-0.437)	0.404 (0.317-0.519)	0.540 (0.422-0.696)	0.684 (0.532-0.887)	0.929 (0.720-1.31)	1.16 (0.862-1.64)	1.41 (1.01-2.05)	1.71 (1.17-2.55)	2.15 (1.41-3.29)	2.52 (1.59-3.84)
15-min	0.415 (0.326-0.533)	0.492 (0.386-0.633)	0.658 (0.515-0.849)	0.834 (0.649-1.08)	1.13 (0.878-1.60)	1.41 (1.05-2.00)	1.72 (1.24-2.50)	2.08 (1.43-3.10)	2.62 (1.72-4.01)	3.07 (1.94-4.69)
30-min	0.553 (0.434-0.710)	0.656 (0.515-0.843)	0.878 (0.687-1.13)	1.11 (0.865-1.44)	1.51 (1.17-2.13)	1.88 (1.40-2.66)	2.29 (1.65-3.32)	2.77 (1.90-4.12)	3.48 (2.29-5.32)	4.08 (2.58-6.22)
60-min	0.684 (0.538-0.879)	0.809 (0.635-1.04)	1.08 (0.846-1.39)	1.37 (1.07-1.78)	1.87 (1.45-2.65)	2.34 (1.75-3.31)	2.87 (2.06-4.16)	3.47 (2.38-5.18)	4.38 (2.88-6.70)	5.14 (3.26-7.85)
2-hr	0.816 (0.646-1.04)	0.961 (0.761-1.22)	1.29 (1.01-1.64)	1.64 (1.28-2.10)	2.24 (1.75-3.14)	2.80 (2.11-3.93)	3.44 (2.49-4.95)	4.17 (2.90-6.17)	5.28 (3.51-8.00)	6.21 (3.97-9.38)
3-hr	0.900 (0.716-1.14)	1.06 (0.839-1.34)	1.41 (1.11-1.79)	1.79 (1.41-2.28)	2.45 (1.93-3.42)	3.06 (2.32-4.28)	3.76 (2.75-5.38)	4.57 (3.19-6.71)	5.79 (3.87-8.71)	6.81 (4.38-10.2)
6-hr	1.08 (0.863-1.35)	1.26 (1.01-1.58)	1.66 (1.33-2.09)	2.09 (1.66-2.64)	2.83 (2.24-3.89)	3.51 (2.68-4.83)	4.28 (3.15-6.04)	5.17 (3.64-7.49)	6.49 (4.38-9.65)	7.61 (4.95-11.3)
12-hr	1.29 (1.04-1.59)	1.53 (1.24-1.90)	2.02 (1.63-2.51)	2.50 (2.00-3.13)	3.28 (2.59-4.40)	3.97 (3.04-5.36)	4.74 (3.50-6.56)	5.60 (3.96-7.97)	6.86 (4.66-10.0)	7.91 (5.19-11.6)
24-hr	1.56 (1.27-1.92)	1.84 (1.50-2.26)	2.37 (1.93-2.92)	2.89 (2.33-3.57)	3.69 (2.93-4.87)	4.40 (3.39-5.85)	5.18 (3.85-7.06)	6.04 (4.31-8.48)	7.29 (5.00-10.5)	8.32 (5.52-12.1)
2-day	1.82 (1.50-2.21)	2.14 (1.76-2.60)	2.72 (2.23-3.32)	3.27 (2.66-4.00)	4.11 (3.28-5.32)	4.83 (3.75-6.32)	5.61 (4.21-7.54)	6.47 (4.66-8.95)	7.70 (5.33-11.0)	8.71 (5.84-12.5)
3-day	1.97 (1.63-2.38)	2.30 (1.90-2.78)	2.90 (2.38-3.51)	3.46 (2.83-4.21)	4.31 (3.46-5.55)	5.04 (3.94-6.56)	5.84 (4.40-7.79)	6.70 (4.85-9.21)	7.95 (5.54-11.2)	8.96 (6.05-12.8)
4-day	2.09 (1.73-2.51)	2.43 (2.01-2.92)	3.05 (2.52-3.68)	3.62 (2.97-4.39)	4.49 (3.61-5.74)	5.23 (4.10-6.76)	6.03 (4.57-8.00)	6.90 (5.02-9.43)	8.14 (5.70-11.5)	9.15 (6.21-13.0)
7-day	2.35 (1.96-2.80)	2.76 (2.30-3.29)	3.48 (2.89-4.16)	4.11 (3.40-4.94)	5.04 (4.06-6.33)	5.80 (4.56-7.39)	6.60 (5.02-8.63)	7.45 (5.45-10.0)	8.64 (6.08-12.0)	9.59 (6.56-13.5)
10-day	2.59 (2.17-3.06)	3.05 (2.55-3.61)	3.83 (3.19-4.55)	4.50 (3.73-5.37)	5.46 (4.41-6.80)	6.24 (4.92-7.87)	7.04 (5.37-9.12)	7.88 (5.78-10.5)	9.03 (6.38-12.4)	9.93 (6.84-13.9)
20-day	3.31 (2.80-3.87)	3.83 (3.23-4.49)	4.69 (3.95-5.51)	5.42 (4.54-6.40)	6.44 (5.23-7.89)	7.25 (5.76-9.01)	8.07 (6.21-10.3)	8.91 (6.59-11.7)	10.0 (7.17-13.6)	10.9 (7.60-15.1)
30-day	3.90 (3.31-4.54)	4.48 (3.80-5.22)	5.43 (4.59-6.34)	6.22 (5.24-7.30)	7.32 (5.97-8.88)	8.17 (6.53-10.1)	9.03 (6.99-11.4)	9.91 (7.37-12.9)	11.1 (7.95-14.9)	12.0 (8.38-16.4)
45-day	4.63 (3.95-5.35)	5.32 (4.54-6.16)	6.44 (5.48-7.48)	7.36 (6.23-8.59)	8.61 (7.04-10.3)	9.56 (7.66-11.7)	10.5 (8.15-13.2)	11.4 (8.54-14.8)	12.6 (9.11-16.9)	13.5 (9.55-18.4)
60-day	5.22 (4.48-6.02)	6.06 (5.19-6.98)	7.38 (6.30-8.53)	8.44 (7.17-9.81)	9.86 (8.08-11.8)	10.9 (8.76-13.2)	11.9 (9.29-14.9)	12.9 (9.68-16.6)	14.2 (10.3-18.8)	15.1 (10.7-20.4)

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

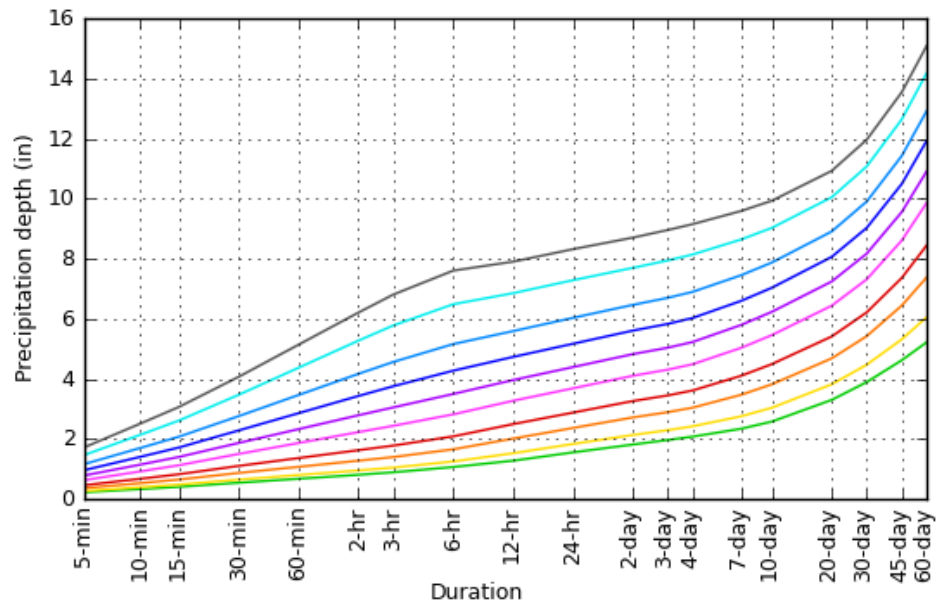
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

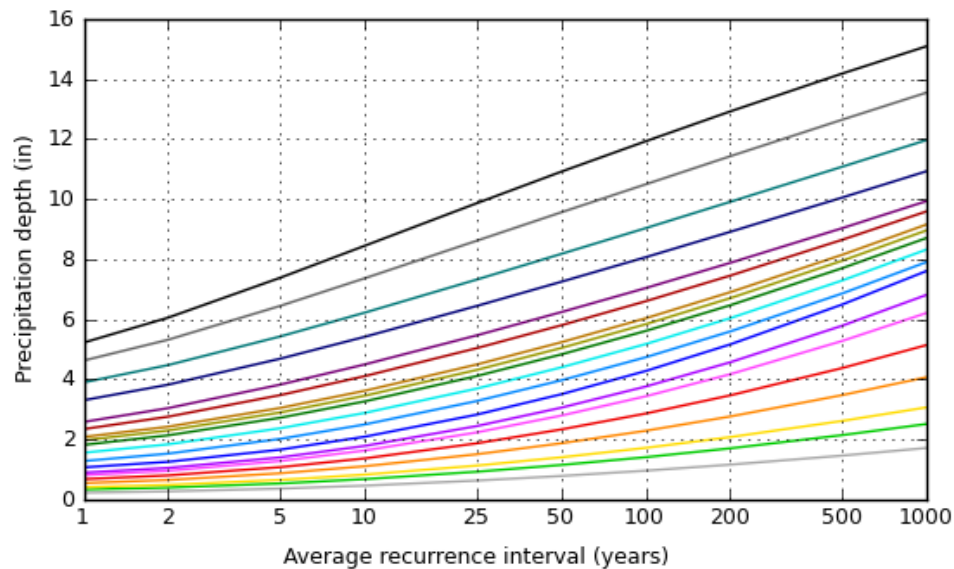
[Back to Top](#)

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.3064°, Longitude: -105.1039°



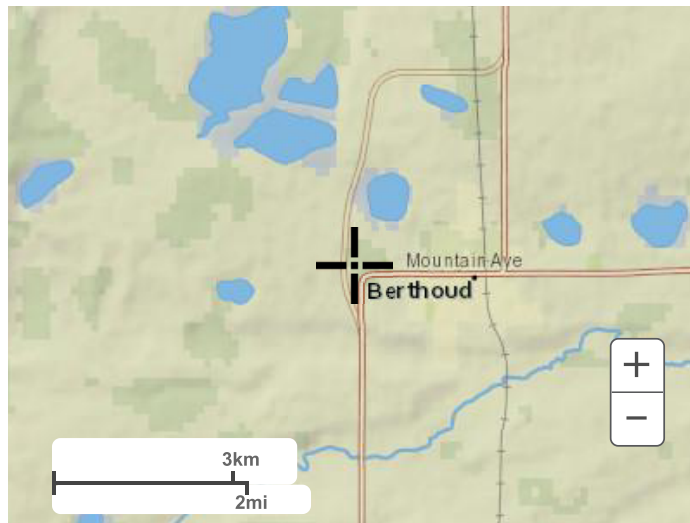
Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



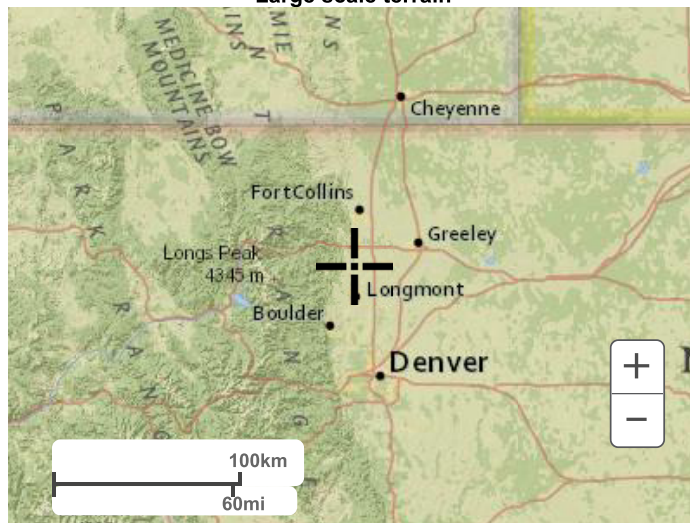
Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

Maps & aerials

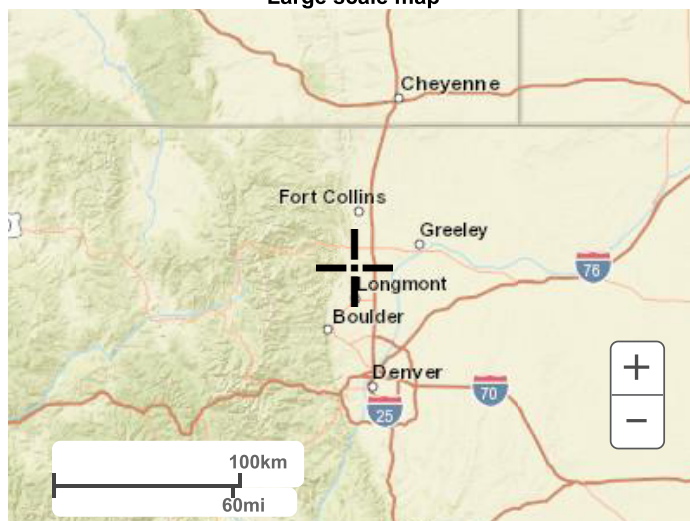
Small scale terrain



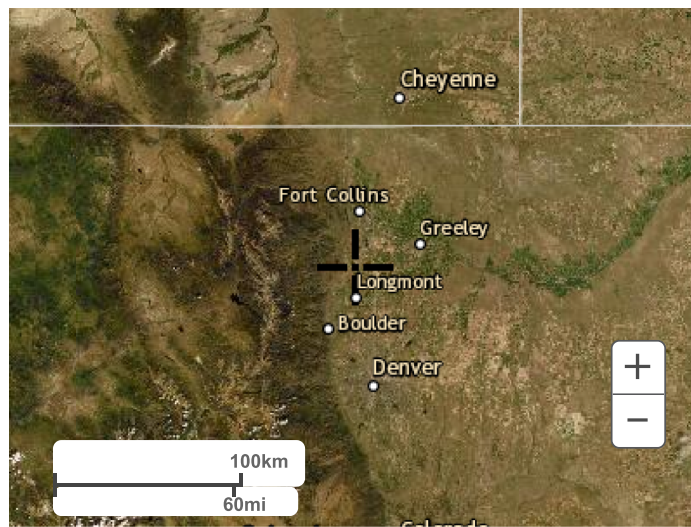
Large scale terrain



Large scale map



Large scale aerial



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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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APPENDIX C
Water Quality and Detention Calcs – Detention Basins A, B, & C

MHFD-Detention, Version 4.04 (February 2021)

Basin ID: Detention Basin A (Includes Underground Detention Volumes)



UG Det. Inv.

Optional User Overrides

	acre-feet
	acre-feet
0.81	inches
1.08	inches
1.38	inches
1.87	inches
2.32	inches
2.84	inches
4.32	inches

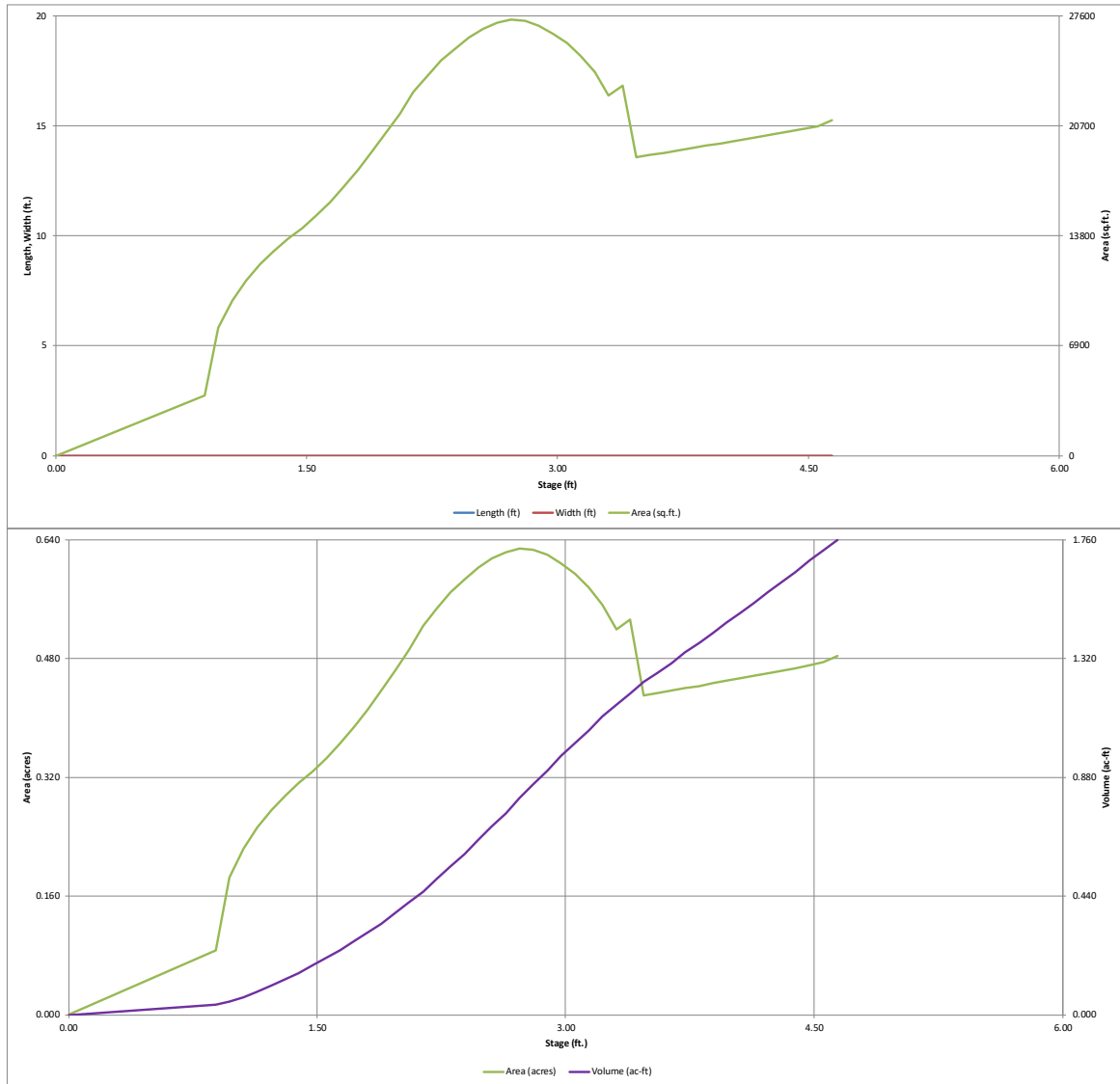
Top of UG Detention

Initial Surcharge Area (A_{DSV}) =	user	ft ²
Surcharge Volume Length (L_{SV}) =	user	ft
Surcharge Volume Width (W_{SV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft ²
Volume of Basin Floor (V_{FLOOR}) =	user	ft ³
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft ²
Volume of Main Basin (V_{MAIN}) =	user	ft ³
Calculated Total Basin Volume (V_{TOTAL}) =	user	acre-feet

Stage Storage Table

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

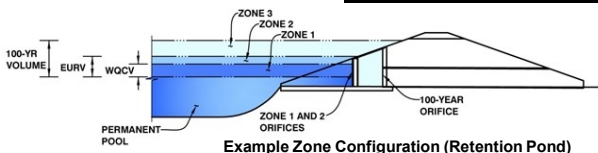


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: WESTSIDE CROSSING

Basin ID: Detention Basin A (Includes Underground Detention Volumes)



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.55	0.209	Orifice Plate
Zone 2 (EURV)	2.43	0.413	Orifice Plate
Zone 3 (100-year)	3.39	0.569	Weir&Pipe (Restrict)
Total (all zones)		1.191	

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

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

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

Invert of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 3.30 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = N/A inches

Calculated Parameters for Plate
WQ Orifice Area per Row = N/A ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.75	1.50					
Orifice Area (sq. inches)	1.25	1.25	1.25					

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

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = N/A Not Selected ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = N/A Not Selected ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = N/A Not Selected inches

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = N/A Not Selected ft²
Vertical Orifice Centroid = N/A Not Selected feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

Overflow Weir Front Edge Height, H_o = 2.50 Not Selected ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 3.00 Not Selected feet
Overflow Weir Grate Slope = 0.00 Not Selected H:V
Horiz. Length of Weir Sides = 3.00 Not Selected feet
Overflow Grate Type = Close Mesh Grate N/A
Debris Clogging % = 50% N/A %

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H_u = 2.50 Not Selected feet
Overflow Weir Slope Length = 3.00 Not Selected feet
Grate Open Area / 100-yr Orifice Area = 4.58 Not Selected
Overflow Grate Open Area w/o Debris = 7.12 Not Selected ft²
Overflow Grate Open Area w/ Debris = 3.56 Not Selected ft²

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

Depth to Invert of Outlet Pipe = 0.17 Not Selected ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = 18.00 Not Selected inches
Restrictor Plate Height Above Pipe Invert = 14.80 Not Selected inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = 1.55 Not Selected ft²
Outlet Orifice Centroid = 0.67 Not Selected feet
Half-Central Angle of Restrictor Plate on Pipe = 2.27 Not Selected radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = 3.40 ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 90.00 feet
Spillway End Slopes = 0.00 H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = 0.24 feet
Stage at Top of Freeboard = 3.64 feet
Basin Area at Top of Freeboard = 0.44 acres
Basin Volume at Top of Freeboard = 1.30 acre-ft

