ORIGINAL

Ordinance No. 2025-06 An Ordinance Of Fairfield Town, Utah, Adopting Fairfield Town Master Water Plan. **Date: May 21, 2025**

Created: May 21, 2025

WHEREAS, the Fairfield Town has authority under Utah law to enact ordinances and desires to formally adopt its Master Water Plan to guide orderly growth and infrastructure development; and

WHEREAS, a public hearing was duly noticed and held on May 7, 2025, in accordance with Utah law;

NOW, THEREFORE, BE IT ORDAINED by the Fairfield Town Council as follows:

SECTION 1. ADOPTION OF MASTER WATER PLAN

The document titled "Master Water Plan," dated May 2025, is hereby adopted as the official water infrastructure planning document.

SECTION 2. SEVERABILITY

If any section, subsection, sentence, clause, or phrase of this ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance.

SECTION 3. EFFECTIVE DATE

Passed and Adopted this **21st day of May, 2025**.

FAIRFIELD TOWN

[signature]
Hollie McKinney, Mayor

RL Panek	yes RP	no_____	abstain ____	absent ____
Tyler Thomas	yes TT	no_____	abstain ____	absent ____
Michael Weber	yes MW	no_____	abstain ____	absent ____
Richard Cameron	yes_____	no_____	abstain ____	absent —

[signature]
Stephanie Shelley, Recorder

(SEAL) FAIRFIELD Recorder SEAL

FAIRFIELD TOWN

STATE OF UTAH)
) ss.
COUNTY OF UTAH)

I, Stephanie Shelley, Town Recorder of Fairfield Town, Utah, do hereby certify and declare that the above and foregoing is a true, full, and correct copy of an ordinance passed by the Town Council of Fairfield Town, Utah, on the **21st day of May, 2025.**

Ordinance No. 2025-06 An Ordinance Of Fairfield Town, Utah, Adopting Fairfield Town Master Water Plan.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of Fairfield Town, Utah, this **21st day of May, 2025.**

Stephanie Shelley
Fairfield Town Recorder/Clerk

(SEAL)

FAIRFIELD ★ Recorder SEAL ★

AFFIDAVIT OF POSTING

STATE OF UTAH)
) ss.
COUNTY OF UTAH)

I, Stephanie Shelley, Town Recorder of Fairfield Town, Utah, do hereby certify and declare that I posted in three (3) public places the following summary of the ordinance which was passed by the Fairfield Town Council on the **21st day of May, 2025**, and herein referred to as:

SUMMARY.

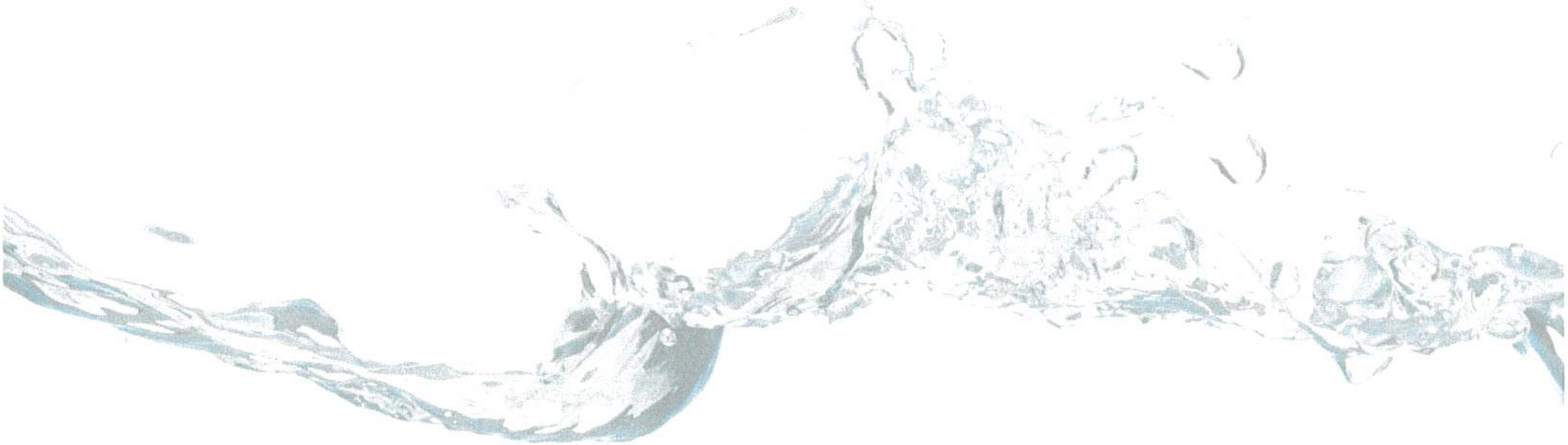
Ordinance No. 2025-06 An Ordinance Of Fairfield Town, Utah, Adopting Fairfield Town Master Water Plan.

The three places are as follows:

1. Fairfield Town Hall
2. Fairfield Town Website
3. Utah State Public Notice Website

Stephanie Shelley
Stephanie Shelley
Fairfield Town Recorder/Clerk

Date of Posting 22nd day of May, 2025



PREPARED FOR:

FAIRFIELD TOWN

PREPARED BY:

BOWEN COLLINS & ASSOCIATES

FAIRFIELD TOWN

MAY 2025

CULINARY WATER MASTER PLAN

Fairfield Town

Culinary Water Master Plan

May 2025

Prepared for:

Fairfield Town

Prepared by:

BOWEN COLLINS & ASSOCIATES

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CHAPTER 1
INTRODUCTION

INTRODUCTION & BACKGROUND

Fairfield Town (the Town) is located in Utah County on the west side of Cedar Valley, situated directly south and west of the city of Eagle Mountain. Historic growth in the Town has been minimal, however recent discussions between the Town and developers may result in an expansion of the Town's population and utility services in the near future.

In response to these development pressures and potential utility service expansion, the Town contracted with Bowen Collins & Associates (BC&A) to complete a Water System Master Plan. The purpose of this master plan is to provide the Town with the information needed to provide an efficient water system capable of meeting existing and expected future demands and satisfying customer expectations in the Town's service area.

SCOPE OF WORK

The following tasks were completed as part of this 2024 Fairfield Water Master Plan:

Task 1: Collect, review, and organize existing data needed to develop the master plan.

Task 2: Evaluate current and projected water use patterns.

Task 3: Evaluate current and possible future water supplies.

Task 4: Create a culinary hydraulic model and identify existing and future operating deficiencies.

Task 5: Evaluate alternative improvements to resolve deficiencies identified in Task 4 and develop a water system capital facilities plan.

Task 6: Document methods and results of the previous tasks in this master plan report.

REPORT ASSUMPTIONS

As a long-term planning document, this report is based on several assumptions related to future growth patterns, service area expansion, and source availability. Assumptions related to water use patterns, development densities, and allowable water use for industrial facilities will be key to monitor as development occurs within the Town. The details of these assumptions are documented within the report. If actual development and water use are significantly different than what has been assumed, the results of this report will need to be adjusted accordingly. Because of these uncertainties, this report should be updated every four to six years or sooner if significant changes such as annexation or changes in development patterns occur.

CHAPTER 2
DEMAND PROJECTIONS

Projecting future increases in water demand is key to planning for the future of the Town. Therefore, BC&A has gathered what is currently known about water use patterns, development, and zoning to create demand projections. The purpose of this chapter is to summarize the work and results of BC&A's projections of existing and future water demands in the Town. A discussion of water supplies is included in Chapter 3.

DEMAND PROJECTION METHODOLOGY

This master plan was developed concurrently with the Town's general plan and relies heavily upon the updated zoning and development vision in the general plan. Demand projections contained here reflect the general plan concepts developed in November of 2024. The methodology used to project demand in this study is as follows:

1. Define the service area.
2. Project the growth of water connections within the study area through buildout based on the Town's general plan and on currently available land development plans.
3. Convert projections of connection growth to a system water demand based on historic per connection demand.

Each step of this process is summarized in the sections that follow.

SERVICE AREA

Although the boundaries of Fairfield Town cover a relatively large area (see Figure 2-1), historic development has been limited to the Town center (i.e. Main Street) and the immediate surrounding areas. The centralized water system is limited to these developed areas. Because the water system service area within Fairfield is limited to a small area, and because the usage patterns across existing users are relatively consistent across the system, BC&A considered the entire system as one service area.

BC&A made multiple assumptions regarding future growth within (and outside) the water service area shown on Figure 2-1:

- Future land development with lot sizes greater than 5 acres are assumed to have their own water supply and will not be serviced by the Town's centralized water system.
- The Manning Canyon Overlay area was not included in this analysis. This area is higher than can be serviced with the existing water tanks and sources and will its own tank, booster station, and/or source for future water service.

Additional details about planned development in Fairfield can be seen in the Town's Vision Plan figure from their General Plan, which is included in Appendix A.

State Route 73
Allens Ranch Rd
Cedar Valley Rd / HWY73
Main St
Lehi Fairfield Rd

PROJECTED GROWTH IN WATER CONNECTIONS

Currently, approximately half of the Town's residents use culinary water from the Town's centralized water system. The remaining residents source their water from private wells. Only the connections to the centralized water system will be analyzed for this study.

Existing Connections

As of December of 2024, the following number of equivalent residential units (ERUs) were connected to the Town's water system (Table 2-1).

Table 2-1
Existing ERUs

Area	Total Connections	Total Connections
Residential	27	27
Commercial	2	0.8
Institutional	4	1.6
Total	33	29.4

System Growth and Buildout Projections

Projected total connections within the Town water system are based on a build-out scenario using expected zoning from the Town's general plan. Additionally, known information regarding upcoming developments was utilized to estimate the timing and location of growth within the water system.

Zoning in the general plan allows residential, light industrial, and commercial development to occur within the Town. After discussing with Town personnel, BC&A has based this analysis on buildout densities (ERU/acre) of residential, commercial, and light industrial to be 1.0, 2.0, and 1.0, respectively. It should be noted that these densities are substantially lower than would be typically seen for development along the Wasatch Front. Town personnel have decided to limit the densities used for planning due to the severely limited access to water rights in the Cedar Valley for new development. Town personnel have indicated that the Town will enforce these lower water use densities in the future through the development review processes and adopting policies that limit the allowable water use of new developments.

The only exception to the development water density limitation that BC&A is aware of is the data center slated to be constructed on the east side of Fairfield. This development is expected to use a peak day peaking factor of 7.0, which is the equivalent of 1.7 ERUs/acre. As this development has already begun plans for lots in Fairfield, the Town has indicated they will allow an exception to this development. Because of this difference in density, this future customer has been identified separately in Table 2-2 below.

Table 2-2 illustrates BC&A's growth projections in ERUs for 10-year and buildout conditions. We anticipate nearly all of the Town's growth to occur by the year 2065.

