



## TOWN OF FREDERICK

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# Potable Water Infrastructure Master Plan

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FEBRUARY 2024

**FORSGREN**  
*Associates Inc.*

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## ACRONYMS

AF, AC-FT	acre-feet
AFY	acre-feet per year
ALT	alternative
AVG	average
C-BT	Colorado-Big Thompson
CCF	hundred cubic feet
CDPHE	Colorado Department of Public Health and Environment
CFS	cubic feet per second
CIP	Capital Improvements Plan
CR	County Road
CWCB	Colorado Water Conservation Board
CWCWD	Central Weld County Water District
EDU	equivalent dwelling unit
FT-MSL	feet, mean sea level
GAL	gallons
GPCD	gallons per capita per day
GPD	gallons per day
GPM	gallons per minute
HP	horsepower
KGAL	one thousand gallons
LHWD	Left Hand Water District
LTWRP	Long-Term Water Resources Plan
MG	million gallons
MGD	million gallons per day
PS	Pump Station
PSI	pounds per square inch
SFE	single family equivalent
SH	State Highway
WEP	Water Efficiency Plan
WTP	water treatment plant

## EXECUTIVE SUMMARY

Frederick has experienced significant growth in recent years. With more commercial and residential development on the horizon, it is crucial to review the Town’s potable water system and thoughtfully plan its continued upgrade and expansion, ensuring reliable water delivery to both current and future Town customers.

Consistent with Frederick’s goals for Strategic, Reliable & Sustainable Infrastructure, this Potable Water Infrastructure Master Plan:

1. Outlines a vision for the “build-out” water system to aid in Town development reviews.
2. Provides recommendations consistent with guidance included in previously completed Town water plans.
3. Documents a Capital Improvements Plan to improve reliability and sustainability for the water system.

### Potable Water System

Frederick’s potable water service area is east of Interstate 25 as shown in Figure 1. The Left Hand Water District serves Frederick citizens west of the interstate. The Central Weld County Water District (CWCWD) furnishes potable water to Frederick through master meters located throughout the service area. CWCWD is responsible for water quality up to the master meters, which are the beginning points of Frederick’s system. Frederick’s future service area includes undeveloped areas within Town limits, and properties within the Town’s planning boundaries, which extend east to County Road 19 and south to State Highway 52 as shown in Figure 1.

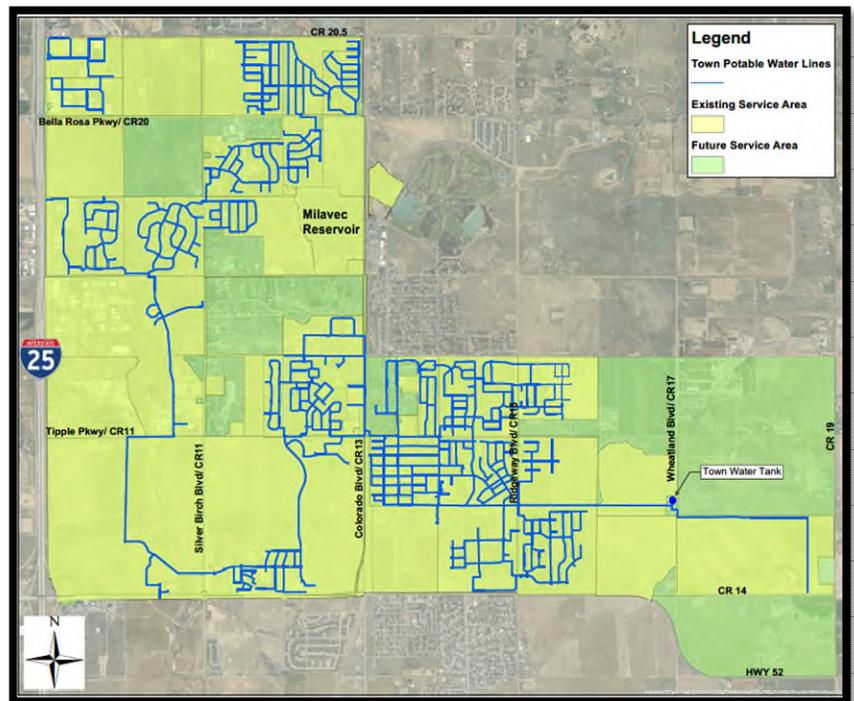


Figure 1 - Frederick Potable Water System & Service Area

The Town’s system includes over 70 miles of waterlines, and one storage tank on Wheatland Boulevard (CR 17) with a volume of 2.8 million gallons (MG). Treatment is provided by

CWCWD at the Carter Lake Filter Plant located west of Berthoud. CWCWD’s system also includes storage available for Frederick’s use.

**Infrastructure Condition Assessment**

This Master Plan includes an assessment of existing infrastructure. According to the Public Works and Engineering Departments, the system has no known history of chronic water main breaks or leaks. Most of the waterlines are PVC pipes installed in 1990 or later. Based on the estimated life of PVC pipe, most of the Town’s waterlines should last another 65 years. The 2.8-MG welded steel tank at Wheatland Boulevard was constructed in 1974, and a recent inspection reported minor wear with no major repairs needed. At nearly 50 years old, the tank could remain functional for another 20 years or more, provided the Town continues with preventative maintenance and repairs based on inspections conducted at least every five years.



**Public Engagement for Master Plan**

Town citizens were given opportunities for in-person and online surveys to offer input on the important topics and strategies they want to be addressed in the Master Plan. A summary of the public input and how the Master Plan addresses each topic is provided in Table 1 below.

**Table 1  
Public Input Summary**

Topic	How Topic is Addressed in Master Plan
Drinking Water Quality	Provide additional loops in distribution system.
Affordability of drinking water	Recommend only improvements that are necessary and cost effective. Identify potential grant funding sources.
Water Conservation	Perform a condition assessment of existing pipes to identify water leak issues. Convert irrigation of parks from potable to non-potable water.
Back-up Water Supply	Consider emergency interconnections with neighboring systems and additional storage.

**Projected Water Demands**

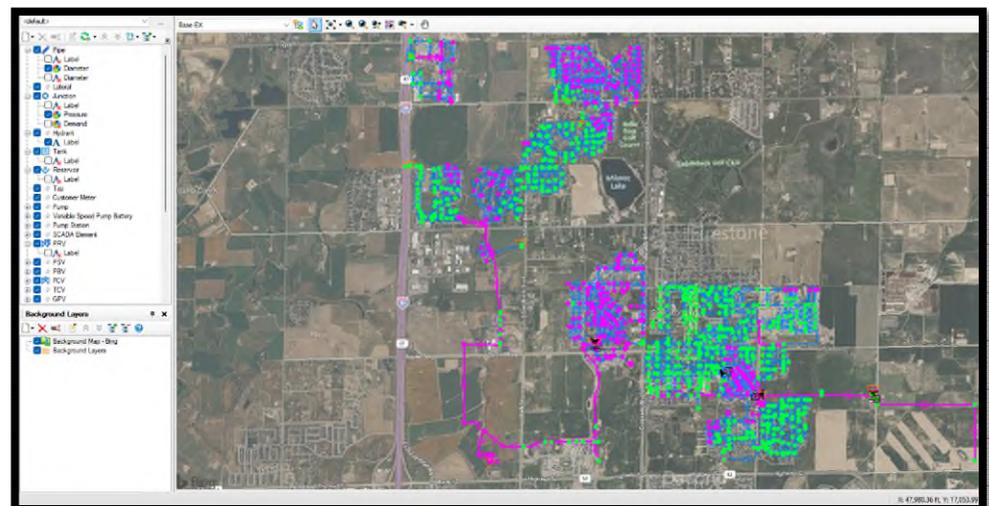
Build-out water demands (shown in Table 2) are projected for the entire Town planning area using Frederick’s Land Use Code, Land Use and Zoning Plans, and dwelling unit estimates for some properties furnished by the Planning Department. The Town’s Long-Term Water Supply Plan estimates that build-out will occur between 2060 and 2070, with population in the potable water service area increasing from approximately 12,000 to 42,400 people. The Town’s 25/52 East Subarea Plan was utilized to estimate water demands for a strategically planned multi-use development at the Frederick interchange. CWCWD requires an additional treatment and delivery water overage of 12% be included in water supply calculations, in addition to the Town’s non-revenue water losses which is estimated at 5%. Also included in Table 2 projections is the water conservation strategy to convert parks from potable to non-potable water irrigation as recommended in the Town’s Water Efficiency Plan.

**Table 2**  
**Projected Average Daily Water Demand for Build-out**

Year	Metered Demand (mgd)	Non-revenue water (mgd)	Treatment & Delivery Overage (mgd)	Total Avg Potable Water Supplied (mgd)
2022	1.84	0.09	0.23	2.16
2023	1.89	0.09	0.24	2.22
2033	2.30	0.11	0.29	2.70
2043	2.94	0.15	0.37	3.46
2053	3.77	0.19	0.47	4.43
2063	4.82	0.24	0.61	5.67
2070	5.72	0.29	0.72	6.72

**Hydraulic Model**

A hydraulic model was developed as an efficient method to size and locate infrastructure to serve the entire future service area. The model can be updated, as development or Town zoning designations change,



to confirm water infrastructure is planned and designed to accommodate other future development.

**Long-Term Capital Improvements**

Major infrastructure recommended for build-out of the Town planning boundaries includes:

1. Water loops to improve water quality and fire protection system capacity.
2. A network of transmission mains to convey water to future development, including from a potential future water treatment plant near Milavec Reservoir.
3. An additional storage tank to provide back-up storage.
4. Emergency interconnections with Left Hand Water District and the Town of Firestone.
5. A booster pump station near the existing tank at Wheatland Boulevard (CR 17) to serve future development in the eastern planning area.

To minimize financial burden to existing Town customers, improvements needed for specific future development are recommended to be funded by the developers. For a conceptual layout of recommended infrastructure, please refer to Exhibit 1, Long-Term Capital Improvements, attached to this Executive Summary.

**10-Year Capital Improvements Plan**

In collaboration with Engineering Department staff, the highest priority projects were incorporated into a recommended 10-Year Capital Improvements Plan (CIP). Table 3 below provides preliminary budget costs, estimated timing and goals for the priority projects. The budget estimates for the five projects in the 10-year CIP total nearly \$20 million. Exhibit 2, Short-Term Capital Improvements, attached to this Executive Summary provides a map showing the locations of the projects included in Table 3.

**Table 3  
10-Year Capital Improvements Projects**

No.	Description	Estimated Timing Range	<sup>1</sup> Preliminary Project Cost Opinion	Project Goals
1	2 <sup>nd</sup> Street Loop	Years 1 to 2	\$0.4M	Improve Reliability & Fire Flow
2	Firestone Emergency Interconnect	Years 2 to 3	\$1.7M	Partial Emergency Backup Water Supply
3	Bear Industrial Park Connector	Years 3 to 4	\$1.4M	Improve Reliability
4	Water Storage Tank	Years 5 to 7	\$12.6M	Additional Storage and Reliability
5	LHWD Emergency Interconnect – Phase 1	Years 6 to 10	\$3.8M	Partial Emergency Backup Water Supply

1. All cost opinions are in current dollars.

Three additional developer-funded water system improvements were also identified that could potentially occur within the next 10 years as shown in Table 4 below. The second phase of the LHWD Emergency Interconnect is on the west side of I-25 and part of LHWD’s future planned improvements to be funded at least partially by developers. Refer to Exhibit 2 for locations of the developer-funded projects listed in Table 4.

**Table 4  
Developer-funded Improvements**

No.	Description	Estimated Timing Range	Project Goals
D-1	Silverstone Marketplace/Miner’s Park Loop	Years 1 to 2	Improve pressure to future developments
D-2	Booster Pump Station near existing Water Tank	TBD	Expand tank service area to future development
D-3	LHWD Emergency Interconnect –Phase 2	Years 6 to 10	Partial emergency backup water supply

**Future Development Reviews**

Future potable water infrastructure recommended and shown in this Master Plan is intended to provide minimum requirements to aid the Town in development reviews. Except where otherwise explicitly agreed by the Town, it is the responsibility of developers to design and construct the necessary potable water infrastructure based on the most recent available information at the time of development, and in accordance with all Town of Frederick policies, guidelines, codes, rules, and regulations.

**Future Master Plan Updates**

It is recommended that this Master Plan be updated every five to seven years to confirm recommendations, budget costs and project schedules.

**Executive Summary Attachments**

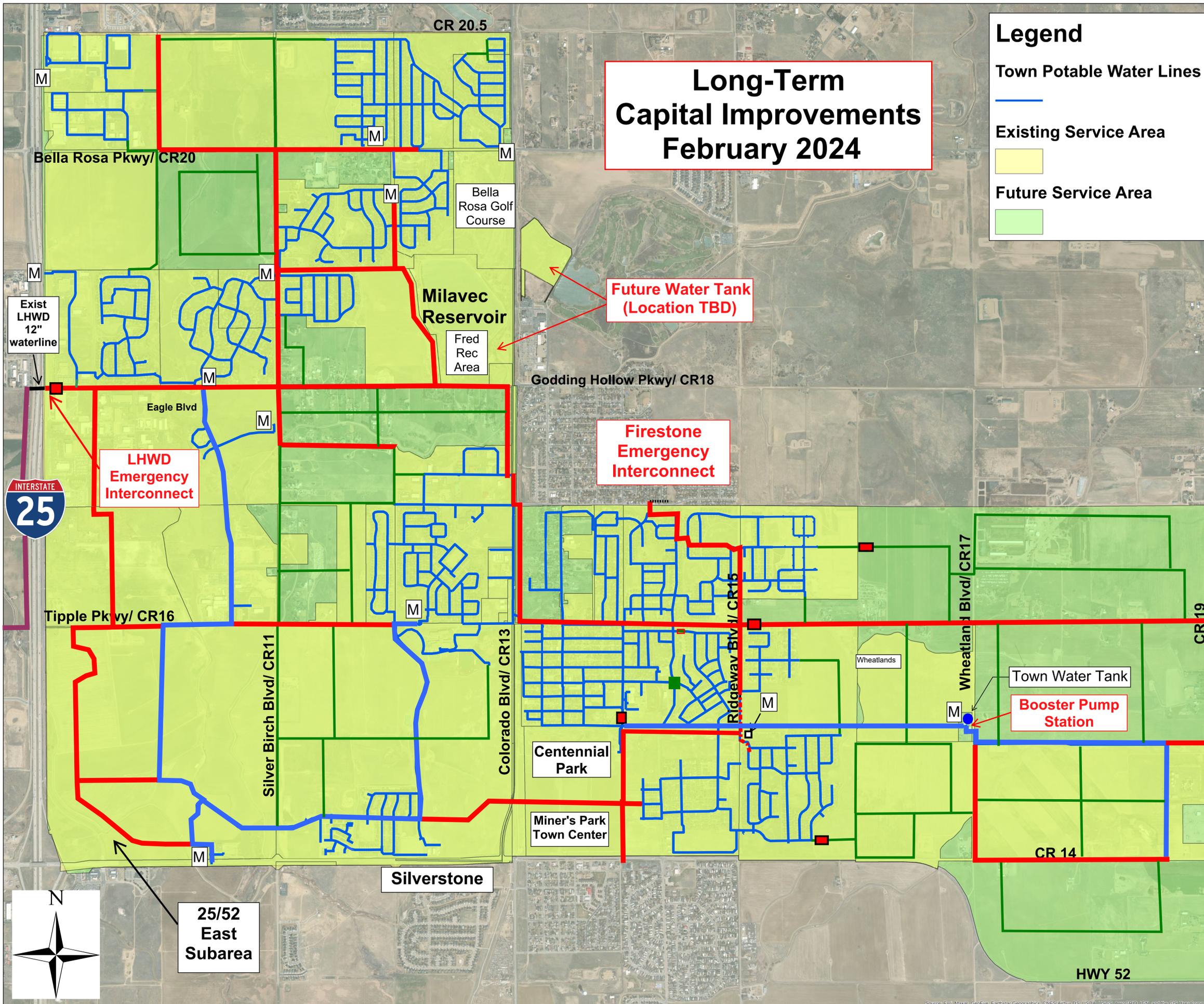
Exhibit 1: Long-Term Capital Improvements Map

Exhibit 2: Short-Term Capital Improvements Map

# Potable Water Infrastructure Master Plan



Built On What Matters



**Long-Term  
Capital Improvements  
February 2024**

**Legend**

- Town Potable Water Lines
- Existing Service Area
- Future Service Area

**Potable Water Infrastructure Legend**

- Existing Waterline
- Existing 12" Waterline
- Future 12" Waterline
- Future 8" Waterline
- Future LHWD Waterline
- Existing Control Valve
- Future Control Valve
- Existing Master Meter

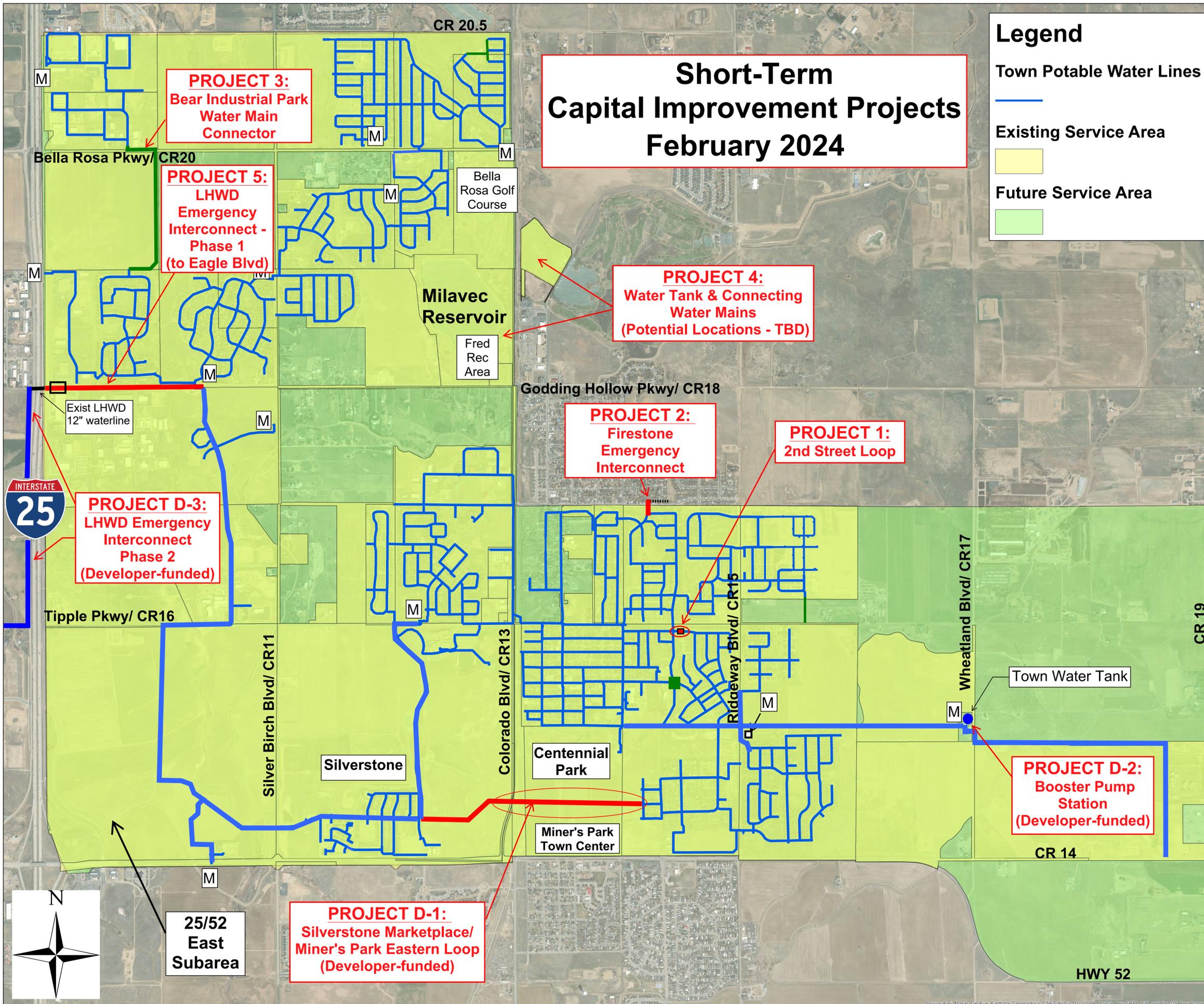
February 2024

**NOTE:** Locations of future waterlines shown in undeveloped areas are conceptual only and will be as determined by the developers and Town staff during the development review process.

# Potable Water Infrastructure Master Plan



Built On What Matters



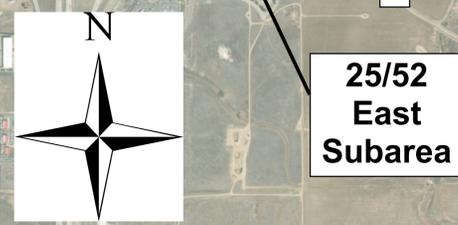
## Short-Term Capital Improvement Projects February 2024

**Legend**

- Town Potable Water Lines
- Existing Service Area
- Future Service Area

**Potable Water Infrastructure Legend**

- Existing Waterline
- Existing 12" Waterline
- Future 12" Waterline
- Future 8" Waterline
- Future LHWD Waterline
- Existing Control Valve
- Future Control Valve
- Existing Master Meter



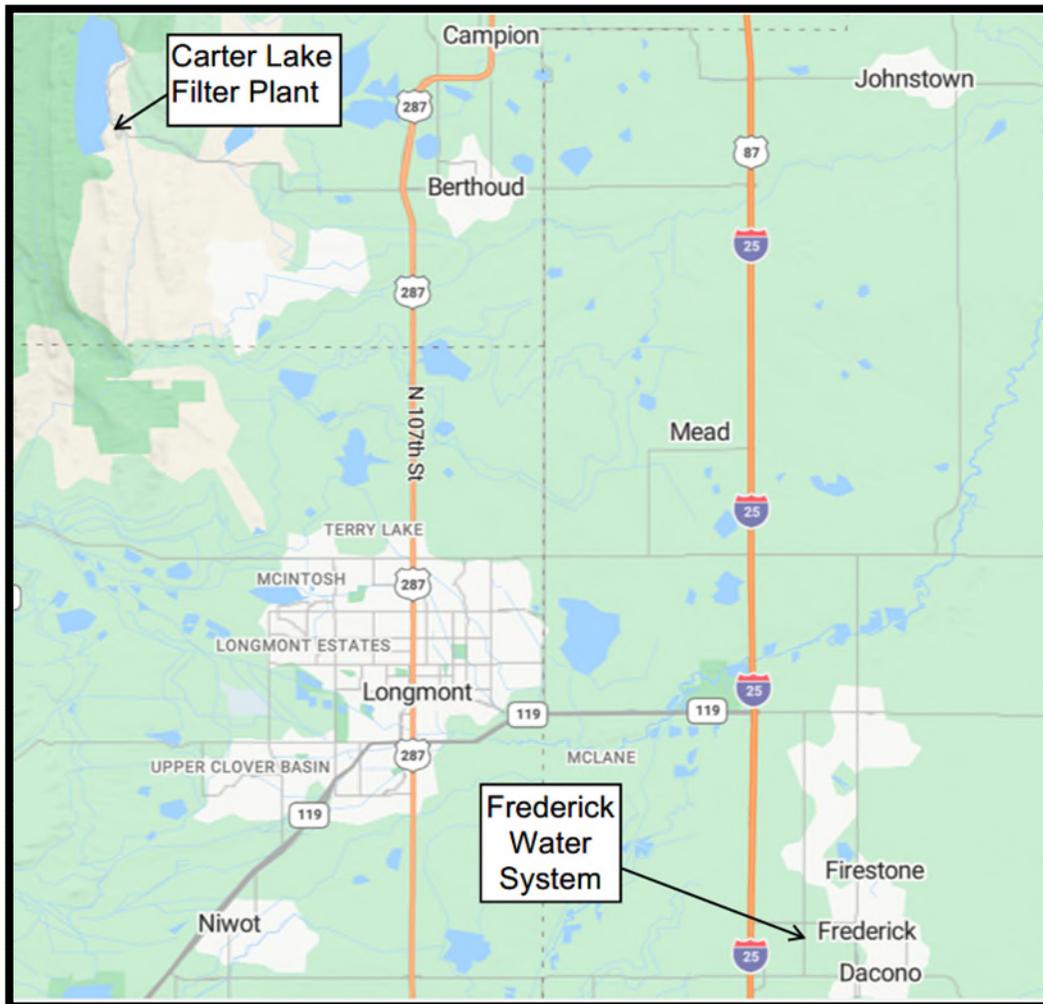
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## 1.0 INTRODUCTION

### 1.1 Overview

The Town of Frederick is located along the Interstate 25 corridor in southern Weld County, approximately 25 miles north of Denver and 10 miles southeast of Longmont as shown in Figure 1.1, Location Map. The Town's potable water system is one of three that serves customers within Frederick's town limits. The Town purchases potable water from the Central Weld County Water District (CWCWD) and delivers water to the east side of Interstate 25 to approximately 4,600 connections. CWCWD's water is treated at the Carter Lake Filter Plant west of Berthoud. Water service for Frederick citizens west of the interstate is provided by Left Hand Water District. This Master Plan is limited to water infrastructure owned by the Town of Frederick on the east side of I-25.

**Figure 1.1 Location Map**



## 1.2 Master Plan Goals

Residential and commercial development in Frederick has accelerated in recent years. With more development on the horizon, the Town selected Forsgren Associates (Forsgren) to prepare this Potable Water Infrastructure Master Plan (MP) to address drinking water reliability and sustainability. This MP is informed by the Town’s 10-year and Long-Term Water Resources Plans and is intended to be consistent with these and other water-related studies. The focus of this MP is the Town’s water infrastructure and does not include evaluation of water supplies, which were evaluated in-depth in other studies. Specifically, the goals of this Master Plan are to:

1. Improve potable water service to current and future customers
2. Outline a vision for the “build-out” water system
3. Evaluate reliability and sustainability of infrastructure
4. Recommend and prioritize short-term and long-term infrastructure improvements
5. Develop estimates of project costs for recommended short-term improvements
6. Be consistent with guidance included in previously completed water plans

## 1.3 Coordination with Comprehensive Plan Update

The Town is in the process of updating its Comprehensive Plan to guide future development, infrastructure and amenities. Potable water is an important resource that must be managed carefully to enhance the livelihood of Frederick as laid out in the Comprehensive Plan’s vision.

Public feedback related to the Comprehensive Plan Update indicates citizens would like to see more amenities and recreational opportunities while preserving Frederick’s small-town character. Forsgren collaborated with Town staff and the Comprehensive Plan consultant to include potable water issues in the Comprehensive Plan public outreaches. These efforts are described in Section 3.

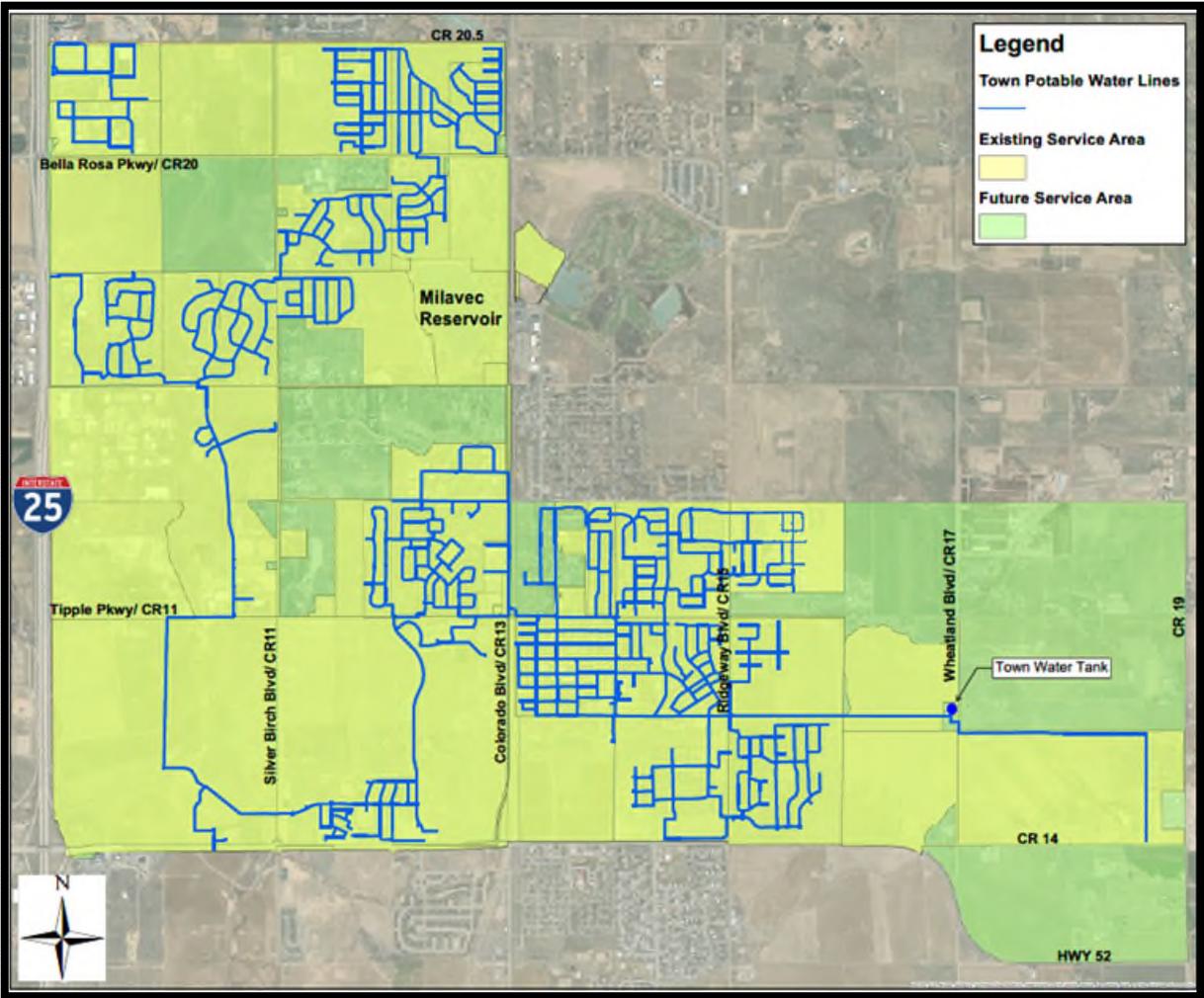
2.0 INFRASTRUCTURE CONDITION ASSESSMENT

2.1 Existing Potable Water Infrastructure

2.1.1 System Overview

Frederick’s potable water system serves customers on the east side of Interstate 25 comprising approximately 10 square miles. The Town receives potable water treated at the Carter Lake Filter Plant west of Berthoud from Central Weld County Water District (CWCWD) transmission lines. The CWCWD water is supplied to Frederick through 13 master meters that connect to and feed the Town’s distribution piping. An additional approximately 40 smaller CWCWD master meters serve individual Town customers, including commercial customers in the West Frederick Business Center near I-25. Due to the relatively high pressure in the CWCWD transmission mains, each of the 13 large master meters includes a pressure reducing station. See Figure 2.1 below for a map of the Town’s water system.