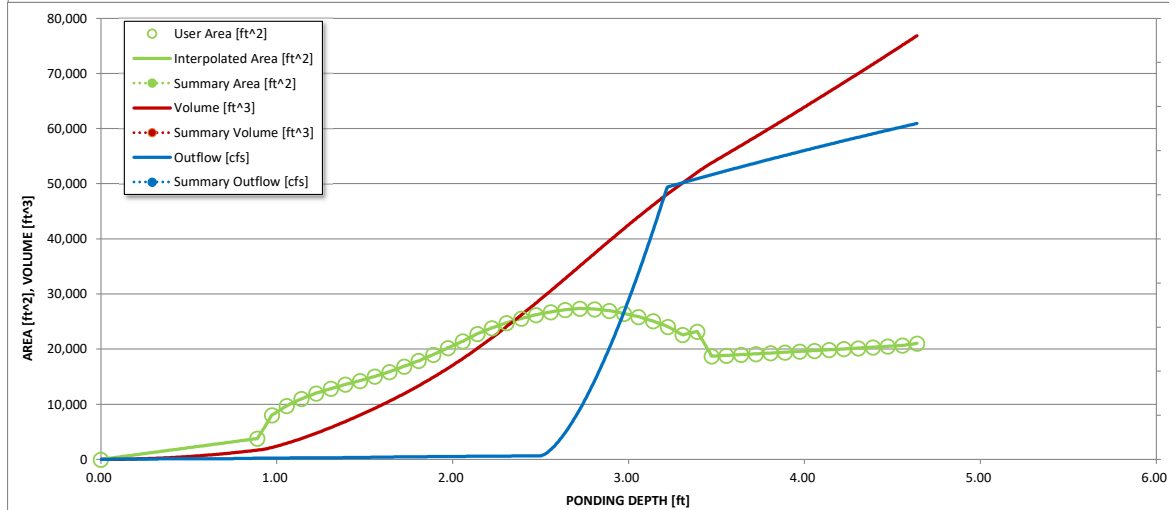
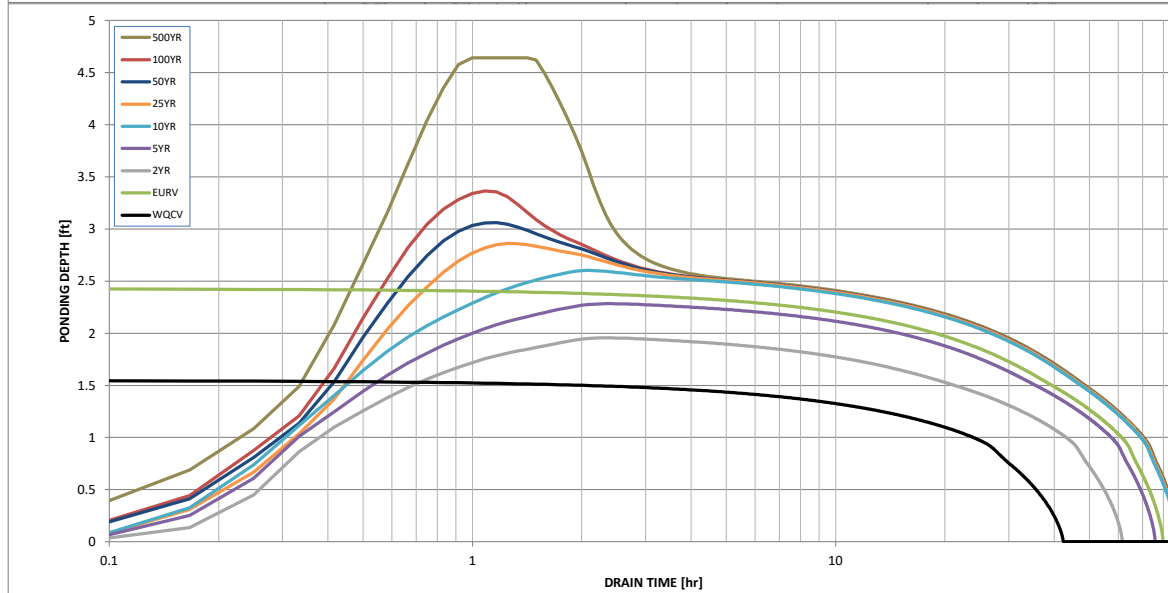
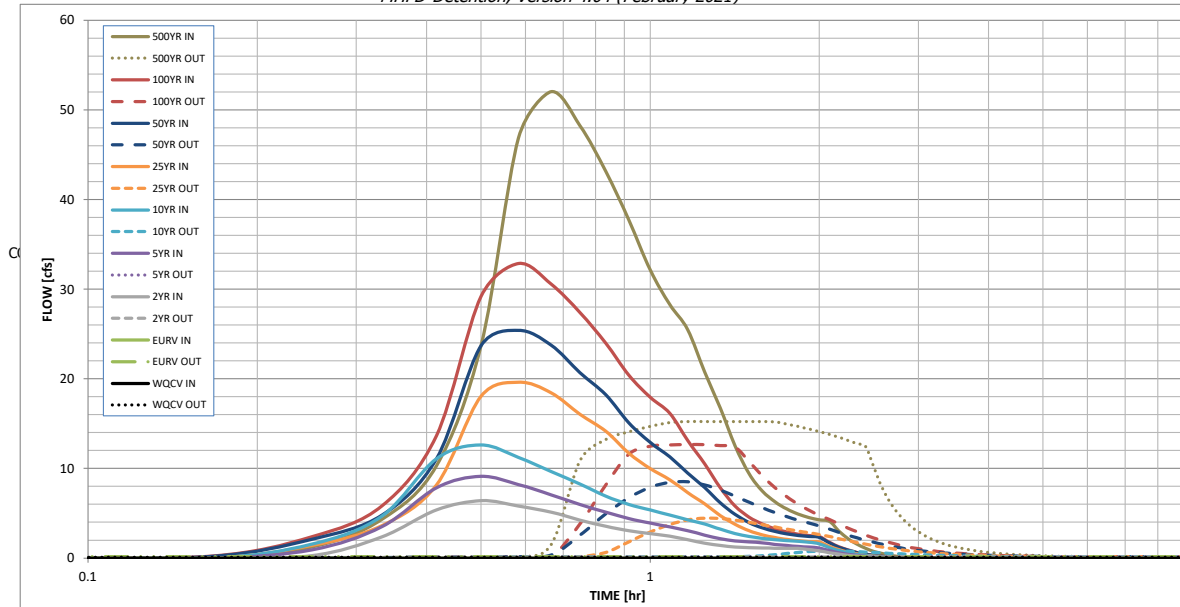
Routed Hydrograph Results

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

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	N/A	N/A	0.81	1.08	1.38	1.87	2.32	2.84	4.32
CUHP Runoff Volume (acre-ft) =	0.209	0.622	0.392	0.564	0.783	1.181	1.537	1.967	3.165
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.392	0.564	0.783	1.181	1.537	1.967	3.165
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.1	0.7	2.5	6.9	10.1	14.4	25.3
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.07	0.27	0.75	1.10	1.57	2.75
Peak Inflow Q (cfs) =	N/A	N/A	6.4	9.1	12.6	19.6	25.4	32.8	52.0
Peak Outflow Q (cfs) =	0.1	0.2	0.1	0.2	0.8	4.5	8.5	12.7	15.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.3	0.6	0.8	0.9	0.6
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.1	0.6	1.2	1.8	2.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	71	55	68	77	74	72	69	64
Time to Drain 99% of Inflow Volume (hours) =	41	76	59	72	83	82	81	79	76
Maximum Ponding Depth (ft) =	1.55	2.43	1.95	2.28	2.60	2.86	3.06	3.36	4.64
Area at Maximum Ponding Depth (acres) =	0.34	0.59	0.46	0.56	0.62	0.62	0.60	0.53	0.48
Maximum Volume Stored (acre-ft) =	0.210	0.625	0.369	0.538	0.728	0.885	1.007	1.179	1.764

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)



PROJECT SUMMARY

CALCULATION DETAILS

- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 4,650 LF

STORAGE SUMMARY

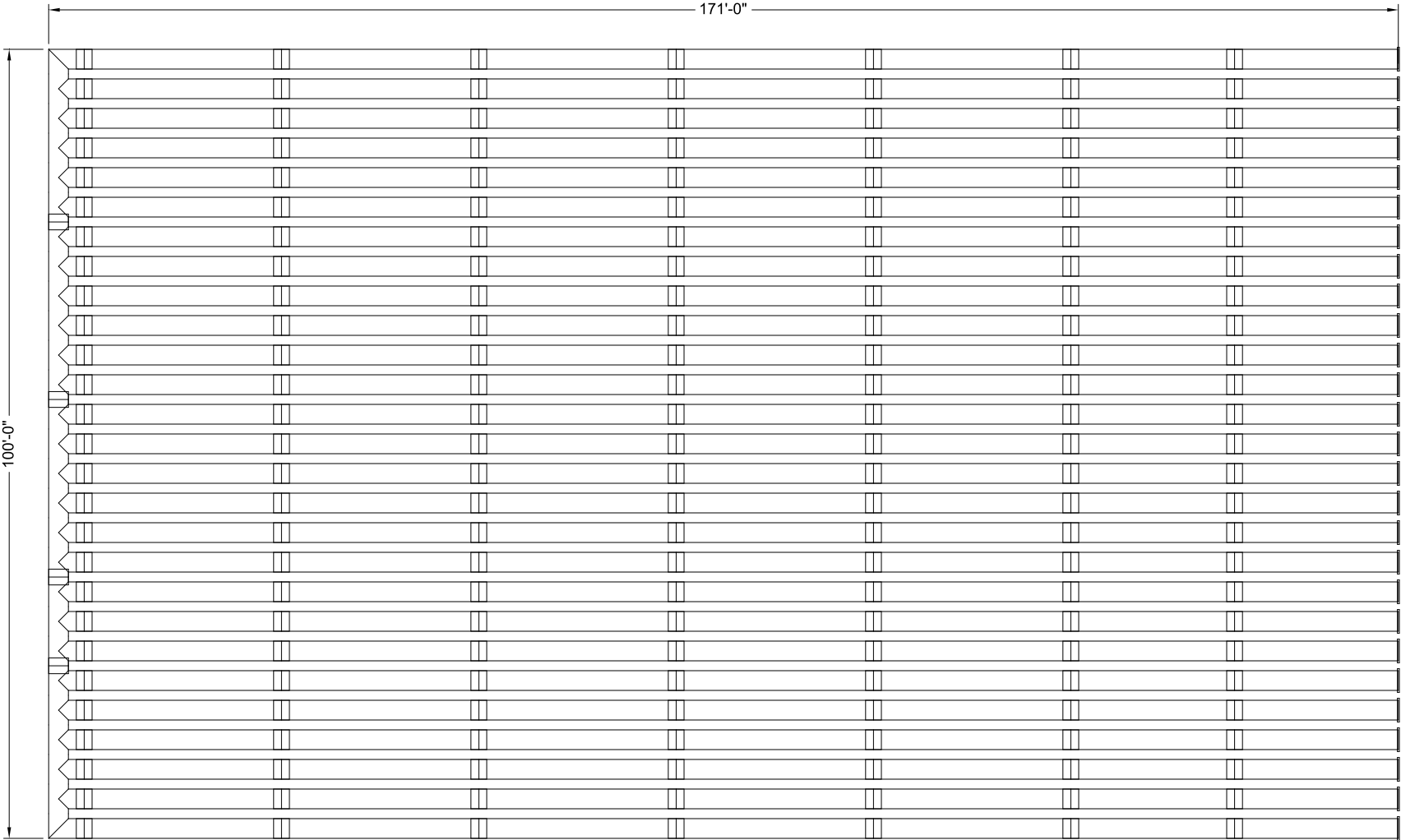
- STORAGE VOLUME REQUIRED = 22,800 CF
- PIPE STORAGE VOLUME = 22,823 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 22,823 CF

PIPE DETAILS

- DIAMETER = 30"
- CORRUGATION = 2 2/3x1/2
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 15"

BACKFILL DETAILS

- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE 2²/₃" x 1¹/₂" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 20'

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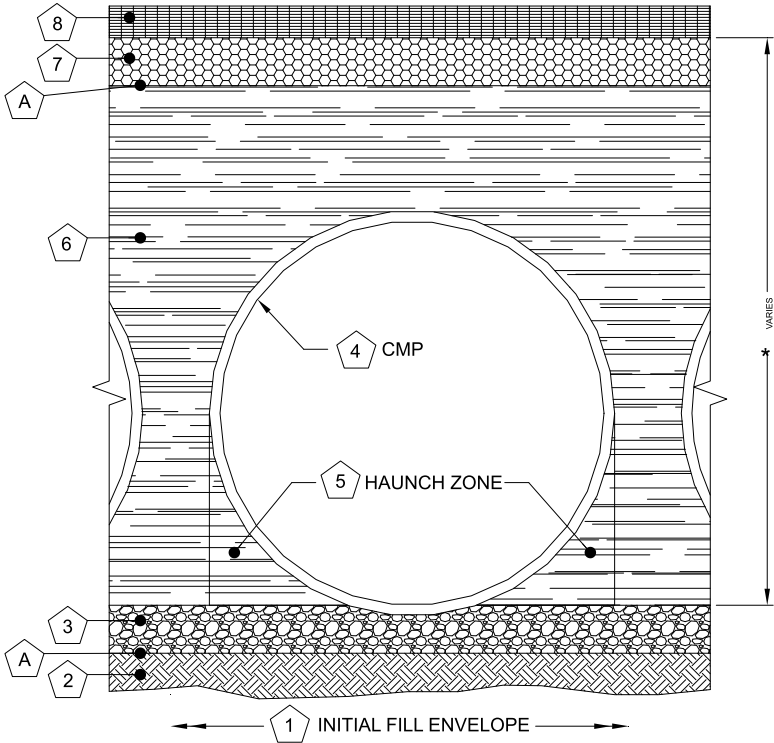
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CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO29865 Westside Crossing
24/36
Aurora, CO
DETENTION SYSTEM

PROJECT No.: 19924	SEQ. No.: 29865	DATE: 4/10/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.:		1



DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE			
Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)		
7	Road Base (if applicable)		
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3
	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57
			Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45
			Engineer Decision for consideration to prevent soil migration into varying soil types
* Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

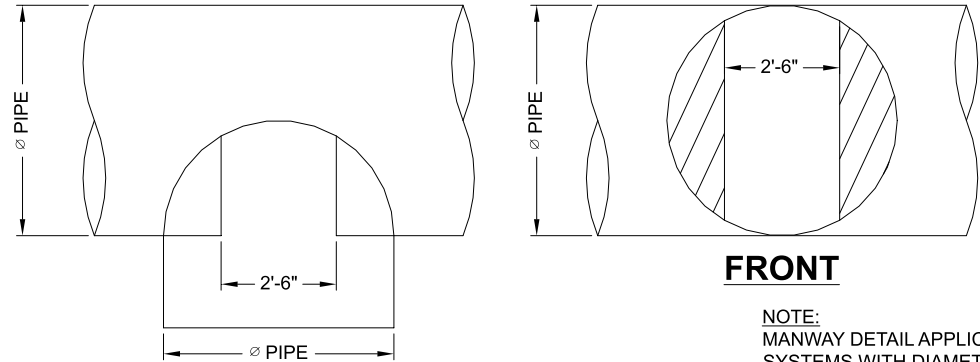
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



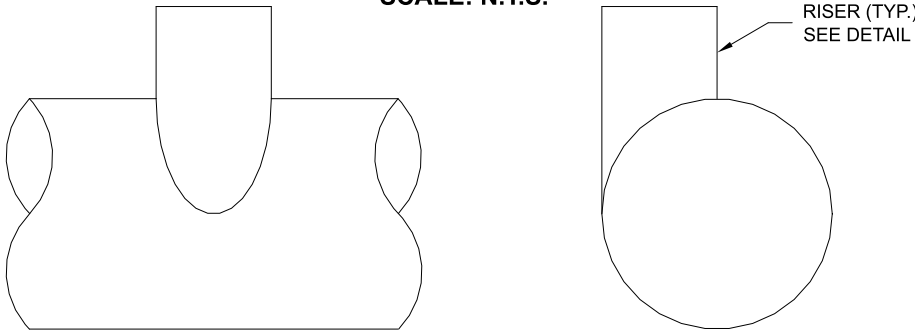
FRONT

NOTE: MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

PLAN

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



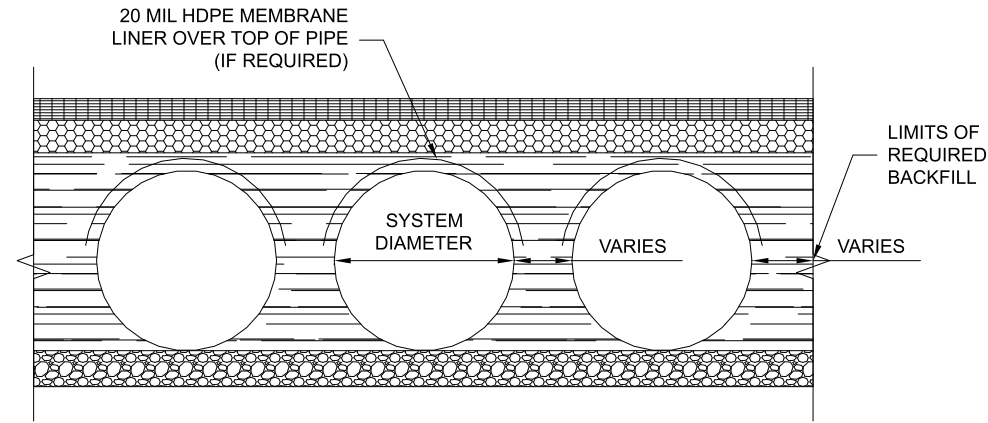
ELEVATION

END

TYPICAL RISER DETAIL

NOTE: LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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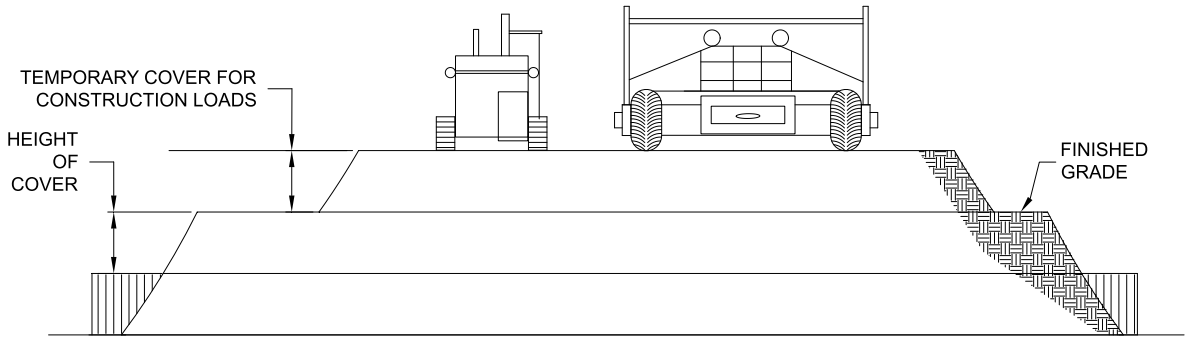
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CMP DETENTION SYSTEMS

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DYO29865 Westside Crossing
24/36
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DETENTION SYSTEM

PROJECT No.: 19924	SEQ. No.: 29865	DATE: 4/10/2023
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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
MINIMUM COVER (FT)				
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE

THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL

THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS

CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

NOTE:

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PIPE

THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE

HANDLING AND ASSEMBLY

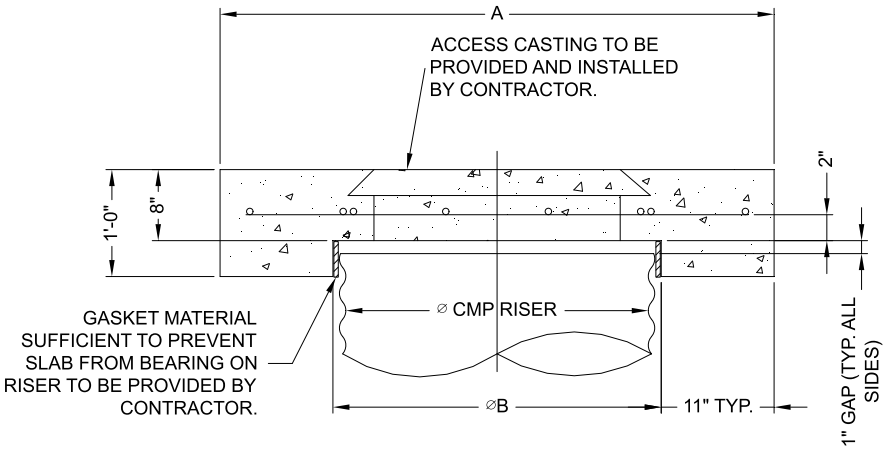
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

REQUIREMENTS

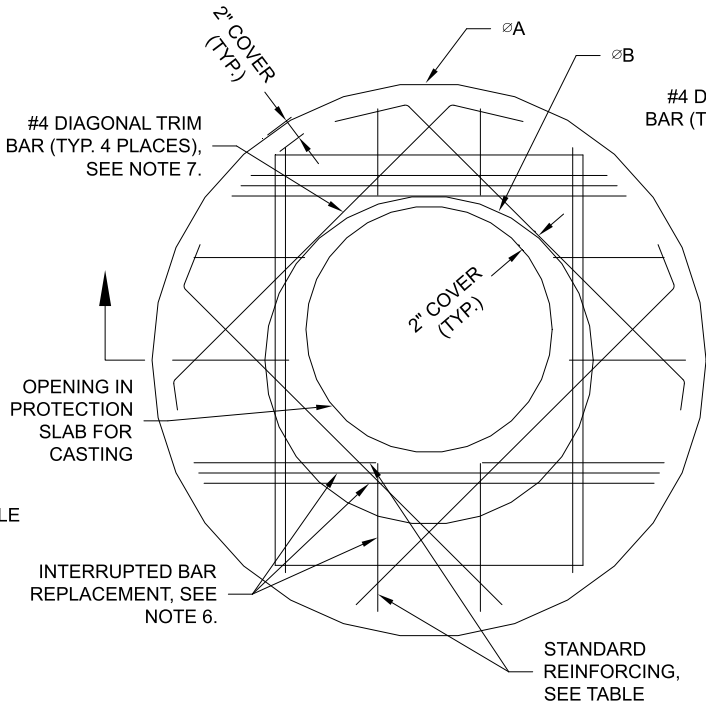
INSTALLATION

SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.



SECTION VIEW



ROUND OPTION PLAN VIEW

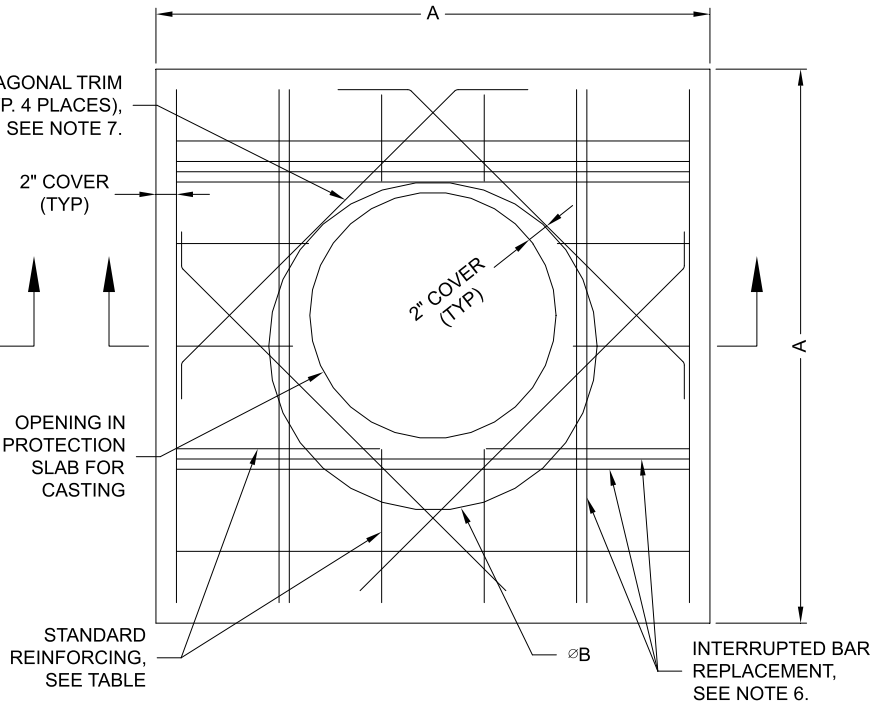
NOTES:

- DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
- DESIGN LOAD HS25.
- EARTH COVER = 1' MAX.
- CONCRETE STRENGTH = 3,500 psi
- REINFORCING STEEL = ASTM A615, GRADE 60.
- PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.