Table 2-2
Buildout ERUs

Area	Existing ERUs	10-Year ERUs	Buildout ERUs
Residential	27	396	989
Industrial (Other than East Data Center)	0	800	634
Commercial	2	20	830
Institutional	4	4	6
East Data Center	0	800	1,122
Total	**33**	**2,020**	**3,581**

WATER USE PROJECTIONS

Water demands are projected assuming that future water use patterns will be similar to existing use patterns. Because the exact split between indoor and outdoor use cannot be determined from available data, BC&A has defined an ERU using typical combined indoor and outdoor use from Fairfield historic data.[1]

Annual Average Demand

Annual average demand refers to the total volume of culinary water consumed each year by Fairfield customers over one year. From Fairfield historical production data, average annual water demand between 2016 and 2023 was 570 gpd per ERU.

While these are the demand standards used in this study, it should be emphasized that the actual water usage in the Town will change over time, especially as the balance between residential and non-residential users changes with development, or the density of residential development changes. As a result, it is important that the Town continue to monitor water demands and adjust recommendations in this master plan accordingly.

[1] *There is a mix of culinary and secondary water used for outdoor applications during the irrigation season within the Town. The Town collects data on source production and water sales. We have made assumptions concerning indoor and outdoor water use patterns due to the lack of data to separate the use applications. For the purposes of this analysis, each connection is assumed to include some irrigation use.*

BC&A estimated indoor use patterns for the existing customers (typical per capita use for the state of Utah) and assumed an indoor average day demand of 198 gpd/ERU (60 gpd x 3.3 people/household).

Within each culinary connection demand estimate we assumed approximately 0.119 acres (5,180 SF) of irrigated area was included as pressurized culinary irrigation. We are aware that existing lots include irrigated areas much larger than this, however, historic water production and sales data suggests that the majority of these areas are irrigated using flood irrigation with secondary water.

Future projections maintain the same estimated culinary use per connection (570 gpd/ERU peak day demand). It is assumed that any irrigation needs in excess of this demand may be obtained through secondary water. Because the nature of real irrigation needs in future development is unknown, it is crucial that the Town monitor water use within the system as new users are added so demand projections can be updated according to real need.

Peak Day Demand

Peak day demand is the highest daily water demand observed during the year. The peak day peaking factor is the ratio of peak day demand to average day demand.

Most water system infrastructure (such as source and storage facilities) is sized to satisfy peak day demands. Therefore, it is imperative to identify the peak day demand of the system. For Fairfield, the current peaking factor for an ERU (including indoor and outdoor usage) was observed to be about 2.57.

Note that we expect that the peaking factor will change over time as the balance between residential and non-residential connections changes. This is because non-residential users typically use more water indoors than outdoor, which is the opposite of typical residential use patterns (i.e. the majority of residential water demands are used outside during the irrigation season). Correspondingly, we have estimated the buildout peak day peaking factor to be about 2.22. This was estimated by calculating a weighted average of residential and non-residential peaking factors for estimated buildout development conditions.

Peak Hour Demand

Peak hour, or instantaneous peak, is used to estimate the needed capacities of transmission and distribution system infrastructure. Due to a lack of historic hourly use data, peak hour demands were estimated using the 10-state standard method of calculating peaking factors for small areas. This is a widely used and accepted method of calculating peaking factors across the industry when other data is unavailable. Through this method, BC&A estimated the current peak hour peaking factor (i.e. ratio of peak hour demand to average annual demand) to be 4.25.

Similar to the peak day peaking factor, BC&A anticipates that the instantaneous peaking factor will change with the expected growth of industrial and commercial facilities. We estimate the future buildout peaking factor to be 2.66 using the same 10-state standard calculation method and projected buildout water demands.

PRODUCTION REQUIREMENTS

The following Table 2-3 contains our projections for the future water production requirements within the Town[2].

[2] These projections do not include consideration of conservation or source redundancy. Conservation refers to the reduction of water use on a per connection basis as customers increase the efficiency of their water use. Redundancy refers to the preservation of extra supply to ensure the Town has an adequate water supply in the event of a medium- or long- term source disruption, such as a low yield due to drought, a water quality event, etc. While the Town expects both of these items to be a part of its future water supply planning, these factors are expected to largely offset each other and have correspondingly been excluded for simplicity at this stage of planning. Additional consideration of these issues are recommended as the Town continues to grow.

Table 2-3
Projected Future Water Production Requirements

Year	ERUs	Annual Demand (ac-ft)	Average Day Demand (gpd)	Peak Day Demand (gpm)	Peak Hour Demand (gpm)
2024	33	21	18,801	34	142
2025	129	82	73,231	129	522
2026	232	148	132,294	231	894
2027	344	220	196,009	338	1,262
2028	464	296	264,401	452	1,632
2029	588	375	335,221	568	1,991
2030	718	458	409,075	688	2,348
2031	846	540	482,151	805	2,683
2032	987	630	562,194	932	3,042
2033	1,137	726	647,954	1,067	3,418
2034	1,295	826	737,732	1,208	3,803
2035	1,456	929	829,511	1,351	4,188
2040	1,617	1,401	1,251,180	1,993	5,835
2050	1,774	1,963	1,752,299	2,718	7,516
2060	1,924	2,229	1,989,816	3,046	8,233
2070	2,065	2,279	2,034,574	3,095	8,286
2080	2,196	2,284	2,039,422	3,092	8,246

Currently the Town is relatively limited in its historical water production data, which adds an additional level of uncertainty to the projections shown in this master plan. Therefore, Fairfield should begin initiatives to gather, consolidate, organize, and make visible its water production and use data. Doing so will support greater accuracy in sizing standards and in future updates to this master plan.

CHAPTER 3
SUPPLY PROJECTIONS

The purpose of this chapter is to evaluate the adequacy of existing Fairfield supplies to meet projected system demands. This evaluation considers supply capacity in terms of annual yield and peak day production.

DISCUSSION ON WATER RIGHTS

The demand projections included in the previous chapter have been prepared under the assumption that there will be sufficient water rights to support development shown in the Town's General Plan. However, based on conversations with Town personnel, general knowledge regarding water rights in the Cedar Valley, and the results of the analysis contained in this chapter, it is likely that water rights will control how much development can occur in Fairfield. BC&A recommends the Town continue their water dedication policy (i.e. developers must turn in water rights before they can develop) to ensure development does not overtake water supply in the future.

A full evaluation of not yet-to-be used water rights is outside the scope of this master plan, but BC&A recommends conducting a water right evaluation to understand how many water rights the Town currently owns and the projected number of rights available in the area that may be dedicated to the Town in the future.

EXISTING WATER SOURCES

This section discusses the water sources Fairfield is currently utilizing as a water source. Municipal water source production capacity must legally and physically meet water demands, which is satisfied in three parts:

1. The water provider must have the necessary water rights.
2. Annual yield of the source must be adequate to provide one year's supply of water; and
3. Peak source production capacity must be adequate to meet peak day demands.

The Town supplies water to its customers from two sources: the Fairfield Town well and Fairfield Town Spring. Table 3-1 below summarizes the current yield in annual supply and estimated peak day capacity of both sources.

Table 3-1
Existing Source Production

Source	Annual Yield (AF)*	Peak Day Capacity (gpm)
Fairfield Town Well	118	146
Fairfield Town Spring	68	84
TOTAL	**186**	**230**

**Due to lack of reliable data, the annual yield shown here is assumed to be 50% of peak day capacity. Actual annual yield may vary significantly from these values based on real water available and water right limitations were not considered.*

PROJECTED ADEQUACY OF WATER SUPPLY

BC&A has examined the adequacy of existing water supply to meet the projected needs of future growth. The projected growth in annual demand is shown versus the Town's existing annual supply in Figure 3-1. The projected growth in peak day demand is shown versus the Town's existing peak capacity in Figure 3-2.