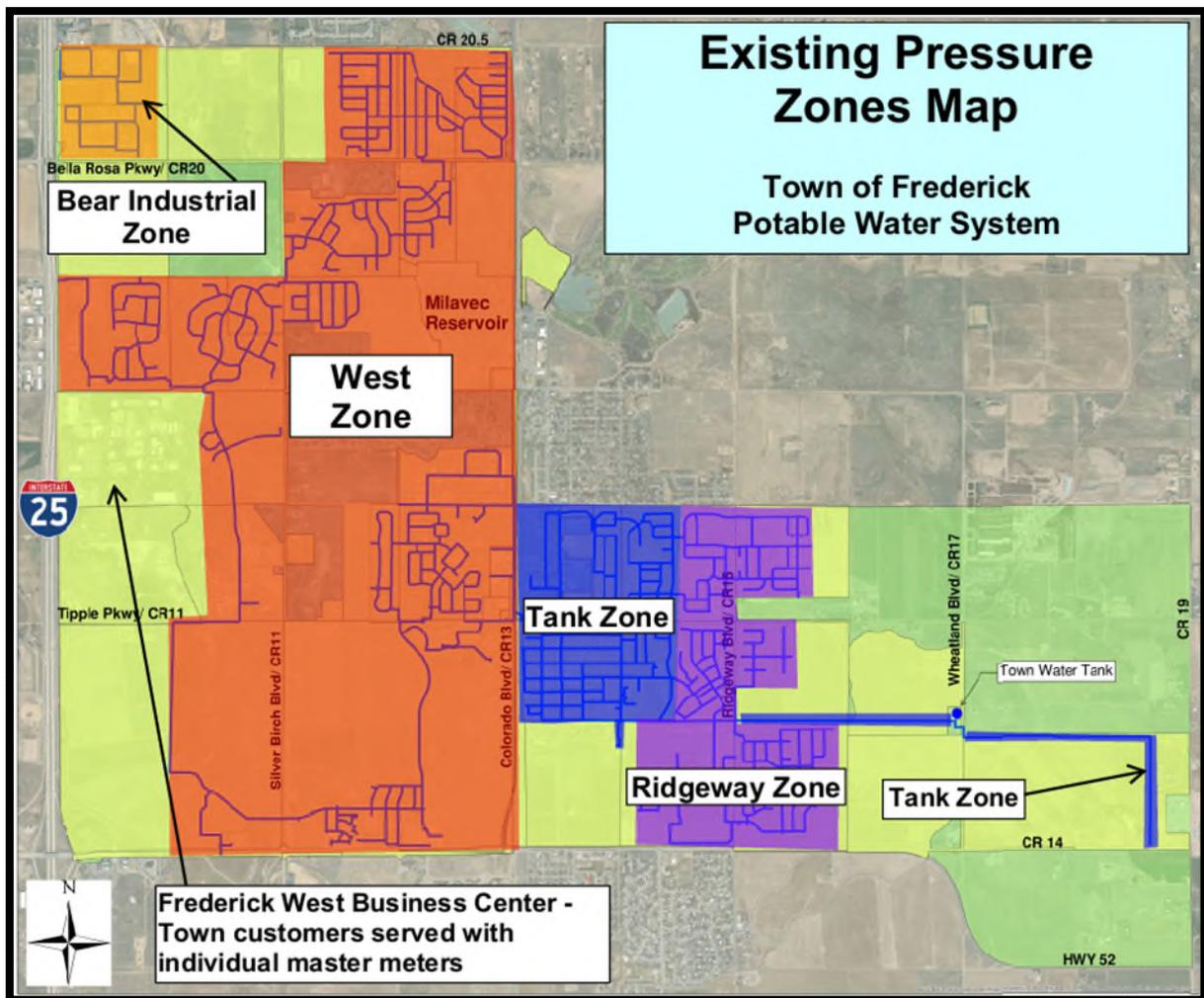
Figure 2.1 Town of Frederick, Potable Water System and Service Area Map



The Town’s water system (Public Water System Identification No. CO162288) includes one 2.8-million gallon (MG) welded steel ground storage tank, over 70 miles of waterlines predominantly between 6-inch and 12-inch diameter, and associated valves, fire hydrants and approximately 4,600 service connections.

Frederick’s distribution system has four separate pressure zones as shown in Figure 2.2. One pressure zone (Town Zone) serves primarily the downtown area and north of downtown, as well as one customer (Spindle Energy) east of the tank. This zone is served by the Town’s existing 2.8-MG tank on Wheatland Boulevard (CR 17). One of the 13 CWCWD master meters/pressure reducing stations supplies water to the Town’s tank. The ground elevations for customers in this pressure zone range from approximately 4970 to 5040 FT-MSL. The tank is at a ground elevation of 5110 FT-MSL, with a hydraulic gradient based on operating water levels in the tank of 5130 to 5150 FT-MSL. This provides system pressures ranging from 55 to 75 psi for customers in this pressure zone.

**Figure 2.2 Existing Pressure Zones Map**



A second pressure zone (Ridgeway Zone) serves mostly residential developments on the east and west sides of Ridgeway Boulevard (CR 15), extending from McClure Avenue to the north, and south to State Highway (SH) 52. Ground elevations range from 5080 FT-MSL at the eastern end of the Savannah development, to approximately 5000 FT-MSL at the northern limits near McClure Avenue. A CWCWD master meter/pressure reducing station on CR 15 supplies water to this zone at pressure of 90 to 100 psi.

The third and largest pressure zone (West Zone) is supplied through 10 CWCWD master meters and supplies water to most of the service area west of Colorado Boulevard. This zone has a mix of residential, commercial and institutional customers, including Frederick High School and Agilant Technologies, the largest water user in the system. Ground elevations range from approximately 5030 north of the Silverstone development to 4900 FT-MSL in The Farm neighborhood north of Bella Rosa Parkway. Pressures from the CWCWD master meters range between approximately 80 and 100 psi for this zone.

The Bear Industrial Park, located in the northeast corner of the service area adjacent to the East I-25 Frontage Road, is hydraulically disconnected from the rest of the system and receives water from one CWCWD master meter on East I-25 Frontage Road, creating the fourth isolated pressure zone (Bear Industrial Zone). This master meter/pressure reducing station supplies pressures of between 80 and 90 psi. Ground elevations in the industrial park range from approximately 4900 to 4940 FT-MSL.

There are also approximately 40 customers in the west part of the service area that have individual CWCWD master meters. These customers are part of the Town's customer base, but are isolated from the larger CWCWD master meter that supplies water to the West Pressure Zone. These customers include approximately 33 commercial customers and seven residential customers.

### ***2.1.2 Central Weld County Water District***

CWCWD serves an approximately 250-square mile service area in Weld County generally beginning south of Greeley and extending to south of Dacono. Besides Frederick, the District provides potable water to eight other communities, LHWD, and rural areas in the County. CWCWD utilizes Colorado-Big Thompson (C-BT) and Windy Gap shares to supply water for treatment at their Carter Lake Filter Plant located west of Berthoud.

Potable water from the Carter Lake Filter Plant is conveyed to Frederick through an approximately 30-mile series of large transmission mains ranging from 42-inch to 12-inch diameter. The elevation at the Filter Plant is approximately 5700 feet, which is over 600 feet higher than Frederick's potable water service area.

As discussed previously in this Section, CWCWD water is supplied to Frederick through 13 main master meters and 40 smaller master meters that serve individual customers within Frederick's water system. Due to the significant elevation difference between the Carter Lake

Filter Plant and Frederick, pressure reducing stations are provided at each master meter to reduce pressures to between 80 and 100 psi.

### **2.1.3 Public Works Department Input**

Based on feedback from the Frederick Public Works Department, the existing potable water infrastructure appears to be in good condition with no history of chronic water main breaks. The only water leak issues have been with service lines and taps. Only one customer has complained of low pressure, but that seems to have been resolved through a new waterline loop that was installed. There have been several instances of high-pressure leaks attributed to higher feed pressure at the CWCWD master meters. Town staff addresses this by requesting CWCWD to adjust pressure reducing valve settings at the master meters.

## **2.2 Risk and Reliability Rating System**

A risk and reliability rating system was developed to evaluate the water distribution system. Waterlines were divided into over 1,200 individual pipe segments between mainline valves, or from a valve to a pipe intersection if no valve was present. Water pipe segments at least ten feet in length were assigned an identification number based on the Town’s fire hydrant grid system. A risk and reliability rating was calculated for each pipe segment using the three factors listed below.

- Condition
- Criticality
- Vulnerability

A value was assigned for each of the three Risk & Reliability factors based on Tables 2-1, 2-2 and 2-3 below, and an overall score was calculated. The highest single value from each table was given to each pipe segment. This score was used to rank the water mains from the highest risk to the lowest. The pipe condition is based solely on the estimated remaining useful life as shown in Table 2-1. Field tests were beyond the scope of this Master Plan.

**Table 2-1 - Pipe Condition**

Criteria	Condition Assessment	Point Rating
Remaining Useful Life < 10 yrs	Poor	4
Remaining Useful Life 11 to 20 yrs	Fair	3
Remaining Useful Life 21 to 40 yrs	Good	2
Remaining Useful Life > 40 yrs	Very Good	1

**Table 2-2 - Pipe Criticality**

Criteria	Criticality Assessment	Point Rating
Transmission Main from Master Meter or Tank	Extremely High	4
Medical Facility	Extremely High	4
Water-critical Business	Extremely High	4
School or Daycare	High	3
Poor Redundancy	High	3
Main Feeder or Loop	Medium	2
Good Redundancy	Low	1

**Table 2-3 - Pipe Vulnerability**

Criteria	Vulnerability Assessment	Point Rating
History of Pipe Breaks or Repairs	High	2
High Pressure (> 95 psi)	Medium	1
No history of pipe breaks, and less than 95 psi	Low	0

The estimated useful life of each pipe segment varies based on the pipe material as listed in Table 2-4 below. Town staff provided approximate installation dates for calculation of the remaining useful life for each pipe. In some instances, no data is available to confirm the installation date. In these cases, remaining useful life is listed as “unknown.”

**Table 2-4 - Pipe Useful Life Estimates**

Pipe Material	Estimated Useful Life (years)
Polyvinyl Chloride (PVC)	100
Ductile Iron Pipe (DIP)	80
Asbestos Cement (AC)	70
Cast Iron Pipe (CIP)	50
DIP without cathodic protection	50

The summation of points for the three categories provides the Total Rating. The maximum possible rating is 10. Pipes with higher Total Ratings carry greater risk. Pipes with a Total Rating of 7 or more have a higher likelihood of failure and greater potential for widespread disruption of water service, and are strong candidates for replacement or rehabilitation. See the Risk & Reliability Rating spreadsheet table in the Appendix for ratings for each pipe segment.

### 2.3 Summary of Waterlines Assessment

Based on Town staff input, most of the distribution system is constructed of polyvinyl chloride (PVC) pipe, which has an estimated useful life of approximately 100 years. Since

most of the pipes were installed in 1990 or later, the remaining useful life is greater than 65 years for most of the distribution system. Town staff indicates no water mains have a history of breaks or repairs. For these reasons, there are no pipes with a Total Rating above 6, and the overall condition of the water mains is good with no immediate need for replacements.

The water mains in the Town's system assigned a Total Rating of 6 include:

- 12-inch PVC water transmission main from the CWCWD master meter at Highway 52 near the Indian Peaks medical facility
- 12-inch PVC water transmission main on Eagle Boulevard that supplies water to a water-critical manufacturing facility
- 12-inch PVC water main from CWCWD master meter #9066 (Raspberry)
- 12-inch and 8-inch PVC water mains from CWCWD master meter #9045 (Countryside)
- 12-inch and 8-inch PVC water mains from CWCWD mater meter #9025 (Eagle Valley)
- 8-inch PVC water main from CWCWD master meter #9013 (No Name Creek)
- 8-inch PVC water main from CWCWD master meter #9049 (Farm)
- 8-inch PVC water main from CWCWD master meter #9023 (Summitview)
- 8-inch PVC water main from CWCWD mater meter #9068 (Elementary School)
- 8-inch PVC water main from CWCWD master meter #9038 (Prairie View)

All the Town's water supply is from CWCWD master meters. Therefore, each transmission main connected to a master meter is considered critical to the Town's ability to supply water and received a Total Rating of at least 5.

The pipeline with the shortest remaining useful life is the 12-inch asbestos-cement (AC) water transmission main between the Town's water storage tank and the downtown area. This transmission main was installed in 1978 and has an estimated remaining useful life of 25 years. The Town is planning to abandon this waterline within the next couple years and utilize the existing CWCWD 14-inch AC transmission line. CWCWD plan to construct a new 30-inch transmission line that will replace their 14-inch line, allowing it to be repurposed by the Town as the main transmission line from the Town's tank. For this reason, replacement of the Town's existing 12-inch transmission main is not needed.

## 2.4 Water Storage Tank

Frederick owns and maintains one storage tank, located on Wheatland Boulevard (CR 17). The welded steel ground storage tank was constructed in 1974 and has a volume of 2.8 million gallons. According to Town staff, a recent inspection of Frederick's 2.8-MG tank indicated the tank has some minor wear but no significant repairs were recommended. The

life span of a welded steel tank is highly dependent on maintenance of coatings and performing minor repairs that are identified during inspections. The Town should continue to have the tank inspected at least every five years. With proper maintenance and repairs recommended after each inspection, the tank could last an additional 20 years or more.

## **2.5 Conclusions**

Based on relatively long useful remaining lives and no history of water main breaks, water main replacements are not recommended for the ten-year planning period. A recent inspection of the tank recommended no repairs, so no improvements to the tank have been identified.

It is recommended the Town track locations of future water main breaks and update the pipe rating table every three to four years as ratings and priorities will change based on repairs and remaining useful lives. The tank should be inspected at least every five years, and any maintenance or repair items identified be corrected promptly.

### 3.0 PUBLIC ENGAGEMENT

#### 3.1 Comprehensive Plan Update

Forsgren attended a joint Comprehensive Plan workshop of Frederick’s Board of Trustees and Planning Commission, and Forsgren also participated in a Comprehensive Plan public engagement outreach at Town Hall to discuss and obtain public input on potable water topics.

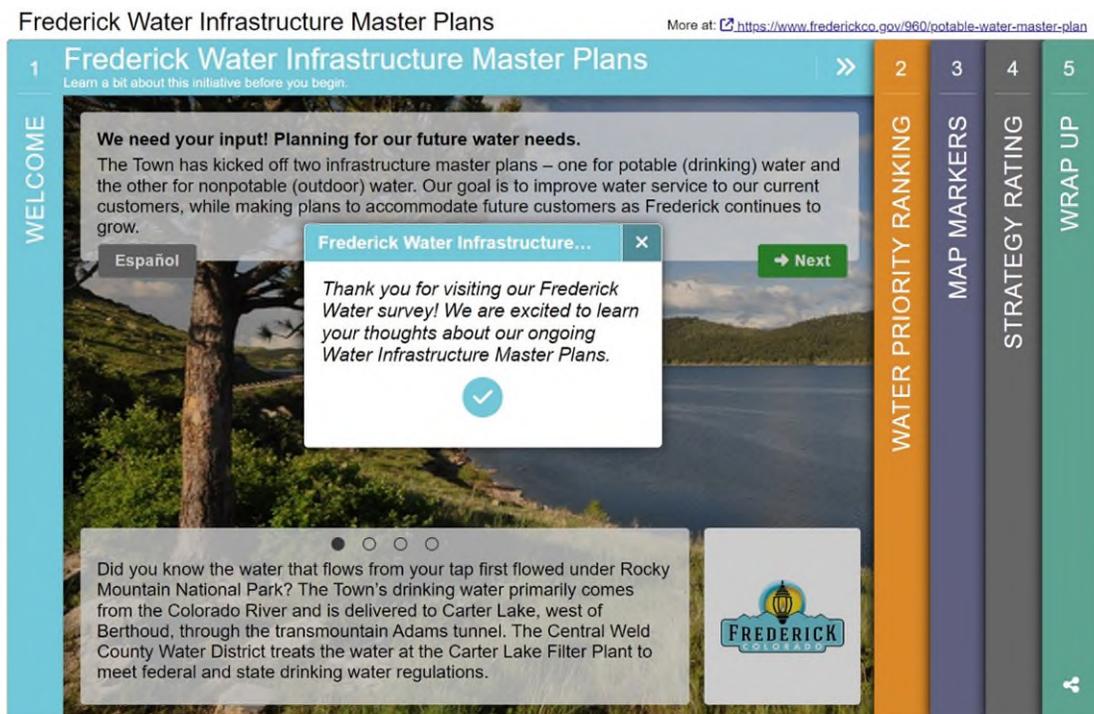
Forsgren and Town staff worked with the Comprehensive Plan consultant to incorporate several water-related questions into their public survey. Survey results showed water affordability and conservation ranked as the public’s top issues. Condition of existing waterlines and water infrastructure needed to support new development were also identified as topics of interest.

#### 3.2 Chainsaws and Chuckwagons Festival

Forsgren joined Town staff’s information table at the Chainsaws and Chuckwagons event to solicit input during one of Frederick’s more popular summer festivals. Forsgren and Town staff talked with festival attendees about water and listened to their ideas and concerns.

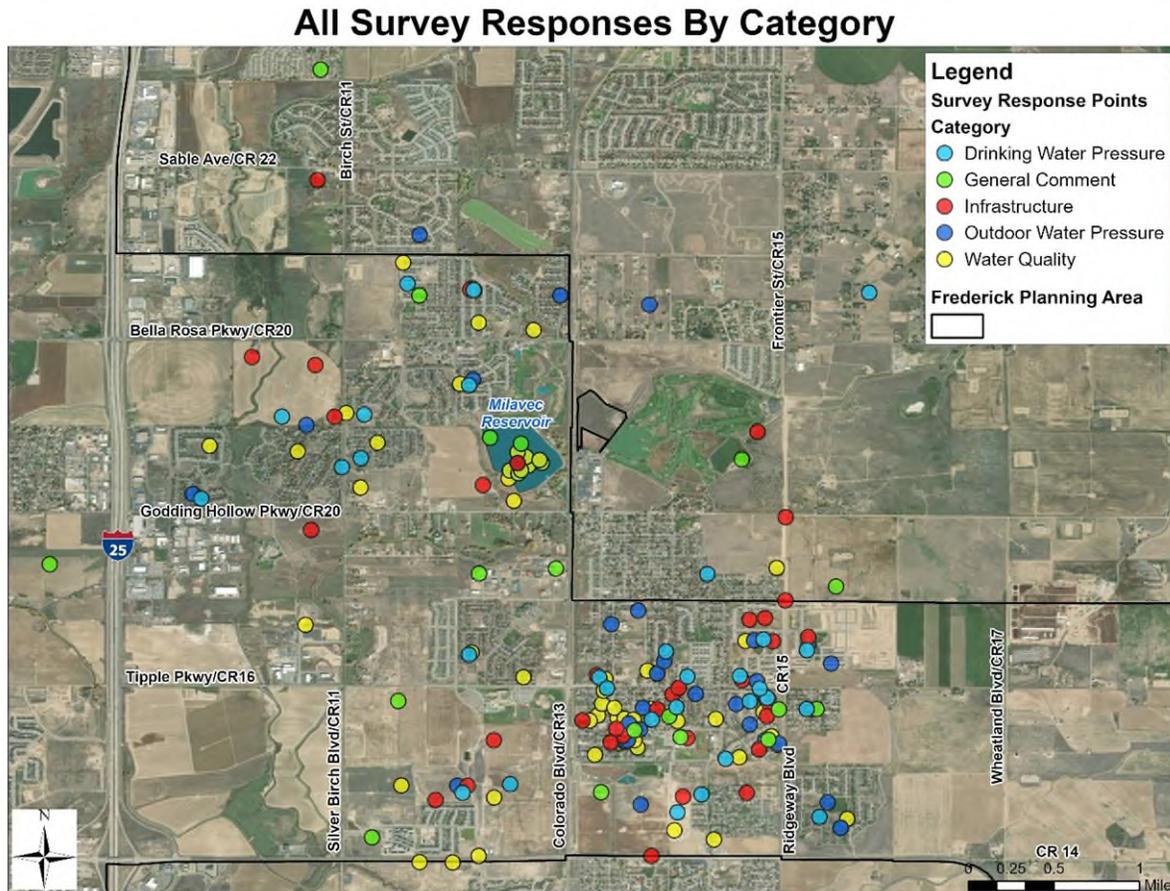
#### 3.3 Web-based Public Survey

An online platform (Metroquest) was developed by Forsgren’s subconsultant, Michael Baker International, to engage the community on water issues, including both potable and non-potable (raw) water. The Town advertised the survey on their Facebook page, website, and electronic newsletter (Frederick Flash). Flyers in English and Spanish with QR codes and website links to the MetroQuest page were distributed at public events.



The survey was active for over two months and had 111 unique participants provide input. Figure 3.1 provides a map showing the approximate locations of public input provided through the on-line platform for five water topics.

**Figure 3.1 On-Line Public Survey Responses by Topic**



### 3.3.1 Public Comments – Water Priorities

Community members were asked to rank their water priorities. Quality of drinking water scored as a top priority for the community. This was followed by affordability of water and water conservation.

Table 3-1 below shows how the participants ranked priorities from highest (No. 1) to lowest.

**Table 3-1 Water Priorities Rankings, Public On-Line Survey**

Priority Ranking	Water Issue
1	Quality of Drinking Water
2	Affordability of Water
3	Water Conservation
4	Back-up source for Drinking Water
5	Fire Protection
6	Condition of Existing Water Lines
7	Water for New Development
8	Water for Irrigation

### 3.3.2 Public Comments

The overall theme is that these participants want to see the Town being a good steward of water resources. Comments included:

- Requests to reduce water demand through native landscaping in tree lawns and right-of-way plantings
- Wanting to see improved water quality
- Reducing waste through better maintenance and quickly identifying leaks and other issues in the system, and looking to smart irrigation systems that do not irrigate during rain events

### 3.3.3 Drinking Water Pressure Comments

Most survey participants rated their drinking water pressure as satisfactory. Participants noted that water pressure tends to drop in the mornings and evenings, or when sprinklers are running.

### 3.3.4 Infrastructure Comments

The infrastructure comments pointed to a concern that as Frederick continues to grow, the water infrastructure may not be able to keep up. The concern is for adequate planning to ensure quality and consistent water supply.

### 3.3.5 Outdoor Water Pressure Comments

Most comments rated the outdoor water pressure as satisfactory, inconsistent or low. It is suspected the inconsistency in outdoor water pressure occurs during high irrigation times.

### 3.3.6 Water Quality Comments

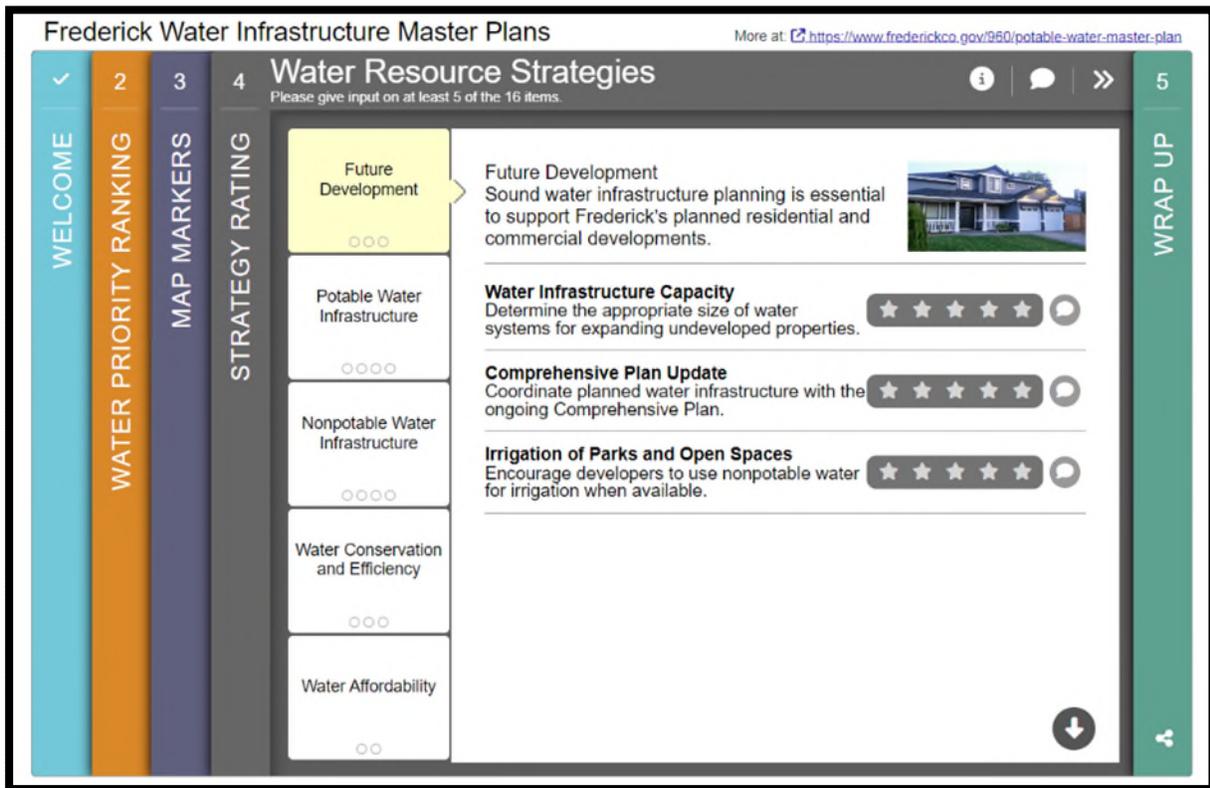
Treatment of the Town’s potable water is provided by the Central Weld County Water District (CWCWD) at the Carter Lake Filter Plant. Therefore, CWCWD is responsible for water quality up to the master meter distribution points to the Town’s system.

Water quality showed a great deal of interest from participants and is a top priority. Several themes emerged from these comments. Approximately 75% of the comments indicated water quality was either satisfactory or very good. A sampling of some of the potable water comments are:

- Some participants noted that the water quality is great and they have no concerns.
- Some participants noted pink and red rings and stains from the water, with several others complaining of chemical or bad smells from water.
- Several participants noted that they do not trust the water source and choose to filter the water or use bottled water.

### 3.4 Water Strategy Input

The strategy rating slide included five categories and a total of 16 strategies. Participants were asked to rate each strategy on a scale of 1 to 5 based on number of stars selected, with five



stars being the highest importance, and one star being the lowest importance. The five general categories for the strategies included:

1. Future Development
2. Potable Water Infrastructure
3. Non-potable Water Infrastructure
4. Water Conservation and Efficiency
5. Water Affordability

Based on input from the Water Strategy survey screen, the public indicated that topics of highest importance are:

1. Require developers to pay their fair share of water infrastructure costs.
2. Develop a multi-year Capital Improvements Plan to prioritize upgrades for replacement and expansion of existing infrastructure.
3. Convert parks and open space irrigation to non-potable water to conserve potable water.
4. Support policies that require xeriscaping or low water landscaping.

### **3.5 Public Engagement Conclusions**

The public outreach for this Potable Water Infrastructure Master Plan provided several opportunities for the citizens of Frederick to be engaged in the Potable Water Infrastructure Master Plan. The on-line survey was especially effective in gaining insightful feedback on what aspects of the Town’s water system are important to the customers. This input is incorporated into the Master Plan approaches and recommendations, and addressed as follows:

<b>Topic</b>	<b>How Topic is Addressed in Master Plan</b>
Drinking Water Quality	Provide additional loops in distribution system.
Affordability of drinking water	Recommend improvements that are necessary and cost effective, and identify potential grant funding sources.
Water Conservation	Complete a condition assessment of existing pipes to identify water leak issues. Convert irrigation of parks from potable to non-potable water.
Back-up Water Supply	Consider emergency interconnections with neighboring systems, and additional storage.

## 4.0 PLANNING

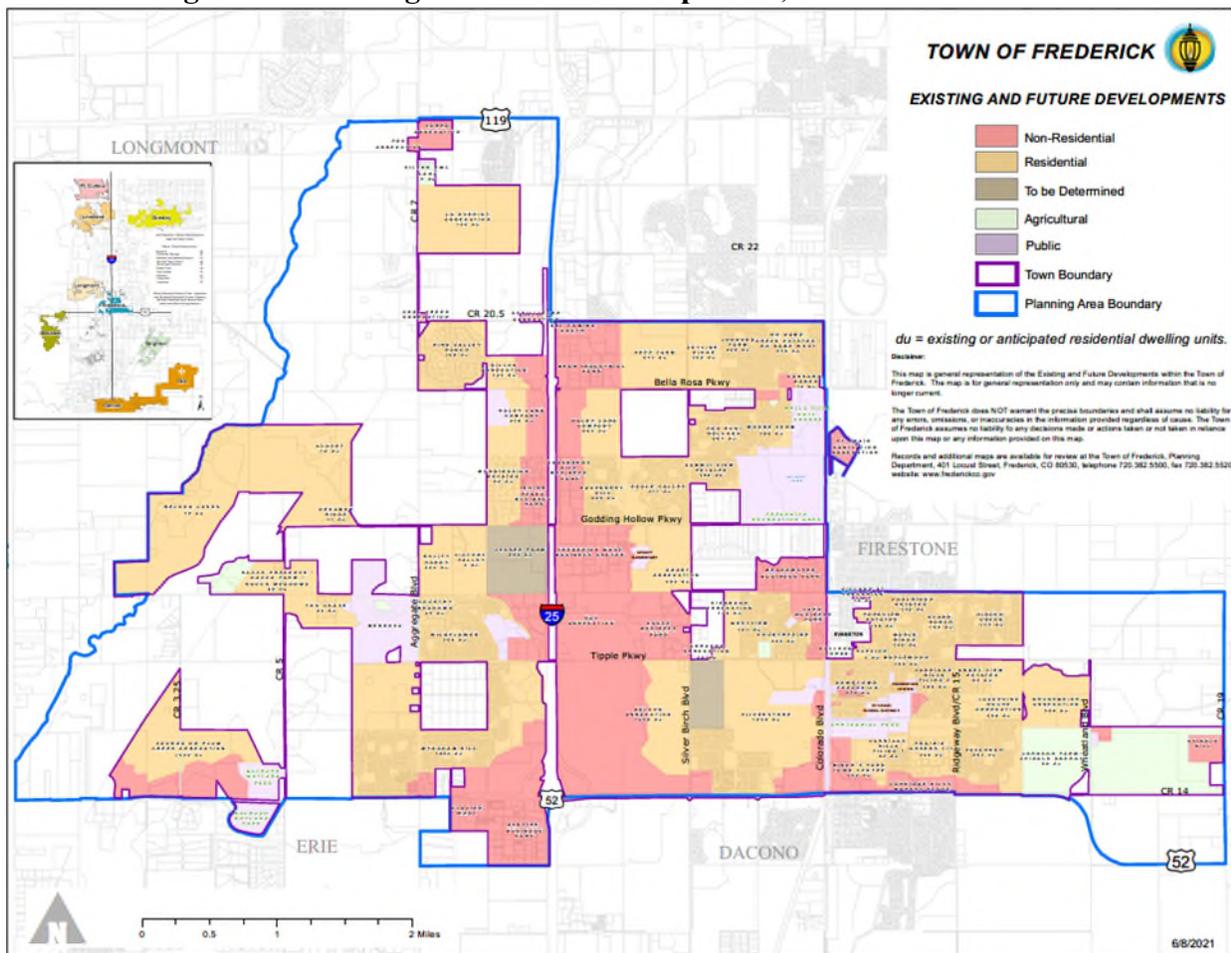
### 4.1 Growth Planning Overview

#### 4.1.1 Town Planning Department Input

The Town Planning Department provided information related to development trends, targeted growth areas, and new development applications that are at various stages in the Town’s review process. All undeveloped areas within the Town’s planning boundary generally do not have potable water infrastructure. Potential future annexation properties and school sites were identified.