REINFORCING TABLE

Ø CMP RISER	A	Ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	Ø 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	Ø 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	Ø 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	Ø 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	Ø 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



SQUARE OPTION PLAN VIEW

- TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
- PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
- DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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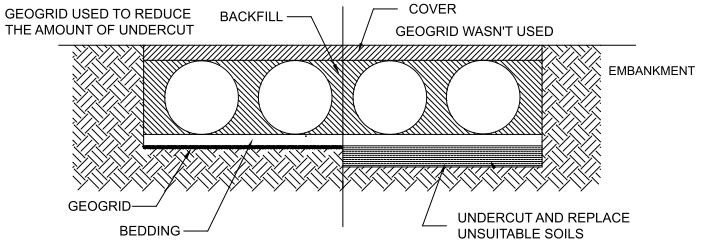
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

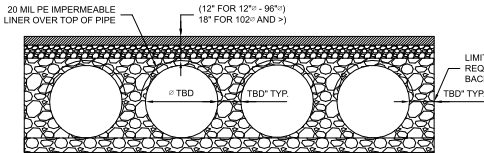


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

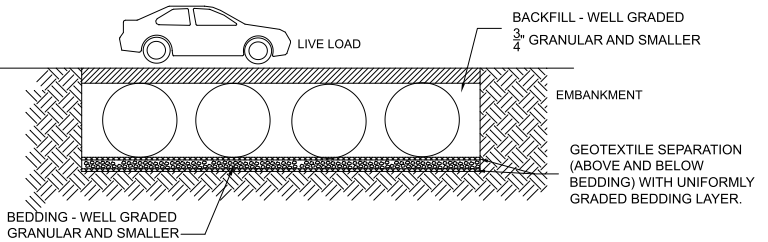
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

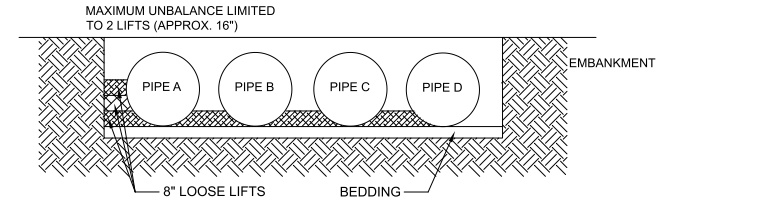
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



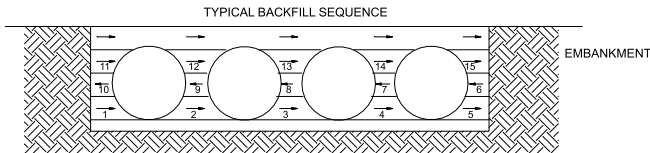
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

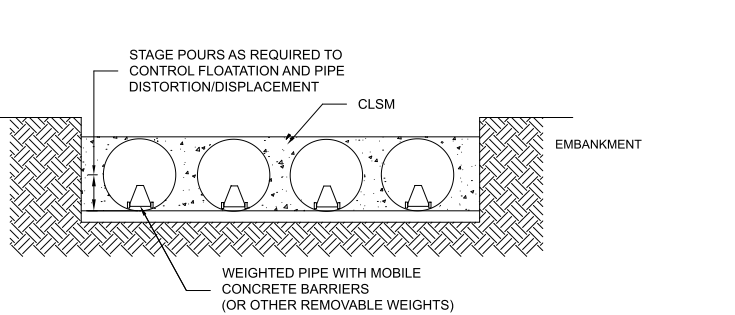


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

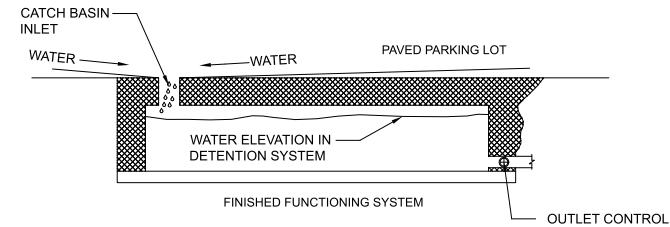


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY	



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CMP DETENTION SYSTEMS

CONTECH
DYODS
DRAWING

DYO29865 Westside Crossing
24/36
Aurora, CO
DETENTION SYSTEM

PROJECT No.: 19924	SEQ. No.: 29865	DATE: 4/10/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.:		1



Round Pipe Stage Storage Table

Contech Engineered Solutions, LLC Engineer:

Date

CEU

4/11/2023

Site Information

Project Name

Project State

Project Location

Westside Crossing

CO

Aurora

Enter Pipe I.D.= in.
Enter Desired Increment = in.

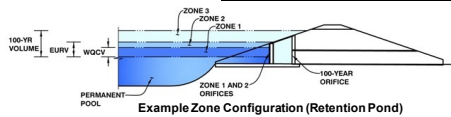
Total Volume/LF
4.91

Total CMP Length= ft.
System Invert= ft.

Inc Num	Water Level (in.)	Inc Area (sq. ft.)	Hyd Rad (ft.)	Top Width (ft.)	Volume (cf)	WS Elevation (ft.)
1	1	0.05	0.05	0.90	233	0.08
2	2	0.14	0.11	1.25	654	0.17
3	3	0.26	0.16	1.50	1188	0.25
4	4	0.39	0.21	1.70	1809	0.33
5	5	0.54	0.26	1.86	2501	0.42
6	6	0.70	0.30	2.00	3250	0.50
7	7	0.87	0.35	2.11	4048	0.58
8	8	1.05	0.39	2.21	4886	0.67
9	9	1.24	0.43	2.29	5759	0.75
10	10	1.43	0.47	2.36	6660	0.83
11	11	1.63	0.50	2.41	7584	0.92
12	12	1.83	0.54	2.45	8526	1.00
13	13	2.04	0.57	2.48	9481	1.08
14	14	2.25	0.60	2.49	10445	1.17
15	15	2.45	0.62	2.50	11413	1.25
16	16	2.66	0.65	2.49	12381	1.33
17	17	2.87	0.67	2.48	13345	1.42
18	18	3.08	0.69	2.45	14300	1.50
19	19	3.28	0.71	2.41	15241	1.58
20	20	3.48	0.73	2.36	16165	1.67
21	21	3.67	0.74	2.29	17066	1.75
22	22	3.86	0.75	2.21	17939	1.83
23	23	4.04	0.76	2.11	18778	1.92
24	24	4.21	0.76	2.00	19576	2.00
25	25	4.37	0.76	1.86	20325	2.08
26	26	4.52	0.76	1.70	21016	2.17
27	27	4.65	0.75	1.50	21638	2.25
28	28	4.77	0.73	1.25	22172	2.33
29	29	4.86	0.70	0.90	22592	2.42
30	30	4.91	0.63	0.00	22826	2.50

These results are submitted to you as a guideline only, without liability on the part of CONTECH Construction Products Inc. for accuracy or suitability to any particular application, and are subject to your verification.

MHFD-Detention, Version 4.04 (February 2021)

Basin ID: POND B

Selected BMP Type =	EDB	
Watershed Area =	5.10	acres
Watershed Length =	720	ft
Watershed Length to Centroid =	450	ft
Watershed Slope =	0.014	ft/ft
Watershed Imperviousness =	72.20%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours

Location for 1-hr Rainfall Depths = Denver - Capitol Building

Optional User Overrides

Water Quality Capture Volume (WQCV) =	0.121	acre-feet
Excess Urban Runoff Volume (EQRV) =	0.359	acre-feet
2-yr Runoff Volume ($P1 = 0.81$ in.) =	0.226	acre-feet
5-yr Runoff Volume ($P1 = 1.08$ in.) =	0.324	acre-feet
10-yr Runoff Volume ($P1 = 1.37$ in.) =	0.442	acre-feet
25-yr Runoff Volume ($P1 = 1.87$ in.) =	0.667	acre-feet
50-yr Runoff Volume ($P1 = 2.34$ in.) =	0.874	acre-feet
100-yr Runoff Volume ($P1 = 2.87$ in.) =	1.116	acre-feet
500-yr Runoff Volume ($P1 = 4.38$ in.) =	1.794	acre-feet
Approximate 2-yr Detention Volume =	0.220	acre-feet
Approximate 5-yr Detention Volume =	0.323	acre-feet
Approximate 10-yr Detention Volume =	0.402	acre-feet
Approximate 25-yr Detention Volume =	0.511	acre-feet
Approximate 50-yr Detention Volume =	0.583	acre-feet
Approximate 100-yr Detention Volume =	0.686	acre-feet

Zone 1 Volume (WQCV) =	0.121	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.237	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.327	acre-feet
Total Detention Basin Volume =	0.686	acre-feet
Initial Surcharge Volume (ISV) =	user	ft ³
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{MB}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV})	=	user	ft ²
Surcharge Volume Length (L_{SV})	=	user	
Surcharge Volume Width (W_{SV})	=	user	
Depth of Basin Floor (H_{FLOOR})	=	user	ft
Length of Basin Floor (L_{FLOOR})	=	user	
Width of Basin Floor (W_{FLOOR})	=	user	
Area of Basin Floor (A_{FLOOR})	=	user	ft ²
Volume of Basin Floor (V_{FLOOR})	=	user	ft ³
Depth of Main Basin (H_{MAIN})	=	user	
Length of Main Basin (L_{MAIN})	=	user	
Width of Main Basin (W_{MAIN})	=	user	
Area of Main Basin (A_{MAIN})	=	user	ft ²
Volume of Main Basin (V_{MAIN})	=	user	ft ³
Calculated Total Basin Volume (V_{TOTAL})	=	user	acre-feet

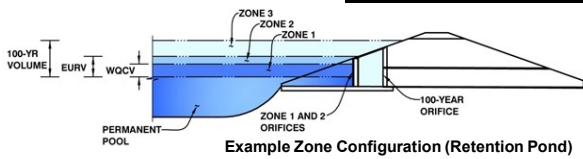
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DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: WESTSIDE CROSSING

Basin ID: POND B



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.84	0.121	Orifice Plate
Zone 2 (EURV)	2.88	0.237	Orifice Plate
Zone 3 (100-year)	4.05	0.327	Weir&Pipe (Restrict)
Total (all zones)		0.686	

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

Underdrain Orifice Invert Depth = N/A ft (distance below the filtration media surface)
Underdrain Orifice Diameter = N/A inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = N/A ft²
Underdrain Orifice Centroid = N/A feet

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

Invert of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 2.88 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = 11.50 inches
Orifice Plate: Orifice Area per Row = N/A inches

Calculated Parameters for Plate

WQ Orifice Area per Row = N/A ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.96	1.92					
Orifice Area (sq. inches)	0.63	0.63	1.70					

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

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = Not Selected Not Selected ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = N/A N/A ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = N/A N/A inches

Calculated Parameters for Vertical Orifice

Vertical Orifice Area = Not Selected Not Selected ft²
Vertical Orifice Centroid = N/A N/A feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

Overflow Weir Front Edge Height, H_o = Zone 3 Weir Not Selected ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 3.00 N/A feet
Overflow Weir Grate Slope = 0.00 N/A H:V
Horiz. Length of Weir Sides = 4.00 N/A feet
Overflow Grate Type = Type C Grate N/A
Debris Clogging % = 50% N/A %

Calculated Parameters for Overflow Weir

Height of Grate Upper Edge, H_u = Zone 3 Weir Not Selected feet
Overflow Weir Slope Length = 4.00 N/A feet
Grate Open Area / 100-yr Orifice Area = 11.01 N/A
Overflow Grate Open Area w/o Debris = 8.35 N/A ft²
Overflow Grate Open Area w/ Debris = 4.18 N/A ft²

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

Depth to Invert of Outlet Pipe = Zone 3 Restrictor Not Selected ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = 18.00 N/A inches
Restrictor Plate Height Above Pipe Invert = 8.00 inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Outlet Orifice Area = Zone 3 Restrictor Not Selected ft²
Outlet Orifice Centroid = 0.39 N/A feet
Half-Central Angle of Restrictor Plate on Pipe = 1.46 N/A radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = 4.95 ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 25.00 feet
Spillway End Slopes = 0.00 H:V
Freeboard above Max Water Surface = 0.00 feet

Calculated Parameters for Spillway

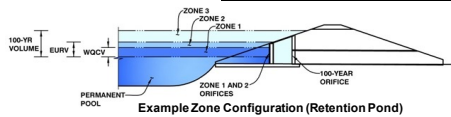
Spillway Design Flow Depth = 0.37 feet
Stage at Top of Freeboard = 5.32 feet
Basin Area at Top of Freeboard = 0.30 acres
Basin Volume at Top of Freeboard = 1.07 acre-ft

Routed Hydrograph Results

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

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	0.81	1.08	1.37	1.87	2.34	2.87	4.38
One-Hour Rainfall Depth (in) =	0.121	0.359	0.226	0.324	0.442	0.667	0.874	1.116	1.794
CUHP Runoff Volume (acre-ft) =	N/A	N/A	0.226	0.324	0.442	0.667	0.874	1.116	1.794
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.0	0.3	1.2	3.4	5.1	7.4	13.0
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.01	0.07	0.24	0.67	1.01	1.44	2.54
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A	3.4	4.9	6.6	10.3	13.5	17.4	27.6
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.1	0.1	0.9	4.0	6.5	6.9	12.1
Peak Inflow Q (cfs) =	N/A	N/A	N/A	0.3	0.7	1.2	1.3	0.9	0.9
Peak Outflow Q (cfs) =	N/A	N/A	N/A	0.3	0.7	1.2	1.3	0.9	0.9
Ratio Peak Outflow to Predevelopment Q =	Plate	Overflow Weir 1	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Structure Controlling Flow =	N/A	N/A	N/A	N/A	0.1	0.5	0.8	0.8	0.9
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	38	67	55	65	69	67	64	62	56
Time to Drain 97% of Inflow Volume (hours) =	40	72	58	69	75	73	72	71	68
Time to Drain 99% of Inflow Volume (hours) =	1.84	2.88	2.26	2.66	2.98	3.19	3.34	3.80	5.09
Maximum Ponding Depth (ft) =	0.20	0.26	0.23	0.25	0.26	0.27	0.28	0.29	0.30
Area at Maximum Ponding Depth (acres) =	0.121	0.361	0.212	0.306	0.387	0.440	0.482	0.613	0.997
Maximum Volume Stored (acre-ft) =									

MHFD-Detention, Version 4.04 (February 2021)

Basin ID: POND C

Example Zone Configuration (Retention Pond)

Selected BMP Type =	EDB	
Watershed Area =	5.50	acres
Watershed Length =	700	ft
Watershed Length to Centroid =	370	ft
Watershed Slope =	0.014	ft/ft
Watershed Imperviousness =	80.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCC Drain Time =	40.0	hours

Location for 1-hr Rainfall Depths = Denver - Capitol Building

Optional User Overrides

Water Quality Capture Volume (WQCV) =	0.150	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.432	acre-feet	acre-feet
2-yr Runoff Volume ($P1 = 0.81$ in.) =	0.268	acre-feet	0.81 inches
5-yr Runoff Volume ($P1 = 1.08$ in.) =	0.380	acre-feet	1.08 inches
10-yr Runoff Volume ($P1 = 1.37$ in.) =	0.509	acre-feet	1.37 inches
25-yr Runoff Volume ($P1 = 1.87$ in.) =	0.748	acre-feet	1.87 inches
50-yr Runoff Volume ($P1 = 2.34$ in.) =	0.969	acre-feet	2.34 inches
100-yr Runoff Volume ($P1 = 2.87$ in.) =	1.225	acre-feet	2.87 inches
500-yr Runoff Volume ($P1 = 4.38$ in.) =	1.945	acre-feet	4.38 inches
Approximate 2-yr Detention Volume =	0.266	acre-feet	
Approximate 5-yr Detention Volume =	0.384	acre-feet	
Approximate 10-yr Detention Volume =	0.481	acre-feet	
Approximate 25-yr Detention Volume =	0.608	acre-feet	
Approximate 50-yr Detention Volume =	0.693	acre-feet	
Approximate 100-yr Detention Volume =	0.802	acre-feet	

Zone 1 Volume (WQCV) =	0.150	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.282	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.370	acre-feet
Total Detention Basin Volume =	0.802	acre-feet
Initial Surcharge Volume (ISV) =	user	ft ³
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H _{total}) =	user	ft
Depth of Trickle Channel (H _{TC}) =	user	ft
Slope of Trickle Channel (S _{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S _{main}) =	user	H/V
Basin Length-to-Width Ratio (R _{L/W}) =	user	

Initial Surcharge Area (A_{BIV})	=	user	ft ²
Surcharge Volume Length (L_{SV})	=	user	ft
Surcharge Volume Width (W_{SV})	=	user	ft
Depth of Basin Floor (H_{LFLOOR})	=	user	ft
Length of Basin Floor (L_{LFLOOR})	=	user	ft
Width of Basin Floor (W_{LFLOOR})	=	user	ft
Area of Basin Floor (A_{LFLOOR})	=	user	ft ²
Volume of Basin Floor (V_{LFLOOR})	=	user	ft ³
Depth of Main Basin (H_{MAIN})	=	user	ft
Length of Main Basin (L_{MAIN})	=	user	ft
Width of Main Basin (W_{MAIN})	=	user	ft
Area of Main Basin (A_{MAIN})	=	user	ft ²
Volume of Main Basin (V_{MAIN})	=	user	ft ³
Calculated Total Basin Volume (V_{TOTAL})	=	user	acre-feet

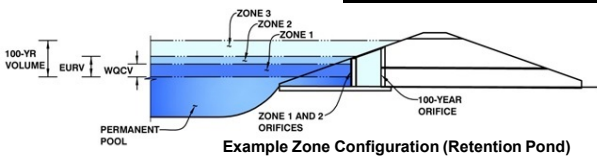
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DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: WESTSIDE CROSSING

Basin ID: POND C



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.86	0.150	Orifice Plate
Zone 2 (EURV)	3.15	0.282	Orifice Plate
Zone 3 (100-year)	4.68	0.370	Weir&Pipe (Restrict)
Total (all zones)		0.802	

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

Underdrain Orifice Invert Depth = N/A ft (distance below the filtration media surface)
Underdrain Orifice Diameter = N/A inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = N/A ft²
Underdrain Orifice Centroid = N/A feet

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

Invert of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 3.32 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = 13.30 inches
Orifice Plate: Orifice Area per Row = N/A inches

Calculated Parameters for Plate
WQ Orifice Area per Row = N/A ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.11	2.21					
Orifice Area (sq. inches)	0.89	0.89	1.75					

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

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = N/A inches

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = N/A ft²
Vertical Orifice Centroid = N/A feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe)

Overflow Weir Front Edge Height, H_o = 3.32 ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 3.00 feet
Overflow Weir Grate Slope = 0.00 H:V
Horiz. Length of Weir Sides = 4.00 feet
Overflow Grate Type = Type C Grate
Debris Clogging % = 50%

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H_i = 3.32 feet
Overflow Weir Slope Length = 4.00 feet
Grate Open Area / 100-yr Orifice Area = 10.17
Overflow Grate Open Area w/o Debris = 8.35 ft²
Overflow Grate Open Area w/ Debris = 4.18 ft²

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

Depth to Invert of Outlet Pipe = 0.17 ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = 18.00 inches
Restrictor Plate Height Above Pipe Invert = 8.50 inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = 0.82 ft²
Outlet Orifice Centroid = 0.41 feet
Half-Central Angle of Restrictor Plate on Pipe = 1.52 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = 4.73 ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 20.00 feet
Spillway End Slopes = 0.00 H:V
Freeboard above Max Water Surface = 1.00 feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = 0.49 feet
Stage at Top of Freeboard = 6.22 feet
Basin Area at Top of Freeboard = 0.25 acres
Basin Volume at Top of Freeboard = 0.94 acre-ft

Routed Hydrograph Results

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

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	0.81	1.08	1.37	1.87	2.34	2.87	4.38
One-Hour Rainfall Depth (in) =	0.150	0.432	0.268	0.380	0.509	0.748	0.969	1.225	1.945
CUHP Runoff Volume (acre-ft) =	N/A	N/A	0.268	0.380	0.509	0.748	0.969	1.225	1.945
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.0	0.4	1.5	4.1	6.1	8.8	15.5
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.01	0.08	0.26	0.75	1.12	1.60	2.81
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A	4.6	6.4	8.4	12.6	16.3	21.0	32.9
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.1	0.2	0.1	0.1	0.3	3.7	7.2	8.0	20.8
Peak Inflow Q (cfs) =	N/A	N/A	N/A	0.3	0.2	0.9	1.2	0.9	1.3
Ratio Peak Outflow to Predevelopment Q =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Structure Controlling Flow =	N/A	N/A	N/A	N/A	0.0	0.4	0.8	0.9	1.0
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	39	68	56	65	73	70	68	65	59
Time to Drain 97% of Inflow Volume (hours) =	40	72	58	69	78	77	76	75	72
Time to Drain 99% of Inflow Volume (hours) =	1.86	3.15	2.36	2.84	3.36	3.61	3.78	4.29	5.07
Maximum Ponding Depth (ft) =	0.19	0.23	0.22	0.23	0.24	0.24	0.24	0.25	0.25
Area at Maximum Ponding Depth (acres) =	0.151	0.433	0.253	0.359	0.480	0.542	0.581	0.705	0.901
Maximum Volume Stored (acre-ft) =									

APPENDIX C.1
Hydraulic Calculations
Inlet and Street Capacity Calculations
UD-Sewer Results Summaries for Outfall Trunkline (10-Yr & 100-Yr)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	Inlet 2	Inlet 1
Site Type (Urban or Rural)		
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	On Grade	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT**User-Defined Design Flows**

Minor Q_{Known} (cfs)	2.7	3.1
Major Q_{Known} (cfs)	6.8	7.5

Bypass (Carry-Over) Flow from Upstream

Inlets must be organized from upstream (left) to downstream (right) in order for bypass flow to be calculated.