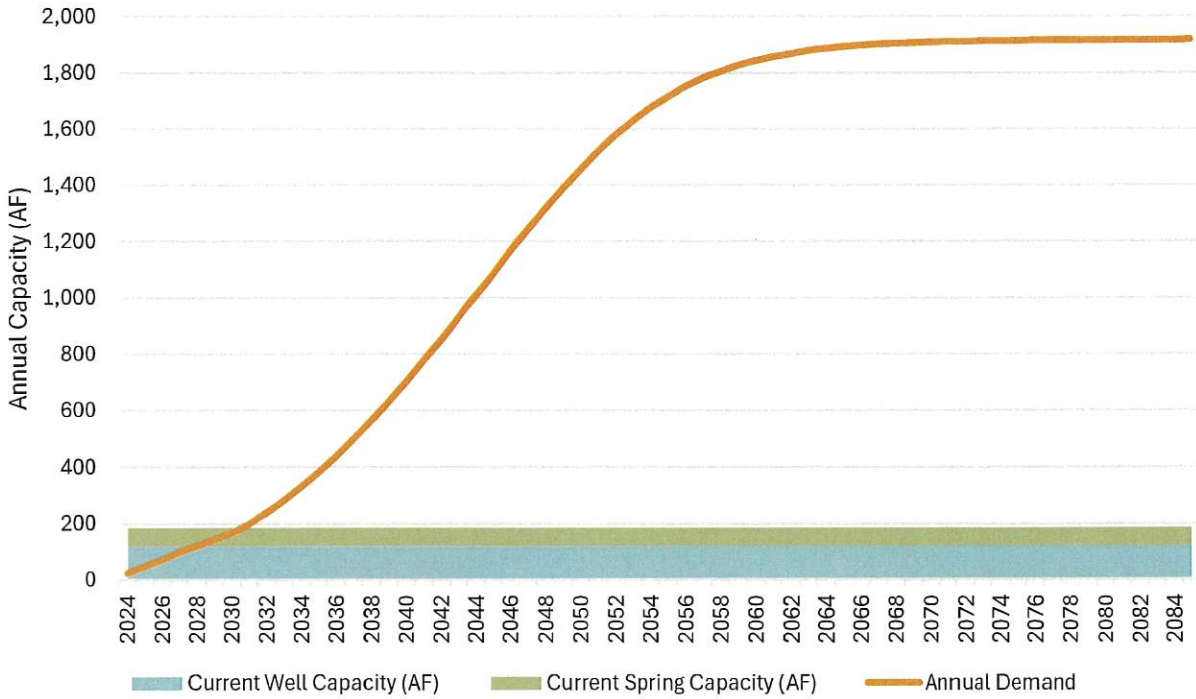


Figure 3-1. Projected Annual Demand vs Supply

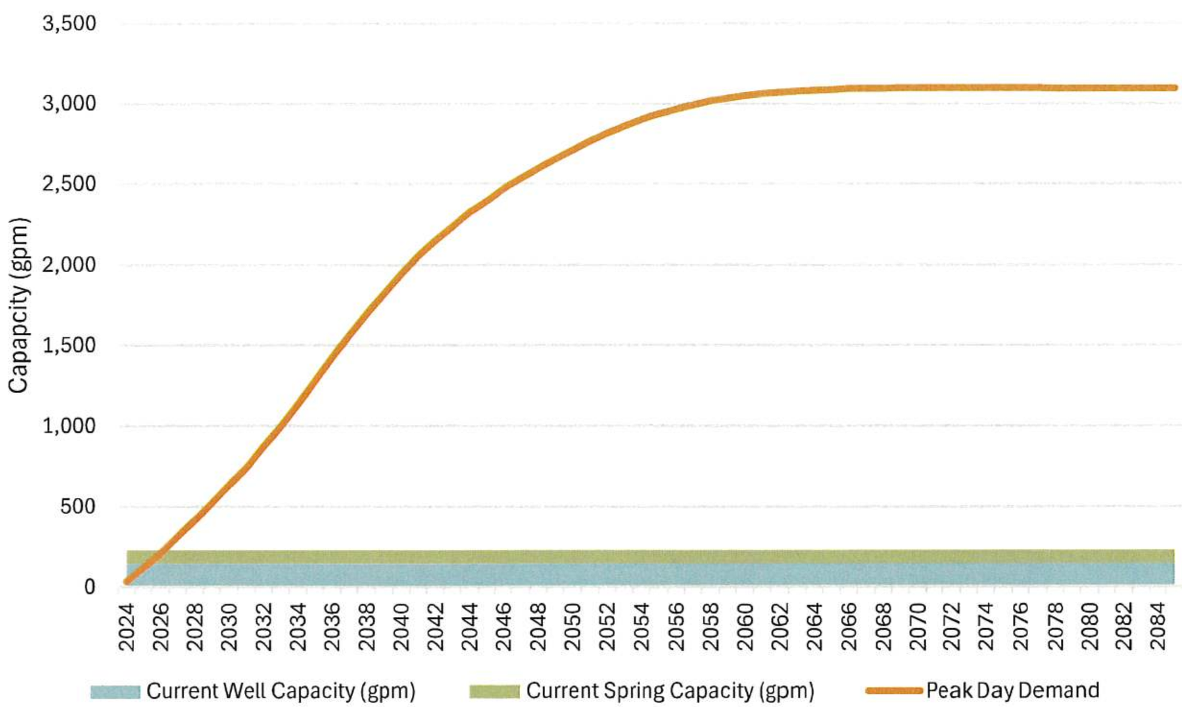


Figure 3-2. Projected Peak Day Demand vs Supply

SUPPLY SUMMARY

Figures 3-1 and 3-2 illustrate that current sources are expected to meet projected annual demands through approximately 2030 and peak demands through approximately 2026. Immediate future source additions or expansions are needed to meet the projected demands of the system at buildout.

BC&A recommends the town begin investigating potential new water sources as soon as possible in order to meet the expected water demands in the near term and beyond. As part of this analysis, the Town may consider looking into the maximum capacity of their current well and the potential to expand their existing water source.

Note that this analysis did not consider a supply buffer or the effects of conservation on water demands (and therefore needed water supplies). These elements should be added in future master planning documents when additional information is available concerning real water demands (with upcoming land development), potential new sources, and water right limitations.

CHAPTER 4
EXISTING WATER SYSTEM

Existing infrastructure in the water system is described in this chapter and shown in Figure 4-1.

WATER PRODUCTION FACILITIES

The Town owns and operates two water sources as part of its water system:

- **The Fairfield Well** – Located on the west end of the water system near the water tanks, the Fairfield well was drilled in 2016. The well is equipped with one pump (described in the "Pump Stations" section below). Additional discussion about the Town's well is contained in the "Existing Water Sources" section of Chapter 3.
- **The Fairfield Spring** – The Fairfield Spring is located directly west of Main Street. Production capacity and annual yield vary depending on water year conditions, however historic production data is somewhat limited. Flows from the spring are used for both the Town's culinary and irrigation systems, with the culinary system flows being capped at 84 gpm (31 shares). Water from the spring is pumped to the storage tanks via the main 12-inch distribution line along State Route 73. Additional discussion about the Town's spring can be found in the "Existing Water sources" section of Chapter 3 and the in the "Pump Stations" section below.

Fairfield water system does not include any treatment processes or chemical additions. As future sources are developed in the valley, the Town may require treatment facilities, depending on the quality of water sources developed. Future treatment may be as involved as a treatment plant, or it may be as simple as including a chlorination step before pumping water into the system. Because future source water quality is unknown at this time, no treatment facilities are planned for the Town water system.

PUMP STATIONS

The Town's water system includes two pump stations on each of the existing water sources. The Table 4-1 below summarizes the capacity of these pumps stations.

Table 4-1
Fairfield Pump Stations

Name	Total Pumping Capacity	Number of Pumps
Well Pump Station	146 gpm	1
Spring Pump Station	84 gpm	1

STORAGE TANKS

The Fairfield water system has two storage tanks, located southwest of the Town's main development. One tank has a 250,000 gallon capacity and the other has a 160,000 gallon capacity. The 250,000 gallon tank was recently constructed in 2016. Both tank elevations are approximately 5,030 ft when full.

CONVEYANCE SYSTEM

The Fairfield distribution system is composed of distribution pipes and transmission pipes up to 12-inches in diameter. Table 4-2 summarizes the total length of pipe in the system. Twon personnel report that all pipes in the system are made of PVC C900.

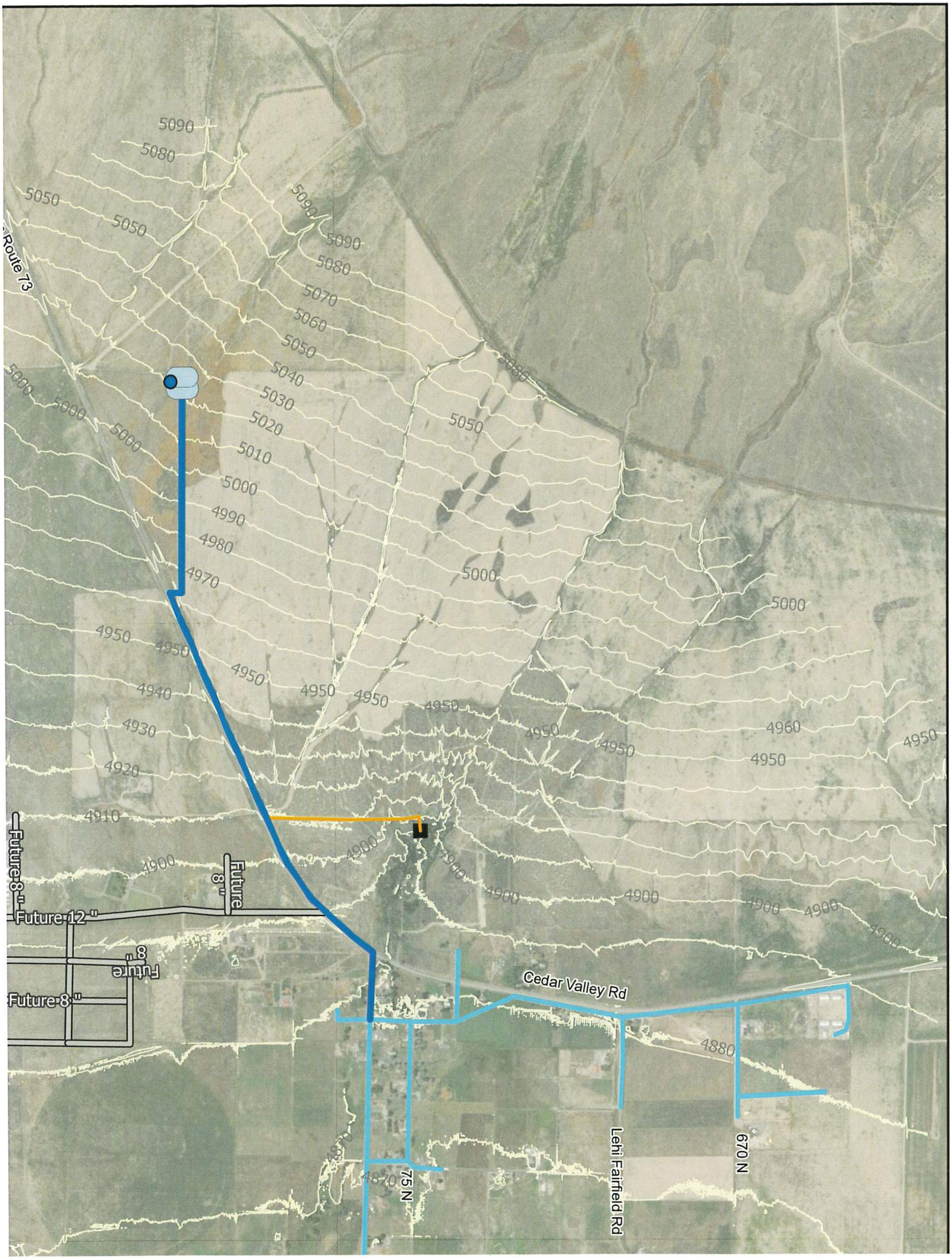
Table 4-2
Pipeline Summary

Pipe Diameter (in)	Total Length (ft)	Total Length (mi)	Percentage of Network
4	2,014	0.38	7.0%
8	18,392	3.48	63.9%
12	8,358	1.58	29.1%
Total	**28,764**	**5.45**	**100.0%**

PRESSURE ZONES

Pressure zones consist of service areas within a water system that have a common operating hydraulic grade line (HGL). The HGL of the pressure zone translates to the available water pressure at points of service within the zone. The HGL in each pressure zone can be controlled by tank or reservoir elevations, pressure reducing valves, and/or pumping pressures.

The existing water system in Fairfield operates on a single pressure zone with an HGL of approximately 5,030 ft. The HGL in the zone is controlled by water surface elevations in the Town's tanks.


Route 73
Cedar Valley Rd
Lehi Fairfield Rd
670 N
75 N
Future 12 "
Future 8 "
Future 8 "
Future 8 "
Future 8 "
4870
4880
4900
4910
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4930
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4980
4990
5000
5010
5020
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5040
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5070
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5090

CHAPTER 5
STORAGE CAPACITY EVALUATION

Utah state law (R309-510-8) requires that public water system storage facilities provide equalization, emergency, and fire flow storage to satisfy the expected demands of the system. This chapter outlines the requirements for the sizing calculations and how the existing Town storage compares to expected storage demands in the future.