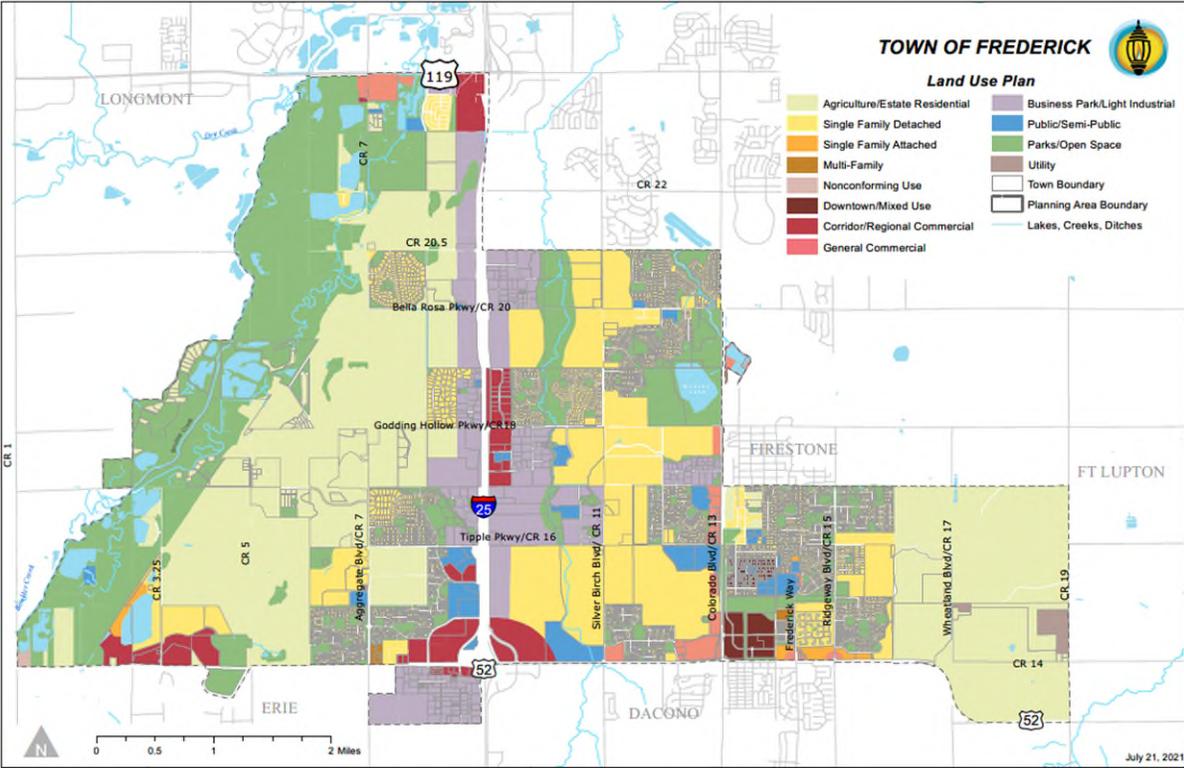
The Planning Department provided the land use and zoning exhibits shown below in Figures 4.1, 4.2 and 4.3. These exhibits include land uses and parcel sizes, and Figure 4.1 provides the expected number of dwelling units for some of the properties in the Town’s planning area. The information in these Town-prepared maps was used to estimate potable water demands for future developments east of Interstate 25. Larger versions of these maps are included in the Appendix for reference.

**Figure 4.1 Existing and Future Developments, Town of Frederick**



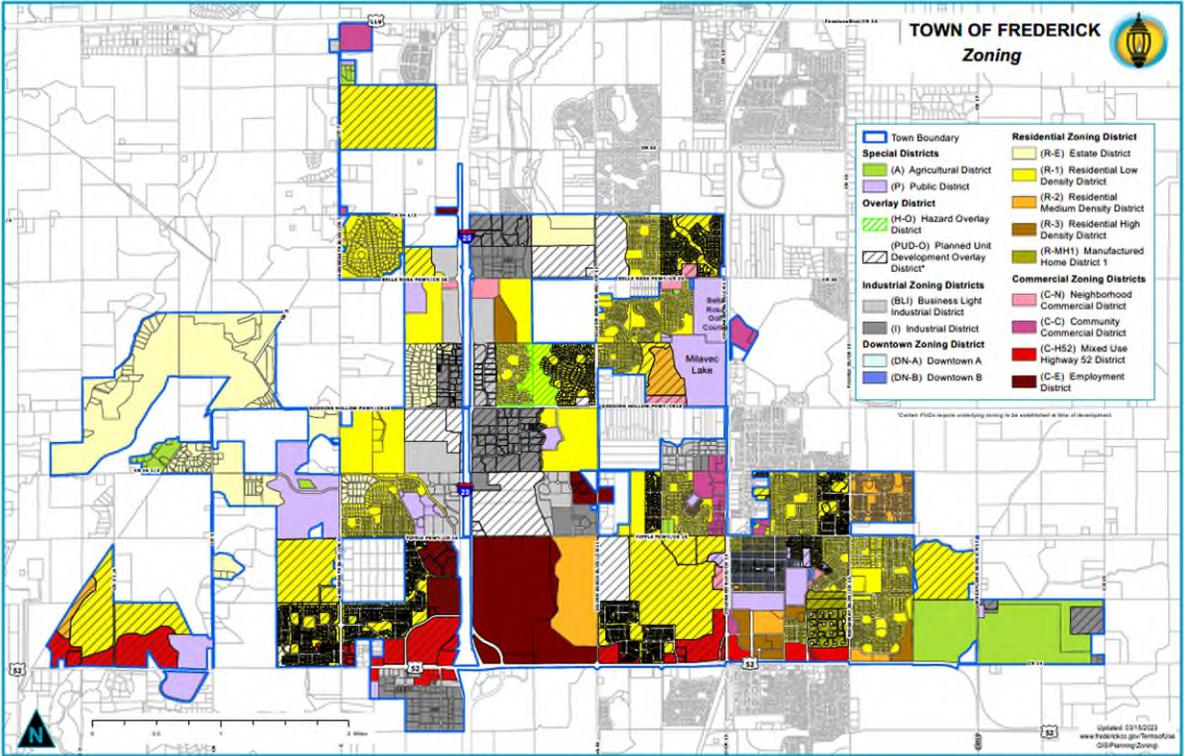
Source: Town of Frederick

Figure 4.2 Land Use Plan, Town of Frederick



Source: Town of Frederick

Figure 4.3 Zoning Map, Town of Frederick



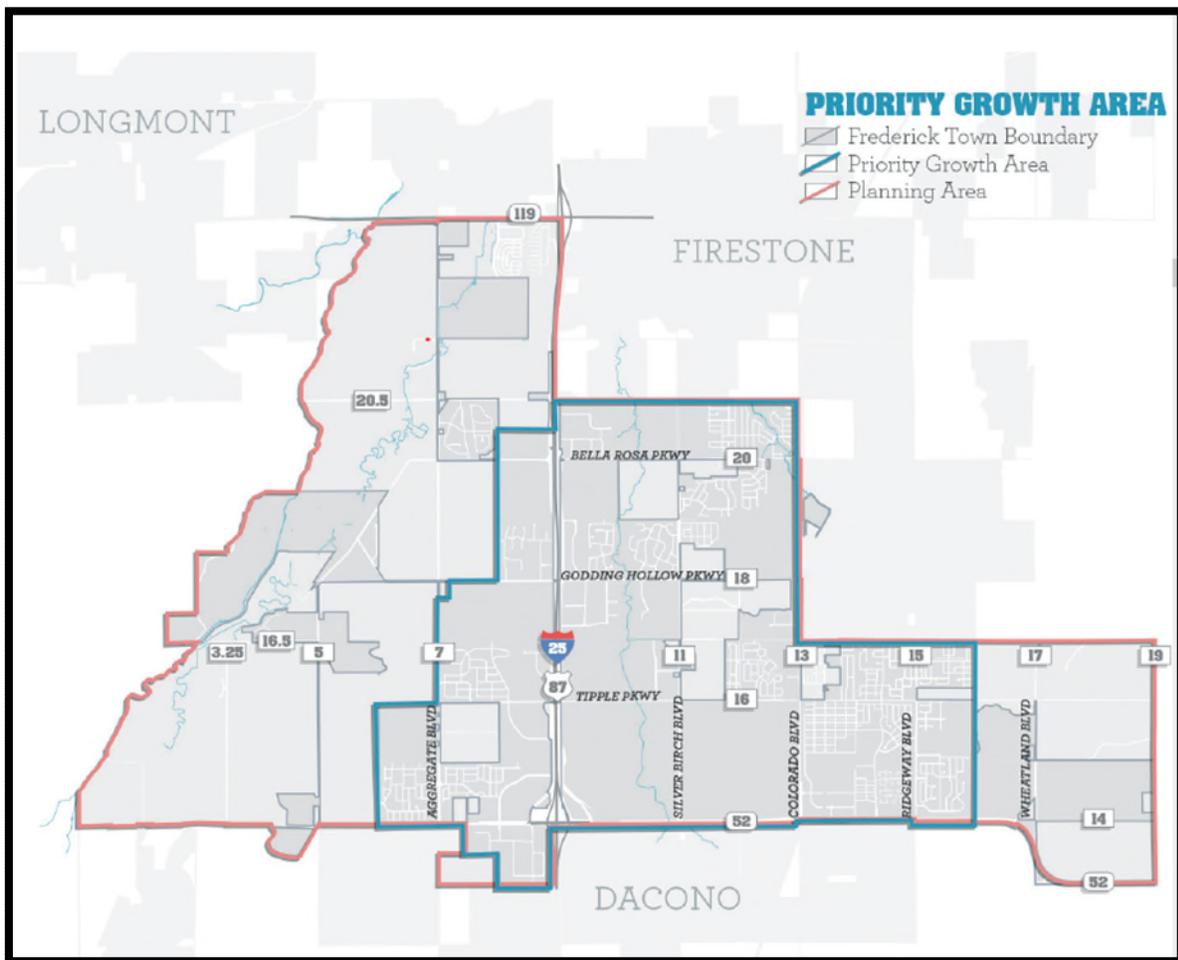
Source: Town of Frederick

## 4.2 Frederick Comprehensive Plan

The most recently completed Comprehensive Plan (2015) identifies a Priority Growth Area and Planning Area. See Figure 4.4 below. Most of the Priority Growth Area is east of I-25 and within the Town’s potable water service area. There has been significant development in recent years in this Priority Growth Area, and the Town continues to receive development applications. For example, the Silverstone development north of State Highway (SH) 52 between Silver Birch Boulevard and Colorado Boulevard is partially constructed, with grocery and retail stores expected to begin construction soon. There are also plans for additional Silverstone residential development to the north.

A portion of the Planning Area extends east of Wheatland Boulevard to County Road (CR) 19, and south to SH 52. The Town’s Land Use Plan (Figure 4.2) denotes this area as Agricultural/Estate Residential, with no official zoning designation since it is currently outside the Town limits. The timing for the development of this eastern planning area is unknown.

**Figure 4.4 Priority Growth Area, Town of Frederick 2015 Comprehensive Plan**



*Source: Town of Frederick Comprehensive Plan, 2015*

Based on housing unit inventory as of late 2022 provided at the Comprehensive Plan Update Board workshop, approximately 95% of Frederick’s housing is comprised of single-family detached homes, over 4% are single-family attached (i.e., townhomes, duplexes), and less than 1% are considered multi-family apartments. However, when developments currently in the plat process are included, the Town’s Comprehensive Plan consultant indicated multi-family units increase to 8% and single-family detached decrease to 88%, reflecting a trend towards more multi-family residential for future development.

The Town Planning Department anticipates the ongoing Comprehensive Plan Update may recommend increasing the residential density for some properties from single-family to multi-family. It is also anticipated that some Agricultural/Estate Residential areas in the eastern Planning Area (Figure 3.4) could change to single-family detached or single-family attached homes.

The Town has identified the I-25/SH 52 interchange as a potential large, mixed-use destination to attract both local and regional visitors. Plans for this interchange are discussed in Section 4.3.

### 4.3 Frederick 25/52 East Subarea Plan

Frederick is planning a mixed-use development for over 600 acres on the northeast side of the I-25/SH 52 interchange. In 2022, the Town prepared the 25/52 East Subarea Plan (by Houseal Lavigne, 3/22/22) outlining a vision for a retail and commercial center with residential units, creating an attractive gateway to the east side of Frederick.



*From 25/52 Subarea Plan (Houseal Lavigne, 2022)*

The 25/52 East Subarea Plan’s conceptual land use for the development is summarized below in Table 4-1.

**Table 4-1 25/52 East Subarea Plan – Conceptual Land Use**

Description	Acres
Retail/Entertainment	140
Corporate Campus/Office	126
Mixed Residential (Single & Multi-family)	150
Public/Civic	12
Recreation	23
Industrial	192
<b>TOTAL</b>	<b>643</b>

*Source: 25/52 Subarea Plan, Houseal Lavigne, 3/22/22*

The Town has some potable water infrastructure in the 25/52 East Subarea, but additional infrastructure will be needed. The land use acreages shown in Table 4-1 serve as the basis for estimating water demands.

#### **4.4 Frederick 10-Year Water Resources Plan and Long-Term Water Resources Plan**

The Town's 10-Year Water Resources Plan and Long-Term Water Resources Plan (Element Water Consulting, 12/6/21 and 5/13/22 respectively) are important references for this Potable Water Infrastructure Master Plan. The 10-year Water Resources Plan lists 679 acre-ft per year (AFY) in pending potable water commitments made by the Town to 11 separate developments, and identifies 18 potable water connections, primarily at parks, that can be converted to raw water use to reduce potable demand by approximately 96 AFY.

The Long-Term Water Resources Plan (LTWRP) provides detailed potable water demand projections for Frederick. The LTWRP estimates the current Frederick population of 12,000 will grow to approximately 42,400 at build-out based on information provided by the Town's Planning Department.

The LTWRP takes a scenario-based planning approach to estimate a water demand range that integrates several factors, including various levels of water conservation and climate adjustments. The LTWRP estimates build-out occurring between 2060 and 2070, and provides estimated potable water demands of 6,650 AFY to 7,710 AFY. These projections equate to a build-out average daily demand range of approximately 5.9 MGD to 6.9 MGD. These LTWRP projections are only for customers on the east side of I-25 within the Town's potable water service area.

According to the Town's 1988 agreement with CWCWD, an additional 20% of water used downstream of the master meters needs to be supplied from the Carter Lake Filter Plant to account for system, treatment, delivery and metering losses. The LTWRP water demand projections include this additional 20%, plus an additional 5% to account for losses in Frederick's distribution system downstream of the master meters. CWCWD and Frederick recently agreed to decrease the 20% overage to 12%. Therefore, the water demand projections in this Master Plan will be based on a 12% overage for CWCWD produced water.

Table 4-2 below provides projected average daily potable water demands for Frederick's potable system based on the LTWRP estimates.

**Table 4-2 Average Daily Potable Water Demand Projections<sup>1</sup>**

Year	Low-Range Avg Daily Demand		High-Range Avg Daily Demand	
	Acre-Ft/Year (AFY)	Million Gal/Day (MGD)	Acre-Ft/Year (AFY)	Million Gal/Day (MGD)
2023	2450	2.19	2450	2.19
2033	3000	2.68	3200	2.86
2043	3850	3.44	4250	3.80
2053	4600	4.11	6000	5.36
2063	5700	5.09	7100	6.34
2070	6650	5.94	7710	6.89

1. Average daily potable water demands estimated from Figure 7 of Town of Frederick, Long Term Water Resources Plan, Element Water Consulting, May 13, 2022.

Potable water treatment for Frederick is provided at the Carter Lake Filter Plant, but the LTWRP discusses the potential need for an additional water supply and possibly a local water treatment plant to meet future demands, potentially using Milavec Reservoir for supply. This is due to limitations in the Town’s current water rights. The water treatment facility may be needed as early as 2034 depending on Town conservation efforts and the success and timing of the Northern Integrated Supply Project (NISP), for which Frederick is currently a participant.

From a water supply perspective, Frederick owns Colorado-Big Thompson (C-BT) units as administered by the Northern Colorado Water Conservancy District. The Town has historically utilized C-BT water to meet potable demands, but also owns Windy Gap units from Dry Creek Reservoir, located near Carter Lake. The C-BT and the Windy Gap water supplies are treated by CWCWD at the Carter Lake Filter Plant, and conveyed to the Town’s water system. The Town has recently moved forward with acquisition of additional C-BT and Windy Gap units to help meet the anticipated shortfall in water supplies needed to meet future demands.

#### **4.5 Frederick Water Efficiency Plan**

Frederick’s Water Efficiency Plan (WEP) prepared by Element Water Consulting (October 2022) indicates 12,030 people were served by the Town’s potable water system on the east side of I-25 as of the end of 2020. The WEP also states for 2020, average potable water residential usage was 114 gallons per day per capita (gpcd), and commercial/industrial usage averaged 24 gpcd.

The WEP includes a “non-revenue” water analysis for 2013 to 2020 that compares CWCWD master meter flows with Town water meter records to identify water losses that are unbilled. Non-revenue water is estimated as the amount of water supplied through CWCWD meters that is not billed by the Town to individual customers. The WEP indicates an uncertainty in meter records for 2017 through

2019 because the Town's metered use was greater than the amount of CWCWD delivered water. This may be due to flow meter inaccuracies or recording errors. This discrepancy was also the case for 2022. For the other years, non-revenue water averaged approximately 8.7% of CWCWD supplied water through master meters. The Town has an ongoing meter replacement program so Town meter accuracy should continue to improve as meters are replaced.

Non-revenue water due to water infrastructure leaks is expected to be minimal. The Town's Public Works Department indicated main line pipe breaks are rare, but there have been some breaks on service lines and service line taps.

The WEP lists a series of Water Efficiency Goals estimated to reduce potable water usage by approximately 160 AFY by 2030. Most of this reduction is achieved through the Town's plan to convert targeted potable irrigation accounts to raw (i.e., non-potable) water irrigation. Other Water Efficiency Activities include installation of Automatic Meter Reading (AMR) systems to improve meter and recording accuracy, several irrigation conservation programs such as turf replacement and smart irrigation controllers, and updates to Town standards for landscape design.

As the Town implements significant water conservation savings, future potable water projections for this Master Plan utilize an estimated 5% non-revenue water, which is lower than the 8.7% experienced in previous years.

## 5.0 CURRENT AND FUTURE WATER DEMANDS

### 5.1 Current Water Demands

#### 5.1.1 Average Daily Water Demand

Table 5-1 below provides water usage for the Town’s individual meters and the calculated average over the 2022 calendar year.

The Town’s daily demand averaged approximately 2.1 million gallons per day (MGD) for 2022, of which approximately 1.7 MGD was for residential and commercial customers. The remainder was for parks and fire hydrant flows. Population served is estimated at approximately 12,000 people.

**Table 5-1 Average Daily Water Usage, Meter Readings, 2022**

<b>Month</b>	<b>Customer Meters (gpd)</b>	<b>Parks (gpd)</b>	<b>Fire Hydrants (gpd)</b>	<b><sup>1</sup>Total Avg Daily Usage (gpd)</b>
January	708,900	367	17,773	727,040
February	678,786	1,143	25	679,954
March	723,214	1,071	15,157	739,442
April	815,030	2,364	5,346	822,740
May	2,321,500	132,633	6,461	2,460,594
June	2,592,433	140,167	29,153	2,761,753
July	3,301,333	298,300	62,366	3,661,999
August	2,983,935	296,355	77,707	3,357,997
September	2,944,406	252,406	59,749	3,256,561
October	1,899,034	122,241	28,131	2,049,406
November	816,900	13,600	8,128	838,628
December	764,167	667	3,497	768,331
<b>Average Daily Usage</b>	<b>1,712,470</b>	<b>105,110</b>	<b>26,191</b>	<b>1,843,771</b>

<sup>1</sup>Average daily usage includes meter data and does not include non-revenue water losses.

July was the highest water demand for residential and commercial customers, likely due to irrigation, with an average daily usage during July of approximately 3.3 MGD.

There are approximately 4,554 residential and commercial customers served by the Town, with approximately 4,410 residential and 144 commercial. The largest water user is the pharmaceutical company Agilant Technologies, which averaged over 1 million gallons per month and a daily average of approximately 36,500 gpd during 2022. Coal Ridge Park had the highest park usage at an average

daily demand of over 40,000 gpd during July 2022, and a total annual water usage of over 350,000 gallons.

### 5.1.2 Equivalent Dwelling Unit (EDU)

An Equivalent Dwelling Unit (EDU) water usage rate is established for the purpose of projecting future water demands. The EDU for this Master Plan is based on a 5/8-inch residential meter. Frederick’s residences are predominantly single-family, so no distinction was made in the data analysis between single-family and multi-family. The EDU demand is calculated by dividing the total residential usage for 2022 by the total number of residential meters (4,410). The average daily residential usage for 2022 was 1.44 MGD, which equates to 326 gpd per EDU.

The hydraulic model for this Master Plan was calibrated using field testing conducted during the winter, so a winter average daily usage is also needed. For 2022, the average water demand during these winter months, not including the parks and fire hydrants, was 727,758 gpd. Excluding the commercial meters, the residential customers demand during these winter months was 632,153 gpd. Dividing this by the 4,410 residential customers results in a winter average daily usage of 143 gpd per EDU. See Table 5-2 below for the Annual and Winter EDU water demands.

**Table 5-2 Equivalent Dwelling Unit (EDU) Water Demand**

<b>EDU Type</b>	<b>Average Daily Demand (gpd)</b>	<b>No. of Residential Customers</b>	<b>EDU Water Demand (gpd)</b>
Annual	1,436,244	4,410	326
Winter	632,153	4,410	143

U.S. Census data for Frederick indicates an average of 2.94 people per household. At the estimated EDU of 326 gpd, this equates to 111 gpd per capita (gpcd). This is similar to the 114 gpcd shown in the Town’s WEP for 2020.

### 5.1.3 Peaking Factors and Fire Flows

Maximum Daily Demand and Peak Hour factors are needed for fire flow and water storage analyses. Water system hydraulic capacity is evaluated for two demand scenarios: 1) Maximum Daily Demand plus Fire Flow; and 2) Peak Hour Demand. Water storage needs are evaluated based on Maximum Daily Demand plus Fire Flow.

The Town records monthly customer meter data, but daily meter data for the Town’s system was not available to determine actual maximum daily demands. The Left Hand Water District (LHWD), which serves the portion of Frederick on the west side of Interstate 25, recently completed a water master plan that evaluated historical daily usage for the LHWD and determined their historical Maximum Daily Demand is approximately 2.63 times average daily demand. A slightly higher Maximum Daily Demand factor of 2.7 times the average daily demand is used for this Master Plan.

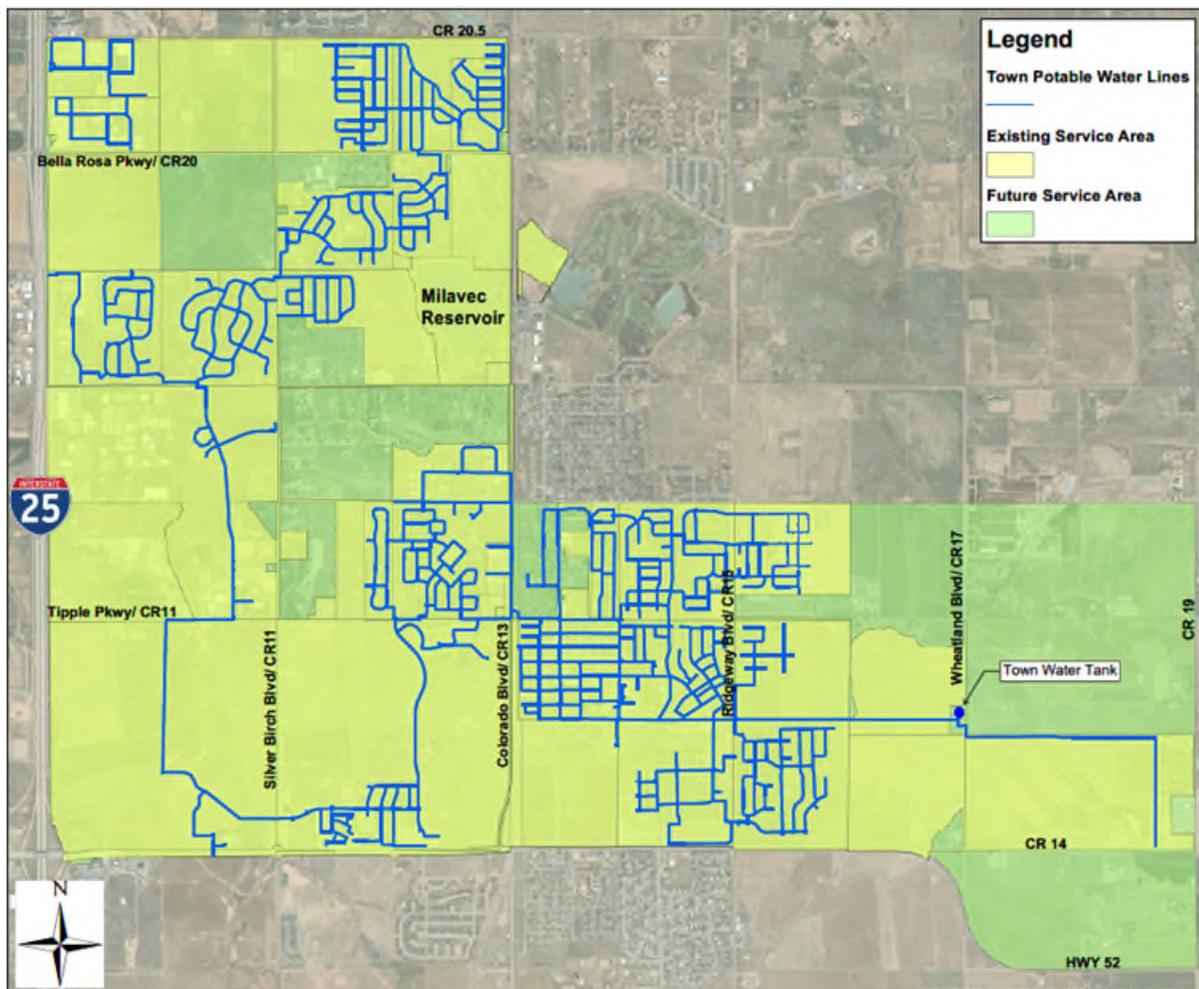
Historical hourly data for Frederick is not available for estimation of a Peak Hour Demand. Therefore, a typical Peak Hour factor of 5.0 times the Average Daily Demand will be utilized.

The Town of Frederick’s Design Standards and Specifications for Potable Water Distribution list minimum fire flows of 1500 gallons per minute (gpm) for single-family residential, and 3500 gpm for multi-family residential and commercial/industrial facilities. According to the International Fire Code, the fire duration for commercial and industrial structures ranges from two to four hours, depending on the required fire flow, type of building construction and the building size.

## 5.2 Future Average and Peak Water Demands

Future potable water demands are estimated for “build-out” of the entire Frederick planning area east of I-25, shown as the Existing and Future Service Areas in Figure 5.1 below. The Long-Term Water Resources Plan estimates a build-out population of approximately 42,400 people.

**Figure 5.1 Existing and Future Potable Water Service Areas**



Town planning maps shown in Section 4 (Figures 4.1, 4.2 and 4.3) were referenced to determine zoning, land uses and parcel sizes. Figure 4.1 (Existing and Future Developments) also provides expected number of dwelling units for some of the properties in the Town’s planning area, and these dwelling unit estimates were utilized for those properties. For the remaining properties in the planning area, the Town’s Land Use Code specifies allowable development densities for each zoning designation, as shown in Table 5-3 below.

**Table 5-3, Residential Densities, Frederick Land Use Code**

<b>Zoning</b>	<b>Description</b>	<b>Typical Residential Use</b>	<b>Maximum Net Density (units per acre)</b>
R-E	Residential - Estate	Single-Family Detached	0.2
R-1	Residential Low Density	Single-Family Detached	5
R-2	Residential Medium Density	Single-Family Attached (Townhomes, Duplexes)	10
R-3	Residential High Density	Mult-Family (Apartments)	25

Potable water demand for the residential properties is estimated using one EDU for each Single-Family unit, and 0.8 EDU for each Multi-Family unit to account for a portion of future apartments having less than three bedrooms and therefore having a lower water demand.