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)		0.0
Major Bypass Flow Received, Q_b (cfs)		0.0

Watershed Characteristics

Subcatchment Area (acres)		
Percent Impervious		
NRCS Soil Type		

Watershed Profile

Overland Slope (ft/ft)		
Overland Length (ft)		
Channel Slope (ft/ft)		
Channel Length (ft)		

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

CALCULATED OUTPUT

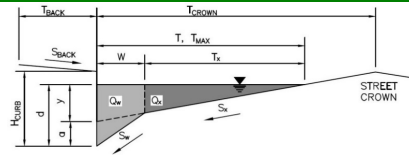
Minor Total Design Peak Flow, Q (cfs)	2.7	3.1
Major Total Design Peak Flow, Q (cfs)	6.8	7.5
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	0.0	N/A

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Westside Crossing - Berthoud

Inlet ID: Inlet 2

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T_{BACK}	=	35.0	ft
S_{BACK}	=	0.020	ft/ft
n_{BACK}	=	0.020	

H_{CURB}	=	6.00	inches
T_{CROWN}	=	34.0	ft
W	=	2.00	ft
S_x	=	0.050	ft/ft
S_y	=	0.083	ft/ft
S_o	=	0.010	ft/ft
n_{STREET}	=	0.015	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
T_{MAX}	12.0	32.0	ft
d_{MAX}	6.0	8.3	inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

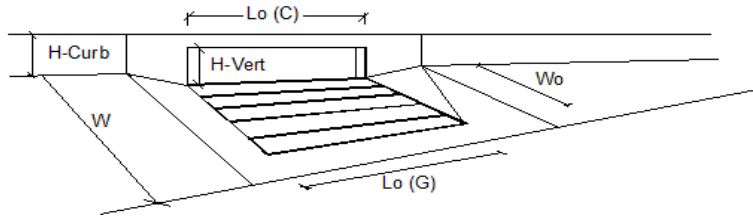
	Minor Storm	Major Storm	
Q_{allow}	8.7	23.9	cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 2.70 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 6.80 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



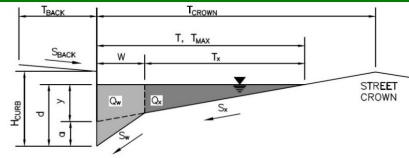
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	0.10	0.10	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q =	2.7	6.8	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_o =	0.0	0.0	cfs
Capture Percentage = Q_o/Q_o		$C\%$ =	100	100	%

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Westside Crossing - Berthoud

Inlet ID: Inlet 1

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T_{BACK}	=	17.0	ft
S_{BACK}	=	0.020	ft/ft
n_{BACK}	=	0.020	

H_{CURB}	=	6.00	inches
T_{CROWN}	=	24.0	ft
W	=	2.00	ft
S_x	=	0.020	ft/ft
S_w	=	0.083	ft/ft
S_o	=	0.000	ft/ft
n_{STREET}	=	0.020	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
T_{MAX}	24.0	24.0	ft
d_{MAX}	6.0	12.0	inches
	☐	☐	

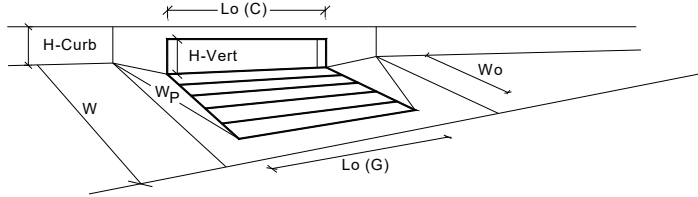
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow}	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	7.3	inches
Grate Information			MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate		L _o (G) =	N/A	N/A	feet
Width of a Unit Grate		W _o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A _{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C _f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C _w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C _o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L _o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H _{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H _{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W _p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C _f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C _w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C _o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d _{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d _{Curb} =	0.33	0.44	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF _{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets		RF _{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets		RF _{Combination} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q _s =	5.4	8.1	cfs
		Q _{PEAK REQUIRED} =	3.1	7.5	cfs

Note:

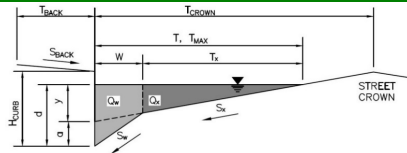
Inlet capacity is only considered for the 10-YR Event and is good. During the 100-YR Event, the outfall trunkline will be pressurized and the inlet at Design Point 23 will be inundated, at which point Meadowlark Ave. will be conveying the majority of the 100-YR Runoff to the existing channel located directly downstream of Design Point 24. See 'Meadowlark Capacity' calculation for street capacity calculations during a 100-YR Event.

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Westside Crossing - Berthoud

Inlet ID: Meadowlark Capacity

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T_{BACK}	=	17.0	ft
S_{BACK}	=	0.020	ft/ft
n_{BACK}	=	0.020	

H_{CURB}	=	6.00	inches
T_{CROWN}	=	24.0	ft
W	=	2.00	ft
S_x	=	0.020	ft/ft
S_w	=	0.083	ft/ft
S_0	=	0.005	ft/ft
n_{STREET}	=	0.020	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
T_{MAX}	24.0	24.0	ft
d_{MAX}	6.0	12.0	inches
	☐	☐	

Maximum Capacity for 1/2 Street based On Allowable SpreadWater Depth without Gutter Depression ($T * S_x * 12$)Vertical Depth between Gutter Lip and Gutter Flowline ($W * S_w * 12$)Gutter Depression ($d_c - (W * S_x * 12)$)Water Depth at Gutter Flowline ($y + a$)Allowable Spread for Discharge outside the Gutter Section ($T - W$)

Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. 7-7)

Discharge outside the Gutter Section, carried in Section T_x Discharge within the Gutter Section ($Q_T - Q_X - Q_{BACK}$)

Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)

Maximum Flow Based On Allowable Spread

Flow Velocity within the Gutter Section

 $V*d$ Product: Flow Velocity times Gutter Flowline Depth

	Minor Storm	Major Storm	
y	5.76	5.76	inches
d_c	2.0	2.0	inches
a	1.51	1.51	inches
d	7.27	7.27	inches
T_x	22.0	22.0	ft
E_0	0.245	0.245	
Q_X	11.1	11.1	cfs
Q_W	3.6	3.6	cfs
Q_{BACK}	0.2	0.2	cfs
Q_T	14.9	14.9	cfs
V	3.4	3.4	fps
$V*d$	2.1	2.1	

Maximum Capacity for 1/2 Street based on Allowable Depth

Theoretical Water Spread

Theoretical Spread for Discharge outside the Gutter Section ($T - W$)

Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. 7-7)

Theoretical Discharge outside the Gutter Section, carried in Section T_{XTH} Actual Discharge outside the Gutter Section, (limited by distance T_{CROWN})Discharge within the Gutter Section ($Q_d - Q_X$)

Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)

Total Discharge for Major & Minor Storm (Pre-Safety Factor)

Average Flow Velocity Within the Gutter Section

 $V*d$ Product: Flow Velocity Times Gutter Flowline DepthSlope-Based Safety Factor for Minor/Major Storm depth reduction, $d \geq 6"$

Max Flow based on Allowable Depth (Safety Factor Applied)

Resultant Flow Depth at Gutter Flowline (Safety Factor Applied)

Resultant Flow Depth at Street Crown (Safety Factor Applied)

	Minor Storm	Major Storm	
T_{TH}	18.7	43.7	ft
T_{XTH}	16.7	41.7	ft
E_0	0.318	0.130	
Q_{XTH}	5.3	61.0	cfs
Q_X	5.3	52.7	cfs
Q_W	2.5	9.2	cfs
Q_{BACK}	0.0	14.8	cfs
Q	7.8	76.7	cfs
V	3.0	5.0	fps
$V*d$	1.5	5.0	
R	1.00	1.00	
Q_d	7.8	76.7	cfs
d	6.00	12.00	inches
d_{CROWN}	0.00	4.73	inches

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

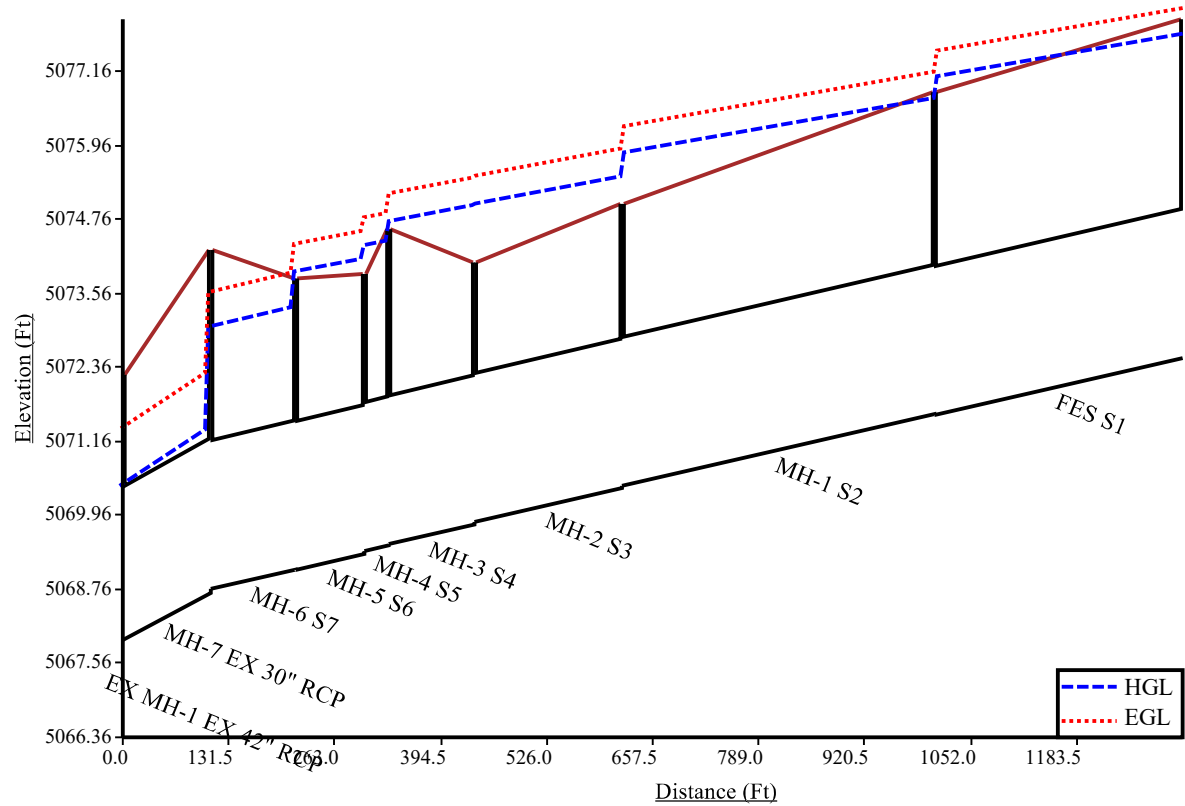
	Minor Storm	Major Storm	
Q_{allow}	7.8	14.9	cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 3.10 cfs on sheet 'Inlet Management'**WARNING: MAJOR STORM max. allowable capacity is less than the design peak flow of 60.30 cfs on sheet 'Inlet Management'**

Note:

Per the UDSewer Results Summary for the 100-YR Event (located in the appendix of this report), a flow of 37 cfs was chosen to enter the outfall trunkline as this elevation reflects the adjacent as-built top-of-curb elevation where flows overtop and enter Meadowlark Avenue at Design Point 20 (5078.38). The ultimate 100-YR Runoff for this project is 97.3 cfs at Design Point 24 (see Proposed Conditions Drainage Map located in the appendix for design point discharges and design point locations). Assuming 37 cfs is captured within the pipe network, 60.3cfs will enter Meadowlark Ave. via Detention Basin emergency spillways and overflow from Design Point 20. Per the calculations above, 76.7 cfs is the max flow allowed within the Meadowlark Ave. half street section (input parameters for max allowable spread and depth reflect Town of Berthoud Design and Construction Specifications Section 602.4 (C)).

Outfall Trunkline 10YR - Phase II



Program:

UDSEWER Math Model Interface 2.1.1.4

Run Date:

7/5/2023 2:04:26 PM

UDSewer Results Summary**Project Title:** Westside Crossing-Phase II**Project Description:** Outfall Trunkline-10YR

Table of Contents

System Input

Manhole Input

Manhole Output

Sewer Input

Sewer Flow

Sewer Sizing

EGL/HGL Summary

System Input Summary**Rainfall Parameters****Rainfall Return Period:** 10**Rainfall Calculation Method:** Formula**One Hour Depth (in):****Rainfall Constant "A":** 28.5**Rainfall Constant "B":** 10**Rainfall Constant "C":** 0.786**Rational Method Constraints****Minimum Urban Runoff Coeff.:** 0.20**Maximum Rural Overland Len. (ft):** 500**Maximum Urban Overland Len. (ft):** 300**Used UDFCD Tc. Maximum:** Yes**Sizer Constraints****Minimum Sewer Size (in):** 18.00**Maximum Depth to Rise Ratio:** 0.90**Maximum Flow Velocity (fps):** 18.0**Minimum Flow Velocity (fps):** 2.0**Backwater Calculations:****Tailwater Elevation (ft):** 5069.17

Manhole Input Summary:

[illegible]

Manhole Output Summary:

[illegible]

Sewer Input Summary:

		Elevation			Loss Coefficients			Given Dimensions		
Element Name	Sewer Length (ft)	Downstream Invert (ft)	Slope (%)	Upstream Invert (ft)	Mannings n	Bend Loss	Lateral Loss	Cross Section	Rise (ft or in)	Span (ft or in)
EX MH-1 EX 42" RCP	37.00	5067.42	0.5	5067.60	0.013	0.00	0.00	CIRCULAR	42.00 in	42.00 in
MH-7 EX 30" RCP	108.80	5067.94	0.7	5068.70	0.013	0.05	0.28	CIRCULAR	30.00 in	30.00 in
MH-6 S7	105.20	5068.76	0.3	5069.08	0.013	0.95	0.25	ELLIPSE	29.00 in	45.00 in
DAP	8.80	5070.60	2.0	5070.78	0.013	0.05	0.00	CIRCULAR	18.00 in	18.00 in
MH-5 S6	85.70	5069.07	0.3	5069.33	0.013	0.05	0.25	ELLIPSE	29.00 in	45.00 in
MH-4 S5	30.00	5069.38	0.3	5069.47	0.013	0.49	0.00	ELLIPSE	29.00 in	45.00 in
MH-3 S4	106.30	5069.49	0.3	5069.81	0.013	0.71	0.00	ELLIPSE	29.00 in	45.00 in
MH-2 S3	183.30	5069.85	0.3	5070.40	0.013	0.06	0.00	ELLIPSE	29.00 in	45.00 in
DBP	13.00	5071.00	0.9	5071.12	0.013	1.00	0.00	CIRCULAR	18.00 in	18.00 in
MH-1 S2	387.30	5070.44	0.3	5071.60	0.013	0.05	0.25	ELLIPSE	29.00 in	45.00 in
DCP	11.50	5072.20	0.9	5072.30	0.013	1.00	0.00	CIRCULAR	18.00 in	18.00 in
FES S1	308.20	5071.59	0.3	5072.51	0.013	0.05	0.25	ELLIPSE	29.00 in	45.00 in
MEADOWLARK INLET MP-1	17.80	5069.10	0.5	5069.19	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
EX I-1 EX 18" RCP	126.70	5067.86	0.3	5068.24	0.013	0.05	0.00	CIRCULAR	18.00 in	18.00 in

Sewer Flow Summary:

	Full Flow Capacity		Critical Flow		Normal Flow						
Element Name	Flow (cfs)	Velocity (fps)	Depth (in)	Velocity (fps)	Depth (in)	Velocity (fps)	Froude Number	Flow Condition	Flow (cfs)	Surcharged Length (ft)	Comment
EX MH-1 EX 42" RCP	71.33	7.41	23.10	7.08	21.94	7.55	1.10	Supercritical	38.40	0.00	
MH-7 EX 30" RCP	34.41	7.01	30.00	7.68	30.00	7.68	0.00	Pressurized	37.70	108.80	
MH-6 S7	37.73	6.01	23.78	7.43	28.98	6.01	0.67	Pressurized	37.70	105.20	
DAP	14.90	8.43	3.99	2.74	2.83	4.49	1.96	Pressurized	0.80	8.80	
MH-5 S6	37.73	6.01	22.47	7.12	26.39	5.93	0.73	Pressurized	33.80	85.70	
MH-4 S5	37.73	6.01	22.47	7.12	26.39	5.93	0.73	Pressurized	33.80	30.00	
MH-3 S4	37.73	6.01	22.47	7.12	26.39	5.93	0.73	Pressurized	33.80	106.30	
MH-2 S3	37.73	6.01	22.47	7.12	26.39	5.93	0.73	Pressurized	33.80	183.30	
DBP	9.99	5.65	4.24	2.83	3.65	3.51	1.34	Pressurized	0.90	13.00	
MH-1 S2	37.73	6.01	22.15	7.05	25.84	5.91	0.74	Pressurized	32.90	387.30	
DCP	9.99	5.65	2.42	2.11	2.14	2.53	1.28	Pressurized	0.30	11.50	
FES S1	37.73	6.01	22.05	7.03	25.67	5.90	0.75	Pressurized	32.60	308.20	
MEADOWLARK INLET MP-1	7.45	4.21	8.04	4.06	8.10	4.02	0.99	Pressurized	3.10	17.80	
EX I-1 EX 18" RCP	5.77	3.26	4.91	3.07	5.57	2.58	0.78	Pressurized	1.20	126.70	

- A Froude number of 0 indicates that pressured flow occurs (adverse slope or undersized pipe).
- If the sewer is not pressurized, full flow represents the maximum gravity flow in the sewer.
- If the sewer is pressurized, full flow represents the pressurized flow conditions.

Sewer Sizing Summary:

			Existing		Calculated		Used			
Element Name	Peak Flow (cfs)	Cross Section	Rise	Span	Rise	Span	Rise	Span	Area (ft^2)	Comment
EX MH-1 EX 42" RCP	38.40	CIRCULAR	42.00 in	42.00 in	36.00 in	36.00 in	42.00 in	42.00 in	9.62	
MH-7 EX 30" RCP	37.70	CIRCULAR	30.00 in	30.00 in	33.00 in	33.00 in	30.00 in	30.00 in	4.91	
MH-6 S7	37.70	ELLIPSE	29.00 in	45.00 in	42.00 in	42.00 in	29.00 in	45.00 in	6.28	
DAP	0.80	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH-5 S6	33.80	ELLIPSE	29.00 in	45.00 in	36.00 in	36.00 in	29.00 in	45.00 in	6.28	
MH-4 S5	33.80	ELLIPSE	29.00 in	45.00 in	36.00 in	36.00 in	29.00 in	45.00 in	6.28	
MH-3 S4	33.80	ELLIPSE	29.00 in	45.00 in	36.00 in	36.00 in	29.00 in	45.00 in	6.28	
MH-2 S3	33.80	ELLIPSE	29.00 in	45.00 in	36.00 in	36.00 in	29.00 in	45.00 in	6.28	
DBP	0.90	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH-1 S2	32.90	ELLIPSE	29.00 in	45.00 in	36.00 in	36.00 in	29.00 in	45.00 in	6.28	
DCP	0.30	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
FES S1	32.60	ELLIPSE	29.00 in	45.00 in	36.00 in	36.00 in	29.00 in	45.00 in	6.28	
MEADOWLARK INLET MP-1	3.10	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
EX I-1 EX 18" RCP	1.20	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	

- Calculated diameter was determined by sewer hydraulic capacity rounded up to the nearest commercially available size.
 - Sewer sizes should not decrease downstream.
 - All hydraulics were calculated using the 'Used' parameters.
-

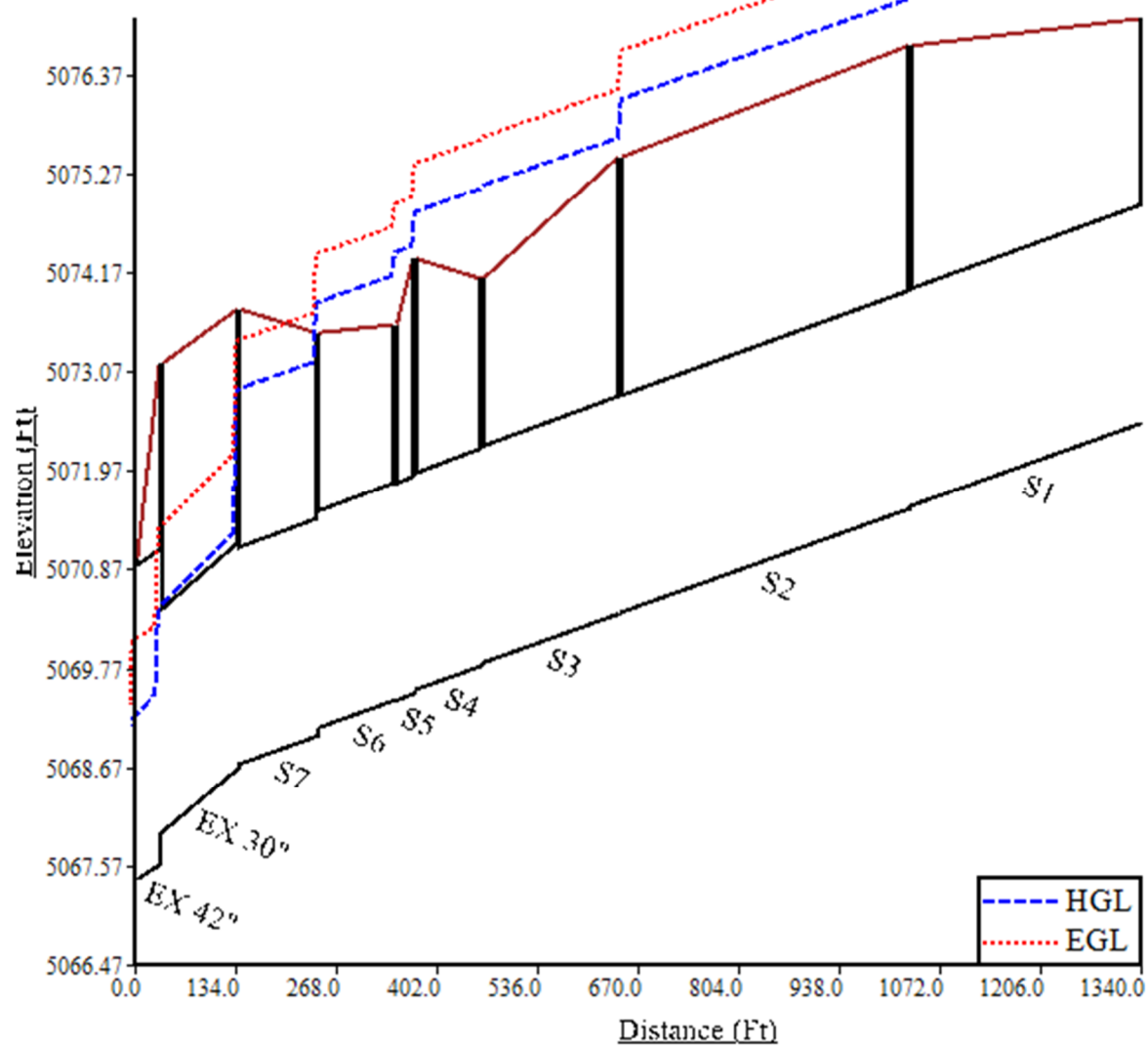
Grade Line Summary:

Tailwater Elevation (ft): 5069.17

	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
Element Name	Downstream (ft)	Upstream (ft)	Bend Loss (ft)	Lateral Loss (ft)	Downstream (ft)	Upstream (ft)	Downstream (ft)	Friction Loss (ft)	Upstream (ft)
EX MH-1 EX 42" RCP	5067.42	5067.60	0.00	0.00	5069.24	5069.53	5070.13	0.17	5070.30
MH-7 EX 30" RCP	5067.94	5068.70	0.05	0.00	5070.44	5071.35	5071.35	0.91	5072.27
MH-6 S7	5068.76	5069.08	0.53	0.78	5073.02	5073.33	5073.58	0.32	5073.89
DAP	5070.60	5070.78	0.00	0.00	5073.89	5073.89	5073.89	0.00	5073.89
MH-5 S6	5069.07	5069.33	0.02	0.45	5073.91	5074.12	5074.36	0.21	5074.57
MH-4 S5	5069.38	5069.47	0.22	0.00	5074.34	5074.41	5074.79	0.07	5074.86
MH-3 S4	5069.49	5069.81	0.32	0.00	5074.73	5074.99	5075.18	0.26	5075.44
MH-2 S3	5069.85	5070.40	0.03	0.00	5075.01	5075.45	5075.46	0.44	5075.90
DBP	5071.00	5071.12	0.00	0.00	5075.90	5075.91	5075.91	0.00	5075.91
MH-1 S2	5070.44	5071.60	0.02	0.34	5075.84	5076.73	5076.27	0.88	5077.15
DCP	5072.20	5072.30	0.00	0.00	5077.15	5077.15	5077.15	0.00	5077.15
FES S1	5071.59	5072.51	0.02	0.32	5077.08	5077.77	5077.50	0.69	5078.19
MEADOWLARK INLET MP-1	5069.10	5069.19	0.06	0.00	5073.91	5073.92	5073.95	0.02	5073.97
EX I-1 EX 18" RCP	5067.86	5068.24	0.00	0.00	5070.30	5070.31	5070.30	0.02	5070.32

- Bend and Lateral losses only apply when there is an outgoing sewer. The system outfall, sewer #0, is not considered a sewer.
 - Bend loss = Bend K * V_{fi} ^ 2/(2*g)
 - Lateral loss = V_{fo} ^ 2/(2*g)- Junction Loss K * V_{fi} ^ 2/(2*g).
 - Friction loss is always Upstream EGL - Downstream EGL.
-

Outfall Trunkline - 100-YR



Program:

UDSEWER Math Model Interface 2.1.1.4

Run Date:

7/5/2023 2:18:41 PM

UDSewer Results Summary

Project Title: Westside Crossing-Phase II**Project Description:** Outfall Trunkline-100YR

Table of Contents

System Input

Manhole Input

Manhole Output

Sewer Input

Sewer Flow

Sewer Sizing

EGL/HGL Summary

System Input Summary

Rainfall Parameters**Rainfall Return Period:** 100**Rainfall Calculation Method:** Formula**One Hour Depth (in):****Rainfall Constant "A":** 28.5**Rainfall Constant "B":** 10**Rainfall Constant "C":** 0.786**Rational Method Constraints****Minimum Urban Runoff Coeff.:** 0.20**Maximum Rural Overland Len. (ft):** 500**Maximum Urban Overland Len. (ft):** 300**Used UDFCD Tc. Maximum:** Yes**Sizer Constraints****Minimum Sewer Size (in):** 18.00**Maximum Depth to Rise Ratio:** 0.90**Maximum Flow Velocity (fps):** 18.0**Minimum Flow Velocity (fps):** 2.0**Backwater Calculations:****Tailwater Elevation (ft):** 5070.92

Manhole Input Summary:

[illegible]

Manhole Output Summary:

[illegible]

Sewer Input Summary:

		Elevation			Loss Coefficients			Given Dimensions		
Element Name	Sewer Length (ft)	Downstream Invert (ft)	Slope (%)	Upstream Invert (ft)	Mannings n	Bend Loss	Lateral Loss	Cross Section	Rise (ft or in)	Span (ft or in)
EX MH-1 EX 42" RCP	37.00	5067.42	0.5	5067.60	0.013	0.00	0.00	CIRCULAR	42.00 in	42.00 in
MH-7 EX 30" RCP	108.80	5067.94	0.7	5068.70	0.013	0.05	0.28	CIRCULAR	30.00 in	30.00 in
MH-6 S7	105.20	5068.76	0.3	5069.08	0.013	0.95	0.25	ELLIPSE	29.00 in	45.00 in
DAP	8.80	5070.60	2.0	5070.78	0.013	0.05	0.00	CIRCULAR	18.00 in	18.00 in
MH-5 S6	85.70	5069.07	0.3	5069.33	0.013	0.05	0.25	ELLIPSE	29.00 in	45.00 in
MH-4 S5	30.00	5069.38	0.3	5069.47	0.013	0.49	0.00	ELLIPSE	29.00 in	45.00 in
MH-3 S4	106.30	5069.49	0.3	5069.81	0.013	0.71	0.00	ELLIPSE	29.00 in	45.00 in
MH-2 S3	183.30	5069.85	0.3	5070.40	0.013	0.06	0.00	ELLIPSE	29.00 in	45.00 in
DBP	13.00	5071.00	0.9	5071.12	0.013	1.00	0.00	CIRCULAR	18.00 in	18.00 in
MH-1 S2	387.30	5070.44	0.3	5071.60	0.013	0.05	0.25	ELLIPSE	29.00 in	45.00 in
DCP	11.50	5072.20	0.9	5072.30	0.013	1.00	0.00	CIRCULAR	18.00 in	18.00 in
FES S1	308.20	5071.59	0.3	5072.51	0.013	0.05	0.25	ELLIPSE	29.00 in	45.00 in
MEADOWLARK INLET MP-1	17.80	5069.10	0.5	5069.19	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
EX I-1 EX 18" RCP	126.70	5067.86	0.3	5068.24	0.013	0.05	0.00	CIRCULAR	18.00 in	18.00 in

Sewer Flow Summary:

	Full Flow Capacity		Critical Flow		Normal Flow						
Element Name	Flow (cfs)	Velocity (fps)	Depth (in)	Velocity (fps)	Depth (in)	Velocity (fps)	Froude Number	Flow Condition	Flow (cfs)	Surcharged Length (ft)	Comment
EX MH-1 EX 42" RCP	71.33	7.41	22.66	6.99	21.46	7.48	1.11	Supercritical Jump	37.00	1.37	
MH-7 EX 30" RCP	34.41	7.01	30.00	7.54	30.00	7.54	0.00	Pressurized	37.00	108.80	
MH-6 S7	37.73	6.01	23.55	7.38	28.48	6.00	0.69	Pressurized	37.00	105.20	
DAP	14.90	8.43	16.09	7.62	12.78	9.47	1.68	Pressurized	12.70	8.80	
MH-5 S6	37.73	6.01	23.55	7.38	28.48	6.00	0.69	Pressurized	37.00	85.70	
MH-4 S5	37.73	6.01	23.55	7.38	28.48	6.00	0.69	Pressurized	37.00	30.00	
MH-3 S4	37.73	6.01	23.55	7.38	28.48	6.00	0.69	Pressurized	37.00	106.30	
MH-2 S3	37.73	6.01	23.55	7.38	28.48	6.00	0.69	Pressurized	37.00	183.30	
DBP	9.99	5.65	12.20	5.41	11.00	6.10	1.22	Pressurized	6.90	13.00	
MH-1 S2	37.73	6.01	23.55	7.38	28.48	6.00	0.69	Pressurized	37.00	387.30	
DCP	9.99	5.65	13.15	5.78	12.19	6.28	1.16	Pressurized	8.00	11.50	
FES S1	37.73	6.01	23.55	7.38	28.48	6.00	0.69	Pressurized	37.00	308.20	
MEADOWLARK INLET MP-1	7.45	4.21	18.00	4.24	18.00	4.24	0.00	Pressurized	7.50	17.80	
EX I-1 EX 18" RCP	5.77	3.26	7.76	3.98	9.03	3.27	0.75	Pressurized	2.90	126.70	

- A Froude number of 0 indicates that pressured flow occurs (adverse slope or undersized pipe).
 - If the sewer is not pressurized, full flow represents the maximum gravity flow in the sewer.
 - If the sewer is pressurized, full flow represents the pressurized flow conditions.
-

Sewer Sizing Summary:

			Existing		Calculated		Used			
Element Name	Peak Flow (cfs)	Cross Section	Rise	Span	Rise	Span	Rise	Span	Area (ft^2)	Comment
EX MH-1 EX 42" RCP	37.00	CIRCULAR	42.00 in	42.00 in	33.00 in	33.00 in	42.00 in	42.00 in	9.62	
MH-7 EX 30" RCP	37.00	CIRCULAR	30.00 in	30.00 in	33.00 in	33.00 in	30.00 in	30.00 in	4.91	
MH-6 S7	37.00	ELLIPSE	29.00 in	45.00 in	42.00 in	42.00 in	29.00 in	45.00 in	6.28	
DAP	12.70	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH-5 S6	37.00	ELLIPSE	29.00 in	45.00 in	42.00 in	42.00 in	29.00 in	45.00 in	6.28	
MH-4 S5	37.00	ELLIPSE	29.00 in	45.00 in	42.00 in	42.00 in	29.00 in	45.00 in	6.28	
MH-3 S4	37.00	ELLIPSE	29.00 in	45.00 in	42.00 in	42.00 in	29.00 in	45.00 in	6.28	
MH-2 S3	37.00	ELLIPSE	29.00 in	45.00 in	42.00 in	42.00 in	29.00 in	45.00 in	6.28	
DBP	6.90	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH-1 S2	37.00	ELLIPSE	29.00 in	45.00 in	42.00 in	42.00 in	29.00 in	45.00 in	6.28	
DCP	8.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
FES S1	37.00	ELLIPSE	29.00 in	45.00 in	42.00 in	42.00 in	29.00 in	45.00 in	6.28	
MEADOWLARK INLET MP-1	7.50	CIRCULAR	18.00 in	18.00 in	21.00 in	21.00 in	18.00 in	18.00 in	1.77	
EX I-1 EX 18" RCP	2.90	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	

- Calculated diameter was determined by sewer hydraulic capacity rounded up to the nearest commercially available size.
 - Sewer sizes should not decrease downstream.
 - All hydraulics were calculated using the 'Used' parameters.
-

Grade Line Summary:

Tailwater Elevation (ft): 5070.92

Element Name	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
	Downstream (ft)	Upstream (ft)	Bend Loss (ft)	Lateral Loss (ft)	Downstream (ft)	Upstream (ft)	Downstream (ft)	Friction Loss (ft)	Upstream (ft)
EX MH-1 EX 42" RCP	5067.42	5067.60	0.00	0.00	5070.92	5070.92	5071.15	0.01	5071.16
MH-7 EX 30" RCP	5067.94	5068.70	0.04	0.00	5070.96	5071.32	5071.32	0.88	5072.20
MH-6 S7	5068.76	5069.08	0.51	0.75	5072.92	5073.23	5073.46	0.30	5073.76
DAP	5070.60	5070.78	0.04	0.00	5073.27	5073.39	5074.07	0.13	5074.20
MH-5 S6	5069.07	5069.33	0.03	0.40	5073.66	5073.90	5074.20	0.25	5074.44
MH-4 S5	5069.38	5069.47	0.26	0.00	5074.17	5074.25	5074.71	0.09	5074.79
MH-3 S4	5069.49	5069.81	0.38	0.00	5074.64	5074.94	5075.18	0.31	5075.48
MH-2 S3	5069.85	5070.40	0.03	0.00	5074.98	5075.51	5075.52	0.53	5076.04
DBP	5071.00	5071.12	0.24	0.00	5076.04	5076.10	5076.28	0.06	5076.34
MH-1 S2	5070.44	5071.60	0.03	0.40	5075.94	5077.05	5076.48	1.12	5077.59
DCP	5072.20	5072.30	0.32	0.00	5077.59	5077.66	5077.91	0.07	5077.98
FES S1	5071.59	5072.51	0.03	0.40	5077.49	5078.38	5078.03	0.89	5078.91
MEADOWLARK INLET MP-1	5069.10	5069.19	0.37	0.00	5073.85	5073.94	5074.13	0.09	5074.22
EX I-1 EX 18" RCP	5067.86	5068.24	0.00	0.00	5071.12	5071.22	5071.16	0.10	5071.26

- Bend and Lateral losses only apply when there is an outgoing sewer. The system outfall, sewer #0, is not considered a sewer.
- Bend loss = $\text{Bend } K * V_{fi}^2 / (2 * g)$
- Lateral loss = $V_{fo}^2 / (2 * g) - \text{Junction Loss } K * V_{fi}^2 / (2 * g)$.
- Friction loss is always Upstream EGL - Downstream EGL.

Note:

A Peak Flow Rate of 37 cfs was chosen for the 100-YR flow through the trunkline outfall as this resulted in an HGL elevation of 5078.38 at the upstream flared end section. This elevation reflects the adjacent as-built top-of-curb elevation where flows overtop and enter Meadowlark Avenue at Design Point 20 (see preliminary Proposed Conditions Drainage Map, Exhibit B, located in the appendix of this report). All remaining flows that aren't anticipated to enter the trunkline outfall system will enter Meadowlark Ave. and be analyzed using allowable street capacities per Town of Berthoud Design and Construction Specifications, Section 602.4 (C).

APPENDIX D
Relevant Pages from other Drainage Studies

January 2002 / Revised October 2002

U.S. Highway 287 Berthoud Bypass Segment #2 Final Hydrology & Hydraulics Report

CDOT Project No. NH2873-114

Colorado Department of Transportation

Region 4 • 1420 Second Street • Greeley, Colorado • 80631

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Town
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FINAL DRAINAGE REPORT

GATEWAY PARK

BERTHOUD, COLORADO

Prepared By:

Drexel, Barrell & Co.

4840 Pearl East Circle, Suite 114

Boulder, Colorado 80301

(303) 442-4338

Prepared For:

Roche Constructors, Inc.

361 71st Avenue

Greeley, Colorado 80632

(970) 356-3611

Date Prepared: April 5, 2001

Revised May 26, 2001

Revised January 8, 2002

Project No. E5082.3

As can be seen in the CUHP Output Summary, located in Appendix B, Sub-Basin 42 has a 2-year historic peak flow of 9.7 cfs and a 100-year historic peak flow of 30.6 cfs. Similarly, Sub-Basin 43 has a 2-year historic peak flow of 8.6 cfs and a 100-year historic peak flow of 28.4 cfs. Once developed, the peak discharge from the West Pond will be 4.8 cfs and 25.4 cfs for 2-year and the 100-year storms respectively. Similarly, the peak discharge from the East Pond will be 5.8 cfs and 28.0 cfs for the 2-year and 100-year storms respectively. While the on-site detention ponds have the effect of reducing the peak flows from the developed site, the overall flows are slightly higher when offsite flows are considered. This phenomenon is due primarily to the coincidence of peak flows from offsite and developed sources. This condition was considered in the preliminary design phase with the recommendation to include the detention ponds in the final design even though it results in a higher peak discharge from on-site and off-site sources.

Off-site runoff from the west of the project (Sub-Basins 1 and 2) will be directed into a swale that will be designed to carry the runoff along the southern boundary to the southeast corner of the site. Similarly, off site runoff from the north (Sub-Basins 3, 15 and 16) will be directed into a swale that will begin at the approximate midpoint of the northern boundary line and flow east and south along the northern and eastern boundaries to the southeast corner of the site. Although this latter swale will not have the capacity to handle an emergency surge in excess of that generated during a 100-year storm event, the park area located at the center of this project will provide for a means of flood transmission through the development.

As discussed previously, runoff collected at the intersection of U.S. 287 and County Road 17 currently sheet flows to the southeast across the intersection. A significant portion of this project will be the elimination of this problem and will involve the installation of a 9'x4' box culvert beneath the intersection. The box culvert will terminate in a swale, designed as part of Berthoud Common Subdivision, that begins at the southeast corner of the intersection, flows to the south until reaching the south side of Welch Avenue, and then turns east, paralleling Welch Avenue. The design of this swale considered the eventuality of further upstream development and was sized to accommodate the flow rates suggested in the Bein SID Study. In addition, the swale lies within an easement that extends to U.S. 287 right-of-way, allowing it to be directly accessed from either the north or the northwest.

A subsurface irrigation pipe will be installed along the eastern property line of this project, replacing the existing open channel ditch owned by the Loveland Lake and Ditch Company. The integrity of this ditch will be maintained throughout the course of this project.

FINAL DRAINAGE REPORT
THE VILLAGE AT MATTHEWS FARMS
BERTHOUD, COLORADO

Prepared By:

Gorton Scott Engineering, LLC
3210 Billington Drive
Erie, Colorado 80516
(303) 438-5658

Prepared For:

M and K Investments of Berthoud, LLC
900 NCR 19
Berthoud, Colorado 80513
(970) 532-7741

Date Prepared: June 4, 2002
Revised: July 14, 2002

Town Copy

Basin EOS3 – Basin EOS3 constitutes a portion of the largely undeveloped area and a portion of Block 4. The runoff generated within this basin will sheet flow off of the site to the south, as it does currently.

Basin EOS4 – Basin EOS4 is located in the southeast corner of the site and includes a portion of an outlot that is adjacent to Block 4 and a small portion of the southern extreme of Meadowlark Drive. The runoff generated in this basin will be collected in the swale that flows to the south, along the west side of Meadowlark Drive.

All of the calculations used to determine runoff coefficients, times of concentration and peak runoff rates (2 year and 100 year frequencies) can be found in Appendix B of this report.

STORM WATER DETENTION

Although separated, the three detention facilities located in The Village at Matthews Farms (Ponds EA, EB, and EC) will work as one facility. Ponds EA and EB will be connected to Pond EC with the use of subsurface piping, that will allow storm water to flow back and forth between the ponds. The combining of the three ponds will yield the following characteristics (the calculations used to determine this information are located in Appendix B):

Basins Intercepted: Basins E1 through E14

2 year Storage Volume Required: 0.59 acre-feet

2 year Storage Volume Provided: 0.59 acre-feet

2 year Allowable Release Rate: 3.5 cfs (adjusted down to account for the un-detained Basins EOS1 through EOS4)

2 year Release Rate: 3.5 cfs (adjusted down to account for the un-detained Basins EOS1 through EOS4)

2 year Water Surface Elevation: 5073.85

100 year Storage Volume Required: 2.04 acre-feet

100 year Storage Volume Provided: 2.06 acre-feet

100 year Allowable Release Rate: 13.5 cfs (adjusted down to account for the un-detained Basins EOS1 through EOS4)

100 year Release Rate: 13.5 cfs (adjusted down to account for the un-detained Basins EOS1 through EOS4)

100 year Water Surface Elevation: 5075.80

Outlet Description: The 2 year release rate will be metered with the use of a low flow orifice that will be partially blocked with a horizontal steel plate. The 100 year release will be metered with the use of a weir. Both of these structures will be placed in the side of a Type C inlet. The inlet will discharge, via a culvert, to the aforementioned Meadowlark Drive swale. Since the downstream invert of the culvert is below the flow line elevation of the ditch, it will be necessary to widen and deepen the ditch all the way to the intersection of Meadowlark Drive and State Highway 56.

Developed Runoff Coefficients

Matthews Farms (East Side)

Berthoud, Colorado

Basin	Area "A" (acres)	Description	C	CA	I (%)	IA(%)
EOS1		Residential (See Note)	0.47	0.00	37%	0%
		Parks	0.25	0.00	5%	0%
	0.58	Unimproved Areas	0.20	0.12	2%	1%
		Asphalt - Concrete - Roofs	0.95	0.00	90%	0%
		Lawns, Sandy Soil 2-7%	0.15	0.00	0%	0%
	ΣCA =			0.12		
	ΣA =			0.58		
Weighted Runoff Coefficient (ΣCA/ΣA) =			0.20			
					ΣIA =	1%
					ΣA =	0.58
Weighted Imperviousness (ΣIA/ΣA) =					2%	
EOS2	0.77	Residential (See Note)	0.47	0.36	37%	28%
		Parks	0.25	0.00	5%	0%
	0.21	Unimproved Areas	0.20	0.04	2%	0%
	0.01	Asphalt - Concrete - Roofs	0.95	0.01	90%	1%
		Lawns, Sandy Soil 2-7%	0.15	0.00	0%	0%
	ΣCA =			0.41		
	ΣA =			0.99		
Weighted Runoff Coefficient (ΣCA/ΣA) =			0.42			
					ΣIA =	30%
					ΣA =	0.99
Weighted Imperviousness (ΣIA/ΣA) =					30%	
EOS3	0.77	Residential (See Note)	0.47	0.36	37%	28%
	0.01	Parks	0.25	0.00	5%	0%
	1.45	Unimproved Areas	0.20	0.29	2%	3%
	0.07	Asphalt - Concrete - Roofs	0.95	0.07	90%	6%
		Lawns, Sandy Soil 2-7%	0.15	0.00	0%	0%
	ΣCA =			0.72		
	ΣA =			2.30		
Weighted Runoff Coefficient (ΣCA/ΣA) =			0.31			
					ΣIA =	38%
					ΣA =	2.30
Weighted Imperviousness (ΣIA/ΣA) =					16%	
EOS4	0.01	Residential (See Note)	0.47	0.00	37%	0%
	0.08	Parks	0.25	0.02	5%	0%
		Unimproved Areas	0.20	0.00	2%	0%
	0.06	Asphalt - Concrete - Roofs	0.95	0.06	90%	5%
	0.02	Lawns, Sandy Soil 2-7%	0.15	0.00	0%	0%
	ΣCA =			0.08		
	ΣA =			0.17		
Weighted Runoff Coefficient (ΣCA/ΣA) =			0.50			
					ΣIA =	6%
					ΣA =	0.17
Weighted Imperviousness (ΣIA/ΣA) =					36%	

Time of Concentration

Matthews Farms (East Side)

Berthoud, Colorado

Basin Data			Initial / Overland Time t_i			Travel Time t_t				t_i+t_t	t_c Check (Urbanized Basins)		Result
Basin	Area (ac)	C	Length (ft)	Slope (%)	t_i	Length (ft)	Slope (%)	Vel (fps)	t_t (min)	t_c (min)	Total Length (ft)	$t_c = (L/180)+10$	t_c (min)
EH	31.22	0.20	500	0.6	44.6	1730	0.5	1.1	26.2	70.8	N/A	N/A	70.8
E1	3.19	0.28	130	0.8	18.8	641	0.6	1.2	8.9	27.7	771	14.3	14.3
E2	5.27	0.43	145	0.9	15.6	472	0.6	1.6	4.9	20.5	617	13.4	13.4
E3	1.21	0.32	119	0.8	17.1	359	0.6	1.6	3.7	20.8	478	12.7	12.7
E4	4.20	0.47	97	1.9	9.4	1018	0.5	1.5	11.3	20.7	1115	16.2	16.2
E5	0.80	0.49	88	1.0	10.7	112	0.5	1.5	1.2	11.9	200	11.1	11.1
E6	0.70	0.33	80	2.8	9.1	445	0.5	1.5	4.9	14.0	525	12.9	12.9
E7	0.58	0.63	84	2.9	5.6	210	0.8	1.8	1.9	7.5	294	11.6	7.5
E8	1.65	0.29	153	1.1	18.1	409	0.7	1.3	5.2	23.3	562	13.1	13.1
E9	0.98	0.47	87	2.0	8.7	387	0.5	1.5	4.3	13.0	474	12.6	12.6
E10	2.77	0.39	500	0.8	32.0	407	0.5	1.5	4.5	36.5	907	15.0	15.0
E11	0.41	0.28	59	25.0	4.0	100	0.5	1.5	1.1	5.1	159	10.9	5.1
E12	2.16	0.47	94	2.0	9.1	826	0.6	1.6	8.6	17.7	920	15.1	15.1
E13	2.25	0.49	98	2.0	9.0	725	0.6	1.6	7.6	16.6	823	14.6	14.6
E14	1.01	0.34	47	11.9	4.3	573	0.5	1.5	6.4	10.7	620	13.4	10.7
EOS1	0.58	0.20	66	1.0	13.7	0			0.0	13.7	66	10.4	10.4
EOS2	0.99	0.42	73	1.5	9.5	0			0.0	9.5	73	10.4	9.5
EOS3	2.30	0.31	181	0.9	20.6	288	0.5	1.1	4.4	25.0	469	12.6	12.6
EOS4	0.17	0.50	78	2.7	7.1	24	0.7	1.7	0.2	7.3	102	10.6	7.3

Notes: Overland Flow Times were calculated using the following equation: $1.87 \times (1.1 - C) \times D^{1/2} / S^{1/3}$

Travel Times velocities were obtained from Figure 3-2, Volume I, Urban Drainage and Flood Control District Storm Drainage Criteria Manual. The "Shallow Gutter Flow" curve was used for all basins except Basins EH, E1, E8 and EOS3, which utilized the "Grassed Waterway" curve.