STORAGE EVALUATION CRITERIA

Equalization Storage

Equalization storage is the volume of water needed to supply the system for periods when demands (peak hour demands) exceed the supply (peak day supply). Based on historic water use patterns of systems similar to Fairfield, BC&A recommends that the equalization storage for the Town be equal to 25 percent of peak day demands.

It is also important to remember that, because equalization storage is used on a daily basis during the summertime, the Town's sources must have the ability to replenish the equalization storage over a 24-hour period. Because emergency and fire flow storage are not used on a regular basis, they do not have the same source requirements as the equalization storage.

Note that the storage requirement discussed in this chapter is typical of residential and commercial areas and therefore may be different for the industrial facilities (especially the east data center). Without additional information regarding future non-residential development daily use patterns (i.e. instantaneous peaking), BC&A cannot calculate storage specifically for these future customers. Therefore, BC&A recommends that the storage shown in this chapter act as a guideline for future expansion, and that each development be required to submit expected instantaneous peak data with a calculated storage estimate that can be verified by the Town.

Emergency Storage

Emergency storage is the volume of water required to meet water demand during an emergency situation which interrupts the supply of water to the tanks. For example, an emergency might be a power outage that prevents the source pumps from operating, or it could be a break on a critical supply pipeline. While redundant equipment and backup power generators are critical measures for handling emergencies, it is also wise to include additional emergency water at storage tanks. This also gives the system operators the benefit of an extra buffer for system operations. BC&A applied a typical standard for emergency storage, which requires that storage meet water demands during a six-hour power outage during the peak day demand. Thus, the typical combined need for equalization and emergency storage is 50 percent of peak day demands.

Fire Suppression Storage

Fire suppression storage is the volume of water needed to provide a required fire flow for a specified period of time. Fire flow storage requirements are defined in Utah State code as follows:

> "R309-510-8(3): Fire Flow Storage:
>
> (a) Fire flow storage shall be provided if fire flow is required by the local fire code official or if fire hydrants intended for fire flow are installed.
>
> (b) Water systems shall consult with the local fire code official regarding needed fire flows in the area under consideration. The fire flow information shall be provided to the Division during the plan review process.

(c) When direction from the local fire code official is not available, the water system shall use Appendix B of the International Fire Code, 2015 edition, for guidance. Unless otherwise approved by the local fire code official, the fire flow and fire flow duration shall not be less than 1,000 gallons per minute for 60 minutes."

As stated in the code, the primary authority responsible for establishing needed fire flows and fire flow storage is the local fire code official. The Cedar Valley Fire Marshall has required that fire suppression storage meets international fire flow standards, which are based on building square footage and building material type.

The anticipated building square footage for the Fairfield study area has been estimated based on typical development patterns. Development is expected to be primary residential and light industrial, with some associated commercial (grocery, hotel, convenience store, etc.) and institutional development (churches, elementary schools, etc.) in the future. For master planning purposes, the existing critical case for fire suppression storage is either the historic schoolhouse or Camp Floyd State Park, which requires 1,500 gpm for two hours. Thus, the resulting fire suppression storage volume for the system is 180,000 gallons.

It is expected that some future structures may require more fire storage than existing (particularly industrial, commercial, or institutional). Therefore, for planning purposes, it has been assumed that buildout fire storage needs in industrial areas will be 3,000 gpm for 3 hours (540,000 gallons).

EXISTING AND FUTURE STORAGE REQUIREMENTS

An analysis of existing and future storage requirements for the Town was conducted that considered the equalization, emergency, and fire storage requirements as discussed above. As there is only one pressure zone within the water system, storage can be analyzed for the system as a whole as shown in Table 5-1.

Table 5-1
Summary of Fairfield Storage Analysis

Tank Service Area	Peak Day Demand (gpm)	Peak Day Equalization Storage (gallons)	Emergency Storage (gallons)	Fire Flow Storage (gallons)	Total Required Storage	Available Storage (gallons)	Storage Surplus/ Deficit (gallons)
Existing Storage	119	42,915	42,915	180,000	265,829	410,000	144,171
10-yr Storage	1,282	461,346	436,346	540,000	1,462,693	410,000	-1,052,693
Buildout Storage	3,089	1,112,125	1,112,125	540,000	2,764,251	410,000	-2,354,251

CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis summarized in the tables above, the Town has sufficient storage in its tanks to meet current system storage requirements with surplus storage. Development in the immediate future may buy into the excess storage capacity of existing tanks. Once all capacity in existing tanks has been allotted, future development will be required to work with the Town to construct or pay for new storage facilities. BC&A estimates that, if the Town is developed to the identified density in its general plan, approximately 2.4 million gallons of additional storage will be needed at buildout. Approximately 1.1 million gallons of this additional storage will likely be needed in the next ten years. Chapter 7 summarizes and describes these expected storage expansion projects in more detail.

CHAPTER 6
DISTRIBUTION SYSTEM EVALUATION

To evaluate the ability of the Town's water distribution system to serve the needs of its existing and future customers, a hydraulic model was created using water system information provided by the Town and McNeil Engineering. Elevation data of the area and the supply and demand information discussed in Chapters 2 and 3 of this report were also utilized in the hydraulic model.

The purpose of this model is to simulate the existing and future demands on the transmission and distribution piping. Based on the results of the model simulations, improvements can then be evaluated to correct any identified deficiencies. The purpose of this chapter is to document the results of this distribution system evaluation.

HYDRAULIC MODEL

The operating characteristics of the existing distribution system were evaluated as part of this study using a hydraulic model. A hydraulic computer model is a digital representation of physical features and characteristics of the water system, including pipes, valves, storage tanks, and pumps. Key physical components of a water system are represented by a set of user defined parameters that represent the characteristics of the system. The computer model utilizes the digital representation of physical system characteristics to mathematically simulate operating conditions of a water distribution system. Computer model output includes pressures at each node and a flow rate and velocity for each pipe in the model.

Computer models are excellent tools that can be used to evaluate operating conditions in water systems. Models can identify where deficiencies in the system are located and can be used to evaluate alternatives to correct any identified problems. Computer models are valuable in examining future operating conditions. They also help to evaluate operating conditions during extreme events such as fires or power failures. There are several different computer programs used for modeling water distribution systems. The program InfowaterPro version 2024.4 by Innovyze was used for this study.

Geometric Model Data

There are two major types of data required to create a hydraulic model of a water system: geometric data and flow data. Geometric data consists of information on the location and size of system facilities including pipes, storage reservoirs, sources, pump stations, etc. It also includes the physical characteristics of the facilities including pipe roughness, delivery point elevations, pump settings, and tank levels. This information is generally collected from system inventory data or through direct field measurement. The following sections describe how geometric data was assembled and is used in the hydraulic model.

Demand Nodes and Pipe

- Pipe sizes were taken from McNeil Engineering records of the water system and from information provided by the previous water system manager, Vern Carson.
- Node elevations were taken from topographical elevation data generated based on light detection and ranging (LiDAR) data provided by the Utah Geospatial Resource Center (UGRC) website.
- Pipe roughness was set at a Hazen-Williams coefficient of 135 for all sizes of pipe, consistent with typical roughness of PVC C900 pipe.

Source Connections

- The Fairfield well and spring sources were modeled as fixed elevation reservoirs with a pump to provide a constant flow to the two tanks they fill as well as the rest of the water system. Elevations of the source reservoirs were set at a head which ensured there would be sufficient pressure to deliver water into the system. Pump head settings were set based on the estimated elevation difference between the water source (i.e. ground level for the spring and the aquifer water level for the well[3]) and the tanks.
- Sources were set up to pump based on tank levels (i.e. turn on when tanks are ~50% empty and turn off when tanks are ~99% full).

Tanks

- Exact tank dimensions were not available. Therefore, they have been estimated based on volumes provided by the Town and typical tank height ranges.
- Future storage was added to the model such that future demands could be met. Actual location or dimensions or future tanks is unknown. Projected storage needs are described in detail in Chapter 5.

Pressure Regulating Valves

- There are no existing pressure regulating valves (PRV) in the system to model, and none are expected to be needed in the future.

Flow Data

Once all required geometric data is collected and a physical model of the system is created, the second type of data needed to model the system is flow data. Two basic types of flow information are required for hydraulic modeling: flow out of the system (demand) and flow into the system (supply).

Demand

Demand for hydraulic modeling must be defined in at least two ways: total demand (production requirement) and distribution of demand across the Fairfield service area.

- Total Production Requirement – Production projections for Fairfield Town have been presented in detail in Chapter 2. Total demands used in the model have been taken directly from those projections. The following years were modeled: 2024 (existing) and 2080 (approximate buildout).
- Distribution of Demand – Where available, distribution of demand is typically based on detailed water meter data. Due to data availability constraints and the relatively small size of the system, BC&A staff split the system into small distribution zones. They determined the demand for each zone based on the number of connections within each zone and the typical water demand per connection, as calculated in Chapter 2. The future buildout demand distribution was estimated using existing and future zoning densities and estimating location and number of connections. These connection estimates were used to model previously projected demands in 2080.

Supply

The model included the following supply scenarios:

[3] The Utah State Division of Water Rights website provides information about all public wells drilled around the State, including date of drilling, total bore depth, finished well depth, well diameter, well intake depth, and water level depth. This information was used to calculate pump head.

- Existing – The sources available in the existing model are the Fairfield well (near the water tanks) and the Fairfield Town spring.
- 2080 – Because the certainty or viability of future sources is unknown at this time, BC&A assumed for the purposes of modeling that additional water sources would be developed as needed with growth. Therefore, in addition to the two existing sources, we modeled two additional wells, located as shown in Figure 7-1. The capacity of future sources is unknown, therefore BC&A modeled a scenario in which these new sources were able to meet projected buildout demands. This assumption allowed us to proceed with the hydraulic analysis of the future system, despite the uncertainty of future sources.

Model Calibration

Model calibration is typically performed by iterations of comparing model results with field-data and altering the model to more accurately represent field conditions. Calibration was done using peak and average pumping data, annual source production data, and hydrant pressure tests performed by Town personnel. This information was used to calibrate the pump settings, system demands, and peaking factors.

Recommended Future Model Improvements

The model prepared for this report has been developed using available data from Fairfield. To increase the model accuracy and facilitate future modeling efforts, the following actions are recommended.

- **Verification of Tank Geometry and Pump Capacities** – BC&A recommends the Town find or obtain records concerning the elevation and dimensions of the existing tanks that could be used to better calibrate the hydraulic model. Additionally, the Town should obtain information about the existing pump capacities and pump curves by either monitoring pumping pressures and flows or locating the original pump documentation (including pump curves). This data can also be used to calibrate the model.
- **More Detail in Demand Distribution** – The distribution of demand based on number of connections is sufficient for this level of analysis. As the system grows and more sophisticated model results are desired, it is recommended that actual meter data be georeferenced and integrated into the model. This will allow the system model to capture differences in water use between different neighborhoods, conduct flushing and contaminant tracing models, and otherwise pursue more nuanced model results. For now, the demands are approximated by zones and thus the model can only effectively simulate the transmission and main distribution pipes (which is ok as that is the goal of the modeling for this master plan).
- **Periodic Model Updates** – The model should be updated on a continual basis to reflect improvements made to the distribution network and changes to demand patterns. Especially important will be to understand and accurately model the final size and location of future sources. Any differences in the future sources from what was assumed here could affect the results and recommendations contained in this report.