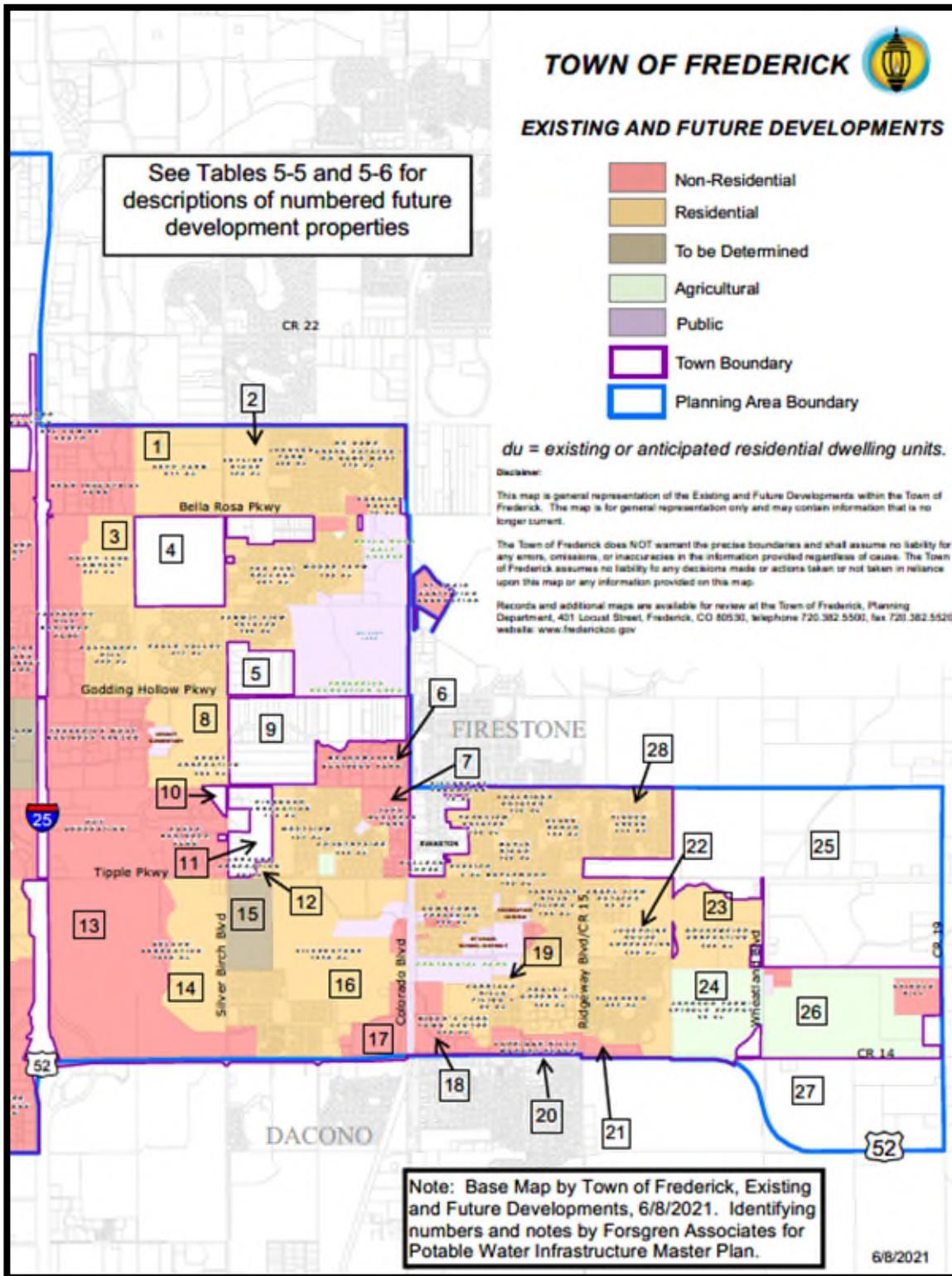
The Town does not have specific water demand criteria required for planned commercial and industrial development. Property designated as commercial is estimated at 1,100 gpd per acre for average daily demand. This is based on nearby Town of Erie’s guideline of 3,000 gpd per acre for maximum daily demand, divided by the 2.7 factor used in this Master Plan to estimate average daily demand. For industrial use, 800 gpd per acre average daily demand is utilized based on recent meter usage data for an existing industrial area in Frederick. See Table 5-4 for a summary of potable water demand criteria for future development.

**Table 5-4 Potable Water Demand Criteria, Future Development**

<b>Land Use</b>	<b>Average Daily Demand (gpd)</b>
Residential, Single-Family	326 gpd/unit
Residential, Multi-Family	260 gpd/unit
Commercial/Public	1100 gpd/acre
Industrial	800 gpd/acre

Undeveloped and partially developed areas within Frederick’s planning area east of I-25 are shown and assigned an identifying number in Figure 5.2 below. Tables 5-5 and 5-6 follow to list the estimated average daily potable water demands for each area, through build-out.

Figure 5.2 Future Development Map,  
Town of Frederick Potable Water Service Area



Source: Base map is excerpt from Town of Frederick Existing and Future Developments Map, 6/8/2021

**Table 5-5 Estimated Water Demands for Future Development Properties,  
Build-out of Planning Area**

Area No.	Description	<sup>1</sup> Area (AC)	<sup>2</sup> Density, EDU's per acre	<sup>3</sup> Estimated EDU's	Demand per EDU or Acre (gpd)	Avg Daily Demand (gpd)
1	Hepp Farm	150	-	611	326	199,200
2	Skyline Ridge	58	-	304	326	99,100
3	Haley Land Company	100	-	843	326	274,800
4	WCR 11 & WCR 20	80	5	400	326	130,400
5	WCR 11 & WCR 18 (east of Godding Hol.)	57	5	285	326	92,900
6	Meadowlark Bus Park (undev.)	9	-	-	<sup>4</sup> 800	7,200
7	Tops Business Park (undev.)	6	-	-	<sup>4</sup> 800	4,800
8	Grant Annexation	95		484	326	157,800
9	WCR 11 & WCR 18 (south of Godding Hol.)	223	5	1115	326	363,500
10	Silver Birch Rd-light industrial	8	-	-	<sup>4</sup> 800	6,400
11	Kickback Annexation	72	-	174	326	56,700
12	Goracke Annexation	2		20	326	6,500
13	25/52 East Subarea <sup>6</sup> (see Table 5-6)	643	-	-	-	1,117,900
14	Nelson Annexation	178	-	1058	326	344,900
15	Silver Birch Blvd/Tipple Pkwy	100	5	500	326	163,000
16	Silverstone future residential	263	-	1100	326	358,600
17	Silverstone Marketplace	37				<sup>7</sup> 96,000
18	Miner's Park	52	-	400	326	130,400
19	Carriage Hills Filing 1	50	-	80	326	26,100
20	Carriage Hills Market Place	17	-	-	<sup>5</sup> 1,100	18,700
21	East of Carriage Hills Market	13	-	-	<sup>5</sup> 1,100	4,300
22	Josephine Roche Annex	91	-	360	326	117,400
23	Brunemeier Annexation	137	-	508	326	165,600
24	Johnson Farm/Spindle (west)	147	-	69	326	22,500
25	Northeast planning area	852	0.2	170	326	55,600
26	Johnson Farm/Spindle (east)	272	0.2	54	326	17,700
27	Southeast planning area	316	0.2	63	326	20,600
28	Hidden Creek (undeveloped)	80	-	265	326	86,400
	<b>TOTALS (Future development)</b>	<b>3958</b>		<b>8253</b>		<b>4,155,000</b>

Notes:

- Property areas are approximate estimates from aerial mapping.
- Density in EDU's per acre based on Land Use Map and Land Use Code, for properties without dwelling unit quantities listed in the Town of Frederick "Existing and Future Developments" map, 6/8/21.
- Estimated EDU's from Town of Frederick "Existing and Future Developments" map, 6/8/21.
- Industrial development water demand estimated at 800 gpd/acre (avg daily demand).
- Commercial development water demand estimated at 1,100 gpd/acre (avg daily demand).
- Refer to Table 5-6 for 25/52 East Subarea water demand breakdown.
- Silverstone Marketplace demand obtained from developer's latest utility plan report.

**Table 5-6 25/52 East Subarea, Estimated Water Demand (Area 13 in Table 5-5)**

No.	<sup>1</sup> Development Type	<sup>1</sup> Approx. Area (AC)	<sup>2</sup> EDU's per acre	EDU's	<sup>3</sup> Demand per EDU or AC (gpd)	Avg Daily Demand (gpd)
A	Residential, Single-Family Attached	100	10	1000	326	326,000
B	Residential, Multi-Family	50	25	1250	260	325,000
C	Commercial	140	-	-	1100	154,000
D	Offices	126	-	-	1100	138,600
E	Industrial	192	-	-	800	153,600
F	Public/Civic	12	-	-	1100	13,200
G	Recreation	23	1	23	326	7,500
	<b>TOTALS (future development)</b>	<b>643</b>				<b>1,117,900</b>

Notes:

1. Development types and areas based on Frederick 25/52 East Subarea Plan, Houseal Lavigne, 3/22/22.
2. Density in EDU's per acre based on Frederick Land Use Code, except for recreation area.
3. Single-Family EDU based on 2022 meter usage. Multi-Family water demand based on 80% of Single-Family demand. Industrial development water demand estimated at 800 gpd/acre (avg daily demand). Commercial development water demand estimated at 1,100 gpd/acre (avg daily demand).

25/52 East Subarea water demand estimates shown in Table 5-6 are based on the development types and areas shown in the Town's 25/52 East Subarea Plan prepared by Houseal Lavigne, 3/22/22.

For build-out of the planning area, the future estimated average daily potable water demand for undeveloped properties is 4.16 mgd as shown in Table 5-5. Adding this future demand to the current 2022 water usage of 1.84 mgd results in a build-out demand of approximately 6.0 mgd.

To determine the water needed downstream of the CWCWD master meters or other future treated supplies, an estimated 5% non-revenue water losses is added to the demand. This results in a projected potable water demand downstream of CWCWD master meters or other future treated supplies of 6.3 mgd.

To estimate the water supplied to the treatment facilities, CWCWD and Frederick have agreed to a 12% overage to account for treatment, delivery and meter losses. This results in a total estimated water supplied to the treatment facility(s) of 7.06 mgd to meet Frederick's long-term needs.

Table 5-7 below provides an estimated water usage projection for build-out occurring in 2070. Long-term projections are dependent on many variables. Actual water usage and growth rates may be less or greater than the amounts shown in the table.

**Table 5-7 Projected Potable Water Usage  
Average Daily Demand for Frederick Planning Area**

Year	Est. Metered Demand (mgd)	Non-revenue water (mgd)	Treatment & Delivery Overage (mgd)	Total Avg Daily Potable Water Supplied (mgd)
2022	1.84	0.09	0.23	2.16
2023	1.89	0.09	0.24	2.22
2033	2.41	0.12	0.30	2.84
2043	3.09	0.15	0.39	3.63
2053	3.96	0.20	0.50	4.65
2063	5.06	0.25	0.64	5.96
2070	6.00	0.30	0.76	7.06

Note: Long-term water demand projections are dependent on many variables. Actual water usage quantities may be less than or greater than the amounts shown depending on growth rates, economics and other factors.

One of the Town’s major water conservation measures is to convert irrigation of parks from potable to non-potable (i.e., raw) water. There are currently 18 parks with potable water meters, with the highest water use between May and October.

Averaging the parks irrigation demand for the entire 2022 calendar year results in an average daily demand of 105,100 gpd. A Non-Potable Water Infrastructure Master Plan is currently underway to evaluate the capital improvements necessary to convert these parks to non-potable water irrigation.

Assuming these parks are converted by 2033 results in a slightly lower projection 6.01 mgd water needed downstream of the CWCWD master meters or other future treated supplies, including the estimated 5% non-revenue water losses. To estimate water supplied to the treatment facility(s) the additional 12% overage results in 6.72 mgd to meet Frederick’s long-term water resources needs. This is within the projected range provided in the LTWRP of 5.94 mgd to 6.89 mgd (6650 AFY to 7710 AFY).

See Table 5-8 below for projections through 2070 for Frederick potable water usage through build-out, considering the conversion of the parks to non-potable water.

**Table 5-8 Projected Potable Water Usage,  
Average Daily Demand  
(Including conversion of Parks to Non-Potable Water)**

<b>Year</b>	<b>Est. Metered Demand (mgd)</b>	<b>Non-revenue water (mgd)</b>	<b>Treatment &amp; Delivery Overage (mgd)</b>	<b>Total Avg Daily Potable Water Supplied (mgd)</b>
2022	1.84	0.09	0.23	2.16
2023	1.89	0.09	0.24	2.22
2033	2.30	0.11	0.29	2.70
2043	2.94	0.15	0.37	3.46
2053	3.77	0.19	0.47	4.43
2063	4.82	0.24	0.61	5.67
2070	5.72	0.29	0.72	6.72

Note: Long-term water demand projections are dependent on many variables. Actual water usage quantities may be less than or greater than the amounts shown depending on growth rates, economics and other factors.

## 6.0 WATER STORAGE

### 6.1 Existing Storage Facilities

The Town of Frederick owns and maintains one storage tank, located on Wheatland Boulevard/CR 17. The welded steel ground storage tank was constructed in 1974 and has a volume of 2.8 million gallons.

Central Weld County Water District (CWCWD) maintains additional potable water storage for its customers, including Frederick. The October 20, 1988 Agreement between CWCWD and Frederick indicates CWCWD will provide equalization and emergency storage for its customers totaling at least two times the average daily demand based on the last three years of water usage.

For the period of 2020 through 2022, Frederick's water imported from CWCWD averaged approximately 1.7 MGD. Per the 1988 Agreement, CWCWD should currently provide at least two times this amount, or 3.4 million gallons (MG) of storage for Frederick. CWCWD has a 5 MG ground storage tank adjacent to Frederick's tank, and approximately 17 MG of storage at the Carter Lake Filter Plant.

Frederick's tank receives potable water from CWCWD through a master meter located at the tank, which is fed from the west by a 14-inch asbestos-cement (AC) water transmission main. CWCWD is currently in the planning and design process to replace this with a 30-inch water main.

According to Town staff, a recent inspection of Frederick's 2.8 MG tank indicated the tank has some minor wear, but no significant repairs were recommended.



### 6.2 Pressure Zones

Frederick's potable water system is divided into four main isolated pressure zones. The Town's existing Wheatland Boulevard tank serves the downtown area and north of downtown, as well as a commercial customer east of the tank. This zone is referred to as the Tank Pressure Zone. The Ridgeway Pressure Zone serves development east and west of Ridgeway Boulevard. The third and largest pressure zone includes most of the remainder of the Town's service area west of Colorado Boulevard (West Pressure Zone) which is supplied water by 10 CWCWD master meter/pressure reducing stations. The Bear Industrial Park is the

fourth pressure zone at the northwest corner of town. This area is served by a CWCWD master meter and is disconnected from the remainder of the Town's system. See Section 2.1 of this Master Plan for additional details regarding the existing pressure zones.

Frederick's tank is located at or near the highest ground elevation within town limits, an elevation of approximately 5110 FT-MSL. Ground elevations gently slope downward in all directions away from the tank. CWCWD and the Town of Firestone also have potable water storage tanks adjacent to Frederick's tank.

Frederick's tank has a high-water operating level of 48 feet. This provides a maximum hydraulic gradient of 5158 FT-MSL. The tank level fluctuates to allow water turnover to maintain water quality, resulting in hydraulic gradient that ranges between 5130 and 5150 FT-MSL.

The tank's hydraulic gradient is sufficient to provide adequate pressure to the downtown area, which is approximately 100 to 140 feet lower in ground elevation than the tank site. System pressures in the Tank Pressure Zone typically range between 55 and 75 psi. Valves in the distribution system are currently closed to isolate the downtown area from the remainder of the distribution system.

The other portions of the Town's distribution system are pressurized by 12 master meter connections with CWCWD that operate at pressures ranging between approximately 80 psi and 100 psi. One of the master meters is dedicated to the Bear Industrial Park. CWCWD's potable water transmission pipes from the Carter Lake Filter Plant operate at even higher pressures, so each master meter is equipped with pressure reducing valves. CWCWD balances the pressure reducing valve settings to maintain adequate operating pressures throughout the system.

### **6.3 Recommended Storage Capacity**

The Colorado Department of Public Health and Environment (CDPHE) Potable Water Design Criteria requires potable water storage to meet domestic water demands plus fire flow. It is generally recommended that a public water system have storage capacity for the maximum daily demand, plus fire flow. Utilizing the 2.7 Maximum Daily Demand factor described in Section 5.1.3, Frederick's Maximum Daily Demand for the 2019 to 2022 three-year period is 4.59 mgd (1.7 mgd x 2.7). At build-out, Average Daily Demand including 5% loss from Table 5-8 is estimated at 6.01 mgd for the year 2070. Utilizing the 2.7 factor results in a Maximum Daily Demand of 16.2 mgd. Based on these estimates, and per the 1988 Agreement, CWCWD reserves storage of at least two times the average daily demand for Frederick, which equates to 3.4 MG for 2022, and 12 MG for 2070.

### **6.4 Fire Flow**

The Town of Frederick's Design Standards and Specifications for Potable Water Distribution lists minimum fire flows of 1500 gpm for single family residential, and 3500 gpm for multi-family residential and commercial/industrial facilities. According to the International Fire

Code, the fire duration for commercial and industrial structures ranges from two to four hours, depending on the required fire flow, type of building construction and the building size. For this storage volume analysis, a 3500-gpm fire flow at four-hour duration will be utilized, resulting in a volume of 840,000 gallons to be stored for fire flow.

## **6.5 Additional Storage Facilities**

CWCWD currently provides storage for the entire Town service area, except the downtown area, which is served by the Town's tank on Wheatland Boulevard. CWCWD also has a 5 MG tank next to the Town's 2.8 MG tank that is hydraulically piped to supplement the Town's tank if needed. CWCWD storage for the rest of the Town's system is near the Carter Lake Filter Plant, approximately 30 miles from Frederick. For improved reliability, it is recommended additional storage facilities be supplied closer to the Town's water demands to provide backup water supply for emergency events when CWCWD may have water supply limitations due to treatment or transmission issues, or drought-related water restrictions.

## **6.6 Future Storage Facilities Location**

As discussed previously, the Town's existing tank is at the highest ground elevation in Frederick, which makes the area around the tank a consideration for additional storage to maximize gravity feeds and minimize pumping. However, while the ground elevations are highest in this area, they are not significantly higher, and the hydraulic capability for gravity feed is limited. Therefore, conveyance of water from this eastern location to the west and north portions of the service area would require large transmission lines, likely in the range of 24-inch to 30-inch diameter, to reduce system pressure losses at peak and fire flows. These large transmission lines would be costly and could result in water quality issues during normal demands due to long detention times.

Since the Town's distribution system currently isolates the Tank pressure zone to serve primarily the downtown area, consideration for additional storage is given west of Colorado Boulevard to centralize the storage in relation to the remainder of the service area. As mentioned in Section 4.5, there may be a future need for a local water treatment plant that potentially would use Milavec Reservoir as its supply. Locating the storage in the general vicinity of Milavec Reservoir consolidates infrastructure and reduces transmission piping between the treatment plant and distribution storage. It could also allow Town-owned property to be used for the storage facilities. The exact location of the future storage tank requires further evaluation and is beyond the scope of this Master Plan.

To serve future development in the eastern planning area, a booster pump station is recommended to draw water out of the existing Town tank to create a separate pressure zone for this portion of the service area.

## 6.7 Water Storage Capacity Projections

The existing Frederick tank will continue to serve the downtown area, and in the future, the eastern planning area. The adjacent CWCWD 5-MG tank is hydraulically connected to provide additional storage to this portion of the Frederick service area.

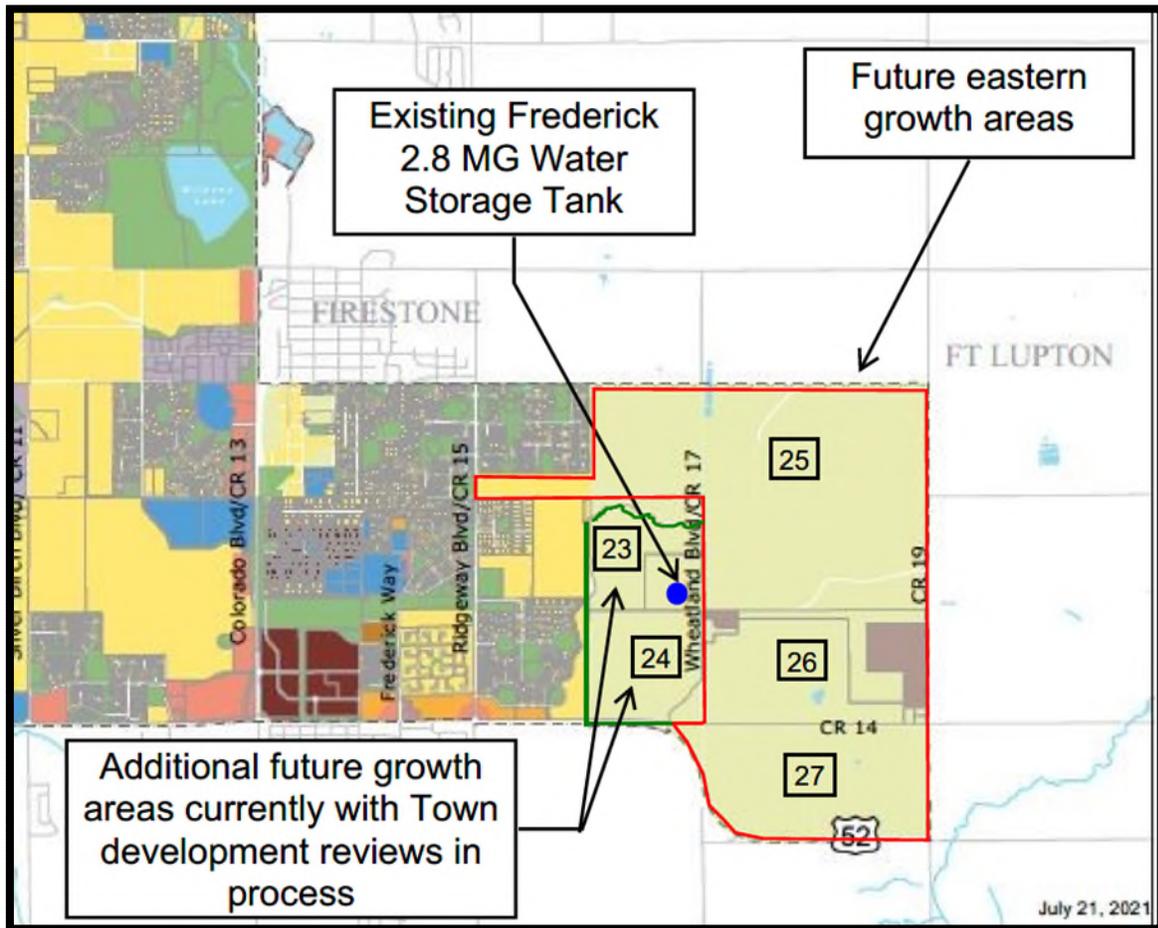
Future storage facilities would serve the remainder of the Town’s service area, with backup storage from CWCWD.

Each of these two tank service areas are evaluated separately for water demand projections and storage needs.

### 6.7.1 Wheatland Boulevard (CR 17) Tank Service Area

The existing tank serves the downtown area through a 12-inch asbestos-cement (AC) transmission pipe between the tank and downtown. Over the past three years the tank output averaged approximately 410,000 gallons per day (gpd), which represents about 22% of the Town’s entire water demand. Properties that can be developed in the future in the eastern planning area were described previously in Section 5.2 and are shown below in Figure 6.1.

**Figure 6.1 Eastern Planning Area Properties**



Note: Figure 6.1 base map from Town of Frederick’s Existing and Future Development Map, 7/21/2021.

To estimate potable water demands, these properties have been divided into five general areas numbered 23 through 27 in the map figure. Some of the areas include multiple parcels. The Town has received development submittals for parcels immediately north/west (No. 23) and south (No. 24) of the tank.

The land use for all five of these areas is depicted as “Agricultural/Estate Residential” on the Town’s Land Use Map. The Town’s Land Use Code shows a maximum density of 0.2 dwelling units (du) per acre for Estate Residential (R-E). However, the Town’s “Existing and Future Developments Map” shows different estimated densities for Areas 1 and 2. Build-out potable water demands have been estimated for the areas in the eastern planning area using Town land planning documents as described in Table 6-1 below.

**Table 6-1 Eastern Planning Area Water Demand Estimates**

<b>Area No.</b>	<b>Description</b>	<b>Approx. Area (AC)</b>	<b><sup>1</sup>EDU's per acre</b>	<b>EDU's</b>	<b>Demand per EDU</b>	<b><sup>2</sup>Avg Day Demand (gpd)</b>
23	Brunemeier Annexation	137	-	508	326	165,600
24	Johnson Farm/Spindle Energy (west)	147	-	69	326	22,500
25	Northeast planning area	852	0.2	170	326	55,600
26	Johnson Farm/Spindle Energy (east)	272	0.2	54	326	17,700
27	Southeast planning area	316	0.2	63	326	20,600
	<b>TOTALS</b>	<b>1724</b>		<b>865</b>	<b>325</b>	<b>281,100</b>

<sup>1</sup>Areas 23 and 24 residential density based on 508 du and 69 du, respectively, as listed in Town of Frederick, Existing and Future Developments map, 6/8/2021. Areas 25, 26 and 27 densities based on Town of Frederick Land Use Map.

<sup>2</sup>Average day demand based on 326 gpd per residential unit from 2022 Town-wide meter records.

During the past three years, the average daily demand from the existing tank to serve the downtown zone is 410,000 gpd. The downtown area is mostly built-out, but could experience minor increases in potable water demands in the future through redevelopment of existing properties. However, the additional water demand is not expected to be significant. The existing 2.8 MG tank has excess capacity to serve the eastern growth area, but is limited by its hydraulic gradient. The ground elevations in the eastern planning area are too high to be served with acceptable system pressure by gravity from this tank. A booster pump station is recommended to draw water out of the tank to adequately serve this eastern planning area.

Utilizing a nominal downtown increase of 40,000 gpd increases the future downtown average daily demand to 450,000 gpd. Combining this with the estimated 281,100 gpd demand for the additional eastern grown area results in a total of 731,100 gpd. Adding 5% non-revenue water loss and applying the 2.7 maximum daily demand factor equates to a future build-out

maximum daily demand of approximately 2.1 MGD, leaving approximately 700,000 gallons for fire flow storage in the 2.8 MG tank. Supplemental storage can be supplied by CWCWD's tank if needed. Therefore, the existing tank could serve this entire area at the estimated development densities and water demands with the addition of a booster pump station to serve the future growth.

Frederick owns an additional parcel on CR 17 just south of the existing tank. This property could be used for the booster pump station if there is not sufficient space at the current tank site.

#### *6.7.2 West Tank Service Area*

With the current tank serving downtown and future development in the eastern planning area, storage for the remainder of Frederick's service area is currently supplied by CWCWD. Additional storage in Frederick is recommended as back-up to improve reliability. Frederick's average daily demand for the past three years is approximately 1.7 MGD, with approximately 0.41 MGD being served by the existing water tank. Therefore, the remainder of the system has a current average daily demand of approximately 1.29 MGD.

Table 5-5 estimates average daily water demands for the remainder of the service area, identified in the table as properties numbering 1 through 22, and 28. The average daily demand for these properties at build-out in 2070 as listed in Table 5-5 totals approximately 3.8 mgd in future development. Combining the future demand with the current demand results in a total of approximately 5.1 mgd average daily demand for the West Tank service area at build-out. Adding 5% non-revenue water loss and applying the 2.7 factor results in a Maximum Daily Demand of 14.46 mgd. Utilizing a fire flow demand of 0.84 MG results in a total recommended storage capacity of 15.3 MG for the West Tank service area.

CWCWD already has 17 MG in storage available at the Carter Lake Filter Plant, which exceeds the build-out storage, so the storage Frederick provides is primarily to improve reliability in the event of an emergency or other limitation of CWCWD water supply. The 1988 CWCWD/Frederick agreement is referenced to estimate storage capacity to be supplied by Frederick. As discussed previously, the agreement indicates CWCWD is to supply storage for at least twice the average daily demand, which equates to 10.2 MG. This leaves a balance of 5.1 MG of storage recommended to be supplied by the Town of Frederick.

Table 6-2 below provides an estimate of storage needs for the West Tank Service Area throughout the planning period.

**Table 6-2 West Tank Storage Recommendation**

Year	Projected Avg Daily Demand (MGD)	Avg Daily Demand incl. 5% water loss (MGD)	Maximum Daily Demand Factor	Maximum Daily Demand (MGD)	Fire Flow Storage (MG)	Total Storage (MG)	CWCWD Storage (MG)	Recommended Town Storage, West Tank (MG)
2022	1.29	1.35	2.7	3.66	0.84	4.50	2.58	1.9
2023	1.32	1.39	2.7	3.75	0.84	4.59	2.64	1.9
2033	1.69	1.78	2.7	4.80	0.84	5.64	3.39	2.3
2043	2.27	2.39	2.7	6.44	0.84	7.28	4.54	2.7
2053	3.06	3.22	2.7	8.69	0.84	9.53	6.13	3.4
2063	4.13	4.34	2.7	11.72	0.84	12.56	8.27	4.3
2070	5.10	5.35	2.7	14.46	0.84	15.30	10.20	5.1

Based on Table 6-2, it is recommended the Town construct a 3 MG storage tank to meet projected storage needs for greater than 20 years. An additional tank could be considered for improved back-up storage around 2047. The timing of additional storage beyond the recommended 3 MG should be re-evaluated at least every five years.

### 6.8 Storage and Pressure Zone Summary

Frederick currently operates four pressure zones. One pressure zone is served by the Town’s existing 2.8 MG tank on Wheatland Boulevard (Tank Zone), a second zone includes the Ridgeway Boulevard area (Ridgeway Zone), a third primary pressure zone west of Colorado Boulevard (West Zone) is supplied water through 10 CWCWD master meters, and a fourth pressure zone for the Bear Industrial Park (Bear Industrial Zone) that is served by a CWCWD master meter and is hydraulically disconnected from the rest of the distribution system.

Recommendations for storage and pressure zones are as follows:

#### Recommendations

- Existing 2.8 MG tank continues to serve the downtown area and north of downtown, and a booster pump station is recommended to draw water from the 2.8 MG tank to serve future development in the eastern planning area. The booster pump station will create a separate pressure zone (East Zone). The timing of the booster pump station is based on development schedules and is therefore unknown.
- Construct a new 3 MG storage tank in the general vicinity of Milavec Reservoir to provide back-up storage to CWCWD storage. The tank could be an elevated storage tank set at a sufficient height to provide acceptable distribution pressure, or a ground storage tank with an accompanying booster pump station. Ground elevations in the vicinity of Milavec Reservoir are not sufficient for gravity service from a ground

storage tank. The 3 MG tank will be integrated into the West Pressure Zone, and adjustment of the CWCWD pressure reducing stations will be needed to provide water turnover in the tank to maintain water quality.

3. Construct a 12-inch waterline between the planned Silverstone Marketplace on the west side of Colorado Boulevard to Ridgeway Boulevard to integrate the Ridgeway Pressure Zone into the West Pressure Zone. The timing of this waterline is based on development schedules.
4. Construct a connecting waterline between Bear Industrial Park and Raspberry Hill to integrate the Bear Industrial Park into the larger West Pressure Zone, which will provide a second redundant water supply feed to the industrial park.

As waterlines are constructed for future development in the vicinity of the Frederick West Business Center, the customers in the business center that are currently served by individual CWCWD master meters can be connected into the West Pressure Zone system.