Since Basin EH has been analyzed under historic conditions, the "Urbanized Check" was not used.

Runoff
Matthews Farms (East Side)
Berthoud, Colorado

Basin	Area (acres)	CC _r (C _r =1.00)	CC _r (C _r =1.25)	Tc (min)	I ₂ (in/hr)	I ₁₀₀ (in/hr)	Q ₂ (cfs)	Q ₁₀₀ (cfs)
EH	31.22	0.20	0.25	70.8	0.9	2.4	5.6	18.7
E1	3.19	0.28	0.35	14.3	2.4	6.2	2.1	6.9
E2	5.27	0.43	0.54	13.4	2.4	6.4	5.4	18.2
E3	1.21	0.32	0.40	12.7	2.5	6.6	1.0	3.2
E4	4.20	0.47	0.59	16.2	2.2	5.9	4.3	14.6
E5	0.80	0.49	0.61	11.1	2.6	6.9	1.0	3.4
E6	0.70	0.33	0.41	12.9	2.5	6.5	0.6	1.9
E7	0.58	0.63	0.79	7.5	3.0	8.2	1.1	3.8
E8	1.65	0.29	0.36	13.1	2.5	6.5	1.2	3.9
E9	0.98	0.47	0.59	12.6	2.5	6.6	1.2	3.8
E10	2.77	0.39	0.49	15.0	2.3	6.1	2.5	8.3
E11	0.41	0.28	0.35	5.1	3.3	9.3	0.4	1.3
E12	2.16	0.47	0.59	15.1	2.3	6.1	2.3	7.8
E13	2.25	0.49	0.61	14.6	2.3	6.2	2.5	8.5
E14	1.01	0.34	0.43	10.7	2.6	7.0	0.9	3.0
EOS1	0.58	0.20	0.25	10.4	2.7	7.0	0.3	1.0
EOS2	0.99	0.42	0.53	9.5	2.8	7.3	1.2	3.8
EOS3	2.30	0.31	0.39	12.6	2.5	6.6	1.8	5.9
EOS4	0.17	0.50	0.63	7.3	3.0	8.3	0.3	0.9

APPENDIX E

Exhibit A: Existing Conditions Drainage Plan
Exhibit B: Proposed Conditions Drainage Plan

From: [Tyson and Suzie Hull](#)
To: [Will Charles](#); [Tawn Hillenbrand](#); [Anne Johnson](#)
Subject: Westside Crossing Preliminary Plat comments
Date: Tuesday, August 15, 2023 9:51:59 AM

Good morning,

We own the property at 425 Meadowlark Drive and watched the Planning Commission hearing on August 10. We had similar concerns about the traffic and proximity to the stop light at 257 & 56. Having a letter or presentation from the traffic study engineers was suggested by the PC. I think this would be very helpful. In addition, it would be beneficial to have the traffic engineer that represents the Town of Berthoud at the hearing on August 22nd to explain what they have reviewed and if they have any other suggestions (ie: roundabout). It's definitely worth getting an explanation from the developer's engineer, but would be equally as helpful to hear from the Town's engineer to either agree or refute information in the study.

Thank you,
Suzanne and Tyson Hull
Hometown Liquors

BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	August 22, 2023
Agenda Title/Subject:	Tree Removals Town Park
Type of Item:	Regular Item
Purpose:	Board Information
Presented by:	Administration

ATTACHMENTS: None

BACKGROUND:

The Town Park Renovation project is underway and in order to construct the project, a handful of the trees in the park were identified to be removed. Per the project design, those specific trees (two honey locusts, one hackberry) are a row of three growing in the overflow parking area and another tree inside the current park where a large pavilion has been designed for the future.

About three weeks ago, a windstorm came through Town Park causing damage and revealing hazardous conditions to several of the long-standing Cottonwoods. Lots of debris and large, heavy limbs fell from those trees during that storm exposing risk as staff walked the property to clean up after the storm. After most large storms, staff assess trees in town as well as conditions to remove any hazardous limbs or trees before they cause injury to a person or damage Town property.

Staff background: Paul Furnas, our Town Forester is an International Society of Arboriculture (ISA) certified arborist, and he has additional qualifications in tree risk assessment from ISA. This additional certification trains arborists on how to identify, quantify, and communicate risks that trees pose to people and property. Arborists and Foresters are educated on identifying factors that affect trees' overall health and stability, consequences of inadequate tree structure, considering 'targets' the tree poses a risk to, and probabilities of failure.

Staff's assessment of the cottonwoods in the park: witnessed visible rotting, potential bacterial/fungal infections, and multiple failures of large branches over the last two years. With Cottonwood trees known to be weak wooded trees, the presence of decay extending into the heartwood of the tree indicates the integrity of the branches is compromised even further. It is impossible to know the extent of the rot within the tree, without a more advanced tree assessment. Rot infiltrates heartwood through large wounds that are too big to properly heal. On the three Cottonwood trees, there are multiple large wounds in branches in the canopy that heartwood cannot be seen anymore, indicating the pocket of rot has started to proceed into the branch. Dark ooze visible from the wounds, along with other symptoms and signs, indicate the trees have an infection called Bacterial Wetwood. Bacterial Wetwood alters the strength properties of the wood and kills meristematic tissue that accounts for tree growth and response to diseases and stress. As with most tree diseases, no effective methods exist to eliminate the disease.

As cottonwoods die large branches tend to break off and become hazardous. These branches are typically quite large and heavy creating a very dangerous situation for anything underneath its crown. Cottonwoods are known to have a shallow root system, rot, and soft brittle bark which makes them potentially dangerous as they age. These cottonwoods are estimated to be between 50-100 years old.

Staff's recommendation: Is to remove the three cottonwood trees in the park after assessing their condition for the safety of the community that visits the park.

As part of developing and constructing the park project, we will be planting 65 + new trees in the park to grow along with the 45 current and established shade trees in the park.

FISCAL IMPACT AND FUND SOURCE:

Removals will be an expense rolled into the current park project contract.

COMMUNITY TOUCHSTONES:

Berthoud's **Community Identity** is it is a great place to visit, live, and recreate. Removing risk and hazard from our parks and being proactive in providing a safe environment for our parkgoers makes everyone enjoy the park offerings without the worry about what could happen should a large tree limb fall on in the park.

RECOMMENDED ACTION(S):

Information and discussion on this item. Staff will be asking for Trustee direction regarding the removal of the described trees in Town Park.

BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	August 22, 2023
Agenda Title/Subject:	Discussion to Set Mosquito Control Policy Special Meeting
Type of Item:	Regular Item
Purpose:	To follow-up on the Board's recent decision to suspend adulticide applications for vector control until a new policy could be formed
Presented by:	Chris Kirk

BACKGROUND:

As the Board will recall, in August 2022 the Board voted to formally suspend the 2017 Mosquito Control Policy and to replace it with a practice of holding a special meeting of the Town Board whenever the Town's Vector Index reached .75 for two consecutive weeks. Test data from July 4, 2023, and July 11, 2023, indicated that the Town's Vector Index was over .75 for two consecutive weeks and a special meeting was held July 18, 2023, to consider the application of mosquito adulticide via truck spraying throughout Town. On July 18, 2023, a majority of the Trustees present voted to apply adulticide via truck spraying.

Following the July 18 meeting, staff worked with Vector Disease Control International (VDCI) to schedule the adulticide application. On July 25, 2023, Town Staff included an item on the agenda outlining the spray plan for adulticide application beginning on the night of July 28, 2023. At the same meeting, a majority of the Trustees present voted to suspend the spray application scheduled for July 28 until a new mosquito control policy could be established.

As a follow-up to that meeting, staff circulated a short list of questions to gather feedback from the Trustees about what might be helpful in developing this new policy. The written responses received to that list of questions is attached to this memo.

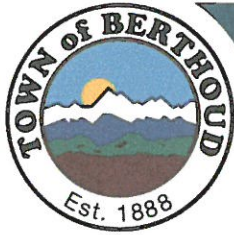
At the August 22, 2023 meeting, staff suggests that the Board finalize a date for a special meeting to discuss the mosquito spray policy. Staff suggests that date be August 29, 2023.

In advance of scheduling a special meeting, staff is also including documents and meeting video links from previous Board meetings related to the same issue. These are provided for historical context and for research information for the Trustees. These documents and videos are as follows:

- Board Information Memo from July 24, 2018. Representatives from the City of Boulder and Larimer County Department of Public Health and Environment (LCDPHE) presented at this meeting.
- Video Link from July 24, 2018: <https://berthoudco.swagit.com/play/07262018-1095>
- Board Information Memo from August 30, 2022
- Video Link from August 30, 2022: <https://www.youtube.com/watch?v=BXx-5JOv64A&t=10652s>
- Board Information Memo from July 18, 2023. Representatives from LCDPHE and Colorado State University presented at this meeting.
- Video Link from July 18, 2023: https://www.youtube.com/watch?v=AP_ZnWVkpFs
- Board Information Memo from July 25, 2023.

RECOMMENDED ACTION(S):

Direct staff to schedule a special meeting of the Town Board on August 29, 2023 to discuss the formation of a new mosquito control policy



Approved: _____

Date: _____

**TOWN ADMINISTRATOR
CHRISTOPHER KIRK**

TOWN BOARD OF TRUSTEES INFORMATION SHEET

MEETING DATE: JULY 24, 2018

ITEM: TOWN OF BERTHOUD PEST MANAGEMENT POLICY

COMMENTS:

At meeting of the Board of Trustees held June 5, 2018, the Board directed staff to suspend any adult mosquito control practices until the Board could review the current policy. Since that time, the Town's pest management contractor, Vector Disease Control International, has continued to conduct larvicide operations in an effort to reduce the number of mosquito larva that emerge as adults.

In preparation of this discussion, a copy of the adopted resolution and mosquito control policy is attached to this memo. Additionally, information regarding previous discussions as contained in the minutes of prior Board meetings can be found on the Town's website at www.berthoud.org. Upon visiting the website, the minutes of these meetings can be found under the "Government" tab by following the link entitled Trustee Document Archive. Minutes of the meetings held on the following dates relate to prior discussions regarding the Town's current policy.

March 14, 2017

March 28, 2017

May 16, 2017

June 13, 2017

In addition to the written summaries of the discussions that are contained in the minutes, the video recordings of those meetings can also be viewed on the website under the Government tab by following the link entitled "Trustee Meeting Videos" and then following a second link on the left side of the page entitled "Archived Trustee Meeting Videos". There is no video recording available of the meeting held May 16, 2017.

For other information about the Town's mosquito spraying policy, links to test data, and links to information about West Nile Virus and mosquito spraying provided by other agencies, visit the Town's website, click on the "Residents" tab, and then follow the link entitled "West Nile and Mosquito Information".

In addition to the historical information regarding the current policy a representative from Larimer County Public Health Department is expected to attend the July 24 Board meeting to answer questions about Larimer County's pest management programs and approach. A representative from the City of Boulder will also be in attendance to share information about Boulder's pest management program.

For information purposes, the Town's Vector Index threshold of 0.5 has not been exceeded as of June 19, 2018 and as such, no mosquito spraying would have been conducted in 2018 pursuant to the adopted policy.

OPTIONS:

DIRECT STAFF TO EXECUTE THE PEST MANAGEMENT PLANS AND POLICIES PREVIOUSLY ADOPTED

or

DIRECT STAFF TO MODIFY THE PEST MANAGEMENT PLANS AND POLICIES PREVIOUSLY ADOPTED

**TOWN OF BERTHOUD
RESOLUTION NO. 6-17b**

**A RESOLUTION OF THE TOWN OF BERTHOUD, COLORADO
ESTABLISHING A POLICY FOR MOSQUITO CONTROL SPRAYING**

WHEREAS the Town of Berthoud is surrounded by agricultural lands and wetland areas which are prone to develop substantial mosquito populations in certain years and seasons; and

WHEREAS vector borne diseases from mosquitoes are a significant public health concern, as is environmental and ecological damage from excessive or unnecessary pesticide application; and

WHEREAS, the Larimer County Health Department regularly conducts evaluations of the intensity and types of mosquito infestations, including a determination of populations likely to carry West Nile virus and other diseases, and provides recommendations as to whether active spraying is warranted; and

WHEREAS, the Town of Berthoud will now maintain its own traps and evaluation data in addition to the data from the county; and

WHEREAS, Town staff has requested a fixed policy to determine when to rely on larval and bacterial control programs regularly employed by the Town and when to engage a contractor for active spraying

WHEREAS, The Town of Berthoud is committed to continuing our motto as "The Garden Spot of Colorado,"

NOW THEREFORE BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE TOWN OF BERTHOUD, COLORADO AS FOLLOWS:

1. The attached 'Emergency Adult Mosquito Control Policy Statement' is hereby adopted as the official policy of the Town for determining when adult mosquito control shall be implemented as a matter of public health and safety;
2. Town staff shall be responsible to promote the communications standards set out in the attached Policy; and
3. Town staff shall implement active mosquito control measures (spraying) only as set forth in the attached 'Emergency Adult Mosquito Control Policy Statement'.

PASSED, ADOPTED AND APPROVED THIS 13th day of June, 2017.

TOWN OF BERTHOUD

BY: _____

Steve Mulvihill, Mayor

ATTEST:

Acting Town Clerk



EMERGENCY ADULT MOSQUITO CONTROL POLICY STATEMENT

1. In order to effectively combat West Nile virus through the season, the Town has contracted to conduct a mosquito surveillance program and sets traps weekly within the Town of Berthoud to monitor changes in the mosquito population over time and to evaluate effective management of its larvicide program. (The Town of Berthoud is also conducting a comprehensive larvae control program to kill mosquito larvae before they emerge from breeding areas. The contract is to apply a biological larvicide to breeding sites per the attached map. The larvicide is a natural non-toxic biological product that affects only mosquitoes and is not harmful to fish and animals).

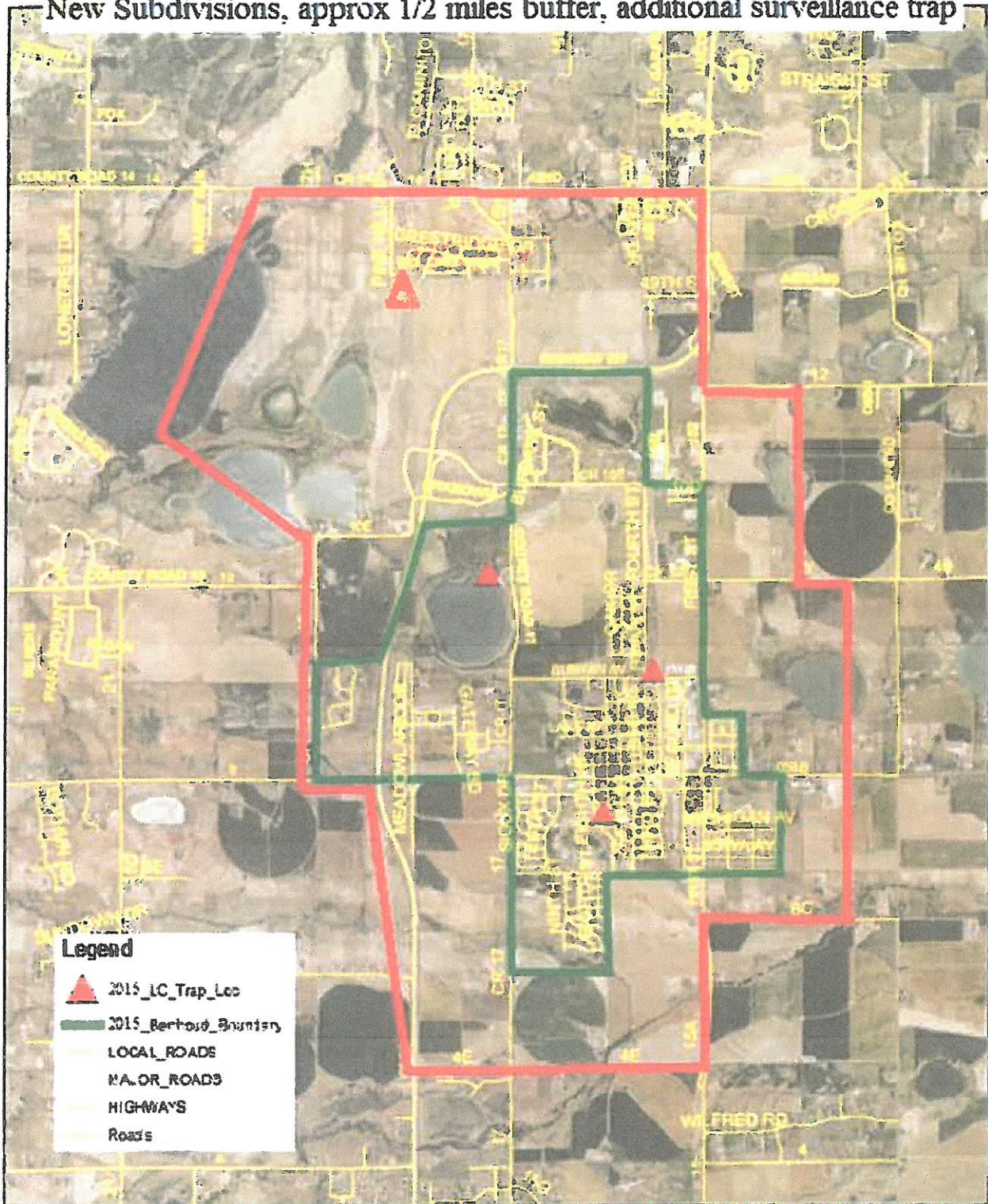
2. At any time that any mosquito-borne disease becomes a real or imminent public health threat, adult mosquito control measures for adult insects will become a priority issue for the Town of Berthoud. A real or imminent public health threat will be established by a Vector Index (VI) of .5 or higher which is calculated for the Town from data obtained as an average of the Town's trap network, per the attached map. Such data shall be published on a weekly basis on the Town web site.

3. The Vector Index (VI), which measures the level of West Nile Virus (WNV) infected mosquitoes in an area, is accepted as the best available predictor of human risk from that disease. The VI is a number calculated by combining measures of the abundance of Culex mosquitoes (the species which carries WNV) and the rate of infection in those mosquitoes. Published investigations of large WNV outbreaks have shown that once a vector index is over 0.5, the risk of human infection increases substantially. The Larimer County Department of Health has adopted the 0.5 VI as the threshold indicator of a health risk to the community.

4. Upon notice of a Vector Index of .5 or higher, as an average of the Town trap network, adult control measures will be implemented town-wide on two consecutive evenings on or after 10 PM (weather permitting) and spray exclusion zones will not be recognized. Such adult control measures shall occur at the direction of the Town staff without further Board action. Notice to residents of the intended application date will be made via the Town website, VDCI website, press release, and social media updates. Community members may also sign up to receive email alerts from VDCI. The Town of Berthoud will give a minimum of 48 hours' notice through these channels before commencing spray operations. The Town of Berthoud will implement all recognized means to reduce the adult mosquito population within the area where disease transmission to humans is a concern. In 2017, the Town has contracted with Colorado State University to test Town traps and provide a weekly data report which will include the Vector Index for the Town. The Town will generally receive those reports on a Monday, meaning that adult control events may occur as early as Wednesday or Thursday of the same week.

Expansion Option 2

New Subdivisions, approx 1/2 miles buffer, additional surveillance trap



Berthoud Mosquito Control Program

0 0.35 0.7 1.4 Miles



This map is the property of
Colorado Mosquito Control, LLC



BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	August 30, 2022
Agenda Title/Subject:	Mosquito Control Policy
Type of Item:	Regular Item
Purpose:	Discuss the Town's adopted Mosquito Control Policy and Vector Control Practices
Presented by:	Town Board and Staff with support from Larimer County Public Health Department

ATTACHMENTS:

- Resolution No. 6-17b (the Town's currently adopted policy)

BACKGROUND:

On August 19, 2022, Town staff initiated adult mosquito control practices utilizing EPA-approved pesticides applied by the Town's vector control contractor, Vector Disease Control International (VDCI). The decision to spray was made based upon the Town's adopted Mosquito Control Policy (attached) and at the recommendation of the Larimer County Public Health Department. In accordance with the Town's policy, spraying is to occur when the Vector Index in Berthoud rises above 0.5.

Vector Index (VI) is a measure of the average number of mosquitos infected with West Nile Virus (WNV) per trap in a given area. The VI indicates the relative risk of West Nile Transmission and a VI over 1.0 is considered to be very high. Spraying is targeted in the areas surrounding the traps where mosquitos infected with WNV were found.

The spray operation conducted on August 19 was the first time in approximately 6 years that the Town has had to implement adult mosquito control measures. As a result, the decision to spray received varied responses including both significant concern and support. At the August 23, 2022, Town Board meeting, the Board requested more information about the Town's vector control practices and to hold a special meeting to consider the appropriateness of the current Policy.

UPDATE/NEXT STEPS:

This special meeting is an opportunity to review the current policy and determine any appropriate next steps.

RECOMMENDED ACTION(S):

Provide direction to Town Staff

**TOWN OF BERTHOUD
RESOLUTION NO. 6-17b**

**A RESOLUTION OF THE TOWN OF BERTHOUD, COLORADO
ESTABLISHING A POLICY FOR MOSQUITO CONTROL SPRAYING**

WHEREAS the Town of Berthoud is surrounded by agricultural lands and wetland areas which are prone to develop substantial mosquito populations in certain years and seasons; and

WHEREAS vector borne diseases from mosquitoes are a significant public health concern, as is environmental and ecological damage from excessive or unnecessary pesticide application; and

WHEREAS, the Larimer County Health Department regularly conducts evaluations of the intensity and types of mosquito infestations, including a determination of populations likely to carry West Nile virus and other diseases, and provides recommendations as to whether active spraying is warranted; and

WHEREAS, the Town of Berthoud will now maintain its own traps and evaluation data in addition to the data from the county; and

WHEREAS, Town staff has requested a fixed policy to determine when to rely on larval and bacterial control programs regularly employed by the Town and when to engage a contractor for active spraying

WHEREAS, The Town of Berthoud is committed to continuing our motto as "The Garden Spot of Colorado,"

**NOW THEREFORE BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE TOWN
OF BERTHOUD, COLORADO AS FOLLOWS:**

1. The attached 'Emergency Adult Mosquito Control Policy Statement' is hereby adopted as the official policy of the Town for determining when adult mosquito control shall be implemented as a matter of public health and safety;
2. Town staff shall be responsible to promote the communications standards set out in the attached Policy; and
3. Town staff shall implement active mosquito control measures (spraying) only as set forth in the attached 'Emergency Adult Mosquito Control Policy Statement'.