Model Scenarios

Three overall scenarios were modeled for this analysis:

- Existing demand with existing model geometry,
- Future demand with existing model geometry as if no recommended improvements (i.e. new sources, system infrastructure, etc.) occurred from now until buildout, and

- Future demand with proposed model geometry (i.e., assuming all recommended improvements are implemented).

Results for all scenarios included static demands, peak day demands, peak hour demands, and peak day demands with fire flow.

EVALUATION CRITERIA

The computer model was used to simulate operating conditions of the water distribution system using current and future water system production requirements. For both existing and future production requirements, the performance of the system was evaluated using the following criteria.

1. **Pressure** – A distribution system should provide adequate delivery pressure across the system. The State of Utah requires that distribution pressures be greater than 40 psi during peak day production requirements and 30 psi during peak hour production requirements. We also recommend that the Town maintain the standard of targeting a maximum delivery pressure of 120 psi with limited exceptions upon Engineer approval. (Note: Future transmission lines may be designed for higher pressures, but service connections should not be allowed to connect to those lines directly.)
2. **Pipe Velocity** – Except in fire flow events, flow velocities in distribution pipes should be limited to less than 7.0 feet per second (ft/s). Transmission pipes can have velocities that are higher than distribution pipes, but typically should be less than 10 ft/s.
3. **Fire Flow** – In accordance with the typical Utah County fire authority requirements for fire flow to residential buildings, most of the Fairfield service area should meet a fire flow of 1,500 gpm for 2 hours at 20 psi of residual pressure. As development occurs it is expected that large buildings will be constructed that require larger fire flows (3,000 gpm for 3 hours with fire sprinklers installed). This study considered the 3,000 gpm fire demand for industrial areas of the buildout system. All residential area fire flow demands were kept at 1,500 gpm for 2 hours through buildout. Any nodes not meeting the requisite fire flows were identified as deficient.

SYSTEM EVALUATION RESULTS

As described above, the hydraulic computer model was used to simulate system conditions for both the existing and buildout (2080) development conditions. Existing and future scenarios were run as extended state models for 24 hours of peak day flows. The following sections describe the model results, conclusions, and recommendations.

Minimum and Maximum Pressures

No maximum pressure deficiencies (>120 psi) were identified in either the existing or buildout system models. Additionally, modeled peak day and peak hour pressures for all modeled points of delivery stayed above 40 psi and 30 psi, respectively.

Maximum Pipe Velocities

No maximum pipe velocity deficiencies were identified in the modeled existing or buildout systems.

Available Fire Flow

Multiple fire flow deficiencies were identified in the existing and buildout water models. These were identified as residual pressure deficiencies as described below:

Existing Conditions:

Multiple locations within the existing system have insufficient pressures to provide the fire flows required by the International fire code, as shown in Figure 6-1 and described below:

- **Lehi-Fairfield Rd, 670 N, and North End of System**: All hydrants north of Lehi-Fairfield Road are deficient in fire flow and residual pressures. At the very end of the pipe on the north end of the system, the maximum flow that can be achieved while maintaining 20 psi of pressure is approximately 960 gpm, well below the 1,500 gpm requested. This deficiency can be remedied through multiple options including: building pipe sections to create more looped connections, constructing an emergency booster station that functions only in fire scenarios, or constructing a tank on the north end of the system. Each of these alternatives are discussed in detail in Chapter 7 under Project FF-1. BC&A recommends coordinating projects that address these deficiencies with upcoming system expansion projects to reduce overall system disruption and minimize project cost.
- **Main St. and 430 E**: The hydrant located at the far east end of Main St experiences residual fire pressure of 19 psi, which is 1 psi lower than the minimum allowable pressure. BC&A has identified a project to loop the system and correct this deficiency in Chapter 7 (Project FF-2). However, because the modeled residual pressure is so close to the acceptable range, and because there are no known future expansions in this area of the system, BC&A recommends monitoring pressures at this hydrant over time and installing the identified looped connection in the future only if system pressures become worse at this location.

Buildout Conditions:

There are multiple areas of the system that are expected to be deficient in meeting fire flow criteria if the system is simply expanded without any additional upgrades. These are described below and illustrated in Figure 6-2.

- **Tal Adair Property & Dead Ends Along Allen's Ranch Rd:** Without additional source or storage capacity, the development on and near the Tal Adair Property is expected to be deficient in fire flow availability.
- **Dead Ends Along Main St and Solder Pass Ln**: As other demands on the system increase, the existing fire flow deficiency on the east end of Main St is expected to become worse.
- **North End of System**: Similar to the deficiency along Main St, the fire flow deficiencies in the north area of the system are expected to worsen as system demands increase in the future. Even with the addition of system looping in the immediate area, additional system improvements will be needed to achieve adequate fire flows on the north end of the system.

All of these deficiencies are expected to be corrected by adding additional storage as the system expands (Projects ST-1 & ST-2), and adding additional source flow and locations (Project S-1). These projects are described in detail in Chapter 7 and are illustrated in the model results in Figure 6-3.

System Reliability/Redundancy

In addition to resolving the existing fire flow deficiencies, looping the north system (Project FF-1a) will also improve redundancy for water availability during a water line shutdown (from a break or routine maintenance).

No additional system reliability or redundancy projects were identified in this study.

System Efficiency

As the Town's water system expands, the Town should consider developing future sources on the North side of the system to reduce the amount of pumping and travel distance (i.e. friction losses) between sources and future development on the north side of the Town. This will be beneficial for multiple reasons, including (but not limited to) the following:

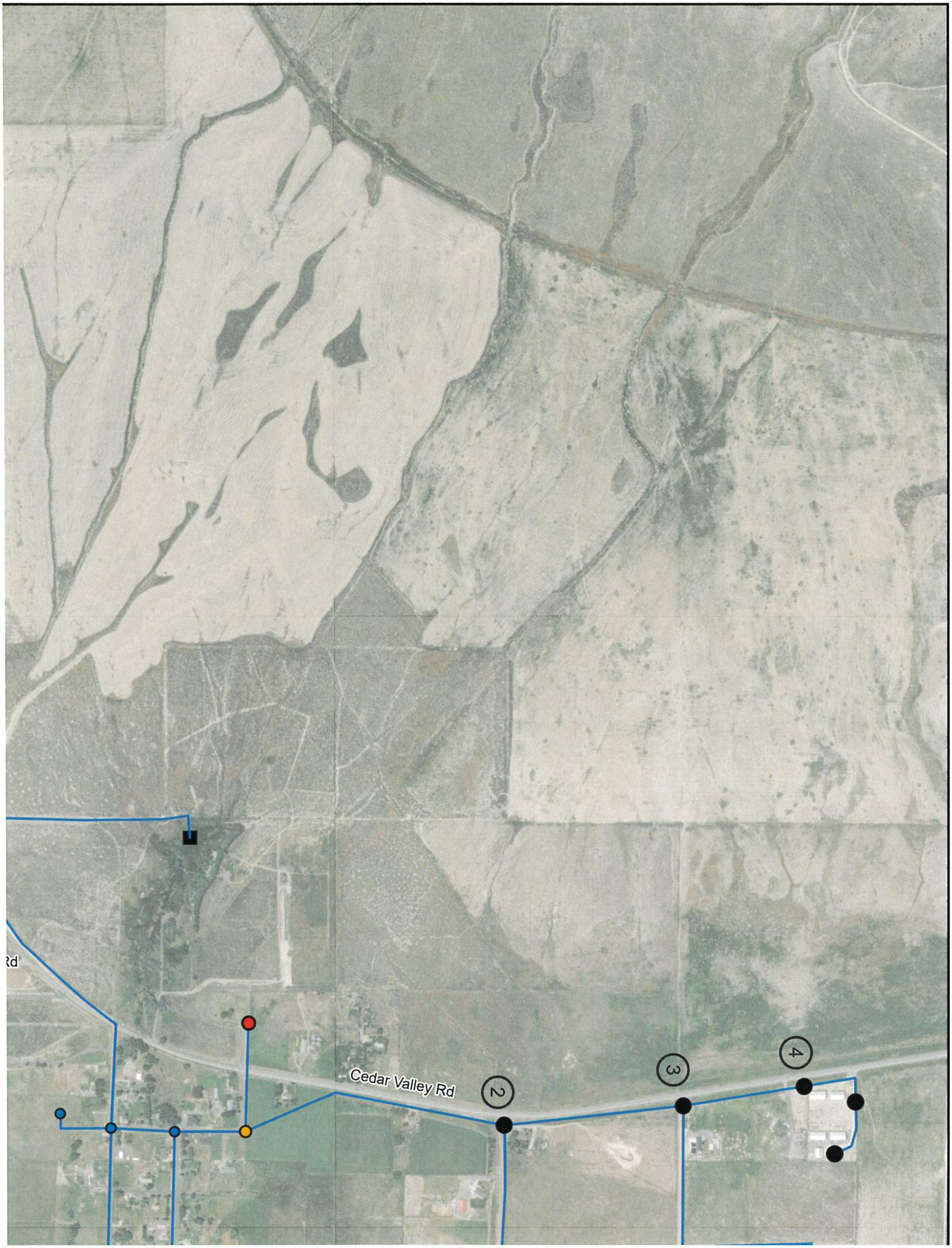
- The further water has to travel through pipe the more energy losses to friction and the more likely water quality issues (i.e. stale water) are to occur.
- This also helps with redundancy peak demand scenarios (i.e. not all water is coming from the same area)