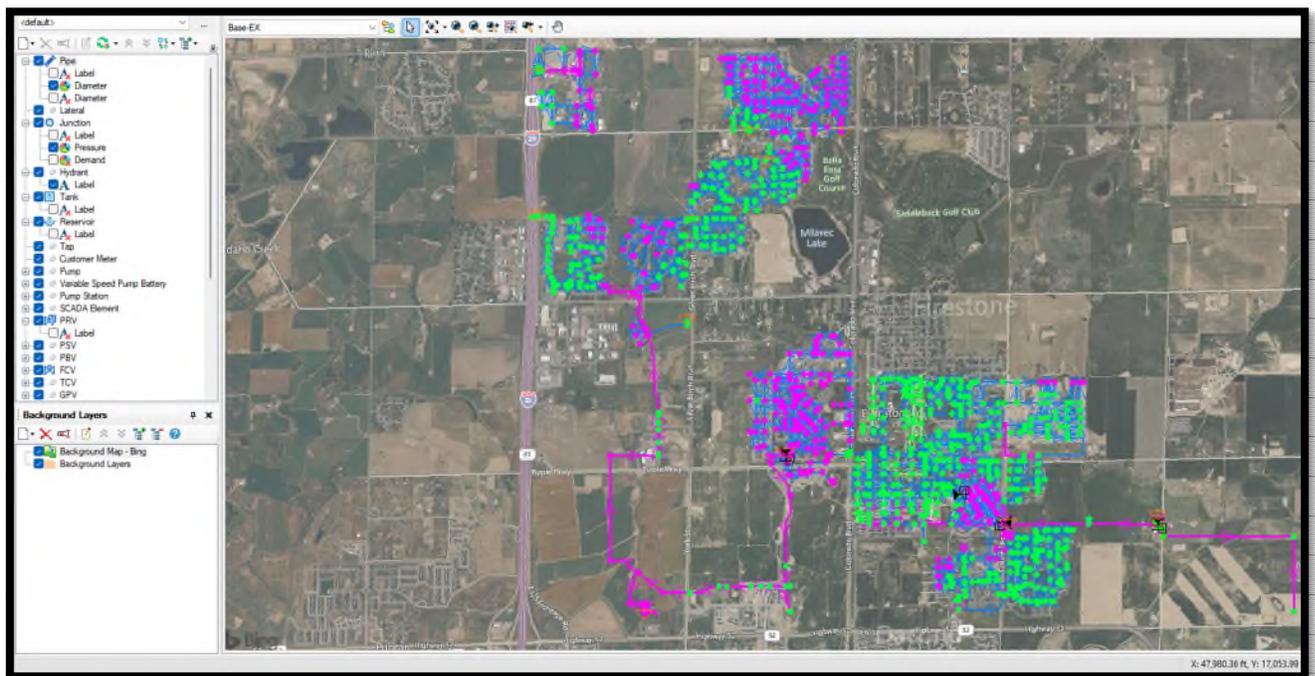
At build-out, it is planned the Town's system will include four pressure zones, with the current Bear Industrial and Ridgeway pressure zones being integrated into the West Pressure Zone, and the addition of the new East Pressure Zone. As waterlines are constructed in conjunction with development, it may be necessary to operate with additional pressure zones prior to build-out to accommodate developments as they progress, and to ensure adequate water turnover in the new 3 MG tank.



## 7.2 Hydraulic Model

### 7.2.1 Description

A computer-based hydraulic model is an important analysis tool for water systems. Forsgren updated the Town’s existing WaterGEMS model with the updated GIS Map data and customer water demands based on 2022 meter usage. Typical pressure settings furnished by CWCWD for each of the master meter/pressure reducing stations were also inputted. The Town’s storage tank water elevation was added, node elevations throughout the pipe network were compared to GoogleEarth data and adjusted when necessary.



*Frederick Potable Water System, Hydraulic Model Update Screenshot*

### 7.2.2 Hydraulic Model Calibration

After the steady-state hydraulic model was completed and validated, the model was calibrated using fire hydrant pressure and flow testing furnished by the Town’s Public Works Department. Eight fire hydrants spanned throughout the distribution system were selected and tested during February 2023. See Figure 7.1 and Table 7-1 for the locations and results of the fire hydrant flow tests.

Fire flow scenarios were run in the model for each of the hydrants tested, and the model was adjusted to approximate field test results for flow and pressure within a reasonable margin to create the calibrated model. Because the field tests were conducted during the winter, dry weather customer water demands were used for the calibrated existing conditions model.

Figure 7.1 Fire Hydrant Test Locations for Hydraulic Model Calibration

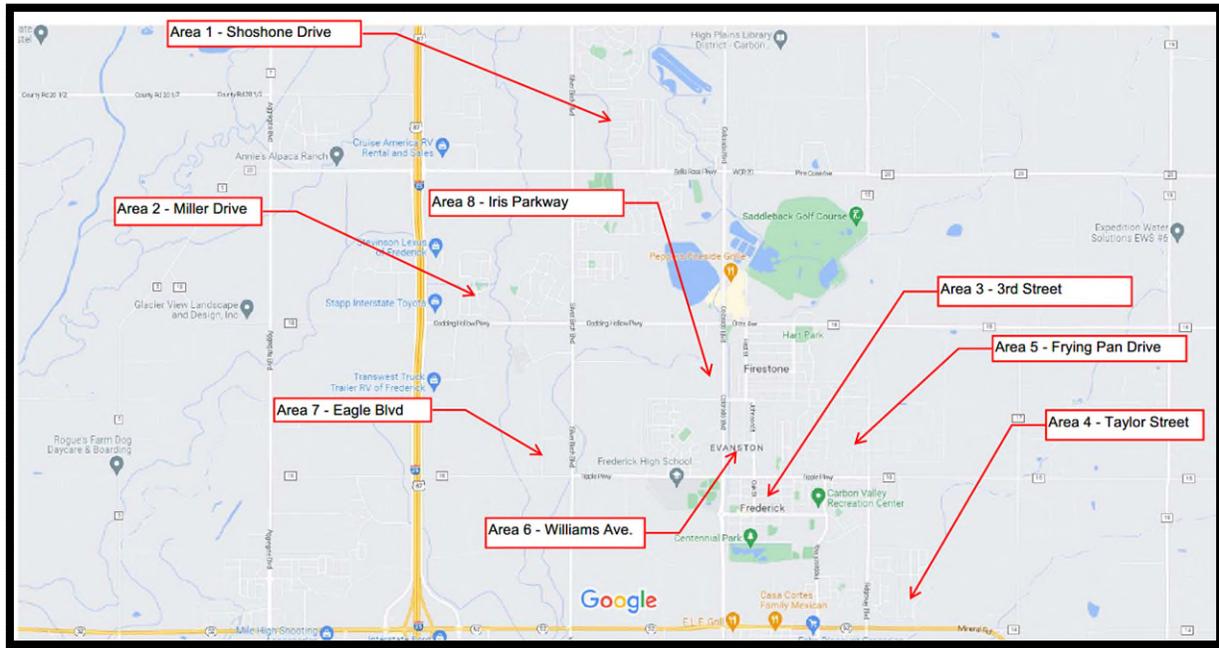


Table 7-1 Fire Hydrant Calibration Test Results

Area	Location	Flowing Hydrant		Location	Residual Hydrant
		Flow (gpm)	Pressure (psi) static/residual		Pressure (psi) static/residual
1	Shoshone/Sequoia	1455	105/75	Shoshone/Pinelands	102/102
2	8173 Miller Dr	1060	115/40	8129 Miller Dr	114/90
3	3rd St/Locust St	1130	70/45	3rd St/Walnut ST	70/48
4	6161 Taylor St	1350	110/65	6187 Taylor St	110/76
5	Across 7206 Frying Pan Dr	1000	56/35	across 7101 Frying Pan Dr	52/52
6	Williams/Abeyta	1190	78/50	Williams/Dunmire	78/76
7	Eagle Blvd/Agilent	1500	106/80	Eagle Blvd/Tipple	108/90
8	5989 Iris Parkway	1190	103/50	5969 Iris	90/90

Note: Fire hydrant testing by Town of Frederick Public Works Department, February 2023

### 7.2.3 Current Conditions Hydraulic Model

Several scenarios were run in the calibrated hydraulic model based on the criteria shown below in Table 7-2. See Section 5.1.3 of this report for the determination of the Maximum Daily and Peak Hour factors.

**Table 7-2 Hydraulic Model Demand Scenarios**

Scenario No.	Demand Scenario	Water Demands
1	Average Daily	2022 Meter Usage
2	Maximum Day plus Fire Flow	2.7 x Annual Avg Daily + Fire Flow <sup>1</sup>
3	Peak Hour	5.0 x Annual Avg Daily

1. Fire flows: 1500 gpm for Single-Family Residential, 3500 gpm for Commercial and Multi-Family Residential

For the Current Conditions Hydraulic Model, pressures throughout the distribution system for all scenarios listed in Table 7-2 were above acceptable minimum standards except for one scenario. For Scenario No. 2, Maximum Day plus Fire Flow, a fire flow of approximately 1700 gpm can be achieved in the downtown commercial area at a minimum pressure of 20 psi. This flow is less than the 3500 gpm listed in the Town’s Engineering Standards for a commercial area. The downtown area is served by the Town’s water storage tank, which is hydraulically limited by its elevation. Closed valves isolate the downtown area from other areas served by CWCWD master meters which generate higher pressures. To achieve a fire flow of 3,500 gpm downtown, one or more of these isolation valves needs to be opened, or modified to open automatically in the event of low pressure. This is reviewed further in the Future Conditions Model.

#### 7.2.4 Future Conditions Hydraulic Model

The Future Conditions Model is a sustainability tool, allowing infrastructure to be planned for capacity to meet the Town’s future expected water demands. Information from the Town’s Comprehensive and Land Use Plans are incorporated to promote connectivity by serving target growth areas, including undeveloped properties within the Town’s planning boundaries and the 25/52 East Subarea. The water needs of anticipated businesses and schools are also considered. The Town’s plan to convert 18 potable water users to non-potable water to conserve potable water is also incorporated by eliminating these demands from the model.

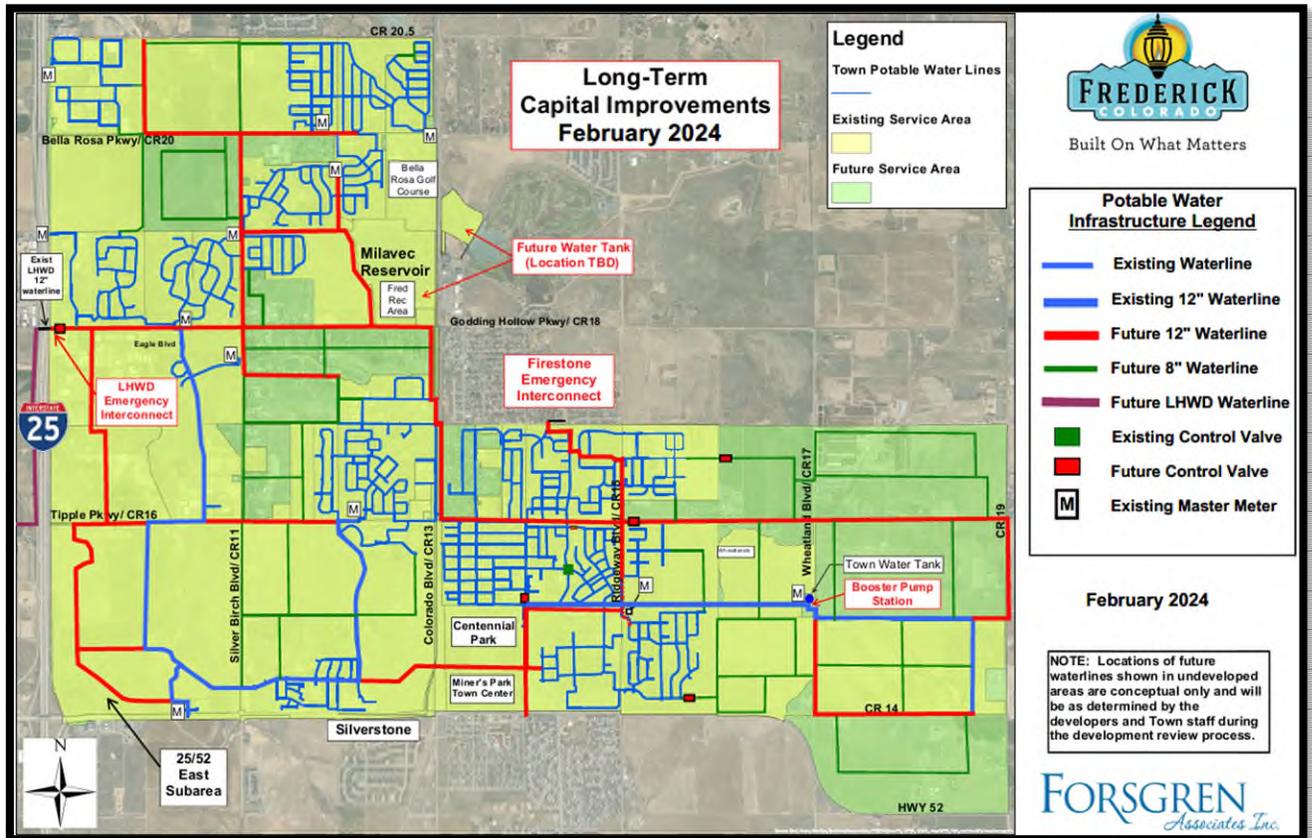
The Town’s Long Term Water Supply Plan identifies the potential need for a local water treatment plant in the coming years, potentially utilizing Milavec Reservoir as a water source. Since additional water storage is recommended, locating the future storage in proximity to the future water treatment plant has merit. The model includes storage and transmission mains to accommodate a future local water treatment plant in the vicinity of Milavec Reservoir. \

#### 7.2.5 Future Potable Water Infrastructure

To serve the future build-out development shown in Figure 5.2 at the potable water demands listed in Table 5-5, water mains were added to the model to develop a Future Conditions

model. The model assumes existing CWCWD master meters remain in operation, and CWCWD water storage continues to be available for Frederick. Water transmission mains are also positioned to convey water from a future water treatment plant that could potentially be constructed near Milavec Reservoir. Major future infrastructure improvements are shown below in Figure 7.2 and described afterwards. See the Appendix for a full-size copy of the Figure 7.2 map.

Figure 7.2 Long-Term Capital Improvements, Potable Water Infrastructure



Eastern Booster Pump Station

To serve future development in the vicinity of the existing storage tank on Wheatland Boulevard (CR 17), a Booster Pump Station is proposed. The topography of most of this area is higher than the operational hydraulic gradient of the existing tank, so pumping is necessary to achieve adequate system pressures. The existing tank has adequate capacity to serve this future development area. The timing of this booster pump station will be dependent on development. Frederick owns an additional parcel on CR 17 just south of the existing tank. This property could be used for the booster pump station if there is not sufficient space at the current tank site. This same Town-owned parcel is also a candidate for another potable water storage tank should the eastern planning area develop at a higher density than the Town’s current land use planning.

### Water Storage Facilities

Section 6 of this report provides an assessment and recommendations for storage facilities. A new 3 MG storage tank is recommended at a central location to serve all but the downtown and eastern planning areas, which will continue to be served by the existing 2.8 MG tank on Wheatland Boulevard. The cost opinions in this report will be based on a prestressed concrete ground storage tank with an accompanying booster pump station, both located in the general vicinity of Milavec Reservoir. This 3 MG tank will provide back-up storage to CWCWD's existing storage.

### Water Transmission Mains

To convey water to the future development and improve fire flows to existing, larger transmission mains are planned at the following general locations. This network of transmission mains will also allow potable water from a potential local treatment plant near Milavec Reservoir to be conveyed throughout the service area. Refer to Figure 7.2 for transmission main locations.

- Bella Rosa Parkway (CR 20)
- Godding Hollow Parkway (CR 18)
- Tipple Parkway (CR 16)
- West of Bear Industrial Park, between CR 20 and CR 20.5
- Future Storage Tank location (vicinity of Milavec Reservoir)
- 25/52 East Subarea
- Silver Birch Boulevard (CR 11)
- Parallel to Colorado Boulevard (CR 13)
- Frederick Way
- Ridgewood Boulevard (CR 15)
- Eastern planning area, including CR 14 and CR 19

In addition, CWCWD is planning to replace their existing 14-inch waterline that feeds Frederick's existing tank on Wheatland Boulevard with a 30-inch transmission main. After the 30-inch line is completed, the 14-inch waterline can be repurposed to replace the Town's 12-inch line that currently feeds the downtown area. Upsizing this line from 12-inch to 14-inch reduces headloss and improves fire flows in the tank pressure zone.

### Waterline Loops

To improve water quality and provide redundant water supply feeds, waterline loops are planned throughout the service area. The locations of most of the loops shown in Figure 7.2 are very approximate and are shown only to indicate that loops will be needed when the properties are developed. The exact location of the waterlines will be determined during the developer submittal process and reviewed by Town staff. One of the developer-driven lines is a 12-inch loop to the east between William Bailey Avenue and Linden Street, to be

constructed in conjunction with the Silverstone Marketplace and Miner’s Park Town Center developments.

Two waterline loops were identified as being higher priorities and recommended as short-term improvements for the Town to construct. The locations of these recommended loops are shown below.

- 8-inch connecting waterline between the Bear Industrial Park and Raspberry Hill
- 8-inch loop at 2<sup>nd</sup> Street near Hawthorne Street (with isolation/pressure control valve)

#### Pressure Control Valve for Tank Pressure Zone

The hydraulic model indicates fire flows for commercial and multi-family customers are lower than the Town’s standard in the downtown/tank pressure zone. To improve fire flows to commercial downtown customers, the proposed 2<sup>nd</sup> Street/Hawthorne Street waterline loop will include a normally closed control valve that will automatically open when pressure in the tank zone is low, allowing higher pressure from the CWCWD master meters to reinforce the existing tank pressure zone. This pressure control valve provides a 3500-gpm fire flow to the commercial downtown area to meet the Town’s standard.

#### Emergency Interconnections

The Left Hand Water District (LHWD) and the Town of Firestone receive potable water from CWCWD, but also have separate water supplies and treatment facilities. Due to the close proximity of these systems to Frederick’s distribution system, these water suppliers were contacted to discuss the potential for emergency interconnections. The quantity of water that could be supplied in the event of an emergency is dependent on several factors, and it is likely neither of these suppliers would be able to supply Frederick’s full potable water demand. Still, the capacity to access water in a CWCWD water shortage emergency is extremely beneficial.

After meeting with staff from the Town of Firestone and the Left Hand Water District, technically feasible locations for interconnects were identified as listed below.

1. Left Hand Water District – LHWD owns a 12-inch waterline that crosses I-25 at Godding Hollow Parkway (CR 18), connecting to a CWCWD master meter on the east side of the interstate. This CWCWD connection is currently needed to supply fire flows to LHWD’s service area north of CR 18. However, LHWD’s current master plan includes upgrades to waterlines along the west I-25 Frontage Road that will eliminate the need for this CWCWD feed. The timing of LHWD’s waterline upgrades is dependent on development and is therefore uncertain but is expected to be in the next 6 to 10 years. After these upgrades are completed, the 12-inch waterline across I-25 could be repurposed as an emergency interconnection to feed water from LHWD

to Frederick's water system. A pressure reducing station included in LHWD's master plan can be moved north of CR 18 to increase the available pressure for the interconnection. This emergency interconnection would provide the highest benefit to portions of Frederick's system west of Colorado Boulevard.

2. Town of Firestone – The most feasible location for an emergency interconnection with Firestone is at Firestone's 10-inch waterline near the McClure Avenue and Coal Ridge Drive intersection. This emergency interconnection will primarily benefit Frederick's service area west of Colorado Boulevard, enhanced by a future 12-inch transmission line between McClure Avenue and Leyden Creek Boulevard that is included in the Long-Term Capital Improvements.

The same demand scenarios listed in Table 6-2 were run in the Future Conditions model and adequate distribution system pressure is achieved in all scenarios. The emergency interconnections with LHWD and Firestone are more effective if used in conjunction with implementation of water restrictions to limit Frederick customer demands to critical needs without irrigation. Additional hydraulic modeling analysis is recommended during the design phases of the LHWD and Firestone emergency interconnections to maximize their effectiveness in providing water to Frederick to meet critical needs during an emergency.

## 8.0 CAPITAL IMPROVEMENTS PLAN

Most of the planned transmission mains listed in the previous Section 7 and shown in Figure 7.2 will be constructed in conjunction with developments, so their timing is unknown. To address more time-sensitive needs, Forsgren collaborated with Town staff to identify and prioritize improvements to be included in a 10-year Capital Improvements Plan (CIP).

Five projects were selected for the 10-year CIP to be constructed by the Town of Frederick, and three additional projects were identified to meet developer projects and, therefore, would be funded by developers. The timing of developer-driven projects is less certain, although the Silverstone Marketplace 12-inch eastern waterline loop is expected to be constructed within the next two years.

Figure 8.1 below provides a map of the recommended 10-year CIP projects. A full-size copy of the map is included in the Appendix.

**Figure 8.1 10-year Capital Improvements Projects, Potable Water Infrastructure**

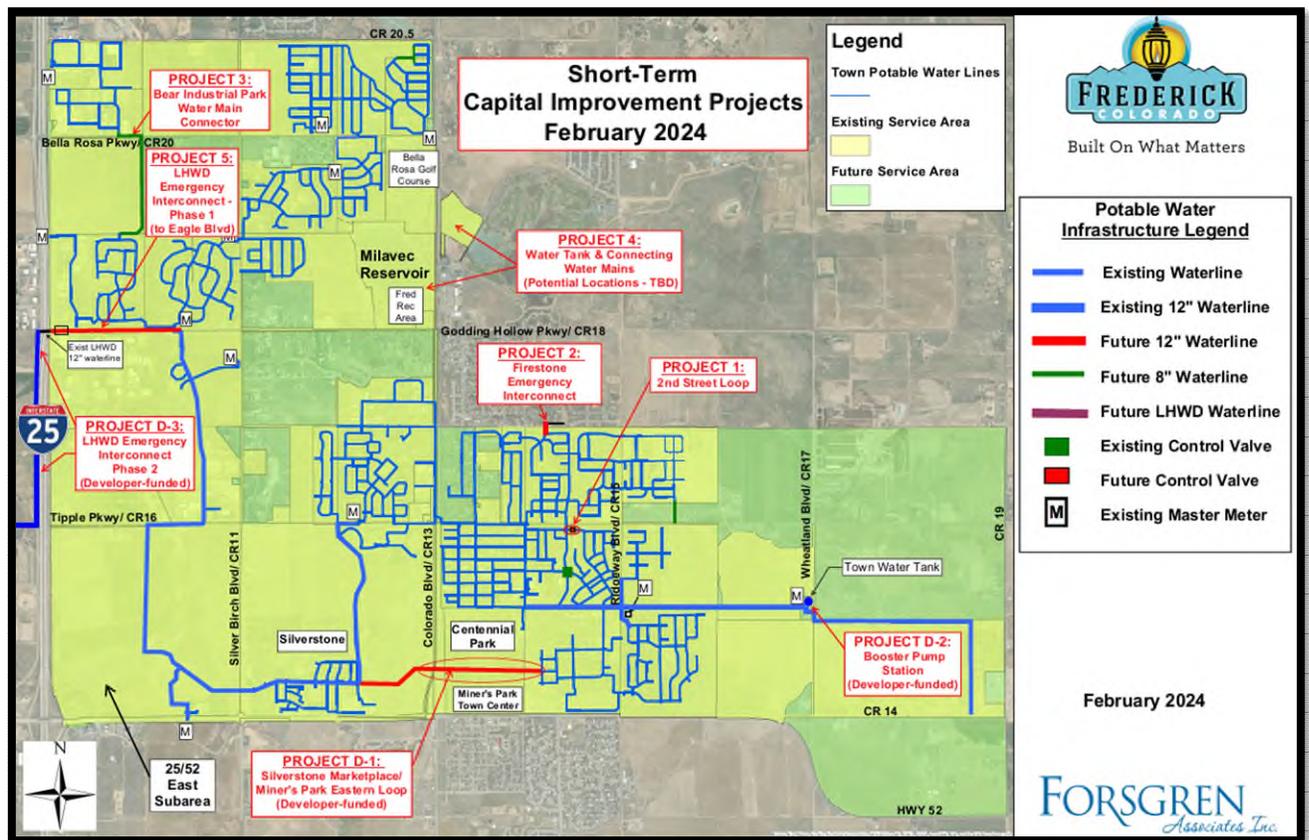


Table 8-1 below provides locations, anticipated timing and preliminary cost opinions for the 10-year CIP projects to be undertaken by the Town. Detailed preliminary cost opinions are provided in the Appendix.

**Table 8-1 10-year Capital Improvements Projects, Potable Water Infrastructure**

Project No.	Description	<sup>1</sup> Location	Estimated Timing Range	<sup>3</sup> Preliminary Project Cost Opinion	Project Goals
1	2 <sup>nd</sup> Street Loop	2 <sup>nd</sup> St at Hawthorne St	Years 1 to 2	\$0.4M	Improve Reliability & Fire Flow
2	Firestone Emergency Interconnect	Coal Ridge Dr & McClure Ave	Years 2 to 3	\$1.7M	Partial Emergency Backup Water Supply
3	Bear Industrial Park Connector	Bella Rosa Pkwy to Raspberry Dr	Years 3 to 4	\$1.4M	Improve Reliability
4	Water Storage Tank, Pump Station & Connectors	TBD	Years 5 to 7	\$12.6M	Additional Storage and Improve Reliability
5	<sup>2</sup> Left Hand Water District Emergency Interconnect – Phase 1	Godding Hollow Rd, East side of I-25	Years 6 to 10	\$3.8M	Partial Emergency Backup Water Supply

Notes:

1. Refer to Figure 8.1 for project locations.
2. Phase 1 Left Hand Water District emergency interconnect must be planned, designed and constructed in conjunction with Phase 2 described in Table 8-2. Timing is developer-dependent and may be sooner or later than the range shown in table.
3. All cost opinions are in current dollars and do not account for future inflation or price escalations.

Three projects shown in Table 8-2 are to be funded and constructed by developers. The preliminary cost opinions are provided to indicate an order of magnitude for the anticipated costs, but actual costs will be determined by the developers.

**Table 8-2 Developer-Funded Projects, Potable Water Infrastructure**

Project No.	Description	<sup>1</sup> Location	Estimated Timing Range	<sup>3</sup> Preliminary Project Cost Opinion	Project Goals
D-1	Silverstone Marketplace/Miner's Park Loop	13 <sup>th</sup> Street, south of Centennial Park	Years 1 to 2	\$1.9M (developer funded)	Improve Pressure to future developments
D-2	Booster Pump Station near existing Water Tank	Wheatland Blvd (CR 17)	TBD	\$2.9M (developer funded)	Expand tank service area to future development
D-3	<sup>2</sup> Left Hand Water District Emergency Interconnect – Phase 2	Bella Rosa Pkwy to Raspberry Dr	Years 6 to 10	TBD (developer funded)	Partial Emergency Backup Water Supply

Notes:

1. Refer to Figure 8.1 for project locations.
2. Phase 2 Left Hand Water District emergency interconnect must be planned, designed and constructed in conjunction with Phase 1 described in Table 8-1. Timing is developer-dependent and may be sooner or later than the range shown in table.
3. All cost opinions are in current dollars and do not account for future inflation or price escalations.

## 9.0 CONCLUSIONS AND RECOMMENDATIONS

### 9.1 Master Plan Summary

Based on feedback from Town staff and review of pipe ages, the Town’s potable water infrastructure appears to be in sound condition, with no immediate needs for repairs or replacements. The hydraulic model of the distribution system indicates minimum pressures and fire flows meet the Town’s engineering standards throughout the system, except for commercial and multi-family residential fire flow in the downtown area. The Master Plan includes a recommendation for a waterline loop at 2<sup>nd</sup> Street with a pressure control valve that will automatically increase pressure and flow downtown during a low-pressure incident to provide for commercial and multi-family fire flows to meet the Town’s engineering standard.

Significant population growth is anticipated in Frederick in the coming years as properties are developed. Potable water demands are projected to increase from approximately 1.9 to 6.0 mgd at build-out of the Town’s planning area. General locations for water transmission and distribution lines are provided in the Long-Term Capital Improvements Plan to accommodate future growth, with the timing of this infrastructure being driven by development. This allows Town planning and engineering staff to require that developers construct waterlines and loop connections where shown, and adequately sized to sustain future development.

A 10-year Capital Improvements Plan is provided in Section 8, pointing toward improved reliability in the short-term, with nearly \$20 million in Town-funded improvements identified over the next 10 years.

### 9.2 Public Engagement

Several opportunities were provided for public input into the Master Plan, including in-person information meetings and an on-line survey. Feedback from the public is addressed in the Master Plan as shown in the table below.

Topic	How Topic is Addressed in Master Plan
Drinking Water Quality	Provide additional loops in distribution system.
Affordability of drinking water	Recommend improvements that are necessary and cost effective, and identify potential grant funding sources.
Water Conservation	Complete a condition assessment of existing pipes to identify water leak issues. Convert irrigation of parks from potable to non-potable water.
Back-up Water Supply	Consider emergency interconnections with neighboring systems, and additional storage.

### 9.3 Potential Funding Sources

There are several programs that could potentially fund the projects included in the Capital Improvements Plan. Some of these programs are listed in the table below.

**Potential Funding Programs for CIP Projects**

Organization	Description	Grant or Loan
Department of Local Affairs (DOLA)	Energy & Mineral Impact Assistance Fund (EIAF)	Grant
Colorado Dept of Public Health & Environment (CDPHE)	Drinking Water Revolving Fund	Low-interest Loan
CDPHE	Bipartisan Infrastructure Law (BIL)	Low-interest Loan
Colorado Water Conservation Board (CWCB)	Water Plan Grant Program	Grant

### 9.4 Recommendations

With the rapid pace of development in Frederick, it is important that water system improvements are planned to reliably meet both present and future needs. This Potable Water Infrastructure Master Plan will be a valuable tool for Town staff to reference in their review of new development requests to ensure that new infrastructure provides long-term water reliability, while also being consistent with the Town’s land use and comprehensive plan goals.

Future potable water infrastructure recommended and shown in this Master Plan is intended to provide minimum requirements for future infrastructure to aid the Town in future development reviews. It is the responsibility of developers to design and construct the necessary potable water infrastructure based on the most recent available information at the time of development, and in accordance with all Town of Frederick policies, guidelines, codes, rules, and regulations.

# APPENDICES

# **APPENDIX A**

**TOWN OF FREDERICK  
POTABLE WATER INFRASTRUCTURE MASTER PLAN  
WATER PIPE RISK & RELIABILITY RATING TABLE  
August 15, 2023**

**Criteria:**

Condition Rating: based on remaining life of pipe material, scale of 1 to 4, with 4 being lowest remaining life  
Criticality Rating: based on criticality type, scale of 1 to 4, with 4 being most critical infrastructure  
Vulnerability Rating: based on history of breaks, or high pressure, scale of 0 to 2, with 2 being most vulnerable  
Risk Rating = Condition Rating + Criticality Rating + Vulnerability Rating. Maximum Risk Rating is 10.