PASSED, ADOPTED AND APPROVED THIS 13th day of June, 2017.

TOWN OF BERTHOUD

BY: _____

Steve Mulvihill, Mayor

ATTEST:

Acting Town Clerk



EMERGENCY ADULT MOSQUITO CONTROL POLICY STATEMENT

1. In order to effectively combat West Nile virus through the season, the Town has contracted to conduct a mosquito surveillance program and sets traps weekly within the Town of Berthoud to monitor changes in the mosquito population over time and to evaluate effective management of its larvicide program. (The Town of Berthoud is also conducting a comprehensive larvae control program to kill mosquito larvae before they emerge from breeding areas. The contract is to apply a biological larvicide to breeding sites per the attached map. The larvicide is a natural non-toxic biological product that affects only mosquitoes and is not harmful to fish and animals).

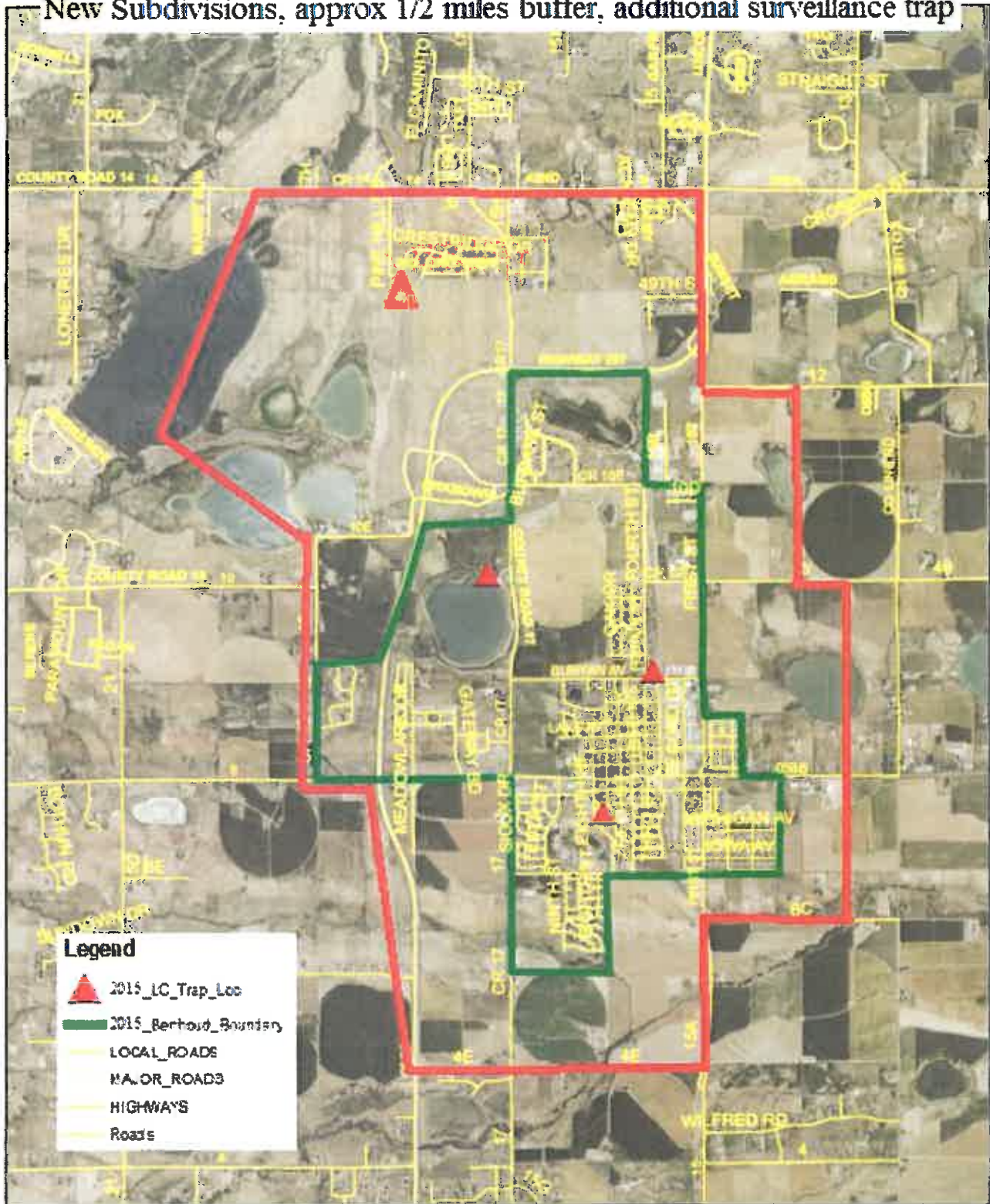
2. At any time that any mosquito-borne disease becomes a real or imminent public health threat, adult mosquito control measures for adult insects will become a priority issue for the Town of Berthoud. A real or imminent public health threat will be established by a Vector Index (VI) of .5 or higher which is calculated for the Town from data obtained as an average of the Town's trap network, per the attached map. Such data shall be published on a weekly basis on the Town web site.

3. The Vector Index (VI), which measures the level of West Nile Virus (WNV) infected mosquitoes in an area, is accepted as the best available predictor of human risk from that disease. The VI is a number calculated by combining measures of the abundance of Culex mosquitoes (the species which carries WNV) and the rate of infection in those mosquitoes. Published investigations of large WNV outbreaks have shown that once a vector index is over 0.5, the risk of human infection increases substantially. The Larimer County Department of Health has adopted the 0.5 VI as the threshold indicator of a health risk to the community.

4. Upon notice of a Vector Index of .5 or higher, as an average of the Town trap network, adult control measures will be implemented town-wide on two consecutive evenings on or after 10 PM (weather permitting) and spray exclusion zones will not be recognized. Such adult control measures shall occur at the direction of the Town staff without further Board action. Notice to residents of the intended application date will be made via the Town website, VDCI website, press release, and social media updates. Community members may also sign up to receive email alerts from VDCI. The Town of Berthoud will give a minimum of 48 hours' notice through these channels before commencing spray operations. The Town of Berthoud will implement all recognized means to reduce the adult mosquito population within the area where disease transmission to humans is a concern. In 2017, the Town has contracted with Colorado State University to test Town traps and provide a weekly data report which will include the Vector Index for the Town. The Town will generally receive those reports on a Monday, meaning that adult control events may occur as early as Wednesday or Thursday of the same week.

Expansion Option 2

New Subdivisions, approx 1/2 miles buffer, additional surveillance trap



Berthoud Mosquito Control Program

0 0.35 0.7 1.4 Miles



This map is the property of
Colorado Mosquito Control, LLC



BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	July 18, 2023
Agenda Title/Subject:	Mosquito Spray Policy
Type of Item:	Regular Item
Purpose:	To consider application of mosquito adulticide (spray) per the Town's previously adopted policy
Presented by:	Chris Kirk

ATTACHMENTS:

- Map Berthoud Mosquito Test Trap Locations
- Test Report Week 27 (Trap Date – July 4, 2023)
- Test Report Week 28 (Trap Date – July 11, 2023)
- Week 27 Data Input (Berthoud Only)
- Week 28 Data Input (Berthoud Only)
- Board Meeting Minutes - August 30, 2022

BACKGROUND:

As the Board is aware, the Town of Berthoud works with Larimer County, Colorado State University, and Vector Disease Control International (VDCI), to trap mosquitos and to test those mosquitos for the prevalence of West Nile Virus (WNV). According to the Center for Disease Control (CDC), WNV is the leading cause of mosquito borne illnesses in the U.S. There are currently no vaccines for WNV and no medications to treat WNV in people. About 1 in 5 people who are infected develop a fever and other symptoms. About 1 out of 150 infected people develop a serious, sometimes fatal, illness. (<https://www.cdc.gov/westnile/index.html>)

The Town's current approach to reducing the overall number of mosquitos is to utilize larvicide to kill mosquito larvae in areas of standing water as commonly used treatments before mosquitos get airborne. This is done under contract with VDCI. In August 2022, the Town Board voted to approve a general policy outlining the Town's approach to using adulticide, which is typically applied by a spray rig attached to a truck. Truck spraying of adulticide is intended to reduce the number of adult airborne mosquitos that could possibly spread WNV.

More specifically, the Town's adopted policy from August 2022 directs staff not to spray adulticide unless the vector index exceeds .75 for two consecutive weeks of testing, and only after being addressed by a special public meeting of the Town Board, called by Town Staff on whether to spray based on the current factors and conditions around current testing. For information, Vector Index is an estimate of the abundance of infected

mosquitos in an area based on WNV infections rates in individual species of mosquitos.

Based upon test data received from the Colorado State laboratory analyzing mosquito traps collected on July 4 and July 11, 2023, the Vector Index was 1.229 and 3.029 respectively. As such, Town Staff have called for a special meeting on July 18, 2023, for the Board to consider utilizing truck spraying of adulticide, per the adopted policy.

UPDATE/NEXT STEPS:

Should the Board vote to not to apply adulticide, Town Staff will continue to apply larvicide treatments per the Town's regular management procedures.

Should the Board vote to apply adulticide via truck spraying, Town Staff will work with VDCI to schedule said spray application and will use all available communication outlets to notify the Town residents of the same.

RECOMMENDED ACTION(S):

VOTE TO DIRECT STAFF TO CONTINUE LARVICIDE PROGRAM ONLY

OR

VOTE TO DIRECT STAFF TO APPLY ADULTICIDE VIA TRUCK SPRAYING AFTER A MINIMUM OF 24 HOURS NOTICE TO TOWN RESIDENTS VIA AVAILABLE COMMUNICATION OUTLETS



MEETING MINUTES OF THE TOWN BOARD

**Town Board Room
807 Mountain Avenue
Town of Berthoud, Colorado
Tuesday, July 18, 2023, 6:30 p.m.**

7/18/2023 - Minutes

1. Meeting Called To Order - Mayor William Karspeck

Mayor Karspeck called the meeting to order at 6:38 pm.

2. Pledge Of Allegiance - Mayor William Karspeck

Mayor Karspeck led the pledge of allegiance.

3. Roll Call - Mayor William Karspeck

The following Board members were present:

Tim Hardy, Trustee

Jeff Butler, Trustee

Will Karspeck, Mayor

Mike Grace, Mayor Pro-Tem

Sean Murphy, Trustee

The following Board members were absent:

May Albrecht, Trustee

Karl Ayers, Trustee

The following Staff members were present:

Chris Kirk, Town Administrator

Christian Samora, Town Clerk

Lexi Weissman, Deputy Town Clerk

4. Mosquito Spray Policy

Town Administrator, Chris Kirk, gave an introduction.

Kim Meyer-Lee gave an overview of how the vector index is calculated.

Tom Gonzales with Larimer County, Chris Manley, Gregory Ebel, and Erika Cathey answered Board member questions.

Mayor Karspeck opened the meeting up to Public Comment.

Richard Rupp, Sheena Chand and Brian Laak spoke during public participation.

Mayor Karspeck closed Public Comment.

Administrator Kirk referenced a letter from citizen Jeff Hindman.

Trustee Murphy moved to apply aduicide via truck after 24 hour notice. Mayor Karspeck seconded the motion. In a 2-3 roll call vote, THE MOTION FAILED.

Mayor Pro-Tem moved to apply aduicide via truck after 24 hour notice if vector index results read higher than 0.75, spraying to occur Monday evening or as soon as possible thereafter. Trustee Butler seconded the motion. In a 3-2 roll call vote, THE MOTION CARRIED.

5. Adjourn

The meeting was adjourned at 8:25 pm.

Town Clerk or Deputy Town Clerk

William Karspeck, Mayor

BOARD OF TRUSTEES INFORMATION



ADMINISTRATION DEPARTMENT

Meeting Date:	July 25, 2023
Agenda Title/Subject:	Mosquito Spray Plan for July 28-29
Type of Item:	Consent Agenda
Purpose:	To inform the board and the public of the mosquito adulticide application scheduled for July 28-29
Presented by:	Chris Kirk

ATTACHMENTS:

- Test Report Week 29 (Trap Date – July 19, 2023)

BACKGROUND:

As the Board is aware, the Vector Index (VI) for Berthoud, as tested by the Colorado State Laboratory, has been over .75 for multiple consecutive weeks. At the last meeting of the Town Board held July 18, 2023, the Board directed Staff to apply mosquito adulticide via truck spraying on July 24, if the VI remained over .75 when test results were received on July 24. Based on the test results received on July 24, the VI for Berthoud was 2.282.

After the July 18 meeting, staff contacted Vector Disease Control International (VDCI) with the goal of scheduling a spray to occur on Monday, July 24, should the VI continue above .75. Unfortunately, given the high abundance of mosquitos in the region and growing West Nile Virus concerns, VDCI has already made commitments to other jurisdictions and the earliest that the Town of Berthoud could be scheduled to be sprayed was July 28.

Staff has scheduled an application of adulticide, via truck spraying, for the Town limits of the Town of Berthoud beginning in the late evening hours of Friday, July 28. Public information will begin to be distributed on Wednesday, July 26 through print, online, and other communications outlets. Staff has already given direction to VDCI to remain on the public streets and not to enter public or private alleyways.

RECOMMENDED ACTION(S):

RECEIVE UPDATE AS PART OF CONSENT AGENDA



Adult Trap Data - Detail

Start Date: 07/18/2023 End Date: 07/19/2023

Berthoud

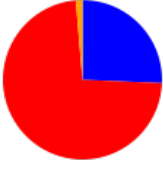
Trap #		Date	Species	Count	Percent		
LC-001	CDC Light Trap	Larimer	Berthoud Park				
		07/18/2023	<i>Aedes dorsalis</i>	16	1.7%		- Aedes-Oc - Anopheles - Culex - Culiseta - Other
		07/18/2023	<i>Aedes vexans</i>	256	28.0%		
		07/18/2023	<i>Culex pipiens</i>	3	0.3%		
		07/18/2023	<i>Culex tarsalis</i>	640	69.9%		
			Total	915			

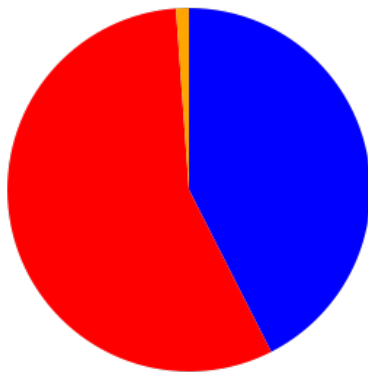
LC-049	CDC Light Trap	Larimer	Berthoud North				
		07/18/2023	<i>Aedes dorsalis</i>	44	19.1%		- Aedes-Oc - Anopheles - Culex - Culiseta - Other
		07/18/2023	<i>Aedes melanimon</i>	13	5.7%		
		07/18/2023	<i>Aedes vexans</i>	50	21.7%		
		07/18/2023	<i>Culex tarsalis</i>	122	53.0%		
		07/18/2023	<i>Culiseta inornata</i>	1	0.4%		
			Total	230			

LC-053	CDC Light Trap	Larimer	Berthoud West				
		07/18/2023	<i>Aedes dorsalis</i>	80	2.6%		- Aedes-Oc - Anopheles - Culex - Culiseta - Other
		07/18/2023	<i>Aedes increpitus</i>	64	2.1%		
		07/18/2023	<i>Aedes melanimon</i>	192	6.4%		
		07/18/2023	<i>Aedes vexans</i>	1,072	35.5%		
		07/18/2023	<i>Culex pipiens</i>	28	0.9%		
		07/18/2023	<i>Culex tarsalis</i>	1,568	51.9%		
		07/18/2023	<i>Culiseta inornata</i>	16	0.5%		
			Total	3,020			

LC-054	CDC Light Trap	Larimer	Berthoud Point				
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Trap #	Date	Species	Count	Percent	 - Aedes-Oc - Anopheles - Culex - Culiseta - Other
	07/18/2023	<i>Aedes dorsalis</i>	80	4.6%	
	07/18/2023	<i>Aedes melanimon</i>	16	0.9%	
	07/18/2023	<i>Aedes vexans</i>	832	47.7%	
	07/18/2023	<i>Culex tarsalis</i>	768	44.0%	
	07/18/2023	<i>Culiseta inornata</i>	48	2.8%	
		Total	1,744		

WC-055	CDC Light Trap	Weld	Berthoud East			
		07/18/2023	<i>Aedes dorsalis</i>	228	19.0%	 - Aedes-Oc - Anopheles - Culex - Culiseta - Other
		07/18/2023	<i>Aedes melanimon</i>	12	1.0%	
		07/18/2023	<i>Aedes vexans</i>	68	5.7%	
		07/18/2023	<i>Culex tarsalis</i>	876	73.0%	
		07/18/2023	<i>Culiseta inornata</i>	16	1.3%	
			Total	1,200		



		TOTAL	%
	<i>Aedes-Oc</i>	3,023	42.5%
	<i>Anopheles</i>	0	0.0%
	<i>Culex</i>	4,005	56.3%
	<i>Culiseta</i>	81	1.1%
	<i>Other</i>	0	0.0%

D. Reporting templates

Based on the need to now report data not only for FC citywide but also separately for each of the four zones (NW, NE, SE, SW; broken down using College and Drake) the city has been divided into for the purpose of WNV surveillance and mosquito control, CSU had to generate a new reporting template. This new reporting template is tailored to provide data relevant to the Level III and IV entomological triggers (see below) for control measures in the “City of Fort Collins Program Response Guidelines to Mosquito Borne Arboviral Activity (July 2008 edition)”.

Level III

- Vector index > 0.5 and increasing
- *Culex* mosquito populations increasing and at or above historical average for that time period
- Mosquito infection rates of > 3.0 per thousand (0.3%) and increasing

Level IV

- Vector index > 0.75.
- *Culex* mosquito population above historical average for that time period
- Sustained mosquito infection rates of > 5.0 per thousand (0.5%)

The new reporting format comprises a set of 6 tables to address the current week (1a, 2a, 3a) and to provide seasonal and historical context (1b, 2b, 3b) (see full table formats on following pages)

- Table 1a. Vector Index for current week
- Table 1b. Vector Index for All *Culex* by week from June-August
- Table 2a. Vector abundance for current week
- Table 2b. Vector abundance for All *Culex* by week from June-August
- Table 3a. WNV infection rate per 1,000 females for current week
- Table 3b. WNV infection rate per 1,000 females for All *Culex* by week from June-August

Table 1a. Vector Index for current week

Week: 29	Mean abundance of females per trap night ¹		Estimate for proportion of females infected with WNV ²		Vector Index		
	<i>Cx. pipiens</i>	<i>Cx. tarsalis</i>	<i>Cx. pipiens</i>	<i>Cx. tarsalis</i>	<i>Cx. pipiens</i> ³	<i>Cx. tarsalis</i> ⁴	All <i>Culex</i> ⁵
FC – Zone NW	13.11	215.22	0.0128	0.0010	0.168	0.224	0.392
FC – Zone NE	26.50	446.90	0.0082	0.0023	0.216	1.027	1.243
FC – Zone SE	8.93	451.60	0.0194	0.0015	0.173	0.688	0.862
FC – Zone SW	19.67	266.44	0.0049	0.0026	0.096	0.696	0.792
FC – Citywide	16.14	362.28	0.0117	0.0019	0.189	0.673	0.862
LV	16.1	695.2	0.0000	0.0011	0.000	0.772	0.772
BE	6.2	794.8	0.0000	0.0029	0.000	2.282	2.282
BC	8.2	40.8	0.0000	0.0156	0.000	0.636	0.636

¹From Table 2a (CDC light trap catches only).

²Derived from the data presented in Table 3a for estimated infection rate per 1,000 females (CDC light trap and gravid trap catches combined).

³Vector Index for *Cx. pipiens* = (Mean abundance of *Cx. pipiens* females per trap night) x (Estimate for proportion of all *Cx. pipiens* females infected with WNV).

⁴Vector Index for *Cx. tarsalis* = (Mean abundance of *Cx. tarsalis* females per trap night) x (Estimate for proportion of all *Cx. tarsalis* females infected with WNV).

⁵Vector Index for All *Culex* = (Vector Index for *Cx. pipiens*) + (Vector Index for *Cx. tarsalis*).

Table 1b. Vector Index for All *Culex* by week from June-August

Week	FC – Zone NW		FC – Zone NE		FC – Zone SE		FC – Zone SW		FC – Citywide		LV	BE	BC
	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹			
23	0.00	0.01	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	N/A
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
25	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.01	0.07	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.00
27	0.00	0.00	0.00	0.02	0.27	0.01	0.00	0.00	0.09	0.01	0.24	1.23	0.00
28	0.09	0.00	0.10	0.03	0.73	0.10	0.27	0.01	0.36	0.04	0.23	3.03	0.00
29	0.39	0.08	1.24	0.09	0.86	0.24	0.79	0.03	0.86	0.12	0.77	2.28	0.64
30		0.08		0.14		0.26		0.07		0.15			
31		0.14		0.17		0.23		0.08		0.18			
32		0.16		0.26		0.32		0.14		0.23			
33		0.14		0.41		0.26		0.10		0.24			
34		0.13		0.20		0.28		0.07		0.19			
35		0.06		0.19		0.25		0.11		0.17			
36		0.03		0.08		0.05		0.02		0.05			
37		0.03		0.11		0.03		0.00		0.04			

¹ The historical average for Week 23 is calculated from 2006-2014 data. The historical average for Week 24 uses 2006-2020 historical data. The historical average for Week 25-35 uses 2006-2022 historical data. Week 36 historical average is calculated from 2015-2022 data (2015 is the first year to have surveillance data collected into weeks 36 & 37). Week 37 historical average is calculated from 2015-2016 and 2018-2019 data. 2003-2005 surveillance data were excluded due to changes in trap locations from 2006 onwards.

Table 2a. Vector abundance for current week (CDC light trap catches only)

Week: 29	Total number females collected			Number CDC light trap nights	Mean abundance of females per CDC light trap night		
	Cx. <i>pipiens</i>	Cx. <i>tarsalis</i>	All <i>Culex</i>		Cx. <i>pipiens</i> ¹	Cx. <i>tarsalis</i> ²	All <i>Culex</i> ³
FC – Zone NW	118	1937	2055	9	13.11	215.22	228.33
FC – Zone NE	265	4469	4734	10	26.50	446.90	473.40
FC – Zone SE	134	6774	6908	15	8.93	451.60	460.53
FC – Zone SW	177	2398	2575	9	19.67	266.44	286.11
FC – Citywide	694	15578	16272	43	16.14	362.28	378.42
LV	596	25723	26319	37	16.11	695.22	711.32
BE	31	3974	4005	5	6.20	794.80	801.00
BC	49	245	294	6	8.17	40.83	49.00

¹Mean abundance of Cx. *pipiens* females per CDC light trap night = (Total number Cx. *pipiens* females collected) / (Number CDC light trap nights).