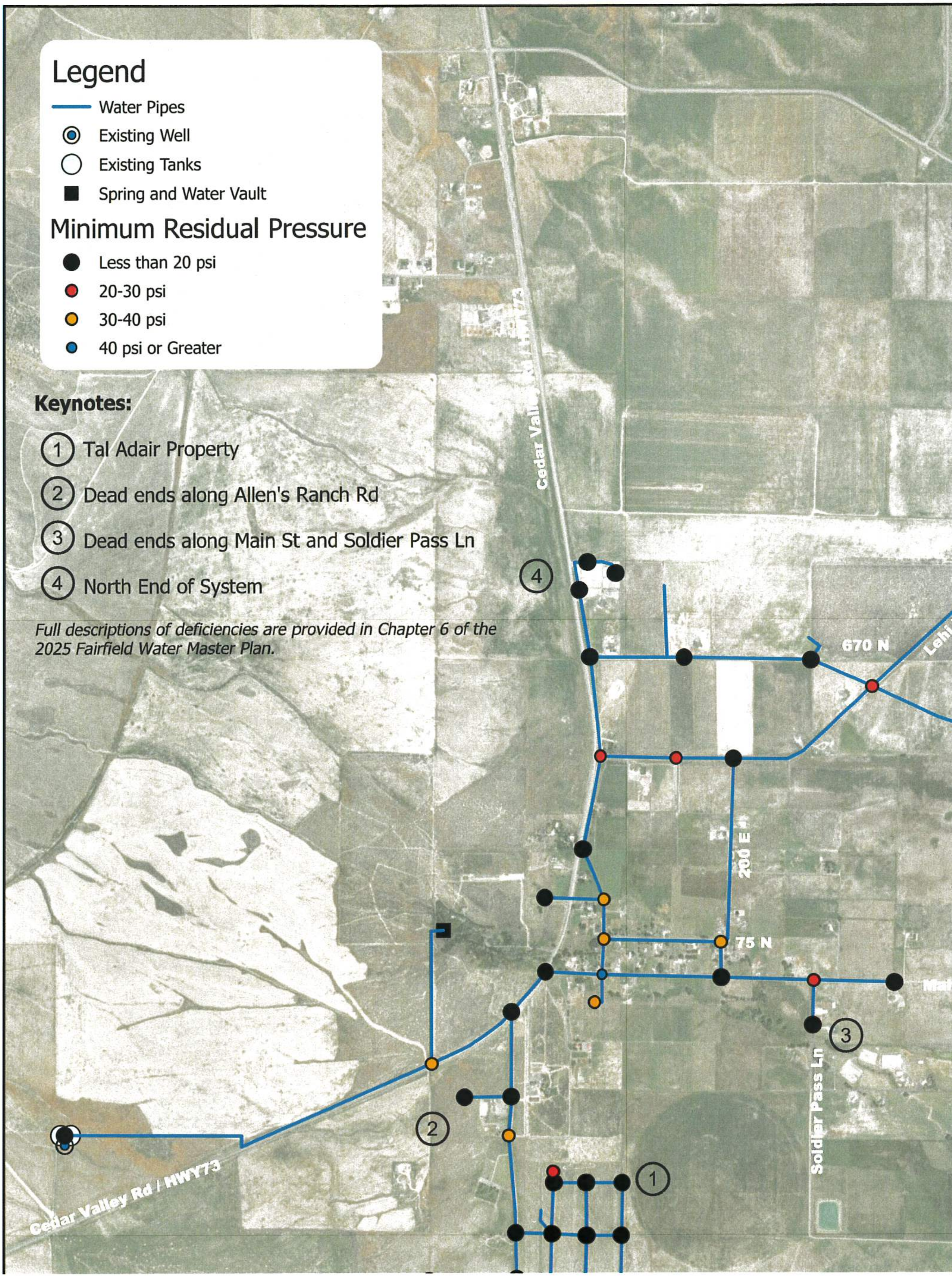
Based on the hydraulic model of the system, building additional storage and sources on the north end of the system will eliminate the need to upsize approximately 9,500 linear feet of existing pipes that convey water from the existing tanks to the rest of the system. These upsizing projects would cost upwards of $4.1 million in 2025 dollars. In order to avoid these costly upsizing projects, BC&A recommends the Town pursue constructing additional storage in the 10-year window on the north end of the system.

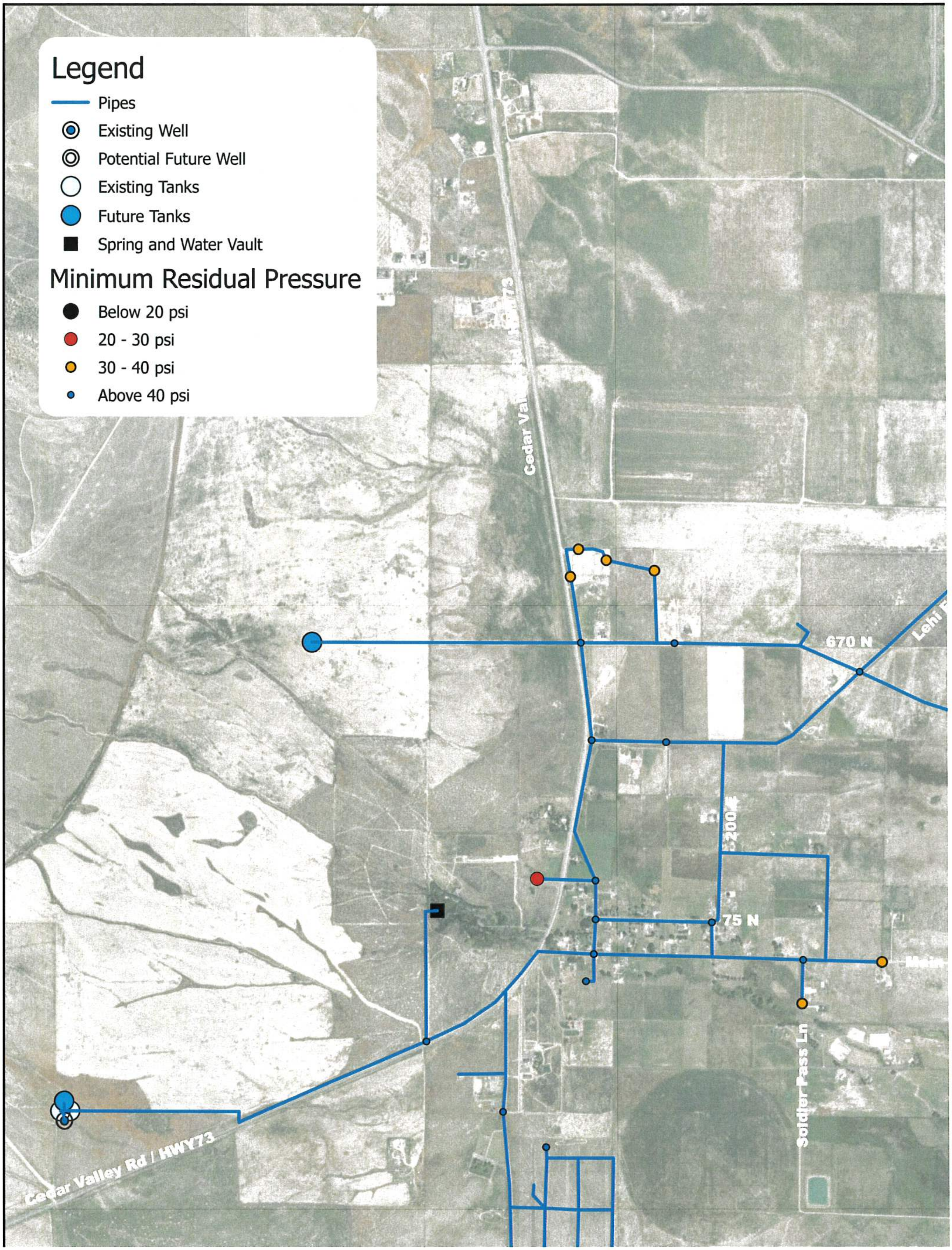
SUMMARY OF RECOMMENDATIONS

Based on the model results and discussion presented above, BC&A recommends the following actions to serve future demands and maintain the reliability of the Fairfield water system.

- Resolve fire flow deficiencies at the north end of the existing system by creating looped connections or considering alternative solutions as discussed in Chapter 7. If possible, the Town should try to coordinate these pipeline projects with developer expansion projects. (Project FF-1)
- Monitor pressures at the east end of Main St during hydrant tests as the system expands and install a looped connection if necessary to ensure adequate fire flows (Project FF-2).
- Consider the viability and availability of creating new water sources that will provide water to new users. (Project S-1).


Rd
Cedar Valley Rd
2
3
4


Legend
Water Pipes
Existing Well
Existing Tanks
Spring and Water Vault
Minimum Residual Pressure
Less than 20 psi
20-30 psi
30-40 psi
40 psi or Greater
Keynotes:
1 Tal Adair Property
2 Dead ends along Allen's Ranch Rd
3 Dead ends along Main St and Soldier Pass Ln
4 North End of System
Full descriptions of deficiencies are provided in Chapter 6 of the 2025 Fairfield Water Master Plan.
Cedar Valley Rd / HWY73
670 N
200 E
75 N
Soldier Pass Ln
Cedar Valley Rd / HWY73
1
2
3
4



Legend
Pipes
Existing Well
Potential Future Well
Existing Tanks
Future Tanks
Spring and Water Vault
Minimum Residual Pressure
Below 20 psi
20 - 30 psi
30 - 40 psi
Above 40 psi
Cedar Valley Rd / HWY73
670 N
200 E
75 N
Soldier Pass Ln
Cedar Valley Rd / HWY73

CHAPTER 7
CAPITAL IMPROVEMENT PLAN

Recommendations pertaining to the Fairfield water system were identified in Chapters 3 through 6. The purpose of this chapter is to organize those recommendations into a capital project list, present a cost estimate for each project, and identify the expected timing of each project.

RECOMMENDED IMPROVEMENTS

The recommended improvement projects have been categorized as Storage, Distribution, Source, and Fire Flow Projects. Each project is described below and is shown in Figure 7-1. Note that many of these projects will not be needed until development creates a need for the system to expand.

Storage Projects

It is recommended that storage be added to the system in phases as follows:

- **ST-1 - Construct Approximately 1.1 Million Gallons of Additional Storage** – BC&A estimates that within the next 10-years, the Town will need an additional 1.1 million gallons of storage to meet the expected demands and additional fire flow storage requirements of the system. Actual storage needs will depend on the rate of development, and the Town will need to work closely with developers to ensure the storage need estimates in this study reflect actual needs of future customers. If possible, this additional storage in the near term should be located on the north end of the system at an elevation which maintains the hydraulic grade line (HGL) set by the existing tanks. In order to maintain tank equilibrium between the north and south tanks, future source operations should be dedicated to this new storage.
- **ST-2 - Construct ~1.3 million gallons of Additional Storage** – Outside of the 10-year planning window, BC&A expects the Town will need to construct 1.3 million gallons of storage (in addition to the 1.1 million gallons constructed in the 10-year window). The Town should be strategic about storage construction timing and locations by balancing the construction of storage with real development in the future. Often it is preferable to construct a larger water storage tank that will serve conditions several years into the future than construct many small tanks. However, having too much storage can create water quality issues and financial burdens on existing customers if future demand does not materialize.

Distribution Projects

As long as storage is constructed on the north end of the system, no distribution projects have been identified.