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
C61	8	PVC	Yes	100	2004	81	main feeder or loop	1	2	1	4	
C62	8	PVC	Yes	100	2002	79	main feeder or loop	1	2	1	4	
C63	8	PVC	Yes	100	2005	82	main feeder or loop	1	2	1	4	
C64	8	PVC	Yes	100	1999	76	main feeder or loop	1	2	1	4	
C65	8	PVC	Yes	100	2013	90	main feeder or loop	1	2	1	4	
C66	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C67	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C68	8	PVC	yes	100	2005	82	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9013 (No Name Creek)
C69	8	PVC	yes	100	2002	79	main feeder or loop	1	2	1	4	
C610	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C611	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C612	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C613	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C614	8	PVC	no	100	2004	81	Poor redundancy	1	3	1	5	
C615	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C616	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C617	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C618	8	PVC	no	100	2001	78	main feeder or loop	1	2	1	4	
C619	8	PVC	no	100	2005	82	main feeder or loop	1	2	1	4	
C620	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C621	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C622	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C623	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C624	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C625	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C626	8	PVC	no	100	2004	81	main feeder or loop	1	2	0	3	
C627	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C628	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C629	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C630	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C631	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C632	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C633	8	PVC	yes	100	2015	92	main feeder or loop	1	2	1	4	
C634	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C635	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C636	8	PVC	yes	100	2013	90	Poor redundancy	1	3	1	5	
C637	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C638	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C639	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C640	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C641	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C642	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C643	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C644	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C645	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C646	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
C647	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C648	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
C649	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
C650	8	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9049 (The Farm)
C651	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
C652	8	PVC	Yes	100	2013	90	main feeder or loop	1	2	1	4	
C653	8	PVC	Yes	100	2003	80	main feeder or loop	1	2	1	4	
C654	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C655	8	PVC	Yes	100	2005	82	main feeder or loop	1	2	1	4	
C656	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C657	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C658	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C659	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
C660	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
C661	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
C662	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C663	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C664	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C665	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C666	8	PVC	yes	100	2005	82	good redundancy	1	1	1	3	
C667	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C668	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C669	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C670	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C671	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C672	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C673	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C674	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C675	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C676	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C677	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C678	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C679	8	PVC	yes	100	2013	90	Poor redundancy	1	3	1	5	
C680	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
C681	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C682	8	PVC	yes	100	2013	90	Poor redundancy	1	3	1	5	
C683	8	PVC	yes	100	2013	90	Poor redundancy	1	3	1	5	
C684	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C685	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C686	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C687	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C688	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C689	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C690	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C691	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C692	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C693	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C694	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C695	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C696	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C697	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C698	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C699	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C6100	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6101	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C6102	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6103	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C6104	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C6105	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C6106	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C6107	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C6108	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C6109	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6110	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
C6111	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C6112	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C6113	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
C6114	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6115	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C6116	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6117	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6118	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C6119	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C6120	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
C6121	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C6122	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C6123	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C6124	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C6125	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
C6126	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6127	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6128	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C6129	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
C6130	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C6131	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
C6132	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
C6133	8	PVC	yes	100	2019	96	Poor redundancy	1	3	1	5	
D61	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D62	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D63	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D64	8	PVC	yes	100	2000	77	main feeder or loop	1	2	1	4	
D65	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D66	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D67	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D68	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D69	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D610	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D611	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D612	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
D613	8	PVC	yes	100	2004	81	Poor redundancy	1	3	1	5	
D614	8	PVC	no	100	1999	76	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9023 (Summitview)
D615	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D616	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D617	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D618	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D619	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D620	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D621	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D622	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D623	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D624	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D625	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D626	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D627	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D628	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D629	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D630	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D631	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D632	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D633	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D634	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D635	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
D636	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D637	8	PVC	no	100	2000	77	Poor redundancy	1	3	0	4	
D638	8	PVC	no	100	1999	76	Poor redundancy	1	3	0	4	
D639	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D640	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
D641	8	PVC	no	100	1999	76	Poor redundancy	1	3	0	4	
D642	8	PVC	yes	100	2000	77	main feeder or loop	1	2	1	4	
D643	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D644	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D645	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D646	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D647	8	PVC	yes	100	2000	77	main feeder or loop	1	2	1	4	
D648	8	PVC	yes	100	2000	77	main feeder or loop	1	2	1	4	
D649	8	PVC	yes	100	2000	77	main feeder or loop	1	2	1	4	
D650	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D651	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D652	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D653	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D654	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D655	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D656	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D657	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D658	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D659	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D660	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D661	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D662	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D663	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
D664	8	PVC	yes	100	2005	82	Poor redundancy	1	3	1	5	
D665	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D666	8	PVC	yes	100	2000	77	Poor redundancy	1	3	1	5	CWCWD Master Meter turned off (#9048)
D667	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
D668	8	PVC	no	100	1999	76	Poor redundancy	1	3	0	4	
D669	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D670	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D671	8	PVC	yes	100	2004	81	main feeder or loop	1	2	0	3	
D672	8	PVC	no	100	1999	76	Poor redundancy	1	3	0	4	
D673	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D674	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D675	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D676	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D677	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D678	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D679	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D680	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D681	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D682	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D683	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D684	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D685	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
D686	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D687	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D688	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D689	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D690	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D691	8	PVC	yes	100	2000	77	main feeder or loop	1	2	1	4	
D692	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
D693	8	PVC	YES	100	2019	96	Poor redundancy	1	3	1	5	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
D51	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D52	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D53	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D54	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D55	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D56	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D57	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D58	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D59	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D510	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D511	8	PVC	yes	100	2012	89	good redundancy	1	1	1	3	
D512	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D513	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D514	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D515	8	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9025 (Eagle Valley)
D516	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D517	8	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9025 (Eagle Valley)
D518	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
D519	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D520	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D521	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D522	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D523	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D524	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D525	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D526	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D527	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D528	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D529	8	PVC	no	100	1999	76	Poor redundancy	1	3	0	4	
D530	8	PVC	yes	100	1999	76	good redundancy	1	1	1	3	
D531	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D532	12	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9025 (Eagle Valley)
D533	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D534	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D535	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D536	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D537	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D538	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D539	12	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D540	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D541	12	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D542	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D543	8	PVC	no	100	1999	76	main feeder or loop	1	2	0	3	
D544	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D545	12	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D546	12	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D547	12	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D548	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D549	8	PVC	yes	100	1999	76	good redundancy	1	1	1	3	
D550	12	PVC	yes	100	2005	82	Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
D551	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D552	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D553	8	PVC	yes	100	2005	82	Poor redundancy	1	3	1	5	
D554	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D555	12	PVC	yes	100	2005	82	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D556	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D557	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D558	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D559	12	PVC	yes	100	2005	82	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D560	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D561	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D562	8	PVC	no	100	1999	76	Poor redundancy	1	3	0	4	
D563	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D564	12	PVC	yes	100	1999	76	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9025 (Eagle Valley)
D565	12	PVC	yes	100	2005	82	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D566	12	PVC	yes	100	2005	82	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D567	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D568	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D569	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D570	12	PVC	yes	100	2005	82	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9066 (Raspberry)
D571	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D572	8	PVC	yes	100	2011	88	Poor redundancy	1	3	1	5	
D573	12	PVC	yes	100	2005	82	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D574	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D575	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D576	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D577	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D578	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D579	8	PVC	yes	100	2012	89	Poor redundancy	1	3	1	5	
D580	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D581	12	PVC	yes	100	2005	82	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9066 (Raspberry)
D582	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D583	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D584	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D585	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D586	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D587	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D588	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D589	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D590	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D591	8	PVC	yes	100	2012	89	Poor redundancy	1	3	1	5	
D592	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D593	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D594	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D595	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D596	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D597	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D598	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D599	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D5100	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
D5101	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
D5102	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D5103	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D5104	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D5105	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D5106	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D5107	8	PVC	yes	100	1999	76	Poor redundancy	1	3	1	5	
D5108	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D5109	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
D5110	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D5111	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D5112	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D5113	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D5114	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D5115	8	PVC	yes	100	2011	88	main feeder or loop	1	2	1	4	
D5116	8	PVC	yes	100	2012	89	main feeder or loop	1	2	1	4	
D5117	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D5118	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
D5119	8	PVC	yes	100	1999	76	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter #9025 (Eagle Valley)
D5120	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E51	12	PVC	yes	100	2014	91	Transmission Main from Master Meter, and to Water Critical Business	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC), to Agilant
E52	12	PVC	yes	100	2017	94	Water Critical Business	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC), to Agilant
E53	12	PVC	yes	100	2014	91	Water Critical Business	1	4	1	6	Main feed to Agilant
E54	8	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9068 (Elem School)
E55	8	PVC	yes	100	2020	97	Poor redundancy	1	3	1	5	
E56	12	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
E57	12	PVC	yes	100	2014	91	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
E58	12	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
E59	8	PVC	no	100	2004	81	Transmission Main from Master Meter or Tank	1	4	0	5	Main feed from CWCWD Master Meter # 9068 (Elem School)
E510	8	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9068 (Elem School)
E511	12	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
E512	12	PVC	yes	100	2014	91	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
E513	12	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
E514	8	PVC	yes	100	2004	81	Poor redundancy	1	3	1	5	
E515	8	PVC	no	100	2004	81	Transmission Main from Master Meter or Tank	1	4	0	5	Main feed from CWCWD Master Meter #9068 (Elem School)
E516	8	PVC	yes	100	2004	81	school or daycare	1	3	1	5	Legacy Elem School
E517	8	PVC	yes	100	2004	81	Poor redundancy	1	3	1	5	
E518	12	PVC	yes	100	2017	94	Transmission Main from Master Meter, and to Water Critical Business	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC), to Agilant
E519	12	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
E520	12	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
E52	8	PVC	yes	100	2004	81	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
E521	12	PVC	yes	100	2014	91	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F51	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F52	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F53	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F54	12	PVC	yes	100	2019	96	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F55	12	PVC	yes	100	2019	96	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F56	12	PVC	yes	100	2019	96	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F57	12	PVC	yes	100	2013	90	Medical Facility	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F58	12	PVC	yes	100	2019	96	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F59	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F510	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F511	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F512	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F513	12	PVC	yes	100	2013	90	Medical Facility	1	4	1	6	Hwy 52 Urgent Care
F514	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F515	12	PVC	yes	100	2013	90	Poor redundancy	1	3	1	5	
F516	12	PVC	yes	100	2013	90	Poor redundancy	1	3	1	5	
F517	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F518	12	PVC	yes	100	2013	90	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F61	8	PVC	yes	100	2010	87	school or daycare	1	3	1	5	High School
F62	8	PVC	yes	100	2010	87	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F63	8	PVC	no	100	2022	99	Poor redundancy	1	3	0	4	
F64	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F65	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F66	12	PVC	yes	100	2010	87	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F67	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F68	12	PVC	yes	100	2019	96	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F69	12	PVC	yes	100	2019	96	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F610	12	PVC	yes	100	2019	96	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F611	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F612	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F613	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F614	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
F615	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F616	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F617	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F618	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F619	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F620	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F621	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F622	12	PVC	yes	100	2010	87	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9092 (IPMC)
F623	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F624	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F625	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F626	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F627	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F628	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F629	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F630	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F631	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F632	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F633	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F634	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F635	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F636	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F637	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F638	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F639	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F640	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F641	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F642	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F643	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F644	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F645	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F646	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F647	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
F648	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F649	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F650	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F651	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F652	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F653	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F654	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F655	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F656	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F657	12	PVC	no	100	2019	96	Transmission Main from Master Meter or Tank	1	4	0	5	
F658	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F659	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
							Transmission Main from					
F660	12	PVC	no	100	2019	96	Master Meter or Tank	1	4	0	5	
F661	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F662	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F663	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F664	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F665	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F666	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F667	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F668	8	PVC	yes	100	2010	87	school or daycare	1	3	1	5	
F669	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F670	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
							Transmission Main from					
F671	12	PVC	no	100	2019	96	Master Meter or Tank	1	4	0	5	
F672	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F673	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F674	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F675	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F676	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F677	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F678	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F679	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F680	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F681	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F682	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F683	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F684	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F685	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
F686	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
F687	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
E61	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
							Transmission Main from					Main feed from CWCWD Master
E62	8	PVC	yes	100	1985	62	Master Meter or Tank	1	4	1	6	Meter # 9092 (IPMC)
E63	8	PVC	yes	100	2007	84	main feeder or loop	1	2	1	4	
E64	8	PVC	yes	100	2002	79	main feeder or loop	1	2	1	4	
E65	8	PVC	yes	100	2007	84	main feeder or loop	1	2	1	4	
E66	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E67	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E68	8	PVC	yes	100	1985	62	main feeder or loop	1	2	1	4	
E69	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E610	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
E611	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
E612	8	PVC	yes	100	2004	81	main feeder or loop	1	2	1	4	
E613	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E614	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E615	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
							Transmission Main from					Main feed from CWCWD Master
E616	12	PVC	yes	100	2001	78	Master Meter or Tank	1	4	1	6	Meter # 9045 (Countryside)
E617	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E618	8	PVC	yes	100	2002	79	good redundancy	1	1	1	3	
E619	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E620	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E621	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E622	8	PVC	yes	100	1985	62	Poor redundancy	1	3	1	5	
E623	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
E624	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E625	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E626	8	PVC	yes	100	2002	79	main feeder or loop	1	2	1	4	
E627	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
E628	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E629	8	PVC	yes	100	2005	82	good redundancy	1	1	1	3	
E630	8	PVC	yes	100	2018	95	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9045 (Countryside)
E631	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E632	8	PVC	yes	100	2005	82	good redundancy	1	1	1	3	
E633	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E634	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E635	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E636	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E637	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E638	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E639	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E640	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E641	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E642	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
E643	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E644	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E645	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E646	8	PVC	yes	100	1985	62	main feeder or loop	1	2	1	4	
E647	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
E648	8	PVC	yes	100	2007	84	main feeder or loop	1	2	1	4	
E649	8	PVC	yes	100	1985	62	main feeder or loop	1	2	1	4	
E650	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E651	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E652	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E653	8	PVC	yes	100	2007	84	Poor redundancy	1	3	1	5	
E654	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E655	8	PVC	yes	100	2007	84	Poor redundancy	1	3	1	5	
E656	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E657	8	PVC	yes	100	2018	95	good redundancy	1	1	1	3	
E658	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
E659	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E660	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E661	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E662	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E663	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E664	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E665	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E666	8	PVC	yes	100	1985	62	main feeder or loop	1	2	1	4	
E667	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E668	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
E669	8	PVC	yes	100	2018	95	Poor redundancy	1	3	1	5	
E670	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E671	8	PVC	yes	100	2018	95	Poor redundancy	1	3	1	5	
E672	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E673	8	PVC	yes	100	2007	84	Poor redundancy	1	3	1	5	
E674	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
E675	8	PVC	yes	100	2002	79	good redundancy	1	1	1	3	
E676	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E677	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E678	8	PVC	yes	100	2001	78	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9045 (Countryside)
E679	8	PVC	yes	100	2001	78	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9045 (Countryside)
E680	8	PVC	yes	100	2005	82	good redundancy	1	1	1	3	
E681	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E682	8	PVC	yes	100	2005	82	good redundancy	1	1	1	3	
E683	8	PVC	yes	100	2007	84	Poor redundancy	1	3	1	5	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
E684	8	PVC	yes	100	1985	62	main feeder or loop	1	2	1	4	
E685	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E686	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E687	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E688	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E689	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E690	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E691	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E692	8	PVC	yes	100	2002	79	main feeder or loop	1	2	1	4	
E693	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E694	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E695	8	PVC	yes	100	1985	62	main feeder or loop	1	2	1	4	
E696	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E697	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E698	8	PVC	yes	100	2018	95	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9045 (Counterside)
E699	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E6100	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6101	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6102	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6103	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E6104	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E6105	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E6106	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E6107	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E6108	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E6109	8	PVC	yes	100	2001	78	good redundancy	1	1	1	3	
E6110	8	PVC	yes	100	2003	80	main feeder or loop	1	2	1	4	
E6111	8	PVC	yes	100	2005	82	good redundancy	1	1	1	3	
E6112	8	PVC	yes	100	2002	79	good redundancy	1	1	1	3	
E6113	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E6114	8	PVC	yes	100	2003	80	good redundancy	1	1	1	3	
E6115	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
E6116	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
E6117	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6118	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6119	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6120	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6121	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6122	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6123	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6124	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6125	8	PVC	yes	100	2018	95	main feeder or loop	1	2	1	4	
E6126	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E6127	8	PVC	yes	100	1999	76	main feeder or loop	1	2	1	4	
E71	6	PVC	no	100	1978	55	main feeder or loop	1	2	0	3	
E72	6	PVC	no	100	1978	55	main feeder or loop	1	2	0	3	
E73	6	PVC	no	100	1994	71	good redundancy	1	1	0	2	
E74	6	PVC	no	100	1995	72	main feeder or loop	1	2	0	3	
E75	6	PVC	no	100	1978	55	main feeder or loop	1	2	0	3	
E76	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E77	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E78	6	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E79	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E710	8	PVC	no	100	2016	93	main feeder or loop	1	2	0	3	
E711	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E712	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
E713	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E714	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
E715	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E716	6	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E717	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E718	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E719	6	PVC	no	100	1978	55	main feeder or loop	1	2	0	3	
E720	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
E721	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E722	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E723	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E724	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E725	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E726	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E727	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E728	8	PVC	no	100	2017	94	main feeder or loop	1	2	0	3	
E729	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E730	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E731	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E732	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E733	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E734	8	PVC	no	100	2000	77	good redundancy	1	1	0	2	
E735	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E736	6	PVC	no	100	1995	72	main feeder or loop	1	2	0	3	
E737	8	PVC	no	100	2018	95	good redundancy	1	1	0	2	
E738	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
E739	8	PVC	no	100	2019	96	Poor redundancy	1	3	0	4	
E740	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E741	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E742	8	PVC	no	100	2000	77	good redundancy	1	1	0	2	
E743	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E744	8	PVC	no	100	1985	62	main feeder or loop	1	2	0	3	
E745	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
E746	8	PVC	no	100	2017	94	main feeder or loop	1	2	0	3	
E747	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E748	8	PVC	no	100	2018	95	good redundancy	1	1	0	2	
E749	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E750	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E751	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E752	6	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E753	4	PVC	no	100	2000	77	Poor redundancy	1	3	0	4	
E754	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E755	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E756	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E757	8	PVC	no	100	2017	94	Poor redundancy	1	3	0	4	
E758	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E759	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E760	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E761	8	PVC	no	100	2018	95	good redundancy	1	1	0	2	
E762	6	PVC	no	100	1978	55	good redundancy	1	1	0	2	
E763	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E764	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E765	8	PVC	no	100	2017	94	good redundancy	1	1	0	2	
E766	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E767	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E768	8	PVC	no	100	2018	95	good redundancy	1	1	0	2	
E769	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E770	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E771	8	PVC	no	100	2000	77	Poor redundancy	1	3	0	4	
E772	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	3	
E773	8	PVC	no	100	2018	95	good redundancy	1	1	0	2	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
E774	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E775	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E776	8	PVC	no	100	2001	78	good redundancy	1	1	0	2	
E777	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E778	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E779	8	PVC	no	100	2000	77	good redundancy	1	1	0	2	
E780	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E781	6	PVC	no	100	1995	72	main feeder or loop	1	2	0	3	
E782	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E783	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E784	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E785	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E786	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E787	8	PVC	no	100	2017	94	main feeder or loop	1	2	0	3	
E788	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E789	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E790	8	PVC	no	100	2018	95	Poor redundancy	1	3	0	4	
E791	8	PVC	no	100	2017	94	Poor redundancy	1	3	0	4	
E792	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E793	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E794	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E795	8	PVC	no	100	2001	78	good redundancy	1	1	0	2	
E796	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E797	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E798	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E799	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E7100	8	PVC	no	100	2018	95	Poor redundancy	1	3	0	4	
E7101	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7102	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7103	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7104	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7105	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7106	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7107	8	PVC	no	100	2019	96	good redundancy	1	1	0	2	
E7108	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7109	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7110	8	PVC	no	100	1995	72	main feeder or loop	1	2	0	3	
E7111	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
E7112	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
E7113	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7114	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E7115	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E7116	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7117	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7118	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7119	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
E7120	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7121	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7122	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7123	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7124	8	PVC	no	100	1995	72	main feeder or loop	1	2	0	3	
E7125	8	PVC	no	100	1995	72	main feeder or loop	1	2	0	3	
E7126	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7127	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
E7128	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
E7129	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	3	
E7130	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	3	
E21	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E22	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
E23	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E24	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E25	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E26	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E27	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E28	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E29	8	PVC	no	100	2020	97	Poor redundancy	1	3	0	4	
E10	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E211	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E212	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E213	8	PVC	no	100	2022	99	Poor redundancy	1	3	0	4	
E214	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E215	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E216	8	PVC	no	100	2020	97	Poor redundancy	1	3	0	4	
E217	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E218	8	PVC	no	100	2020	97	main feeder or loop	1	3	0	4	
E219	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E220	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E221	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E222	8	PVC	no	100	2022	99	Poor redundancy	1	3	0	4	
E223	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E224	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E225	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E226	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E227	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E228	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E229	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E230	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E231	8	PVC	no	100	2020	97	Poor redundancy	1	3	0	4	
E232	8	PVC	no	100	2020	97	Poor redundancy	1	3	0	4	
E233	8	PVC	no	100	2020	97	good redundancy	1	1	0	2	
E234	8	PVC	no	100	2022	99	good redundancy	1	1	0	2	
E235	8	PVC	no	100	2020	97	Poor redundancy	1	3	0	4	
E236	8	PVC	no	100	2022	99	good redundancy	1	1	0	2	
E237	8	PVC	no	100	2020	97	good redundancy	1	1	0	2	
E238	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E239	8	PVC	no	100	2020	97	main feeder or loop	1	3	0	4	
E240	8	PVC	no	100	2020	97	good redundancy	1	1	0	2	
E241	8	PVC	no	100	2020	97	good redundancy	1	1	0	2	
E242	8	PVC	no	100	2020	97	good redundancy	1	1	0	2	
E243	8	PVC	no	100	2022	99	good redundancy	1	1	0	2	
E244	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E245	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E246	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E247	8	PVC	no	100	2022	99	good redundancy	1	1	0	2	
E248	8	PVC	no	100	2020	97	good redundancy	1	1	0	2	
E249	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E250	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E251	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E252	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E253	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E254	8	PVC	no	100	2022	99	good redundancy	1	1	0	2	
E255	8	PVC	no	100	2022	99	good redundancy	1	2	0	3	
E256	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E257	8	PVC	no	100	2022	99	Poor redundancy	1	3	0	4	
E258	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E259	8	PVC	no	100	2020	97	good redundancy	1	1	0	2	
E260	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E261	8	PVC	no	100	2020	97	good redundancy	1	1	0	2	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
E262	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E263	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E264	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E265	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
E266	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E267	8	PVC	no	100	2020	97	Poor redundancy	1	3	0	4	
E268	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E269	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E270	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E271	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E272	8	PVC	no	100	2020	97	Poor redundancy	1	3	0	4	
E273	8	PVC	no	100	2020	97	main feeder or loop	1	2	0	3	
E274	8	PVC	no	100	2022	99	main feeder or loop	1	2	0	3	
F81	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F82	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F83	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F84	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F85	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F86	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F84	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F88	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F89	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F810	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F811	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F812	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F813	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F814	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F815	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F816	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F817	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F818	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F819	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F820	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F821	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F822	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F823	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F824	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F825	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F826	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F827	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
							Transmission Main from					
F828	12	AC	no	70	1978	25	Master Meter and Tank	2	4	0	6	Main transmission from Town Tank
F829	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
							Transmission Main from					
F830	12	AC	no	70	1978	25	Master Meter and Tank	2	4	0	6	Main transmission from Town Tank
							Transmission Main from					
F831	12	AC	no	70	1978	25	Master Meter and Tank	2	4	0	6	Main transmission from Town Tank
F832	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F833	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F834	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F835	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F836	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F837	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F838	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F839	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F840	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F841	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F842	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F843	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
F844	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F845	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F846	8	PVC	no	100	2001	78	good redundancy	1	1	0	2	
F847	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F848	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F849	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F850	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F851	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F852	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F853	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F854	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F855	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F856	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F857	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F858	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F859	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F860	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F861	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F862	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F863	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F864	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F865	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F866	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F867	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F868	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F869	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F870	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F871	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F872	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F873	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F874	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F875	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F876	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F877	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F878	8	PVC	no	100	2001	78	good redundancy	1	1	0	2	
							Transmission Main from					Main feed from CWCWD Master
F879	8	PVC	yes	100	2001	78	Master Meter or Tank	1	4	1	6	Meter # 9038 (Prairieview)
F880	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F881	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F882	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F883	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F884	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F885	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F886	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F887	8	PVC	no	100	2003	80	Poor redundancy	1	3	0	4	
F888	8	PVC	no	100	2001	78	good redundancy	1	1	0	2	
F889	8	PVC	no	100	2003	80	good redundancy	1	1	0	2	
							Transmission Main from					Main feed from CWCWD Master
F890	8	PVC	yes	100	2001	78	Master Meter or Tank	1	4	1	6	Meter # 9038 (Prairie View)
F891	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F892	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F893	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F894	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F895	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F896	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F897	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F898	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F899	8	PVC	no	100	2003	80	Poor redundancy	1	3	0	4	
F8100	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
F8101	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8102	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F8103	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F8104	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8105	8	PVC	no	100	2003	80	Poor redundancy	1	3	0	4	
F8106	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F8107	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8108	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8109	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8110	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8111	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8112	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F8113	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8114	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8115	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F8116	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8117	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8118	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8119	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8120	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F8121	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8122	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8123	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F8124	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8125	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8126	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8127	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8128	8	PVC	no	100	2003	80	Poor redundancy	1	3	0	4	
F8129	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8130	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8131	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8132	12	PVC	no	100	1978	55	Transmission Main from Master Meter or Tank	1	4	0	5	
F8133	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8134	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8135	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8136	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8137	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8138	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8139	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8140	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8141	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8142	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8143	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F8144	8	PVC	no	100	2001	78	Poor redundancy	1	3	0	4	
F8145	8	PVC	no	100	2003	80	main feeder or loop	1	2	0	3	
F8146	8	PVC	yes	100	2001	78	Poor redundancy	1	3	1	5	
F91	12	PVC	no	100	2006	83	Transmission Main from Master Meter or Tank	1	4	0	5	
F92	12	PVC	no	100	2006	83	Transmission Main from Master Meter or Tank	1	4	0	5	
F93	12	PVC	no	100	2006	83	Transmission Main from Master Meter or Tank	1	4	0	5	
F94	12	PVC	no	100	2006	83	Transmission Main from Master Meter or Tank	1	4	0	5	
F95	12	PVC	no	100	2006	83	Transmission Main from Master Meter or Tank	1	4	0	5	
F96	12	PVC	NO	100	2006	83	Transmission Main from Master Meter or Tank	1	4	0	5	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
F71	8	PVC	yes	100	2001	78	Transmission Main from Master Meter or Tank	1	4	1	6	Main feed from CWCWD Master Meter # 9038 (Prarie View)
F72	12	AC	no	70	1978	25	Transmission Main from Master Meter or Tank	2	4	0	6	Main transmission from Town Tank
F73	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F74	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F75	12	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F76	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F77	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F78	8	PVC	yes	100	2016	93	main feeder or loop	1	2	1	4	
F79	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F710	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F711	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
F712	12	AC	no	70	1978	25	Transmission Main from Master Meter or Tank	2	4	0	6	Main transmission from Town Tank
F713	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F714	8	PVC	no	100	1996	73	main feeder or loop	1	2	0	3	
F715	12	PVC	no	70	2006	53	Transmission Main from Master Meter or Tank	1	4	0	5	
F716	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F717	8	PVC	yes	100	2016	93	main feeder or loop	1	2	1	4	
F718	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F719	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F720	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F721	8	PVC	yes	100	2016	93	main feeder or loop	1	2	1	4	
F722	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F723	12	PVC	no	100	2006	83	Poor redundancy	1	3	0	4	
F724	4	PVC	no	100	Unknown	Unknown	school or daycare	N/A	3	0	3	
F725	8	PVC	yes	100	2006	83	main feeder or loop	1	2	1	4	
F726	8	PVC	no	100	2005	82	main feeder or loop	1	2	0	3	
F727	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F728	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3	
F729	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F730	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F731	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F732	10	PVC	no	100	Unknown	Unknown	Transmission Main from Master Meter or Tank	N/A	4	0	4	
F733	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F734	8	PVC	yes	100	2000	77	main feeder or loop	1	2	1	4	
F735	8	PVC	no	100	2005	82	main feeder or loop	1	2	0	3	
F736	8	PVC	no	100	2012	89	main feeder or loop	1	2	0	3	
F737	8	PVC	no	100	2012	89	main feeder or loop	1	2	0	3	
F738	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F739	10	PVC	no	100	1994	71	Transmission Main from Master Meter or Tank	1	4	0	5	
F740	8	PVC	no	100	2012	89	main feeder or loop	1	2	0	3	
F741	8	PVC	no	100	1996	73	main feeder or loop	1	2	0	3	
F742	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F743	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F744	8	PVC	YES	100	2016	93	main feeder or loop	1	2	1	4	
F745	4	PVC	no	100	Unknown	Unknown	good redundancy	N/A	1	0	1	
F746	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F747	8	PVC	YES	100	2001	78	Poor redundancy	1	3	0	4	
F748	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F749	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F750	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F751	10	PVC	no	100	1994	71	Transmission Main from Master Meter or Tank	1	4	0	5	
F752	8	PVC	YES	100	2016	93	main feeder or loop	1	2	1	4	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes	
F753	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3		
F754	8	PVC	no	100	2012	89	main feeder or loop	1	2	0	3		
F755	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3		
F756	6	PVC	no	100	1990	67	main feeder or loop	1	2	0	3		
F757	8	PVC	YES	100	2000	77	main feeder or loop	1	2	1	4		
F758	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
							Transmission Main from						
F759	10	PVC	no	100	Unknown	Unknown	Master Meter or Tank	N/A	4	0	4		
F760	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F761	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F762	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3		
F763	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F764	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F765	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F766	6	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F767	6	PVC	no	100	1993	70	main feeder or loop	1	2	0	3		
F768	6	PVC	no	100	Unknown	Unknown	Poor redundancy	N/A	3	0	3		
F769	4	PVC	no	100	Unknown	Unknown	Poor redundancy	N/A	3	0	3		
F770	6	PVC	no	100	Unknown	Unknown	school or daycare	N/A	3	0	3		
							Transmission Main from						
F771	10	PVC	no	100	1994	71	Master Meter or Tank	1	4	0	5		
F772	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3		
F773	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3		
F774	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F775	8	PVC	yes	100	2013	90	main feeder or loop	1	2	0	3		
F776	8	PVC	no	100	1993	70	good redundancy	1	1	0	2		
F777	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F778	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3		
F779	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F780	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3		
							Transmission Main from						
F781	12	AC	no	70	1978	25	Master Meter or Tank	2	4	0	6	Main transmission from Town Tank	
F782	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3		
F783	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F784	8	PVC	no	100	Unknown	Unknown	good redundancy	N/A	1	0	1		
F785	8	PVC	no	100	Unknown	Unknown	good redundancy	N/A	1	0	1		
F786	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3		
F787	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	..	
F788	8	PVC	no	100	Unknown	Unknown	Poor redundancy	N/A	3	0	3		
F789	10	PVC	no	100	1990	67	main feeder or loop	1	2	0	3		
F790	8	pvc	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
							Transmission Main from						
F791	12	AC	no	70	1978	25	Master Meter or Tank	2	4	0	6	Main transmission from Town Tank	
							Transmission Main from						
F792	10	PVC	no	100	Unknown	Unknown	Master Meter or Tank	N/A	4	0	4		
F793	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4		
F794	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4		
F795	6	PVC	no	100	1990	67	main feeder or loop	1	2	0	3		
F796	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4		
F797	6	PVC	no	100	Unknown	Unknown	school or daycare	N/A	3	0	3		
							Transmission Main from						
F798	12	AC	no	70	1978	25	Master Meter or Tank	2	4	0	6	Main transmission from Town Tank	
F799	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3		
F7100	10	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		
F7101	8	PVC	yes	100	2000	77	Poor redundancy	1	3	1	5		
F7102	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4		
							Transmission Main from						
F7103	12	AC	no	100	Unknown	Unknown	Master Meter or Tank	N/A	4	0	4		
F7104	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2		