²Mean abundance of Cx. *tarsalis* females per CDC light trap night = (Total number Cx. *tarsalis* females collected) / (Number CDC light trap nights).

³Mean abundance of All *Culex* females per CDC light trap night = (Total number All *Culex* females collected) / (Number CDC light trap nights).

Table 2b. Vector abundance for All *Culex* by week from June-August

Week	FC – Zone NW		FC – Zone NE		FC – Zone SE		FC – Zone SW		FC – Citywide		LV	BE	BC
	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹			
23	6.11	2.81	1.00	5.48	5.67	8.04	7.11	0.78	4.98	5.67	8.57	12.80	N/A
24	4.33	2.90	2.70	7.22	9.00	9.00	6.56	1.83	6.05	5.80	11.65	11.60	N/A
25	18.00	6.07	14.70	17.18	29.20	21.45	7.00	3.95	18.84	13.49	41.51	98.00	6.32
26	126.67	12.78	128.50	30.90	222.87	33.19	96.56	8.07	154.35	23.08	237.59	848.80	45.00
27	28.56	26.20	204.30	59.47	361.27	46.37	25.89	11.86	184.93	39.49	392.95	712.40	49.00
28	169.78	41.14	128.30	85.39	439.00	87.64	265.00	17.70	273.98	62.95	196.65	1056.00	49.00
29	228.33	47.89	473.40	86.69	460.53	74.04	286.11	22.52	378.42	61.74	711.3	801.00	49.00
30		47.92		107.84		80.94		22.16		68.37			
31		55.08		96.93		63.68		19.93		63.02			
32		39.85		78.44		52.73		20.69		49.71			
33		28.80		68.09		42.43		14.21		40.70			
34		21.58		53.67		27.74		10.35		29.68			
35		10.83		27.34		17.94		6.39		16.36			
36		11.18		36.44		13.82		4.94		16.63			
37		8.13		34.33		11.08		3.12		14.29			

¹ The historical average for Week 23 is calculated from 2006-2014 data. The historical average for Week 24 uses 2006-2020 historical data. The historical average for Week 25-35 uses 2006-2022 historical data. Week 36 historical average is calculated from 2015-2022 data (2015 is the first year to have surveillance data collected into weeks 36 & 37). Week 37 historical average is calculated from 2015-2016 and 2018-2019 data. 2003-2005 surveillance data were excluded due to changes in trap locations from 2006 onwards

Table 3a. WNV infection rate per 1,000 females for current week (CDC light trap and gravid trap catches combined)

Week: 29	Total number individuals examined			Total number pools examined			Total number WNV-infected pools			Estimate for WNV infection rate per 1,000 females ¹		
	Cx. <i>pipiens</i>	Cx. <i>tarsalis</i>	All <i>Culex</i>	Cx. <i>pipiens</i>	Cx. <i>tarsalis</i>	All <i>Culex</i>	Cx. <i>pipiens</i>	Cx. <i>tarsalis</i>	All <i>Culex</i>	Cx. <i>pipiens</i>	Cx. <i>tarsalis</i>	All <i>Culex</i>
FC – Zone NW	485	1941	2426	16	45	61	5	2	7	12.82	1.04	3.04
FC – Zone NE	395	4575	4970	15	97	112	3	10	13	8.17	2.30	2.77
FC – Zone SE	238	6785	7023	13	143	156	4	10	14	19.39	1.52	2.07
FC – Zone SW	193	2398	2591	9	52	61	1	6	7	4.88	2.61	2.82
FC – Citywide	1311	15699	17010	53	337	390	13	28	41	11.71	1.86	2.54
LV	20	900	920	2	18	20	0	1	1	0.00	1.11	1.09
BE	31	722	753	2	15	17	0	2	2	0.00	2.87	2.75
BC	49	245	294	1	5	6	0	3	3	0.00	15.58	12.40

¹Maximum likelihood estimate (MLE) for WNV infection rate per 1,000 females calculated using the CDC PooledInfRate 4.0 plug-in for Excel.

Table 3b. WNV infection rate per 1,000 females for All *Culex* by week from June-August

Week	FC – Zone NW		FC – Zone NE		FC – Zone SE		FC – Zone SW		FC – Citywide		LV	BE	BC
	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹			
23	0.00	0.00	0.00	0.00	0.00	1.60	0.00	0.00	0.00	0.52	0.00	0.00	N/A
24	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00	0.00	0.33	0.00	0.00	N/A
25	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
26	0.00	0.00	0.00	0.06	0.29	0.28	0.00	0.28	0.15	0.17	0.00	0.00	0.00
27	0.00	0.00	0.00	0.14	0.74	0.28	0.00	0.00	0.50	0.20	0.60	2.83	0.00
28	0.64	0.00	0.74	0.42	1.69	0.76	1.23	0.59	1.36	0.51	1.18	2.73	0.00
29	3.04	1.37	2.77	0.86	2.07	2.10	2.82	0.84	2.54	1.38	1.09	2.75	12.40
30		1.97		1.62		3.47		2.06		2.40			
31		2.94		1.82		4.77		3.38		3.28			
32		4.31		4.54		6.86		9.22		5.23			
33		6.40		6.51		9.37		6.67		7.50			
34		7.89		4.05		10.38		9.88		7.39			
35		9.39		5.81		14.70		35.98		10.13			
36		6.94		1.98		3.55		6.45		2.76			
37		3.53		3.04		3.56		0.00		3.97			

¹ The historical average for Week 23 is calculated from 2006-2014 data. The historical average for Week 24 uses 2006-2020 historical data. The historical average for Week 25-35 uses 2006-2022 historical data. Week 36 historical average is calculated from 2015-2022 data (2015 is the first year to have surveillance data collected into weeks 36 & 37). Week 37 historical average is calculated from 2015-2016 and 2018-2019 data. 2003-2005 surveillance data were excluded due to changes in trap locations from 2006 onwards.

GRAPH 1A

Week: 29	Mean abundance of females per trap night ¹		Estimate for proportion of females infected with WNV ²		Vector Index		
	<i>Cx. pipiens</i>	<i>Cx. tarsalis</i>	<i>Cx. pipiens</i> ³	<i>Cx. tarsalis</i> ⁴	<i>Cx. pipiens</i> ³	<i>Cx. tarsalis</i> ⁴	All <i>Culex</i> ⁵
FC – Zone NW	13.11	215.22	0.0128	0.0010	0.168	0.224	0.392
FC – Zone NE	26.50	446.90	0.0082	0.0023	0.216	1.027	1.243
FC – Zone SE	8.93	451.60	0.0194	0.0015	0.173	0.688	0.862
FC – Zone SW	19.67	266.44	0.0049	0.0026	0.096	0.696	0.792
FC – Citywide	16.14	362.28	0.0117	0.0019	0.189	0.673	0.862
LV	16.1	695.2	0.0000	0.0011	0.000	0.772	0.772
BE	6.2	794.8	0.0000	0.0029	0.000	2.282	2.282
BC	8.2	40.8	0.0000	0.0156	0.000	0.636	0.636

Graph 1B

Week	FC – Zone NW		FC – Zone NE		FC – Zone SE		FC – Zone SW		FC – Citywide		LV	BE	BC
	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹			
23	0.00	0.01	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	N/A
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A
25	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.01	0.07	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.00
27	0.00	0.00	0.00	0.02	0.27	0.01	0.00	0.00	0.09	0.01	0.24	1.23	0.00
28	0.09	0.00	0.10	0.03	0.73	0.10	0.27	0.01	0.36	0.04	0.23	3.03	0.00
29	0.39	0.08	1.24	0.09	0.86	0.24	0.79	0.03	0.86	0.12	0.77	2.28	0.64
30		0.08		0.14		0.26		0.07		0.15			
31		0.14		0.17		0.23		0.08		0.18			
32		0.16		0.26		0.32		0.14		0.23			
33		0.14		0.41		0.26		0.10		0.24			
34		0.13		0.20		0.28		0.07		0.19			
35		0.06		0.19		0.25		0.11		0.17			
36		0.03		0.08		0.05		0.02		0.05			
37		0.03		0.11		0.03		0.00		0.04			

Graph 2a

Week: 29	Total number females collected			Number CDC light trap nights	Mean abundance of females per CDC light trap night		
	<i>Cx. pipiens</i>	<i>Cx. tarsalis</i>	All <i>Culex</i>		<i>Cx. pipiens</i> ¹	<i>Cx. tarsalis</i> ²	All <i>Culex</i> ³
FC – Zone NW	118	1937	2055	9	13.11	215.22	228.33
FC – Zone NE	265	4469	4734	10	26.50	446.90	473.40
FC – Zone SE	134	6774	6908	15	8.93	451.60	460.53
FC – Zone SW	177	2398	2575	9	19.67	266.44	286.11
FC – Citywide	694	15578	16272	43	16.14	362.28	378.42
LV	596	25723	26319	37	16.11	695.22	711.32
BE	31	3974	4005	5	6.20	794.80	801.00
BC	49	245	294	6	8.17	40.83	49.00

Graph 2b

Week	FC – Zone NW		FC – Zone NE		FC – Zone SE		FC – Zone SW		FC – Citywide		LV	BE	BC
	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹			
23	6.11	2.81	1.00	5.48	5.67	8.04	7.11	0.78	4.98	5.67	8.57	12.80	N/A
24	4.33	2.90	2.70	7.22	9.00	9.00	6.56	1.83	6.05	5.80	11.65	11.60	N/A
25	18.00	6.07	14.70	17.18	29.20	21.45	7.00	3.95	18.84	13.49	41.51	98.00	6.32
26	126.67	12.78	128.50	30.90	222.87	33.19	96.56	8.07	154.35	23.08	237.59	848.80	45.00
27	28.56	26.20	204.30	59.47	361.27	46.37	25.89	11.86	184.93	39.49	392.95	712.40	49.00
28	169.78	41.14	128.30	85.39	439.00	87.64	265.00	17.70	273.98	62.95	196.65	1056.00	49.00
29	228.33	47.89	473.40	86.69	460.53	74.04	286.11	22.52	378.42	61.74	711.32	801.00	49.00
30		47.92		107.84		80.94		22.16		68.37			
31		55.08		96.93		63.68		19.93		63.02			
32		39.85		78.44		52.73		20.69		49.71			
33		28.80		68.09		42.43		14.21		40.70			
34		21.58		53.67		27.74		10.35		29.68			
35		10.83		27.34		17.94		6.39		16.36			
36		11.18		36.44		13.82		4.94		16.63			
37		8.13		34.33		11.08		3.12		14.29			

Graph 3a

Week: 29	Total number individuals examined			Total number pools examined			Total number WNV-infected pools			Estimate for WNV infection rate per 1,000 females ¹		
	<i>Cx. pipiens</i>	<i>Cx. tarsalis</i>	All <i>Culex</i>	<i>Cx. pipiens</i>	<i>Cx. tarsalis</i>	All <i>Culex</i>	<i>Cx. pipiens</i>	<i>Cx. tarsalis</i>	All <i>Culex</i>	<i>Cx. pipiens</i>	<i>Cx. tarsalis</i>	All <i>Culex</i>

FC – Zone NW	485	1941	2426	16	45	61	5	2	7	12.82	1.04	3.04
FC – Zone NE	395	4575	4970	15	97	112	3	10	13	8.17	2.30	2.77
FC – Zone SE	238	6785	7023	13	143	156	4	10	14	19.39	1.52	2.07
FC – Zone SW	193	2398	2591	9	52	61	1	6	7	4.88	2.61	2.82
FC – Citywide	1311	15699	17010	53	337	390	13	28	41	11.71	1.86	2.54
LV	20	900	920	2	18	20	0	1	1	0.00	1.11	1.09
BE	31	722	753	2	15	17	0	2	2	0.00	2.87	2.75
BC	49	245	294	1	5	6	0	3	3	0.00	15.58	12.40

Graph 3b

Week	FC – Zone NW		FC – Zone NE		FC – Zone SE		FC – Zone SW		FC – Citywide		LV	BE	BC
	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹	Current year	Historical average ¹			
23	0.00	0.00	0.00	0.00	0.00	1.60	0.00	0.00	0.00	0.52	0.00	0.00	N/A
24	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00	0.00	0.33	0.00	0.00	N/A
25	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
26	0.00	0.00	0.00	0.06	0.29	0.28	0.00	0.28	0.15	0.17	0.00	0.00	0.00
27	0.00	0.00	0.00	0.14	0.74	0.28	0.00	0.00	0.50	0.20	0.60	2.83	0.00
28	0.64	0.00	0.74	0.42	1.69	0.76	1.23	0.59	1.36	0.51	1.18	2.73	0.00
29	3.04	1.37	2.77	0.86	2.07	2.10	2.82	0.84	2.54	1.38	1.09	2.75	12.40
30		1.97		1.62		3.47		2.06		2.40			
31		2.94		1.82		4.77		3.38		3.28			
32		4.31		4.54		6.86		9.22		5.23			
33		6.40		6.51		9.37		6.67		7.50			
34		7.89		4.05		10.38		9.88		7.39			
35		9.39		5.81		14.70		35.98		10.13			
36		6.94		1.98		3.55		6.45		2.76			
37		3.53		3.04		3.56		0.00		3.97			



MEETING MINUTES OF THE TOWN BOARD

**Town Board Room
807 Mountain Avenue
Town of Berthoud, Colorado
Tuesday, July 25, 2023, 6:30 p.m.**

7/25/2023 - Minutes

1. Meeting Called To Order - Mayor William Karspeck

Mayor Karspeck called the meeting to order at 6:30 P.M.

2. Pledge Of Allegiance - Mayor William Karspeck

Mayor Karspeck led the Pledge of Allegiance.

3. Roll Call - Mayor William Karspeck

The following Board Members were present:

Will Karspeck, Mayor
Mike Grace, Mayor Pro-Tem
Tim Hardy, Trustee
May Albrecht, Trustee
Jeff Butler, Trustee

The following Board Members were absent:

Sean Murphy, Trustee
Karl Ayers, Trustee

The following staff members were present:

Chris Kirk, Town Administrator
Christian Samora, Town Clerk
Tawn Hillenbrand, Planner

4. Citizen Participation

Linda Wilson of Berthoud spoke regarding artwork at a storage facility and property maintenance.

5. Scheduled Items And Estimated Time For Discussion

5.1. Consent Agenda

Mayor Pro-Tem Grace moved to combine and approve the items on the Consent Agenda, except for item "f" and item "g". Trustee Albrecht seconded the motion. In a 5-0 roll call vote, THE MOTION CARRIED.

f. Sidewalk Cost Share Update

Trustee Hardy moved to approve the Sidewalk Cost Share Update. Trustee Albrecht seconded the motion. In a 5-0 roll call vote, THE MOTION CARRIED.

g. Mosquito Spray Plan for July 28-29

Trustee Albrecht moved to suspend mosquito spraying. Trustee Hardy seconded the motion. In a 3-2 roll call vote, THE MOTION CARRIED. Mayor Karspeck and Trustee Butler had the dissenting votes.

5.II. Ludlow Annexation Substantial Compliance

Hillenbrand gave an introduction and provided background information.

Mayor Pro-Tem Grace moved to approve Resolution 2023-16, a resolution regarding a petition for annexation filed by Ludlow Farms, LLC and setting the matter for a public hearing. Trustee Hardy seconded the motion. In a 5-0 roll call vote, THE MOTION CARRIED.

5.III. I-25 Interchange Improvements Project

Kirk gave an introduction and provided background information.

Mayor Pro-Tem Grace moved to award the I-25 Roundabout Improvements Project to Integrated Site Solutions in the amount of \$1,356,670 and authorize the Town Administrator to authorize any necessary change orders and direct the Town Administrator to include this expense in the 2023 mid-year budget update to increase total budgeted funds to \$1,745,000. Trustee Albrecht seconded the motion. In a 5-0 roll call vote, THE MOTION CARRIED.

5.IV. Business Licensing - Public Hearing

Samora gave an introduction and provided background information.

Mayor Karspeck opened the Public Hearing.

There was not any testimony.

Mayor Karspeck closed the Public Hearing

Trustee Albrecht moved to approve Ordinance 1320, an ordinance of the Town of Berthoud to repeal Local Sales Tax License requirement and require general licensing of businesses. Trustee Hardy seconded the motion. In a 5-0 roll call vote, THE MOTION CARRIED.

6. Elected Official Reports

Trustee Albrecht Reported:

Albrecht asked about the replacement of the welcome signage on 287. Kirk indicated that the replacement of the sign is a current project and is in progress.

Trustee Hardy Reported:

Hardy provided an update regarding Berthoud Mainstreet. Hardy asked about the timing at the Hwy 287/Hwy 56 intersection. Kirk indicated that staff can reach out to CDOT regarding the timing and the placement of an arrow on the pole.

Trustee Butler Reported:

Butler requested efforts to enhance the appearance of the entry corridors into Berthoud.

Butler indicated that he had sent a resignation notification to the Board and that it would be his last meeting. Butler stated that he would be relocating to Loveland and would no longer be able to serve on the Town Board.

Mayor Pro-Tem Grace Reported:

Grace is working with the Youth Advisory Commission, who will be presenting an update and follow up to the Board regarding Scorch Fest. Grace asked about the steel plate on 10E near Berthoud Parkway. Kirk indicated that the contractor has had delays and that the repair should be completed soon.

Mayor Karspeck Reported:

Karspeck referenced the upcoming MPO deadline. Karspeck asked for clarification regarding how the Board would fill the vacancy created by the resignation of Trustee Butler. Samora explained that statute requires the governing body to fill the vacancy within 60 day of such vacancy occurring. The vacancy will exist on August 1st, and the Board will have 60 days from that date to fill the vacancy. If not filled, there would need to be an election to fill the vacancy.

7. Executive Session

Trustee Butler moved to enter into Executive Session C.R.S. § 24-6-402(4)(e)(I) to determine positions relative to matters that may be subject to negotiations, developing a strategy for negotiations, and instructing negotiators. And the following details are provided: Potential Water Purchase. Mayor Pro-Tem Grace seconded the motion. In a 5-0 roll call vote, THE MOTION CARRIED.

8. Adjourn

The Meeting adjourned at 8:40 P.M.

	What are your most important questions that you feel like you still need answers to, as it relates to developing a new policy?	What would you say is your number one priority in developing a new mosquito control policy?	What is the biggest flaw you've seen in our current policy/practices?	What do you think is working in our current policy/practices?	How much community involvement do you think there should be in developing the policy and in what ways?	Who are the public or private entities/individuals you believe would be important to have involved in the conversation?	Are there any other counties or municipalities you are aware of that we should study or consider modeling a policy after?
Trustee Grace	Are there any recent statistics or studies that correlate spraying for mosquitos and a reduction in WNV infections?	One that gives us timely information that will allow us to act with effect	Its design was to put the board was in more control to handle this situation, but it seems to have become a point of contention regarding week old numbers. Likewise, a week-long delay in report puts ANY policy of being too slow to intervene either direction. The flaw is the inconsistency of when we know about the problem and when an action can be taken.	It does force a conversation and willingness to understand the effects of spraying, so it's less likely to be "rubber stamped". More often than not, this "lets wait and see" has ended up being beneficial as the mosquito count has naturally declined over time.	I think community feedback and sentiment should be heard, but without a true public poll we won't be able to fairly honor EVERY perspective (from never spray to weekly spraying).	None that we haven't already heard from	I'd like to know what our neighbors (similar in size and commercial/industrial/Agricultural mix) have in terms of spraying rules
Trustee Hardy	I don't believe I have any questions on how to develop a new policy. Just one that holds well and also with future boards who may fall into the pressures of Tom Gonzales and spraying. We need to set a clear message as to why we set the policy so going forward there is no question as to why we developed the policy.	I don't feel we need to develop a new policy. I believe it did exactly as it was written to do. meaning we have a board meeting to discuss why the vector index is where it is at. take into considerations the extra amount of rain we have had, are there extra bodies of water not being treated with larvicide due to all the excess rain etc. these all play a role in why the numbers would increase and decrease as quickly as they have.	The biggest flaw in the current policy is the misunderstanding as to what it is and what it was meant to do. some thought it would trigger an automatic spraying, while others understood it was to create a meeting to discuss the why and why not we should spray. If trustees and staff do not want to have this discussion when levels are high, then maybe we should just adopt a flat out no spray policy.	Our current policy worked just as it was written. it began a discussion to determine why our numbers are so high. if this had been any other summer, we probably would not have had any special meetings to discuss based on previous data. we have just had an unusual amount of moisture.	I do not believe community involvement would be needed because they have not had the extensive conversations with the LC health dept, VDCI and other experts as we have. even some of our own board members have missed this conversations. Most in the community I believe think we should be spraying due to the nuisance of mosquitos and don't view our spraying policy as a health decision, but rather a convenience or nuisance control. I also felt that when the town sprays, it creates a false sense of security that they should not protect themselves with bug spray, wearing appropriate clothing, remove/report standing water etc.	I believe other experts who work with even more experts should be present. one local expert in my opinion would be Beth Conrey. she is part of an organization called PPAN. she could bring appropriate information and maybe other experts to the table.	Boulder, Co; Sherman, TX; Roundrock, TX; Others...
Trustee Murphy	None aside from how the majority of the board would like to proceed.	I thought we had a decent policy in 2017. It found consensus with the prior board and followed the science. I saw that it had room for improvement on communication and implementation. I would like to see a policy that automatically triggers adulticide application when scientifically backed thresholds are crossed and would be administered by the Town Administrator without board involvement. I believe further communication and mitigation measures could be added as time goes by. I have attached my full policy proposal that amends the 2017 policy and also proposes supplemental measures.	The current policy fails to communicate the board's intentions or reasoning. It wastes everyone's time having the same discussions and arguments. Residents are unable to plan for an application. It neglects our responsibilities to work with and protect public health. With delayed action, it minimizes the effect of any applications that do happen while contributing to mosquito resistance to the adulticide applied.	I do believe staff has done an excellent job communicating to the public. Testing, larvicide, education, and other preliminary measures are effective. I believe the current adulticide policy fails by every metric.	I believe we have heard sufficient public comment on the issue.	I'm satisfied with what I have heard in the discussions over the past two years. Larimer County Health has been a great asset in these discussions. Any entomologists from CSU could be beneficial on the education side.	I appreciate Fort Collins' policy, particularly in their communication efforts.
Trustee Ayers		More intensive/widespread larvicide; creating habitat for mosquito predators in public & private property.	(This is not a comment on you or town staff) Following reactive instead of proactive protocols, i.e., not spraying alleys, et al.	More proactive education and notification: alerting citizens about rising numbers; reminding people to dump standing water and to self protect.	This is a tough one in that the most vocal supporters of each side are the minority and they are the ones to comment. However, I think getting informed comments from members of the public and more outreach would be helpful.	Toxicologists, entomologists, public officials that have had successful programs of not spraying. Anyone who has long-term information about the benefits/negatives of spraying.	I think Boulder's opinion might be useful. If possible, I think communities further abroad: Georgia/Florida, Africa, Europe – anywhere that has mosquito borne illnesses that are in check (or not).