Source Projects

To satisfy the projected growth in demand in the Town, the following water source improvements are recommended:

- **S-1 - Investigate the Viability of Adding New Source(s) to the Water System** – The Town should complete an analysis and field investigation to determine if adding new sources to the water system is viable. This will likely involve a study of the groundwater levels and availability in the area and the quality of the groundwater. This study will inform the Town about how much water is available in the area and how much development can realistically occur if new sources could be developed.
- **S-2 - Complete an Evaluation of the Town's Water Rights** – In addition to understanding the wet water availability in the Town, it is also crucial to understand how many water rights the Town currently owns and project how many could be dedicated in the future. BC&A

recommends the Town complete an evaluation of water rights to understand how much development can occur based on available water rights.

- **S-3 – Add Additional Source Capacity** –Although the results of the recommended studies in projects S-1 and S-2 are unknown, the Town will need to develop a new source by 2030, as discussed in Chapter 3. This new source may be drilling a new well or contracting with another entity to purchase additional water. For planning purposes, we have assumed the construction of a new 500 gpm well.

Fire Flow Projects

Eliminating the existing fire flow deficiencies will require the following improvements:

- **FF- 1 – Resolve Existing North Fire Flow Deficiencies –** BC&A considered the following alternative projects to address the existing fire flow deficiencies within the system (Figure 7-2):

    a. **(FF-1.1) Connect dead end water lines on the north end of the system.** Although this improvement on its own will not completely resolve the deficient fire flows, this improvement will be needed regardless of which additional alternative project is pursued. This will involve installing approximately 710 ft of 8-inch pipe between the dead ends on the far north of the system, as shown in Figure 7-1 and 7-2. (Estimated cost ~$280,000)

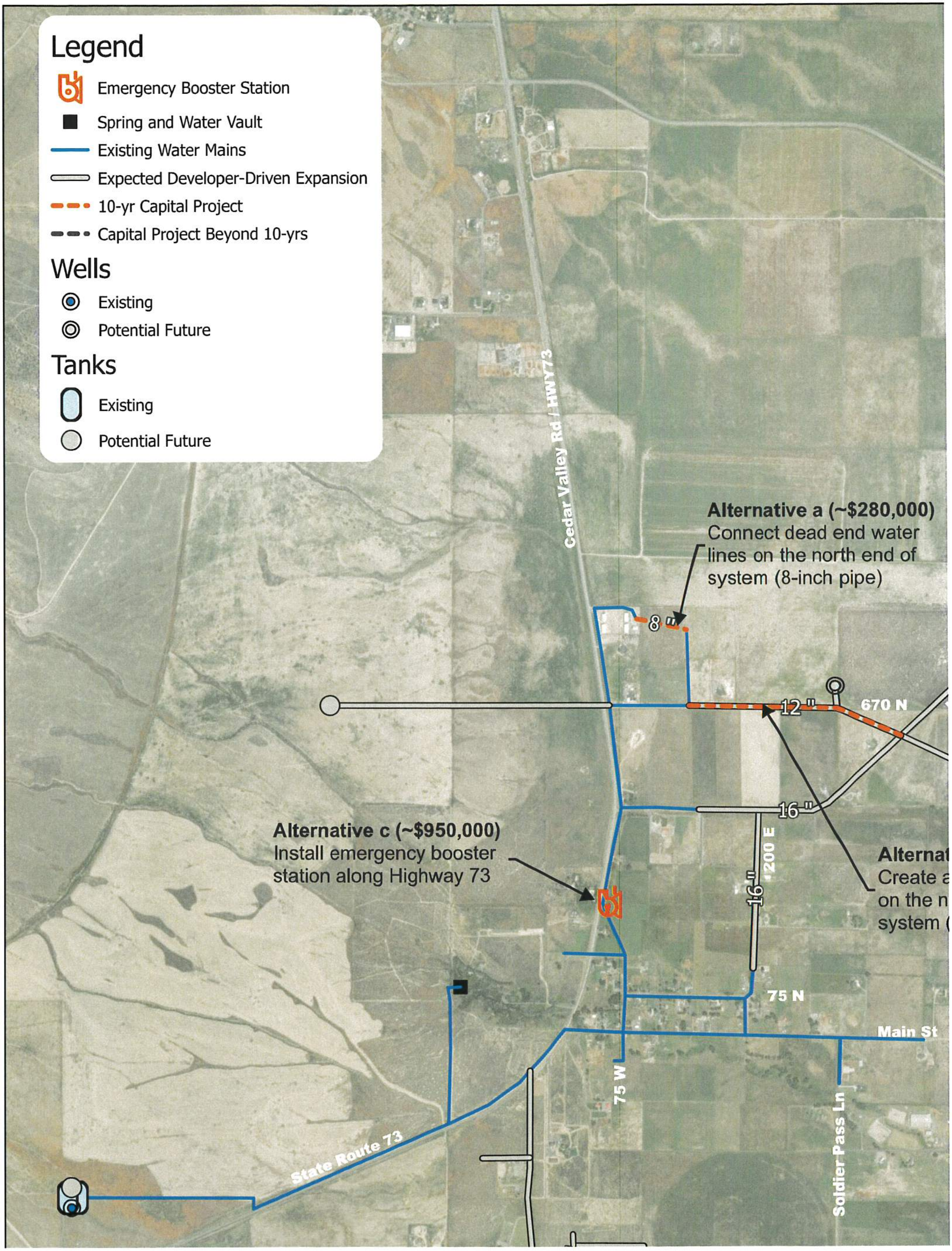
    b. **Create a looped connection on the north end of the system.** Ideally, this project would be completed in conjunction with expansion of the system along Lehi-Fairfield Rd to minimize the capital investment to the Town (see Figure 7-2 for potential overlap of pipe installation). This would require installing approximately 3,000 feet of 12-inch pipe along 670 N between Highway 73 and an expected pipeline along Lehi-Fairfield Rd. Completing a looped connection to the rest of the system will resolve the existing fire flow deficiency. (Estimated cost ~$1.2 million)

    c. **(FF-1.2) Install emergency booster station along Highway 73.** Adding an emergency booster station within the distribution system would solve the challenge of low residual pressures on the far north end of the system until additional development creates more looping in the system. This solution would require that the pump installed be a variable frequency drive (VFD) pump and capable of pumping the 1,500 gpm of fire flow requested for the north area (see Figure 7-2). It is likely that this option would be used solely as a temporary solution and would be abandoned when the system becomes more interconnected through future development. This is especially true if a tank and source are constructed on the north end of the system by upcoming development, as is recommended. (Estimated cost ~$950,000)

In order to keep project costs as low as possible for the Town, BC&A recommends completing project FF-1.1 in the near term, which is expected to improve available fire flow in the area from ~960 gpm to ~1,070 gpm (or residual pressures of -33 psi to -13 psi), which is 70% of the fire flow requested by the Fire Marshall for this area. We also recommend monitoring development in this area as the Town budgets to complete project FF-1.2 in the next 10 years. The Town should be aware of and make use of future opportunities to address this fire flow deficiency in conjunction with future development-driven expansion.

- **FF-2 – Monitor Hydrant Pressures and Add Looped Connection Along 220 N and 430 E as Necessary** – There is an existing fire flow deficiency at the east end of Main St. However, this deficiency is slight (1 psi lower than the minimum allowable residual pressure) and may improve depending on development patterns and source development in the future. The Town should periodically perform hydrant tests at this location to monitor these fire flow pressures. If pressures appear to get worse over time, a looped connection along 220 N and 430 E, connecting 200 E and Main St main lines, should be completed to improve fire flow availability at this location.

Legend
Wells
Existing
Potential Future
Name
Existing
Potential Future
Spring and Water Vault
Existing Water Mains
Expected Developer-Driven Expansion
10-yr Capital Project
Capital Project Beyond 10-yrs
Emergency Booster Station
Cedar Valley Rd / HWY73
FF-1.1: Connect dead end water lines on the north end of system (8-inch)
8"
8" Existing
670 N
ST-1: Construct 1.1 million gallons of additional storage
8" Existing
8" Existing
16"
200 E
FF-1.2: Install emergency booster station along Highway 73
16"
8"
8" Existing
8" Existing
75 N
12" Existing
8" Existing
Main St
8" Existing
4" Existing
75 W
Soldier Pass Ln 8" Existing
ST-2: Construct up to 1.3 million gallons of additional storage
State Route 73
12" Existing
S-1: In
of addi
the wa



Legend
Emergency Booster Station
Spring and Water Vault
Existing Water Mains
Expected Developer-Driven Expansion
10-yr Capital Project
Capital Project Beyond 10-yrs
Wells
Existing
Potential Future
Tanks
Existing
Potential Future
Cedar Valley Rd / HWY73
Alternative a (~$280,000)
Connect dead end water lines on the north end of system (8-inch pipe)
8"
12"
670 N
16"
200 E
16"
Alternative c (~$950,000)
Install emergency booster station along Highway 73
Alternat
Create a
on the n
system (
75 N
Main St
75 W
Soldier Pass Ln
State Route 73

CAPITAL IMPROVEMENTS PLAN SUMMARY

The recommended improvements for the Fairfield Town Water System have been summarized in Table 7-1. The table includes a summary of each project, an estimated year (or years) of completion, and an estimated project cost in 2025 dollars. More detailed cost estimates for each project are included in Appendix B.

Each project has been prioritized based on level of importance relative to the Town's goal of providing efficient and reliable water service to its customers. Some projects are driven by land development and have been scheduled based on current assumptions of future growth. As land development plans deviate from these assumptions, the project schedule will likely need to be adjusted. Project locations are shown in Figure 7-1. We also recommend that an update to this master plan and its associated analyses be completed every five to seven years.

Table 7-1
Summary of Recommended Water System Improvements

Project ID	Description	Estimated Year of Completion	Estimated Cost (2025 $'s)
Storage			
ST-1	Construct 1.1 million gallons of additional storage	2032	$3,962 ,000
ST-2	Construct 1,3 million gallons of additional storage	Beyond 2035	$4,413,000
Storage Subtotal			*$8,375,000*
Distribution			
None Identified			
Distribution Subtotal			*$0*
Source			
S-1	Investigate the viability of adding new source(s) to the water system	2028	$50,000
S-2	Complete an evaluation of the Town's water rights	2025	$13,500
S-3	Add additional source capacity	2030	$1,600,000
Source Subtotal			*$1,663,500*
Fire Flow			
FF-1.1	Connect north existing system with planned expansion along Lehi-Fairfield Rd*	2030	$280,000
FF-1.2	Construct emergency booster station along Highway 73	2035	$950,000
FF-2	Install Looped Connection along 220 N and 430 E As Necessary	Beyond 2035	$1,117,000
Fire Flow Subtotal			*$2,347,000*
TOTAL			**$12,385,500**
TOTAL WITHIN 10-YR WINDOW			$6,855,500

**The actual cost of project FF-1.2 will depend on coordination and cost sharing with developers.*

RECOMMENDED CAPITAL IMPROVEMENTS BUDGET

Each component of the water system has a finite service life. As such, it is necessary to continually budget for the rehabilitation or replacement of these system components. Adequate funds must be set aside for regular system maintenance and renewal in order to prevent the system from falling into disrepair. To maintain the water system in good operating condition, it is recommended that the Fairfield annual budget for water system renewal be approximately equal to the replacement value of the system divided by its estimated service life.