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
F7105	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	3	
F7106	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F7107	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F7108	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7109	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
F7110	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
F7111	8	PVC	yes	100	2013	90	Poor redundancy	1	3	1	5	
F7112	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3	
F7113	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7114	8	PVC	yes	100	2013	90	good redundancy	1	1	1	3	
F7115	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	2	
F7116	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F7117	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
F7118	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F7119	8	PVC	yes	100	2005	82	Poor redundancy	1	3	1	5	
F7120	8	PVC	yes	100	2016	93	main feeder or loop	1	2	1	4	
F7121	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
F7122	8	PVC	yes	100	2016	93	main feeder or loop	1	2	1	4	
F7123	8	PVC	no	100	2013	90	main feeder or loop	1	2	1	4	
F7124	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7125	8	PVC	yes	100	2001	78	Poor redundancy	1	3	1	5	
F7126	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3	
F7127	8	PVC	no	100	2000	77	Poor redundancy	1	3	0	4	
							Transmission Main from					
F7128	10	PVC	no	100	1994	71	Master Meter or Tank	1	4	0	5	
F7129	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
F7130	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7131	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7132	8	PVC	no	100	2013	90	Poor redundancy	1	3	0	4	
F7133	8	PVC	yes	100	2016	93	main feeder or loop	1	2	1	4	
F7134	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	3	
F7135	8	PVC	no	100	1996	73	main feeder or loop	1	2	0	3	
							Transmission Main from					
F7136	10	PVC	no	100	1994	71	Master Meter or Tank	1	4	0	5	
F7137	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	3	
F7138	6	PVC	no	100	Unknown	Unknown	school or daycare	N/A	3	0	3	
F7139	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3	
F7140	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7141	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
F7142	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	3	
F7143	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7144	8	PVC	no	100	Unknown	Unknown	school or daycare	N/A	3	0	3	
F7145	8	PVC	yes	100	2005	82	Poor redundancy	1	3	0	4	
F7146	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F7147	8	PVC	no	100	2000	77	main feeder or loop	1	2	1	4	
F7148	6	PVC	no	100	Unknown	Unknown	school or daycare	N/A	3	0	3	
F7149	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F7150	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7151	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F7152	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F7153	8	PVC	yes	100	2005	82	Poor redundancy	1	3	1	5	
F7154	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7155	8	PVC	yes	100	2005	82	Poor redundancy	1	3	1	5	
F7156	6	PVC	no	100	1990	67	Poor redundancy	1	3	0	4	
F7157	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F7158	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7159	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7160	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7161	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	

Pipe No.	Size (in)	Material	Pressure 95 PSI or Greater	Useful Life (yr)	Install Date	Remaining Life (yr)	Criticality Type	Condition Rating	Criticality Rating	Vulnerability Rating	Risk Rating	Notes
F7162	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7163	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7164	8	PVC	yes	100	2016	93	main feeder or loop	1	2	1	4	
F7165	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	3	
F7166	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F7167	6	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F7168	6	PVC	no	100	1990	67	main feeder or loop	1	2	0	3	
F7169	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3	
F7170	12	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
Transmission Main from												
F7171	12	AC	no	70	1978	25	Master Meter or Tank	2	4	0	6	Main transmission from Town Tank
F7172	8	PVC	no	100	1993	70	Poor redundancy	1	3	0	4	
F7173	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7174	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F7175	8	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F7176	8	PVC	no	100	1993	70	Poor redundancy	1	3	0	4	
F7177	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F7178	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	3	
F7179	6	PVC	no	100	1990	67	Poor redundancy	1	3	0	4	
F7180	8	PVC	yes	100	2005	82	Poor redundancy	1	3	1	5	
F7181	6	PVC	no	100	2001	78	main feeder or loop	1	2	0	3	
F7182	6	PVC	no	100	1990	67	main feeder or loop	1	2	0	3	
F7183	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7184	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F7185	10	PVC	no	100	1978	55	main feeder or loop	1	2	0	3	
F7186	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
Transmission Main from												
F7187	10	PVC	no	100	1994	71	Master Meter or Tank	1	4	0	5	
F7188	8	PVC	yes	100	2005	82	main feeder or loop	1	2	1	4	
F7189	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7190	8	PVC	no	100	2006	83	Poor redundancy	1	3	0	4	
F7191	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
F7192	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7193	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7194	8	PVC	no	100	1993	70	main feeder or loop	1	2	0	3	
F7195	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3	
F7196	8	PVC	yes	100	2013	90	main feeder or loop	1	2	1	4	
F7197	8	PVC	no	100	2013	90	main feeder or loop	1	2	0	3	
F7198	8	PVC	no	100	1990	67	main feeder or loop	1	2	0	3	
F7199	6	PVC	no	100	1990	67	main feeder or loop	1	2	0	3	
F7200	8	PVC	no	100	1994	71	main feeder or loop	1	2	0	3	
F7201	8	PVC	no	100	1990	67	main feeder or loop	1	2	0	3	
F7202	8	PVC	yes	100	2001	78	main feeder or loop	1	2	1	4	
F7203	8	PVC	no	100	2005	82	main feeder or loop	1	2	0	3	
F7204	8	PVC	yes	100	1996	73	main feeder or loop	1	2	1	4	
F7205	8	PVC	no	100	1994	71	Poor redundancy	1	3	0	4	
F7207	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7208	8	PVC	no	100	Unknown	Unknown	main feeder or loop	N/A	2	0	2	
F7209	8	PVC	no	100	Unknown	Unknown	Poor redundancy	N/A	3	0	3	
F7210	8	PVC	no	100	Unknown	Unknown	Poor redundancy	N/A	3	0	3	
F7211	8	PVC	NO	100	Unknown	Unknown	Poor redundancy	N/A	3	0	3	
F7212	8	PVC	NO	100	Unknown	Unknown	Poor redundancy	N/A	3	0	3	
F7213	8	PVC	yes	100	2000	77	main feeder or loop	1	2	1	4	
F7214	8	PVC	no	100	2000	77	main feeder or loop	1	2	0	3	
C51	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
C52	8	PVC	no	100	2004	81	main feeder or loop	1	2	0	3	
C53	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
C54	8	PVC	no	100	2018	95	good redundancy	1	1	0	2	
C56	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	

<u>Pipe No.</u>	<u>Size (in)</u>	<u>Material</u>	<u>Pressure 95 PSI or Greater</u>	<u>Useful Life (yr)</u>	<u>Install Date</u>	<u>Remaining Life (yr)</u>	<u>Criticality Type</u>	<u>Condition Rating</u>	<u>Criticality Rating</u>	<u>Vulnerability Rating</u>	<u>Risk Rating</u>	<u>Notes</u>
C57	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C58	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C59	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
C510	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C511	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C512	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C513	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C514	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
C515	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
C516	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C517	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
C518	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C519	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C520	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C521	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C522	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C523	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C524	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
C525	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C526	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C527	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C528	8	PVC	no	100	2006	83	main feeder or loop	1	2	0	3	
C529	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	
							Transmission Main from					
C530	8	PVC	no	100	1998	75	Master Meter or Tank	1	4	0	5	Main Feed from CWCWD Master
C531	8	PVC	no	100	2019	96	main feeder or loop	1	2	0	3	Meter #9021 (TSN-Bear Ind. Park)
C532	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C533	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
C534	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C535	8	PVC	no	100	1998	75	main feeder or loop	1	2	0	3	
C536	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
C537	8	PVC	no	100	2018	95	main feeder or loop	1	2	0	3	
							Transmission Main from					
F91	12	PVC	no	100	2006	83	Master Meter or Tank	1	4	0	5	
							Transmission Main from					
F92	12	PVC	no	100	2007	84	Master Meter or Tank	1	4	0	5	
							Transmission Main from					
F93	12	PVC	no	100	2008	85	Master Meter or Tank	1	4	0	5	
							Transmission Main from					
F94	12	PVC	no	100	2009	86	Master Meter or Tank	1	4	0	5	

# **APPENDIX B**



## EXISTING AND FUTURE DEVELOPMENTS

- Non-Residential
- Residential
- To be Determined
- Agricultural
- Public
- Town Boundary
- Planning Area Boundary

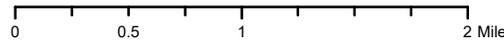
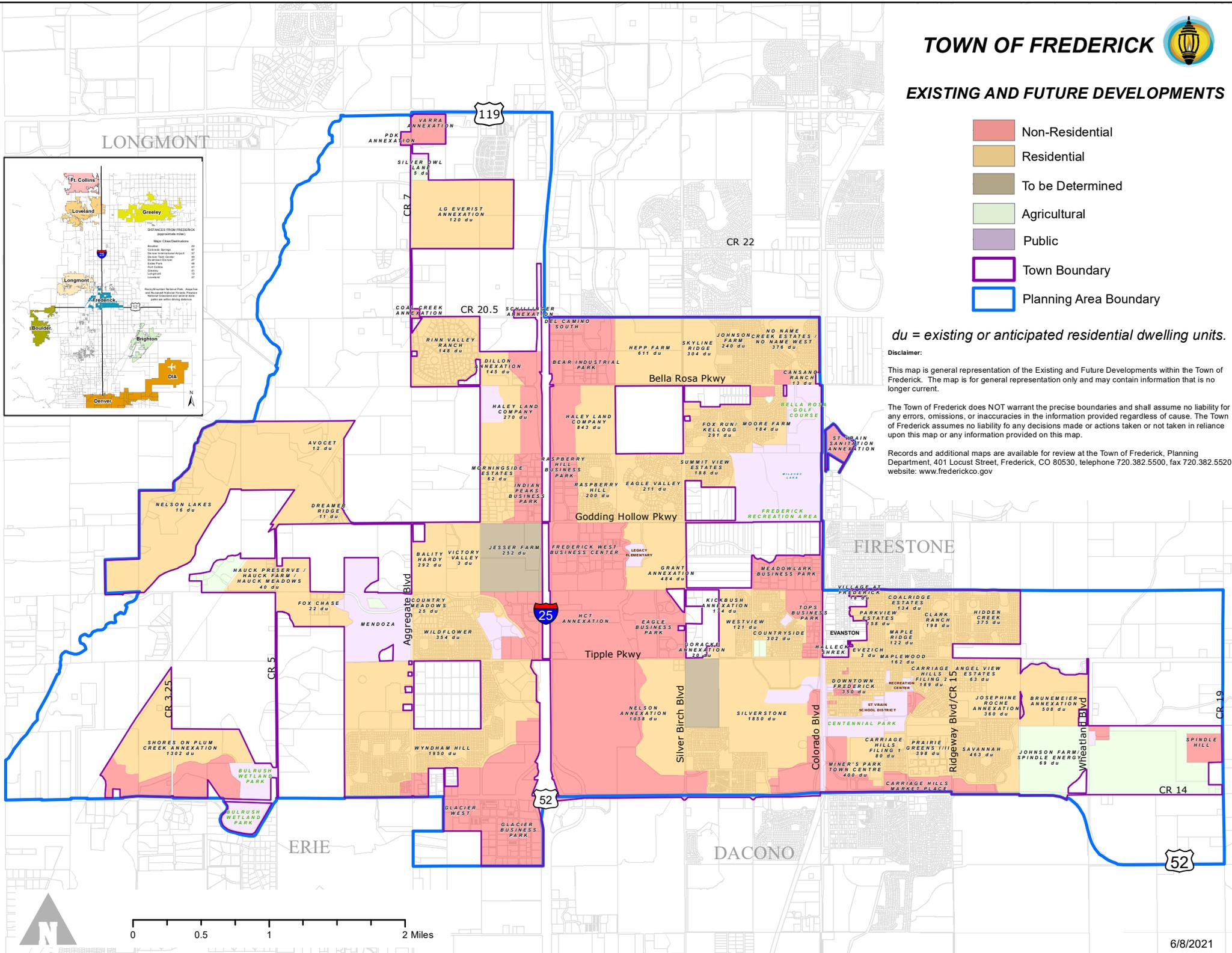
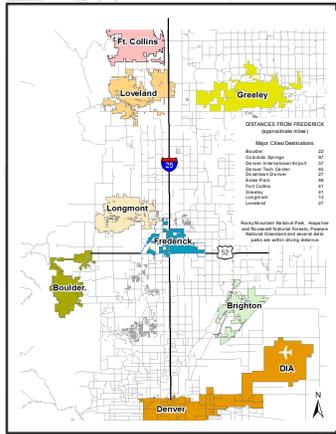
*du = existing or anticipated residential dwelling units.*

**Disclaimer:**

This map is general representation of the Existing and Future Developments within the Town of Frederick. The map is for general representation only and may contain information that is no longer current.

The Town of Frederick does NOT warrant the precise boundaries and shall assume no liability for any errors, omissions, or inaccuracies in the information provided regardless of cause. The Town of Frederick assumes no liability for any decisions made or actions taken or not taken in reliance upon this map or any information provided on this map.

Records and additional maps are available for review at the Town of Frederick, Planning Department, 401 Locust Street, Frederick, CO 80530, telephone 720.382.5500, fax 720.382.5520 website: [www.frederickco.gov](http://www.frederickco.gov)

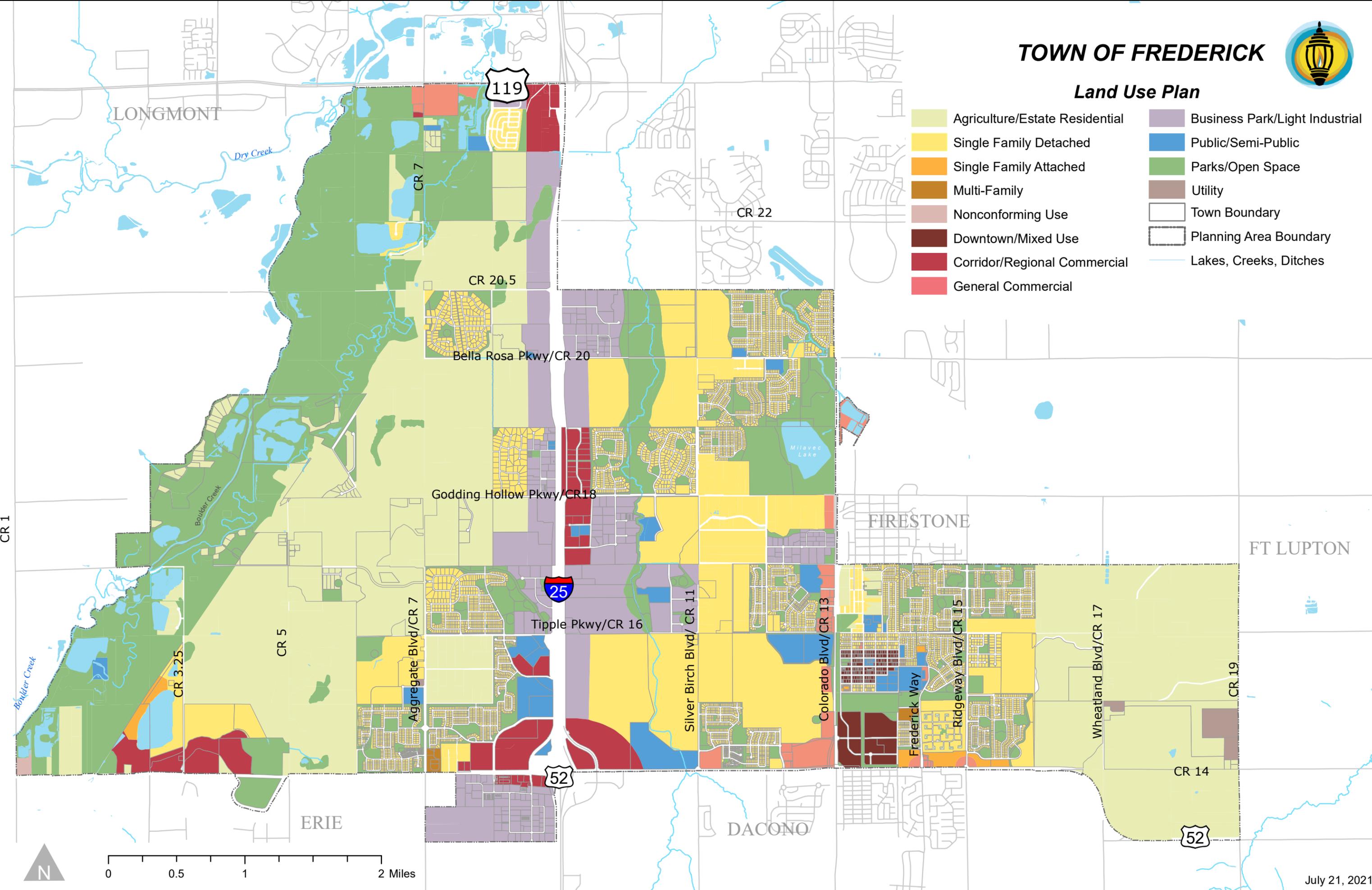


# TOWN OF FREDERICK



## Land Use Plan

- |  |  |
|--|--|
|  Agriculture/Estate Residential |  Business Park/Light Industrial |
|  Single Family Detached         |  Public/Semi-Public             |
|  Single Family Attached         |  Parks/Open Space               |
|  Multi-Family                   |  Utility                        |
|  Nonconforming Use              |  Town Boundary                  |
|  Downtown/Mixed Use             |  Planning Area Boundary         |
|  Corridor/Regional Commercial   |  Lakes, Creeks, Ditches         |
|  General Commercial             |  |



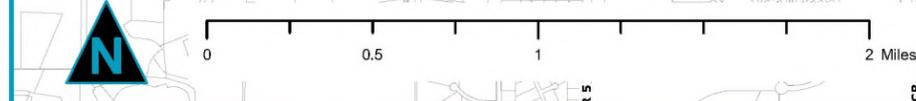
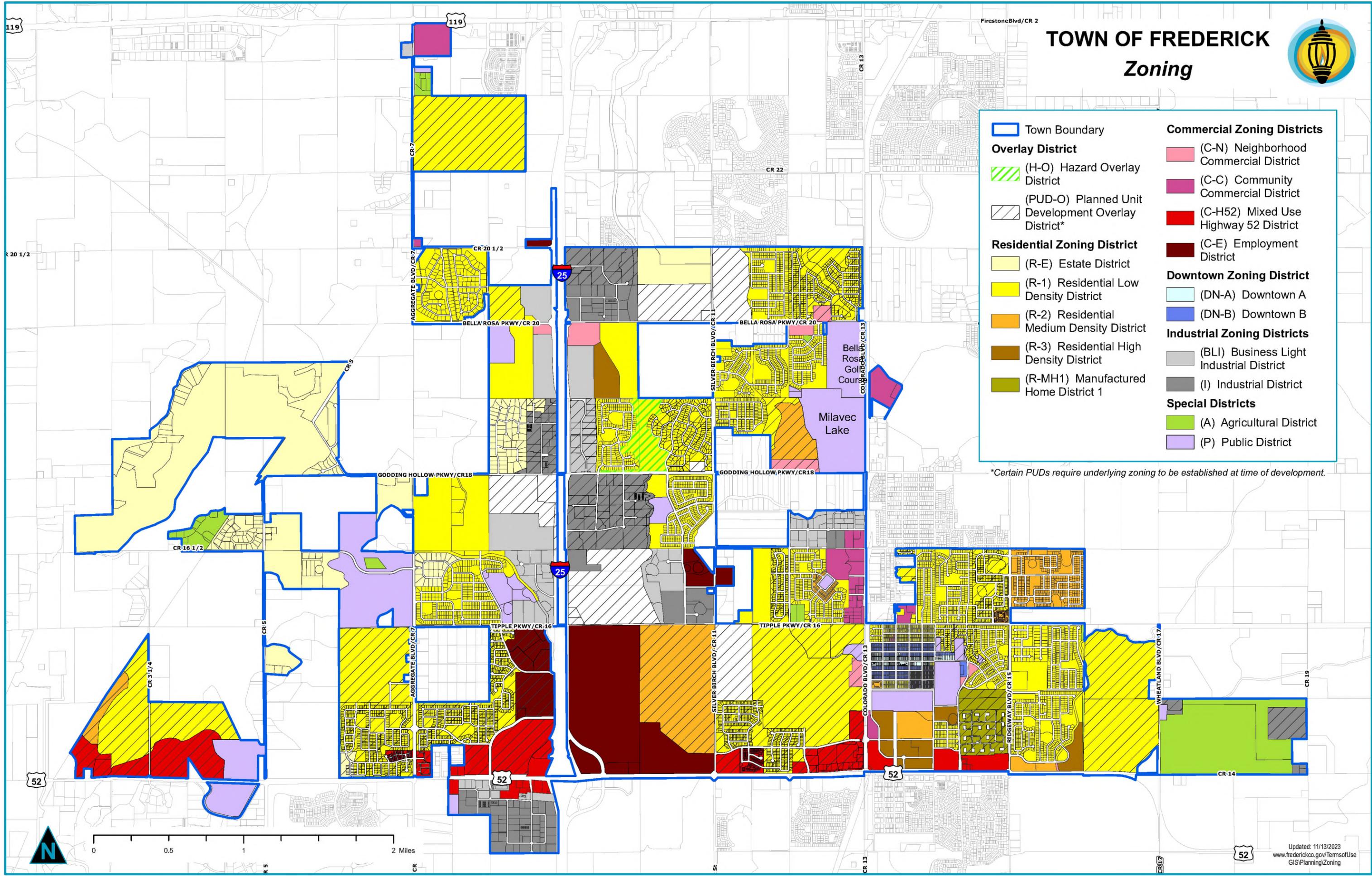
# TOWN OF FREDERICK

## Zoning



Town Boundary	<b>Commercial Zoning Districts</b>
<b>Overlay District</b>	(C-N) Neighborhood Commercial District
(H-O) Hazard Overlay District	(C-C) Community Commercial District
(PUD-O) Planned Unit Development Overlay District*	(C-H52) Mixed Use Highway 52 District
<b>Residential Zoning District</b>	(C-E) Employment District
(R-E) Estate District	<b>Downtown Zoning District</b>
(R-1) Residential Low Density District	(DN-A) Downtown A
(R-2) Residential Medium Density District	(DN-B) Downtown B
(R-3) Residential High Density District	<b>Industrial Zoning Districts</b>
(R-MH1) Manufactured Home District 1	(BLI) Business Light Industrial District
	(I) Industrial District
	<b>Special Districts</b>
	(A) Agricultural District
	(P) Public District

\*Certain PUDs require underlying zoning to be established at time of development.