- **Replacement Value** – The replacement value of the Fairfield water system is estimated to be approximately $12 million. This estimate has been prepared using a GIS database of the system and includes the value of pipelines, wells and tanks.
- **Service Life** – The service life for water facilities can vary greatly depending on the type of facility and the conditions in which it serves. Service life estimates by system component are shown in Table 7-2 below.

Based on these estimates in Table 7-2, the annual capital improvements budget should be set to approximately $175,000. Although the Town may not spend this amount every year, it is important to consider setting aside that amount for years when large capital projects in the water system need to be completed.

Table 7-2
System Replacement Value Summary

Infrastructure Type	Total Replacement Value	Estimated Average Service Life (Years)	Average Annual Investment (2025 $'s)
Pipes	$10,178,000	70	$145,400
Tanks	$1,697,000	70	$24,200
Source	$345,000	70	$4,900
TOTAL	**$12,220,000**	--	**$174,500**

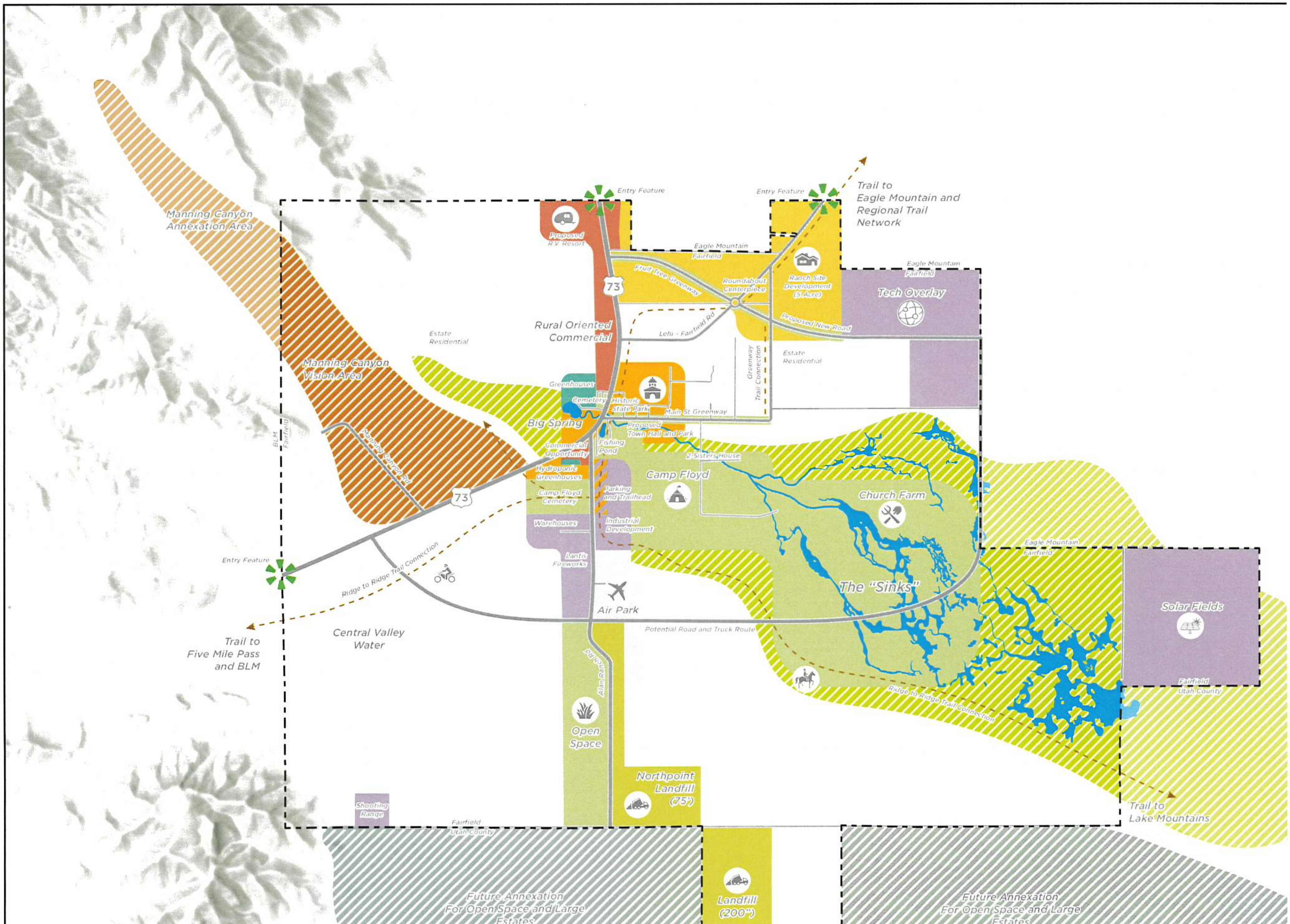
RECOMMENDATIONS SUMMARY

Based on the analysis contained in this report and in addition to the capital improvement projects listed in this chapter, BC&A recommends taking the following actions:

- **Create Town Policy to Limit Development Density and Corresponding Water Use.** A basic assumption for this study was that future development would be limited to 1, 2, and 1 ERU/acre of allowable water use for residential, commercial, and light industrial, respectively. The Town should consider creating a town policy to support these water use densities and preserve the limited water available in the area.
- **Improve Data Gathering and Organization.** When BC&A began this analysis, it appeared that the Town's access to historical water usage and production data was relatively limited, which adds an additional level of uncertainty to the projections shown in this master plan. At the end of this study, BC&A learned that the Town has installed AMI meters which collect hourly data. We recommend the Town begin initiatives to ensure this data is accessible and reliable, and ensure this data is being recorded for future reference. Doing so will support greater accuracy in sizing standards and in future updates to this master plan.
- **Adopt the Master Plan with Its 10-yr Capital Improvement Plan.** The 10-year capital improvement plan summarized in Table 7-1 represents the latest assessment of Town capital needs in the upcoming years. It is recommended that this plan be adopted for budgeting, staffing, and financial planning purposes.

- **Prepare to Adequately Fund Projects.** In order to facilitate the completion of the proposed projects and keep up with rehabilitation and replacement needs, the Town will need to budget accordingly. This may include completing a rate study to increase rates as well an update to the Town's impact fees.
- **Look for Opportunities to Cost Effectively Add Customers.** A quick review of the sustainable funding level for capital improvements will reveal that it will require nearly $500 per month per connection to maintain the existing system moving forward (capital costs only – does not include O&M). This is very high compared to other communities in the State. The reason for the high costs is the comparatively large amount of infrastructure being supported by only a small number of connections. Adding connections that don't require significant expansion of the existing infrastructure can lower the per connection cost for all customers.
- **Update This Master Plan Regularly.** This water master plan should be viewed as a living document. The conclusions contained herein are based on several assumptions that will assuredly change from time to time. Examples of this include assumptions associated with development patterns, regulatory requirements, economic conditions, etc. As changes occur in these areas, the conclusions and recommendations in this report may need to be revised. For this reason, it is recommended that this report be updated on a regular basis. This should be at least once every 5 years and more often if necessitated by a major change in the Town (e.g. major new regulatory requirement, significant deviation from the underlying master plan assumptions, annexation of a new area, etc.).

APPENDIX A
FAIRFIELD VISION PLAN


Manning Canyon Annexation Area
Manning Canyon Vision Area
Manning Canyon Rd
BLM
Fairfield
Entry Feature
Proposed RV Resort
73
Rural Oriented Commercial
Estate Residential
Eagle Mountain
Fairfield
Fruit Tree Greenway
Roundabout Centerpiece
Ranch Site Development (5 Acre)
Entry Feature
Trail to Eagle Mountain and Regional Trail Network
Tech Overlay
Proposed New Road
Lehi - Fairfield Rd
Greenway Trail Connection
Estate Residential
Greenhouses
Cemetery
Historic State Park
Main St Greenway
Big Spring
Proposed Town Hall and Park
Fishing Pond
Commercial Opportunity
2 Sisters House
Hydroponic Greenhouses
Camp Floyd
Camp Floyd Cemetery
Parking and Trailhead
Church Farm
Warehouses
Industrial Development
Lantis Fireworks
Entry Feature
Ridge to Ridge Trail Connection
The "Sinks"
Air Park
Trail to Five Mile Pass and BLM
Central Valley Water
Potential Road and Truck Route
Alan Ranch Rd
Open Space
Ridge to Ridge Trail Connection
Solar Fields
Fairfield
Utah County
Northpoint Landfill (75')
Shooting Range
Trail to Lake Mountains
Future Annexation For Open Space and Large Estates
Landfill (200")
Future Annexation For Open Space and Large Estates

APPENDIX B
DETAILED PROJECT COST ESTIMATES

Appendix B: Detailed Project Cost Estimates

Project ID	Description	Quantity	Unit	Unit Cost	Initial Cost Estimate	Contingency	Engineering	Item Total
Storage								
ST-1	Construct 1,100,000 gallons of additional storage	1,100,000	gal	$2.61	$2,871,000	$574,200	$516,780	$3,962,000
ST-2	Construct 1,300,000 gallons of additional storage	1,300,000	gal	$2.46	$3,198,000	$639,600	$575,640	$4,413,000
Storage Subtotal								$8,375,000
Distribution								
None Identified								
Distribution Subtotal								
Source								
S-1	Investigate the viability of adding new source(s) to the water system	1	EA	$50,000	$50,000	--	--	$50,000
S-2	Complete an evaluation of the Town's water rights	1	EA	$13,450	$13,450	--	--	$13,500
S-3	Add additional source capacity	1	EA	$1,600,000	$1,600,000	--	--	$1,600,000
Source Subtotal								$1,663,500
Fire Flow								
FF-1.1	Connect north dead ends with ~710 ft of 8" pipe	710	LF	$261	$185,310	$38,857	$56,042	$280,000
FF-1.2	Construct emergency booster station along Highway 73	1	EA	$688,410	$688,410	$137,682	$123,914	$950,000
FF-2	Add looped connection along 220 N and 430 E to connect 200 E and Main St water lines and address fire flow deficiencies at east dead end	3,100	LF	$261	$809,100	$161,820	$145,638	$1,117,000
Fire Flow Subtotal								$2,347,000
TOTAL								**$12,385,500**

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