# **APPENDIX C**

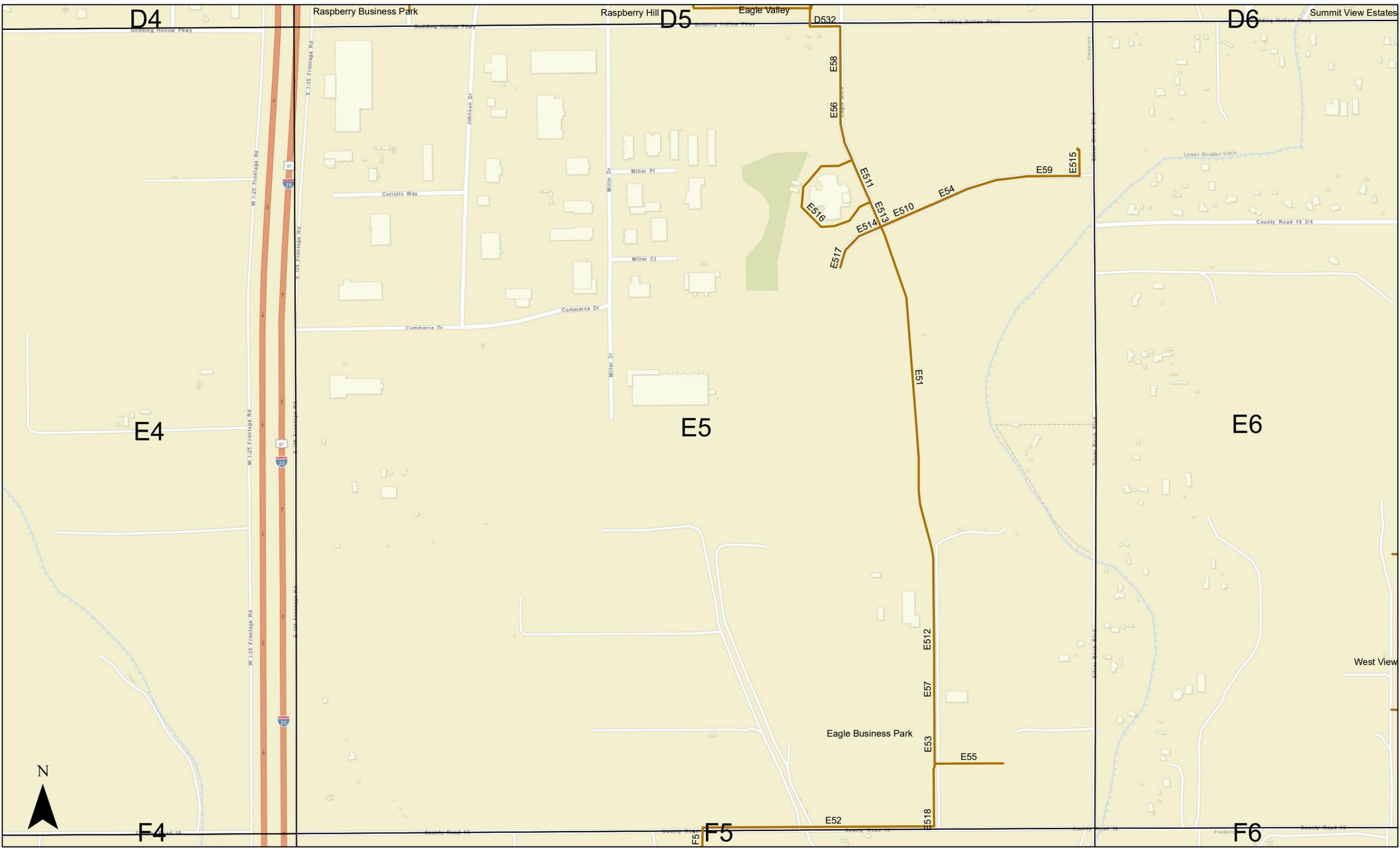




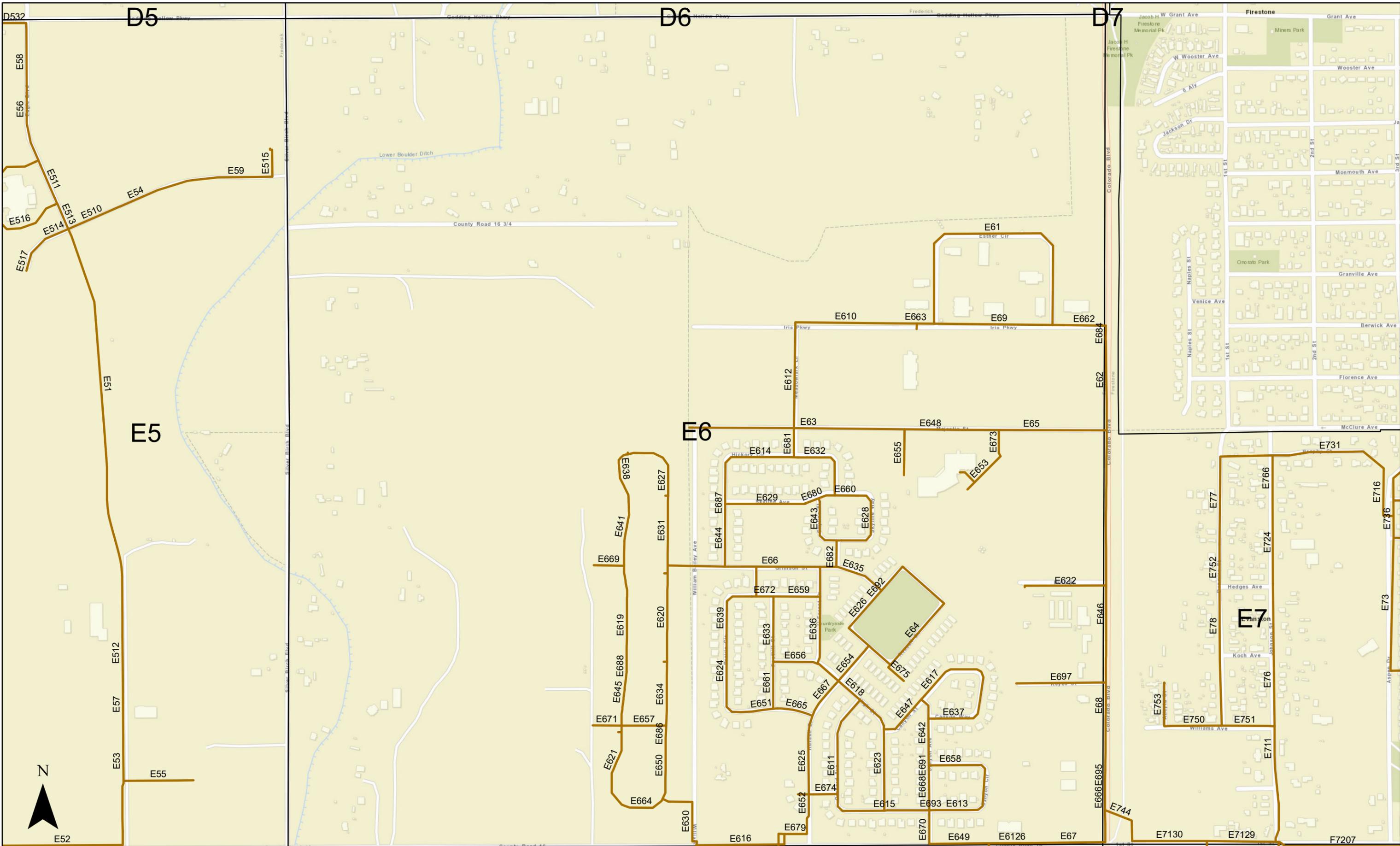






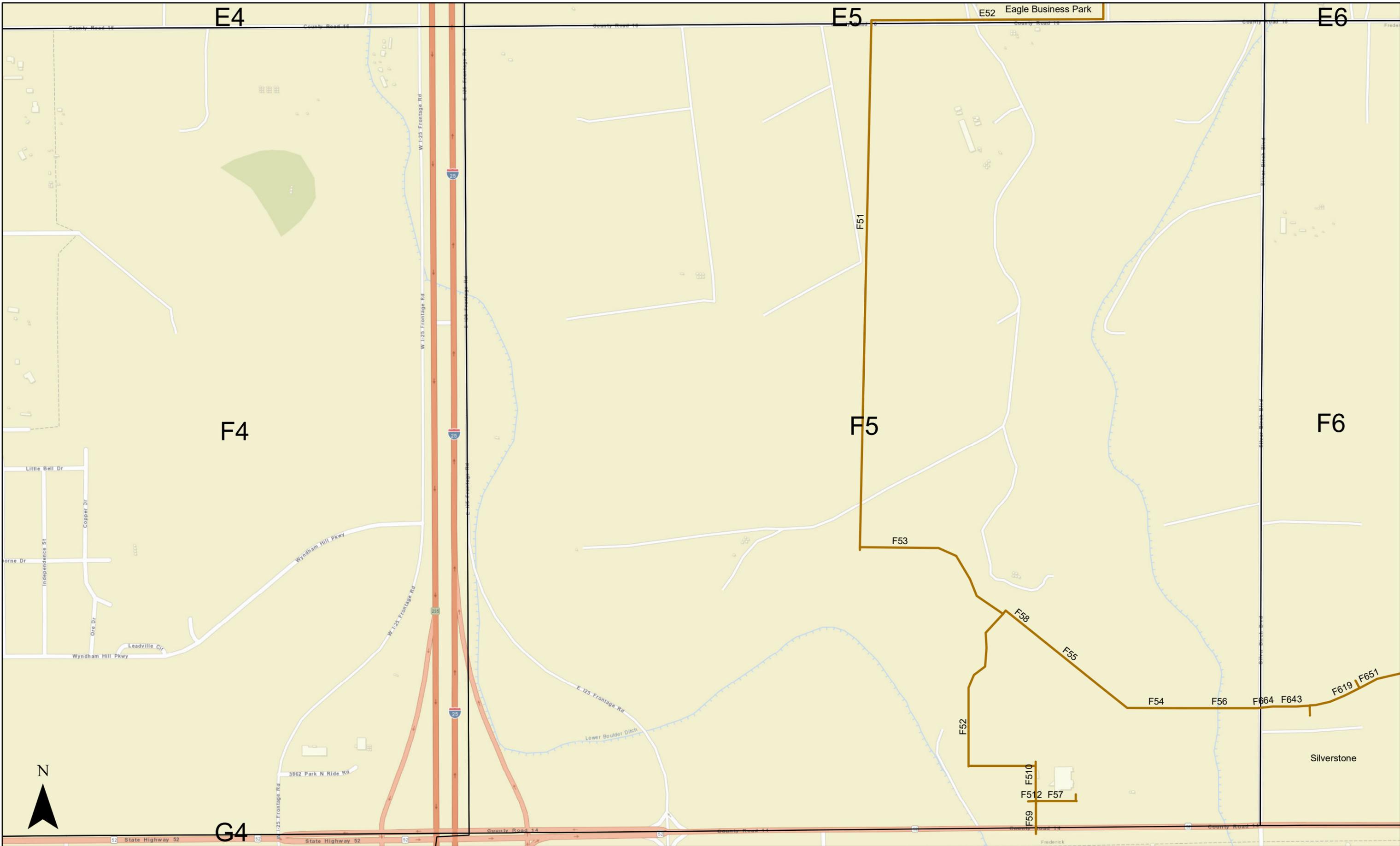


E5 PIPE SEGMENTS

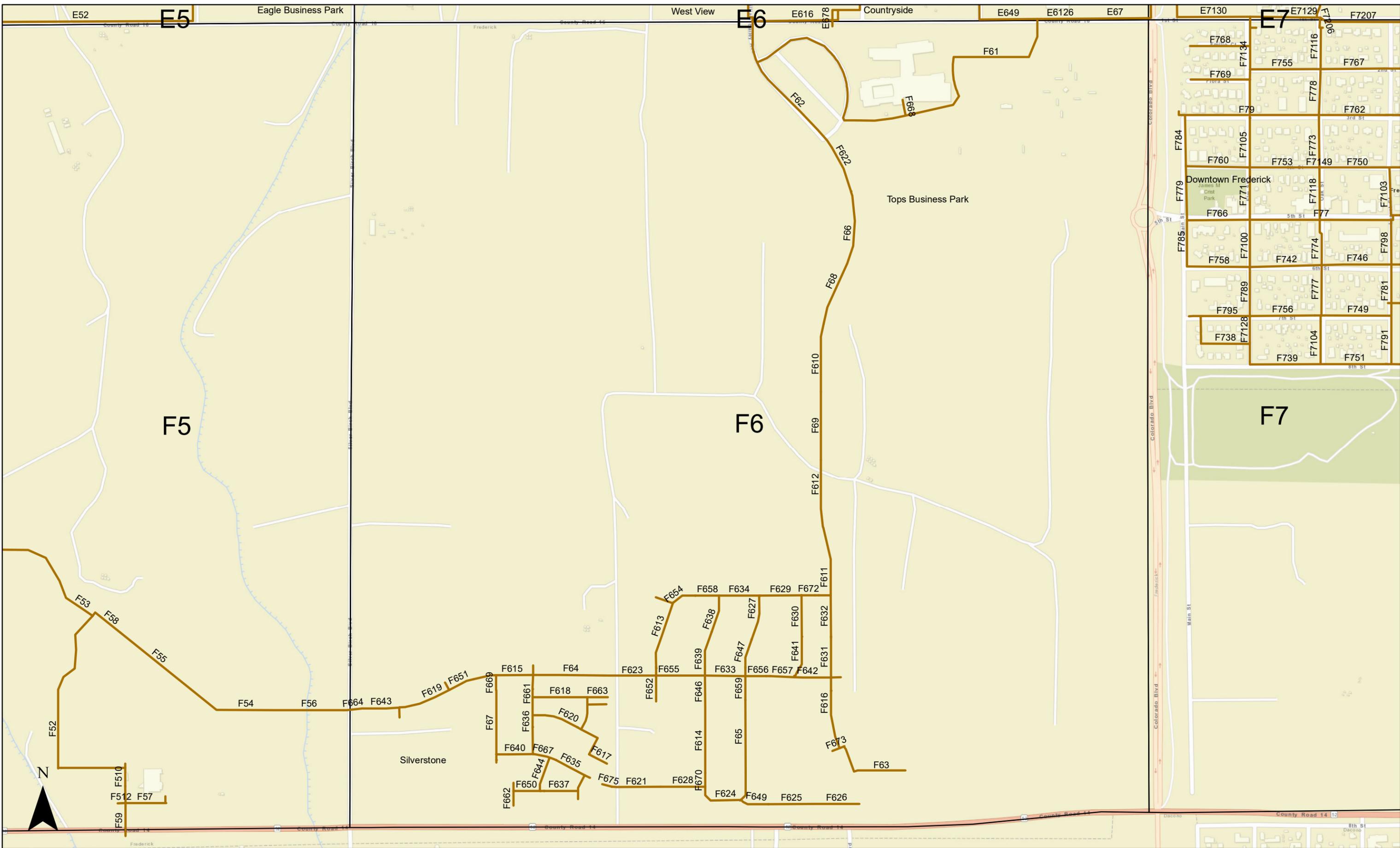


E6 PIPE SEGMENTS





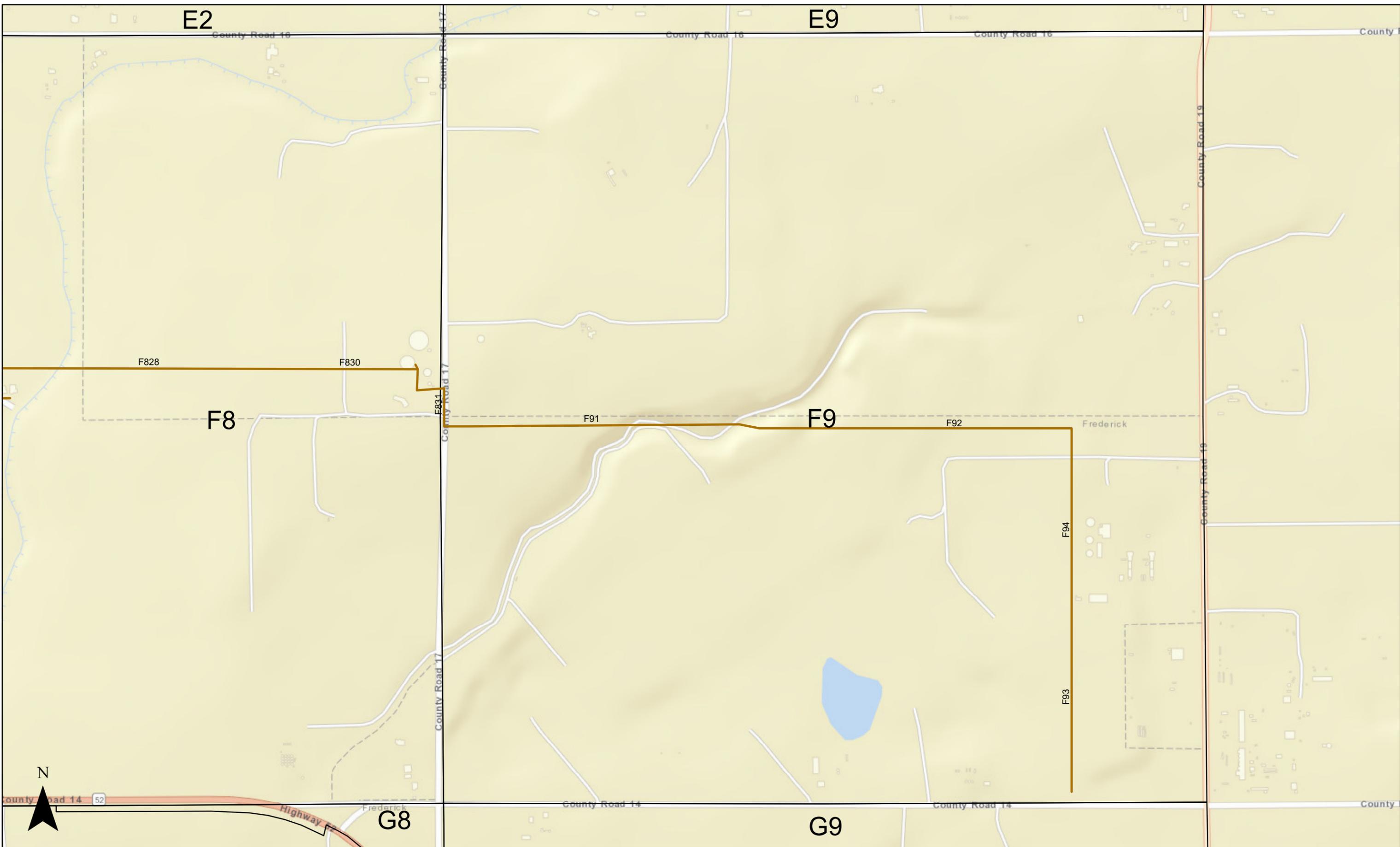
F5 PIPE SEGMENTS



F6 PIPE SEGMENTS







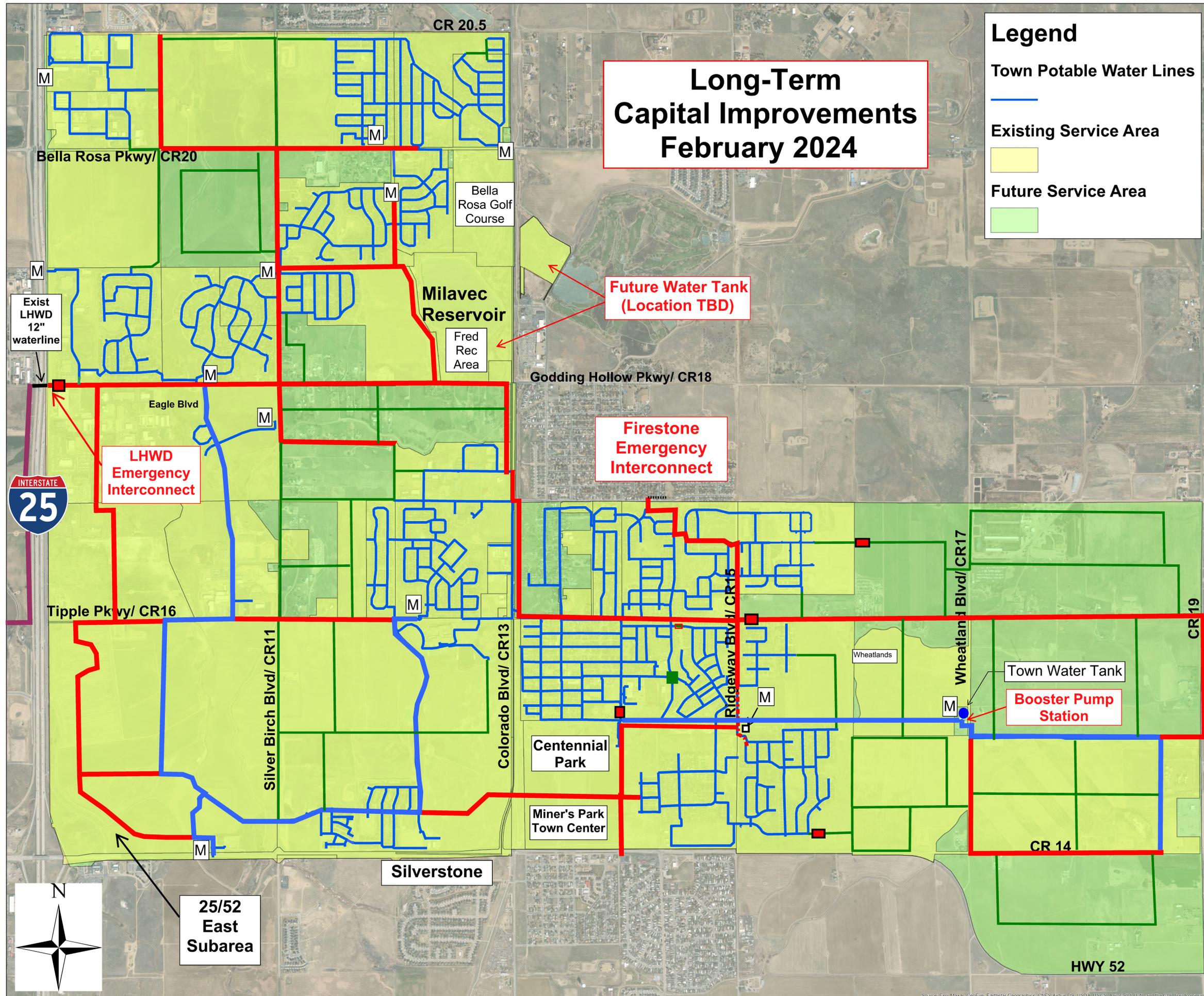
F9 PIPE SEGMENTS

# **APPENDIX D**

# Potable Water Infrastructure Master Plan



Built On What Matters



**Long-Term  
Capital Improvements  
February 2024**

**Legend**

- Town Potable Water Lines
- Existing Service Area
- Future Service Area

**Future Water Tank  
(Location TBD)**

**Firestone  
Emergency  
Interconnect**

**LHWD  
Emergency  
Interconnect**

**Town Water Tank  
Booster Pump  
Station**

**Potable Water  
Infrastructure Legend**

- Existing Waterline
- Existing 12" Waterline
- Future 12" Waterline
- Future 8" Waterline
- Future LHWD Waterline
- Existing Control Valve
- Future Control Valve
- Existing Master Meter

**February 2024**

**NOTE:** Locations of future waterlines shown in undeveloped areas are conceptual only and will be as determined by the developers and Town staff during the development review process.

**25/52  
East  
Subarea**

# **APPENDIX E**

# Potable Water Infrastructure Master Plan



Built On What Matters

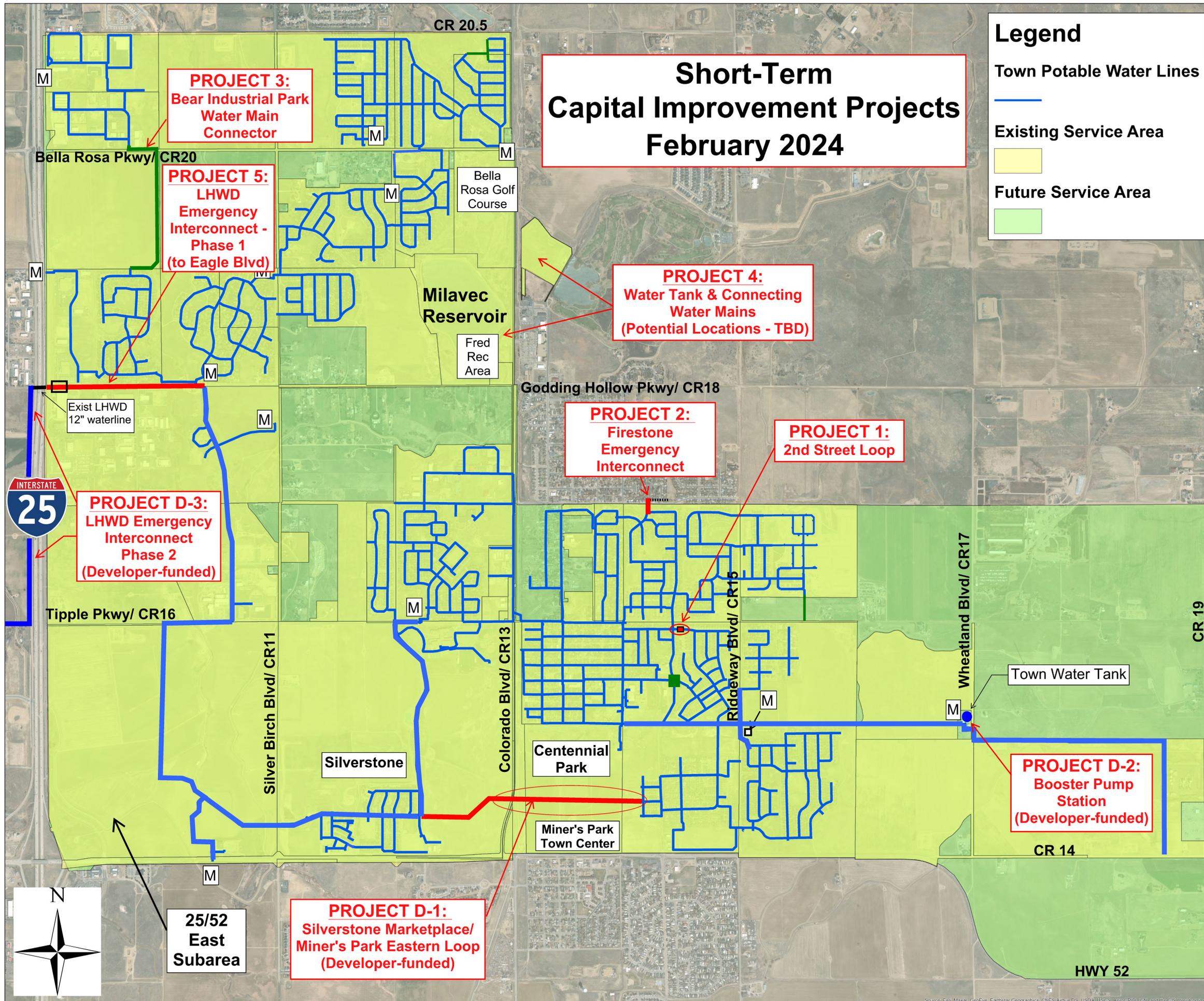
## Short-Term Capital Improvement Projects February 2024

### Legend

- Town Potable Water Lines
- Existing Service Area
- Future Service Area

### Potable Water Infrastructure Legend

- Existing Waterline
- Existing 12" Waterline
- Future 12" Waterline
- Future 8" Waterline
- Future LHWD Waterline
- Existing Control Valve
- Future Control Valve
- Existing Master Meter



February 2024

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# **APPENDIX F**

**Town of Frederick - Potable Water Infrastructure Master Plan**  
**Preliminary Opinion of Probable Costs**  
**Project No. 1 - Second Street Loop (S. Hawthorne St. - Pinyon St)**  
**February 2024**



Item No.	Line Item Description	Quantity	Unit	Unit Price	Line Item Cost
1	Contractor mobilization & general conditions	1	LS	\$23,500	\$23,500
2	8" Waterline	300	LF	\$180	\$54,000
3	8" gate valve	4	EA	\$3,500	\$14,000
4	Pressure control valve and vault	1	LS	\$60,000	\$60,000
5	Asphalt repair	400	SY	\$200	\$80,000
6	Connections to existing waterlines	2	EA	\$4,000	\$8,000
7	Erosion & sediment control	1	LS	\$5,000	\$5,000
8	Traffic control	1	LS	\$5,000	\$5,000
9	Potholing	4	EA	\$800	\$3,200
10	Materials testing	1	LS	\$5,000	\$5,000
	<b>Sub Total</b>				<b>\$257,700</b>
	Construction Contingency (30%)			30%	\$77,400
	Engineering & Permitting (25%)			25%	\$64,500
	Environmental & Geotechnical			\$2,000	\$2,000
	Easements & ROWs			\$2,000	\$2,000
	<b>Project Total</b>				<b>\$404,000</b>

Note:

1. This Preliminary Opinion of Probable Costs is Class 4 AACE for Study or Feasibility level, with accuracy range as defined by AACE.
2. Costs based on current dollars as of the date of the probable cost opinion.
3. Construction Contingency based on current project development stage.
4. The Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor(s) methods of determining prices or over competitive bidding or market conditions. The Engineer cannot and does not guarantee that actual costs will not vary from this Conceptual Opinion of Probable Costs.

**Town of Frederick - Potable Water Infrastructure Master Plan**  
**Preliminary Opinion of Probable Costs**  
**Project No. 2 - Firestone Emergency Interconnection - McClure Ave**  
**February 2024**



Item No.	Line Item Description	Quantity	Unit	Unit Price	Line Item Cost
1	Contractor mobilization & general conditions	1	LS	\$96,200	\$96,200
2	Interconnection vault	1	LS	\$700,000	\$700,000
3	12" Waterline	200	LF	\$200	\$40,000
4	12" gate valve	4	EA	\$4,000	\$16,000
5	Asphalt repair	350	SY	\$200	\$70,000
6	Erosion & sediment control	1	LS	\$40,000	\$40,000
7	Traffic control	1	LS	\$60,000	\$60,000
8	Potholing	20	EA	\$800	\$16,000
9	Materials testing	1	LS	\$20,000	\$20,000
	<b>Sub Total</b>				<b>\$1,058,200</b>
	Construction Contingency (30%)			30%	\$317,500
	Engineering & Permitting (25%)			25%	\$264,600
	Environmental & Geotechnical			\$5,000	\$5,000
	Easements & ROWs			\$30,000	\$30,000
	<b>Project Total</b>				<b>\$1,676,000</b>

Note:

1. This Preliminary Opinion of Probable Costs is Class 4 AACE for Study or Feasibility level, with accuracy range as defined by AACE.
2. Costs based on current dollars as of the date of the probable cost opinion.
3. Construction Contingency based on current project development stage.
4. The Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor(s) methods of determining prices or over competitive bidding or market conditions. The Engineer cannot and does not guarantee that actual costs will not vary from this Conceptual Opinion of Probable Costs.

**Town of Frederick - Potable Water Infrastructure Master Plan**  
**Preliminary Opinion of Probable Costs**  
**Project No. 3 - Bear Industrial Park Water Main Connector**  
**February 2024**



Item No.	Line Item Description	Quantity	Unit	Unit Price	Line Item Cost
1	Contractor mobilization & general conditions	1	LS	\$77,200	\$77,200
2	8" Waterline	3800	LF	\$180	\$684,000
3	8" gate valve	6	EA	\$3,500	\$21,000
4	Asphalt repair	100	SY	\$200	\$20,000
5	Connections to existing waterlines	2	EA	\$4,000	\$8,000
6	Erosion & sediment control	1	LS	\$20,000	\$20,000
7	Traffic control	1	LS	\$5,000	\$5,000
8	Potholing	4	EA	\$800	\$3,200
9	Materials testing	1	LS	\$10,000	\$10,000
<b>Sub Total</b>					<b>\$848,400</b>
Construction Contingency (30%)				30%	\$254,600
Engineering & Permitting (25%)				25%	\$212,100
Environmental & Geotechnical				\$10,000	\$10,000
Easements & ROWs				\$50,000	\$50,000
<b>Project Total</b>					<b>\$1,376,000</b>

Note:

1. This Preliminary Opinion of Probable Costs is Class 4 AACE for Study or Feasibility level, with accuracy range as defined by AACE.
2. Costs based on current dollars as of the date of the probable cost opinion.
3. Construction Contingency based on current project development stage.
4. The Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor(s) methods of determining prices or over competitive bidding or market conditions. The Engineer cannot and does not guarantee that actual costs will not vary from this Conceptual Opinion of Probable Costs.

**Town of Frederick - Potable Water Infrastructure Master Plan**  
**Preliminary Opinion of Probable Costs**  
**Project No. 4 - Water Storage Tank, Pump Station & Water Main Connectors**  
**February 2024**



Item No.	Line Item Description	Quantity	Unit	Unit Price	Line Item Cost
1	Contractor mobilization & general conditions	1	LS	\$729,500	\$729,500
2	3 MG prestressed concrete ground storage tank	1	LS	\$3,000,000	\$3,000,000
3	12" Waterline	4500	LF	\$200	\$900,000
4	12" gate valve	10	EA	\$4,000	\$40,000
5	CWCWD Master Meter and Vault	1	LS	\$800,000	\$800,000
6	Tank inlet and outlet piping	1	LS	\$100,000	\$100,000
7	Sitework	1	LS	\$100,000	\$100,000
8	Access Road (gravel)	1	LS	\$100,000	\$100,000
9	Fencing	1	LS	\$100,000	\$100,000
10	Landscaping	1	LS	\$50,000	\$50,000
11	Asphalt repair	2000	SY	\$200	\$400,000
12	Electrical and Controls	1	LS	\$100,000	\$100,000
13	Booster pump station	1	LS	\$1,500,000	\$1,500,000
14	Erosion & sediment control	1	LS	\$50,000	\$50,000
15	Revegetation	1	LS	\$30,000	\$30,000
16	Traffic control	1	LS	\$5,000	\$5,000
17	Materials testing	1	LS	\$20,000	\$20,000
	<b>Sub Total</b>				<b>\$8,024,500</b>
	Construction Contingency (30%)			30%	\$2,407,400
	Engineering & Permitting (25%)			25%	\$2,006,200
	Environmental & Geotechnical			\$50,000	\$50,000
	Easements & ROWs			\$80,000	\$80,000
	<b>Project Total</b>				<b>\$12,569,000</b>

Note:

1. This Preliminary Opinion of Probable Costs is Class 4 AACE for Study or Feasibility level, with accuracy range as defined by AACE.
2. Costs based on current dollars as of the date of the probable cost opinion.
3. Construction Contingency based on current project development stage.
4. The Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor(s) methods of determining prices or over competitive bidding or market conditions. The Engineer cannot and does not guarantee that actual costs will not vary from this Conceptual Opinion of Probable Costs.
5. Quantities of waterlines and associated valves and pavement repair are dependent on the location of the water tank. Quantities should be reviewed and adjusted as required after the water tank location has been identified.

**Town of Frederick - Potable Water Infrastructure Master Plan**  
**Preliminary Opinion of Probable Costs**  
**Project No. 5 - Left Hand Water District Emergency Interconnection - Phase 1**  
**February 2024**



Item No.	Line Item Description	Quantity	Unit	Unit Price	Line Item Cost
1	Contractor mobilization & general conditions	1	LS	\$214,400	\$214,400
2	Interconnection vault	1	LS	\$700,000	\$700,000
3	12" Waterline (Godding Hollow Rd, I25 to Eagle Blvd)	3500	LF	\$200	\$700,000
4	Piping and valve modifications at CWCWD meter	1	LS	\$50,000	\$50,000
5	12" gate valve	4	EA	\$4,000	\$16,000
6	Asphalt repair	3000	SY	\$200	\$600,000
7	Erosion & sedimentation control	1	LS	\$20,000	\$20,000
8	Traffic control	1	LS	\$30,000	\$30,000
9	Potholing	10	EA	\$800	\$8,000
10	Materials testing	1	LS	\$20,000	\$20,000
	<b>Sub Total</b>				<b>\$2,358,400</b>
	Construction Contingency (30%)			30%	\$707,600
	Engineering & Permitting (25%)			25%	\$589,600
	Environmental & Geotechnical			\$20,000	\$20,000
	Easements & ROWs			\$50,000	\$50,000
	<b>Project Total</b>				<b>\$3,726,000</b>

Note:

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3. Construction Contingency based on current project development stage.
4. The Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor(s) methods of determining prices or over competitive bidding or market conditions. The Engineer cannot and does not guarantee that actual costs will not vary from this Conceptual Opinion of Probable Costs.

**Town of Frederick - Potable Water Infrastructure Master Plan**  
**Preliminary Opinion of Probable Costs**  
**Project No. D-1, Silverstone Marketplace Eastern Loop (Developer-funded)**  
**February 2024**



Item No.	Line Item Description	Quantity	Unit	Unit Price	Line Item Cost
1	Contractor mobilization & general conditions	1	LS	\$106,500	\$106,500
2	12" Waterline	3600	LF	\$200	\$720,000
3	12" gate valve	8	EA	\$4,000	\$32,000
4	Asphalt repair	300	SY	\$200	\$60,000
5	Concrete repair	30	CY	\$810	\$24,300
6	Highway crossing (bore and jack)	100	LF	\$1,700	\$170,000
7	Erosion & sediment control	1	LS	\$20,000	\$20,000
8	Traffic control	1	LS	\$10,000	\$10,000
9	Potholing	10	EA	\$800	\$8,000
10	Materials testing	1	LS	\$20,000	\$20,000
	<b>Sub Total</b>				<b>\$1,170,800</b>
	Construction Contingency (30%)			30%	\$351,300
	Engineering & Permitting (25%)			25%	\$292,700
	Environmental & Geotechnical			\$30,000	\$30,000
	Easements & ROWs			\$10,000	\$10,000
	<b>Project Total</b>				<b>\$1,855,000</b>

Note:

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3. Construction Contingency based on current project development stage.
4. The Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor(s) methods of determining prices or over competitive bidding or market conditions. The Engineer cannot and does not guarantee that actual costs will not vary from this Conceptual Opinion of Probable Costs.

**Town of Frederick - Potable Water Infrastructure Master Plan**  
**Preliminary Opinion of Probable Costs**  
**Project No. D-2, Booster Pump Station at Existing Storage Tank (Developer-funded)**  
**February 2024**



Item No.	Line Item Description	Quantity	Unit	Unit Price	Line Item Cost
1	Contractor mobilization & general conditions	1	LS	\$166,000	\$166,000
2	Booster pump station	1	LS	\$1,500,000	\$1,500,000
3	12" yard piping and connections	1	LS	\$100,000	\$100,000
4	12" gate valve	4	EA	\$4,000	\$16,000
5	Erosion & sediment control	1	LS	\$20,000	\$20,000
6	Potholing	5	EA	\$800	\$4,000
7	Materials testing	1	LS	\$20,000	\$20,000
	<b>Sub Total</b>				<b>\$1,826,000</b>
	Construction Contingency (30%)			30%	\$547,800
	Engineering & Permitting (25%)			25%	\$456,500
	Environmental & Geotechnical			\$20,000	\$20,000
	Easements & ROWs			\$10,000	\$10,000
	<b>Project Total</b>				<b>\$2,861,000</b>

Note:

1. This Preliminary Opinion of Probable Costs is Class 4 AACE for Study or Feasibility level, with accuracy range as defined by AACE.
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3. Construction Contingency based on current project development stage.
4. The Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor(s) methods of determining prices or over competitive bidding or market conditions. The Engineer cannot and does not guarantee that actual costs will not vary from this Conceptual Opinion of Probable Costs.